Part B

Response to key stakeholder submissions

WestConnex

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B Response to key stakeholder submissions

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B1 NSW Health

This chapter addresses issues raised by NSW Health.

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B1.1 Air quality

Refer to Chapter 9 (Air quality) and Appendix I (Technical working paper: Air quality) of the Environmental Impact Statement (EIS) for details of air quality.

B1.1.1 Models used to assess air quality impacts

The models used to assess air quality impacts are consistent with those used previously on Stage 1b and Stage 2 and were considered adequate.

Response

The comments received from NSW Health on the air quality modelling and assessment in the EIS are noted.

B1.1.2 Minimising exposure to traffic related air pollution

Exposure to traffic related air pollution has been shown in epidemiological and clinical studies to be associated with a range of cardiovascular and respiratory health outcomes. There is also little evidence of any threshold below which exposure to components of traffic related air pollution are not associated with adverse health effects. For these reasons, it is important that all reasonable measures are taken to minimise exposure to traffic related air pollution where feasible.

Consistent with this, the National Health and Medical Research Council (NHMRC) 2008 report *Air quality in and around traffic tunnels* concludes that it is good practice to limit, as far as possible, exposure to traffic related air pollution in and around tunnel portals and stacks. NSW Health supports this position and this is reflected in the comments provided in this submission.

Response

Environmental management measures, including those associated with air quality impacts during operation of the project, are provided in **Chapter E1** (Environmental management measures).

The transfer of traffic from surface roads to tunnels would minimise exposure to traffic emissions, as the practice of exhausting emissions from elevated ventilation outlets at appropriate velocities is a more effective dispersion mechanism than ground-level dispersion from surface roads. In addition, emissions from the portals of major Sydney road tunnels opened since 1998 is not permitted and so the air is drawn back from portals and is emitted through the nearest ventilation outlet. The outlets for the project have been subject to sensitivity testing to determine the height appropriate for effective dispersion while meeting the requirements for aviation safety.

The human health risk assessment undertaken for the project in relation to air quality (refer to Appendix K (Technical working paper: Human health risk assessment) of the EIS), followed national guidelines and addressed requirements of key government agencies, including NSW Health. The assessment determined that as the majority of the project footprint would be underground, the operation of the project is predicted to result in a decrease in total pollutant levels in the community, with a redistribution of vehicle emissions associated with redistribution of the traffic on surface roads. For much of the community this would result in no change or a small improvement (ie decreased concentrations of pollutants and associated health impacts), however for some areas located near key surface roads, a small increase in pollutant concentration may occur as a result of redistribution of traffic on surface roads. Refer to Chapter 6 of Appendix K (Technical working paper: Human health risk assessment) of the EIS for further details.

B1.1.3 Filtration of in-tunnel air

The EIS sets out reasons why filtration of in-tunnel air prior to ejection from ventilation stacks is not feasible or reasonable for this project (Appendix I, pages 232-240). The reasons relate to lack of effectiveness of the technology where it is in use in other countries, minimal impact on air quality, and cost. These conclusions are consistent with those in the *Initial Report on Tunnel Air Quality* of the Advisory Committee on Tunnel Air Quality, which has previously been established to provide the NSW Government with an understanding of the scientific and engineering issues informing road tunnel ventilation design and operation. It is important that the justification for not having filters in ventilation stacks is clearly communicated to community.

Response

NSW Health's comment regarding the non-filtration of the ventilation outlets and the need for clear communication with the community is noted. Filtration is discussed in section 9.2.2 of Appendix I (Technical working paper: Air Quality) of the EIS and in the responses to community submissions in **Chapter C09** (Air quality).

B1.1.4 Sensitivity tests

No sensitivity tests were conducted for the air quality modelling and assessment. The reason provided in the EIS for not doing sensitivity tests was that the parameters for the sensitivity tests conducted for previous WestConnex projects (M4 East and New MS [M5]) were very similar to that for the M4-M5 Link project, and therefore the outcomes for the previous sensitivity tests would also apply to the M4-M5 Link project. Outcomes of sensitivity tests for a parameter such as ventilation outlet temperature may be similar between projects. However, for parameters such as ventilation outlet height and the inclusion of buildings near ventilation heights, which will have site specific effects on air quality, the outcomes of sensitivity tests may differ between projects. Sensitivity tests related to these parameters resulted in changes to air pollutant concentrations by a factor of 1.3 to 1.5 for previous WestConnex projects. Changes of this magnitude could significantly change outcomes of the human health risk assessment. Sensitivity tests should be conducted for assessment of air quality related to the M4-M5 Link project.

Response

Sensitivity tests have been conducted in response to the comments received from NSW Health in its submission on the EIS to investigate the effects of varying important model parameters on the predicted concentrations around project ventilation outlets. For each parameter, the value used in the Graz Lagrangian Model (GRAL) was varied around a central estimate that was representative of the value used in the EIS.

The following model inputs were investigated:

- The influence of ventilation outlet temperature
- The influence of ventilation outlet height
- The inclusion of buildings near tunnel ventilation outlets.

The sensitivity tests were only conducted for the ventilation outlet contribution (ie background and surface road contributions were excluded), for maximum 24-hour $PM_{2.5}$ and annual mean $PM_{2.5}$, to assess the effects of the outlet parameters on dispersion of the emissions. $PM_{2.5}$ was used as an indicator of changes in response to the outlet parameters because of its importance to human health.

The tests were mainly conducted for a sub-area (the Rozelle domain) of the M4-M5 Link GRAL domain as presented in the EIS, of approximately three kilometres by three kilometres around the Rozelle ventilation facility (outlet H for the Western Harbour Tunnel, and outlets I and J for the M4-M5 Link/Iron Cove Link), as shown in **Figure B1-1**. Because there are few large buildings in this Rozelle domain, additional tests to examine the effects of buildings on pollution dispersion were undertaken for a similar domain around the northern outlet for the Iron Cove Link (outlet L) (see **Figure B1-2**). The building tests for the Rozelle and Iron Cove Link domains demonstrate the differences between the generally small and scattered buildings in the Rozelle domain and the higher density of buildings in the Iron Cove Link domain. Not all buildings in the Rozelle domain building test were included in the Iron Cove Link domain test as they were considered to be too far away to be significantly affected by the Iron Cove Link outlet. The effects of outlet temperature and height were not considered for the Iron Cove Link domain.

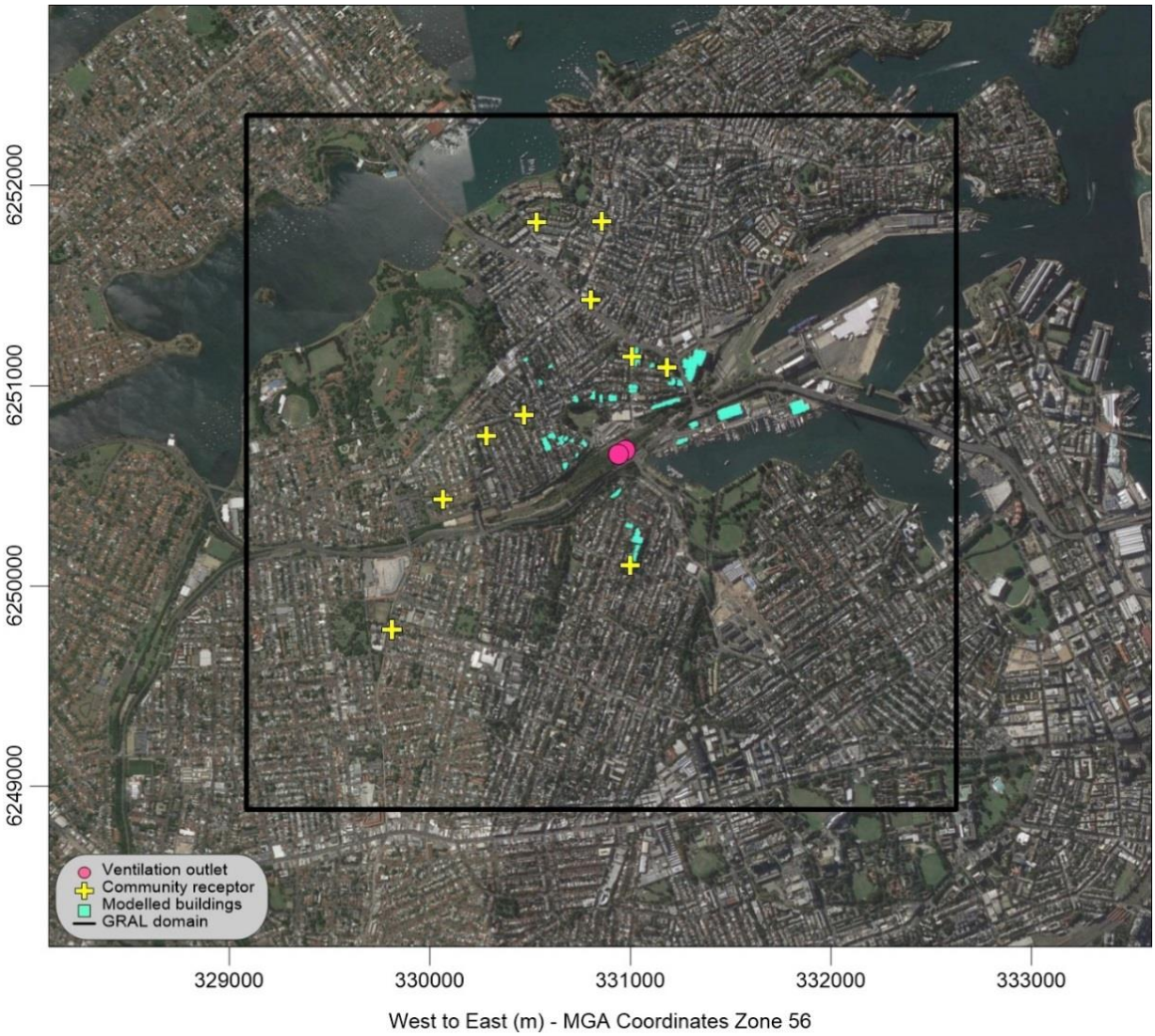

Figure B1-1 Domain and buildings for Rozelle sensitivity tests



Figure B1-2 Domain and buildings for Iron Cove Link building sensitivity tests

Model predictions for these sensitivity tests were considered for 10 community receptors in the Rozelle domain and nine community receptors in the Iron Cove Link domain, as listed in **Table B1-1**. These community receptors were also used in the air quality assessment (refer to Chapter 9 (Air quality) of the EIS).

Table B1-1 Community receptors included in sensitivity tests

Rozelle domain		Iron Cove Link domain	
ID	**Location**	**ID**	**Location**
CR01	Lilyfield Community Centre	CR01	Lilyfield Community Centre
CR02	Balmain Cove Early Learning Centre	CR02	Balmain Cove Early Learning Centre
CR03	Rosebud Cottage Child Care Centre	CR03	Rosebud Cottage Child Care Centre
CR04	Sydney Community College	CR04	Sydney Community College
CR05	Rozelle Total Health	CR05	Rozelle Total Health
CR16	Sydney Secondary College Leichhardt Campus	CR15	Rozelle Child Care Centre
CR18	Inner Sydney Montessori - Lilyfield	CR22	St Thomas Child Care Centre
CR21	St Basil's Sister Dorothea Village	CR31	Rozelle Public School
CR22	St Thomas Child Care Centre	CR32	Lilyfield Early Learning Centre
CR32	Lilyfield Early Learning Centre		

Ventilation outlet temperature

In the air quality assessment, a single annual average temperature was used in GRAL for each tunnel ventilation outlet. For ventilation outlet temperature, the central estimate for Rozelle (test TT02) was taken to be 22˚C. The effects of defining outlet temperatures 10˚C below and above this value were then investigated. In temperature test TT01, the outlet temperature was set to 12˚C, and in temperature test TT03, the outlet temperature was set to 32˚C. This temperature range of 20˚C is larger than the variation in temperature of the air from existing tunnels in Sydney. For example, for the Cross City, Lane Cove and M5 East tunnels, the difference between the minimum and maximum outlet temperatures during the course of a year is typically between around 12˚C and 17˚C respectively.

As expected, for the outlet temperature of 12˚C, the predicted $PM_{2.5}$ concentrations were systematically higher than those in the central estimate as a consequence of the reduced thermal buoyancy of the plume, which leads to poorer dispersion. However, predicted outlet contributions remain very low relative to the background and surface road traffic contributions.

For the outlet temperature of 32˚C, the predicted $PM_{2.5}$ concentrations were systematically lower than those in the central estimate because of increased thermal plume buoyancy which increases dispersion.

Table B1-2 shows the results of the sensitivity test for outlet temperatures for the Rozelle domain.

The tests for different outlet temperatures show that the changes as a result of differing outlet temperatures would not change the outcome of the air quality assessment presented in the EIS as the contributions of the ventilation outlets remain extremely low. For example, for the 12˚C test, the highest predicted concentration to 24-hour $PM_{2.5}$ is 3.4 per cent of the criterion and the highest predicted concentration to annual mean $PM_{2.5}$ is 1.7 per cent of the criterion.

Table B1-2 Results of sensitivity tests for outlet temperature (Rozelle domain) – predicted concentrations

ID	Location	$PM_{2.5}$ (µg/m^3)					
		TT01 (12°C)		TT02 (22°C)		TT03 (32°C)	
		Max 24h	Annual	Max 24h	Annual	Max 24h	Annual
		Impact assessment criteria					
		25	8	25	8	25	8
CR01	Lilyfield Community Centre	0.700	0.137	0.482	0.102	0.369	0.082
CR02	Balmain Cove Early Learning Centre	0.314	0.063	0.308	0.056	0.272	0.050
CR03	Rosebud Cottage Child Care Centre	0.465	0.068	0.309	0.049	0.261	0.039
CR04	Sydney Community College	0.629	0.117	0.473	0.086	0.359	0.066
CR05	Rozelle Total Health	0.362	0.061	0.343	0.053	0.287	0.047
CR16	Sydney Secondary College Leichhardt Campus	0.371	0.056	0.338	0.049	0.298	0.043
CR18	Inner Sydney Montessori, Lilyfield	0.596	0.097	0.496	0.084	0.452	0.072
CR21	St Basil's Sister Dorothea Village	0.495	0.065	0.349	0.043	0.249	0.031
CR22	St Thomas Child Care Centre	0.676	0.121	0.561	0.098	0.486	0.082
CR32	Lilyfield Early Learning Centre	0.839	0.096	0.551	0.075	0.455	0.061

Ventilation outlet height

For the ventilation outlet heights, the central estimate for Rozelle (HT02) was taken to be 35 metres above existing ground level (the outlet height used in the EIS). In height test HT01, the height was set to 30 metres above existing ground level, and in height test HT03, the height was set to 40 metres above existing ground level. This was considered to be a realistic potential range for the outlet height at this location.

For the outlet height of 30 metres, the predicted $PM_{2.5}$ concentrations were systematically higher than those for the 35 metre outlet. The largest increase in the concentration from a 30 metre ventilation outlet was 19 per cent, compared to the current proposed 35 metre outlet. However, the predicted outlet contributions remain small percentages of the air quality criteria for $PM_{2.5}$ and of the background air quality.

For the outlet height of 40 metres, the predicted $PM_{2.5}$ concentrations were in most cases lower than those for the 35 metre outlet. The largest decrease at any community receptor was 27 per cent and the average decrease was 11 per cent. However, these percentage changes are only percentages of around one per cent of the background air quality. Again, the contribution from the ventilation outlet is very small compared to the criteria and the background air quality.

The results for different outlet heights are shown in **Table B1-3**.

Table B1-3 Results of sensitivity tests for outlet height (Rozelle domain) – predicted concentrations

ID	Location	$PM_{2.5}$ (µg/m^3)					
		HT01 (30m)		HT02 (35m)		HT03 (40m)	
		Max 24h	Annual	Max 24h	Annual	Max 24h	Annual
		Impact assessment criteria					
		25	8	25	8	25	8
CR01	Lilyfield Community Centre	0.549	0.115	0.507	0.104	0.411	0.096
CR02	Balmain Cove Early Learning Centre	0.311	0.058	0.291	0.056	0.276	0.054
CR03	Rosebud Cottage Child Care Centre	0.353	0.055	0.327	0.049	0.274	0.045
CR04	Sydney Community College	0.564	0.099	0.472	0.085	0.391	0.075
CR05	Rozelle Total Health	0.359	0.057	0.337	0.054	0.294	0.050
CR16	Sydney Secondary College Leichhardt Campus	0.344	0.051	0.323	0.048	0.304	0.048
CR18	Inner Sydney Montessori, Lilyfield	0.564	0.089	0.508	0.084	0.450	0.079
CR21	St Basil's Sister Dorothea Village	0.399	0.046	0.353	0.042	0.312	0.041
CR22	St Thomas Child Care Centre	0.653	0.106	0.580	0.099	0.485	0.089
CR32	Lilyfield Early Learning Centre	0.717	0.083	0.626	0.075	0.511	0.071

Buildings

Buildings can be included in dispersion modelling to account for building wake effects in the vicinity of ventilation outlets. However for the project assessment, buildings were excluded (the rationale for this was provided in section 8.4.6 of Appendix I of the EIS). The sensitivity of the inclusion of buildings to predicted concentrations was therefore assessed in response to NSW Health's submission on the EIS. As noted earlier, the effects of buildings were tested for both the Rozelle and Iron Cove Link domains. The buildings included in the tests are shown by light blue shading in **Figure B1-1** and **Figure B1-2**.

The results for the Rozelle domain are given in **Table B1-4**. These show that although there were increases in the concentrations associated with the ventilation outlets due to the inclusion of buildings in the sensitivity tests, the outlet contributions remained very small relative to the criteria.

The results for the Iron Cove Link domain are given in **Table B1-5**. This table also shows that there were increases in the concentrations associated with the ventilation outlets; however the outlet contributions remained very small relative to the criteria.

Although there are localised increases at some receptors with buildings included, the largest increases for a receptor with buildings included is 64 times less than the criterion for 24-hour $PM_{2.5}$ and 155 times less than the criterion for annual mean $PM_{2.5.}$ The total predicted concentrations, and the conclusions of the assessment, would not change significantly with the inclusion of buildings.

Table B1-4 Results of sensitivity tests for buildings (Rozelle domain) – predicted concentrations

ID	Location	$PM_{2.5}$ (µg/m^3)			
		BT01 (with buildings)		BT02 (without buildings)	
		Max 24h	Annual	Max 24h	Annual
		Impact assessment criteria			
		25	8	25	8
CR01	Lilyfield Community Centre	0.634	0.131	0.491	0.103
CR02	Balmain Cove Early Learning Centre	0.333	0.066	0.315	0.059
CR03	Rosebud Cottage Child Care Centre	0.482	0.081	0.369	0.059
CR04	Sydney Community College	0.871	0.138	0.481	0.086
CR05	Rozelle Total Health	0.357	0.061	0.341	0.054
CR16	Sydney Secondary College Leichhardt Campus	0.338	0.052	0.329	0.048
CR18	Inner Sydney Montessori, Lilyfield	0.539	0.089	0.500	0.081
CR21	St Basil's Sister Dorothea Village	0.456	0.056	0.343	0.042
CR22	St Thomas Child Care Centre	0.660	0.118	0.552	0.098
CR32	Lilyfield Early Learning Centre	0.752	0.082	0.645	0.076

Table B1-5 Results of sensitivity tests for buildings (Iron Cove Link domain) – predicted concentrations

ID	Location	$PM_{2.5}$ ($\mu g/m^3$)			
		BT01 (with buildings)		BT02 (without buildings)	
		Max 24h	Annual	Max 24h	Annual
		Impact assessment criteria			
		25	8	25	8
CR01	Lilyfield Community Centre	0.056	0.007	0.050	0.006
CR02	Balmain Cove Early Learning Centre	0.200	0.027	0.122	0.018
CR03	Rosebud Cottage Child Care Centre	0.053	0.008	0.045	0.007
CR04	Sydney Community College	0.066	0.010	0.056	0.008
CR05	Rozelle Total Health	0.123	0.014	0.083	0.009
CR15	Rozelle CCC	0.105	0.014	0.084	0.011
CR22	St Thomas Child Care Centre	0.130	0.018	0.095	0.012
CR31	Rozelle Public School	0.191	0.024	0.122	0.015
CR32	Lilyfield Early Learning Centre	0.066	0.010	0.056	0.008

Summary of sensitivity tests

In the outlet temperature tests for the Rozelle domain, even with a significant change in temperature relative to the central estimate, the predicted outlet contributions to $PM_{2.5}$ remained small in absolute terms. Consequently, the total predicted concentration (including the background, surface road and ventilation outlet contributions) is unlikely to be affected significantly. The assumption of a single annual average temperature in the GRAL dispersion model was therefore considered unlikely to represent a large source of uncertainty in the overall predictions.

The results for the ventilation outlet height tests for the Rozelle domain were broadly similar to those for the temperature sensitivity tests, and again a difference in height of the order tested is unlikely to represent a large source of uncertainty in the overall predictions.

The building tests for the Rozelle and Iron Cove Link domains indicated that the exclusion of buildings is also unlikely to represent a large source of uncertainty in the overall predictions in the assessment, given the small absolute contribution to $PM_{2.5}$. Although there are localised increases at some receptors with buildings included the largest increases for a receptor with buildings included is 64 times less than the criterion for 24-hour $PM_{2.5}$ and 155 times less than the criterion for annual mean $PM_{2.5.}$ The total predicted concentrations, and the conclusions of the assessment, would not change significantly with the inclusion of buildings.

The project has been designed for the central cases used in the sensitivity tests, not the high or low cases. The tests were conducted to demonstrate the influence of the separate factors of outlet height, temperature and the inclusion of buildings in the modelling domain. The tests demonstrate that the ventilation outlets have been designed to minimise air quality impacts, with consideration of the requirements for urban design and aviation safety, and secondly that the dispersion of pollutants is not significantly affected by the exclusion of buildings in the dispersion model.

B1.1.5 Air quality impacts from construction

Dust generated during construction activities can impact the health of nearby residents. It is important that dust emissions are mitigated according to best practice procedures and that dust management reduces exposure by residents near construction activities. The EIS refers to a *Construction Air Quality Management Plan*, however as the plan is not yet available NSW Health is unable to comment on its adequacy. The plan should be reviewed by the appropriate regulatory authority and NSW Health prior to the commencement of any construction related to the M4-M5 Link project. Dust mitigation measures should be subject to regular monitoring. Community members should be notified in advance of activities likely to generate substantial dust, and mitigation measures and options for reducing or avoiding exposure be made available and be accessible. This is especially important as some residents may be exposed for prolonged periods given the time periods of construction.

Response

A Construction Air Quality Management Plan will be prepared for the project in accordance with the conditions of approval imposed by the NSW Department of Planning and Environment (DP&E) and will include the relevant environmental management measures for the control of dust that are presented in **Chapter E1** (Environmental management measures). These include dust suppression techniques when undertaking activities likely to generate dust in close proximity to sensitive receivers, covering vehicle loads, tunnelling and spoil handling within acoustic sheds, as well as implementing controls such as wheel washes and rumble grids.

This plan will be prepared in consultation with relevant stakeholders as required by the conditions of approval for the project.

B1.2 Human health

Refer to Chapter 11 (Human health risk) and Appendix K (Technical working paper: Human health risk assessment) of the EIS for details of air quality.

B1.2.1 Approach used for the human health assessment

NSW Health is satisfied that for this particular project the HHRA has used a generally appropriate approach for the assessment of human health.

Response

NSW Health's comment on the human health risk assessment undertaken for the project are noted.

B1.2.2 Operational air quality impacts external to tunnels

The human health risk assessment (HHRA) of the environmental impact statement (EIS) has identified potential human health risks associated with air quality related to operation of the M4-M5 Link that it defines as unacceptable (greater than 1 in 10,000). The EIS does not describe in detail project design or mitigation options that were considered to reduce health risks at those locations where unacceptable health risks were identified. Consideration should be given to ways to mitigate these potential impacts as well as putting in place controls to prevent residential use of land within these areas or at these elevations.

Response

The specific locations of concern are addressed in the responses in **section B1.2.3** and **section B1.2.4**.

B1.2.3 Industrial location near Sydney Airport

Potential unacceptable health risks were identified in an industrial/workplace area. The EIS states that the health risks may be lower at this location because exposure may occur only during work hours. However, the amount of time that an individual could spend at a workplace or industrial site may not be as modelled. It is important that consideration be given to how to mitigate these effects through options such as improved traffic management as the impacts appear to be largely due to surface road congestion.

The EIS considered it 'not relevant to evaluate future residential exposures at this location' because it was considered unlikely that the location of concern near Sydney Airport would be rezoned for residential use. Given the recent substantial building of residential apartment blocks near to Sydney Airport, consideration should be given to implementing controls on future rezoning for residential purposes especially if mitigation of the air quality impacts is not feasible.

Response

The health risk calculated at this location for a single commercial receptor is a result of the forecast emissions from the surface road that is part of the indicative Sydney Gateway design (refer to Appendix K (Technical working paper: Human health risk assessment) of the EIS). Given the uncertainty of the design for the proposed future Sydney Gateway project, these results are likely to be unrealistic. In addition, it is not possible to provide an assessment of future residential exposure with any certainty in this location while the proposed future Sydney Gateway project is in development.

The Sydney Gateway project is under development by NSW Roads and Maritime Services (Roads and Maritime) and would be subject to a separate environmental assessment and planning approval in the future, subject to agency and community review and submissions in accordance with the *Environmental Planning and Assessment Act 1979* (NSW). As such, the location with unacceptable health risk would be reassessed as part of that project and the impacts and the health risks are likely to be different to those assessed as part of this project.

Consideration of planning controls for future rezoning and development within this area would be a matter for DP&E following the assessment of air quality carried out for the proposed future Sydney Gateway project.

B1.2.4 Elevated receptors near the St Peters interchange

The HHRA identified unacceptable health risks associated with air pollution 30 metres above ground-level adjacent to the tunnel ventilation stack at the St Peters interchange. This is a hypothetical risk because current buildings are less than 10 metres in height at that location. Consideration should be given to ensuring that planning controls are put in place so that building heights in the area are limited and exposure to these levels of $PM_{2.5}$ are avoided.

The EIS determined that air quality at an elevation of 10 metres near the proposed St Peters interchange, which includes a 20 metre high ventilation stack, would be minimally impacted by the project. Air quality at heights between 10 and 30 metres were not modelled. Therefore the impact of the project on air quality at heights between 10 and 30 metres is unknown. On this basis, planning controls should be developed in the vicinity of the St Peters interchange to limit future building heights to no higher than 10 metres.

There is inconsistency within the EIS with regards to developing planning controls for the St Peters area. The air quality assessment states that planning controls in the vicinity of St Peters should 'ensure future developments at heights 30 metres or higher are not adversely impacted by the ventilation outlets' (page 9-106), while the HHRA states that planning controls should 'ensure future developments at heights above 10 metres are not adversely impacted by the ventilation outlets' (page 11-34). Unless air quality assessment of St Peters demonstrates acceptable impacts on air quality at heights between 10 and 30 metres, planning controls should limit building heights in that area to 10 metres.

Response

The appropriate recommended height for planning controls at St Peters is 10 metres as noted in section 11.5.1 of the EIS. The figure of 30 metres noted in section 9.7.5 of the EIS is a typographical error.

An assessment was undertaken to determine the air quality impacts of the project on elevated receivers. The calculation of elevation considered the height of buildings and terrain (refer to section 9.7.5 of the EIS). The terrain within the project footprint varies from an elevation of around 10 metres Australian Height Datum (AHD) at the western end at Haberfield to an elevation of around 14 metres AHD at the Rozelle interchange and 10 metres at St Peters, at the southern end of the project footprint.

Concentrations at two elevated receptor heights (10 metres and 30 metres) were considered for annual mean and 24-hour $PM_{2.5}$. At these two receptor heights, it was not necessarily the case that there were existing buildings at these heights at sensitive receptor locations.

The intent of the elevated receiver analysis was to:

- Determine potential adverse air quality impacts on existing elevated receivers
- Identify if there are potential constraints that should be taken into account for potential future residential developments, and which should be addressed through planning controls.

The ventilation outlets were predicted to not result in adverse air quality impacts at any existing elevated receptors as there are no existing buildings 10 metres or higher located close to the proposed ventilation facilities.

The implications of the results of the assessment of elevated receivers can be summarised as follows:

- For all receptor locations, the changes in $PM_{2.5}$ concentration at 10 metres are acceptable
- Future developments to the height of 10 metres should be possible at all locations in the area assessed. This assumes that the changes in $PM_{2.5}$ concentration for heights between ground level and 10 metres are also acceptable
- Planning controls should be developed in the vicinity of St Peters to ensure future developments at heights 10 metres or higher are not adversely impacted by the ventilation outlets.

The future development of land (including rezoning) in the vicinity of St Peters that may involve multi-story buildings at heights of 10 metres or higher would need to consider the air dispersion performance of the Campbell Road ventilation facility. Roads and Maritime would assist local councils in determining any relevant land use considerations applicable to future development for inclusion in local environmental plans or development control plans, where required.

B1.2.5 Traffic modelling

The WestConnex Road Traffic Model, in operational models of the M4-M5 Link, was unable to accommodate forecast growth in peak hour traffic to and from Sydney Airport without the proposed Sydney Gateway project which is presumably necessary to accommodate future traffic growth (Appendix H, page 53). It appears that peak hour traffic demand to and from Sydney Airport was therefore reduced by a factor of 0.7-0.75 so that the model could be applied to this area for scenarios without the Sydney Gateway (Table 4-1, Appendix H, page 53). This could mean that potential health risks associated with air pollution at St Peters, an area where the HHRA identified unacceptable health risks (see above), could be higher than the estimates provided in the EIS.

Response

The WestConnex Road Traffic Model (WRTM) is a strategic traffic model that forecasts future traffic demand. It is not constrained by the current capacity of the road network and is used to provide projected future traffic volumes that need to be accommodated on the road network for planning and design of future upgrades.

The forecast traffic demands used for the air quality assessment at Appendix I (Technical working paper: Air quality) of the EIS were also unaffected by this reduction factor as the air quality assessment used the WRTM traffic demand outputs. Consequently, the HHRA was not affected by scaling factors.

The peak hour reduction applied for Sydney Airport forecast traffic demand was only applied to the micro-simulation traffic models used for the more detailed modelling of the road network performance (as presented in Appendix H (Technical working paper: Traffic and transport) of the EIS).

B1.2.6 In-tunnel air quality

The modelled in-tunnel air quality should not result in air pollution exposures known to be associated with health effects if commuters have motor vehicle windows closed and ventilation on recirculate while traversing the WestConnex tunnel network. The predicted in tunnel air quality would appear to be consistent with the In-tunnel air quality (nitrogen dioxide) policy and I note the whole of government work in this space.

The EIS states that during extreme traffic congestion, for people with asthma who do not adopt advice to keep motor vehicle windows closed and ventilation on recirculate, or who are on a motor bike, there is the potential for those people 'to experience some minor change in respiratory response after using the tunnels' ((Appendix K), page 97). Signage and other messaging promoting motor vehicle drivers to close windows and set vehicle ventilation to recirculate while driving through tunnels should be adopted.

Response

All long tunnels in Sydney have signage displaying this advice. Similar signage will be installed in all WestConnex tunnels, including the M4-M5 Link tunnels. This will include signage at the tunnel entrances.

B1.2.7 Impacts on active transport infrastructure

Significant health benefits are associated with active transport such as walking, cycling, and public transport. It is important that the M4-M5 Link project has minimal impact on the accessibility and availability of active transport. Incorporation of active transport infrastructure (walking and cycling paths) into the project are supported and encouraged.

Response

NSW Health's support of the incorporation of active transport infrastructure into the project is noted. Chapter 6 (Construction work), Chapter 8 (Traffic and transport) and Appendix H (Technical working paper: Traffic and transport) of the EIS provide details on expected changes to pedestrian and cycling infrastructure during construction. As part of construction planning, details about these changes, including diversion routes, durations and consultation with relevant stakeholders, will be further developed and documented in the Construction Traffic and Access Management Plan that will be prepared for the project. Roads and Maritime recognise the important role of walking and cycling for mobility in and around the project footprint and will ensure that impacts on active transport infrastructure are minimised and managed for the duration of the construction program.

Chapter 13 (Urban design and visual amenity) and Appendix N (Technical working paper: Active transport strategy) of the EIS provide details about the permanent walking and cycling connections that would be provided as part of the project, as well as the manner in which these will integrate with existing and planned active transport infrastructure around the project footprint.

B1.3 Noise and vibration

Refer to Chapter 10 (Noise and vibration) and Appendix J (Technical working paper: Noise and vibration) of the EIS for details of noise and vibration impacts.

B1.3.1 Potential impacts on the Royal Prince Alfred Hospital

Given the proximity of the Royal Prince Alfred Hospital (RPAH), Camperdown to proposed construction activities and the sensitivity of this facility to the effects of air quality, noise and vibration, it is important that RPAH management is consulted on the potential impacts of construction well in advance of any activity which may impact the site.

Response

Design refinements to the M4-M5 Link project during the development of the concept design included the following, which would avoid or minimise impacts on the Royal Prince Alfred Hospital:

- Removal of the proposed road interchange at Camperdown and associated requirements for construction ancillary facilities and areas in its vicinity
- Subsequent amendment of the alignment of the mainline tunnels further to the west (away from the Royal Prince Alfred Hospital), which also means that the closest construction ancillary facility to the Royal Prince Alfred Hospital is around 600 metres away (Pyrmont Bridge Road tunnel site (C9))
- Identification of spoil haulage routes that would avoid roads near the Royal Prince Alfred Hospital.

It is anticipated that the Royal Prince Alfred Hospital would be consulted during the detailed design in accordance with the Community Consultation Strategy (see environmental management measure SE2 in **Chapter E1** (Environmental management measures)), including consultation on non-vibration matters and to establish appropriate vibration levels taking into account the sensitive equipment that may be located within the hospital.

Further discussion on potential construction impacts on the Royal Prince Alfred Hospital at Camperdown associated with air quality and noise and vibration are described in the following sections.

Air quality impacts

The Institute of Air Quality Management (IAQM) *Guidance on the assessment of dust from demolition and construction* (2014) identifies that an assessment of construction dust is normally required for human receptors that may experience the adverse effects of airborne dust, dust soiling or exposure to PM_{10} over a time period that is relevant to air quality standards and goals. For human receptors, the assessment is required for those within 350 metres of the boundary of the site or 50 metres within the routes used by construction vehicles on public highways, up to 500 metres from the site entrances. Sites outside of these distances are typically not impacted by dust.

As the Royal Price Alfred Hospital is around 600 metres from the Pyrmont Bridge Road tunnel site (C9) as noted in section 12.2.2 of the EIS and is not along proposed spoil haulage routes for the project (as described in Chapter 6 (Construction work) of the EIS), the risk of dust, soiling and exposure to PM_{10} at the Royal Prince Alfred Hospital is expected to be low and further reduced as a result of the environmental management measures presented in **Chapter E1** (Environmental management measures) to control dust during construction.

Noise and vibration impacts

The realignment of the mainline tunnels described in the section above means that no tunnelling would be undertaken beneath the Royal Prince Alfred Hospital.

Notwithstanding this and as noted in section 10.3.7 of the EIS, the Royal Prince Albert Hospital has been identified as a vibration sensitive receiver and will be considered during the development of the Construction Noise and Vibration Management Plan (CNVMP) (see environmental management measure NV2 in **Chapter E1** (Environmental management measures)). No medical facilities, including the Royal Prince Albert hospital, were identified as noise sensitive receivers (refer to Table 10-23 of the EIS).

B1.3.2 Construction noise mitigation

The EIS discusses potential mitigation measures but does not provide details as to how or when mitigation measures will be applied, nor any assessment of residual noise impacts after mitigation. This will only be undertaken during the development of the Construction Noise and Vibration Management Plan (CNVMP) at the detailed design phase. It is therefore not possible for NSW Health to comment on the adequacy of mitigation measures or the acceptability of residual noise and associated health impacts. The proponent should provide further detail on mitigation measures where possible and give a clear commitment to mitigate noise levels in order to prevent exceedances of relevant management levels. The CNVMP should be reviewed by the appropriate regulatory authority and NSW Health prior to the commencement of any construction related to the M4-M5 Link project.

Response

Chapter 7 of Appendix J (Technical working paper: Noise and vibration) of the EIS includes a summary of potential noise and vibration impacts as a result of the project and details of proposed management and mitigation measures. Without additional mitigation, the EIS noise and vibration assessment stated that construction noise levels would exceed the relevant goals at most of the noise catchment areas for construction activities including earthworks, demolition of existing structures, site establishment, road tie-in works, road and intersection modifications and utility adjustments. The most affected receivers are those located around the surface works for the Iron Cove Link at Rozelle, Rozelle interchange, Parramatta Road West civil and tunnel site (C1b) and Parramatta Road East civil site (C3b) at Haberfield and Ashfield. For most construction activities, it is expected that the actual construction noise levels would generally be lower than the worst-case levels as predictions are representative of the highest noise level inclusive of all plant operating simultaneously at the closest location to each receiver.

Construction noise impacts would be managed using measures including scheduling of works, noise reduction measures for plant and equipment and provision of respite periods for sensitive receivers. Design and construction contractor(s) would be required to minimise time and duration of impacts to sensitive receivers and keep them proactively informed of likely timing and impacts of noisy activities. In addition, specific strategies to manage longer duration impacts are outlined in **section B1.3.3**. Further detail on construction noise and vibration management and mitigation measures is provided in the following sections and in **Chapter E1** (Environmental management measures).

Construction noise management and mitigation measures

Feasible and reasonable management and mitigation measures would be identified for the project as noted in the noise and vibration environmental management measures presented in **Chapter E1** (Environmental management measures). This includes the development of a CNVMP which will be prepared for the project (see environmental management measure NV2 in **Chapter E1** (Environmental management measures)). The plan will:

- Identify relevant performance criteria in relation to noise and vibration
- Identify noise and vibration sensitive receivers and features in the vicinity of the project
- Include standard and additional mitigation measures from the *Construction Noise and Vibration Guideline* (CNVG) (Roads and Maritime 2016) and details about when each will be applied
- Describe the process(es) that will be adopted for carrying out location and activity specific noise and vibration impact assessments to assist with the selection of appropriate mitigation measures
- Include protocols that will be adopted to manage works required outside standard construction hours in accordance with relevant guidelines
- Detail monitoring that will be carried out to confirm project performance in relation to noise and vibration performance criteria.

The CNVMP will be implemented for the duration of construction of the project.

Review of the Construction Noise and Vibration Management Plan

The CNVMP will be prepared in accordance with the conditions of approval for the project and will include mechanisms for monitoring, review and amendment of the plan.

In addition, a suitably qualified Acoustics Advisor will be engaged during construction and will be responsible for:

- Reviewing management plans related to noise and vibration and endorsing that they address all relevant conditions of approval and requirements of all applicable guidelines
- Reviewing location and activity specific noise and vibration impact assessments prepared during the project and endorsing the assessments and proposed mitigation measures
- Reviewing proposals regarding works outside standard construction hours, confirming that the works are appropriate and endorsing the proposed mitigation measures
- Monitoring noise and vibration from construction generally and:
  - confirming that actual noise and vibration levels and impacts are consistent with predictions
  - confirming that reasonable and feasible noise and vibration mitigation measures are being implemented
  - suggesting additional reasonable measures to further reduce impacts
- Monitoring and providing advice in relation to compliance with conditions of approval and project commitments related to noise and vibration
- Providing advice in relation to complaints regarding noise and vibration impacts that cannot be resolved between the complaint and the project
- Reviewing and endorsing the proposed operational noise controls, the associated noise model and the proposed implementation program.

Residual noise and vibration impacts

Chapter 28 (Environmental risk analysis) of the EIS includes an environmental risk analysis of key issues that includes an assessment of residual risk following the implementation of management and mitigation measures. For key noise and vibration impacts, the residual risk was identified as being Medium.

Through the detailed design of the project there are further opportunities to:

- Resolve potential construction noise and vibration impacts as identified in section 10.3 of the EIS through design refinement, which could include revisions to the construction methodology and reconfiguration of the layout of construction ancillary facilities
- Develop effective construction methodologies and planning with the design and construction contractor(s) to ensure that management and mitigation measures are effectively implemented
- Implement a process of review, correction and audit for the Construction Environmental Management Plan (CEMP) and Operation Environmental Management Plan (OEMP). This is a process of continuous improvement that will form part of the CEMP and OEMP and allow for management measures to be updated or improved during construction and operational phases where practical.

Specific construction noise and vibration management and mitigation measures that will be applied during construction include the development of location and activity specific noise and vibration impact assessments, which will be carried out prior to (as a minimum) activities where the impacts have the potential to exceed criteria:

- With the potential to result in noise levels above 75 dBA at any receiver
- Required outside standard construction hours likely to result in noise levels greater than the relevant noise management levels
- With the potential to exceed relevant performance criteria for vibration.

The assessments will clarify predicted impacts at relevant receivers in the vicinity of the activities to assist with the selection of appropriate management measures, consistent with the requirements of the *Interim Construction Noise Guideline* (ICNG) (NSW Environment Protection Authority 2009 (EPA))

and CNVG that will be implemented during the works. The Acoustics Advisor will be engaged during construction and will review the noise and vibration assessments, confirm that proposed mitigation measures proposed are appropriate and are implemented and suggest improvements that could be made to reduce noise and vibration impacts in accordance with environmental management measure NV1 in **Chapter E1** (Environmental management measures).

However, it is acknowledged that even with feasible and reasonable mitigation measures it may not always be possible to prevent exceedances of construction noise goals, particularly those associated with out-of-hours work which needs to be undertaken at specific times to minimise impacts on the road network. Management measures to mitigate these impacts will include notifying the community of noise impacts anticipated at specific times. Additional mitigation measures for affected receivers may include offering individual briefings on impacts and mitigation measures, respite periods and alternate accommodation.

Consultation with the affected receivers will occur in accordance with Community Communication Strategy (see environmental management measure SE2 in **Chapter E1** (Environmental management measures)) and conditions of approval for the project.

Timing of the implementation of management measures

Where reasonable and feasible, operational noise mitigation such as noise barriers and at-property treatments identified during detailed design would be installed early in the project so as to provide a benefit to receivers during the construction phase of the project (see environmental management measure NV10 in **Chapter E1** (Environmental management measures)).

In addition, receivers that qualify for assessment for at receiver treatment in relation to operational noise, that are also predicted to experience significant exceedances of noise management levels due to construction, will be given priority preference for assessment for treatment based on the severity and timing of impact. Where the building owner accepts the at receiver treatment proposal, the treatments will be installed as soon as possible (see environmental management measure NV9 in **Chapter E1** (Environmental management measures)).

Further detail about management and mitigation measures for receivers that may experience longer duration construction noise impacts is provided in **section B1.3.3**.

B1.3.3 Longer duration of construction noise impacts due to multiple WestConnex projects

Noise levels associated with construction are estimated to exceed management levels for some residences and at other sensitive locations such as child care centres and schools. Due to the on-going nature of the WestConnex development, some people could be exposed to noise from construction activities over a period of several years. NSW Health recommends that mitigation strategies are applied to minimise the risk of adverse health impacts to residents and other sensitive people from exposure to excessive noise.

Response

Longer duration construction impacts are expected where the project connects to the M4 East and New M5 projects at Haberfield/Ashfield and St Peters respectively. Chapter 26 (Cumulative impacts) of the EIS provides a detailed overview of the cumulative impact assessment or the project. Furthermore, respective technical working papers included in Appendix H (Technical working paper: Traffic and transport) Appendix J (Technical working paper: Noise and vibration) and Appendix I (Technical working paper: Air quality) of the EIS include consideration of consecutive and concurrent (cumulative) impacts during construction and operation of the project. The outcomes of the respective assessments of cumulative impacts were then used to inform the development of management and mitigation measures (see **Chapter E1** (Environmental management measures)).

Roads and Maritime acknowledge that the impacts from construction of the WestConnex program of works at Haberfield/Ashfield and St Peters are not short term, as the consecutive construction of components of the WestConnex projects would extend the duration of impacts to a period of up to seven years for some receivers in these areas. The range and intensity of impacts have and would continue to vary during these periods as construction progresses, with the majority of impacts occurring or expected to occur as a result of certain construction activities and during certain times of the day (for example outside standard daytime construction hours).

Key impacts resulting from longer duration construction in these areas may include noise and vibration, construction traffic, dust, visual impacts and impacts on parking on local streets around construction sites. Construction activities most likely to result in longer duration impacts include surface road works, utility works, tunnelling and tunnelling support (such as spoil handling and transport).

In many instances, M4 East and New M5 construction will transition to less intensive works as the respective construction programs progress towards their conclusion and tunnelling is completed. These less intensive activities include mechanical and electrical fitout, pavement and linemarking works and landscaping, which would occur prior to or at the same time as M4-M5 Link site establishment works commence.

This means that construction activities that overlap or occur consecutively from these projects and the M4-M5 Link would generally be less intensive and cause less disturbance to nearby communities. In addition, these works would typically be expected to require less road occupations (except for line marking and pavement works) and therefore would be more likely to occur during standard construction hours. In addition, at the completion of construction of the M4 East and New M5 projects, permanent noise treatments would be established and/or installed as required by the conditions of approval for these respective projects. This would include (where required by the conditions) the installation of at-receiver treatments and the establishment of permanent noise barriers. The noise modelling that has informed these at-receiver treatments has included the additional traffic forecast for the M4-M5 Link project. These treatments would assist in ameliorating construction noise impacts on these receivers.

Around Haberfield and Ashfield, the majority of the above ground infrastructure required for the M4-M5 Link project is currently being built by the M4 East project. The large civil construction works such as the construction of the Wattle Street and Parramatta Road entry and exit ramps and the Parramatta Road ventilation facility (including the outlet for the M4-M5 Link project) will be complete or nearing completion before construction of the M4-M5 Link commences. This includes the construction of the M4-M5 Link entry and exit ramps along Wattle Street, including the dive and cut-and-cover structure.

Around St Peters, clean-up of the Alexandria Landfill site, construction of the St Peters interchange as well as construction of a component of the above ground infrastructure required for the M4-M5 Link project is being carried out by the New M5 project. This includes construction of the M4-M5 Link entry and exit ramps, upgrades of the local roads (including Campbell Road) and the provision of a construction hardstand area and construction access driveway that will be reused for the Campbell Road civil and tunnel site (C10).

The M4-M5 Link project will need to carry out some civil construction works (including construction of the Campbell Road ventilation facility) and civil finishing works for infrastructure at Haberfield and St Peters. However, construction of surface infrastructure at both locations as part of the M4-M5 Link project has been minimised as much as practicable.

As described in section 6.4 of the EIS, site establishment activities associated with the M4-M5 Link project would include utility works, vegetation removal, the establishment of traffic management and environmental controls and demolition of buildings and structures to facilitate the establishment of construction ancillary facilities. Although these site establishment works are relatively intense in nature and thus are anticipated to generate amenity related impacts such as noise and vibration, they would typically occur during standard daytime construction hours, with scheduled respite periods that will be implemented in accordance with the conditions of approval and associated Environment Protection Licence.

To minimise the impacts associated with longer duration construction impacts from the concurrent construction of the WestConnex component projects in these areas and to respond to issues raised during the construction of other WestConnex projects and in submissions on the M4-M5 Link EIS, the following strategies are proposed:

- Provision of additional off-street car parking for the construction workforce at Rozelle, with the use of the White Bay civil site which would provide around 50 parking spaces. This site is further described in **Chapter D2** (White Bay civil site (C11))
- Using the Northcote Street civil site at Haberfield as a construction workforce car park and laydown area. Currently this site is used as the main tunnelling site for the eastern end of the M4 East project
- Reducing the surface construction footprint of the Wattle Street civil and tunnel site (C1a) to limit surface construction activities to the Wattle Street entry and exit ramps. Compared to the

indicative layout presented in Chapter 6 (Construction work) of the EIS for this site, this would reduce potential construction impacts such as noise and vibration and dust during construction of the M4-M5 Link project and would also allow for realisation of the M4 East urban design and landscaping outcome for this area at the completion of the M4 East project

- Provision of a heavy vehicle truck marshalling facility at the White Bay civil site at Rozelle, which would cater for around 40 heavy vehicles and stage the release of trucks to the tunnelling sites to manage the arrival of trucks to construction ancillary facilities (see **Part D** (Preferred infrastructure report)). Provision of a truck marshalling facility and additional construction workforce parking would result in several benefits for the community and the project, including:
  - Reducing potential queuing, idling, circling and congestion on local roads surrounding the project and associated construction ancillary facilities
  - Providing additional construction workforce parking spaces, which would minimise construction workers parking on local roads
  - Minimising disruptions to the road network around construction ancillary facilities and noise and other disturbance to the local community including residential, business and commercial properties
  - Improving safety for construction workers, motorists and the general public by providing a controlled area from which project traffic schedulers can manage trucks and direct truck drivers to the construction sites at an appropriate time
- Development of a car parking strategy that will quantify construction workforce parking demand, identify public transport options (and measures such as carpooling and shuttle-buses) and identify all locations that will be used for construction workforce parking (see environmental management measure TT04 in **Chapter E1** (Environmental management measures))
- Development and implementation of a truck management strategy that will identify potential truck marshalling areas that will be used for the project and describe management measures for project-related heavy vehicles to avoid queuing and site-circling in adjacent streets and other potential traffic and access disruptions (see environmental management measure TT16 in **Chapter E1** (Environmental management measures))
- Designing acoustic sheds with consideration of the activities that will occur within them and the relevant noise management levels in adjacent areas. Monitoring will be carried out to confirm that the actual acoustic performance of each shed is consistent with predicted acoustic performance (see environmental management measure NV7 in **Chapter E1** (Environmental management measures))
- The appointment of a suitably qualified and experienced Acoustics Advisor, who is independent of the design and construction contractor, and who will be engaged for the duration of construction of the project (see environmental management measure NV1 in **Chapter E1** (Environmental management measures))
- Use of the M4 East and New M5 tunnels for spoil haulage when they become available and where practicable, to minimise heavy vehicle movements on the surface road network
- Consideration of receivers that qualify for assessment for at-receiver treatment due to predicted operational road traffic noise, that are also predicted to experience exceedances of noise management levels during construction, for at-receiver treatments as a priority (see environmental management measure NV9 in **Chapter E1** (Environmental management measures)).

Specific management and mitigation will be documented in relevant construction environmental management sub-plans, the Ancillary Facilities Management Plan and the Construction Traffic and Access Management Plan. This will include detailed consideration of the types of activities that would be most likely to cause longer duration impacts during construction of the project, the types of impacts already experienced by these communities as a result of M4 East and New M5 construction, and subsequent development and implementation of location and activity specific mitigation that considers the consecutive nature of construction at these locations.

B1.3.4 Construction noise mitigation for vulnerable members of the community

The proponent should implement tailored mitigation and communication strategies for vulnerable members of the community and are likely to be more susceptible to adverse health effects of noise, especially those who are elderly, who do not speak English, are housebound, or who may be unwell. Vulnerable community members should be individually consulted to determine appropriate mitigation and management plans, and have ongoing two-way communication regarding noise impacts during construction. Consideration should be given to whether vulnerable community members are at home during the day and hence require additional mitigation to reduce noise impacts during standard construction hours.

Response

During construction of the project, the community engagement professionals representing the project would establish the specific needs of communities. These project representatives would ensure that the needs of specific at-risk (or more vulnerable) individuals are considered when developing and/or modifying construction staging and/or management plans, including the CNVMP.

In addition, a suitably qualified and experienced Acoustics Advisor, who is independent of the design and construction contractor, will be engaged for the duration of construction of the project. The Acoustics Advisor will be responsible for:

- Monitoring noise and vibration from construction generally
- Confirming that appropriate management measures are implemented
- Assisting with the resolution of complaints related to noise and vibration, as required.

Further details regarding the role and responsibility of the Acoustics Advisor is provided in **section B1.3.2**.

B1.3.5 Effect of lower noise level reduction than assumed in the EIS

Some noise management levels used in the EIS, including for sleep disturbance and for sensitive receptors such as schools, are based on the assumption that noise levels are reduced by 10 dBA from outside to inside with an open window. However, some dwellings may only provide a 5 dBA reduction with an open window. The EIS should consider how this may affect the numbers of receptors impacted and whether additional mitigation measures are required.

Response

As described in section 10.1.9 of the EIS, the 10 dBA assumption is considered conservative and is recommended by NSW EPA within the *Industrial Noise Policy* (INP) (NSW EPA 1999) and ICNG assessment guidelines. In practice there will be some variation in reduction due to the design of the existing building and other limitations such as building condition, however this assumption is appropriate for a typical building and therefore appropriate for the assessment presented in the EIS.

Further, construction noise management levels and road traffic noise criteria for residential receivers are applied externally to those properties. Therefore the reduction loss through an open window is of no consequence in determining the number of receptors impacted and/or if additional noise mitigation measures should be considered.

Management and mitigation measures include the preparation of location and activity specific noise and vibration impact assessments for noise sensitive receivers, which will be carried out prior to (as a minimum) activities:

- With the potential to result in noise levels above 75 dBA at any receiver
- Required outside standard construction hours likely to result in noise levels greater than the relevant noise management levels
- With the potential to exceed relevant performance criteria for vibration.

The assessments will clarify predicted impacts at relevant receivers in the vicinity of the activities to assist with the selection of appropriate management measures, consistent with the requirements of ICNG and CNVG that will be implemented during the works.

B1.3.6 Mitigation of operational noise impacts

Operation of the M4-M5 Link is expected to decrease the level of noise exposure for most people however there is expected to be a significant increase in noise exposure for some people.

Noise generated during construction is estimated to exceed management levels for exposure by some residents and other sensitive locations such as schools. It is important that all feasible measures to mitigate these expected or potential impacts from construction and operation of the M4-M5 Link be considered.

It is noted that the M4-M5 Link is expected to decrease exposure to traffic noise for most people, with more traffic moving underground. However there are expected to be significant increases in noise exposure for some residents as a result of changes in the location and movement of traffic.

All feasible and reasonable mitigation strategies should be implemented for all significant increases in noise exposure associated with changes in traffic resulting from the M4-M5 Link.

Response

Feasible and reasonable measures to manage and mitigate construction noise and vibration impacts are discussed in **section B1.3.2**.

With regards to managing and mitigating operational noise impacts, as detailed in Appendix J (Technical working paper: Noise and vibration) of the EIS, at-source noise controls such as road design, quiet road surfaces, followed by path controls such as noise barriers, are the first consideration where road traffic noise criteria are exceeded at noise sensitive receivers. Section 7.4.2 of Appendix J (Technical working paper: Noise and vibration) of the EIS provides a discussion of the 56 noise catchment areas and the operational impacts associated with each of those areas.

The environmental management measures also note potential operational noise performance of the project based on the detailed design will be assessed in accordance with NSW Road Noise Policy (Department of Environment and Climate Change and Water (DECCW) 2011) and appropriate management measures will be confirmed and implemented (see **Chapter E1** (Environmental management measures)).

Within 12 months of the commencement of the operation of the project, actual operational noise performance will be assessed and compared to predicted operational noise performance. The assessment will include identification of any further feasible and reasonable noise mitigation measures required to meet the relevant operational road traffic noise criteria, and identify timing and responsibilities for implementation, as identified in the environmental management measure NV14 (see **Chapter E1** (Environmental management measures)).

B1.3.7 Health impacts of environmental noise

There is also emerging evidence of the health impacts of environmental noise. The evidence is strongest for impacts on cardiovascular disease and sleep disturbance. Measures to limit the community exposure to noise are therefore important to protect public health.

Response

Section 8.5 and section 8.6 of Appendix K (Technical working paper: Human health risk assessment) of the EIS consider the impacts on human health relevant to noise predicted to be generated by the project during construction and operation.

Potential noise impacts have been assessed against noise criteria developed by the NSW EPA. These criteria have been established predominantly on the basis of attitudinal surveys linking the level of annoyance reaction to noise exposure with due consideration given to sleep disturbance and potential impairment to non-auditory tasks. Regular exposure to consistent elevated sound levels can adversely affect mental and physical health. Thus, the aim of these criteria is to protect majority of residences and other sensitive land uses from noise pollution most of the time.

The criteria developed for use in the assessment for control of noise come from policy documents developed by the NSW Government including the INP, Road Noise Policy and the ICNG (NSW Department of Environment and Climate Change (DECC) 2009, NSW DECCW 2011, NSW EPA 2000). All of these policies consider the potential health effects due to regular and excessive noise exposure outlined in the reviews published by the following organisations:

- World Health Organization (WHO) – *Guidelines on Community Noise – Health effects of noise* (WHO 1999)

- World Health Organization – *Night Noise Guidelines for Europe* (WHO 2009)
- International Institute of Noise Control Engineering – *Guidelines for Community Noise Impact Assessment and Mitigation* (I-INCE 2011)
- Environmental Health Council of Australia – The health effects of environmental noise – other than hearing loss (enHealth 2004).

The approach used to assess sleep disturbance and health and wellbeing impacts is discussed in section 4.7.3 of Appendix J (Technical working paper: Noise and vibration) of the EIS.

Construction noise

During standard construction hours, noise levels would exceed the relevant goals in most of the noise catchment areas for work activities including earthworks, demolition, site establishment and utility adjustments. The most affected receivers are located around the Iron Cove Link at Rozelle, the Rozelle interchange and around the Parramatta Road West civil and tunnel site and Parramatta Road East civil site at Haberfield and Ashfield. For most construction activities, it is expected that the actual construction noise levels would generally be lower than the worst-case levels as predictions are representative of the highest noise level inclusive of all plant operating simultaneously at the closest location to each receiver.

Construction noise impacts would be managed using measures including scheduling of works, noise reduction measures for plant and equipment and provision of respite periods for sensitive receivers. Design and construction contractor(s) would be required to minimise time and duration of impacts to sensitive receivers and keep them proactively informed of likely timing and impacts of noisy activities.

A review of the predicted $L_{A1(1minute)}$ exceedances associated with construction noise at the nearest noise sensitive receivers provided in Annexure F of Appendix J (Technical working paper: Noise and vibration) of the EIS indicates that the sleep disturbance screening criterion is likely to be exceeded when night works are occurring adjacent to residential receivers. At this early stage in the project, the assessment has included predictions of maximum noise impacts for assessment of potential sleep disturbance, however, the ICNG requires the project to consider maximum noise levels where construction works are planned to extend over more than two consecutive nights.

The out-of-hours work protocol that will be developed as part of the project wide CNVMP will set parameters around how works outside standard daytime construction hours will be carried out, including timing and frequency, and the mitigation measures that will be implemented based on predicted impacts identified through location and activity specific assessments. The out-of-hours work protocol will be developed as part of the CNVMP as detailed in environmental management measure NV5 (see **Chapter E1** (Environmental management measures)).

However, it is acknowledged that even with feasible and reasonable mitigation measures it may be not always possible to prevent exceedances of construction noise goals, particularly those associated with out-of-hours work which needs to be undertaken at such time to minimise impacts on the road network.

Where reasonable and feasible, operational noise mitigation such as noise barriers and at-property treatments identified during detailed design should be installed early in the project so as to provide a benefit to receivers during the construction phase of the project. (see environmental management measures NV9 and NV10 in **Chapter E1** (Environmental management measures)).

In addition, receivers that qualify for assessment for at receiver treatment in relation to operational noise, that are also predicted to experience significant exceedances of noise management levels due to construction, will be given priority preference for assessment for treatment based on the severity and timing of impact. Where the building owner accepts the at receiver treatment proposal, the treatments will be installed as soon as possible (see environmental management measure NV9 in **Chapter E1** (Environmental management measures)).

Further detail about management and mitigation measures for receivers that may experience longer duration construction noise impacts is provided in **section B1.3.3**.

Operational noise

For over 60 per cent of the receptors evaluated as part of the operational noise assessment presented in Appendix J (Technical working paper: Noise and vibration) of the EIS, operational noise levels would be reduced as a consequence of the project. However, the worst case assessment also predicts that operational noise criteria would be exceeded at a number of properties adjacent to the project during operation.

The Road Noise Policy (NSW DECCW 2011) has been developed in consideration of noise related health impacts (as outlined above). As required by environmental management measure NV13, potential operational noise performance of the project based on the detailed design will be assessed in accordance with the Road Noise Policy (NSW DECCW 2011) and appropriate management measures will be confirmed and implemented. Environmental management measure NV14 also requires that within 12 months of the commencement of the operation of the project, actual operational noise performance will be assessed and compared to predicted operational noise performance. The assessment will include identification of any further feasible and reasonable noise mitigation measures required to meet the relevant operational road traffic noise criteria, and identify timing and responsibilities for implementation (see **Chapter E1** (Environmental management measures)).

The worst-case levels estimated are sufficiently high for some receptors that noise impacts are likely to occur. These properties are located south of Victoria Road adjacent to the Iron Cove Link tunnel portals, and to the west of Victoria Road near Lilyfield Road. These are primarily related to the new road alignment being closer to residential homes, and the removal of buildings closest to the road (that previously were a barrier to noise from the roadway). Mitigation measures considered for minimising operational noise impacts principally involve the use of Open Graded Asphalt or equivalent and noise barriers. Where these measures cannot be installed or do not provide sufficient mitigation, at-receiver treatments would be implemented where feasible and reasonable to minimise residual noise impact.

B2 NSW EPA

This chapter addresses issues raised by the NSW Environmental Protection Authority (NSW EPA).

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B2.1 Air quality

Refer to Chapter 9 (Air quality) and Appendix I (Technical working paper: Air quality) of the Environmental Impact Statement (EIS) for details of air quality.

B2.1.1 Assessment of air toxics

The assessment of air toxics (expected and regulatory worst case scenarios) involves comparing the change in the maximum predicted one hour average concentration of each compound to the corresponding impact assessment criterion in the Approved Methods. The justification for comparing the change and not predicted total concentration is that 'the criteria in the Approved Methods cannot be readily applied to complex road projects in urban areas, as they are based on the assumption that a project represents a new source, and not a modification to an existing source'. It is not appropriate to compare the change in speciated air toxics to the assessment criteria. The EPA impact assessment criteria for air toxics are incremental, however, this is in recognition of the generally very low levels in 'background' air quality. For this project a comparison of predicted ventilation outlet plus surface road speciated air toxic concentrations against the assessment criteria should be made. Further, the toxic assessment criteria have previously been applied to modifications of existing sources.

Recommendation: the proponent provide predicted impact (ventilation outlet and surface road) at receptors for speciated air toxics for both the expected traffic and regulatory worst case scenarios.

Response

Table 8-26 of Appendix I (Technical working paper: Air quality) of the EIS shows the results for air toxics at all residential, workplace and recreational (RWR) receptors in the regulatory worst case scenarios. Even if the maximum ventilation outlet contribution is added to the maximum increase in concentration with the project (including outlets and surface roads, which implies some double counting), the results are still below the impact assessment criteria.

B2.1.2 Regulatory worst case scenario

The results for the regulatory worst case scenario are presented at the following receptors:

- 1 hour NO_2 [nitrogen dioxide]: a regulatory worst case receptor at each ventilation facility
- Toxics: most affected RWR receptor
- CO [carbon monoxide] and PM [particulate matter]: maximum impacted residential and RWR receptor.

The impacts for the regulatory worst case scenario are all presented at different receptors. There is also lack of clarity regarding where the impacts are predicted and whether or not it includes the maximum impacted receptor in the domain, as the maximum impacted receptor in the domain may not necessarily be a RWR receptor.

Recommendation: For the regulatory worst case scenario, the EPA recommends that the proponent demonstrates for each pollutant, that the results include the maximum impacted receptor in the domain or provides the results for the maximum impacted receptor in the domain.

Response

Table B2-1 includes the results for air toxics at residential receptors (not included in Appendix I (Technical working paper: Air quality) of the EIS). These values are highlighted in **bold**, although they are the same as the values for all receptors.

Table B2-1 Results of regulatory worst case assessment (RWR receptors) – CO, PM and air toxics

Pollutant and period	Unit	Maximum ventilation outlet contribution at any receptor	
		Regulatory worst case (RWC)-2033-DSC[2]	
		All receptors	Residential receptors
Criteria pollutants			
CO (1-h)	(mg/m^3)	0.50	0.50
PM_{10} (annual)	($\mu g/m^3$)	1.01	1.01
PM_{10} (24-h)	($\mu g/m^3$)	4.51	4.06
$PM_{2.5}$ (annual)[1]	($\mu g/m^3$)	1.01	1.01
$PM_{2.5}$ (24-h)[1]	($\mu g/m^3$)	4.51	4.06
Air toxics			
Benzene (1-h)	($\mu g/m^3$)	2.20	**2.20**
PAH (BaP) (1-h)	($\mu g/m^3$)	0.016	**0.016**
Formaldehyde (1-h)	($\mu g/m^3$)	1.83	**1.83**
1,3-butadiene (1-h)	($\mu g/m^3$)	0.59	**0.59**

Notes:
1 The same emission rates were used for PM_{10} and $PM_{2.5}$.
2 DSC = Do something cumulative.

For simplicity of presentation, spatial information on the regulatory worst case (RWC) results has not been included in Appendix I (Technical working paper: Air quality) of the EIS.

Appendix I (Technical working paper: Air quality) of the EIS states that the maximum impacted receptor may not be a RWR receptor. Given the large number of closely-spaced RWR receptors (86,375) that are within the model domain and subject to the influence of surface road traffic from the project, it is very unlikely that other locations, further away from the project, would experience a larger impact. RWR receptors were all discrete receptor locations within the project footprint, and mainly covered residential and commercial land uses. For these receptors, a simpler[1] statistical approach was used to combine a concentration statistic for the modelled roads and outlets (eg maximum 24-hour mean PM_{10}) with an appropriate background statistic. The RWR receptors include 40 community receptors.

As described in the EIS, the RWR receptors are discrete points in space where people are likely to be present for some period of the day, classified according to the land use identified at that location. The RWR receptors do not identify the number of residential (or other) properties at the location. The residential land use at a RWR receptor location may range from a single-storey dwelling to a multi-storey, multi-dwelling building.

The main reason for the distinction between RWR and community receptors was to permit a more detailed analysis of short-term metrics for representative community receptors. The number of such receptors that could be included was dictated by the limit on the number of time series for individual receptors that could be extracted from the Graz Lagrangian Model (GRAL). Due to the computational requirements of the GRAL model, it was not possible to include a larger number of time series for receptors over such a large project footprint.

Figure B2-1 shows the locations of the various discrete community receptors.

[1] The simplification only related to short-term metrics. Annual mean concentrations were equally valid for both types of receptor.

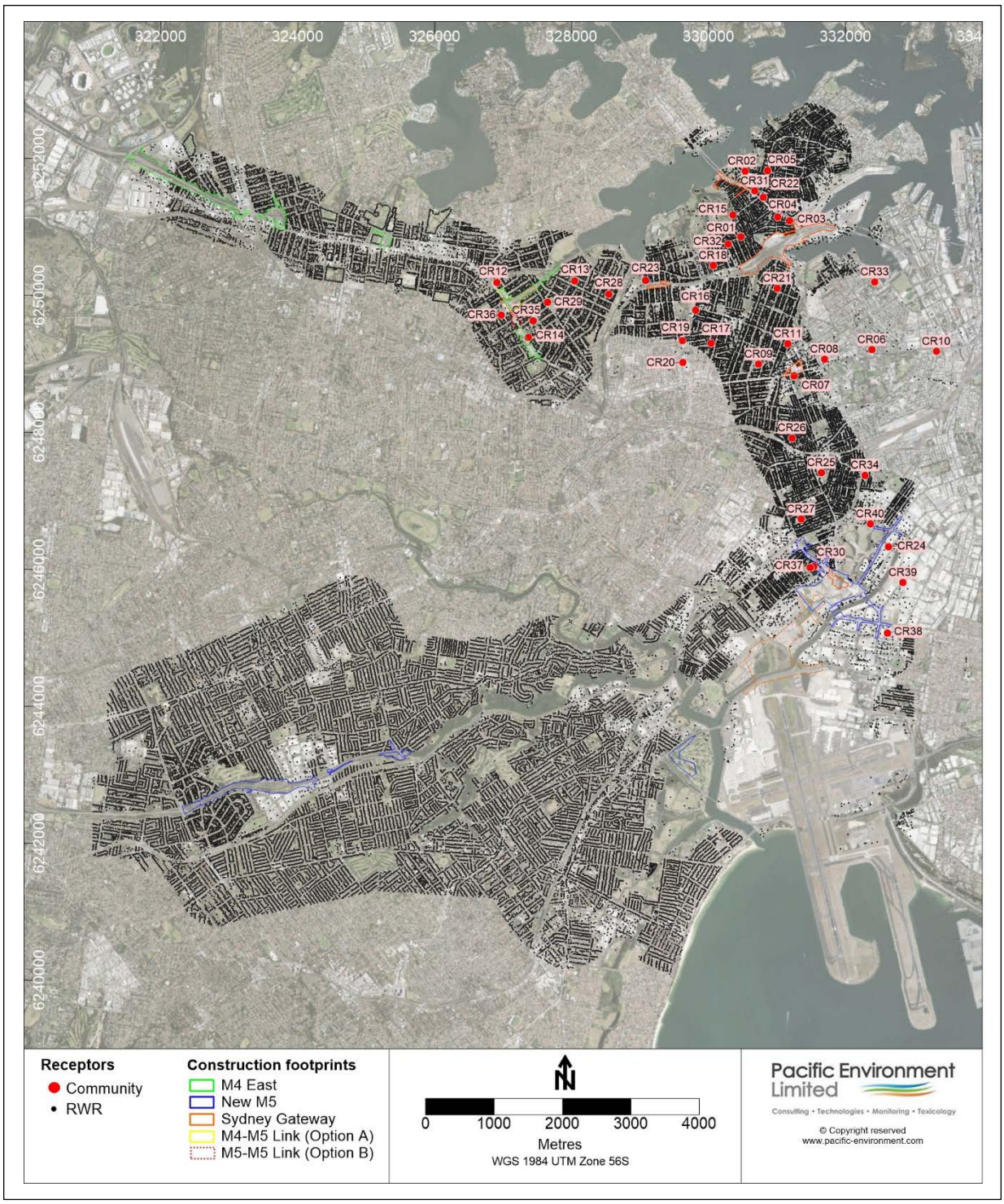


Figure B2-1 Modelled discrete receptor locations and project footprint

B2.1.3 Vehicle emissions estimation techniques

Annexure L of Appendix I was reviewed to assess the in-tunnel motor vehicle emission modelling. It is noted that this M4-M5 Link EIS assesses the entire WestConnex network including the M4 East and the New M5, and it is stated that this M4-M5 Link EIS will effectively supersede the ventilation reports in these previous EIS. Hence issues raised in the EPA's responses to the M4 East and New M5 EIS will also be superseded by those made here.

The motor vehicle emissions have been estimated using the detailed PIARC [Permanent International Association of Road Congress] method which specifically considers the fuel type mix, age profile and emission certification standards of the NSW fleet. This is a significant improvement relative to the simple PIARC approach applied in the two previous WestConnex project EIS.

Notwithstanding the improved methodology, some issues were noted and are listed below. Importantly, the validation of the emission model should be presented in full to demonstrate the level of conservatism of the in-tunnel emissions modelling.

Fleet model

a) The proportion of total diesel passenger vehicle and total light duty vehicle (light commercial vehicle) predicted in tables 6.12 and 6.13 are a little higher than predicted by the EPA fleet model. However, the higher diesel fuel type estimates in the EIS will generally lead to more conservative (ie. higher) emission estimations.

b) The assignment of the passenger vehicle fleet to Euro emission standards has assumed the introduction of Euro 6 for light vehicles, however this standard has not been promulgated as an Australian Design Rule as at October 2017. The Commonwealth government emission standard review draft RIS published in December 2016 proposes introduction dates of 2019-2020 for those options that consider Euro 6 for light vehicles and Euro VI for heavy vehicles. Given that nearly 12 months have passed and no announcement has been made, a full implementation of Euro 6 should not be expected until 2020 at the very earliest.

c) The assignment of passenger cars and light duty vehicles to Euro standards is presented in table 6.15, and shows an assumed implementation of Euro 5 in 2014 and Euro 6 in 2019. These dates are considered too early; ADR79/03 phased in Euro 5 from November 2013 for new model vehicles, but ADR79/04 did not require Euro 5 for all new vehicles until November 2016. As noted in b) above, it is unlikely that Euro 6 will be implemented for all new vehicles until 2020 at the very earliest.

It is noted that the adoption of Euro VI for heavy duty diesel vehicles has not been assumed. This provides for a level of conservatism in the emission estimates if it is assumed that Australia will adopt Euro VI at some time in the future.

d) The percentages of the light vehicle fleet that are assumed to be Euro 6 presented in table 6.12 for the year 2023 are considered too high for a Euro 6 implementation of 2019. EPA estimates that in 2023, petrol vehicles with year of first registration between 2019 and 2023 will comprise only 18% of the car fleet and 6% for diesel vehicles, versus the 32% and 12% in table 6.12. This will have minimal impact for petrol vehicles but will result in lower emission estimations for diesel vehicles, particularly for NOx, as the PIARC emission factors assume a very significant decrease in NOx for Euro 6 vehicles.

It is suspected that the data in table 6.12 and 6.13 are the percentage of VKT [vehicle kilometres travelled] by emission standard class, which would give higher values for the newer emissions classes. However even if this is the case, the petrol Euro 5 and Euro 6 VKT percentages, in particular, appear too high. Overestimation of the proportion of VKT by newer emission certification vehicles will result in lower emission estimates.

Emission Model Validation

Section 6.6.9 of the Ventilation Report states that a validation was performed on the emission model using tunnel measurements from the existing M5 East tunnel. It is stated that this validation found the emissions estimated in the ventilation report are ‘consistent with in-tunnel measurements’. No detail is presented to support this statement, and the report referenced is not appended to the E18, and does not appear to be publicly accessible.

Recommendations:

- The proponent should perform a sensitivity analysis to assess the impact on the fleet aggregate emission factors of full implementation of Euro 5 in 2017 rather than 2014, and full implementation of Euro 6 in 2021. The analysis should disaggregate the emission contributions by vehicle type (PC, LDV and HGV) and assess the level of conservatism in the model based on the relative assumptions for light and heavy vehicles
- The proponent should clarify the data in table 6.12 and 6.13 including its derivation; ie. fleet numbers and assumed VKT as a function of vehicle age
- The proponent should present full details of the validation to substantiate the claim made in section 6.6.9. The validation report should be made publicly available. Note that this validation conducted in 2015 will only validate the emission model for vehicles conforming with emission standards up to Euro 4 for petrol and diesel light duty vehicles and Euro V for heavy duty vehicles, and will not address the fleet model issues raised above.

Response

Fleet assumptions for the EIS ventilation analysis

In September 2016, NSW Roads and Maritime Services (Roads and Maritime) prepared a forecast of the on-road NSW vehicle fleet, taking into account trends in vehicle registrations, vehicle age and vehicle kilometres travelled for each vehicle category (see **Figure B2-2**). This forecast enables accurate estimates of vehicle emissions for future road tunnel projects up to the year 2040, by supplementing the PIARC (2012) methodology. This work is presented in the Draft NSW Fleet Forecast for Tunnel Ventilation Design: 2016 to 2040[2].

Some of the key assumptions within the vehicle emissions estimation provided in the EIS are outlined below:

- Vehicles compliant with Australian Design Rule (ADR)79/03 (Euro 5a) and ADR79/04 (Euro 5b) were assumed to be equivalent to Euro 5 emissions standard
- Euro 6 emissions standard assumed to be mandated for all vehicles from 2019 onwards
- Alternative fuelled vehicles (low emission, zero emission) are excluded from the emissions estimation and ventilation analysis. All vehicles are assumed to be either petrol or diesel powered.

Year	- 1995	1996-1998	1999-2002	2003	2004-2005	2006	2007	2008 - 2009	2010	2011-2013	2014-2016	2017-2018	2019-
Petrol PCs	Euro 0	Euro 1 (ADR 37/01)			Euro 2	Euro 3 (ADR79/01)			Euro 4 (ADR79/02)		Euro 5a	Euro 5b	Euro 6
Diesel PCs	Euro 0	Euro 1		Euro 2 (ADR 79/00)				Euro 4 (ADR 79/02)			Euro 5a	Euro 5b	Euro 6
Petrol LDVs	Euro 0	Euro 1 (ADR 37/01)			Euro 2	Euro 3 (ADR79/01)			Euro 4 (ADR79/02)		Euro 5a	Euro 5b	Euro 6
Diesel LDVs	Euro 0	Euro 1		Euro 2 (ADR 79/00)				Euro 4 (ADR 79/02)			Euro 5a	Euro 5b	Euro 6
Diesel HGVs	Euro 0	Euro I (ADR 70/00)		Euro III (ADR 80/00)				Euro IV (ADR 80/02)		Euro V (ADR 80/03)			

Notes:
PC = passenger car
LDV = light-duty vehicle
HGV = heavy goods vehicle (the same emission rates were used for PM_{10} and $PM_{2.5}$)
DSC = Do something cumulative.

Figure B2-2 Fleet forecast vehicle emissions standard assumed years of implementation

[2] https://www.westconnex.com.au/local-updates?default_view=2&project=14&updates=9

Table B2-2 EIS fleet composition - opening year (2023)

Emission Standard		PC Petrol	PC Diesel	LDV Petrol	PDV Diesel	HGV Diesel
Pre Euro	Pre-ADR37/01	0.10%	0.00%	1.12%	0.19%	5.19%
Euro 1	ADR37/01	0.78%	0.01%	1.45%	0.18%	2.78%
Euro 2	ADR79/00	1.15%	0.21%	1.01%	0.92%	-
Euro 3	ADR79/01	5.44%	-	3.29%	-	6.08%
Euro 4	ADR79/02	13.25%	2.98%	5.00%	12.02%	13.99%
Euro 5	ADR79/03	26.43%	6.48%	5.46%	25.37%	71.96%
Euro 6		31.63%	11.53%	4.58%	39.39%	-
Total		100%		100%		100%
Estimated Qty of Vehicles		4,818,517		876,342		145,232

Assessment of sensitivity of the fleet emissions standards used in the EIS ventilation design

As suggested by the NSW EPA, a sensitivity assessment has been carried out to compare the emissions estimation was based on the alternative assumptions for implementation of vehicle emissions standard as set out in **Figure B2-3**. The fleet composition for this sensitivity check for the year 2023 is shown in **Table B2-3**.

For this sensitivity assessment, it was assumed that:

- Vehicles complaint with ADR79/03 (Euro 5a) assumed to be equivalent to Euro 4 emissions standard
- Vehicles compliant with ADR79/04 (Euro 5b) assumed to be equivalent to Euro 5 emissions standard
- Euro 6 emissions standard assumed to be mandated for all vehicles from 2021 onwards
- Alternative fuelled vehicles are excluded from the emissions estimation and ventilation analysis. All vehicles are assumed to be either petrol or diesel powered.

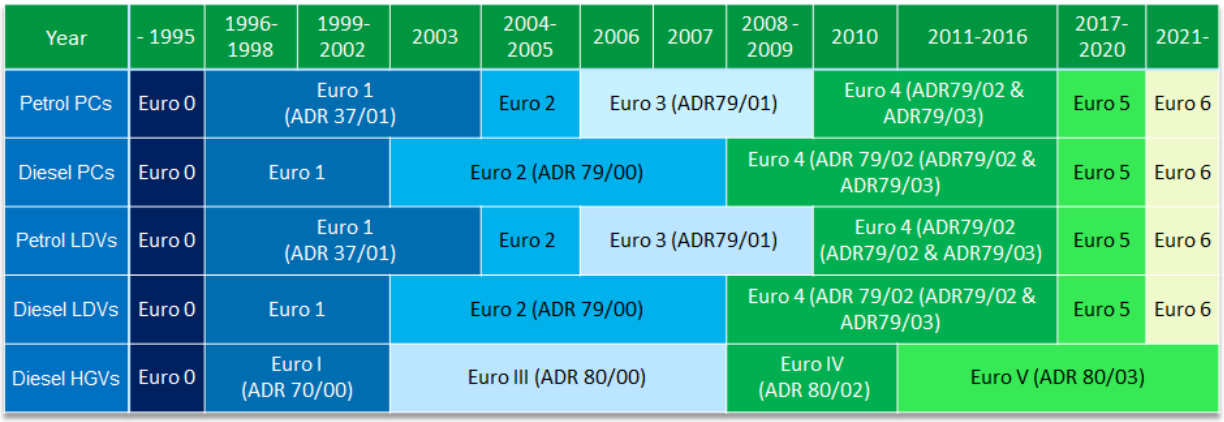


Figure B2-3 Sensitivity check - fleet forecast vehicle emissions standard assumed years of implementation

Table B2-3 Sensitivity assessment - fleet composition - opening year (2023)

Emission Standard		PC Petrol	PC Diesel	LDV Petrol	PDV Diesel	HGV Diesel
Pre Euro	Pre-ADR37/01	0.10%	0.00%	1.12%	0.19%	5.19%
Euro 1	ADR37/01	0.78%	0.01%	1.45%	0.18%	2.78%
Euro 2	ADR79/00	1.15%	0.21%	1.01%	0.92%	-
Euro 3	ADR79/01	5.44%	-	3.29%	-	6.08%
Euro 4	ADR79/02	27.79%	6.04%	8.24%	25.62%	13.99%
Euro 5	ADR79/03	25.81%	8.11%	4.35%	26.85%	71.96%
Euro 6		17.71%	6.84%	2.46%	24.30%	-
Total		100%		100%		100%
Estimated Qty of Vehicles		4,818,517		876,342		145,232

Table B2-4 shows the sensitivity comparison for the 2023 fleet composition with 14 per cent heavy vehicles. In addition to the change in composition of the fleet, the different implementation of Euro years for calculating age degradation is also included. The values provided are the emissions from a fleet average vehicle traversing the route from the M4 East entry portal to the New M5 exit portal and return, so provide a nominal average comparison for the mix of mainline tunnel section lengths and gradients in WestConnex.

These increases in in-tunnel concentrations are within the margins allowed for the ventilation design.

Although it is possible that the inclusion of Euro 6 emission factors in the NSW EPA model could have meant that NO_X emissions from diesel light vehicles were underestimated in the assessment, overall it is likely that the approach used would, in itself, have tended to give a conservative estimate of emissions. For example, all diesel light duty vehicles in Australia are imported, and hence Euro 6 vehicles will enter the fleet irrespective of promulgating ADR79/05, and they will probably reflect the enhanced standards incorporating real driving emissions (RDE).

The change in ambient air quality as a result of delayed implementation of Euro 6 would be negligible and within the conservatism of the model predictions. The analysis of postponed implementation of the standards confirms that the effects on both in-tunnel and ambient air quality would be marginal.

Table B2-4 Sensitivity analysis – M4 portal to M5 portal total mass of emissions for typical fleet vehicle (14%HGV)

	NO_2 emissions (g)/"fleet avg vehicle"				NO_X emissions (g)/"fleet avg vehicle"				CO emissions (g)/"fleet avg vehicle"				PM emissions m^2 "fleet avg vehicle"			
Speed (kilometres per hour)	80	60	40	20	80	60	40	20	80	60	40	20	80	60	40	20
EIS at 2023	3.38	3.69	4.90	7.83	20.44	22.95	30.74	49.23	29.85	24.79	28.32	46.29	9.91	10.06	10.63	12.03
Fleet composition sensitivity check at 2023	3.75	3.99	5.23	8.29	21.26	23.62	31.47	50.27	29.98	24.85	28.40	46.50	10.11	10.23	10.82	12.27
Percentage increase from EIS	11%	8%	7%	6%	4%	3%	2%	2%	0%	0%	0%	0%	2%	2%	2%	2%

Emission model validation

The validation of the emissions model used for the ventilation design is described in the report; *Comparison of PIARC based pollution estimates with measurements in the M5 East tunnel* (Stacey Agnew 2017) which is available on the WestConnex website[3].

B2.1.4 Construction dust controls

Dust controls will be documented and implemented during construction activities to ensure the potential for off-site impacts are minimised. Additional control measures that will be implemented as necessary, and the process for determining whether or not additional control measures are necessary, will also be detailed.

Response

Dust management measures are outlined in **Chapter E1** (Environmental management measures). Dust management during construction will be documented in a Construction Air Quality Management Plan that will be developed and implemented to monitor and manage potential air quality impacts associated with the construction for the project. The Plan will be implemented for the duration of construction (see **Chapter E1** (Environmental management measures)).

B2.2 Social and economic

Refer to Chapter 14 (Social and economic) and Appendix P (Technical working paper: Social and economic) of the EIS for details of social and economic impacts.

B2.2.1 Ongoing construction impacts at Haberfield and St Peters

The EPA is concerned about the significant and ongoing nature of construction impacts experienced by the communities at Haberfield and St Peters, particularly in relation to noise and vibration. Whilst the EIS acknowledges that certain communities along the alignment will be subject to consecutive construction impacts from the stages of the WestConnex project, there is minimal evidence to suggest that this has shaped the approach to mitigation in the assessment; the EIS makes repeated references to 'short-term' impacts from the construction work. The EPA considers that the ongoing impacts on the communities at Haberfield and St Peters need to be quantified and assessed in detail in the EIS, rather than being addressed under a post-approval management plan, if the project is approved as proposed.

Response

Longer duration construction impacts are expected where the project connects to the M4 East and New M5 projects at Haberfield/Ashfield and St Peters respectively. Chapter 26 (Cumulative impacts) of the EIS comprises a detailed cumulative impact assessment. Furthermore, respective technical working papers including traffic and transport (Appendix H (Technical working paper: Traffic and transport) of the EIS), noise and vibration (Appendix J (Technical working paper: Noise and vibration) of the EIS) and air quality (Appendix I (Technical working paper: Air quality) of the EIS) include consideration of consecutive and concurrent (cumulative) impacts during construction and operation of the project. The outcomes of the respective assessments of cumulative impacts were then used to inform the development of management and mitigation measures (see **Chapter E1** (Environmental management measures)).

Roads and Maritime acknowledge that the impacts from construction of the WestConnex program of works at Haberfield/Ashfield and St Peters are not short-term, as the consecutive construction of components of the WestConnex projects would extend the duration of impacts to a period of up to seven years for some receivers in these areas. The range and intensity of impacts have and would continue to vary during these periods as construction progresses, with the majority of impacts occurring, or expected to occur, as a result of certain construction activities and during certain times of the day (for example outside standard construction hours).

[3] https://www.westconnex.com.au/local-updates?default_view=2&project=14&updates=9

Key impacts resulting from longer duration construction in these areas may include noise and vibration, including ground-borne noise from tunnelling, construction traffic including spoil haulage, dust, visual impacts and impacts on parking on local streets around construction sites. Construction activities most likely to result in longer duration impacts include surface road works, utility works, tunnelling and tunnelling support (such as spoil handling and transport).

The majority of intensive utility and civil construction works (including surface road works) around Haberfield/Ashfield and St Peters will be completed as part of the M4 East and New M5 projects respectively. In addition, in many instances, M4 East and New M5 construction will transition to less intensive works as the respective construction programs progress towards their conclusion and tunnelling is completed. These less intensive activities include mechanical and electrical fit-out, pavement and line-marking works and landscaping, which would occur prior to or at the same time as M4-M5 Link site establishment works commence. Areas where longer duration impacts are likely to be experienced around Haberfield/Ashfield and St Peters are shown in **Figure B2-4** to **Figure B2-6**.

This means that construction activities that overlap or occur consecutively from these projects and the M4-M5 Link would generally be less intensive and cause less disturbance to nearby communities. In addition, these works would be typically be expected to require less road occupations (except for line marking and pavement works) and therefore would be more likely to occur during standard construction hours. In addition, at the completion of construction of the M4 East and New M5 projects, permanent noise treatments would be established and/or installed as required by the conditions of approval for these respective projects. This would include (where required by the conditions) the installation of at-receiver treatments and the establishment of permanent noise barriers. The noise modelling that has informed these at-receiver treatments is based on a cumulative scenario that includes the additional traffic forecast for the M4-M5 Link project. These treatments would assist in ameliorating construction noise impacts on these receivers.

Around Haberfield and Ashfield, the majority of the above-ground infrastructure required for the M4-M5 Link project is currently being built by the M4 East project. The large civil construction works such as the construction of the Wattle Street and Parramatta Road entry and exit ramps and associated civil construction works on Wattle Street and Parramatta Road, as well as the Parramatta Road ventilation facility (including the outlet for the M4-M5 Link project) will be complete or nearing completion before construction of the M4-M5 Link commences. This includes the construction of the M4-M5 Link entry and exit ramps along Wattle Street, including the dive and cut-and-cover structure.

Around St Peters, clean-up of the Alexandria Landfill site, construction of the St Peters interchange as well as construction of a component of the above ground infrastructure required for the M4-M5 Link project is being carried out by the New M5 project. This includes construction of the M4-M5 Link entry and exit ramps, upgrades of the local roads (including Campbell Road) and the provision of a construction hardstand area and construction access driveway that will be reused for the Campbell Road civil and tunnel site (C10).

The M4-M5 Link project will need to carry out some civil construction works (including construction of the Campbell Road ventilation facility) and civil finishing works for infrastructure at Haberfield and St Peters. However, construction of surface infrastructure at both locations as part of the M4-M5 Link project has been minimised as much as practicable.

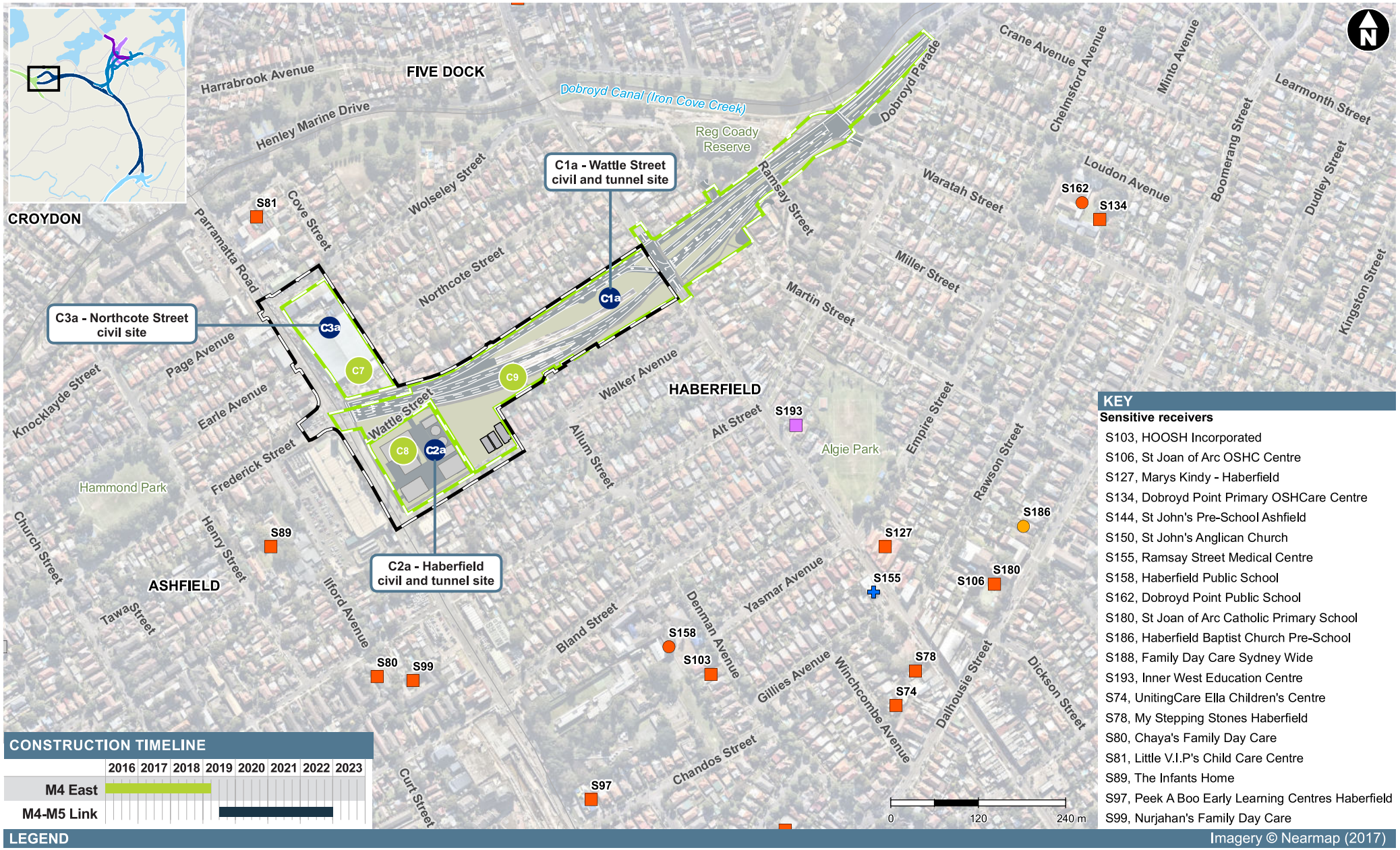
As described in section 6.4 of Chapter 6 (Construction work) of the EIS, site establishment activities associated with the M4-M5 Link project would include utility works, vegetation removal, the establishment of traffic management and environmental controls and demolition of buildings and structures to facilitate the establishment of construction ancillary facilities. Although these site establishment works are relatively intense in nature and thus are anticipated to generate amenity related impacts such as noise and vibration and dust, they would typically occur during standard day time construction hours, with scheduled respite periods that will be implemented in accordance with the conditions of approval and associated environment protection licence. The majority of site establishment activities would also be relatively short in duration, with the exception of some activities such as utility works.

To further manage the impacts associated with longer duration construction impacts from the concurrent construction of the WestConnex component projects in these areas and to respond to issues raised during the construction of other WestConnex projects and in submissions on the M4-M5 Link EIS, the following strategies are proposed:

- Provision of additional off-street car parking for the construction workforce at Rozelle, with the use of the White Bay civil site which would provide around 50 parking spaces. This site is further described in **Chapter D2** (White Bay civil site (C11))

- Using the Northcote Street civil site for construction workforce car parking and laydown. Currently this site is used as the main tunnelling site for the eastern end of the M4 East project
- Reducing the surface construction footprint of the Wattle Street civil and tunnel site (C1a) to limit surface construction activities to the Wattle Street entry and exit ramps. Compared to the indicative layout presented in Chapter 6 (Construction work) of the EIS for this site, this would reduce potential construction impacts such as noise and vibration and dust during construction of the M4-M5 Link project and would also allow for realisation of the M4 East urban design and landscaping outcome for this area at the completion of the M4 East project
- Provision of a heavy vehicle truck marshalling facility at the White Bay civil site at Rozelle, which would cater for around 40 heavy vehicles and stage the release of trucks to the tunnelling sites to manage the arrival of trucks to construction ancillary facilities (see **Part D** (Preferred infrastructure report)). Provision of a truck marshalling facility and additional construction workforce parking would result in several benefits for the community and the project, including:
  - Reducing potential queuing, idling, circling and congestion on local roads surrounding the project and associated construction ancillary facilities
  - Providing additional construction workforce parking spaces, which would minimise construction workers parking on local roads
  - Minimising disruptions to the road network around construction ancillary facilities and noise and other disturbance to the local community including residential, business and commercial properties
  - Improving safety for construction workers, motorists and the general public by providing a controlled area from which project traffic schedulers can manage trucks and direct truck drivers to the construction sites at an appropriate time
- Development of a car parking strategy that will quantify construction workforce parking demand, identify public transport options (and measures such as carpooling and shuttle-buses) and identify all locations that will be used for construction workforce parking (see environmental management measure TT04 in **Chapter E1** (Environmental management measures))
- Development and implementation of a truck management strategy that will identify potential truck marshalling areas that will be used by project-related heavy vehicles and describe management measures for project-related heavy vehicles to avoid queuing and site-circling in adjacent streets and other potential traffic and access disruptions (see environmental management measure TT16 in **Chapter E1** (Environmental management measures))
- Designing acoustic sheds with consideration of the activities that will occur within them and the relevant noise management levels in adjacent areas. Monitoring will be carried out to confirm that the actual acoustic performance of each shed is consistent with predicted acoustic performance (see environmental management measure NV7 in **Chapter E1** (Environmental management measures))
- The appointment of a suitably qualified and experienced Acoustics Advisor, who is independent of the design and construction personnel, and who will be engaged for the duration of construction of the project (see environmental management measure NV1 in **Chapter E1** (Environmental management measures))
- Use of the M4 East and New M5 tunnels for spoil haulage when they become available and where practicable, to minimise heavy vehicle movements on the surface road network
- Receivers that qualify for assessment for at receiver treatment in relation to operational noise, that are also predicted to experience significant exceedances of noise management levels due to construction, will be given priority preference for assessment for treatment based on the severity and timing of impact. Where the building owner accepts the at receiver treatment proposal, the treatments will be installed as soon as possible (see environmental management measure NV9 in **Chapter E1** (Environmental management measures)).

Specific management and mitigation will be documented in relevant construction environmental management sub-plans including the Ancillary Facilities Management Plan and the Construction Traffic and Access Management Plan. This will include detailed consideration of the types of activities that would be most likely to cause longer duration impacts during construction of the project, the types of impacts already experienced by these communities as a result of M4 East and New M5 construction, and subsequent development and implementation of location and activity specific mitigation that considers the consecutive nature of construction at these locations.



KEY

Sensitive receivers

- S103, HOOSH Incorporated
- S106, St Joan of Arc OSHC Centre
- S127, Marys Kindy - Haberfield
- S134, Dobroyd Point Primary OSHCare Centre
- S144, St John's Pre-School Ashfield
- S150, St John's Anglican Church
- S155, Ramsay Street Medical Centre
- S158, Haberfield Public School
- S162, Dobroyd Point Public School
- S180, St Joan of Arc Catholic Primary School
- S186, Haberfield Baptist Church Pre-School
- S188, Family Day Care Sydney Wide
- S193, Inner West Education Centre
- S74, UnitingCare Ella Children's Centre
- S78, My Stepping Stones Haberfield
- S80, Chaya's Family Day Care
- S81, Little V.I.P's Child Care Centre
- S89, The Infants Home
- S97, Peek A Boo Early Learning Centres Haberfield
- S99, Nurjahan's Family Day Care

CONSTRUCTION TIMELINE

LEGEND

Imagery © Nearmap (2017)

WestConnex

- M4-M5 Link project footprint
- M4 East construction footprint

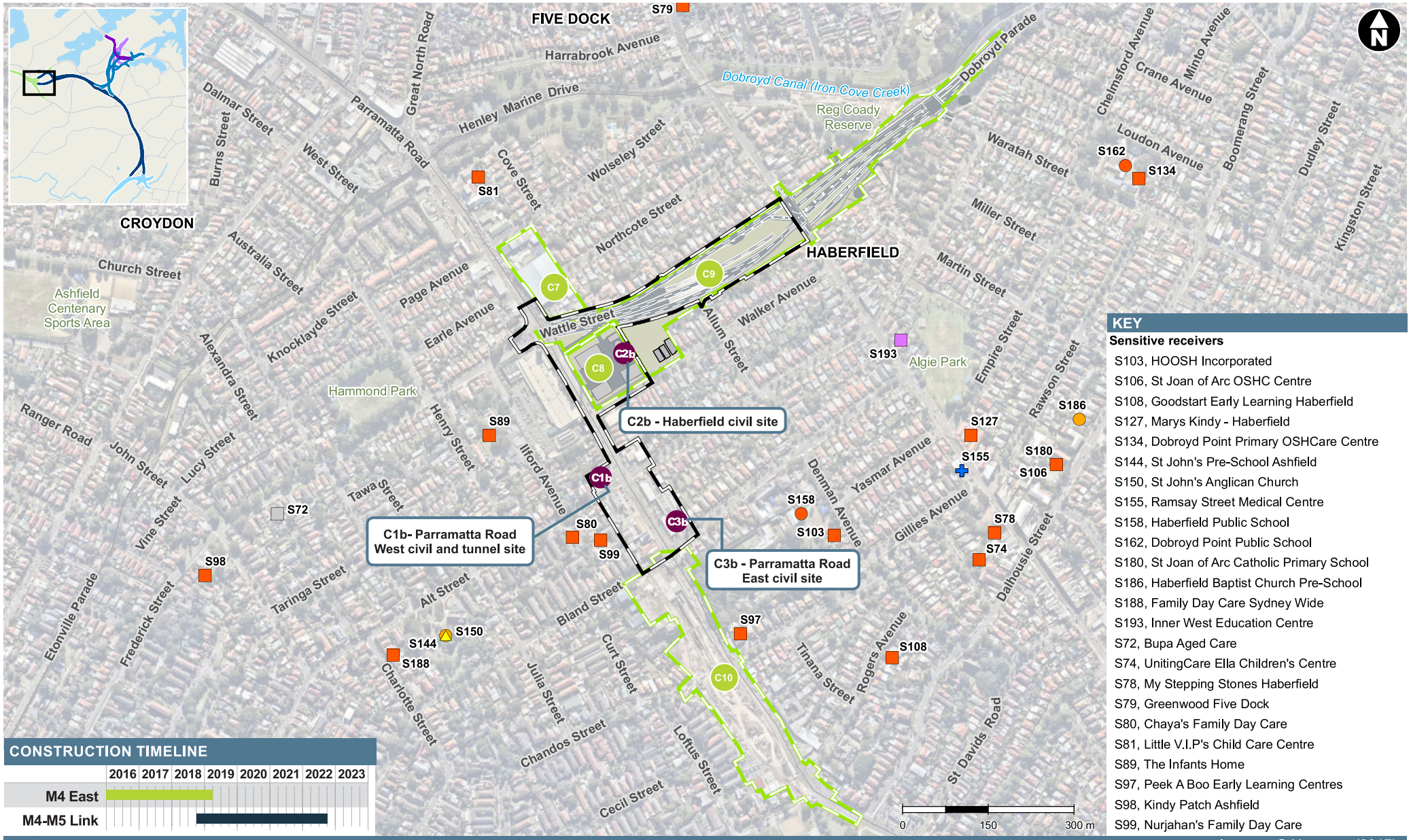
Sensitive receivers

- Aged Care
- Child Care
- Church
- Health
- Education
- Preschool
- School

M4 East

- C7 Northcote Street tunnel site
- C8 Eastern ventilation facility site
- C9 Wattle Street and Walker Avenue civil site

Figure B2-4 Cumulative construction impacts – Haberfield (Option A)



KEY

Sensitive receivers

- S103, HOOSH Incorporated
- S106, St Joan of Arc OSHC Centre
- S108, Goodstart Early Learning Haberfield
- S127, Marys Kindy - Haberfield
- S134, Dobroyd Point Primary OSHCare Centre
- S144, St John's Pre-School Ashfield
- S150, St John's Anglican Church
- S155, Ramsay Street Medical Centre
- S158, Haberfield Public School
- S162, Dobroyd Point Public School
- S180, St Joan of Arc Catholic Primary School
- S186, Haberfield Baptist Church Pre-School
- S188, Family Day Care Sydney Wide
- S193, Inner West Education Centre
- S72, Bupa Aged Care
- S74, UnitingCare Ella Children's Centre
- S78, My Stepping Stones Haberfield
- S79, Greenwood Five Dock
- S80, Chaya's Family Day Care
- S81, Little V.I.P's Child Care Centre
- S89, The Infants Home
- S97, Peek A Boo Early Learning Centres
- S98, Kindy Patch Ashfield
- S99, Nurjahan's Family Day Care

CONSTRUCTION TIMELINE

	2016	2017	2018	2019	2020	2021	2022	2023
M4 East								
M4-M5 Link								

LEGEND

Imagery © Nearmap (2017)

Existing features
- Light rail
- Light rail stop

WestConnex
- M4-M5 Link project footprint
- M4 East construction footprint

Sensitive receivers
- Aged Care
- Child Care
- Church
- Health
- Education
- Preschool
- School

M4 East
- C7 Northcote Street tunnel site
- C8 Eastern ventilation facility site
- C9 Wattle Street and Walker Avenue civil site
- C10 Parramatta Road civil site

Figure B2-5 Cumulative construction impacts – Haberfield (Option B)

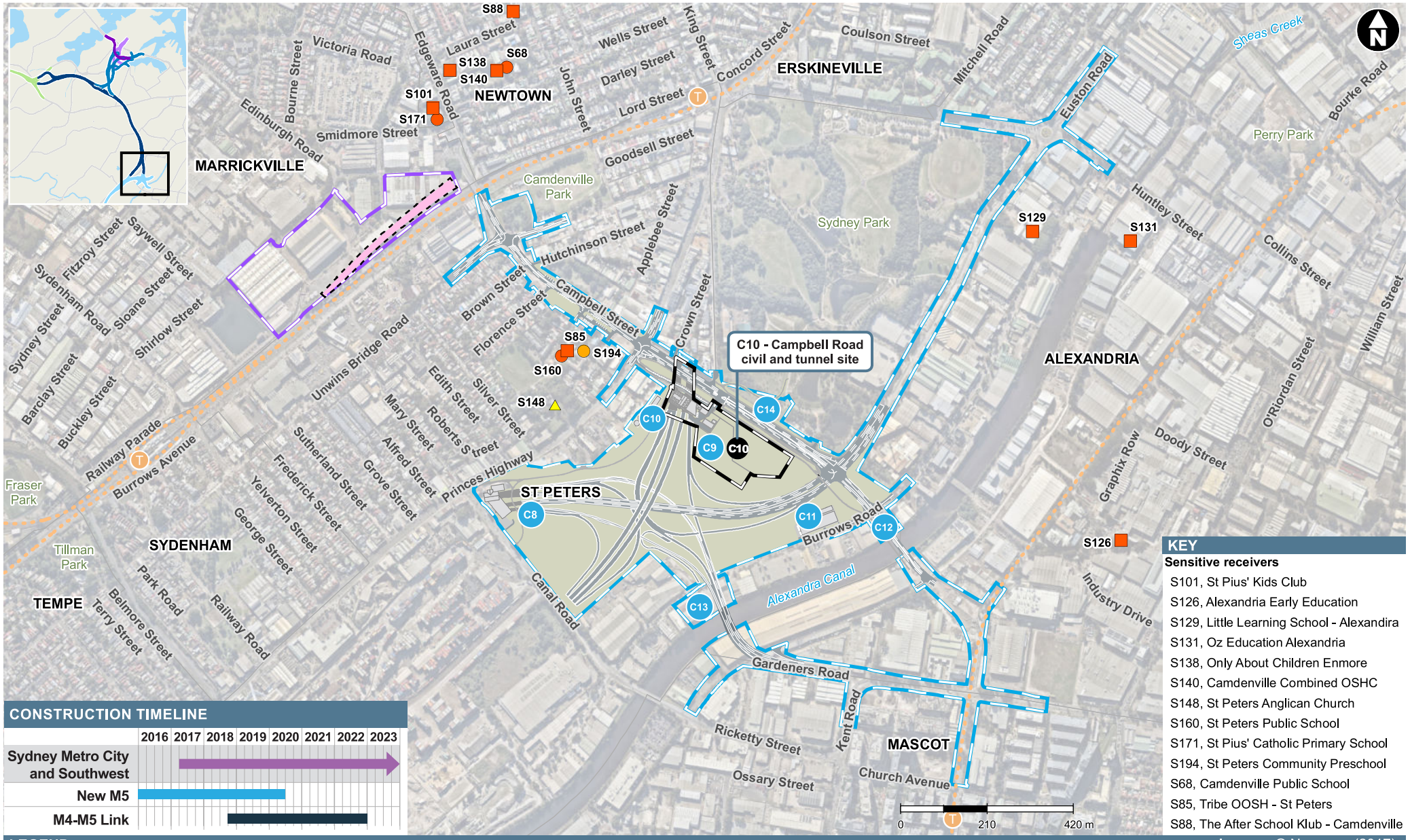


Figure B2-6 Cumulative construction impacts – St Peters

B2.3 Noise and vibration

Refer to Chapter 10 (Noise and vibration) and Appendix J (Technical working paper: Noise and vibration) of the EIS for details of noise and vibration impacts.

B2.3.1 Construction works outside of standard construction hours

In relation to noise and vibration impacts, the proponent has incorporated an assessment for works that will occur outside of standard construction hours. Justification for this scenario has not been provided. For works subject to an EPL [Environment Protection Licence], strong justification (other than scheduling) is necessary to support any application to work outside of standard construction hours. It should not be assumed that there will be provisions made within an EPL for works to occur outside standard construction hours; the justifications are essential for the EPA to make this assessment.

Response

The timely construction and delivery of the project is an essential part of the NSW Government's multi-faceted approach to planning for future growth in Sydney, along with other State significant projects such as other WestConnex projects as well as the Sydney Metro City and Southwest, NorthConnex and the Central Business District (CBD) and South East Light Rail.

In developing construction methodologies and a construction program for the project, the aim has been to minimise the duration of the construction period, while maintaining an acceptable and manageable amenity outcome for surrounding receivers. This has required a balance between the speed of construction activities and the ability to reasonably and feasibly manage potential impacts within acceptable limits.

Tunnelling and associated tunnelling support construction activities (including spoil haulage) would occur 24 hours per day, seven days per week. The exception to this would be at the Darley Road civil and tunnel site (C4), where tunnelling, along with spoil management within an acoustic shed, would occur 24 hours per day, seven days per week, but spoil haulage would occur during standard construction hours only.

The majority of surface construction would be undertaken during standard working hours. However, some construction activities would need to be undertaken outside standard construction hours (ie at night). When works outside of standard construction hours are required, these will need to be justified in accordance with the *Interim Construction Noise Guidelines* (NSW Department of Environment and Climate Change 2009). Construction works that might be undertaken outside the recommended standard hours are:

- Utility works
- Surface works to arterial roads, such as Wattle Street, City West Link, The Crescent, Anzac Bridge, Victoria Road, to minimise impacts on peak traffic flows
- The delivery of oversized plant or structures which are determined by authorities and police to be transported at a time which minimises disruption and safety concerns
- Maintenance and repair of public infrastructure where disruption to essential services and/or considerations of worker safety do not allow work within standard hours
- Emergency work required to avoid the loss of life, damage to property or to prevent environmental harm
- Public infrastructure works that shorten the length of the project and are supported by the affected community
- Works where a justification of the need to operate outside the recommended standard hours is accepted.

Where required, the proponent will provide the relevant authority with a clear justification for the need for out-of-hours works, such as to sustain operational integrity of the road networks.

An out-of-hours works protocol will be developed for the construction of the project (see NV5 in **Chapter E1** (Environmental management measures)). The protocol will include:

- Details of works required outside standard construction hours, including justification of why the activities are required outside standard construction hours
- Measures that will be implemented to manage potential impacts associated with works outside standard construction hours
- Location and activity specific noise and vibration impact assessment process(es) that will be followed to identify potentially affected receivers, clarify potential impacts and select appropriate management measures
- Details of the approval process (internal and external) for works proposed outside standard construction hours.

The protocol will be included in the Construction Noise and Vibration Management Plan (CNVMP).

B2.3.2 Noise and vibration mitigation

The EIS includes discussion of options A and B for tunnelling and support works at Haberfield. This indicates that noise and vibration mitigation is conceptual at this point and that further review of feasible and reasonable mitigation will need to be undertaken once the contractor has been appointed and during detailed design.

Recommendation: Further assessment of actual impacts and reasonable and feasible mitigation measures is undertaken.

Response

The construction methodologies described in this EIS are based on the concept design for the project and are therefore indicative only with detailed design to be carried out by the design and construction contractor(s).

As described in section 6.1 of the EIS, the EIS has been prepared prior to the appointment of a design and construction contractor and as such the construction strategy presented in the EIS aims to provide an assessment of probable construction methodologies, while retaining flexibility for the design and construction contractor to refine the construction methodology following their appointment. The design and construction methodology presented by the contractor(s) would be consistent with the environmental performance outcomes and environmental management measures described in **Chapter E1** (Environmental management measures) and the conditions of approval for the project. This approach has been used by several recent large infrastructure projects in Sydney including Sydney Metro City and South West and CBD and South East Light Rail.

The noise and vibration assessment undertaken to inform the EIS was prepared in response to the Secretary's Environmental Assessment Requirements (SEARs) as issued by the Department of Planning and Environment (DP&E). The assessment was undertaken in accordance with the following guidelines/policies:

- *Noise Criteria Guideline* (Roads and Maritime 2015)
- *Noise Mitigation Guideline* (Roads and Maritime 2015)
- *NSW Road Noise Policy* (NSW EPA 2011)
- *NSW Industrial Noise Policy* (NSW EPA 1999)
- *Construction Noise and Vibration Guideline* (CNVG) (Roads and Maritime 2016)
- *Interim Construction Noise Guideline* (ICNG) (NSW EPA 2009).

Twelve construction ancillary facilities are described and assessed in this EIS. This included the assessment of two potential combinations of construction ancillary facilities at Haberfield and Ashfield (Option A and Option B) as representative scenarios, the purpose of which was to inform the development of a construction methodology that would manage constructability constraints and the need for construction to occur in a safe and efficient manner, while minimising impacts on local communities, the environment and users of the surrounding road and other transport networks.

As described in section 6.5.1 of the EIS, the layout and access arrangements for the construction ancillary facilities are based on the concept design only and would be confirmed and refined during detailed design. The construction ancillary facilities as described in the EIS provide a good representation of what may be present during construction. Consequently, detailed assessments presented in the EIS therefore provide a robust representation of the likely impacts during the establishment and use of construction ancillary facilities.

The final construction site layouts and access arrangements would be consistent with the EIS and the Submissions and preferred infrastructure report (including the environmental management measures outlined in **Chapter E1** (Environmental management measures)) and satisfy criteria identified in any relevant conditions of approval. They would also have regard to the following amenity criteria:

- Where practicable, temporary buildings and structures (such as offices and amenities) would be used to provide a noise barrier between the construction site and adjacent sensitive receivers
- Vehicle access points and internal circulation roads would be located away from adjacent sensitive receivers
- Vehicle access points would have ready access to the arterial road network and would minimise the need for heavy vehicles to travel on local roads through residential areas
- Construction sites would provide sufficient area for the storage of raw materials to minimise, to the greatest extent practical, the number of deliveries required outside standard construction hours.

Management and mitigation measures have been developed to avoid or minimise the impacts from construction noise and vibration on nearby receivers. These are outlined in **Chapter E1** (Environmental management measures) and include the preparation of a CNVMP that will be prepared for the project. The plan will:

- Identify relevant performance criteria in relation to noise and vibration
- Identify noise and vibration sensitive receivers and features in the vicinity of the project
- Include standard and additional mitigation measures from the *Construction Noise and Vibration Guideline* (CNVG) (Roads and Maritime 2016) and details about when each will be applied
- Describe the process(es) that will be adopted for carrying out location and activity specific noise and vibration impact assessments to assist with the selection of appropriate mitigation measures
- Include protocols that will be adopted to manage works required outside standard construction hours in accordance with relevant guidelines
- Detail monitoring that will be carried out to confirm project performance in relation to noise and vibration performance criteria.

The CNVMP will be implemented for the duration of construction of the project.

In addition, location and activity specific noise and vibration impact assessments will be carried out prior to (as a minimum) activities:

- With the potential to result in noise levels above 75 dBA at any receiver
- Required outside standard construction hours likely to result in noise levels greater than the relevant noise management levels
- With the potential to exceed relevant performance criteria for vibration.

The assessments will clarify predicted impacts at relevant receivers in the vicinity of the activities to assist with the selection of appropriate management measures, consistent with the requirements of ICNG and CNVG that will be implemented during the works.

Environmental management measure NV1 (see **Chapter E1** (Environmental management measures) also requires that an Acoustics Advisor be engaged for the duration of the construction of the project. The Acoustics Advisor will be responsible for:

- Reviewing management plans related to noise and vibration and endorsing that they address all relevant conditions of approval and requirements of all applicable guidelines
- Reviewing location and activity specific noise and vibration impact assessments prepared during the project and endorsing the assessments and proposed mitigation measures

- Reviewing proposals regarding works outside standard construction hours, confirming that the works are appropriate and endorsing the proposed mitigation measures
- Monitoring noise and vibration from construction generally and:
  - Confirming that actual noise and vibration levels and impacts are consistent with predictions
  - Confirming that reasonable and feasible noise and vibration mitigation measures are being implemented
  - Ssuggesting additional reasonable measures to further reduce impacts
- Monitoring and providing advice in relation to compliance with conditions of approval and project commitments related to noise and vibration
- Providing advice in relation to complaints regarding noise and vibration impacts that cannot be resolved between the complaint and the project
- Reviewing and endorsing the proposed operational noise controls, the associated noise model and the proposed implementation program.

B2.3.3 Noise and vibration mitigation

With regard to construction noise and vibration, the EPA considers that the proponent has not adequately provided clear justification for out-of-hours works, even though this has been assumed and assessed as part of the proposal.

Recommendation: Construction work be limited to standard construction hours as per the *Interim Construction Noise Guideline* unless the proponent can demonstrate strong justification for out of hours works (other than scheduling).

Response

See the response in **section B2.3.1** for justification of works proposed outside of standard construction hours.

B2.3.4 Conditions of approval (noise and vibration)

NSW EPA recommends that the Department of Planning and Environment includes in any approval given for the project the recommended conditions provided as part of the NSW EPA submission.

Response

Noted. Conditions of approval are a matter for the DP&E to consider during its assessment of the project.

B2.4 Soil and water quality

Refer to Chapter 15 (Soil and water quality) and Appendix Q (Technical working paper: Surface water and Flooding) of the EIS for details of impacts on soil and water quality.

B2.4.1 Water quality impact assessment

The EIS states the relevant Water Quality Objectives (protection of aquatic ecosystems, visual amenity, secondary contact recreation, primary contact recreation and aquatic foods cooked) and most of the indicators and trigger values for the receiving waters' environmental values, listing both the lowland rivers and estuarine values. The EIS anticipates that the discharge water quality requirements for the construction phase would be consistent with the 90% species protection level for toxicants in accordance with the ANZECC [Australian and New Zealand Environment Conservation Council] Guidelines (2000).

While the EPA accepts that the proposed works are in proximity to highly disturbed waterways, the ANZECC Guidelines recommend that 'guideline trigger values for slightly to moderately disturbed systems also be applied to highly disturbed ecosystems wherever possible'. The Guidelines also state: 'the aim is to eventually restore highly disturbed systems to a slightly to moderately disturbed condition', and that: 'It is not acceptable to allow poor environmental performance or water pollution, simply because a water way is degraded'.

Consistent with this, the policy in NSW is that the level of protection applied to most waterways is the one suggested for 'slightly to moderately disturbed' ecosystems. In a highly disturbed waterway, a reduced level of protection may be appropriate as a pragmatic short-term goal, with the aim of eventually restoring it to the status of 'slightly to moderately disturbed'. The construction phase however is projected to be close to 4 years (for each stage), which the EPA does not consider to be 'short-term, particularly given the consecutive nature of the WestConnex Project at certain areas along the alignment.

Recommendation: The receiving waterways require an appropriate protection level relevant to the duration of the project. The proponent should demonstrate that any discharge water quality is consistent with at least the 95% protection level for the appropriate receiving environment ie freshwater and/or marine ecosystems.

Response

Section 8.2.1 of Appendix Q (Technical working paper: Surface water and flooding) of the EIS discusses that temporary construction water treatment facilities would be designed to treat wastewater from the tunnelling works which includes groundwater ingress, rainfall runoff in tunnel portals and ventilation shafts, heat and dust suppression water and wash down runoff.

An ANZECC (2000) species protection level of 90 per cent for toxicants was considered appropriate for adoption as a discharge criterion during construction where practical and feasible. The 90 per cent species protection level is considered to be acceptable for the construction phase because:

- As described in section 2.2.1.9 of ANZECC (2000) and in the *Using the ANZECC Guidelines and Water Quality Objectives in NSW* (NSW Department of Environment and Conservation 2005) the guidelines and objectives are not intended to be applied directly as discharge criteria. They have been derived to apply to the ambient waters that receive effluent or stormwater discharges and protect the environmental values they support. Therefore a less stringent criteria for an end of pipe discharge is considered appropriate when other factors are considered, as described below
- While a quantitative assessment has not been undertaken for the construction phase discharges, when considering the results of the box modelling conducted to inform this response for the operational water treatment plant discharges (see **section B2.4.4**), it is considered that aiming to achieve guideline trigger levels for slightly to moderately disturbed systems as discharge criteria for groundwater treatment is unlikely to result in a material improvement to ambient water quality.

Additional treatment processes such as reverse osmosis or ion exchange would be required to achieve a discharge criteria equivalent to the more stringent 95 per cent species protection level and 99 per cent for contaminants that bioaccumulate, with limited benefit to ambient water quality. Reverse osmosis and ion exchange also have negative environmental impacts including the additional energy usage and chemical waste requiring disposal. Additional footprint would also be required at each location where a construction water treatment plant is proposed to accommodate these more advanced facilities which would result in loss of viable construction area and potentially the need for additional property acquisition.

The discharge criteria for the treatment facilities will be finalised during the preparation of the Construction Soil and Water Management Plan in consultation with relevant stakeholders.

See **section B2.4.4** for details on operational water treatment plant discharges.

B2.4.2 Water quality objectives

An assessment of the potential impacts on the relevant Water Quality Objectives is not provided. The EIS has not provided any predicted water quality discharge concentrations for the duration of the construction and operational phases. The EIS also does not assess the nature and degree of impact that discharges may have on the receiving environment, including consideration of all pollutants that pose a risk of non-trivial harm to human health and the environment.

Recommendation: The 99% protection level should be applied for contaminants that bio-accumulate.

Response

Appendix Q (Technical working paper: Surface water and flooding) of the EIS has been prepared in accordance with the SEARs for the project and with consideration of relevant legislation, guidelines and policy. Further details on the assessment methodology is included in Chapter 3 of Appendix Q (Technical working paper: Surface water and flooding) of the EIS.

The EIS has qualitatively assessed impacts to relevant water quality objectives. This level of assessment is consistent with assessments undertaken for the M4 East and New M5 projects. Residual impacts to ambient water quality will generally be negligible with impacts localised to the zone near the outlet where discharges mix with receiving waters. In the context of the entire catchment draining to Sydney Harbour, the project is likely to have a negligible influence on achieving the water quality objectives. Further assessment including the development of a box model has been undertaken to demonstrate that this is the case. See response in **section B2.4.4** for further details.

The EIS outlines stormwater pollutants and groundwater pollutants of concern for tunnel discharges from the Darley Road and Rozelle water treatment facilities during operation and discusses the nature and degree of impacts. Pollutants from other drainage streams in the tunnel would be captured and tested, and tanked offsite for treatment elsewhere if not suitable for treatment at the project's water treatment facilities and subsequent discharge; therefore they have not been considered further.

Due to the mixing and dilution affect which would occur at the outlet to the receiving waters, impacts to ambient water quality are likely to be negligible where iron and manganese are treated by the water treatment plants. Any minor impacts are likely to be localised and near to the outlet. The constructed wetland would also provide polishing treatment at Rozelle interchange, which would likely remove a portion of the nutrient and metal load (see **section B2.4.4** for further details about operational water treatment including the specific requirement for treatment of iron and manganese).

The recommendation of a 99 per cent protection level is acknowledged as an appropriate level of protection for contaminants that bioaccumulate in slightly to moderately disturbed systems. However, based on a review of the mean groundwater quality for contaminants that bioaccumulate, only nickel (0.008 mg/L) in the mainline tunnel groundwater inflows exceeds the marine water 99 per cent protection level (0.007 mg/L). With consideration of the negligible magnitude of the exceedance and negligible benefit to ambient water quality that would be achieved by a 0.001 mg/L improvement in discharge quality, further investigation of the need for treatment of nickel is not considered necessary.

B2.4.3 Construction state water treatment plants

Temporary construction water treatment plants are proposed and would be designed to treat wastewater including tunnel groundwater ingress, rainfall runoff in tunnel portals and ventilation outlets, heat and dust suppression water and wash down runoff and then discharge into receiving waters (stormwater and local waterways). The EIS has identified that the water treatment would typically involve: primary settling tanks, pH balance, flocculation. The EIS does not confirm that all identified pollutants of concern will be treated (ie no commitment has been made to treat nutrients (including ammonia), heavy metals, hydrocarbons and salinity). The EIS states that type, arrangement and performance of construction water treatment facilities will be developed and finalised during detailed design.

Recommendation: Confirmation that all identified pollutants of concern will be treated by the proposed methods during construction, and where these methods are not suitable, an assessment of additional treatment measures is undertaken.

Response

Section 5.3.1 of Appendix Q (Technical working paper: Surface water and flooding) of the EIS states that iron, manganese, suspended solids, hydrocarbons and other settleable compounds and pH would likely be treated at construction water treatment plants and provides some details around the type of treatment processes. It is considered that there is no need to treat salinity as discharges are to tidal water bodies.

Based on review of the most recent groundwater quality data undertaken since the EIS was prepared, phosphorus, nitrogen, chromium, copper, nickel and zinc are also potential pollutants of concern. Chromium, copper, nickel and zinc only slightly exceeded ANZECC slightly to moderately disturbed criteria with only copper (Rozelle tunnel wells) and zinc (mainline tunnel wells) exceeding 90 per cent species protection levels (see **Table B2-5** and **Table B2-6**). Given the low concentrations of these metals, impacts of untreated discharges would likely result in negligible impacts to water quality when considering the mixing and dilution which would occur within the receiving waters. Treatment of nickel and chromium is therefore not considered to be required. Opportunities to incorporate copper treatment processes at the Rozelle construction water treatment facilities, and zinc treatment processes at the mainline construction water treatment facilities, would be considered further during detailed design.

Phosphorus and nitrogen concentrations in groundwater were elevated in relation to the 90 per cent species protection level. The groundwater concentrations for both nitrogen and phosphorus are sufficiently low such that when considering dilution and mixing affects, discharges during construction are likely to result in negligible impacts to ambient water quality. Opportunities to treat phosphorus would be incorporated where feasible and reasonable, but nitrogen is not proposed to be treated during construction due to the need for advanced treatment methods.

Temporary construction water treatment plants will be designed and managed so that treated water will be of suitable quality for discharge to the receiving environment (see SW10 in **Chapter E1** (Environmental management measures)). An ANZECC (2000) species protection level of 90 per cent is considered appropriate for adoption as discharge criteria for toxicants where practical and feasible. The discharge criteria for the treatment facilities will be included in the Construction Soil and Water Management Plan (CSWMP).

B2.4.4 Operational state water treatment plants

Operational water treatment plants would be provided for the mainline tunnels at Darley Road, Leichhardt and for the Rozelle interchange and Iron Cove Link tunnels at the Rozelle interchange. The EIS states that the preferred option for treated water discharge from the Darley Road water treatment plant would be confirmed during detailed design. Options include direct discharges to either Hawthorne Canal, existing stormwater networks or to the sewer system. Treated flows from the Rozelle plant would drain via a constructed wetland to Rozelle Bay. The EIS provides limited information on the pollutants to be treated and the proposed treatment methods except for Iron and Manganese.

Recommendation: Further assessment of all pollutants is required as well as confirmation that the level of treatment proposed will produce effluent of a suitable quality for discharge to the receiving environment and that this has been developed in accordance with the ANZECC (2000) and relevant NSW WQOs.

The EIS states that the proposed constructed wetland will provide ‘polishing’ treatment to treated groundwater flows from Rozelle which would likely remove a portion of the nutrient and metal load. No details or modelling has been provided for the proposed constructed wetlands to demonstrate any treatment efficiencies. There is also potential for the constructed wetlands to be impacted by any remaining contaminated soil and/or groundwater onsite.

Recommendation:

- Detailed modelling should be provided to justify the claim that the constructed wetlands will treat groundwater inflows from Rozelle and will not be impacted by residual contaminated material
- Further investigation as part of the EIS should be provided into any opportunities to incorporate nutrient treatment (eg. ion exchange or reverse osmosis) within the water treatment plant at Darley Road
- It is not appropriate for the above assessment to be deferred to the detailed stage (as stated in the EIS) given that there could be impacts to the receiving water body - this should be quantified as part of the impact assessment.

Response

At the time of preparation of the EIS, groundwater monitoring results showed that iron and manganese had a high percentage of samples exceeding guideline level and therefore are the pollutants of most concern.

As identified in section 6.3.3 of Appendix Q (Technical working paper: Surface water and flooding) of the EIS, metal, nutrient and ammonia loading to Hawthorne Canal and Rozelle Bay is likely to increase as a result of the continuous treated groundwater discharges.

The operational water treatment facilities will be designed and managed such that effluent will be of suitable quality for discharge to the receiving environment. Opportunities to incorporate nutrient treatment within the plant at Darley Road will be investigated during detailed design. Discharge criteria will be developed in accordance with ANZECC (2000) and relevant NSW water quality objectives (WQOs), and will also include the following discharge criteria:

- 0.3 milligrams per litre for iron
- 1.9 milligrams per litre for manganese.

The discharge criteria for the treatment facilities will be nominated during detailed design in consultation with relevant stakeholders and included in the OEMP (see environmental management measure OSW16 in **Chapter E1** (Environmental management measures)).

The latest available groundwater monitoring results (July 2016 to August 2017) were reviewed after the preparation of the EIS to inform this response. Monitoring results were separated and assessed based on their location and assumed relevance to the mainline tunnel and Rozelle tunnels respectively. The monitoring results were reviewed against the various species protection levels (estuarine physical and chemical stressors and marine water for toxicants). Recreational water quality criteria were also considered. A summary of the analysis is provided in **Table B2-5** and **Table B2-6**.

Table B2-5 M4-M5 Link mainline tunnel groundwater monitoring results

Parameter	Units	Mainline Mean GW Concentration	99% SPL	95% SPL	90% SPL	80% SPL	Recreational Criteria	Groundwater Quality Assessment	Comments
pH	pH units	8.72	NA	**6.5-8.5**	7.6 to 8.0	NA	6.5-8.5	Outside range for SMD and 80%ile reference criteria	Proposed treatment suitable
Iron	mg/L	35.78	NA	NA	NA	NA	0.3	> Recreational Criteria.	Proposed treatment suitable
Nitrite (as N)	mg/L	0.06	NA	NA	NA	NA	1	< Recreational Criteria.	Pollutant not of concern
Nitrate (as N)	mg/L	0.09	0.017	**0.7**	3.4	17	10	<SMD PL.	Pollutant not of concern
Ammonia as N	mg/L	0.66	0.5	**0.91**	1.2	1.7	0.01	<SMD PL but > Recreational criteria	No treatment proposed
Nitrogen (Total)	mg/L	1.87	NA	**0.3**	0.9	NA	NA	>SMD PL and 80%ile reference criteria	No treatment proposed
Total Phosphorus	mg/L	1.16	NA	**0.03**	0.12	NA	NA	>SMD PL and 80%ile reference criteria	No treatment proposed
Reactive Phosphorus	mg/L	0.011	NA	**0.005**	0.04	NA	NA	>SMD PL but less than 80%ile reference criteria	No treatment proposed
Arsenic	mg/L	0.0008	0.0008	**0.013**	0.042	0.14	0.05	<SMD PL.	Pollutant not of concern
Cadmium	mg/L	0.00006	**0.0007**	0.0274	0.0486	0.0906	0.005	<SMD PL.	Pollutant not of concern
Chromium (III+VI)	mg/L	0.006	0.00014	**0.0044**	0.02	0.085	0.05	>SMD PL but <90% SPL	No treatment proposed
Copper	mg/L	0.003	0.0003	**0.0013**	0.003	0.008	1	>SMD PL. but equal to 90% SPL	No treatment proposed
Lead	mg/L	0.0006	0.0022	**0.0044**	0.0066	0.012	0.05	<SMD PL.	Pollutant not of concern
Manganese	mg/L	0.97	1.2	**1.9**	2.5	3.6	0.1	> Recreational Criteria.	Proposed treatment suitable
Mercury	mg/L		**0.0001**	0.0004	0.0007	0.0014	0.001	<SMD PL	Pollutant not of concern

Parameter	Units	Mainline Mean GW Concentration	99% SPL	95% SPL	90% SPL	80% SPL	Recreational Criteria	Groundwater Quality Assessment	Comments
Nickel	mg/L	0.008	**0.007**	0.07	0.2	0.56	0.1	> SMD PL but <90% SPL	No treatment proposed
Zinc	mg/L	0.07	0.007	**0.015**	0.023	0.043	5	> SMD PL. Exceeds 80% SPL.	No treatment proposed

Notes:
Bold values indicates slightly to moderately disturbed (SMD) protection level
Highlighted grey values indicates toxicants that bioaccumulate
In the absence of Marine Water criteria, the Freshwater criteria were adopted for arsenic, nitrate and manganese
Arsenic (V) and Chromium (VI) criteria were used
80 percentile Iron Cove reference criteria adopted as 80% SPL for pH, nitrogen, phosphorus and reactive phosphorus

Table B2-6 M4-M5 Link Rozelle and Iron Cove Link groundwater monitoring results

Parameter	Units	Rozelle Mean GW Concentration	99% SPL	95% SPL	90% SPL	80% SPL	Recreational Criteria	Groundwater Quality Assessment	Comments
pH	pH units	7.643	NA	**6.5-8.5**	7.4 to 8.0	NA	6.5-8.5	Outside range for SMD and 80%ile reference criteria	Pollutant not of concern
Iron	mg/L	34.8	NA	NA	NA	NA	0.3	> Recreational Criteria.	Proposed treatment suitable
Nitrite (as N)	mg/L	0.018	NA	NA	NA	NA	1	< Recreational Criteria.	Pollutant not of concern
Nitrate (as N)	mg/L	0.151	0.017	**0.7**	3.4	17	10	<SMD PL.	Pollutant not of concern
Ammonia as N	mg/L	0.38	0.5	**0.91**	1.2	1.7	0.01	<SMD PL but > Recreational criteria	Wetland proposed
Nitrogen (Total)	mg/L	1.47	NA	**0.3**	1.05	NA	NA	>SMD PL and 80%ile reference criteria	Wetland proposed
Total Phosphorus	mg/L	0.22	NA	**0.03**	0.1	NA	NA	>SMD PL and 80%ile reference criteria	Wetland proposed

Parameter	Units	Rozelle Mean GW Concentration	99% SPL	95% SPL	90% SPL	80% SPL	Recreational Criteria	Groundwater Quality Assessment	Comments
Reactive Phosphorus	mg/L	0.009	NA	**0.005**	0.03	NA	NA	>SMD PL but less than 80%ile reference criteria	Wetland proposed
Arsenic	mg/L	0.002	0.0008	**0.013**	0.042	0.14	0.05	<SMD PL.	Pollutant not of concern
Cadmium	mg/L	0.00006	**0.0007**	0.0274	0.0486	0.0906	0.005	<SMD PL.	Pollutant not of concern
Chromium (III+VI)	mg/L	0.003	0.00014	**0.0044**	0.02	0.085	0.05	>SMD PL but <90% SPL	Pollutant not of concern
Copper	mg/L	0.010	0.0003	**0.0013**	0.003	0.008	1	>SMD PL. but equal to 90% SPL	No treatment proposed
Lead	mg/L	0.002	0.0022	**0.0044**	0.0066	0.012	0.05	<SMD PL.	Pollutant not of concern
Manganese	mg/L	0.59	1.2	**1.9**	2.5	3.6	0.1	> Recreational Criteria.	Proposed treatment suitable
Mercury	mg/L	0.000051	**0.0001**	0.0004	0.0007	0.0014	0.001	<SMD PL	Pollutant not of concern
Nickel	mg/L	0.007	**0.007**	0.07	0.2	0.56	0.1	> SMD PL but <90% SPL	Pollutant not of concern
Zinc	mg/L	0.019	0.007	**0.015**	0.023	0.043	5	> SMD PL. Exceeds 80% SPL.	No treatment proposed

Notes:
Bold values indicates slightly to moderately disturbed (SMD) protection level
Highlighted grey values indicates toxicants that bioaccumulate
In the absence of Marine Water criteria, the Freshwater criteria were adopted for arsenic, nitrate and manganese
Arsenic (V) and Chromium (VI) criteria were used
80 percentile Iron Cove reference criteria adopted as 80% SPL for pH, nitrogen, phosphorus and reactive phosphorus

For Rozelle interchange monitoring wells average groundwater concentrations exceeded water quality criteria as follows:

- Total nitrogen, total phosphorus, reactive phosphorus, copper and zinc exceeded slightly to moderately disturbed trigger levels
- Iron, manganese and ammonia exceeded recreational water quality trigger levels.

For mainline tunnel monitoring wells average groundwater concentrations exceeded criteria as follows:

- pH, total nitrogen, total phosphorus, reactive phosphorus, copper, chromium, nickel and zinc exceeded slightly to moderately disturbed trigger levels
- Iron, manganese and ammonia exceeded recreational water quality trigger levels.

The proposed operational water treatment plants at Darley Road (MOC1) and Rozelle (MOC3) would treat suspended solids, pH, iron and manganese. The proposed constructed wetland at the Rozelle Rail Yards would provide 'polishing' treatment to the treated groundwater flows, removing a proportion of the nutrient (forms of nitrogen and phosphorus) and metal load.

As the wetland at Rozelle Rail Yards is considered to be a 'polishing' wetland it would not be designed to perform to achieve a certain discharge criteria. The discharge criteria would be set as the discharge from the treatment plant upstream of the construction wetland. With this in mind, the box model assessment (as discussed below) did not take into account any potential water quality benefits from the wetland. However, the wetland would provide some water quality benefit by reducing nutrient and metal loading to Rozelle Bay.

MUSIC modelling of the constructed wetland was undertaken to gain an appreciation of what benefit the wetland might provide to inform the concept design and EIS. The modelling indicated that the wetland would reduce nutrient concentrations close to the assumed background concentrations within a wetland (MUSIC assumes background concentrations to be 1 mg/L for nitrogen and 0.06 mg/L for phosphorus) with an increasing removal rate as groundwater nutrient concentration increased. MUSIC is unable to model metal treatment. Further investigation would be undertaken at detailed design to confirm the effectiveness of the wetland. Notwithstanding this, the water treatment facility at the Rozelle East motorway operations complex (MOC3) would provide the necessary treatment to achieve the discharge criteria.

The wetland would be lined, eliminating the risk of direct groundwater inflows. A contamination investigation would be undertaken during detailed design, the findings of which would inform the need for site remediation and/or management measures. Potential contamination impacts to the wetland and other surface water systems (drainage channels) would be considered and appropriately managed as part of this investigation.

As no constructed wetland is proposed at the Darley Road motorway operations complex (MOC2), opportunities to incorporate other forms of nutrient treatment (for example ion exchange or reverse osmosis) within the plant at Darley Road will be investigated during detailed design. Other metals with mean concentrations which exceeded the slightly to moderately disturbed criteria, including zinc and copper (Rozelle and mainline tunnel) and chromium and nickel (mainline tunnel only) would also require similar forms of treatment to reduce their already low concentrations to slightly to moderately disturbed levels. Appropriate treatment methods, such as reverse osmosis and ion exchange, have negative environmental impacts including the additional energy usage and chemical waste requiring disposal. Additional footprint would also be required to accommodate these more advanced facilities which would result in a greater operational footprint and less land available for future non-road uses. With consideration of these factors, further assessment has been undertaken on the need for more advanced treatment as described below.

To inform this response, a box model was developed to quantify the impact of discharges from the operational water treatment plant to ambient water quality within the Hawthorne Canal/Iron Cove and Rozelle Bay systems when mixing and dilution affects are considered. In this model, Rozelle Bay and Iron Cove have been schematised as their own control volumes whereby the main process of mixing is tidal exchange. This mixing is assumed to be uniform and effective. Stormwater and groundwater concentrations have been averaged over time with Sydney Harbour having constant water quality; and inflows averaged over time. With this assumption, an iterative scheme over many tidal cycles has been created to estimate the final water body concentrations for a selection of analytes.

Scenarios were analysed for no treatment to identify high risk pollutants and with treatment to understand the benefits of treatment to the receiving waterways.

The box model supports the conclusions of the EIS that when mixing and dilution affects are considered, impacts to ambient water quality from treated groundwater within the receiving waterways would be negligible (generally less than three per cent impact to ambient water quality) with the exception of iron and manganese, which would require treatment.

Although some of the other metal and nutrient concentrations in groundwater exceeded the slightly to moderately disturbed ecosystem criteria (as detailed above), they are still sufficiently low such that when considering dilution and mixing affects, discharges during construction are likely to result in a negligible impacts to ambient water quality with no treatment. The benefit of providing treatment to achieve the ANZECC slightly to moderately disturbed criteria for other nutrients and metals (excluding iron and manganese) was assessed in the model and shown to provide a negligible improvement to ambient water quality by comparison with the 'no treatment' option. Furthermore, species protection levels in ANZECC (2000) are not intended to be applied as discharge criteria. As described in section 2.2.1.9 of ANZECC (2000) and in the *Using the ANZECC Guidelines and Water Quality Objectives in NSW* (NSW Department of Environment and Conservation 2005) the guidelines and objectives are intended to apply to ambient waters that receive effluent or stormwater discharges and are just one factor that needs to be considered when developing discharge criteria (such as the impacts of more advanced treatments).

The benefit of providing additional ammonia treatment with consideration to the recreational water quality criteria was also considered. The box model assessment indicated that a negligible benefit to ambient water quality would be achieved by comparison with the 'no treatment' option.

Therefore, when considering the limited benefits to ambient water quality and negative environmental impacts, more advanced treatment is not considered to be required for these lower risk pollutants.

B2.4.5 Work in waterways

The EPA is generally supportive of channel naturalisation treatments where potential contamination legacy issues are assessed and addressed. The EIS states that the project would involve works in and around waterways, including Whites Creek and Rozelle Bay during bridge construction works as part of the realignment of The Crescent as well as widening of Whites Creek to manage flooding and drainage. These works may lead to disturbance of contaminated sediments and erosion of exposed banks once the existing channel's concrete lining has been removed (and prior to construction of the naturalised channel treatment). Construction of new stormwater outlets to receiving bays (Rozelle Bay and Iron Cove) would cause localised mobilisation of potentially contaminated sediments. Sediments settled on top of the hard, lined base of Whites Creek would also be disturbed. No detail was provided on the proposed mitigation measures for in-channel sediment disturbance, including measures for protecting water quality associated with construction/modification activities within and adjacent to waterways.

Recommendation: Further assessment of mitigation measures to address in-channel sediment disturbance.

Response

Section 5.3 of Appendix Q (Technical working paper: Surface water and flooding) of the EIS states that works at Whites Creek and Rozelle Bay during bridge construction may lead to disturbance of contaminated sediments and potentially erosion of exposed banks once the existing channel concrete lining has been removed and prior to construction of naturalised channel treatments. This could result in temporary turbidity impacts to water quality within Whites Creek and Rozelle Bay during construction. Impacts are likely to be temporary until settling occurs and would be managed in accordance with the NSW Department of Primary Industries guidelines for controlled activities on waterfront land including the in-stream works, riparian corridors and watercourse crossings guidelines. Potential impacts associated with contaminated sediments will be managed in accordance with:

- Environmental management measure SW01 (see **Chapter E1** (Environmental management measures)), which requires the preparation and implementation of a CSWMP which will include the measures that will be implemented to manage and monitor potential surface water quality impacts during construction
- Environmental management measure SW02, which requires a program to monitor potential surface water quality impacts due to the project, including the disturbance of contaminated sediment (see SW02 in **Chapter E1** (Environmental management measures))

- Environmental management measure CM01, which requires that potentially contaminated areas directly affected by the project will be investigated and managed in accordance with the requirements of guidance endorsed under section 105 of the *Contaminated Land Management Act 1997* (NSW). This includes further investigations in areas of potential contamination identified in the project footprint. If contamination posing a risk to human or ecological receptors is identified, a Remediation Action Plan will be prepared.

Construction environmental management measures, as identified in **Chapter E1** (Environmental management measures), will be captured in a Construction Environmental Management Plan and associated sub-plans, including a CSWMP and erosion and sediment control plans, and prepared in accordance with the relevant conditions of approval.

Furthermore, there are a number of specific environmental management measures proposed in **Chapter E1** (Environmental management measures) relating to construction and operational impacts around Whites Creek and Rozelle Bay including environmental management measures SW03, SW09, OSW17, OSW18, B3, B4 and OB10.

The CSWMP will include the measures that will be implemented to manage and monitor specific surface water quality impacts during construction. Therefore, it is considered suitable that mitigation measures to address in-channel sediment disturbance be developed as part of this process.

B2.4.6 Water quality monitoring program

The EIS states that a program to monitor potential surface water quality impacts associated with the project will be developed and included in the Construction Soil and Water Management Plan. The program will include the water quality monitoring parameters and the monitoring locations identified in Annexure E of Appendix Q (Technical working paper: Surface water and flooding). Although ammonia has been identified as a contaminant of concern, it has not been included as a water quality monitoring parameter.

Recommendation: Inclusion of Ammonia as a water quality monitoring parameter.

Response

It is acknowledged that ammonia should be included as a water quality monitoring parameter and this will be considered in the development of the CSWMP.

B2.4.7 Recommended conditions of consent

NSW EPA recommended a number of conditions of consent that should be considered as part of any planning approval that would be issued for the project.

Response

Conditions of approval are a matter for DP&E to consider during its assessment of the project.

B2.5 Contamination

Refer to Chapter 17 (Contamination) and Appendix R (Technical working paper: Contamination) of the EIS for details of contaminants of potential concern and the existing environment.

B2.5.1 Site identification and characterisation

The EPA notes the presence of former and operational commercial/industrial facilities and service stations surrounding the proposed tunnel alignment. The proposed development traverses various suburbs with areas that have been notified to the NSW EPA under section 60 of the *Contaminated Land Management Act 1997* ('CLM Act") or formerly regulated by the NSW EPA under the CLM Act. The EPA also notes presence of former and operational dry cleaning facilities surrounding the proposed tunnel alignment including but not limited to Haberfield civil and tunnel site (C2a) at Haberfield, Parramatta Road East civil site (C3b) at Haberfield, and Pyrmont Bridge Road Tunnel site at Annandale. Considering this, chlorinated hydrocarbons could be present in soil, groundwater and soil vapour.

Recommendations: Chlorinated hydrocarbons should be included as potential contaminants of concern in future investigation works.

Chapter 16 and Appendix R of the EIS reported that there are notified sites under section 60 of the CLM Act within 300 metres of the tunnel alignment, or sites formerly regulated by the NSW EPA under the CLM Act. The EPA has reviewed the management status of these sites against its internal records.

Recommendations: The management status of sites listed in Table 16-18, Table 16-19, Table 16-20 and Table 16-21 be updated as follows:

From Table 16-18:

- White Bay Power Station Rozelle - Regulation under CLM Act not required
- Balmain Power Station (Terry Street Rozelle) - Formerly regulated under the CLM Act
- Former Chemplex Factory (35 Terry Street Rozelle) - Formerly regulated under the CLM Act
- Caltex Service Station (121 Victoria Road Rozelle) - Regulation under CLM Act not required
- 7 Eleven Service Station (178-180 Victoria Road Rozelle) - Regulation under CLM Act not required.

From Table 16-49:

- O'Dea Reserve (Salisbury Lane, Camperdown) - Formerly regulated under the CLM Act
- 7 Eleven (Former Mobil) Service Station (198 Parramatta Road Annandale) - Regulation under CLM Act not required.

From Table 16-20:

- Caltex Service Station (26 Enmore Road Newtown) - Regulation under CLM Act not required.

From Table 16-21:

- BP Express Service Station (2 Princes Highway, St Peters) - Regulation under CLM Act not required
- Former Tidyburn Facility (53 Barwon Park Road, St Peters) - Formerly regulated under the CLM Act
- Camdenville Park (May Street, St Peters) - Regulation under CLM Act not required.

Response

Appendix R (Technical working paper: Contamination) of the EIS notes that where potential sources of chlorinated hydrocarbons such as manufacturing and dry cleaners were identified, volatile organic compounds were listed as a potential contaminant of concern. Volatile organic compounds include chlorinated hydrocarbons, as well as halogenated hydrocarbons and other solvents commonly used in industrial processes. Therefore, chlorinated hydrocarbons would be included as potential contaminants of concern in future investigation works.

The reviewed management status of the sites recorded in the EIS is acknowledged and revisions (as appropriate) have been documented in **Chapter A4** (Clarifications). As outlined in environmental management measure CM01, potentially contaminated areas directly affected by the project will be investigated and managed in accordance with the requirements of guidance endorsed under section 105 of the CLM Act (see **Chapter E1** (Environmental management measures)). This includes further investigations in areas of potential contamination identified in the project footprint. If contamination posing a risk to human or ecological receptors is identified, a Remediation Action Plan will be prepared. Environmental management measures to mitigate contamination impacts are described in full in **Chapter E1** (Environmental management measures).

B3 NSW Chief Scientist and Engineer/ACTAQ

This chapter addresses issues raised by NSW Chief Scientist and Engineer/Advisory Committee on Tunnel Air Quality (ACTAQ).

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B3.1 Assessment process

Refer to Chapter 2 (Assessment process) of the Environmental Impact Statement (EIS) for details of the assessment process.

B3.1.1 Main findings of the review

Our overall conclusion of the WestConnex EIS is that it constitutes a thorough review of high quality. It covers all of the major issues and areas that an EIS for a project of this scale should. The information presented is of suitable detail and logical in order. The choices made regarding data used and methods followed have been logical and reasonable and it is our view that the benefit of exploring alternative approaches would be questionable or marginal.

Response

The comments received on the EIS are noted.

B3.2 Air quality

Refer to Chapter 9 (Air quality) and Appendix I (Technical working paper: Air Quality) of the EIS for details of air quality.

B3.2.1 Consideration of cumulative impacts

This project links the New M5 and M4 East projects, both of which are mainly road tunnels. To some degree these other WestConnex projects add road capacity to an existing corridor or route. However, the M4-M5 Link also introduces new high-speed routes across Sydney. It is therefore unsurprising that the EIS predicts an overall increase in vehicle emissions in this area of Sydney relative to the "Do Minimum" option.

It is also unsurprising that this project (as with WestConnex as a whole) will redistribute traffic flows in many parts of the city. However, by linking other tunnels together the M4-M5 Link is unique in Sydney in that it substantially increases the time that a vehicle could spend continuously in tunnels.

This means that, from an air quality point of view, this project presents some similarities and differences to the other WestConnex projects (M4 East and New M5). The major difference that needs to be explicitly considered is the cumulative impacts on ambient air quality, in-tunnel air quality and human exposure to pollutants of the three WestConnex projects.

Response

The comments received on the cumulative impact assessment are noted.

An analysis of the cumulative impacts of the operation of the WestConnex program of works on ambient and in-tunnel air quality is discussed in Chapter 9 (Air quality), section 26.4.2 and Appendix I (Technical working paper: Air quality) of the EIS. Human health cumulative impacts are discussed in section 26.4.4 of the EIS with further detail provided in Appendix K (Technical working paper: Human health risk assessment) of the EIS.

B3.2.2 General comments on assessment methodology

We find that the assessment methodology is sound and represents best practice. All of the models and data used are appropriate and expertly used. We have found no significant errors nor important omissions, other than lack of inclusion of new information on NO_x emissions from late-model diesel light-duty vehicles — discussed in detail below.

Response

The general comment by ACTAQ on the methodology is noted and a response to the detailed comments is provided in **section B3.2.2**.

B3.2.3 Emission modelling

The methodology (models used, assumptions made, etc.) to calculate emissions — in tunnels and on the surface road network, respectively — in the M4-M5 Link EIS is the same as in the New M5 (and M4 East) EIS. The third-party review of the New M5 EIS carried out by us in 2015 concluded regarding the emission modelling: "To summarize, there seems to be no or few weak points in the emission modelling part of the New M5 EIS".

Now, with two years having passed since the last EIS review, the following comments can be made:

- It is stated in the EIS that both of the emission models that have been used for the M4-M5 Link EIS were updated in 2012. Bearing in mind - among other things - the "dieselgate" scandal revealed in 2015, a question and concern thus is if the two models today represent the state of the art regarding emerging knowledge on late-model diesel light-duty vehicles' (LDVs) NO real-world emission performance, including the direct emissions of primary NO_2

  For instance, the NO emission factors (EFs) for diesel LDVs complying with the Euro 5 emission standard in the European emission model HBEFA (www.hbefa.net) has been updated twice since late 2015, as new knowledge has emerged, each update resulting in higher EFs compared to the preceding model version. A similar evolution has occurred for diesel LDV Euro 6 emissions. This may have implications for both the baseline and the future emission scenarios for NO and NO_2 for tunnel traffic and traffic on the surface road network

- The consequences of the anticipated non-compliance of many late model diesel light-duty vehicles with regard to the NO_x legislative Euro 5 and 6 emission limits are amplified by the expected strong growth in the share of diesel light-duty vehicles until 2033.

Since any detailed vehicle-specific emission factors have not been presented in the M4-M5 Link EIS, it is not possible to assess the consequences for the emission modelling results of the EIS of the two factors mentioned above, although Annexure E [of Appendix I of the EIS] presents an evaluation of the NSW EPA emissions model conducted in the Lane Cove Tunnel, showing that the model overestimates emissions in that specific application.

Response

Emission factors for light duty vehicles

The emissions factors used for the ventilation design in the EIS were based on the Sydney fleet and were calibrated against tunnel traffic. The calibration report is available on the WestConnex website[1]. The in-tunnel emissions for the future years were estimated using the detailed Permanent International Association of Road Congresses (PIARC) method based on the local fleet emissions factors which is a change from the M4 East and New M5 EISs which used the simple PIARC method.

The emissions factors used for the ambient air quality modelling was based on the NSW Environment Protection Authority (NSW EPA) emissions model, which is based on real-world monitoring data, and not based on manufacturers specifications. The accuracy of the NSW EPA model[2] in representing vehicle emissions (carbon monoxide (CO), oxides of nitrogen (NO_X), nitrogen dioxide (NO_2), particulate matter 10 micrometers or less in diameter (PM_{10}) and particulate matter 2.5 micrometers or less in diameter ($PM_{2.5}$)) was investigated using measurements from the ventilation outlets of the Lane Cove Tunnel during October and November 2013. The ventilation conditions in the tunnel result in all vehicle emissions being released from the ventilation outlets. No pollution is released from the tunnel portals. This makes it possible to compare the predicted mass emission rate (in grams per hour) for the traffic in each direction of the tunnel with the observed emission rate in the corresponding ventilation outlet. On average, the model overestimated emissions of each pollutant in the tunnel, and by a factor of between 1.7 and 3.3.

[1] https://www.westconnex.com.au/local-updates?default_view=2&project=14&updates=9
[2] It should be noted that this work excludes the changes to the fuel splits for cars and light commercial vehicles following the Roads and Maritime fleet model revision in 2016.

Implications for baseline and future scenarios

Although it is possible that the inclusion of Euro 6 emission factors in the NSW EPA model could have meant that NO_X emissions from diesel light vehicles were underestimated in the assessment, overall it is likely that the approach used would, in itself, have tended to give a conservative estimate of emissions. For example, all diesel light-duty vehicles in Australia are imported, and hence Euro 6 vehicles will enter the fleet irrespective of promulgating ADR79/05, and they will probably reflect the enhanced standards incorporating real driving emissions (RDE). To develop the Euro 6 emission factors in the NSW EPA model, the European real-world Euro 5 NO_X emissions were scaled by the ratio of the Euro 6 and Euro 5 limit values. Given that the Euro 5 emission factors accounted for high real-world emissions, while Euro 6 will impose RDE, the Euro 6 NO_X emission factors in the NSW EPA model are likely to be conservative.

The introduction of Euro 6 in Australia is likely to have minimal impact on emissions from petrol light-duty vehicles. The Euro 6 emission factors in the NSW EPA model are estimated to be 10 per cent lower than Euro 5 for HC, CO, NO_X and PM. Given the introduction of particle number (PN) limits for gasoline direct injection (GDI) vehicles in Euro 6, and the large uptake of GDI technology, the PM assumption is also likely to be conservative.

Alternative models

Consideration was given to the use of alternative models such as the Handbook Emission Factors for Road Transport (HBEFA) or COPERT (EU version) in preference to PIARC or the NSW EPA model. In both cases there are arguments to support the models that were used. PIARC is the recognised international model for calculating tunnel ventilation requirements, and includes assumptions/algorithms that are specific to vehicle operation in tunnels.

For the reasons stated in the air quality assessment (Annexure E of Appendix I (Technical working paper: Air quality) of the EIS), the NSW EPA model was considered to be the most suitable for the surface road assessment having been based on and validated against the local vehicle fleet. It is based on tests on Australian vehicles and includes assumptions relating specifically to vehicles in NSW. Neither the NSW EPA or PIARC models had been updated at the commencement of modelling for the EIS assessment in late 2016.

Primary NO_2

The lack of up-to-date data on primary NO_2 emissions is not relevant to the assessment, as primary NO_2 emissions are not used for surface road emissions and ambient air quality assessment. Rather, the approach used predicts total NO_X emissions and conducts an empirical conversion to NO_2 using up-to-date ambient air quality monitoring data.

B3.2.4 In-tunnel air quality

The M4-M5 Link ventilation report is a very ambitious, comprehensive and detailed report, successfully serving its purpose of assessing both in-tunnel air quality and emissions to surrounding environments for further dispersion calculations. One of its main conclusions is that "the tunnel design meets the in-tunnel pollution criteria for all traffic conditions", which is also the most likely one. It has been out of the scope of this review to review all the modelling exercises and calculation results in detail. However, a few remarks of concern can be made, similar to those for the emission modelling part of the M4-M5 Link EIS in general:

- The emission model/emission data (PIARC) used represents the state of knowledge about five years ago (2012) regarding (real-world) road vehicle emissions[2]
- The most recently updated emission models, e.g. HBEFA, have in particular revised the emission factors for NO valid for late model (i.e. complying with the Euro 5 and 6 standards) diesel light-duty vehicles (passenger cars and light commercial vehicles) to gradually higher values, as a result of many vehicles having much higher emissions in real world driving than anticipated from the emission level given by the Euro standard
- It is also mentioned in the ventilation report that, as for the PIARC data used, "The LDV fleet is fixed at 50% petrol and 50% diesel, whereas it is forecast to be dominated by diesel vehicles by the time the M4-M5 link opens". This is not consistent with the data presented for the emission model calculations in Chapter 8 in Appendix I of the EIS, where the diesel fraction is considerably lower (Table 8-7)

- The fleet NO2:NOx ratios for Euro 3 and Euro 4 diesel light-duty vehicles (both passenger cars and what is assumed to be light commercial vehicles (entitled "LDV") appear to be much higher than what is known from the literature/other emission models.

Since the emission calculations and underlying assumptions presented in the ventilation report of the M4-M5 Link EIS are very conservative, the main conclusion about in-tunnel air quality should still be valid, despite the above concerns. A quantitative assessment of the difference in results, if updated and higher emission factors were used, would represent a significant amount of additional work.

Footnote 2 from issue addressed in first bullet: In addition, regarding PIARC data, it is stated in the EIS that "No methodology for estimating (in tunnel emissions) beyond 2020 is provided".

Response

The comments received on the ventilation report are noted.

B3.2.5 In-tunnel cumulative impacts

We are satisfied that the EIS has comprehensively addressed the issue of cumulative exposure arising from journeys through multiple consecutive tunnels made possible by the M4-M5 Link.

Response

The comments received on the in-tunnel cumulative impact assessment are noted.

B3.2.6 GRAMM/GRAL model evaluation

The GRAMM-GRAL dispersion modelling suite has been used appropriately and appears to be giving credible results. We recognise that the 'validation' of the dispersion model presented within the EIS has significant methodological limitations (the observational data available was not collected for, and is not particularly well suited to, this purpose) — this is indeed why a separate study to validate GRAL in the Australasian context has been commissioned. However, the validation assessment provided within this EIS indicates that the method for assessing background concentrations, and for modelling short-term ambient NO_2 concentrations (both discussed further below), are now the weakest links in the assessment.

Response

The comments received on the GRAMM/GRAL model evaluation are noted (the GRAMM/GRAL Is a system consisting of two main modules: a prognostic wind field model (Graz Mesoscale Model - GRAMM) and a dispersion model (GRAL itself).

B3.2.7 Assessment of background air quality

Assessment of background air quality is a surprisingly challenging aspect of any EIS like this. In common with previous WestConnex and NorthConnex projects considerable funds have been spent on air quality monitoring, putting the M4-M5 Link in the enviable position of having a far richer observational dataset available than most, if not all, comparable projects. Within this context, therefore, the assessment of background air quality in this EIS may be seen as good rather than best practice.

We call particular attention to the fact that datasets of < 1 year (due to monitoring starting too late) have been under-used or discarded, despite the fact that these data could be extrapolated to 1 year with acceptable uncertainty.

The consequence appears to be unnecessary uncertainty in several background estimates. This makes it difficult to evaluate dispersion model performance and to explore equity and distributional issues (see further comment below). It also makes it difficult to assess the margin of compliance with the NEPM for $PM_{2.5}$. This is an issue because Sydney's air quality is marginally non-compliant with the current NEPM and is unlikely to meet the 2025 NEPM target without further interventions (as indicated by projections of future $PM_{2.5}$ emissions provided in the EIS). The role that the WestConnex projects could play in meeting the NEPM is difficult to assess without a more accurate understanding of the current state of background air quality.

On the other hand, we do not believe that the weakness in background air quality assessment is seriously influencing the key conclusions of the EIS, and in particular does not impact the health risk assessment.

Therefore, despite these limitations, we find the current assessment of background air quality to be acceptable and fit for purpose. However, we recommend that careful consideration is given to this issue for the assessment of any future road and road tunnel projects in Sydney.

Response

The ACTAQ's comments in relation to the acceptability of the background air quality assessment are noted. The use of any National Environment Protection (Ambient Air Quality) Measure (AAQNEPM) air quality criteria in relation to the assessment of projects and developments is outside the scope of the AAQNEPM itself, and is decided by the State and territory jurisdictions. The criteria for air quality assessments for projects/developments in NSW are contained in the NSW EPA Approved Methods.

The base year of the assessment was 2015. Consequently, the available data for 2015 was included in the determination of background concentrations. The exceptions to this were the following background sites:

- St Peters Public School in Church Street, St Peters
- Bestic Street, Rockdale
- Beverly Hills Park, Beverly Hills.

For these sites, monitoring data was only available for the second half of 2015. The extension of the data from these sites to the whole of 2015 would have an uncertainty of its own. This might have improved some aspects of the background concentrations (eg spatial definition of annual mean NO_X), but it is not clear how short-term (one hour, 24 hour) concentrations would be determined for these sites for use in the synthetic profiles, unless the reviewers are only referring to annual means.

Three project-specific air quality monitoring stations are in operation and will provide data to inform the design and construction contractor's air quality modelling during the detailed design of the project.

B3.2.8 Method to estimate NO_2 concentration

The method used has limitations, which the EIS appropriately acknowledges. However, we find the empirical approach of estimating NO_2 concentrations using observational NO_2 and NO data to be sound, appropriate and the approach most suited to the purposes of the EIS.

Response

The comments received on the methodology used to estimate NO_2 concentration are noted.

B3.2.9 Assessment and management of construction impacts

With a few exceptions, the methodology applied for the assessment of construction impacts in the WestConnex M4-M5 Link EIS is the same as the one applied in the New M5 EIS from 2015 (as well as the M4 East EIS, also from 2015). Thus, it is based on the guidance provided by the UK Institute of Air Quality Management in 2014, but adapted for use in Sydney, taking into account factors such as the assessment criteria for ambient PM_{10} concentrations.

One potentially important distinction, and possible improvement, between the M4-M5 Link and the New M5/M4 East construction impacts assessment is the grouping of the above-ground construction activities for the M4-M5 Link (taking place at a number of separate locations, with the work staggered in time) into 12 distinct compounds. To avoid underestimations of the risks, given that the construction activities in several of these compounds are expected to take place concurrently and in close proximity to one another, the 12 compounds were combined according to seven "worst case" scenarios for the assessment. For each of these scenarios a risk assessment for each of the three dust impacts types (dust soiling, human health and ecological, respectively) and each of the four construction activities (demolition, earthworks, construction and track-out, respectively) was made, i.e. in all 84 individual risk assessments, whereas in the New M5/M4 East EIS in all only 12 individual risk assessments were made. This enabled in the M4-M5 Link case that mitigation measures in some instances could be specifically tailored for individual - or at least groups of - scenarios, which was not the case for the New M5/M4 East construction projects, thus a likely improvement in methodology.

It appears that the risk of dust impacts on human health on average is assessed as being in the range "Medium" to "Low Risk" for the M4-M5 Link, whereas it is assessed as "High Risk" for the New M5, and this should deserve some explanation or attention in the M4-M5 Link EIS.

Response

The comments received on the methodology used to assess construction works are noted.

The construction air quality assessment in the New M5 EIS assessed a single worst case scenario with the scale of the overall project component was determined to be 'Large' for each activity (demolition, earthworks, construction and track-out). The approach was refined in the M4-M5 Link work with the assessment of risk completed for each compound, rather than as a whole, where the scale of each activity in accordance with the proposed construction program varying from 'Small' to 'Large'. As the scale of the activity has significant bearing on the outcome of the risk assessment, the risk assessment in the New M5 works could be considered highly conservative. Refer to Table 7-1 of Appendix H (Technical working paper: Air Quality) of the New M5 EIS for the criteria for assessing the potential scale of emissions.

B3.2.10 Grouping of receptor categories

A potential downside of the M4-M5 Link construction impact assessment compared to that of the New M5/M4 East assessments, is that in the former it appears that the three human receptor categories "Child Care", "Educational" and "Aged Care" are lumped into one single receptor category "Community", whereas these are identified separately in the latter. This may be significant for the risk assessment and associated mitigation measures, since small children and elderly people are believed to be more vulnerable to air pollution than the population at large.

Response

The outcome of the construction assessment is not influenced by grouping of the receptor categories as this information is only used to calculate the number of people potentially exposed to dust impacts. As per section 7.5.2 of Appendix I (Technical working paper: Air quality) of the EIS, community receptors are defined and include community centres, schools and childcare centres with approximate receptor populations provided. The number of receptors in each distance band from construction sites was estimated from land use zoning of the site.

The exact number of 'human receptors' is not required by the Institute of Air Quality Management (IAQM) guidance, which recommends that judgement is used to determine the approximate number of receptors within each distance band. For receptors that are not dwellings, judgement was used to determine the number of human receptors. The results of the screening assessment of receptors in proximity to the various construction sites are shown in Figure 9-14 of Chapter 9 (Air quality) of the EIS. The assumed numbers of people (receptors) in each building are provided in section 9.6.2 of the EIS.

B3.2.11 Assessment conclusions and equity issues

Overall, the project (as assessed) seems to deliver improved air quality at a majority of receptors despite increased emissions and traffic — a simple yet important conclusion that the EIS does not emphasise. However it is unclear how much of this is due to improved pollutant removal/dispersion (i.e. use of stacks) versus spatial redistribution of traffic or emissions.

The EIS clearly indicates that the project leads to some highly localised improvements to air quality in some areas and similarly localised worsening of air quality in other areas. However, it does not discuss whether these changes increase or decrease the range of concentrations, i.e. how changes are related to absolute concentrations. We accept that the SEARS do not require a consideration of equity of impacts, however such a consideration can be of value to stakeholders. A cursory examination of both the maps and the community receptor results appears to show that improvements in air quality (DSC relative to DM scenarios) are predominantly in areas of relatively poorer air quality, i.e. the project has an overall tendency to narrow the distribution of concentration, reducing inequality of impacts.

Response

As noted in the ACTAQ's comment, consideration of equity of air quality impacts is not a requirement of the SEARs set for the project. Any increases in air quality emissions due to the project are small, so any changes in in the equity of air quality impacts will also be small.

It should also be noted that for metrics such as one hour NO_2 and 24 hour PM_{10}, exceedances of the criteria were predicted to occur both with and without the project. However, the total numbers of receptors with exceedances decreased slightly with the project and in the cumulative scenarios. This is consistent with ACTAQ's tentative conclusion that the project has an overall tendency to narrow the distribution of concentration, reducing inequality of impacts.

B3.2.12 Recommendations for future projects

We note that at least three more major road tunnel projects are being considered for Sydney. We make the following recommendations for any future EIS relating to these projects:

1) That meteorological and dispersion modelling considers and responds to the findings of the study: "Optimisation of the application of GRAL in the Australian context", which was commissioned on behalf of the Advisory Committee on Tunnel Air Quality

2) Stakeholders consider whether an assessment of equity is desired and should be included in the SEARs

3) After recent studies to validate the emissions and dispersion models used in the WestConnex EISs, the methods for assessing background concentrations (see section le above) and for modelling short-term ambient NO_2 concentration (see section if above), are now the weakest links in the assessment. We recommend that the large amount of ambient air quality data for Sydney that has become available due to the NorthConnex and WestConnex projects is analysed and mined to inform new models of background air quality.

Response

The comments received regarding recommendations for future EISs are noted.

B3.2.13 Minor errors

Main report (1B) Table 9-3 —the hourly CO, daily NO_2, annual PM_{10} and daily PM $_{2.5}$ 'criteria' "by 2020" for New Zealand do not exist. These appear to be the 2002 Guidelines http://www.mfe.govt.nzipublications/airtambient-air-ouality-guidelines-2002-update

Response

This error is noted and clarified in **Chapter A4** (Clarifications).

B3.3 Human health risk

Refer to Chapter 11 (Human health risk) and Appendix K (Technical working paper: Human health risk assessment) of the EIS for details of the human health risk assessment.

B3.3.1 Health risk assessment

We find the health risk assessment to be sound and agree with its findings.

Response

The comments received on the human health risk assessment are noted.

B4 Sydney Water Corporation

This chapter addresses issues raised by Sydney Water Corporation.

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B4.1 General comments

B4.1.1 Requested amendments to the Utilities Management Strategy

Volume 2B Section 1.7.1 NSW Legislation - please add *Sydney Water Act 1994*.

Volume 2B Section 2.3 Major Utility Services includes:

- Potable Water (Sydney Water) - mains of 250 millimetre diameter or greater
- Wastewater (Sydney Water) - pipes greater than 300 millimetre diameter
- Stormwater (Sydney Water) - mains of 375 millimetre diameter or greater including, culverts and open channels.

Response

Sydney Water's comments regarding the requested amendments to Volume 2B are noted.

The purpose of the Utilities Management Strategy is to provide a framework and process for identifying potential impacts of the project on utilities, with a focus on the major (trunk) utility works rather than identifying all utilities which may be affected. Section 2.3 of the Utilities Management Strategy (refer to Appendix F (Utilities Management Strategy) of the Environmental Impact Statement (EIS)) outlines the utility services that were considered during the development of the concept design and the strategy.

During detailed design, further consultation will be undertaken with utility service providers and relevant agencies, including Sydney Water, in relation to any potential impacts on their infrastructure. As identified in environmental management measure PL12 (see **Chapter E1** (Environmental management measures)) interface agreements will be entered into with the owners of infrastructure and utility services likely to be impacted by construction of the project. The agreements will identify as required:

- Minimum separation distances and appropriate settlement criteria for utility infrastructure
- Settlement monitoring requirements during construction
- Contingency actions in the event that settlement limits are exceeded.

B4.1.2 Assessment of impacts to Sydney Water assets

Volume 2B Section 3.8.1 Sydney Water Utility Services - amend the statement:

'It is expected the Sydney Water assets would not be adversely impacted' to 'It is expected the Sydney Water assets should not be adversely impacted'. There is currently no detailed assessment that confirms the assets would not be adversely impacted by the Main Line tunnel.

Volume 2B Section 3.8.1 Sydney Water Utility Services - amend the statement:

'It is expected that the potential vibration and settlement impacts on these utility services would be negligible and can be managed' to 'Potential vibration and settlement impacts on the City and Pressure tunnels are not yet determined until further assessments are conducted. Once determined, suitable control measures must be implemented to minimise vibration and settlement impacts.'

Response

A preliminary assessment of the potential settlement and vibration impacts due to construction of the project has been considered in the vicinity of major (trunk) utility services including the Sydney Water Pressure Tunnel and City Tunnel. The preliminary assessment, discussed in section 12.3.4 of the EIS, identified that the base of the M4-M5 Link mainline tunnels are located about 12 metres above the obvert level for the Pressure Tunnel. The closest construction/access shaft for the Pressure Tunnel (shaft 14) is around 45 metres from the M4-M5 Link mainline tunnels. With regards to the City Tunnel, the M4-M5 Link mainline tunnel alignment is proposed to pass below the City Tunnel in the vicinity of the Princes Highway and Alice Street at Newtown, with the top of the M4-M5 Link mainline tunnels located about 11 metres below the invert level for the City Tunnel.

The preliminary assessment discussed in section 12.3.4 of the EIS also noted that due to the clearance achieved by the M4-M5 Link tunnel alignment relative to the Sydney Water tunnels, and the geological conditions in the areas where these crossover points occur, it is expected the Sydney Water assets would not be adversely impacted by the project. Preliminary settlement assessments have predicted that both of the Sydney Water tunnels would experience minimal movement:

- Around two to five millimetres (upward heave) and maximum angular distortion of one in 3,000 for the Pressure Tunnel
- Around 10 to 16 millimetres (settlement) and maximum angular distortion of one in 2,000 for the City Tunnel.

The assessment was based on assumptions about the strength and stiffness of the water tunnels given that limited information about the design and condition of these assets was available at the time the assessment was undertaken.

Section 3.8 of Appendix F (Utilities Management Strategy) of the EIS identified that detailed surveys should be undertaken to verify the levels and condition of these Sydney Water assets. In addition, the environmental management measures in **Chapter E1** (Environmental management measures) that directly relate to these aspects include:

- Further assessment of potential settlement impacts, including numerical modelling (environmental management measure PL7)
- Preparation of a settlement monitoring plan (environmental management measure PL8)
- Interface agreements will be entered into with the owners of infrastructure and utility services likely to be impacted by construction of the project (environmental management measure PL12). The agreements will identify as required:
  - Minimum separation distances and appropriate settlement criteria for utility infrastructure
  - Settlement monitoring requirements during construction
  - Contingency actions in the event that settlement limits are exceeded
- Preparation and implementation of a Construction Noise and Vibration Management Plan (environmental management measure NV2)
- Location and activity specific noise and vibration impact assessments, if applicable (environmental management measure NV4)
- Monitoring at the commencement of activities for which a location and activity specific noise and vibration impact assessment has been prepared to confirm that actual noise and vibration levels are consistent with noise and vibration impact predictions and that the management measures that have been implemented are appropriate (environmental management measure NV6).

B4.2 Construction work

Refer to Chapter 6 (Construction work) of the EIS for details of the construction strategy.

B4.2.1 Staging and timing of construction work

Sydney Water recommends early consideration of staging and timing design for work and delivery of the project. This is very critical to allow sufficient time for Sydney Water to schedule and program shutdowns and reconnections of our assets. This will ensure that Sydney Water continues to meet its Operating Licence and most importantly maintain services to our customers. A Water Service Coordinator can assist you with this process.

Response

Sydney Water's comment is noted.

The project is proposed to be constructed and opened in two stages (as noted in section 1.1.2 of Appendix F (Utilities Management Strategy) and section 5.1.3 of the EIS), with Stage 1 – mainline tunnels, due to commence construction in 2018 and be open to traffic in 2022. Stage 2 – Rozelle interchange and the Iron Cove Link are due to commence construction in late 2018 and be open to traffic in 2023. Indicative timing and duration of utility works is presented in section 6.5 of Appendix F (Utilities Management Strategy) of the EIS.

Consultation with Sydney Water with regards to the staging, timing and duration of works and potential impacts to Sydney Water assets and operations would be ongoing during the detailed design and construction phase.

B4.3 Utilities

Refer to Appendix F (Utilities Management Strategy) of the EIS for details of potential impacts on utilities.

B4.3.1 Sydney Water assets

Sydney Water owns and operates trunk and reticulation assets located within and adjacent to the project boundary for the proposed Stage 3 WestConnex M4-M5 Link Project. These assets provide wastewater and potable water services to our customers in the affected area. Sydney Water must continue to provide these services during and post project works for the Stage 3 WestConnex M4-M5 Link Project as per Sydney Water Operating Licence and regulatory requirements. These assets include (but are not limited to) the City and Pressure Tunnels, Balmain Slopes Submain at Iron Cove and Sewage Pumping Station (SP0006) at Easton Park.

Response

The proponent acknowledges the importance of the water and wastewater services that Sydney Water provides to customers and the need to avoid, or minimise, any disruptions to the services. The Utilities Management Strategy includes an assessment of the potential impacts from the M4-M5 Link on utility assets, including Sydney Water assets, and environmental management measures are proposed, where appropriate, in **Chapter E1** (Environmental management measures).

Chapter 3 of the Utilities Management Strategy identifies a number of trunk Sydney Water assets for the areas of interest located within the project footprint and outside the project footprint and these are discussed in sections 3.2 to 3.8 of Appendix F (Utilities Management Strategy) of the EIS. Proposed works outside the project footprint are discussed in section 5.4 of Appendix F (Utilities Management Strategy). In relation to the specific assets listed in Sydney Water's comments:

- The City Tunnel and Pressure Tunnel are discussed in section 3.8.1 of Appendix F (Utilities Management Strategy) of the EIS, with proposed management measures in Table 3-8 of Appendix F (Utilities Management Strategy) of the EIS
- The Balmain Slopes Submain at Iron Cove is discussed in section 3.5 of Appendix F (Utilities Management Strategy) of the EIS
- The Sewage Pumping Station SP0006 at Easton Park is outside the project footprint, but was discussed in Chapter 20 (Non-Aboriginal) of the EIS, with more detailed discussion in Chapter 6 and Table 6-15 of Appendix U (Technical working paper: Non-Aboriginal heritage) of the EIS.

As discussed in section 2.4 of Appendix F (Utilities Management Strategy) of the EIS, the approach proposed for treating utility services is to:

- Avoid or minimise impacts on utility services where practicable such as by adjusting the project design and construction methodology
- Retain and protect utility services if and where required
- Relocate utilities, including removing utility services and re-laying those services in a designated utility service corridor in a different location within or immediately adjacent to the project footprint where practicable. If a service needs to be relocated outside the project footprint, locations within an existing road reserve or infrastructure corridor would be preferred
- Remove or suitably isolate any redundant utility services as agreed with the appropriate utility service provider.

Ongoing consultation and coordination of activities will occur with utility service providers with assets in close proximity to project locations to ensure that the services they provide are not unreasonably affected and they can continue to access, operate and maintain their assets.

B4.3.2 Access to assets during construction and operation

Sydney Water reserves the right to assess, based on final project layout and construction designs prepared by the project team and or their contractors, the impacts on our assets located within the project scope, and the potential needs for adjustments funded by the project to accommodate accessibility of our pipes for operational and maintenance purposes, new pavement locations and changes to structures.

Sydney Water requires safe unrestricted access to our assets throughout the life of the project. We need to ensure these assets are fully operational at all times.

Response

Sydney Water's items raised are noted.

Ongoing consultation and coordination of activities will occur with utility service providers with assets in close proximity to project locations to ensure that the services they provide are not unreasonably affected and they can continue to access, operate and maintain their assets during construction and operation of the project.

B4.3.3 Sydney Water processes

Sydney Water Asset Adjustment process, found on the Sydney Water website, should be adhered to for the relocation, adjustment and/or protection of our assets. Additionally, if assets are required to be changed, the environmental approval will need to cover any works identified that may fall outside of the project boundary, but be a result of the project works.

Response

Sydney Water's comment in relation to asset adjustment process is noted.

Utilities requiring adjustment or relocation within the construction footprint or in defined areas outside the project footprint would be confirmed during detailed design and would be adjusted according to utility provider requirements. If there are project changes proposed during detailed design, these would be subject to an updated environmental constraints analysis and risk assessment to confirm if the proposed management measures in the Utilities Relocation Management Plan (for works undertaken prior to the approval of the Construction Environmental Management Plan (CEMP)), and the CEMP (for works undertaken after the approval), are appropriate.

This process is summarised in Figure 1-4 and discussed in section 9.2 of Appendix F (Utilities Management Strategy) of the EIS). Consultation on these matters has commenced with Sydney Water and will be ongoing during the detailed design and construction phases.

B4.3.4 Utilities Management Strategy

Sydney Water endorses this strategy to work together with all utilities involved in this project throughout detailed design and construction phases to ensure protection of all utilities assets. This is referenced in the Utility Management Strategy (Volume 2B, Appendix F) of the EIS.

Also create a clash register which can prioritise high to low risk assets.

Response

Sydney Water's endorsement of the Utilities Management Strategy is noted. A clash register or similar will be developed by the design and construction contractor(s) during detailed design in consultation with relevant utility providers including Sydney Water.

B4.4 Consultation

Refer to Chapter 7 (Consultation) and Appendix F (Utilities Management Strategy) of the EIS for details regarding consultation, including for utilities management.

B4.4.1 Early consultation

Sydney Water encourages the contractor for these works to conduct early consultation and discussions with Sydney Water. We also recommend that all relevant information, plans and needs specifications for these assets are requested from Sydney Water.

Response

The items raised by Sydney Water are noted.

Consultation with Sydney Water on matters associated with the M4-M5 Link project will continue during the detailed design and construction phases.

B4.4.2 Consultation regarding flood assessment

Continual communication with Sydney Water regarding the detailed design and flood assessment will be required. Any weakening of the EIS position during detailed design will be critically examined by Sydney Water. Sydney Water recommends continued meetings to discuss designs and constraints will benefit the project.

Response

Consultation with Sydney Water will be ongoing during the detailed design and construction phases. Sydney Water has been identified as a project stakeholder in Appendix G (Draft community consultation framework) and in Appendix F (Utilities Management Strategy) of the EIS. In addition, consultation with Sydney Water has been committed to in a number of the environmental management measures presented in **Chapter E1** (Environmental management measures)). This includes consultation regarding the Flood Mitigation Strategy (FMS) (environmental management measures FD01).

During detailed design, hydrologic and hydraulic assessments will be carried out for all temporary project components (including ancillary facilities) and permanent design features that have the potential to affect flood levels in the vicinity of the project. The results of these assessments will inform the preparation of the flood mitigation strategy and the development of the design (see environmental management measure FD02 in **Chapter E1** (Environmental management measures)).

Measures developed to manage potential flood impacts, as identified in the flood mitigation strategy, will be incorporated into the design of temporary and permanent project components and construction and operational management systems as relevant (see environmental management measure FD03 in **Chapter E1** (Environmental management measures)).

B4.5 Soil and water quality

Refer to Chapter 15 (Soil and water) and Appendix Q (Technical working paper: Surface water and Flooding) of the EIS for details of potential impacts on water quality during construction and operation.

B4.5.1 Surface water impacts

Overall the approach to managing surface water impacts of the project is sound. Close consultation with Sydney Water during the concept and detailed design, construction and operational phases of the project will be required to ensure that the objectives are met and that the impacts to Sydney Water stormwater assets is minimised, or improvements to the receiving environment can be achieved.

Response

Sydney Water's comment regarding the approach for managing surface water impacts is noted. Consultation with Sydney Water on matters associated with the M4-M5 Link project will be ongoing during the detailed design and construction phases.

B4.5.2 Water quality objectives

We commend the EIS position aiming to achieve best practice outcomes for the entire project. We also support adoption of the NSW Water Quality Objectives, ANZECC Water Quality Guidelines, Sydney Harbour and Botany Bay Water Quality Improvement Plans.

Response

The applicability of the documents referred to by Sydney Water have been considered by the project. The NSW Water Quality Objectives and the Australian and New Zealand Environment Conservation Council (ANZECC) Water Quality Guidelines (2000) are discussed in section 15.1.4 of the EIS and sections 3.2.2 and 3.2.1 of Appendix Q (Technical working paper: Surface water and flooding) of the EIS respectively. The water quality improvement plans for Sydney Harbour and Botany Bay are discussed in section 3.2.4 and 3.2.5 of Appendix Q (Technical working paper: Surface water and flooding) of the EIS.

B4.5.3 Annual pollutant reduction targets not met

However, the EIS advises that the stormwater mean annual pollutant load reduction targets would not be achieved for the project or for the individual catchments, based on the treatment measures that could practically or readily be implemented. Table 15-12 'MUSIC modelling results for operational water quality' shows that the project fails to meet 20 out of 25 pollutant reduction targets. Sydney Water is concerned that even at this early stage of the project design development there appears to be a lack of application by the project to meet suitable targets.

Response

The project is located within the Sydney Harbour and Parramatta River catchment and the Cooks River catchment. Existing water quality in these catchments is generally poor, indicative of a highly urbanised catchment, with a number of the waterways having been concrete lined (including Whites Creek and Johnstons Creek). However, a number of waterways are considered to be sensitive receiving environments, including Iron Cove at Rozelle, constructed wetlands along Whites Creek and Johnstons Creek and mapped Key Fish Habitat including at Rozelle Bay, White Bay, Alexandra Canal and downstream portions of Dobroyd Canal (Iron Cove Creek) and Hawthorne Canal.

A summary of the Model for Urban Stormwater Improvement Conceptualisation (MUSIC) modelling which was carried out to assess the performance of the proposed water quality treatment measures against pollutant reduction targets is presented in section 15.4.2 and Table 15-1 of the EIS. The modelling results for the main locations where water would be discharged (Rozelle Bay, Iron Cove, White Bay and Whites Creek) and for the project as a whole indicate that:

- The project would generally reduce the mean annual stormwater pollutant loads being discharged to the Sydney Harbour and the Parramatta River estuary, when compared to the existing conditions
- The project would generally reduce the mean annual stormwater pollutant loads being discharged to the five receiving waterways, when compared to the existing conditions (except for total phosphorus loading to Dobroyd Canal (Iron Cove Creek), which would be slightly higher than the existing loading)
- The stormwater mean annual pollutant load reduction targets (refer to section 15.1.5 of the EIS) would not be achieved for the project or for the individual catchments, based on the treatment measures that could practically or readily be implemented.

The pollutant load reduction targets were not achieved due to the following:

- Highly constrained nature of the existing project footprint particularly the surface roads adjacent to Rozelle Bay, which limits potential treatment options to the use of proprietary devices
- The assumptions applied in the model for proprietary devices (used in highly constrained catchments) were conservative due to uncertainty in the practicality, feasibility and type of device which might be implemented at detailed design. Opportunities for potential improvements in treatment performance in highly constrained catchments will be investigated further during detailed design
- Oversizing other treatment measures further to offset the reduced treatment for the project is not generally practical within the available project footprint, given that this would reduce the area available for operational road infrastructure and/or open space.

In the highly constrained areas, proprietary devices or good practice treatment techniques would be deployed where feasible and reasonable to achieve the criteria, as reflected in the environmental management measures in **Chapter E1** (Environmental management measures).

B4.5.4 Tunnel water discharge targets

In view of the substantial annual volumes of groundwater delivered to the two concentrated outlets (Darley Road - Hawthorne Canal and Rozelle - proposed wetland), there is a potential for unsuitable quality groundwater to overwhelm benefits associated with current and future catchment wide stormwater management / treatment efforts by Sydney Water and Councils for these locations.

Sydney Water requests that the establishment of appropriate tunnel water discharge treatment targets be reviewed and determined by a suitable independent expert and that the project designers apply a high degree or verifiable effort to meet the targets.

Response

The operational water treatment facilities will be designed and managed such that effluent will be of suitable quality for discharge to the receiving environment. Opportunities to incorporate nutrient treatment within the plant at Darley Road will be investigated during detailed design. Discharge criteria will be developed in accordance with ANZECC (2000), with consideration of the species protection levels for slightly to moderately disturbed marine waters and relevant NSW WQOs, and will also include the following discharge criteria:

- 0.3 milligrams per litre for iron
- 1.9 milligrams per litre for manganese.

The discharge criteria for the treatment facilities will be nominated during detailed design in consultation with relevant stakeholders and included in the OEMP (see environmental management measure OSW16 in **Chapter E1** (Environmental management measures)) and the conditions of approval for the project.

Given the consultation proposed, it is not considered necessary for an independent review to be undertaken.

B4.5.5 Stormwater quality targets

Sydney Water's stormwater quality targets will apply when a connection to our asset is required (refer to Sydney Water's website http://www.sydneywater.com.au/SW/water-the-environment/how-we-manage-sydney-s-water/stormwater-network/stormwater-quality-targets/index.htm)

Response

The project would include treatment devices during operation to achieve the Sydney Water pollutant load reduction targets for direct connections to Sydney Water assets where feasible and reasonable.

The Sydney Water pollutant load reduction targets for construction would not be applied for the M4-M5 Link project due to:

- The Sydney Water targets as described within the policy on Sydney Waters website are not intended to be used for construction
- The Sydney Water policy states that eWater's MUSIC model be used to demonstrate compliance. The NSW MUSIC modelling guidelines (BMT WBM 2015) which are state wide current best practice guidelines, state that only post-development sediment basins should be modelled in MUSIC and that construction phase sediment basins shall be sized using the methods in Managing Urban Stormwater: Soils and Construction – Volume 1 (Landcom 2004)
- There would be significant difficulties in demonstrating compliance as construction ancillary facility layouts are refined during detailed construction planning and adapted during their use (eg changes in impervious area). In addition, controls for water management would be flexible and adaptive to the configuration and use of construction ancillary facilities, therefore modelling a proposed layout and controls for water management prior to commencement of the project may not be representative of the construction works. Ongoing modelling or monitoring to demonstrate compliance is not considered to be feasible or reasonable
- Vegetated systems used to achieve the targets take months to establish and are highly susceptible to failure when exposed to high sediment loads (a characteristic of a construction site)

and as such aren't appropriate for construction. Proprietary devices for tertiary treatment to achieve the targets are also susceptible to failure with high sediment loads

- It is noted that pollutant loading during construction is primarily related to tunnelling works. Tunnel water is to be treated by construction water treatment plants. Concentration based discharge criteria will be set for the construction water treatment plants, not pollutant load reduction targets.

B4.5.6 Stormwater quality monitoring results

Stormwater quality monitoring results for stormwater discharges should be provided to Sydney Water throughout including pre, during and post construction of the road (3 years).

Response

A program to monitor potential surface water quality impacts due to the construction of the project will be developed and included in the Construction and Soil Water Management Plan. The monitoring program will commence prior to any ground disturbance to establish appropriate baseline conditions and continue for the duration of construction. The program will include monitoring of project discharges (see environmental management measure SW02 in **Chapter E1** (Environmental management measures)).

B4.6 Flooding and drainage

Refer to Chapter 17 (Flooding and drainage) and Appendix Q (Technical working paper: Surface water and Flooding) of the EIS for details of potential impacts on flooding and drainage during construction and operation.

B4.6.1 Discharge protocols of chlorinated water

The environmental approval needs to meet the discharge protocols of chlorinated water due to watermain shutdown and reconnection of live Sydney Water assets that will need to be adjusted.

Response

Sydney Water's discharge protocols will be followed for water main shutdown and reconnection of live Sydney Water assets.

B4.6.2 Asset amplification

Consultation with Sydney Water is required early to ensure any amplifications are identified, planned and confirmed early in the process. Amplification of assets may be required to facilitate future growth along the development corridor. This will be assessed as adjustment applications are referred to Sydney Water for review.

Response

Utility infrastructure that requires adjustment or relocation due to construction of the project will be confirmed during detailed design and would be adjusted according to utility provider requirements on a like for like basis. Where future network extensions or capacity expansions planned by utility service providers coincide with utility works proposed as part of the project, there is the opportunity to undertake both at the same time to avoid future impacts on receivers in the vicinity (subject to complying with the relevant conditions of approval). If amplification was required to accommodate future growth, then the details of amplification will need to be provided by Sydney Water to Roads and Maritime prior to the preparation of detailed design.

B4.6.3 Design of stormwater infrastructure

Sydney Water requests that the project designers consider the project in the context of the broader catchment and likely long-term flood mitigation service requirements. Any stormwater infrastructure should also be designed in a way that enhances biodiversity, aesthetics and social amenity whilst also achieving flood mitigation and water quality objectives.

Response

It is agreed that the design of the project should consider the broader catchment and long-term flood mitigation service requirements, where possible, while still enhancing biodiversity, aesthetics and the social amenity of the area.

The EIS has considered the existing environment and relevant local plans and policies in the flood assessment. A FMS will be prepared by a suitably qualified and experienced person in consultation with directly affected landowners, the NSW Office of Environment and Heritage, Sydney Water and relevant local councils. Identification of flood risks to the project and adjoining areas will consider local drainage catchment assessments and climate change implications on rainfall, drainage and tidal characteristics (see environmental management measure FD01 in **Chapter E1** (Environmental management measures)).

Chapter 13 (Urban design and visual amenity) of the EIS discusses how the project will minimise impacts on visual amenity and enhance the aesthetic of the surrounding area. This is discussed in more detail in section 5.5.6 of Appendix L (Technical working paper: Urban design) of the EIS which notes that water sensitive urban design is a fundamental consideration in the final design of the project, which would have environmental, aesthetic and amenity benefits. Consideration and implementation of water sensitive urban design is also specified in the environmental management measure OSW12 (see **Chapter E1** (Environmental management measures)) whereby the final design of stormwater treatment devices will be supported by water sensitive urban design principles.

The project will be subject to the preparation of Urban Design and Landscape Plans, which will include the design of water treatment facilities. This will include works associated with the design of drainage channels and the wetland as part of the new open space at the Rozelle Rail Yards, the outlet to Rozelle Bay, integration of naturalisation works at Whites Creek (as described in section 5.1.3 and illustrated in Figure 5.6 of Appendix L (Technical working paper: Urban design) of the EIS) and the design of the bioretention facility at King George Park to treat surface water run-off from Victoria Road.

To enhance biodiversity, consultation will be undertaken with Sydney Water regarding integration of naturalisation works at Whites Creek, including re-establishment of vegetation where possible following construction activities. Vegetation re-establishment will be undertaken in accordance with *Guide 3: Re-establishment of native vegetation of the Biodiversity Guidelines: Protecting and management biodiversity on RTA project* (NSW Roads and Traffic Authority 2011) (see environmental management measure OB10 in **Chapter E1** (Environmental management measures)).

B4.7 Non-Aboriginal Heritage

Refer to Chapter 20 (Non-Aboriginal heritage) and Appendix U (Technical working paper: Non-Aboriginal) of the EIS for details of potential impacts to non-Aboriginal heritage.

B4.7.1 Heritage and environmental management

Works around the Rozelle Railyard will require heritage and environmental safeguards, which are site specific and may not be currently covered by the conservation management plan for the canal. Sydney Water must be included in the consultation with the Environmental Protection Authority and WestConnex on this issue.

Response

Non-Aboriginal heritage considerations associated with the Rozelle Rail Yards, including the Lilyfield Road Stormwater Canal (Easton Park drain), are discussed in section 20.2.3 and Appendix U (Technical working paper: Non-Aboriginal) of the EIS. This includes discussion of the potential for the underground section of the canal, which is not heritage listed under SREP 26, to have potential archaeological significance.

Archival photographic recording will be undertaken of the Whites Creek Stormwater Channel No. 95, in the area to be impacted and the Lilyfield Road Stormwater Canal in accordance with the NSW Heritage Office guidelines *Photographic Recording of Heritage Items Using Film or Digital Capture* (2006). The photographic recording will occur prior to any works that have the potential to impact upon the items as noted in the environmental management measure NAH03 presented in **Chapter E1** (Environmental management measures) and the conditions of approval set by the NSW Department of Planning and Environment.

Any items of potential heritage conservation significance, including those which may be discovered in the underground section of Lilyfield Road Stormwater Canal, will be managed in accordance with an Unexpected Finds Protocol (see environmental management measure NAH08 in **Chapter E1** (Environmental management measures)).

Consultation with Sydney Water on matters associated with the M4-M5 Link project will continue during the detailed design and construction phases.

B4.8 Resource use and waste minimisation

Refer to Chapter 23 (Resource use and waste minimisation) of the EIS for details of resource use and waste management.

B4.8.1 Availability and volume of potable water

The Environmental Impact Statement provides a figure for potable water use within and for the project. The availability and volume of these flows will depend on system capability and will be confirmed during detail design.

Response

Sydney Water's comment is noted.

B4.8.2 Trade waste licencing

Any trade waste licence request, most notably for removal of leachate, will need to meet Sydney Water's requirements.

Response

Sydney Water's comment is noted.

B4.8.3 Opportunities to reuse for irrigation of open spaces

There may be opportunities to irrigate surrounding open spaces with broader catchment stormwater and tunnel water. This could go a significant way to helping the project achieve its water quality commitments whilst also reducing potable water demands and providing more liveable open space outcomes for the community.

Response

The EIS recognises that opportunities for the reuse of treated groundwater would be considered in preference to discharge to the stormwater system or receiving waterbodies. This could include irrigation of landscaped areas within the project footprint, such as the new open space at the Rozelle Rail Yards (see environmental management measure OpRW3 in **Chapter E1** (Environmental management measures)).

Whilst it may be possible to reuse stormwater collected in the constructed wetland (subject to final arrangement), additional storage would be required for a separated stormwater harvesting system, which would need to either occupy additional area of open space or be sited underground. As the groundwater is a more constant supply, and will be treated by the water treatment plant and the wetland, it is considered that on-site reuse of treated groundwater may represent a better whole of life outcome for the project.

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B5 Department of Primary Industries

This chapter addresses issues raised by the NSW Department of Primary Industries (DPI).

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B5.1 Groundwater

Refer to Chapter 19 (Groundwater) and Appendix T (Technical working paper: Groundwater) of the Environmental Impact Statement (EIS) for details of potential construction impacts on groundwater.

B5.1.1 Groundwater tunnel inflows

With respect to Groundwater SEAR 3b, the Department of Planning and Environment should continue to condition groundwater tunnel inflows so they do not exceed 1 L/sec/km. Currently all modelling of groundwater extraction impacts are based on this assumption and has been used to determine where proposed tunnels will be lined and unlined.

Where tunnelling is designed to occur through shallow sandstone, there is a high risk of fracture and a high degree of connection to the overlying alluvium. The Proponent should further clarify how the long term tunnel inflow rates will be maintained below the recommended rate of 1 L/sec/km specifically for the areas where the juxtaposition of sandstone and alluvium occurs.

Response

Previous tunnelling in Hawkesbury Sandstone in the Sydney region has shown that groundwater inflow is typically highest during construction. It then reduces as the cone of drawdown expands and equilibrium, or a steady state condition, is reached. Long-term groundwater inflow rates are expected to be lower than construction inflow rates for the project. Tunnelling and cut-and-cover sections for the project through the alluvium, such as in the Whites Creek alluvium beneath the Rozelle Rail Yards, would be tanked to prevent tunnel ingress from the palaeochannels as noted in section 19.2.7 of the EIS. Tunnelling will be beneath the alluvium and palaeochannels at Hawthorne Canal and Iron Cove Creek to reduce the risk of groundwater inflows. Groundwater leakage from the alluvium into the drained sandstone tunnels beneath the alluvium will be minimised as required using methods such as pre-grouting, grout injection and the use of waterproofing membranes during construction as is proposed elsewhere along the alignment (refer to section 19.3.2 of the EIS).

Tunnel inflows will be measured during construction by directing collected water through a flow meter, to monitor inflows. If exceedance of inflow criteria is identified, appropriate waterproofing, such as grout injection into the rock to reduce the permeability, will be implemented in accordance with the environmental management measure GW2 (see **Chapter E1** (Environmental management measures)) and conditions of approval. Other waterproofing options to reduce groundwater inflows could include the installation of waterproofing membranes or pressure grouting into the tunnel walls as outlined in section 2.3.2 of Appendix T (Technical working paper: Groundwater) of the EIS.

A detailed groundwater model will be developed by the construction contractor during detailed design. The model will be used to predict groundwater inflow rates and volumes within the tunnels and groundwater levels (including drawdown) in adjacent areas during construction and operation of the project as identified in the environmental management measure GW7 (see **Chapter E1** (Environmental management measures)).

A groundwater monitoring program will be prepared and implemented to monitor groundwater inflows in the tunnels and groundwater levels as well as groundwater quality in the three main aquifers and inflows during construction (see environmental management measure GW9 in **Chapter E1** (Environmental management measures)). The program will identify groundwater monitoring locations, performance criteria in relation to groundwater inflow and levels and potential remedial actions that will be considered to address any non-compliances with performance criteria. As a minimum, the program will include manual groundwater level and quality monitoring monthly and inflow volumes and quality weekly. The monitoring program will be developed in consultation with the NSW Environment Protection Authority (NSW EPA), DPI-Fisheries, DPI-Water, City of Sydney Council and Inner West Council.

The groundwater monitoring program prepared and implemented during construction will be augmented and continued during the operational phase (see environmental management measure OGW10 in **Chapter E1** (Environmental management measures)). Groundwater will be monitored during the operations phase for three years or as otherwise required by the project conditions of approval and will include trigger levels for response or remedial action based on monitoring results and relevant performance criteria.

At least three monitoring wells and vibrating wire piezometers (VWPs) should be constructed as close as possible to the tunnel centrelines to allow for the comparison of pore pressures and standing water levels. The wells could be constructed about five to 10 metres above the top of the tunnel crown to allow for groundwater drawdown monitoring in the Hawkesbury Sandstone.

The program will include procedures for monitoring and reporting of extracted groundwater volumes to DPI-Water annually for the duration of construction and operation, unless otherwise agreed to or directed by the Secretary. The operational groundwater monitoring program will be developed in consultation with the NSW EPA, DPI-Water and the relevant councils and documented in the Operational Environmental Management Plan (OEMP) or Environmental Management System (EMS).

B5.1.2 Salt water intrusion

DPI considers that the largely untanked (unlined) sections of tunnel which require continuous dewatering will exceed the Level 1 water quality criteria under the Aquifer Interference Policy and will trigger Level 2. The proponent should demonstrate where salt water intrusion from tidal areas will occur and then re-analyse these impacts on sensitive uses of the groundwater. The proponent should also confirm if the particle tracking component of the groundwater model was sufficient to analyse these overall impacts of salt water ingress to the tunnel ecosystems along this tidal fringe.

Response

Saltwater intrusion during construction is discussed in section 5.5.6 and during operation in section 6.4.3 of Appendix T (Technical working paper: Groundwater) of the EIS.

A minimal impact assessment was conducted as part of the EIS in accordance with the *NSW Aquifer Interference Policy Step by Step Guide* (NSW Office of Water 2013b) (AIP). In accordance with the AIP, groundwater modelling (particle tracking) was conducted to assess the potential impacts of saline intrusion. A summary of the assessment is provided in Table 9-1 of Appendix T (Technical working paper: Groundwater) of the EIS for the Less Productive Fractured Rock Aquifer which covers much of the project footprint. The EIS also considered the Botany Sands, which although not intersected by the project, are in close proximity to the east of the project, and therefore likely to be impacted by the project. A summary of the assessment for the Botany Sands is presented in Table 9-2 of Appendix T (Technical working paper: Groundwater) of the EIS for Highly Productive Coastal Aquifer.

Groundwater model development

The groundwater model was developed primarily as a flow transport model to predict groundwater drawdown for various scenarios to allow impacts to receptors to be assessed. The model was not designed as a solute transport model to predict groundwater concentration variations over time. Instead the model was adapted to conduct a capture zone analysis to identify zones within which recharge to the land surface will ultimately report to the tunnels, and within which saline tidal water will be drawn towards the tunnels.

Particle tracking has been used to estimate the travel time of particles from a tidal water body travelling towards the tunnels. This process simulates the movement of saline water or saltwater intrusion through the porous alluvium and sandstone. The computed rate of groundwater flow or travel times is dependent on the aquifer properties including the hydraulic conductivity, hydraulic gradients and effective porosity. Backward or reverse particle tracking is where a large number of particles are released at the tunnel inverts represented in the model. Flow directions are reversed and the locations where those particles would have been at different times in the past are computed and displayed as a function of time.

In the three dimensional model, plotting the reverse particle tracks maps the capture zone and thus the impacted area. While this method of tracking saltwater intrusion does not provide salinity concentration changes with time, it does provide the time scale over which the saltwater intrusion is predicted to occur. Particle tracking calculates the movement of the saltwater interface. Since the area of influence is mapped and it has been calculated that the saltwater intrusion leading edge moves very slowly, taking in the order of tens to hundreds of years to travel a few kilometres, this modelling methodology is considered suitable to predict impacts due to saltwater intrusion.

Less Productive Fractured Rock Aquifer (Ashfield Shale and Hawkesbury Sandstone)

The AIP assessment for the Less Productive Fractured Rock Aquifer considered groundwater in both the Ashfield Shale and Hawkesbury Sandstone. Natural groundwater salinity (electrical conductivity) collected during the groundwater monitoring program from June 2016 to November 2017 has been averaged for each monitoring well and converted to milligrams per litre (mg/L) total dissolved solids and is presented on **Figure B5-1** (Ashfield Shale) and **Figure B5-2** (Hawkesbury Sandstone). The figures show that groundwater salinity is highly variable which is attributed to limited hydraulic connectivity within the fractured rock aquifer. There appears to be no trend associated with increased salinity within the bedrock aquifers associated with close proximity to tidal water bodies. There is a reticulated water supply provided by Sydney Water across the project footprint which limits the use of groundwater resources.

Groundwater between the tunnel and tidal water bodies is predicted to become more saline as saltwater intrusion occurs due to tunnel inflows, causing a reduction in the groundwater pressure within the pores of the Hawkesbury Sandstone and inducing groundwater flow away from the shoreline. Saltwater intrusion occurs predominately around the foreshore, becoming less pronounced with increased distance from the edge of the saline water source. Groundwater modelling (particle tracking) has been used to predict the travel time taken for the saline water to migrate into the groundwater, which has shown that the saline intrusion leading edge moves very slowly taking in the order of tens to hundreds of years to travel a few kilometres.

Groundwater quality within the Ashfield Shale is highly variable but is typically brackish or saline, due to the marine salts contained within the shale. Groundwater quality is generally good within the Hawkesbury Sandstone, with low salinity except in the upper part of the aquifer which can be elevated due to leakage from the Ashfield Shale. Groundwater use across most of the project footprint is low as bore yields are typically low and the area has access to reticulated water. In the area between the tidal zones and the tunnels, no registered domestic or recreational water supply bores were identified in the tidal area that could become more saline.

Five domestic or recreational bores were identified in the DPI-Water search; none were located between the project footprint and the tidal zones. Two of the bores were located in the Botany Sands (GW106192 and GW111164), one at Redfern Park (GW71907) which is used for irrigation, one at Abbotsford (GW106159), and one at the University of Sydney (GW110247). There are also no groundwater dependent ecosystems between the project footprint and tidal zones. A map of groundwater dependant ecosystems in relation to the project footprint is provided in Figure 4.8 of Appendix S (Technical working paper: Biodiversity Assessment Report) of the EIS.

In the broader area, it is predicted that it would take in the order of hundreds of years for saline water to travel from the alluvium in Whites Bay to the University of Sydney bore (GW110247), which is the closest to the tidal zone. It also shows that the nearest high priority groundwater dependent ecosystems (Lachlan Swamp and Botany wetlands) at Centennial Park will not be impacted by saltwater intrusion as saltwater would not be travelling towards these wetlands.

Given the limited groundwater use and the lack of groundwater dependent ecosystems or culturally significant sites within the *Water Sharing Plan for the Greater Metropolitan Region Groundwater Sources (Greater Metropolitan Regional Groundwater Sharing Plan)* (NSW Office of Water 2011) which covers the project footprint and surrounds, it would be unlikely that there would be a lowering of the aquifer systems beneficial use category within the project footprint. As a result, an assessment against the Level 1 water quality criteria under the Aquifer Interference Policy was considered appropriate for the Less Productive Fractured Rock Aquifer, as the criteria for this level were not exceeded.

Highly Productive Coastal Aquifer (Botany Sands)

As with the project footprint, groundwater within the Botany Sands area has limited beneficial use potential. Although the Botany Sands aquifer contains a significant groundwater resource under natural conditions, due to contamination, DPI-Water has embargoed domestic groundwater use under the *Greater Metropolitan Regional Groundwater Sharing Plan*. There is also a reticulated water supply provided by Sydney Water to this area, thereby limiting the usage of groundwater resources.

Groundwater modelling predicts there is likely to be saline water ingress from Alexandra Canal to the project footprint, which may increase the salinity of the groundwater resource between the project footprint and the canal. Groundwater flow toward the project footprint from Alexandra Canal would be restricted by the cut-off wall which is to be installed as part of the New M5 project around the southeast perimeter of the Alexandria landfill. In the area between the eastern edge of the former landfill and Alexandra Canal, groundwater gradients will be reversed within the Botany Sands aquifer due to the installation of the cut-off wall, restoring pre quarry hydraulic gradients, causing groundwater to discharge into the canal. The Botany Sands aquifer however will not be impacted by salt water intrusion as the Botany Sands occur predominately east of Alexandra Canal. Any canal water drawn around the cut-off wall, over hundreds of years, would impact the Ashfield Shale and not the Botany Sands.

The closest high priority ecosystems in the Botany Sands listed under Schedule 4 of the *Greater Metropolitan Regional Groundwater Sharing Plan* are the Botany Wetlands including the Lachlan Swamps, Mill Pond, Mill Stream and Engine Pond. These ecosystems are located more than two kilometres from the project footprint. Groundwater modelling conducted as part of this investigation indicates that the water quality at these wetlands is unlikely to decline due to saltwater intrusion or any other influences due to the project (refer to section 5.4.1 of Appendix T (Technical working paper: Groundwater) of the EIS). This is because saltwater ingress due to depressurisation of the aquifer, induced by tunnel inflows, will predominately occur along the foreshore where there is tidal interaction. Consequently, the majority of saltwater intrusion will occur along the foreshore fringes, limiting impacts to groundwater resources further inland. Capture zone analysis undertaken as part of the groundwater modelling predicted that groundwater quality within the Botany Sands aquifer would increase in salinity slowly over time in the order of hundreds of years. At the St Peters interchange, the cut-off wall constructed around the south east perimeter of the former Alexandria landfill would further restrict saline water movement through the Botany Sands from the Alexandra Canal.

No culturally significant sites were identified within the *Greater Metropolitan Regional Groundwater Sharing Plan* that would be impacted by groundwater changes as a result of the project. Groundwater modelling predicted that no registered bores within a two kilometre radius of the tunnels that intersect alluvium are likely to be drawn down by more than two metres. As this is within Zone 2 of the Botany Sands Source Management Zone, domestic use of groundwater is banned, and as a result the drawdown impacts are not considered significant.

As a result, the Level 1 assessment was considered appropriate for the Highly Productive Coastal Aquifer as the criteria for Level 1 have not been exceeded.

Areas potentially impacted by saltwater intrusion

Areas potentially impacted by saltwater intrusion are the areas between a tidal (saline) water body and the tunnel. Initially it will be the groundwater within the alluvial flanking the foreshore that will be impacted as groundwater is slowly drawn towards the tunnels. Natural groundwater salinity (mg/L total dissolved solids (TDS) within the alluvium derived from the groundwater monitoring program is presented in **Figure B5-3**. The range of salinity values indicates groundwater salinity within the alluvium is highly variable ranging from fresh water to in excess of 10,000 mg/L TDS, with no apparent areal trends.

Four key areas have been identified that may be subject to saltwater intrusion as shown on **Figure B5-4** and **Figure B5-5** (refer to Figure 3-2 and Figure 2-3 of Appendix T (Technical working paper: Groundwater) of the EIS). These figures show the direction of flow of saline surface water towards the tunnels and the initial area of influence. These identified areas are:

- Lilyfield and Rozelle on the south eastern edge of Iron Cove
- Rozelle west of White Bay
- Rozelle west of Rozelle Bay
- St Peters north-west of Alexandra Canal.

Following construction, it is recommended that existing monitoring wells between these foreshore areas and the project tunnels are identified and are added to the groundwater monitoring network to monitor for any changes in groundwater quality that could be attributed to saltwater intrusion.

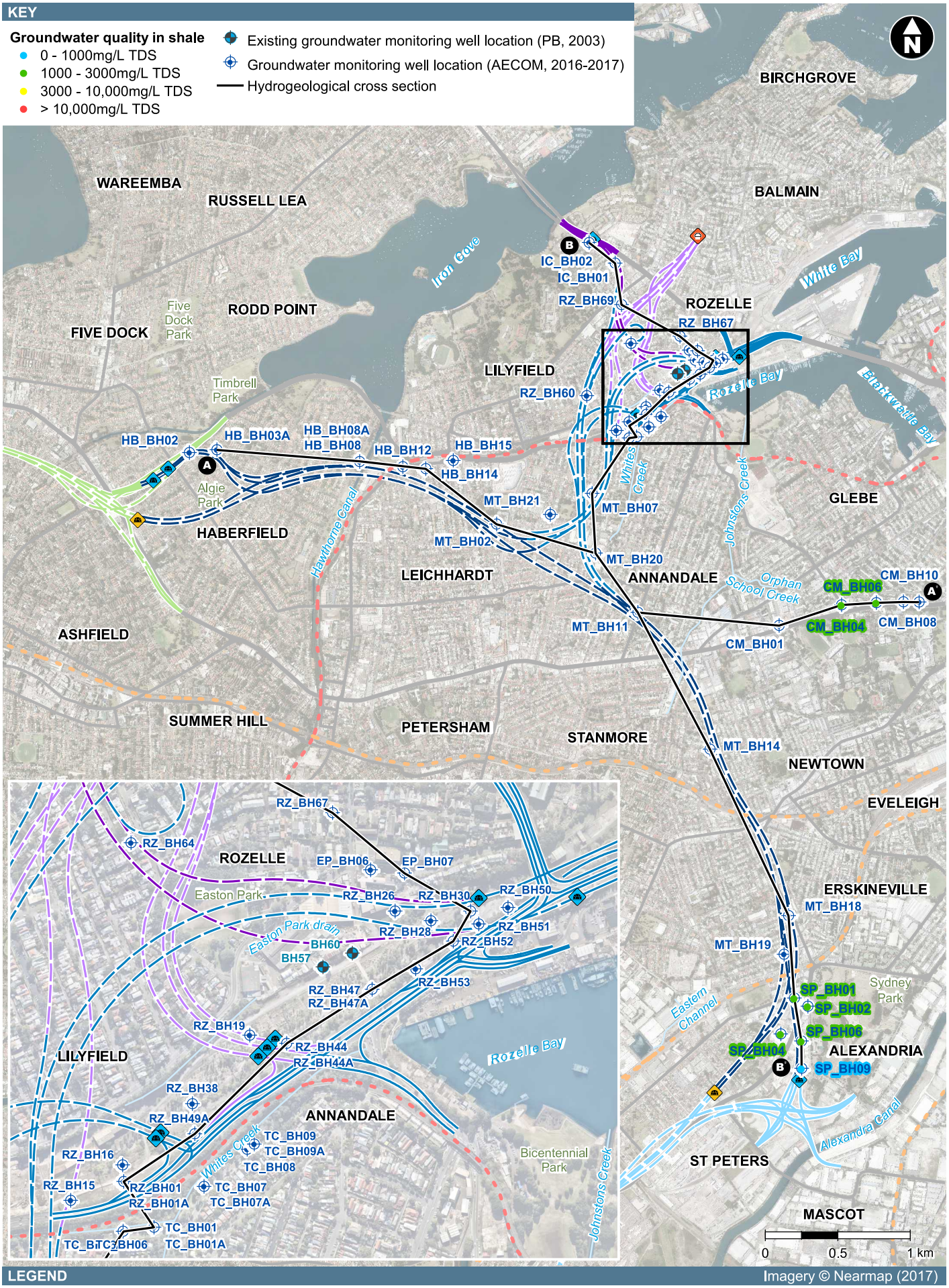


Figure B5-1 Groundwater quality - shale

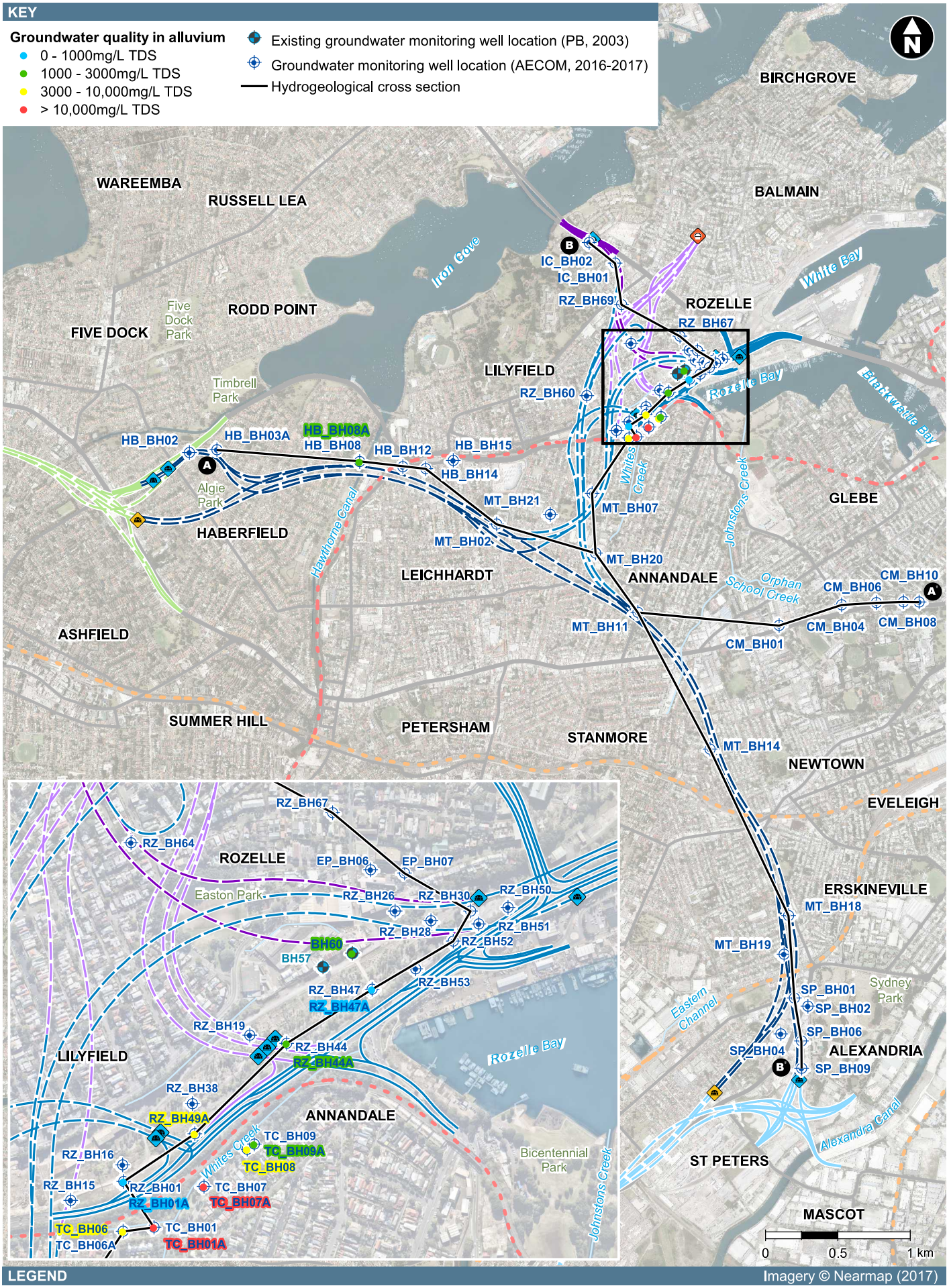


Figure B5-2 Groundwater quality - alluvium

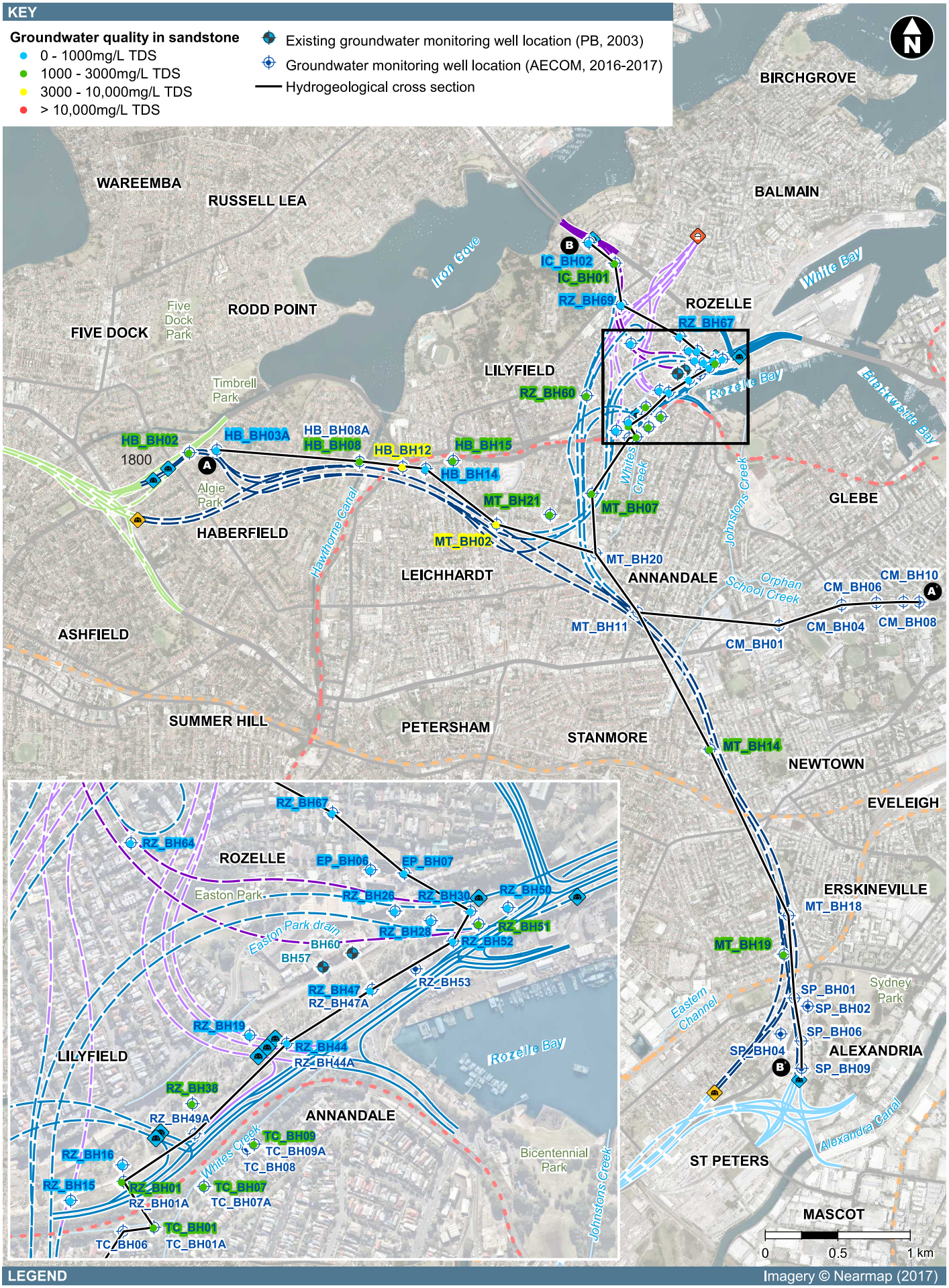


Figure B5-3 Groundwater quality - Hawkesbury Sandstone

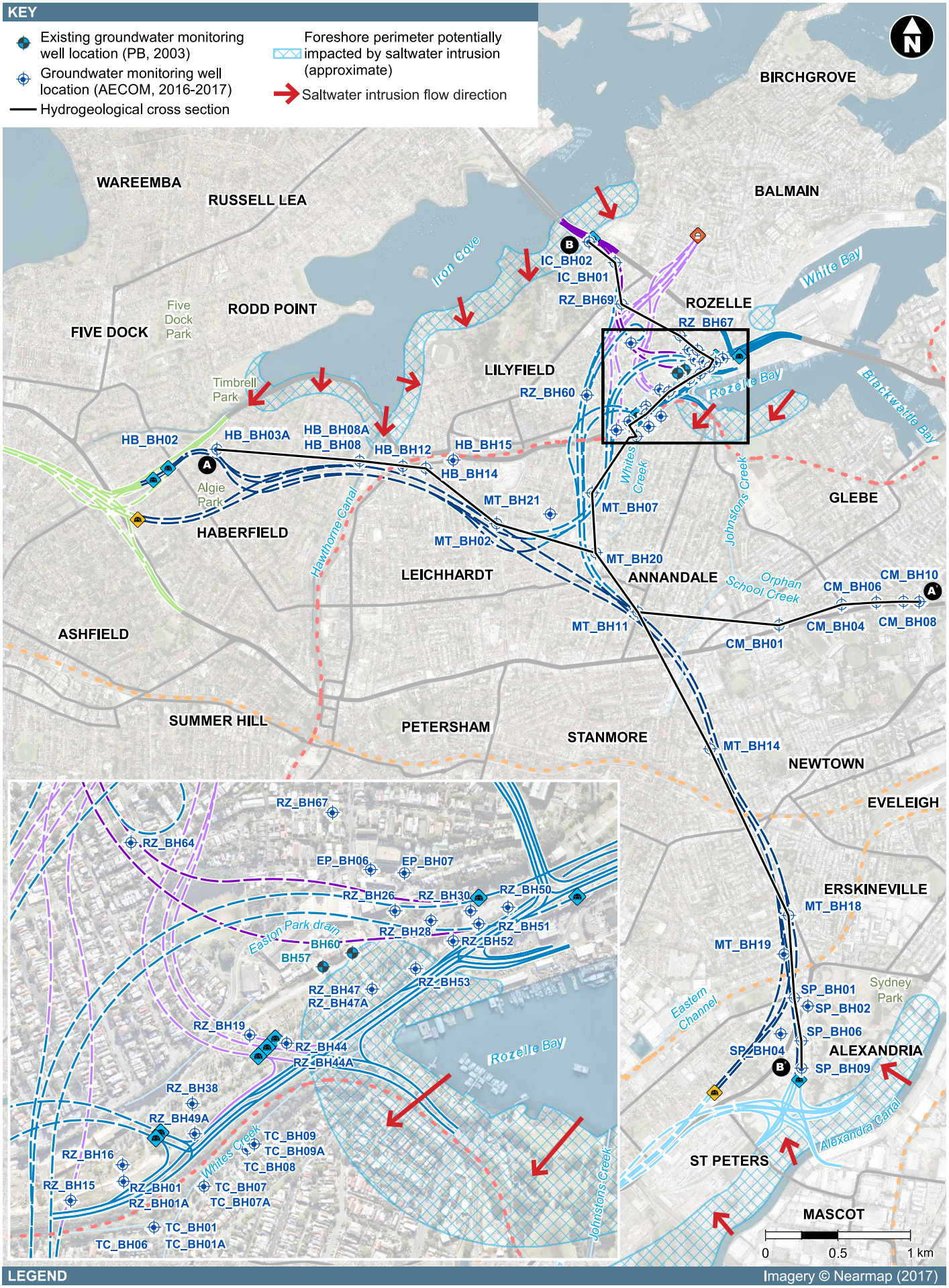
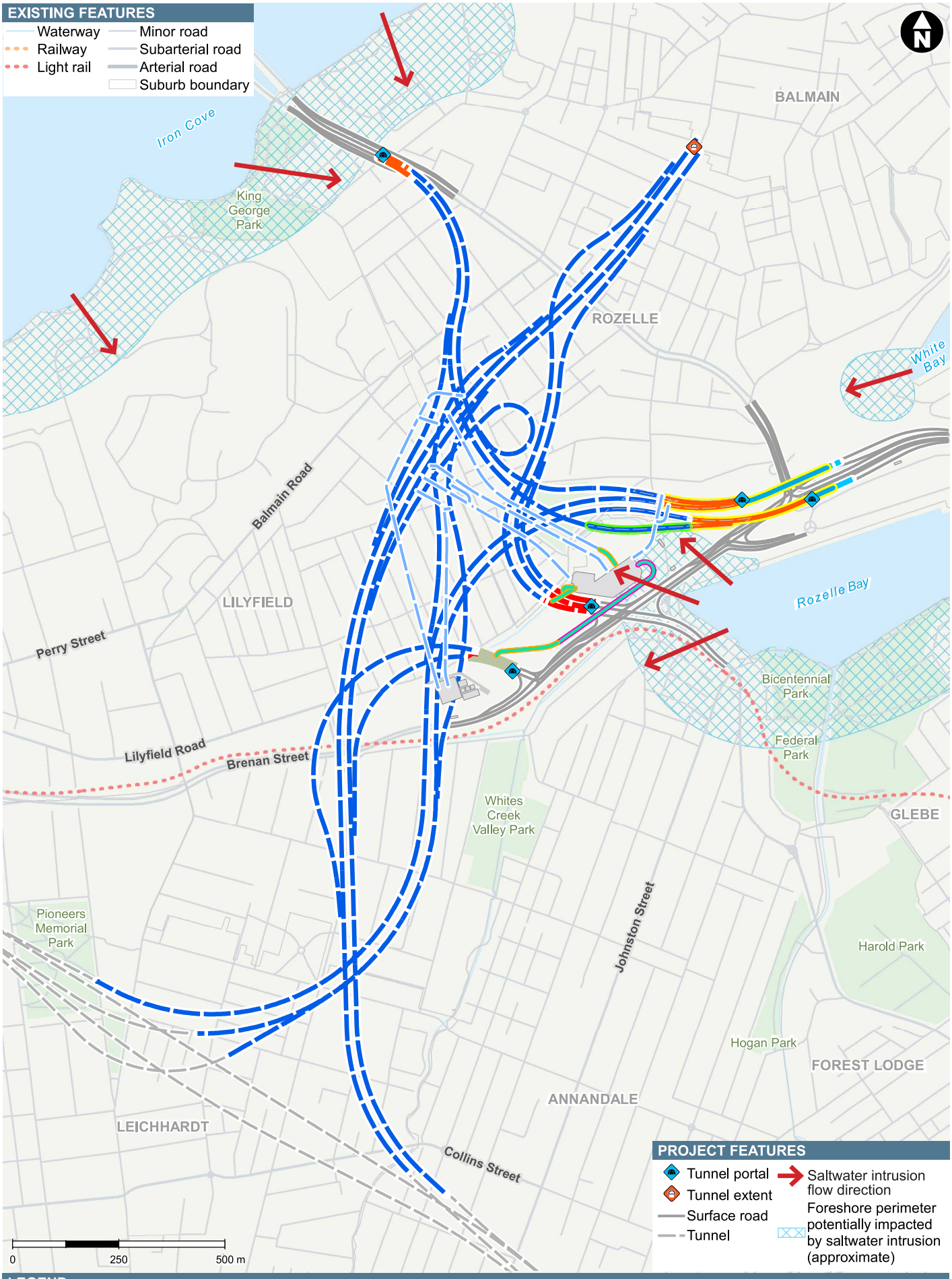


Figure B5-4 Areas potentially in luenced by saltwater intrusion



LEGEND

Road Tunnel Type

Driven tunnel
- Tanked
- Drained

Trough Covered
- Drained

Cut and cover
- Drained
- Water Cut off (ground level to top of rock)

Trough
- Drained
- Water Cut off (ground level to top of rock)

Ventilation Tunnel Type

Driven tunnel
- Drained

Cut and cover
- Tanked
- Water Cut off (ground level to top of rock)

Figure B5-5 Areas potentially in luenced by saltwater intrusion - Rozelle interchange

B5.1.3 Groundwater monitoring measures

The proponent should consult with Crown Lands and Water (water.referrals@dpi.nsw.gov.au) on the design and development of groundwater monitoring measures, which should include:

- Increased monitoring of groundwater salinity at key monitoring bore sites (acknowledging the Level 2 trigger)
- Use of open monitoring bores to monitor groundwater level impacts as well as groundwater quality
- Monitoring during construction and the post-construction operational phase for the life of the development. This will allow gauging of the predicted impacts, allowing mitigation measures to be undertaken in the case of exceedances
- Continuation of baseline groundwater monitoring post EIS until the handover to the construction phase. This background information will assist in assessing groundwater impacts and trigger level guidelines outside seasonal variation.

The proponent should liaise with Crown Lands and Water to discuss licensing requirements for the ongoing take of groundwater.

Response

As discussed in **section B5.1.2**, the Level 1 criteria for water quality of the AIP was considered appropriate for the groundwater assessment.

Groundwater monitoring has been carried out since June 2016 and this has provided a robust baseline monitoring dataset which has informed the modelling presented in Chapter 19 (Groundwater) and Appendix T (Technical working paper: Groundwater) of the EIS. As outlined in environmental management measure OGW10 (see **Chapter E1** (Environmental management measures)), the groundwater monitoring program prepared and implemented during construction will be augmented and continued during the operational phase. See **section B5.1.1** for further details about groundwater monitoring that would be carried out by the project.

The licensing and/or registration requirements associated with groundwater abstraction would be discussed with Crown Lands (NSW Department of Industry – Lands and Water) during the detailed design and construction phases of the project. Consultation with key stakeholders, including Crown Lands and Water, would continue during the development of detailed design for the project in accordance with the Community Communication Strategy (environmental management measure SE2 (see **Chapter E1** (Environmental management measures)) and conditions of approval.

B5.2 Flooding and drainage

Refer to section 17.4 and Appendix Q (Technical working paper: Surface water and Flooding) of the EIS for details of operational impacts on flooding and drainage.

B5.2.1 Monitoring and maintenance of the wetland

The proponent should advise who will be responsible for monitoring and maintaining the constructed wetland at Rozelle for the operational life of the project.

Response

The implementation of management measures identified in the EIS and relevant conditions of approval would be the responsibility of NSW Roads and Maritime Services (Roads and Maritime) as the proponent of the project.

B5.3 Soil and water quality

Refer to Chapter 15 (Soil and water) and Appendix Q (Technical working paper: Surface water and Flooding) for details of impacts to soil and water quality.

B5.3.1 Consultation with Crown Lands and Water and DPI Fisheries

The proponent should develop the following in consultation with Crown Lands and Water:

- Construction Environmental Management Plan
- Operational Environmental Management Plan.

The proponent should prepare the following in consultation with Crown Lands and Water and DPI Fisheries (ahp.central@dpi.nsw.gov.au):

- Construction Soil and Water Management Plan
- Sediment Control Plans for activities occurring around Whites Creek and Rozelle Bay.

Response

Construction environmental management measures, as identified in **Chapter E1** (Environmental management measures) would be captured in a Construction Environmental Management Plan (CEMP) and associated sub-plans, including a Construction Soil and Water Management Plan (CSWMP). The CSWMP will include measures to manage surface and groundwater impacts during construction and will be prepared in consultation with the relevant stakeholders as required by the conditions of approval. In addition, Erosion and Sediment Control Plans will be prepared and implemented on a case by case basis consistent with *Managing Urban Stormwater – Soils and Construction Vols 1 and 2, 4th Edition* (Landcom, 2004) and in accordance with the relevant conditions of approval for the project. The CEMP and associated sub-plans will be prepared in consultation with relevant stakeholders as required by the conditions of approval.

Operational environmental management measures would be captured in an OEMP or EMS and reflect the environmental management measures (see **Chapter E1** (Environmental management measures)) and the relevant conditions of approval for the project. The OEMP will outline the environmental management practices and procedures that are to be followed during operation, and will be prepared in consultation with relevant agencies as required by the conditions of approval.

B5.3.2 Detailed assessment of discharge of nutrients

The proponent should provide more detailed investigation into treatment during detailed design with details of final expected discharge values to be provided to Crown Lands and Water for review when the design is completed this should include more detailed assessment of discharge of nutrients into Hawthorne Canal.

Response

Construction

As outlined in environmental management measure SW10 (see **Chapter E1** (Environmental management measures)), temporary construction water treatment plants will be designed and managed so that treated water will be of suitable quality for discharge to the receiving environment. An Australian and New Zealand Environment and Conservation Council (2000) (ANZECC) species protection level of 90 per cent is considered appropriate for adoption as discharge criteria for toxicants where practical and feasible. The discharge criteria for the treatment facilities will be included in the CSWMP.

The final design of treatments will be supported by Model for Urban Stormwater Improvement Conceptualisation (MUSIC) modelling and water sensitive urban design principles.

Operation

The operational water treatment facilities will be designed and managed such that effluent will be of suitable quality for discharge to the receiving environment. Discharge criteria will be developed in accordance with ANZECC (2000), with consideration of the species protection levels for slightly to moderately disturbed marine waters and relevant NSW WQOs, and will also include the following discharge criteria:

- 0.3 milligrams per litre for iron
- 1.9 milligrams per litre for manganese.

Opportunities to incorporate other forms of nutrient treatment (for example ion exchange or reverse osmosis) within the water treatment plant at the Darley Road motorway operations complex (MOC1) will be investigated during detailed design.

The discharge criteria for the treatment facilities will be nominated during detailed design in consultation with relevant stakeholders and included in the OEMP.

Design of the operational stormwater controls and water treatment facilities will be undertaken in accordance with environmental management measures OSW12, OSW15 and OSW16 (see **Chapter E1** (Environmental management measures)).

B5.3.3 Water Guidelines for Controlled Activities

The proponent should ensure all works on waterfront land are carried out in accordance with the DPI Water *Guidelines for Controlled Activities on Waterfront Land* (2012).

Response

Works, including all associated temporary and permanent infrastructure, located near or adjacent to waterways will be designed and constructed in a manner consistent with the *Controlled Activities on Waterfront Land Guidelines* (DPI 2012).

B5.4 Land use and property

Refer to section 12.3 of the EIS for details of potential impacts on property.

B5.4.1 Compulsory acquisition

The proponent will need to compulsorily acquire any impacted Crown lands under provisions of the Land Acquisition (Just Terms Compensation Act 1991).

Response

As outlined in section 12.3 of the EIS, land acquisition required for the project would be undertaken in accordance with the *Land Acquisition (Just Terms Compensation) Act 1991* (NSW), the *Land Acquisition Information Guide* (NSW Government 2014) and the land acquisition reforms announced by the NSW Government in 2016 (NSW Government 2016), as detailed in the environmental management measures in **Chapter E1** (Environmental management measures).

Section 12.3.2 of the EIS discusses the proposed acquisition of two areas of Crown land for the project. These being:

- Land required for the construction of the bioretention facility and upgrades to the existing car park at King George Park at Rozelle, adjacent to Manning Street. This land is currently being used as an informal car park for users of King George Park
- Land within King George Park adjacent to Victoria Road and Byrnes Street at Rozelle for the widening of Victoria Road. This land consists of turf and a landscaped embankment. A small section of the Bay Run in King George Park would also be permanently realigned slightly to accommodate the widened Victoria Road carriageway and the bioretention facility.

Since the EIS was finalised, ongoing design development has identified that the proposed location of the bioretention facility on Manning Street at Rozelle as outlined in Chapter 5 (Project description) and Chapter 12 (Land use and property) of the EIS is on land currently subject to an undetermined Aboriginal land claim lodged by Metropolitan Local Aboriginal Land Council (Lot 662, DP 729277). Given the uncertainty regarding the future outcome and timing of resolution of this claim, an alternative location for the bioretention facility has been considered and assessed.

The revised location for the bioretention facility is described in **Part D** (Preferred infrastructure report) and shown in **Figure D3-1**. The bioretention facility would be within and adjacent to land at King George Park that is adjacent to Victoria Road and Byrnes Street at Rozelle. The land on which the bioretention facility would be located is Crown land, under the control and care of Inner West Council and Roads and Maritime.

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B6 NSW Office of Environment and Heritage

This chapter addresses issues raised by the NSW Office of Environment and Heritage (OEH).

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B6.1 General

B6.1.1 Consultation with OEH

OEH has reviewed the biodiversity, flooding and Aboriginal cultural heritage sections of the Environmental Impact Statement (and the relevant technical reports) and have no comments to make. I understand the Heritage Division of OEH as a delegate of the Heritage Council of NSW, has already provided comments on the proposal.

Response

Noted. Responses to the Heritage Division of OEH as delegate of the Heritage Council of NSW are presented in **Chapter B7** (Heritage Council).

B7 Heritage Council of NSW

This chapter addresses issues raised by the Heritage Council of NSW.

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B7.1 Non-Aboriginal heritage

Refer to Chapter 20 (Non-Aboriginal heritage) and Appendix U (Technical working paper: Non-Aboriginal heritage) of the Environmental Impact Statement (EIS) for details of non-Aboriginal heritage.

B7.1.1 Heritage interpretation of Rozelle Rail Yards

Area 3 - Rozelle, Lilyfield and Annandale interchange:

Parts of the Rail Yards are to be developed into a recreational area and wetlands. The Rozelle Rail Yards have a strong association with White Bay Power Station, as it was built to supply power to the rail network in the region. The rail corridor is recognised as a key component of the historic industrial, transport and maritime landscape of the area.

It is understood the removal of the Darling Harbour Goods line tracks within Rozelle Rail Yards has already taken place. These tracks were the last sections of the line in situ. It is unclear where these tracks have been stored. Consideration must be given to returning these tracks to the site for reinstatement or reuse. This was principally an industrial type landscape and this needs to be considered and addressed in terms of any proposed new landscape/beautification scheme. The former use of the railyards and their contribution to NSW industry needs to be delivered as part of any interpretation scheme for the wider area.

Response

The historical significance of the Rozelle Rail Yards was assessed in section 20.2.3 and Appendix U (Technical working paper: Non-Aboriginal heritage) of the EIS.

Site management works are being carried out by NSW Roads and Maritime Services (Roads and Maritime) on a portion of the Rozelle Rail Yards under a separate planning approval under Part 5 of the *Environmental Planning and Assessment Act 1979 (*NSW) (EP&A Act). As part of these works, sections of the railway track have been salvaged and stored for potential future reuse. In addition, the lighting tower and some overhead rail gantries have been removed and stored for potential reuse. The non-Aboriginal heritage context of the Rozelle Rail Yards is also described in the site management works Review of Environmental Factors (REF) (Roads and Maritime 2016) which can be accessed on the Roads and Maritime website[1].

The manner in which salvaged rail-related infrastructure will be reused within the Rozelle Rail Yards will be considered in the context of the proposed final uses of the site, including motorway infrastructure and public open space. The potential reuse of rail-related infrastructure within the future urban design and landscaping setting for the Rozelle Rail Yards will be considered within an Interpretation Strategy, as defined in environmental management measure NAH02 in the EIS (see **Chapter E1** (Environmental management measures)).

The Interpretation Strategy will be developed and implemented to identify and interpret the key heritage values and stories of the heritage areas affected by the project in accordance with *Interpreting Heritage Places and Items Guideline* (NSW Heritage Office 2005), and will inform the development of the Urban Design and Landscape Plan (UDLP) for the project. The Interpretation Strategy will:

- Build on themes, stories and initiatives proposed as part of other stages of WestConnex to ensure a consistent approach to heritage interpretation for the project
- Include themes and stories including the Rozelle railways historic functions, trains and trams transport, industrialisation and the Rozelle-Darling Harbour Goods Line
- Identify how the rail related infrastructure salvaged from the Rozelle Rail Yards will be reused.

[1] http://www.rms.nsw.gov.au/projects/sydney-inner/rozelle-rail-yard-site-management/index.html#Projectdocuments

The UDLPs will be prepared prior to commencement of permanent built surface works and/or landscaping, or as otherwise agreed by the Secretary of the NSW Department of Environment and Planning (DP&E) and must be approved by the Secretary of DP&E. The Interpretation Strategy will explore how themes and stories, including the Rozelle railway's historic functions, trains and trams transport, industrialisation and the Rozelle-Darling Harbour Goods line, among other aspects of significance, can best be told. The strategy will also identify how the rail-related infrastructure salvaged from the Rozelle Rail Yards can be reused.

B7.1.2 Potential impact on the southern penstock

The construction of a temporary bridge across Victoria R[oa]d will encroach into the south-western curtilage of the State Heritage Register (SHR) listed White Bay Power Station. Whilst this work will be located some distance from the power station building, it will occur close to the southern penstock in the north-eastern part of the site. This element, which fed water to the power station, is outside the SHR curtilage, however it is considered highly significant. Proposed works are noted as being restricted to three metres of this item. However it is considered this exclusion zone must be expanded to ten metres to avoid potential adverse heritage impacts.

Response

The restriction of works to no closer than three metres of the southern penstock was proposed as an environmental management measures as part of the separate site management works REF (Roads and Maritime 2016).

As noted by the Heritage Council, and shown on Figure 20-9 of the EIS, the southern penstock is located outside the White Bay Power Station SHR curtilage. However, the White Bay Power Station 2013 Conservation Management Plan (Design 5 Architects 2004) and the EIS acknowledge that the penstock is of 'high significance' as an element of the cooling system for the White Bay Power Station, which is still substantially intact. The southern penstock is directly associated with the White Bay Power Station and therefore contributes to its heritage significance.

Environmental management measures NAH12 and NAH13 (see **Chapter E1** (Environmental management measures) require that:

- A condition assessment of the southern penstock (and its associated water channels) will be carried out by a heritage specialist and a structural engineer prior to any works in the vicinity with the potential impact upon the item. If required any conservation works required to limit potential impacts on deteriorated fabric (loose bricks, corroded steel) will be identified and implemented prior to construction
- The southern penstock and its associated water channels (location and extent unknown) will be protected during works associated with the reconstruction of the Victoria Road bridge.

The condition assessment of the southern penstock (and its associated water channels) will be undertaken during detailed design when further information regarding the nature and proximity of construction works around the structure are known. This assessment will derive the appropriate protection measures to ensure the southern penstock is not impacted during construction of the project. A stipulated exclusion zone around the southern penstock has therefore not been specified at this stage of the project. Roads and Maritime will be guided by the typical safe working distances to avoid vibratory impacts when considering possible impacts and associated protection measures.

If required, potential subsurface features associated with the southern penstock would be managed in accordance with the Unexpected Heritage Finds and Humans Remains Procedure that would be developed for the project (see environmental management measure NAH08 in **Chapter E1** (Environmental management measures)).

B7.1.3 Demolition of "Cadden le Messurier" and Former Hotel, 78 Lilyfield Road

The works also involve the demolition of three items listed as being of local significance on the SREP 26 Heritage Register along Lilyfield Rd. Two of these items, late nineteenth century Cadden Le Messurier, and 1878 Former Hotel are on the edge of the project footprint. The need to demolish these buildings is unclear as they are some distance from the construction zone. It is therefore recommended that the project footprint is realigned to exclude these properties from the works area.

Response

The Sydney Regional Environmental Plan No. 26 – City West (SREP No 26) listed heritage items "Cadden le Messurier" at 84 Lilyfield Road and Former Hotel at 78 Lilyfield Road in Rozelle are located within the project footprint (refer to Figure 20-15 in Chapter 20 (Non-Aboriginal heritage) of the EIS). These items are proposed to be demolished to facilitate construction and operation of the Rozelle interchange.

The concept design for the Rozelle interchange indicates that shallow tunnelling below or immediately adjacent to these two items is required. The alignment of these tunnels has been informed by detailed investigations and constraints including geotechnical and property impacts and in consideration of relevant road design guidelines, and provides for connections to/from the surface road network at the eastern edge of the Rozelle Rail Yards.

Further, substantial utility works are also planned at the perimeter of the Rozelle Rail Yards. This includes along the northern boundary adjacent to Lilyfield Road, to move existing utilities and locate new utilities away from proposed motorway infrastructure. The removal of these listed heritage items is therefore necessitated.

Photographic archival recording will be undertaken of both heritage items in accordance with the NSW Heritage Office guidelines *Photographic Recording of Heritage Items Using Film or Digital Capture* (2006) and the salvage potential of the fabric and features of the buildings will be identified in the Heritage Salvage Strategy that will be prepared for the project.

As detailed in section 4.5.1 of the EIS, consideration of preservation of heritage items was undertaken during concept design development and this is reflected in the previous revision of the project footprint to avoid direct impacts to Easton Park and Sydney Water Sewage Pumping Station No. 6 (SP0006), which are both heritage listed items.

B7.1.4 Design of ventilation outlets at Rozelle Rail Yards

Works also include the permanent construction of two motorway operations complexes including the construction of 3 x 35m high ventilation stacks. It is understood the final design of these elements has not yet commenced. However, due to their proposed height and scale, they will potentially be visually intrusive. The design of these ventilation facilities must be sympathetic to the surrounding character and setting, including the Hornsey Street, Easton Park and Brennan's Estate Heritage Conservation Areas (HCAs). The design must also ensure views to the SHR listed White Bay Power Station are not impacted.

Response

The project ventilation system, including the ventilation outlets, has been designed and would be operated so that it would achieve some of the most stringent standards in the world for in-tunnel air quality, and would be effective at maintaining local and regional ambient air quality. Consideration of air quality standards has informed the height of the ventilation outlets, along with other considerations such as urban design, visual amenity and aviation safety. Further information is provided in Chapter 9 (Air quality) of the EIS.

The design of the ventilation outlets will be further developed during detailed design and in accordance with the UDLPs. Environmental management measure LV22 (see **Chapter E1** (Environmental management measures)) requires that during detailed design, measures are investigated to reduce the height, bulk, scale and enhance the landscape setting of ventilation outlets. This will be done with consideration of achieving desired ventilation outcomes and in accordance with the design principles detailed in the M4-M5 Link Urban Design report (refer to Appendix L (Urban Design report) of the EIS).

The UDLPs will be prepared with advice and guidance from an Urban Design Review Panel (UDRP) and in consultation with other relevant stakeholders, who will be responsible for integrating heritage conservation and interpretation into the realised urban design at this location. Given the proximity of heritage items and HCAs to the Rozelle Rail Yards, an independent heritage architect would be a member of the UDRP for the permanent operational infrastructure, including ventilation facilities, at this location.

Chapter 5 (Project description) of the EIS described two motorway operations complexes located in the open space at Rozelle, each containing permanent operational infrastructure. The permanent infrastructure within the Rozelle East motorway operations complex (MOC3) (ie water treatment plant, ventilation facility and outlets) have been sited towards the centre of the Rozelle Rail Yards and as far as possible to the south, near City West Link, away from the HCAs to the north including the Hornsey Street, Easton Park and Brennan's Estate HCAs. This siting would maximise physical and visual separation in an effort to minimise intrusion impacts on the curtilage and setting of the HCAs. Landscape planting along Lilyfield Road and within the new open space area at the Rozelle Rail Yards would also act as screening and assist in softening views to the ventilation outlet structures. Where feasible, the size, form, design and materiality of the proposed ventilation facility, outlets and water treatment plant would be as recessive as possible to minimise permanent visual impacts and intrusion on the HCAs.

The ventilation supply facility and substation is contained in the Rozelle West motorway operations complex (MOC2) and is sited at the southwestern extent of the Rozelle Rail Yards, adjacent to facilities constructed for the CBD and South East Light Rail project. MOC2 is located in a part of the Rozelle Rail Yards that is set lower than Lilyfield Road and separated by a sandstone cutting which would reduce the visual prominence of this infrastructure. The infrastructure in MOC2 would also be of lower profile and more limited scale compared to the infrastructure proposed for MOC3, which would be expected to be higher due to the ventilation outlets and with a potentially larger footprint. Similar principles to that described above have been employed to reduce the visual prominence of the MOC2 infrastructure.

While further design refinement will be undertaken during detailed design, the three ventilation outlets in the Rozelle Rail Yards would be viewed within the context of other proximate, large infrastructure elements in the skyline, such as the White Bay Power Station chimney stacks, the Glebe island grain silos and Anzac Bridge. The design of ventilation outlets within the Rozelle Rail Yards, including material and colour choice, will respond to the local character including these large nearby infrastructure elements with input and guidance from the UDRP. As per environmental management measures LV8, visible elements of operational facilities will be designed to satisfy functional requirements and adopt the design principles detailed in the M4-M5 Link Urban Design report (refer to Appendix L (Urban Design report) of the EIS). The proposed designs will be documented in the relevant UDLP for the project.

The White Bay Power Station can be clearly seen from within and at the peripheries of parts of the project footprint, including at the western end of Anzac Bridge, and at the junction of Victoria Road and Robert Street. The station's remaining chimneys are clearly visible from many vantage points. The project would impact views of the power station from a number of these locations. While the Rozelle Rail Yards is within a naturally low point in the landscape, higher elevations on either side in Rozelle and Annandale, long clear views to Jubilee Park and Rozelle Bay, as well as elevated infrastructure such as the Anzac Bridge and parts of Victoria Road and Catherine Street, all create a complex visual environment that would minimise the intrusion of new large scale permanent infrastructure.

B7.1.5 Impacts on the character of Iron Cove HCA

Area 4 - Iron Cove Link

As part of works within this area, six buildings identified as being of potential local heritage significance are proposed to be demolished. Their demolition is not supported, as it would diminish the character of the area. However, if demolition is approved, historic fabric and features must be salvaged for distribution back to the former landowners and the local community.

Works also include the construction of the Iron Cove Motorway Operations Complex, and a 20 metre high ventilation stack. Whilst the design of this element has not been finalised, its proposed placement will be visually intrusive. The design and placement of this element must give consideration to the surrounding character and setting including the adjacent Iron Cove HCA.

Response

The six potential heritage items of local significance that are proposed to be demolished in Area 4 – Iron Cove are not heritage listed and are not located within a HCA. Nonetheless they were assessed as having potential heritage significance in the Non-Aboriginal heritage assessment in the EIS (refer to Table 20-18 of Chapter 20 (Non-Aboriginal heritage) and Annexure A of Appendix U (Technical working paper: Non-Aboriginal heritage) of the EIS). As part of the project, Victoria Road needs to be widened in order to accommodate the Iron Cove Link portal connections including the entry and exit ramps within the Victoria Road carriageways. The widening would need to occur on the southern side of Victoria Road to better align with the existing road geometry. Widening Victoria Road on the southern side would also avoid property impacts on the northern side of Victoria Road (to a multi-level residential apartment building, commercial properties and a substation) and a direct impact on part of the Iron Cove HCA to the north, fronting Victoria Road. As a result, removal of the six potential heritage items is unavoidable to create the necessary space in which to carry out the road widening as it has the smallest net impact on the heritage values of the area.

A Heritage Salvage Strategy will be prepared to identify the salvage potential of the fabric and features from heritage items and potential heritage items that will be demolished to facilitate the project. This could include timber joinery, fireplaces, stained glass, stairs, decorative tiles, bricks, steel truss structures, windows etc. The strategy will also identify options and a process for dissemination of salvaged items to owners, community groups and interested parties (see environmental management measure NAH09 in **Chapter E1** (Environmental management measures)).

Environmental management measure NAH03 (see **Chapter E1** (Environmental management measures)) also requires that photographic recording will be undertaken of these buildings in accordance with the NSW Heritage Office guidelines *Photographic Recording of Heritage Items Using Film or Digital Capture* (2006). The photographic archival recording will occur prior to any works that have the potential to impact upon the items and will include the identification of appropriate stakeholders to receive copies of the documentation.

The Iron Cove HCA extends from Victoria Road, between Iron Cove and Terry Street, Darling Street, Rowntree Street and Cove Street, but does not include the area east of Terry Street (bound by Victoria Road, Terry Street and Wellington Street), which is closer to the location of the proposed ventilation outlet. Table 6-33 of Appendix U (Technical working paper: Non-Aboriginal heritage) of the EIS includes an assessment of the potential impacts from the project on this HCA.

The assessment found that although the Iron Cove Link ventilation outlet would have a height of 20 metres above existing ground level and would be in the vicinity of the Iron Cove HCA, the outlet would be visually isolated from the HCA by its position in the middle of the road corridor and by the trees and buildings at the corner of Victoria Road and Terry Street. The assessment concluded that the Iron Cove Link works, including the Iron Cove ventilation outlet, would have a neutral impact on the HCA.

The project ventilation system, including the ventilation outlets, has been designed and would be operated so that it would achieve some of the most stringent standards in the world for in-tunnel air quality, and would be effective at maintaining local and regional ambient air quality. Consideration of air quality standards has informed the height of the ventilation outlets, along with other considerations such as urban design, visual amenity and aviation safety. Further information is provided in Chapter 9 (Air quality) of the EIS.

The UDLPs that will be prepared for the project during design development will include the investigation of measures to reduce the height, bulk, scale and enhance the landscape setting of ventilation outlets as reflected in environmental management measure LV22 in **Chapter E1** (Environmental management measures), subject to achieving desired ventilation outcomes, in accordance with the design principles detailed in the M4-M5 Link Urban Design report (refer to Appendix L of the EIS). The UDLPs will be prepared with advice and guidance from an UDRP and in consultation with other relevant stakeholders. The independent heritage architect will also be responsible for integrating heritage conservation and interpretation into the realised urban design at this location.

In addition, environmental management measure LV19 in **Chapter E1** (Environmental management measures) commits to the investigation of vegetative and other screening measures along Victoria Road to improve the visual amenity of the streetscape and reduce impacts associated with the ventilation outlet and increased glare from the portals to residential dwellings to the north of Victoria Road. Reasonable and feasible landscaping measures, consistent with Austroads guidelines, will be included in the relevant UDLP.

B7.1.6 Impacts on the Former Bank of NSW building

Area 5 - Annandale (Pyrmont Bridge Road and Parramatta Road)

11 properties are proposed to be demolished as part temporary works within this area, including an item identified as being of potential local heritage significance, the Former Bank of NSW. This Inter-War commercial building was purpose built and is rare in the context of Parramatta Road. It is recommended that the layout of the construction area be revised to exclude this building from the construction site. Further, consideration must be given to retaining the storage warehouse along Pyrmont Bridge Road to ensure impact to the character of the streetscape is minimised.

Response

The Former Bank of NSW building that would be demolished as part of the project is not heritage listed and is not located within a HCA. Nonetheless the building was assessed as having potential heritage significance (refer to Table 20-18 of Chapter 20 (Non-Aboriginal heritage) and Annexure A of Appendix U (Technical working paper: Non-Aboriginal heritage) of the EIS).

As discussed in section 20.3.3 of the EIS, the Former Bank of NSW building would be subject to a direct impact from the project through full demolition to allow for the construction of the Pyrmont Bridge Road tunnel site (C9). This would result in the permanent loss of a potential item of local significance, considered to have historic and aesthetic values, from the Parramatta Road streetscape.

The Pyrmont Bridge Road tunnel site (C9) would be required to support tunnelling construction activities. This site would act as a mid-tunnel site, providing for tunnel construction from an approximate half way point along the tunnel alignment. The use of mid-tunnel sites at Pyrmont Bridge Road and Darley Road assists in minimising the total duration of construction by enabling tunnelling to occur from both the ends, as well as the middle sections of the tunnel alignment. Key construction activities that would be carried out at the Pyrmont Bridge Road tunnel site (C9) would include tunnel excavation of the northbound and southbound mainline tunnels and tunnel spoil handling and haulage (refer to section 6.5.13 of the EIS).

The Pyrmont Bridge Road tunnel site (C9) is already constrained in size by Bignell Lane through the site, Parramatta Road to the south, Pyrmont Bridge Road to the north, as well as Mallett Street to the east. The area has been minimised to avoid impacts to adjacent buildings, including the James Squire Brewery and the 7-Eleven petrol station, to the west of the site. Investigations into altering the layout of the Pyrmont Bridge Road site to retain the Former Bank of NSW identified that this would substantially reduce the available area for construction and associated elements including the acoustic shed, spoil handling areas, truck and light vehicles ingress and egress, as well as the site facilities, offices and amenities.

The storage warehouse at 79 Pyrmont Bridge Road was assessed in Appendix U (Technical working paper: Non-Aboriginal heritage) of the EIS for its heritage significance. It was concluded that while the property makes some contribution to the industrial character of the streetscape and is from the era of industrial development in Camperdown, the high level of modifications necessitated by the conversion of the building to a self-storage function meant that it was unlikely to meet the threshold for listing at a local level (refer to Annexure A of Appendix U (Technical working paper: Non-Aboriginal heritage) of the EIS). Investigations were carried out into the retention and use of the storage warehouse at 79 Pyrmont Bridge Road during construction. These investigations concluded that the works required to adapt the storage warehouse would be substantial and would likely make the building unsafe and impractical for use during construction of the project.

Environmental management measure NAH03 (see **Chapter E1** (Environmental management measures)) also requires that photographic recording will be undertaken of the Former Bank of NSW in accordance with the NSW Heritage Office guidelines *Photographic Recording of Heritage Items Using Film or Digital Capture* (2006). The photographic archival recording will occur prior to any works that have the potential to impact upon the items and will include the identification of appropriate stakeholders to receive copies of the documentation.

In addition, a Heritage Salvage Strategy will be prepared to identify the salvage potential of the fabric and features from heritage items and potential heritage items that will be demolished to facilitate the project. This could include timber joinery, fireplaces, stained glass, stairs, decorative tiles, bricks, steel truss structures, windows etc. The strategy will also identify options and a process for dissemination of salvaged items to owners, community groups and interested parties (see environmental management measure NAH09 in **Chapter E1** (Environmental management measures)).

B7.1.7 Consideration of heritage impacts during detailed design

General Comments

It is noted that detail of the design and construction approach presented in the EIS is indicative only and will be subject to further detailed design and construction planning. The Heritage Council advises of the need for further consideration of heritage impacts during the detailed design of this project, including ongoing input from heritage specialists and the Heritage Division. In addition, associated motorway infrastructure, such as electronic toll gantries, traffic lights, signage etc are still to be developed. These have the potential to have visual impacts on the setting of heritage items and the character of the HCAs within the project corridor. Input from heritage specialists and the Heritage Division should be sought during any further design development so that any potential impacts can be minimised.

Response

Visible elements of operational facilities, including associated motorway infrastructure will be designed to satisfy functional requirements and adopt the design principles detailed in the M4-M5 Link Urban Design report (Appendix L (Urban Design report) of the EIS), including implementing place-sensitive design. The proposed designs will be documented in the UDLPs for the project, in consultation with relevant councils, stakeholders including the Heritage Division where relevant (refer to environmental management measure UD1 in **Chapter E1** (Environmental management measures)) and the community. The UDLPs will be prepared with advice and guidance from an UDRP, that will be responsible for integrating heritage conservation and interpretation into the realised urban design at this location. Where the works affect places of heritage significance, an independent heritage architect will form part of the UDRP.

Associated motorway infrastructure (such as electronic toll gantries, traffic lights and signage) would be further developed during detailed design and would be subject to separate environmental assessment approval processes (as appropriate). As part of this process, potential impacts of these items on values of non-Aboriginal heritage would be considered and assessed, and where appropriate, management measures would be recommended to minimise impacts.

B7.2 Non-Aboriginal heritage indirect impacts

Refer to Chapter 20 (Non-Aboriginal heritage) and Appendix U (Technical working paper: Non-Aboriginal heritage) of the EIS for details of non-Aboriginal heritage.

B7.2.1 Impacts to Leichhardt (Charles Street) Underbridge

Area 2 – Leichhardt:

Works within this area are proposed to occur adjacent to Section 170 item Leichhardt (Charles Street) Underbridge. Whilst it is considered there would be no physical impacts as proposed works are located away from the bridge, there may be some indirect setting and vibration impacts as a result of the adjacent site being demolished and used for tunnelling.

There may also be visual impacts to Leichhardt (Charles Street) Underbridge with the construction of the motorway operations complex. The motorway operations complex should be positioned on the site to ensure views and vistas to the Leichhardt (Charles Street) Underbridge are not obscured. Further, monitoring must be undertaken during demolition and tunnelling to ensure the bridge is not structurally impacted.

Response

The Leichhardt (Charles Street) Underbridge is a heritage item listed under RailCorp's State Agency Section 170 Heritage and Conservation Register under the *Heritage Act 1977* (NSW). Appendix U (Technical working paper: Non-Aboriginal heritage) of the EIS state that the Leichhardt (Charles Street) Underbridge would be subject to minor and temporary indirect (setting and vibration) impacts as a result of the buildings and structures on the adjacent site being demolished and the site being used for the Darley Road civil and tunnel site (C4) during construction.

Vibration impacts during construction on the Leichhardt (Charles Street) Underbridge are expected to be negligible as vibration intensive works are not proposed at the western end of this site (nearest to the Leichhardt (Charles Street) Underbridge). Furthermore, no tunnelling is proposed below or immediately adjacent to the Leichhardt (Charles Street) Underbridge. During construction, the western part of the site adjacent to the Leichhardt (Charles Street) Underbridge would comprise light vehicle parking, a site office and a workshop (refer to Figure 6-21 of the EIS). The layout of this site would be confirmed during detailed design, along with further consideration of potential vibration impacts to the Leichhardt (Charles Street) Underbridge.

The civil and tunnel construction works would not directly impact on the Leichhardt (Charles Street) Underbridge which would be retained and continue to function (for the light rail). However, some indirect impacts from vibration or changes to visual setting may be experienced during construction. These would be minor, would not be expected to impact on the structural integrity of the bridge, and would occur during the construction period only. The Leichhardt (Charles Street) Underbridge would have been designed to withstand, and would currently experience, vibrations from light rail movements, and would therefore likely be resilient to any vibrations generated by the project.

Potential vibration impacts to items of heritage significance, including the Leichhardt (Charles Street) Underbridge, will be managed in accordance with the Construction Noise and Vibration Management Plan (CNVMP) prepared for the project. The Leichhardt (Charles Street) Underbridge is located within the cosmetic damage minimum working distance for vibration (refer to Table 5-63 of Appendix J (Technical working paper: Noise and vibration) the EIS). This conclusion is drawn from a worst case scenario where a large rockbreaker is operating adjacent to the Leichhardt (Charles Street) Underbridge. However, it is unlikely that this construction scenario would occur as the majority of more intensive construction such as that requiring rockbreakers is expected to occur at the eastern end of the site.

The structural integrity of the Leichhardt (Charles Street) Underbridge would be confirmed at detailed design. This information would then be used to verify the applicable vibration criteria and associated impacts. The following would also occur during detailed design for vibration near heritage items, including the Leichhardt (Charles Street) Underbridge:

- Review and confirm locations for vibration intensive equipment
- Validate predicted vibration levels at the heritage item
- If necessary, confirm the structural integrity of the heritage item
- Carry out attended vibration monitoring prior to and during construction works to ensure that actual vibration levels remain below relevant cosmetic damage criteria.

The CNVMP will detail monitoring that will be carried out to confirm project performance in relation to noise and vibration performance criteria.

A permanent motorway operations complex (MOC1) would be constructed on a portion of the Darley Road civil and tunnel site, including a water treatment plant, carparking areas and substation. The exact configuration, appearance and location of MOC1 would be determined as part of the detailed design. However, for the purposes of the EIS assessment, it was assumed to be located at the western end of the site in the general vicinity of the Leichhardt (Charles Street) Underbridge. This layout is shown in Figure 5-44 of the EIS.

The more visually prominent infrastructure would be the water treatment facility which is located toward the centre of the site some distance from the Leichhardt (Charles Street) Underbridge. The substation is a lower profile structure which would have a height of around four metres with landscaped areas to its perimeter. The remainder (eastern portion) of the site would be rehabilitated and would become remaining project land, with the future use of this land to be determined by Roads and Maritime in accordance with the Residual Land Management Plan. An existing view and artist's impression view at 12 to 18 months following construction of the project looking east along Darley Road near the corner of Charles Street are provided in Figures 13-18 and 13-19 of Chapter 13 (Urban design and visual amenity) of the EIS.

Due to the height of the Leichhardt (Charles Street) Underbridge (about four metres above ground level), the permanent infrastructure is not expected to significantly impact on views of the Leichhardt (Charles Street) Underbridge from the street.

Environmental management measure NAH15 (see **Chapter E1** (Environmental management measures)) requires that landscaping, following the construction of the substation should consider screening the substation and water treatment plant from the Leichhardt (Charles Street) Underbridge. The design and location of the landscaping will be informed by a heritage specialist and should seek to create a visual separation between the new structure and the heritage item.

Environmental management measure LV12 (see **Chapter E1** (Environmental management measures)) also requires that architectural design and detailing of the water treatment facility, substation and front fencing should achieve articulation, visual interest, and integrate with the streetscape.

B7.3 Non-Aboriginal heritage cumulative impacts

Refer to section Chapter 26 (Cumulative impacts) and Appendix U (Technical working paper: Non-Aboriginal heritage) of the EIS for details of cumulative non-Aboriginal heritage impacts.

B7.3.1 Impact on the Haberfield Heritage Conservation Area as a result of increased construction footprint

Area 1 - Haberfield/ Ashfield:

Two additional construction ancillary facilities have been identified as part of the works, Parramatta Road East civil and tunnel site (between Alt Street and Bland Street), and Parramatta Road West civil and tunnel site (between Alt Street and Bland Street). Both sites are proposed to be used for tunnelling support during construction and would require the demolition of several commercial properties for construction.

It is unclear why these additional construction areas are required considering there are already existing cleared construction sites available. It is considered that the cumulative impact of expansion of the construction footprint will have a negative effect on the Haberfield HCA and the area more generally. The construction area must be limited to the existing Northcote Street civil site only.

Response

As described in section 6.5.1 of the EIS, 12 construction ancillary facilities have been described and assessed in the EIS, including five sites at Haberfield and Ashfield:

- Wattle Street civil and tunnel site (C1a)
- Haberfield civil and tunnel site (C2a)/ Haberfield civil site (C2b)
- Northcote Street civil site (C3a)
- Parramatta Road West civil and tunnel site (C1b)
- Parramatta Road East civil site (C3b).

The number, location and layout of construction ancillary facilities would be finalised as part of detailed construction planning during detailed design and would consider the:

- General principles for construction outlined in section 6.1.1 of the EIS
- Environmental performance outcomes stated in the EIS and the Submissions and preferred infrastructure report
- Relevant guidelines including noise goals identified in the EIS
- Criteria for final construction site layouts and access arrangements as listed in section 6.5.1 of the EIS
- Environmental management measures identified in **Chapter E1** (Environmental management measures)
- Relevant conditions of approval.

Based on community feedback and concerns raised in submissions on the EIS, a number of refinements to the construction ancillary facilities at Haberfield and Ashfield have been made to further minimise impacts on the community and sensitive receivers. This includes:

- Wattle Street civil and tunnel site – the area at the surface currently being used as a construction zone for the M4 East project would no longer be used. Construction activities would be limited to the Wattle Street entry and exit ramps
- Haberfield civil site – footprint reduced and site to be used as a civil site only as per the arrangement for the Haberfield civil site (C2b). The C2a option would therefore not be used for the construction of the project. No tunnelling from this site is proposed.

The number, location and layout of construction ancillary facilities would be finalised as part of detailed construction planning during detailed design and would meet the environmental performance outcomes stated in the EIS and the Submissions and preferred infrastructure report and satisfy criteria identified in any relevant conditions of approval. Further, additional ancillary facilities may be proposed by the contractor, once engaged. Prior to the establishment of ancillary facilities that are not identified in this EIS, the contractor would need to satisfy criteria that would be identified in any relevant conditions of approval and in accordance with an Ancillary Facilities Management Plan.

The construction of the project at Haberfield and Ashfield cannot be limited to the use of Northcote Street civil site. The Parramatta Road West civil and tunnel site and the Parramatta Road East civil site are closer to the M4-M5 Link mainline tunnels than the Northcote Street civil site. Use of these sites would result in a substantially shorter temporary access tunnel to connect to the mainline tunnels than that which would be required from the Northcote Street civil site. The benefits of minimising the construction access tunnel length include:

- Program efficiencies by enabling tunnelling of the mainline tunnels to commence before construction work for the M4 East has been completed in 2019
- Allowing tunnelling to be undertaken from two locations at the same time.

The Parramatta Road West civil and tunnel site and Parramatta Road East civil site are located on land already owned by Roads and Maritime. Neither site is located within the Haberfield HCA, nor contains listed or potential heritage items. There would be no direct impacts on the Haberfield HCA from the use of these sites.

Further, civil finishing works, including mechanical and electrical works, to both the Wattle Street entry and exit ramps and stub tunnels and the Parramatta Road ventilation facility are also required to be undertaken during construction of the project. Although the majority of construction works for these elements will have been completed as part of the M4 East project, these finishing works are required as part of the M4-M5 Link project to prepare these elements for operation. Therefore, the continued use of the construction ancillary facilities currently being used by the M4 East project within Haberfield are required to support the construction of the M4-M5 Link project as described in Chapter 6 (Construction work) of the EIS. These construction activities at the Wattle Street entry and exit ramps were also identified as being required as part of the M4-M5 Link project in the M4 East EIS.

Appendix S (Non-Aboriginal heritage) of the M4 East EIS acknowledged that the M4–M5 Link project could potentially have further impacts on the Haberfield HCA, including tunnelling underneath the Haberfield HCA, further surface works and additional demolition for construction compounds. The Wattle Street ramps and Parramatta Road ventilation and ancillary facilities for the western end of the M4–M5 Link were developed as part of the M4 East project, avoiding the need to undertake further surface works in the Haberfield HCA to develop key infrastructure associated with the M4-M5 Link. The M4 East EIS also acknowledged that given the major adverse impact of the M4 East project on the Haberfield HCA, further works for the M4-M5 Link project within the Haberfield HCA should be avoided.

Notwithstanding this, the use of these sites during construction would have potential setting, vibration and settlement impacts (as noted in Table 6-1 of Appendix U (Technical working paper: Non-Aboriginal heritage)) of the EIS. A Construction Heritage Management Plan (CHMP) will be prepared and implemented as part of the Construction Environmental Management Plan and will include measures to manage potential impacts to items of heritage significance.

B7.4 Recommended conditions

Refer to **Chapter E1** (Environmental management measures) for details of environmental management measures to manage potential non-Aboriginal heritage impacts.

B7.4.1 Recommended conditions of approval

The Heritage Council recommends that the Department of Planning and Environment includes in any approval given for the project the recommended conditions provided as part of the Heritage Council submission.

Response

Noted. Conditions of approval are a matter for DP&E to consider during its assessment of the project.

B7.5 Aboriginal heritage

Refer to Chapter 21 (Aboriginal heritage) and Appendix V (Technical working paper: Aboriginal heritage) of the EIS for details of Aboriginal heritage.

B7.5.1 Unexpected finds (Aboriginal heritage items)

Should any Aboriginal 'objects' be uncovered by the work, excavation or disturbance of the area is to stop immediately and the Office of Environment & Heritage is to be informed in accordance with Section 89A of the *National Parks and Wildlife Act 1974* (NSW) (as amended). Works affecting Aboriginal 'objects' on the site must not continue until the Office of Environment and Heritage has been informed. Aboriginal 'objects' must be managed in accordance with the *National Parks and Wildlife Act 1974* (NSW).

Response

As described in **Chapter E1** (Environmental management measures), an Unexpected Heritage Finds and Human Remains Procedure will be developed for the project. The purpose of this Procedure is to guide the management of potential objects of heritage conservation significance or potential human remains which be discovered during construction activities. The Procedure will reflect statutory requirements and be based on *the Unexpected Heritage Items Procedure* (Roads and Maritime 2015a) with guidance from the Heritage Council and the NSW Office of Environment and Heritage - Heritage Division. It will also detail the requirements associated with the notification of relevant agencies and the NSW Police.

B8 Port Authority of NSW

This chapter addresses issues raised by the Port Authority of NSW.

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B8.1 Traffic and transport

Refer to Chapter 8 (Traffic and transport) and Appendix H (Technical working paper: Traffic and transport) of the Environmental Impact Statement (EIS) for details of traffic and transport.

B8.1.1 Existing and future uses at Glebe Island/White Bay

Existing Uses at Glebe Island/White Bay

The Port Authority is a State owned corporation which owns and manages common user berths and port land at Glebe Island and White Bay, which are in direct vicinity of the proposed Rozelle interchange portion of SSI 16_7485. Port land owned by the Port Authority in the Glebe Island / White Bay area is shown in the attached figure. [Note that the figure was not provided as part of the submission].

The Glebe Island port facility consists of four operational shipping berths and is currently used for unloading / loading bulk vessels (cement, gypsum, sugar and salt) and well as other temporary / occasional port, maritime and working harbour uses. The White Bay port facility consists of five operational shipping berths and is currently used as a cruise ship terminal, unloading / loading bulk vessels (tallow, lubrizol), a marine refuelling facility and a myriad of ad hoc port and working harbour uses.

Access to the port facilities is provided via James Craig Road and by the James Craig Road/The Crescent intersection. Cruise ship and other port related traffic, including heavy traffic, use James Craig Road to access/exit the port facilities of Glebe Island and White Bay. It is noted that the alternative access point to White Bay and Glebe Island, via Victoria Road and Robert Street, Rozelle, is not allowed to be used for the vast majority of traffic generated at the Port. Robert Street only functions as an access and egress point for the marine fuelling and boat storage facility at White Bay 6, [providing] traffic (only) for the White Bay Cruise Terminal, and for the ad hoc port and working harbour uses at White Bay.

Future short to medium term uses of Glebe Island/White Bay

In 2017, following an Infrastructure NSW strategic review of Glebe Island, the NSW Government endorsed a recommendation that port facilities at Glebe Island be retained and expanded to meet the strategic supply needs of the construction industry in the Inner Sydney, in particular the materials for concrete production being sand, cement and aggregates. Consistent with the cabinet decision, Glebe Island is currently subject to the following proposals:

- A proposed Multi-User facility at Glebe Island for the import by sea of sand and other bulk dry construction materials to supply the increasing demand of these materials to the inner city. This proposal is progressing under a Part 5 process under the *Environmental Planning and Assessment Act 1979* (EP&A Act). Subject to obtaining planning approval, the Multi-User facility is expected to commence operations in the first quarter of 2019

  Peak traffic from the Multi-User will be around 500 trucks per day (1,000 movements per day). Traffic to/from the proposed Multi-User facility will be by James Craig Road

- A proposal by Hanson to construct and operate a concrete batching plant at Glebe Island (SSD 17_8544), in effect relocating their existing facility at the head of Blackwattle Bay to facilitate the redevelopment of this area. An EIS is currently being prepared for the proposed concrete batching plant. Hanson's request for Secretary's Environmental Assessment Requirements (SEARs) (JBA, 8 June 2017) indicate that the concrete batching plant will be supported by new aggregate shipping terminal facilities at Glebe Island 1 with capacity to manage up to 1,000 m3 of concrete aggregates per annum delivered by ship, and with a capacity to produce up to 1 million tonnes of concrete per annum. Concrete from the batching plant will be dispatched via trucks. Subject to obtaining planning approval, it is expected the proposed batching plant will commence operations in the second half of 2018 or early 2019. Traffic movements from the proposed concrete batching plant is not reported in the Hanson's request for SEARs (JBA, 8 June 2017). Traffic from the proposed concrete batching plant will also use James Craig Road

- In addition, Glebe Island and White Bay are located within the Bays Precinct area which is earmarked for staged urban renewal under the Bays Precinct Urban Transformation Plan (Urban Growth, October 2015). The Plan anticipates the potential temporary use of Glebe Island as construction logistics site for major infrastructure projects. A number of NSW Government agencies have approached the Port Authority with proposals to use parts of the Glebe Island/White Bay precinct as construction support sites for some of the large infrastructure projects, including locating truck marshalling yards at the port facilities. These proposals have the potential to be traffic intensive developments. Traffic from these projects will all use James Craig Road.

James Craig Road/The Crescent intersection

As indicated above, port traffic associated with existing and proposed developments at Glebe Island | White Bay will use James Craig Road by The Crescent / James Craig Road intersection.

The Environmental Assessment for the White Bay Cruise Terminal (JBA, 2010) predicted peak hour traffic at James Craig Road with the cruise terminal and some other developments near Glebe Island ranging from 225-375 movements per hour, and the intersection analysis for James Craig Road/The Crescent predicted a Level of Service (LoS) of D/C. LoS A indicates good operation while LoS F indicates unsatisfactorily operation. LoS D is the lowest desirable level of service.

Response

The EIS did not propose to use roads under the ownership of the Port Authority of NSW. However, since the preparation and public exhibition of the EIS, Roads and Maritime has been in discussions with the Port Authority of NSW to use a portion of its land within the White Bay area for an additional construction ancillary facility to support a truck marshalling facility and construction light vehicle parking.

A detailed response to the potential impacts from M4-M5 Link associated construction traffic on James Craig Road, the intersection of James Craig Road/The Crescent and cumulative impacts associated with the future uses identified by the Port Authority of NSW in its submission on the M4-M5 Link EIS is provided in **section D2.4.1** of **Part D** (Preferred infrastructure report) as part of the proposed use of the White Bay civil site (C11) during construction of the project.

Consultation with the Port Authority of NSW and UrbanGrowth NSW has been ongoing during the development of the concept design, and the preparation and public exhibition of the EIS in relation to the use of land at White Bay as a construction ancillary facility to support the M4-M5 Link. Consultation with these agencies would continue during detailed design with consideration given to minimising potential impacts on other proposals for the area, including impacts on the operation of James Craig Road.

NSW Roads and Maritime Services (Roads and Maritime) will continue to consult with the Port Authority of NSW and the Freight Trial Development and Delivery branch of the Sydney Coordination Office (a Transport for NSW initiative) to manage potential cumulative traffic and transport impacts in this area.

B8.1.2 Access to port roads

Given the current uses and proposed traffic intensive developments at the Port facility in the short to medium term, the Port Authority have concerns regarding the impacts of the proposal on the James Craig Road port access. Nothing in the EIS suggests that construction traffic will require access to port roads. A change in this position will require the consent of the Port Authority of NSW.

Response

The EIS did not propose to use roads under the ownership of the Port Authority of NSW. However, since the preparation and public exhibition of the EIS, Roads and Maritime has been in discussions with the Port Authority of NSW to use a portion of its land within the White Bay area for an additional construction ancillary facility to support a truck marshalling facility and construction light vehicle parking. The proposed White Bay civil site (C11) is detailed further in **Part D** (Preferred infrastructure report).

As identified in **Part D** (Preferred infrastructure report), use of this land for a truck marshalling facility and construction light vehicle parking area would require the use of port roads (James Craig Road and Sommerville Road) for construction traffic ingress and egress. Discussions with the Port Authority of NSW are ongoing for the use of this land, which will be used in accordance with the conditions as imposed by the licence between the Port Authority of NSW and Roads and Maritime, relevant environmental management measures (see **Chapter E1** (Environmental management measures)) and any relevant conditions of approval.

A response regarding the proposed use of port roads (James Craig Road and Sommerville Road) by M4-M5 Link construction traffic associated with a truck marshalling facility and construction light vehicle parking area is discussed in **section B8.1.3**.

B8.1.3 Construction traffic impacts on port access

The timing of the WestConnex's works (2018-2023), and specifically the Stage 2 works (2019-2023), which involve the construction of the Rozelle interchange, coinciding with the operation of the proposed Multi-User Facility, the proposed Hanson concrete batching plant, and the anticipated use of Glebe Island/White Bay for construction logistics for major infrastructure projects (including truck marshalling yards for a number of infrastructure projects).

The EIS indicates that the Rozelle civil and tunnel site works, located in the vicinity of the port facilities, would generate over 500 heavy vehicles movements and about 350 light vehicles movements per day. Two heavy vehicle accesses to the Rozelle city and tunnel site are proposed at the City West Link to the west of the James Craig Road/The Crescent intersection. The traffic assessment indicates that construction traffic would potentially impact on operation of the road network surrounding the construction facilities. Potential impacts due to temporary lane closures and speed reductions, particularly during traffic staging, are anticipated.

The EIS's Technical working paper: Traffic and Transport (the traffic assessment) does not consider the additional James Craig Road port related traffic associated with the proposed Multi-User Facility and the Hanson's concrete batching plant in Glebe island (as these proposals were not known at the time of preparing the WestConnex's EIS). It is unclear whether the traffic assessment has considered traffic generation from construction logistics sites for major infrastructure projects within Glebe island/White Bay (also using James Craig Road) as the details of these proposals are not fully known.

Port Authority seeks to understand:

- How the increasing port traffic along James Craig Road and its intersection with The Crescent could be impacted during peak hours and peak construction periods
- How additional congestion caused by construction traffic in the Rozelle area would impact on port traffic during peak hours
- The potential impact on port traffic that may arise from the minor civil works proposed at James Craig Road and James Craig Road / The Crescent intersection.

Response

The timing of the proposed developments within the Glebe Island/White Bay precinct is noted. As noted in the submission received by the Port Authority of NSW, details about these proposed future uses at Glebe Island/White Bay were not known at the time of preparing the Traffic and transport impact assessment (refer to Appendix H (Technical working paper: Traffic and transport) of the EIS) and were therefore not included in the assessment.

Part D (Preferred infrastructure report) contemplates the use of a portion of land owned by the Port Authority of NSW adjacent to the White Bay Power Station at Rozelle as an additional construction ancillary facility to support construction of the M4-M5 Link project. The White Bay civil site (C11) is proposed for the purposes of a truck marshalling facility and construction light vehicle parking area. Ingress and egress to this proposed construction ancillary facility would be via James Craig Road and Sommerville Road.

An assessment of the potential traffic and transport impacts from the construction of the M4-M5 Link project, including the proposed use of a portion of land owned by the Port Authority of NSW adjacent to the White Bay Power Station at Rozelle for the White Bay civil site (C11), is included in **section D2.4.1** and **Appendix A** (Traffic and transport impact assessment). This assessment includes consideration of a cumulative scenario that includes M4-M5 Link construction and proposed developments at Glebe Island/White Bay to the extent to which these can be considered based on the known or available information. Details about the assumptions applied for each of the proposed developments assessed in the cumulative impact assessment are provided in section 3.1.5 of **Appendix A** (Traffic and transport impact assessment).

The use of the White Bay civil site (C11) as proposed in **Part D** (Preferred infrastructure report) would be carried out in accordance with licence conditions as agreed between the Port Authority of NSW and Roads and Maritime including negotiated restrictions on access to the site from Sommerville Road and James Craig Road during defined time periods on days when the cruise ship terminal is operating. In addition, Roads and Maritime will continue to consult with the Port Authority of NSW and the Freight Trial Development and Delivery branch of the Sydney Coordination Office (a Transport for NSW initiative) to manage potential cumulative traffic and transport impacts in this area.

Impact of minor civil works

Minor civil works as part of the project at the intersection of The Crescent and James Craig Road are identified in section 5.6.1 of the EIS and would include tie-in works including drainage, pavement and line-marking. All turning movements at this intersection would be retained and the works would occur predominantly within the existing road reserve, and within adjacent Roads and Maritime owned land.

Minor civil works at this intersection would be managed to avoid significant impacts to the operational integrity of the road network in the vicinity during construction of the project in accordance with the Construction Traffic and Access Management Plan (CTAMP). This would include measures to ensure that existing functionality is maintained where feasible and practical.

B8.1.4 Construction Traffic and Access Management Plan

The EIS indicates that prior to the commencement of construction, a CTAMP would be prepared as part of the Construction Environmental Management Plan to “set out the approach that will be adopted to minimise delays and disruptions, and identify and respond to any changes required to ensure road safety. ...would propose a car parking strategy for construction staff at the various worksites, developed in consultation with relevant... stakeholders and identify measures to management the movements of construction related traffic to minimise traffic and access disruptions in the public road network”.

The Port Authority requests that the CTAMP components associated with the Rozelle interchange surface works be prepared in consultation with the Port Authority to ensure that adequate access is maintained for port related traffic from Glebe island and White Bay, which must use the James Craig Road / The Crescent intersection.

Response

Roads and Maritime will continue to consult with the Port Authority of NSW and other stakeholders as appropriate to ensure coordination between the operation of the White Bay civil site (C11) and other relevant projects in the vicinity, including existing operations associated with port activities (see environmental management measure TT19 in **Part E1** (Environmental management measures)). This would include consultation with the Port Authority of NSW in relation to the CTAMP where potential impacts on port access roads may occur (see environmental management measure TT01 in **Part E1** (Environmental management measures)).

Roads and Maritime will continue to consult with the Port Authority of NSW and the Freight Trial Development and Delivery branch of the Sydney Coordination Office (a Transport for NSW initiative) to manage potential cumulative traffic and transport impacts in this area.

B8.2 Consultation

Refer to Chapter 7 (Consultation) of the EIS for details of consultation activities during the preparation of the EIS.

B8.2.1 Level of consultation

The Port Authority is satisfied with the level of consultation undertaken by the Roads and Maritime Service (Sydney Motorway Corporation) during the EIS public exhibition period.

The Port Authority seeks consultation with the proponent during the detailed design (construction and operation) of the Rozelle interchange works to ensure that port related traffic retains adequate access to and from Glebe Island and White Bay 24/7.

Response

Roads and Maritime will continue to consult with the Port Authority of NSW and other stakeholders as appropriate to ensure coordination between the operation of the White Bay civil site (C11) and other relevant projects in the vicinity, including existing operations associated with port activities (see environmental management measure TT19 in **Part E1** (Environmental management measures)). This would include consultation with the Port Authority of NSW in relation to the CTAMP where potential impacts on port access roads may occur (see environmental management measure TT01 in **Part E1** (Environmental management measures)).

Roads and Maritime will continue to consult with the Port Authority of NSW and the Freight Trial Development and Delivery branch of the Sydney Coordination Office (a Transport for NSW initiative) to manage potential cumulative traffic and transport impacts in this area.

B8.2.2 Project working group (construction)

The EIS indicates that “consideration would be given to the creation of a project working group, or equivalent, with the aim of managing projects impacts and disruptions through the sharing of relevant project information (eg. timing, duration and location of construction activities)”.

The Port Authority supports the idea of creating a Project Working Group to manage construction related impacts and sharing information. The Port Authority must be represented in the Project Working Group as a key stakeholder impacted by construction traffic.

Response

Roads and Maritime will continue to participate in the Bays Transportation Working Group, convened by Transport for NSW, which has been established to keep stakeholders informed of proposed projects and associated impacts and disruptions in the area around White Bay, Glebe Island, Rozelle Bay and Rozelle Rail Yards. Roads and Maritime intends to use this forum to share information regarding its projects in the area, including the M4-M5 Link, and to work collaboratively to ensure consistent messaging to the community regarding cumulative impacts from numerous projects underway concurrently (as reflected in environmental management measure C1 in **Chapter E1** (Environmental management measures)).

Roads and Maritime will continue to consult with the Port Authority of NSW and the Freight Trial Development and Delivery branch of the Sydney Coordination Office (a Transport for NSW initiative) to manage potential cumulative traffic and transport impacts in this area.

B8.2.3 Consultation in relation to utility services

The EIS’s Utilities Management Strategy indicates that as a result of the Rozelle interchange works “there would be significant impacts on existing utility services in that area which would need to be managed”. Services potentially affected include Ausgrid 132 kV and 33 kV transmission feeders, Telstra multi-fibre optic cable and Sydney Water sewer and water mains. Proposed management measures are provided in Table 3-4 of the Utilities Management Strategy. Potential impacts reported include “temporary disruption to services such as power and water supply during the works”.

The Port Authority requests that consultation with Port Authority be undertaken during detailed design of the utility services for the Rozelle interchange area to minimise the risk of impacts on capacity to supply the port facility and the potential for disruption of services. As recommended in the EIS, the Port Authority supports the establishment of a Utility Co-ordination Committee including representatives of key agencies including the Port Authority.

Response

Consultation with the Port Authority of NSW on matters associated with the M4-M5 Link project would be ongoing during the detailed design and construction phases. As noted in section 9.5 of Appendix F (Utilities Management Strategy) of the EIS, a Utility Co-ordination Committee will be established to coordinate utility works with concurrent works associated with multiple overlapping projects to manage potential cumulative impacts and ensure that appropriate respite is provided for potentially affected residents and other sensitive receivers. The Utility Co-ordination Committee will comprise representatives from the Port Authority of NSW, relevant utility service providers, local councils and the other major infrastructure projects occurring in proximity to the project. Implementation of the Utilities Management Strategy (Appendix F of the EIS) would be in accordance with environmental management measure PL14 in **Chapter E1** (Environmental management measures).

B8.3 Land use and property

Refer to Chapter 12 (Land use and property) of the EIS for details of land use and property.

B8.3.1 Works within land owned by the Port Authority

Section 6.3 of the EIS describes “the project footprint” as the area required for construction and/or operation of the project. Figures 6-5 and 6-6 of the EIS shows the project footprint within land owned by the Port Authority (ie. Lot 10 DP1170710; Port Authority’s land north and east of Victoria Road and adjacent to Sommerville Road). The EIS describes the works in this area as “utility treatments, traffic management changes and measures, installation of safety and environmental controls and establishment of temporary pedestrian and cyclist diversions (if required)”. It also indicates that removal of trees within Port Authority’s land will be required.

Works within Ports Authority’s owned land will require land owner’s consent. Consultation with Port Authority will be required to better understand the nature, extent and impacts of the works on Port Authority’s infrastructure.

Response

Consultation with the Port Authority of NSW on matters associated with the M4-M5 Link project would be ongoing during the detailed design and construction phases, as identified in the Community Consultation Framework (Appendix G of the EIS), Community Consultation Strategy (environmental management measure SE2), Utilities Management Strategy (Appendix F of the EIS), and in accordance with conditions of approval established for the project.

Roads and Maritime will continue to consult with the Port Authority of NSW and other stakeholders as appropriate to ensure coordination between the operation of the White Bay civil site (C11) and other relevant projects in the vicinity, including existing operations associated with port activities (see environmental management measure TT19 in **Part E1** (Environmental management measures)). This would include consultation with the Port Authority of NSW in relation to the CTAMP where potential impacts on port access roads may occur (see environmental management measure TT01 in **Part E1** (Environmental management measures)).

Roads and Maritime will continue to consult with the Port Authority of NSW and the Freight Trial Development and Delivery branch of the Sydney Coordination Office (a Transport for NSW initiative) to manage potential cumulative traffic and transport impacts in this area.

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B9 Fire and Rescue NSW

This chapter addresses issues raised by Fire and Rescue NSW.

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B9.1 Hazard and risk

Refer to Chapter 25 (Hazard and risk) of the Environmental Impact Statement (EIS) for details of hazards and risks.

B9.1.1 Fire safety emergency planning and management during operations

Fire and Rescue NSW outlined a number of fire safety emergency planning and management considerations relating to the operation of the motorway. Fire and Rescue NSW made the following recommendations for consideration by the NSW Department of Planning and Environment (DP&E):

- That the M4-M5 Link's fire hydrant system incorporates motorised isolating valves (with local manual override actuation capability). Motorised isolating valves are to be installed in locations and configured such that when remotely actuated, they restore emergency fire hydrant water supplies to the fire hydrant system while minimising disruptions to any potential [Fire and Rescue NSW] FRNSW firefighting operational activities that may be in progress
- That the M4-M5 Link's fire hydrant system incorporates motorised isolating valves that can be remotely actuated and controlled from the tunnel's control centre
- In addition, to ensure that hydraulic fire main failures can be quickly identified and isolated, FRNSW recommends that leak detection be incorporated into fire service mains that serve the tunnel's deluge and fire hydrant systems.

Response

NSW Roads and Maritime Services (Roads and Maritime) would continue to consult with key stakeholders throughout detailed design, construction and during operation of the project. This would include consultation with Fire and Rescue NSW in relation to fire safety, emergency planning and management for the project.

B9.1.2 Consultation with Fire and Rescue NSW

Fire and Rescue NSW considers that consultation should occur between the project team and Fire and Rescue NSW throughout the life of the project. In order to facilitate this effectively, Fire and Rescue NSW recommends that the conditions of approval attached to its submission be included in the Minister for Planning’s approval of the project.

Response

Conditions of approval are a matter for DP&E to consider during its assessment of the project.

Roads and Maritime would continue to consult with key stakeholders throughout detailed design, construction and during operation of the project. This would include consultation with Fire and Rescue NSW in relation to fire safety provisions, emergency planning and management for the project. Roads and Maritime would comply with all consultation requirements of the conditions of approval.

B10 City of Sydney Council

This chapter addresses issues raised by City of Sydney Council.

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B10.1 General comments

B10.1.1 Objection to WestConnex including M4-M5 Link

Section 1.3

The City strongly objects to WestConnex, including the Stage 3 M4-M5 Link, for the following reasons:

- WestConnex fails to meet the Government's primary objectives of providing a direct motorway connection between Western Sydney and Sydney Airport and Port
- WestConnex undermines the economic competitiveness of the Sydney city centre
- There is a lack of strategic justification for WestConnex. No feasible alternatives have been developed or assessed
- WestConnex will have unacceptable impacts on health and air quality. The EIS identifies an additional five unfiltered ventilation stacks to be constructed in Inner Sydney. In addition local surface roads will be widened and traffic volumes will increase
- There is a lack of alignment between WestConnex and the NSW Government's priorities and policies
- WestConnex will create a number of legacy impacts and worsen intergenerational equity
- The costs outweigh the benefits and the Project is not financially viable unless the Sydney Gateway, Western Harbour Tunnel and Beaches Link and F6 Extension are constructed – yet no business case, funding commitment or timeline is provided for these other projects. The Project will create road network failures that may be used to justify further privately operated motorways
- There will be major impacts on the Anzac Bridge (projected to carry some 30 per cent more traffic than its ceiling capacity) and city centre resulting from the Project. The EIS forecasts major impacts on bus travel time and reliability
- Construction of the M4 East and New M5 appears to be used as part of the justification for the M4-M5 Link – constructing a motorway to justify more motorways
- The Project objectives do not align with the objectives outlined for WestConnex
- The EIS does not contain sufficient safeguards for the community. Government is seeking planning approval to sell the Project to the private sector and discharging its responsibility and control for the delivery of the Project
- There will be major negative impacts on the community as a result of the Project.

Response

The City of Sydney's objection to WestConnex, including the M4-M5 Link is noted. The City of Sydney's objection is responded to in the following sections:

- WestConnex fails to meet the Government's primary objectives of providing a direct motorway connection between Western Sydney and Sydney Airport and Port – see **section B10.3.7**
- WestConnex undermines the economic competitiveness of the Sydney city centre – the manner in which the project would support the economic competitiveness of Sydney is described in **section B10.1.5**. The impact of the project on the Sydney city centre is outlined in **section B10.8.6**
- There is a lack of strategic justification for WestConnex. No feasible alternatives have been developed or assessed – see **section B10.3** (Strategic context and project need) and **section B10.4** (Project development and alternatives)
- WestConnex will have unacceptable impacts on health and air quality. The Environmental Impact Statement (EIS) identifies an additional five unfiltered ventilation outlets to be constructed in inner Sydney. In addition, local surface roads will be widened and traffic volumes will increase – see **section B10.9** (Air quality) and **section B10.11** (Human health)
- There is a lack of alignment between WestConnex and the NSW Government's priorities and policies – see **section B10.3** (Strategic context and project need)

- WestConnex will create a number of legacy impacts and worsen intergenerational equity – the justification for the project is established in Chapter 30 (Project justification) of the EIS. Further discussion of the strategic context and project need is provided in **section B10.3** (Strategic context and project need)
- The costs outweigh the benefits and the project is not financially viable unless the Sydney Gateway, Western Harbour Tunnel and Beaches Link and F6 Extension are constructed – yet no business case, funding commitment or timeline is provided for these other projects. The project will create road network failures that may be used to justify further privately operated motorways – see **section B10.3.6** and **section B10.3.7** for a discussion on the relationship between the project and other motorway projects planned as part of the development of Sydney's strategic road network. See **section B10.8.5** for a summary of the potential cumulative traffic and transport impacts from the operation of the project and these proposed future motorway projects. See **section B10.8.8** for a description of the management and mitigation measures that would manage operational traffic impacts from the project
- There will be major impacts on the Anzac Bridge (projected to carry some 30 per cent more traffic than its ceiling capacity) and city centre resulting from the Project. The EIS forecasts major impacts on bus travel time and reliability – see **section B10.5.5** and **section B10.8.6** for discussion on the impact of the project on the Sydney Central Business District (CBD) road network. See **section B10.3.5** for a discussion on the impacts on bus travel times along Victoria Road
- Construction of the M4 East and New M5 appears to be used as part of the justification for the M4-M5 Link – constructing a motorway to justify more motorways – see **section B10.3** (Strategic context and project need)
- The project objectives do not align with the objectives outlined for WestConnex – see **section B10.3.8**
- The EIS does not contain sufficient safeguards for the community. Government is seeking planning approval to sell the project to the private sector and discharging its responsibility and control for the delivery of the project – see **section B10.2** (Assessment process)
- There will be major negative impacts on the community as a result of the project – the justification for the project is established in Chapter 30 (Project justification) of the EIS.

B10.1.2 Investment should be in public transport

Section 1.3

The NSW Government has missed a significant opportunity to be truly visionary, recognising and embracing technological change that offers the potential to revolutionise urban travel, support economic agglomeration and deliver on health and wellbeing outcomes.

Instead the people of NSW will be left with an intrusive inner city motorway, that escalating tolls will make unpopular and technological change will render redundant. Other global cities are investing in fast and efficient public transport that truly connects homes and jobs, supports the decentralisation of commercial investment and develops a resilient and equitable city for future generations.

Response

The consideration of public transport alternatives is described in section 4.4.2 of the EIS. The need for investment in transport infrastructure in NSW, including the WestConnex program of works, has been established by the NSW Government at a strategic level in state planning and policy documents (see **section C3.1.1**). The *WestConnex Updated Strategic Business Case 2015* was prepared to assess the viability of the WestConnex program of works as part of a broader integrated transport and land use solution for NSW. Subsequent EISs for each stage of the WestConnex program of works, including the EIS for the M4-M5 Link, have therefore carried out an assessment of strategic alternatives in consideration of the established strategic transport and land use policy context and the recognised need for the WestConnex program of works as set out in the *WestConnex Updated Strategic Business Case 2015*.

The *State Infrastructure Strategy 2012 – 2032* (Infrastructure NSW 2012) states that, based on the economic and demographic forecasts, public transport is expected to experience strong growth, particularly around the Sydney CBD and other business centres. The Strategy also notes that the key challenges facing urban public transport relate to the following:

- The ability of the existing public transport network to serve a growing population while providing the mobility and connectivity necessary to sustain economic growth and productivity
- Improving access to the Sydney CBD
- Supporting growth in Sydney's emerging centres
- Optimising the performance of the existing public transport network
- Building future network capacity that keeps pace with demand and meets the needs of businesses and households.

While the use of public transport is expected to grow with the implementation of key public transport initiatives, most growth in transport demand over the next 20 years will continue to be met by roads. Public transport is best suited to providing concentrated, high volume flows of people to and from established centres. It is less suited to providing dispersed cross-city or local trips.

In 2014, around 17.6 million trips were made each average weekday in Sydney, with around 75 per cent of these by road. To meet this demand, the NSW Government has been investigating and investing in public transport, including committing more than $400 million in the NSW 2016-2017 budget to plan, develop and deliver enhancements to increase and improve rail services. Sydney Metro West is one of the key public transport projects in the early planning phase, which would be a largely underground railway line between Sydney CBD and Parramatta. However, even with significant investment and high levels of patronage growth forecast for Sydney's public transport network, about 72 per cent of around 27.5 million journeys in 2031 are expected to be made on the road network each weekday by private vehicles, equal to an additional 4.3 million new trips compared to 2014 (Infrastructure NSW 2014).

Not all trips in Sydney can be undertaken by public transport as customer needs are diverse, often requiring travel over long distances or dispersed across multiple destinations. With about 60 per cent of employment dispersed across the Sydney metropolitan area, public transport alone cannot viably serve most of these locations. Even under the most ambitious scenarios for land use change and growth in public transport, the absolute number of car journeys will continue to increase (SMC 2015a). Public transport improvements alone are therefore not a viable alternative to meeting the project objectives. Investment in integrated transport solutions that involve both roads and public transport is needed to cater for the concentrated population growth forecasts and associated increase in travel movements.

Employment growth in the Sydney metropolitan area is expected to increase in keeping with a growing population. While Sydney has an extensive public transport network (with rail being the most popular mode used to access the Sydney CBD), the Level of Service (LoS) can vary significantly. A key constraint to the expansion and development of the rail network is Sydney's geography, with large parts of the Sydney metropolitan area, such as outer western Sydney and the Northern Beaches region, being relatively poorly connected by public transport to Sydney's global employment centres. As major rail projects have a long lead time, the focus in the shorter term is to improve public transport services through the bus network, such as bus priority programs and bus rapid transit.

The NSW Government is committed to investing in a range of public transport projects, as identified by the recently released Draft *Future Transport Strategy 2056* (NSW Government 2017) as well as the *State Infrastructure Strategy Update* (Infrastructure NSW 2014), *A Plan for Growing Sydney* (NSW Government 2014) and the *NSW State Priorities* (NSW Government 2015) which are discussed in section 4.4.2 of the EIS. These public transport projects include Sydney Metro Northwest, Sydney Metro City and Southwest CBD and South East Light Rail, Parramatta Light Rail and Sydney Metro West. The Draft *Future Transport Strategy* discusses a number of public transport initiatives, including the intermediate transit network, discussed on page 81 of the strategy which, combined with existing commitments such as the Sydney Metro West, will create opportunities in the community around The Bays Precinct by connecting them to major economic hubs in the Sydney CBD, Parramatta and Sydney Olympic Park.

In addition to the public transport initiatives, the Draft *Future Transport Strategy* (NSW Government 2017) has re-iterated the need to plan and invest in the future of Sydney's motorway network as identified in the *State Infrastructure Strategy Update* and the *State Infrastructure Strategy*. It recognises the role that the road network plays in providing vital infrastructure connections within and between travel demand corridors for private vehicles, public transport and freight. In doing so, it acknowledges that any investment in motorway infrastructure has to be aligned with supporting public transport initiatives to achieve an increase in capacity, while aiming to reduce the reliance on and demand for private vehicles on the future road network.

The WestConnex program of works is one part of a broader solution to these emerging pressures. While public transport is also part of this mix, it is recognised that not all trips in Sydney can be served by public transport, such as trips to dispersed destinations, or commercial trips requiring the movement of large or heavy goods/materials. A congested road network also affects road-based public transport, increased bus travel times and variable journey times. For these reasons, the NSW Government is also investigating and investing in light rail, metro, bus rapid transit and motorways to provide a multi-modal response to the future challenges. In this context, WestConnex is an enabler of integrated transport and land use planning, supporting the development of initiatives including The Bays Precinct, Victoria Road and Parramatta Road public transport improvements and the *Parramatta Road Corridor Urban Transformation Strategy*.

B10.1.3 Context of the project

Section 1.4, p11

The Project and the context in which it sits is summarised below.



Source: WestConnex M4-M5 Link EIS [Figure 1-1 of the EIS]

The EIS is for the third of five stages of WestConnex that the Government has so far committed to. Stage 1 completed the widening of the M4 and largely completed a tunnel to Haberfield from the end of the current M4; Stage 2 comprised the M5 upgrade and New M5 including the St Peters Interchange; Stage 3, the M4-M5 Link, is the subject of this EIS.

The EIS is based on the spurious assertion that the M4 and M5 need linking, when they are already linked by the M7, A6 and A3. The A3 is the primary eastern link between the two motorways and is shown in the State Road network hierarchy as the M4-M5 Connector. The M4-M5 Link enables the expansion of the WestConnex network to include the proposed Western Harbour Tunnel, Beaches Link and F6. These motorway projects were not part of the WestConnex business case and are not priority projects in any State or Federal roads plan. Crucially, to make the sale more attractive, the tunnels between Haberfield and St Peters will be built independently of the Rozelle Interchange.

Response

Justification of the need for the M4-M5 Link

The project is listed as a 'high priority initiative' in the *Australian Infrastructure Plan: The Infrastructure Priority List* (Infrastructure Australia 2016). The project is also part of the NSW Government's commitment to deliver WestConnex for Sydney in response to the recommendations from the *State Infrastructure Strategy*, the *State Infrastructure Strategy Update*, the *NSW Long Term Transport Master Plan* (*Transport Master Plan*) (Transport for NSW 2012), the *NSW State Priorities* announced in September 2015 (NSW Government 2015) and the *NSW Freight and Port Strategy* (Transport for NSW 2013).

The WestConnex program of works, which includes the project, has the potential to be a catalyst for major urban renewal and complements *A Plan for Growing Sydney* (NSW Government 2014), the *Draft Greater Sydney Region Plan* (Greater Sydney Commission 2017), and the *Revised Draft Eastern City District Plan*[1] (Greater Sydney Commission 2017). The project also complements the vision established in *Towards our Greater Sydney 2056* (Greater Sydney Commission 2016) by providing improved connectivity between the Eastern City, Central City and Western City of the greater Sydney metropolitan region.

Investment in the M4-M5 Link, as part of WestConnex program of works, would assist in facilitating the delivery of other major city-shaping improvements, such as the Parramatta Road Corridor Urban Transformation and The Bays Precinct Transformation, which would all contribute to delivering economic growth. Delivery of *The Bays Precinct Transformation Plan* (UrbanGrowth NSW 2015) is intended to be staged and coordinated with the planning and delivery of infrastructure projects including WestConnex. As part of the broader WestConnex program of works, the project would support NSW's major sources of economic activity and provide a strategic response to the future transport demands on the already congested road network.

Section 4.2.3 of the EIS describes the development of the M4-M5 Link concept, and specifically the identification of the opportunity to design the WestConnex program of works to support connectivity to planned future motorway networks, including a northern and southern extension:

- The proposed northern extension, to connect WestConnex to the proposed future Western Harbour Tunnel and Beaches Link. The M4-M5 Link has been enhanced to incorporate the northern extension
- The proposed southern extension, referred to as the Southern Connector in the *WestConnex Updated Strategic Business Case* (Sydney Motorway Corporation 2015a) and now referred to as the proposed future F6 Extension. The New M5 project tunnels include provision for a future connection to the F6 Extension.

These extensions were described in the *State Infrastructure Strategy Update* and in the *WestConnex Updated Strategic Business Case*.

The M4-M5 Link is the final stage of the WestConnex program of works. While one of the objectives of the project is to enable long-term motorway network development by providing a connection to the proposed future Western Harbour Tunnel and Beaches Link program of works to the north (see section 3.3 of the EIS), the proposed future Western Harbour Tunnel, Beaches Link (and F6 Extension) projects are not part of the WestConnex program of works. Together with the proposed future Sydney Gateway, the project would also facilitate improved connections between western Sydney, Sydney Airport and Port Botany. The M4-M5 Link is not dependent on any of these projects going ahead.

[1] the Revised Draft Eastern City District Plan replaces the Draft Central District Plan (Greater Sydney Commission 2016)

While these related projects are considered in the cumulative impact assessment in the EIS, the EIS is seeking approval for the M4-M5 Link project (which includes construction of a tunnel connection to the proposed future Western Harbour Tunnel project, as explained in Chapter 5 (Project description) of the EIS). The proposed future Western Harbour Tunnel and Beaches Link program of works and the F6 Extension are identified as 'priority initiatives' in the *Australian Infrastructure Plan: The Infrastructure Priority List* and are identified in the Draft *Greater Sydney Region Plan* (Greater Sydney Commission 2017) as committed government projects in the planning stage. These projects are subject to their own business case and assurance processes, environmental assessment and approvals.

Existing arterial road network alternatives to the project

There are currently no existing arterial roads that would directly link the M4 East Motorway at Haberfield with the New M5 Motorway at St Peters, both of which are currently under construction. The M4-M5 Link would provide both an east-west connection towards Anzac Bridge and the Sydney CBD, and a north-south connection toward St Peters. The project would also provide a connection to the Sydney Airport and Port Botany precinct with the addition of the proposed future Sydney Gateway, and a connection to the southern Sydney precincts with the proposed future F6 Extension. In addition, the project would enable long-term motorway network development by providing a connection to the proposed future Western Harbour Tunnel and Beaches Link project to the north. Together with the other components of the WestConnex program of works the project would facilitate improved connections between western Sydney (including the Parramatta Road corridor) and south and south-western Sydney (including the M5 South West Motorway).

In the absence of the project, motorists using the M4 East and New M5 motorway tunnels wishing to travel north or south would be required to travel along local and sub-arterial roads or traverse the Sydney CBD to access existing key north–south corridors such as the M1 Motorway. Examples of existing routes that would provide connectivity to the north and south as well as to the east and west (as an alternative to the project) could include Parramatta Road, City Road/King Street/Princes Highway, King Georges Road, M1 Motorway/Anzac Bridge/City West Link, Johnston Street/The Crescent, Edgeware Road, Shaw Street and Norton Street, as well as the local road network. The connectivity between the M4 East and the New M5 motorways provided by these routes is indirect and requires motorists to travel through many at-grade intersections and, in some cases, steep grades such as on parts of King Georges Road. It also requires motorists to negotiate congestion and high pedestrian traffic such as on King Street at Newtown, which are not appropriate for freight vehicles. Notwithstanding this, these routes would remain available as an alternative to those who choose not to use the M4-M5 Link motorway.

Without the project, passenger and commercial vehicles, trucks and buses travelling from Haberfield to the Sydney CBD would continue to use the already congested east–west arterial road network (ie Parramatta Road and City West Link). According to the *Transport Master Plan*, this is one of the most constrained strategic transport corridors in Sydney. The north-south arterial road network between Drummoyne and the Sydney CBD via Victoria Road and Anzac Bridge is similarly congested.

As a result of the M5 East Motorway currently operating over capacity for long periods of the day, connecting arterial roads such as King Georges Road and the remainder of the A3 corridor, perform a higher-order transport workload than they were originally intended for, particularly for heavy vehicles. Traffic flows on the A3 corridor between the M4 and M5 motorways vary from around 60,000 vehicles per day to nearly 100,000 vehicles per day. The result is increased congestion, travel time variability and a higher risk of traffic breakdowns and collisions.

The A3 corridor between the Hume Highway and the M5 Motorway is bordered by predominantly private residences, with many homes sited close to the road, and with clusters of businesses in some suburbs. Grade separation may result in potential visual impact issues and requires more land than at-grade intersections, which would require the acquisition of businesses and homes around each intersection. There are two grade separated and 17 signalised intersections along the A3 corridor between the M4 and M5 motorways. Heavy congestion on the corridor during peak periods reduced average travel speeds to around 25 kilometres per hour in 2015.

It would not be feasible to grade separate each intersection and therefore stop-start traffic at signalised intersections would continue. In general, adding to the number of heavy vehicles along this already busy corridor would reduce amenity for homes, schools (such as Wiley Park Public School), businesses and pedestrians and re-create the poor amenity experienced on Parramatta Road as a result of congested traffic and high number of heavy vehicles.

In addition, the corridor is an important transit corridor for buses and any upgrades would need to consider the needs of buses and their ability to pull into and out of bus stops without conflicting with heavy vehicles.

The key advantages of the M4-M5 Link are that traffic, particularly heavy vehicle traffic, would be removed from the surface roads so that air quality, amenity and safety is improved for people living and working along surface routes such as the A3 corridor, and secondly, that travel would be more efficient in a tunnel, without intersections.

The M7 Motorway primarily serves Sydney's west and was developed to respond to a need to connect the M2, M4 and M5 motorways, complete a substantial part of the NSW Government's Sydney Orbital Strategy and reduce travel times across western Sydney. Although the M7 Motorway provides an important north-south connection in Sydney's strategic road network, it is a connection through the middle and outer western suburbs of Sydney. The M7 Motorway is not an alternative to the project, as it does not provide a north-south connection through the inner suburbs of Sydney and does not link to Sydney Airport or Port Botany.

Improvements to the road network, as an alternative to the project, would require significant upgrades (eg road widening or road closures) and the implementation of traffic controls (eg clearways) to accommodate projected traffic volumes. Improvements to the existing arterial road network would:

- Result in potentially significant community and environmental impacts through increased traffic flows within residential areas leading to increased noise and detrimental air quality, and potential property acquisition impacts associated with road upgrades
- Make it difficult to achieve future land use regeneration and urban renewal along parts of Parramatta Road or along Victoria Road (east of Iron Cove Bridge), or to upgrade public transport services along these corridors, as proposed by the NSW Government
- Not provide the connectivity to Sydney's international gateways at Sydney Airport and Port Botany through the St Peters interchange and the proposed future Sydney Gateway project
- Not enable direct and free flow connections to the proposed future Western Harbour Tunnel and Beaches Link program of works and F6 Extension (via the New M5) to provide a western bypass of the Sydney CBD.

Improvements to the arterial road network would only provide incremental change in the efficiency of the road network, and would not support the additional capacity required for regional traffic growth to support the forecast increase in Sydney's population and subsequent increases in vehicle kilometres travelled (VKT). Arterial road improvements alone would therefore not meet the project objectives.

To improve the capacity and performance of the arterial road network across the Sydney metropolitan area, NSW Roads and Maritime Services (Roads and Maritime) would continue to implement projects in addition to the M4-M5 Link, such as the Easing Sydney's Congestion program.

Staging of construction and operation of the M4-M5 Link

As the project design evolved, so did the construction strategy and the proposed delivery mechanism for the project. Various options were considered for the packaging of the project works including packaging the works by major infrastructure components or by geographical location. Factors that were considered included:

- Timing and critical path items
- Cost and affordability
- Risk allocation and transfer
- Market competition.

Following consideration of options for the construction and delivery of the project, it is proposed that the project would be constructed and opened to traffic in two stages:

- Stage 1 – construction of the mainline tunnels and stub tunnels to the Rozelle interchange at the Inner West subsurface interchange
- Stage 2 – construction of the Rozelle interchange and Iron Cove Link including:
  - Connections to the stub tunnels for the mainline tunnels (built during Stage 1)
  - Connections to the surface road network

– Civil construction of tunnels, entry and exit ramps and infrastructure (a ventilation outlet and ancillary facilities) to provide connections to the proposed future Western Harbour Tunnel.

The rationale for this approach was based on the following considerations:

- Easing current congestion issues along Parramatta Road and providing connectivity with the other WestConnex tunnels as soon as practical
- Allowing more time to optimise the concept design and develop the detailed design for the Rozelle interchange
- Making the scope of the project more manageable for delivery by dividing the works into two construction contracts.

Construction of the mainline tunnels (Stage 1) would occur between 2018 and 2022 and construction of the Rozelle interchange and the Iron Cove Link (Stage 2) would occur between late 2018 and 2023. Stage 1 of the project is expected to be complete and open to traffic by 2022 and the whole project would be complete and open to traffic by 2023. Further details on the timing of staging and the description of works to be undertaken in each stage are provided in Chapter 6 (Construction work) of the EIS. An assessment of the traffic and transport impacts associated with the staged opening of the project is provided in Chapter 8 (Traffic and transport) of the EIS.

B10.1.4 EIS is based on concept design

Section 1.4, p12

The EIS has been prepared based on a concept design only. A final design has not been adopted. The EIS cannot then adequately canvas all the impacts that may arise.

Response

The delivery mechanism adopted for the M4 East and New M5 projects is different to the approach for the M4-M5 Link. For the M4 East and New M5 projects, a design and construction contractor was appointed early (prior to the EIS being publicly exhibited) and therefore had direct input into the design development, EIS preparation and construction planning for those projects. Community and agency feedback during the M4 East and New M5 EIS exhibition period indicated a preference for the usual approach taken for projects of allowing the community to provide input into the scope of the project through the EIS public exhibition process before the detailed design of the project was undertaken and "locked in".

After considering the community feedback on the issue, the approach of assessing a concept design has been adopted for the M4-M5 Link project. This approach presents the community and stakeholders with an opportunity to consider and provide feedback on the project before the detailed design work for construction of the project is carried out. Recent State significant infrastructure (SSI) development in NSW that has been assessed on a concept design includes M4 Widening, CBD and South East Light Rail and Sydney Metro City and Southwest.

The Secretary's Environmental Assessment Requirements (SEARs) required that the EIS provide a detailed description of the project and its construction in order that the impacts could be comprehensively addressed. The concept design for the project presented in the EIS was assessed using a conservative approach, which included identifying the project components, the project footprint (section 5.1.2 of the EIS) and assessing the worst case impacts and scenarios. The design of the project presented in the EIS, including tunnels and operational facilities, considered the best available technical information and adopted good practice environmental standards, goals and measures to minimise environmental risks. The construction methodology developed for the concept design has been based on input from constructability experts and technical specialists with appropriate expertise.

Detailed investigations, planning and surveys will be undertaken by a design and construction contractor(s) appointed following the determination of the EIS. The design and construction contractor(s) would be selected based on various criteria, included their proven ability to deliver large and complex projects, and to provide value for money. The design presented by the contractor will need to satisfy all technical road design requirements and road functionality as described in the EIS, and to be consistent with the approved scope of the project, including environmental management measures and conditions of approval for the project. Aspects of the detailed design, including the Social Infrastructure Plan and Urban Design and Landscape Plans (UDLPs), will be developed in consultation with the community.

The detailed design will be prepared based on the project approval, including the EIS, the Submissions and preferred infrastructure report and conditions of approval, to determine whether the detailed design is consistent with the approved project. Where the detailed design is inconsistent with the approved project, further assessment and approval would be required under the *Environmental Planning and Assessment Act 1979* (NSW) (EP&A Act). If further assessment/approval is required due to project design changes, the applicable statutory process will be followed prior to commencement of construction of the relevant aspect of the project. This may be in the form of a modification request lodged with NSW Department of Planning and Environment (DP&E), depending on the scale of the proposed modification and the potential for environmental or social impacts.

B10.1.5 The WestConnex Business Case

Section 1.5, p12

Key criticisms of the Business Case focus on the limitations of the process. Searle and Legacy [2017] raise fundamental issues about the way infrastructure business cases in general are developed, and WestConnex in particular.

The first of the limitations identified by Searle and Legacy [2017] is the manner in which strategic transport and land use planning considerations are evaluated in business cases. They found, in relation to WestConnex that:

- The Business Case did not factor in the impact that longer total journey lengths will have on urban sprawl, which will have a flow-cost for infrastructure and servicing
- The Business Case included benefits from WestConnex supporting more compact commercial land use ('agglomeration benefits'), when this outcome is generally not the result of motorway investment, and is unlikely to be in the area served by WestConnex Stage 3
- The Business Case did not attempt to cost the reductions in public transport use, especially the loss of fare revenue
- Ancillary road projects necessitated by WestConnex, such as the Alexandria-Moore Park Connectivity Upgrade (which could cost over $1 Billion), should have been included in the Business Case
- Impact on property values, costs of noise during construction, and loss of business should all have been costed and included in the Business Case
- Loss of heritage to the whole community (not just property owners) should have been costed and included in the Business Case.

The second category of limitations is the manner in which other planning issues are excluded from cost-benefit analysis, which is a key component of developing a business case. Searle and Legacy found:

- There was no analysis of equity impacts of the infrastructure investment and the tolling regime, given the lower socio-economic status of many areas of Western Sydney, and the requirement for potential users of WestConnex to own or pay for access to a private vehicle to be able to use it
- The localised impact of air quality around the ventilation outlets should have been accounted for
- Impacts associated with loss of amenity from reduced access to open space should have been accounted for.

Searle and Legacy attribute some of these issues with the Business Case to the decision of the NSW Government to include WestConnex in the *State Infrastructure Strategy* and other land use and transport plans before a business case was developed. There was no incentive to explore alternatives or to fully explore the costs and benefits.

- This process has been described as 'locked in'. Commitment escalates because a project has been announced and appears in numerous policy documents
- WestConnex is a clear example of government 'locking in' its commitment before sufficient analysis had been undertaken.

With the Government fully 'locked-in' to WestConnex, the issues and inadequacies identified in the Updated Strategic Business Case are also reflected in the Stage 3 M4-M5 EIS.

The Strategic Business Case for the full WestConnex project, made up of the M4 Widening and M4 East, New M5, M4-M5 Link, King Georges Road Interchange upgrade and Sydney Gateway, was completed in August 2013 but only a summary was released.

After the Strategic Business Case, the WestConnex project changed significantly. An Updated Strategic Business Case reflecting an updated concept design was published in 2015.

SGS Economics and Planning (SGS) undertook a detailed assessment of the Updated Strategic Business Case and reached the following conclusions:

- The Benefit Cost Ratio (BCR) as misrepresented as 1.71 when it was 1.64
- The Business Case did not identify Stage 3 WestConnex, connecting the M4 to the M5, as a priority for 'filling in the missing links in Sydney's motorway network'
- Modelling for post-2031 conditions was not undertaken, however benefits were assumed to continue until 2052
- The transport modelling used in the Business Case was likely to have underestimated the impact of extra traffic induced by the additional capacity, which would significantly reduce the BCR.
- The Business Case did not reflect global approaches to congestion management, such as investment in public transport and travel demand management
- The Business Case suggested WestConnex would help renew Parramatta Road by reducing traffic on it, despite the modelling showing that many parts of it would carry more traffic, not less
- Travel time savings were relied on as a key component of the positive BCR. A significant proportion of these purported benefits are from travel time savings which were within the margin of error of modelling and would be so small that motorists may not notice them (and therefore would not value them)
- Research[2] has found that business travellers are more concerned with predictability and reliability of travel times than they are with actual travel time
- Insufficient justification was provided for the significant travel time savings, and economic benefits, factored into the BCR for business and light commercial vehicles – for instance there was insufficient analysis of origins and destinations of these trips
- The construction costs were considerable, with the implication being that if these increase, by even a small percentage, the BCR would reduce accordingly
- Other costs were not accounted for, such as reduced amenity on urban development, loss of land for higher value activities, and the health costs of potentially reduced public transport use.

Response

The scope of the EIS was designed to address the SEARs, which focused on the assessment of impacts (adverse and beneficial) from the construction and operation of the M4-M5 Link project. The EIS was prepared in accordance with Part 5.1 of the EP&A Act the SEARs and Part 3 of Schedule 2 of the Environmental Planning and Assessment Regulation 2000 (NSW) (Environmental Planning and Assessment Regulation). A checklist against this regulation is provided in Appendix D (Environmental Planning and Assessment Regulation Requirements) of the EIS. A copy of the SEARs, including an indication of where they are addressed in the EIS is provided in Appendix B (Secretary's Environmental Assessment Requirements checklist) of the EIS.

The need for investment in transport infrastructure in NSW, including the WestConnex program of works, has been established by the NSW Government at a strategic level in state planning and policy documents (see **section C3.1.1**). The *WestConnex Updated Strategic Business Case* was prepared to assess the viability of the WestConnex program of works as part of a broader integrated transport and land use solution for NSW. Subsequent EISs for each stage of the WestConnex program of works, including the EIS for the M4-M5 Link, have therefore carried out an assessment of strategic alternatives in consideration of the established strategic transport and land use policy context and the recognised need for the WestConnex program of works as set out in the *WestConnex Updated Strategic Business Case*.

[2] Roads Australia 2013, Building the Case for Customers.

The WestConnex Updated Strategic Business Case

Sydney's population is expected to increase by more than 1.6 million people by 2031 and without major investment in road network infrastructure this growth would result in worsening road congestion. This congestion would in turn affect Sydney's economic competitiveness as a global city.

WestConnex was a key initiative recommended in the NSW Government's *State Infrastructure Strategy* which was prepared by Infrastructure NSW to provide independent advice on the infrastructure needs of the state. WestConnex has been assessed as a program of works and a motorway network in the *WestConnex Strategic Business Case* which was approved by the NSW Government in August 2013. In November 2015, the *WestConnex Updated Strategic Business Case* was released, which consolidated the work undertaken in the original business case and incorporated further development in the program of works and feedback received from stakeholders. The enhancements included in the updated business case are:

- The acceleration of the New M5 project from a 2020 completion to a 2019 completion date, and the confirmation of its alignment
- The realignment of the M4-M5 Link with a 'northern extension' being incorporated that would duplicate City West Link to Rozelle, providing connectivity to the Anzac Bridge and Victoria Road
- Works to enable connectivity with the proposed future Western Harbour Tunnel and Beaches Link and Southern Connector [now the F6 Extension]
- Improved connections to the Sydney Airport and Port Botany precinct.

The business case assessed all the WestConnex projects on an incremental basis, with and without each component project. The project is a critical component of the WestConnex program of works, as it links the M4 East at Haberfield with the New M5 at St Peters, and as a result, allows the full benefits of WestConnex to be realised.

The *WestConnex Updated Strategic Business Case* has been written in accordance with the requirements of the NSW Treasury *Guidelines for Capital Business Cases*, as well as Infrastructure NSW and Infrastructure Australia requirements. These include recommendations by both the NSW Auditor General and Infrastructure Australia resulting from reports prepared by these bodies on aspects of WestConnex, which have been considered and incorporated into the *Updated Strategic Business Case*. All relevant information supporting the *Updated Strategic Business Case* has been transparently and publicly released, except in limited circumstances where to do so would be contrary to the public interest or position of the State for commercial or legal reasons.

The *WestConnex Updated Strategic Business Case* was independently reviewed by Infrastructure for NSW and Infrastructure Australia. In accordance with the recommendation by the NSW Auditor-General that major projects and key documents, such as the *WestConnex Updated Strategic Business Case*, be subject to the *Infrastructure Investor Assurance Framework* designed by Infrastructure NSW, the *WestConnex Updated Strategic Business Case* has been through an externally managed Business Case Gateway Review. All relevant information supporting the *WestConnex Updated Strategic Business Case* has been transparently and publicly released, except in limited circumstances where to do so would be contrary to the public interest or position of the state for commercial or legal reasons. Independent reviews of the project and business case is further discussed in **section C3.3**.

The business case considered traffic modelling to forecast traffic flows and changes on the future road network in 2031. Linear interpolation was used to estimate the benefits up to 2031 and for benefits beyond 2031, a 'decay' function was used which assumes there would be plateauing over time due to increased traffic resulting from population growth. This was a conservative approach.

The NSW Government is committed to investing in a range of public transport projects. The *Transport Master Plan* provides a framework for delivering an integrated, modern and multi-modal transport system, identifying NSW's transport actions and investment priorities for the next 20 years. Public transport and rail freight options are complementary to the project and WestConnex as a whole. Strategies to deliver an integrated package of transport improvements in parallel with the construction of WestConnex are recognised in the *Transport Master Plan*. The provision of the project is not expected to impact revenue received from public transport.

The combined number of new road trips and trips reassigned from public transport as a result of the full WestConnex program of works is anticipated to be around with induced demand equating to about 0.3 per cent of additional daily trips in the Sydney metropolitan area in 2033 (see **section B10.5.9**). This mode shift has been included in the WestConnex Road Traffic Model version 2.3 (WRTM v2.3) and considered in the traffic modelling undertaken for the project discussed in Chapter 8 (Traffic and transport) and Appendix H (Technical working paper: Traffic and transport) of the EIS.

The business case proposed that funding of WestConnex would be facilitated by user pays contributions to reduce the overall burden on the wider NSW taxpayers. Inclusion of a toll makes construction of the project affordable and equitable, as the cost is shared between taxpayers and individual users of the M4-M5 Link.

Roads and Maritime are working on a range of road upgrades, including the Alexandria to Moore Park Connectivity Upgrade, which was not included in the business case for the WestConnex program of works, as its scale and size warrants that it be considered as a separate project.

Economic analysis of the business case

The economic appraisal completed as part of this *Updated Strategic Business Case* concluded that WestConnex would deliver $1.71 in benefits for every one dollar spent when assessed without reference to the wider economic benefits of the projects. When the wider economic benefits are considered this rises to $1.88 in benefits for every one dollar spent. The BCR is a measure of the net benefit to society derived from the capital investment in the project.

For the M4-M5 Link project, the BCR has been calculated as $2.38 or $2.94 with wider economic benefits meaning that for every dollar invested, the project would return $2.38 or $2.94 respectively. These ratios indicate an economically viable proposal.

The economic analysis for the WestConnex program of works determined that WestConnex would create benefits that would outweigh the upfront construction costs and ongoing operational costs. The economic analysis adopts the NSW Treasury definition for the BCR metric, defined as the present value of benefits less the present value of operating costs, divided by the present value of capital expenditure. The BCR is therefore a measure of net benefit to society derived from the capital investment in the project.

A sensitivity analysis was done as part of the economic appraisal to test potential changes to the BCR. The analysis showed that even with increased capital and operational costs of 30 per cent, WestConnex remained economically viable. The *WestConnex Full Scheme: Economic Appraisal* (KPMG 2015) provides additional information on the analysis approach and can be accessed from the WestConnex website[3]. Further information on the business case is provided in **section B10.1.5**.

The investment in the WestConnex program of works would facilitate improvements across the network and generate more than $20 billion worth of benefits to the Australian economy, while creating almost 10,000 jobs during the construction phase. Specifically, the M4-M5 Link project is expected to support around 1,550 construction jobs as well as numerous operational jobs.

The manner in which the project would support urban renewal of Parramatta Road is addressed in **section B10.3.3**.

A range of alternatives to the M4-M5 Link were considered to identify the extent to which they could meet the project objectives (refer to section 3.3 of the EIS for the project objectives) and how well they performed with reference to other transport, environmental, social and economic factors. Investing in alternative transport modes is described in section 4.4.2 of the EIS. Further detail on the strategic alternatives that were assessed in the EIS is provided in **section B10.4.1**.

B10.1.6 City of Sydney's requirements in relation to the response to the submission

Section 1.6, p14

The City takes its role as a key stakeholder for the Project very seriously and has allocated significant time and resources to reviewing and providing evidence based feedback to the EIS.

[3] www.westconnex.com.au

As a minimum, the City requires that the [DP&E]:

- Provides detailed responses to each Key Finding provided in this document
- Include the Planning Conditions in the Minister's Conditions of Approval
- Set out actions to respond to each Matter to be addressed provided in this document
- Ensure all issues raised in this submission are addressed explicitly in the submissions report prepared by RMS.

If DP&E disputes any of the above, the City requires that it provides evidence and explanation to support its position by the time it issues the Submissions Report.

Response

The response to the City of Sydney's key findings, matters to be addressed and information supporting these items are provided in each of the sections of this response, according to the sections in the City of Sydney's submission. Conditions of approval are a matter for DP&E to consider during its assessment of the critical SSI project. Critical SSI projects are high priority infrastructure projects that have been deemed by the NSW Minister for Planning to be essential to the State of NSW for economic, social or environmental reasons.

B10.2 Assessment process

Refer to Chapter 2 (Assessment process) of the EIS for details of the assessment process.

B10.2.1 Difficulty in assessing stages of WestConnex

Section 2.1, Key Findings, p15

WestConnex is an extremely large, multi-staged project that could eventually affect much of the Sydney Metropolitan area but its assessment is being rushed through in advance of the release of major strategic planning documents aimed at coordinating planning for the Sydney Metropolitan Area e.g. TfNSW's [Transport for NSWs] *Future Transport* and the Growth Centres Commission's *Towards our Greater Sydney 2056*.

The separate exhibitions and approvals as well as design changes throughout the process make assessment of WestConnex extremely difficult for individual stages and near impossible [for] the scheme as a whole.

Response

The size and scale of WestConnex requires the program of works to be delivered in stages. Separate environmental impact assessments were therefore required to be prepared for each project to correspond to the construction stages. The M4 Widening, M4 East, King Georges Road Interchange Upgrade, New M5 and M4-M5 Link components of the WestConnex program of works have been declared critical SSI by virtue of Schedule 5 of the State Environmental Planning Policy (State and Regional Development) 2011.

In addition, and as described in **section B10.1.2** the project is listed as a 'high priority initiative' in the *Australian Infrastructure Plan: The Infrastructure Priority List* (Infrastructure Australia 2016). The project is also part of the NSW Government's commitment to deliver WestConnex for Sydney in response to the recommendations from the State Infrastructure Strategy 2012–2032 (Infrastructure NSW 2012), the *State Infrastructure Strategy Update* 2014 (Infrastructure NSW 2014), the *Transport Master Plan*, the *NSW State Priorities* announced in September 2015 (NSW Government 2015) and the *NSW Freight and Port Strategy* (Transport for NSW 2013). Further, the Draft *Future Transport Strategy 2056* (NSW Government 2017) was released in October 2017 and reiterates the need to plan and invest in the future of Sydney's motorway network, including the delivery of the WestConnex program of works. The project also complements the vision established in *Towards our Greater Sydney 2056* by providing an integrated transport solution to support population and commercial growth in western Sydney.

In accordance with the SEARs, the M4-M5 Link EIS (as with the preceding WestConnex EISs) included a cumulative impact assessment of potential environmental impacts (adverse and beneficial) of the project with the other WestConnex component projects (refer to Chapter 26 (Cumulative impacts) of the EIS). As the M4-M5 Link is the final stage of the WestConnex program of works, cumulative impacts could be more realistically assessed using information presented in the EISs for the previous component projects. This chapter assessed potential cumulative impacts from the construction and operation of the project, the component projects of the WestConnex program of works and other projects, and was based on information that was publicly available at the time the EIS was prepared. This included an assessment of cumulative traffic and transport, air quality, noise and vibration, human health, urban design and visual amenity, social and economic, non-Aboriginal heritage, biodiversity, soil and water quality, flooding and drainage, groundwater and Aboriginal heritage impacts.

The staging strategy for the WestConnex program of works was outlined in the *WestConnex Updated Strategic Business Case.* An update of the timing for the various component projects is illustrated in Figure 4-9 of the EIS. Factors considered in the staging of the WestConnex component projects included:

- Transport benefits and traffic management
- Timing of pre-construction activities
- Government funding requirement
- Infrastructure market capacity.

The staged delivery of critical SSI projects is not unique to WestConnex and has recently also been applied to the Sydney Metro project, which comprises:

- Stage 1: Sydney Metro Northwest
- Stage 2: Sydney Metro City and Southwest:
  - Stage 1: Chatswood to Sydenham
  - Stage 2: Sydenham to Bankstown
- Sydney Metro West.

Three separate EISs were undertaken for Stages 1 and 2 of the Sydney Metro project, with Sydney Metro West subject to its own environmental assessment and approval.

B10.2.2 Assessment of detailed design

Section 2.1, Key Findings, p15

It is not clear how the detailed assessment of the Project, following any approval and subsequent detailed design and planning, will be undertaken and by whom as the ‘detail of the design and construction approach presented in this EIS is indicative only based on a concept design and is subject to detailed design and construction planning to be undertaken by the successful contractors’.

Response

See **section B10.1.4** for discussion on how the project will be developed and refined during detailed design and construction planning.

The detailed design will be prepared based on the approved project as described in the EIS and this Submissions and preferred infrastructure report and will be consistent with any conditions of approval and other requirements of DP&E, if approved. Where the detailed design is inconsistent with the approved project, further assessment and approval will be taken as required by the EP&A Act. If further assessment/approval is required due to project design changes, the applicable statutory process will be followed prior to commencement of construction or operation of the relevant aspect of the project. This may be in the form of a modification to the Instrument of Approval under section 115Z1 of the EP&A Act, depending on the scale of the proposed modification and the potential for environmental or social impacts.

B10.2.3 Traffic analysis

Section 2.1, Key Findings, p15

The traffic projections and benefits provided in the EIS are far from 'balanced'. They have been 'cherry-picked' to present the Project in a positive light. There is a lack of transparency in terms of key inputs to the traffic modelling process (which form the basis of the analysis and assessment of many key impacts associated with the Project).

Response

As detailed in section 4.1 of Appendix H (Technical working paper: Traffic and transport) of the EIS, the modelling approach and assessment for traffic and transport has been undertaken in accordance with the SEARs which outline the modelling approach to be undertaken for the assessment as well as the guidelines which the assessment needed to follow. The assessment presents the beneficial and adverse traffic and transport impacts associated with the construction and operation of the project. These have been determined through an assessment of key metrics for the measurement of impacts, including:

- Network performance for the Sydney metropolitan road network and around each of the project interchanges (Wattle Street, Rozelle and St Peters). These metrics include total distance travelled and total time travelled
- Mid-block LoS, showing changed travel routes and impacts
- Intersection LoS, showing changed performance of these typically constraining elements of urban road networks
- Travel times and speeds
- Traffic crashes
- Screenline analysis, showing changes on strategic roads outside the operational model areas.

A detailed description of the assessment criteria used in the traffic and transport assessment is provided in section 4.3 of Appendix H (Technical working paper: Traffic and transport) of the EIS.

The assessment of potential traffic and transport impacts of the project was undertaken using the WRTM, which was developed and operated by Roads and Maritime at the outset of the WestConnex program of works. The WRTM provides a platform to understand changes in future weekday travel patterns under different land use, transport infrastructure and pricing scenarios.

Although the WRTM is a network-wide model that encompasses existing and future road networks in the Sydney Metropolitan area, it was principally developed to assess infrastructure improvements associated with the WestConnex component projects individually and in combination. To ensure the modelling used in the EIS is as accurate and representative as possible, the traffic model has been developed in the manner summarised below and detailed in full in section 4.2.1 of Appendix H (Technical working paper: Traffic and transport) of the EIS:

- Task A – Traffic demand forecasts are developed taking into consideration a number of factors including but not limited to: historical demands (traffic counts and surveys) current and future mode choice factors, toll behaviour factors, land use projections (population and employment locations) and induced demand
- Task B – Future year demand development, without the project. This provides an analysis of the projected future (2023 and 2033) year traffic demands based on the information derived from Stage 1
- Task C – Assessing the operational impact of the project by applying the anticipated impact of the project to the 'Without project' scenarios developed in Stage 2 to determine the impacts of the project.

The data that supported the development of the WRTM is obtained from a range of sources including government agencies tasked with, for example, maintaining accurate demographic (land use and employment) statistics. Therefore, modelling reliability, including accuracy in regards to the modelling, is considered to be appropriate.

Traffic modelling for the project has relied on trip generation data from the NSW Bureau of Transport Statistics, which was the best information available at the time the traffic modelling for the EIS was undertaken. These projections were based on DP&E future population and employment forecasts (dated September 2014), which have been derived from the 2011 census data and incorporates known major urban renewal precincts and development projects such as The Bays Precinct, Parramatta Road Corridor, Green Square, Central to Eveleigh, Western Sydney Airport, Port Botany, Sydney Airport Freight terminal and intermodal terminals.

The WRTM contains commercially sensitive information and is not publically available. The WRTM has been reviewed by independent experts who have verified its suitability for use in the NSW Government's planning investigations.

Further discussion on the traffic modelling used for the project is provided in **section B10.8.1**.

B10.2.4 Analysis of alternatives

Section 2.1, Key Findings, p15

No alternatives have been developed nor has any analysis of alternatives been undertaken.

Response

The EIS was prepared in accordance with the relevant provisions of the EP&A Act. It was prepared to address the SEARs and the relevant provisions of Schedule 2 of the Environmental Planning and Assessment Regulation 2000 (NSW). Consideration of the project against a range of strategic alternatives to identify the extent to which they could meet the project objectives (refer to section 3.3 of the EIS for the project objectives) and how well they performed with reference to other transport, environmental, social and economic factors has been undertaken in accordance with the SEARs and is presented in section 4.4 of the EIS. The following strategic alternatives that were considered in section 4.4 of the EIS comprise:

- Alternative 1 – improvements to the existing arterial road network
- Alternative 2 – investment in alternative transport modes
- Alternative 3 – demand management
- Alternative 4 – the 'Do nothing'/'Do minimum' case
- Alternative 5 – development of the M4-M5 Link.

These alternatives are described in more detail in section 4.4.1 to section 4.4.5 of the EIS.

The SEARs for the project required that the EIS contain an analysis of the feasible alternatives to carrying out of the project, including an analysis of the alternatives/options considered, having regard to the project objectives. As such, any strategic alternatives were required to be considered in terms of the project objectives as outlined in Chapter 3 (Strategic context and project need) of the EIS.

The need for investment in transport infrastructure in NSW, including the WestConnex program of works, has been established by the NSW Government at a strategic level in State planning and policy documents (see **section C3.1.1**). The *WestConnex Updated Strategic Business Case* (NSW Government 2015) was prepared to assess the viability of the WestConnex program of works as part of a broader integrated transport and land use solution for NSW. Subsequent EISs for each stage of the WestConnex program of works, including the EIS for the M4-M5 Link, have therefore carried out an assessment of strategic alternatives in consideration of the established strategic transport and land use policy context and the recognised need for the WestConnex program of works as set out in the *WestConnex Updated Strategic Business Case*.

B10.2.5 SEARs response is inadequate

Section 2.1, Key Findings, p15

The EIS fails to demonstrate how the performance outcomes in the SEARs will be achieved.

Section 2.2, p15

The Environmental Planning and Assessment Regulation and DP&E practice note states the Proponent must ensure an EIS complies with the SEARs so decision-makers, government regulators and government advisory agencies are able to understand and assess a project and its impacts without seeking further information. However despite a huge volume of documentation, the EIS does not provide sufficient quality information to allow for a good understanding of the Project and its impacts by regulators such as local government.

The EIS fails to demonstrate how the stated performance outcomes outlined in the SEARs will be achieved. Key examples:

- The SEARs specifies that assessment must be transparent. The WestConnex Road Transport Model (WRTM) is the basis of the analysis and assessment of many key impacts. However, basic information has not been provided about the assumptions that have been applied or the forecasts associated with populations and transport demands, including for major changes resulting from the Western Sydney Airport, planned intermodal freight terminals or the Western Sydney Employment area
- The EIS is required to demonstrate that the process for assessment is 'balanced' however the traffic projections and benefits provided in the EIS have been carefully selected and worded to imply positive outcomes that are at best optimistic and at worst misleading
- The SEARs require analysis of feasible alternatives to the Project. No feasible alternatives have been developed and no analysis of alternatives has been undertaken. While Section 4.4 of the EIS purports to cover Strategic Alternatives, it does little more than offer a discussion of why an alternative was not pursued
- The EIS is required to 'provide confidence that the Project will be constructed and operated within acceptable levels of impact' but the traffic impacts on the Anzac Bridge and city centre have not been demonstrated
- The SEARs require that the Project be developed with meaningful and effective engagement during design. However, the final design will be unknown until a contract is signed and there is no ongoing mechanism for community engagement.

Response

Table 5-1 of Appendix A (Project synthesis) of the EIS demonstrates how the project will achieve the desired performance outcomes.

The EIS was prepared in accordance with Part 5.1 of the EP&A Act, the SEARs and Part 3 of Schedule 2 of the Environmental Planning and Assessment Regulation 2000 (NSW). A checklist against this regulation is provided in Appendix D of the EIS. A copy of the SEARs, including an indication of where they are addressed in the EIS is provided in Appendix B (Secretary's Environmental Assessment Requirements checklist) of the EIS.

The EIS was prepared by a team of qualified professionals to provide a balanced, merit-based environmental impact assessment, and was reviewed by Roads and Maritime. The EIS was not commissioned by road toll operators. Further, subject matter experts from Roads and Maritime were involved with reviewing the approach and methodology for quantitative modelling undertaken for the EIS and for reviewing the outcomes of the various technical assessments for the EIS. SMC is responsible for preparing the planning approval applications and associated documents in respect to the project (including the EIS) on behalf of Roads and Maritime under Part 5.1 of the EP&A Act. All third-party sources of information used in the EIS are referenced for transparency and the EIS does not make any claims as to the accuracy or reliability of the sourced information.

The EIS included a range of comprehensive technical studies prepared in accordance with the key issues identified in the SEARs, which included requirements issued by key government regulatory agencies as well as industry standards and guidelines. The EIS, including detailed technical studies, was reviewed by the DP&E (and its independent technical peer reviewers) and key NSW Government agencies to confirm that it addressed the SEARs prior to being finalised and placed on public exhibition.

In relation to the key examples identified by the City:

- Responses to the City of Sydney's concerns with regard to the WRTM and the requirement for the EIS to demonstrate that the process for assessment is 'balanced' (specifically in relation to the traffic and transport assessment) are provided in **section B10.2.3**
- A response to the City of Sydney's concerns with regards to the development and assessment of feasible alternatives to the project in the EIS is provided in **section B10.2.4**. Consideration of the project against a range of strategic alternatives has been undertaken in accordance with the SEARs and is presented in section 4.4 of the EIS
- An assessment of the potential traffic and transport impacts from the project on the Anzac Bridge is provided in section 10.4 (for the 'With project' scenario) and section 12.5 (for the 'Cumulative' scenario) of Appendix H (Technical working paper: Traffic and transport) of the EIS. Management and mitigation measures specific to traffic and transport impacts on the Anzac Bridge are included in section 11.2.2 of Appendix H (Technical working paper: Traffic and transport) of the EIS
- Justification of the nominated boundaries of the operational model areas is provided in Annexure B of Appendix H (Technical working paper: Traffic and transport) of the EIS. Operational modelling was focussed around the areas of largest local impact in the AM and PM peak hours, which are generally found around the motorway interchanges (namely the Wattle Street interchange, the Rozelle interchange and the St Peters interchange)
- Due to the small forecast change in the Sydney CBD with the project and the complexity of the CBD traffic operations, it was not considered appropriate to model the operation of intersections internal to the CBD. The forecast daily traffic demand changes can be seen in Figure 10.1 and 10.2 of Appendix H (Technical working paper: Traffic and transport) of the EIS and the forecast AM and PM peak hour traffic demand changes can be seen in Figure 3 and Figure 4 of Annexure B (Justification of modelled areas) of Appendix H (Technical working paper: Traffic and transport) of the EIS. These figures illustrate that the main changes are focused on the Western Distributor/Sydney Harbour Bridge and Sydney Harbour Tunnel/Eastern Distributor, with minimal changes forecast within the CBD
- Community engagement during detailed design is addressed in **section B10.7.6**.

B10.2.6 Status of State significant infrastructure application

Section 2.3, p16

The status of the application is not clear. The EIS states that 'detail of the design and construction approach presented in this EIS is indicative only based on a concept design and is subject to detailed design and construction planning to be undertaken by the successful contractors.'

However, the EIS does not indicate that the application is a staged State Significant Infrastructure (SSI) application under section 115ZD of the EP&A Act, which requires subsequent applications and detailed assessment. It is not clear how the detailed assessment of the Project, following any approval and subsequent detailed design and planning, will be undertaken and by whom.

Response

The project has been declared by Ministerial Order to be SSI and critical SSI under sections 115U(4) and 115V of the EP&A Act. The Ministerial Order also amended Schedule 5 of *State Environmental Planning Policy (State and Regional Development) 2011*. The project is subject to assessment under Part 5.1 of the *Environmental Panning and Assessment Act 1979 (NSW)* and requires the approval of the NSW Minister for Planning. The assessment and approvals process under Part 5.1 of the *Environmental Panning and Assessment Act 1979 (NSW)* is illustrated in **Figure 2-1** of the EIS.

Roads and Maritime has not submitted a staged infrastructure application pursuant to section 115ZD of the EP&A Act. As described in section 1.3.1 of the EIS, it is anticipated the project would be constructed and opened to traffic in two stages, however is subject of one SSI application.

See **section B10.1.4** for discussion on how the project will be developed and refined during detailed design and construction planning.

B10.2.7 Critical State significant infrastructure declaration

Section 2.5, p17

The EIS states that a request has been made to the Minister for Planning for the Project to be declared Critical State Significant Infrastructure (CSSI). The DP&E website notes that a CSSI declaration has been made but does not specify the date of declaration.

We note WestConnex Stage 1 M4 East was declared CSSI 5/12/14 with EIS exhibition in September 2015. The timing for the CSSI declaration is inconsistent with M4 East.

Response

Subsequent to the EIS being finalised however prior to the commencement of public exhibition of the EIS, the project was declared by Ministerial Order to be SSI and critical SSI under sections 115U(4) and 115V of the EP&A Act. The Ministerial Order also amended Schedule 5 of *State Environmental Planning Policy* (State and Regional Development*)* 2011. A note to this effect was included on the inside front cover of the printed version of Volume 1A of the EIS.

The critical SSI order is dated 15 August 2017 and was published on the NSW legislation website on 18 August 2017[4].

B10.2.8 Approval under the *Airports Act 1996*

Section 2.4, p16

The EIS states that the Project has been designed to satisfy Department of Infrastructure and Regional Development requirements for structures such as ventilation facilities and equipment moving and lighting and plume rise from ventilation facilities may be deemed a controlled action under section 183 of the *Airports Act 1996*.

The EIS notes that a plume rise assessment would be carried out in accordance with relevant Civil Aviation Safety Authority requirements prior to the operation of the Project to determine whether it's a controlled action.

This results in the deferral of full assessment of this issue post-State approval and project construction.

Response

Approval for the operation of the relevant project ventilation outlets was received from the Australian Government Department of Infrastructure, Regional Development and Cities in accordance with the Airspace (Protection of Airspace) Regulations 1996 (Commonwealth) and the *Airports Act 1996* (Commonwealth) on 23 November 2017.

B10.2.9 Inconsistency between the Rozelle interchange and The Bays Precinct Transformation Plan

Section 2.5, p17

The Rozelle interchange would override land intended for employment and affordable housing in The Bays Precinct which is identified as a critical precinct in the Government's Plan for Growing Sydney. Permission for the Rozelle interchange must therefore be refused.

[4] https://www.legislation.nsw.gov.au/regulations/2017-421.pdf

Response

Section 12.4.3 of the EIS acknowledges that while the project is consistent with *The Bays Precinct Transformation Plan* vision for the creation of new open spaces, provision of new pedestrian and cyclist links, and the acknowledgment of the rail heritage of the area, it is inconsistent with the Plan with respect to the future development of the Rozelle Rail Yards for mixed housing. The project would deliver up to 10 hectares of new open space and active transport links for the community at the Rozelle Rail Yards as part of the development of the Rozelle interchange, as committed to by the NSW Government (announced in July 2016). Further details on active transport links at the Rozelle Rail Yards are shown in Appendix N (Active transport strategy) of the EIS.

The project would support the realisation of *The Bays Precinct Transformation Plan* by providing new amenity for future residents and workers, including new open space and improved pedestrian and cyclist connections within and around the Rozelle Rail Yards. Improving walk/cycle connectivity at Rozelle Rail Yards is discussed in **section C13.10.1**.

See **section B10.12.1** for further detail.

B10.3 Strategic context and project need

Refer to Chapter 3 (Strategic context and project need) of the EIS for details of the strategic context and need for the project.

B10.3.1 Specific transport needs not addressed in the EIS

Section 3.1

The EIS does not set out the specific transport needs addressed by the Project. Nor is it demonstrated that projections in growth in population and employment correlate to traffic demand increase along the proposed M4-M5 Link. As a result it is not possible to assess the Project's ability to meet those needs.

The cited 'key customers' that would benefit from the Project (long distance, freight, businesses) do not reflect the bulk of vehicles which would actually use the Project which are single occupancy commuter vehicles. The key customers could be served by a far more modest project, given they represent an extremely small proportion of projected traffic on the Project.

Section 3.2

The EIS (Section 3.2) does not set out the specific transport needs addressed by the Project but states additional road capacity is required to meet projected increases in trips. It does not set out the trips, desire lines, demand corridors or growth that the WestConnex project is addressing. As a result it is not possible to assess the Project's ability to meet these needs. Nor is it demonstrated that projections in growth in population and employment correlate to traffic demand increase along the proposed M4-M5 Link. TfNSW data confirms that the number of vehicles entering the Sydney Centre during the morning peak hour was stable between 2002 and 2012 and in fact decreased by some 9 per cent in the two years since construction of light rail began. The number of trips by public transport, by contrast, increased by some 38 per cent between 2002 and 2012 and another 10 per cent in the two years since construction of light rail commenced.

The EIS does not set out a credible strategic rationale for WestConnex. There is no informed discussion on the economic geography of Sydney, and the role an integrated transport system has to play in meeting the needs of businesses and residents.

The cited 'key customers' that would benefit from the Project (long distance, freight, businesses) do not reflect the bulk of vehicles which would actually use the Project (single occupancy commuter vehicles). The key customers could be served by a far more modest project, given they represent an extremely small proportion of projected traffic on the Project.

Response

Strategic context

As noted in section 3.2 of the EIS, Sydney's population is forecast to increase from 4.3 to 5.9 million (around 37 per cent) by 2031 (NSW Government 2014), which equates to an average of 80,000 additional residents per year. Moreover, by 2036, the number of trips made around Sydney each day is forecast to increase by 31 per cent from 16 to 21 million vehicle movements. This growth would place increasing pressure on the NSW transport network and the key travel demand corridors connecting regional cities and major centres across the greater Sydney metropolitan area, as shown in **Figure B10-1**.

Key corridors currently accommodate high levels of daily traffic including freight, commuter and leisure travel. Users of these corridors frequently experience congestion and delay, particularly during weekday and weekend peak periods. Both the *Transport Master Plan* and the *State Infrastructure Strategy* (Infrastructure NSW 2014) identified the need to plan and invest in the future of Sydney's motorway network, which provides vital infrastructure connections within and between travel demand corridors. Any investment in motorway infrastructure has to be aligned with supporting public and active transport initiatives to achieve an increase in capacity, while aiming to reduce the reliance on and demand for private vehicles on the future road network.



Figure B10-1 Sydney travel demand corridors

Source: *NSW Long Term Transport Master Plan* (Transport for NSW 2012)

WestConnex was a key initiative recommended in the NSW Government's *State Infrastructure Strategy* (Infrastructure NSW 2012, updated in 2014), which was prepared by Infrastructure NSW to provide independent advice on the infrastructure needs of the State. WestConnex has been assessed as a program of works and a motorway network in the *Updated Strategic Business Case.*

Since the preparation of the EIS, the Draft *Future Transport Strategy 2056* (NSW Government 2017) was released for public comment in tandem with the Draft *Greater Sydney Region Plan* (Greater Sydney Commission 2017). The Draft *Future Transport Strategy 2056* is an update of the *Transport Master Plan* and sets the vision, direction and outcomes framework for commuter mobility in NSW and aims to guide transport investment over the longer term. The draft strategy identifies the WestConnex program of works, which includes the project, as a 'city-shaping' project.

The *Draft Greater Sydney Services and Infrastructure Plan* (NSW Government 2017) acknowledges that roads will continue to perform an important function in transporting people and goods within Greater Sydney, and that the future strategic road network in Sydney will support key movements by road, including public transport, private vehicles and freight movements.

Transport needs

Improved connectivity

To achieve the broad strategic objectives outlined in *A Plan for Growing Sydney* and the more detailed District Plans, Sydney's businesses and households require good access for workers and for the distribution of goods and services across the Sydney region. Improved connections for workers, suppliers, trades and customers through improvements to the transport network, including the strategic road network, are needed to support the growth of these centres and the 'global economic corridor'.

The WestConnex program of works is part of an integrated transport solution to the increasing pressure on Sydney's road network. The WestConnex program of works, including the project, would facilitate improved connections between western Sydney and Sydney Airport and Port Botany (via the St Peters interchange), as well as better connectivity between key employment hubs and local communities. The need for the WestConnex program of works, including the project, is identified in national and state planning and policy documents (see **section C3.1.1**) as it would help deliver the transport connectivity required to meet future urban growth expectations as part of the transformation of Greater Sydney. The Australian Government is contributing around $3.5 billion to the development of the M4-M5 Link, which was identified as a 'high priority initiative' in the 2016 *Australian Infrastructure Plan: The Infrastructure Priority List.* Further information on the funding arrangements for the project are provided in **section C1.4.1**.

Congestion relief

The road network in the traffic and transport study area currently functions under high levels of traffic demand, which often exceeds the operational capacity, especially citybound during the AM peak period. Major routes in the traffic and transport study area, such as Parramatta Road, City West Link, Victoria Road, Anzac Bridge/Western Distributor, Southern Cross Drive, the Princes Highway and King Street, all experience significant congestion with resultant increase in travel time and variability, which can cause typical morning and evening peak hours to spread over longer periods, and extend the peak period.

The following four main travel demand corridors fall within the study area and would be served by the project:

- Parramatta to the Sydney CBD via Strathfield
- Parramatta to the Sydney CBD via Ryde
- Sydney Airport to the Sydney CBD
- Liverpool to Sydney Airport.

As demonstrated in section 3.1 of Appendix H (Technical working paper: Traffic and transport) of the EIS, volume to capacity ratios for car, bus and rail demand is forecast to increase by 2031. This illustrates the growth in demand on the key transport corridors that the project proposes to address.

The overall forecast growth in traffic demand is consistent with the forecast growth in population in the Sydney metropolitan area. Importantly, this growth in traffic is not confined to major routes – increased traffic on many roads in Sydney is forecast without the project in the 2023 and 2033 peak periods, as vehicles seek to avoid the congested arterial road network by travelling along lower order roads.

Without WestConnex, by 2031 travel speeds and congestion would significantly worsen on the road network serving western and southwestern Sydney (including the M4 Motorway, Parramatta Road, City West Link and the M5 Motorway corridor) and connections to Sydney Airport and Port Botany (eg the M1 corridor also known as Southern Cross Drive/Eastern Distributor). Congestion would also be a major issue on the key north–south links that connect the M4 and M5 motorway corridors (eg the A3 corridor also known as Centenary Drive/Roberts Road/King Georges Road), even with planned future public transport enhancements (Sydney Motorway Corporation 2015).

A number of key benefits and improvements to the surface road network are forecast as a result of the project, including:

- Non-motorway roads in the Inner West local government area (LGA) are forecast to experience faster trips with the daily average speed increasing by about 10 per cent. Similarly, the vehicle distance travelled on non-motorway roads is forecast to reduce by about 12 per cent. This indicates that on average, these trips are fewer in number and faster
- Improved network productivity on the metropolitan network, with more trips forecast to be made or longer distances travelled on the network in a shorter time. The forecast increase in VKT and reduction in vehicle hours travelled (VHT) is mainly due to traffic using the new motorway, with reductions in daily VKT and VHT also forecast on non-motorway roads
- The project, along with investment in other road, public transport and active transport projects, would help to accommodate the forecast growth in population and travel demand in the Sydney metropolitan area
- Reduced travel times are forecast on key corridors, such as between the M4 Motorway corridor and the Sydney Airport/Port Botany precinct
- Reduced traffic is forecast on sections of major arterial roads including City West Link, Parramatta Road, Victoria Road, King Street, King Georges Road and Sydenham Road
- Around 2,000 heavy vehicles are forecast to be removed from Parramatta Road, east of the M4 East Parramatta Road ramps, each weekday.

In addition, as a result of the additional road network capacity provided by the project, the two-way future year Average Weekly Travel (AWT) traffic demand compared to a 'Without project' scenario is predicted to significantly decrease on:

- City West Link and Parramatta Road, east of the M4 East Wattle Street and Parramatta Road ramps respectively, by about 25 per cent in the 2023 and 2033 'With project' and 'Cumulative' scenarios
- King Street in St Peters by about 20 per cent in the 2023 and 2033 'With project' scenarios
- Stanmore Road in Stanmore by about 15 per cent in the 2023 and 2033 'With project' and 'Cumulative' scenarios
- Lyons Road in Russell Lea by about 15 per cent in the 2023 and 2033 'With project' scenarios, and about 20 per cent in the 2023 and 2033 'Cumulative' scenarios
- Southern Cross Drive and the Sydney Harbour Tunnel by about 20 per cent and 25 per cent respectively in the 2023 and 2033 'Cumulative' scenarios (refer to Chapter 9 of Appendix H (Technical working paper: Traffic and transport) of the EIS).

The M4-M5 Link would provide alternative parallel options to the roads listed above in the 'With project' scenario and with the proposed future Western Harbour Tunnel and Sydney Gateway (and Beaches Link and F6 Extension in 2033) in the 'Cumulative' scenarios. The screenline analysis, presented in Chapter 9 of the Appendix H (Technical working paper: Traffic and transport) of the EIS, found no major shifts in daily traffic onto parallel routes as a result of the project.

Facilitating urban renewal

The *Draft Greater Sydney Region Plan* sets the vision for a growing and changing Greater Sydney and its transformation into a 'metropolis of three cities'. The draft plan proposes that urban renewal investigation opportunities consider alignment with key infrastructure, such as the WestConnex program of works, to ensure connectivity between these cities. The project, as part of the WestConnex program of works, is therefore consistent with the vision outlined in both the Draft *Future Transport Strategy 2056* and the *Draft Greater Sydney Region Plan.* These draft plans are expected to be finalised in 2018.

Investment in the M4-M5 Link, as part of WestConnex program of works, would assist in facilitating the delivery of other major city-shaping improvements, such as the Parramatta Road Corridor Urban Transformation and The Bays Precinct Transformation, which would contribute to delivering economic growth. Delivery of *The Bays Precinct Transformation Plan* is intended to be staged and coordinated with the planning and delivery of infrastructure projects including WestConnex. As part of the broader WestConnex program of works, the project would support NSW's major sources of economic activity and provide a strategic response to the future transport demands on the already congested road network. Delivery of *The Bays Precinct Transformation Plan* is intended to be staged and coordinated with the planning and delivery of infrastructure projects including WestConnex.

Roads and Maritime and UrbanGrowth NSW are in regular dialogue around opportunities for greater synergy between the project and the various developments proposed as part of The Bays Precinct Transformation, including the future development of the White Bay Power Station. As discussed in greater detail in **section C4.9**, the NSW Government announcement to develop the Rozelle Rail Yards for the Rozelle interchange, including the delivery of up to 10 hectares of open space, means that certain aspects of The Bays Precinct Transformation, such as housing development and employment uses at the Rozelle Rail Yards, would not be possible if the project goes ahead.

Key customers

An objective of the WestConnex program of works is to cater for the diverse travel demands along the key corridors identified in the *WestConnex Updated Strategic Business Case*. As identified in Table 3-2 of the EIS, the key customers who would benefit from the project include:

- Highly dispersed and long distance passengers
- Heavy and light freight and commercial services
- Businesses whose travel patterns are highly dispersed and diverse.

Whilst it is acknowledged that private vehicles, including single occupancy commuter vehicles, will use the motorway, the key customer markets identified for the project include highly dispersed and long distance passenger movements, as well as heavy and light freight and commercial services and businesses whose travel patterns are also highly dispersed and diverse in nature. These customers have highly varied requirements when it comes to the transfer of goods and services. These requirements include the transport of containerised freight by rigid and articulated trucks, light trucks, vans, utility vehicles and cars. Public transport would only partially address these customer demands. No feasible strategic transport alternatives such as heavy or light rail options or bus corridor enhancements would meet the diverse range of customer needs for travel in this corridor and address the project objectives as effectively as the project and the broader WestConnex program of works.

The transport demands of these customers, as well as short distance local passengers who use arterial roads in the project area are best served by an efficient motorway connection and an improved network of roads. The project would meet this WestConnex objective by relieving congestion on sections of the surface road network within and in proximity to the project footprint as well as facilitating efficient passenger and freight movements through the provision of new motorway capacity.

The reduction in traffic demand on parts of major parallel traffic routes such as the A3 corridor (Centenary Drive/King Georges Road), Sydenham Road, Parramatta Road and King Street at St Peters is likely to improve speed, journey reliability and safety on these corridors compared to a 'Without project' scenario. The project would also provide additional route options along the corridor and therefore increase network resilience in the event of accidents or network disturbances (refer to Chapter 9 of Appendix H (Technical working paper: Traffic and Transport) of the EIS).

B10.3.2 The project does not form part of an integrated planning solution

Section 3.1

The EIS suggests that the Project forms part of an integrated planning solution. This is simply not true. While WestConnex might integrate with the wider motorway network, no evidence is provided demonstrating that it integrates with the wider road network – let alone the broader transport and land use system. WestConnex contradicts and undermines a number of key NSW Government Strategies, including the *Transport Master Plan*, *Future Transport* and *Sydney City Centre Access Strategy*. Further, the role of WestConnex in relation to public transport and freight rail is not considered.

Section 3.3

The EIS suggests that the Project forms part of an integrated planning solution. This is simply not true. While WestConnex might integrate with the wider motorway network, no evidence is provided demonstrating that it integrates with the wider road network – let alone the broader transport and land use system. For example the Project will increase traffic entering the Sydney city centre, Australia's pre-eminent business centre.

RMS has only just commenced work to identify which roads serving WestConnex portals will need to be upgraded to deliver large numbers of vehicles to and from the Project. It is therefore impossible to properly understand the environmental impacts – the very purpose of the EIS. The Greater Sydney Commission is currently preparing strategic plans (six District Plans and the Greater Sydney Region Plan) for Sydney's long-term future and TfNSW is currently developing Sydney's Transport Future. All motorway projects should be placed on hold until finalisation of these plans.

The Project focuses on 'catering for traffic growth' (P4.15). This contradicts and undermines the NSW Government's *Transport Master Plan* and commitments expressed on the Future Transport web site which commit to an integrated approach to congestion management focussed on land use planning, demand management, public transport investment and 'a coherent whole of network planning strategy'.

The WestConnex program of works has been described as an integrated transport network solution. However, WestConnex's role and interdependency with public transport and freight rail is not considered. The recent Government commitment to a Metro West requires a rethink on the need for WestConnex, particularly as the *WestConnex Updated Strategic Business Case* outlines a mode shift from public transport to the toll road the [that] would undermine rail investment in this corridor.

Section 3.3

The Western Sydney Airport is due to commence construction next year with completion in 2026. Demand for air travel in Sydney is set to double over the next 20 years. Initial patronage is said to be 10 million passengers per year. Information should be provided demonstrating how (or if) the Project caters for travel to the new airport and the likely lessening of demand to the current airport.

Response

As noted in **section B10.3.1**, Sydney's expected population growth will place increasing pressure on the NSW transport network and the key travel demand corridors connecting regional cities and major centres across the greater Sydney metropolitan area. In response to this forecast future demand, a range of infrastructure, transport and planning strategies have been released, including:

- *State Infrastructure Strategy* (Infrastructure NSW 2012, updated 2014)
- *NSW Long Term Transport Master Plan* (Transport for NSW 2012)
- Draft *Future Transport Strategy 2056* (NSW Government 2017)
- *Sydney CBD to Parramatta – Strategic Transport Plan* (UrbanGrowth NSW 2015)
- *A Plan for Growing Sydney* (NSW Government 2014)
- *Parramatta Road Corridor Urban Transformation Strategy* (UrbanGrowth NSW 2016)
- Draft *Towards our Greater Sydney 2056* (Greater Sydney Commission 2016)
- Draft *Greater Sydney Region Plan* (Greater Sydney Commission 2017).

The transport projects identified in these strategies, along with Roads and Maritime projects including Easing Sydney's Congestion are designed to deliver improvements in network performance in response to both current and future demands.

Alignment with NSW planning and infrastructure policy

Existing NSW Government policies, plans and programs relevant to the nature of the project and the project footprint were reviewed and reported on in Chapter 3 (Strategic context and project need) of the EIS. The review considered potential positive and negative effects of the project on policy decisions and government initiatives. Delivery of the project is largely consistent with all applicable government policies, plans and programs with respect to transport infrastructure, urban growth initiatives and connectivity.

The project is listed as a 'high priority initiative' in the *Australian Infrastructure Plan: The Infrastructure Priority List* (Infrastructure Australia 2016). The project is also part of the NSW Government's commitment to deliver WestConnex for Sydney in response to the recommendations from the *State Infrastructure Strategy* 2012-2032 (Infrastructure NSW 2012), the *State Infrastructure Strategy Update* 2014 (Infrastructure NSW 2014), the *Transport Master Plan*, the *NSW State Priorities* announced in September 2015 (NSW Government 2015) and the *NSW Freight and Port Strategy* (Transport for NSW 2013).

The WestConnex program of works, which includes the project, has the potential to be a catalyst for major urban renewal and complements *A Plan for Growing Sydney* (NSW Government 2014) and the *Draft Central District Plan* (Greater Sydney Commission 2016). The project also complements the vision established in *Towards our Greater Sydney 2056* (Greater Sydney Commission 2016) and the draft *District Plans* (Greater Sydney Commission 2016), specifically the *Draft Central District Plan,* by providing an integrated transport solution to support population and commercial growth in western Sydney.

Since the preparation of the EIS, the Draft *Future Transport Strategy 2056* (NSW Government 2017) was released for public comment in tandem with the *Draft Greater Sydney Region Plan* (Greater Sydney Commission 2017). The *Draft Future Transport Strategy 2056* is an update of the *Transport Master Plan* and sets the vision, direction and outcomes framework for commuter mobility in NSW and aims to guide transport investment over the longer term. The draft strategy identifies the WestConnex program of works, which includes the project, as a 'city-shaping' project.

The *Draft Greater Sydney Services and Infrastructure Plan* (NSW Government 2017) acknowledges that roads will continue to perform an important function in transporting people and goods within Greater Sydney, and that the future strategic road network in Sydney will support key movements by road, including public transport, private vehicles and freight movements.

The *Draft Greater Sydney Region Plan* sets the vision for a growing and changing Greater Sydney and its transformation into a 'metropolis of three cities'. The draft plan proposes that urban renewal investigation opportunities consider alignment with key infrastructure, such as the WestConnex program of works, to ensure connectivity between these cities.

The project, as part of the WestConnex program of works, is therefore consistent with the vision outlined in both the *Draft Future Transport Strategy 2056* and the *Draft Greater Sydney Region Plan.* These draft plans are expected to be finalised in 2018.

The *Sydney City Centre Access Strategy* (Transport for NSW 2013) (*City Centre Access Strategy*) is the NSW Government's long term strategy to deliver a fully integrated transport network in Sydney's city centre that meets the growing transport needs for all transport modes. The *City Centre Access Strategy* aims to prioritise and allocate street space for public transport, general traffic, pedestrians, cyclists, taxis and service vehicles.

The anticipated impacts of the project, and the objectives and actions contained in the *City Centre Access Strategy*, have been considered together to determine potential transport interactions between the project and the strategy. The planned actions contained in the *City Centre Access Strategy* are reflected in the Strategic Travel Model (STM). STM is operated by Transport for NSW Transport Performance and Analytics and is used to project travel patterns in Sydney, Newcastle and Wollongong under different land use, transport and pricing scenarios. STM provided the trip forecasts used in WRTM, and therefore the planned actions contained in the *City Centre Access Strategy* are accounted for in the project evaluation.

Traffic forecasts show that the project is generally anticipated to have little impact, or to reduce traffic on some roads that are identified as city centre bypass routes in the *Sydney City Centre Access Strategy*, such as the Cahill Expressway. However, other roads identified as city centre bypass routes are forecast to have increased traffic as a result of the project, including the Western Distributor, and the Cross City Tunnel. Changes in traffic volumes on these roads should be considered in the planning and implementation of the traffic and bypass priority routes. Refer to **section B10.8.6** for discussion of impacts on Sydney city centre streets.

The *Sydney City Centre Access Strategy* acknowledges that WestConnex is one of the NSW Government's key infrastructure projects which aims to ease congestion, create jobs and connect communities. It also acknowledges that the 33 kilometre motorway will support Sydney's economy by providing improved access to freight, commercial and business vehicles.

Integration with the wider road network

The project would integrate with the wider motorway and road network via:

- Motorway to motorway connections at Haberfield (to the M4 East) and St Peters (to the New M5)
- Connections to the future motorway network via the Rozelle interchange (to the proposed future Western Harbour Tunnel and Beaches Link) and the St Peters interchange (to Sydney Gateway)
- Connections to the surface road network including:
  - Wattle Street and Parramatta Road at Haberfield, via the Wattle Street interchange
  - City West Link, The Crescent and Victoria Road via the Rozelle interchange
  - Euston Road, Gardeners Road and Campbell Road via the St Peters interchange.

These connections are described in Chapter 5 (Project description) of the EIS.

The strategic modelling information provided in Appendix H (Technical working paper: Traffic and Transport) of the EIS shows that productivity of the wider network, and specifically in the LGAs surrounding the project, sees general improvements to the performance of the surface road network.

Surface impacts surrounding the interchanges are described in Chapter 10 of Appendix H (Technical working paper: Traffic and transport) of the EIS. Figure 10.1 of Appendix H (Technical working paper: Traffic and transport) of the EIS illustrates how the project would provide relief to other major roads in the study area that suffer from congestion during peak travel hours. Table 10-2 of Appendix H (Technical working paper: Traffic and transport) of the EIS presents the forecast percentage change in daily VKT, VHT and average speed in 2023 with the project on non-motorway links in the LGAs closest to the project. The forecast percentage changes indicate that, apart from Bayside, all other LGAs would either benefit from reduced traffic on surface roads or there is no forecast change. Roads within the Inner West LGA would experience a 12 per cent reduction in daily VKT, a 20 per cent reduction in daily VHT and a 10 per cent increase in daily average speed in 2023.

The role of WestConnex role and its interdependency with freight rail

The role of WestConnex in relation to rail freight is considered in section 4.4.2 of the EIS. The current situation for freight movements into and out of Port Botany, and potential future scenarios for freight movements in NSW, was considered in assessing improvements to the freight rail network as a viable alternative to the project. The recorded throughput at Port Botany was over 2.3 million 20-foot equivalent units (TEUs) (one TEU is equivalent to the dimensions of a standard shipping container) in the 2015/2016 financial year (NSW Ports 2016). By 2020, the volume of TEUs at Port Botany is forecast to grow to between three and 3.6 million, reaching between 4.9 and seven million by 2030 (Sydney Motorway Corporation 2015a).

The volumes of all commodities demanding capacity on the freight network are expected to grow as population and economic activity increases across NSW. Port Botany and Sydney Airport are predicted to accommodate much of the rapid growth forecast for containerised cargo and air travel over the next 20 years (Infrastructure NSW 2014). The implications of this growth for the road and rail network are expected to be significant, with capacity across key parts of the network, particularly the Sydney metropolitan area, already under pressure to match demand.

Although opportunities exist to shift more freight from the road network onto the freight heavy rail network, the need to transport freight by road will continue. The *Freight Strategy* notes that dedicated freight rail corridors are being planned to ensure passenger and freight rail demand can be accommodated. However, rail freight transport is more effective for long distance transport of goods to regional centres while Sydney's freight, service and business task relies upon a dispersed point-to-point transport connection to customers within the metropolitan area.

To cater for the growth in the container market, new intermodal terminals have recently been established at Chullora (2015), Enfield (2016) and Moorebank (under construction). Strategic locations for potential future intermodal terminals and/or facilities include Eastern Creek and Western Sydney Airport to provide a connection to the Metropolitan Freight Network. However, even with new intermodal terminals, there remains a significant demand for road freight movements in the Sydney metropolitan area.

The *NSW Freight and Ports Strategy* (Transport for NSW 2013b) (*Freight Strategy*) states that about 63 per cent of NSW's freight in 2011 was transported by road and about 33 per cent by rail. When coal-related freight is removed, road-based freight movements account for nearly 90 per cent of the NSW freight task. The relative share of container freight that was moved by rail (relative to road transport) to and from Port Botany in 2012 was about 14 per cent. To support an increased role for rail based freight movements, the NSW Government and Australian Rail Track Corporation (ARTC) are currently investigating the duplication of the rail line between Port Botany and the Cooks River.

The Draft *Future Transport Strategy 2056,* published after the EIS was prepared, updates the forecast freight task in Greater Sydney, with projections of growth in container freight task of around 175 per cent over the next 40 years. This projected growth emphasises the need for a freight network that supports safe, efficient and reliable journeys. Specifically, the Draft *Future Transport Strategy 2056* highlights the strategic importance of WestConnex in providing additional road capacity for the movement of goods between freight precincts in the west, centres in the east and Port Botany.

Further consideration of how the project would support the objectives and strategic actions programs of the *NSW Freight and Ports Strategy* (Transport for NSW 2013b) (*Freight Strategy*) is provided in section 3.1.10 of the EIS. The manner in which WestConnex would support the road freight task through improved connectivity along and between Sydney's motorway corridors is discussed in section 3.2.2 of the EIS.

The role of WestConnex and its interdependency with public transport

The Draft *Future Transport Strategy 2056* acknowledges the importance of the future strategic road network for Greater Sydney in supporting key movements by road, including public transport, private vehicles and freight. The M4-M5 Link, and the broader WestConnex program of works, is an important component of the future strategic road network, and will reduce pressure on local roads, enabling these to be revitalised into more attractive places and to support local journeys.

Customer Outcome 5 in the Draft *Greater Sydney Services and Infrastructure Plan* introduces the concept of the '30 minute city', with the intent of providing access for customers to their nearest centre by public transport, seven days a week. To achieve this, a coordinated approach to land use, transport and infrastructure is identified in the plan as being essential, with short, medium and long-term commitments to investigate and deliver mass transit, improved service frequencies, better prioritisation of public transport around centres and improved walking and cycling connections to public transport.

The '30 minute city' approach is supported by the M4-M5 Link and the broader WestConnex program of works, with the Draft *Future Transport Strategy 2056* acknowledging the importance of the future strategic road network in reducing pressure on local roads, enabling these to support local journeys, and to be revitalised into more attractive places. This is further supported by the Draft *Greater Sydney Services and Infrastructure Plan* which notes that *'For all types of transport – public and private – roads will continue to perform an important function in transporting people and goods within Greater Sydney. Efficient, reliable and easy to understand journeys will be enabled through a clear road hierarchy that better separates different types of trips.'* As discussed above (and demonstrated in Chapter 10 of Appendix H (Technical working paper: Traffic and transport) of the EIS), all LGAs surrounding the project (apart from Bayside) would either benefit from reduced traffic on surface roads as a result of the project or there is no forecast change

The role of WestConnex in relation to the Western Sydney Airport

The Western Sydney Airport EIS (Department of Infrastructure and Regional Development 2016) acknowledges that Sydney Airport would continue to be the most important airport in the Sydney region for the foreseeable future, with overall demand at Sydney Airport expected to continue to grow to 51 million passengers annually by 2030, 72.7 million passengers annually by 2050 and 85.3 million passengers annually by 2075. At the same time, Western Sydney Airport is forecast to service 10 million passengers annually by 2031, 37 million passengers annually by 2050 and 82 million passengers annually by 2063.

The M4-M5 Link would, together with the other components of the WestConnex program of works and the proposed future Sydney Gateway, facilitate improved connections between western Sydney, Sydney Airport and Port Botany and south and south-western Sydney, as well as better connectivity between the important economic centres along Sydney's Global Economic Corridor and local communities.

Demand for travel to Western Sydney Airport is being supported by the Western Sydney Infrastructure Plan, a 10 year, $3.6 billion road investment program[5] being coordinated by Roads and Maritime. This includes the construction of the M12 Motorway, which will provide direct access to the Western Sydney Airport as well as connections to the M7 Motorway, and the broader Sydney motorway network. In addition, the Australian and NSW Government - led by the Department of Infrastructure and Regional Development and Transport for NSW – are undertaking a Scoping Study to determine the rail needs of western Sydney and the Western Sydney Airport [6]. The objectives of the scoping study include to determine the rail service needs of western Sydney from the commencement of operations of a Western Sydney Airport, taking into account the ground transport needs of a Western Sydney Airport and western Sydney generally.

Furthermore, a train link between the Western Sydney Airport and Parramatta is identified as an initiative for investigation in collaboration with the Australian Government under the Draft *Future Transport Strategy 2056*.

B10.3.3 The project does not enable urban renewal

Section 3.1

The EIS asserts that WestConnex will be a catalyst for urban renewal along major corridors but provides no evidence to support this. The *Parramatta Road Urban Transformation* project has been put on hold by the NSW Government largely due to uncertainties relating to traffic capacity on Parramatta Road following the construction of WestConnex. The Rozelle Interchange will prevent redevelopment in the Rozelle Rail Yards. This area has been identified by the NSW Government as a major opportunity for urban renewal for over 20 years.

Section 3.4

The EIS misrepresents the structure of the Global Economic Corridor (GEC) and overstates the relationship of the Project to centres within it by claiming the Project serves centres in the north of the GEC when it does not. The EIS asserts that WestConnex will be a catalyst for urban renewal along major corridors. No evidence is provided to back this assertion. The Sydney experience suggests that roads do not act as urban renewal catalysts as evidenced by Canterbury Road after the M5 East was built and the Cumberland Highway corridor after the M7 was completed.

The *Parramatta Road Urban Transformation* project has been put on hold by the NSW Government for a number of reasons, including the uncertainties relating to traffic capacity on Parramatta Road following the construction of WestConnex. To claim this as a benefit is misleading. The Project predicts increased traffic congestion on Parramatta Road, prior to any renewal, which is clearly not a benefit. There is relatively limited urban redevelopment potential along the small section of Victoria Road that the Project would decongest, and this section has not been classified by the NSW Government as redevelopment area. To claim this as a benefit is misleading.

The Rozelle Interchange will prevent major redevelopment of the Rozelle Rail Yard and surrounding former industrial land. This area has been identified by the NSW Government as a major opportunity for urban renewal for over 20 years. The Rozelle Interchange should not go ahead.

Response

The WestConnex program of works, which includes the project, has the potential to be a catalyst for major urban renewal and complements *A Plan for Growing Sydney* (NSW Government 2014) and the *Draft Central District Plan*[7] (Greater Sydney Commission 2016). The project also complements the vision established in the *Draft Towards our Greater Sydney 2056* (Greater Sydney Commission 2016) and the draft *District Plans* (Greater Sydney Commission 2016), specifically the *Draft Central District Plan,* by providing one component of an integrated transport solution being delivered by the NSW Government to support population and commercial growth in western Sydney and addresses the broader transport challenges of a growing Sydney.

[5] http://www.rms.nsw.gov.au/projects/sydney-west/infrastructure-plan/index.html
[6] https://www.westernsydneyrail.transport.nsw.gov.au/about-the-western-sydney-rail-needs-study
[7] Note that this draft plan was replaced by the *Revised Draft Eastern City District Plan* (Greater Sydney Commission 2017) after the EIS was exhibited

Investment in the M4-M5 Link, together with the other WestConnex projects, would assist in facilitating land use outcomes identified in strategic planning documents, such as the *Parramatta Road Corridor Urban Transformation Strategy* and *The Bays Precinct Transformation Plan*, by reducing traffic on surface roads, providing opportunities for public transport improvement on key transport corridors, improving connectivity and providing new open space and active transport links, which would all contribute to delivering economic growth. As part of the broader WestConnex program of works, the project would support NSW's major sources of economic activity and provide a strategic response to the future transport demands on the already congested road network.

The *Parramatta Road Corridor Urban Transformation Strategy* and associated Implementation Plan 2016-2023 identifies WestConnex as the enabler of opportunities to transform Parramatta Road through changed traffic volumes in some areas and the provision of an alternative route for trucks and heavy vehicles. The Implementation Plan acknowledges that these changes would free up road space for better public transport and amenity improvements along Parramatta Road and would encourage walking and cycling. The Implementation Plan also notes that the staging of land use change and development in certain parts of the Parramatta Road corridor is contingent on, and may need to await, the completion of WestConnex.

Implementation of the Transformation Strategy will be staged and sequenced with the delivery of key infrastructure. Agencies responsible for delivering the Transformation Strategy include DP&E, the Greater Sydney Commission, Transport for NSW, Roads and Maritime and local councils.

The provision of transport improvements along the Parramatta Road corridor will be carried out in accordance with the Transformation Strategy and supporting implementation tool kit, and in consideration of the *Sydney CBD to Parramatta Strategic Transport Plan* (Transport for NSW 2015). State transport agencies, Transport for NSW and Roads and Maritime will be responsible for the delivery of transport initiatives for the corridor outlined in the Implementation Plan through a best practice decision-making and strategic planning framework. Strategic transport initiatives would go through a government approval and funding process, subject to standard government considerations, including business cases and assurance reviews.

Section 10.1.1 and section 10.1.2 of Appendix H (Technical working paper: Traffic and transport) of the EIS identifies significant reductions in daily traffic volumes on Parramatta Road (east of the M4 East Parramatta Road ramps) in both 2023 and 2033. This forecast reduction is illustrated in Figure 10-1 and Figure 10-2 of Appendix H (Technical working paper: Traffic and transport) of the EIS, which shows the difference in average weekday traffic between the 'With project' and 'Without project' scenarios in 2023 and 2033. The forecast reduction in traffic along this section of the Parramatta Road corridor would support the objectives for urban renewal and public transport improvements outlined in the Transformation Strategy. A reduction in vehicles on this corridor may also result in greater safety for cyclists and pedestrians, making these alternative modes of transport more desirable.

The forecast reduction in daily traffic volumes along Victoria Road (south of Iron Cove Bridge) in the 2023 and 2033 future year scenarios aligns with the key project objective to relieve road congestion, particularly along existing arterial road corridors. As a result, opportunities to rejuvenate this section of Victoria Road would be facilitated. NSW Government planning and policy documents do not identify Victoria Road as a priority for urban renewal, however, due to the extent of changes that would be brought about by the project, creating opportunities for urban renewal along Victoria Road would be of benefit to the local community. Public transport improvements along Victoria Road have been identified as a key element for consideration in the next 20 years in the Revised Draft *Eastern City District Plan* (Greater Sydney Commission 2017). Victoria Road east of Iron Cove Bridge is also identified as a strategic bus corridor in *The Bays Precinct Transformation Plan*. By reducing traffic congestion on parts of Victoria Road, the project would create opportunities for future public transport improvements in the area.

Furthermore, the reduction in daily traffic volumes along this section of Victoria Road would support the development of The Bays Precinct, which is identified as a Priority Growth Area in the Draft *Greater Sydney Region Plan 2017* (Greater Sydney Commission 2017). The forecast reduction in daily traffic volumes would support the objectives for improved connectivity, potentially enabling public transport improvements along this section of Victoria Road and supporting the movement of traffic to and from The Bays Precinct. Further, the project would provide upgraded active transport connections around the Rozelle Rail Yards and White Bay Power Station destinations, as identified in *The Bays Precinct Transformation Plan*.

A Global Economic Corridor, that includes Port Botany and Sydney Airport, the Sydney CBD, Macquarie Park, Parramatta, Norwest and Sydney Olympic Park, is identified in *A Plan for Growing Sydney* as an area of concentrated employment, economic activity, transport gateways and industrial land. Section 3.2.1 of the EIS identifies the role of the project, as part of the WestConnex program of works, in providing improved connectivity to and between hubs within the Global Economic Corridor, via the provision of new motorway links. The project and WestConnex's influence would be greatest in providing connections to the components of the Global Economic Corridor south of the harbour, including Sydney Airport and Port Botany (via the proposed future Sydney Gateway), Sydney CBD, Sydney Olympic Park and Parramatta. However, the provision of new motorway links would also support onward connections to the northern components of the Global Economic Corridor, and would complement planned road network improvements in these areas.

The Rozelle interchange would not prevent redevelopment of the Rozelle Rail Yards. As described in Chapter 5 (Project description) of the EIS, the project includes the provision of up to 10 hectares of open space and active transport connections within the Rozelle Rail Yards, which will support the development of The Bays Precinct. The Rozelle interchange also provides improved connectivity to The Bays Precinct from western and south-western Sydney via the M4-M5 Link mainline tunnels and subsequent connections to the M4 East and New M5 projects. The integration of the Rozelle interchange with the vision for The Bays Precinct transformation is outlined in section 3.1.12 of the EIS.

B10.3.4 Claims congestion will be eased are incorrect and misleading

Section 3.1

The EIS narrowly defines congestion as 'traffic congestion' rather than delays to reliable and efficient access to human capital, goods and services which reduces economic activity and productivity. This results in an incorrect and misleading assessment.

There is no evidence presented (or available) that building motorways reduces traffic congestion over the long term.

Section 3.5

The EIS narrowly defines congestion as 'traffic congestion' rather than delays to reliable and efficient access to human capital, goods and services which reduces economic activity and productivity. This results in an incorrect and misleading assessment.

The method and logic used to develop and assess the Project is similar to methods that have delivered numerous motorways around Australia that have not only failed to ease congestion, but have made it significantly worse.

There is no evidence presented (or available) that building motorways reduces traffic congestion over the long term. No major urban arterial road project, without carefully considered and implemented pricing signals, has succeeded in easing congestion for more than a few years. This is acknowledged in planning disciplines, on the Future Transport website and has been stated by the current Minister for Transport and the current Premier (during her time as Shadow Minister for Transport).

Response

The WestConnex program of works, including the project, does not claim to resolve all of Sydney's road congestion issues but it will make a significant contribution to improving road capacity.

The benefits provided by the project as part of the WestConnex program of works include:

- Ease congestion on surface roads by providing an underground motorway alternative and allowing for increased use of surface roads by pedestrians and cyclists and for public transport
- Reduce through traffic on sections of major arterial roads including City West Link, Parramatta Road, Victoria Road, King Street, King Georges Road and Sydenham Road, facilitating urban renewal opportunities to be realised along parts of the Parramatta Road and Victoria Road corridors
- Improve network productivity on the metropolitan network, with more trips forecast to be made or longer distances travelled on the network in a shorter time. The forecast increase in VKT and reduction in VHT is mainly due to traffic using the new motorway, with reductions in daily VKT and reduction in VHT also forecast on non-motorway roads

- Reduce travel times on key corridors, such as between the M4 Motorway corridor and the Sydney Airport/Port Botany precinct and between the main centres on the Global Economic Corridor, including Sydney CBD, Sydney Olympic Park and Parramatta CBD
- Facilitate future growth in Sydney's transport network by allowing for connections to the proposed future Western Harbour Tunnel and Beaches Link and Sydney Gateway projects.

The project, as part of the future strategic road network for Greater Sydney and in conjunction with the future mass transit/train network for Greater Sydney, is identified in the Draft *Future Transport Strategy 2056* as important in the context of expanding the Greater Sydney transport network to serve three cities and improve 30 minute access to centres. In particular, the future strategic road network, that includes WestConnex, is identified as playing a critical role in reducing pressure on local roads, enabling these to service local journeys and to become attractive places.

The WestConnex program of works, including the project, does not claim to resolve all of Sydney's road congestion issues but it will make a significant contribution to improving road capacity, the benefits of which are described above. WestConnex, as well as other related road projects, have been identified by the NSW Government as being critical infrastructure necessary to cater for Sydney's growth and development.

B10.3.5 The project will worsen public transport along Victoria Road

Section 3.1

According to the EIS, buses travelling to the city centre will be slower, despite the construction of a tunnel between Iron Cove and the Anzac Bridge. This is an unacceptable outcome of such a major, supposedly 'integrated' transport project.

Section 3.6

The EIS states that buses travelling to the city centre will be slower, despite the construction of a tunnel between Iron Cove and the Anzac Bridge.

Response

An assessment of the impact of the project on public transport services in the Rozelle interchange study area is provided in section 10.4.6 of Appendix H (Technical working paper: Traffic and transport) of the EIS. The assessment examined the main bus route along Victoria Road and over the Anzac Bridge as well as to and from Druitt Street.

The results show longer citybound bus journey times in the AM peak, due to the congested traffic conditions on Western Distributor and Anzac Bridge combined with the increased demands to Bathurst Street and Sydney Harbour Bridge, compared to the 'Without project' case. Mitigation for this is discussed in the following section.

In the outbound direction, the Iron Cove Link significantly improves the congestion over Anzac Bridge. As a result, bus journey times reduce in the 'With project' scenario. The forecast reduction in general traffic demand on Victoria Road between Iron Cove Link and Anzac Bridge would provide the opportunity to investigate improving public transport operations, such as extending the existing bus lanes on Victoria Road.

Management measures

Roads and Maritime will develop a strategy to ensure appropriate network integration in areas surrounding the Rozelle Interchange which will include a review of capacity improvements, project staging options, demand management measures and the interface with road based public transport on the Western Distributor and Victoria Road in consultation with Transport for NSW (see environmental management measure OpTT3 in **Chapter E1** (Environmental management measures)).

The project has also committed to conducting a review of operational network performance 12 months and five years from the opening of the project to confirm the operational impacts of the project on surrounding arterial roads and major intersections in proximity to the Wattle Street interchange, Rozelle interchange and St Peters interchange. The assessment would be based on future updated traffic surveys taken during operation utilising an appropriate methodology following the relevant and industry accepted guidelines current at the time. The results of the review will be considered in future operational network performance planning carried out by Roads and Maritime (see environmental management measure OpTT1 in **Chapter E1** (Environmental management measures)).

In addition to these measures, the forecast reduction in general traffic demand on Victoria Road between Iron Cove Link and Anzac Bridge would provide the opportunity to investigate improving public transport operations along the Victoria Road corridor. These improvements do not form part of the project and would be the responsibility of Transport for NSW. The *Draft Greater Sydney Services and Infrastructure Plan* identifies Victoria Road transport improvements as initiatives for investigation within a 10 year horizon (to 2026).

B10.3.6 Rozelle interchange, Iron Cove Link and Western Harbour Tunnel connections

Section 3.1

The EIS refers to benefits from road projects that are not part of the Project's scope. The full costs, benefits and impacts of these projects need to be considered in a transparent process.

The Project objectives include enabling the construction of motorways over the harbour and to the northern beaches. However, the traffic impacts of these motorways in Rozelle have not been assessed. These projects were not part of the business case that justified WestConnex in the first place.

Section 3.7

The Rozelle and Iron Cove interchanges are not required to meet the Project objective of linking the M4 East and New M5 and should not be included in the Project. Existing motorways (Cross City Tunnel and Eastern Distributor) would provide suitable road capacity to avoid the city centre.

To the west are the M7, A6 and A3 connections. There has been no modelling provided investigating whether, with appropriate upgrades, these connections might provide far more cost effective and time efficient connections, particularly given their alignments would service multiple demand corridors.

The Project objectives include enabling the construction of a motorway across the harbour (Western Harbour Tunnel) and to the Northern Beaches (Beaches Link). However, the traffic impacts of these future tollway projects have not been assessed around Rozelle in the operational modelling process. Further, these future projects were not part of the Updated Strategic Business Case that justified WestConnex in the first place, nor are they mentioned in the overall WestConnex objectives. The Proponent appears to be planning and justifying WestConnex on the run is making it up as they go along.

Response

Section 4.2.3 of the EIS describes the development of the M4-M5 Link concept, and specifically the identification of the opportunity to design the WestConnex program of works to support connectivity to planned future motorway networks, including a northern extension that would enable:

- A connection to the Sydney CBD via Anzac Bridge, as well as to Victoria Road
- A connection to the proposed future Western Harbour Tunnel and Beaches Link, which together with the M4-M5 Link, would create a western bypass of the Sydney CBD
- Connectivity to The Bays Precinct
- Reduction in surface traffic along Parramatta Road.

These extensions were described in the *State Infrastructure Strategy Update 2014* (Infrastructure NSW 2014).

In late 2014 the constructability, economic and financial feasibility and traffic impacts of the northern and southern extensions were investigated and a preliminary design put forward for the M4-M5 Link to the NSW Government. The preliminary design work for the project confirmed the viability of the northern extension (ie connections to Victoria Road, Anzac Bridge and the proposed future Western Harbour Tunnel and Beaches Link) and recommended that this future extension be considered in the alignment of the project. The mainline tunnel alignment was amended to divert from the previous Parramatta Road alignment, to instead follow a City West Link alignment to Rozelle (to connect with Anzac Bridge) before turning south to Camperdown and continuing to St Peters. The alignment through Rozelle was amended to facilitate the connection to a future harbour crossing to the northeast (the proposed future Western Harbour Tunnel and Beaches Link project) as well as to Anzac Bridge and Victoria Road.

The *State Infrastructure Strategy Update 2014* identified that a completed WestConnex program of works, together with the proposed future Western Harbour Tunnel and Beaches Link project, would provide a western bypass of the Sydney CBD, alleviating pressure on existing north−south corridors including Southern Cross Drive, the A1 (the Princes Highway) and A3 (Centenary Drive/Roberts Road/King Georges Road) and the Sydney orbital network, as well as reducing traffic volumes on the Sydney Harbour Bridge and Sydney Harbour Tunnel. These changes would reduce journey times between Sydney's northern and southern suburbs.

Strategic and financial analysis of the new alignment for the M4-M5 Link recommended proceeding with the amended project design. Based on this advice, the NSW Government accepted the change to the mainline tunnel alignment in October 2014.

In November 2015, the *WestConnex Updated Strategic Business Case* was released, which consolidated the work undertaken in the 2013 business case with additional modelling, analysis and scope development. The *WestConnex Updated Strategic Business Case* described the development of a modified alignment for the M4-M5 Link with connections at Rozelle and Camperdown. The modified alignment would allow for the inclusion of a northern extension, allowing connections to the proposed future Western Harbour Tunnel and Beaches Link.

As identified in section 3.2 of Appendix H (Technical working paper: Traffic and transport) of the EIS, traffic movements across the Sydney Harbour primarily use either the Sydney Harbour Bridge via the Western Distributor or Sydney Harbour Tunnel via the Eastern Distributor, making these two connections among the most critical in the broader road network. Forming part of the Sydney Airport to the Sydney CBD corridor (refer to section 3.1.3 of Appendix H (Technical working paper: Traffic and transport) of the EIS), this corridor experiences high levels of congestion, as illustrated by the following operational performance statistics in the *Transport Master Plan*:

- Southern Cross Drive operates at capacity during the AM peak period, with average speeds of 35 kilometres per hour
- Due to congestion on the Eastern Distributor, traffic diverts onto the adjacent arterial road network including O'Riordan and Bourke Streets, which are also congested.

Figure B10-2 illustrates the impacts a 'Do nothing' scenario would have on the performance of public and private transport along the Sydney Airport to Sydney CBD corridor. The figure shows that AM peak volume over capacity (V/C) ratios consistently increase over the 20 year period.

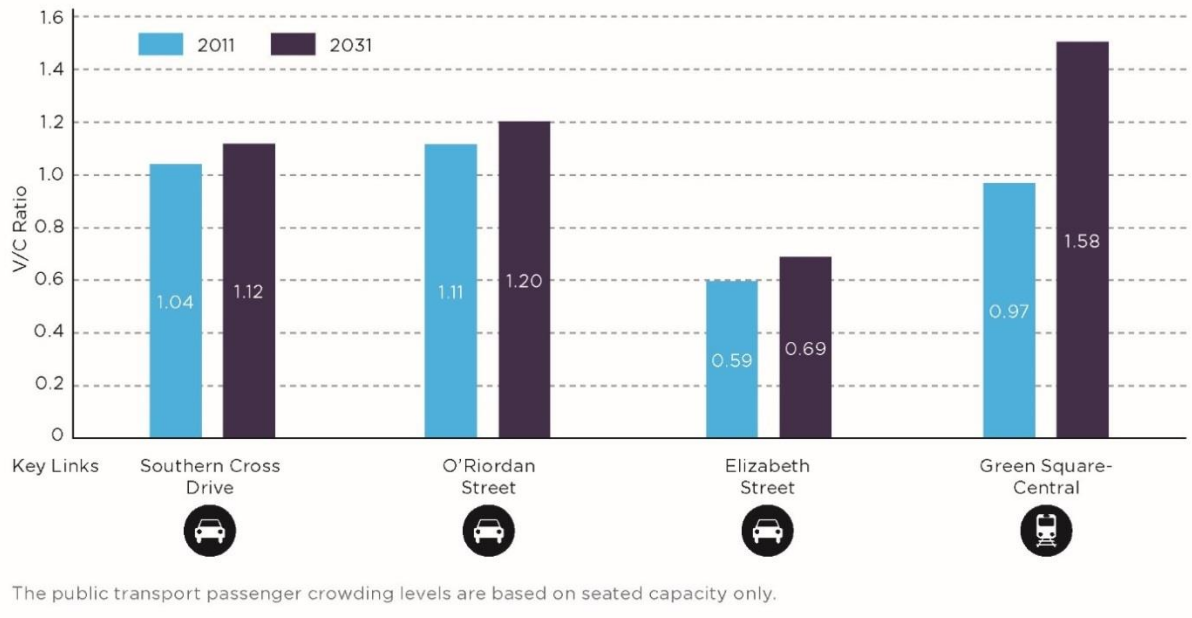


Figure B10-2 Sydney Airport to the Sydney CBD corridor: AM peak V/C – 2011 | 2031 'Do nothing' scenario

Source: *NSW Long Term Transport Master Plan* (Transport for NSW 2012)

The Rozelle interchange is a key component of the project as it would provide connectivity with the local surface road network at the City West Link, The Crescent and Victoria Road. In addition, it provides a north-south corridor between the New M5 at St Peters and Rozelle that would bypass the Sydney CBD. The Rozelle interchange would also facilitate future growth in Sydney's transport network by allowing for connections to the proposed future Western Harbour Tunnel and Beaches Link. This future connection would provide a western bypass of the Sydney CBD, alleviating pressure on existing north−south corridors including the Southern Cross Drive, A1 (the Princes Highway) and A3 (Centenary Drive/Roberts Road/King Georges Road) and the Sydney orbital network, as well as reducing traffic volumes on the Sydney Harbour Bridge and Sydney Harbour Tunnel. These changes would reduce journey times between Sydney's northern and southern suburbs.

Section 4.5.3 of the EIS describes the rationale for the inclusion of the Iron Cove Link in the project. The forecast reductions in AWT on Victoria Road south of Iron Cove Bridge in the 'With project' scenarios compared to the 'Without project' scenarios supports a number of specific project objectives, including:

- Improving traffic conditions and reducing congestion on key arterial roads in proximity to the project
- Facilitating urban renewal in areas where the project would reduce traffic.

Additional benefits that would be realised as a result of the inclusion of the Iron Cove Link include:

- Bypassing six sets of traffic lights at intersections along Victoria Road
- Enabling an opportunity for improved public transport reliability and future public transport improvements along Victoria Road, east of Iron Cove Bridge
- Creating a motorway standard link for regional traffic from the northwest, including heavy vehicles, to access the New M5 Motorway (once operational) and the Sydney Airport and Port Botany precinct via the project and the future proposed Sydney Gateway
- Assisting with constructability and staging of works for the Rozelle interchange
- Indirectly creating a number of potential opportunities for the local surface road network including public transport, amenity and active transport improvements along Victoria Road as well as improving east-west connectivity across Victoria Road.

The construction of the M4-M5 Link does not undermine the role that the M7, A6 and A3 have as they would continue to serve as a north-south links between the M4 and M5 for the western parts of Sydney. See section **B10.1.3** for a detailed response to this issue.

Chapter 12 of Appendix H (Technical working paper: Traffic and transport) of the EIS details the forecast traffic performance of the study area during the 'Cumulative' scenarios. The detailed assessments have been undertaken using forecast traffic volumes produced using the WRTM for the following scenarios:

- **Operation 'Cumulative' (2023)**: With the 'Do minimum' projects completed, the M4-M5 Link complete and open to traffic, and in addition, the proposed future Sydney Gateway and the proposed future Western Harbour Tunnel (a component of the proposed future Western Harbour Tunnel and Beaches Link project) operational
- **Operation 'Cumulative' (2033)**: With the 'Do minimum' projects completed, the M4-M5 Link complete and open to traffic, and in addition, the proposed future Sydney Gateway, Western Harbour Tunnel and Beaches Link and F6 Extension projects operational.

Three other major Roads and Maritime projects are currently in planning and have been included in the cumulative assessments:

- Proposed future Sydney Gateway
- Proposed future Western Harbour Tunnel and Beaches Link
- F6 Extension.

These projects are subject to separate environmental assessment and approval.

Section 12.5 of Appendix H (Technical working paper: Traffic and transport) of the EIS summarises the outcomes of the operational modelling for the cumulative scenarios for both future years (2023 and 2033) around the Rozelle interchange. In both 2023 and 2033, comparing the 'Cumulative' scenario to the 'With project' scenario:

- Anzac Bridge/Western Distributor is forecast to be less congested eastbound in the AM peak period due to traffic reassigning to the proposed future Western Harbour Tunnel (and Beaches Link in the 2033 'Cumulative' scenario)
- In the PM peak period, the network functions similar to the project case, with fewer unreleased vehicles on Western Distributor due to traffic reassigning to proposed future Western Harbour Tunnel (and Beaches Link in the 2033 'Cumulative' scenario).

Primarily due to capacity constraints on Anzac Bridge and the Western Distributor, forecast demands cannot access the road network during the peak periods due to congestion extending back into model entry points. This occurs at the model boundaries on Victoria Road, City West Link and The Crescent/Johnston Street. Potential mitigation measures are discussed in the following section.

The proposed future Western Harbour Tunnel and Beaches Link is a key component of the *WestConnex Updated Strategic Business Case* with clearly identified links to the M4-M5 Link project, including the Rozelle interchange (eg refer to Table E.1 of the *WestConnex Updated Strategic Business Case*) as well as in relation to the rationale for the change to the design of the WestConnex program of works that introduced the northern extension (refer to section 5.3.3 of the *WestConnex Updated Strategic Business Case*).

Furthermore, the WestConnex project objectives, as listed on page 23 of the *WestConnex Updated Strategic Business Case* include a specific objective to provide the ability to deliver an additional harbour road crossing and northern beaches motorway, the proposed future Western Harbour Tunnel and Beaches Link, which should be able to connect into the WestConnex motorway.

As identified in Table 5-2 of the EIS, the proposed future Western Harbour Tunnel is a related, but separate, project and will be subject to a separate business case and planning and approvals processes.

Management measures

Roads and Maritime will develop a strategy to ensure appropriate network integration in areas surrounding the Rozelle Interchange which will include a review of capacity improvements, project staging options, demand management measures and the interface with road based public transport on the Western Distributor and Victoria Road in consultation with Transport for NSW (see environmental management measure OpTT3 in **Chapter E1** (Environmental management measures)).

The project has also committed to conducting a review of operational network performance 12 months and five years from the opening of the project to confirm the operational impacts of the project on surrounding arterial roads and major intersections in proximity to the Wattle Street interchange, Rozelle interchange and St Peters interchange. The assessment will be based on updated traffic surveys at the time and the methodology used will be comparable with that used in this assessment. The results of the review will be considered in future operational network performance planning carried out by Roads and Maritime (see environmental management measure OpTT1 in **Chapter E1** (Environmental management measures)).

B10.3.7 Consideration of Sydney Gateway benefits

Section 3.1

Assertions relating to improvements for freight services rely on the Sydney Gateway Project, which is not part of WestConnex, and which poses significant threats to the crucial freight rail connection to Port Botany.

The EIS states that the Project will improve connections to the Sydney Airport and Port Botany. It will not. The Sydney Gateway does not form part of the WestConnex project. Without the Sydney Gateway, connections between WestConnex (St Peters Interchange) and Sydney Airport and Port Botany will be via congested surface roads in Botany and Mascot.

Section 3.5

The EIS forecasts increases in freight volumes without offering evidence as to how the Project enables this. Assertions relating to improvements for freight services rely on the Sydney Gateway, which is not part of WestConnex, and which poses significant threats to the crucial freight rail connection to Port Botany.

The EIS asserts that the M4-M5 link would complete the orbital road network between Western Sydney and the eastern gateways of Port Botany and Sydney Airport. That orbital already exists in the form of the 110km Sydney Orbital - the M2, M7, M5, Eastern Distributor, Harbour Tunnel, Gore Hill Freeway and Lane Cove Tunnel.

Section 3.8

The EIS states that the Project will improve connections to the Sydney Airport and Port Botany. It will not. The Sydney Gateway does not form part of the WestConnex project. Without the Sydney Gateway, connections between WestConnex (St Peters Interchange) and Sydney Airport and Port Botany will be via congested surface roads in Botany and Mascot. As the connection is unresolved, it is impossible to determine the effect on demand of the unknown pricing regime that will apply to the Sydney Gateway, nor how much travel time will be incurred – which might actually negate the proposed travel time savings.

Matter 3.1

The BCR (p. 3-20) includes notional costs and benefits for the Sydney Gateway project. These are unable to be assessed given the lack of a clear and costed concept. Determination of the EIS should not proceed until there has been an analysis of the revised BCR once a Sydney Gateway concept design is released.

Response

The M4-M5 Link is part of the WestConnex program of works. Its purpose is to link other key component projects to form the WestConnex motorway. The project is a critical motorway link that contributes (together with the M4 East and New M5 projects) to connecting western Sydney's population and growth centres with employment and business opportunities in the Sydney CBD and the Sydney Airport and the Port Botany precinct, through a direct connection to the proposed future Sydney Gateway project at St Peters. The project objectives are consistent with the broader objectives of the WestConnex program of works, which have been developed to be aligned with the strategic objectives of national and NSW planning and policy documents. The project is a critical motorway link that contributes (together with the M4 East and New M5 projects) to connecting western Sydney's population and growth centres with employment and business opportunities in the Sydney CBD and the Sydney Airport and the Port Botany precinct, through a direct connection to the proposed future Sydney Gateway project at St Peters.

As part of the Rozelle interchange the M4-M5 Link project would construct mainline tunnel and ramp connections to the proposed future Western Harbour Tunnel project and associated infrastructure, should this project be approved. Linking the M4 East and New M5 motorways is only one of a number of project objectives. The Rozelle interchange and Iron Cove Link are consistent with other project objectives including improving traffic conditions and reducing congestion on key arterial roads in proximity to the project and enabling long-term motorway network development by providing a connection to the proposed future Western Harbour Tunnel and Beaches Link project to the north. In addition, as part of the WestConnex program of works, the project would facilitate improved connections to the St Peters interchange, improving connections between western Sydney and Sydney Airport and Port Botany, as well as providing better connectivity between key employment hubs and local communities. Full motorway connectivity to Sydney Airport and Port Botany would be delivered by the Sydney Gateway project (currently in design development phase and subject to final business case and environmental assessment).

While these related projects have been considered in the cumulative impact assessment for the M4-M5 Link, summarised in Chapter 26 (Cumulative impacts) of the EIS, the M4-M5 Link is not dependent on any of these projects proceeding and is feasible without them. In 2033, the EIS assesses a project only scenario which includes all WestConnex projects but not the proposed future Western Harbour Tunnel and Beaches Link, Sydney Gateway or F6 Extension projects. The EIS also assesses a 2033 cumulative scenario which includes the projects described above (refer section 4.2.1 of Appendix H (Technical working paper: Traffic and transport) of the EIS).

The importance of the M4-M5 Link in achieving all of the broader WestConnex strategic objectives is recognised in the EIS (refer to section 3.3 of the EIS). This is reflected in the traffic impact assessment carried out for the project (refer to Appendix H (Technical working paper: Traffic and transport) of the EIS), which identified that additional road network augmentation would be required to achieve the full benefits of WestConnex.

The proposed future Western Harbour Tunnel and Beaches Link program of works, the Sydney Gateway (via the St Peters interchange) and the F6 Extension (via the New M5) projects, are not part of the M4-M5 Link project and are beyond the scope of the EIS. An assessment of the travel time impacts as a result of the respective projects is expected to be included in the traffic and transport assessments undertaken as part of the EISs for those projects.

The mitigation measures proposed for the project (including the measures proposed in **Chapter E1** (Environmental management measures)) relates solely to the project. The project does not rely on the proposed future Western Harbour Tunnel project for mitigation.

As noted in section 3.4.3 of the EIS, the *NSW Freight and Port Strategy* (Transport for NSW 2013) includes an action to connect and complete Sydney's motorway network including priority freight movements. It recognises the infrastructure provided through WestConnex, including the M4-M5 Link, would be a key component in expanding capacity on NSW roads that would provide benefits for freight movement, particularly around major freight activity centres such as Sydney's international gateways, Port Botany and Sydney Airport.

B10.3.8 Failure to meet project objectives

Section 3.9 Table 1 brings together an assessment of key areas where the Project fails to meet the objectives outlined in the EIS.

Response

To assist with responding to the concerns raised by the City of Sydney, the table (Table 1) from the submission has been included in the response as **Table B10-1** with an additional column addressing the issues.

Table B10-1 Failure to meet project objectives

Project objective	City of Sydney's submission	Response
Support Sydney's long-term economic growth through improved motorway access and connections linking Sydney's international gateways with Western Sydney and places of business across the city.	The Project does not improve connections to international gateways of Port Botany and Sydney Airport. It relies on this traffic filtering through surface streets that are already congested. The EIS provides no evidence to show that long term economic growth is dependent on improved motorway access, nor that investment in other transport options would not better support Sydney's long term economic growth. There is very little capacity to accommodate additional vehicle access to Sydney and Parramatta city centre. At the same time, NSW Government planning transport policy promotes access to key centres of business by non-car modes	As part of the WestConnex program of works, the project would facilitate improved connections to the St Peters interchange, improving connections between western Sydney and Sydney Airport and Port Botany, as well as providing better connectivity between key employment hubs and local communities. Full motorway connectivity to Sydney Airport and Port Botany would be delivered by the Sydney Gateway project (currently in design development phase and subject to final business case and environmental assessment). Should the Sydney Gateway project be delayed for a significant length of time, it is expected that both the New M5 Road Network Performance Review Plan (conditioned as part of the New M5 approval) and the proposed M4-M5 Link Road Network Performance Review would confirm the operational traffic impacts of the projects on surrounding arterial roads and major intersections. In the absence of the Sydney Gateway it would be necessary to introduce a number of upgrades at the following intersections to accommodate the forecast traffic: • Gardeners Road/Kent Road • Gardeners Road/O'Riordan Street • Kent Road/Coward Street • Bourke Road/Coward Street • Kent Road/Ricketty Street. Section 4.4.2 of the EIS considered investment in alternative transport modes, including public transport, rail freight, road freight, Western Sydney Airport and active transport improvements. This section considered each of these as an alternative to the M4-M5 Link project. The review concluded that while the NSW Government is investing $41.5 billion (2016–2017 NSW Budget) in transport projects over the next four years (including roads and public transport) there are no feasible strategic public transport or freight alternatives to the project that, on their

Project objective	City of Sydney's submission	Response
		own, would meet the diverse range of needs for travel in the Sydney metropolitan area which the M4-M5 Link is contributing to achieving. Further detail on the economic impacts and opportunities provided by the project is provided in Chapter 14 (Social and economic) and Appendix P (Technical working paper: Social and economic) of the EIS.
Relieves road congestion so as to improve the speed, reliability and safety of travel on the M4, M5 and Sydney city centre /Sydney Airport/Port Botany corridors, including parallel arterial roads.	The traffic modelling that informs the projected changes to traffic congestion, speed, reliability and safety is inadequate and cannot be relied on. The improvements projected are smaller than the degree of accuracy of the modelling process used.	The assessment of potential traffic and transport impacts of the project was undertaken using the WRTM v2.3, a fit-for-purpose model that was developed at the outset of the WestConnex program of works and is operated by Roads and Maritime. Concerns regarding the accuracy and reliability of the traffic modelling process are discussed in **section B10.08.1**. A number of key benefits and improvements are forecast as a result of the project: • Non-motorway roads in the Inner West local LGA are forecast to experience faster trips with the daily average speed increasing by about 10 per cent. Similarly, the vehicle distance travelled on non-motorway roads is forecast to reduce by about 12 per cent. This indicates that on average, these trips are fewer in number and faster • Improved network productivity on the metropolitan network, with more trips forecast to be made or longer distances travelled on the network in a shorter time. The forecast increase in VKT and reduction in VHT is mainly due to traffic using the new motorway, with reductions in daily VKT and VHT also forecast on non-motorway roads • The project, along with investment in other road, public transport and active transport projects, would help to accommodate the forecast growth in population and travel demand in the Sydney metropolitan area • Reduced travel times are forecast on key corridors, such as between the M4 Motorway corridor and the Sydney Airport/Port Botany precinct

Project objective	City of Sydney's submission	Response
		• Reduced traffic is forecast on sections of major arterial roads including City West Link, Parramatta Road, Victoria Road, King Street, King Georges Road and Sydenham Road • Around 2,000 heavy vehicles are forecast to be removed from Parramatta Road, east of the M4 East Parramatta Road ramps, each weekday. Where the project would connect to the existing road network, increased congestion is forecast in parts of Mascot, along Frederick Street at Haberfield, Victoria Road north of Iron Cove Bridge, Johnston Street at Annandale and on the Western Distributor. A number of these areas are forecast to improve when the proposed future Sydney Gateway and the proposed future Western Harbour Tunnel and Beaches Link are completed.
Cater for the diverse travel demands along these corridors that are best met by road infrastructure.	The cited 'key customers' that would benefit from the Project (long distance, freight, businesses) do not reflect the bulk of vehicles which would actually use the Project (single occupancy commuter vehicles). The key customers could be served by a far more modest project. The assertion that 'the transport demands of these key customers are best served by an efficient motorway connection' is a baseless assertion which lacks evidence. This calls into doubt the Project's potential to achieve this objective.	Concerns regarding key customers for the project are discussed in **section B10.3.1**.

Project objective	City of Sydney's submission	Response
Create opportunities for urban renewal, improved liveability, and public and active transport improvements along and around Parramatta Road.	The key urban development project (Parramatta Road Urban Transformation) and public transport project (Parramatta Road Interim Transit) have both been put on indefinite hold by the NSW Government with no commitment made to light rail, Bus Rapid Transit or urban redevelopment on Parramatta Road. This reduces the Project's potential to achieve this objective.	See **section B10.3.3** for detail about how the project would support the *Parramatta Road Corridor Urban Transformation Strategy*.
Enhance the productivity of commercial and freight-generating land uses strategically located near and along transport infrastructure.	The cited improvements for access by commercial vehicles between Western Sydney and Sydney Airport and Port Botany rely on the Sydney Gateway which does not form part of WestConnex and is currently unfunded by Government.	The project would reduce freight journey times and improve reliability by connecting the M4 and M5 motorway corridors. It would also support the connection with the Sydney Airport and Port Botany precinct via the proposed future Sydney Gateway project and the St Peters interchange, leading to an overall increase in the capacity of the strategic freight network. Full motorway connectivity to Sydney Airport and Port Botany would be delivered by the Sydney Gateway project (currently in design development phase and subject to final business case and environmental assessment). The project would support the economic development of Sydney by providing a high quality and efficient road connection for business and freight vehicles within the global economic corridor, including to and from Port Botany and Sydney Airport. This connectivity is identified in the priority actions to achieve the goals set in *A Plan for Growing Sydney*.
Fit within the financial capacity of the State and Federal Governments, in partnership with the private	The EIS provides no evidence of how the Project would be funded, nor of the risks of the proposed financing model to State and Federal Government.	WestConnex is being delivered by a financing model which includes an initial contribution from the State and Australian Governments, with private sector debt and tolling revenue providing the remaining funding for the project. This financing strategy has allowed the NSW Government to recycle its equity investment in SMC by effectively using the sale

Project objective	City of Sydney's submission	Response
sector.	It is understood that the toll risk of the Project is being borne by the NSW Government, which, should toll revenue fall short, would place significant burden on future generations of tax payers and threaten the ability for the NSW Government to fund other important aspects of the State's economy such as education, health, community services and non-motorway transport. This calls into doubt the Project's potential to achieve this objective.	proceeds from the initial stages to help fund the final stage. The NSW Government is contributing over $2 billion to fund the WestConnex program of works, while the Australian Government is providing contributions to the NSW Government of over $3.5 billion. The project would deliver more than $20 billion in economic benefits, including employment and expenditure during construction and flow-on effects in the medium-long to long term, and broader economic benefits due to improved connectivity between areas with high employment densities. Supplementary funding of WestConnex, as proposed in the WestConnex Updated Strategic Business Case (SMC 2015), assumes a distance based toll would be implemented on operation of each component project. Distance based tolling means that motorists would only pay tolls for the sections of the motorway they use. Tolls for the entire WestConnex motorway would be capped at a maximum amount of $8.60 ($2017) for cars and light commercial vehicles and a distance of around 40 kilometres. Cars and light commercial vehicles would pay one third of the toll for heavy commercial vehicles. Tolls would escalate up to a maximum of four per cent or the consumer price index (CPI) per year (whichever is greater) until 2040. After that, CPI would apply. Use of toll revenue from the project is discussed in section C3.5.4. In August 2017, the NSW Government announced it would proceed with the sale of at least a 51 per cent stake in SMC (NSW Government 2017) while retaining a 49 per cent interest. The sale of SMC will be used to help fund the M4-M5 Link (see further details in section C1.5.1). This sale forms part of the NSW Government's core strategy to build budget strength while delivering an infrastructure pipeline that creates jobs and drives economic growth. The use of toll revenue from existing toll roads depends on the ownership structure of the asset. The NSW Government determines the most appropriate use of these funds. In 2011, the NSW Government established the Restart NSW fund to enable high priority infrastructure projects to be funded and delivered. As at June 2017, funds deposited into Restart NSW, since 2011, have

Project objective	City of Sydney's submission	Response
		totalled $29.8 billion. Restart NSW is the vehicle for the delivery of the Rebuilding NSW plan, which is the Government's 10-year plan to invest $20 billion in new infrastructure funded by the electricity network transactions, Commonwealth Government Asset Recycling Initiative payments, and investment earnings. These proceeds are first deposited into Restart NSW before being invested into infrastructure projects, such as the M4-M5 Link. The NSW Government is also investing $41.5 billion (2016–2017 NSW Budget) in transport projects over the next four years (including roads and public transport).
Optimise user pays contributions to support funding in a way that is affordable, equitable and fair.	No evidence is provided as to how the Project would be affordable, equitable and fair. At the most fundamental level: It only provides an option for people who are able to drive and can afford to pay the toll. By the same token, it would favour people able to drive and afford tolls. It does not provide an option for people using public transport or active modes for transport. It is understood that half the toll risk of the Project is being borne by the NSW Government. Should the toll revenue fall short, it will place significant burden on future generations of tax payers and threaten the ability for the NSW Government to fund other aspects of the State Economy such as education, health, community services and non-motorway transport. This is not equitable.	A tolled motorway would facilitate user pays contributions and reduce the overall burden on the wider community in NSW. Inclusion of a toll makes construction of the project affordable and equitable, as the cost is shared between tax payers and individual users of the M4-M5 Link. The project comprises tolled and untolled components. Use of the mainline tunnel and Rozelle interchange for long distance trips would be tolled. Iron Cove Link would be untolled to provide an alternative for motorists using this section of Victoria Road. After opening in 2023, the project would provide a journey using the M4 Motorway straight through to Anzac Bridge, via the M4-M5 Link, for a toll capped (for the entire WestConnex motorway) at $8.60 ($2017). This would provide significant time and cost savings for motorists. The existing (non-tolled) road network will not be restricted as a result of the project and travel on sections of the existing road network would likely experience faster and more reliable travel times due to reduced congestion. Further information on project tolling, including discussion of the NSW Government's tolling principles, is provided in Chapter 14 (Social and economic) of the EIS and in **section B10.14.7**. WestConnex is one of more than 80 projects outlined in the *Transport Master Plan* to address the State's complex transport needs. As part of a broader integrated transport and land use solution, WestConnex supports

Project objective	City of Sydney's submission	Response
		a coordinated approach to the management of freight and passenger movements, and is complementary to other modes of transport including rail, bus, ferries, light rail, cycling and walking. However, Sydney's freight, commercial and services tasks require distribution of goods and services across the Sydney basin, which relies on diverse and dispersed point-to-point transport connections that are most efficiently provided by the road network. Not all trips in Sydney can be undertaken by public transport as customer needs are diverse, often requiring travel over long distances or dispersed across multiple destinations. For example, it is not practical for trades persons carrying heavy or bulky material to travel on public transport. Even though projects are being undertaken to significantly increase the share of freight being moved by rail, the overall growth in the freight task is outgrowing demand for the transport of freight by road. As such, the capacity and reach of the motorway and arterial road network needs to be increased to accommodate this growth. While the NSW Government is investing $41.5 billion (2016–2017 NSW Budget) in transport projects over the next four years (including roads and public transport) there are no feasible strategic public transport or freight alternatives to the project that, on their own, would meet the diverse range of needs for travel in the Sydney metropolitan area.
Integrate with the preceding and proposed future stages of WestConnex projects without creating significant impacts on the surrounding environment or duplicating any potential issues across the construction periods.	The EIS has not identified the impacts of future stages of WestConnex projects in terms of capacity upgrades on roads that will experience increases in traffic volumes due to WestConnex. These upgrades (such as road widening, local parking removal and intersection widening) will have material impacts on the surrounding areas and communities, but the EIS provides no information by which to	The M4-M5 Link is part of the WestConnex program of works, with the M4 Widening, King Georges Road Interchange Upgrade projects open to traffic and construction work having commenced on the M4 East and New M5 projects as noted in Table 5-2 of the EIS. Table 5-2 of the EIS also describes three other projects which are related to the WestConnex program of works which are not part of the program of works, but interface with M4-M5 Link project: • Sydney Gateway • Western Harbour Tunnel and Beaches Link

Project objective	City of Sydney's submission	Response
	understand or assess these impacts.	• F6 Extension. Chapter 10 of Appendix H (Technical working paper: Traffic and transport) of the EIS assesses the impact of changes in traffic volumes on the road network as a result of the project. Mitigation works on the road network as a result of changes in traffic volumes due to the project are described in Chapter 11 of Appendix H (Technical working paper: Traffic and transport) of the EIS. Similar to the M4 East and New M5 projects, a review of operational network performance will be undertaken 12 months and five years from the opening of the project to confirm the operational impacts of the project on surrounding arterial roads and major intersections in proximity to the Wattle Street interchange, Rozelle interchange and St Peters interchange. The assessment will be based on updated traffic surveys at the time and the methodology used will be comparable with that used in this assessment. The results of the review will be considered in future operational network performance planning carried out by Roads and Maritime. These reviews would examine potential management measures at these locations, and other locations as identified in the Road Network Performance Review, following the collection of data that would facilitate a clearer understanding of actual project impacts. The cumulative impacts (as relevant) associated with integration with the preceding stages of WestConnex, the motorway projects listed above and other related infrastructure projects or projects in the vicinity of the project have been assessed in Chapter 26 (Cumulative impacts) of the EIS, and in the respective technical working papers in Appendix H to Appendix X of the EIS. While specific mitigation measures for the cumulative scenarios assessed in the EIS are beyond the scope of this EIS, the issues identified would be examined as part of the design development for the proposed future Western Harbour Tunnel and Beaches Link and Sydney Gateway projects and as part of Roads and Maritime network mitigation strategies.

Project objective	City of Sydney's submission	Response
		Ongoing consultation with the design teams for these projects is occurring with the objective of minimising cumulative traffic impacts. The impacts of these projects, including consideration of the impacts to residents and the community surrounding the works would be considered as part of the environmental impact assessment undertaken as part of the planning and approvals process for each of the projects.
Provide the ability for an additional Sydney Harbour tunnel road crossing, the Western Harbour Tunnel and Beaches Link (subject to approval), to connect to WestConnex.	The physical infrastructure might provide the ability for an additional Sydney Harbour tunnel road crossing, the Western Harbour Tunnel and Beaches Link, but the EIS has made no case for these additional motorway connections nor how they could be viably funded. This was not an objective of the WestConnex project when it was originally described in 2012.	Refer to the response in **section B10.3.6** for a detailed description of the manner in which the proposed future Western Harbour Tunnel and Beaches Link is considered in the context of the project and the broader WestConnex program of works, including the *WestConnex Updated Strategic Business Case*, which includes a specific objective to 'Provide the ability to deliver an additional harbour road crossing and northern beaches motorway, the proposed future Western Harbour Tunnel and Beaches Link, which should be able to connect into the WestConnex motorway.' The proposed future Western Harbour Tunnel and Beaches Link would be subject to standard government considerations, including business cases and assurance reviews.
Support improved connectivity between Sydney, the Sutherland Shire, and the Illawarra, with the ability for the proposed future F6 Extension to connect to WestConnex.	The EIS has made no case for these additional motorway connections nor how they could be viably funded. They were not part of the WestConnex project when it was originally described in 2012. The Proponent appears to be adding objectives that justify further motorway construction. There is no additional capacity to accommodate additional vehicle travel within the Sydney city centre and given the limited capacity within the centre, there is ample existing arterial road connectivity to	The M4-M5 Link is part of the WestConnex program of works. Its purpose is to link other key component projects to form the WestConnex Motorway. The project objectives are consistent with the broader objectives of the WestConnex program of works, which have been developed to be aligned with the strategic objectives of national and NSW planning and policy documents. The project is a critical motorway link that contributes (together with the M4 East and New M5 projects) to connecting western Sydney's population and growth centres with employment and business opportunities in the Sydney CBD and the Sydney Airport and the Port Botany precinct, through a direct connection to the proposed future Sydney Gateway project at St Peters. However, one of the project objectives is to enable long-term motorway

Project objective	City of Sydney's submission	Response
	provide vehicle access to/from it.	network development by providing a connection to the proposed future Western Harbour Tunnel and Beaches Link program of works to the north (refer to section 3.3 of the EIS). Therefore, in addition to linking to other WestConnex projects, the M4-M5 Link is designed to allow for connections to the proposed future Western Harbour Tunnel and Beaches Link program of works, the Sydney Gateway (via the St Peters interchange) and the F6 Extension (via the New M5) projects, should they be approved. While these related projects have been considered in the cumulative impact assessment for the M4-M5 Link, summarised in Chapter 26 (Cumulative impacts) of the EIS, the M4-M5 Link is not dependent on any of these projects proceeding and is feasible without them. In 2033, the EIS assesses a project only scenario which includes all WestConnex projects but not the proposed future Western Harbour Tunnel and Beaches Link, Sydney Gateway or F6 Extension projects. The EIS also assesses a 2033 cumulative scenario which includes the projects described above (refer section 4.2.1 of Appendix H (Technical working paper: Traffic and transport) of the EIS). The importance of the M4-M5 Link in achieving all of the broader WestConnex strategic objectives is recognised in the EIS (refer to section 3.3 of the EIS). This is reflected in the traffic impact assessment carried out for the project (refer to Appendix H (Technical working paper: Traffic and transport) of the EIS), which identified that additional road network augmentation would be required to achieve the full benefits of WestConnex. The proposed future Western Harbour Tunnel and Beaches Link program of works, the Sydney Gateway (via the St Peters interchange) and the F6 Extension (via the New M5) projects, are not part of the M4-M5 Link project and are beyond the scope of the EIS. An assessment of the travel time impacts as a result of the respective projects is expected to be included in the traffic and transport assessments undertaken as part of the EISs for those projects.

Project objective	City of Sydney's submission	Response
		Due to the small forecast change in the Sydney city centre with the project and the complexity of the city centre traffic operations, it was not considered appropriate to model the operation of intersections internal to the city centre. The forecast daily traffic demand changes can be seen in Figure 10.1 and 10.2 of Appendix H (Technical working paper: Traffic and transport) of the EIS and the forecast AM and PM peak hour traffic demand changes can be seen in Figure 3 and Figure 4 of Annexure B (Justification of modelled areas) of Appendix H (Technical working paper: Traffic and transport) of the EIS. These figures illustrate that the main changes are focused on the Western Distributor/Sydney Harbour Bridge and Sydney Harbour Tunnel/Eastern Distributor, with minimal changes forecast within the Sydney city centre.

B10.3.9 Impacts on Green Square

Matter 3.2

A separate analysis of the likely impacts of the Project and related works in the Green Square area be undertaken before the Project is determined.

Response

Development of Green Square has been included in the population and employment forecasts incorporated into the WRTM, which has been used to assess the traffic and transport impacts of the project.

The lower north-south screenline assessment presented in section 9.5.1 of Appendix H (Technical working paper: Traffic and transport) of the EIS includes a location on the M4-M5 Link mainline between the Rozelle interchange and the St Peters interchange, as well as locations on 10 north-south regional connector roads, including roads in the immediate vicinity of Green Square (Wyndham Street, Botany Road, Elizabeth Street and Southern Cross Drive).

The results of this screenline assessment show modest decreases in forecast two-way AWT traffic volumes on these roads under the 'With project' scenario compared to the 'Without project' scenario in both 2023 and 2033 (three to six per cent reductions in 2023 and one to four per cent reductions in 2033). Forecast reductions in two-way AWT volumes crossing the screenline on roads around Green Square would largely be due to traffic reassigning to the M4-M5 Link, with two-way traffic on the M4-M5 Link forecast to be 16 per cent of total two-way AWT crossing the screenline in 2023 and 17 per cent in 2033, with AWT crossing the screenline on existing surface roads forecast to decrease by seven per cent in 2023 and 2033.

B10.4 Project development and alternatives

Refer to Chapter 4 (Project development and alternatives) of the EIS for details of the project development and alternatives.

B10.4.1 Assessment of strategic alternatives

Key Findings, p27

No feasible alternatives have been developed and no analysis of alternatives has been undertaken. The SEARs require an analysis of any feasible alternatives to the Project. While Section 4.4 of the EIS purports to cover Strategic Alternatives, it does little more than offer a discussion of why an alternative was not pursued.

The basic question that the people of NSW need answered by the EIS is: for the same or lower cost of the Project, could we do something that is different to the Project that will deliver outcomes that are as good or better? The EIS does not provide an answer.

Section 4.2, p27

The basic question that the people of NSW need answered by the EIS is:

For the same or lower cost of the Project, could we do something that is different to the Project that will deliver outcomes that are as good or better?

The SEARs require analysis of feasible alternatives to the Project. No feasible alternatives have been developed and no analysis of alternatives has been undertaken. While Section 4.4 of the EIS purports to cover Strategic Alternatives, it does little more than offer a discussion of why an alternative was not pursued.

It is impossible to separate the impacts of WestConnex Stage 2 from the additional roads that it is clearly aiming to facilitate – a Western Harbour Tunnel, a Beaches Link, the Sydney Gateway, a southern F6 road of some description, the proposed Alexandria-Moore Park Connectivity Upgrade. Most of these projects have involved little to no planning or development and there is no evidence they are appropriate solutions for identifiable problems in these corridors.

There is insufficient investigation of alternatives eg rapid transit investment, peak pricing on existing roads, increased investment in rail freight. Construction of the M4 East and New M5 appears to be used as part of the justification for the M4-M5 Link – this is just constructing motorway to justify more motorways.

The EIS says that the M4-M5 link would complete the orbital road network between Western Sydney and the eastern gateways of Port Botany and Sydney Airport (p4.4). That orbital already exists in the form of the 110 km Sydney Orbital- the M2, Lane Cove Tunnel, Gore Hill Freeway, Sydney Harbour Tunnel, Eastern Distributor, M5, and M7 […] and [this text is verbatim from the submission].

Section 4.3, p 28

The apparent lack of will within the NSW Government to reconsider or modify the Project to deliver better outcomes with less financial risk constitutes a major risk for the people of NSW.

Matter 4.1, p29

Before a determination is made, the Proponent will undertake a thorough assessment of Strategic Alternative 1 (improvements to the existing arterial road network) which shall, at a very minimum:

- Identify key network capacity issues
- Develop a scenario of investments in (potentially major) arterial road improvements required to address road network capacity constraints. This shall include reallocation of road space from single occupant vehicles to public transport and bus priority
- Draw on a process of transport modelling and economic assessment to inform the analysis and assessment of the alternative.

Response

The EIS was prepared in accordance with the relevant provisions of the EP&A Act. It was prepared to address the SEARs and the relevant provisions of Schedule 2 of the Environmental Planning and Assessment Regulation. Consideration of the project against a range of strategic alternatives to identify the extent to which they could meet the project objectives (refer to section 3.3 of the EIS for the project objectives) and how well they performed with reference to other transport, environmental, social and economic factors has been undertaken in accordance with the SEARs and is presented in section 4.4 of the EIS. The strategic alternatives that were considered in section 4.4 of the EIS comprise:

- Alternative 1 – improvements to the existing arterial road network
- Alternative 2 – investment in alternative transport modes
- Alternative 3 – demand management
- Alternative 4 – the 'Do nothing'/'Do minimum' case
- Alternative 5 – development of the M4-M5 Link.

Investing in alternative transport modes is described in section 4.4.2 of the EIS.

WestConnex is one of more than 80 projects outlined in the *Transport Master Plan* to address the state's complex transport needs. As part of a broader integrated transport and land use solution, WestConnex supports a coordinated approach to the management of freight and passenger movements, and is complementary to other modes of transport including rail, bus, ferries, light rail, cycling and walking. Sydney's freight, commercial and services tasks require distribution of goods and services across the Sydney basin, which relies on diverse and dispersed point-to-point transport connections that are most efficiently provided by the road network.

Not all trips in Sydney can be undertaken by public transport as customer needs are diverse, often requiring travel over long distances or dispersed across multiple destinations. Even though projects are being undertaken to significantly increase the share of freight being moved by rail, the overall growth in the freight task is outgrowing demand for the transport of freight by road. As such, the capacity and reach of the motorway and arterial road network needs to be increased to accommodate this growth. While the NSW Government is investing $41.5 billion (2016–2017 NSW Budget) in transport projects over the next four years (including roads and public transport) there are no feasible strategic public transport or freight alternatives to the project that, on their own, would meet the diverse range of needs for travel in the Sydney metropolitan area.

The EIS does not claim that the project, as part of the WestConnex program of works, would address all of Sydney's congestion problems or resolve all bottlenecks in the project footprint and immediate surrounds. What the WestConnex motorway would do is provide a viable alternative underground route, primarily for freight and commercial vehicles, thereby improving traffic conditions on the surface road network over the short to medium term. Ongoing network improvement strategies and other key motorway connections would be required to address the pressures of Sydney's growing population over the longer term.

The size and scale of WestConnex requires the program of works to be delivered in stages. The staging strategy for the WestConnex program of works was outlined in the *WestConnex Updated Strategic Business Case.* An update of the timing for the various component projects is illustrated in Figure 4-9 of the EIS. Factors considered in the staging of the WestConnex component projects included:

- Transport benefits and traffic management
- Timing of pre-construction activities
- Government funding requirement
- Infrastructure market capacity.

Separate environmental impact assessments were therefore required to be prepared for each stage. The M4 Widening, M4 East, King Georges Road Interchange Upgrade, New M5 and M4-M5 Link components of the WestConnex program of works have been declared critical SSI by virtue of schedule 5 of the State Environmental Planning Policy (State and Regional Development) 2011. Critical SSI projects are high priority infrastructure projects that have been deemed by the NSW Minister for Planning to be essential to the State for economic, social or environmental reasons.

In addition, and as described in **section B10.1.2** the project is listed as a 'high priority initiative' in the *Australian Infrastructure Plan: The Infrastructure Priority List* (Infrastructure Australia 2016). The project is also part of the NSW Government's commitment to deliver WestConnex for Sydney in response to the recommendations from the State Infrastructure Strategy 2012–2032 (Infrastructure NSW 2012), the *State Infrastructure Strategy Update* 2014 (Infrastructure NSW 2014), the *Transport Master Plan* (Transport for NSW 2012), the *NSW State Priorities* announced in September 2015 (NSW Government 2015) and the *NSW Freight and Port Strategy* (Transport for NSW 2013).

Further, the Draft *Future Transport Strategy 2056* (NSW Government 2017), which was released in October 2017 reiterates the need to plan and invest in the future of Sydney's motorway network. The *Draft Greater Sydney Services and Infrastructure Plan* (NSW Government 2017) acknowledges that roads will continue to perform an important function in transporting people and goods within Greater Sydney, and that the future strategic road network in Sydney will support key movements by road, including public transport, private vehicles and freight movements.

By providing a motorway link between the M4 East at Haberfield and the New M5 at St Peters, the project would help to connect major employment centres, which are critical in supporting the creation of jobs and businesses. This would include centres within the 'global economic corridor', which includes the Sydney Airport and Port Botany precinct, Parramatta CBD, Sydney CBD as well as Sydney Olympic Park. The project would also support the Western Sydney Employment Area, which is outside the global economic corridor.

The benefits provided by the project as part of the WestConnex program of works include:

- Ease congestion on surface roads by providing an underground motorway alternative and allowing for increased use of surface roads by pedestrians and cyclists and for public transport
- Reduce through traffic on sections of major arterial roads including City West Link, Parramatta Road, Victoria Road, King Street, King Georges Road and Sydenham Road, facilitating urban renewal opportunities to be realised along parts of the Parramatta Road and Victoria Road corridors
- Improve network productivity on the metropolitan network, with more trips forecast to be made or longer distances travelled on the network in a shorter time. The forecast increase in VKT and reduction in VHT is mainly due to traffic using the new motorway, with reductions in daily VKT and reduction in VHT so forecast on non-motorway roads

- Reduce travel times on key corridors, such as between the M4 Motorway corridor and the Sydney Airport/Port Botany precinct and between the main centres on the Global Economic Corridor, including Sydney CBD, Sydney Olympic Park and Parramatta CBD
- Facilitate future growth in Sydney's transport network by allowing for connections to the proposed future Western Harbour Tunnel and Beaches Link and Sydney Gateway projects.

Investment in the M4-M5 Link, together with the other WestConnex component projects, would assist in facilitating the delivery of other major city-shaping improvements, such as the Parramatta Road Corridor Urban Transformation and The Bays Precinct Transformation, which would all contribute to delivering economic growth. As part of the broader WestConnex program of works, the project would support NSW's major sources of economic activity and provide a strategic response to the future transport demands on the already congested road network, which includes the A3 corridor.

In the absence of the project, motorists using the M4 East and New M5 motorway tunnels wishing to travel north or south would be required to travel along local and sub-arterial roads or traverse the Sydney CBD to access existing key north–south corridors. Examples of existing routes that would provide connectivity to the north and south as well as to the east and west (as an alternative to the project) could include Parramatta Road, City Road/King Street/the Princes Highway, King Georges Road, Anzac Bridge/City West Link, Johnston Street/The Crescent, Edgeware Road, Shaw Street and Norton Street, as well as the local road network. The connectivity between the M4 East and the New M5 motorways provided by these routes is indirect and requires motorists to travel through many at-grade intersections and, in some cases, steep grades such as on parts of King Georges Road, or congestion and high pedestrian traffic such as on King Street at Newtown.

Improvements to the existing arterial road network as an alternative to the project is described in section 4.4.1 of the EIS.

Ongoing improvements to the broader transport network are planned or underway (such as Roads and Maritime's 'Easing Sydney's Congestion' initiatives) including some new infrastructure and intersection improvements to improve capacity and cater for traffic growth. However, improvements to the arterial road network (such as improving intersection performance and implementing traffic calming measures, lane closures or clearways) would only provide incremental change in the efficiency of the road network, and would not support the additional capacity required for regional traffic growth, which is associated with the forecast increase in Sydney's population (from 4.3 to 5.9 million between 2011 and 2031 (NSW Government 2014) and subsequent increases in VKT.

Continued urban development along the Parramatta Road and Victoria Road corridors has resulted in limited capacity for widening and/or upgrades to these roads. As a result, any future improvements to the surface road network would not be able to proceed without considerable challenges, including the acquisition of a large number of properties. Even if arterial road upgrades could be achieved at reasonable cost and minimal impact, the improvements are unlikely to match the capacity that would be provided by the project; hence the potential benefits to motorists would be limited in the longer term. As such, improvements to the arterial road network alone are not a feasible or long-term alternative to the project.

Without the project, passenger and commercial vehicles, trucks and buses travelling from Haberfield to the Sydney CBD would continue to use the already congested east–west arterial road network (ie Parramatta Road and City West Link). According to the *Transport Master Plan*, this is one of the most constrained strategic transport corridors in Sydney. Similarly, the north-south arterial road network between Drummoyne and the Sydney CBD via Victoria Road and Anzac Bridge is one of the most congested sections of the Sydney road network.

Improvements to the road network through these corridors, as an alternative to the project, would require significant upgrades (eg road widening or road closures and grade separation of intersections) and the implementation of traffic controls (eg clearways) to accommodate projected traffic volumes. Improvements to the existing arterial road network would:

- Result in potentially significant community and environmental impacts through increased traffic flows within inner city residential areas leading to increased noise and detrimental air quality, and potential property acquisition impacts associated with road upgrades
- Make it difficult to achieve land use regeneration and urban renewal along parts of Parramatta Road or along Victoria Road (east of Iron Cove Bridge), or to upgrade public transport services along these corridors, as proposed by the NSW Government

- Not provide the connectivity to Sydney's international gateways at Sydney Airport and Port Botany through the St Peters interchange and the proposed future Sydney Gateway project
- Not enable direct and free flow connections to the proposed future Western Harbour Tunnel and Beaches Link program of works and F6 Extension project to provide an effective western bypass of the Sydney CBD.

Arterial road improvements alone would therefore not meet the project objectives. In order to improve the capacity and performance of the arterial road network across the Sydney metropolitan area, Roads and Maritime would continue to implement projects in addition to the M4-M5 Link, such as the Easing Sydney's Congestion program.

B10.4.2 Assessment of alternate road projects

Section 4.3

The EIS purports to canvas alternatives to the Project. However, better use of existing road infrastructure has not been thoroughly analysed as a feasible alternative. The EIS only refers to existing RMS programs. An analysis of urban road projects recommended in the State Infrastructure Strategy Update 2014 should be conducted as strategic alternatives including:

- Smart Motorways investments on the M4, the Gore Hill Freeway and Eastern Distributor
- Upgrading the Sydney Coordinated Adaptive Traffic System (SCATS) [8].

Response

A range of alternatives to the M4-M5 Link were considered in the EIS, as discussed in **section B10.4.1**. The SEARs for the project required that the EIS contain an analysis of the feasible alternatives to carrying out of the project, including an analysis of the alternatives/options considered, having regard to the project objectives. As such, any strategic alternatives were required to be considered in terms of the project objectives as outlined in Chapter 3 (Strategic context and project need) of the EIS.

Ongoing improvements to the broader transport network are planned or underway (such as Roads and Maritime 'Easing Sydney's Congestion' initiatives) including some new infrastructure and intersection improvements to improve capacity and cater for traffic growth.

There are no existing arterial roads that would directly link the M4 East Motorway at Haberfield with the New M5 Motorway at St Peters, both of which are currently under construction. The M4-M5 Link would provide both an east-west connection towards Anzac Bridge and the Sydney CBD, and a north-south connection toward St Peters. In addition, the project would enable long-term motorway network development by providing a connection to the proposed future Western Harbour Tunnel and Beaches Link project to the north. Together with the other components of the WestConnex program of works the project would facilitate improved connections between western Sydney (including the Parramatta Road corridor) and south and south-western Sydney (including the M5 South West Motorway).

In the absence of the project, motorists using the M4 East and New M5 motorway tunnels wishing to travel north or south would be required to travel along existing local and sub-arterial roads or traverse the Sydney CBD to access existing key north–south corridors such as the M1 Motorway. Examples of existing routes that would provide connectivity to the north and south (as an alternative to the project) could include Parramatta Road, City Road/King Street/the Princes Highway, King Georges Road, M1 Motorway/Anzac Bridge/City West Link, Johnston Street/The Crescent, Edgeware Road, Shaw Street and Norton Street, as well as the local road network. The connectivity between the M4 East and the New M5 motorways provided by these routes is indirect and requires motorists to travel through many at-grade intersections and, in some cases, steep grades such as on parts of King Georges Road, or congestion and high pedestrian traffic such as on King Street at Newtown, which are not appropriate for freight vehicles.

[8] The Sydney coordinated adaptive traffic system (SCATS) is a traffic management system used to synchronise traffic signals to optimise traffic flow.

Continued urban development along the Parramatta Road and Victoria Road corridors has resulted in limited capacity for widening and/or upgrades to these roads. Limited road reserves would mean that any future improvements to the surface road network would not be able to proceed without considerable challenges, including the acquisition of a large number of properties. Even if arterial road upgrades could be achieved at reasonable cost and impacts, the improvements are unlikely to match the capacity that would be provided by the project; hence the potential benefits to motorists would be limited in the longer term. As such, improvements to the arterial road network alone are not a feasible or long-term alternative to the project.

Improvements to the road network through these corridors, as an alternative to the project, would require significant upgrades (eg road widening or road closures) and the implementation of traffic controls (eg clearways) to accommodate projected traffic volumes. Improvements to the existing arterial road network would:

- Result in potentially significant community and environmental impacts through increased traffic flows within residential areas leading to increased noise and detrimental air quality, and potential property acquisition impacts associated with road upgrades
- Make it difficult to achieve land use regeneration and urban renewal along parts of Parramatta Road or along Victoria Road (east of Iron Cove Bridge), or to upgrade public transport services along these corridors, as proposed by the NSW Government
- Not provide the future connectivity to Sydney's international gateways at Sydney Airport and Port Botany through the St Peters interchange and the proposed future Sydney Gateway project
- Not enable direct and free flow connections to the proposed future Western Harbour Tunnel and Beaches Link program of works and F6 Extension project to provide a western bypass of the Sydney CBD.

Arterial road improvements alone would therefore not meet the project objectives. In order to improve the capacity and performance of the arterial road network across the Sydney metropolitan area, Roads and Maritime would continue to implement projects in addition to the M4-M5 Link, such as the Easing Sydney's Congestion program.

Section 3 of the *State Infrastructure Strategy Update* (2014) identifies the strategic objective of optimising passenger and freight movements on the existing road network at the same time as facilitating broader economic development through selective extensions to the Sydney motorway network. The implementation of smart motorways on the M4 Motorway, the Warringah Freeway and Southern Cross Drive-General Holmes Drive (also known as the M1 corridor) and upgrades to Sydney's traffic management system are identified by Infrastructure NSW in the *State Infrastructure Strategy Update* (2014) as high value, congestion-mitigating investments that would improve the performance of the existing road network. However, the *State Infrastructure Strategy Update* (2014) does not present these upgrades as alternatives to the project, but rather as complementary upgrades to the WestConnex program of works.

Specifically, Infrastructure NSW in the *State Infrastructure Strategy Update* (2014) recommended refining the scope, alignment and procurement strategy for the WestConnex Northern and Southern Extensions with a view to their delivery as toll roads within the next decade, acknowledging the role of the project in alleviating pressure on the existing north-south corridor of Sydney's orbital network and reducing journey times from the city's south. In addition, the *State Infrastructure Strategy Update* (2014) identifies that the Northern Extension of the WestConnex program of works would enable a connection to the proposed future Western Harbour Tunnel project and therefore a third harbour road crossing, to alleviate pressure on Sydney's 'most constrained 'pinch point'.

The M4-M5 Link would be designed to include the integration of 'smart motorways' (also known as managed motorways) features, that would use real-time information, communication and traffic control systems incorporated into and alongside the road, to improve traffic flow. The roll-out of this is the subject of ongoing Roads and Maritime projects. The SCATS is an adaptive urban traffic management system that synchronises traffic signals to optimise traffic flow. As such, improvements to the SCATS would only provide incremental change in the efficiency of the road network, and would not support the additional capacity required for regional traffic growth.

B10.4.3 Assessment of integrated transport

There is no evidence of scenario modelling being used to allow testing of the ability of different packages of integrated transport measures to achieve outcomes. TfNSW's *Long Term Transport Masterplan* states that integrated approaches are required to manage congestion. Even without scenario modelling, there is no evidence of detailed corridor planning. This is a major fault in the Project's development now that rapid transport options such as Sydney Metro City and Southwest are being constructed, and Metro West is in planning. Additional rail freight network improvements and intermodal facilities should also be considered.

The EIS considers 'catering for traffic growth' at 4.15 whereas the *Transport Master Plan outlined* an integrated approach to congestion management, focussed on land use planning, demand management, public transport investment and 'a coherent whole of network planning strategy'. The EIS states that the 'WestConnex program of works has been developed to provide an integrated transport network solution' (p4.1). However, the Project deals only with roads. The role of public transport, and in particular, the Sydney Metro network, is not considered. The Project does not deliver an integrated transport network solution.

The EIS states that 'there are no feasible strategic public transport or freight alternatives to the Project that, on their own, would meet the diverse range of needs for travel in the Sydney metropolitan area'. It is clear that a package of measures is needed but has not been considered.

The EIS states that *Sydney's Bus Future* (TfNSW 2013a) proposes to redesign the Sydney bus network to meet current and future demands by providing rapid service routes to 'connect major centres along transport routes with mass transit demand' and that 'new bus connections would take advantage of WestConnex'. There is no evidence provided that WestConnex is pivotal to that approach, and by increasing traffic in a bus-rich area, it will affect the efficiency of bus services.

Matter 4.2, p30

Before a determination is made, the Proponent will undertake an assessment of Strategic Alternative 2 (Investment in 'alternative transport' modes) which shall, at a very minimum:

- Identify key network capacity issues
- Identify the mode shift away from private vehicles required to deliver the necessary relief on the road network to meet the future transport needs of Sydney.
- Identify the mix of investments in public transport, cycling and walking required to deliver these mode splits.
- Draw on a process of multi-modal transport modelling and economic assessment to inform the analysis and assessment of the alternative.

Response

As noted in **section B10.3.1**, Sydney's expected population growth will place increasing pressure on the NSW transport network and the key travel demand corridors connecting regional cities and major centres across the greater Sydney metropolitan area. In response to this forecast future demand, a range of infrastructure, transport and planning strategies have been released, including:

- *State Infrastructure Strategy* (Infrastructure NSW 2012, updated 2014)
- *NSW Long Term Transport Master Plan* (Transport for NSW 2012)
- Draft *Future Transport Strategy 2056* (NSW Government 2017)
- *Sydney CBD to Parramatta – Strategic Transport Plan* (UrbanGrowth NSW 2015)
- *A Plan for Growing Sydney* (NSW Government 2014)
- *Parramatta Road Corridor Urban Transformation Strategy* (UrbanGrowth NSW 2016)
- *Draft Towards our Greater Sydney 2056* (Greater Sydney Commission 2016)
- *Draft Greater Sydney Region Plan* (Greater Sydney Commission 2017).

The transport projects identified in these strategies, along with Roads and Maritime projects including Easing Sydney's Congestion are designed to deliver improvements in network performance in response to both current and future demands.

Existing NSW Government policies, plans and programs relevant to the nature of the project and the project footprint were reviewed and reported on in Chapter 3 (Strategic context and project need) of the EIS. The review considered potential positive and negative effects of the project on policy decisions and government initiatives. Delivery of the project is largely consistent with all applicable government policies, plans and programs with respect to transport infrastructure, urban growth initiatives and connectivity.

The project is listed as a 'high priority initiative' in the *Australian Infrastructure Plan: The Infrastructure Priority List* (Infrastructure Australia 2016). The project is also part of the NSW Government's commitment to deliver WestConnex for Sydney in response to the recommendations from the *State Infrastructure Strategy* 2012-2032 (Infrastructure NSW 2012), the *State Infrastructure Strategy Update* 2014 (Infrastructure NSW 2014), the *Transport Master Plan* (Transport for NSW 2012), the *NSW State Priorities* announced in September 2015 (NSW Government 2015) and the *NSW Freight and Port Strategy* (Transport for NSW 2013).

The WestConnex program of works, which includes the project, has the potential to be a catalyst for major urban renewal and complements *A Plan for Growing Sydney* (NSW Government 2014) and the Draft *Central District Plan* (Greater Sydney Commission 2016). The project also complements the vision established in *Towards our Greater Sydney 2056* (Greater Sydney Commission 2016) and the draft *District Plans* (Greater Sydney Commission 2016), specifically the Draft *Central District Plan,* by providing an integrated transport solution to support population and commercial growth in western Sydney.

Since the preparation of the EIS, the Draft *Future Transport Strategy 2056* (NSW Government 2017) was released for public comment in tandem with the Draft *Greater Sydney Region Plan* (Greater Sydney Commission 2017). The Draft *Future Transport Strategy 2056* is an update of the *Transport Master Plan* and sets the vision, direction and outcomes framework for commuter mobility in NSW and aims to guide transport investment over the longer term. The draft strategy identifies the WestConnex program of works, which includes the project, as a 'city-shaping' project.

The *Draft Greater Sydney Services and Infrastructure Plan* (NSW Government 2017) acknowledges that roads will continue to perform an important function in transporting people and goods within Greater Sydney, and that the future strategic road network in Sydney will support key movements by road, including public transport, private vehicles and freight movements.

The Draft *Greater Sydney Region Plan* sets the vision for a growing and changing Greater Sydney and its transformation into a 'metropolis of three cities'. The draft plan proposes that urban renewal investigation opportunities consider alignment with key infrastructure, such as the WestConnex program of works, to ensure connectivity between these cities.

The project, as part of the WestConnex program of works, is therefore consistent with the vision outlined in both the Draft *Future Transport Strategy 2056* and the Draft *Greater Sydney Region Plan.* These draft plans are expected to be finalised in 2018.

While the use of public transport is expected to grow with the implementation of key public transport initiatives, most growth in transport demand over the next 20 years will continue to be met by roads. This is because public transport is best suited to providing concentrated, high volume flows of people to and from established centres. It is less suited to providing dispersed cross-city or local trips. In 2014, around 17.6 million trips were made each average weekday in Sydney, with around 75 per cent of these by road. Even with significant investment and high levels of patronage growth forecast for Sydney's public transport network, about 72 per cent of around 27.5 million journeys in 2031 are expected to be made on the road network each weekday by private vehicles, equal to an additional 4.3 million new trips compared to 2014 (Infrastructure NSW 2014).

Not all trips in Sydney can be undertaken by public transport as customer needs are diverse, often requiring travel over long distances or dispersed across multiple destinations. For example it is not practical for trades persons carrying heavy or bulky material to travel on public transport. With about 60 per cent of employment dispersed across the Sydney metropolitan area, public transport alone cannot viably serve most of these locations. Even under the most ambitious scenarios for land use change and growth in public transport, the absolute number of car journeys will continue to increase (Sydney Motorway Corporation 2015a). Public transport improvements alone are therefore not a viable alternative to meeting the project objectives. Investment in integrated transport solutions that involve both roads and public transport is needed to cater for the concentrated population growth forecasts and associated increase in travel movements.

Employment growth in the Sydney metropolitan area is expected to increase in keeping with a growing population. While Sydney has an extensive public transport network (with rail being the most popular mode used to access the Sydney CBD), the LoS can vary significantly. A key constraint to the expansion and development of the rail network is Sydney's geography, with large parts of the Sydney metropolitan area, such as outer western Sydney and the Northern Beaches region, being relatively poorly connected by public transport to Sydney's global employment centres. As major rail projects have a long lead time, the focus in the shorter term is to improve public transport services through the bus network, such as bus priority programs and bus rapid transit.

Beyond the movement of people between places, roads serve an important role in moving freight between the source and end markets, including the intermediary destinations in the supply chain. These sources, intermediary locations and end markets are geographically dispersed across the Sydney basin. As a result, Sydney's freight, commercial and services tasks require more diverse and dispersed point-to-point transport connections that can only be provided by the road network.

This does not mean that there is not an opportunity to significantly increase the share of freight being moved by rail and the NSW Government has invested in projects to support the overall growth in the freight task. However, investment in freight rail alone is unlikely to result in all freight being able to be moved by rail as there will still need to be deliveries of good and services to receiving destinations in the community. As such, the capacity and reach of the motorway and arterial road network needs to be increased to accommodate this growth. See **section B10.3.2** for further detail regarding the role of WestConnex in the context of Sydney's current and forecast freight task.

WestConnex is one of more than 80 projects outlined in the *Transport Master Plan* to address the state's complex transport needs. As part of a broader integrated transport and land use solution, WestConnex supports a coordinated approach to the management of freight and passenger movements, and is complementary to other modes of transport including rail, bus, ferries, light rail, cycling and walking. However, Sydney's freight, commercial and services tasks require distribution of goods and services across the Sydney basin, which relies on diverse and dispersed point-to-point transport connections that are most efficiently provided by the road network.

Not all trips in Sydney can be undertaken by public transport as customer needs are diverse, often requiring travel over long distances or dispersed across multiple destinations. Even though projects are being undertaken to significantly increase the share of freight being moved by rail, the overall growth in the freight task is outgrowing demand for the transport of freight by road. As such, the capacity and reach of the motorway and arterial road network needs to be increased to accommodate this growth.

The M4-M5 Link, as a component of the WestConnex program of works, supports a coordinated approach to the management of freight and passenger movements. It is complementary to other projects, across all modes of transport including road, rail, bus, ferries, light rail, cycling and walking, which are being delivered as part of the NSW Governments $41.5 billion (2016–2017 NSW Budget) investment in transport projects over the next four years. However, there are no feasible strategic public transport or freight alternatives to the project that, on their own, would meet the diverse range of needs for people and freight travel in the Sydney metropolitan area which the M4-M5 Link is contributing to achieving.

B10.4.4 Assessment of travel demand management

TfNSW and Infrastructure NSW (INSW) policies and strategies promote transport solutions to reduce travel demand as an effective mechanism for addressing congestion impacts. The EIS must investigate these options.

The EIS forecasts that more and longer trips will be made (p4.31). This undermines the government's proposal, set out in the *Transport Master Plan* to reduce the kilometres travelled by motor vehicles. When considering travel demand management strategies the EIS confines itself to consideration of urban consolidation, jobs location, transit oriented development and parking restrictions. These are important tools in managing travel demand. However road pricing can be an effective tool, when used not just as a tolls-based revenue source to pay for roads. There are many international examples of pricing leading to changes in time or route of travel, change of mode or overall reduced travel (without measurable impacts on accessibility).

The EIS states that 'travel demand management measures would require considerable changes in social attitudes, travel behaviour and government policy and can take many years to achieve'. There is no evidence to support this statement, TfNSW's Travel Choices behaviour change campaign has contributed in a substantial way to an eleven per cent decline in the number of vehicles entering the city centre. Even if the statement is correct it is not a reason to ignore this option. Sydney already utilises many travel demand management techniques that are generally supported by the community for example:

- Tolls on certain roads
- Time of day tolling on some roads
- Strict parking controls in new developments and centres
- Parking Space Levy
- Reallocation of roadspace to more efficient uses eg light rail, bus lanes
- Changes to logistics and servicing around Sydney Olympics, World Youth Day and the Sydney city centre revitalisation
- Car share and rideshare solutions.

Matter 4.3, p30

Before a determination is made, the Proponent will undertake an assessment of Strategic Alternative 3 (Travel Demand Management) which shall, at a very minimum:

- Identify key network capacity issues
- Develop a package of Travel Demand Management mechanisms to address the road network capacity constraints. The package should aim to retime, re-mode or reduce trips that make less productive use of congested road space. It shall include: tolls on certain roads, time of day tolling on some roads, strict parking controls in new developments and centres, Parking Space Levy, reallocation of roadspace to more efficient uses eg light rail, bus lanes, changes to logistics and servicing around the Sydney city centre revitalisation, car share and rideshare solutions
- Draw on a process of multi-modal transport modelling and economic assessment to inform the analysis and assessment of the alternative.

Response

Demand management was considered as part of Alternative 3 – demand management in section 4.4.3 of the EIS. Travel demand management relates to minimising or avoiding the need to invest in new motorway infrastructure such as the project, by reducing individual trip lengths and making alternative transport mode options more viable.

The addition of the M4-M5 Link provides a significant overall improvement to network productivity. As shown in Table B10-2, an overall increase in daily VKT and a reduction in daily VHT on the road network are forecast. This means that more trips could be made or longer distances travelled on the network in a shorter time. The forecast increase in VKT and reduction in VHT is mainly due to traffic using the new motorway, with reductions in daily VKT and VHT forecast on the non-motorway roads. This indicates the additional network capacity provided by the project would assist in accommodating the forecast growth in population and associated travel demand on the modelled road network that would otherwise contribute to worsening road network and traffic conditions without the project. This trend continues in the ‘Cumulative’ scenario, with reduced daily VKT and VHT forecast for the non-motorway roads.

Table B10-2 Comparison of daily VKT and VHT for metropolitan Sydney under future scenarios

Scenario	Year	Daily VKT ('000 km)			Daily VHT ('000 hours)		
		Motorway	Other	Total	Motorway	Other	Total
Base case	2015	23,940	74,810	98,750	400	2,520	2,920
Do minimum (without project)	2023	26,880	86,520	113,400	470	3,160	3,630
With project		27,730	86,050	113,780	480	3,120	3,600
Cumulative		27,980	85,970	113,950	470	3,110	3,570
Do minimum (without project)	2033	31,030	101,900	132,930	590	4,670	5,560
With project		32,010	101,410	133,430	600	4,610	5,220
Cumulative		33,780	100,650	134,420	600	4,500	5,100

Source: WRTM v2.3 2017

A forecast reduction in daily VKT and VHT forecast for non-motorway roads also supports the reallocation of road space to enable potential public transport improvements. By reducing surface road traffic along sections of Parramatta Road and Victoria Road, the project would provide an opportunity for potential future developments in public transport and support the expansion of the active transport network to achieve the sustainability and liveability objectives of the WestConnex program of works.

The travel demand management techniques identified in the City of Sydney's submission are acknowledged as being effective at managing travel demand. However, these are viewed as complementary initiatives, together with the project, to reduce the impacts of road traffic on Sydney's road network, as while travel demand management could help reduce demand on the road network during peak times, its effectiveness would be limited by other constraints, such as:

- Land use patterns, in particular the location of new jobs relative to areas of residential growth
- The availability of alternative travel modes at the user's origin and destination such as public transport and active transport
- Flexibility of working arrangements to take advantage of 'time of day' tolling or transport pricing benefits.

No evidence was provided in the City of Sydney's submission to support the claim that the travel demand measures identified by the City of Sydney are generally supported by the community. However, to have a major impact on road traffic, travel demand management measures would require considerable changes in social attitudes, travel behaviour and government policy and can take many years to achieve. Travel demand management measures such as road pricing would therefore need to be assessed and introduced at a NSW Government policy level.

Population growth, combined with the growing road freight task in the Sydney metropolitan area, would result in a continued demand for use of roads providing east-west and north-south connections such as the M4 Motorway, M5 Motorway, M1 Motorway and A3 and A6 corridors (refer to Figure 4-12 of the EIS). NSW Government policy has a focus on delivering transport projects, including public transport and Western Sydney Airport, and through this, employment growth in key centres such as Parramatta, Western Sydney Airport, and the southwest and northwest growth centres. Without infrastructure investment or significant changes to how people travel, the continued demand and use of these corridors would result in additional, prolonged congestion.

B10.5 Project description

Refer to Chapter 5 (Project description) of the EIS for the project description.

B10.5.1 Urban design

Section 5.1 Key Findings

The urban design objectives and proposed methodology in table 5.3 in Chapter 5 does not address the principles contained within the NSW Government's policy Better Placed: An integrated design policy for the built environment of New South Wales.

Section 5.3, 931

The urban design objectives and proposed methodology in table 5.3 in the EIS do not address either the principles contained within the NSW Government's policy Better Placed: An integrated design policy for the built environment of New South Wales or RMS's Beyond the Pavement.

Better Placed includes the following seven objectives that have been created to define the key considerations that should be met in the design of the built environment:

- Better fit: contextual, local and of its place
- Better performance: sustainable, adaptable and durable
- Better for community: inclusive, connected and diverse
- Better for people: safe, comfortable and liveable
- Better working: functional, efficient and fit for purpose
- Better value: creating and adding value
- Better look and feel: engaging, inviting and attractive.

In reviewing the proposed urban design objectives all modifiers including 'Where possible' and terms like 'enhance' should indicate the objective's hierarchy in relation to other considerations (like cost and increasing traffic capacity). This will clarify what constraints are at play, and where it is appropriate to apply the modification.

Matter 5.3, p33

Ensure that the importance of the urban design objectives is made explicitly equal to, or on a higher level than, the objective of increasing traffic capacity.

Response

Better Placed: An integrated design policy for the built environment of New South Wales (Government Architect NSW 2017) was released in September 2017 and therefore after the M4-M5 Link Urban Design Report for the EIS was prepared and while the EIS was on public exhibition. Notwithstanding this, it is expected that this document would be considered as appropriate during the preparation of UDLPs for the project.

The objectives for the project, as listed in section 3.3 of the EIS, include 'Delivering a project with a beneficial urban design outcome' which reflects Roads and Maritime's commitment to the importance of urban design as part of the project. Appendix L (Technical working paper: Urban design) of the EIS is consistent with the key issues identified in the SEARs, which includes requirements issued by key government regulatory agencies as well as industry standards and guidelines.

The relationship of the key objectives for the project to the urban design guidelines and policies, including *Beyond the Pavement: Urban Design Procedures and Design Principles* (Roads and Maritime 2014a) and the *WestConnex Motorway Urban Design Framework* (Roads and Maritime 2013a) is discussed in section 3.1 of Appendix L (Technical working paper: Urban design) of the EIS.

The importance of achieving a beneficial urban design outcome in the project is demonstrated through the integrated urban design and engineering process and landscape character and visual impact assessment undertaken, outlined in section 13.1 of the EIS. The urban design principles set out in table 13-2 of the EIS would be developed into detailed designs under UDLPs for the various components of the project.

B10.5.2 Project is only a concept design

Section 5.1 Key Findings

The description only represents a concept design for the Stage M4-M5 Link with the likelihood of changes once tenders are awarded. It is evident that the objective of many components of this Project is securing the patronage of eight traffic lanes in the mainline tunnels as well as future tollways, instead of providing improved links to the existing airport or the ports.

Section 5.2, p32

The description only represents a concept design for Stage 3 with the likelihood of changes once tenders are awarded. It is evident that the objective of many components of this project is securing sufficient patronage to justify eight traffic lanes in the mainline tunnels as well as future tollways instead of providing improved links to the existing airport or the ports.

Response

A discussion on the assessment of a concept design in the EIS is provided in **section B10.5.2**.

The specific objectives of the project are:

- Linking the M4 East and New M5 motorways so that further benefits and opportunities of WestConnex can be realised
- Improving traffic conditions and reducing congestion on key arterial roads in proximity to the project
- Improving accessibility and reliability for commercial vehicle movement in the M4 and M5 motorway corridors to economic centres, including to the Sydney Airport and Port Botany precinct
- Facilitating urban renewal in areas where the project would reduce traffic
- Minimising impacts associated with acquisition of residential and commercial properties on communities
- Enabling long-term motorway network development by providing a connection to the proposed future Western Harbour Tunnel and Beaches Link project to the north
- Delivering a project with a beneficial urban design outcome.

As the project is part of the WestConnex program of works, the objectives of the project are consistent with those of WestConnex, as stated in the *WestConnex Updated Strategic Business Case*.

The M4-M5 Link would connect to the proposed future Sydney Gateway via the St Peters interchange, which would improve connectivity between Sydney's international gateways (Sydney Airport and Port Botany), western Sydney and places of business across the Sydney region. The proposed future Sydney Gateway project is currently undergoing design development and would be subject to a separate business case and environmental assessment process.

B10.5.3 Information about forecast demand for movement between affected locations not included

Section 5.2

The WestConnex program of works involves expanding or duplicating existing road infrastructure including widening the M4, upgrading King Georges Road interchange, creating a new M5 and further duplications of Victoria Road. No information has been provided about the forecast demand for movements between the affected locations. The Project takes place ahead of other projects which could prioritise freight/business movements, provide for diverse passenger trips such as public transport or optimise existing road infrastructure.

Response

The need for the project is established in Chapter 3 (Strategic context and project need) of the EIS. Further discussion on the specific transport needs of the project including demand for movements between the project interchanges is provided in **section B10.3.1**.

A range of alternatives to the M4-M5 Link were considered to identify the extent to which they could meet the project objectives (refer to section 3.3 of the EIS for the project objectives) and how well they performed with reference to other transport, environmental, social and economic factors. Investing in alternative transport modes is described in section 4.4.2 of the EIS. **Section B10.4** provides further detail about the assessment of these strategic alternatives, and the role of the project, as part of the broader WestConnex program of works, as part of the NSW Government's broader integrated transport and land use solution.

B10.5.4 Key components of the project

Section 5.2, p31

Part 5.1.1 of the EIS broadly outlines key components of the Project including the following:

- A pair of mainline tunnels, up to four lanes in each direction, between the M4 East at Haberfield and the New M5 at St Peters
- Connections to tunnel stubs now under construction, but not approved yet, at Haberfield and St Peters as well as new entry/exit ramps
- Portals and ramps at Iron Cove Bridge leading to/from tunnels, duplicating Victoria Road, between Iron Cove Bridge and Anzac Bridge and connecting with the mainline tunnels
- A new interchange at Lilyfield-Rozelle connecting the mainline tunnels with congested roads in the inner city as well future tollways under Sydney Harbour
- An underground interchange beneath Leichhardt/Annandale linking Rozelle, Iron Cove and the mainline tunnels
- High impact surface works at Rozelle-Lilyfield including widening and realignment of The Crescent to accommodate unplanned and unfunded works, a new intersection and portals on City West Link, reconstruction and realignment of Victoria Road at The Crescent, widening of Whites Creek to manage stormwater, three 35 m ventilation stacks and three operational complexes.

Response

The City of Sydney's identification of the key components of the project is noted, however, contains errors that are corrected in the following section.

The construction of tunnel stubs at Haberfield and St Peters are approved as part of the M4 East and New M5 projects respectively. The operation of these tunnels as part of the broader WestConnex program of works has been assessed in the M4-M5 Link EIS as well as the cumulative impact assessment sections of the relevant technical working papers of the EISs for the M4 East and New M5 projects.

The widening and realignment of The Crescent is required to address a range of factors including the potential future connection to the proposed future Western Harbour Tunnel and Beaches Link, as discussed in **section B10.5.3**. The proposed future Western Harbour Tunnel project is a committed initiative under the Draft *Future Transport Strategy* (NSW Government 2017), subject to a standard NSW Government business case and assurance processes.

Tunnel portals connecting the Rozelle interchange with the M4-M5 Link mainline tunnels and the proposed future Western Harbour Tunnel and Beaches Link would be constructed within the Rozelle Rail Yards to consolidate construction impacts and therefore minimise impacts on the surface road network and surrounding residential receivers during construction. Works would be required along City West Link to provide access to and from these tunnel portals, including a new intersection at the western end of the Rozelle Rail Yards and changes to the City West Link/The Crescent intersection. There are two motorway operations complexes proposed at the Rozelle interchange (Rozelle West (motorway operations complex (MOC) (MOC2) and Rozelle East (MOC3)) and one at Iron Cove (Iron Cove Link (MOC4)).

B10.5.5 Impacts on city centre and inner city streets

Section 5.2

The range and extent of works involved in the Project would result in major impacts on the city centre and congested inner city streets. The description shows seven portals in Rozelle and Lilyfield feeding to and from Anzac Bridge, Victoria Road and the City West Link without full modelling of their long term impacts locally or on the city centre.

Response

An assessment of operational traffic and transport impacts from the project for two future year scenarios (2023 and 2033) is provided in section 10.4 of Appendix H (Technical working paper: Traffic and transport) of the EIS. This included an assessment of operational performance around the Rozelle interchange, including Anzac Bridge, Victoria Road and City West Link. A summary of this assessment is as follows:

By 2023, comparing the 'With project' scenario to the 'Do minimum' or 'Without project' scenario:

- There is a substantial increase in overall forecast traffic demand in this area during the AM peak hour due to the new connectivity being provided by the Rozelle interchange, with eastbound congestion issues on the Western Distributor, mainly due to downstream exit blocking from Sydney Harbour Bridge. Congestion on the Western Distributor and across Anzac Bridge in the eastbound direction is forecast to cause queuing and delays on City West Link and Victoria Road and, for brief periods, the M4 eastbound exit ramp and the Iron Cove Link ramp to Anzac Bridge. Approaches to address this are discussed in the mitigation section
- In the PM peak hour, there are travel time improvements in the peak westbound direction towards City West Link and Victoria Road due to the Iron Cove Link and M4 connectivity. There are also forecast eastbound delays on the same roads caused by forecast traffic demand increases to Sydney Harbour Bridge.

By 2033, comparing the 'With project' scenario to the 'Do minimum' or 'Without project' scenario:

- In the AM peak period, Anzac Bridge/Western Distributor is more congested citybound because of a forecast increase in demand due to the new connectivity being provided by the Rozelle interchange. As in 2023, citybound movements are mainly affected by the downstream exit blocking from Sydney Harbour Bridge. Congestion on the Western Distributor and across Anzac Bridge is forecast to cause delays and queues on City West Link and Victoria Road, as well as the M4 East exit ramp and the Iron Cove Link ramp to Anzac Bridge. Approaches to address this are discussed in the mitigation section
- In the PM peak period, the modelled road network with the project performs better than the 'Without project' scenario, especially westbound from the Sydney CBD, due to the introduction of free flow connections from Anzac Bridge to the M4 East and Iron Cove Link. There is large unreleased demand on the Western Distributor (as in the base case), The Crescent and Johnston Street by the end of the peak hour, indicating vehicles are likely to struggle to enter the modelled network in the peak hour.

The analysis has shown that Anzac Bridge/Western Distributor is currently at or close to capacity in the 2015 base case, particularly in the AM peak where existing operational and geometric features of the road network limit the capacity. As a result, the predicted increase in traffic demands in all future scenarios cannot be accommodated without some form of traffic or network management.

With the M4-M5 Link operational, there is an increase in the forecast eastbound AM peak hour demand, because the M4 East exit ramp and the Iron Cove Link to Anzac Bridge/Western Distributor provide bypasses of City West Link and Victoria Road respectively. Once the proposed future Western Harbour Tunnel and Beaches Link is operational, this forecast growth in demand reduces, but is still forecast to exceed the capacity of Anzac Bridge/Western Distributor.

As provided in section 11.2.2 of Appendix H (Technical working paper: Traffic and transport) of the EIS, Roads and Maritime is developing a strategy to ensure appropriate network integration in the areas surrounding the Rozelle interchange, including:

- Capacity improvement measures – a number of areas have been identified for investigation to improve capacity including the intersection of the Western Distributor and Pyrmont Bridge Road at Pyrmont, the merge and weave arrangements on the Western Distributor close to Darling Harbour, modifications through the use of moveable medians on the approaches to the Harbour Bridge and a review of kerbside use of the road network at the interfaces with the Western Distributor to remove key bottlenecks and allow additional capacity where appropriate
- Project staging options – effective staging of the opening of major projects would also keep forecast demands closer to capacity and adjustments to current staging and program timelines for major projects with the surrounding network may be required. Investigations are underway by Roads and Maritime to determine the effect and viability of altering key project timelines to achieve the best road network performance. This may include timing projects to reduce 'spikes' in the forecast demand that would exceed capacity operation and ensure effective control of traffic. As many of these projects are still in development, the requirements for staging are yet to be determined
- Demand management measures – demand management measures are being considered to effectively manage peak demand on critical links. These include the use of Smart Motorways (including ramp metering, variable speed limits and lane use management) and arterial management through the re-optimisation of the SCATS[9] to manage the altered traffic patterns that will occur with the introduction of the project.

Specific measures will be identified as investigations progress and their implementation will depend on their complexity and appropriate timing to minimise impact on the community. Roads and Maritime will carry out these investigations in consultation with councils and DP&E to develop a program of works.

While the construction impact of the proposed future Western Harbour Tunnel entry and exit ramps at the Rozelle interchange is included in this EIS, a comprehensive operational traffic impact of these ramps is not part of this EIS. Due to the ongoing development of the proposed future Western Harbour Tunnel and Beaches Link project, this would be assessed in the proposed future Western Harbour Tunnel and Beaches Link EIS.

However, a high level assessment of potential impacts associated with the proposed future Western Harbour Tunnel and Beaches Link surface ramps at City West Link is provided in section 12.5.8 of Appendix H (Technical working paper: Traffic and transport) of the EIS. The assessment indicates that there is likely to be some reduction in traffic on the Western Distributor and Sydney Harbour Bridge, as more traffic would be able to access the proposed future Western Harbour Tunnel and Beaches Link. However, there is likely to be increased traffic on City West Link, The Crescent and Johnston Street. The impacts of these surface ramps would be assessed in detail as part of future environmental assessment for the proposed future Western Harbour Tunnel and Beaches Link to be carried out by others.

A response to impacts on city centre streets is provided in **section B10.8.6**. Due to the small forecast change in the Sydney CBD with the project and the complexity of the Sydney CBD traffic operations, it was not considered appropriate to model the operation of intersections internal to the Sydney CBD. The forecast daily traffic demand changes can be seen in Figure 10.1 and 10.2 of Appendix H (Technical working paper: Traffic and transport) of the EIS and the forecast AM and PM peak hour traffic demand changes can be seen in Figure 3 and Figure 4 of Annexure B (Justification of modelled areas) of Appendix H (Technical working paper: Traffic and transport) of the EIS. These figures illustrate that the main changes are focused on the Western Distributor/Sydney Harbour Bridge and Sydney Harbour Tunnel/Eastern Distributor, with minimal changes forecast within the Sydney CBD.

[9] The Sydney coordinated adaptive traffic system (SCATS) is a traffic management system used to synchronise traffic signals to optimise traffic flow.

B10.5.6 Development of Rozelle Rail Yards

Section 5.2

It does not provide sufficient assurance that open space at the Rozelle Rail Yards will be landscaped to a standard suitable for community use.

Response

The City of Sydney's concerns regarding landscaping of Rozelle Rail Yards public open space for community use are discussed in **section B10.5.10**.

B10.5.7 Road network performance reviews

The description also fails to include changes proposed to local streets intended by the Road Network Performance Review mentioned in Appendix H, or information about the enormous signage likely to be installed on approach streets guiding motorists into divided entry ramps, which aim to reduce the amount of lane changes within the tunnels.

Response

The City of Sydney's concerns regarding the road network performance reviews are discussed in **section B10.8.8**.

Signage is discussed in section 5.8.9 of the EIS. Wayfinding signage for the road infrastructure will be developed to the satisfaction of Roads and Maritime. Consultation will occur with the relevant local council regarding road signs for council roads. Signage for road infrastructure will be installed prior to the commencement of operation.

Traffic, locational, directional, warning and variable message signs would be incorporated within the tunnels and on surface roads at approaches to the tunnels. Variable message signs would be located within or directly adjacent to areas of operational infrastructure for the project and the existing adjacent arterial road network. Directional signage would be installed in accordance with Austroads and Roads and Maritime standards, with a focus on providing clear and unambiguous direction to motorists.

The exact location for tunnel and surface road signage will be determined during detailed design and would be subject to separate environmental assessment and approval as appropriate, which would include consideration of impacts on nearby receivers, including potential landscape and visual impacts.

B10.5.8 Project considers future unplanned and unfunded road projects

Section 5.4

The Project includes widening and re-aligning of The Crescent to link with three portals serving any future Western Harbour Tunnel. The Western Harbour Tunnel is, however, unplanned and unfunded, and surface road operations in Rozelle have not been modelled.

Response

A response to this issue in relation to potential traffic and transport impacts is provided in **section B10.8.4**.

The design for the widening and realignment of The Crescent is proposed in response to a range of factors including:

- To respond to the location and arrangement of operational infrastructure and proposed open space within the Rozelle Rail Yards, including the consolidation of the Rozelle ventilation facility, the location of drainage infrastructure, the optimal layout and functionality of proposed open space areas and the associated alignment of active transport infrastructure that would span City West Link between the Rozelle Rail Yards and The Crescent/Rozelle Bay
- To enable works along the Whites Creek channel and bridge to address drainage/flooding constraints and to The Crescent/City West Link intersection, while maintaining an operational road network. The new alignment of The Crescent would be constructed 'offline' (that is, next to the existing alignment). Traffic would be switched onto the new alignment when ready, and the old alignment of The Crescent would be demolished

- To minimise encroachment into land on the eastern side of The Crescent for permanent operational infrastructure, which would otherwise potentially impact on planned urban renewal of this area as part of The Bays Precinct Transformation Plan
- Having regard to the above, to enable a suitable location for a potential future connection between City West Link, The Crescent and the proposed future Western Harbour Tunnel and Beaches Link.

The proposed future Western Harbour Tunnel project (part of the Western Harbour Tunnel and Beaches Link program of works) is a committed initiative under the Draft *Future Transport Strategy* (NSW Government 2017), subject to a standard NSW Government business case and assurance processes.

The Western Harbour Tunnel and Beaches Link project consists of two components: Western Harbour Tunnel and Warringah Freeway Upgrade and the Beaches Link and the Gore Hill Freeway Connection. Scoping reports for these two components have been submitted to DP&E with SEARs issued to the proponent on 15 December 2017. EISs for each component are being prepared. The traffic and transport assessment for the Western Harbour Tunnel and Beaches Link project would include an assessment of traffic impacts on the surface roads at Rozelle.

B10.5.9 Request to ensure that regional and induced traffic does not increase through existing and planned communities

Matter 5.1, p32

Design the Project and surrounding roads to ensure regional and induced traffic does not increase through areas where existing, and planned communities will live or recreate.

Response

Even with no growth in regional population and economic activity, a new or substantially upgraded road can induce changes in trip patterns which then appear as induced traffic demand. The WRTM incorporates a function that determines induced demand. The method used for the induced demand analysis for the WestConnex project was independently reviewed. Independent analysis verified that the method was sound and specifically calculated that the parameters proposed by the New Zealand Transport Agency Economic Evaluation Manual were appropriate for use in Sydney.

The WRTM indicates that induced demand equates to about 0.3 per cent of additional daily trips in the Sydney metropolitan area in 2033. The M4-M5 Link and the broader WestConnex program of works have been designed to have sufficient capacity to accommodate anticipated traffic volumes over the life of that infrastructure, including induced demand.

The project would include a number of intersection upgrades as part of the Rozelle and Iron Cove Link surface works and improved surface connectivity to direct through traffic along arterial routes and away from residential properties and local streets. These are described in Chapter 5 (Project description) of the EIS.

The concept design, which will be progressed during detailed design, has considered the future traffic demand and will provide the following opportunities within the existing and future communities around the project as noted in section 30.2 of the EIS:

- Ease congestion on surface roads by providing an underground motorway alternative and allowing for increased use of surface roads by pedestrians and cyclists and for public transport
- Reduce through traffic on sections of major arterial roads including City West Link, Parramatta Road, Victoria Road, King Street, King Georges Road and Sydenham Road, facilitating urban renewal opportunities to be realised along parts of the Parramatta Road and Victoria Road corridors
- Improve network productivity on the metropolitan network, with more trips forecast to be made or longer distances travelled on the network in a shorter time. The forecast increase in VKT and reduction in VHT is mainly due to traffic using the new motorway, with reductions in daily VKT and VHT also forecast on some non-motorway roads
- Reduce travel times on key corridors, such as between the M4 Motorway corridor and the Sydney Airport/Port Botany precinct

- Deliver up to 10 hectares of new open space including at the Rozelle Rail Yards, which would provide an open space link between Bicentennial Park at Glebe and Easton Park at Rozelle. New open space at the Rozelle Rail Yards would be integrated with the motorway infrastructure to be provided at this location
- Deliver new north–south and east–west pedestrian and cycleway connections to link Rozelle and Lilyfield with Annandale, Balmain, Glebe and The Bays Precinct
- Facilitate future growth in Sydney's transport network by allowing for connections to the proposed future Western Harbour Tunnel and Beaches Link program of works.

B10.5.10 Rozelle surface works

Matter 5.2, p33

The City requests that the Proponent provide further information in relation to the proposed widening and realignment of The Crescent, as part of the Response to Submissions (RTS) documentation.

Section 5.4, p33

The Project includes widening and re-aligning of The Crescent to link with three portals serving any future Western Harbour Tunnel. The Western Harbour Tunnel is, however, unplanned and unfunded, and surface road operations in Rozelle of any future tunnel have not been modelled.

In light of this, any surface road works intended to serve the future Western Harbour Tunnel, including widening and realignment of The Crescent, must be deleted from the Project.

The Rozelle Surface Works are poorly designed as merely space left over after planning a motorway, its utilities and service housings. They must be redesigned with priority given to providing high quality parklands. To enable this, a separate Urban Design Directorate must be established to direct their redesign.

Matter 5.4

All available land, including any land resulting from compacting the WestConnex works at Rozelle, to be used for open space recreation. Any additional land must be used for public open space and recreation areas and must not be sold for commercial or development purposes at any time.

Response

Surface works to The Crescent at Annandale and Rozelle

The widening and realignment of The Crescent is required to address a range of factors including the potential future connection to the Western Harbour Tunnel, as discussed in **section B10.5.8**. The potential traffic and transport impacts associated with this component of the project are discussed in **section B10.8.4**.

The proposed future Western Harbour Tunnel project (part of the Western Harbour Tunnel and Beaches Link program of works) is a committed initiative under the Draft *Future Transport Strategy* (NSW Government 2017), subject to a standard NSW Government business case and assurance processes.

The Western Harbour Tunnel and Beaches Link project consists of two components: Western Harbour Tunnel and Warringah Freeway Upgrade and the Beaches Link and the Gore Hill Freeway Connection. Scoping reports for these two components have been submitted to DP&E with SEARs issued to the proponent on 15 December 2017. EISs for each component are being prepared. The traffic and transport assessment for the Western Harbour Tunnel and Beaches Link project would include an assessment of traffic impacts on the surface roads at Rozelle.

Rozelle Rail Yards open space

Section 4.5.1 of the EIS discusses the various options considered for the design of the Rozelle interchange and the reasons for selecting the preferred option. The EIS reflects that further consultation will be undertaken with UrbanGrowth NSW Development Corporation as part of the master plan development for the Rozelle Rail Yards. As per the NSW Government announcement in July 2016, a commitment of up to 10 hectares of open space for community use has been stated within the EIS as a project outcome. UDLPs will include further refinement of the urban design outcomes and commitments for the Rozelle Rail Yards, including future opportunities as part of the development of the relevant UDLP.

B10.6 Construction work

Refer to Chapter 6 (Construction work) of the EIS for details of the construction methodology for the project.

B10.6.1 Construction Traffic and Access Management Plan

Key Findings, p34

The Construction Traffic and Access Management Plan (CTAMP) for the New M5 Project (WestConnex Stage 2) was poorly managed. A different approach is required.

Section 6.2, p42

The EIS states a CTAMP would be developed in consultation with local Councils and stakeholders. A similar commitment made for WestConnex Stage 2 New M5 has been poorly managed with neither SMC nor RMS taking responsibility for complying with the CTAMP and blaming each other for any compliance failures. The Proponent must prepare the CTAMPs in conjunction with councils and key stakeholders and feedback provided must be acknowledged and responded to within 10 business days of receipt. The plan must include strategies to address the use of local streets for parking by construction workers and sub-contractors and truck marshalling areas.

Matter 6.4, p38

The Proponent must prepare the CTAMP with local councils and key stakeholders including bicycle groups. Feedback provided by local Councils and key stakeholders must be acknowledged and responded to within 10 business days of receipt.

Response

A Construction Traffic and Access Management Plan (CTAMP) will be prepared in consultation with key stakeholders as reflected in the environmental management measures detailed in **Chapter E1** (Environmental management measures) and in accordance with the conditions of approval for the project.

Further, and as reflected in the environmental management measures TT01 and TT04 in **Chapter E1** (Environmental management measures), a car parking strategy for the construction workforce will be prepared as part of the CTAMP and will include consultation with relevant local councils.

It is anticipated that construction workforce parking would be primarily provided at the following construction ancillary facilities, with shuttle bus transfers provided to other nearby construction sites:

- Northcote Street civil site (C3a) – around 150 car parking spaces (Option A)
- Parramatta Road East civil site (C3b) – around 140 car parking spaces (Option B)
- Rozelle civil and tunnel site (C5) – around 400 car parking spaces
- Campbell Road civil and tunnel site (C10) – around 150 car parking spaces.

As reflected in environmental management measure TT16 in **Chapter E1** (Environmental management measures), a truck management strategy will be prepared as part of the CTAMP in consultation with relevant councils.

In response to issues raised during consultation with DP&E and agencies and the submissions received on the EIS, an additional construction ancillary facility (White Bay civil site (C11)) is proposed on a portion of the land owned by the Port Authority of NSW located near White Bay. This site would accommodate around 50 additional construction workforce parking spaces, as well as provide a truck marshalling area for around 40 heavy vehicles. This facility would assist in reducing potential queuing and congestion on streets around construction ancillary facilities. Further detail is provided in **Chapter D2** (White Bay civil site (C11)).

Lessons learnt from preceding WestConnex component projects and other recent major infrastructure projects in NSW, including feedback from the community, key stakeholders, design and construction contractor(s) and DP&E, have been considered in the development of the environmental management measures for the M4-M5 Link. As a result, a number of additional measures are proposed compared to the M4 East and New M5 projects (see **Chapter E1** (Environmental management measures)).

B10.6.2 Management of construction vehicles

Key Findings, p38

Management of construction vehicles on the Princes Highway does not reflect the RMS King Street Gateway project which will reduce the capacity of the Princes Highway.

Section 6.2, p43

The EIS does not show future traffic conditions on the Princes Highway near the St Peters interchange. RMS is currently developing the King Street Gateway project which will reduce the capacity of the Princes Highway north of Campbell Street from six to four lanes.

Response

Specific impacts associated with the construction and operation of the proposed future King Street Gateway project is beyond the scope of the M4-M5 Link project.

While investigations into the King Street Gateway project are underway by Roads and Maritime, no confirmed road layout changes or program details were available to inform the technical assessments for the M4-M5 Link EIS. As stated in Chapter 26 of the EIS, the King Street Gateway project was therefore not considered in the cumulative impact assessment undertaken for the EIS. The King Street Gateway project would not be precluded by the M4-M5 Link project.

The section of the Princes Highway south of Campbell Road would be used as a spoil haulage route during construction of the project. During peak hours, seven heavy vehicle movements in each direction are predicted on the Princes Highway associated with the project (refer to Table 6-22 in the EIS). No change is forecast to the 2021 mid-block LoS on the Princes Highway south of Campbell Road (refer to section 7.4.2 of Appendix H (Technical working paper: Traffic and Transport) of the EIS). No change is forecast to 2021 intersection LoS on the Princes Highway except for the Princes Highway/Mary Street/Canal Road intersection during PM peak periods (LoS E to F) (refer to section 7.4.3 of Appendix H (Technical working paper: Traffic and transport) of the EIS).

During detailed design, opportunities would be investigated further for heavy vehicles to use the WestConnex tunnels either directly via St Peters interchange or via Campbell Road and St Peters interchange after the completion of the New M5 project in 2020.

During operation, two-way average weekday traffic volumes on King Street are predicted to reduce by around 19 per cent with the project for both 2023 and 2033 (refer to section 9.5.1 of Appendix H (Technical working paper: Traffic and transport) of the EIS). This may accommodate the reconfiguration of the Princes Highway (north of Campbell Road) as described in the submission.

B10.6.3 Performance of temporary signalised intersection at Rozelle

Key Findings, p38

The claim that temporary traffic signals on the City West Link would operate at Level of Service A is unrealistic in this heavily-congested location, particularly during peak periods.

Section 6.2, p43

The EIS states construction vehicles would access the Rozelle Civil and Tunnel Site (C5) via temporary traffic signals on City West Link, west of The Crescent. The intersection analysis for the temporary signals forecasts a Level of Service A for the weekday AM and PM peak-travel periods. This is optimistic given the heavily-congested traffic conditions in this location.

Response

As discussed in section 8.3.1 of the EIS, a new temporary signalised intersection is proposed during construction on City West Link about 400 metres west of The Crescent, accommodating a second (western) site access to the Rozelle civil and tunnel site (C5).

Construction vehicles are only permitted to turn right out of this access road, with a traffic signal phase required to safely accommodate this movement. This temporary intersection is proposed for the sole purpose of providing a second access point into the Rozelle civil and tunnel site (C5). For this purpose, the intersection is forecast to operate at LoS A in both the AM and PM peak hours.

B10.6.4 Information on the impact of out of peak period construction traffic on network

Matter 6.1, p38

For the 2021 construction year, the EIS focusses on the impact of construction traffic during the weekday AM and PM peak periods only. Information must be provided on the impact of construction-related vehicles outside the weekday peak periods particularly on Saturday between 10am and 4pm and for sites where 24 hour operations are proposed.

Response

The EIS assessed the potential construction traffic and transport impacts of the project during a peak construction period. The peak hour identified is representative of highest estimated construction volumes and falls within the broader peak periods experienced on the network.

Based on the planned construction activities and indicative construction program, a worst case construction traffic scenario was assumed to be the period of spoil removal from tunnel construction during 2021. The current road network, with the addition of the M4 East and New M5 projects, was assumed for the road network in the construction scenario. The scope of the construction traffic assessment included all of the construction work within the project footprint. The project footprint is shown in Figure 6-1 to Figure 6-10 in Chapter 6 (Construction work) of the EIS.

The following guidelines were followed in carrying out the traffic and transport assessment:

- *Guide to Traffic Management – Part 3 Traffic Studies and Analysis* (Austroads 2013)
- *Traffic Modelling Guidelines* (Roads and Maritime 2013)
- *Guide to Traffic Generating Developments Version 2.2* (NSW Roads and Traffic Authority (RTA) 2002).

The modelled traffic volumes presented in the EIS are subject to the normal limitations inherent in strategic models of this nature.

Section 5.4.4 of Appendix H (Technical working paper: Traffic and transport) of the EIS provides the average weekday traffic and average daily traffic (including weekends) volumes for Victoria Road, City West Link and Anzac Bridge. The results show that there is no material difference in weekday versus weekend traffic volumes and patterns. Therefore the assessment results can be relied upon for both weekday and weekend peak periods.

B10.6.5 Requirement for temporary changes to intersection

Matter 6.2, p38

The EIS states temporary changes to the intersection of The Crescent and Chapman Road may be required. More information must be provided about these temporary changes.

Matter 6.5, p39

More information must be provided about the temporary changes to the intersection of The Crescent and Chapman Road.

Response

As discussed in section 6.6.1 of the EIS, at the intersection of The Crescent and Chapman Road there may be temporary changes as a result of the realignment of kerbing and footpath on the eastern side of The Crescent to accommodate the construction of an additional right turn lane into Johnston Street. Specific details would be confirmed during detailed design. Vehicular access between The Crescent and Chapman Road would be maintained at all times during construction of the project.

B10.6.6 Information on crash statistics associated with construction related vehicles

Matter 6.3, p38

In discussing the road safety impacts of construction vehicles, the EIS only refers to the volume of construction-related vehicles. It must also account for the size and manoeuvrability of the vehicles involved given larger vehicles have differing crash statistics and severities.

Matter 6.6, p39

The road safety assessment must also account for the size and manoeuvrability of larger vehicles given differing crash statistics and severities.

Section 6.2, p43

The EIS states construction-related vehicles associated with the Project is not expected to substantially impact road safety in and around the study area. The crash analysis underpinning this conclusion appears to be based primarily on the volume of construction-related vehicles and does not account for the size and manoeuvrability of large vehicles which have differing crash statistics and severities.

Section 8.12.1, p78

Discussions on crashes focuses on traffic crashes conforming with guidelines for reporting and classifying road vehicle crashes.

Response

Construction traffic routes to and from construction ancillary facilities are generally along arterial roads (such as City West Link, Wattle Street, Victoria Road, Parramatta Road and the Princes Highway) and motorways. The contribution of construction related heavy and light vehicle traffic would be relatively minor compared to existing background traffic flows along the majority of construction haulage routes. The potential for construction traffic to significantly increase the likelihood of incidents is therefore low.

Where possible, construction traffic would avoid narrow streets or lanes with all heavy vehicle traffic to be moved to the arterial road network at the safest and most practical opportunity. If heavy vehicle traffic on local roads cannot be avoided, traffic control measures including signage and speed zones may be enforced to manage any safety issues.

Long-term traffic control plans, temporary works and traffic staging plans, will be subject to independent road safety audits that will be carried out in accordance with *Road Safety Audits Guide* (TC2003/RS03) (Roads and Maritime) and with reference to current practices outlined in Austroads *Road Safety Audit Guide* (2nd Edition 2002). Road safety audits will assess the safety performance of any new or modified local road, parking, pedestrian and cycle infrastructure provided as part of the project (including ancillary facilities) to ensure that they meet the requirements of relevant design, engineering and safety guidelines, including Austroads *Guide to Road Design (2010)*. The process for the carrying out of road safety audits would be detailed in the CTAMP that will be prepared for the project.

Issues identified in the road safety audit will be responded to by:

- Detailing actions taken/to be taken to address each of the issues raised
- Providing justification for proposals and actions on particular issues raised.

B10.6.7 Approval requirement for oversize and over mass vehicles using local and regional roads

Matter 6.7, p39

Any oversize and/or over-mass vehicles using Local or Regional Roads must gain approval from the relevant local Council prior to travel.

Response

Heavy vehicles would primarily use the arterial road network to travel to and from construction sites as detailed in section 6.6.4 of the EIS. Specific requirements for oversize and/or over-mass vehicles, including the requirements for additional permits and/or approvals for these vehicles, will be stipulated in the CTAMP that will be prepared for the project. The CTAMP will be developed in consultation with key stakeholders, including the relevant councils.

B10.6.8 Off-street construction related vehicles

Matter 6.8, p39

All construction-related vehicles must be entirely off-street.

Response

A construction workforce parking strategy will be prepared as part of the CTAMP to limit impacts on parking and property access for the surrounding communities. The strategy will be developed in consultation with relevant councils and stakeholders, as well as with the M4 East and New M5 project contractors to identify opportunities to use parking being used during their respective construction periods (see environmental management measure TT04 in **Chapter E1** (Environmental management measures) for further information regarding the car parking strategy).

It is proposed that construction workforce parking would be primarily provided at the following construction ancillary facilities, with shuttle bus transfers provided to other nearby construction sites:

- Northcote Street civil site (C3a) – around 150 car parking spaces
- Parramatta Road East civil site (C3b) – around 140 car parking spaces
- Rozelle civil and tunnel site (C5) – around 400 car parking spaces
- Campbell Road civil and tunnel site (C10) – around 150 car parking spaces
- White Bay civil site (C11) – around 50 car parking spaces (see **Chapter D2** (White Bay civil site (C11))).

As reflected in environmental management measure TT16 in **Chapter E1** (Environmental management measures), a truck management strategy will be prepared as part of the CTAMP in consultation with relevant councils.

To reduce the impact of heavy vehicle queuing on local roads, an additional construction ancillary facility (the White Bay civil site (C11)) is proposed at White Bay on land owned by the Port Authority of NSW (see **Chapter D2** (White Bay civil site (C11))). The facility would provide a truck marshalling area for around 40 heavy vehicles transporting tunnel spoil and parking for the construction workforce. The facility would also provide additional space to store construction plant, machinery and materials at the site. The provision of the White Bay civil site (C11) would result in several benefits for the community and the project, including:

- Provide a truck marshalling area for around 40 heavy vehicles transporting tunnel spoil and parking for the construction workforce, thereby reducing potential queuing and congestion on local streets surrounding the project and associated construction ancillary facilities
- Providing additional construction workforce parking spaces (around 50 spaces), which would assist in minimising the loss of parking on local streets
- Minimising disruptions to the road network around construction ancillary facilities and noise and other disturbance to the local community including landowners and business and commercial properties
- Improving safety for construction workers, motorists and the general public by providing a controlled area from which project traffic schedulers can direct truck drivers to construction sites at an appropriate time.

A truck management strategy will be developed as part of the CTAMP which will:

- Identify truck marshalling areas that can be used by project-related heavy vehicles
- Describe management measures for project-related spoil haulage vehicles to avoid queuing and site-circling in local roads and other potential traffic and access disruptions
- Describe monitoring programs to demonstrate that project-related heavy vehicles are complying with the strategy.

B10.7 Consultation

B10.7.1 Consultation process is flawed

Key Findings, p 36

The consultation process has been flawed. It was not genuine consultation, it was merely a public relations exercise. Despite the assertion that consultation has been comprehensive, it has largely consisted of providing limited information which was of little real value. Repeated requests for answers to a wide range of questions and issues remained unanswered.

Section 7.2, p36

The Project Proponent seems determined to go ahead with Stage 3, irrespective of significant community opposition. The lack of detailed information in the EIS and associated high-profile advertising campaign suggests this is a promotional exercise only and that community feedback will not be taken into consideration. The City notes that the report back on submissions on the WestConnex Stage 3 Concept Design was released around the same time as the Stage 3 EIS was placed on exhibition, indicating that scant attention was made to the communities' feedback.

Matter 7.1, p37

Once submissions have been assessed, the Project should be re-exhibited with full background information, outlining how community concerns have been addressed.

Response

Adequacy and genuineness of consultation

An overview of the project consultation process and activities is discussed in Chapter 7 (Consultation) of the EIS, with Table 7-3 of the EIS providing a detailed timeline of the consultation activities undertaken for the project. As noted in Table 7-3 of the EIS, the community and stakeholder consultation effort for the project included activities before and during the display of the EIS using a variety of communication and engagement methods. These included a website, a centralised WestConnex information telephone line, a project email and postal address, an online 'Have your say' form, community updates, newspaper advertisements, social media channels, community information sessions, fact sheets, face-to-face meetings and briefings (such as dedicated sessions which included group meetings and one-on-one meetings with individuals), door-knocking, business surveys and public forums. Communications materials (as referenced above) were produced in a number of various mediums from printed information in the form of newsletters, flyers, summary community booklets through to electronic and website material conveyed through targeted communications and social media channels. These communication materials also included information on translation services available.

Consultation during the preparation of the EIS for the project was undertaken in accordance with the SSI provisions of the EP&A Act and the SEARs, to incorporate meaningful and effective engagement for this stage of the project. Consultation activities targeted affected communities, including local residents and businesses, and were planned and advertised in advance. Design changes that resulted from responses to early feedback are detailed in Table 7-2 of the EIS and include avoiding direct impacts to Easton Park, Blackmore Park and removal of the Camperdown interchange. Community feedback has also led to the inclusion of a truck marshalling facility (see **Chapter D2** (White Bay civil site (C11)) and Utilities Coordinator (refer to Appendix F (Utilities Management Strategy) of the EIS). Changes to road closures and access related to the Iron Cove Link were made as a result of the concept design community information sessions. The undergrounding of the Rozelle interchange was also in part a result of community feedback and lessons learnt from preceding stages of the WestConnex program of works. In addition, lessons learnt from previous consultation on other stages of WestConnex have been taken into account, particularly for communities in Haberfield, Ashfield and St Peters.

Consultation with local councils has also been ongoing. Table 7-9 of the EIS provides a summary of the feedback received from each of the councils including the City of Sydney and provides a reference to where these concerns were addressed in the EIS for feedback provided prior to August 2017. A similar table (Table 7-10 of the EIS) provides references to where community concerns have been addressed in the EIS.

In accordance with section 115Z(6) of the EP&A Act, a preferred infrastructure report has also been prepared for the project (see **Part D** (Preferred infrastructure report)). The preferred infrastructure report explains changes or refinements that have been identified to minimise environmental impacts or to address issues raised during exhibition of the EIS. This includes the addition of the White Bay civil site (C11) to provide a heavy vehicle marshalling facility and additional construction workforce parking, and the relocation of the bioretention facility at Rozelle. Consultation has been undertaken with key stakeholders, including government agencies, on the nature of the proposed project changes and the potential impacts identified in the preferred infrastructure report. This Submissions and preferred infrastructure report is available on the DP&E Major Projects website[10], however, the NSW Minister for Planning has determined that the preferred infrastructure report does not require a public exhibition.

Timing of concept design feedback report release

The non-statutory consultation period on the concept design report commenced in May 2017 and sought to provide the community and stakeholders with information about the M4-M5 Link project before the release of the EIS, as well as the opportunity to provide feedback. Consultation activities included five community information sessions, which were held between May 2017 and June 2017; and a collaborative map in which the community and stakeholders could provide feedback online[11]. The community information sessions took place in Camperdown, Leichhardt, Newtown, Balmain and Haberfield. More than 800 comments were received on the collaborative map. In addition, close to 900 emails and correspondence relating to the concept design were received during the lengthy consultation period.

It is acknowledged that the time period between the close of comments on the Concept design report and the exhibition of the EIS was limited. The timing of the release of the Concept design feedback report[12] did not prevent the community's feedback from being genuinely considered in the EIS and as part of this Submissions and preferred infrastructure report. Reasons for this include:

- The majority of feedback on the concept design report was received early on in the 12-week response period
- Feedback was provided to the EIS team weekly for consideration
- A dedicated analyst was engaged from the beginning of the consultation period to analyse and compile the feedback report to ensure it was ready soon after the feedback period closed
- The feedback received did not identify any significant new issues not identified during previous consultation with the community and that had not already been considered during the preparation of the EIS.

Table 7-10 of the EIS details the feedback received during early consultation, including on the concept design, and where the issues have been addressed in the EIS. Feedback from government agencies, including the City of Sydney have been addressed in Table 7-8 and 7-9 in the EIS. An overview of design changes and commitments in response to community feedback is also provided online on the WestConnex website[13].

Future consultation and information dissemination

As outlined in **section A2.4**, SMC and Roads and Maritime will continue to consult with the community and other key stakeholders during the ongoing refinement of the design, with a view to further minimising impacts of the project on communities.

During construction, a dedicated community relations team will deliver:

- A detailed Community Communication Strategy (identifying relevant stakeholders, procedures for distributing information and receiving/responding to feedback, and procedures for resolving stakeholder and community complaints during construction and operation)
- Notification letters and phone calls to residents and businesses directly affected by construction works, changes to traffic arrangements and out-of-hours works
- Face-to-face meetings with landowners as needed

[10] http://majorprojects.planning.nsw.gov.au/
[11] https://www.collaborativemap.com/WestConnex
[12] https://www.westconnex.com.au/sites/default/files/JB000216%20M4-M5%20Link%20community%20feedback%20report_FA_DIGITAL_0_0.PDF
[13] https://www.westconnex.com.au/sites/default/files/Response%20to%20community%20feedback%20factsheet_FA_digital.pdf

- Regular community updates on the progress of the construction program
- Regular updates to the WestConnex website, with notifications of the updates sent out to website subscribers
- Media releases and project advertising in local and metropolitan English language and non-English language newspapers to provide contact information for the project team
- Site signage around construction ancillary facilities
- A 24-hour, toll-free project information and complaints line, a dedicated email address and postal address.

When considering whether to approve the project, DP&E will consider, amongst other things, feedback and comments from the community and key stakeholders (including local councils) received during the exhibition period. DP&E's assessment and recommendation will be set out in the Secretary's Environmental Assessment Report. The recommendation (including either conditions of approval or reasons for refusal) will be considered by the NSW Minister for Planning before making a decision to approve or not approve the project.

Relevant councils will be consulted with during the development of the Construction Environmental Management Plan (CEMP) for the project. In addition, operational plans such as UDLPs and the Social Infrastructure Plan will also be prepared in consultation with relevant councils.

In addition, a number of the environmental management measures identified in the EIS would require further consultation with the community and project stakeholders. These are summarised in **Chapter E1** (Environmental management measures).

If further assessment/approval is required due to project design changes, the applicable statutory process will be followed prior to the commencement of construction of the relevant aspect of the project. This may be in the form of a modification request lodged with DP&E, depending on the scale of the proposed modification and the potential for environmental or social impacts. As the proponent, Roads and Maritime would be required to apply to the NSW Minister for Planning for a modification. Any modification requests would be lodged with DP&E for assessment. The modification request would be appropriately notified and/or exhibited by DP&E, if deemed necessary.

B10.7.2 Exhibition period was inadequate

The exhibition period was inadequate. Despite requests for a submission period of at least three months, avoiding the school holidays, only two months has been allowed for submissions on the EIS, which has included a school holiday period.

Section 7.2, p36

WestConnex is a major program of works and the EIS for Stage 3, with documentation totalling approximately 7,500 pages, should have been exhibited for at least three months to allow sufficient time to work through all the elements of the Project and its impacts.

Response

The EIS was placed on public display for a period of 60 days (18 August to 16 October 2017), longer than the minimum statutory exhibition period under Part 5 Section 113 of the *Environmental Panning and Assessment Act 1979 (NSW)* which requires a minimum of 30 days. This extended public exhibition period was set by the Secretary of DP&E in recognition of overlap between the exhibition period and school holidays, and the length and complexity of the EIS documentation. The 60 day public display period was deemed by DP&E to be sufficient to allow time the community and stakeholders to consider the EIS and to make a submission. The public display period for the EIS was supported by a comprehensive engagement program, including community information sessions, briefings and meetings with key stakeholders, to provide information on the outcomes of the environmental impact assessment for the project.

Due to the length of the EIS and in order to provide an appropriate level of detail for all readers, the EIS includes an Executive Summary that provides an overview of the key impacts/benefits and management and mitigation measures. Appendix A (Project synthesis) of the EIS provides a technical summary of the EIS and overview of key impacts and mitigation measures, as required by the SEARs. In addition, a Community Guide to the EIS was also developed, which provides a high-level, plain English overview of the project and reference to where the community could find detailed information within the EIS. Fact sheets were also made available on the WestConnex website that captured key issues and impacts from the EIS.

B10.7.3 New M5 consultation

On the New M5 project, community consultation has been poor in terms of time available, quality of materials provided and access to the necessary information. These shortcomings must be rectified for the Project.

Response

Consultation activities associated with the New M5 project are outside the scope of the EIS.

See **section B10.7.1** and **section A2.4** for details on future consultation during post-approval, detailed design and construction of the M4-M5 Link project.

B10.7.4 Media campaign details

WestConnex has developed into a major program of future roadways which if all stages proceed, would impact on northern, southern, western and inner Sydney. It bears little resemblance to the first concept design released in 2012 which involved integrating the M4 extension from Parramatta towards the airport with an expansion of the M5 East. The current media campaign for WestConnex does not mention links with the North and South in the future nor refer to connections to the airport.

Response

The various stages of the WestConnex program of works have not fundamentally changed since the scheme's inception in 2012 and the overview presented in the *WestConnex Updated Strategic Business Case*. The history of WestConnex and related projects and the development of the M4-M5 Link is outlined in sections 4.1, 4.2 and 4.3 of the EIS.

The concept design for the project has undergone significant changes, including those which have been made in response to community and stakeholder feedback. This includes changes at the Rozelle interchange, Iron Cove Link and exclusion of ramps at Camperdown. In addition, the M4-M5 Link was realigned to the north of Parramatta Road to facilitate connections to the proposed future Western Harbour Tunnel via the Rozelle interchange. A detailed description of the development of the M4-M5 Link concept is provided in section 4.2 of the EIS.

One of the WestConnex project objectives is to facilitate future road connections. While outside the scope of the WestConnex program of works, the northern and southern extensions including the proposed future Western Harbour Tunnel and Beaches Link and F6 Extension, are supported by and facilitated WestConnex.

Future motorway connections such as the Sydney Gateway, F6 Extension and proposed future Western Harbour Tunnel and Beaches Link (excluding the civil construction of entry and exit ramps, tunnel portals, tunnels and civil infrastructure for connecting the M4-M5 Link to the proposed future Western Harbour Tunnel and Beaches Link) are separate projects and do not form part of the WestConnex program of works. These projects are each subject to ongoing design development, a final business case and environmental assessment and approval processes.

B10.7.5 Request for more information

In its submission the City has requested additional information and access to background information which has not been included in the EIS to support many of the conclusions in the EIS.

Response

These items of additional information are responded to in the sections of this Submissions and preferred infrastructure report where they have been raised. In addition, Volume 2 of the EIS contains the technical working papers which provide more detailed information to support the simplified chapters provided in the main EIS.

B10.7.6 Consultation activity requirements

Matter 7.1, p37

DP&E must set and enforce clear parameters for consultation activities relating to the Project in terms of:

- Time provided - minimum of 28 days, not including school holidays or public holidays
- Quality of information - sufficient information must be provided in a format that is clear and readily downloadable (in the case of electronic information)
- Access to information - consultation material must be provided in locations that are easily accessible by members of the community

Matter 7.2, p37

Further community consultation must be undertaken as the design is developed after the contract has been awarded.

Response

As outlined in **section A2.4**, SMC and Roads and Maritime would continue to provide consultation opportunities for the community and other key stakeholders during the ongoing refinement of the design, with a view to further minimising impacts of the project on communities, in line with the draft Community Consultation Framework provided in the EIS, the environmental management measures (see **Chapter E1** (Environmental management measures)) and any future conditions of approval. Conditions of approval are a matter for DP&E to consider and formulate during its assessment of the project.

If further assessment/approval is required due to project design changes, the applicable statutory process will be followed prior to the commencement of construction of the relevant aspect of the project. This may be in the form of a modification request lodged with DP&E, depending on the scale of the proposed modification and the potential for environmental or social impacts. As the proponent, Roads and Maritime would be required to apply to the NSW Minister for Planning for a modification. Any modification requests would be lodged with DP&E for assessment. The modification request would be appropriately notified and/or exhibited by DP&E, if deemed necessary.

B10.8 Traffic and transport

Refer to Chapter 8 (Traffic and transport) and Appendix H (Technical working paper: Traffic and transport) of the EIS for details of traffic and transport.

B10.8.1 EIS traffic modelling is fundamentally flawed and inaccurate

Key Findings, p47

The approach to traffic modelling is fundamentally flawed and inaccurate.

The EIS offers no indication of the level of accuracy and reliability of the traffic modelling process. This is critical as traffic projections have direct and significant influence on a range of key aspects of the EIS including: air quality modelling, noise and vibration modelling, safety benefits estimates. It also has a major bearing on toll and revenue projections, critical to assess the financial viability of the Project.

Section 8.2, p48

There is no statement on the level of accuracy and reliability of the traffic modelling process. This is a major shortcoming and is contrary to the SEARs.

The traffic model used for the EIS is an ‘unconstrained’ model. It assumes that all vehicles will travel on the route with the lowest generalised cost (time and money), but does not consider whether those routes have the capacity to handle all those vehicles. In the real world people change their time of travel, method of travel and consider whether to make a trip at all to avoid congested routes. As a result travel patterns in the real world are very different to the patterns identified in the model.

The traffic modelling process that has been used in the EIS is not fit for purpose and places significant risks on the people of NSW in terms of:

- The traffic impacts that will be significantly different to those presented in the EIS.
- Toll earnings that will be significantly lower than projections – resulting in government subsidising the owner for lost earnings.

The accuracy of the model outputs are only as good as the accuracy of the inputs. Projections of key inputs relating to population and employment become very vague beyond 10 or 15 years. Additionally the transport sector is potentially facing significant disruption from connected, automated vehicles that may have a significant impact on traffic growth. This has not been considered or modelled.

The modelling process incorporates a highly unusual definition of induced traffic (p.45 of Appendix H). Induced traffic should not include the increase in trips due to population growth and land use changes as these are modelled elsewhere.

Response

Accuracy and reliability of the traffic modelling process

Traffic modelling requires forecasting, which is typically carried out using sophisticated numerical models, the most up to date current data and trends/future projections to make realistic predictions. The assessment of potential traffic and transport impacts of the project was undertaken using the WestConnex Road Traffic Model version 2.3 (WRTM v2.3), a fit for purpose model that was developed at the outset of the WestConnex program of works and is operated by Roads and Maritime. The WRTM v2.3 uses data from across the Sydney metropolitan area to assess the effects of traffic beyond the project footprint on the project. WRTM v2.3 provides a platform to understand changes in future weekday travel patterns under different land use, transport infrastructure and pricing scenarios.

The model has used the most recent traffic data collected for the project and from a range of reliable sources, as described in Chapter 4 of Appendix H (Technical working paper: Traffic and transport) of the EIS. Traffic modelling for the project has relied on trip generation data from Transport for NSW Transport Performance and Analytics (TPA), which was the best available information at the time the traffic modelling for the EIS was undertaken. These projections were based on DP&E future population and employment forecasts (dated September 2014), which has been derived from the 2011 census data and incorporates known major urban renewal and developments. Based on experience on previous projects of a similar nature, the approach taken provides an appropriate level of accuracy for assessing project impacts.

Although the WRTM is a network-wide model that encompasses existing and future road networks in the Sydney metropolitan area, it was principally developed to assess infrastructure improvements associated with the WestConnex component projects individually and in combination. The WRTM v2.3 was used for this EIS, and as traffic models undergo constant development and refinement, it is anticipated that future projects would use further iterations of the model as they become available.

To ensure the modelling used in the EIS is as representative as possible, a staged approach was undertaken to developing the traffic model as summarised below and detailed in full in section 4.2.1 of Appendix H (Technical working paper: Traffic and transport) of the EIS:

- Stage 1 – Traffic demand forecasts are developed taking into consideration a number of factors including but not limited to: historical demands (traffic counts and surveys), current and future mode choice factors, toll behaviour factors, land use projections (population and employment locations) and induced demand
- Stage 2 – Future year demand development, without the project. This provides an analysis of the projected future (2023 and 2033) year traffic demands based on the information derived from Stage 1
- Stage 3 – Assessing the operational impact of the project by applying the anticipated impact of the 'With project' to the 'Without project' scenarios developed in Stage 2 to determine the impacts of the project.

An integral part of the modelling process was the involvement of independent expert peer reviewers to examine model development, methodologies for the production of traffic forecasts and the traffic forecasts. DP&E also commissioned independent technical peer reviews of key technical studies presented in the EIS to inform its assessment, including the traffic modelling.

It is recognised that future traffic volumes and conditions may differ from the current predictions due to the large number of variable factors that affect traffic, including population distribution and future development. The modelling presented in the EIS, however, represents a realistic prediction based on data and information available at that time.

Travel behaviour modelling

The WRTM project model incorporated observed driver behaviour on Sydney's toll roads as indicated by the Value of Travel Time Savings (VTTS) surveys. The Sydney VTTS surveys were used to identify drivers' willingness to pay tolls and were undertaken to inform the toll choice modelling (to enable the model to best reflect current driver behaviour in the specific context of the WestConnex component projects), which informed the route choice forecasted.

In addition, the WRTM develops forecasts growth in traffic on the road network including growth in future private vehicle (car) travel based on forecasts for future travel demand in Sydney by all modes as produced by the STM. Future growth in car travel in the WRTM is therefore not 'unconstrained', but fully recognises that people can choose to change their method of travel when and where costs of road travel increase, as is forecast through the mode choice forecasts of the STM.

Toll earnings

The WRTM uses current best practice methods for representing drivers' behaviour with respect to their willingness to pay tolls for road travel time savings for multiple toll roads and routes through the Sydney metropolitan network. The toll choice model was developed for the WestConnex project as an augmentation of standard traffic route modelling procedures that are normally used in planning and assessment of untolled roads. The toll choice model addresses private vehicle and commercial (truck) traffic behaviour, representing the different willingness of these vehicle users to pay for travel time savings in the context of total journey costs including tolls, travel times and distances available on competing routes.

Traffic demand data used in the traffic and transport assessment was taken from the WRTM, following assessment of the model calibration and validation by independent peer reviewers and agreement that the model is suitable for this purpose.

To further enhance the parameters of induced demand estimation, the WRTM also considers that different motorists place different values on paying tolls to make time savings, including heavy vehicle motorists.

A reference tolling regime was developed for WestConnex and is explained in the *Updated Strategic Business Case*, released in November 2015. The reference tolling regime has been used in the traffic demand modelling, revenue figures and the economic and financial analysis within the business case.

The current tolls on all tolled roads in the Sydney metropolitan area are incorporated into the model. The model also considers future changes in perceived value of tolls taking into account escalation of tolls, effects of inflation and average weekly earning projections.

Induced traffic definition

The WRTM project model includes induced traffic demand as a result of improved travel times between homes and destinations, such as workplaces, shopping centres and education facilities, which cause changes to region-wide trip patterns, as defined in the third bullet point of the induced demand section (under section 4.2.1) on page 45 of Appendix H (Technical working paper: Traffic and transport) of the EIS. The increase in trips due to population growth and land use changes are not included in this definition.

Even with no growth in regional population and economic activity, a new or substantially upgraded road can induce changes in trip patterns which then appear as induced traffic demand. The WRTM forecasts induced demand equating to about 0.3 per cent additional daily trips in the Sydney metropolitan area in 2033.

Autonomous cars (connected automated vehicles)

Irrespective of the timing and magnitude of the take up of new technologies such as connected and autonomous vehicles (CAVs), there is still a need to provide for the growth in commercial and freight travel demand and to reduce congestion across the Sydney road network. The market penetration of CAV's, vehicles with high automation (Society of Automotive Engineers (SAE) level 4 - drivers are still required to be present) or full automation (SAE level 5 - driverless cars) is expected to take many decades to reach levels high enough to significantly affect traffic and congestion.

Research by IHS Markit (2016) advises that in the Asia Pacific region, the sales of CAV's would account for about 0.6 per cent of new vehicles sold in 2025 and about 4.5 per cent of new vehicles sold in 2036. However, given the time taken for fleet turnover and the time needed for mature regulatory frameworks to be developed, there is likely to be a long period with a mixed fleet of driverless and human driven vehicles.

The UK Department for Transport (DOT UK) report: *Research on impacts of connected and autonomous vehicles (CAV's) on traffic flow Stage 1: Evidence Review, March 2016* (DOT UK 2016a) examined a range of published research papers to understand the likely impacts of CAV's would have on safety and capacity of road networks. The DOT UK summary of 'the top down' studies it examined concluded:

- In many studies, 100 per cent penetration is assumed to give a 'best case' scenario. Related to this, other studies show little impact on traffic flow and capacity until relatively high penetrations of vehicles with high levels of automation is occurring on road networks
- There is evidence of the potential for demand to rise as capacity increases, or even if just the quality of transport increases
- The way CAV technology is deployed (especially in terms of time gap and the trade-off between comfort, time and safety) by vehicle makers would have a large impact on capacity, and hence policy implications
- Studies are generally confined to self-driving passenger cars, with public transport, freight or alternative ownership models not considered
- There is mixed information and conclusions from earlier studies on capacity, ranging from a potential to reduce it, little change or large increases.

The second stage of the DOT UK report (*Research on the impacts of connected and autonomous vehicles (CAVs) on traffic flow, Stage 2: Traffic Modelling and Analysis Technical Report, May 2016 (DOT UK 2016b)*) sought to understand the impacts of CAV's on capacity through modelling of differing types of road network with a range of differing proportions of CAV's in the vehicle fleet and for differing road hierarchy, including motorways/major highways and also on urban roads.

This second stage of investigation concluded that:

- *'Accounting for user preference, comfort and safety, it is plausible that at least a section of the emerging CAV vehicle fleet is more cautious than that currently operating. This has been represented in the design of CAV scenarios, with early (low penetration) deployments of CAVs including a relatively high proportion of cautious vehicles. This results in a potential worsening of measures of network performance and road capacity especially in high-speed, high-flow situations (such as on the Strategic Road Network (SRN))'*
- *'There is great potential for significant capacity, delay and journey time benefits, particularly in high-speed, high-flow situations. However, there is evidence that at low penetrations, any assertive CAVs are limited by the behaviour of other vehicles; that vehicles are not able to make use of their enhanced capability. This leads to suggestion of a tipping point – the proportion of enhanced vehicles required before benefits are seen. This work suggests this may be between 50% and 75% penetration of CAVs. Results for the SRN (peak period) indicate improvements in delay of only 7% for a 50% penetration of CAVs, increasing to 17% for 75% penetration and as high as 40% for a fully automated vehicle fleet.'*

In summary, research suggests that adoption of CAV's in the Asia Pacific region would remain low for at least two decades. With the opening of the M4-M5 Link due in 2023, CAV's are unlikely to have any impact on capacity at this time. Forecast sales of CAV's represent as little as 4.5 per cent of all new vehicles sold in 2036. Even when levels of penetration of CAV's into the vehicle fleet reaches 50 per cent their potential their impact on network capacity is likely to range from slightly negative to slightly positive (seven per cent increase).

B10.8.2 Vehicle kilometre travelled difference between M4 East EIS and M4-M5 Link EIS

Key Findings, p46

There is a substantial discrepancy in the VKT in the base case modelling used in the M4-M5 Link EIS and the base case modelling used in the M4 East EIS. The M4 East EIS states vehicles in the study area travelled 14.5 million kilometres each day in 2014 (p9.45). The M4-M5 Link EIS states that vehicles in the study area travelled 11.5 million kilometres travelled each day (some 26 per cent more vehicles) (Appendix I p94).

The fact that the M4-M5 Link EIS uses a substantially lower value calls into question the technical robustness, clarity and transparency of the EIS. This discrepancy must be explained.

Section 8.2 p48-49

The M4 East EIS states vehicles in the study area travelled 14.5 million kilometres each day in 2014 (p9.45). The M4-M5 Link EIS states that vehicles in the study area travelled 11.5 million kilometres travelled each day (some 26 per cent more vehicles) (Appendix I p94).

Matter 8.2 p50

The Proponent must address the apparent discrepancy in the study area vehicle kilometres travelled value used in the M4 East EIS (14.5 million kilometres per day in 2014) and the M4-M5 Link EIS (11.5 million kilometres per day).

The outcomes of this investigation shall be reported transparently and publically as if a discrepancy is found, the fact that the M4-M5 Link EIS uses a substantially lower value calls into question the technical robustness, clarity and transparency of the EIS.

Response

As per the reference in the City of Sydney's submission to page 94 of Appendix I (Technical working paper: Air quality) of the EIS, the values of 14.5 million VKT for the M4 East EIS and 11.5 million VKT for the M4-M5 Link are the total million vehicle kilometres for the WestConnex Graz Lagrangian (GRAL) modelling domain in the baseline years used for the studies. The GRAL domain refers to the dispersion model used for the operational ambient air quality assessment (refer to section 9.4.2 of the EIS for further detail).

The M4 East EIS used traffic demand forecasts from the WRTM v2.1 which was refined for the M4-M5 Link to WRTM v2.3. In addition, the base and forecast years, land uses and demographics were different for both projects. The M4 East used a base year of 2014 and forecast years 2021 and 2031, while the M4-M5 Link used a base year of 2015 and forecast years of 2023 and 2033. Since the M4 East traffic assessments were undertaken, updates and enhancements to the WRTM inputs and zones have occurred. These included updated land use and population forecasts, including revised land use development along Parramatta Road, The Bays Precinct, the Western Sydney Airport and in Mascot town centre.

In addition, a number of public transport improvements, such as those which form part of the *Parramatta Road Corridor Urban Transformation Strategy* (UrbanGrowth NSW 2016), were open to traffic and public transport users in the forecast years for M4-M5 Link resulting in different traffic patterns between the two projects.

Details regarding the definition of the modelling domains for each of the projects are discussed in section 5.5.3 of Appendix H (Technical working paper: Air quality) of the M4 East EIS and section 5.5.3 of Appendix I (Technical working paper: Air quality) of the M4-M5 Link EIS. A description of the traffic and transport modelling domains is provided in Chapter 4 of Appendix H (Technical working paper: Traffic and transport) of the M4 East EIS and in section 1.2 and Annexure B of Appendix H (Technical working paper: Traffic and transport) of the M4-M5 Link EIS.

B10.8.3 Consequences of unreliable traffic projections

Section 8.2.1, p49

Unreliable traffic projections lead to significant and compounding errors in the design, EIS and business case processes, including:

- Dimensioning of motorway tunnels and interchanges (on-and off-ramps) and expansion of roads feeding traffic to, and discharging traffic from, the toll road
- Assessment of the Project's traffic impacts on other parts of the street network
- Assessment of overall traffic generation and induced traffic associated with the Project
- Emissions based on traffic volume and driving style (e.g. stop-start driving in congested traffic leads to higher emissions impacts)
- Toll earnings
- Other key inputs to the business case that are derived from strategic traffic modelling, including: purported reductions in crashes, purported improvements in productivity etc.

Matter 8.1

Numerous parts of the EIS relied on traffic projections to estimate and assess impacts, including: air quality modelling, noise and vibration modelling, safety benefits estimates.

Key chapters within the EIS shall be revisited to ensure that they are consistent with the accuracy and reliability of the traffic projections that informed them. I.e. no outputs shall be presented at a level of detail or reliability that is more specific than the level of accuracy and reliability of the modelling process that informed them.

Response

As discussed in **section B10.8.1** the modelling was independently peer reviewed and is considered fit for purpose, having used the most recent set of traffic data as collected for the project and inputs and projections from a range of reliable sources. Air quality and noise modelling that uses traffic inputs derived from the traffic modelling are therefore also considered reliable within the limitations of modelling as described in the response in **section B10.8.1**.

Section 4.5 of the EIS provides a detailed description of the project evolution and design refinements, including the number of tunnel lanes and the design of the project interchanges. In addition, section 11.2.1 of Appendix H (Technical working paper: Traffic and transport) of the EIS outlines the network changes that have been included in the project design to complement and/or mitigate the impacts of the project.

A detailed assessment of the traffic and transport impacts of the project on the road network around each of the project interchanges is provided in Chapter 10 of Appendix H (Technical working paper: Traffic and transport) of the EIS. Consideration of induced demand in the traffic modelling is discussed further in the response in **section B10.8.1**.

B10.8.4 Modelling scenarios are unfeasible and modelling outputs are incomplete

Section 8.2.2, p50

The 2023 'Cumulative' modelling scenario includes the Sydney Gateway and the Western Harbour Tunnel. Neither of these projects are currently committed and it is highly unlikely they will be completed by this date. This raises the question of why did the Proponent adopt such a misleading scenario and how does it affect the impacts stated?

The construction impact of the future Harbour Tunnel and Beaches Link entry and exit ramps connecting to City West Link/The Crescent has been assessed but the operational traffic impact of these ramps has not. This should be completed and publicly released before determination.

Response

Traffic modelling for the project case (or 'With project' scenario) for 2023 and 2033 is presented in Chapter 10 of Appendix H (Technical working paper: Traffic and transport) of the EIS. This assessment has been prepared in accordance with the SEARs, including the requirement that the proponent model and/or assess the operational transport impacts of the project. The impacts (beneficial and adverse) from operation of the project are presented for the 'With project' case independent of proposed future motorway projects presented in the cumulative scenario.

Chapter 12 of Appendix H (Technical working paper: Traffic and transport) of the EIS) and Chapter 26 (Cumulative impacts) of the EIS assesses potential cumulative impacts associated with the operation of all components of the WestConnex program of works, plus the proposed future Western Harbour Tunnel and Beaches Link, Sydney Gateway and F6 Extension. The assessment was carried out based on information about these projects that was publicly available at the time the traffic modelling for the EIS was carried out.

While the construction impact of the proposed future Western Harbour Tunnel entry and exit ramps at the Rozelle interchange is included in this EIS, a comprehensive operational traffic impact of these ramps is not part of this EIS. Due to the ongoing development of the proposed future Western Harbour Tunnel and Beaches Link project, this would be assessed in the future Western Harbour Tunnel and Beaches Link EIS. The modelled 'Cumulative' scenarios assume a sub-surface, motorway-to-motorway connection between the proposed future Western Harbour Tunnel and Beaches Link and the M4-M5 Link, but do not assume a surface connection to and from the proposed future Western Harbour Tunnel and Beaches Link at the Rozelle interchange.

Notwithstanding this, a high level assessment of potential impacts associated with the proposed future Western Harbour Tunnel and Beaches Link surface ramps at City West Link is provided in section 12.5.8 of Appendix H (Technical working paper: Traffic and transport) of the EIS. The assessment indicates that there is likely to be some reduction in traffic on the Western Distributor and Sydney Harbour Bridge, as more traffic would be able to access the proposed future Western Harbour Tunnel and Beaches Link. However, there is likely to be increased traffic on City West Link, The Crescent and Johnston Street. The impacts of these surface ramps would be assessed in detail as part of future environmental assessment for the proposed future Western Harbour Tunnel and Beaches Link to be carried out by others.

The EIS acknowledges that other proposed future motorway projects such as the proposed future Western Harbour Tunnel and Beaches Link and the Sydney Gateway are needed to deliver a number of project benefits. However, Chapter 10 of Appendix H (Technical working paper: Traffic and transport) of the EIS also identifies several project benefits that would be delivered by the M4-M5 Link project alone, and in combination with the other component parts of WestConnex that are already operational (M4 Widening and King Georges Road interchange upgrade) and/or currently under construction (M4 East and New M5).

Any future motorway projects, including the proposed future Western Harbour Tunnel and Beaches Link, Sydney Gateway and the F6 Extension would be subject to separate planning approval and assessment.

The proposed future Western Harbour Tunnel project (part of the Western Harbour Tunnel and Beaches Link program of works) is a committed initiative under the Draft *Future Transport Strategy* (NSW Government 2017), subject to a standard NSW Government business case and assurance processes.

The proposed future Western Harbour Tunnel and Beaches Link project consists of two components: Western Harbour Tunnel and Warringah Freeway Upgrade and the Beaches Link and the Gore Hill Freeway Connection. Scoping reports for these two components have been submitted to DP&E with SEARs issued to the proponent on 15 December 2017. EISs for each component are being prepared. The traffic and transport assessment for the Western Harbour Tunnel and Beaches Link project would include an assessment of traffic impacts on the surface roads at Rozelle.

Specific impacts associated with the construction and operation of the proposed future F6 Extension project are beyond the scope of the M4-M5 Link project. The proposed future F6 Extension project is being developed as a separate project and would be subject to a separate assessment process to meet relevant legislative requirements.

The F6 Extension has been considered as part of the M4-M5 Link EIS only to the extent that it relates to the broader strategic objectives of the WestConnex program of works and in relation to cumulative impacts. The F6 Extension was included in the 2033 cumulative scenario modelled and assessed in the EIS in the following chapters: traffic and transport (refer to section 8.3.4); air quality (refer to section 9.7); and noise and vibration (refer to section 10.4). In addition, cumulative impacts of the M4-M5 Link project and the F6 Extension are summarised in Chapter 26 (Cumulative impacts) of the EIS.

Since the cumulative impact assessment for the M4-M5 Link EIS was undertaken, Roads and Maritime has lodged a scoping report for Stage 1 (linking the New M5 at Arncliffe with President Avenue at Kogarah). Further details on the proposed future F6 Extension project are available on the Roads and Maritime project website.

B10.8.5 Justification for the inclusion of Sydney Gateway, Western Harbour Tunnel, and Beaches Link in cumulative modelling

Executive Summary, p5, Key Findings p46

The proposed Western Harbour Tunnel and Beaches Link would see traffic volumes increase, bringing volumes closer to the capacity of the mainline tunnel. This would lead to significant impacts across the surface road network. The resulting congestion would negatively impact surrounding communities, much of the inner city and road network within the Global Economic Corridor.

Key Findings, p47, Section 8.2.2, p50

The 2023 'Cumulative' modelling scenario adopted in the EIS includes the Sydney Gateway and the Western Harbour Tunnel despite the fact that neither of these projects are currently committed and it is highly unlikely they will be completed by this date.

This raises the question, why did the Proponent adopt such a misleading scenario and how does it affect the impacts stated?

The construction impact of the future Harbour Tunnel and Beaches Link entry and exit ramps connecting to City West Link/The Crescent has been assessed but the operational traffic impact of these ramps has not. This should be completed and publicly released before determination.

Matter 8.3, p50

The operational impact of the future Harbour Tunnel and Beaches Link entry and exit ramps connecting to City West Link/The Crescent must be assessed and publicly released before determination.

Section 8.4, p55

The proposed Western Harbour Tunnel and Beaches Link would see traffic volumes increase, bringing volumes closer to the capacity of the mainline tunnel. This would lead to significant impacts across the surface road network. The resulting congestion would negatively impact much of the inner city and road network at the southern end of the GEC.

Section 8.4.2, p56

If a link to the Northern Beaches via a Western Harbour Tunnel is added (shown in red), volumes in the mainline tunnel could increase significantly as the capacity of the feeder network becomes greater than the tunnel capacity. When this happens, the model shows mainline tunnel volumes would increase to around 80 per cent of capacity and Level Of Service on the surrounding feeder road network drops significantly, creating heavily congested conditions across a wide stretch of the inner city and southern end of the road network that serves the GEC which includes the Airport and Port Botany.

Matter 8.4, p51

Before any determination is made, the Proponent shall remodel and reassess the 2023 'cumulative' modelling scenario without the Sydney Gateway and the Western Harbour Tunnel. Neither of these projects are currently committed and it is highly unlikely they will be completed by this date.

Matter 8.5, p51

Before any determination is made, the Proponent shall assess the operational impact of the future Harbour Tunnel and Beaches Link entry and exit ramps connecting to City West Link/The Crescent and make public the traffic modelling informing this assessment.

Response

A response to the City of Sydney's concerns regarding an assessment of a 2023 cumulative scenario that includes the proposed future Western Harbour Tunnel and Sydney Gateway projects is provided in **section B10.8.4**. Further, **section B10.8.4** also includes a summary of the high-level assessment of the operation of the proposed future Western Harbour Tunnel ramps at City West Link. The impacts of these surface ramps would be assessed in detail as part of future environmental assessment for the proposed future Western Harbour Tunnel to be carried out by others.

Operational traffic volumes on the surface road network due to the Western Harbour Tunnel and Beaches Link

Chapter 12 of Appendix H (Technical working paper: Traffic and transport) considers the potential implications of the 'With project' scenario in addition to proposed future projects as follows:

- **Operation 'Cumulative' (2023)**: With the 'Do minimum' projects completed, the M4-M5 Link complete and open to traffic, and in addition, the proposed future Sydney Gateway and the proposed future Western Harbour Tunnel (a component of the proposed future Western Harbour Tunnel and Beaches Link project) operational
- **Operation 'Cumulative' (2033)**: With the 'Do minimum' projects completed, the M4-M5 Link complete and open to traffic, and in addition, the proposed future Sydney Gateway, Western Harbour Tunnel and Beaches Link and F6 Extension projects operational.

The proposed future Sydney Gateway, Western Harbour Tunnel, Beaches Link and F6 Extension projects are subject to separate environmental assessment and approval. A description of the status of these projects is provided in the response in **section B10.8.4**.

Key findings of the cumulative traffic and transport assessment indicate that in both 2023 and 2033, road network productivity improves, with the inclusion of the proposed future Western Harbour Tunnel and the Sydney Gateway for 2023 and inclusion of the Beaches Link and F6 Extension projects by 2033. There is a drop in the daily VKT and VHT on the arterial network (identified as 'Other' in the tables below) with an increase in kilometres travelled along the motorway routes, as shown in **Table B10-3** and **Table B10-4**.

Table B10-3 Comparison of daily 2023 VKT and VHT for metropolitan Sydney in the 'With project' and 'Cumulative' scenarios

Scenario	Daily VKT ('000 km)			Daily VHT ('000 hours)		
	Motorway	Other	Total	Motorway	Other	Total
Do minimum (without project)	26,880	86,520	113,400	470	3,160	3,630
With project	27,730	86,050	113,780	480	3,120	3,600
Cumulative	27,980	85,970	113,950	470	3,110	3,570

Source: WRTM v2.3 2017

Table B10-4 Comparison of daily 2033 VKT and VHT for metropolitan Sydney in 'With project' and 'Cumulative' scenarios

Scenario	Daily VKT ('000 km)			Daily VHT ('000 hours)		
	Motorway	Other	Total	Motorway	Other	Total
Do minimum (without project)	31,030	101,900	132,930	590	4,670	5,560
With project	32,010	101,410	133,430	600	4,610	5,220
Cumulative	33,780	100,650	134,420	600	4,500	5,100

Source: WRTM v2.3 2017

As indicated in section 12.3 of Appendix H (Technical working paper: Traffic and transport) of the EIS, the 2023 'Cumulative' scenario analysis of microsimulation modelling indicates that traffic flows on the motorway are forecast to generally be denser with a corresponding reduction in LoS in the peak hours, when compared to the 2023 'With project' scenario. However, the motorway is still forecast to generally operate at an acceptable LoS with average speeds of 80 kilometres per hour forecast for the majority of the motorway, and slightly lower average speeds of 70 kilometres and 76 kilometres forecast for the area around the Wattle Street interchange and the interface with the M4 East respectively.

The 2033 'Cumulative' scenario analysis indicates traffic flows on the motorway are forecast to be denser compared to the 2033 'With project' scenario, with a corresponding reduction in LoS in the peak hours. This is due to the additional motorway links in the 'Cumulative' scenario (proposed future Western Harbour Tunnel and Beaches Link, Sydney Gateway, and F6 Extension projects), resulting in more traffic in the M4-M5 Link. Sections of the motorway are forecast to operate at LoS E in the peak hours, particularly around the merge and diverge locations, eg where the Wattle Street interchange ramps and the mainline connect. Even with this increased density, average motorway speeds are still forecast to be 63 kilometres per hour or above in the peak hours.

Provision has been made for Smart (or Managed) Motorway infrastructure in the M4-M5 Link design. A Smart Motorway uses technology to monitor, provide intelligence and control the motorway to ease congestion and keep traffic flowing more effectively. Technology, including lane use management signs, vehicle detection equipment, CCTV cameras and entry ramp signals, allows road operators to manage, in real-time, traffic entering, exiting and traversing the motorway. A comprehensive network-wide strategy could have significant benefits in maintaining acceptable operating conditions on the motorway in the future.

Surface impacts surrounding the interchanges are described in Chapter 10 of Appendix H (Technical working paper: Traffic and transport) of the EIS, with Table 10-2 presenting the forecast percentage changed in daily VKT, VHT and average speed in 2023 with the project on non-motorway links in the LGAs closest to the project. The forecast percentage changes indicate that, apart from Bayside LGA, all other LGAs would either benefit from reduced traffic on surface roads or there is no forecast change.

B10.8.6 Impact on Sydney city centre streets, intersections, Anzac Bridge and Western Distributor not assessed

Key Findings, p47

The EIS does not assess the impacts of the Project on Sydney's city centre streets and intersections, Anzac Bridge and Western Distributor.

Given the highly constrained and congested nature of the city centre and in light of the NSW Government's transport policy which focuses on reducing the number of cars in the city centre in favour of public transport and walking and cycling, any additional vehicles travelling into the Sydney city centre threatens the potential to meet the access requirements of the growing CBD. Additional traffic within the Sydney city centre also threatens the productivity and liveability of Australia's Global City Centre.

The only information pertaining to likely increases in traffic over the Anzac Bridge that can be gleaned from the EIS is the Average Weekday Traffic (AWT). These figures indicate that the Project would lead to traffic some 30 per cent higher than the capacity of the road link.

Section 8.2.2, p50

The EIS (including Appendix H) fails to model impacts of the Project on city centre streets and intersections. Given the highly constrained and congested nature of the city centre and the NSW Government's transport policy which focusses on reducing the number of cars in the city centre in favour of public transport and walking and cycling, this is unacceptable.

Information about the impact of traffic generated by the Project on the Anzac Bridge is scant. What little information is available suggests more traffic will attempt to travel on the bridge than can fit on it. Whilst chapters 10 and 12 of Appendix H show mid-block level of service at interfaces with interchanges and points within the tunnels, there is no information about other mid-block points such as the Anzac Bridge. The EIS refers to increases in daily traffic on the Anzac Bridge/Western Distributor, particularly in the AM peak, as traffic accesses the M4-M5 Link and the need for traffic or network management in the future (Part 8.3.3). However, the only solid data provided is the Average Weekday Traffic (AWT). This indicates that the Project would lead to traffic demand some 30 per cent higher than the capacity of the road link.

Matter 8.6, p50

Before any determination is made, the Proponent shall assess potential impacts of the Project on city centre streets and intersections and will make public the traffic modelling informing this assessment.

Response

Traffic and transport impacts on roads within the Sydney city centre

An assessment of the potential traffic and transport impacts from the project on roads around the Rozelle interchange, including the Anzac Bridge is provided in section 10.4 (for the 'With project' scenario) of Appendix H (Technical working paper: Traffic and transport) of the EIS. Management and mitigation measures specific to traffic and transport impacts on the Anzac Bridge are included in section 11.2.2 of Appendix H (Technical working paper: Traffic and transport) of the EIS.

The analysis has shown that Anzac Bridge/Western Distributor is currently at or close to capacity in the 2015 base case, particularly in the AM peak where existing operational and geometric features of the road network limit the capacity. As a result, the predicted increase in traffic demands in all future scenarios cannot be accommodated without some form of traffic or network management.

With the M4-M5 Link operational, there is an increase in the forecast eastbound AM peak hour demand, because the M4 East exit ramp and the Iron Cove Link to Anzac Bridge/Western Distributor provide bypasses of City West Link and Victoria Road respectively. Once the proposed future Western Harbour Tunnel and Beaches Link is operational, this forecast growth in demand reduces, but is still forecast to exceed the capacity of Anzac Bridge/Western Distributor.

Roads and Maritime is developing a strategy to ensure appropriate network integration in the areas surrounding the Rozelle interchange, including:

- Capacity improvement measures – a number of areas have been identified for investigation to improve capacity including the intersection of the Western Distributor and Pyrmont Bridge Road at Pyrmont, the merge and weave arrangements on the Western Distributor close to Darling Harbour, modifications through the use of moveable medians on the approaches to the Harbour Bridge and a review of kerbside use of the road network at the interfaces with the Western Distributor to remove key bottlenecks and allow additional capacity where appropriate
- Project staging options – effective staging of the opening of major projects would also keep forecast demands closer to capacity and adjustments to current staging and program timelines for major projects with the surrounding network may be required. Investigations are underway by Roads and Maritime to determine the effect and viability of altering key project timelines to achieve the best road network performance. This may include timing projects to reduce 'spikes' in the forecast demand that would exceed capacity operation and ensure effective control of traffic. As many of these projects are still in development, the requirements for staging are yet to be determined

- Demand management measures – demand management measures are being considered to effectively manage peak demand on critical links. These include the use of 'smart motorways' (including ramp metering, variable speed limits and lane use management) and arterial management through the re-optimisation of the SCATS[14] to manage the altered traffic patterns that will occur with the introduction of the project.

Specific measures will be identified as investigations progress and their implementation will depend on their complexity and appropriate timing to minimise impact on the community. Roads and Maritime will carry out these investigations in consultation with councils and DP&E to develop a program of works.

Due to the small forecast change in the Sydney CBD with the project and the complexity of the Sydney CBD traffic operations, it was not considered appropriate to model the operation of intersections and streets in Sydney's city centre. The forecast daily traffic demand changes can be seen in Figure 10.1 and Figure 10.2 of Appendix H (Technical working paper: Traffic and transport) of the EIS and the forecast AM and PM peak hour traffic demand changes can be seen in Figure 3 and Figure 4 of Annexure B (Justification of modelled areas) of Appendix H (Technical working paper: Traffic and transport) of the EIS. These figures illustrate that the main changes in Sydney's city centre are focused on the Western Distributor/Sydney Harbour Bridge and Sydney Harbour Tunnel/Eastern Distributor, with minimal changes forecast within the Sydney CBD.

B10.8.7 Justification regarding the need for four lanes

Executive Summary, p5

The traffic projected to travel along the M4-M5 Link would only fill it to around one third of its available capacity during peak periods. This significantly undermines the justification for building the mainline tunnel with four lanes in each direction.

Key Findings p46

The traffic projected to travel along the M4-M5 Link alone would only fill it to around one third of its available capacity during peak periods. This significantly undermines the justification for building the mainline tunnel with four lanes in each direction.

Section 8.4, p54

If the M4-M5 Link alone was built, without the Western Harbour Tunnel, Beaches Link and F6, traffic travelling along the link would only use one third of its capacity during peak periods. This significantly undermines the justification for building the mainline tunnel with four lanes in each direction.

Section 8.4.2, p56

The mainline tunnel of the Project (shown in orange) is currently proposed to have four lanes in each direction. If this is the only motorway section built, the four lanes in each direction would go largely unused as the feeder road network has a lower capacity than the tunnel itself.

Section 8.5, p58

Hourly AM peak traffic volume estimates for the mainline tunnel (four lanes in each direction) indicate it would receive traffic volumes that are less than one third of the total capacity available. The hourly capacity for the proposed mainline tunnel of the M4-M5 Link is 16,000 vehicles/hour for both directions at Level of Service E, or 8,000 vehicles/hour in one direction. This is highlighted in Figure 4 [reproduced from Figure 9-6 as referenced below the figure].

[14] The Sydney coordinated adaptive traffic system (SCATS) is a traffic management system used to synchronise traffic signals to optimise traffic flow.

Figure 4. Lower north-south screenline volumes for M4-M5 Link roads.

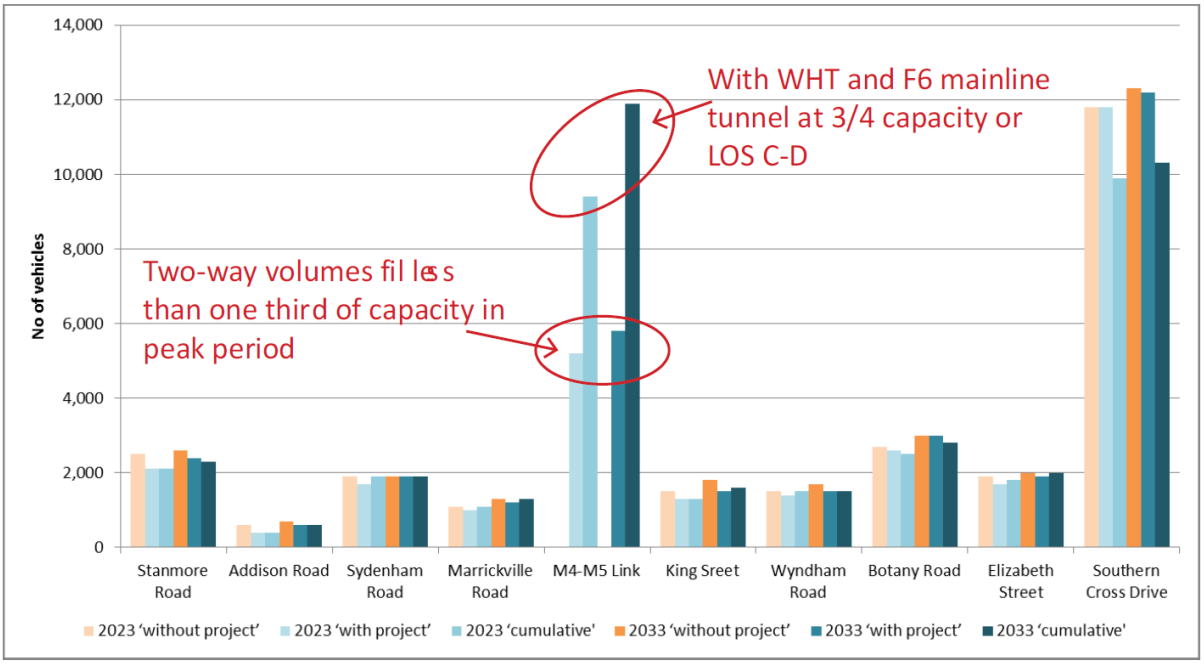


Figure 9-6 Lower north–south screenline: comparison of two-way AM peak one hour volumes

Source: WRTM v2.3 2017

Response

Sydney's population is forecast to increase to 5.9 million by 2031 (NSW Government 2014). With this increase in population it is anticipated there will be an increase in vehicles travelling on Sydney's roads, with the number of trips made around Sydney each day forecast to increase by 31 per cent, from 16 million to 21 million vehicle movements, by 2036 (Infrastructure Australia 2015). This growth would place increasing pressure on the NSW transport network and the key travel demand corridors connecting regional cities and major centres across the greater Sydney metropolitan area.

In addition, the volumes of all commodities demanding capacity on the freight network are expected to grow as population and economic activity increases across NSW. Port Botany and Sydney Airport are predicted to accommodate much of the rapid growth forecast for containerised cargo and air travel over the next 20 years (Infrastructure NSW 2014). The implications of this growth for the road and rail network are expected to be significant, with capacity across key parts of the network, particularly the Sydney metropolitan area, already under pressure to match demand.

The Draft *Future Transport Strategy 2056,* published after the EIS was prepared, updates the forecast freight task in Greater Sydney, with projections of growth in container freight task of around 175 per cent over the next 40 years. This projected growth emphasises the need for a freight network that supports safe, efficient and reliable journeys. Specifically, the Draft *Future Transport Strategy 2056* highlights the strategic importance of WestConnex in providing additional road capacity for the movement of goods between freight precincts in the west, centres in the east and Port Botany.

Investment in infrastructure is needed to meet the demands of a growing population and the increased amount of vehicles travelling between the regions of Sydney, as well as the forecast growth in Sydney's freight task, which is reflected in the aims of various NSW Government policies and plans. Plans such as *A Plan for Growing Sydney* (NSW Government 2014), *Towards our Greater Sydney* 2056 (Greater Sydney Commission 2016b) the draft *District Plans* (Greater Sydney Commission 2016), the *NSW Freight and Ports Strategy* and the Draft *Future Transport Strategy 2056* identify investment in transport infrastructure as achieving the objectives of these plans. In addition, and as identified in the *WestConnex Updated Strategic Business Case*, the WestConnex program of works has been designed to integrate with future motorway projects such as the proposed future Western Harbour Tunnel and Beaches Link, Sydney Gateway and the F6 Extension. These projects have been consistently detailed in NSW Government planning and policy documents over the past three to five years, including the recently released draft update to the *Transport Master Plan*, the Draft *Future Transport Strategy 2056*.

The inclusion of four lanes on the M4-M5 Link means that it is being designed to meet the traffic demands for the future. By considering the future demands, rather than the traffic demand expected at the opening of the stages, the project would enhance benefits and continue to facilitate future growth in Sydney's strategic transport network and connectivity between important economic centres along Sydney's Global Economic Corridor.

B10.8.8 Unspecified road upgrades and network integration works

Executive Summary, p6

The M4-M5 Link will, like other sections of WestConnex, require the extension of surface roads but the NSW Government has adopted a 'wait and see' approach to identifying these impacts and costs.

Key Findings, p46

The EIS provides no details of the 'program of network integration works to upgrade roads affected by the Project' despite the fact that these works could affect numerous road corridors and could include intersection and road widening, banning parking in local centres, removal of trees, footpaths and cycling facilities.

In adopting the 'wait and see' approach to identify road 'improvements' required as a result of the Project, the EIS does not provide sufficient detail of the likely impacts for communities affected by the Project, nor does it provide the people of NSW with a true reflection of the level of taxpayer funds required to deliver the identified works.

Section 5.2, p32

The range and extent of works involved in the Project would result in major impacts on the city centre and congested inner city streets. The description shows seven portals in Rozelle and Lilyfield feeding to and from Anzac Bridge, Victoria Road and the City West Link without full modelling of their long term impacts locally or on the city centre. It does not provide sufficient assurance that open space at the Rozelle Rail Yards will be landscaped to a standard suitable for community use. The description also fails to include changes proposed to local streets intended by the Road Network Performance Review mentioned in Appendix H, or information about the enormous signage likely to be installed on approach streets guiding motorists into divided entry ramps, which aim to reduce the amount of lane changes within the tunnels.

Section 8.6.1, p63

The Proponent has advised that they expect 'improvements' will need to be made to the Western Distributor, The Crescent, Johnston Street and Flood Street due to increased traffic levels. However, they have not provided information on what those improvements might be. Without that information it is difficult to assess the full impact of the Project on local traffic.

Section 8.11, commencing p75

The EIS notes that RMS would develop the M4-M5 Link Road Network Performance Review Plan based on an 'Operational Traffic Performance Review' undertaken 12 months and five years after the M4-M5 Link opens. The review will consider the need for 'post-opening mitigation measures' (Page 223, Chapter 9.8, Appendix H).

In other parts of the EIS, reference is made to 'network integration works'. The nature of these 'mitigation measures' and 'integration works' are not specified. Their impacts could be significant and must be detailed in the EIS.

The EIS provides no details of the 'program of network integration works to upgrade roads affected by the Project' despite the fact that these works could affect numerous road corridors.

The City questions the definition of 'upgrades' used in the EIS as it is understood to include intersection and road widening, banning parking in local centres, removal of trees, footpaths and cycling facilities. Council is unlikely to accept any these outcomes.

The objectives of the review are unclear – they should be to maintain or reduce surface traffic levels.

Key questions that must be addressed regarding any performance review plan are:

- How will this review relate to similar reviews proposed for the New M5 Project in the streets surrounding the St Peters Interchange one year (2012) and five years (2026) after the project opens?
- What is the study boundary for the 'Operational Traffic Performance Review'?
- Will the focus be primarily on State Roads or also include analysis of Council- owned Regional and Local Roads?
- Will local Councils be directly involved in developing the scope of the 'Operational Traffic Performance Review'?
- Has specific budget been set aside by the NSW Government to fund mitigation measures identified by the 'Operational Traffic Performance Review'?
- Will RMS be responsible for delivering mitigation measures identified by the 'Operational Traffic Performance Review' even on Council-owned Regional and Local Roads?

What are the nature of mitigation works? Could they include intersection and road widening, banning parking in local centres, removal of trees, footpaths and cycling facilities?

Matters to be addressed 8.23, p78

The M4-M5 Link Road Network Performance Review must be integrated with the Review Plan proposed for the New M5 Project in the streets surrounding the St Peters Interchange.

Details of the study boundary for the 'Operational Traffic Performance Review' must be made public before a determination is made.

The objectives of the review must be to maintain or reduce surface road traffic levels.

The Proponent must advise whether the performance review will focus primarily on State Roads or also include analysis of Council-owned Regional and Local Roads?

Local Councils must be directly involved in developing the scope of the 'Operational Traffic Performance Review'

A specific budget must be set aside by the NSW Government to fund mitigation measures identified by the 'Operational Traffic Performance Review'

Roles and responsibilities must be defined for the delivery of mitigation measures identified by the 'Operational Traffic Performance Review' on Council-owned Regional and Local Roads

The nature of mitigation works must be described and analysed before the EIS is determined. This includes intersection and road widening, banning parking in local centres, removal of trees, footpaths and cycling facilities.

Response

Section 11.2 of Appendix H (Technical working paper: Traffic and transport) of the EIS identifies the management and mitigation measures that would manage operational traffic impacts from the project.

Operational traffic review

The traffic assessment has identified intersections where the operational performance would significantly change under the future traffic demands as modelled. This assessment has been based on forecast traffic demands derived from the WRTM and, consequently, the outcome may be affected by the limitations of the modelling process as described in **section B10.8.1**.

As with the M4 East and New M5 projects, Roads and Maritime would undertake a Road Network Performance Review, in consultation with Transport for NSW and relevant councils. This would confirm the operational traffic impacts of the M4-M5 Link on surrounding arterial roads and major intersections at both 12 months and five years after opening of the project. The assessment would be based on future updated traffic surveys taken during operation utilising an appropriate methodology following the relevant and industry accepted guidelines current at the time. Regardless, those areas that have been identified as being potentially impacted by the project have been identified in Appendix H (Technical working paper: Traffic and transport) of the EIS and would be addressed prior to these operational reviews, or as needed.

Wattle Street interchange and surrounds

The analysis has identified key constraints impacting the performance of the network on Frederick Street (southbound), Parramatta Road (eastbound) and City West Link (northbound) in the 'Without project' scenario. The capacity constraints on Parramatta Road and City West Link are generally reduced by the M4-M5 Link project, particularly in 2023. It is expected that the M4 East Road Network Performance Review Plan would examine potential management measures at these locations following the collection of updated data that would facilitate an understanding of actual project outcomes.

Notwithstanding the above, Roads and Maritime proposes the following opportunity to manage operational impacts:

- The identified exit blocking from Frederick Street through the Parramatta Road/Wattle Street intersection in the 'With project' scenario arises from forecast increase in southbound demand, combined with capacity restrictions at downstream intersections and limited storage space on Frederick Street. Management measures to be investigated by Roads and Maritime, in consultation with relevant local councils, could include:
  - Queuing and capacity monitoring and management on the Frederick Street/Milton Street corridor
  - Managing lane use and utilisation to improve the operation of the corridor.

Rozelle interchange and surrounds

The analysis has shown that the Anzac Bridge/Western Distributor is currently at or close to capacity and cannot accommodate more demand, especially in the eastbound AM peak hour, due to existing operational and geometric features of the road network. In all future scenarios, the forecast demand would exceed capacity and therefore management is required.

With the M4-M5 Link operational, there is an increase in the forecast eastbound AM peak hour demand, as the M4 exit ramp and the Iron Cove Link to Anzac Bridge/Western Distributor provide bypasses of City West Link and Victoria Road respectively. Once the proposed future Western Harbour Tunnel is operational, this forecast demand increase diminishes, but is still forecast to exceed the capacity of Anzac Bridge/Western Distributor.

Roads and Maritime is developing a strategy to ensure appropriate network integration in the areas surrounding the Rozelle interchange, including:

- Capacity improvement measures – a number of areas have been identified for investigation to improve capacity including the intersection of the Western Distributor and Pyrmont Bridge Road at Pyrmont, the merge and weave arrangements on the Western Distributor in close proximity to Darling Harbour, modifications through the use of moveable medians on the approaches to the Harbour Bridge and a review of kerbside use of the road network at the interfaces with the Western Distributor to remove key bottlenecks and allow additional capacity where appropriate
- Project staging options – effective staging of the opening of major projects would also keep forecast demands closer to capacity and key adjustments to current staging and program timelines for major projects with the surrounding network may be required. Investigations are underway by Roads and Maritime to determine the effect and viability of altering key project timelines to achieve the best road network performance. This may include timing projects to reduce 'spikes' in the forecast demand that would exceed capacity operation and ensure effective control of traffic. As many of these projects are still in development, the requirements for staging are yet to be determined
- Demand management measures – demand management measures are being considered to effectively manage peak demand on critical links. These include the use of Smart Motorways (including ramp metering, variable speed limits and lane use management) and arterial management through the re-optimisation of the SCATS[15] to manage the altered traffic patterns that will occur with the introduction of the M4-M5 Link project.

[15] The Sydney coordinated adaptive traffic system (SCATS) is a traffic management system used to synchronise traffic signals to optimise traffic flow.

Specific measures will be identified as investigations progress and their implementation will depend on their complexity and appropriate timing to minimise impact on the community. Roads and Maritime will carry out these investigations in consultation with SMC, councils and DP&E to develop appropriate mitigation measures.

The Crescent, Johnston Street and Ross Street are forecast to experience increased levels of demand with the introduction of the project, with people travelling to and from the southern fringe of the Sydney CBD through the Annandale area. A strategy is being developed by Roads and Maritime to ensure the impacts of the project are minimised. The strategy will involve investigating and identifying capacity improvement and mitigation measures along The Crescent, Ross Street and Johnston Street. These measures will be implemented in a staged approach to accommodate forecast demand firstly for the M4-M5 Link and thereafter for the proposed future Western Harbour Tunnel. Implementation of these measures will depend on the complexity of the measure and will be implemented at an appropriate stage to minimise impact on the community.

St Peters interchange and surrounds

The analysis has indicated a deteriorated network performance in the St Peters and Mascot area with the project. However, once Sydney Gateway is in place, a considerable amount of traffic would be removed from the St Peters and Mascot area and the network performance improved to a level generally better than in the 'Without project' scenarios. Sydney Gateway is expected to be open at a similar time to the M4-M5 Link. Specific interim mitigation measures for the 'With project' scenario are therefore not proposed.

Should the Sydney Gateway project be delayed for a significant length of time, it is expected that both the New M5 Road Network Performance Review Plan (conditioned as part of the New M5 approval) and the proposed M4-M5 Link Road Network Performance Review would confirm the operational traffic impacts of the projects on surrounding arterial roads and major intersections. These reviews are scheduled at 12 months and five years after the commencement of operation of the New M5 and the M4-M5 Link respectively. Key intersections in the St Peters and Mascot areas are already identified for investigation as part of the New M5 conditions of approval and the following should be included in the M4-M5 Link Road Network Performance Review Plan:

- Gardeners Road/Kent Road
- Gardeners Road/O'Riordan Street
- Kent Road/Coward Street
- Bourke Road/Coward Street
- Kent Road/Ricketty Street.

These reviews would examine potential management measures at these locations, and other locations as identified in the Road Network Performance Review, following the collection of data that would facilitate a clearer understanding of actual project impacts.

Other management techniques and mitigation measures

Management of road network assets is a key function of Roads and Maritime, which uses network and corridor planning strategies to best manage and enhance these assets to maximise community benefits. Network and corridor planning is a process aimed at enhancing the capacity to manage the road network performance to meet community expectations. Integrated network and corridor planning processes are critical to working towards the vision of 'a safe, sustainable and efficient road transport system'.

The process involves a few key elements including:

- Setting network and corridor objectives in line with NSW and Australian Government strategies and community expectations
- Analysing anticipated performance against appropriate safety, traffic and asset measures
- Identifying strategic priorities to achieve appropriate safety, traffic and asset performance over the longer term within the context of limited funding.

As a key part of network management, network and/or corridor optimisation is a key tool in the management of project impacts. Together with the ongoing delivery of the Pinch Point Program through the Easing Sydney's Congestion office, which targets peak hour traffic hotspots, and other infrastructure measures previously discussed, network optimisation facilitates the management of impacts identified to ensure travel time savings are maintained to the greatest possible extent by minimising intersection and mid-block delays.

In addition to an optimisation strategy and potential infrastructure provision, the maintenance of the existing traffic control system is a key ingredient in providing Roads and Maritime with the tools to appropriately manage congestion on the network. A review of existing SCATS infrastructure at key intersections in the study area, including detectors, will be undertaken and upgrades implemented where appropriate.

Specific issues relating to the operational network performance review

How will this review relate to similar reviews proposed for the New M5 Project in the streets surrounding the St Peters Interchange one year (2021) and five years (2026) after the project opens?

The scope of the operational network performance review is provided in section 11.2.2 of Appendix H (Technical working paper: Traffic and transport) of the EIS and in the section above. Around the St Peters interchange, both the New M5 and the M4-M5 Link operational network performance review would be used to confirm the operational traffic impacts of these projects on surrounding arterial roads and major intersections.

What is the study boundary for the 'Operational Traffic Performance Review'?

The study boundary for the operational network performance review, as determined by Roads and Maritime and SMC, will include the M4-M5 Link and surrounding arterial roads and major intersections. The review would examine potential management measures at each of the interchange locations, and other locations as identified in the review, following the collection of data that would facilitate a clearer understanding of actual project impacts.

Will the focus be primarily on State Roads or also include analysis of Council-owned Regional and Local Roads?

The operational network performance review will look at the operational impacts of the project on surrounding arterial roads and major intersections in proximity to the Wattle Street interchange, Rozelle interchange and St Peters interchange as noted in the environmental management measure OpTT1 in **Chapter E1** (Environmental management measures). Although the review will be focused on arterial roads, consideration of impacts on roads under the care and control of Council (such as local roads) will also form part of the review as appropriate.

Will local Councils be directly involved in developing the scope of the 'Operational Traffic Performance Review'?

Roads and Maritime will be responsible for carrying out the operational network performance review in consultation with the relevant roads authorities including relevant local council(s). The review will be developed in accordance with the environmental management measure OpTT1 in **Chapter E1** (Environmental management measures) and the conditions of approval for the project.

Has specific budget been set aside by the NSW Government to fund mitigation measures identified by the 'Operational Traffic Performance Review'? Will RMS be responsible for delivering mitigation measures identified by the 'Operational Traffic Performance Review' even on Council-owned Regional and Local Roads?

There is currently no specific budget for mitigation measures identified by the operational network performance review as the specific measures have not yet been identified. As the proponent of the project, Roads and Maritime will be responsible for delivering measures identified in the operational network performance review. The review will focus on impacts directly related to the project.

A response to the manner in which the project would affect roads in the Sydney LGA is provided in **section B10.8.6**.

The provision of road signage as part of the project is discussed further in **section B10.5.7**.

Issues relating to the provision of open space at the Rozelle Rail Yards are addressed in **section B10.12.8** and **section B10.13.1**.

B10.8.9 Constraining traffic to protect the amenity of local areas

Executive Summary p 46, Section 8.11, p75, Key Findings Chapter 13, p105

Where the Project risks leading to additional traffic demand on the surface street network, the priority will be to protect the amenity of the local areas and avoid these impacts by constraining traffic flows and the associated noise, emissions and safety risks.

Response

A response to this issue as it relates to amenity impacts including noise, emissions and safety risks is provided in **section B10.12.10, section B10.13.2 and section B10.13.6**.

The project would include a number of intersection upgrades as part of the Rozelle and Iron Cove Link surface works and improved surface connectivity to direct through traffic along arterial routes and away from residential properties and local streets. These upgrades include:

- A new interchange at Lilyfield and Rozelle (the Rozelle interchange) that would connect the M4-M5 Link mainline tunnels with:
  - City West Link
  - The Anzac Bridge
  - The Iron Cove Link (see below)
  - The proposed future Western Harbour Tunnel and Beaches Link
- The Rozelle surface works, including:
  - Realigning The Crescent at Annandale, including a new bridge over Whites Creek and modifications to the intersection with City West Link
  - A new intersection on City West Link around 300 metres west of the realigned position of The Crescent, which would provide a connection to and from the New M5/St Peters interchange (via the M4-M5 Link mainline tunnels)
  - Reconstructing the intersection of The Crescent and Victoria Road at Rozelle, including construction of a new bridge at Victoria Road
- The Iron Cove Link surface works, including:
  - Dive structures and tunnel portals between the westbound and eastbound Victoria Road carriageways, to connect Victoria Road east of Iron Cove Bridge with the Iron Cove Link
  - Realignment of the westbound (southern) carriageway of Victoria Road between Springside Street and the eastern abutment of Iron Cove Bridge
  - Modifications to the existing intersections between Victoria Road and Terry, Clubb, Toelle and Callan streets.

In addition, certain local streets and intersections around interchanges are being upgraded as part of the project to ensure safe and efficient connections. Other local road upgrades and amendments are being made by the preceding WestConnex projects.

Use of local roads by heavy vehicles delivering materials and/or equipment during construction would be minimised as far as practicable. Indicative access routes to and from construction ancillary facilities (refer to Chapter 6 (Construction work) of the EIS) would be confirmed during detailed design and documented in the CTAMP that would be prepared for the project. These routes would use arterial roads and the completed components of the WestConnex motorway network wherever possible, with some potential use of local roads required during site establishment and in the case of exceptional circumstances as identified in Table 6-24 of the EIS.

Roads and Maritime would undertake a review of network performance, in consultation with the relevant road authorities, to confirm the operational traffic impacts of the M4-M5 Link on surrounding arterial roads and major intersections at both 12 months and at five years after the commencement of operation of the M4-M5 Link. The assessment would be based on future updated traffic surveys taken during operation utilising an appropriate methodology following the relevant and industry accepted guidelines current at the time.

B10.8.10 Impact on Victoria Road bus services

Key Findings, p46

The Project will reduce the speed and reliability of buses travelling between the busy Victoria Road Corridor and the city centre via the Anzac Bridge.

The EIS provides no mitigation measures to even maintain the current (poor) levels of travel time and reliability of Victoria Road bus services.

Further, the EIS provides no assessment of other bus routes affected by the additional traffic congestion caused by the Project. Notably, no comment is made on impacts of bus services in the Sydney city centre.

Section 8.10, p74

The Project offers no protection to travel time and reliability of Victoria Road bus services. Since the Project was announced, the NSW Government has put the Victoria Road Bus Rapid Transit project 'on-hold'.

Response

A response to the issue of project impacts on public transport along the Victoria Road corridor is provided in **section B10.3.5**.

B10.8.11 Levels of service at major intersections

Key Findings, p47

When the projected levels of service of major intersections are filtered from minor intersections, the following outcomes are identified:

The Project will cause almost all major intersections around the Rozelle Interchange to have a worse Level of Service in comparison to existing conditions. These will further worsen if additional proposed motorways links (Western Harbour Tunnel, Beaches Link, F6) are added to the network.

The Project will cause most major intersections around the St Peters Interchange and Wattle Street Interchange to have a worse Level of Service in comparison to existing conditions. These will further worsen if additional proposed motorways links (Western Harbour Tunnel, Beaches Link, F6) are added to the network.

Response

Appendix H (Technical working paper: Traffic and transport) of the EIS assesses the impacts from the project (the 'With project' scenario) against a 'Do minimum' or 'Without project' scenario at the year of opening (2023) and ten years after opening (2033). A comparison to existing conditions (the 'base case' (2015)) is not made in the traffic and transport assessment as this would not take into account under construction infrastructure projects such as the M4 East and New M5 projects, ongoing improvements to the broader road and public transport network over time including some new infrastructure and intersection enhancements to improve capacity and cater for traffic growth and background traffic growth as a result of land use, population and employment forecasts.

Chapter 8 of Appendix H (Technical working paper: Traffic and transport) of the EIS presents the assessment of operational impacts without the project. This assessment indicates that without the project, the forecast traffic growth around the Wattle Street, Rozelle and St Peters interchanges will result in deteriorating network performance during peak periods in both 2023 and 2033.

In the without project scenario intersection performance is forecast to worsen at key intersections, including:

- Wattle Street interchange: Parramatta Road/Wattle Street and Parramatta Road/Liverpool Road intersections
- Rozelle interchange: Intersections along Victoria Road at Rozelle
- St Peters interchange: Intersections along the Gardeners Road, O'Riordan Street, Botany Road and the Princes Highway corridors.

This is primarily due to forecast growth in travel demand for both traffic and public transport and is consistent with the forecast increase in population growth in the Sydney metropolitan area.

Chapter 10 and Chapter 12 of Appendix H (Technical working paper: Traffic and transport) of the EIS present an assessment of operational impacts from the project, and an assessment of the cumulative impacts, respectively.

Key intersection performance (LoS) around the Wattle Street interchange

For the Wattle Street interchange and surrounds, the network is forecast to undergo general improvement in the AM and PM peak periods in both 2023 and 2033, although parts of the network are forecast to still experience congestion. Intersection performance would generally remain stable and/or improve in the AM and PM peak periods in both 2023 and 2033, with a small number of intersections forecast to worsen. In the 'Cumulative' scenario, intersections are forecast to perform at the same or better levels of service. Performance improvements are noted in the 2033 PM peak hour 'Cumulative' scenario when compared to the 'With project' scenario, as a result of reduced demand to and from Parramatta Road to the east.

Key intersection performance (LoS) around the Rozelle interchange

With forecast traffic growth, the network performance in the vicinity of Rozelle without the project is forecast to deteriorate over time, with longer queues forecast on the Western Distributor and flow breakdown on Anzac Bridge, Victoria Road and City West Link in the AM peak period. In the PM peak period, the network performance is also forecast to deteriorate over time, with the network unable to accommodate the future traffic demands.

Intersection performance analysis demonstrates that by 2033, without the project, more intersections along Victoria Road are forecast to experience significant congestion during the peak hours than currently do. In the PM peak hour 'With project' scenario, the intersections along Victoria Road and City West Link are forecast to operate at an improved LoS compared with the 'Without project' scenario, due to the direct link from Anzac Bridge to the M4 East and Iron Cove Link.

The Victoria Road/Lyons Road intersection in both peak hours, the Victoria Road/Darling Street and Victoria Road/Robert Street intersections in the AM peak hour and The Crescent/Johnston Street intersection in the PM peak hour remain at or over capacity due to the forecast demands. Upgrades are proposed as part of the project at The Crescent/Johnston Street intersection, but any further upgrades at this intersection to improve performance are constrained by the existing light rail bridge.

The forecast intersection performances in the 'Cumulative' scenario are similar to the 'With project' scenario at most intersections in both peak hours. Improved performance is forecast at the Victoria Road/The Crescent intersection, as a result of traffic forecast to reassign to the proposed future Western Harbour Tunnel project.

However, as in the 'With project' scenario, the Victoria Road/Lyons Road intersection in both peak hours, the Victoria Road/Darling Street and Victoria Road/Robert Street intersections in the AM peak hour and The Crescent/Johnston Street intersection in both peak hours remain at or over capacity due to the forecast demands.

Key intersection performance (LoS) around the St Peters interchange

The surface road network in the model is unable to accommodate the forecast peak hour demands without the additional road capacity provided by the proposed future Sydney Gateway. The proposed future Sydney Gateway introduces a bypass to Mascot town centre and, in its absence, it would be necessary to introduce upgrades at a number of intersections, as provided in the response in **section B10.8.8**.

The modelling results show that in the AM peak hour, under the 2023 'With project' scenario, the intersections generally record similar LoS compared with the 'Without project' scenario, except for the Campbell Road/Bourke Road and Gardeners Road/Bourke Road intersections, while by 2033, all of the intersections perform similar or better in the 'With project' scenario, with the exception of the Campbell Road/Bourke Road intersection.

In the 2023 PM peak hour, the intersections are generally forecast to operate at a similar LoS compared with the 'Without project' scenario, except for the Campbell Road/Euston Road, the Princes Highway/Campbell Street and Gardeners Road/Bourke Road intersections. In the 2033 PM peak hour, most intersections are forecast to operate poorly, which corresponds to the poor network performance.

The surface network in the 'Without project' and 'With project' scenarios is not the same. The additions in the 'With project' scenario are the M4-M5 Link entry and exit ramps at St Peters interchange and the surface road intersection upgrades required to accommodate the additional forecast traffic demand, in the absence of Sydney Gateway.

Operational traffic and transport management measures

Section 11.2 of Appendix H (Technical working paper: Traffic and transport) of the EIS describes the management and mitigation measures that would be implemented to manage the operational traffic impacts from the project, and includes specific measures around each of the project interchanges.

As detailed in section 12.7 of Appendix H (Technical working paper: Traffic and transport) of the EIS, while specific mitigation measures for the cumulative scenarios assessed in this report are beyond the scope of this EIS, the issues identified would be examined as part of the design development for the proposed future Western Harbour Tunnel and Beaches Link and Sydney Gateway projects and as part of Roads and Maritime network mitigation strategies.

Ongoing consultation with the design teams for these projects is occurring with the objective of minimising cumulative traffic impacts.

B10.8.12 Modelling indicates higher traffic volumes than capacity at peak periods

Key Findings, p47

All future scenarios modelled by the EIS result in traffic volumes in the Sydney Harbour Tunnel that are greater than the capacity of the road link in the AM and PM peak hours. Given the Western Harbour Tunnel is proposed to relieve congestion on harbour crossings, this finding is counterintuitive.

Response

The capacity of a road link is the nominal maximum number of vehicles which have a reasonable expectation of passing over a section of road in one direction during a given time period under prevailing roadway conditions.

Travel behaviour such as time of departure and route selection on any given day is influenced by congestion. Due to forecast congestion, some of the traffic is predicted to not be able to start or finish their journey within the peak period. Some drivers will therefore choose to make their journey either earlier or later to avoid delay. In the modelling carried out for the M4-M5 Link, where the forecast one hour future demand would exceed the physical road capacity, the calculated future excess demand would be distributed into the hours before and after the peak hour to correspond with anticipated peak spreading, effectively predicting longer peak periods in the future.

A summary of the cross-harbour screenline analysis for the 'Cumulative' scenario for 2023 and 2033 is provided in section 8.3.3 of the EIS. Two-way average weekday traffic is forecast to decrease by around six per cent on the Sydney Harbour Bridge and by around 23 per cent in the Sydney Harbour Tunnel under the 'Cumulative' scenario and a similar forecast change is expected for 2033.

B10.8.13 EIS does not include 'Without project' traffic estimates for 2033

Key Findings, p47

The EIS does not provide 'Without project' traffic estimates for 2033 which means that they cannot be compared to the 2033 'With project' and 'Cumulative' scenarios. This omission casts the validity of the EIS into doubt as it could be assumed that this is because the modelling outputs showed little benefits (or actual worsening) accruing to the Project relative to the base case.

Response

'Without project' traffic estimates for 2033 are provided in Chapter 8 of Appendix H (Technical working paper: Traffic and transport) of the EIS.

'Without project' traffic estimates for 2023 and 2033 are subsequently used as a point of comparison against the 'With project' forecasts for 2023 and 2033 in Chapter 10 of Appendix H (Technical working paper: Traffic and transport) of the EIS.

The screenline analysis provided in Chapter 9 of Appendix H (Technical working paper: Traffic and transport) of the EIS also includes 'Without project', 'With project' and 'Cumulative' case forecasts for 2023 and 2033.

B10.8.14 Difficulty in comparing traffic forecasts

Key Findings, p47

The EIS has made it extremely difficult to compare traffic forecasts. This is contrary to the SEARs which require that 'the process for assessment of the proposal is transparent'.

Response

A full description of the traffic modelling scenarios is provided in section 4.2.1 of Appendix H (Technical working paper: Traffic and transport) of the EIS.

The structure of Appendix H (Technical working paper: Traffic and transport) of the EIS follows a logical order which is summarised below:

- Chapter 5 presents the existing traffic and transport environment in the base year (2015)
- Chapter 6 presents the existing road network performance in the base year (2015)
- Chapter 8 presents the assessment of operational impacts without the project in 2023 and 2033
- Chapter 9 presents the future year traffic volumes and patterns with the project in both 2023 and 2033. This is a wider assessment using only traffic forecasting data (derived from the WRTM) as this provides evidence of high level patterns across parallel strategic corridors within and external to the study area for peak and daily time periods
- Chapter 10 presents the assessment of operational impacts with the project in 2023 and 2033
- Chapter 11 presents the management and mitigation measures proposed to manage operational impacts from the project
- Chapter 12 presents an assessment of cumulative impacts in 2023 and 2033.

The traffic and transport assessment in Appendix H (Technical working paper: Traffic and transport) and summarised in Chapter 8 (Traffic and transport) of the EIS has been prepared in accordance with the SEARs for the project, which outlined the modelling approach to be undertaken for the assessment as well as the guidelines that the assessment needed to follow. In considering the future changes in travel demand as a result of the project, several scenarios were considered, reflecting the timeframe under which the project would be delivered and the scope and timing of other infrastructure developments. These scenarios were explored through development of specific modelled scenarios, reflecting various future travel demands. Further detail on the assessment methodology for the traffic and transport assessment is provided in Chapter 4 of Appendix H (Technical working paper: Traffic and transport) of the EIS.

B10.8.15 Failure to consider and assess active transport projects

Key Findings, p47

The Active Transport Strategy referred to in the EIS demonstrates a poor understanding of existing walking and cycling needs and infrastructure particularly near the Rozelle interchange.

The proposed active transport infrastructure discussed in the EIS lacks sufficient detail and is inconsistent. It is not included in the Project Description and no commitment has been given to delivery of the active transport links.

The impacts imposed on pedestrian and bicycle riders during construction would be significant and unacceptable.

Section 8.12.2

Active transport links under development have not been assessed as part of the Cumulative Impact Assessment in chapter 26, or in Appendix C. This includes the GreenWay linking Dulwich Hill and Drummoyne and the City West bicycle link connecting Haberfield with The Bays Precinct. These projects were not included in the cumulative assessment despite overlapping with and adjacent to the Project footprint (a criterion for cumulative assessment).

In 2011, Stage 1 of the Inner West Light Rail extension included the GreenWay active transport link before it was deferred by the State Government. The Greenway project is well developed and has strong community support. Failure to assess the Project demonstrates a major failure in the strategic coordination of NSW Government work.

The draft District Plan for the Central District specifies actions to 'improve connections and amenity along the WestConnex corridor' including better north– south connections across Parramatta Road. The Greenway would achieve this.

The Inner City Regional Bike Network was not considered in the Cumulative Impact assessment even though it has been identified by Infrastructure Australia as a Priority Initiative and a review of the business case is now underway.

The Westconnex program includes a new cycleway and pedestrian bridge over the Alexandra Canal at Campbell Road. The Project has not considered the potential to connect Alexandra Canal shared path with the M5 East bike route.

The failure to assess these projects and provide assurance of their delivery represents an oversight in considering integrated transport options.

Connections with surrounding local streets are important to encourage local walking and riding to the Glebe Foreshore, Fish Markets, Rozelle growers market, Callan Park and Victoria Road buses. Failure to provide these links means more people will drive to local destinations creating more congestion on the network.

The Active Transport Strategy in Appendix N does not adequately identify existing or potential bicycle routes as required by the SEARs.

Maps in the EIS identifying existing bicycle routes include incorrect and impossible links through private property, via the disused Glebe Island Bridge and on streets barely used by riders because they are steep and busy with traffic.

The maps and written information are unclear and inconsistent. Some proposed projects already exist and experience long delays and are extremely unpleasant to travel through, especially when walking.

The Strategy does not provide any certainty about the construction of active transport links or other changes needed to accommodate them, such as upgrading of traffic signals or the use of RMS owned land.

The two separated cycleways proposed on Victoria Road near Robert Street and near Springside Street are isolated. They need to be joined with a protected cycleway along Victoria Road between the Iron Cove and Anzac Bridges as shown in the Active Transport Strategy (Figure 4.5, Appendix N, p21). Assurance must be provided about the implementation of this facility in the short term.

Certainty must be provided that the separated cycleway in Johnston Street Annandale shown in the Active Transport Strategy (Figure 5.5, Appendix N, p28) will be fully implemented in the short term.

The pedestrian and cyclist links proposed for the Rozelle Rail Yards do not provide adequate links with surrounding streets, particularly north of the Yards and require people to make long diversions.

The removal of the two overhead bridges on Victoria Road and City West Link is intended early in construction. These bridges are very well used. Removing them will create longer walking and riding routes with significant delays and poor amenity for walking. The removal of these bridges must be delayed and alternative routes with comparable amenity and travel time provided to enable walking and riding between Anzac Bridge, Lilyfield Road and the City West Link?

If the Project is approved, the traffic lights at Robert Street must be upgraded as soon as these bridges are removed to provide a crossing of Victoria Road by pedestrians and bicycle riders. This would also support the proposed separated cycleway in Victoria Road linking the Rails Yards and Robert Street.

The Project proposes permanent closure of Buruwan Park. This is a very popular walking and cycling link to the light rail station, Glebe foreshore, Leichhardt and Rozelle. Access to the park must be retained. The alternative access outlined is long, steep and circuitous. If the Project is approved, Buruwan Park must only be closed after other active transport links are completed the including bridge near Whites Creek, the bridge linking The Crescent and the Rozelle Rail Yards and the underpass linking Anzac Bridge with the Rail Yards.

Some maps (such as Figure 7.1 of Appendix N and Figure 5.6 of Appendix L) show a link to Gordon Street, Rozelle. Other maps do not show this link and it is not listed in the active transport network summary in the Active Transport Strategy. This link must be included.

If the Project goes ahead a working group must be convened for development and implementation of the network integration strategy to be developed for the areas surrounding the Rozelle interchange by RMS. The working group must include relevant local government, Bicycle User Groups and Transport for NSW. The group should be established immediately following determination of the Rozelle and St Peters interchanges. Active transport infrastructure not identified in the EIS and/or Instrument of Approval must be specified in the network integration strategy.

Matter 8.25, p81

The Determination must provide certainty about the provision of active transport links. The Project Description must be amended to include the active transport links. If the Project is approved active transport links must be explicitly documented in any Instrument of Approval involving the Rozelle interchange. Any Instrument of Approval must commit to their provision prior to opening of the Project to traffic.

Matter 8.26, p81

The Proponent shall provide assurance that the two separated cycleways proposed on Victoria Road near Robert Street and near Springside Street will be joined with a protected cycleway along Victoria Road between the Iron Cove and Anzac Bridges as shown in the Active Transport Strategy (Figure 4.5 Appendix N, p21).

Matter 8.27, p81

The Proponent shall provide certainty that the separated cycleway in Johnston Street Annandale shown in the Active Transport Strategy (Figure 5.5, Appendix N, p28) will be fully implemented in the short term.

Response

The scope of the Road Network Performance Review will be in accordance with the conditions of approval for the project, which is a matter for DP&E to consider during assessment.

Identification of existing walking and cycling needs and infrastructure

Appendix N (Technical working paper: Active transport strategy) of the EIS has been developed in accordance with the SEARs for the project and through the analysis and consideration of:

- The current active transport routes within the vicinity of the project interchanges
- Planned and proposed active transport routes
- Key strategies and documents including *Sydney's Cycling Future* and Inner Sydney Regional Bicycle Network (refer to section 2.3 of Appendix N (Technical working paper: Active transport strategy) of the EIS for a complete list of strategies and documents considered)
- Outcomes of consultation with key stakeholders including relevant councils, Transport for NSW, DP&E, bicycle user groups and UrbanGrowth NSW.

Figure 2.1 of Appendix N (Technical working paper: Active transport strategy) of the EIS provides an overview of the methodology used to understand the existing walking and cycling needs and infrastructure in the vicinity of the project, as well as the broader area. The existing active transport network in section 3.0 of Appendix N (Technical working paper: Active transport strategy) is designed to include significant active transport networks and was not intended to identify all routes.

Consideration of planned and proposed active transport links

In addition to the existing and M4-M5 Link proposed active transport routes, future active transport routes proposed by others are also identified in Chapters 4 and 5 of Appendix N (Technical working paper: Active transport strategy) of the EIS. These are also included in a number of network plans in Chapters 3 to 5 of Appendix N (Technical working paper: Active transport strategy) of the EIS. Future links around the project are shown in Figure 5.1 to Figure 5.8 of Appendix N (Technical working paper: Active transport strategy) of the EIS. The summary table in Table 7.1 of Appendix N (Technical working paper: Active transport strategy) of the EIS clearly identifies those links which would be delivered by the project, and planned and proposed links that would be delivered by others.

Inclusion of active transport in the project description

Active transport elements of the project are identified as a key component of the project as described in Chapter 5 (Project Description) of the EIS. Details of the proposed pedestrian and cyclist facilities are described throughout section 5.6 of the EIS for the Rozelle interchange and in section 5.7.4 of the EIS for the Iron Cove Link. These sections also contain figures of the surface work locations which includes locations of the shared paths which form part of the project.

Conditions of approval containing specific reference to the opening of active transport links prior to the opening of the road infrastructure is a matter for DP&E to consider during their assessment.

Assurance that the cycleways being delivered by others will be delivered

The provision of cycleways that may be delivered by others as identified in Appendix N (Technical working paper: Active transport strategy) of the EIS is beyond the scope of the EIS.

Consideration of active transport links in the cumulative assessment

A number of active transport projects were considered, but not assessed as part of the cumulative impact assessment as noted in Appendix C (Cumulative impact assessment methodology) of the EIS. This includes the GreenWay and the Lilyfield Road Regional Bike Route. Justification for exclusion of these projects in the cumulative assessment is discussed in Table 1-2 of Appendix C (Cumulative Impact Assessment Methodology) of the EIS and further detail is provided in the response in **section B10.25.1**. Notwithstanding this, these projects were considered in the Active transport strategy at Appendix N (Technical working paper: Active transport strategy) of the EIS.

Construction impacts to active transport users

Table 6-20 of the EIS describes the indicative modifications to pedestrian and cyclist facilities during construction. Pedestrian and cyclist access and connectivity would be maintained where possible, throughout the construction phase. Where it would not be feasible to use existing access, alternate routes would be provided and communicated to the community. Pedestrian and cyclist movements around construction ancillary facilities would be managed in accordance with a CTAMP (see **Chapter E1** (Environmental management measures)).

Section 7.4.7 of Appendix H (Technical working paper: Traffic and transport) of the EIS describes possible alternative routes during construction. These would be confirmed during detailed design as part of the preparation of the CTAMP for the project. Temporary diversions to active transport routes would be minimised wherever reasonable and feasible, however some diversions would be required over the course of the project to maintain the safety of all road users including motorists, cyclists and pedestrians.

As described in Table 6-20 of the EIS, the removal of two active transport bridges at Rozelle (east-west over Victoria Road and north-south over The Crescent (City West Link)) would occur during construction. In recognition of the importance of these connections for active transport users in the Rozelle area, these active transport bridges would not be removed until equivalent connections are established.

In addition, the connection through Buruwan Park between The Crescent and Bayview Crescent/Railway Parade at Annandale would be removed. Roads and Maritime acknowledge that the temporary diversion of this route during construction via The Crescent, Johnston Street and Kentville Avenue at Annandale would increase travel times due to the longer distance and the grade of some of these roads. It is not possible to install the permanent connections prior to the removal of the connection through Buruwan Park due to the need to carry out the realignment of The Crescent including the reconstruction of the City West Link/The Crescent intersection prior to the establishment of these active transport connections. However, Roads and Maritime will investigate opportunities to improve the temporary diversion of the active transport connection between The Crescent and Bayview Crescent/Railway Parade at Annandale during the preparation of the CTAMP.

At the completion of construction this connection would reinstated, albeit in a new configuration which would link directly with the Rozelle Rail Yards via a bridge over City West Link/The Crescent. Refer to the connectivity section of section 13.5.3 of the EIS for further details about this connection.

The City of Sydney has been consulted with during the development of the Active transport strategy. Further consultation on proposed temporary and permanent changes to active transport facilities and routes during planning and construction as identified in section 6.0 of Appendix N (Technical working paper: Active transport strategy) of the EIS would be carried out, including during the development of the CTAMP and the UDLPs, which will detail the temporary and permanent active transport infrastructure that will be delivered by the project respectively.

Operational active transport connectivity

A Social Infrastructure Plan will be prepared for the project during detailed design, which identifies the measures that will be delivered by the project to improve community connectivity in areas affected by the project, including those associated with pedestrian and cyclist access as reflected in the environmental management measure OSE8 in **Chapter E1** (Environmental management measures). The plan will be prepared in consultation with the community and relevant councils.

The project will include the provision of new active transport connections that would substantially improve connectivity around the Rozelle and Lilyfield areas.

Around the Rozelle interchange, key north–south connectivity would be established via the two new bridges over City West Link. These links would greatly improve accessibility between Glebe/Annandale and Rozelle/Lilyfield. They would also provide connectivity between the Rozelle Bay and Iron Cove, through key green spaces of Bicentennial Park, open space at the Rozelle Rail Yards, Easton Park and Callan Park.

East–west connectivity would be provided through the site connecting to the Lilyfield Road cycleway adjacent to the CBD and South East Light Rail Rozelle maintenance depot. A path would be provided that connects to the existing Anzac Bridge shared path by travelling underneath the Victoria Road/City West Link intersection. This connection would provide future possibilities for connections into The Bays Precinct.

Delivery of an active transport link at Iron Cove would improve pedestrian and cyclist connectivity in the area. The Iron Cove active transport link would be developed for the project and would be a key connector that would:

- Connect the northern suburbs of Drummoyne (and Russell Lea and Five Dock via the Bay Run) to The Bays Precinct and the Sydney CBD
- Connect the existing retail centres on Darling Street and Victoria Road as well as local schools and other community services
- Provide a direct route, notwithstanding significant gradient changes, from Iron Cove towards Darling Street
- Connect to active transport routes on local routes
- Link significant open space from the Bay Run, Callan Park and the future open space at Rozelle Rail Yards and foreshore along The Bays Precinct.

As identified in Appendix N (Technical working paper: Active transport strategy) of the EIS, active transport connections to be provided by the project have been designed in consideration of and to integrate with the broader existing and planned active transport network. The connections to be provided by the project, as well as planned or proposed active transport connections that would be provided by others is outlined in Table 7.1 of Appendix N (Technical working paper: Active transport strategy) of the EIS.

B10.8.16 Insufficient consideration of pedestrian and cyclist safety

Section 8.1 Key Findings, p48

The impacts imposed on pedestrian and bicycle riders during construction would be significant and unacceptable.

Section 8.12, commencing p75

The SEARs requires an assessment of the likely risks to public safety with particular attention to pedestrian safety. The EIS completely fails to address this requirement.

In chapter 8, Traffic and Transport, pedestrian safety is not mentioned at all. Discussion about pedestrian issues almost entirely refers to diversions, longer walking times to bus stops or light rail and safety impacts as a result of construction vehicles or faster flowing traffic.

Appendix H acknowledges pedestrian safety issues as a result of freer flowing traffic on Victoria Road but offers nothing to address the issue.

Response

An assessment of the safety impacts to pedestrians and cyclists during construction is included in section 8.3 and section 7.4.7 of Appendix H (Technical working paper: Traffic and transport) of the EIS. Safety considerations associated with pedestrian and cyclist movements around construction ancillary facilities would be considered as part of the CTAMP (see **Chapter E1** (Environmental management measures)).

Long-term traffic control plans, temporary works and traffic staging plans and pedestrian and cycle infrastructure will be subject to independent road safety audits that will be carried out in accordance with *Road Safety Audits Guide* (TC2003/RS03) (Roads and Maritime) and with reference to current practices outlined in *Austroads Road Safety Audit Guide* (2nd Edition 2002). Road safety audits will assess the safety performance of any new or modified local road, parking, pedestrian and cycle infrastructure provided as part of the SSI (including ancillary facilities) to ensure that they meet the requirements of relevant design, engineering and safety guidelines, including *Austroads Guide to Road Design (2010)*. The process for the carrying out of road safety audits would be detailed in the CTAMP that will be prepared for the project.

Issues identified in the road safety audit will be responded to by:

- Detailing actions taken/to be taken to address each of the issues raised
- Providing justification for proposals and actions on particular issues raised.

B10.8.17 Active transport during construction

Section 8.1 Key Findings, p48

The impacts imposed on pedestrian and bicycle riders during construction would be significant and unacceptable.

Section 8.12, commencing p75

During construction pedestrians would be diverted via longer walking routes including steep hills and long delays at traffic signals. Pedestrians would have to navigate heavy vehicles on Parramatta Road, Pyrmont Bridge Road, Victoria Road and Darley Road and Campbell Road.

The EIS dismisses the construction impacts on pedestrian movements by saying changes would be confirmed following the appointment of the design and construction contractor.

Section 8.12.3, commencing p81

Inadequate consideration of construction impacts on pedestrians and bicycle riders

The EIS commits to maintaining vehicle access on the road network with staged traffic plans during construction. Only ‘minimal consideration’ is given to maintaining access for active transport and public transport.

Little information is provided about access during the five years of construction. The closure of popular walking and cycling links is proposed but no measures to address the needs of the users are proposed in response.

During construction the EIS states there will be longer walking times to bus stops and delays at intersections as well as reduced amenity for bus passengers waiting at stops. The criterion for assessing the impact on walking and cycling routes is based on distance only. It does not account for the additional time, difficultly or safety of any diversions. These matters must be considered when planning for people walking and cycling during construction.

The EIS refers to temporary closures of the Victoria Road shared paths saying that one side would remain open at all times however, crossings on Victoria Road are spread out requiring steep or long deviations as well as delays with some intersections not currently providing any pedestrian access such as Victoria Road and Robert Street.

Existing access for pedestrians and bicycles must be maintained throughout construction until equal alternative links are provided.

Response

Potential impacts on pedestrians and cyclists during construction are described in **section B10.8.15** and **section B10.8.16**.

Active transport on Victoria Road during construction

Section 6.6.2 of Chapter 6 (Construction work) of the EIS describes the indicative modifications to the pedestrian and cyclist network during construction. As noted, temporary, periodic closure of the shared paths on the eastern and western sides of Victoria Road at Rozelle would be required. Works would be staged so that the shared path on either the eastern or western side of Victoria Road at Rozelle would remain open at all times.

Pedestrian and cyclist access and connectivity would be maintained where possible, throughout the construction phase. Where it would not be feasible to use existing access, alternative routes would be provided and communicated to the community. Pedestrian and cyclist movements around construction ancillary facilities would be managed in accordance with a CTAMP (see **Chapter E1** (Environmental management measures)).

It is also expected that pedestrian and cyclist safety during construction would be reviewed in road safety audits (where required), which would be undertaken in accordance with the conditions of approval for the project.

B10.8.18 Active transport during operation

Section 8.1 Key Findings, p48

The Active Transport Strategy referred to in the EIS demonstrates a poor understanding of existing walking and cycling needs and infrastructure particularly near the Rozelle interchange.

The proposed active transport infrastructure discussed in the EIS lacks sufficient detail and is inconsistent. It is not included in the Project Description and no commitment has been given to delivery of the active transport links.

Section 8.12, commencing p75

The NSW Government failed to deliver any pedestrian improvements to Victoria Road with duplication of Iron Cove Bridge in 2011. Despite claims that the $175 million project would provide active transport facilities, footpaths remain barren and hazardous with long waiting times to cross roads. Should this Project go ahead, it must include improvements to the walking environment on Victoria Road with improved footpaths and street trees.

Matter 8.24, p 76

The Project must improve the walking environment on Victoria Road, including improving footpaths and planting street trees.

Response

The Iron Cove Bridge duplication included the provision of a shared pedestrian and cycle path which connects the Drummoyne and Rozelle sides of the Bay Run.

The project would deliver around 3.8 kilometres of new and upgraded pedestrian and cycling infrastructure. Much of this infrastructure would be physically separated from the road network to minimise the interface between pedestrians, cyclists and motor vehicles. This enhancement is considered a major positive impact, as it would result in a significant, long-term change to the social and economic environment, benefiting a large number of people. Active transport links being delivered as part of the project are listed in **section C8.20**.

Throughout the development of the project concept design, active transport (pedestrian and cyclist infrastructure) has been a key consideration. Following exhibition of the EIS and in response to submissions, additional work will be undertaken to build on the work completed to date, and to ensure pedestrian and cyclist facilities are consistent with existing State and local government policies and strategies.

Trees on the western side of Victoria Road just north of Quirk Street in Rozelle would be retained as shown on Figure 5-4 of the EIS. Additional trees, planted as part of the replacement tree strategy (see environmental management measure B6 in **Chapter E1** (Environmental management measures)) may be considered in consultation with councils during the development of UDLPs. Further, landscaping works would be carried out within the new areas of open space that would be provided on the southern side of Victoria Road between Springside Street and the eastern abutment of Iron Cove Bridge. This would include the provision of pedestrian and cycling paths and street trees. These elements would be detailed in the UDLPs that would be prepared for this area.

Reinstatement of the shared path between Quirk Street and The Crescent is included in the surface works for the Rozelle interchange as also shown on Figure 5-4 of Chapter 5 (Project description) of the EIS. It is expected that this section of the shared path would be reinstated in an improved condition relative to the existing condition of this path.

B10.9 Air quality

Refer to Chapter 9 (Air quality) and Appendix I (Technical working paper: Air quality) of the EIS for details of air quality.

B10.9.1 Objection on the basis of air quality impacts

Section 9.1

The City of Sydney objects to the road being approved as it will lead to decline[~~s~~] in air quality.

Response

The City of Sydney's objection is noted.

For some air quality metrics (1-hour nitrogen dioxide (NO_2) and 24-hour particulate matter with 10 micrometers and 2.5 micrometers (PM_{10} and $PM_{2.5}$)), exceedances of the criteria are predicted to occur both 'With' and 'Without' the project. However where this is the case, the total numbers of receptors with exceedances are predicted to decrease slightly with the project and in the cumulative scenarios. That is, the project would result in a better overall outcome than the 'Without project' scenario because of the reduction in surface road traffic.

A key operating restriction for tunnels in Sydney is the requirement for there to be no emissions of air pollutants from the portals. To avoid portal emissions, the design would ensure that polluted air would be expelled from one or more elevated ventilation outlets along its length. The ventilation outlets would be designed to effectively disperse the emissions from the tunnels and are predicted to have negligible impact on local ground level concentrations. The heights of the ventilation outlets have been optimised to provide the most effective dispersion within the constraints of height limitations imposed by air safety requirements.

B10.9.2 Flawed traffic modelling used for air quality impact assessment

Section 9.1

The M4-M5 Link EIS traffic figures used to estimate air pollution generated by WestConnex roads are alarmingly flawed and call into question the accuracy of the whole EIS.

The M4 East EIS states vehicles in the study area travelled 14.5 million kilometres each day in 2014 (p9.45). The M4-M5 Link EIS (p94) states 11.5 million kilometres are travelled each day. This substantial discrepancy is of grave concern and calls into question the EIS modelling.

Concentrations of $PM_{2.5}$ (annual mean and 24 hour mean) and PM_{10} (max 24 hour mean) are near the current standard and in excess of proposed standards (p9-81, p9-93). Given the modelling omits to consider 3 million kilometres per day being travelled in the study area, the impact on exceedances must be greater than currently stated.

Matter 9.1

Given that the air quality modelling is based on significantly compromised traffic modelling, and with poor air quality having a significant health impact, the EIS should not be approved until an independent, appropriately qualified reviewer has analysed the stated air quality outcomes and identified any deficits.

Response

The traffic modelling is not flawed. The model has used the most recent traffic data collected for the project and from a range of reliable sources, as described in Section 4 of Appendix H (Technical working paper: Traffic and transport) of the EIS.

As per the reference in the City of Sydney's submission to page 94 of Appendix I (Technical working paper: Air quality), the values of 14.5 million VKT for the M4 East EIS and 11.5 million VKT for the M4-M5 Link are the total million vehicle kilometres for the WestConnex GRAL modelling domain in the baseline years used for the studies. The GRAL domain refers to the dispersion model used for the operational ambient air quality assessment (refer to section 9.4.2 of the EIS for further detail).

The M4 East EIS used traffic demand forecasts from the WRTM v2.1 which was refined for the M4-M5 Link to WRTM v2.3. In addition, the base and forecast years, land uses and demographics were different for both projects. The M4 East used a base year of 2014 and forecast years 2021 and 2031, while the M4-M5 Link used a base year of 2015 and forecast years of 2023 and 2033. Since the M4 East traffic assessments were undertaken, updates and enhancements to the WRTM inputs and zones have occurred. These included updated land use and population forecasts, including revised land use development along Parramatta Road, The Bays Precinct, the Western Sydney Airport and in Mascot town centre.

For PM_{10} and $PM_{2.5}$, background levels are already at or slightly above the criterion for both the annual and 24 hour means. Therefore, PM_{10} and $PM_{2.5}$ exceedances of the NSW annual mean criteria (25 µg/m^3 and 0.8 µg/m^3 respectively) are predicted to occur both with and without the project. Due to the reduction in surface traffic as a result of the project, the number of receptors with exceedances of the criteria is predicted to decrease slightly.

The air quality assessment was reviewed by independent international reviewers engaged by the NSW Office of the Chief Scientist and Engineer on behalf of the NSW Government Advisory Committee on Tunnel Air Quality (ACTAQ). The main finding of the review was that:

'Our overall conclusion of the WestConnex EIS is that it constitutes a thorough review of high quality. It covers all of the major issues and areas that an EIS for a project of this scale should. The information presented is of suitable detail and logical in order. The choices made regarding data used and methods followed have been logical and reasonable and it is our view that the benefit of exploring alternative approaches would be questionable or marginal' (page 2)[16].

B10.9.3 Air quality impacts due to future vehicle emission standards

Section 9.2

Vehicles are becoming increasingly efficient, but more rigorous emissions standards incorporating Particulate Matter (PM) have only been in place in Australia since 2013 and only apply to emissions; there are no measures in place to reduce the significant non-emission vehicle contribution to particulates. In NSW around 78% of the vehicle fleet was manufactured before these regulations were put in place[17].

The significant declines in pollutant reported in the EIS are largely due to improvements to in-vehicle technology and fuel. However, plans to improve standards for heavy vehicles, which disproportionately contribute to nitrogen oxide emissions and thus ozone, appear to have stalled.

[16] https://majorprojects.accelo.com/public/082ec5861c25e7624d52cb97860c7f61/WestConnex%20M4-M5%20Chief%20Scientist%20Submission.pdf

[17] http://www.rms.nsw.gov.au/about/corporatepublications/statistics/registrationandlicensing/tables/table113_2017q2.html (accessed 20 September 2017) [originally reference 23 in the City of Sydney submission]

The EIS needs to provide a model of the air quality impacts due to delays in adopting improved emission standards.

Matter 9.2

Before a determination is made the proponent must model the air quality impacts due to delays in adopting improved emission standards.

Response

Improvements to in-vehicle technology and fuel would contribute to the declines in pollutants reported in the EIS. Further discussion about declines in pollutant levels due to changes in in-vehicle technology and a sensitivity analysis are provided in **section B2.1.3**.

B10.9.4 Emissions from ventilation stack

Section 9.3

The St Peters and Rozelle interchanges are of particular concern. St Peters will have large volumes of vehicles accelerating and decelerating as they enter and exit tunnels and access roads, next to proposed playing fields. This is complicated by emissions stacks located in the interchange – pollution from the interchange would be intensified by the emissions from the stacks.

The Rozelle interchange has an unprecedented concentration of stacks, in a valley, adjacent to densely populated suburbs. The interchange has long, steep climbs, which will increase emission concentrations, which will then be pumped into the surrounding area. The modelling does not account for stop-start conditions, yet the EIS shows significant traffic volumes heading onto the Anzac Bridge. There will be significant queues heading into the tunnels, greatly increasing the level of emissions. The bridge currently operates at the lowest Level of Service (F) in peak times.

The existing M5 in peak conditions may provide a more realistic base line.

Response

The air quality assessment included all contributors to air quality, including the surface roads, the contribution of the ventilation outlets and the background air quality.

The emissions model used to estimate vehicle emissions for the ventilation design of the M4-M5 Link project including the Rozelle interchange accounts for the effects of all of the different grades within the tunnel system and congested or stop-start conditions on the likely emissions. The dispersion model also takes into account local terrain and topography, such as Rozelle being located within a valley.

The assessment of potential air quality impacts from the operation of the project (refer to Appendix I (Technical working paper: Air quality) of the EIS) assessed two scenarios for ambient air quality: expected traffic scenarios and regulatory worst case scenarios. The regulatory worst case scenarios represented the theoretical maximum changes in air quality for all potential traffic operations in the tunnel, including unconstrained and worst case traffic conditions from an emissions perspective, as well as vehicle breakdown situations (refer to section 5.5.2 and section 5.5.3 of Appendix I (Technical working paper: Air quality) of the EIS). The assumptions underpinning these scenarios were very conservative, and resulted in contributions from project ventilation outlets at ground level that were much higher than those that could occur under any foreseeable operational conditions in the tunnel.

The air quality impact assessment in the EIS determined that emissions from the project ventilation outlets at St Peters and Rozelle, even in the regulatory worst case scenarios, would not result in significance contributions to ground level concentrations of pollutants (refer to section 8.4.12 of Appendix I (Technical working paper: Air quality) of the EIS). Ambient air quality monitoring will be carried out during operation of the project to monitor air quality impacts from the project (see environmental management measure AQ29 in **Chapter E1** (Environmental management measures)).

B10.9.5 Potential air quality impacts around tunnel portals

Section 9.4

The EIS (9.2.5) states that the tunnel portals are required to operate with no emissions of air pollutants from the portals. Given the increase in traffic volumes, and anticipated congestion at portals there will most likely be concentrated zones of vehicular exhaust emissions.

Response

Any congestion on the surface road network and the tunnels has been included in the assessment of surface road traffic in the air quality assessment. Any changes in the local air quality are shown in the contour change plots in section 9.7.3 of the EIS. These plots show an improvement in air quality on the surface road network along the route of the tunnels, although some of the surface road network such as to the north of the Iron Cove Link and near Anzac Bridge show increases in pollutant concentrations due to increased traffic volumes in the 'With project' scenario.

Entry and exit ramps would vary in size and shape in response to local conditions, but all are designed to minimise gradient changes and congestion at the project portals both when vehicles are entering and exiting the tunnels. This would therefore minimise vehicles emissions being concentrated near tunnel ramps at either end of the project.

B10.9.6 Exposure to particulates

Section 9.5

Should the Project proceed, local surface roads will be widened and traffic volumes will increase. The dual effects of induced traffic and toll avoidance will see traffic volumes increase and congestion worsen, increasing exposure to particulate matter across metropolitan Sydney.

Research has shown that any exposure to particulate matter generated by traffic is detrimental to health: there is no safe exposure level. It is a classified carcinogen. Further, children, the elderly, people with chronic disease and people otherwise generally susceptible are particularly at risk of the health effects of traffic related particulate matter. These particulates are a classified carcinogen and are known to have critical, and at times fatal, consequences if elevated.

The EIS shows that concentrations of $PM_{2.5}$ and PM_{10} in Sydney are already near the current Australian standard and in excess of proposed standards (p9-81, p9-93).

The City objects to the omission of a figure for the annual mean $PM_{2.5}$ concentration at community receptors (with-project (DS) and cumulative (DSC) scenarios, relative to corresponding Do Minimum scenarios) which would show exceedances at all receptors.

Matter 9.3

Before the EIS is determined the Proponent must publish a figure setting out the "annual mean $PM_{2.5}$ concentration at community receptors (with-project (DS) and cumulative (DSC) scenarios, relative to corresponding Do Minimum scenarios)" in the same way it has been set out in Volume 1B, Figures 9-27, 9- 33, 9-39, 9-45.

Response

The figure requested in City of Sydney's submission is included as Figure 8-71 in Appendix I (Technical working paper: Air quality) of the EIS and shown in **Figure B10-3** below. Figure 8-72 of Appendix I (Technical working paper: Air quality) of the EIS was erroneously added to Chapter 9 (Air quality) of the EIS (as Figure 9-51) instead of Figure 8-71. This error has been captured in the clarifications chapter of this report (see **Chapter A4** (Clarifications)).

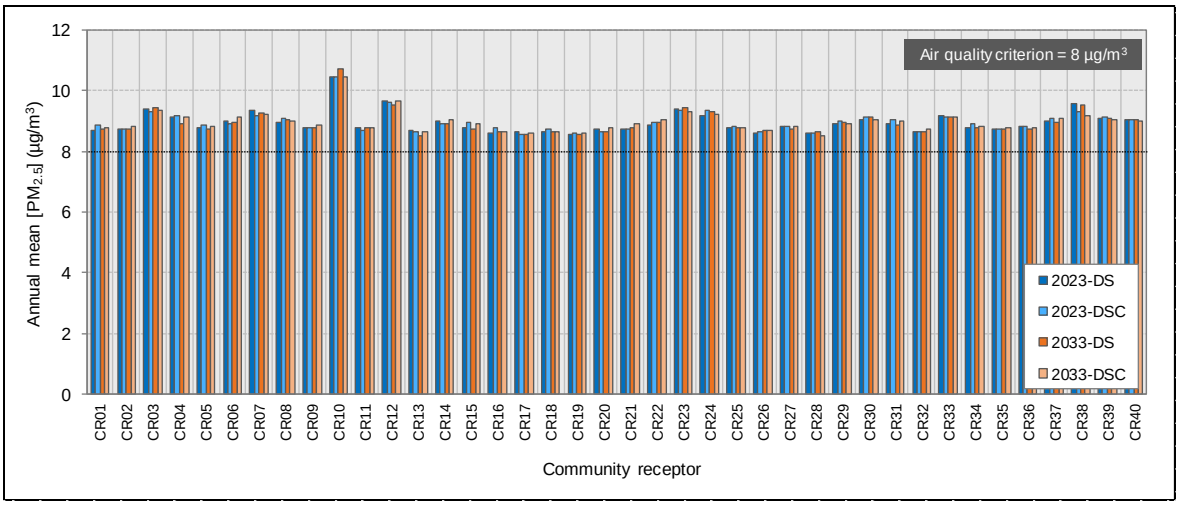


Figure B10-3 Annual mean $PM_{2.5}$ concentration at community receptors (with-project and cumulative scenarios) for 2023 and 2033

Results for community receptors

Figure B10-4 presents the annual mean $PM_{2.5}$ concentrations at the community receptors. The results are based on an assumed background concentration of 8 µg/m^3 (which is the NSW Environment Protection Authority (NSW EPA) criteria and therefore the figure shows exceedances at all receptors. Internationally, there are no standards lower than 8 µg/m^3 for annual mean $PM_{2.5}$. The next lowest is 12 µg/m^3 (California and Scotland).

Figure B10-4 (Figure 9-51 in the EIS) shows predicted changes in annual mean $PM_{2.5}$ concentration at community receptors (with-project (DS) and cumulative (DSC) scenarios, relative to corresponding Do Minimum scenarios for 2023 and 2033). Any increases with the project were generally less than 0.2 µg/m^3; the largest increase (0.56 µg/m^3 receptor CR38, in the 2033-DS scenario) equated to seven per cent of the air quality criterion. The predictions, although in excess of the criterion, generally show an improvement in particulate concentrations due to the project.

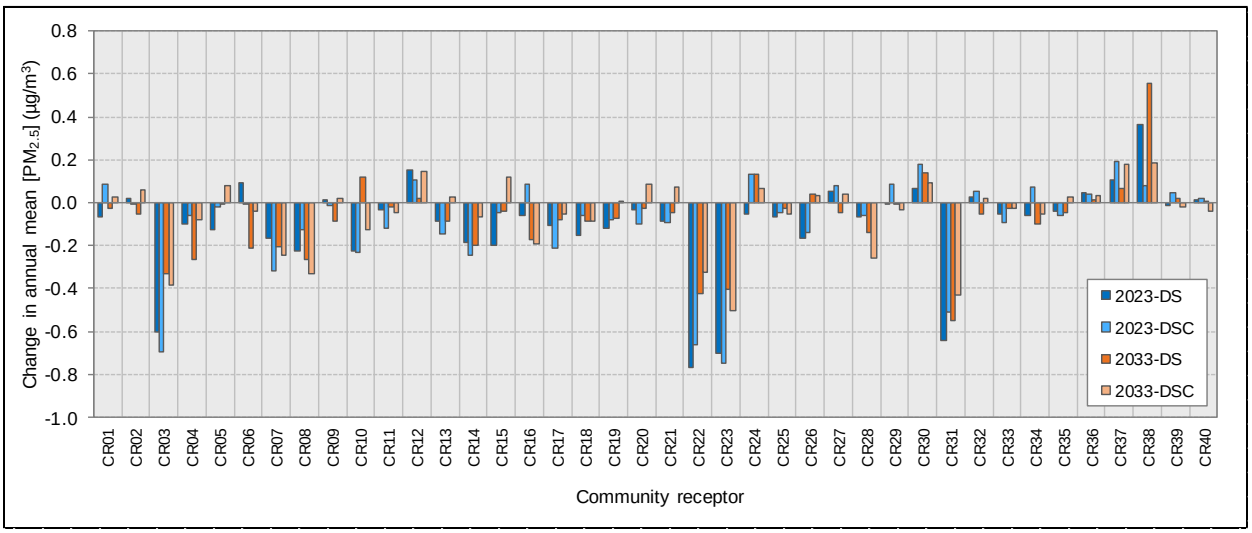


Figure B10-4 Change in annual mean $PM_{2.5}$ concentration at community receptors (with-project (DS) and cumulative (DSC) scenarios, relative to corresponding Do Minimum scenarios for 2023 and 2033)

B10.9.7 Ozone emissions

Section 9.6, p87

The EIS states that the impact on regional air quality is minimal and that the Project's impact on ozone is negligible. Ozone is a major pollutant and Western Sydney, and Campbelltown in particular, suffers the worst ozone pollution. Major components of ozone are generated in eastern Sydney and drift West. Previous State environment agencies have previously discussed the need for an eight-hour standard for ozone (DECCEW 2010, State of Knowledge: Ozone).

Matter 9.4, p88

Before the project is determined the EIS should model the cumulative impact of proposed new motorways on an eight hour ozone standard of 0.08 ppm [particles per million].

Response

NSW EPA has developed an ozone assessment tool: *Tiered Procedure for Estimating Ground Level Ozone Impacts from Stationary Sources* (ENVIRON 2011). Although this procedure does not relate specifically to road projects, it was applied to the project to give an indication of the likely significance of the project's effect on ozone concentrations in the broader Sydney region. The results from the tool, shown in section 8.5 of Appendix I (Technical working paper: Air quality) of the EIS, shows that for the 2023 and 2033 DSC scenarios, the incremental ozone concentration is below the screening impact level.

The scope of the EIS does not extend to consideration of potential future ozone emission standards.

B10.9.8 Health impacts

Section 9.7, p88

The adverse health impacts of living close to busy roads is well documented and studies looking specifically at Sydney have shown consistent results. These health impacts include increased mortality, respiratory and cardio-vascular disease, and adverse birth outcomes. Many other health impacts have also been associated with living near busy roads including cancers.

While larger particulates are concentrated in road corridors, smaller particulates are more evenly spread across the urban area as the smaller particles remain airborne. People living within 500 metres of heavily affected areas have demonstrably shorter lives, much higher incidences of chronic lung conditions and higher levels of cardiovascular diseases.

As two-thirds of the NSW population lives in metropolitan Sydney in relatively close proximity to major roads, vehicles are one of the most important sources of PM [particulate matter] exposure in NSW and therefore a significant contributor to negative health outcomes.

Response

Potential health impacts on the community as a result of the project have been assessed in detail in Chapter 11 (Human health risk) and Appendix K (Technical working paper: Human health risk assessment) of the EIS. As the larger part of the project alignment would be underground, the operation of the project is predicted to result in a decrease in total pollutant levels in the community. There would be a redistribution of vehicle emissions associated with redistribution of the traffic on surface roads. For much of the community this would result in no change or a small improvement (ie decreased concentrations and health impacts), however for some areas located near key surface roads, a small increase in pollutant concentration may occur. Potential health impacts associated with changes in air quality (specifically nitrogen dioxide and particulates) within the local community have been assessed and are considered to be acceptable in relation to the applicable standards.

B10.9.9 Planning controls

Matter 9.5, p92

Future development of land (including re-zonings) in the vicinity of the Campbell Road ventilation facility requires planning controls to be developed to ensure future developments at heights 10 metres or higher are not adversely impacted by the ventilation outlets.

Response

Future developments to the height of 10 metres should be possible at all locations in the air quality study area, including those in the vicinity of Campbell Road, as discussed in section 9.7.5 of the EIS. As noted in section 11.5.1 of the EIS, the appropriate recommended height for planning controls at St Peters is 10 metres and above. The figure of 30 metres mentioned in Chapter 9 (section 9.7.5) of the EIS is a typographical error. This error has been corrected in **Chapter A4** (Clarifications).

B10.10 Noise and vibration

Refer to Chapter 10 (Noise and vibration) and Appendix J (Technical working paper: Noise and vibration) of the EIS for details of noise and vibration.

B10.10.1 Adequacy of the noise assessment

Key Findings, p93

The operational noise impacts are based on questionable traffic modelling inputs and outputs and cannot be judged as reliable

Section 10.2, p93

The EIS states that not all noise impacts are assessed. The approval process has deferred assessment of impacts that may not be completely known until detailed assessments, not necessarily finalised at the EIS stage, are complete. This makes it difficult to comment on the EIS.

Response

Adequacy of traffic modelling for use in noise impact assessment modelling

A response to the City of Sydney's concerns regarding the adequacy of the traffic modelling is provided in **section B10.8.1**.

Noise impact modelling that uses traffic inputs derived from the traffic modelling are therefore also considered as accurate as possible within the limitations of modelling as described in **section B10.8.1**.

Timing for detailed assessments of potential noise and vibration impacts

The noise and vibration assessment has been undertaken on the concept design and construction methodology, which may change during detailed design when additional information regarding construction activities and the detailed design is available. The detailed design and construction methodology would need to be consistent with any environmental management measures, conditions of approval for the project and other requirements identified during the assessment of the project.

Assessment of operational noise impacts

The potential operational noise impacts due to the project have been assessed in accordance with the SEARs and applicable guidelines using a detailed and purpose built numerical model calibrated using real word traffic and ambient noise data. The model provides a realistic prediction of future operational noise levels due to the project.

The modelling indicates that less than one per cent of receivers are predicted to experience an increase of more than 2 dBA due to the project. Marginal increases (1-2 dBA) are predicted on The Crescent and parts of Johnston Street, and also on some of the adjacent roads, such as Gordon Street, associated with increased volumes due to redistribution of traffic. In addition, significant reductions in noise (up to around -4 dB) are identified along sections of Victoria Road in Rozelle, where the project is forecast to significantly reduce traffic numbers.

Large increases in noise (up to around 15 dBA) due to the project are predicted on Victoria Road near Iron Cove Bridge in the vicinity of the proposed tunnel portals and near the new Victoria Road bridge, where the project results in traffic lanes being moved closer to receivers, in combination with removing existing screening due to property acquisitions. These predicted increases are generally limited to the receivers that would have partial or direct line-of-sight to Victoria Road once the acquired buildings are demolished.

A total of 431 receivers (200 individual buildings) are predicted to have exceedances of the operational road traffic noise criteria for the project and are therefore eligible for consideration of additional noise mitigation. Of these, 383 receivers (173 individual buildings) are identified as residential, and 48 (27 individual buildings) are identified as other sensitive receivers.

The operational noise impacts would be reassessed based on the detailed design to confirm the selection of appropriate mitigation measures.

Management of potential operational impacts

The operational assessment has identified the potential noise benefits associated with the use of low noise pavement, noise barriers and at-property treatment. However, due to engineering uncertainties and urban design considerations, a provisional noise mitigation option in the form of at-property treatment has been recommended.

A preferred noise mitigation option (Open Graded Asphalt or equivalent, noise barrier, architectural treatments, a combination or other) would be determined during detailed design, taking into account whole-of-life engineering considerations and the overall social, economic and environmental effects. The preference will be given to selecting noise mitigation measures that reduce outdoor noise levels and the number of at-property treatments. Detailed investigations would be carried out for the area around Victoria Road near Iron Cove Bridge to develop an optimum suite of mitigation options, in consultation with the community, to address the large predicted increases in road traffic noise at that location (largely due to the removal of existing buildings in this area which offer shielding to the road).

B10.10.2 Construction noise and vibration impacts

Key Findings, p93

- Residents adjoining the roadway will be subject to sleep disturbance noise 20dB in excess of sleep disturbance criteria along with significant ground borne noise, vibration impact and high levels of airborne noise
- Construction noise and vibration will have a considerable impact on the City and this is likely to continue for a number of years
- There is the potential for vibration to physically damage private property and heritage and culturally significant items.

Section 10.3, p93

Sensitive receivers will be subject to sleep disturbance, ground borne noise, vibration impact and high levels of airborne noise.

- St Peters
  - The access point at St Peters has the potential to increase noise impact due to the intensified road traffic on the existing above ground road network
- Rozelle
  - Operations to the north of Bicentennial Park and Glebe will breach noise criteria, including sleep disturbance criteria. Reported exceedances are up to 20 db. Properties in the City may not suffer the intense level of disturbance experienced by residents of the Inner West Council, due to distance separation
- Camperdown
  - Properties adjoining Mallett Street will be subject to noise in 20dB in excess of sleep disturbance criteria.

Section 10.4, p95

Vibration is likely to have a significant impact on the City LGA, with potential for vibration to damage private property and heritage and culturally significant items.

Response

Construction noise impacts

Consistent with most major construction projects in urban areas, noise impacts are likely as works require the use of noise intensive equipment and are generally in the near vicinity of sensitive receivers. At any particular location, the potential impacts can vary greatly depending on factors such as the relative proximity of sensitive receivers, the overall duration of the construction works, the intensity of the noise and vibration levels, the time at which the construction works are undertaken, and the character of the noise or vibration emissions.

The proposed strategy for construction noise management and mitigation are described in detail in the response in **section B10.10.1** and in **Chapter E1** (Environmental management measures). However, it is acknowledged that even with feasible and reasonable mitigation measures it may not always be possible to prevent exceedances of construction noise goals, particularly those associated with out-of-hours work that needs to be undertaken at specific times to minimise impacts on the road network.

Management measures to mitigate these impacts will include notifying the community of noise impacts anticipated at specific times. An out-of-hours work (OOHW) protocol will be developed as part of the project wide Construction Noise and Vibration Management Plan to set parameters around how works outside standard daytime construction hours will be carried out, including timing and frequency, and the mitigation measures that will be implemented based on predicted impacts identified through location and activity specific assessments. The OOHW protocol will be developed in consultation with DP&E and NSW EPA. Construction noise and vibration from these works would be regulated by the NSW EPA through the environmental protection licence for the project

Additional mitigation measures for affected receivers may include offering individual briefings on impacts and mitigation measures, respite periods and alternate accommodation. In addition, monitoring will be carried out at the commencement of new noise and vibration intensive activities and works in new locations to confirm that actual noise and vibration levels are consistent with noise and vibration impact predictions and that the management measures that have been implemented are appropriate (see environmental management measure NV5 in **Chapter E1** (Environmental management measures)).

Consultation with the affected receivers will occur in accordance with Community Consultation Strategy (see environmental management measure SE2 in **Chapter E1** (Environmental management measures)) and conditions of approval for the project.

To further manage the impacts associated with longer duration construction impacts from the concurrent construction of the WestConnex component projects in these areas and to respond to issues raised during the construction of other WestConnex projects and in submissions on the M4-M5 Link EIS, the following strategies are proposed:

- Using the Northcote Street civil site for construction workforce car parking and laydown. Currently this site is used as the main tunnelling site for the eastern end of the M4 East project
- Provision of a heavy vehicle truck marshalling facility at the White Bay civil site (C11) at Rozelle, which would cater for around 40 heavy vehicles and stage the release of trucks to the tunnelling sites to manage the arrival of trucks to construction ancillary facilities (see **Part D** (Preferred infrastructure report)). Provision of a truck marshalling facility and additional construction workforce parking would result in several benefits for the community and the project, including:
  - Reducing potential queuing, idling, circling and congestion on local roads surrounding the project and associated construction ancillary facilities
  - Providing additional construction workforce parking spaces, which would minimise construction workers parking on local roads
  - Minimising disruptions to the road network around construction ancillary facilities and noise and other disturbance to the local community including residential, business and commercial properties
  - Improving safety for construction workers, motorists and the general public by providing a controlled area from which project traffic schedulers can manage trucks and direct truck drivers to the construction sites at an appropriate time

- Designing acoustic sheds with consideration of the activities that will occur within them and the relevant noise management levels in adjacent areas. Monitoring will be carried out to confirm that the actual acoustic performance of the sheds is consistent with predicted acoustic performance (see environmental management measure NV7 in **Chapter E1** (Environmental management measures))
- The appointment of a suitably qualified and experienced acoustics advisor, who is independent of the design and construction personnel, and who will be engaged for the duration of construction of the project (see environmental management measure NV1 in **Chapter E1** (Environmental management measures))
- Use of the M4 East and New M5 tunnels for spoil haulage when they become available and where practicable, to minimise heavy vehicle movements on the surface road network
- Consideration of receivers that qualify for assessment for at-receiver treatment due to predicted operational road traffic noise that are also predicted to experience exceedances of noise management levels during construction for at-receiver treatments as a priority (see environmental management measure NV9 in **Chapter E1** (Environmental management measures)).

Specific management and mitigation will be documented in relevant construction environmental management sub-plans such as the Ancillary Facilities Management Plan and the CTAMP (see **Chapter E1** (Environmental management measures)). This will include detailed consideration of the types of activities that would be most likely to cause longer duration impacts during construction of the project, the types of impacts already experienced by these communities as a result of M4 East and New M5 construction, and subsequent development and implementation of location and activity specific mitigation that considers the consecutive nature of construction at these locations.

Rozelle interchange

Appendix J (Technical working paper: Noise and vibration) of the EIS acknowledges that construction activities associated with the Rozelle interchange would result in construction noise levels that would exceed the relevant goals at times in parts of most of the noise catchment areas for construction activities including earthworks, demolition of existing structures, site establishment, road tie-in works, road and intersection modifications and utility adjustments.

The assessment identifies up to 61 receivers that are predicted with high noise impacts (>20 dBA above noise management level (NML)) during out of hours roadworks, which require the use of multiple road work equipment concurrently. This activity would be carried out at different locations over the course of 3.5 years and as such would not impact the same receiver for the total duration of the work. The assessment also identifies up to 29 receivers (predominantly towards the east of the site) that may be highly noise affected during the utility adjustment works at some point within the anticipated 64-week activity schedule (when works are located immediately adjacent to the receiver).

St Peters interchange

Activities within the St Peters study area would occur within the Campbell Road civil and tunnel site (C10) located on the southern side of Albert Street and Campbell Lane in St Peters. The site is currently part of the Campbell Road construction compound for the New M5 project. The assessment of construction road traffic noise around the St Peters interchange identified that construction traffic is unlikely to result in a noticeable increase in ambient (LA_{eq}) noise levels at receivers along the proposed routes. Further detail is provided in section 5.6.3 of Appendix J (Technical working paper: Noise and vibration) of the EIS.

The assessment of construction road traffic noise around the St Peters interchange takes into account the upgrades to local roads being carried out as part of the New M5 project, including Campbell Road and the Campbell Road/the Princes Highway intersection. Changes in road traffic volumes on these roads are therefore included in the assessment.

Pyrmont Bridge Road tunnel site (C9) (Camperdown)

Residential receivers adjoining Mallett Street at Camperdown in the vicinity of the Pyrmont Bridge Road civil and tunnel site are located in Noise catchment area (NCA)41 and NCA44. The predicted worst case noise levels for receivers in these NCAs are presented in Table 5-112 to Table 5-115 of Appendix J (Technical working paper: Noise and vibration) of the EIS. Exceedances of more than 20 dB during the night-time are predicted to occur at the nearest residential receiver within NCA41 as a result of pavement and infrastructure works. There are no predicted exceedances of more than 20 dB during the night-time at residential receivers within NCA44 (refer to Table 5-114 of Appendix J (Technical working paper: Noise and vibration) of the EIS). For pavement works (PYR-05) the operation of the concrete saw dominates the noise predictions and as such, mitigation and management measures would focus on the operation of this item. The use of a concrete saw, however, would only be required intermittently during this activity. It is estimated that when the concrete saw is not in operation, NML exceedances would generally reduce by up to 6 dBA. Works associated with PYR-05 would occur during site establishment, which would account for a relatively small percentage of the total works duration (up to eight weeks).

Review of the predicted $L_{A1(1minute)}$ exceedances at the nearest noise sensitive receivers provided in Annexure F-5 of Appendix J (Technical working paper: Noise and vibration) of the EIS indicates that the sleep disturbance screening criterion is likely to be exceeded when night works are occurring adjacent to residential receivers. At this early stage in the project, the assessment has included predictions of maximum noise impacts for assessment of potential sleep disturbance, however, it is noted that the *Interim Construction Noise Guideline* (NSW DECC 2009) (ICNG) only requires the project to consider maximum noise levels where construction works are planned to extend over more than two consecutive nights.

Construction vibration impacts

Construction vibration impacts as a result of the project are assessed in Chapter 5 of Appendix J (Technical working paper: Noise and vibration) of the EIS. Specific to the City of Sydney LGA, construction vibration impacts at the Pyrmont Bridge Road tunnel site (C9) and St Peters are assessed in sections 5.5 and 5.6 of Appendix J (Technical working paper: Noise and vibration) of the EIS. Ground-borne noise and vibration impacts associated with the construction of the mainline tunnels are described in section 5.7 of Appendix J (Technical working paper: Noise and vibration) of the EIS.

The prediction of vibration during construction was undertaken using three-dimensional models of the existing ground and project design. Vibration can take the form of disturbing human comfort, affecting building contents or damaging the integrity of a building structure. Sources of vibration were modelled at the locations anticipated to form the construction areas for the project and to account for plant and equipment likely to be required to construct the project.

Based on expected plant and equipment to be used during surface work, the key vibration generating equipment are expected to be a vibratory roller and a hydraulic hammer (rock-breaker). This equipment has the potential to exceed:

- The human response vibration criterion within 100 metres of a vibratory roller and 73 metres of a large hydraulic hammer
- The structural cosmetic damage criterion within 25 metres of a vibratory roller and 22 metres of a large hydraulic hammer.

The following sections contain a summary of the potential vibration impacts from surface work. The predicted vibration levels for the locations assessed are representative of the worst case impacts where works are undertaken. Vibration impacts presented are based on a realistic worst case assessment, which is when equipment is operating at the shortest distance to the receiver. For most construction activities, however, it is expected that the vibration from surface construction activities would frequently be lower than predicted at the most-exposed receiver due to increased separation distances.

Potential vibration impacts to human receivers and non-heritage listed buildings

Safe working distances could be encroached by some vibration intensive construction activities in proximity to residential receivers. This has the potential to result in impacts on human comfort and potentially cosmetic structural damage.

Receivers adjacent to the construction areas may perceive vibration impacts during active construction work in their immediate vicinity. This would be expected when equipment such as rock-breakers and other high vibration plant items are operating. In practice, vibration impacts from most construction activities would be intermittent throughout the construction period. The locations where vibration intensive equipment is proposed to be used would be reviewed during detailed construction planning when more specific information is available.

A summary of the expected vibration impacts on human receivers and non-heritage listed buildings within the City of Sydney LGA:

- Pyrmont Bridge Road - up to 33 buildings may be within the minimum working distances for cosmetic damage should a large rock-breaker be used at the outer extents of the site. Under this scenario up to 73 receivers would be within the nominated minimum working distance for human comfort vibration. This includes receivers on the eastern side of Mallett Street within the City of Sydney LGA as shown on the Pyrmont Bridge Road – Sensitive Receivers Minimum Working Distance Large Rock-breaker map set in Annexure J (Construction vibration minimum working distances) of Appendix J (Technical working paper: Noise and vibration) of the EIS
- St Peters - No vibration intensive works are proposed at the Campbell Road civil and tunnel site C10) as part of the M4-M5 Link project.

Potential vibration impacts to heritage structures and buildings

The following is a summary of heritage listed buildings and structures that have been assessed as having the potential to be affected by vibration generated by the project:

- Pyrmont Bridge Road - up to five heritage listed items have been identified as having the potential to be within the minimum safe working distances if a large rock-breaker is used at the outer extents of this site. This includes two heritage listed items within the City of Sydney LGA on the eastern side of Mallett Street as shown on the Pyrmont Bridge Road – Heritage Items Minimum Working Distance Large Rock-breaker map set in Annexure J (Construction vibration minimum working distances) of Appendix J (Technical working paper: Noise and vibration) of the EIS
- St Peters - No vibration intensive work are proposed from the St Peters site (Campbell Road civil and tunnel site C10) as part of the M4-M5 Link project.

Construction ground-borne noise impacts

Based on the concept design, ground-borne noise impacts within the City of Sydney LGA would be contained to the vicinity of the St Peters interchange (west of Sydney Park), where the tunnel ramps climb to meet St Peters tunnel stubs, 39 receivers are predicted to experience noise levels above the criteria. Ground-borne noise would increase as the excavation front moves towards a receiver and decrease as the excavation front moves away. Ground-borne noise levels of up to around 44 dBA $L_{Aeq(15minute)}$ are predicted when tunnelling equipment is located at the shortest distance to the receiver.

While most road-heading works are anticipated to progress at a consistent rate, there may be discreet locations which require a longer duration of tunnelling works due to site conditions. In addition, there will be multiple road headers due to the excavation of the adjacent tunnel tubes and also potential ground-borne noise impacts associated with other in-tunnel excavations such as cross-passages, service trenches and niches (if present).

Vibration and ground-borne noise impacts would be managed in accordance with relevant guidelines and contractor procedures. See **Chapter E1** (Environmental management measures) for details of how vibration impacts would be managed during construction of the project.

B10.10.3 Noise impacts from drafting fans associated with the ventilation facilities

Key Findings, p93

Drafting fans associated with ventilation operations could pose noise impacts.

Response

An assessment of operational noise impacts from fixed facilities is provided in section 6.12 of Appendix J (Technical working paper: Noise and vibration) of the EIS.

The selected mechanical equipment for each facility would be reviewed and assessed against the relevant operational noise criteria at the detailed design stage of the project. Specific plant would be selected and designed to achieve compliance with the relevant criteria. The cumulative noise emissions from all fixed facility noise sources would be considered when determining the appropriate mitigation options.

B10.11 Human health risk

Refer to Chapter 11 (Human health risk) and Appendix K (Technical working paper: Human health risk assessment) of the EIS for details of the human health risk assessment.

B10.11.1 Key findings associated with human health risk

Key Findings, p96

A number of properties located within the project footprint were identified as having a high risk of contamination and these must be further investigated. Project works could adversely impact soil, groundwater and surface water if not managed appropriately. The City has concerns that no further contamination assessments have been proposed prior to construction works.

There is significant potential for structural damage to be caused to property and heritage (including Aboriginal heritage) and the environment generally from vibrations.

The health assessment is inadequate. It does not consider, or assess, the increased health burden of disease resulting from more people driving. Increased rates of driving will also lead to higher levels of crash related injuries and fatalities, with associated increases in health costs. Motorists and cyclists in particular, will be potential exposed to elevated levels of nitrogen dioxide (particularly during traffic congestion).

Response

The human health key findings in City of Sydney's submission are noted.

Human health risk of contamination during construction

Properties at risk of contamination and the potential for contamination to impact on soil, groundwater and surface water are discussed in Chapter 16 (Contamination) and Appendix R (Technical working paper: Contamination) of the EIS.

Contamination risk to the community during construction due to exposure to contaminated soil and groundwater is discussed in section 9.2.1 and section 9.3 of Appendix K (Technical working paper: Human health risk assessment).

The level of risk depends on the likelihood of contamination being present, including the concentrations that may be present, and the likelihood that the community or the environment may be exposed to the contamination, as a result of the project. A high level risk was identified at the Rozelle civil and tunnel site (C5) at Rozelle, The Crescent civil site (C6) at Annandale and at the Campbell Road civil and tunnel site (C10) at St Peters (also noted to be potentially affected by landfill gas).

During tunnelling works, groundwater would be extracted and would be collected, treated and discharged in accordance with the adopted site guidelines. The surface water receiving bodies in the vicinity of the project that have the potential to be impacted if groundwater disposal is not effectively addressed include Cooks River (including Alexandra Canal) and Sydney Harbour/Parramatta River (including Hawthorne Canal, Rozelle Bay and Iron Cove).

Locations where shallow tunnelling works are proposed may also encounter contaminated groundwater derived from a range of former and current businesses/industries overlying the tunnelling activities. This is specifically relevant on Parramatta Road in Annandale, Victoria Road at Rozelle, St Peters and the Rozelle Rail Yards. This may result in the ingress of contaminated groundwater that would require the temporary construction of water treatment plants to treat and manage this water to comply with the NSW Water Quality Objectives.

Meeting these guidelines would require contaminant levels to be sufficiently low that they do not affect the health of the community using these waterways for recreation.

Appendix R (Technical working paper: Contamination) of the EIS outlines the measures required to be adopted during construction to manage soil and water contamination. These are to be outlined in detail in the CEMP. For sites where remediation is required a remedial action plan (RAP) would be required. In some cases, where limited information is currently available on contamination a detailed site investigation (DSI) is required. A DSI and RAP, and all remediation works are required to be undertaken in accordance with guidance from the NSW EPA, including obtaining approved by an independent NSW EPA accredited site auditor. This process is required to ensure assessment and remedial works adequately address and prevent risks to human health, including the surrounding community.

Vibration impacts on property and heritage items are discussed in **section B10.10**. Vibration impacts during construction and operation are discussed in sections 5 and 6 of Appendix J (Technical working paper: Noise and vibration) of the EIS. Vibration impacts on non-Aboriginal heritage items are discussed in section 6.11 of Appendix U (Technical working paper: Non-Aboriginal heritage) of the EIS.

Impacts to the heritage items and the environment as a result of vibrations

Vibration impacts on Aboriginal heritage items are discussed in section 9.2 of Appendix V (Technical working paper: Aboriginal heritage) of the EIS. Only one Aboriginal Heritage Information Management System (AHIMS) site (#45-6-2278) was identified that could potentially be indirectly impacted by vibration, as there would be underground tunnel excavations in the general area beneath the site. As per environmental management measure AH2 (see **Chapter E1** (Environmental management measures)), subject to gaining access from the relevant landholder, a suitably qualified archaeologist would visit the AHIMS site prior to commencement of any vibration intensive construction activities in the vicinity of the site to verify the site and confirm its current location. As per environmental management measures AH3, an assessment will be completed (if the site is verified) by a suitably qualified and experienced person prior to any commencement of vibration intensive construction activities. The assessment will consider all vibration intensive activities that will occur in the vicinity, the likely vibration levels and relevant vibration criteria; and identify the management measures, including monitoring, that will be implemented to prevent and reduce potential impacts. A final condition assessment will be carried out at the completion of construction detailing recommendations for remediation measures, if required.

Health burden due to increased driving

The human health risk assessment also addresses the SEARs issued by the Secretary of DP&E. An assessment of the health burden of disease resulting from more people driving is beyond the scope of the EIS as defined by the SEARs.

The methodology for the human health risk assessment involved defining, quantifying where feasible, and assessing the potential risks to human health from the construction and operation of the project. The assessment focussed on the key impacts on local and regional air quality, in-tunnel air quality for tunnel users, noise and vibration and social changes. The assessment included direct/indirect impacts from construction activities and longer term impacts associated with the operation of the project on the health of the local population and wider Sydney population.

In order to quantify the human health impacts, the assessment was based on the findings of the following EIS chapters: Chapter 8 (Traffic and transport), Chapter 9 (Air quality), Chapter 10 (Noise and vibration) and the cumulative assessment which included impacts associated with other WestConnex projects summarised in Chapter 26 (Cumulative impacts).

The following NSW Government agencies and bodies were consulted during the development and preparation of the human health risk assessment for the project:

- DP&E
- NSW EPA
- NSW Health
- NSW Office of the Chief Scientist and Engineer
- The NSW Government Advisory Committee on Tunnel Air Quality (ACTAQ).

There has been substantial scrutiny and rigour in the review of the methodology of the human health risk assessment and supporting assessments (ie air quality assessment) completed for the EIS by independent reviewers including international experts engaged by ACTAQ. The air quality modelling was reviewed by SMCs independent peer reviewers for air quality and ventilation and Roads and Maritime subject matter experts. The EIS, including the air quality assessment report, has been reviewed by specialists from key government agencies including the NSW EPA, NSW Health, and independent international peer reviewers on behalf of the NSW Chief Scientist and Engineer.

Notwithstanding this, once the project is complete, it is expected that reductions in vehicle delays in a number of areas would occur. Traffic congestion and long commuting times can contribute to increased levels of stress and fatigue, more aggressive behaviour and increased traffic and accident risks on residential and local roads as drivers try to avoid congested areas (Hansson et al. 2011). Increased travel times reduce the available time to spend on healthy behaviours such as exercise, or engage in social interactions with family and friends. Long commute times are also associated with sleep disturbance, low self-rated health and absence from work (Hansson et al. 2011). Reducing travel times and road congestion is expected to reduce these health impacts.

Crash related injuries/fatalities due to increased driving

An assessment of the crash related injuries/fatalities resulting from more people driving is beyond the scope of the EIS as defined by the SEARs and is not normally considered in a human health risk assessment (or EIS). A description of the assessment methodology for the human health risk assessment as required by the SEARs for the project is provided in the section above.

However, the impact of the project on the anticipated number of traffic crashes is provided in section 8.3.3 of the EIS and the following sections of Appendix H (Technical working paper: Traffic and transport) of the EIS for the 'With project' scenario:

- M4-M5 Link – section 10.2.2
- Wattle Street interchange – section 10.3.5
- Rozelle interchange – section 10.4.5
- St Peters interchange – section 10.5.5.

While the design of the project has been developed to inherently minimise the likelihood of incidents and crashes, the project does not significantly change the design of existing surface road infrastructure. The project would involve a reduction in traffic on some roadways, which has the potential to reduce crash rates and improve pedestrian and cyclist safety (refer to section 11.5.3 of the EIS).

Crash rates on motorways are generally much lower than on arterial roads, as they are generally designed to provide for efficient, free flowing traffic with physical capacity to accommodate predicted traffic volumes with no at-grade intersections. It is predicted that there would be little change or marginal decrease in crash numbers and costs at surface roads surrounding the three interchanges. Anzac Bridge and a section of the Princes Highway (between Enmore Road and Gannon Street) show a marginal increase in crash numbers in the 'With project' scenario (refer to section 8.3.3 of the EIS). This is due to the forecast increase in daily traffic on these roads.

Exposure to elevated levels of NO_2

In February 2016, the ACTAQ issued a document entitled In-tunnel Air Quality (Nitrogen Dioxide) Policy (ACTAQ 2016). The policy wording requires tunnels to be '*designed and operated so that the tunnel average nitrogen dioxide (NO2) concentration is less than 0.5 ppm as a rolling 15-minute average'*. This criterion compares favourably to the international in-tunnel guidelines which range between 0.4 and 1.0 parts per million (ppm). The in-tunnel air quality assessment is outlined in section 9.7.1 of the EIS. The three pollutants assessed for in-tunnel air quality were NO_2, CO and visibility.

While concentrations of pollutants from vehicle emissions are higher within the tunnel (compared with outside the tunnel), and with the completion of a number of tunnel projects (approved or proposed), there is the potential for exposures to occur within a network of tunnels over varying periods of time, depending on the journey. The tunnel ventilation system would be designed and operated so that the in-tunnel air quality limits, consistent with those in the conditions of approval for NorthConnex and the approved WestConnex component projects, are not exceeded for any journey through the M4-M5 Link and adjoining tunnels, no matter how long the journey.

The assessment of potential exposures inside these tunnels indicated:

- Where windows are up and ventilation is on recirculation, exposure to NO_2 inside vehicles is expected to be well below the current health based guidelines. In congested conditions inside the tunnels, it is not considered likely that significant adverse health effects would occur. Placing ventilation on recirculation is also expected to minimise exposures to particulates during travel through the tunnels
- For motorcyclists, where there is no opportunity to minimise exposures through the use of in-vehicle ventilation, there is the potential for higher levels of exposure to NO_2 and particulate matter. These exposures, under normal conditions, are not expected to result in adverse health effects. When the tunnels are congested it is expected that motorcyclists would spend less time in the tunnels than passenger vehicles and trucks, limiting the duration of exposure and the potential for adverse health effects
- For individuals who regularly use tunnels for commuting or as part of their employment there is the potential for repeated exposures to higher levels of NO_2 and particulates during the day. While these exposures are not likely to be additive, in terms of potential health effects, it is important that these road users utilise vehicle ventilation on recirculation whenever they are using the tunnels
- Where advice is provided to place ventilation on recirculation when using the tunnel or the proposed network of tunnels, it is not expected to result in carbon dioxide levels inside the vehicle that may adversely affect driver safety. However, where Roads and Maritime provides specific advice to drivers entering road tunnels to put ventilation on recirculation, further advice would be provided to motorists that recirculation should be switched off at some point after using the tunnel network and not left on for an extended period of time to avoid any build-up of carbon dioxide in the vehicle cabin.

The ambient air quality for surface road users, including cyclists who are unable to use the tunnel and motorists who choose to use the surface roads, will experience a concentration of nitrogen dioxide below 32 µg/m^3, and therefore well below the NSW impact assessment criterion of 62 µg/m^3, as discussed in section 9.7.3 of the EIS. Therefore, no adverse health effects are expected in relation to chronic exposures to NO_2 in the local area surrounding the project.

The findings made by ACTAQ on the air quality assessment and ventilation report (Annexure I of Appendix I (Technical working paper: Air quality)) were:

'We are satisfied that the EIS has comprehensively addressed the issue of cumulative exposure arising from journeys through multiple consecutive tunnels made possible by the M4-M5 Link.' (See responses in **section B3.2.5**).

The EIS, including the human health risk assessment, has been reviewed by NSW Health and a response to their submission is presented in **Chapter B1** (NSW Health).

B10.11.2 Independent population health expert

Matter 11.1, p96

To ensure population health matters are considered with independence and authority the City strongly recommends that DP&E appoint an independent population health expert to review the EIS and any submissions, commentary and the like made in relation to health issues, and publish an independent report. The briefing and direction set for the independent expert to be conducted by the Director of the Environmental Health Branch at NSW Health.

Response

The EIS, including the human health risk assessment, has been reviewed by NSW EPA and a response to their submission is presented in **Chapter B1 (NSW Health)** and **Chapter B2** (NSW EPA), respectively. The ACTAQ also reviewed the human health risk assessment and provided the following comment '*We find the health risk assessment to be sound and agree with its findings'* (page 7)[18]. The ACTAQ submission is presented in **Chapter B3** (Chief scientist/ACTAQ).

[18] https://majorprojects.accelo.com/public/082ec5861c25e7624d52cb97860c7f61/WestConnex%20M4-M5%20Chief%20Scientist%20Submission.pdf

B10.12 Land use and property

Refer to Chapter 12 (Land use and property) of the EIS for details on land use and property.

B10.12.1 The Bays Transformation

Key Findings, p102

The Project would override the Government's intentions around housing, including affordable housing, and employment specified in The Bays Precinct Transformation Plan.

Response

The Bays Precinct Transformation Plan (Urban Growth NSW 2015) identifies the Rozelle Rail Yards as a long-term priority destination and the potential for the Rozelle Rail Yards to reconnect areas to the north and south. *The Bays Precinct Transformation Plan* identifies potential features for the Rozelle Rail Yards as a long-term priority of the plan. **Table B10-5** lists the features identified in the plan and discusses the consistency of the project with these features.

Table B10-5 Consistency of the M4-M5 Link with The Bays Precinct Transformation Plan

Features for the Rozelle Rail Yards, identified in The Bays Precinct Transformation Plan	Consistency with the M4-M5 Link
Intersecting with major infrastructure	*The Bays Precinct Transformation Plan* acknowledges that the Rozelle Rail Yards is subject to the WestConnex project and the CBD and South East Light Rail stabling yard.
Providing greater housing choice	The M4-M5 Link does not propose future housing within the Rozelle Rail Yards. The NSW Government (announced in July 2016) that the project would deliver up to 10 hectares of new open space and active transport links for the community that would transform the Rozelle Rail Yards, providing much needed open space for forecast residential and commercial development in the region, including the White Bay Power Station Destination identified in *The Bays Precinct Transformation Plan*.
Creating new open space and nature reserves to link to the Harbour	The M4-M5 Link would deliver up to 10 hectares of new open space at the Rozelle Rail Yards including new active transport connections that would connect Balmain, Lilyfield, Rozelle and Annandale to Rozelle Bay and the Glebe parklands.
Integrating and reconnecting communities	The delivery of up to 10 hectares of new open space and active transport links at the Rozelle Rail Yards would create a connection between the previously disconnected communities of Annandale, Glebe and Rozelle Bay, the foreshore and CBD.
Providing new pedestrian and cycle links between Lilyfield and Rozelle	New pedestrian and cyclist links to be provided around the Rozelle interchange would connect with the Lilyfield Road cycleway currently being planned by the Inner West Council, and would also link the Bay Run, The Bays Precinct and the GreenWay in the west to Anzac Bridge and the CBD in the east. Refer to the Active Transport Strategy for the project for further detail (Appendix N (Technical working paper: Active transport strategy) of the EIS).

Features for the Rozelle Rail Yards, identified in The Bays Precinct Transformation Plan	Consistency with the M4-M5 Link
Raising awareness of and interpreting heritage of rail transport	An Interpretation Strategy will be developed and implemented to identify and interpret the key heritage values, including rail transport at the Rozelle Rail Yards, affected by the project and inform the development of the UDLPs for the project. The Interpretation Strategy would include themes and stories of the Rozelle railways historic functions, trains and trams transport and will identify how the rail related infrastructure will be reused. See environmental management measure NAH02 in **Chapter E1** (Environmental management measures).

The reduction in traffic on sections of Victoria Road east of Iron Cove Bridge as a result of the project (specifically the Iron Cove Link), and improvements in regional vehicle access to this destination (via the Rozelle interchange) for current and future uses, would support ongoing development of adjacent destinations in The Bays Precinct such as White Bay and Rozelle Bay.

B10.12.2 Uncertainty regarding future use of land

Key Findings, p102

There is too much uncertainty about how land acquired for the Project will be used in future.

Response

Land required for the construction of the project that is not required for operation would be identified following detailed design and construction planning. This land would either be subject to the relevant UDLP or would become 'remaining project land'. Remaining project land would then be broken down further into:

- Land to be retained for future (separate) road infrastructure projects
- Residual land – land required for the construction of the project that is not required for operation or for future (separate) infrastructure projects.

A flowchart showing the process for identifying the future use of land not required for operational infrastructure is included in **Figure B10-5**.

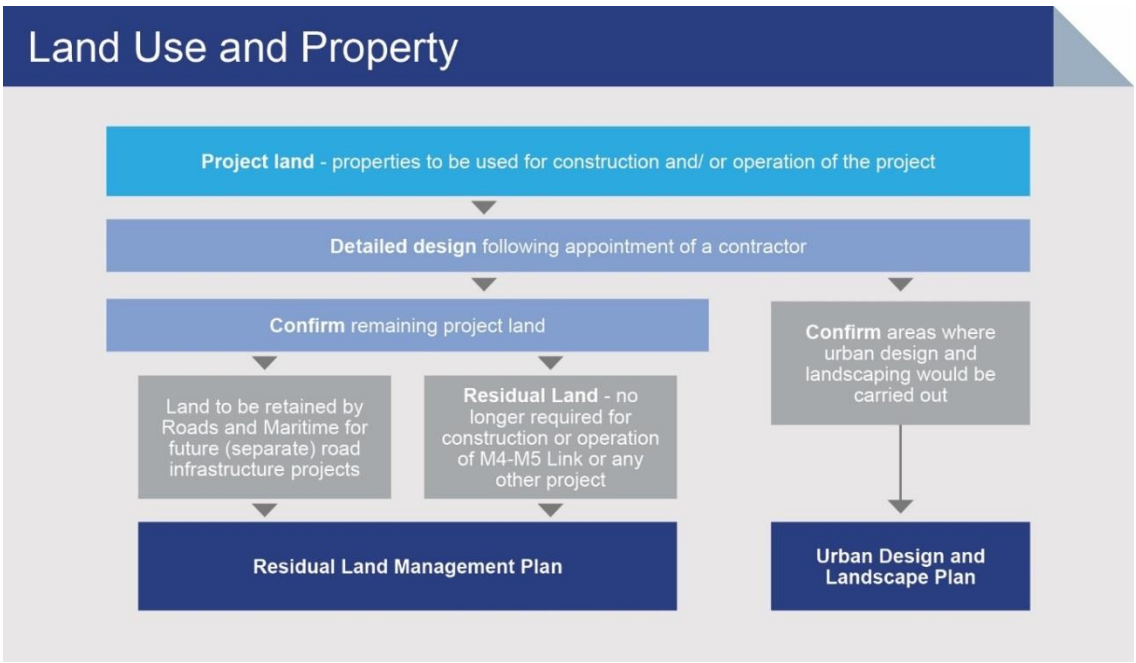


Figure B10-5 Process for identifying the future use of land not required for operational infrastructure

An indicative summary of the locations of remaining project land at the end of construction is presented in Table 12-3 of the EIS.

The project would not rezone or consolidate remaining project land. The future use of remaining project land would be required to be consistent with the existing land zoning.

Environmental management measure PL3 (see **Chapter E1** (Environmental management measures)) requires that a Residual Land Management Plan be prepared in consultation with relevant local councils and other key stakeholders. The plan will identify and illustrate remaining project land following construction, identify any feasible uses for the land including justification for the selected uses and will identify timeframes for implementation of the actions in relation to the identified uses.

Future use would be decided by Roads and Maritime and any future development would be subject to separate development assessment and approval. The project would not rezone or consolidate remaining project land and therefore there would be no changes to land use zoning or existing development controls that would guide future development.

The measures and works identified in the Residual Land Management Plan and UDLPs would be delivered by Roads and Maritime.

B10.12.3 Consultation regarding design and siting of project elements

Matter 12.1, p102

As required by the SEARs the design and siting of project elements is to be located so functional, contiguous areas of residual land are maximised. Prior to finalisation of the final design, local government must be consulted to ensure this requirement is met.

Response

The design and siting of project elements as represented in the concept design has been developed to ensure functional and contiguous areas of land that will be subject to UDLPs and remaining project land are maximised. **Table B10-6** summarises the key design and siting considerations at each of the surface areas associated with the project.

Table B10-6 Design and siting of permanent operational infrastructure

Project area	Summary of design and siting considerations
Wattle Street interchange surface works	The construction footprint at Haberfield allows the M4 East UDLP for the area along Wattle Street/Walker Avenue to be completed earlier by the M4 East project.
Parramatta Road West civil and tunnel site (C1b) and the Parramatta Road East civil site (C3b)	No operational infrastructure would be located at this site.
Darley Road surface works	The indicative siting of operational project infrastructure maximises areas of land that would be available for potential future development by optimising the design to co-locate facilities (such as the water treatment plant and substation), therefore reducing land-take. The siting of the operational project infrastructure at the western end of the site also allows for the remaining project land component to be located nearest to the Leichhardt North light rail stop.
Rozelle surface works	The siting of operational project infrastructure such as the ventilation facilities and tunnel portals and entry and exit ramps has ensured the reservation of adequate space between operational elements of the project to enable separate future delivery of sporting fields and associated elements such as amenities blocks and car parking.

Project area	Summary of design and siting considerations
Iron Cove Link surface works	The siting of the ventilation outlet in the middle of Victoria Road and the ventilation facility and substation at the eastern perimeter on the southern side of Victoria road would create a contiguous parcel of land (albeit interrupted by Callan, Toelle and Clubb Streets) to enable strong connections between Springside Street, King George Park and Iron Cove Bridge. This would be supported by the provision of an improved active transport connection as part of the project.
Pyrmont Bridge Road surface works	No operational infrastructure would be located at this site.
St Peters interchange surface works	The siting of the ventilation outlet and substation above the St Peters interchange portals in the northwest corner of the site maximises the area of land available for open space along the south side of Campbell Road.

B10.12.4 Residual land around The Crescent at Annandale

Matter 12.2, pg102

Any residual land on The Crescent is to be incorporated into the parkland and handed over to the City.

Response

The construction site adjacent to The Crescent (The Crescent civil site (C6)) is located on land owned by the NSW Government and would be rehabilitated at the completion of construction and returned to its previous use. It is not anticipated that there would be any residual land adjacent to The Crescent at the completion of construction. Notwithstanding this, land adjacent to The Crescent within the project footprint is within the Inner West LGA boundary.

B10.12.5 Parramatta Road Corridor Urban Transformation

Matter 12.3, p102

To derive the claimed benefits of the Project on Parramatta Road, any future rezoning or redevelopment of this land must occur only after the delivery of improved public transport in exclusive dedicated lanes on Parramatta Road, between Burwood and Central Sydney, in accordance with the Parramatta Road Corridor Urban Transformation - Implementation Plan 2016–2023.

Response

The provision of public transport improvements along Parramatta Road between Burwood and Central Sydney is the responsibility of Transport for NSW and is outside the scope of this EIS. As noted in the *Parramatta Road Corridor Urban Transformation - Implementation Plan 2016–2023*, Transport for NSW is undertaking detailed planning for public transport services along Parramatta Road and the surrounding road network. Parramatta Road public transport improvements are also identified as an initiative for investigation under the Draft *Future Transport Strategy* (NSW Government 2017).

The project does not propose to rezone land within the project footprint including land identified in the Parramatta Road Corridor Urban Transformation Strategy. As noted in section 12.4 of the EIS, when considering potential reuse opportunities for remaining project land, Roads and Maritime would have regard to the objectives of the *Parramatta Road Corridor Urban Transformation Strategy.*

B10.12.6 Acquisition of land

Section 12.1, p102

This chapter outlines the acquisition of approximately 50 sites for construction, tunnelling and permanent operations centres. Sites occupied by peoples' homes and thriving businesses and close to aged-care facilities, childcare centres and schools which will be affected by five years of construction.

Response

Noted. Property acquisition impacts are assessed in sections 12.3, 12.4 and 14.3 of the EIS.

During construction, the main land use and property impacts would relate to property acquisitions, and demolition of acquired properties, as well as properties that are owned by the NSW Government that are being used for construction and/or operation of the project.

The project has been designed and developed to minimise the need for surface property acquisition and occupation. The need to reduce these impacts has been balanced with maximising opportunities for beneficial re-use of the areas required for construction that would be remaining project land to the operational needs of the project. Notwithstanding this design intent, construction and operation of the project would result in temporary and permanent impacts on property.

B10.12.7 Development potential

Section 12.1, p102

Work in St Peters is located near high density development at Mascot and Green Square. The Bays Precinct will also soon commence major redevelopment and more traffic in these locations would reduce residential amenity, lessen land values and decrease the development potential for new housing as developers have to bear the additional costs of designing for noisy polluted environments.

Response

A response to how the project would facilitate the renewal of The Bays Precinct is provided in **section B10.12.1**.

Delivery of the *Bays Precinct Transformation Plan* is intended to be staged and coordinated with the planning and delivery of infrastructure projects including WestConnex. This staging would manage traffic in the local area and minimise congestion related impacts.

During operation, the reduction in traffic along Victoria Road (between Iron Cove Bridge and City West Link) as a result of the Iron Cove Link would allow a more balanced surface road network in the Lilyfield/Rozelle area, including The Bays Precinct.

The project would improve amenity and connectivity in the locality by delivering up to 10 hectares of new open space at the Rozelle Rail Yards and delivering new and upgraded active transport links including cycleways and pedestrian paths (refer to Appendix L (Technical working paper: Urban Design) and Appendix N (Technical working paper: Active transport strategy) of the EIS).

An increase in noise as a result of the project is unlikely to decrease the development potential for new housing, as significant increases in noise resulting from the operation of the project are not anticipated in most areas. In general, the following noise and vibration impacts are expected during operation:

- A general reduction in the number of receivers exceeding the *Noise Criteria Guideline* (NCG) criteria across the study area as a result of forecast reductions in traffic volumes on some parts of the road network as a result of the project (ie moving vehicles from surface roads to the tunnels)
- A reduction in noise levels for around 60 per cent of the receivers within the study area
- A minor (less than 2 dBA) increase in noise levels for just over 40 per cent of receivers in the study area (considered unlikely to be perceptible by the average person)
- An noise increase of more than 2 dBA for less than one per cent of receivers in the study area
- Significant reductions in noise (up to around 4 dBA) are forecast along sections of Victoria Road in Rozelle, where the project is forecast to significantly reduce traffic numbers.

Residential and commercial development associated with The Bays Precinct and around Mascot and Green Square would need to be undertaken in a manner which is suitable to its location (ie adjacent to major road corridors, as well as the Glebe Island port facility including the White Bay cruise ship terminal (for development around White Bay) and Sydney Airport (for development around Mascot and Green Square)). The project is therefore not expected to adversely affect urban renewal outcomes planned for The Bays Precinct and around Mascot and Green Square.

Changes in traffic volumes around Mascot and Green Square are represented in the lower north-south screenline assessment presented in section 9.5.1 of Appendix H (Technical working paper: Traffic and transport) of the EIS, which includes a location on the M4-M5 Link mainline between the Rozelle interchange and the St Peters interchange, as well as locations on 10 north–south regional connector roads, including roads in the immediate vicinity of Green Square (Wyndham Street, Botany Road, Elizabeth Street and Southern Cross Drive). The results of this screenline assessment show modest decreases in forecast two-way AWT traffic volumes on these roads under the 'With project' scenario compared to the 'Without project' scenario in both 2023 and 2033 (three to six per cent reductions in 2023 and one to four per cent reductions in 2033). Forecast reductions in two-way AWT volumes crossing the screenline on roads around Green Square would largely be due to traffic reassigning to the M4-M5 Link, with two-way traffic on the M4-M5 Link forecast to be 16 per cent of total two-way AWT crossing the screenline in 2023 and 17 per cent in 2033, with AWT crossing the screenline on existing surface roads forecast to decrease by seven per cent in 2023 and 2033.

There are forecast increases in peak hour volumes on sections of some roads around the St Peters interchange including Campbell Road, Euston Road and the Princes Highway. These changes are shown for the AM and PM peak in 2033 in Figure 5 and Figure 6 of Annexure B of Appendix H (Technical working paper: Traffic and transport) of the EIS.

Therefore, traffic congestion is anticipated to improve in most locations in the Mascot and Green square area, which would improve residential amenity.

As noted in section 6.10 of Appendix J (Technical working paper: Noise and vibration) of the EIS, changes in traffic volumes under the 'With project' scenario may influence noise levels at adjacent receivers around the St Peters interchange. For the M4-M5 Link, differences in the forecast traffic volumes on the surface road network at St Peters may occur as the result of a combination of factors including:

- Updated version of traffic model (WRTM v2.3)
- Updated land use, employment forecasts and future projects that form part of the cumulative operational scenario
- Changes in design of M4-M5 Link project.

The changes in forecast traffic volumes between the interfacing WestConnex projects and the M4-M5 Link and in turn differences in the operational noise assessments would be captured in a progressive manner by:

- The operational noise and vibration reports being undertaken as part of the Minister's Conditions of Approval for the M4 East project which is due to open in 2019 and the New M5 project which is due to open in 2020
- The operational noise and vibration reports that will be undertaken as part of the Minister's Conditions of Approval for the M4-M5 Link project (should that project be approved). The project is due to open in a staged manner in 2022 and 2023.

B10.12.8 The Bays Transformation

Section 12.1, p102

- The Project would take land intended for housing, including affordable housing, and employment specified in The Bays Precinct Transformation Plan and increased traffic around and within the Bay's Precinct on Bridge Road, Wattle Street and the Western Distributor will reduce the amenity and value of the investment in the renewal of the Bays Market District which is now underway.

Section 12.1, p103

- The Project is inconsistent with *The Bays Precinct Transformation Plan* by overriding intentions for housing and employment on the Rozelle Rail Yards. This would be irrational in a city wishing to provide housing near jobs and transport.

  The Rozelle interchange must not be given approval. Construction of the West Metro and retaining the current proposal for the Bays Precinct would provide transit-orientated development which is the growing trend in cities around the world.

Response

A response to how the project relates to *The Bays Precinct Transformation Plan*, specifically at the Rozelle Rail Yards, is provided in **section B10.12.1**.

B10.12.9 Gardeners Road

Section 12.1, p103

Increased traffic on Gardeners Road would require land use planning changes which is likely to decrease the value of land. Any intention to acquire future land for widening of Gardeners Road as part of the Road Network Performance Review by RMS must be clearly outlined before determination of the project.

Response

No changes to land use planning along Gardeners Road are proposed by the project or are considered necessary as a result of changes in traffic volumes from the M4-M5 Link project. Similarly, there is no requirement to acquire future land for widening of Gardeners Road as part of the project.

The traffic assessment for the project (Appendix H (Technical working paper: Traffic and transport) of the EIS) identified intersections where the operational performance would significantly change under the future traffic demands that were modelled (using the WRTM). The analysis indicated a deteriorated network performance in the St Peters and Mascot area with the project. However, once the Sydney Gateway is in place, a considerable amount of traffic would be removed from the St Peters and Mascot area and the network performance improved to a level generally better than in the 'Without project' scenario. Detailed planning and design of the proposed future Sydney Gateway is underway, subject to a final business case and assurances processes and environmental assessment and approval. It is anticipated that the proposed future Sydney Gateway would be open to traffic in 2023.

Should the proposed future Sydney Gateway project be delayed for a significant length of time, it is expected that both the New M5 Road Network Performance Review Plan (conditioned as part of the New M5 approval) and the proposed M4-M5 Link Road Network Performance Review would confirm the operational traffic impacts of the projects on surrounding arterial roads and major intersections. These reviews are scheduled at 12 months and five years after the commencement of operation of the New M5 and the M4-M5 Link respectively. Key intersections in the St Peters and Mascot areas are already identified for review in the New M5 Road Network Performance Review Plan as part of the New M5 conditions of approval and the following additional intersections should be included in the M4-M5 Link Road Network Performance Review Plan:

- Gardeners Road/Kent Road
- Gardeners Road/O'Riordan Street
- Kent Road/Coward Street
- Bourke Road/Coward Street
- Kent Road/Ricketty Street.

These reviews would examine potential management measures at these locations, and other locations as identified in the Road Network Performance Review, to improve performance following the collection of data that would facilitate a clearer understanding of actual project impacts. Any proposed management measures are, however, outside the scope of the project and would be subject to separate assessment and approval as required.

New housing in these areas would be developed in a manner which is suitable to its location (adjacent to major road corridors, industrial/commercial development and an international airport) and to ensure appropriate internal amenity.

As outlined in section 6.2 of Appendix P (Technical working paper: Social and economic) of the EIS, an assessment of the impact of the project on residential and commercial property prices has not been included in the EIS given the large number of factors that influence the value of a property. It is extremely difficult to anticipate market perceptions, particularly as these in turn are influenced by broader macroeconomic considerations (eg strength of the economy, outlook for economic growth, interest rate levels and availability of finance, unemployment levels). As such, a reliable assessment of the interaction between the project and the property market cannot be made with any certainty.

B10.12.10 Future land uses

Section 12.1, p103

There is too much uncertainty about how land acquired for the project will be used in future, for e.g. the statement that parts of the Project's footprint not required for operations 'may be contemplated' for future redevelopment and may be retained by RMS for future road projects. Too often RMS-owned land no longer required is retained for many years and becomes derelict. The SEARs specify that the design and siting of project elements should be located in such a way that functional, contiguous areas of residual land are maximised. Prior to finalisation of the WestConnex Stage 3 design, the relevant local government authority must be consulted to ensure this requirement is met.

Response

A response to how remaining land acquired for the project will be used in the future is provided in **section B10.12.2**.

B10.12.11 Active transport adjacent to The Crescent

Section 12.1, p103

Land adjacent to The Crescent is cited as land to be retained for future road infrastructure. This land must include walking and cycling connections as shown in the Active Transport Strategy, and any surplus land should be incorporated into the parkland.

Response

As discussed in section 7.0 of Appendix N (Technical working paper: Active transport strategy) of the EIS, the strategy proposes the following active transport routes to be delivered at The Crescent, as part of the M4-M5 Link:

- From Rozelle Rail Yards over City West Link to The Crescent
- From James Craig Road to The Crescent
- From The Crescent to Rozelle Bay Light Rail stop
- From The Crescent to Railway Parade.

The proposed active transport routes provided in Appendix N (Technical working paper: Active transport strategy) of the EIS outline a possible future form for the active transport network within and around the M4-M5 Link corridor. Further consultation will be carried out with councils as well as other stakeholders and the community, to realise the routes proposed. In addition, the routes would be developed further in the UDLPs to be prepared for the project (also in consultation with councils, stakeholders and the community).

Future use of residual land adjacent to The Crescent is discussed in **section B10.12.4**.

B10.12.12 Acquisition of business at the Pyrmont Bridge Road tunnel site (C9)

Section 12.1, p103

The Pyrmont Bridge Road tunnel site (C9) involves the removal of successful mixed businesses. To derive the claimed benefits of the project on Parramatta Road and achieve consistency with the *Parramatta Road Corridor Urban Transformation - Implementation Plan 2016–2023*, any future rezoning or redevelopment of this land must occur only after the delivery of improved public transport in exclusive dedicated lanes on Parramatta Road between Burwood and Central Sydney.

Response

The Pyrmont Bridge Road tunnel site (C9) would require the acquisition of nine commercial/industrial properties. The Pyrmont Bridge Road tunnel site would be required to support tunnelling construction activities. This site would act as a mid-tunnel site, providing for tunnel construction from an approximate half-way point along the tunnel alignment. The use of mid-tunnel sites at Pyrmont Bridge Road and Darley Road assists in minimising the total duration of construction by enabling tunnelling to occur from both the ends and the middle sections of the mainline tunnel alignment (which is around 7.5 kilometres in length).

Following construction, the site would be rehabilitated to generally the existing ground level or as otherwise agreed with Roads and Maritime. Future development would be determined by Roads and Maritime, and would be subject to separate development assessment and approval and the restrictions of the relevant consent authority. The project would not rezone or consolidate remaining project land and therefore there would be no permanent changes to land use zoning for future development. Further details on the potential development and/or use of remaining project land at this location would be outlined in the Residual Land Management Plan that would be prepared for the project.

When considering potential reuse opportunities for this land, Roads and Maritime would consider land use zoning and development controls and the relevant objectives of the *Parramatta Road Corridor Urban Transformation Strategy* for the Camperdown Precinct.

The provision of public transport improvements along Parramatta Road between Burwood and Central Sydney is the responsibility of Transport for NSW and is outside the scope of this EIS. Parramatta Road public transport improvements are an initiative for investigation under the Draft *Future Transport Strategy* (NSW Government 2017).

B10.13 Urban design and visual amenity

Refer to Chapter 13 (Urban design and visual amenity) and Appendix O (Technical working paper: Landscape and visual impact assessment) of the EIS for details on urban design and visual amenity.

B10.13.1 St Peters interchange and Rozelle recreation areas

Key Findings, p105

- The Project will concentrate vehicle emissions around portals and emission stacks, meaning that recreational spaces proposed at St Peters and Rozelle cannot be safely used by the community
- If air pollution levels at the site renders it unsuitable for active recreation the concept must be abandoned. A guarantee of air quality is required before any consideration is made of using these areas as recreation spaces
- Both the St Peters Active Recreation Area and the Rozelle Interchange Open Space are false promises. Without a commitment and agreement to construct and manage them, they are presented as unimproved grassed wastelands with compromised amenity, adjoined by ventilation facilities
- The current design also falls well short of the City's standards for open space facilities and environmental improvements. In addition to the potential health impacts associated with active recreation near portals and emission stacks, in Rozelle, recreation areas are divided by above ground portals and are difficult to access as they are surrounded by busy roads.

Key Findings, p106

- The St Peters Intersection ventilation facility's planning configurations restricts the potential maximum use of the St Peters Intersection Recreation Area.

Response

Ambient air quality at the St Peters and Rozelle recreation areas

The Campbell Road ventilation facility at St Peters would include a ventilation outlet facility. The air quality assessment provided emission profiles for each ventilation outlet (refer to section I.1.3 of Annexure I of Appendix I (Technical working paper: Air quality) of the EIS). Detailed contour plots which map the predicted dispersion of airborne emissions from the ventilation outlets are provided in Annexure K of Appendix I (Technical working paper: Air quality) of the EIS. The contour plots show annual mean and maximum 24-hour mean emission of oxides of nitrogen (NO_X), PM_{10} and $PM_{2.5}$ for 2023 and 2033 for each ventilation outlet.

Even accounting for wind direction, the ventilation outlet at St Peters was predicted not to result in adverse air quality impacts at any existing receptors including residences, school and sports fields. The air quality impact assessment in the EIS determined that emissions from the project ventilation outlet at St Peters, even in the regulatory worst case scenarios, would not result in adverse impacts on local air quality.

The Rozelle ventilation facility at the Rozelle interchange would include three ventilation outlets up to 35 metres in height (above existing ground level) (two outlets for the M4-M5 Link and a separate outlet for the proposed future Western Harbour Tunnel) at the Rozelle East motorway operations complex (MOC3). The total tunnel emissions, and therefore the emissions from the outlets, have been calculated based on the sum of each tunnel section's emissions, factoring in the length of each section, the time taken for vehicles in the tunnel to pass through each section, the density of vehicles in the tunnel and the respective gradients.

The air quality impact assessment in the EIS determined that emissions (including PM_{10} and NO_2) from the project ventilation outlet at Rozelle, even in the regulatory worst case scenarios, would not result in adverse impacts on local air quality including on residential receivers and sensitive community receivers such as open space, parks, active transport routes and playgrounds. This is due to the effective dispersion that occurs when the tunnel emissions are discharged at height and at velocity into the atmosphere.

For PM_{10} the maximum contribution of the ventilation outlets under the worst case scenarios, would be small. For both the annual mean and maximum 24 hour metrics the outlet contributions were less than 10 per cent of the respective criteria. This would be significant for some receptors, but exceedances of the criteria due to the ventilation outlets alone would still be unlikely.

A detailed analysis was conducted for one hour NO_2. Although in some cases the ventilation outlet contributions appeared to be substantial, this was deceptive. As the background and surface road contributions (and hence total NO_X) increase, there is a pronounced reduction in the contribution of the outlets to NO_2. The analysis showed that maximum outlet contributions occurred when other contributions were low, such that overall NO_2 concentrations were well below the criterion or even the predicted maximum.

The modelled results would be confirmed by conducting ambient air quality monitoring during operation of the project to demonstrate that emissions from the ventilation outlets would have no detectable impact on local air quality (see to AQ29 in **Chapter E1** (Environmental management measures)).

St Peters active recreation area and the Rozelle interchange open space

The St Peters Interchange is being constructed and delivered by the New M5 project. Integration works to connect the M4-M5 Link with the St Peters interchange and construction of the Campbell Road motorway operations complex (MOC5) would occur on the site. As this area is currently being used for the construction of the New M5 project, the ongoing use of this area for the construction of the project would be consistent with the current land use.

The M4-M5 Link project would include construction of the Campbell Road motorway operations complex (MOC5) and ventilation facilities within the St Peters Interchange. The ventilation outlets would be around 22 metres above existing ground level.

The remainder of the site would be landscaped and converted into public open space following the completion of the M4-M5 Link and the New M5 projects. Urban design and landscaping works would be carried out in accordance with the UDLPs and consistent with the New M5 Residual Land Management Plan and the New M5 UDLP. The UDLP for the area adjoining Campbell Road motorway operations complex (MOC5) would be consistent with the New M5 UDLP at St Peters (see environmental management measure LV21 in **Chapter E1** (Environmental management measures)).

New, passive open space would be provided within the Rozelle Rail Yards, which are currently inaccessible to the public. While some areas at the Rozelle Rail Yards would be required for above ground motorway structures, the project would deliver a significant increase in open space in this area.

The three ventilation outlets at the Rozelle ventilation facility would be up to 35 metres in height (above existing ground level) and would be located near the intersection of City West Link and The Crescent. Their design, including material and colour choice, would respond to the local character, which includes the White Bay Power Station chimneys.

Measures would be investigated during detailed design to reduce the height, bulk, scale and enhance the landscape setting of the ventilation outlets at St Peters and Rozelle, subject to achieving desired ventilation outcomes, and in accordance with the design principles detailed in the M4-M5 Link UDLPs (see environmental management measure LV22 in **Chapter E1** (Environmental management measures)).

The air intake facility, water treatment facility and electricity substation within the Rozelle interchange would be designed in a manner that allows them to become recessive elements within the overall park design. Elements such as the water treatment facility and ventilation facilities would be co-located within the landscape to offer more functional space to the community.

Active transport links provided within and around open space and operational motorway infrastructure would provide north-south and east-west connectivity over the proposed drainage channel at the Rozelle Rail Yards so as to not isolate areas of open space (refer to Appendix N (Technical working paper: Active transport strategy) of the EIS). The active transport links would also provide connectivity across the City West Link, the light rail corridor and under Victoria Road.

Responsibility for the maintenance of the open space at the Rozelle Rail Yards would be subject to an agreement between Roads and Maritime and relevant stakeholders, including local council.

UDLPs will be prepared in consultation with relevant councils, other stakeholders and the community prior to the commencement of permanent built surface works and/or landscape works and will present an integrated urban design for the project. The concepts and principles outlined in the UDLPs will be developed into a detailed design for operational project infrastructure. The Urban Design Review Panel, established by Roads and Maritime, would provide advice regarding the urban design concept its development and would make recommendations in relation to architecture, urban and landscape design and artistic aspects of the project. These recommendations would be used during detailed design and preparation of the UDLPs in the course of the design review.

An operating restriction for tunnels in Sydney is the requirement for there to be no emissions of air pollutants from the portals. Emissions from vehicles assessed within the EIS included carbon monoxide (CO), NO_X, PM_{10} and $PM_{2.5}$ and hydrocarbons (refer to Chapter 9 (Air quality) of the EIS for more detail). The project ventilation system has been designed and would be operated so that it will achieve some of the most stringent standards in the world for in-tunnel air quality, and will be effective at maintaining local air quality. The ventilation system has also been designed to account for congestion and emergency situations.

Velocity monitors will be placed in each tunnel ventilation section and at portal entry and exit points. The velocity monitors in combination with air quality monitors will be used to control the ventilation fans within the tunnel to manage air quality and to ensure air inflow at all tunnel portals (refer to **Chapter E1** (Environmental management measures)).

B10.13.2 Reduction in residential amenity, land value and potential for higher density housing

Key Findings, p105

- Increased traffic on local roads decreases existing residential amenity, reduces land value and decreases the potential for new higher density housing
- Where the Project risks leading to additional traffic demand on the surface street network, the priority will be to protect the amenity of the local areas and avoid these impacts by constraining traffic flows and the associated noise, emissions and safety risks
- At minimum, this effects The Crescent, Minogue Crescent, Ross, Mount Vernon, Catherine, Ross and Arundel streets in Glebe; and Euston Road, McEvoy, Botany, Wyndham, Bourke and Lachlan streets in the Green Square area
- In the redevelopment areas, land adjoining these streets are likely to suffer a loss of development potential, a loss in value and will incur additional costs as a consequence of designing for noisy environments.

Section 13.3, p110

- Increased traffic on local roads decreases existing residential amenity, lessens land value and decreases the potential for new higher density housing.

Response

Impacts on local area amenity and development potential

A response to the City of Sydney's concerns regarding changes in traffic volumes as a result of the project impacting on residential amenity and the potential for higher density development is provided in **section B10.12.9**. Residential and commercial development associated with redevelopment areas including The Bays Precinct and around Mascot and Green Square would need to be undertaken in a manner which is suitable to its location (ie adjacent to major road corridors, as well as the Glebe Island port facility including the White Bay cruise ship terminal (for development around White Bay) and the Sydney Airport (for development around Mascot and Green Square)). The project is therefore not expected to adversely affect urban redevelopment outcomes planned for precincts around the project. The project may act as a catalyst for urban transformation due to the projects guiding principles for urban design being informed by the *WestConnex Motorway Urban Design Framework* (Roads and Maritime 2013a) and *Beyond the Pavement: Urban Design Procedures and Design Principles* (Roads and Maritime 2014a).

A response to the City of Sydney's concerns regarding changes in traffic volumes on roads around the project interchanges is provided in **section B10.8.9**.

A review of operational network performance will be undertaken 12 months and five years from the opening of the project to confirm the operational impacts of the project on surrounding arterial roads and major intersections in proximity to the Wattle Street interchange, Rozelle interchange and St Peters interchange, as per environmental management measure OpTT1 (see **Chapter E1** (Environmental management measures)). A strategy is being developed by Roads and Maritime to ensure impacts of the project on The Crescent, Johnston Street and Ross Street are minimised. The strategy will involve investigating and identifying capacity improvement and mitigation measures along Ross Street, as well as The Crescent and Johnston Street.

An assessment of the impact of the project on residential and commercial property values has not been included in the preparation of the EIS given the large number of factors that influence the value of a property. However, Appendix P (Technical Working Paper: Social and Economic) of the EIS recognises that impacts on property values prior to and during construction would be of a temporary nature, and are likely to include uncertainty amongst property owners about property acquisition and the magnitude of potential amenity, accessibility and construction traffic impacts, as well as potential impacts to the perceived value of properties during the construction period.

The long-term impact of the project on property values would be influenced by the long-term benefits of the project as perceived in the land and property markets, arising from general overall improvements in amenity, including improved air quality, reduced traffic noise and improved road safety on local surface roads as traffic is diverted from the surface road network to the new tunnel.

It is very difficult to anticipate market perceptions, particularly as these in turn are influenced by broader macroeconomic considerations (eg strength of the economy, outlook for economic growth, interest rate levels and availability of finance, unemployment levels). As such, a reliable assessment of the interaction between the project and the property market cannot be made.

B10.13.3 Future potential road widening needs

Key Findings, P105

- Ross Street is constrained in width and its capacity cannot be increased without widening. Any anticipated widening that requires land acquisition must be included as part of this project and not deferred to any future project
- Gardeners Road and Bourke Road in the south may also require future widening because of the Project. Any anticipated widening that requires land acquisition must be included as part of this Project.

Section 13.3, p110

- Gardeners Road and Bourke Road in the Green Square area may also require future widening because of the project. Any anticipated widening that requires land acquisition must be part of this project.

Response

No widening of Ross Street, Gardeners Road or Bourke Street is proposed as part of the M4-M5 Link project.

Ross Street is forecast to experience increased levels of demand with the introduction of the project, with people travelling to and from the southern fringe of the Sydney CBD through the Annandale area. A strategy is being developed by Roads and Maritime to ensure impacts of the project are minimised. The strategy will involve investigating and identifying capacity improvement and mitigation measures along Ross Street, as well as The Crescent and Johnston Street. These measures will be implemented in a staged approach to accommodate forecast demand firstly for the M4-M5 Link and thereafter for the proposed future Western Harbour Tunnel. Implementation of these measures will depend on the complexity of the measure and will be implemented at an appropriate stage to minimise impact to the community (refer to section 11.2.2 of Appendix H (Technical working paper: Traffic and transport) of the EIS).

A review of operational network performance will be undertaken 12 months and five years from the opening of the project to confirm the operational impacts of the project on surrounding arterial roads and major intersections in proximity to the Wattle Street interchange, Rozelle interchange and St Peters interchange, as per environmental management measure OpTT1 (see **Chapter E1** (Environmental management measures)).

See **section B10.12.9** for a response to future widening of Gardeners Road and Bourke Road.

B10.13.4 Gardeners Road

Key Findings, p105

Increased traffic on Gardeners Road will require land use planning changes that may decrease the value of land.

Response

No changes to land use planning along Gardeners Road are proposed by the project or are considered necessary as a result of changes in traffic volumes from the M4-M5 Link project. Further detail is provided in **section B10.12.9**.

B10.13.5 Parramatta Road corridor amenity

Key Findings, p106

- The WestConnex business case states, at https://www.westconnex.com.au/sites/default/files/westconnex-executive-summary-september-2013.pdf, that “Improving connectivity with public transport, including trains, light rail and bus services in the inner west… will make the Parramatta Road corridor an even more attractive place to live, work and socialise”
- Despite this promise Parramatta Road remains a barrier to urban revitalisation. The City is concerned that there is NO discussion of this commitment in the EIS. Light Rail on Parramatta Road between Burwood and Central Sydney should be part of the proposal.

Section 13.3, p110

- The commitments in the EIS do not accomplish the Parramatta Road business case objectives for WestConnex. Parramatta Road will not be revitalised. There will be no improvement of amenity relative to the current state of environmental degradation. The Parramatta Road corridor will not be made suitably healthy for human habitation. It will not be a good (or better) place to live or work.

Response

By reducing traffic along Parramatta Road (east of Haberfield) and Victoria Road (east of Iron Cove Bridge), the project would facilitate opportunities for urban renewal and liveability improvements in communities along those road corridors. A reduction in vehicles on those corridors may result in greater safety for cyclists and pedestrians, making these alternative modes of transport more desirable.

The Parramatta Road corridor is an important bus route servicing the inner west. As demand for public transport is forecast to grow, the WestConnex program of works has explored opportunities to facilitate the integrated use of public transport options on the road network. The reduction in traffic along sections of Parramatta Road as a result of the project facilitates the opportunity for the future development of on-road public transport improvements as envisaged by the NSW Government.

The provision of public transport improvements, including the delivery of light rail, along Parramatta Road between Burwood and Central Sydney is the responsibility of Transport for NSW, is outside the scope of the EIS. Parramatta Road public transport improvements are also identified as an initiative for investigation under the Draft *Future Transport Strategy 2056* as part of the NSW Government's objectives to integrate transport and land use planning (NSW Government).

The project also includes the use of land at Annandale, near the junction of Parramatta Road and Pyrmont Bridge Road, as a temporary construction ancillary facility. This site would be rehabilitated for future redevelopment once construction of the project is complete. When considering potential reuse opportunities for this land, Roads and Maritime would have regard to the objectives of the *Parramatta Road Corridor Urban Transformation Strategy* (UrbanGrowth NSW 2016a) for the Camperdown Precinct.

One of the conditions of approval for the M4 East project includes a requirement for that project to dedicate at least two lanes of Parramatta Road between Burwood and Haberfield for the sole use of public transport. This requirement is incorporated into the design of the M4 East project so that future public transport initiatives on Parramatta Road can be integrated with the WestConnex program. This includes the potential of a new high frequency bus route between Burwood and the CBD, via Parramatta Road, currently being investigated by Transport for NSW.

B10.13.6 Amenity impacts from traffic on roads outside the project area

Key Findings, p106

- Increased traffic cannot be accommodated within Central Sydney. More traffic will further impede pedestrian movement and comfort, undermining easy access to public transport. This reduces effective job density, or the relative access to jobs, over large areas of the metropolis. It also undermines the attractiveness of Central Sydney to internationally competitive and high productivity firms and their potential employees, adversely affecting overall productivity.
- Increased traffic on Bridge Road, Wattle Street and the Western Distributor will reduce the amenity and value of the investment in the renewal of the Fish Markets and the Bays Market District.

Response

Traffic forecasts show that the project is generally anticipated to have little impact, or to reduce traffic on some roads that are identified in the *City Centre Access Strategy* as city centre bypass routes. However, other roads identified as city centre bypass routes are forecast to have increased traffic as a result of the project, including the Western Distributor, and the Cross City Tunnel. While these forecast increases are inconsistent to the *City Centre Access Strategy*, changes in traffic volumes on these roads should be considered in the planning and implementation of the traffic and bypass priority routes. There is little impact forecast on the roads within the CBD, while reductions are forecast for access roads to the CBD from the south, such as Broadway and City Road.

Further discussion on changes to traffic volumes within the Sydney CBD is provided in **section B10.5.5**.

Traffic analysis undertaken has showed that Anzac Bridge and Wester Distributor are currently at or close to capacity and cannot accommodate more demand, especially in the eastbound AM peak hour. With the M4-M5 Link operational, there is an increase in the forecast eastbound AM peak hour demand, as the M4 exit ramp and the Iron Cove Link to Anzac Bridge/Western Distributor provide bypasses of City West Link and Victoria Road respectively. Once the proposed future Western Harbour Tunnel is operational, this forecast demand increase diminishes, but would still exceed the capacity of Anzac Bridge/Western Distributor.

Roads and Maritime is developing a strategy to ensure appropriate network integration in these areas including capacity improvement measures, project staging options and demand management measures. Specific measures will be identified as investigations progress and their implementation will depend on their complexity and appropriate timing to minimise impact on the community. Roads and Maritime will carry out these investigations in consultation with SMC, councils and DP&E to develop a program of works (refer to section 11.1.1 of Appendix H (Technical working paper: Traffic and transport) of the EIS).

B10.13.7 Camperdown work site

Matter 13.1, p106

Any rezoning of the Camperdown work site must be contingent on, and only occur after, the completion of a light rail service on Parramatta Road linking Burwood to Central Sydney.

Response

The project would not rezone or consolidate land at the Pyrmont Bridge Road tunnel site (C9) at the completion of construction. Future development would be determined by Roads and Maritime, and would be subject to separate development assessment and approval and the restrictions of the relevant consent authority.

When considering potential reuse opportunities for this land, Roads and Maritime would have regard to the existing land use zoning and development controls and the relevant objectives of the *Parramatta Road Corridor Urban Transformation Strategy* for the Camperdown Precinct (see **section B10.12.12**).

The project would act as a catalyst for the proposed urban transformation along Parramatta Road by facilitating a forecast reduction in surface road traffic along Parramatta Road, east of the M4 East entry and exit ramps.

The provision of a light rail service on Parramatta Road linking Burwood to Central Sydney is outside the scope of the EIS.

B10.13.8 Future Land use zoning changes

Matter 13.2, p106

Change the land use zoning, height and floor space ratio of properties along local roads that will be adversely affected by noise and pollution to ensure future residents health and well-being are not adversely affected by noise and pollution.

Section 13.3, p110

Land use zoning, height and floor space ratios as well as more detailed planning controls and advice may need to change along affected local roads to ensure future residents health and well-being are not adversely affected by noise and pollution from increased traffic.

Response

Operational air quality and noise impacts resulting from the project are discussed in section 9.7 and section 10.4 of the EIS respectively. Mitigation measures are proposed to address the identified impacts where appropriate (see **Chapter E1** (Environmental management measures)).

Section 9.7.5 of the EIS identifies a recommendation that planning controls be developed in the vicinity of the Campbell Road ventilation facility to ensure future developments at heights of 30 metres or higher are not adversely impacted by the ventilation outlets. This is an error in the EIS as it is inconsistent with the Human Health Risk Assessment, which states that planning controls should ensure future developments at heights above 10 metres are not adversely impacted by the ventilation outlets. Unless air quality assessment of St Peters demonstrates acceptable impacts on air quality at heights between 10 and 30 metres, planning controls should limit building heights in that area to 10 metres.

No further changes in planning controls including changes to land use zoning and height and floor space ratios are contemplated by the project.

B10.13.9 Temporary and permanent construction works on The Crescent

Matter 13.3, p106

No approval should be granted for any permanent and/or temporary works at any location on The Crescent that could lead to an increase the vehicular capacity of that road.

Response

The decision as to whether or not to approve the project is a matter for DP&E. Upgrade, widening and intersection works along The Crescent are discussed in section 5.6.1 of the EIS. Changes to The Crescent would extend as far as The Crescent/Johnston Street intersection.

B10.13.10 St Peters interchange and Rozelle recreation areas

Section 5.2

It [the EIS] does not provide sufficient assurance that open space at the Rozelle Rail Yards will be landscaped to a standard suitable for community use.

Section 13.2, p109

- There is no commitment to provide the St Peters or Rozelle lands in a form that is suitable for public use
- The EIS does not commit to provision of geotechnical suitable foundations that have suitable soil profile (e.g. compaction) and/or long term subsidence suitability for active public use
- The EIS does not commit to the provision of any facilities on the land. The cost of embellishment may be substantial and is not budgeted for by Council(s)
- Both proposed recreation areas abut the ventilation facilities. In some conditions the air quality may be hazardous for recreation use – no live monitoring or reporting/warnings are proposed to deal with this health hazard
- The Rozelle interchange is divided by above ground portals and dive structures
- Both proposed recreation areas are adjacent to busy roads and are exposed to significant noise and air pollution
- The New M5 consent condition B62b St Peters interchange Recreational Area Sub-plan has not fulfilled DP&E's acknowledged 'need for additional active recreational facilities in the region' as set out in the following report: https://majorprojects.accelo.com/public/46c601fd33b639d97e89672b5fab2728/001.%20WestConnex%20New%20M5_Environmental%20Assessment%20Report.pdf p126
- The New M5 proponent has developed a concept design for the land with the City and Inner West councils. However, there is no implementation plan, no management plan and no agreement of land ownership for these lands
- This has resulted in a promise of additional recreational areas with no path for delivery
- In response to New M5 consent condition B40a one proposal under consideration that is favoured by the Urban Design Review Panel is the reuse of the salvaged material from the Rudders Bond Store as an enclosure for the sports courts in the St Peters Intersection Recreation Area. It would be sensible to include this in the Project
- The Project uses this land for its works area, and will occupy part of this land for a ventilation facility and associated uses. It is, therefore, the most suitable project to fulfil DP&E's requirement that the recreation area be implemented, and this is best ensured by including this work as part of the Project
- If air pollution levels at the site renders it unsuitable for active recreation the concept must be abandoned
- For the completion of the St Peters Recreational Area the following actions are required:
    - Provision of real time pollution monitoring to the satisfaction of the long term owners and managers of the facility to ensure that the facility is safe to use, given the adjoining ventilation facility

  - Provision of foundation material that will be suitable for long term use as sports fields i.e. not subject to undue subsidence
  - Maximisation of the number of fields and courts – this would require consolidation of the ventilation and associated facilities area and minimising the area required for water detention and retention, including its relocation
- The City also require full landscaping and construction of the parklands (both hard and soft works) around the recreation facilities
- Consideration of the reuse of the Rudders Bond Store structure to enable all weather use of sports courts and the erection of such a facility
- Consultation with and agreement obtained with the City of Sydney and Inner West Council to be the long term owners and managers of the facility
- Retention of the ownership of the area for a sufficient period of time (at least 10 years) to ensure that subsidence has not and/or will not occur; including solving any subsidence that does occur and remaining responsible for the repair of any subsidence following the transfer of the land
- Provision of the facilities including the sports fields and courts, building to house sports and maintenance equipment, management facility, toilets and change rooms.

Response

A discussion on providing St Peters and Rozelle lands for public use and above ground motorway structures at the Rozelle interchanged is provided in **section B10.13.1**.

The assessment of air quality during operation at the St Peters Interchange and Rozelle recreation areas showed that emissions would not result in adverse impacts on local air quality on community receivers included receivers such as open space. This is discussed further in **section B10.13.1**. The modelled results from the air quality assessment (refer to Appendix I (Technical working paper: Air quality) of the EIS) would be confirmed by conducting ambient air quality monitoring during operation of the facility to demonstrate that emissions from the ventilation outlets would have no detectable impact on local air quality.

During operation, traffic related noise at most locations in the study area is generally expected to decrease as a result of traffic being displaced from surface roads into the mainline tunnels. This would have a moderate positive impact, resulting in a noticeable and substantial positive change in the existing environment. This impact would be long-term and would affect a large number of people. Residential and commercial development associated with The Bays Precinct and around Mascot and Green Square would need to be undertaken in a manner which is suitable to its location (ie adjacent to existing major road corridors, as well as the Glebe Island port facility including the White Bay cruise ship terminal (for development around White Bay) and the Sydney Airport (for development around Mascot and Green Square). Changes in operational noise as a result of the project are therefore not expected to adversely affect development planned for The Bays Precinct and around the St Peters interchange, Mascot and Green Square. Refer to the response in **section B10.12.7** for further detail.

The New M5 project is being constructed as a separate project and was subject to its own planning assessment process. Planning approval under the *Environmental Panning and Assessment Act 1979 (NSW)* was granted on 20 April 2016. The majority of the open space to be constructed at the St Peters interchange would be undertaken in stages as part of the New M5 works.

The Campbell Road motorway operations complex (MOC5), located within the St Peters interchange, would be constructed on land used by the Campbell Road civil and tunnel site (C10) during construction of the M5-M5 Link. As discussed in section 12.4.7 of the EIS, the remainder of the site not required for the motorway operations complex would be landscaped and converted into open space in stages in accordance with the construction of the M4-M5 Link and New M5 projects. Urban design and landscaping works would be carried out in accordance with the relevant UDLP and consistent with the New M5 Residual Land Management Plan and the New M5 UDLP.

The UDLPs for the New M5 and M4-M5 Link will be prepared in consultation with the relevant council(s) and community and would then be approved by the Secretary of DP&E. The UDLPs for both the New M5 and M4-M5 Link will be prepared such that they represent a consistent approach to development of the open space at the St Peters interchange.

Consideration of the reuse of the Rudders Bond Store structure is subject to the New M5 and out of scope for this project.

B10.13.11 Increased traffic on local roads and through existing residential areas

Section 13.3, p110

- Increased traffic affects areas in Glebe and Forest Lodge adjoining The Crescent, Minogue Crescent, Ross Street, Mount Vernon Street, Catherine Street, and Arundel Street
- Additional traffic on the Crescent and Minogue Crescent in Forest Lodge will reduce the amenity and property values of the more than 1200 dwellings in the recently completed Harold Park redevelopment precinct
- Increased traffic affects the Green Square area adjoining Euston Road, McEvoy Street, Botany Road, Wyndham Street, Bourke Road and Lachlan Street
- In the Green Square urban renewal area, land adjoining these streets may suffer a loss of development potential, a loss of value and will bear the additional costs of designing for noisy environments
- Along the Euston Road / McEvoy Street corridor more than 4000 existing or approved dwellings (more than 8000 residents) will be impacted by additional noise and emissions. These dwellings will require improvements to protect residents from adverse health effects of increased noise and pollution
- Ross Street in Forest Lodge is constrained in width and cannot have its capacity improved without widening particularly in the area between Wigram Road and Bridge Road. Any anticipated widening that requires land acquisition must be part of this project
- Increased traffic on Gardeners Road will impact on adjacent residential development around Botany Road and south Rosebery and high density residential development south of Gardeners Road in the Bayside Council area.

Response

The project would deliver the following key benefits and improvements to traffic:

- Ease congestion on surface roads by providing an underground motorway alternative and allowing for increased use of surface roads by pedestrians and cyclists and for public transport
- Reduce through traffic on sections of major arterial roads including City West Link, Parramatta Road, Victoria Road, King Street, King Georges Road and Sydenham Road, facilitating urban renewal opportunities to be realised along parts of the Parramatta Road and Victoria Road corridors
- Improve network productivity on the metropolitan network, with more trips forecast to be made or longer distances travelled on the network in a shorter time. The forecast increase in VKT and reduction in VHT is mainly due to traffic using the new motorway, with reductions in daily VKT and VHT also forecast on non-motorway roads
- Reduce travel times on key corridors, such as between the M4 Motorway corridor and the Sydney Airport/Port Botany precinct and between the main centres on the Global Economic Corridor, including Sydney CBD, Sydney Olympic Park and Parramatta CBD
- Facilitate future growth in Sydney's transport network by allowing for connections to the proposed future Western Harbour Tunnel and Beaches Link and Sydney Gateway projects.

Where the project would connect to the existing road network, increased congestion is forecast in parts of Mascot including Gardeners Road, O'Riordan Street, Botany Road and the Princes Highway corridors, along Frederick Street at Haberfield, Victoria Road north of Iron Cove Bridge, Johnston Street at Annandale and on the Western Distributor. A number of these areas are forecast to improve when the proposed future Sydney Gateway and the proposed future Western Harbour Tunnel and Beaches Link are completed.

The regional land use zoning context of the project is shown in Figure 12-1 and described in section 12.2.2 of the EIS, highlighting the existing urbanised environment in which the project would be located. The majority of the project would be located underground. Some new surface infrastructure and changes to existing surface infrastructure including upgrades to the existing surface road network would be required.

No changes in land use planning along the roads listed in the submission are proposed by the project or are considered necessary as a result of the changes in traffic volumes from the M4-M5 Link project. An increase in noise as a result of the project is unlikely to decrease the development potential for new housing, as significant increases in noise resulting from the operation of the project is not anticipated in most areas. This is discussed further in **section B10.12.7**.

An increase in air pollution resulting from the project is unlikely to facilitate the need for dwelling improvements to protect residents from health impacts. The air quality impact assessment (Appendix I (Technical working paper: Air quality) of the EIS) concluded that the combination of emissions from the tunnel ventilation outlets and ground level concentrations of pollutants would be negligible for expected traffic scenarios. For some air quality metrics (one hour NO_2 and 24 hour PM_{10} and $PM_{2.5}$), exceedances of the criteria were predicted to occur both with and without the project. However, where this was the case the total numbers of receptors with exceedances were predicted in the air quality modelling to decrease slightly with the project and in the cumulative scenarios.

The modelled results would be confirmed by conducting ambient air quality monitoring during operation of the facility to compare actual air quality with predictions and also with relevant air quality criteria.

A response to the issue regarding increased traffic and its impact on residential amenity, land value and high density development, including at Green Square, is provided in **section B10.13.2**.

No widening of Ross Street or land acquisition is proposed as part of the project. This is discussed further in **section B10.13.3**.

A response to the issue regarding changing land use zoning, height and floor space ratios to ensure future residents are not affected by noise and pollution from increased traffic is provided in **section B10.13.8**.

B10.13.12 Central Sydney

Section 13.4, p111

- In Central Sydney increased traffic cannot be accommodated. It will further impede pedestrian movement, comfort and safety undermining easy access to public transport
- Reduced access reduces effective job density (the relative access to jobs) over large areas of metropolitan Sydney. It undermines the attractiveness of Central Sydney to internationally competitive high productivity firms and their potential employees
- Overall metropolitan productivity and competitiveness is adversely affected
- Projects that encourage additional private vehicles to access Central Sydney are inconsistent with TfNSW's Sydney City Centre Access Strategy.

Response

A response to the concern regarding changes in traffic volumes in the Sydney CBD as a result of the project is provided in **section B10.13.6**.

Overall, the project would make a substantial contribution to the functionality of Sydney's strategic road network through the provision of additional motorway capacity and associated connectivity upgrades, which, together with the other components of the WestConnex program of works and the proposed future Sydney Gateway and proposed future Western Harbour tunnel, the project would facilitate improved connections between western Sydney, Sydney Airport and Port Botany and south and south-western Sydney, as well as better connectivity between the important economic centres along Sydney's Global Economic Corridor and local communities. In addition, the project would deliver improved active transport facilities and maintain or improve access to public transport around the project including the light rail and the bus network. Increased accessibility and connectivity has the potential to reduce delivery time, increase delivery reliability and reduce transport costs to local businesses.

B10.13.13 Bays Precinct

Section 13.5, p111

- Increased traffic on the Western Distributor will reduce the amenity of any future adjacent tall residential buildings and undermine the business case for the renewal of the Fish Markets
- Increased traffic on Bridge Road, Wattle Street and the Western Distributor will reduce the amenity and value of the investment in the renewal of the Fish Markets and renewal of the Bays Market District
- The Rozelle Interchange Open Space is a false promise
- As per 13.2, without commitment and agreement for construction and management this is presented as unimproved grassed wastelands with compromised amenity, in Rozelle, divided by above ground portals and are difficult to access as it is surrounded by busy roads.

Response

A response to the issues regarding increased traffic on the Western Distributor, Bridge Road and Wattle Street is provided in **section B10.13.6**.

A response to the issues regarding the Rozelle Interchange open space is provided in **section B10.13.1**.

Residential and commercial development associated with The Bays Precinct would need to be undertaken in a manner which is suitable to its location (ie adjacent to existing major road corridors, as well as the Glebe Island port facility including the White Bay Cruise Ship Terminal). The project is therefore not expected to adversely affect urban renewal outcomes planned for The Bays Precinct.

The manner in which the program would support urban renewal associated with The Bays Precinct is further described in **section B10.3.3**.

B10.13.14 St Peters ventilation facility

Section 13.6, p111

- The ventilation facility consists of two functional distinct areas: the ventilation outlets, exhaust and supply facilities to the West; and the car parking, substation and other ancillary uses to the East. Although the ventilation parts are more or less fixed in relation to the tunnels, the other parts are not. The location of these facilities reduces the potential area of the St Peters Interchange Recreational Area. The South end, North and North-west of the ventilation facility, are relatively unused landscaped areas
- Reconfiguring and relocating the ancillary uses that are to the east of the main ventilation uses to the North and South of the ventilation facilities makes better use of leftover space and enables more space for use as part of the St Peters Recreational Area.

Response

The Campbell Road motorway operations complex is located within the St Peters interchange, which is being delivered by the New M5 project. As described in section 5.8.2 of the EIS, the Campbell Road motorway operations complex (including the Campbell Road ventilation facility and an intake substation) would include the following key components:

- The ventilation exhaust facility would consist of one building, with four outlets for the M4-M5 Link. The facility would extract exhaust from the southbound mainline tunnel and the southbound St Peters exit ramp
- The ventilation outlets would have a height of around 22 metres above the existing ground level. The ventilation outlets have been designed at this height to meet project air quality criteria, urban design and visual amenity objectives, and to avoid impacts on civil air operations
- A ventilation supply facility that would supply fresh air to the southbound M4-M5 Link mainline tunnel
- The facility would also include a substation, motor control room, amenities building, driveway access and car parking area, which would be utilised for loading and servicing of the ventilation facilities.

The indicative layout for the Campbell Road motorway operations facility is shown in Figure 5-48 of the EIS. Every effort has been made to reduce the size of the facility to the maximum extent possible.

The St Peters Interchange is being constructed and delivered by the New M5 project. Integration works to connect the M4-M5 Link with the St Peters interchange and construction of the Campbell Road motorway operations complex would occur on the site. The UDLP for the area adjoin Campbell Road motorway operations complex would be consistent with the New M5 UDLP at St Peters (see environmental management measure LV21 in **Chapter E1** (Environmental management measures)).

A design and construction contractor(s) would be appointed to undertake the detailed design and construction planning following determination of the EIS, should it be approved. In addition, a detailed review and finalisation of the architectural treatment of the motorway operational ancillary facilities, including ventilation facilities, portals and all permanent infrastructure would be carried out during detailed design. The architectural treatment of these facilities would be guided by ventilation facility performance requirements, the outcomes of council, stakeholder and community consultation and the urban design principles identified in Appendix L (Technical working paper: Urban design) of the EIS. The urban design principles of the project would be developed into detailed designs under UDLPs for the various components of the project. In addition, consideration would be given to the New M5 UDLP relevant to the open space area adjacent to the Campbell Road ventilation facility to ensure a consistent response.

In addition, measures would be investigated during detailed design to reduce the height, bulk, scale and enhance the landscape setting of the ventilation outlets, subject to achieving desired ventilation outcomes, and in accordance with the design principles detailed in the M4-M5 Link Urban Design Report (see environmental management measure LV22 in **Chapter E1** (Environmental management measures)).

B10.14 Social and economic

Refer to Chapter 14 (Social and economic) and Appendix P (Technical working paper: Social and economic) of the EIS for details of social and economic matters.

B10.14.1 City of Sydney's Sustainable Sydney 2030 – Community Strategic Plan

Appendix P states this project is consistent with the City of Sydney's Sustainable Sydney 2030 – Community Strategic Plan. This is incorrect.

Response

The City of Sydney's Sustainable Sydney 2030 – Community Strategic Plan was considered during the development of the Technical working paper: Social and economic (also referred to as the social and economic impact assessment or SEIA) at Appendix P of the EIS. The strategic direction of the City of Sydney's Sustainable Sydney 2030 – Community Strategic Plan is discussed in section 4.4.2 of Appendix P (Technical working paper: Social and economic) of the EIS.

Notwithstanding that the scope of the City of Sydney's Sustainable Sydney 2030 - Community Strategic Plan extends beyond the objectives of the project, the project is generally consistent with the delivery of many of the proposed outcomes of the City of Sydney's Sustainable Sydney 2030 - Community Strategic Plan. The operation of the project would increase travel speeds and reliability and reduce distances travelled by freight vehicles. The project would relieve road congestion, link communities and businesses, provide new open space, provide new active transport links and create capacity for improved public transport services.

B10.14.2 Assessment guidelines

Relying on the Roads and Maritime practice note to assess the social and economic impacts is not suitable or adequate for a project of this scale.

Matter 14.1, page 113

DP&E has established socio-economic impact assessment guidelines for resource projects (mining, petroleum production and extractive industries) and these guidelines must be extended to other significant infrastructure projects.

Response

The SEIA was undertaken in accordance with the Roads and Maritime *Environmental Impact Assessment Practice Note - Socio-economic assessment* (EIA-N05) as required by the SEARs for the project. Other socio-economic policies were also considered as listed in Chapter 4 of Appendix P (Technical working paper: Social and economic) of the EIS.

The Roads and Maritime Practice Note EIA-N05 applies when assessing the socio-economic impacts of medium to large scale road projects and provides guidance on the steps to be undertaken when completing a SEIA, including the relevant reporting requirements. The practice note requires:

- A comprehensive assessment of potential social and economic impacts for a project of this scale
- Establishment of a socio-economic baseline and a comprehensive assessment to consider the full range of aspects of the socio-economic baseline
- Identifies a range of matters to be considered in assessing the socio-economic benefits and impacts of a road project, including property impacts, changes to population and demography, business and industry, social infrastructure, community values, local amenity, and access and connectivity.

The practice note, in addition to the other socio-economic guidelines and policies considered when preparing the SEIA, is a current and adequate guideline for assessing the potential social and economic impacts associated with a major road project.

DP&E has recently released a draft guideline for social impact assessment (draft guideline for State significant mining, petroleum, production and extractive industry development). This guideline aims to provide a consistent and transparent framework and overarching methodology for identifying, assessing and responding to the social impacts of large state significant development resource projects. The guideline is a draft only and is not directly relevant to linear transport infrastructure projects. Furthermore, it was not required to be considered as part of the SEARs for the project.

Nonetheless, the draft guideline was considered during preparation of the SEIA with particular reference to Appendix B of the draft guideline – Scoping methodology for negative social impacts. Matters as outlined in Table 4: Checklist of matters were considered in the assessment including, amenity, access, built environment, heritage, community, economic, air, biodiversity, land and water. The assessment methodology was developed in line with *Table 5: Impact characteristics* including the effective assessment of extent, duration, severity and sensitivity. The consequence and likelihood of the project impacts was also determined using a model similar to the social risk matrix in Figure 6. This methodology was applied to both positive and negative impacts to ensure a consistent and robust assessment was applied.

B10.14.3 Economic impact of congestion

The economic impacts of the additional congestion forecast on Anzac Bridge have not been assessed and the economic impacts of any additional congestion in the city centre has not been considered.

The economic and traffic modelling relied on in the EIS has not addressed the traffic impacts on the city centre. The costs of further congestion will result in increased levels of time lost. The analysis in the report shows Anzac Bridge and the Western Distributor are currently at, or close to, capacity particularly in the AM peak, but the traffic analysis has not provided projections of changes in traffic volumes approaching the city centre via the Anzac Bridge and Western Distributor.

Response

Due to the small forecast change in the Sydney CBD with the project and the complexity of the CBD traffic operations, it was not considered appropriate to model the operation of intersections internal to the CBD. The forecast daily traffic demand changes can be seen in Figure 10.1 and 10.2 of Appendix H (Technical working paper: Traffic and transport) of the EIS and the forecast AM and PM peak hour traffic demand changes can be seen in Figure 3 and Figure 4 of Annexure B (Justification of modelled areas) of Appendix H (Technical working paper: Traffic and transport) of the EIS. These figures illustrate that the main changes are focused on the Western Distributor/Sydney Harbour Bridge and Sydney Harbour Tunnel/Eastern Distributor, with minimal changes forecast within the CBD (see **section B10.8.6** for further information). The economic impacts of these traffic changes would therefore also be minimal.

The EIS acknowledges that during operation, additional congestion is forecast on Anzac Bridge. However, from a network wide productivity perspective, the addition of the M4-M5 Link would provide a significant overall benefit. Roads and Maritime is developing a strategy to ensure appropriate network integration in the areas surrounding the Rozelle interchange, including:

- Capacity improvement measures
- Project staging options
- Demand management measures.

Refer to section 11.2.2 of Appendix H (Technical working paper: Traffic and transport) of the EIS for further detail regarding the strategy. Specific measures will be identified as investigations progress and their implementation will depend on their complexity and appropriate timing to minimise impact on the community. Roads and Maritime will carry out these investigations in consultation with relevant councils and DP&E to develop a program of works.

B10.14.4 Negative impacts from the M4-M5 Link

Appendix P identifies a wide range of impacts which illustrate the broad nature of the negative impacts resulting from WestConnex Stage 3 including:

- Delayed bus services
- Construction noise including 24-hour tunnelling leading to disturbed sleep and diminished business operations
- Displaced residents and business owners experiencing emotional and financial stress as they search for new homes
- The use of large rock-breakers resulting in vibrations affecting buildings and people with heightened stress and anxiety levels
- Increased dust, air emissions and odours, heavy metals or fungal spoils from affecting business and residential amenity
- Reduced safety and amenity for pedestrians as a result of concealed locations
- Changes to local access in mainly residential streets
- Loss of parking for residents, business customers and light rail passengers
- Drivers taking different routes to avoid construction-impacted areas.

Response

Changes to parking, road, public transport and active transport networks would affect access and connectivity for road users, residents, business owners, social infrastructure users and visitors. During construction, these changes are likely to arise from the establishment and operation of construction sites, portals, interchanges and ancillary infrastructure that trigger alterations or disruptions to traffic and transport connections and access to properties, businesses and social infrastructure. During construction, the greatest social and economic impacts would be those relating to the road network such as connectivity, noise and traffic and congestion. While these impacts may not be short term, due to the length of the construction program, they would be temporary and are considered necessary to realise the wider benefits of the project during the operational phase. These impacts would be managed in accordance with the environmental management measures as described in **Chapter E1** (Environmental management measures). See **section B2.1** and **section B1.3** for further detail regarding the management of potential social and economic impacts during the construction of the project.

Upon operation, the project would deliver an integrated motorway and local road network that would provide substantial benefits to greater Sydney and would create opportunity for future connections to northern Sydney and Sydney Airport and Port Botany.

The overall social and economic impact of the project during operation is considered to be positive, improving transport efficiency, business connectivity and active transport connections.

B10.14.5 Assessment of impacts to vulnerable community members

The social and economic impacts of this project will be significant in the short to medium term, with further impacts to come as other projects are rolled out following the M4-M5 Link. The EIS fails to adequately assess these impacts, particularly for those with potentially greater needs such as older people who live alone or households with low incomes, for whom the impacts of WestConnex Stage 3 are likely to be more serious.

Response

The SEIA acknowledges that during construction of the M4-M5 Link project key impacts of the social and economic environment would include changes to parking, road, public transport and active transport networks that would affect access and connectivity for road users, residents, business owners, social infrastructure users and visitors.

The SEIA also acknowledges that these impacts would be particularly felt by vulnerable members of the community, including the frail, elderly, people with a disability or poor health, those with low English language skills, households with low incomes and people with no qualifications or in low skilled occupations (see section 7.1.2, 7.2.1 and 7.3.1 of Appendix P (Technical working paper: Social and economic) of the EIS). In particular, these community members may be most at risk from stress and in need of support when going through the property acquisition and relocation process which can be emotionally and physically taxing.

Affected persons with special needs would be identified through consultation undertaken by the design and construction contractor(s) and the project team would work with them to address concerns throughout construction. A detailed Community Communication Strategy will be prepared identifying relevant stakeholders, including vulnerable community members, procedures for distributing information and receiving/responding to feedback, and procedures for resolving stakeholder and community complaints during construction and operation.

The property acquisition process and the subsequent need to relocate can also elevate health risks, causing stress and anxiety. This can particularly affect vulnerable households, such as the elderly, those suffering illness or a disability, or those that speak English as a second language. Impacts associated with property acquisition would be managed through a property acquisition support service, which includes an independent service provided to vulnerable households to assist with relocation. Assistance could include finding a suitable house for relocation, arranging removalists, disconnecting services and attending appointments with solicitors or other representatives to assist with language barriers and understanding of the process.

The EIS has focused on assessing the impacts of extended construction duration in areas which overlap with other WestConnex component projects such as the M4 East at Haberfield and the New M5 at St Peters. Chapter 26 (Cumulative impacts) of the EIS comprises a detailed cumulative impact assessment including an assessment of construction fatigue. Furthermore, respective technical working papers including traffic and transport (Appendix H (Technical working paper: Traffic and transport) of the EIS), noise and vibration (Appendix J (Technical working paper: Noise and vibration) of the EIS), air quality (Appendix I (Technical working paper: Air quality) of the EIS) and social and economic (Appendix P (Technical working paper: Social and economic) of the EIS) include consideration of consecutive and concurrent (cumulative) impacts during construction and operation of the project. The outcomes of the respective assessments of cumulative impacts were then used to inform the development of management and mitigation measures (see **Chapter E1** (Environmental management measures)).

The project will maintain regular communication with other projects that have the potential to result in cumulative impacts with the M4-M5 Link to facilitate coordination of project works to manage potential cumulative impacts where feasible (see environmental management measure C1 **Chapter E1** (Environmental management measures).

The social and economic assessment of impacts associated with other projects delivered after the M4-M5 Link is beyond the scope of SEIA prepared for the M4-M5 Link project. The EISs for connecting projects, such as Sydney Gateway and the proposed future Western Harbour Tunnel and Beaches Link, would be required to consider cumulative impacts as part of their respective assessment processes. Responses to concerns raised regarding the cumulative impact assessment are detailed in **Chapter B10.25** (Cumulative impacts).

B10.14.6 Claimed benefits are unproven

Many of the benefits claimed are unproven. In addition, those components of the project to which a number of benefits are attributed, such as reduced traffic on local streets, better walking and cycling connections, new useable open space and improved urban renewal and economic development, are yet to be confirmed. Given the primary aim of the Project is to enable more major roadways in the future, steps must be taken to monitor and report on the claimed benefits. Furthermore, if the project is approved, DP&E will enforce the conditions of approval through compliance checks during delivery of the project.

Response

The specific objectives of the project are described in section 3.3 of the EIS. The objective to enable long-term motorway network development is one of seven specific project objectives and is not identified as the primary objective of the project.

The project would deliver the following key benefits and opportunities:

- Ease congestion on surface roads by providing an underground motorway alternative and allowing for increased use of surface roads by pedestrians and cyclists and for public transport
- Reduce through traffic on sections of major arterial roads including City West Link, Parramatta Road, Victoria Road, King Street, King Georges Road and Sydenham Road, facilitating urban renewal opportunities to be realised along parts of the Parramatta Road and Victoria Road corridors
- Improve network productivity on the metropolitan network, with more trips forecast to be made or longer distances travelled on the network in a shorter time. The forecast increase in VKT and reduction in VHT is mainly due to traffic using the new motorway, with reductions in daily VKT and VHT also forecast on non-motorway roads
- Reduce travel times on key corridors, such as between the M4 Motorway corridor and the Sydney Airport/Port Botany precinct and between the main centres on the Global Economic Corridor, including Sydney CBD, Sydney Olympic Park and Parramatta CBD.
- Deliver up to 10 hectares of new open space at the Rozelle interchange (as announced by the NSW Government in July 2016) which would provide an open space link between Bicentennial Park at Glebe and Easton Park at Rozelle
- Deliver new north–south and east–west pedestrian and cycleway connections to link Rozelle and Lilyfield with Annandale, Balmain, Glebe and The Bays Precinct
- Facilitate future growth in Sydney's transport network by allowing for connections to the proposed future Western Harbour Tunnel and Beaches Link and Sydney Gateway projects.

The EIS is a rigorous assessment based on current data and information that aims to provide realistic predictions based on the concept design and demonstrate that the key benefits and opportunities would be delivered. The concept designed has been refined throughout the assessment process accordingly. The EIS has been prepared in accordance with the SEARs and determined to be adequate. Technical studies have also been subject to independent peer review for key subject matter. For example, the key benefits related to traffic have been identified through comprehensive traffic modelling prepared by specialists as set out in Appendix H (Technical working paper: Traffic and transport) of the EIS and the suitability of the use of the model to inform the assessment was validated by independent peer reviewers.

Benefits of the project would be monitored through relevant environmental management measures (and subsequent conditions of approval) for the project:

- Traffic network benefits: a review of operational network performance will be undertaken 12 months and five years from the opening of the project to confirm the operational impacts of the project on surrounding arterial roads and major intersections in proximity to the Wattle Street interchange, Rozelle interchange and St Peters interchange. The assessment would be based on future updated traffic surveys taken during operation utilising an appropriate methodology following the relevant and industry accepted guidelines current at the time (see environmental management measure OpTT1)

- Delivery of open space: UDLPs will be prepared for operational project infrastructure including final landscape works and architectural design in consultation with relevant councils, stakeholders and the community (see environmental management measure UD1)
- Delivery of pedestrian and cyclist connections: an Active Transport Network Implementation Strategy will be prepared for the project in consultation with relevant councils and Bicycle NSW. The strategy will be consistent with the Active transport strategy in Appendix N (Technical working paper: Active transport strategy) of the EIS and include:
  - Pedestrian and cycle engineering and safety standards
  - A safety audit of existing and proposed pedestrian and cycle facilities to address the above standards
  - Details of selected routes and connections to existing local and regional routes
  - Timing and staging of all works
  - Infrastructure details, including lighting, safety, security, and standards compliance
  - Signage and wayfinding measures
  - Details of associated landscaping works (see environmental management measure TT19)
- Delivery of community connectivity: a Social Infrastructure Plan will be prepared that details:
  - Measures that will be delivered as part of the project to improve community connectivity in areas affected by the project, including pedestrian and cyclist access
  - Community and social facilities, for example open space, that will be delivered or enhanced as part of the project
  - Community initiatives and programs that will receive support as part of the project, including the manner in which support will be provided (see environmental management measure OSE8).

Refer to **Chapter E1** (Environmental management measures) for a complete list of environmental management measures for the project.

The concept design utilised a conservative approach and project footprint for assessment of project risks and impacts. As part of detailed design, the contractor will identify design and construction improvements to deliver the project; however the project must be built in accordance with the parameters and environmental management measures described in the EIS, road design requirements, active transport links and urban design and landscape concepts, and as required by the project approval.

Certain aspects of how the project would be delivered including to meet environmental management measures and conditions of approval would be made available to the public. These documents would include plans such as the UDLPs and Social Infrastructure Plan. These plans will be prepared in consultation with relevant councils, stakeholders and the community, and implemented as part of the project (see environmental management measures UD1 and OSE8 in **Chapter E1** (Environmental management measures)).

B10.14.7 Social and economic impacts of tolling

Chapter 14 and Appendix P fails to address the economic impact following the imposition of tolls which is a significant omission.

The WRTM relies on a project-specific piece of work from 2013 about road users approach to tolls to determine willingness to pay. However, more recent independent work has been completed and is now available. In 2016 research by the Institute of Transport and Logistical Studies, at the University of Sydney, on linked toll roads in Sydney suggested people are only prepared to pay up to a certain level in tolls to save time. The researchers concluded that previous errors in forecasting of toll road use may be explained by people viewing the time saved as less valuable as a result of 'toll saturation'.

Response

A tolled motorway applies a 'user-pays' principle to the provision of the faster alternative route compared to existing routes. This principle aims to fund the improved infrastructure through contributions from those who would benefit the most, rather than paying for the project out of general government revenue which is raised from tax payers across NSW, not just those in Sydney that would benefit. This model is considered fair by Transport for NSW as the NSW Government alone cannot fund all infrastructure investment required in NSW. This model also accords with the Australian Government's National Public Private Partnership Guidelines (2015), which sets out the basic case for user charging, noting that this allows infrastructure investment to be brought forward. This in turn provides for improved economic growth and efficiencies, providing benefits across the state in both the short and long term.

Key considerations in the approach to tolling are outlined in the *WestConnex Updated Strategic Business Case* and include such elements as: distance based tolling, higher tolls for heavy vehicles and minimum and maximum charges. In setting the toll for the project the NSW Government's tolling principles have been applied, which are:

1) New tolls are applied only where users receive a direct benefit
2) Tolls can continue while they provide broader network benefits or fund ongoing costs
3) Distance-based tolling for all new motorways
4) Tolls charged for both directions of travel on all motorways
5) Tolls charged reflect the cost of delivering the motorway network
6) Tolls take account of increases in expenses, income and comparable toll roads
7) Tolls will be applied consistently across different motorways, to the extent practicable, taking into account existing concessions and tolls
8) Truck tolls at least three times higher than car tolls
9) Regulations could be used so trucks use new motorway segments
10) Un-tolled alternative arterial roads remain available for customers.

The SEIA acknowledges that the use of a toll road may increase the cost of living for individuals and can exacerbate social inequality noting that higher income earners are more capable of absorbing the cost of tolls than lower income households, whereas lower income households are more likely to travel longer distances and avoid tolls due to affordability constraints (refer to section 8.6.3 of Appendix P (Technical working paper: Social and economic) of the EIS)).

Australian Bureau of Statistics (ABS) 2011 Census data on taxable personal incomes identified that Sydney's west, including Bankstown, Blacktown, Parramatta, Fairfield and Liverpool, are in the bottom 20 per cent of Sydney's income receivers (2016 Census data was not available at the time the SEIA was prepared). Geographically, these households also have some of the longest commute times and the poorest access to public transport connecting them to major employment centres. This in turn means that despite the introduction of the M4-M5 Link toll-road, a proportion of the population may not be able to afford to benefit from the increased efficiency and travel times that the M4-M5 Link project could offer.

Free alternative traffic routes, such as Parramatta Road, City West Link, King Georges Rd, the Hume Highway, Stanmore Road, Sydenham Road and the Princes Highway, would remain available to those who choose not to use the tolled motorway. Motorists who choose to use the existing surface road network would still benefit as congestion on these alternative routes is forecast to reduce (as freight and commercial vehicles are expected to use the motorway tunnels). Individuals will have to weigh up the benefits of using the motorway, which includes travel time savings, a safer option with lower potential for traffic accidents and reduced vehicle operation and maintenance costs, with the financial cost of using the motorway.

Appendix H (Technical working paper: Traffic and transport) of the EIS has predicted no major shifts in daily forecast traffic onto alternative, parallel routes as a result of the project. Once the M4-M5 Link is operational, it is expected that there will be a period where drivers trial both their existing, toll-free routes and the new, tolled M4-M5 Link, before deciding on a regular route. Congestion in peak periods on the existing, toll-free surface roads may provide an incentive to use the new, tolled road.

It is acknowledged that users may only be prepared to pay up to a certain level in tolls to save time. For the entire WestConnex motorway, tolling would be capped at a maximum amount of $8.60 (2017 dollars) for cars and light commercial vehicles, after around 16 kilometres, with the total length of the WestConnex motorway to be around 33 kilometres. The maximum toll for the M4-M5 Link section of WestConnex will be $6.50 (2017 dollars). Tolls would escalate up to a maximum of four per cent or the consumer price index per year (whichever is greater) until 2040. After that, consumer index would apply.

In November 2017, the NSW Premier announced a vehicle registration cashback scheme for motorists who spend more than $25 a week on tolls in NSW to claim free vehicle registration. The scheme (as announced) will be available for standard privately registered cars, utes, four-wheel-drives and motorcycles from 1 July 2018 and be backdated to July 2017. The scheme will not include trucks or other vehicles weighing more than 2,795 kilograms. This is expected to save the majority of motorists who apply to the scheme around $358 a year on registration costs, and some up to $715 a year.

The M4-M5 Link would enhance the benefits of the broader WestConnex project, particularly for travel between western Sydney and the Sydney CBD. For example, a person driving a car in 2017 from Penrith to the Sydney CBD (prior to the introduction of tolls on the M4) currently has the option of travelling along the M4 Motorway, which ends at Concord, and then would need to travel on the congested surface road network to the Sydney CBD. An alternative route using the M4 Motorway, WestLink M7, the Hills M2 Motorway, Lane Cove Tunnel and the Sydney Harbour Bridge or the Sydney Harbour Tunnel would cost around $22.00 in tolls (in 2017 dollars) and is a distance of around 55 kilometres. After opening in 2023, the M4-M5 Link project would provide a journey using the M4 Motorway straight through to Anzac Bridge, via the M4-M5 Link, for a toll capped at $8.60 (in 2017 dollars) and a distance of around 40 kilometres. This would provide time and cost savings for motorists and increased access to employment centres.

Although road tolling would be a cost to businesses, increased accessibility and connectivity has the potential to generally reduce delivery time, increase delivery reliability and as a result reduce overall transport costs. Businesses would also have the choice of using the free surface road network.

See **section B11.1.5** for further detail regarding potential negative economic impacts associated with tolls.

The WestConnex Road Traffic Model (WRTM) (discussed further in **section B10.8.1**) uses current best practice methods for representing drivers' behaviour with respect to their willingness to pay tolls for road travel time savings for multiple toll roads and routes through the Sydney metropolitan network. The toll choice model was developed for the WestConnex project as an augmentation of standard traffic route modelling procedures that are normally used in planning and assessment of un-tolled roads. The toll choice model addresses private vehicle and commercial (truck) traffic behaviour, representing the different willingness of these vehicle users to pay for travel time savings in the context of total journey costs including tolls, travel times and distances available on competing routes.

To assess the values that differing vehicle users place on travel time savings, a project specific survey was designed and conducted in Sydney in 2013 asking road users questions about their willingness to pay tolls. Independent specialist peer reviewers provided oversight throughout the design and analysis of the survey. The survey yielded a distribution of estimates of the value that Sydney drivers are willing to pay in terms of tolls to reduce their travel time. These values were benchmarked against values from other studies in Australia and internationally. The survey results are used within WRTM's route choice algorithm to represent the influence of a toll.

B10.14.8 No consideration of longer term impacts

There is no discussion of impacts beyond the first 15 years of operation of the project. The absence of longer term modelling means that any longer term traffic or socioeconomic impacts are not being identified, mitigated or monitored.

Response

The SEIA assessed the potential social and economic impacts of an operational project scenario at opening in 2023 and at ten years after opening in 2033, based on the outcomes of the traffic modelling undertaken for the EIS. The year 2033 was selected as representative of a future scenario based on the *Roads and Maritime Traffic Modelling Guidelines 2013.* A ten year assessment of operation of the project (year of opening plus 10 years) is the standard assessment approach for major road infrastructure projects and is consistent with the assessment approach adopted in the M4 Widening EIS, M4 East EIS, New M5 EIS and other transport projects. Given the vast array of variables that can affect traffic and socio-economic predictions in the future (the global and local economy, population and employment growth and patterns and rapid technological change) impact predictions more than 10 years on are subject to higher levels of uncertainty.

B10.14.9 Consecutive construction impacts at Rozelle

Appendix P states the Rozelle Rail Yards are likely to be affected by consecutive construction activities including the future West Harbour Tunnel, with this site experiencing 517 heavy truck movements each day, in one direction only. This would impose an enormous impact on the Rozelle community over many years.

Table 9-5 [of Appendix P] only refers to 2020 and yet construction of this project would extend to 2023 with further disruptions as a result of the West Harbour Tunnel and development of The Bays Precinct. This will impose significant pressures on this community over many years.

Response

The potential long term duration social and economic impacts associated with consecutive use of the Rozelle Rail Yards for construction of the M4-M5 Link and the proposed future Western Harbour Tunnel is assessed in section 9.3 of Appendix P (Technical working paper: Social and economic) and in section 26.4.6 of the EIS.

Heavy vehicle movements would be limited to the arterial road network and would not travel on local roads. Heavy vehicles would also have the option to use the M4 East tunnels to minimise interaction with the surface road network. Heavy vehicles would enter and exit the Rozelle civil and tunnel site (C5) via signalised intersections.

Details regarding construction of the proposed future Western Harbour Tunnel component of the proposed future Western Harbour Tunnel and Beaches Link project are not available at this time as the project is in the early stages of design development. For the purposes of the cumulative assessment for the M4-M5 Link project, it was assumed that there would be a construction site for the proposed future Western Harbour Tunnel within the central portion of the Rozelle Rail Yards site, and construction work would commence at the end of 2019 and continue through until around 2025. The year 2020 was identified as a peak construction year and was therefore assessed to provide a worst-case assessment of potential impacts. Anticipated heavy vehicle movements at Rozelle during this time included a conservative allowance for spoil haulage for the proposed future Western Harbour Tunnel. Table 9-5 in Appendix P (Technical working paper: Social and economic) shows indicative construction timeframes at Rozelle from 2018 to 2020. This is an error and the table should include the years 2021, 2022 and 2023 to show the overlap between construction at the Rozelle Rail Yards for the M4-M5 Link and proposed future Western Harbour Tunnel. **Table B10-7** shows an updated table for the indicative construction timeframes at Rozelle.

Table B10-7 Construction timeframes at the Rozelle Rail Yards

Construction activity	Indicative construction timeframe											
	2021				2022				2023			
CBD and South East Light Rail Rozelle maintenance depot												
Main construction works												
Proposed future Western Harbour Tunnel Beaches Link*												
Construction activity												
Rozelle civil and tunnel site (C5) indicative construction program												
Site establishment and utility works												
Traffic diversions and intersection works												
Construction of cut-and-cover and tunnel portals												
Tunnelling												
Construction of motorway operational ancillary infrastructure												
Civil and mechanical fitout												
The Crescent civil site (C6) indicative construction program												
Site establishment and utility works												
Surface road and intersection works												
Whites Creek widening and improvement works												
Drainage works including construction of the culvert below City West Link and upgrades to the drainage outfall to Rozelle Bay												
Construction of Whites Creek Bridge and demolition of existing bridge												
Victoria Road civil site (C7) indicative construction program												
Site establishment and utility works												
Support for the reconstruction of Victoria Road including construction of the new bridge												

Note: There is no overlap with Rozelle Rail Yards site management works

*No further detail available for proposed future Western Harbour Tunnel and Beaches Link construction

Roads and Maritime acknowledge that the impacts from construction of these two projects at Rozelle would not be short term, as the consecutive construction of these projects would potentially extend the duration of impacts to a period of up to seven years for some receivers in this area. The range and intensity of impacts have and would continue to vary during these periods as construction progresses, with the majority of impacts occurring or expected to occur as a result of certain construction activities and during certain times of the day (for example outside standard daytime construction hours). It should be noted that the size of the construction site for the proposed future Western Harbour Tunnel at the Rozelle Rail Yards is expected to be reduced compared to the larger Rozelle civil and tunnel site (C5) (refer to Figure 26-4 of the EIS).

The SEIA acknowledges that during construction, the presence of heavy vehicles would affect access and general amenity for road users, residents, business owners, social infrastructure users and visitors, including around the Rozelle civil and tunnel site. An estimated 517 daily heavy vehicles (one way) are forecast during construction to service the Rozelle civil and tunnel site (refer to Table 7-15 in Appendix H (Technical working paper: Traffic and transport) of the EIS). To reduce traffic and amenity impacts on local roads, spoil haulage routes would operate on arterial roads including City West Link and The Crescent at Rozelle (refer to Figure 6-29 of the EIS). The indicative spoil haulage routes may vary based on the final construction methodology and program.

To address concerns regarding available areas for heavy vehicle queuing and the potential for queuing on local roads, an additional construction ancillary facility (the White Bay civil site (C11)) is proposed near White Bay in Rozelle to be used as a truck marshalling facility. This facility would reduce potential queuing and congestion on, as well as minimising traffic and noise disruptions to local streets surrounding the project and associated construction ancillary facilities. This would therefore minimise traffic impacts from consecutive construction activities in the area. Further detail is provided in **Chapter D2** (White Bay civil site (C11)).

The separate Western Harbour Tunnel EIS would provide further detail of construction methodologies and timeframes and would also assess potential cumulative construction impacts, including at Rozelle, and identify applicable environmental management measures.

Planning for The Bays Precinct will be delivered according to *The Bays Precinct Transformation Plan* which is a strategic document that will be progressively delivered over a 25 year timeframe. As such it is not possible to accurately assess the cumulative construction impacts that may arise. It is clear however, the general surrounding area would be subject to extended periods of construction disruption including increased traffic around Victoria Road, the Rozelle interchange, City West Link and Anzac Bridge. This would include traffic, visual amenity, noise and air quality impacts in particular. There are presently no construction details available for these future projects and any potential consecutive impacts would be required to be managed by those projects, not as part of the M4-M5 Link.

Upon operation, the project would deliver an integrated motorway and local road network that would provide substantial benefits to communities in Sydney's inner west by improving community connectivity on local roads through transferring traffic and heavy vehicles from surface roads, to underground.

B10.14.10 Construction impacts at Rozelle

The City notes that much has been made of Google deciding against locating in the Bays area because of concerns about construction impacts and poor accessibility. In sharp contrast, the impact on the existing community is dismissed as negligible or easily overcome with unenforceable compliance plans and strategies.

Response

The project would result in a range of positive and negative social and economic impacts on residents, businesses and social infrastructure. Whilst the construction of the project is likely to stimulate broader economic benefits by way of job generation and construction multipliers, at a more local level, residential, social infrastructure users, businesses and landowners would experience a degree of disruption and other temporary negative impacts. This would be particularly felt by people located within close proximity to the proposed construction compounds, within close proximity to the tunnel alignment and areas where utility works would occur.

The social and economic impact assessment undertaken in Appendix P (Technical working paper: Social and economic) of the EIS used relevant data and information from stakeholder and community consultation to determine the type and magnitude of the impacts and to identify measures to avoid, minimise, manage and mitigate these. The potential social and economic impacts at Rozelle discussed in the assessment included impacts to access and connectivity, local amenity, property acquisitions, community values and construction fatigue. Impacts would be carefully and proactively managed with the management measures outlined in **Chapter E1** (Environmental management measures). The environmental management measures will form part of the CEMP, sub-plans and other plans required by the conditions of approval, which will be implemented throughout construction. The conditions of approval placed on the project by DP&E will be legally enforceable; and compliance will be checked and reported throughout delivery of the project.

The temporary loss of amenity for residents in Rozelle during construction will be offset by the benefits to the community that will be realised once construction is complete.

With regard to active transport connectivity, key north–south connectivity would be established for the project via the two new bridges over City West Link. These links would greatly improve accessibility between Glebe/Annandale and Rozelle/Lilyfield. They would also provide connectivity between the Rozelle Bay and Iron Cove, through key green spaces of Bicentennial Park, open space at the Rozelle Rail Yards, Easton Park and Callan Park.

East–west connectivity would be provided through the site connecting to the Lilyfield Road cycleway adjacent to the CBD and South East Light Rail Rozelle maintenance depot. A path would be provided that connects to the existing Anzac Bridge shared path by travelling underneath the Victoria Road/City West Link intersection. This connection would provide future possibilities for connections into The Bays Precinct.

B10.14.11 Recommended conditions of approval

The EIS states construction effects would extend to the medium to long term and Appendix P includes the following recommendations for a series of mitigation plans which are in addition to those recommended by the SEARs or other appendices:

- Business Management Plan to support businesses in Camperdown and Rozelle throughout construction
- A car parking strategy as part of a construction traffic management and access plan (with forecast construction parking demand, review of existing parking supply and use, impact on existing parking, consultation activities and proposed mitigation measures
- Social Infrastructure Plan including measures to be delivered as part of the Project such as pedestrian and bicycle access, community and social facilities including open space.

These strategies must be specified in any instrument of approval and must be binding.

Small business in particular need reliable day-to-day turnover to survive and the interruption of construction projects even for short periods has significant negative impacts. Support for businesses throughout the planning process and during construction must be put in place, with direct engagement with affected businesses.

To minimise the burden on local streets, the car parking strategy must focus on onsite parking provision along with minimising the demand for construction workforce parking.

Any Social Infrastructure Plan must be developed in consultation with local government and community groups and must be consistent with active transport provisions as identified by plans or other conditions of approval.

Response

Conditions of approval are a matter for DP&E to consider during its assessment of the project. The commitments made in the form of the environmental management measures are binding, as per typical conditions of approval applied to all SSI projects. Relevant environmental management measures that would be included for the project include:

- Environmental management measure SE1 - A Business Management Plan will be prepared and will include:
  - Identification of businesses that have the potential to be adversely affected by construction activities that will occur as part of the project
  - Management measures that will be implemented to maintain appropriate vehicular and pedestrian access to businesses and business clusters during business hours and to maintain the visibility of the businesses and communicate access arrangements to potential customers during construction, including alternative arrangements for times when access and visibility cannot be maintained. These will be determined in consultation with the owners of the identified businesses
- Environmental management measure TT01 - A car parking strategy for construction staff at the various worksites and ancillary facilities will be described in the CTAMP
- Environmental management measure TT04 - The car parking strategy described in the CTAMP will:
  - Quantify construction workforce parking demand around project work sites and ancillary facilities during site establishment and the construction phase generally
  - Identify public transport options and other management measures (such as carpooling and shuttle-buses) to reduce construction workforce parking demand
  - Identify all locations that will be used for construction workforce parking

- Identify potential offsite areas that could be used for construction workforce parking that would be investigated and secured for use during construction where required and possible
- Identify exclusion zones, in consultation with potentially affected stakeholders, around construction sites and facilities where construction workforce parking would be restricted.

The strategy will also be developed in consultation with the M4 East and New M5 contractors to identify opportunities to use existing parking arrangements associated with those projects during their respective construction periods and once those periods are completed

- Environmental management measure OSE8 - A Social Infrastructure Plan will be prepared that details:
  - Measures that will be delivered as part of the project to improve community connectivity in areas affected by the project, including pedestrian and cyclist access
  - Community and social facilities, for example open space, that will be delivered or enhanced as part of the project
  - Community initiatives and programs that will receive support as part of the project, including the manner in which support will be provided

  The Social Infrastructure Plan will be prepared by a suitably qualified and experienced person in consultation with the community and relevant councils and implemented as part of the project.

Refer to **Chapter E1** (Environmental management measures) for a complete list of environmental management measures for the project.

It is anticipated that construction workforce parking would be primarily provided at the following construction ancillary facilities, with shuttle bus transfers provided to other nearby construction sites:

- Northcote Street civil site (C3a) – around 150 car parking spaces (Option A)
- Parramatta Road East civil site (C3b) – around 140 car parking spaces (Option B)
- Rozelle civil and tunnel site (C5) – around 400 car parking spaces
- Campbell Road civil and tunnel site (C10) – around 150 car parking spaces.
- White Bay civil site (C11) – around 50 car parking spaces (refer to **Chapter D2** (White Bay civil site (C11)).

B10.14.12 Impact on residential and commercial property prices and development potential

Key Findings, p105

Increased traffic on local roads decreases existing residential amenity, reduces land value and decreases the potential for new higher density housing.

Where the Project risks leading to additional traffic demand on the surface street network, the priority will be to protect the amenity of the local areas and avoid these impacts by constraining traffic flows and the associated noise, emissions and safety risks.

At minimum, this effects The Crescent, Minogue Crescent, Ross, Mount Vernon, Catherine, Ross and Arundel streets in Glebe; and Euston Road, McEvoy, Botany, Wyndham, Bourke and Lachlan streets in the Green Square area.

In the redevelopment areas, land adjoining these streets are likely to suffer a loss of development potential, a loss in value and will incur additional costs as a consequence of designing for noisy environments.

Section 13.3, p110

Increased traffic on local roads decreases existing residential amenity, lessens land value and decreases the potential for new higher density housing.

Response

Property values are driven by a range of factors. For example, business property values are generally driven by factors such as access or proximity to markets and products, customer access, and visibility while residential property values are more heavily influenced by liveability as reflected by local amenity and accessibility to employment, transport and social infrastructure.

The general presence of construction and related activities associated with the project would reduce the overall amenity of affected areas, which has the potential to impact property values during construction. However, improved traffic connectivity and provision of new open space and active transport links that would result from the project would likely be a positive influence on the property values of surrounding communities.

Future movements in the value of a property are also difficult to forecast as they are subject to many variables, including specific attributes of the property, capital improvements, demand and supply factors and other changes in the wider property market.

B10.15 Soil and water quality

Refer to Chapter 15 (Soil and water quality) and Appendix Q (Technical working paper: Surface water and flooding) of the EIS for details on soil and water quality.

B10.15.1 Wastewater treatment methods

Section 15.1 – Key Findings

During construction and operational stages of the project large quantities of waste water will be generated and it is proposed to discharge this waste water into the surrounding waterways. Although the EIS states that this water will be monitored and treated for gross pollutants, sediment and nutrients no treatment method is proposed to address the elevated levels of salinity, heavy metals including copper, chromium, lead, nickel and zinc.

Response

Construction

During construction there are two different waste streams, tunnel wastewater and stormwater captured during the surface works. Tunnel wastewater would be treated in a construction water treatment plant to a quality suitable for discharge to the receiving environment. The temporary construction water treatment plants would be designed to achieve an Australian and New Zealand Environment Conservation Council (ANZECC) (2000) species protection level of 90 percent for toxicants where practical and feasible (see environmental management measure SW10 in **Chapter E1** (Environmental management measures)). Groundwater would be the main source of water in the tunnel. Extensive groundwater monitoring was carried out during preparation of the EIS to confirm likely groundwater quality. Other sources include rainfall runoff in portals and ventilation outlets, cooling and dust suppression water and wash down runoff. Pollutants from all sources were considered.

Stormwater captured at surface would be managed in accordance with Managing Urban Stormwater - Soils and Construction, Volume 1 (Landcom 2004) (otherwise known as 'The Blue Book') and relevant licence conditions.

Section 5.3.1 of Appendix Q (Technical working paper: Surface water and flooding) of the EIS states that iron, manganese, suspended solids, hydrocarbons and other settleable compounds and pH would likely be treated at construction water treatment plants and provides some details around the type of treatment processes. It is considered that there is no need to treat salinity as discharges will be to tidal water bodies.

Phosphorus and nitrogen concentrations in existing groundwater are elevated in relation to the ANZECC slightly to moderately disturbed criteria and generally slightly elevated in relation to water quality within the receiving waterways and bays. The groundwater concentrations for both nitrogen and phosphorus are, however, sufficiently low such that when considering dilution and mixing affects, discharges during construction are likely to result in negligible impacts on ambient water quality. Opportunities to treat phosphorus would be incorporated where feasible and reasonable, but nitrogen is not proposed to be treated during construction due to the need for advanced treatment methods and the anticipated negligible impacts on ambient water quality.

Further details on treatment of identified pollutants of concern would be determined during detailed design and would consider the characteristics of the waterbody and any operational constraints or practicalities and associated environmental impacts. Treatment would be developed to meet the discharge criteria, which will be developed in accordance with ANZECC (2000) and in consultation with relevant stakeholders as required by the conditions of approval (documented in the Construction Soil and Water Management Plan).

Operation

During operation there would be three key waste streams, stormwater runoff at surface, groundwater inflows into the tunnel and other tunnel water (including stormwater ingress to portals, spills, maintenance washdown, fire suppressant deluge). These three waste streams would be managed separately and via different approaches as described below.

Stormwater

Stormwater would be managed by water sensitive urban design treatment measures (bioretention facility the Iron Cove and a constructed wetland at Rozelle) and proprietary devices. Model for Urban Stormwater Improvement Conceptualisation (MUSIC) modelling was used to test the performance of the proposed treatment measures. The results are discussed in **section B10.15.3**.

Groundwater in tunnel

The 'marine water' slightly to moderately disturbed protection level (95 per cent species protection and 99 per cent for species that bioaccumulate) is considered an appropriate protection level for the receiving waterways (ambient water quality). The species protection levels in ANZECC (2000), however, are not intended to be applied as discharge criteria.

At the time of preparation of the EIS, groundwater monitoring results showed that iron and manganese had a high percentage of samples exceeding trigger levels for slightly to moderately disturbed marine water and therefore are the pollutants of most concern. The latest available groundwater monitoring results (July 2016 to August 2017) were reviewed after the preparation of the EIS to inform this response. Based on review of the most recent groundwater quality data, phosphorus, nitrogen, chromium, copper, nickel and zinc are also potential pollutants of concern.

Levels of the pollutant of concern in the groundwater quality have been considered in relation to the slightly to moderately disturbed species protection levels for marine waters. Based on the assessment, it was determined that the proposed operational water treatment plants at Darley Road (MOC1) and Rozelle (MOC3) would treat suspended solids, pH, iron and manganese. The proposed constructed wetland at the Rozelle Rail Yards would provide a 'polishing' treatment to the treated groundwater flows, removing a proportion of the nutrient (forms of nitrogen and phosphorus) and metal load. Opportunities to incorporate nutrient treatment within the plant at Darley Road (MOC1) would be investigated during detailed design. It is considered that there is no need to treat salinity as discharges are to tidal water bodies.

The applicable treatment methods depend on the adopted discharge criteria. The discharge criteria for operational water treatment plants would be developed during detailed design. The discharge criteria would be developed in accordance with ANZECC (2000), with consideration of the species protection levels for slightly to moderately disturbed marine water, relevant NSW WQOs, and in accordance with environmental management measure OSW16 in **Chapter E1** (Environmental management measures). The specific treatment methods that will be used will be therefore be confirmed during the development of the discharge criteria during detailed design.

Other tunnel water streams

Water and any other liquids in the tunnel would be collected in a sump (separate from the collection and reticulation system used for collecting groundwater), tested and in conjunction with knowledge of its source (ie washdown or a spill) a determination would be made whether it can be pumped to and discharged (if of suitable quality) at the surface, otherwise it will require removal directly from the sump by tanker for treatment and disposal elsewhere. The decision to pump to the surface would consider the capacity of the water treatment facilities to accommodate and treat additional flows.

B10.15.2 Wastewater impacts on human health and aquatic species

Section 15.1 – Key Findings

The EIS states that there is potential for wastewater to impact on the receiving waterways by introducing increased nutrient loading which will result in algal growth with increased risk to human health. The EIS only intends to minimise impacts on receiving waterways and does not adequately address the risks to human health and aquatic species due to heavy metals or other toxicants.

Response

The risk of contamination of water on public health is discussed in section 9.3 of Appendix K (Technical working paper: Human health risk assessment) of the EIS. Impacts to aquatic species is discussed in section 9.4.1 of Appendix S (Technical working paper: Biodiversity Assessment Report) of the EIS.

Tunnel wastewater, if discharged untreated or poorly treated, has the potential to impact the receiving waterways by introducing increased nutrient loading and result in algal growth with increased risk to human health, including potential impacts to aquatic species as a result of heavy metal or other toxicants (refer to section 15.3.2 of the EIS).

Although some nutrient concentrations in groundwater exceeded the slightly to moderately disturbed ecosystem trigger levels, they are still sufficiently low such that when considering dilution and mixing affects, discharges are likely to result in negligible impacts to ambient water quality in receiving waters. Opportunities for the inclusion of nutrient removal will, however, be considered further during detailed design and implemented where reasonable and feasible. Further details on treatment of identified pollutants of concern would be determined during detailed design and would be developed in accordance with ANZECC (2000) and consideration of the relevant NSW water quality objectives (refer to **Chapter E1** (Environmental management measures)). Discharge criteria would be finalised at detailed design in consultation with key stakeholders and in accordance with the conditions of approval for the project.

B10.15.3 Wastewater discharge targets

Section 15.1 – Key Findings

The EIS claims it will meet the reduction requirements for gross pollutants, sediments and nutrients but the modelling results given in table 15.2 clearly show they fail to meet these targets.

Response

It is noted that these targets relate to stormwater only. Tunnel water is managed separately as discussed in **section B10.15.1**.

MUSIC modelling undertaken to assess the impact of the project and performance of the stormwater quality treatment measures with consideration to the Sydney Harbour and Parramatta River Catchment water quality objectives and the project pollutant load reduction targets indicate that:

- The project will generally reduce the mean annual stormwater pollutant loads being discharged to the Sydney Harbour and the Parramatta River estuary when compared to the existing conditions
- The project will generally reduce the mean annual stormwater pollutant loads being discharged to the five receiving waterways when compared to the existing conditions, with the exception of total phosphorus loading to Dobroyd Canal which was slightly higher than the existing loading
- The stormwater mean annual pollutant load reduction targets were not quite achieved for the project or the individual catchments based on the treatment measures that could practically or readily be implemented.

By decreasing the mean annual stormwater pollutant load when compared to existing conditions, the project would provide a beneficial effect in terms of reducing stormwater pollutant loads to the Sydney Harbour and Parramatta River Catchment.

The pollutant load reduction targets were not achieved due to the modelling assumption that primary and secondary treatment proprietary devices would be utilised within highly constrained zones where implementation of vegetated water-sensitive urban design (WSUD) or tertiary treatment devices is not considered reasonable. Oversizing other treatment measures to offset the reduced treatment within all the constrained zones was assessed and is not considered to be feasible and/or reasonable given that improvements in treatment performance diminish significantly with increasing footprint of the treatment devices. In addition, increasing the footprint of treatment devices would also likely impact on the size of available open space areas in locations such as Rozelle and Iron Cove.

In the highly constrained areas, appropriate proprietary devices and maintenance activities would be deployed, as reflected in the environmental management measures in **Chapter E1** (Environmental management measures).

B10.15.4 Impacts on sensitive receiving environments

Section 15.1 – Key Findings

The EIS states that the project has the potential to interact with at least eight sensitive receiving environments but gives no indication as to how they intend to identify the issues, what prevention measures will be used or how it will mitigate any impacts.

Response

Section 15.2.2 of Chapter 15 (Soil and water quality) of the EIS outlines the sensitive receiving environments the project has the potential to interact with. Where impacts on sensitive receiving environments are considered likely, these impacts have been assessed in sections 15.3 and 15.4 of Chapter 15 (Soil and water quality) of the EIS. This includes potential impacts on Iron Cove, Johnstons Creek, Whites Creek and Parramatta River Estuary and key fish habitat at Rozelle Bay, Iron Cove, White Bay, Alexandra Canal, Dobroyd Canal (Iron Cove Creek) and Hawthorne Canal. Potential impacts on other identified sensitive receiving environments were not considered likely as a result of the project (including Cooks River, Botany Bay and seagrasses in Botany Bay).

Residual impacts to ambient water quality will generally be negligible with impacts localised to the zone near the outlet where discharges mix with receiving waters. In the context of the entire catchment draining to Sydney Harbour, the project is likely to have a negligible influence on achieving the water quality objectives. Refer to responses in **section B10.15.1**, **section B10.15.2** and **section B10.15.3** for further details.

Chapter E1 (Environmental management measures) outlines the management measures that would be implemented to manage potential impacts on sensitive receiving environments.

B10.15.5 Consideration of relevant policies

Section 15.1 - Key Findings

It has not been demonstrated that the works will be undertaken in accordance with the requirements of the City's draft interim floodplain management policy May 2014. (Ref Section 15 table 15-1 SEAR item 10).

Response

The City of Sydney's draft interim floodplain management policy (May 2014) will be considered during development of the detailed design and the preparation of the Flood Mitigation Strategy, which will be prepared in consultation with key stakeholders including relevant local councils (environmental management measures FD01 and FD03 in **Chapter E1** (Environmental management measures)).

B10.15.6 Aquatic connectivity and access to habitat for spawning and refuge

Section 15.2 – Water - Hydrology

It has not been demonstrated that the works will be undertaken in accordance with the requirements to assess the aquatic connectivity and access to habitat for spawning and refuge. (Ref Section 15 table 15-1 SEAR item10.3a).

Response

Section 5.4.2 of Appendix S (Technical working paper: Biodiversity Assessment Report) of the EIS identifies that it is possible some species may opportunistically pass near the project footprint in estuarine bays given the connectivity to the broader harbour and coastal habitats, but they are unlikely to depend on the habitat within the project footprint. It is also considered unlikely that there is valuable or specific aquatic habitat for threatened aquatic/estuarine species, populations or communities listed under the *Fisheries Management Act 1994* (FM Act), *Threatened Species Conservation Act 1995* (TSC Act) and *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) within the project footprint. Since the EIS was prepared, the TSC Act has been repealed and replaced with the *Biodiversity Conservation Act 2016* (NSW), however the biodiversity assessment was undertaken in accordance with the TSC Act which was the prevailing legislation when the EIS was prepared.

Aquatic impacts are assessed in section 9.4.1 of Appendix S (Technical working paper: Biodiversity Assessment Report). With regards to aquatic connectivity and access to habitat for spawning and refuge, the assessment identifies that the upgraded section of The Crescent that crosses Whites Creek will shade the aquatic habitat within the concrete channel, creating less favourable conditions for barnacles and oysters attached to the wall. The increased bridge width is unlikely to act as a behavioural barrier to fish passage (as is the case with small dark culverts). The passage appears to have adequate clearance (two to three metres above water), depth (one to two metres) and width (nine metres) to encourage fish movement, maintaining aquatic connectivity.

Works within Whites Creek would temporarily obstruct fish passage if a floating boom and silt curtain is placed near the creek outlet across the bay. This impact would be minimal given the poor creek habitat in Whites Creek and Rozelle Bay intertidal area. The design of the road bridge at Whites Creek will be designed with consideration of *Policy and Guidelines for Fish Habitat Conservation Update 2013* (DPI-Fisheries 2013) and *Why do Fish Need to Cross the Road? Fish Passage Requirements for Waterway Crossings* (NSW-Fisheries 2003) in accordance with environmental management measure B3 (see **Chapter E1** (Environmental management measures)). Fish passage would be restored during operation in accordance with the environmental management measure SW08 (in **Chapter E1** (Environmental management measures)).

B10.15.7 Ambient water quality objectives

Section 15.3 – Water - Quality

The list of ambient NSW Water Quality Objectives (NSWWQO) are not given in section 15.1.4 as stated in the EIS (Ref Section 15 table 15-1 SEAR item11.1a and Section 15.1.4)

Response

A list of the ambient NSW Water Quality Objectives for receiving waters within the project study area is included in Table 15-3 in section 15.1.5 of the EIS. The reference to section 15.1.4 is a typographical error. Table 3-3 in Appendix Q (Technical working paper: Surface water and flooding) of the EIS also provides details of the water quality objectives and provides a cross reference to where these are discussed.

B10.15.8 Quality of pollutants

The EIS has not identified the quality of all pollutants that may be introduced into the water cycle by source and discharge point as required (Ref Section 15 table 15-1 SEAR item11.1b, Sections 15.3.2 and 15.4.2)

Response

The potential impacts of stormwater pollutants and tunnel pollutant discharges (which are the primary discharges associated with the project) have been assessed in section 6.3 of Appendix Q (Technical working paper: Surface water and flooding) of the EIS including stormwater pollutant loading to each waterway and potential treated groundwater discharge concentrations. Other potential pollutants of concern have been listed in sections 4.10, 5.3 and 6.3 of Appendix Q (Technical working paper: Surface water and flooding) of the EIS.

The potential impacts identified for each waste stream have been considered and appropriately managed within the design or as part of the environmental management measures. Pollutant concentrations from the non-groundwater and stormwater waste streams will be variable and as such design and management measures would be developed during detailed design and implemented to manage this risk. These are provided in **Chapter E1** (Environmental management measures). Further discussion on construction and operational water quality treatment and discharge is provided in response to the NSW EPA's submission on the EIS in **section B2.3**.

B10.16 Contamination

No comments were received from the City of Sydney on contamination.

B10.17 Flooding and drainage

Refer to Chapter 17 (Flooding and drainage) and Appendix Q (Technical working paper: Surface water and flooding) of the EIS for details of flooding and drainage.

B10.17.1 Assessment and management of flood risk is inadequate

Key Findings

Assessment of flood risk, and strategies to manage that risk, is inadequate.

Section 17.2, Matter 17.1

The Proponent must ensure that the flood impacts are negated and associated flood risk mitigation measures implemented, as part of the New M5 project, for the M4-M5 project works at St Peters Interchanges (Section 17.2.3).

Section 17.2, Matter 17.3

Quantitative Assessment should not be limited to only 10, 100 year average recurrence interval floods and probably maximum flood. In order to identify flood impacts on neighbouring properties and or amenities due to the project works, including flood proofing of the portals, tunnel entries and associated amenities, five year and 20 year ARI storm events must be included in the assessment.

Section 17.2, Matter 17.4

Pyrmont Bridge Road – at the Western end of Bignell Lane near Pyrmont Bridge Road existing flood depth is identified up to one metre in the 100 year ARI event. As per the NSW Government Floodplain Development Manual – 2005 the location is to be considered as high flood hazard area. Site specific mitigation measures are required to address flood hazard to an acceptable level without adversely affecting upstream or downstream of the area, as well as immediate adjacent properties.

Section 17.3, Matter 17.6

The Proponent must set out the flood impacts and associated flood risk mitigation measures were implemented as part of the New M5 project for the M4-M5 Link project works at St Peters Interchanges (Section 17.2.3).

Response

The EIS, including the assessment of flooding and drainage at Chapter 17 (Flooding and drainage) and Appendix Q (Technical working paper: Surface water and flooding) of the EIS, has been prepared in accordance with the SEARs, prepared by the Secretary of DP&E and the relevant provisions of Schedule 2 of the Environmental Planning and Assessment Regulation.

As noted in section 17.2.3 of the EIS, the provision of flood mitigation measures at the St Peters interchange as they relate to the M4-M5 Link project footprint at this location is being delivered by the New M5 project and are subject to the New M5 conditions of approval. This includes the provision of the construction site platform, which will be designed to protect the site from flooding, as well as a temporary stormwater drainage strategy to divert flows around and away from stockpile sites and other vulnerable infrastructure. The assessment of potential flooding impacts at the St Peters interchange and associated management and mitigation measures are set out in the New M5 EIS (November 2015).

The 10 year average recurrence interval (ARI), 100 year ARI and the Probable Maximum Flood (PMF) were selected as they represent a range of different flood events, from a more frequent event (the 10 year ARI), up to an extreme event (the PMF). Annexure C of Appendix Q (Technical working paper: Surface water and flooding) of the EIS notes that the flood model considered the five, 10, 20 and 100 year ARI storm events in accordance with the Australian Rainfall and Runoff (1987).

However, as noted in section 17.1.3 of the EIS, the flood behaviour across the 10 year ARI, 100 year ARI and PMF design events was found to be similar. Modelling additional flood events would therefore not change the assessment findings or mitigation measures proposed. The tunnel portals for the project and associated flood protection barriers would be located above the PMF level or the 100 year ARI flood level plus 0.5 metres (whichever is greater) (refer to section 2.4.2 of Appendix Q of the EIS and environmental management measure FD04 in **Chapter E1** (Environmental management measures)). Pavement drainage systems at the tunnel entrances would be designed to capture pavement runoff at the tunnel portals for storms up to the PMF.

As discussed in section 4.4.1 of Appendix Q (Technical working paper: Surface water and flooding) of the EIS, the Pyrmont Bridge Road tunnel site (C9) is located near the top of the Johnstons Creek catchment. There is only a small catchment draining to the site but the dense existing building development means that runoff is channelled along Bignell Lane before ponding at the low point on Bignell Lane where the local drainage system connects to the road drainage system on Pyrmont Bridge Road. The road drainage system subsequently drains towards Johnstons Creek.

The Leichhardt Flood Study identified flood depths generally between 0.1 metres and 0.2 metres along Bignell Lane in the 100 year ARI event and up to one metre at the low point on Bignell Lane. Given the small catchment size, the relatively high flood depths are a result of the confined overland flowpath.

Section 4.4.1 of Appendix Q (Technical working paper: Surface water and flooding) of the EIS also notes that the existing buildings on the Pyrmont Bridge Road tunnel site (C9) will be demolished during construction and replaced with temporary facilities of a smaller footprint, which would allow for less concentrated overland flows paths and would also reduce the potential to displace water and impact surrounding properties. With appropriate site drainage to manage runoff the risk of flooding impacts associated with the Pyrmont Bridge Road tunnel site (C9) is considered to be low.

Specific measures to manage flooding during construction are identified in Table 8-1 of Appendix Q (Technical working paper: Surface water and flooding) of the EIS. If other measures are required, these would be finalised during detailed design but would be expected to include a combination of temporary piped drainage, open drains and swales and sedimentation and erosion control measures.

B10.17.2 Discharge during construction

Section 17.2, Matter 17.2

During construction phase, groundwater or stormwater from the construction site must not discharge into the stormwater network.

Section 17.3, Matter 17.7

During construction phase, groundwater or stormwater from the construction site must not discharge into the stormwater network.

Response

Controlled stormwater and tunnel water discharges into the stormwater network would occur during construction. This is common for all major construction and tunnelling projects.

During construction, the wastewater generated in the tunnel would be captured, tested and treated at a construction water treatment plant (if required) prior to reuse or discharge, or disposed of offsite. Further details on treatment of identified pollutants of concern would be determined during detailed design, as discussed in **section B10.15.1**.

Stormwater would be managed in accordance with the principles and requirements in *Managing Urban Stormwater – Soils and Construction*, Volume 1 (Landcom 2004) and Volume 2D (DECCW 2008), commonly referred to as the '*Blue Book*'.

B10.17.3 Environmental management measures

Section 17.3, Matter 17.5

Table 17- 5 Environmental management measures – Flooding and drainage

- (FD01) 'A maximum increase of 50mm in inundation at properties that the floor level is not flood affected' is not acceptable. There must be no increase in flood level in all cases with the flood level estimation tolerance of ±10mm
- (FD01) There must not be any change is flood hazard categories e.g. low to high
- (FD03) 'Measure developed to manage potential flood…..' Must not shift flooding elsewhere
- (FD13) 'runoff generated from the project construction and operational facilities…..' Must not cause surcharge downstream to receiving drainage network.

Response

Environmental management measures are included in **Chapter E1** (Environmental management measures).

The intent of the Flood Mitigation Strategy (environmental management measure FD01) is to demonstrate that the existing flooding characteristics will not be exacerbated as a consequence of the project. The strategy will be prepared by a suitably qualified and experienced person in consultation with directly affected landowners, the Lands and Water branch of the NSW Department of Industry, Sydney Water and relevant councils.

A maximum increase of 50 millimetres in inundation to properties where floor levels would not be exceeded in a 1 in 100 year ARI event is consistent with the conditions of approval for the New M5 and M4 East projects. When it comes to flood impacts, there are no policies or guidelines that give a strict definition on what acceptable flood impacts are. The industry consensus is that there needs to be a merit-based approach to flood impact limits, taking into consideration the type of the project/infrastructure, public safety, surrounding land use and infrastructure and cost of flood mitigation measures. The NSW Floodplain Development Manual recommends a similar merit-based approach to flood planning levels. In line with that approach, the flood impact limits in FD01 have been refined to also state that there should be no impact at properties where floor levels are already inundated, ie the most affected properties won't be made worse.

A flood impact of 50mm at properties has been used fairly consistently across many major projects in NSW in recent years including the New M5, M4 East, most of the Pacific Highway Upgrade projects and Sydney Metro North. The limit of model accuracy for estimating flood levels is generally ±10mm, and applying a blanket ±10mm limit to flood impacts means that there should not be any flood impacts anywhere along the project.

As stated in environmental management measure FD01 in **Chapter E1** (Environmental management measures), changes in flood behaviour under PMF conditions will be assessed to identify impacts on critical infrastructure and significant changes in flood hazards as a result of the project. There should be no increase in flood hazard, where possible.

With regards to the City of Sydney's comment in relation to environmental management measures FD03 and FD13, the design of construction ancillary facilities and permanent operational infrastructure has been developed to avoid or minimise changes to flood behaviour in and around the project footprint, and if required, further refinements would be made to the temporary or permanent designs as required to minimise impacts (as noted in section 6.2.1 of the Appendix Q (Technical working paper: Surface water and flooding) of the EIS). This may include the upgrading or replacement of the existing drainage system in areas as noted in environmental management measure FD12 (see **Chapter E1** (Environmental management measures)). The design and construction contractor(s) may make changes to the construction ancillary facility designs, in which case flooding would need to be reassessed. As discussed above for environmental management measures FD01 and FD11, shifting flooding or surcharge of drainage systems would lead to flood impacts and this would be mitigated.

B10.17.4 Stormwater drainage

Section 17.3, Matter 17.8

Stormwater networks must not be used for relieving/ shifting flooding elsewhere without proper assessment of the existing stormwater network capacity, potential downstream surcharge risk.

Response

Hydrologic and hydraulic assessments will be carried out for all temporary project components (including ancillary facilities) and permanent design features that have the potential to affect flood levels and drainage systems in the vicinity of the project (see environmental management measure FD02 in **Chapter E1** (Environmental management measures)). The results of the assessment will inform the preparation of the Flood Mitigation Strategy (environmental management measure FD01 in **Chapter E1** (Environmental management measures)) as well as the design development of temporary and permanent works. Further hydrologic and hydraulic modelling will also be undertaken to determine the capacity of existing drainage systems and their ability to convey flows from the project site and to identify all feasible and reasonable mitigation measures to be implemented where drainage from the project is predicted to adversely impact on receiving drainage systems (see environmental management measure FD11).

B10.18 Biodiversity

Refer to Chapter 18 (Biodiversity) and Appendix S (Technical working paper: Biodiversity Assessment Report) of the EIS for details of biodiversity.

B10.18.1 Biodiversity protection

Key Findings, p131

The proposed mitigations for the loss of foraging habitat for the Grey Headed Flying-fox and microbats is unsatisfactory.

Section 18.2

Microbat roosting beneath Iron Cove bridges is highly probable.

The loss of foraging habitat for the Grey headed Flying-fox and microbats is assessed as 'low', with a proposed mitigation response of providing compensatory planting (OB9). The replacement of this habitat to maturity would take many years and would not provide an immediate replacement of habitat.

A higher risk is more likely and detail of a how disturbance will be realistically managed is required.

Response

Microbat roosting

Iron Cove Bridge is noted in Appendix S (Technical working paper: Biodiversity Assessment Report) of the EIS as a potential suitable roosting habitat for microbat species. Iron Cove Bridge, and any microbat roosting habitat that it provides, would not be directly impacted by the project. The permanent bioretention facility at Rozelle is proposed to be relocated from Manning Street at Rozelle (as outlined in Chapter 5 (Project description) of the EIS) to around 150 metres north in an area adjacent to Victoria Road at the eastern abutment of Iron Cove Bridge and within King George Park (see **Chapter D3** (Relocation of the bioretention facility at Rozelle) in the preferred infrastructure report). If present, microbats under Iron Cove Bridge may be affected during construction, primarily from noise during installation of the drainage connection to Iron Cove (a section of which may be constructed beneath or adjacent to the bridge). As construction in this area would be undertaken during standard construction hours, night lighting would not be used and as such, would not affect microbats in this area, if present. Any potential impacts to microbats at this location are not expected to be significant, as microbats, if present, are highly mobile species and the construction works in the immediate vicinity of the bridge would be a short term activity.

A Construction Flora and Fauna Management Plan (CFFMP) will be developed and implemented during construction of the project in accordance with the environmental management measure B1 in **Chapter E1**. The CFFMP will include pre-disturbance inspection requirements to identify features of biodiversity conservation significance that might be directly impacted be the project and select appropriate management measures and environmental controls. The plan would include management measures outlined in Appendix S (Technical paper: Biodiversity Assessment Report) of the EIS and from any additional assessments carried out during detailed design and project delivery as relevant.

Foraging Habitat

An assessment in accordance with criterion under the *Matter of National Environmental Significance Significant Impact Guidelines* (Australian Government 2013) for the Grey-headed Flying-fox was undertaken and is provided in Annexure E of Appendix S (Technical working paper: Biodiversity Assessment Report) of the EIS. This assessment concluded that the project would remove up to 4.49 hectares of vegetation that comprises marginal potential foraging habitat in the form of individual Fig trees (*Ficus sp*) and limited flowering eucalyptus. The loss of foraging habitat was considered negligible in the context of similar available habitat in the surrounding area and within the foraging range for this species. Potential foraging habitat for this species is abundant throughout the locality, and the species is known to travel large distances for food sources. While the habitat may contribute as a 'stepping stone' for this highly mobile species to other more substantial foraging habitat sites, this function is unlikely to be significantly inhibited by the works. There are no roosting camps for the Grey-headed Flying-fox within the locality. The project would not have a significant impact on the Grey-headed Flying-fox.

The project would also remove up to 3.78 hectares of foraging habitat for threatened microbats, including the Eastern Bentwing-bat and the Yellow-bellied Sheathtail-bat. This would not have a significant impact on these species considering they are highly mobile, and given the presence of similar available habitat in the surrounding area and within the foraging range for these species.

As discussed above, the project would implement a CFFMP during construction of the project in accordance with environmental management measure B1 (see **Chapter E1** (Environmental management measures)). As per environmental management measure B6, as many trees as possible will be retained during construction, and in the event that tree removal cannot be avoided, a tree replacement strategy will be prepared. Replacement trees will be included in the relevant UDLP. The relevant UDLP will also include species recommendations for the landscape design to consider, including foraging habitat for the Grey-headed Flying-fox (as per environmental management measure B9).

In addition, the project would deliver up to 10 hectares of open space at the Rozelle Rail Yards, which would, at least partially, compensate for the loss of foraging habitat, provided the open space is suitably landscaped as per environmental management measure B9 (see **Chapter E1** (Environmental management measures).

The proposed mitigation measures identified respond to the level of impacts identified for the Grey headed Flying-fox and microbats, including loss of potential foraging habitat and loss of potential roosting habitat for microbats at Victoria Road bridge. The level of confidence in the assessment of the impact to loss of foraging habitat was considered to be high given that impacts are predictable (refer to Table 9.1 in Appendix S of the EIS).

B10.19 Groundwater

Refer to Chapter 19 (Groundwater) Appendix T (Technical working paper: Groundwater) of the EIS for details of groundwater.

B10.19.1 Discharge into stormwater

Key Findings

Section 19.2.5 Hydrological Setting - Groundwater inflow in existing Sydney Tunnels - Groundwater and infiltration into tunnels must not be discharged into the stormwater drainage system.

Response

Controlled tunnel water discharges into the stormwater network would occur during construction and operation.

During construction, the wastewater generated in the tunnel would be captured, tested and treated at a construction water treatment plant prior to reuse or discharge, or disposed offsite if required. Where discharge to the local stormwater system is proposed, discharges will be managed to prevent overloading of the receiving drainage system.

During operation, the tunnels would include drainage infrastructure to capture groundwater and stormwater ingress, spills, maintenance wastewater, fire suppressant deluge and other potential water sources. Tunnel wastewater from the tunnels would be pumped to water treatment facilities at the Darley Road motorway operations complex (MOC1), Rozelle East motorway operations complex (MOC3) and the New M5 operational water treatment facility at Arncliffe. Treated flows from a plant at Darley Road would be discharged to Hawthorne Canal. This may occur via the existing stormwater system (subject to capacity and condition assessments) or via a new connection to be installed as part of the project. Treated flows from the Rozelle plant would drain via a constructed wetland to Rozelle Bay (refer to section 6.3.3 of Appendix Q (Technical working paper: Surface water and flooding) of the EIS).

Both the temporary construction water treatment plants and operational water treatment facilities will be designed and managed so that treated water will be of suitable quality for discharge to the receiving environment, consistent with discharge criteria developed in accordance with ANZECC (2000) and with consideration to the relevant NSW Water Quality Objectives (WQOs) and *Protection of the Environment Operations Act 1997* (NSW).

Runoff generated from the project construction and operational facilities and discharges from water treatment facilities will be managed to mitigate risk of overloading the receiving drainage system (see environmental management measure FD13 in **Chapter E1** (Environmental management measures)).

Further hydrological and hydraulic modelling based on the detailed design would be undertaken to determine the ability of the receiving drainage systems to effectively convey drainage discharged from the project once operational (see environmental management measure FD11 in **Chapter E1** (Environmental management measures)). This would include confirming that the stormwater collection system is appropriately sized and identifying where upsizing works are required.

B10.20 Non-Aboriginal heritage

Refer to Chapter 20 (Non-Aboriginal heritage) Appendix U (Technical working paper: Non-Aboriginal heritage) of the EIS for details of non-Aboriginal heritage.

B10.20.1 Demolition of heritage items

Key Findings, p133

A significant number of buildings and other structures that are heritage listed or identified as potential heritage items will be demolished or affected by the project. Two heritage items are identified as being affected by the works in Chapter 20.3.2. Heritage item number I2242 of Sydney Local Environmental plan (LEP) 2012, known as the former Grace Bros Repository including interiors at 6-10 Mallett Street, Camperdown, and the terrace group at 2–34 Campbell Road, Alexandria, heritage item number I12 of Sydney LEP 2012 potentially through settlement and vibration. Also potentially impacted upon by these works are the former corner shop and residence at 70 Church Street, Camperdown, Sydney LEP 2012 #I51, and the Warehouse at 9-11 Layton Street, Camperdown, Sydney LEP 2012 #I58.

Response

The project has been designed and developed to minimise the need for surface property acquisition and therefore demolition of properties, including listed and potential heritage items. Notwithstanding this, an unavoidable impact of the project is the partial and full demolition of structures, including listed and potential heritage items. Four listed heritage items and 10 potential heritage items would be fully or partially demolished as a result of the project. None of these are within the City of Sydney LGA.

As identified in Table 20-17 of the EIS, two non-Aboriginal heritage listed items listed in the Sydney LEP would experience the following impacts from construction of the project:

- Former Grace Bros Repository including interiors at 6-10 Mallett Street, Camperdown (around 10 metres east of the Pyrmont Bridge Road tunnel site (C9) and around 20 metres east of the entry

to the temporary access tunnel and about 400 metres east of the mainline tunnel) – minor adverse impacts due to setting and vibration

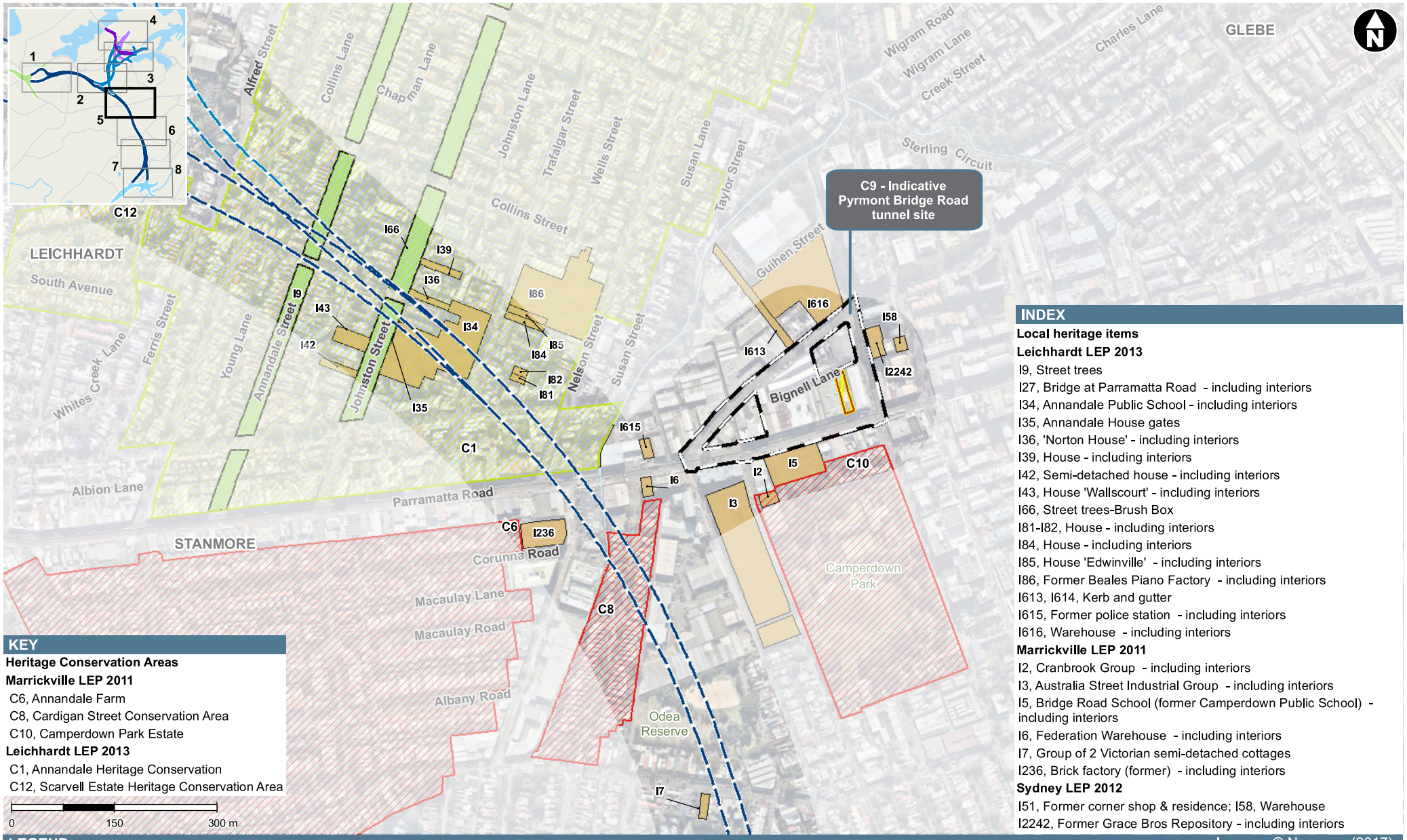
- Terrace group at 2-34 Campbell Road, Alexandria (230 metres south east of the Campbell Road motorway operations complex (MOC5)) – neutral impact due to setting and vibration.

Impacts on 'setting' include visual impacts caused by the construction and operation surface infrastructure. The Pyrmont Bridge Road tunnel site (C9) would be used during construction and then rehabilitated to generally the existing ground level or as otherwise agreed with Roads and Maritime. Any infill structure would be appropriate to the character and other urban design values of the setting. Therefore the impacts due to setting at the former Grace Bros Repository would be temporary.

Owing to the physical separation of the terrace group at 2-34 Campbell Road and the Campbell Road motorway operations complex (MOC5), as well as the proposed widening and landscaping of Campbell Road, it is not anticipated that the construction of the motorway operations complex would have significant impacts on the setting of the terrace group.

The former corner shop and residence at 70 Church Street, Camperdown is about 500 metres from the tunnelling works for the project and about 300 metres from the temporary access tunnel at the Pyrmont Bridge Road tunnel site. Therefore, it is unlikely that this heritage item will be impacted by the project. The warehouse at 9-11 Layton Street, Camperdown is about 500 metres from the tunnelling works and about 50 metres from the realignment works at Bignell Lane and the temporary access tunnel at the Pyrmont Bridge Road tunnel site (C9). Due to the distance from the works it is unlikely that this heritage item would be impacted by the project.

Maps showing the location of heritage items in relation to the Pyrmont Bridge Road tunnel site (C9) and the Campbell Road civil and tunnel site (C10) are included in **Figure B10-6** and **Figure B10-7.**



INDEX

Local heritage items

Leichhardt LEP 2013

I9, Street trees
I27, Bridge at Parramatta Road - including interiors
I34, Annandale Public School - including interiors
I35, Annandale House gates
I36, 'Norton House' - including interiors
I39, House - including interiors
I42, Semi-detached house - including interiors
I43, House 'Wallscourt' - including interiors
I66, Street trees-Brush Box
I81-I82, House - including interiors
I84, House - including interiors
I85, House 'Edwinville' - including interiors
I86, Former Beales Piano Factory - including interiors
I613, I614, Kerb and gutter
I615, Former police station - including interiors
I616, Warehouse - including interiors

Marrickville LEP 2011

I2, Cranbrook Group - including interiors
I3, Australia Street Industrial Group - including interiors
I5, Bridge Road School (former Camperdown Public School) - including interiors
I6, Federation Warehouse - including interiors
I7, Group of 2 Victorian semi-detached cottages
I236, Brick factory (former) - including interiors

Sydney LEP 2012

I51, Former corner shop & residence; I58, Warehouse
I2242, Former Grace Bros Repository - including interiors

KEY

Heritage Conservation Areas

Marrickville LEP 2011

C6, Annandale Farm
C8, Cardigan Street Conservation Area
C10, Camperdown Park Estate

Leichhardt LEP 2013

C1, Annandale Heritage Conservation
C12, Scarvell Estate Heritage Conservation Area

Imagery © Nearmap (2017)

LEGEND

M4-M5 Link Mainline tunnel
Tunnel

M4-M5 Link Rozelle interchange
Tunnel
Project footprint

Leichhardt LEP 2013
Heritage Conservation Area

Marrickville LEP 2011
Heritage Conservation Area
Heritage item
Landscape heritage item

Potential heritage item
Item

Figure B10-6 Heritage items within 100 metres of the Pyrmont Bridge Road tunnel site (C9)

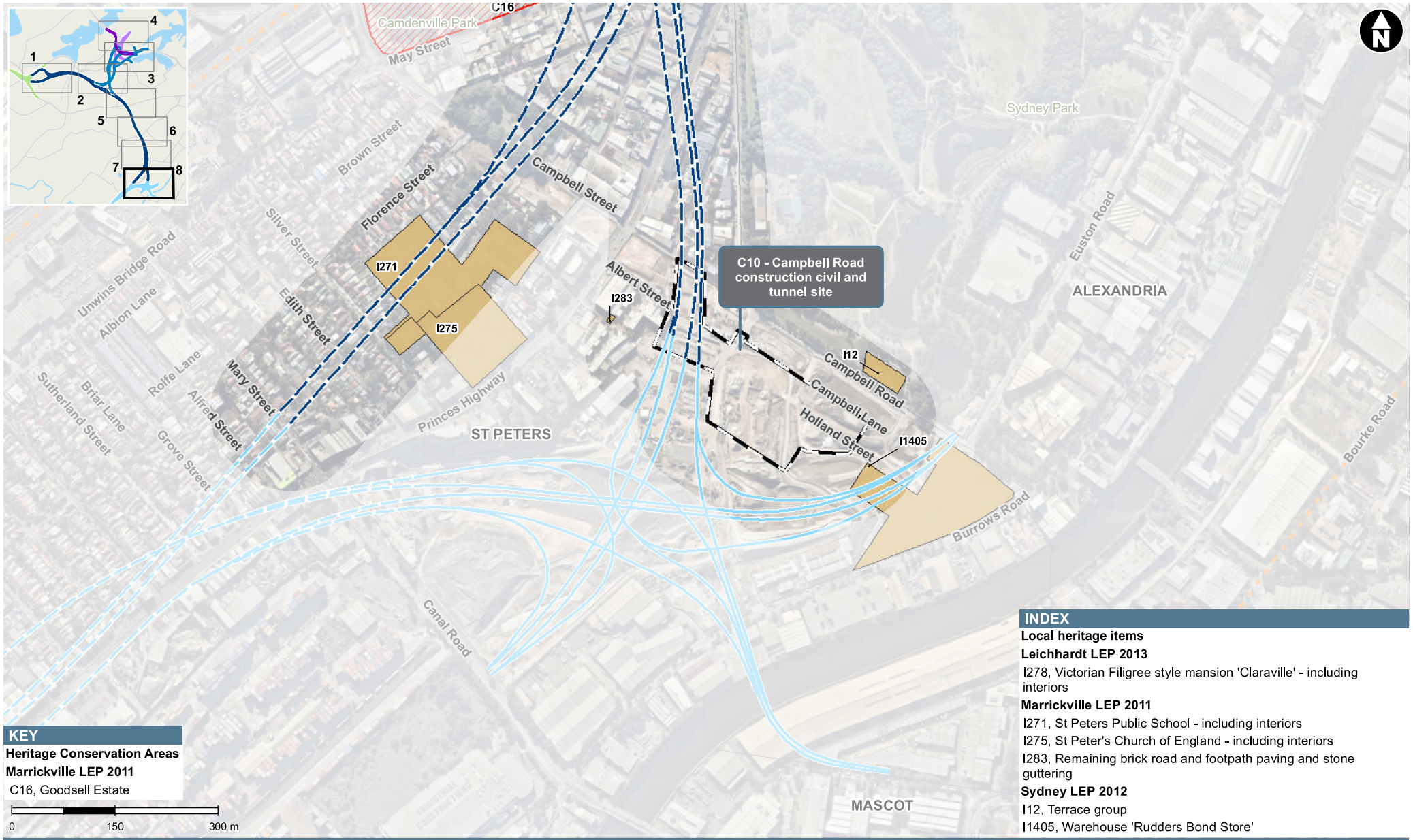


Figure B10-7 Heritage items within 100 metres of the Campbell Road civil and tunnel site (C10)

B10.20.2 Impacts on non-Aboriginal heritage items from the mainline tunnel construction

Key Findings, p133

The 'mainline' of the tunnel passes beneath Sydney LGA heritage items and heritage conservation areas along the southern section of King Street, Newtown. The construction of this tunnel has the potential to affect heritage items and heritage building in heritage conservation areas above the tunnel corridor, through settlement and vibration impacts.

The following heritage items within the City of Sydney may be impacted by the tunnel:

- St George's Hall,' (352 King Street) including interior 344–358 King Street, Newtown Sydney Local environmental plan (LEP) 2012 #I1014
- Saints Constantine and Helen Greek Orthodox Church including buildings and their interiors, front fence and grounds, 366–378 King Street, Newtown Sydney LEP 2012 #I1015
- Service station 'Rising Sun', (426 King Street) including interior and front forecourt 424–430 King Street, Newtown Sydney LEP 2012 #I1016
- Commercial building including interior, 482–496 King Street, Newtown Sydney LEP 2012 #I1017
- Commercial building including interior, 522–524A King Street, Newtown Sydney LEP 2012 #I1018
- Union Hotel, Newtown Sydney LEP 2012 #I1019
- Sydney LEP 2012 #I130, Victorian Georgian house and stables - including interiors
- Sydney LEP 2012 # I141, Corner shop - including interiors
- Sydney LEP 2012 #I142, Group of Victorian Style Terraces - including interiors
- Sydney LEP 2012 #I152, Cragos Flour Mills site - including interiors
- Sydney LEP 2012 #I163, Former electricity substation
- Sydney LEP 2012 #I165, Victorian terrace - including interiors
- Sydney LEP 2012 #I309, St Joseph's Boys School - including interiors
- Sydney LEP 2012 #I1013, Newtown Primary School (344-350 King Street)
- Sydney LEP 2012 #I613, Commercial building
- Sydney LEP 2012 #I623, Cottage group 'Henry Knight Cottages'
- Glebe Railway Viaduct, NSW State Heritage register #01034.

Heritage buildings within the following heritage conservation areas in the City of Sydney may be impacted upon by the tunnel:

- King Street Heritage Conservation Area, Sydney LEP 2012 C47
- Newman and Gibbes streets Newtown heritage Conservation Area, Sydney LEP C42.

Response

Figure 6-13 to Figure 6-20 in section 6.14 of Appendix U (Technical working paper: Non-Aboriginal heritage) of the EIS illustrates heritage items and conservation areas listed on local, State and Section 170 Registers located above the tunnel alignment. Potential for vibration impacts on heritage items associated with tunnelling is described in section 6.11 of Appendix U (Technical working paper: Non-Aboriginal heritage) of the EIS. Potential settlement impacts on heritage items are described in section 6.13 of Appendix U (Technical working paper: Non-Aboriginal heritage) of the EIS.

Heritage items and heritage conservation areas (HCAs) located above and directly intersecting with the project tunnelling alignment were identified as requiring further assessment due to their susceptibility to potential settlement and vibration impacts. Table 6-48 of Appendix U (Technical working paper: Non-Aboriginal heritage) of the EIS summarises the potential impacts on these items located above and directly intersecting with the project tunnelling alignment.

It was concluded that the following items, included in Table 6-48 in Appendix U of the EIS, are unlikely to be impacted by the project and therefore were given a neutral impact rating:

- St George's Hall, (352 King Street) including interior 344–358 King Street, Newtown Sydney LEP 2012 #I1014
- Saints Constantine and Helen Greek Orthodox Church including buildings and their interiors, front fence and grounds, 366–378 King Street, Newtown Sydney LEP 2012 #I1015
- Service station 'Rising Sun,' (426 King Street) including interior and front forecourt 424–430 King Street, Newtown Sydney LEP 2012 #I1016
- Commercial building including interior, 482–496 King Street, Newtown Sydney LEP 2012 #I1017
- Commercial building including interior, 522–524A King Street, Newtown Sydney LEP 2012 #I1018.

The heritage items listed below are located outside of the area above or directly intersecting with the project tunnelling alignment and were therefore not included in the assessment in Table 6-48 of Appendix U (Technical working paper: Non-Aboriginal heritage) of the EIS:

- Union Hotel, Newtown Sydney LEP 2012 #I1019
- Sydney LEP 2012 #I1013, Newtown Primary School (344-350 King Street)
- Sydney LEP 2012 #I613, Commercial building
- Sydney LEP 2012 #I623, Cottage group 'Henry Knight Cottages'.

The Glebe Railway Viaduct (NSW State Heritage register # 01034) is located around 25 metres south east of The Crescent and Johnston Street intersection surface works. The proposed works at this intersection would be unlikely to impact this heritage item. Table 6-23 of Appendix U (Technical working paper: Non-Aboriginal heritage) of the EIS assessed the potential impact to Annandale (Johnston Street) Underbridge and this was given a neutral rating as works would not directly impact on the underbridge.

The heritage items listed below are incorrectly labelled in this submission as being listed under the Sydney LEP 2012. These items are located within the Inner West Council LGA and are listed under the Marrickville LEP 2011. All of these items are intersected by or are within 80 metres of the tunnel alignment. At these locations, the proposed tunnels would be between 30 and 60 metres below ground level. Due to the depth of the tunnel at these locations, it is unlikely that any of these heritage listed items would be impacted by the project. The assessment in the EIS ranked the impact on these items as neutral.

- Marrickville LEP 2011 #I130, Victorian Georgian house and stables - including interiors
- Marrickville LEP 2011 # I141, Corner shop - including interiors
- Marrickville LEP 2011 #I142, Group of Victorian Style Terraces - including interiors
- Marrickville LEP 2011 #I152, Cragos Flour Mills site - including interiors
- Marrickville LEP 2011 #I163, Former electricity substation
- Marrickville LEP 2011 #I165, Victorian terrace - including interiors
- Marrickville LEP 2011 #I309, St Joseph's Boys School - including interiors.

The King Street Heritage Conservation Area (Sydney LEP 2012 C47) is included in the assessment in Table 6-48 of Appendix U (Technical working paper: Non-Aboriginal heritage) of the EIS and was identified as being unlikely to be impacted. The Newman and Gibbes Streets Newtown Heritage Conservation Area (Sydney LEP C42) is not located above or directly intersecting with the project tunnelling alignment and was therefore not included in the assessment in Table 6-48 of Appendix U (Technical working paper: Non-Aboriginal heritage) of the EIS.

Environmental management measures to manage potential settlement and vibration impacts during construction of the project are set out in **Chapter E1** (Environmental management measures). This includes building condition surveys, which will be offered to property owners within the zone of influence of tunnel settlement (50 metres from the outer edge of the tunnels and within 50 metres of surface works) or as otherwise directed by the Independent Property Impact Assessment Panel (see PL11). Building condition surveys of properties will be carried out by a structural engineer prior to the commencement of any project works in the vicinity that have the potential to result in damage to the properties, as identified by the contractor and confirmed by the Independent Property Impact Assessment Panel.

B10.20.3 Unexpected finds

Matter 20.1, p134

Of the six areas of disturbance and 11 Historical Archaeological Management Units (HAMUs) identified in Chapter 20 of the EIS, none are within the City's LGA. Nonetheless there is potential for unexpected finds that should be managed in accordance with best archaeological practice.

Response

Environmental management measures NAH08 in **Chapter E1** (Environmental management measures) relates to unexpected heritage finds. The measure states that 'Any items of potential heritage conservation significance or human remains discovered during construction will be managed in accordance with an Unexpected Heritage Finds and Humans Remains Procedure developed for the project in accordance with relevant guidance provided by the Heritage Council of NSW, the NSW Heritage Division of OEH and the *Standard Management Procedure Unexpected Archaeological Finds* (Roads and Maritime 2015a). The procedure will detail requirements regarding notification of relevant agencies and the NSW Police and will be implemented for the duration of construction.

B10.21 Aboriginal heritage

Refer to Chapter 21 (Aboriginal heritage) Appendix V (Technical working paper: Aboriginal heritage) of the EIS for details of Aboriginal heritage.

B10.21.1 Damage to Aboriginal heritage from vibration

There is significant potential for structural damage to be caused to property and heritage (including Aboriginal heritage) and the environment generally from vibrations.

Response

Vibration impacts on Aboriginal heritage items are discussed in section 9.2 of Appendix V (Technical working paper: Aboriginal heritage) of the EIS. Only one AHIMS site (#45-6-2278) was identified that could potentially be indirectly impacted by vibration, as there would be underground tunnel excavations in the general area beneath the site. As per environmental management measure AH2 (see **Chapter E1** (Environmental management measures)), subject to gaining access from the relevant landholder, a suitably qualified archaeologist would visit the AHIMS site prior to commencement of any vibration intensive construction activities in the vicinity of the site to verify the site and confirm its current location. As per AH3, an assessment will be completed (if the site is verified) by a suitably qualified and experienced person prior to any commencement of vibration intensive construction activities. The assessment will consider all vibration intensive activities that will occur in the vicinity, the likely vibration levels and relevant vibration criteria; and identify the management measures, including monitoring, that will be implemented to prevent and reduce potential impacts. A final condition assessment will be carried out at the completion of construction detailing recommendations for remediation measures, if required.

B10.21.2 Protection of Aboriginal objects

Key Findings, p136

Action should be taken to protect Aboriginal objects discovered during excavation or disturbance.

Response

As described in environmental management measure AH1 in **Chapter E1** (Environmental management measures), an Unexpected Heritage Finds and Human Remains Procedure will be developed for the construction of the project. The purpose of this procedure is to guide the management of potential objects of heritage conservation significance or potential human remains which may be discovered during construction of the project. The Procedure will reflect statutory requirements and be based on the *Unexpected Heritage Items Procedure* (Roads and Maritime 2015a). It will also detail the requirements associated with the notification of relevant agencies and the NSW Police.

B10.21.3 Protection of Aboriginal heritage

Section 21.2, p136

The areas identified as affected by the projects are largely highly disturbed or land fill sites. Chapter 21 of the report states that it is unlikely that Aboriginal object or place[s] would be impacted by the project.

Response

Noted.

B10.22 Greenhouse gas

Refer to Chapter 22 (Greenhouse gas) and Appendix W (Detailed greenhouse gas calculations) for details of the greenhouse gas assessment.

B10.22.1 Project will result in an increase in GHG

Key Findings

The Project will increase greenhouse gas emissions.

Section 22.5

The assessment states that there will be a net increase in GHG emissions in 2023 under the 'With project' scenario while the 2023 'Cumulative' scenario states there be a net decrease in emissions (page 22-15). As the 'Cumulative' scenario includes the Sydney Gateway and Western Harbor Tunnel projects, which are not yet confirmed to proceed, the 'With project' scenario should be considered as a likely outcome – which would see an increase in emissions.

Emissions were not modelled beyond 2033. This is an omission, as the contractual life of the project is significantly longer, until 2060. The EIS states, on page 22-15 that 'it is expected that savings in emissions from improved road performance would reduce over time as traffic volumes increase'. Therefore, the longer-term outcome of the project is likely to be an increase in GHG emissions.

Response

The GHG assessment undertaken for the project (refer to Chapter 22 (Greenhouse gas) of the EIS) has assessed the emissions associated with the combined construction and operation of the M4-M5 Link project and the 'Cumulative' operational traffic scenario (refer to Chapter 8 (Traffic and transport) of the EIS. The assessment considered international, national and state policies on climate change, including outcomes of the Paris Global Climate Agreement, the Australian Government's Direct Action Plan and the NSW Government Climate Change Policy Framework.

Section 22.5 of the EIS (see **section B10.22.2** for a clarification relating to the order of figures in Chapter 22 of the EIS) demonstrates that emissions estimated to be generated during construction and the annual emissions from the operation and maintenance of road infrastructure would result in a nett increase of emissions generated for the project in 2023 for the 'With project' scenario.

However, under the 'Cumulative' scenario for 2023, emissions generated in construction and annual operation and maintenance would be offset against emissions savings as a result of improved road performance within the study area boundary. Similarly, annual operation and maintenance emissions estimated to be generated in 2033 would be offset against emissions savings for the 'With project' and 'Cumulative' scenarios.

Estimation of GHG emissions beyond 2033 is not considered appropriate for a number of reasons, including:

- Traffic forecasts beyond the operational traffic horizon for the project, which was assessed up to 2033, were not available
- There is significant uncertainty in the prediction of conditions beyond 2033, including traffic forecasts, vehicle efficiencies and fuel mixes
- To extrapolate data using the average emissions interpolated between 2023 and 2033 would not provide a credible estimate of annual emissions.

The GHG assessment in the EIS followed a similar approach to that used for previously approved WestConnex projects, which used year of opening and 10 years after opening as the forecast years for traffic and GHG modelling.

The discussion provided in section 22.5 of the EIS on combined project emissions acknowledges that savings in emissions would reduce over time as traffic volumes increase in line with forecast population growth. However, improvements in fuel efficiency and increased uptake of vehicles that do not release GHG emissions, including electric vehicles are likely to offset some of the increased emissions due to increased traffic volumes.

B10.22.2 Figure location in the chapter

Key Findings

Key figures are in the wrong section of the chapter, making it difficult to obtain a correct picture of the greenhouse gas assessment.

Section 22.2

There is an error in Chapter 22. Figure 22-1 and Figure 22-2 have been transposed, and are in the wrong place. These are key charts on this section and this error makes it difficult for the reader to obtain a correct picture of the Greenhouse Gas (GHG) Assessment.

Response

Figure 22-1 and Figure 22-2 are in the wrong order. This error has been corrected in **Chapter A4** (Clarifications). Notwithstanding this, the details presented in these figures are correct.

B10.22.3 Assessment methodology

Section 22.3

The GHG assessment is based on the WRTM v2.3. This model has major flaws and the unreliable outputs of the model put into question the GHG assessment. Both ‘With project' and ‘Cumulative' scenarios for 2033 show a reduction in emissions vs the ‘do minimum’ scenario. This is likely to rely on ‘free-flow’ conditions for the Project for most of the day. Should this not occur, the modelled outcomes could be significantly different.

Emissions were not modelled beyond 2033. This is an omission, as the contractual life of the project is significantly longer, until 2060. The EIS states, on page 22-15 that ‘it is expected that savings in emissions from improved road performance would reduce over time as traffic volumes increase’. Therefore, the longer-term outcome of the project is likely to be an increase in GHG emissions.

Response

As described in **section B10.8.1**, the WRTM has used the most recent traffic data that was available at the time of the assessment and from a range of reliable sources. The assessment methodology for the traffic and transport assessment is described in section 4.2 of Appendix H (Technical working paper: Traffic and transport) of the EIS.

The traffic conditions considered within the WRTM included the average speed of vehicles travelling along the motorway and key routes within the study area. The average speeds used in the model reflected the impacts of congestion on parts of the surface road network.

Refer to response in **section B10.22.1** for a rationale for the appropriateness of the use of operational traffic modelling scenarios for the GHG assessment.

B10.22.4 Alignment with NSW Government policy

Key Findings

Project targets are unclear and do not align with NSW Government policy.

Section 22.4

The targets for renewable energy and carbon offsets (at Table 22-8) are not aligned with NSW government policy. Targets for renewable energy and carbon offsets are not aligned with NSW government policy. Table 22-8 states that:

- At least 20 per cent of construction energy for the project will be sourced from an accredited GreenPower energy supplier, where possible. Six per cent of construction electricity requirements will be offset
- At least six per cent of operational energy will be sourced from accredited Green Power supplier and/or through renewable energy generated onsite.

As stated in the EIS (section 22.2.1 and 22.2.2) the Australian and NSW government have made commitments to reduce emissions that require significant action in energy efficiency and uptake of renewable energy. The NSW government has committed to net zero carbon emissions by 2050.

The target of 6 per cent of operational energy to come from GreenPower falls well below what is required for the project to contribute equitably to State and Federal commitments, and is not in line with other major infrastructure projects in NSW. The Sydney Metro is required to fully offset the carbon emissions generated from its operation, and is procuring renewable energy for a significant proportion of its requirements.

Targets for renewable energy and offsets are unclear:

- GHG6: Will 20 per cent of construction energy (which include diesel, gas, petrol and electricity) or just 20 percent of construction electricity be sourced from Green Power? (Note – Green Power is only available for electricity)
- Then, is the six per cent of construction electricity to be offset in addition to the 20 percent from Green Power?
- OGHG9 - Will six per cent of operational energy will be sourced from accredited Green Power supplier and/or through renewable energy generated onsite; or is this just meaning six per cent of electricity? Also, is this six per cent of the energy used for road infrastructure operation and maintenance; or is it six per cent of energy used for the operation of vehicles using the road network?

Response

As described in section 22.7.2 of the EIS, mitigation measures will be incorporated during the construction and operation of the project to further reduce GHG emissions generated by the project, in accordance with the *WestConnex Sustainability Strategy* (SMC 2015). The *WestConnex Sustainability Strategy* outlines a sustainability vision, commitments, guiding principles, objectives and overarching targets across a range of sustainability themes, and was prepared to align with the *Transport for NSW Environment and Sustainability Policy Framework* (Transport for NSW 2013) as well as other relevant Government sustainability instruments. These instruments include targets specific to GHG emissions and energy use, being the NSW Government *Resource Efficiency Policy* (OEH 2014) and the *NSW Climate Change Policy Framework* (OEH 2016), as described in the section 27.2 of the EIS. The NSW Government *Resource Efficiency Policy* (OEH 2014) aims to drive resource efficiency, with a focus on energy, water and waste, and a reduction in harmful air emissions.

The project electricity targets align with the NSW Government *Resource Efficiency Policy*. At least 20 per cent of construction energy (electricity) required for the project will be sourced from renewable energy generated onsite and/or an accredited GreenPower energy supplier, where possible. At least six per cent of construction energy (electricity) use will be offset, with any offset undertaken in accordance with the Australian Government National Carbon Offset Standard.

The *NSW Climate Change Policy Framework* (OEH 2016) aims to maximise the economic, social and environmental wellbeing of NSW in the context of a changing climate. As part of the implementation of this framework, two additional draft plans have been released for public consultation, including the Draft *Climate Change Fund Strategic Plan 2017–2022* which sets out priority investment areas for funding over the next five years to prepare NSW for a changing climate, and the Draft *Plan to Save NSW Energy and Money* (OEH 2016) which is proposed to meet the NSW Government's energy efficiency target of 16,000 gigawatt hours of annual energy savings by 2020, and contribute to achieving net zero emissions by 2050.

An Energy Efficiency and Greenhouse Gas Emissions Strategy and Management Plan will be prepared for the project as part of the project's Sustainability Management Plan (see environmental management measure S1 in **Chapter E1** (Environmental management measures)). This commitment is generally aligned with the NSW Government stated intention to reduce net GHG emissions.

Environmental management measures GHG6 and OGHG9 have been revised to provide clarity with regards to the renewable energy, GreenPower and offsetting targets and requirements for construction and operation are included in **Chapter E1** (Environmental management measures). This includes the commitment to:

- Source at least 20 per cent of construction energy required for the project from renewable energy generated onsite and/or an accredited GreenPower energy supplier, where possible. At least six per cent of construction energy use will be offset, with any offset undertaken in accordance with the Australian Government National Carbon Offset Standard (GHG6)
- Source at least six per cent of operational energy required for the project from an accredited GreenPower energy supplier and/or through renewable energy generated onsite. Opportunities for operational energy offset, in accordance with the Australian Government National Carbon Offset Standard, will be considered during detailed design (OGHG9).

It is noted that energy in the context of these updated environmental management measures is intended to mean electricity.

B10.23 Resource use and waste minimisation

Refer to Chapter 23 (Resource use and waste minimisation) of the EIS for details of resource use and waste minimisation.

B10.23.1 Volumes of waste

Key Findings

The Project will generate vast volumes of waste and waste mitigation proposals are weak.

Section 23.2

The mitigation action to manage and dispose of waste in accordance with relevant NSW legislation and government policies requires strengthening given the volume of waste expected from the site. Assurance is required that waste would be managed as per legislative requirements.

Response

Waste streams generated during construction of the project would include construction and demolition waste, vegetation waste, packaging materials and liquid wastes as discussed in section 23.3.2 of the EIS. All wastes would be managed using the hierarchy approach of waste avoidance and resource recovery before consideration of waste disposal and this is reflected in environmental management measure RW4 in **Chapter E1** (Environmental management measures). Should the generation of wastes be unavoidable, or the waste is unsuitable for reuse/recycling, disposal methods would be selected based on the classification of the waste material in accordance with the *Waste Classification Guidelines: Part 1 Classifying Waste* (NSW EPA 2014). *The Waste Classification Guidelines* provide direction on the classification of waste, specifying requirements for management, transportation and disposal of each waste category.

All wastes will also be managed in accordance with the waste provisions contained within the *Protection of the Environment Operations Act 1997* (NSW) and, where reused off-site, will comply with relevant NSW EPA resource recovery exemptions and requirements as noted in the environmental management measure RW2 (see **Chapter E1** (Environmental management measures)).

Excavated soil and rock (spoil), mainly from tunnelling and bulk excavation works, would make up most of the solid waste generated by the project during construction. Resource recovery will be applied to the management of construction waste and will include recovery of resources for reuse, recycling and reprocessing (environmental management measure RW5). The project will reuse or recycle around 95 per cent of uncontaminated spoil generated for beneficial purposes (environmental management measure RW8).

Existing metropolitan waste management facilities would have capacity to receive the anticipated waste streams generated by the project. General wastes from site offices such as putrescible wastes, paper, cardboard, plastics, glass and printer cartridges would be collected for off-site recycling wherever practicable. Demolition and excavation waste generated by the project has the potential to contain hazardous materials, including acid sulfate soils, asbestos containing material (ACM) and other contaminated materials. Construction waste management is discussed in detail in section 23.3.2 of the EIS.

Further plans and strategies will be developed prior to construction, including the following:

- A Sustainability Management Plan (see environmental management measure S1 in **Chapter E1** (Environmental management measures)) (further to the WestConnex Sustainability Strategy) including measures to optimise waste management
- A Construction Waste Management Plan detailing appropriate procedures for waste management (see environmental management measure RW3)
- Procedures to manage acid sulfate soils would be included in a Construction Soil and Water Management Plan (see environmental management measure SW11)
- The excavation, handling, storage, movement and disposal of ACM would be undertaken in accordance with procedures detailed in an Asbestos Management Plan (see environmental management measure RW14).

B10.23.2 Portland cement content in concrete

The EIS states the project will 'Optimise the amount of cement replacement material used in concrete', however it does not set a target for the quantum of this reduction (Ref Section 23.3.1 Construction resource consumption). The Portland cement content within concrete mixes is the most greenhouse gas intensive component of the material. Reducing the Portland cement content will achieve a lower embodied carbon outcome.

A target should be set for reduction in the use of Portland cement, in order to achieve a lower embodied carbon outcome.

Table 23-2 states that the project will require 400,000 cubic metres of concrete, which it will aim to source from 'Sydney suppliers located close to the project'. An assessment must be made as to whether the suppliers have the ability to provide a cement mix with a lower than standard Portland cement content.

The City recommends that a target be set for a minimum of 30 per cent reduction in Portland cement content measured by mass, compared to a base case.

Matter 23.1

A target must be set for a reduction in the use of Portland cement.

Response

Cement content of permanent road infrastructure is often based on design specifications, which are aimed at achieving suitability strength and durability over the life of the asset. Arbitrarily setting reduction targets without understanding the potential implications for detailed design is therefore not appropriate.

Construction material will be sourced in accordance with the relevant aims of the *WestConnex Sustainability Strategy* (SMC 2015) and a Sustainability Management Plan which will be developed during detailed design reflected in environmental management measure S1 in **Chapter E1** (Environmental management measures). The Plan will include initiatives and targets to optimise resource efficiency and waste management. These will be developed in consideration of the Infrastructure Sustainability (IS) rating scheme requirements, the availability of alternate materials which meet specification and the selection of locally sourced materials and prefabricated assets where possible, to reduce greenhouse gas emissions.

B10.23.3 Recycled steel use

Use of recycled materials to off-set use of virgin materials is a big opportunity to reduce the environmental impact of major construction works, The Anzac Bridge pylons used 65 per cent waste industrial product to offset use of Portland cement. SMC should commit to using recycled content in steel where available and assuming that it does not compromise structural requirements.

Response

As noted in **section B10.23.2**, initiatives to optimise resource efficiency, which would include the use of recycled content steel, will be developed as part of the Sustainability Management Plan, subject to availability and the meeting of structural specifications (see environmental management measure S1 in **Chapter E1** (Environmental management measures)).

B10.24 Climate change risk and adaptation

Refer to Chapter 24 (Climate change risk and adaptation) and Appendix X (Climate Change Risk Assessment Framework) of the EIS for details of the climate change risk assessment.

B10.24.1 Adaptation planning not using the Adapt Infrastructure tool

Key Findings

There is no attempt to coordinate adaptation planning or responses for this project with other major projects.

The Adapt Infrastructure tool currently in development by the Office of Environment and Heritage and Sydney Water has not been taken into account.

This chapter assesses the risk of climate change events on the design and operation of the project.

The Office of Environment and Heritage and Sydney Water are coordinating the development of the Adapt Infrastructure tool. This is cross-agency work involving a number of state government bodies to avoid projects being considered in isolation, as a standalone piece of infrastructure.

WestConnex does not operate in isolation from other roads, modes of transport, power sources, water infrastructure and so and the interdependency of these infrastructure types and operating organisations needs to be factored into adaptation planning.

Table 24-6 [of the EIS] outlines measures to manage climate change risks however, there is no measure to coordinate these with other infrastructure operators or assets and this represents both a failure of cross-agency consultation on this EIS and poor application of relevant government work now underway.

Matter 24.1

Action must be taken to apply the Adapt Infrastructure tool currently in development by the Office of Environment and Heritage and Sydney Water.

Response

At the time of preparing the EIS, the Adapt Infrastructure tool was not available and therefore was not used for the assessment of climate change risks during the preparation of the EIS. This does not preclude its use in detailed climate change risk assessments to be undertaken during detailed design, which will be prepared in accordance with AS5334 Climate change adaptation for settlements and infrastructure as referenced in environmental management measure CC2 (see **Chapter E1** (Environmental management measures)).

The climate change risk assessment has been prepared in accordance with the relevant provisions of Schedule 2 of the Environmental Planning and Assessment Regulation (2000) (NSW) and the SEARs prepared by the Secretary of DP&E, including the requirement to assess the risk and vulnerability of the project to climate change in accordance with the current guidelines. As noted by the City of Sydney, the climate change risk assessment in the EIS assesses the risk of climate change events on the design and operation of the project.

As noted in section 24.1 of the EIS, the risk assessment approach considered Roads and Maritime *Technical Guide for Climate Change Adaptation for the State Road Network* (Roads and Maritime (unpublished) 2015) which is in the process of being finalised, as well as the Australian Standard (AS 5334-2013) Climate change adaptation for settlements and infrastructure – A risk based approach, which follows ISO 31000:2009 Risk Management – Principles and guidelines. The Infrastructure Sustainability Council of Australia's *AGIC Guideline for Climate Change Adaptation* (Australia Green Infrastructure Council 2011) was also used to inform the assessment and is referenced by the NSW OEH for addressing risks to infrastructure. Additional standards and guidelines referred to include:

- The risk assessment approach set out in AS/NZS ISO 31000:2009 Risk Management – Principles and guidelines and ISO/IEC 31010 Risk Management – Risk assessment techniques
- AS 5334-2013 Climate change adaptation for settlements and infrastructure – A risk based approach, which follows ISO 31000:2009 Risk Management – Principles and guidelines
- *Australian Government, Climate Change Impacts & Risk Management – A Guide for Business and Government*, (Department of the Environment and Energy 2006)
- *Guidelines for Risk Management* (Roads and Maritime 2014).

B10.25 Hazard and risk

No comments were received from the City of Sydney on hazard and risk.

B10.26 Cumulative impacts

Refer to Chapter 26 (Cumulative impacts) and Appendix C (Cumulative impact assessment methodology) of the EIS for details of cumulative impacts.

B10.26.1 Cumulative impacts do not consider all projects which are directly relevant to the project

Key Findings, p144

Projects serving comparable or complementary transport demands were either not assessed, or dismissed without adequate assessment while barely-conceived projects such as the Western Harbour Tunnel and Beaches Link have been assessed.

Section 26.2, p145

The cumulative assessment has included barely-conceived projects which this project will enable (such as the Western Harbour Tunnel and Beaches Link) and yet ignored or dismissed as irrelevant other projects that meet the assessment criteria specified in Appendix C.

Response

Appendix C (Cumulative impact assessment methodology) of the EIS provides a description of how projects were identified for consideration to be assessed for cumulative impacts with the project. There are currently no NSW or Australian Government guidelines on undertaking cumulative impact assessments and therefore the cumulative impact assessment in the EIS was based on the requirements set out in the SEARs for the project.

Only projects considered to be of 'material' scale in the vicinity of the M4-M5 Link were included on the list of projects to be screened for inclusion in the cumulative assessment. The materiality threshold is defined as projects listed on the DP&E Major Projects website as State significant development, SSI and known project proposals of relevant scale or resultant impact that involve activities that could result in a cumulative impact with the project, including proposed projects that directly with the project.

Following the identification of potentially relevant projects, the following criteria were applied to determine whether each project or strategic development should be included in the cumulative impact assessment:

- **Spatial relevance:** A project was considered to be spatially relevant where that project overlapped or was adjacent or proximal to the M4-M5 Link project footprint

  - A project was considered to be adjacent to the M4-M5 Link project where it was within 500 metres of the M4-M5 Link project footprint
  - A project was considered to be proximal to the M4-M5 Link project where it was within two kilometres of construction sites or within 10 kilometres of the M4-M5 Link project footprint
- **Temporal relevance:** A project was considered to be temporally relevant where the expected timing of the construction or operation of a project would be concurrent (ie overlap) with the timing of the construction or operation of the M4-M5 Link project
- **Publicly available information:** Projects under consideration must have publicly-available information (at the time of preparing this EIS), with an adequate level of detail. If a potential future project was known, but there was insufficient public data available to allow a qualitative assessment of the potential cumulative impacts, it was not able to be included in the cumulative impact assessment.

Based on the screening process described above and in section 1.1 of Appendix C (Cumulative impact assessment methodology) of the EIS, Table 1-2 and Table 1-3 in Appendix C (Cumulative impact assessment methodology) of the EIS, list the projects which were considered but not assessed in the cumulative impact assessment and the projects which were included in the cumulative impact assessment, respectively. The assessment of cumulative impacts during construction and operation of the project is detailed in section 26.4 of the EIS.

Planning is underway by Roads and Maritime for the proposed future Western Harbour Tunnel and Beaches Link program of works. The proposed future Western Harbour Tunnel project is proposed to link directly with the M4-M5 Link at the Rozelle interchange and the M4-M5 Link mainline tunnels. The proposed future Western Harbour Tunnel and Beaches Link projects have been included in multiple NSW Government planning and policy documents, including:

- State Infrastructure Strategy 2012–2032 (Infrastructure NSW 2012)
- A Plan for Growing Sydney (NSW Government 2014)
- Draft *Towards our Greater Sydney 2056* (Greater Sydney Commission 2016).

The proposed future Western Harbour Tunnel and Beaches Link program of works consists of two components: the Western Harbour Tunnel and Warringah Freeway Upgrade project, and the Beaches Link and the Gore Hill Freeway Connection project. Scoping reports for these two projects have been submitted to DP&E with SEARs issued to the proponent on 15 December 2017. EISs for each project are being prepared. The Western Harbour Tunnel and Beaches Link and the other proposed future projects discussed in Chapter 26 (Cumulative impacts) of the EIS would be required to prepare a cumulative impact assessment as part of their individual EISs and in accordance with relevant SEARs.

B10.26.2 Inclusion of the Western Sydney Airport in the cumulative impact assessment

Key Findings, p144

The Western Sydney Airport will significantly change the demand for air services in Greater Sydney but it has not been included in the cumulative impact assessment.

Section 26.2, p145

The Western Sydney Airport will change how Sydney functions, especially Western Sydney. Commencing operations in the mid-2020s, it is expected to service around five million passengers a year with this doubling to 10 million passengers after five years. The 2017 discussion paper on the Federal Government Inquiry into National Freight and Supply Chain Priorities states that Sydney Airport has about the same value of trade flowing through as Port Botany. Appendix C says the Western Sydney Airport was assessed in terms of traffic, air quality, noise and vibration and human health however traffic details are buried in traffic modelling established specifically for this project and not available for peer-review and the second airport is not mentioned in Appendix J (noise and vibration), Appendix I (air quality) or Appendix K (human health risk). This project is premised on improved access to Sydney Airport and a second airport will significantly alter travel demand for air services and the failure to assess the impact of a future airport is short-sighted.

Response

The criteria applied in determining whether a project was included in the cumulative impact assessment for the project is described in **section B10.26.1** and Appendix C (Cumulative impact assessment methodology) of the EIS. Exceptions were made for strategic transport infrastructure and master plan projects that did not meet all of the criteria. These strategic projects, including the Western Sydney Airport, were already captured in the updated land use and employment forecasts in the strategic traffic model (the WRTM) which was used to inform the operational traffic modelling, including the 'Cumulative' scenario. The cumulative operational assessments for air quality and noise and vibration were based on the traffic modelling, and therefore were not specifically discussed in Chapter 26 (Cumulative impacts) of the EIS. The role of WestConnex in relation to the Western Sydney Airport is discussed in **section B10.3.2**.

B10.26.3 Inclusion of the redevelopment of The Bays Precinct in the cumulative impact assessment

Key Findings, p144

Redevelopment of The Bays Precinct has been dismissed as having an "operational overlap" and being "complementary even though this Project would override intentions for employment and housing including affordable housing.

Section 26.2, p146

Redevelopment of The Bays Precinct has been dismissed as having an "operational overlap" and being "complementary" even though this project would override intentions for employment and housing including affordable housing.

Response

Table 1-3 in Appendix C (Cumulative impact assessment methodology) of the EIS lists *The Bays Precinct Transformation Plan* as one of the 'other projects and strategic developments' included in the cumulative impact assessment. The temporal relevance of the plan to the project is stated as 'operational overlap'.

As defined in **section B10.26.1** and Appendix C (Cumulative impact assessment methodology) of the EIS, a project is considered temporally relevant where the expected timing of the construction or operation of a project would be concurrent (ie overlap) with the timing of the construction or operation of the M4-M5 Link project. The assessment identifies that *The Bays Precinct Transformation Plan* is relevant to the issues considered in the M4-M5 Link EIS including traffic and transport, land use, social and economic and visual amenity. As discussed in **section B10.26.2**, The *Bays Precinct Transformation Plan* is a strategic project which is captured in the updated land use and employment forecasts that informed the operational traffic modelling (WRTM version 2.3). The WRTM was subsequently used to assess the cumulative operational traffic and transport impacts from the project, with these outputs also used to inform air quality and noise and vibration modelling. The transformation plan is a long term strategy that is expected to be delivered over the next 20 to 30 years.

A response to the issue regarding the project overriding intentions for employment and housing in The Bays Precinct is provided in **section B10.12.1**.

B10.26.4 SEARs requirements for the cumulative impact assessment

Section 26.2, p145

The SEARs requires assessment of the cumulative impacts of the 'key issues' identified in the Project Application (including traffic and transport, air quality, health and safety and noise vibration) as well as the cumulative impacts of other projects either related or in the vicinity of the project. The SEARs has specified projects proposed and approved where information is available at the time of writing and yet many are not assessed.

Response

The SEARs for the project required an assessment of the cumulative impacts of the project taking into account other stages of WestConnex, the proposed future Western Harbour Tunnel, projects that have been approved but where construction has not commenced, projects that have commenced construction, and projects that have recently been completed. Cumulative impacts from a number of projects have been addressed in detail in the relevant technical working papers and appendices throughout the EIS. The methodology used for identifying projects to be included in the cumulative impact assessment is described in **section B10.26.1** and Appendix C (Cumulative impact assessment methodology) of the EIS.

B10.26.5 Projects included in the cumulative impact assessment

Section 26.2, p145

Strategic transport infrastructure and master plan projects - Green Square, Western Sydney Airport, Central to Eveleigh – have been excluded from the cumulative impact assessment based on their inclusion in the WRTM version 2.3 traffic modelling however no information is available about the forecast populations or movements associated with these projects.

Response

The WRTM is linked to the STM operated by TPA, which is used to project travel patterns in Sydney. The data has been supplied by TPA and is based on the latest population and employment projections, including data incorporating known major urban renewal projects and developments. The base vehicle demands from STM are consistent with these demographic assumptions and therefore provide a consistent base for the future demands used in the WRTM. Projects and developments included in the WRTM v2.3 modelling also include the strategic directives contained in *A Plan for Growing Sydney* (NSW Government 2014) in 14 transport and land use corridors, including Green Square, Central to Eveleigh and the Western Sydney Airport. The WRTM contains commercially sensitive information and is not publicly available. The WRTM has been reviewed by independent experts who have verified its suitability for use in the NSW Government's transport planning investigations.

As discussed in **section B10.26.2**, as these strategic projects were captured in the updated population and employment forecasts that were incorporated into the WRTM and informed the operational assessments for traffic, air quality and noise and vibration, they were therefore not discussed in Chapter 26 (Cumulative impacts) of the EIS.

B10.26.6 Inclusion of Sydney Metro West in the cumulative impact assessment

Section 26.2, p146

Western Sydney Metro was not assessed even though it is directly adjacent and relevant to this project. Sydney West Metro has been called "Sydney's next big railway infrastructure investment" delivering a direct connection between the city centres of Parramatta and Sydney and linking communities along the way, as would transport on Parramatta Road. And yet these were not assessed under cumulative impact or as strategic alternatives in Part 4.4 of the EIS even though directly comparable in terms of transport demands. This is deliberate and myopic and represents a failure of the assessment process.

Response

The methodology used for identifying projects to be included in the cumulative impact assessment is described in **section B10.26.1** and Appendix C (Cumulative impact assessment methodology) of the EIS.

Sydney Metro West is listed in Table 1-2 of Appendix C (Cumulative impact assessment methodology) of the EIS as a project which was considered but not assessed in the cumulative impact assessment. Justification for the exclusion of the Sydney Metro West from the cumulative impact assessment included:

- Design of the project in early stages
- Insufficient public information available
- Impacts and the timing of the project are not yet known.

Limited publicly available information relating to the Sydney Metro West project was available at the time of preparing the cumulative impact assessment for the M4-M5 Link EIS. Should the Sydney Metro West progress beyond the scoping stage or business case, it would be subject to its own environmental impact assessment, including a cumulative impact assessment, which would be expected to include consideration of the M4-M5 Link.

B10.26.7 Inclusion of the Alexandria and Moore Park Connectivity Upgrade in the cumulative impact assessment

Section 26.2, p146

The RMS is currently planning changes to roads in Alexandria and Moore Park to accommodate the additional traffic generated by WestConnex yet it has not been assessed. However this project has been publicly exhibited including road sections and intersection designs and its exclusion from the cumulative impact assessment means traffic modelling as well as other impacts are potentially inaccurate.

Response

The methodology used for identifying projects to be included in the cumulative impact assessment is described in **section B10.26.1** and Appendix C (Cumulative impact assessment methodology) of the EIS.

The Alexandria to Moore Park Connectivity Upgrade includes road upgrades in Alexandria, Waterloo and Moore Park to improve traffic flow and facilities for pedestrians and cyclists in one of Sydney's fastest growing precincts. The proposed improvements will support urban renewal along the Alexandria to Moore Park corridor, and encourage motorists to use alternate routes away from the CBD, a key focus of the Sydney City Centre Access Strategy (Transport for NSW 2013). The project is listed in Table 1-2 of Appendix C (Cumulative impact assessment methodology) of the EIS as a project which was considered but not assessed in the cumulative impact assessment. Justification for the exclusion of the upgrade from the cumulative impact assessment included:

- Design of the project is in early stages
- Insufficient public information is available
- Impacts and the timing of the project are not yet known.

The preliminary concept design of the Alexandria to Moore Park Connectivity Upgrade went on public display on 8 June 2017, after the traffic and transport modelling and assessment for the M4-M5 Link project had been completed. The concept design and environmental assessment for the project is currently being prepared and will be displayed to the public.

B10.26.8 Inclusion of active transport projects in the cumulative impact assessment

Section 26.2, p146

This Project could provide an opportunity to improve cycling links for local trips and yet well-developed projects have not been assessed including the Lilyfield separated cycleway, the Greenway and the Inner City Regional Bike Network which has been identified by Infrastructure Australia as a Priority Initiative. A safe bicycle network can absorb trips of 5-10km in distance relieving road congestion for other traffic.

Response

The methodology used for identifying projects to be included in the cumulative impact assessment is described in **section B10.26.1** and Appendix C (Cumulative impact assessment methodology) of the EIS.

The Lilyfield Road Regional Bike Route Separated Cycleway and Inner West Greenway are listed in Table 1-2 of Appendix C (Cumulative impact assessment methodology) of the EIS as projects which were considered but not assessed in the cumulative impact assessment. Justification for the exclusion of the Lilyfield Road Regional Bike Route Separated Cycleway project from the cumulative impact assessment included:

- Design of the project in early stages
- Insufficient public information available

- Impacts and the timing of the project are not yet known.

Justification for the exclusion of the Inner West Greenway project from the cumulative impact assessment included:

- Design of the missing links of the project in early stages
- Insufficient public information was available
- Impacts and the timing of the missing links of the project were not known at the time of the EIS assessment.

Appendix N (Technical working paper: Active transport strategy) of the EIS outlines the investigation of a regional active transport network and the role of the M4-M5 Link in this network. The report recommends a number of new strategic links and the delivery mechanisms for them, including identifications of the sections of these links that would be delivered by the project.

The Inner Sydney Regional Bicycle Network, April 2010, amongst other strategies and documents, was used to inform and develop the M4-M5 Link Active Transport Strategy (refer to Annexure 1 in Appendix N (Active Transport Strategy) of the EIS).

B10.27 Sustainability

Refer to Chapter 27 (Sustainability) of the EIS for details of sustainability.

B10.27.1 Renewable energy and offset targets

Key Findings, p146

Targets for renewable energy and carbon offsets are not aligned with NSW government policy.

The target of 6 percent of operational energy to come from GreenPower falls well below what is required for the Project to contribute equitably to State and Federal commitments, and is not in line with other major infrastructure projects in NSW. The Sydney Metro is required to fully offset the carbon emissions generated from its operation, and is procuring renewable energy for a significant proportion of its requirements.

Response

Alignment of the project with NSW Government policy for renewable energy and carbon offsets is discussed in **section B10.22.4**.

As identified in environmental management measure OGHG9 in **Chapter E1** (Environmental management measures), six per cent of operational phase energy requirements of the project would be offset in accordance with the Australian Government's National Carbon Offset Standard (Department of the Environment and Energy 2017). This would be reviewed during detailed design to refine the approach to offsetting energy requirements and to identify whether additional electricity consumption can be offset.

The project's operational GreenPower commitment is part of a suite of sustainability objectives and targets. Environmental management measures OGHG7 and OGHG8 in **Chapter E1** (Environmental management measures) are proposed to optimise energy efficiency for the project, including operation of motorway infrastructure. Furthermore, the project would comply with any conditions of approval imposed by DP&E.

B10.27.2 Updates to the WestConnex Sustainability Strategy

Key Findings, p146

The *WestConnex Sustainability Strategy* was, it claims, developed in alignment with federal and NSW government sustainability objectives and targets. The strategy states it is a "live working document" which will be progressively refined as WestConnex progresses. It must be updated to be consistent with the *NSW Climate Change Policy Framework*.

The *WestConnex Sustainability Strategy* needs to be updated to ensure important sustainability aspirations are not diminished as the project approval process continues. Holding the proponent and the successful tenderers to these contractual requirements or conditions of consent will be crucial to see good intent converted into delivered actions.

Matters to be addressed

The WestConnex Sustainability Strategy must be updated to be consistent with the NSW Climate Change Policy Framework.

Response

Future revisions to the *WestConnex Sustainability Strategy* would have regards to relevant state and federal climate change policy as appropriate. However, the WestConnex Sustainability Strategy has been specifically prepared to be contextually relevant to a road infrastructure project.

In the case of the M4-M5 Link project, the *NSW Climate Change Policy Framework* (OEH 2016) was considered during the development of the EIS and this is reflected in both Chapter 27 (Sustainability) and Chapter 24 (Climate change risk and adaptation) of the EIS. Consistency with regards to the NSW Climate Change Policy Framework (OEH 2016) is discussed in **section B10.22.4**.

While sustainability is considered throughout design, the WestConnex sustainability objectives and targets would be met through the implementation of a project specific Sustainability Management Plan and sustainability initiatives. The design and construction contractor(s) will develop and implement a Sustainability Management Plan during detailed design and construction phases of the project as reflected in the environmental management measure S1 presented in **Chapter E1** (Environmental management measures). The Sustainability Management Plan would establish governance structures, processes and systems that ensure integration of all sustainability considerations (vision, commitments, principles, objectives and targets), initiatives, monitoring and reporting during the detailed design and construction phases of the project.

B10.27.3 Sustainable infrastructure definition

Key Findings, p146

The Infrastructure Sustainability Council of Australia (ISCA) defines sustainable infrastructure as that which is ‘designed, constructed and operated to optimise environmental, social and economic outcomes over the long term’ (ISCA 2012).

Seeking an 'Excellent' rating under the ISCA framework is also an important goal for which the proponent must be held to account.

Response

ISCA defines infrastructure sustainability ‘as infrastructure that is designed, constructed and operated to optimise environmental, social and economic outcomes over the long term’ (ISCA 2016).

ISCA also notes that ‘[t]he optimisation component is important as it reflects a ‘triple bottom line’ approach to decision making and performance measurement and it promotes doing more than simply minimising impacts. The long-term component is also important given that infrastructure assets often tend to last 50 to 100 or more years and therefore they need to be adaptable to global changes and to the changing needs of society over these timeframes’ (ISCA 2016).

The projects consideration of each of the aspects in ISCA’s definition is reflected in Chapter 27 (Sustainability) of the EIS and the commitment to achieving an ISCA rating of ‘Excellent’ as presented in section 27.3 of the EIS. Conditions of approval typically require that the project is carried out as described in the EIS. Therefore achieving an ISCA rating of ‘Excellent’ as committed in the EIS, is likely to become a compliance requirement.

B10.28 Environmental risk analysis

Refer to Chapter 28 (Environmental risk analysis) for details of the environmental risk analysis.

B10.28.1 Method of assessing risk rates

Key Findings, p147

The Environmental Risk Assessment rates as 'Low Risk' several risk aspects that do not appear to adequately account for the impacts on the environment and public health. The method of arriving at a rating of 'Low' is unclear. These risks require further analysis to assess the impact and strengthen options for mitigation. Specifically, the following matters require further analysis and detailed, effective responses:

- Dust generated by construction activities
- Effects of poor in tunnel air quality on human health
- Impacts to ambient air quality.

Response

The risk rating assigned for issues identified in Chapter 28 (Environmental risk analysis) of the EIS is based on a risk assessment process that is aligned with ISO31000 Risk Management, whereby the likelihood and consequence of an impact is assessed and this determines the risk rating (refer to section 28.1.1 of the EIS). Low risk issues are those which are either unlikely, or likely however would have a minor consequence for example, where there are minor effects on the built or natural environment or the community. A low risk may also be due to an unlikely event which has a moderate consequence, ie where the impact is more widespread, but still in the short or medium term, and is more difficult to rectify.

For each of the identified issues, a level of assessment was undertaken commensurate with the potential degree of impact the project may have on that issue. This included an assessment of whether the identified impacts could be avoided or minimised (for example, through design amendments). Where impacts could not be avoided, environmental management measures have been recommended to manage impacts to acceptable levels (see **Chapter E1** (Environmental management measures)). The final residual risk is identified after considering the likelihood, consequence and the proposed management and mitigation.

In the case of dust generated through construction, the impact was determined to be likely, but the consequences, after implementation of the management and mitigation measures, would be minor as it is typically a reasonably short term event affecting a relatively small area, which can be managed through implementing the various air quality environmental management measures identified in **Chapter E1** (Environmental management measures).

Chapter 7 of Appendix K (Technical working paper: Human health risk assessment) comprises an assessment of in-tunnel air quality impacts on human health. The assessment notes that concentrations of pollutants from vehicle emissions are higher within the tunnel compared with outside the tunnel. This, plus the completion of a number of tunnel projects (approved or proposed), means there is the potential for exposures to occur within a network of tunnels over varying periods of time, depending on the journey. The assessment of potential exposures inside these tunnels has indicated:

- Where windows are up and ventilation in the vehicle is on recirculation, exposure to nitrogen dioxide inside vehicles is expected to be below the current health based guidelines. In congested conditions inside the tunnels, it is not considered likely that significant adverse health effects would occur. Placing ventilation on recirculation is also expected to minimise exposures to particulates during travel through the tunnels. Signs would be established at the entrance of the tunnels to advise drivers to put windows up and car ventilation systems on recirculation
- For motorcyclists, where there is no opportunity to minimise exposure through the use of vehicle ventilation, there is the potential for higher levels of exposure to nitrogen dioxide. These exposures, under normal conditions, are not expected to result in adverse health effects. When the tunnels are congested it is expected that motorcyclists would spend less time in the tunnels than passenger vehicles and trucks due to lane filtering, limiting the duration of exposure and the potential for adverse health effects.

Based on experiences from the operation of similar tunnels in Sydney, and those located across the world, the design and operation of ventilation systems would ensure that it is unlikely that there will be poor in tunnel air quality which would have an effect on human health. The tunnel infrastructure will be designed to minimise the generation of pollutant emissions as identified in environmental management measure AQ26. In tunnel monitoring of emission levels will occur during operations to monitor compliance with the relevant NSW EPA air quality criteria and the requirements set in the conditions of approval for the project as noted in environmental management measures AQ27 and AQ28 in **Chapter E1** (Environmental management measures).

The project is expected to result in a decrease in total airborne pollutant levels in the community. The project is expected to result in a redistribution of impacts associated with vehicle emissions, specifically in relation to emissions derived from vehicles using surface roads. For much of the community this would result in no change or a small improvement (ie decreased concentrations and health impacts), however for some areas located near key surface roads, a small increase in pollutant concentration may occur. Potential health impacts associated with changes in air quality (specifically nitrogen dioxide and particulates) within the local community have been assessed and are considered to be acceptable.

In addition, tunnel infrastructure will be designed in such a way that the generation of pollutant emissions by the traffic using the tunnel is minimised. The main considerations are minimising gradients and ensuring that lane capacity remains constant or increases from entry to exit point (AQ26). Ventilation outlets will be designed and constructed to achieve the regulatory outlet discharge limits and modelled dispersion outcomes for pollutant concentrations at ground level. A residual risk rating of low for impacts on ambient air quality is therefore considered to be reasonable.

B10.28.2 Biodiversity impacts

Key Findings, p147

Biodiversity: The loss of foraging habitat for the Grey headed Flying-fox and loss of habitat for microbats, is assessed as low with a mitigation response to provide compensatory planting (OB9). This is not an appropriate mitigation response as replacement (to maturity) of removed foraging tree species will take years. This assessment should be reassessed for a higher residual risk.

Microbat roosting beneath Iron Cove bridges is highly probable. Details of how disturbance can realistically be managed (if it actually can be) is required.

Response

The loss of foraging habitat for the Grey headed Flying-Fox, microbat habitat and roosting sites are discussed in **section B10.18.1**.

B10.29 Recommended conditions

B10.29.1 Recommended conditions of approval

The City of Sydney recommends that the Department of Planning and Environment includes the recommended conditions provided as part of the City of Sydney's submission in any approval given for the project.

Response

Noted. Conditions of approval are a matter for DP&E to consider during its assessment of the project.

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B11 Inner West Council

Responses to the Inner West Council's submission have been addressed in the chapter which best aligns with the subject of the concern, rather than the chapter of the submission in which they were raised. Where the same issue has been raised in a number of sections, these have been consolidated. References to the location in which the comments were made are provided to enable comparison with the submission by the Inner West Council.

An addendum to the Inner West Council's submission was also received (dated 6 November 2017). Issues raised in this addendum have been included in this chapter and responses provided.

The Inner West Council commissioned Beca to carry out an assessment of the M4-M5 Link EIS on their behalf. Responses to the issues raised by Beca on behalf of the Inner West Council are provided in **Chapter B12** (Beca report).

In many sections of this chapter, references to Beca's assessment are made. Responses to these issues are provided in this chapter or a cross reference to the relevant section of **Chapter B12** (Beca report) provided.

The Inner West Council's verbatim submission has been included in the issue description. Where editorial changes have been made to address typographical errors or provide clarity as to how the issue has been interpreted these have been enclosed in [square brackets].

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B11.1 General

B11.1.1 Opposition to M4-M5 Link and the WestConnex program of works

Summary, p2

Since its inception in 2014 each of the three Councils now forming Sydney's Inner West Council have strongly opposed WestConnex on environmental, public health, traffic, transport, construction impacts and its economic basis, as well as its general lack of adherence to good planning practice. The opinions outlined in this submission indicate that the WestConnex Stage 3 (M4-M5 Link) Environmental Impact Statement (EIS) does not alter Council's opposition to the project.

Summary, p 4

Content issues raised by the EIS are expressed in this submission at both a strategic level and a more detailed level that considers local impacts. As is apparent from recent resolutions quoted above [not included verbatim, but summarised in **section B11.1.2**], Council continues to strongly oppose WestConnex. Council would prefer that no part of the project had been planned or constructed, and its substantial funding had been devoted to public transport and other demand-management (traffic reduction) options.

Part 2, p13

The newly-elected Inner West Council is strongly opposed to WestConnex [also includes resolution from meeting 3 October 2017 not included verbatim, but included in the content which is summarised in **section B11.1.2**].

Response

Inner West Council's objection to the M4-M5 Link and WestConnex program of works is noted. The issues raised in the summary of the submission by Inner West Council are addressed below and throughout the responses to the submission from Inner West Council.

B11.1.2 Discussion of M4-M5 Link in Inner West Council meetings

In the summary of the submission and Part 2, Inner West Council provided details regarding the meetings held by council where the project was discussed. As no specific issues were raised, the content of this section not been included.

Response

The record of the discussions at meetings and objections are noted and are available as part of the Inner West Council's submission on the project, which is available on the NSW Department of Planning and Environment (DP&E) Major Projects website[1].

B11.1.3 Request for an inquiry

Summary, p4

Council strongly believes that Stage 3 should not be approved and an independent inquiry should be held to identify, investigate and resolve the many flaws in all stages of the project – whether in construction or planning. Should, after such an inquiry, Stages 1 and 2 continue to be developed, extensive ameliorating measures should be implemented in consultation with affected Councils and local communities, to minimise any impacts that might occur as a consequence of Stages 1 and 2 proceeding in the absence of Stage 3.

Foremost in this submission is Council's request to the NSW Premier and relevant ministers that [the] assessment of Stage 3 be suspended until an inquiry into the entire WestConnex project has been held, with any deficiencies in the current EIS addressed and the Preferred Infrastructure Report publicly exhibited.

[1] http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=7485

The inquiry's main task would be to investigate the business case for the project to identify flaws in the process of evaluating the project at the highest level, and to determine whether Stage 3 (as currently designed) represents the best outcome compared with a range of other transport options. The inquiry's examination of alternatives should be comprehensive, and should consider alternative proposals of the City of Sydney, Inner West Council and other hybrid proposals which include significant public transport enhancement, supported by location-specific road improvements and demand-management initiatives.

Beca's assessment of local issues raised by the Stage 3 EIS at Attachment 1 includes a number of conclusions about flaws in the EIS. Critical among these flaws are the assumptions that have guided the EIS's traffic and air quality modelling and lack of information about the precise nature of construction impacts. This is further evidence of the need for an inquiry.

Part 2, p13

All work on WestConnex should cease and a public independent inquiry held.

Further, Council requests a public independent inquiry be held to identify, investigate and resolve the problems that have been brought to light with all stages of the project – at both the planning and stages. The inquiry's main task would be to investigate the business case for the project to identify, flaws in the process of evaluating the project at the highest level, and to determine whether Stage 3 (as currently designed) represents the best outcome for the economy and environment compared with a range of other transport options. The inquiry's examination of alternatives should be comprehensive, and should consider a full range of alternative proposals including those presented by the City of Sydney and Inner West Council.

Summary, p4 and Part 2, p13

The inquiry would also be tasked to investigate the full range of local construction impact issues that have been encountered to date from Stages 1 and 2 and predicted local operational traffic impacts. This would result in a number of immediate improvements to the design details and construction practices of Stages 1 and 2 to reduce the currently unacceptable impacts being suffered by the Haberfield/Ashfield and St Peters communities and future operational impacts. This would involve a number of retrospective modifications to Stage 1 and 2 conditions of approval and environmental licenses [licences].

Response

The Inner West Council's comments relating to an inquiry are noted. The establishment of an inquiry is beyond the scope of the EIS for the project and is a matter for the NSW Government. The assessment of the EIS is being undertaken in accordance with the *Environmental Planning and Assessment Act 1979* (NSW) (EP&A Act) and is regulated by DP&E.

Issues raised by Inner West Council in relation to approvals for the other WestConnex projects are outside of the scope of the M4-M5 Link EIS. However, longer duration construction impacts resulting from continued construction at the project interface areas (Haberfield, Ashfield and St Peters) have been considered in the cumulative impact assessment and environmental management measures in the EIS. Cumulative construction impacts in these areas are discussed further in **section B10.10.2**.

Environmental management measures are provided in **Chapter E1** (Environmental management measures).

Issues raised in the assessment provided as Attachment 1 to the Inner West Council submission and summarised in this response are addressed in **Chapter B12** (Beca report).

B11.1.4 Lessons learnt from Stages 1 and 2

Summary, p6

Importantly, should any form of Stage 3 proceed, Inner West Council is also keen to ensure that lessons from Stages 1 and 2 are learned so that conditions of approval are strengthened, construction practices improved and incidences of non-compliance reduced. It is imperative that current poor practices are not repeated, and that residents affected by Stage 3 are not subject to the same intolerable impacts as those affected by Stages 1 and 2.

Part 4, p30

Council is keen to ensure that lessons learned from Stages 1 and 2 in relation to management of construction impacts result in significant improvements for Stage 3. There is a need for the shortcomings from Stages 1 and 2 in relation to construction impacts not be repeated for Stage 3. Lessons learned must result in appropriate design changes, stronger conditions of approval, improved management regimes and a more generous and considerate attitude toward affected residents for Stage 3. It is also important to note that mitigation measures should not bring benefits to some residents at the expense of others.

Response

Feedback from other Sydney Motorway Corporation (SMC) project teams, design and construction contractor(s), DP&E and other relevant government agencies including NSW Environment Protection Authority (NSW EPA) was sought on the M4 East and New M5 construction phases to identify lessons learnt and areas for improvements to work processes and mitigation measures to assist in developing the concept construction methodology and addressing potential construction impacts for the M4-M5 Link. Feedback and the lessons learnt from these earlier stages will also further guide the development of the detailed design.

Community and agency feedback during the M4 East and New M5 EIS exhibition periods indicated a preference for the usual approach taken for projects of allowing the community to provide input into the scope of the project through the EIS public exhibition process before the detailed design of the project was undertaken and 'locked in'. After considering the community feedback on the issue, the approach of assessing a concept design has been adopted for the M4-M5 Link project. This approach presents the community and stakeholders with an opportunity to consider and provide feedback on the project before the detailed design work for construction of the project is carried out. This delivery mechanism is different to the one adopted for the M4 East and New M5 projects, where the design and construction contractor was appointed early (prior to the EIS being publicly exhibited) and therefore had direct input into the design development, EIS preparation and construction planning for those projects.

NSW Roads and Maritime Services (Roads and Maritime) has also considered lessons from other infrastructure projects under development in Sydney, including NorthConnex, Sydney Metro City and Southwest and the Central Business District (CBD) and South East Light Rail, as part of a commitment to continuous improvement. This commitment to continuous improvement is also demonstrated in the recognition of longer duration impacts that may occur at the project interfaces with the M4 East and New M5 projects at Haberfield/Ashfield and St Peters respectively (see **section B10.10.2**) and informed the development of management and mitigation measures (see **Chapter E1** (Environmental management measures)). In addition to stakeholder feedback, multiple community and stakeholder consultation sessions were also held for the M4-M5 Link project prior to and during preparation of the concept design report and EIS, and throughout the submissions process. Feedback from these sessions has also assisted with the identification of lessons learnt.

Examples of how lessons learnt have informed the scope of the assessment in the EIS and the environmental management measures (see **Chapter E1** (Environmental management measures)) includes:

- The majority of the project, including the Rozelle interchange, is located below ground to minimise surface property acquisition and disturbance and to maximise the provision of public open space as a legacy of the project
- The project has been designed and developed to minimise the need for surface property acquisition and occupation. This was achieved by utilising, where possible, areas that are within the project footprint of the M4 East and New M5 projects and government owned properties, such as at the Rozelle Rail Yards and Darley Road civil and tunnel site (C4)
- A Utilities Co-ordination Committee will be established to ensure better planning for, and co-ordination of, utilities work being undertaken where there are interfaces with other projects
- A heavy vehicle truck marshalling facility would be provided at the White Bay civil site at Rozelle, which would cater for around 40 heavy vehicles and stage the release of trucks to the tunnelling sites to manage the arrival of trucks to construction ancillary facilities. The site would also provide around 50 additional construction workforce parking spaces (see **Chapter D2** (White Bay civil site (C11)))

- A truck management strategy for the project will be developed as part of the Construction Traffic and Access Management Plan (CTAMP) (see TT16 in **Chapter E1** (Environmental management measures)). The truck management strategy will:
  - Identify truck marshalling areas that will be used by project-related heavy vehicles
  - Describe management measures for project-related heavy vehicles to avoid queuing and site-circling in adjacent streets and other potential traffic and access disruptions
  - Describe monitoring programs to demonstrate that project-related heavy vehicles are complying with the strategy
- A car parking strategy for the project will be developed (see TT04 in **Chapter E1** (Environmental management measures)). The car parking strategy will be described in the CTAMP and will:
  - Quantify construction workforce parking demand around project work sites and ancillary facilities during site establishment and the construction phase generally
  - Identify public transport options and other management measures (such as carpooling and shuttle-buses) to reduce construction workforce parking demand
  - Identify all locations that will be used for construction workforce parking
  - Identify potential offsite areas that could be used for construction workforce parking that would be investigated and secured for use during construction where required and possible
  - Identify parking exclusion zones, in consultation with potentially affected stakeholders, around construction sites and facilities where construction workforce parking would be restricted
  - The strategy will also be developed in consultation with the M4 East and New M5 contractors to identify opportunities to use existing parking arrangements associated with those projects during their respective construction periods and once those periods are completed
- Monitoring will be carried out to confirm that the actual acoustic performance of the acoustic sheds is consistent with predicted acoustic performance (see environmental management measure NV7 in **Chapter E1** (Environmental management measures))
- Consideration of receivers that qualify for assessment for at receiver treatment in relation to operational noise that are also predicted to significant experience exceedances of noise management levels during construction will be given priority preference for assessment for treatment based on the severity and timing of impact. Where the building owner accepts the at receiver treatment proposal, the treatments will be installed as soon as possible. (see environmental management measure NV9 in **Chapter E1** (Environmental management measures))
- Agency comments from preceding projects in the WestConnex program of works were built into relevant methodologies for the technical studies with peer reviewers supporting improvements to the scope of key technical papers before the EIS commenced
- Feedback from the community on preceding WestConnex projects were built into the concept design and construction planning for the M4-M5 Link. This included undergrounding the Rozelle interchange and working more closely with council officers. The feedback was also considered in the options assessments for the M4-M5 Link, which resulted in removing Easton Park from the construction footprint
- Feedback from DP&E suggested benchmarking against other projects such as Sydney Metro. This resulted in the adoption of relevant mitigation measures from other projects such as the inclusion of an Acoustics Advisor, as proposed for the Sydney Metro project, to address more rigour and compliance with the construction noise and vibration assessment
- A suitably qualified and experienced Acoustics Advisor will be appointed, who is independent of the design and construction personnel, and who will be engaged for the duration of construction of the project (see environmental management measure NV1 in **Chapter E1** (Environmental management measures))
- Workshops were held with DP&E and other agencies regarding key issues raised in preceding WestConnex projects

- Workshops were held with WestConnex M4 East and New M5 construction contractors to identify environmental management measures that are working effectively and measures which could be further improved to ensure community concerns and expectations are met
- Sought advice from Environmental Representatives on other WestConnex projects on environmental management measures to ensure they are measureable and related to a performance outcome.

Lessons learnt would also inform the preparation of the Construction Environmental Management Plan (CEMP) and its sub-plans, including the CTAMP and the Construction Noise and Vibration Management Plan (CNVMP).

Specific management and mitigation will be documented in relevant construction environmental management sub-plans such as the CTAMP and also in the Ancillary Facilities Management Plan (AFMP), as relevant. This will include detailed consideration of the types of activities that would be most likely to cause longer duration impacts during construction of the project, the types of impacts already experienced by these communities as a result of M4 East and New M5 construction, and subsequent development and implementation of location and activity specific mitigation that considers the consecutive nature of construction at these locations.

B11.1.5 Discontinue future motorway projects

Part 2, p12

Though construction of WestConnex M4 East and New M5 is advanced, it is not too late to stop WestConnex, and also abandon plans for other urban motorways such as the Sydney Gateway, Western Harbour Tunnel & Beaches Link and F6 Extension.

The EIS explains that WestConnex is Australia's largest infrastructure project. RMS (as proponent) has engaged SMC to finance, deliver and operate WestConnex projects on behalf of the NSW Government.

WestConnex Stage 3 is one of a number of the following WestConnex component projects that includes:

- Stage 1 – New M4 - M4 widening (completed) and M4 East (about 48% completed)
- Stage 2 – King Georges Road Interchange Upgrade (completed) and New M5 (about 36% completed)
- Stage 3 – M4-M5 Link (in planning).

Related proposed motorway projects (all at an early planning stage) include:

- Sydney Gateway – a proposed motorway connection from the St Peters Interchange to Sydney Airport / Port Botany (in early planning)
- Western Harbour Tunnel & Beaches Link – a proposed motorway and road upgrade connection from the Rozelle Interchange to the Warringah Freeway and Frenchs Forest (in early planning)
- F6 Extension – a proposed motorway connection from the New M5 at Arncliffe to the Princes Highway at Loftus (in early planning).

Response

The NSW Government is committed to delivering the proposed future Sydney Gateway, Western Harbour Tunnel and Beaches Link and the F6 Extension projects, which would be subject to separate business cases, environmental impact assessments and approval. These projects are not part of the project which is the subject of this report.

The size and scale of WestConnex requires the program of works to be delivered in stages. Separate environmental impact assessments were therefore required to be prepared for each stage. The M4 Widening, M4 East, King Georges Road Interchange Upgrade, New M5 and M4-M5 Link components of the WestConnex program of works have been declared by Ministerial Order to be SSI and critical SSI under sections 115U(4) and 115V of the EP&A Act. Critical SSI projects are high priority infrastructure projects that have been deemed by the NSW Minister for Planning to be essential to the State for economic, social or environmental reasons.

The project is listed as a 'high priority initiative' in the *Australian Infrastructure Plan: The Infrastructure Priority List* (Infrastructure Australia 2016) and as a committed initiative for the strategic road network and strategic freight network in the *Draft Greater Sydney Services and Infrastructure Plan* (October 2017). The project is also part of the NSW Government's commitment to deliver WestConnex for Sydney in response to the recommendations from the *State Infrastructure Strategy* 2012–2032 (Infrastructure NSW 2012), the *State Infrastructure Strategy Update 2014* (Infrastructure NSW 2014), the *NSW Long Term Transport Master Plan* (*Transport Master Plan)* (Transport for NSW 2012), the *NSW State Priorities* announced in September 2015 (NSW Government 2015) and the *NSW Freight and Port Strategy* (Transport for NSW 2013).

The WestConnex program of works, which includes the project, has the potential to be a catalyst for major urban renewal and complements the *Draft Greater Sydney Region Plan* (Greater Sydney Commission 2017), *A Plan for Growing Sydney* (NSW Government 2014) and the *Revised Draft Eastern City District Plan*[2] (Greater Sydney Commission 2017). The project also complements the vision established in *Towards our Greater Sydney 2056* (Greater Sydney Commission 2016) by providing improved connectivity between Eastern City, Central City and Western City of the greater Sydney metropolitan region.

Investment in the M4-M5 Link, as part of WestConnex program of works, would assist in facilitating the delivery of other major city-shaping improvements, such as the Parramatta Road Corridor Urban Transformation and The Bays Precinct Transformation, which would contribute to delivering economic growth. Delivery of *The Bays Precinct Transformation Plan* is intended to be staged and coordinated with the planning and delivery of infrastructure projects including WestConnex. As part of the broader WestConnex program of works, the project would support NSW's major sources of economic activity and provide a strategic response to the future transport demands on the already congested road network.

B11.1.6 WestConnex Business Case

Part 2, p16

The 2016 SGS review of the WestConnex business case explains there has been no serious evaluation of the chosen motorway-only option against other transport and demand-management option. Council continues to be seriously concerned about the flawed processes for the evaluation of this project. In 2015 and 2016 submissions from the former councils that now make up Inner West Council on WestConnex Stages 1 and 2, particular concerns were raised the poor business case for the project.

In particular, there has been no serious evaluation of the chosen motorway-only option against combinations of other transport options that would have been more effective in allowing the project to meet its own objectives at a lower cost. Some of these options are outlined in the alternative proposals recommended by Inner West Council and the City of Sydney. It is apparent from the project's business case that the motorway-only option was chosen at the very beginning of the planning process and the business case drafted to support this.

As part of the development of submissions by former Leichhardt and City of Sydney Councils Stage 2 (New M5) in 2016, SGS Economics and Planning was commissioned by both councils to undertake review of the WestConnex business case. Though the review was undertaken in 2016, all of its findings are currently relevant, and are as equally relevant to Stage 3 as they were to Stage 2. This report is available on Council's website.

In summary, the SGS review's findings were:

WestConnex does not align with the NSW Government's Metropolitan Strategy ('A Plan for Growing Sydney', December 2014) or reflect Sydney's changing employment, land- use and transport needs. It could be added that WestConnex also does not align with the Greater Sydney Commission's 2016 Draft Central District Plan.

Whilst WestConnex will be the largest continuous motorway in Australia and will influence land use and transport patterns over half of Sydney, its purpose and the challenges it is trying to address are unclear.

[2] the Revised Draft Eastern City District Plan replaces the Draft Central District Plan (Greater Sydney Commission 2016)

The NSW Government's Metropolitan Strategy sets out a multi-centre strategy, focused on making it easier for Sydney residents to move between their homes, jobs and the centres where they shop, study and play. The plan highlights the transformation of western Sydney centres (Parramatta, Penrith, Liverpool and the Campbelltown-Macarthur region) through growth and investment. WestConnex does not align with the Metropolitan Strategy and squanders limited infrastructure funding that is needed for effective transport solutions for western Sydney.

WestConnex will not deliver for Western Sydney, or for taxpayers, or the travelling public. Sydney's travel and employment patterns are changing and motorways focused on the inner city do not align with current travel needs, let alone the emerging needs for the future of Sydney.

The stated freight and urban renewal justifications for WestConnex are outdated or unsubstantiated. The first original rationale of freight connections to Sydney's gateways of Port Botany and Sydney Airport are no longer a core part of the project, and WestConnex does not take into account the second airport at Badgerys Creek.

The Federal Government's commitment to the construction of a second Sydney airport at Badgerys Creek was made after WestConnex was announced and its business case completed. The announcement of the second airport itself is sufficient to warrant a review into the merits of WestConnex.

By the time WestConnex links to Sydney's existing airport in 2023, planes will be arriving at Sydney's new international airport at Badgerys Creek. When WestConnex finally links to industrial areas in Mascot, most of the area's freight industry and manufacturing jobs will have relocated to the light industrial centres of Eastern Creek, the Broader Western Sydney Employment Area and south-west Sydney.

Alternative freight infrastructure is already being delivered, including the Port Botany Rail Freight upgrade and the Moore bank Intermodal terminal. These projects will increase capacity to move freight to and from Port Botany by rail. WestConnex will duplicate the M5 East motorway without clear benefits for freight transport.

The second original rationale of urban renewal on Parramatta Road is uncertain, as congestion is likely to continue to undermine amenity along Parramatta Road. No traffic forecasts have been released to justify how this busy road will become any safer, healthier or more liveable, compared with a 'Do nothing' scenario. Parramatta Road remains in need of the only real solution to congestion—high quality public transport.

WestConnex won't increase western Sydney residents' access to jobs and economic development. Only a small proportion of workers from western Sydney commute to inner Sydney. Of those that do need to commute to inner Sydney, 90% rely on public transport. Increasingly, commuters are facing crush conditions on the CityRail network approaching both Parramatta and central Sydney. WestConnex will divert funding to a project that will not ease pressure on rail services and which does not serve western Sydney's major employment centres.

Western Sydney needs more jobs close to where people live, and better transport within and to the key centres of Liverpool, Parramatta, Penrith and Campbelltown-Macarthur. Industrial areas near Mascot are rapidly becoming commercial and residential, and manufacturing jobs have largely moved to Western Sydney.

WestConnex will cost taxpayers $11.5 billion (2016 figure) – in direct Government funding and the payment of user tolls for decades, including the introduction of new tolls on roads that are not currently tolled. It is residents of western Sydney who are most likely to be short-changed, with toll and parking costs of up to $48 predicted for a single trip. That's $240 per week for a commuter who has no reliable access to public transport alternatives.

Alternative projects could deliver more effectively on stated government objectives, including public transport projects focused on Western Sydney. Extending the North West Rail Link through the Sydney CBD to Liverpool, Sydney Rapid Transit (SRT) would connect the North West and South West to jobs, unlocking critical capacity across the rail network. Similarly, the Western Sydney Rapid Transit (WSRT) would link Western Sydney to the Sydney CBD via the Parramatta Road Corridor, serving important centres such as Parramatta, Sydney Olympic Park and Strathfield and supporting the renewal of Parramatta Road could also be created.

Concern that the project has not been subject to proper governance and independent assurance are supported. The Auditor-General's Report (WestConnex: Assurance to Government, 18 December 2014) raised serious concerns around the process undertaken to date and the adequacy of the project in terms of governance and independent assurance. The report found that the Government failed to implement its own Major Projects Assurance Framework.

The NSW Auditor-General's Report found that the preliminary business case submitted for a Gateway review had many deficiencies and fell well short of the standard required for such a document. The subsequent business case put to Government still included deficiencies. Significant questions remain about the WestConnex project's capacity to achieve its stated aims and meet Sydney's transport challenges.

Part 2, p19

The NSW and Australian Auditors General reviews of WestConnex funding and approvals processes is highly critical of the project.

The abovementioned SGS review explained the NSW Auditor General had been critical of the project. Since the SGS review, the Australian Auditor-General has also reviewed the WestConnex business case, and in February 2017 released a report on its findings, which was critical of many aspects of the project's funding and approvals process. It found the project had a poor business case that did not adequately consider alternative transport options, had lacked strategic oversight of its funding/approval process and appeared to be rushed to implementation.

Response

Sydney's population is expected to increase by more than 1.6 million people by 2031 and without major investment in road network infrastructure, this growth would result in worsening road congestion. This congestion would in turn affect Sydney's economic competitiveness as a global city.

WestConnex is a key initiative recommended in the NSW Government's *State Infrastructure Strategy* which was prepared by Infrastructure NSW to provide independent advice on the infrastructure needs of the state. WestConnex has been assessed as a program of works and a motorway network in the *WestConnex Strategic Business Case* which was approved by the NSW Government in August 2013. In November 2015, the *WestConnex Updated Strategic Business Case* was released, which consolidated the work undertaken in the original business case and incorporated further development in the program of works and feedback received from stakeholders.

As part of the WestConnex program of works, the project delivers on the NSW Government's plans to deliver an integrated transport solution, comprising roads and public transport, to address congestion on Sydney's roads. This is discussed further in Chapter 3 (Strategic context and project need) of the EIS. The project, as part of the WestConnex program of works, aims to support and facilitate the vision outlined in the strategies, including the Sydney Metro City and Southwest, the CBD and South East Light Rail, Sydney Metro West and Parramatta Light Rail projects. The project, as part of the WestConnex program of works, would also act as a catalyst for urban renewal along parts of Parramatta Road and Victoria Road which may include future public transport initiatives, such as rapid bus transit or light rail. Strategic alternatives to the project, including public transport, are discussed in Chapter 4 (Project development and alternatives) of the EIS.

WestConnex, along with the M4 Motorway, M5 Motorway, M7 Motorway and the proposed M12 Motorway (between the M7 Motorway, Cecil Hills and The Northern Road, Luddenham) corridors would provide a motorway standard link to the Western Sydney Airport and western Sydney Employment Area, which is a key focus for economic growth in Sydney over the medium to long term. As described in section 4.4.2 of the EIS, Stage 1 of the Western Sydney Airport would include freight facilities prior to airport operations commencing in the mid-2020s. As demand grows, the airport would continue to expand. The development of the Western Sydney Airport at Badgerys Creek has the potential to change the way some freight is moved around Sydney, by providing an alternative entry or exit point for freight.

However, while demand for goods and services (and associated job creation) for Western Sydney Airport is expected in the medium to long term, there is currently a growing freight market for Sydney Airport, with freight (including from the industrial and manufacturing sectors) projected to increase from around 600,000 tonnes in 2012 to over one million tonnes per year by 2033 (Sydney Airport Corporation Limited 2014). The project would reduce freight journey times and improve reliability by connecting the M4 and M5 motorway corridors and supporting the connection with the proposed future Sydney Gateway project (via the St Peters interchange) with the Sydney Airport and Port Botany precinct, leading to an overall increase in the capacity of the strategic freight network.

As discussed in section 4.4.2 of the EIS, while proposed or in progress rail developments such as intermodal terminals and the duplication of the Port Botany rail line would help increase freight capacity, there remains a significant demand for road freight movements in the Sydney metropolitan area.

The NSW Government remains committed to the delivery of the Sydney Gateway project, therefore the WestConnex program of works, including the project, has a key role to play, in line with its objectives, to provide a connection between western Sydney and the Sydney Airport and Port Botany precinct.

A demonstration of how the project meets the goals outlined in *A Plan for Growing Sydney* (NSW Government 2014) as well as the *Draft Towards Our Greater Sydney 2056* (Greater Sydney Commission 2016), which supersedes *A Plan for Growing Sydney,* is provided in Chapter 3 (Strategic context and project need) of the EIS. The WestConnex program of work provides one component of an integrated transport solution being delivered to by the NSW Government to support population and commercial growth in western Sydney and addresses the broader transport challenges of a growing Sydney. Further consideration of relevant planning and policy documents released since the preparation of the EIS*,* is discussed in **section C3.2**.

The *WestConnex Updated Strategic Business Case* was independently reviewed by Infrastructure NSW and Infrastructure Australia. In accordance with the recommendation by the NSW Auditor-General that major projects and key documents, such as the *WestConnex Updated Strategic Business Case*, be subject to the Infrastructure Investor Assurance Framework designed by Infrastructure NSW, the *WestConnex Updated Strategic Business Case* has been through a transparent and externally managed Business Case Gateway Review. All relevant information supporting the *WestConnex Updated Strategic Business Case* has been publicly released, except in limited circumstances where to do so would be contrary to the public interest or position of the State for commercial or legal reasons. Independent reviews of the project and business case are further discussed in **section C3.3**.

A discussion of project tolls and potential impacts is discussed in **section B11.8.22**.

A discussion of congestion relief, including along Parramatta Road, and the associated benefits, is provided in **section B10.3.1**.

B11.1.7 WestConnex cost benefit analysis

Summary, p2

Costs have been underestimated and benefits overestimated.

Part 2, p19

The benefits of WestConnex have been overestimated and the costs underestimated.

Council is of the view that the economic case for all stages of WestConnex is flawed, with the costs far outweighing the benefits. Even if the case for WestConnex could be boosted through enhanced connectivity with other motorways such as the Western Harbour Tunnel, the Beaches Link and F6 Extension (which is doubted), there is no business case, timeline or funding commitment to these other projects. Even the Sydney Gateway Project, providing a critical link to Sydney Airport / Port Botany, has been separated from WestConnex and will be assessed separately.

It would appear the project's benefits have been overestimated and its costs underestimated. As is discussed elsewhere in this submission, Council doubts the timesaving benefits of the project - and even if realised, whether they are of sufficient magnitude to be of any real value to individual motorists. The financial opportunity cost of WestConnex is high and rising - but of particular concern to Council are the substantial unaccounted health costs inflicted on Inner West residents through the many and varied construction and operational impacts of the project.

Response

The economic analysis for the WestConnex program of works determined that WestConnex would create benefits that would outweigh the upfront construction costs and ongoing operational costs. The economic analysis adopts the NSW Treasury definition for the benefit cost ratio (BCR) metric, defined as the present value of benefits less the present value of operating costs, divided by the present value of capital expenditure. The BCR is therefore a measure of net benefit to society derived from the capital investment in the project.

A sensitivity analysis was done as part of the economic appraisal to test potential changes to the BCR. The analysis showed that even with increased capital and operational costs of 30 per cent, WestConnex remained economically viable. The WestConnex Full Scheme: Economic Appraisal (KPMG 2015) provides additional information on the analysis approach and can be accessed from the WestConnex website[3].

By enabling connections to the proposed future Western Harbour Tunnel project and Sydney Gateway project, the M4-M5 Link would allow for potential further benefits to be realised, such as improved connectivity with the Sydney Airport/Port Botany precinct, the F6 Extension and forming part of an inner western bypass of the Sydney CBD. The long term benefits of the project would deliver value for money to the communities of the Sydney metropolitan area.

The BCR for the M4-M5 Link project, as identified in the *WestConnex Updated Strategic Business Case*, has been calculated as $2.38 or $2.94 with wider economic benefits. While it is an objective of the project to facilitate growth in Sydney's transport network and enhance connectivity, the economic analysis showed that the project was viable without the proposed connections to future motorways. The *WestConnex Updated Strategic Business Case* was subject to an independent review by Infrastructure for NSW and Infrastructure Australia. The latter confirmed that the full value of WestConnex would only be realised once the project (based on the preliminary design presented in that document) was completed.

Further discussion of the economic analysis for the project is provided in **section C3.2.4** and **section C3.3.3**.

The ongoing management of project costs is subject to a governance structure that includes the NSW Auditor-General's 'gateway process', in line with the Infrastructure Investor Assurance Framework. All major decisions regarding WestConnex are subject to a Cabinet-approval process. These decision points are aligned to the *Infrastructure Investor Assurance Framework*. As WestConnex components projects move through the project lifecycle, they are subject to an independent gateway assurance review process organised by Infrastructure NSW. The Cabinet or the appropriate Cabinet Committee must provide approval to proceed. The importance of the M4-M5 Link in achieving all of the broader WestConnex strategic objectives is recognised in the EIS (refer to section 3.3 of the EIS).

The assessment of travel time for the 'With project' and 'Without project' scenarios are in the EIS are described in Appendix H (Technical working paper: Traffic and transport) of the EIS. Further discussion on the travel time benefits of the project are discussed in **section B11.8.22**.

The human health risk assessment at Appendix K (Technical working paper: Human health risk assessment) of the EIS considers the impacts of the project on the health of affected communities. Further discussion is provided in **section B11.11**. The community safety and health impacts during construction are also presented in Appendix P (Technical working paper: Social and economic) of the EIS.

B11.1.8 Concerns raised by former Marrickville Council on the New M5 project

Part 4, 44

Council would like to reiterate the concerns raised about the St Peters Interchange site in the submission by former Marrickville Council on the Stage 2 EIS.

Most of the comments made by the former Marrickville Council in its February 2016 submission on Stage 2 on the design construction impacts of the St Peters interchange site are relevant to the Stage 3 EIS given construction will continue on this site. This submission is available on Council's website.

[3] www.westconnex.com.au

Key concerns raised in the former Marrickville submission include:

- use of the site for WestConnex not being productive use of the land;
- the expansive design of the interchange creating isolated spaces;
- the need to reduce the number and extent of motorway service facilities;
- impacts on individuals and households from compulsory acquisitions;
- construction impacts (predominantly dust and noise) on the health of nearby residents;
- cumulative impacts from other projects, e.g. creation of the Sydney Metro rail stabling area at St Peters;
- cumulative impacts from background impacts, e.g. noise & air emissions from Sydney Airport flight paths;
- parking impacts in St Peters area;
- biodiversity impacts from clearing the site;
- need for quality design of residual lands; and
- impacts of road and footpath closures and diversions during construction.

Response

Responses to Marrickville Council's submission to the EIS for the New M5 project are addressed in section 4.12 of the Submissions and Preferred infrastructure report for that project which is available on the DP&E Major Projects website. The New M5 project has been approved and is now under construction.

Responses to a number of the concerns raised in the Marrickville Council's submission to the New M5 EIS that are relevant to the M4-M5 Link project have been raised by the Inner West Council in its submission on the M4-M5 Link EIS. These have been addressed in the following sections of this chapter:

- Number and extent of motorway service facilities (**section B11.5.2**)
- Impacts on individuals and households from compulsory acquisitions (**section B11.14.7**)
- Dust and noise on the health of nearby residents, particularly those residents exposed to longer duration impacts (**section B11.11.3**)
- Cumulative impacts from other projects (**section B11.26.2**)
- Cumulative impacts from background impacts, eg noise and air emissions from Sydney Airport flight paths (**section B11.26.1**)
- Parking impacts, particularly construction workforce parking (**section B11.8.26**)
- Biodiversity impacts (**section B11.18**)
- Residual lands (**section B11.12**)
- Active transport connectivity during construction (**section B11.8.18**).

B11.2 Assessment process

Refer to Chapter 2 (Assessment process) of the EIS for details of the assessment process.

B11.2.1 Insufficient detail in the EIS for an assessment of the project

Summary, p2

Council's analysis of the EIS indicates the following concerns, noting there are many other elements of the project and EIS that require further assessment before a truly accurate assessment of the project's impacts can be considered:

- Limited consideration of the broader environmental implications of the project;

- Inadequate analysis of genuine alternatives to the project (including consideration of hybrid solutions which could include public transport and location specific road improvements complemented by demand management initiatives);
- The travel-time benefits achieved by WestConnex are negligible, with analysis of network-wide distance travelled against time taken indicating that in 2033 with the total "cumulative" project operational, the estimated average vehicle speed will be 26.4kph. This is only 1.1kph faster than the "do minimum" scenario and approximately 7.4kph slower than today's network-wide average;
- There has been no serious assessment of public transport and demand-management initiatives that could achieve similar congestion reductions and so equivalent travel time savings through reduced congestion;
- There has been no analysis of the impact of the proposal on the long term viability of Sydney's public transport and active transport network;
- There is not sufficient detail in the EIS to allow for a complete assessment of the project, with detail of a number of core issues deferred to later planning stages, such as the Preferred Infrastructure Report and construction management plans;
- There is no consideration or response in the EIS to the multitude of process inadequacies already experienced from construction of Stages 1 and 2 of WestConnex;
- The EIS's traffic and air quality modelling are flawed and based on unrealistic assumptions – for example, recent diversions of traffic away from the newly-tolled widened M4 raises concerns about the EIS's toll sensitivity analysis; and
- There is no consideration in the EIS of measures to minimise traffic impacts associated with the opening of Stages 1 and 2 should Stage 3 not proceed.

Summary, p5

Lack of detail and clarity in the EIS on key issues. The EIS states that further detail and a final design will be included in a Preferred Infrastructure Report drafted by the proponent after the EIS has been determined. It is thus imperative that the Preferred Infrastructure Report is placed on public exhibition prior to any determination to ensure Council and the community can comment on the additional assessments sought and final project designs.

Part 2, p14

WestConnex cannot be justified strategically and the Stage 3 EIS is fundamentally flawed. Beca's assessment of local issues raised by the EIS includes a number of conclusions about flaws in the EIS. This includes flaws in the assumptions that have guided the EIS's traffic and air quality modelling and lack of information about the precise nature of construction impacts. This is further evidence of the need for an inquiry.

Response

Insufficient detail in the EIS

The EIS was prepared in accordance with Part 5.1 of the EP&A Act, the Secretary's Environmental Assessment Requirements (SEARs) and Part 3 of Schedule 2 of the Environmental Planning and Assessment Regulation 2000 (NSW). The checklist against this regulation is provided in Appendix D (Environment Planning and Assessment Regulation 2000 (NSW) checklist) of the EIS. A copy of the SEARs, including an indication of where they are addressed in the EIS is provided in Appendix B (Secretary's Environmental Assessment Requirements checklist) of the EIS.

The EIS was prepared by a team of qualified professionals, including technical specialists, and was reviewed by subject matter experts from Roads and Maritime and independent peer reviewers to provide a balanced, merit-based environmental impact assessment. The environmental assessment was undertaken in consultation with key stakeholders and relevant statutory and agency requirements.

The EIS included the preparation of a range of comprehensive technical studies with consideration of changes to the environment as a result of Stages 1 and 2 of WestConnex. These technical studies were prepared in accordance with the key issues identified in the SEARs which included requirements issued by key government regulatory agencies as well as industry standards and guidelines. The EIS, including detailed technical studies, was reviewed by DP&E and relevant agencies to confirm that it adequately addressed the SEARs prior to being placed on public exhibition. DP&E also commissioned independent technical peer reviews of key technical studies presented in the EIS to inform its assessment, including traffic modelling, air quality, human health, urban design and contamination studies. The objectives of the independently reviewed *WestConnex Updated Strategic Business Case* were taken into account in the preparation of the EIS.

The EIS was prepared using a conservative approach, which included assessing the worst case impacts and scenarios across study areas directly or indirectly affected by construction and operation of the project, as relevant to the methodology of each assessment. The assessment was undertaken using an environmental risk analysis process utilising a likelihood and consequence approach (refer to Chapter 28 (Environmental risk analysis) of the EIS), the best available technical information and adopted good practice environmental standards, goals and measures to minimise environmental risks. The environmental risk analysis:

- Identified environmental issues, including key issues in the SEARs, and any other issues
- Examined potential impacts and proposed management and mitigation measures in relation to the identified issues
- Identified the impacts likely to remain after management and mitigation measures are applied (ie the residual impacts).

Mitigation measures have been developed to address the risks and impacts identified through the assessment and environmental risk analysis process. Additional mitigation measures, where required, would be confirmed during detailed design and would employ best practice environmental management measures in accordance with industry standards and the conditions of approval. See **Chapter E1** (Environmental management measures) for a summary of the proposed environmental management measures. It is not usual practice to prepare environmental management plans at the EIS stage, prior to appointment of design and construction contractor(s) and preparation of the detailed design.

A Preferred infrastructure report has been prepared that describes the design changes and refinements that are proposed to minimise environmental impacts, further address design and constructability issues and address issues raised during public exhibition of the EIS and the assessment of the project (see **Part D** (Preferred infrastructure report)). The report provides details regarding the inclusion of the White Bay civil site (C11) to provide a heavy vehicle marshalling facility and additional construction workforce parking, and the relocation of the bioretention facility at Rozelle.

The assumptions that guided the traffic modelling in the EIS are described in Appendix H (Technical working paper: Traffic and transport) of the EIS. Further discussion on the adequacy of the traffic modelling is provided in **section B11.7.1**. Concerns regarding the travel-time benefits are discussed in **section B11.8.22**.

The assumptions that guided the air quality modelling in the EIS are described in Appendix I (Technical working paper: Air quality) of the EIS. Further discussion on the adequacy of the air quality modelling is provided in **section B11.8.1**.

The adequacy of the EIS, including the level of detail provided and the outcomes of the technical assessments, is discussed further in **section B11.2.1**.

A discussion regarding the need for an inquiry is provided in **section B11.1.3.**

Consideration of public transport and demand-management alternatives are described in Chapter 4 of the EIS. Specific issues raised by the Inner West Council on public transport and demand management alternatives are discussed in **section B11.4**.

Concerns raised by the Inner West Council regarding the potential for the project to impact on the active transport network are discussed in **section B11.8.18**.

Impacts associated with preceding stages of WestConnex, or alternatives to address traffic concerns should the M4-M5 Link not proceed, are beyond the scope of the EIS.

Limited consideration of the broader environmental implications

The EIS included the preparation of a range of detailed technical studies (refer to Appendix H to Appendix X of the EIS). These technical studies were prepared in accordance with the SEARs and associated material received from key regulatory agencies as well as industry standards and guidelines. These studies also built upon the findings from preceding stages of WestConnex relating to assumptions and methodologies to further reinforce technical rigor with the aim of presenting robust and balanced assessments. The methodologies for the key technical assessments were also peer reviewed ahead of the assessment commencing. Project objectives and how they would be achieved through the project are stated in section 30.1.2 of the EIS.

The identification and assessment of potential environmental impacts associated with the project are included in Chapters 8 to 25 of the EIS and associated technical studies, where relevant. Each of the assessments presented in the EIS makes reference to the receivers and communities and provides details of the anticipated level of impact, its level of acceptability relative to established, applicable assessment criteria and presents appropriate mitigation measures for the identified impacts.

The EIS identifies that impacts from the construction and operation of the M4-M5 Link project would be within acceptable limits following the application of management measures as identified in **Chapter E1** (Environmental management measures) of this report. These management measures aim to ensure the most effective and acceptable environmental outcomes are achieved during construction and operation of the project, and would adhere to industry standards and guidelines. The environmental management measures have also been developed with consideration of the feedback received during construction of the M4 East and New M5 projects. For example, a Utilities Co-ordination Committee will be established to coordinate concurrent works associated with multiple overlapping projects and individual utility works to manage potential cumulative impacts and ensure that appropriate respite is provided for potentially affected residents and other sensitive receivers. Further opportunities to reduce impacts from the project would be refined during detailed design. The EIS demonstrates that impacts as a result of the project can be effectively managed or minimised where possible through design and the application of environmental management measures (see **Chapter E1** (Environmental management measures)).

The project would result in environment, social and land use enhancements through:

- Allowing for improved efficiency of the road network and predicted travel time savings, resulting in lower vehicle emissions and a long term reduction in greenhouse gas emissions
- Reducing surface road traffic and diverting some of this traffic into the motorway tunnels
- Delivering up to 10 hectares of new open space at the Rozelle interchange
- Enhancing pedestrian and cycleway infrastructure around the Rozelle interchange, improving accessibility by providing greater connectivity for cyclists and pedestrian journeys
- Providing opportunities for future public transport improvements along the Victoria Road and Parramatta Road corridors.

B11.2.2 Timing of the public release of the concept design

Summary, p5

The nine working days between the close of exhibition of the Concept Design and commencement of exhibition of the EIS could not have possibly allowed the issues raised by the former document to influence the latter.

Part 1

Council is concerned that issues raised in the submissions to the Stage 3 concept design could not have guided the EIS.

As was the case for the Concept Design, the EIS raises consultation process issues as well as content issues. At this stage there are three key process issues. The first is that the nine working days between the close of exhibition of the Concept Design and commencement of exhibition of the EIS could not have possibly allowed the issues raised by the former document to influence the latter. This signals to Council and the community that consultation on Stage 3 is tokenistic, has been rushed and could not have incorporated the detailed feedback provided on the Concept Design or resulted in any variation of the concept design.

Response

Prior to the statutory exhibition period for the EIS, consultation on the M4-M5 Link concept design was carried out during a 12-week non-statutory consultation period between May and August 2017. This consultation period sought to provide the community and other stakeholders with information about the M4-M5 Link project before the release of the EIS, as well as the opportunity for the community to provide feedback and engage directly into the process of understanding design considerations. The consultation period for the M4-M5 Link concept design also included community information sessions and key stakeholder meetings where issues and feedback was captured directly by the EIS team and integrated into the EIS, where required. An example of this includes changes to local road closures from near the Iron Cove Link portals following receipt of feedback from the community during the concept design consultation period, with these changes reflected in the design presented in the EIS. A community feedback report that addresses the main themes of feedback received during this period was prepared and made publicly available on the WestConnex website. This feedback report includes reference to where issues raised are addressed in the EIS.

It is acknowledged that the time period between the close of comments on the concept design and the exhibition of the EIS was limited. The timing of the release of the concept design feedback report did not prevent the community's feedback from being genuinely considered with comments documented in the report and received during the concept design consultation period considered on a broad scale in the EIS. Comments were also progressively forwarded to the EIS team throughout the consultation period on the concept design. A fact sheet summary describing how feedback received has influenced the concept design for the M4-M5 Link project can be viewed on the WestConnex website[4].

The consultation undertaken prior to and during concept design development and EIS preparation, including the timing of the public release of the concept design and incorporation of community feedback is also discussed further in Chapter 7 (Consultation) of the EIS and **Chapter A2** (Community and stakeholder involvement).

The Inner West Council's request to be involved in the assessment and approval of management plans is noted. Key stakeholders, including councils will be consulted on the preparation and implementation of management plans as appropriate and in accordance with the conditions of approval.

B11.2.3 Duration of EIS exhibition

Summary, p5

The 60-day EIS exhibition period is not adequate to allow for proper consideration of issues by Councils and the community. Consequently, several Councils have sought an extension of time, but this has not been granted.

Part 1

The two-month exhibition period is not sufficient to allow Council and the community to properly consider the EIS. The two-month exhibition period has not been adequate to allow for proper consideration of issues by Council and the community. The period includes two weeks of school holidays and does not easily allow a draft submission to be reported to a Council meeting and comments integrated.

At over 7,000-pages, the EIS is very long and not easy to negotiate. For some issues, there is an over-supply of information, including complex presentations of data, whilst for other issues (including some very important issues for the Inner West) there is a lack of information. There are multiple changes in terminology - for example, traffic modelling data is expressed in varying units (Average Weekday Travel (AWT), Average Annual Daily Travel (AADT) or Level of Service (LoS)), making interpretation difficult or impossible. All this has made it particularly difficult for Council and the community to understand this very large and complex project and make informed comments.

The newly-elected Council was concerned at the 3 October 2017 meeting that further resources were needed to cover topics considered critical to Council's assessment. This resulted in [a] resolution:

[4] https://www.westconnex.com.au/sites/default/files/Response%20to%20community%20feedback%20factsheet_FA_digital.pdf

However there are issues identified in the […] resolution that could not be addressed in the […] short timeframe. Accordingly, Council has sought to identify the main issues that would have been addressed in greater detail had there been sufficient time.

These issues are:

- A cost-benefit analysis of all three stages of WestConnex;
- A detailed assessment of EIS traffic modelling results against Council's independent modelling;
- A detailed assessment of human health impacts, including mental health; and
- A detailed assessment of stormwater and flooding impacts; and
- Other issues that will likely be raised after the submission has been lodged, including issues arising from Council's consideration of the final submission (as lodged) at its 24 October 2017 Ordinary Meeting.

Council considered a draft of this submission at its 12 October 2017 Ordinary Meeting and made a number of comments that were able to be integrated into this submission in the two working days available between the meeting and the submission deadline. […]

Council has written to the DP&E requesting a two-week extension, but this has been denied. At the first formal meeting of the newly-elected Council – the Extraordinary Meeting of 21 September 2017 - Council adopted an urgency motion to write to the DP&E seeking an extension. Accordingly Council has again written to the DP&E but this request has also been denied.

Council has resolved to consider the final submission (as lodged) at its 24 October 2017 meeting and to forward to the DP&E further comments that may arise from that meeting.

Response

The response provided below responds to the assessment process related sections of the preceding issue description. The issues raised that are not related to the assessment process are responded to in relevant sections of this chapter.

Under the EP&A Act, the statutory duration for the public exhibition period for an EIS is a minimum of 30 (calendar) days. The Secretary of DP&E is responsible for determining the timing and duration of public exhibition periods for an EIS. For the project, the Secretary of DP&E determined to extend the public exhibition period from the statutory minimum of 30 calendar days to a total of 60 calendar days (18 August to 16 October 2017). This was due to school holidays and the length and complexity of the EIS documentation. Multiple community information sessions and stakeholder meetings were held during the EIS exhibition period. The consultation activities undertaken during exhibition of the EIS are summarised in **section A2.3**. It is noted that in previous correspondence from the Inner West Council, a request was made for the EIS exhibition period to be for not less than eight weeks.

Prior to the formation of Inner West Council on 12 May 2016, ongoing meetings were held with the former Ashfield, Leichhardt and Marrickville councils. Prior to the exhibition of the EIS and since April 2016, meetings with the former councils and Inner West Council have been held regularly during the development of the concept design and EIS. This has included discussions and presentations on urban design and active transport designs, surface water and flooding, construction ancillary facilities, project design and design refinements, EIS program, community consultation overviews, noise monitoring, use of King George Park during construction of the project, possible impact on Easton Park and geotechnical investigations.

Table 7-4 in the EIS provides a summary of the consultation activities undertaken with Inner West Council (or the respective former councils that now comprise the Inner West Council) and other local, State and Commonwealth government agencies and elected representatives during the development of the EIS.

The EIS has been prepared by a team of qualified professionals and presents a balanced merit-based environmental impact assessment in accordance with the EP&A Act, the SEARs and applicable NSW assessment policies. This required various detailed investigations and technical specialist studies to be completed to assess the potential environmental impacts of the M4-M5 Link. While the technical working papers and other supporting documents appended to the EIS are by their nature technical documents, the main EIS chapters have been simplified and written in plain English as far as is possible, while still conveying the outcomes of the technical assessments undertaken. Due to the scale and complex nature of the M4-M5 Link project, this has in some cases resulted in large EIS chapters and technical documents. The EIS includes an executive summary that provides an overview of the key impacts/benefits and management and mitigation measures.

A project synthesis (refer to Appendix A (Project synthesis) of the EIS) was prepared in response to the SEARs issued by DP&E. The project synthesis acts a standalone report to provide a technical summary with details of the key information contained in the EIS. In addition, a Community Guide to the EIS was also developed, which provides a high-level, plain English snap-shot of the project and reference to where the community could find detailed information within the EIS.

Roads and Maritime has endeavoured to use less technical terms and common language in the EIS, where possible. Where technical terms or units of measurements have been used, definitions were provided in the EIS glossary. The EIS has been reviewed by technical editors and communications personnel to make the document readable and understandable for the general public.

B11.2.4 Delivery of the project by private organisation

Part 1, p11

Experience with consultation over Stages 1 and 2 raises concerns about delivery of the project being delegated to a corporation.

Council's experience with dealing with SMC over Stages 1 and 2 has at times raised issues about poor construction and complaints handling processes, and inability to access information that is commercial in-confidence. Council would prefer that all road projects in NSW were delivered by RMS rather than a corporation on behalf of RMS.

Response

All projects progressively release information to the public as preparation, design development and other analysis/investigative works progress. Once finalised, the information is made public through various documents including a business case, SSI application report, concept design report, EIS and response to submissions report. The project has followed this approach. A number of relevant documents are available via the WestConnex website. Further, SMC has participated in regular consultation with the council, through which project information was discussed and disseminated.

Roads and Maritime is the proponent for the project and will be responsible for meeting the requirements of the conditions of approval for the project (should it be approved) including adherence to the environmental management measures outlined in the **Chapter E1** (Environmental management measures). Roads and Maritime has commissioned SMC to deliver WestConnex, on behalf of the NSW Government. The NSW Government established SMC to finance, deliver and operate WestConnex, ensuring a well-resourced and highly experienced team focused specifically on project delivery. SMC is a private company limited by shares and established by the NSW Government in August 2014 under the *Corporations Act 2001* (Commonwealth), meaning that it is a private company that is not guaranteed by the State.

From April 2017, the shareholders of SMC include the NSW Minister for WestConnex the Hon. Stuart Ayres MP, the NSW Treasurer the Hon. Dominic Perrottet MP and NSW Minister for Finance, Services and Property the Hon. Victor Dominello MP. As a private company, SMC has a Board of Directors which has a duty to act in the best interest of its shareholders.

There are external governance and oversight arrangements in place for the project given the importance and scale of WestConnex and its cross-portfolio implications. This allows transparency and is facilitated through the WestConnex Interdepartmental Steering Committee (which includes Australian Government representation), regular project monitoring by Infrastructure NSW and quarterly project reporting to the NSW Cabinet Committee on Infrastructure. Further information on these arrangements is discussed in the *WestConnex Updated Strategic Business Case* (SMC 2015a) which is available on the WestConnex website[5].

As noted in **section B11.7.4**, a Complaints Management System will be in place for the duration of construction. This system will include the recording of complaints and how the complaint was addressed (within a Complaints Register). A Community Complaints Commissioner, who is an independent specialist, would oversee the system and would follow-up on any complaint where the public is not satisfied with the response.

B11.2.5 Uncertainties around the construction of the Rozelle interchange

Part 1, p12

Council is concerned that recent uncertainties around construction of the Rozelle Interchange could lead to major changes to the staging and design of Stage 3.

Recent reports that the NSW Government was finding it difficult to procure a contractor to construct the Rozelle Interchange part of Stage 3. This has reinforced Council's prior concerns about the complex, difficult nature of this part of Stage 3 and the possibility that there will need to be significant design changes before the interchange could be feasibly constructed. There is also the possibility that planning of the mainline tunnel and Rozelle Interchange components of the project may proceed separately.

This highlights the concerns expressed elsewhere in this submission about the need for Council and community input into design changes. Significant changes, including the splitting of Stage 3 into two separate parts, would require a new EIS. Council does not want a situation where it has commented on a design that is significantly changed without its further input. This would be contrary to the intent and possibly letter of the NSW planning system.

Addendum to the Inner West Council's submission

That the status of the Rozelle Underground Interchange be included in the submission.

Council was also concerned about recent reports that have highlighted technical difficulties associated with construction of the Rozelle Interchange, and the possibility that its design could be significantly altered. Council was particularly concerned that all or part of the interchange could be above−ground rather than underground as is currently proposed. Council was strongly of the view that should Rozelle Interchange designs be altered, a new EIS be prepared and publicly exhibited.

Response

While the Rozelle interchange is comprised of a complex system of tunnels, the concept design has been prepared by a multi-disciplinary team and has been rigourously tested to ensure the design is constructible and that impacts are able to be managed within acceptable limits. The design and construction contractor(s) for the Rozelle interchange would be selected based on various criteria, included their ability and capacity to deliver the project and to provide value for money. The design presented by the design and construction contractor(s) will need to satisfy all technical road design requirements based on the project as described in the EIS and **Part D** (Preferred infrastructure report).

The Rozelle interchange is located below ground and to the north of the Rozelle Rail Yards. This location would provide better opportunities for improved residual land outcomes comprising open space and/or recreational land, while taking advantage of favourable ground conditions that are suitable for tunnelling.

As noted in section 6.1.2 of the EIS, the project would be constructed in two stages, with the Rozelle interchange forming part of the second stage. However, the EIS assesses both stages of the project to ensure the assessment considered a worst case, conservative outcome that incorporated cumulative impacts associated with concurrent construction of the mainline tunnels and the Rozelle interchange and Iron Cove Link. The implications of a staged delivery of the project are assessed in the EIS.

[5] https://www.westconnex.com.au/resources

If further assessment/approval is required due to project design changes, the applicable statutory process will be followed prior to the commencement of construction of the relevant aspect of the project. This may be in the form of a modification request lodged with DP&E, depending on the scale of the proposed modification and the potential for environmental or social impacts. The modification request would be appropriately notified and/or exhibited by DP&E, if deemed necessary.

As outlined in **section A2.4**, SMC and Roads and Maritime will continue to provide consultation opportunities for the community and other key stakeholders including the Inner West Council, during the ongoing refinement of the design and during construction, with a view to further minimising impacts of the project on communities.

In addition, a number of the environmental management measures identified in the EIS would require further consultation with the community and project stakeholders. These are summarised in **Chapter E1** (Environmental management measures) of this report.

B11.2.6 Changes to the design subsequent to approval

Addendum to the Inner West Council's submission

That the submission include a requirement that says that any changes to the design subsequent to the approval (should it be approved) must be brought back for public comment.

Council felt there was a need for public exhibition of any design changes subsequent to determination due to the lack of detail in the EIS about some key areas of interest, and also the likelihood that there would be significant changes between designs shown in the EIS and final approved designs.

Response

The design and construction contractor(s) will be appointed to undertake the detailed design and construction planning of the M4-M5 Link following determination of the project application, should it be approved. Section 1.1 of the EIS provides further detail of the delivery mechanism for the project.

The detailed design will be prepared based on the approved project as described in the EIS and this Submissions and preferred infrastructure report and will be consistent with any conditions of approval and other requirements of DP&E, if approved. Where the detailed design is inconsistent with the approved project, further assessment and approval will be taken as required by the EP&A Act. If further assessment/approval is required due to project design changes, the applicable statutory process will be followed prior to commencement of construction or operation of the relevant aspect of the project. This may be in the form of a modification to the Instrument of Approval under section 115ZI of the EP&A Act, depending on the scale of the proposed modification and the potential for environmental or social impacts.

The concept design used a conservative approach and project footprint for assessment of project risks and impacts. During detailed design, the design and construction contractors(s) will identify improvements to deliver the project, however, the design presented by the design and construction contractors(s) will need to satisfy all technical road design requirements and road functionality as described in the EIS, and be consistent with the approved scope of the project, including environmental management measures and conditions of approval for the project. Issues raised during public exhibition of the EIS will also be taken into account during the detailed design process.

Certain aspects of the detailed design of the project would be made available to the public for input including the UDLPs and the Social Infrastructure Plan. These plans will be prepared in consultation with relevant councils and the community (see environmental management measures UD1 and OSE8 in **Chapter E1** (Environmental management measures)). Ongoing consultation with relevant local councils and the community will be undertaken in accordance with a Community Communication Strategy, which includes mechanisms for notification and feedback.

B11.2.7 Request for determination to be withheld

Part 12, p75

While Council could provide a detailed set of conditions and constraints it is currently considered that information in the EIS and the existing level of detail provided by the design is insufficient to provide further extensive and reliable comment. Consequently Council requests that determination of the project be withheld until such a time as detailed design, plans and modelling can be provided, with Council, the community, and other key stakeholders permitted to review and comment.

Response

The level of detail provided in the concept design is considered sufficient to properly inform and enable the assessments undertaken in the EIS and to meet the requirements of the SEARs as discussed in **section B11.2.1**.

The Inner West Council's request for deferment of the determination is a matter for DP&E to consider during its assessment of the EIS.

B11.3 Strategic context and project need

Refer to Chapter 3 (Strategic context and project need) of the EIS for details of strategic context and project need.

B11.3.1 Long-term viability of Sydney's public and active transport network

Summary, p2

There has been no analysis of the impact of the proposal on the long term viability of Sydney's public transport and active transport network.

Response

The manner in which public transport has been considered and incorporated into the project has been addressed in Chapter 4 (Project development and alternatives), Chapter 5 (Project description), Chapter 6 (Construction work) and Chapter 12 (Land use and property) of the EIS. Chapter 8 (Traffic and transport) of the EIS assesses the potential impacts on public transport serviced during construction and operation of the project.

As part of WestConnex, the project assists the NSW Government's plans to deliver an integrated transport solution, comprising roads and public transport, to address congestion on Sydney's roads. This is discussed further in Chapter 3 (Strategic context and project need) of the EIS. The project, as part of the WestConnex program of works, aims to support and facilitate the vision outlined in the strategies, including the Sydney Metro City and Southwest, CBD and South East Light Rail, Sydney Metro West and Parramatta Light Rail. The project, as part of the WestConnex program of works, would act as a catalyst for urban renewal along parts of Parramatta Road and Victoria Road which may include future public transport initiatives, such as rapid bus transit. The project has been assessed under Division 2, Part 5.1 of the EP&A Act as SSI and critical SSI.

Strategic alternatives, including investment in alternative transport modes, were considered in section 4.4.2 of the EIS. It was concluded that public transport improvements alone are not a viable alternative to meet the project objectives. Investment in integrated transport solutions that involve both roads and public transport are needed to cater for the population growth forecasts and associated increase in travel movements.

As outlined in *Sydney's Cycling Future* (Transport for NSW 2013c) and *Sydney's Walking Future* (Transport for NSW 2013f), journeys made by cycling and walking are generally for short trips only. Improvements to cyclist and pedestrian infrastructure alone would not cater for the diverse travel demands within the project footprint that are best met by road infrastructure. Further improvements to cyclist and pedestrian infrastructure alone would not support long-term economic growth through improved motorway access or enhance the productivity of commercial and freight generating land uses. The active transport network is therefore complementary to other modes of transport as part of an integrated transport solution.

The project would deliver new and improved active transport links within open space created by the project such as within the Rozelle Rail Yards and along the southern side of Victoria Road at Rozelle. These works would be consistent with other plans for active transport improvements in the area, as outlined in the *Parramatta Road Corridor Urban Transformation Strategy* (UrbanGrowth NSW 2016a), *The Bays Precinct Transformation Plan* (UrbanGrowth NSW 2015) and various council initiatives such as Greenway, The Green Grid and the Lilyfield Road regional bike route.

How the project would integrate with the public transport network around the Rozelle interchange, including the Inner West Light Rail line and the bus routes that run along Victoria Road and The Crescent is discussed in section 5.6.8 of the EIS. Integration with public transport around the Iron Cove Link is discussed in section 5.7.6 of the EIS. Further discussion is also provided in Chapter 8 (Traffic and transport) and Chapter 13 (Urban design and visual amenity) of the EIS.

Anticipated modifications to the public transport network needed to facilitate construction of the project are outlined in section 6.6.3 of the EIS. These would consist of changes to bus stop locations. The proposed changes would be reviewed during detailed design with the objective of minimising disruptions to public transport services and customers. Any bus stop relocations would be agreed with Transport for NSW and all affected bus operators.

The combined number of new road trips and trips reassigned from public transport as a result of the full WestConnex program of works is anticipated to be around 0.3 per cent of the total number of daily car trips on the WestConnex Road Traffic Model (WRTM) Sydney-wide network in 2033 (refer to section 4.2.1 of Appendix H (Technical working paper: Traffic and transport) of the EIS). This mode shift has been included in the WRTM and considered in the traffic modelling for the project described in Chapter 8 and Appendix H (Technical working paper: Traffic and transport) of the EIS.

As described in **section C3.2.3**, the design of the M4-M5 Link has considered proposed public transport projects such as Sydney Metro West, public transport improvements along Parramatta Road between Burwood and the Sydney CBD and public transport improvement projects along Victoria Road. By reducing traffic on Victoria Road, there is an opportunity to improve public transport services along this corridor which may connect with a future metro rail station located within The Bays Precinct. The new east-west and north-south active transport connections created by the project at Rozelle would also provide improved connectivity to a future metro rail station located within The Bays Precinct.

Opportunities to integrate the project with future public transport projects will continue to be investigated throughout the detailed design phase, in consultation with relevant government agencies and other key stakeholders including UrbanGrowth NSW and Transport for NSW. The project therefore does not preclude the development of public transport within the project footprint or in the vicinity.

Land use and transport integration and opportunities adjacent to the surface works are discussed in section 12.4 of the EIS.

B11.3.2 Justification of the project

Summary, p5

In summary, Council believes no part of WestConnex, including Stage 3, is justified on economic or environmental grounds. It represents a poor transport option compared to public transport and demand management alternatives, is not consistent with key NSW Government planning and transport policies and does not meet some of its own original aims. Costs have been underestimated and benefits overestimated. Of particular concern to Council is lack of accounting for the significant health costs imposed on local communities and the equity impacts of tolls.

Stage 3 should not be approved because it lacks justification and its EIS is seriously flawed. A moratorium should be placed on all work associated with WestConnex until an inquiry is held to investigate and resolve the many flaws in all of its stages, evidenced by the serious negative impacts that have arisen from Stages 1 and 2 (under construction) and inadequate EIS for Stage 3. This inquiry should also address the impacts of proceeding with Stage 1 and 2, without Stage 3 - as a consequence, consideration should be given to halting work on Stages 1 and 2 to avoid these impacts.

Part 2, p14

WestConnex cannot be justified strategically and the Stage 3 EIS is fundamentally flawed.

WestConnex Stage 3 is not justified at the strategic level as it represents a poor transport option that will have profound negative impacts on the liveability and urban form of the Inner West and wider metropolitan region. Nor is the project justified at a local level due to the severe and widespread local impacts that will be suffered by the Inner West community.

Beca's assessment of local issues raised by the EIS includes a number of conclusions about flaws in the EIS. This includes flaws in the assumptions that have guided the EIS's traffic and air quality modelling and lack of information about the precise nature of construction impacts. This is further evidence of the need for an inquiry.

Response

The adequacy of the EIS, including the level of detail provided, the outcomes of the technical assessments and the level of technical and peer review, is discussed further in **section B11.2.1**.

Alignment with WestConnex objectives

Project objectives are set out in section 3.3 of the EIS. A justification for the project that considers the project objectives is provided in section 30.1.1 of the EIS. In addition, an assessment of how the project would meet its objectives is provided in **section C3.6.2**.

The economic appraisal completed as part of the *WestConnex Updated Strategic Business Case* concluded that the WestConnex program of works would deliver $1.71 in benefits for every one dollar spent when assessed without reference to the wider economic benefits of the projects. When the wider economic benefits are considered this rises to $1.88 in benefits for every one dollar spent. The benefit cost ratio is a measure of the net benefit to society derived from the capital investment in the project.

For the M4-M5 Link project, the benefit cost ratio has been calculated as $2.38 or $2.94 with wider economic benefits. These ratios indicate an economically viable proposal.

The investment in the WestConnex program of works would facilitate improvements across the network and generate more than $20 billion worth of benefits to the Australian economy. For the M4-M5 Link it is estimated that based on a five-year construction period, around 14,300 direct (onsite) job years would be created between 2018 and 2023, which is equivalent to around 2,800 jobs per annum. Furthermore, about 42,300 indirect (offsite) job years would be generated, equivalent to around 8,400 jobs per annum based on the project period.

In addition to the economic benefits to the project described above, the project would provide the following key benefits to the community and businesses:

- Reduce travel times and improve reliability for bus services, business, personal and freight journeys along the Sydney road network
- Improve road safety by reducing traffic congestion on Sydney's arterial roads
- Ease congestion on surface roads by providing an underground motorway alternative and allowing for increased use of surface roads by pedestrians and cyclists and for public transport
- Reduce through traffic on surface roads thereby facilitating urban renewal opportunities to be realised along parts of the Parramatta Road and Victoria Road corridors
- Reduce traffic pressure on other key north-south links including the Princes Highway/King Street, Southern Cross Drive, and the A3 and A6 corridors
- Deliver up to 10 hectares of new open space at the Rozelle Rail Yards which would provide an open space link between Bicentennial Park at Glebe and Easton Park at Rozelle
- Deliver new north-south and east-west pedestrian and cycleway connections to link Rozelle and Lilyfield with Annandale, Balmain, Glebe and The Bays Precinct.

Assessment of strategic alternatives

Strategic alternatives, including investment in alternative transport modes and demand management alternatives, were considered in section 4.4.2 and section 4.4.3 of the EIS respectively.

It was concluded that public transport improvements alone are not a viable alternative to meet project objectives and instead investment in integrated transport solutions that involve both roads and public transport are needed to cater for the concentrated population growth forecasts and associated increase in travel movements.

To have a major impact on road traffic, travel demand management measures would require considerable changes in social attitudes, travel behaviour and government policy and can take many years to achieve. Therefore, while travel demand management could help reduce demand on the road network during peak times, its effectiveness would be limited by other constraints, such as:

- Land use patterns, in particular the location of new jobs relative to areas of residential growth
- The availability of alternative travel modes at the user's origin and destination such as public transport and active transport
- Flexibility of working arrangements to take advantage of 'time of day' tolling or transport pricing benefits.

Travel demand management changes alone are therefore not a viable alternative to meeting the project objectives. They are, however, viewed as complementary initiatives, together with the project, to reduce the impacts of road traffic on Sydney's road network.

Population growth, combined with the growing road freight task in the Sydney metropolitan area, would result in a continued demand for use of roads providing east-west and north-south connections such as the M4 Motorway, M5 Motorway, M1 Motorway and A3 and A6 corridors. Without infrastructure investment or significant changes to how people travel, the continued demand and use of these corridors would result in additional, prolonged congestion.

All strategic planning policies relevant to the project and study area were reviewed and reported in the EIS (refer to section 3.1 of the EIS). The review considered both positive and negative effects on existing policy. Delivery of the project would align with Government policies and help facilitate urban growth initiatives. WestConnex has consistently been a component of the NSW Government's transport and land use policies since 2012.

The project is listed as a 'high priority initiative' in the *Australian Infrastructure Plan: The Infrastructure Priority List* (Infrastructure Australia 2016). The project is also part of the NSW Government's commitment to deliver WestConnex for Sydney in response to the recommendations from *the State Infrastructure Strategy 2012–2032* (Infrastructure NSW 2012), the *State Infrastructure Strategy Update 2014* (Infrastructure NSW 2014), the *Transport Master Plan*, the NSW State Priorities announced in September 2015 (NSW Government 2015) and the *NSW Freight and Port Strategy* (Transport for NSW 2013). It is also referenced in the *Draft Future Transport Strategy 2056* which has recently been released by Transport for NSW, which will effectively replace the *Transport Master Plan*. The WestConnex program of works, which includes the project, also has the potential to be a catalyst for major urban renewal, as identified in *A Plan for Growing Sydney* (NSW Government 2014) (referred to as the 2014 Metropolitan Strategy in the submission from Inner West Council) and the *Draft Central District Plan* (Greater Sydney Commission 2016a). The latter has been replaced by the *Revised Draft Eastern City District Plan* (Greater Sydney Commission 2017).

The transport network in Sydney is expected to be put under increasing pressure over the next 20 years. *A Plan for Growing Sydney* (NSW Government 2014) indicates that from 2011 to 2031, Sydney's population is forecast to increase from 4.3 to 5.9 million, which equates to an average of 80,000 additional residents per year. Moreover, by 2036, the number of trips made around Sydney each day is forecast to increase by 31 per cent from 16 to 21 million vehicle movements. This growth will place increasing pressure on the NSW transport network and the key travel demand corridors connecting regional cities and major centres across the greater Sydney metropolitan area.

The WestConnex project is one part of a broader solution to these emerging pressures. While public transport is also part of this mix, it is recognised that not all trips in Sydney can be served by public transport, especially trips to dispersed destinations or commercial trips requiring the movement of large or heavy goods/materials. A congested road network also affects road-based public transport, increasing bus travel times and journey time variability. For these reasons, the NSW Government is also investigating and investing in light rail, metro, bus rapid transit and motorways to provide a multi-modal response to the future challenges. In this context, WestConnex is an enabler of integrated transport and land use planning, supporting the development of initiatives including *The Bays Precinct Transformation Plan* (UrbanGrown NSW 2015) and the *Parramatta Road Corridor Urban Transformation Strategy* (UrbanGrowth NSW 2016).

Lessons learnt from preceding WestConnex stages

Feedback from other SMC project teams, design and construction contractor(s), DP&E and other relevant agencies, including NSW EPA, was sought on the M4 East and New M5 construction phases to identify lessons learnt and areas for improvements to work processes and mitigation measures to assist in addressing potential construction impacts for theM4-M5 Link. Feedback and the lessons learnt from these earlier stages will also further guide the development of the detailed design. The impacts of the two preceding stages of WestConnex without Stage 3 were assessed as part of the M4 East and New M5 EISs. The assessment of the cumulative impacts of all the WestConnex component projects, plus other related projects, is included in Chapter 26 (Cumulative impacts) of the M4-M5 Link EIS.

Areas of concern

The traffic modelling carried out for the EIS, the results of which are presented in Appendix H (Technical working paper: Traffic and transport) of the EIS, was not flawed. Further discussion on the adequacy of the traffic modelling is provided in **section B11.8.1**. The outcomes of the traffic and transport assessment were used as inputs for the air quality and noise and vibration modelling.

The human health risk assessment in Appendix K (Technical working paper: Human health risk assessment) of the EIS considers the impacts of the project on the health of affected communities. Further discussion is provided in **section B11.11**

The equity impacts of tolls were assessed in Appendix P (Technical working paper: Social and economic) of the EIS. Further discussion is provided in **section B11.14.1**.

A discussion regarding the need for an inquiry is provided in **section B11.1.3**.

B11.3.3 Inconsistency with NSW Government planning policies

Part 2, p15

WestConnex is not consistent with a number of NSW Government planning policies and is not consistent with some of its original aims.

Through induced traffic, WestConnex will undermine the NSW Government's own efforts to create transit-oriented development in other parts of Sydney, such as that proposed within along the Parramatta Road and Sydenham to Bankstown corridors. The impact of WestConnex on these corridors is further discussed in other parts of this submission.

WestConnex will also undermine several of the NSW Government's own transport and planning policies, including the 2014 Metropolitan Strategy, the 2016 draft Central Subregional District Plan and 2016 Future Transport Technology Roadmap. The latter strategy foresees a number of changes around technology, demographics and rates of car ownership that threaten to undermine the value of WestConnex in the longer-term. By increasing vehicular traffic, WestConnex also undermines the NSW Government's active transport plans and policies, such as the 2013 Sydney City Centre Access Strategy and 2013 Sydney's Cycling Future.

It is well recognised that the provision of on-site parking contributes significantly to the cost of both housing and business premises. Consequently, by encouraging increased reliance on private cars and increasing the need for development to provide parking, WestConnex undermines the State's various affordable housing policies. Increasing pressures for kerbside parking makes it difficult for Council to reclaim kerbside space for much-needed street improvements such as widened footpaths, bicycle lanes and trees/gardens.

Council is concerned that WestConnex, as a motorway-only transport option, fails to meet some of its own objectives. Key failures include the likelihood that surface traffic will not be reduced in the long-term due to mode-shifting and associated induced traffic, that the project will not lead to the rejuvenation of Parramatta Road, there will be worsening of congestion on already congested roads such as Victoria Road at Iron Cove Bridge and City West Link Road at Anzac Bridge, there will be lack of connectivity to Sydney Airport and Port Botany and the project will have limited advantages for heavy vehicles. The alternative proposals of the City of Sydney and Inner West Council had aimed to draw attention to this issue.

Regarding connections to Sydney Airport and Port Botany Beca's assessment acknowledges that "The NSW Transport Master Plan recognises that WestConnex would support Sydney's long-term economic growth by supporting the growing freight task between Sydney's international gateways and greater western Sydney, facilitating the transfer of goods and services between Sydney's eastern and western economic centres by improving capacity and reducing travel times, and supporting the continued development of Sydney's global economic corridor."

Beca is however concerned that there have been a number of subsequent changes to the project's alignment has moved this aim well down the list of priorities, with the Sydney Gateway project to meet this aim at a later stage. The reasons for this shift in priorities have not been communicated in the EIS or updated Business Case.

Response

Chapter 30 of the EIS provides a summary of the strategic need and justification for the project, including the manner in which the project would fulfil the objectives outlined in Chapter 3 (Strategic context and project need) of the EIS.

The consistency of the project with relevant NSW Government policy as well as a discussion on how the project would meet its, and the broader WestConnex program of works, objectives is provided in **section B11.3.2**.

The WestConnex program of works, which includes the project, has the potential to be a catalyst for major urban renewal and complements A Plan for Growing Sydney (NSW Government 2014) and the *Draft Central District Plan*[6] (Greater Sydney Commission 2016). The project also complements the vision established in *Towards our Greater Sydney 2056* (Greater Sydney Commission 2016) by providing an integrated transport solution to support population and commercial growth in western Sydney.

Investment in the M4-M5 Link, together with the other WestConnex projects, would assist in facilitating the delivery of other major city-shaping improvements, such as the Parramatta Road Corridor Urban Transformation and The Bays Precinct Transformation, which would all contribute to delivering economic growth. This would be achieved by reducing traffic on these key road corridors and providing future opportunities for public transport improvements, and by providing improved connectivity, new open space and active transport links at Rozelle. Delivery of the Bays Precinct Transformation Plan is intended to be staged and coordinated with the planning and delivery of infrastructure projects including WestConnex. As part of the broader WestConnex program of works, the project would support NSW's major sources of economic activity and provide a strategic response to the future transport demands on the already congested road network.

The *Future Transport Technology Roadmap 2016* (Transport for NSW 2016) (the Roadmap) acknowledges that '*delivering mobility in a rapidly developing transport system'* is an objective for future transport. The Roadmap lists the WestConnex program of works as one of the major new projects the NSW Government has embarked upon as part of an ambitious infrastructure program to inject much-need capacity into the transport system. The Roadmap recognises that capacity enhancements of this nature must continue in order to respond to the ongoing shifts and growth in mobility demand.

The *Draft Greater Sydney Services and Infrastructure Plan* (NSW Government 2017) acknowledges that roads will continue to perform an important function in transporting people and goods within Greater Sydney, and that the future strategic road network in Sydney will support key movements by road, including public transport, private vehicles and freight movements.

The Sydney City Centre Access Strategy (Transport for NSW 2013e) identifies WestConnex as 'one of NSW Government's key infrastructure projects which aims to ease congestion, create jobs and connect communities'. The strategy acknowledges that the WestConnex motorway will support Sydney's economy by providing improved access for freight, commercial and business vehicles.

[6] Note that this draft plan was replaced by the *Revised Draft Eastern City District Plan* (Greater Sydney Commission 2017) after the EIS was exhibited

The NSW Government's *Sydney's Cycling Future* (Transport for NSW 2013c) develops a strategy for bicycle infrastructure planning in metropolitan Sydney. This strategy was used to inform and develop the M4-M5 Link Active Transport Strategy (refer to Appendix N (Technical working paper: Active transport strategy) of the EIS) including the provision of new and upgraded active transport connections around Rozelle and Lilyfield.

The project has been designed to improve the flow of commuter and freight traffic through the road network. Any induced traffic demand would be from existing background demand and underlying growth. Parking at destinations is a matter for individual proponents of new developments or the owners or managers of existing developments. It should be noted that the project is part of the NSW Government integrated package of multi-modal transport projects aimed at improving transport and reducing congestion. This includes projects like the Sydney Metro City and Southwest and the CBD and South East Light Rail which aims to move people out of cars and onto public transport, further reducing parking demand.

B11.4 Project development and alternatives

Refer to Chapter 4 (Project development and alternatives) of the EIS for details of project development and alternatives.

B11.4.1 Assessment of alternatives to the project

Summary, p2

Inadequate analysis of genuine alternatives to the project (including consideration of hybrid solutions which could include public transport and location specific road improvements complemented by demand management initiatives).

There has been no serious assessment of public transport and demand-management initiatives that could achieve similar congestion reductions and so equivalent travel time savings through reduced congestion. There has been no analysis of the impact of the proposal on the long term viability of Sydney's public transport and active transport network.

Part 2, p14

The substantial cost of WestConnex to be redirected to public transport and other traffic-reduction options to secure Sydney's economic future. As Council has repeatedly argued, public transport and other traffic-reduction options (not motorways) are needed to move Sydney toward a liveable and economically efficient transit- oriented urban form, where the city's inhabitants can for the most part access jobs, services and recreational opportunities by means other than car.

Creation of a transit-oriented urban form is increasingly necessary for a city's economic performance, as it is a pre-requisite for the 'new economy'. Knowledge-based corporations and their workers seek mixed, densely-developed urban areas that facilitate face-to-face interaction and are liveable, affordable and well-served by public transport.

It has been proven around the world that the most cost-effective means of reducing traffic is to continue to increase the extent and quality of public transport, supported by transit- oriented development and other traffic-reduction actions. In large cities such as Sydney, rail speed and reliability can be the most significant factor determining road speed and reliability. Increasing road capacity to solve traffic congestion has been proven to be self-defeating and ultimately futile.

The economic future of Sydney depends on its ability to compete with other large cities nationally and around the world to attract new economic activity, with the key measure for success being quality of public transport. Google's recent decision to withdraw its interest in establishing a corporate headquarters in the Bays Precinct due to lack of public transport access to the site highlights the importance of quality public transport in securing Sydney's economic future.

WestConnex will contribute to the opposite – reduced patronage of public transport with corresponding declines in reliability and quality, induced traffic, urban sprawl, polluted air, compromised neighbourhoods, declining public health and an inefficient, costly transport system that will become a burden on the city's economy. While other major cities around the world have abandoned large-scale inner-urban motorway construction, the NSW Government continues to push forward with this outdated road-based solution to Sydney's traffic problems.

Most of the views expressed in this submission on the strategic aspects of WestConnex are not unique to Inner West Council – they are the views of the former councils that now make up Inner West Council, the City of Sydney and numerous planning/transport professionals and residents of Inner West Council and the wider inner-Sydney area, including several western Sydney councils.

Note that Council's position of opposition to WestConnex is consistent with its 2016 independent survey of Inner West Council residents on a number of issues, including WestConnex. The survey found that almost 60% of respondents were opposed to WestConnex.

Response

As part of WestConnex, the project delivers on the NSW Government's plans to deliver an integrated transport solution, comprising roads and public transport, to address congestion on Sydney's roads. This is discussed further in Chapter 3 (Strategic context and project need) of the EIS. The project, as part of the WestConnex program of works, aims to support and facilitate the vision outlined in the strategies, including the Sydney Metro City and Southwest, CBD and South East Light Rail, Parramatta Light Rail, Sydney Metro West and the Easing Sydney's Congestion program of works. The project, as part of the WestConnex program of works, would act as a catalyst for urban renewal along parts of Parramatta Road and Victoria Road which may include future public transport initiatives, such as rapid bus transit (refer to section 3.2.4 of the EIS).

The EIS was prepared in accordance with the relevant provisions of the EP&A Act. It was prepared to address the SEARs and the relevant provisions of Schedule 2 of the EP&A Regulation. Consideration of the project against a range of strategic alternatives to identify the extent to which they could meet the project objectives (refer to section 3.3 of the EIS for the project objectives) and how well they performed with reference to other transport, environmental, social and economic factors has been undertaken in accordance with the SEARs and is presented in section 4.4 of the EIS. The following strategic alternatives were considered in section 4.4 of the EIS:

- Alternative 1 – improvements to the existing arterial road network
- Alternative 2 – investment in alternative transport modes
- Alternative 3 – demand management
- Alternative 4 – the 'Do nothing'/'Do minimum' case
- Alternative 5 – development of the M4-M5 Link.

These alternatives are described in more detail in section 4.4.1 to section 4.4.5 of the EIS. The need for investment in transport infrastructure in NSW, including the WestConnex program of works, has been established by the NSW Government at a strategic level in state planning and policy documents (see **section C3.1.1**). The WestConnex Updated Strategic Business Case 2015 was prepared to assess the viability of the WestConnex program of works as part of a broader integrated transport and land use solution for NSW. Subsequent EISs for each stage of the WestConnex program of works, including the EIS for the M4-M5 Link, have therefore carried out an assessment of strategic alternatives in consideration of the established strategic transport and land use policy context and the recognised need for the WestConnex program of works as set out in the WestConnex Updated Strategic Business Case 2015.

The *State Infrastructure Strategy* states that, based on the economic and demographic forecasts, public transport is expected to experience strong growth, particularly around the Sydney CBD and other business centres. The Strategy also notes that the key challenges facing urban public transport relate to the following:

- The ability of the existing public transport network to serve a growing population while providing the mobility and connectivity necessary to sustain economic growth and productivity
- Improving access to the Sydney CBD
- Supporting growth in Sydney's emerging centres
- Optimising the performance of the existing public transport network
- Building future network capacity that keeps pace with demand and meets the needs of businesses and households.

While the use of public transport is expected to grow with the implementation of key public transport initiatives, most growth in transport demand over the next 20 years will continue to be met by roads. This is because public transport is best suited to providing concentrated, high volume flows of people to and from established centres. It is less suited to providing dispersed cross-city or local trips.

In 2014, around 17.6 million trips were made each average weekday in Sydney, with around 75 per cent of these by road. To meet this demand, the NSW Government has been investigating and investing in public transport, including committing more than $400 million in the NSW 2016-2017 budget to plan, develop and deliver enhancements to increase and improve rail services. Sydney Metro West is one of the key rail projects in the early planning phase, which would be a largely underground railway line between Sydney CBD and Parramatta. However, even with significant investment and high levels of patronage growth forecast for Sydney's public transport network, about 72 per cent of around 27.5 million journeys in 2031 are expected to be made on the road network each weekday by private vehicles, equal to an additional 4.3 million new trips compared to 2014 (Infrastructure NSW 2014).

Not all trips in Sydney can be undertaken by public transport as customer needs are diverse, often requiring travel over long distances or dispersed across multiple destinations. With about 60 per cent of employment dispersed across the Sydney metropolitan area, public transport alone cannot viably serve most of these locations. Even under the most ambitious scenarios for land use change and growth in public transport, the absolute number of car journeys will continue to increase (SMC 2015a). Public transport improvements alone are therefore not a viable alternative to meeting the project objectives. Investment in integrated transport solutions that involve both roads and public transport is needed to cater for the concentrated population growth forecasts and associated increase in travel movements.

Employment growth in the Sydney metropolitan area is expected to increase in keeping with a growing population. While Sydney has an extensive public transport network (with rail being the most popular mode used to access the Sydney CBD), the LoS can vary significantly. A key constraint to the expansion and development of the rail network is Sydney's geography, with large parts of the Sydney metropolitan area, such as outer western Sydney and the Northern Beaches region, being relatively poorly connected by public transport to Sydney's global employment centres. As major rail projects have a long lead time, the focus in the shorter term is to improve public transport services through the bus network, such as bus priority programs and bus rapid transit.

Beyond the movement of people between places, roads serve an important role in moving freight between the source and end markets, including the intermediary destinations in the supply chain. These sources, intermediary locations and end markets are geographically dispersed across the Sydney basin. As a result, Sydney's freight, commercial and services tasks require more diverse and dispersed point-to-point transport connections that can only be provided by the road network.

This does not mean that there is not an opportunity to significantly increase the share of freight being moved by rail and the NSW Government has invested in projects to support the overall growth in the freight task. However, investment in freight rail alone is unlikely to result in all freight being able to be moved by rail as there will still need to be deliveries of good and services to receiving destinations in the community. As such, the capacity and reach of the motorway and arterial road network needs to be increased to accommodate this growth.

The M4-M5 Link, as a component of the WestConnex program of works, supports a coordinated approach to the management of freight and passenger movements. It is complementary to other projects, across all modes of transport including road, rail, bus, ferries, light rail, cycling and walking, which are being invested in as part of the NSW Government's $41.5 billion (2016–2017 NSW Budget) investment in transport projects over the next four years. However, there are no feasible strategic public transport or freight alternatives to the project that, on their own, would meet the diverse range of needs for people and freight travel in the Sydney metropolitan area as identified in the *Draft Future Transport Strategy 2056* and in which the M4-M5 Link is identified as a key component.

B11.4.2 Preference for public transport

Part 3, p19, Part 3, p20

At a strategic level, Council's preference for public transport is in part based on the air quality benefits that accrue from public transport over motorways. Council accepts that due to technological advances per-vehicle emissions have declined in recent years, but remains concerned about additional traffic generated by WestConnex negating technology-related air quality reductions.

Part 3, p19

Council continues to argue that high-occupancy public transport coupled with transit-oriented development is the most effective way to achieve travel emission reductions on a per- passenger-kilometre basis. It is acknowledged that currently a proportion of the electricity generated for public transport is from non-renewable sources, but it should be a national and State goal for the longer-term that public transport be powered from renewable sources.

Part 3, p20

Council continues to argue that high-occupancy public transport coupled with transit-oriented development is the best way to achieve per-capita emission reductions. It is acknowledged that currently a proportion of the electricity generated for public transport is from coal-fired power stations, but the goal for the longer-term should be that public transport is powered by renewables.

Response

The transport network in Sydney is expected to be placed under increasing pressure over the next 20 years due to the forecast increase in Sydney's population and associated increases in traffic and public transport demand. The WestConnex program of works is one part of a broader solution to these emerging pressures. Further discussion is provided in **section B11.3.2**.

As described in **section B11.4.1**, public transport would not provide for all of the mobility needs of commercial and freight transport which will increase in proportion to the growing population. The *Draft Greater Sydney Services and Infrastructure Plan* (NSW Government 2017) is aiming to move more trips to public transport and to reduce overall transport emissions. However, this policy also acknowledges the important role of the strategic road network in supporting public transport, private vehicles and freight, and the WestConnex program of works.

The potential for public transport to reduce local emissions is outside the scope of the EIS as defined by the SEARs and has not been assessed in the EIS.

B11.4.3 Consideration of alternate designs

Part 9, p 65

The EIS has not seriously considered alternative designs that would reduce the project's adverse impacts on residents. There is concern that all stages of WestConnex will continue to reduce local connectivity and reduced ability for some to participate in community activities.

Response

The assessment of alternatives to the project was undertaken in accordance with the SEARs and the relevant provisions of Schedule 2 of the Environmental Planning and Assessment Regulation 2000 (NSW) as discussed in Chapter 4 (Project development and alternatives) of the EIS. This includes a description of options within the project and how these were analysed to inform the selection of the concept design.

The EIS is based on a concept design, which would be finalised during detail design. This includes the implementation of opportunities to minimise impacts on the community, environment and climate change as identified in the environmental management measures presented in **Chapter E1** (Environmental management measures). The environmental management measures include consideration of opportunities to improve community connectivity in areas affected as well as community and social facilities which will be delivered or enhanced by the project as part of the Social Infrastructure Plan as per environmental management measure OSE8.

Multiple community and stakeholder consultation sessions were also held for the M4-M5 Link project prior to and during preparation of the concept design report and EIS, and throughout the submissions report process for the project. A detailed summary of community and stakeholder consultation undertaken for the project is included in Chapter 7 (Consultation) of the EIS.

In response to this feedback, the M4-M5 Link project has been designed to address the issues raised during the two other stages of WestConnex, and management measures have been identified to manage potential construction impacts, as below:

- The majority of the project, including the Rozelle interchange, is located below ground to minimise surface property acquisition and disturbance

- Where possible, areas that are within the project footprint of the M4 East and New M5 projects and government owned properties, such as at the Rozelle Rail Yards and Darley Road civil and tunnel site would be used
- A heavy vehicle truck marshalling facility would be provided at the White Bay civil site at Rozelle, which would cater for around 40 heavy vehicles and stage the release of trucks to the tunnelling sites to manage the arrival of trucks to construction ancillary facilities (see **Chapter D2** (White Bay civil site (C11)))
- A suitably qualified and experienced Acoustics Advisor will be appointed, who is independent of the design and construction personnel, and who will be engaged for the duration of construction of the project (see environmental management measure NV1 in **Chapter E1** (Environmental management measures))
- The M4 East and New M5 tunnels will be used for spoil haulage when they become available and where practicable, to minimise heavy vehicle movements on the surface road network
- Consideration of receivers that qualify for assessment for at receiver treatment due to predicted operational noise that are also predicted to experience significant exceedances of noise management levels due to construction, will be given priority preference for assessment for treatment based on the severity and timing of impact. Where the building owner accepts the at receiver treatment proposal, the treatments will be installed as soon as possible (see environmental management measure NV9 in **Chapter E1** (Environmental management measures)).

The project would generally improve the amenity and liveability of local communities through the reduction in surface traffic and significant improvements to north-south and east-west active transport links (see **section B11.8.25**), particularly around Rozelle, Lilyfield and Annandale and their adjoining suburbs. This would include a substantial increase in local open space at Rozelle (up to 10 hectares) as a result of the design of the Rozelle interchange being predominantly underground. This would improve the general amenity and safety of the existing pedestrian link along Victoria Road, which provides a walkable local connection to the retail area of Rozelle village. The reduction in traffic passing Darling Street on Victoria Road has the potential to increase the amenity and attractiveness of Rozelle village for pedestrians. This, combined with retaining the existing pedestrian connectivity across Victoria Road at Toelle and Terry streets, means that the general walkability in this area is likely to improve upon operation of the project

As outlined in **section A2.4**, SMC and Roads and Maritime will continue to provide consultation opportunities for the community and key stakeholders during the ongoing refinement of the design and during construction, with a view to further minimising impacts of the project on communities.

B11.4.4 Darley Road motorway operations complex (MOC1)

A further concern about the Darley Road site is that contrary to previous indications, a substantial portion of the site will not be returned to the community, but will become permanent tunnel support infrastructure. Given the proximity and density of residential development around the site it is important that the extent and environmental impact of this infrastructure be minimised.

Response

The site for the Darley Road motorway operation complex (MOC1) is owned by the NSW Government.

The indicative siting of operational project infrastructure has been developed in consideration of maximising areas of land that would be available for potential future development (remaining project land). An indicative site layout of operational project infrastructure at the Darley Road civil and tunnel site (C4) has been developed, and is provided in Figure 5-44 in section 5.8.1 of the EIS. This has primarily been achieved by optimising the design to co-locate facilities, therefore reducing land take. The siting of the operational project infrastructure at the western end of the site also allows for the remaining project land component to be located nearest to the Leichhardt North light rail stop. Future development would be determined by Roads and Maritime, and would be subject to separate development assessment and approval and the restrictions of the relevant consent authority. The project would not rezone or consolidate remaining project land and therefore there would be no permanent changes to land use zoning for future development. Land not required for operational infrastructure at the Darley Road site would become remaining project land and a Residual Land Management Plan (RLMP) which would be prepared in consultation with relevant councils and other

key stakeholders in accordance with environmental management measure PL3 detailed in **Chapter E1** (Environmental management measures).

B11.4.5 Pyrmont Bridge Road tunnel site (C9)

Part 4, p42

Council has concerns about the Pyrmont Bridge construction site, and seeks to have the site returned to a 'biomedical hub' use post-construction.

The Pyrmont Bridge Road tunnel site is proposed to be located between Parramatta Road and Pyrmont Bridge Road at Annandale. Like Darley Road, it is a 'mid-tunnel construction dive-site'. It would be established on land currently occupied by commercial and light industrial businesses, which are being compulsorily acquired. No permanent facilities would remain after the site had been used for Stage 3 construction. The site would be returned to a form of commercial use compatible with its location within the 'biomedical hub' precinct as identified by the NSW Government's *Parramatta Road Urban Transformation Strategy*. Though Council remains opposed to all Stage 3 dive-sites, it supports the return of the site to an appropriate 'biomedical hub' use.

Response

No operational infrastructure is proposed at the Pyrmont Bridge Road tunnel site (C9). Following construction, the Pyrmont Bridge Road tunnel site (C9) would be rehabilitated. Future development would be determined by Roads and Maritime in accordance with the RLMP that will be prepared for the project, and would be subject to separate development assessment and approval and the restrictions of the relevant consent authority. When considering potential reuse opportunities for this land, Roads and Maritime would have regard to the current land use zoning and development controls and the objectives of the *Parramatta Road Corridor Urban Transformation Strategy* (UrbanGrowth NSW 2016). Refer to section 12.4.6 of the EIS for further information.

B11.4.6 Consideration of international best practice transport plans

Part 5, p66

Consider examples of international best-practice transport plans that promote social well-being.

Comparing an alternative international transport systems and plans can offer a valuable means of evaluating the objectives and impacts of WestConnex against other plans/projects. An example of an alternative transportation strategy which is based upon different principles to those underpinning WestConnex is the City of Vancouver's 2013 *Transportation 2040* plan.

The primary long-term goals of *Transportation 2040* are to increase the mode share of travel by walking, cycling and public transport to at least two-thirds of all trips (from approximately 44% today) and to work toward zero traffic-related deaths. *Transportation 2040* emphasises the importance of public space, parks and reserves – so that people can gather, interact, exercise and enjoy themselves. Significantly it links transportation not just to mobility, but to public health, safety, accessibility, vibrant and resilient communities, and environmental well- being.

In contrast to WestConnex, *Transportation 2040* embraces a number of goals that promote the 'three pillars of sustainability'. Together they support an economically, environmentally, and socially sustainable city. These goals are considered to be interdependent. Targets play an integral part in realising the goals of Transportation 2040. For example, by 2040 the goal is that at least two-thirds of all trips to or within Vancouver made on foot, bicycle or transit on public transport. The plan is dedicated to increasing the total number of trips made by sustainable transport while decreasing the trips made by motor vehicles.

Transportation 2040 also addresses the 21st Century challenge of rising fuel prices. In this regard, the plan notes that fossil fuel prices have increased significantly in the past decade and will continue to rise as global oil production peaks. By prioritising sustainable transport options, Transportation 2040 aims to reduce oil dependency which in turn is expected to help residents and the economy survive (and even flourish) in a post-carbon world.

The second 21st Century challenge addressed is climate change, which is already having impacts around the world. Conditions will continue to deteriorate unless greenhouse gas emissions are substantially reduced. In Vancouver, vehicles contribute to over 30% of greenhouse gas emissions. Transportation 2040 prioritises transportation choices that don't use fossil fuels, or which use them more efficiently.

Vancouver's *Transportation 2040* is committed to increasing the total number of trips made by sustainable transport while decreasing trips made by motor vehicles. Furthermore Transportation 2040 links transportation not just to mobility, but to public health, safety, accessibility, vibrant and resilient communities, and environmental well-being. WestConnex however does not establish these links. *Transportation 2040* demonstrates that an effective social, economic and environmental plan is achievable, notwithstanding the challenges of 21st century social life.

Response

The Inner West Council's summary of the City of Vancouver's *Transportation 2040* plan is noted. The WestConnex program of works is one part of a broader solution to Sydney's congestion, which together form part of the NSW Government's integrated and multi-modal response to the transport challenges of Sydney. On this basis the comparison made by the Inner West Council is not considered valid to the assessment in the EIS.

The assessment of project alternatives was undertaken in accordance with the SEARs and the relevant provisions of Schedule 2 of the Environmental Planning and Assessment Regulation 2000 (NSW) as discussed in Chapter 4 (Project development and alternatives) of the EIS. The SEARs for the project required that the EIS contain an analysis of the feasible alternatives to the carrying out of the project, including the analysis of the alternatives/options considered, having regard to the project objectives. The merits of the M4-M5 Link were considered in the context of a range of other alternatives, based on the extent to which they could meet the project objectives (refer to Chapter 3 (Strategic context and project need) of the EIS) and how well they performed with reference to other transport, environmental, engineering, social and economic factors. The alternatives assessed are described in more detail in section 4.4.1 to section 4.4.5 of the EIS.

As noted in **section B11.4.1**, the M4-M5 Link, as a component of the WestConnex program of works, supports a coordinated approach to the management of freight and passenger movements. It is complementary to other projects, across all modes of transport including road, rail, bus, ferries, light rail, cycling and walking, which are being invested in as part of the NSW Government's $41.5 billion (2016–2017 NSW Budget) investment in transport projects over the next four years. However, there are no feasible strategic public transport or freight alternatives to the project that, on their own, would meet the diverse range of needs for people and freight travel in the Sydney metropolitan area which the M4-M5 Link is contributing to achieving.

B11.4.7 Opposition to mid-tunnel construction dive sites

Part 4, p28

Opposition to all Stage 3 mid-tunnel construction dive-sites and preference for no [tunnel] dive-sites or a potentially lower-impact alternatives at the western end of the RRY site

Response

The requirement for, and location of, construction ancillary facilities, including tunnel dive sites, is discussed in section 4.6.2 of the EIS. Table 4-7 of the EIS also identifies alternative construction ancillary facility options that were investigated but do not form part of the project.

The Darley Road civil and tunnel site (C4) and Pyrmont Bridge Road tunnel site (C9) are required to support tunnelling construction activities. These sites would act as mid-tunnel sites, providing for tunnel construction from an approximate half-way point along the tunnel alignment. The use of mid-tunnel sites at Darley Road and Pyrmont Bridge Road assists in minimising the total duration of construction (and associated amenity impacts) by enabling tunnelling to occur from both the ends and the middle sections of the mainline tunnel alignment.

B11.5 Project description

Refer to Chapter 5 (Project description) of the EIS for the project description.

B11.5.1 Active transport along Victoria Road

There is a need for separated bicycle lanes along Victoria Road at Rozelle and clarification of plans for the existing walk/cycle bridge over Victoria Road.

Regarding the impact of pedestrian and cycling routes along Victoria Road at Rozelle, there appears to be a difference between the EIS's active transport strategy and other parts of the EIS. The active transport strategy refers to a separated cycleway along Victoria Road while EIS plans don't appear to indicate one. Further, the plans don't appear to indicate any public domain improvements along Victoria Road. From the EIS it is also unclear whether the walk/cycle bridge over Victoria Road near Lilyfield Road will remain. Removal of this bridge has a number of implications, including maintenance of pedestrian access to the White Bay bus stop.

Response

The active transport links proposed to be delivered by the M4-M5 Link are outlined in Table 13-10 of Chapter 13 (Urban design and visual amenity) of the EIS and in section 4.0 of Appendix N (Technical working paper: Active transport strategy) of the EIS.

The existing pedestrian and cyclist overpass over Victoria Road, near Lilyfield Road, would be removed during construction. Prior to the removal of this bridge, alternative east-west access for pedestrians and cyclists would be provided below Victoria Road via an underpass. This underpass would connect Lilyfield Road and the western side of Victoria Road to the existing pedestrian and cyclist path that continues over the Anzac Bridge, as well as to the eastern side of Victoria Road. This underpass would be subsequently adapted to form the new permanent east-west connection below Lilyfield Road. Pedestrian access to the White Bay bus stop would be maintained for the duration of construction and during operation.

Upgrades to the pedestrian and cycling routes along Victoria Road as part of the Iron Cove Link surface works would include realignment and improvements to a section of the shared pedestrian and cyclist path between around Springside Street and the Bay Run connection to Iron Cove Bridge, on the southern side of the westbound carriageway of Victoria Road. These upgrades are described consistently throughout the EIS including in Appendix N (Technical working paper: Active transport strategy) of the EIS.

Proposed upgrades to the pedestrian and cycle path associated with the Iron Cove Link surface works would provide the opportunity for future integration with a separated cycle way proposed to be developed by Inner West Council, which would connect the intersection of Robert Street up and over Victoria Road to the intersection of Springside Street. This would provide a link to the upgrades to the pedestrian and cycling routes proposed to be undertaken by the M4-M5 Link (as part of the Rozelle interchange works and Iron Cove Link surface works, discussed above), however would not form part of the project.

Table 13-10 and Table 13-15 of the EIS summarise proposed active transport connectivity for the project around the Rozelle interchange and Iron Cove Link respectively. Table 13-10 and Table 13-15 also identify complementary active transport connections around these areas that would be delivered separately by others, subject to environmental assessment. As discussed in section 13.5.4 of the EIS and section 6.2 of Appendix L (Technical working paper: Urban design) of the EIS, urban renewal along Victoria Road has been identified as a potential future opportunity facilitated by the M4-M5 Link due to the forecast reduction in traffic along Victoria Road between Iron Cove Bridge and The Crescent. However, these future opportunities are outside the scope of the project. Community input through the development of the relevant Urban Design and Landscape Plan (UDLP) would be central to determining the ultimate future uses of remaining project land on Victoria Road.

B11.5.2 Motorway support facilities in the Rozelle Rail Yards

Part 10, p 71

There is a need to minimise the number and extent of motorway support facilities in the RRY recreation area.

Council is disappointed at the number and extent of motorway support facilities planned for the RRY site. This was not so apparent in the Concept Design, but the EIS shows that these facilities would occupy a fair proportion of the site, break up useable areas and create a sense of clutter. With careful design and consolidation of these facilities, it should be possible to accommodate these facilities without hindering free movement open vistas around the site.

Similarly, mounding of turfed areas to accommodate motorway portals should be minimised. Mounding could isolate playing fields, and when combined with the barrier of City West Link Road could enclose playing fields on three sides. This is a further reason why improving physical and visual links to the many streets in Lilyfield to the north is important.

Response

A significant amount of motorway operational infrastructure is required in the vicinity of the Rozelle interchange. The decision to locate the proposed infrastructure within the Rozelle Rail Yards was made to make use of the disused government-owned land and reduce the requirement to acquire land elsewhere. The location of the Rozelle Rail Yards is also strategically advantageous in that it allows for connections between the tunnels and key arterial roads including City West Link and Anzac Bridge, as well as the proposed future Western Harbour Tunnel.

In addition to the motorway operational infrastructure, the project has committed to delivering up to 10 hectares of open space at the Rozelle Rail Yards. The concept design for the Rozelle Rail Yards presented in the EIS is based on the key strategies presented in section 5.1.3 of Appendix L (Technical working paper: Urban design) of the EIS, including the integration of active transport links that integrates with existing and future connections. Elements such as the water treatment facility and ventilation facilities would be co-located within the landscape to offer more functional space to the community.

The motorway operational infrastructure at Rozelle Rail Yards would be designed to satisfy functional requirements and adopt the design principles detailed in the M4-M5 Link Technical working paper: Urban design (refer to Appendix L (Technical working paper: Urban design) of the EIS). These include cross scale connection of spaces to prioritise both locally and regionally significant connections, integrating the motorway within its context by understanding the existing landscape and using landscape features such as changes in topography to disguise the motorway, whilst responding in an adaptive manner that considers holistically how a diversity of users would experience the space. The proposed designs will be documented in the relevant UDLPs for the project, which will be prepared in consultation with key stakeholders including relevant councils and the community.

B11.6 Construction work

Refer to Chapter 6 (Construction work) of the EIS for the details regarding construction for the project.

B11.6.1 Range of construction impacts

Part 4, p28

This section relates to EIS Chapter 6: Construction work. It also relates to Issues 2 to 6 in Council's submission on the Stage 3 Concept Design, which are in summary:

- Concerns about the full range of construction impacts – including truck traffic, employee parking, construction noise and dust – around all Stage 3 construction sites
- Particular concerns about construction impacts from mid-tunnel construction dive-sites – concerns about noise, dust and traffic impacts from such sites proposed for Darley Road, Leichhardt and Bridge Road / Parramatta Road, Annandale
- Opposition to all Stage 3 mid-tunnel construction dive-sites and preference for no dive- sites or a potentially lower-impact alternatives at the western end of the RRY site

- Concerns about continuation of construction impacts at Haberfield - resulting in a prolonged extension of construction impacts – an important issue as Haberfield residents have already endured significant impacts from the construction of Stage 1
- Concerns about construction traffic, particularly large numbers of construction trucks using local streets for stabling and travelling along local roads – with resulting noise, safety, parking and amenity impacts.

Response

The issues raised are addressed in the following sections:

- Construction impacts at mid-tunnel dive sites are discussed in **section B11.6.9**
- Construction noise and vibration impacts are discussed in **section B11.9**
- Dust and airborne contaminants are discussed in **section B11.9.14**
- Longer duration construction impacts at Haberfield is discussed in **section B11.11.3**
- Construction traffic and transport impacts, including workforce parking are discussed in **section B11.8**.

B11.6.2 Construction staging

Part 4, p28

Council's main concern with the two-stage construction of Stage 3 is that this should not increase or extend construction or operational impacts on residents.

Council is concerned about the number, variety and staging of Stage 3 construction activities across multiple sites.

As has been the case for Stages 1 and 2, a range of construction facilities will be established and activities undertaken at and around all Stage 3 worksites. Sites that support the construction of the mainline tunnels would be located throughout Haberfield/Ashfield, Leichhardt, Annandale and St Peters. Sites that support the construction of the Rozelle Interchange would be located throughout Lilyfield, Annandale and Rozelle.

All of these construction sites are within the Inner West Council area, with the exception of the Campbell Road site, which is located within both the Inner West and City of Sydney council areas. It is also noted that the Annandale/Camperdown and Rozelle/Lilyfield/Annandale sites are close to Council's border with the City of Sydney.

Construction impacts will be felt across a large part of the Inner West. There will be a range of individual and cumulative impacts from the wide range of construction facilities and activities proposed. Whilst most of the facilities would be temporary, some would be permanent - raising further concerns about on-going, longer-term impacts.

It is noted from the EIS that temporary facilities and activities include: site offices; staff and workforce amenities; workshop maintenance; tunnel launch & support; tunnel spoil management; civil & surface works; construction water treatment plant; sedimentation pond; temporary ventilation plant; temporary substation; and parking. Permanent facilities and activities include: ventilation facility; fresh air supply facility; substation; motorway operations complex(es); workshop facilities and bulky equipment store; operational water treatment facility; fire pump room & water tanks.

Council notes from the EIS WestConnex Stage 3 is proposed to be constructed in two stages: Stage 3(a) – construction of the mainline tunnel from Haberfield/Ashfield to St Peters to start in 2018 and be open to traffic in 2022; and Stage 3(b) – construction of the Rozelle Interchange and Iron Cove Link to start in late 2018 and be open to traffic in 2023. The EIS states that building the project in two stages will allow for the Stage 3(a) mainline tunnels to operate independently (initially with two lanes in each direction) prior to the completion of Stage 3(b). Council's main concern with the two-stage construction of Stage 3 is that this does not increase or extend construction or operational impacts on residents.

As a result of Stage 3 being constructed in two parts, the length of the construction period and commencement/conclusion times of the sites will vary. For sites at Haberfield/Ashfield (both options), Darley Road, Annandale/Camperdown, St Peters, The Crescent and Victoria Road, works would be undertaken within the period mid-late 2018 and end of 2022. At the Rozelle and Iron Cove Link sites, works would commence in late 2018, but would not be completed until the second half of 2023.

The EIS states that construction activities for the mainline tunnels Rozelle Interchange and Iron Cove Link include: site and construction support facilities establishment; utility works and connections; tunnel construction; portal construction; construction of permanent operational facilities; mechanical and electrical fit-out works; establishment of tolling facilities; site rehabilitation and landscaping; surface road works; demobilisation and rehabilitation; and testing and commissioning.

Construction activities for the include: site and construction support facilities establishment; utility works and connections; tunnel construction; portal construction; construction of surface road works; construction of permanent operational facilities; mechanical and electrical fit-out works; establishment of tolling facilities; site rehabilitation and landscaping; demobilisation and rehabilitation; and testing and commissioning.

It is proposed that tunnelling would involve road headers excavating the two mainline tunnels (each 7.5km), and tunnels for the Rozelle Interchange and Iron Cove Link. Tunnel depths would range from 65m below the surface, with shallower sections of 10-20m below the surface at sub-surface interchange areas and approaching portals. Tunnelling would most likely be undertaken in section, with excavated material (spoil) brought to the surface and loaded into trucks to be taken to disposal sites.

After tunnel excavation is complete, finishing works would begin. These include installation of stormwater and groundwater drainage, pavement construction, line-marking, painting, and installation of electrical pipes, road signage, street lighting and electrical panels. Finally, tunnels would be fitted out with operational infrastructure, including power, lighting, ventilation, fire safety measures, tolling facilities and traffic controls.

Response

The rationale for constructing and opening the project in stages is provided in section 4.3.2 of the EIS and is based on the following considerations:

- Opening the mainline tunnels to traffic earlier than the remainder of the project would assist in easing congestion along Parramatta Road and provide connectivity with the other WestConnex projects as early as possible
- Allowing more time to resolve the design and construction issues associated with the Rozelle interchange
- Dividing the works into two construction contracts, making the scope of the project more manageable for delivery.

Longer duration construction impacts are expected where the project connects to the M4 East and New M5 projects at Haberfield/Ashfield and St Peters respectively. Further information regarding ongoing construction impacts at Haberfield and St Peters is provided in **section B2.2.1**. Discussion of specific concerns regarding longer term impacts raised by Inner West Council in relation to longer duration construction impacts at Haberfield/Ashfield and St Peters are presented in **section B11.11.3**. Potential cumulative construction impacts with other projects are described in Chapter 26 (Cumulative impacts) of the EIS with additional information provided in **section B11.26**.

In developing construction methodologies and a construction program for the project, the aim has been to minimise the duration of the construction period while maintaining an acceptable and manageable amenity outcome for surrounding receivers as well as manageable scope of work for contractors. This has required a balance between the duration of the construction activities, with ensuring impacts on the community and environment are managed appropriately.

The various impacts of these activities during construction and operation, such as noise, traffic and dust generation, are identified in the respective chapters of the EIS. Measures to manage the impacts identified in the chapters are provided in **Chapter E1** (Environmental management measures).

B11.6.3 Baseline information and assumptions used for Haberfield/Ashfield and St Peters construction sites

Part 4, p31

Council is concerned the EIS has not updated baseline environmental information for Haberfield/Ashfield and St Peters sites, nor has it assessed the interaction between Stages 1 and 2 and Stage 3 at these sites.

The Stage 3 EIS should present Stage 1 and 2 predictions and assumptions about Haberfield/Ashfield and St Peters interchanges and surrounds against predictions and assumptions made in M4-M5 EIS. It is apparent that substantial sections of Stage 1 and 2 EISs have been copied into the Stage 3 EIS when dealing with baseline information for Haberfield/Ashfield and St Peters. As a result, the Stage 3 EIS appears to focus on the new construction areas. This makes it difficult for Council and the community to fully assess the construction impacts of Stage 3 and its interaction with Stages 1 and 2 on Haberfield/Ashfield and St Peters areas.

Response

Each of the technical disciplines which are assessed in the EIS (Chapter 8 to Chapter 25 and their corresponding technical working papers) have included an assessment of the existing environment for the subject being assessed in that chapter. This information on the existing environment, typically collected through monitoring and observation programs and historical records, is used to identify the potential impacts which are expected during construction and operation as described in the assessment methodology section of each chapter and technical working paper.

The technical studies characterise the existing environment at the time of the assessment of theM4-M5 Link project and were prepared with consideration of changes to the built and natural environment as a result of preceding WestConnex projects. Baseline environmental information from the M4 East and New M5 EISs at Haberfield and St Peters is considered to still be recent and relevant for the assessment of the M4-M5 Link project. The technical studies considered in some detail the interfaces between the M4 East around Haberfield and the New M5 around St Peters. This took into account potentially new and additional impacts at these locations, lessons learnt from the previous projects and cumulative impacts, to ensure impacts could be comprehensively avoided, managed and minimised.

Further detail regarding the overlap of other WestConnex component projects with the M4-M5 Link is described in Chapter 26 (Cumulative impacts) of the EIS. The operational integration of the M4-M5 Link with other WestConnex component projects is described in section 5.4 of the EIS.

The EIS acknowledges construction works currently being undertaken for the M4 East and New M5 projects. The lessons learnt on these projects will inform the development the CEMP and associated sub-plans for the M4-M5 Link. Further discussion of how the learnings from these projects have informed the technical studies is provided in **section B11.4.1.**

B11.6.4 Extended working hours and night works

Part 4, p31

Though all construction works have a major impact, Council is particularly keen to ensure that night-works are minimised and conditions of approval and environmental protection licenses are stringent.

The EIS states that most construction work would take place underground, with road headers generally operating 24/7. Construction of tunnel portals, support facilities and most other surface works would be undertaken during standard daytime hours. These hours are 7am-6pm Monday to Friday, 8am-1pm Saturday, with no work generally undertaken on Sundays and public holidays. Where work is required to be undertaken outside these hours, it would be carried out in accordance with conditions of approval and Environmental Protection License conditions.

The most pressing of these impacts has been noise from night-works, as residents continue to suffer health problems related to stress and sleep deprivation. The impacts have been particularly acute when night-works are undertaken over a long period without adequate respite. In most instances, residents in this position have not been offered alternative arrangements for respite such as suitable alternative accommodation, so have endured impacts over a long period, with health issues resulting.

Council is also concerned that extended working hours and night-works are being driven by RMS imperatives to keep roads open to traffic during the day and financial incentives for contractors to complete project milestones on time - without regard for impacts on residents.

Response

Construction work hours for the project have been developed based on a balanced consideration of the need to minimise noise and traffic related impacts and reducing the overall length of the construction program. For surface works the preference is to work within standard construction hours to allow for longer shifts, ease of work and reduce cost. However, tunnelling is preferable to take place over extended hours. Using standard construction hours for tunnelling would result in significant extension of project duration and as a result, prolonged amenity disturbance or additional roadheader launch sites, with associated disturbance in new areas.

The majority of surface construction would be undertaken during standard working hours. However, some construction activities would need to be undertaken outside standard construction hours (ie at night). When works outside of standard construction hours are required, these will need to be justified in accordance with the *Interim Construction Noise Guidelines* (NSW Department of Environment and Climate Change 2009). Construction works that might be undertaken outside the recommended standard hours are:

- Utility works
- Surface works to arterial roads, such as Wattle Street, City West Link, The Crescent, Anzac Bridge, Victoria Road, to minimise impacts on peak traffic flows
- The delivery of oversized plant or structures which are determined by authorities and police to be transported at a time which minimises disruption and safety concerns
- Maintenance and repair of public infrastructure where disruption to essential services and/or considerations of worker safety do not allow work within standard hours
- When emergency work is required to avoid the loss of life, damage to property or to prevent environmental harm
- Public infrastructure works that shorten the length of the project and are supported by the affected community
- Works where a justification of the need to operate outside the recommended standard hours is accepted.

Where required, the proponent will provide the relevant authority with a clear justification for the need for out-of-hours works, such as to sustain operational integrity of the road networks. An out-of-hours works protocol will be developed for the construction of the project in accordance with environmental management measure NV5 presented in **Chapter E1** (Environmental management measures).

The need for temporary diversions to be put in place during construction would be subject to design and construction contractor(s) requirements. As part of the CTAMP there are requirements for the design and construction contractor(s) to consult with impacted residents and relevant councils. The CTAMP will also be publically available and regular construction updates will be issued providing details of proposed changes to traffic conditions such as temporary diversions and the measures that are proposed to address related impacts.

Temporary diversions and/or lane closures may be required to enable construction vehicle access to be established. There may also be a need to temporarily occupy one lane of traffic during site establishment for other construction activities; however these instances would be limited and would typically occur during the non-peak periods, which may include out of hours work.

The design and construction contractor(s) would be required to obtain a road occupancy licence (ROL) from the Traffic Management Centre (TMC) for works which:

- Slows, stops or otherwise delays traffic
- Diverts traffic from its normal course along the road carriageway, including lane closures, turning restrictions, detours and diversions
- Occupies any portion of a local road that is normally available as a trafficable lane.

Road occupancy licences would be subject to the specific period of operation stated on the approved licence and any associated conditions.

As outlined in Appendix F (Utilities Management Strategy) of the EIS, a Utility Co-ordination Committee would be established to coordinate concurrent works associated with multiple overlapping projects and individual utility works to manage potential cumulative impacts and ensure that appropriate respite is provided for potentially affected residents and other sensitive receivers. The Utility Co-ordination Committee would comprise representatives from the Inner West Council and City of Sydney Council, relevant utility service providers and other major infrastructure projects occurring in proximity to the project (see **Chapter E1** (Environmental management measures)).

Longer duration construction impacts are expected where the project connects to the M4 East and New M5 projects at Haberfield/Ashfield and St Peters respectively. Chapter 26 (Cumulative impacts) of the EIS comprises a detailed cumulative impact assessment. Further information is provided in **section B11.11.3**, with regard to longer duration construction (cumulative) impacts at these locations.

B11.6.5 Coordination of utility works

Part 4, p32

Council seeks improved co-ordination of project-related utilities works to reduce cumulative construction impacts.

Experience with Stages 1 and 2 has shown that cumulative construction impacts has been a major issue for residents. These have arisen primarily from a vast range of utility relocation works necessitated by WestConnex being undertaken at the same time as project works, or during periods when residents might otherwise enjoy respite. Whilst project works are 'contestable' in that they must comply with the project's conditions of approval, the utilities works are 'non- contestable' as they are formally not part of the project.

In addition to utilities works, geotechnical investigation works for various stages of WestConnex have added to the cumulative impact problem. Although necessitated by the core project, these works are also non-contestable in that they are permitted by the NSW Roads Act are not guided by conditions of approval. There have been several instances in Haberfield/Ashfield and St Peters residents have complained about intolerable impacts from project works, utilities works and geotechnical investigation works being undertaken simultaneously.

There have been utilities and other works not at all related to WestConnex that have added to cumulative impact issues in Haberfield/Ashfield and St Peters. These have included emergency utilities works and routine utilities and Council road/footway maintenance works. For example, residents near Campbell Street at St Peters recently endured night-time impacts from emergency repairs by Sydney Water to ageing water supply infrastructure.

Though not related to WestConnex, this had a significant impact on residents already fatigued by WestConnex works.

Response

A Utilities Management Strategy was prepared as part of the EIS to address the SEARs (refer to Appendix F (Utilities Management strategy) of the EIS). The purpose of the Utilities Management Strategy is:

- To outline the main (trunk) utility works currently proposed as part of the project
- To outline the options currently being considered for the provision of construction power supply and permanent operational power supply for the project
- To outline the options currently being considered for the upgrade of existing drainage infrastructure or provision of new drainage infrastructure for the project
- To provide an overview of how the utility works, including power supply and drainage works would be carried out
- To assess the range of potential environmental impacts associated with utility works, including cumulative impacts
- To identify and assess potential impacts to existing utility assets
- To provide an environmental constraints analysis for areas outside of the project footprint where utility works, such as construction and operational power supply connections, are likely to be required

- To outline a range of mitigation measures which would be applied to minimise the potential environmental impacts
- To outline a process for how utility works that are not assessed as part of the EIS would be managed including requirements for:
  - Obtaining agreements with utility service providers
  - Effective co-ordination of utility adjustment works
  - Consideration of route options where appropriate
  - Undertaking environmental constraints analysis and risk assessment to confirm potential environmental impacts and appropriate management measures
  - Stakeholder and community consultation and notification.

As noted in section 9.5 of Appendix F (Utilities Management Strategy) of the EIS, a Utility Co-ordination Committee would be established to ensure better planning for, and co-ordination of, individual utility works and also to ensure that these utility works are co-ordinated with other works being undertaken either as part of broader M4-M5 Link project construction and/or other projects. The establishment of a Utility Co-ordination Committee has been influenced by feedback received from the Inner West Council as well as the local communities affected by WestConnex construction, in an effort to better manage and co-ordinate utility and project works.

In this way, the Utility Co-ordination Committee would assist in managing potential cumulative impacts and ensure that appropriate respite is provided for potentially affected residents and other sensitive receivers. The Utility Co-ordination Committee would comprise representatives from the Inner West Council and City of Sydney, relevant utility service providers, including Sydney Water and the other major infrastructure projects occurring in proximity to the project (see **Chapter E1** (Environmental management measures)).

B11.6.6 Compliance monitoring resources

Part 4, p 33

There is a need for the NSW Government to increase resources for compliance monitoring.

A further construction issue for Stages 1 and 2 has been lack of NSW Government compliance resources for this very large, high-impact project. Responding to advocacy by Council on this matter in early-mid 2016, DP&E has created a full-time WestConnex compliance officer position, and that officer has been working from Council offices part-time. This has been positive, but one part-time position is not sufficient, particularly as that officer will (should Stage 3 proceed) need to cover all three stages of WestConnex.

Council has also been concerned that the compliance resources within EPA have also not been adequate, and that there has not been sufficient input from other relevant agencies – particularly NSW Health – in minimising the impacts on residents described above.

Response

Compliance resourcing is a matter for DP&E and NSW EPA and is beyond the scope of the EIS.

The design and construction contractor(s) would be responsible for the implementation of the conditions of approval, overseen by the proponent (Roads and Maritime). Roads and Maritime would ensure conditions of approval are followed through by the implementation of a compliance tracking program to track and monitor compliance. The DP&E compliance team undertakes inspections to ensure projects meet the strict conditions included in their approvals. This team works closely with the community, local councils and other state and federal government agencies to investigate potential breaches and carry out enforcement where necessary. Enforcement can range from negotiating practical solutions to issuing penalty notices and, in serious cases, criminal prosecutions.

The design and construction contractor(s) will be required to obtain the required Environment Protection Licences (EPL) for the project and will be directly responsible for compliance with the conditions of the licences.

The compliance tracking program would include a program for independent environmental auditing in accordance with AS/NZS ISO 19011:2014 (*Guidelines for Auditing Management Systems*), and provide relevant procedures for reporting and rectifying incidents and any non-compliance identified.

B11.6.7 Implementation of conditions

Part 4, p34

There is a need for stronger conditions, enforcement of conditions and a willingness to implement best-practice construction management procedures.

The cumulative impact issue has been exacerbated by works that may have breached conditions of approval, such as works extending slightly beyond approved hours - or where breaches are not clear due to imprecisely-worded conditions of approval. As an example of the latter issue – it has not been clear that idling of trucks in residential streets (due primarily to lack of marshalling areas) has constituted a breach, even though this has had a major impact on residents.

There has been at times a lack of willingness by SMC and/or project contractors to undertake best practice (beyond simple compliance) and deal with residents with a spirit of generosity in addressing cumulative impact issues. Council is particularly concerned that this lack of generosity may be the result of an inadequate funding set aside to assist affected residents - for example, to voluntarily acquire properties (at a fair price) or pay for alternative accommodation where impacts become intolerable.

Response

The conditions of approval for the project are a matter for DP&E to consider during its assessment. Should the project be approved, the proponent and its contractor(s) must comply with all requirements of the conditions of approval for critical SSI. The project has also committed to a range of environmental management measures which are described in **Chapter E1** (Environmental management measures). As described in **section B11.6.6**, a compliance tracking program would be developed and implemented by the design and construction contractor(s) and would include a program for independent environmental auditing in accordance with AS/NZS ISO 19011:2014 (*Guidelines for Auditing Management Systems*), and provide relevant procedures for reporting and rectifying incidents and any non-compliance identified. Implementation of the compliance tracking program would be monitored by Roads and Maritime.

Feedback from other SMC project teams, design and construction contractor(s), and DP&E and other government agencies as relevant including NSW EPA, was sought on the M4 East and New M5 construction phases to identify lessons learnt and areas for improvements to work processes and mitigation measures to assist in developing the concept construction methodology and addressing potential construction impacts for the M4-M5 Link. Feedback and the lessons learnt from these earlier stages will also further guide the development of the detailed design.

Section B11.7.3 sets out the consultation activities that would be undertaken with communities prior to and duration construction, whilst **section B11.7.4** discusses the Inner West Council's concerns regarding the complaints handling process.

Under the *Land Acquisition (Just Terms Compensation) Act 1991* (NSW), compensation is only payable where the whole or a part of the property is acquired for the project. However, as identified in **Chapter E1** (Environmental management measures), management measures to minimise environmental impacts on residents have been proposed.

In instances where Roads and Maritime considers that the owner's hardship circumstances are significant and exceptional, Roads and Maritime may, at its discretion, consider such circumstances as warranting purchase of the property by Roads and Maritime. In such exceptional circumstances, the purchase would be based on the market value of the property with each party being responsible for its own costs of sale. The property would be valued based on an assessment of its market value, unaffected by the project.

B11.6.8 Construction ancillary facilities at Haberfield/Ashfield

An assessment is needed of Haberfield/Ashfield construction Options A and B to determine which option has the least impact on residents.

For Haberfield/Ashfield, the EIS provides two options for the location of construction sites. Option A would essentially retain Stage 1 sites Wattle Street, Haberfield and Northcote Street use by Stage 3. Option B would essentially retain Stage 1 sites Parramatta Road West and Haberfield, but would create a new site Parramatta Road East. Creation of the new site would require acquisition of a commercial property on Parramatta Road.

In general terms, Option A would result in a continuation of construction impacts in the Wattle Street / Northcote Street area in Haberfield, whilst Option B would shift the impacts to the south to the area around Walker Avenue Haberfield and around Alt Street at Haberfield and Ashfield. The EIS has not made clear whether there will be continuous use of Stage 3 exit/entry ramps along Wattle St between Parramatta Road and Ramsay Street. Continued use of these ramps would cause continued impacts for residents who have already endured significant impacts regardless of whether Option A or B is chosen.

Although both options are unsatisfactory in terms of impacts on resident, Council's preference would be for the option that results in a lower level of impacts on residents overall with special consideration to residents that have endured the greatest impacts from Stage 1 construction to date. It would appear at this stage that this could be achieved through limited surface works and use of the Wattle Street portals as the prime access for tunnel construction.

Notwithstanding, the EIS does not provide an assessment of impacts in a way that would allow a conclusion to be reached about which of the options would be preferred on the basis of the lowest impacts. It is also concerning that the proponent may choose a construction option that is some combination of Options A and B, or worse still, using all sites across both options, with no guarantee that this choice is aimed primarily at minimising impacts on residents.

The EIS is vague and it appears the proponent seeks to have all options available. A further assessment is needed that explains worst case impact scenarios of all options under consideration – including hybrid options and full use of all sites. Regardless of which option is chosen, a night-time curfew should operate, so that no tunnelling, trucking or other work occurs after 10 pm.

Response

As described in section 6.5.1 of the EIS, 12 construction ancillary facilities have been described and assessed in the EIS, including five sites as Haberfield and Ashfield:

- Wattle Street civil and tunnel site (C1a)
- Haberfield civil and tunnel site (C2a)/Haberfield civil site (C2b)
- Northcote Street civil site (C3a)
- Parramatta Road West civil and tunnel site (C1b)
- Parramatta Road East civil site (C3b).

The EIS noted that the number, location and layout of construction ancillary facilities would be finalised as part of detailed construction planning during detailed design and would consider the:

- General principles for construction outlined in section 6.1.1 of the EIS
- Environmental performance outcomes stated in the EIS and the Submissions and preferred infrastructure report
- Relevant guidelines including noise goals identified in the EIS
- Criteria for final construction site layouts and access arrangements as listed in section 6.5.1 of the EIS
- Environmental management measures as identified in **Chapter E1** (Environmental management measures)
- Relevant conditions of approval.

Based on community feedback and concerns raised in submissions on the EIS, a number of refinements to the construction ancillary facilities at Haberfield and Ashfield have been made to further minimise impacts on the community and sensitive receivers. This includes:

- Wattle Street civil and tunnel site – no surface sites therefore a lower magnitude of impacts
- Haberfield civil site – footprint reduced and site to be used as a civil site only.

The number, location and layout of construction ancillary facilities would be finalised as part of detailed construction planning during detailed design and would meet the environmental performance outcomes stated in the EIS and the Submissions and preferred infrastructure report and satisfy criteria identified in any relevant conditions of approval. Further, additional ancillary facilities may be proposed by the contractor(s), once engaged. Prior to the establishment of ancillary facilities that are not identified in this EIS, the contractor(s) would need to satisfy criteria that would be identified in any relevant conditions of approval and in accordance with an AFMP.

Issues related to longer duration impacts at Haberfield/Ashfield are discussed in **section B11.11.3** as well as in **Chapter C14** (Social and economic). Additional mitigation measures to address longer duration impacts are outlined in **Chapter E1** (Environmental management measures).

B11.6.9 Alternative to Darley Road civil and tunnel site (C4)

Part 4, p40

A further assessment is needed of alternative sites to Darley Road that result in lower impacts on residents overall.

Throughout 2016-17 Council has supported local residents and community groups in raising issues about this site and expressing opposition to the two Stage 3 mid-tunnel dive-sites – Darley Road and Pyrmont Bridge Road. Council has expressed a preference that there be no mid-tunnel dive-sites for Stage 3, recognising that if this were to be the case, all spoil would need to be removed from portals at Haberfield/Ashfield and the RRY site over a longer construction period.

Council has consequently argued that a site at the western end of the RRY site could potentially offer a lower-impact alternative to the Darley Road, Bridge Road and no dive-site options. Accordingly, in early 2017, Council commissioned independent consulting engineer James Holt to report on alternative options, and the report is at Attachment 2.

The report confirmed that the RRY site was potentially a lower-impact option compared to Darley Road, and could technically be implemented. However, the report also raised a number of queries about future use of the site, which Council had relayed to SMC in a letter at Attachment 2. Council sought further information about future use of the site, and the degree to which the light rail stabling would prevent access by project trucks. Council had referred these queries to SMC, and the response is at Attachment 2.

SMC's response has not in Council's view adequately explained why this site has not been used. Contrary to SMC's comment about access difficulties, it would appear that truck access to the RRY site has not been severed (nor likely to be severed) despite the light rail stabling area being established. Council agrees with SMC that the RRY site (western end) would involve a longer access tunnel than for the Darley Road site, but this was not seen by Council's independent engineer to be a significant disadvantage, particularly as the longer access tunnel would benefit from a gentler grade.

Part 4, p42

A further concern about the Darley Road site is that contrary to previous indications, a substantial portion of the site will not be returned to the community, but will become permanent tunnel support infrastructure. Given the proximity and density of residential development around the site it is important that the extent and environmental impact of this infrastructure be minimised.

Response

The use of mid-tunnel dive sites at Pyrmont Bridge Road and Darley Road are discussed in section 6.4.2 of the EIS, whilst table 4-7 of the EIS identifies alternative construction ancillary facility options to the Darley Road site that were investigated. These included:

- Derbyshire Road, Leichhardt
- Blackmore Park, Leichhardt
- Moore Street, Leichhardt
- City West Link, Lilyfield (note this was incorrectly identified in the EIS as an alternative to C5).

The rationale for not proceeding with the City West Link site at Lilyfield as a construction ancillary facility includes:

- A longer length of construction access tunnel would be required to reach the mainline tunnel, which would result in a longer duration and reduced efficiency of tunnelling
- Proximity to the Inner West Light Rail line, with associated complexities in tunnelling the temporary access tunnel underneath
- Access constraints, given level differences with surrounding roads and the need for heavy vehicles to enter and leave the site
- Potential for contamination given previous land uses.

During public exhibition of the EIS, submitters raised concerns about the traffic, safety and noise impacts associated with heavy vehicles using Darley Road to access the Darley Road civil and tunnel site (C4). As a result, and in accordance with section 6.5.8 of the EIS which noted that investigations into alternative access for the Darley Road civil and tunnel site (C4) were ongoing, the proponent has investigated two options of providing heavy vehicle access to/from City West Link thereby minimising the need for heavy vehicles to use Darley Road. These options would involve:

- Option 1: Conveyor and hopper option
  - Utilising land between City West Link, the light rail corridor and Charles Street to load trucks with tunnel spoil from the C4 site
  - Creating a new entry driveway to this area from the westbound carriageway of City West Link around 100 metres west of the James Street intersection. This would involve creating an opening in a section of the existing noise barrier along this side of City West Link and realigning the noise barrier accordingly
  - Tunnel spoil form the C4 site would be transferred to this area by using an enclosed elevated conveyor which crossed above the existing light rail corridor. The spoil from the conveyor would then be loaded onto trucks via a hopper
  - Loaded spoil trucks would then exit this area by turning right onto Charles Street/Canal Road and heading west before merging with westbound traffic on City West Link. This would involve creating an opening in a section of the existing noise barrier along this side of City West Link and realigning the noise barrier accordingly
  - This section of Charles Street/Canal Road would also need to be widened to separate spoil trucks from existing traffic using this road
- Option 2: One way east-west movement through the site
  - Creating a new ramp at the eastern end of the site that would allow for access via the City West Link/James Street intersection. This would involve changes to the existing intersection design to allow construction traffic to enter the site when other motorists are stopped
  - Tunnel spoil would be loaded into trucks within an acoustic shed
  - Loaded spoil trucks would exit the site directly onto Charles Street/Canal Road via a new egress point just south of the Charles Street overbridge
  - Loaded spoil trucks would then head west on Charles Street/Canal Road before merging with westbound traffic on City West Link. This would involve creating an opening in a section of the existing noise barrier along this side of City West Link and realigning the noise barrier accordingly
  - This section of Charles Street/Canal Road would also need to be widened to separate spoil trucks from existing traffic using this road.

The investigation of these options considered a range of issues including potential impacts on traffic and safety, operation of the light rail line, pedestrian access to the light rail stop, existing vegetation, noise and visual impacts.

Option 1 was not considered to be a feasible alternative at this time for the following reasons:

- Potential safety issues involved in constructing and operating an elevated conveyor above an active light rail corridor

- Potential traffic and safety issues associated with trucks:
  - accessing this area via the new driveway entry in close proximity to the City West Link/James Street intersection
  - exiting this area and merging with existing westbound traffic on City West Link
  - interacting with existing traffic along Charles Street/Canal Road
- Potential noise and visual impacts associated with operation of an elevated conveyor and hopper system to load the trucks
- Potential impacts on the existing pedestrian access to the light rail stop on the north side of the light rail corridor
- Potential impacts on existing vegetation located in the area to the north of the light rail corridor and along the widened section of Charles Street/Canal Road
- Potential impacts on maintenance access to the light rail corridor, which is currently provided via an existing access point from Charles Street/Canal Road and which would conflict with the proposed truck loading area.

Option 2 was not considered to be a feasible alternative at this time for the following reasons:

- Potential traffic and safety issues associated with:
  - Modifying the City West Link/James Street intersection to allow trucks to enter at the eastern end of the site
  - Trucks merging with existing westbound traffic on City West Link
  - Trucks interacting with existing traffic along Charles Street/Canal Road
- Constructability constraints associated with building a ramp into the site from the eastern end, including achieving the appropriate grades and avoiding conflict with the adjacent Leichhardt North light rail stop and associated infrastructure and the proposed construction access tunnel
- Potential impacts on access to the pedestrian walkway and lift that connect pedestrians to the Leichhardt North light rail stop near the City West Link/James Street intersection
- Potential impacts on existing vegetation along the widened section of Charles Street/Canal Road

Darley Road is an arterial Road. Based on traffic counts carried out for SMC in October 2017, Darley Road carries around 16,000 average two-way vehicle movements per day. Around 10 per cent of this traffic is heavy vehicles (around 1,600 average two-way heavy vehicle movements per day). The EIS has predicted that the Darley Road civil and tunnel site (C4) would generate around seven trucks (14 movements) per hour and a total of around 100 trucks (200 movements) per day. This represents only a minimal increase in the context of existing traffic volumes on the road (around a one per cent increase in average two-way daily vehicle movements).

In recognition of the proximity of the Darley Road civil and tunnel site to an existing residential area, the EIS has proposed that spoil haulage to/from the Darley Road civil and tunnel site would be restricted to standard construction hours. Also, in response to concerns raised by submitters it is proposed to remove the proposed right turn movement from City West Link eastbound into James Street for heavy vehicles. All heavy vehicle construction traffic would now use a left turn movement from City West Link westbound into James Street. During detailed design the access arrangements to the Darley Road civil and tunnel site would be reviewed to minimise impact on existing on-street car parking and existing pedestrian access along and across Darley Road. Spoil haulage from Darley Road civil and tunnel site (C4) is discussed further in **section B11.23.1**.

Prior to construction, a CTAMP will be developed and implemented to manage the movement of vehicles to and from project sites and to ensure that vehicle movements are conducted in a manner that minimises impacts on local amenity, traffic flows and road safety. This would include a review of access arrangements to the Darley Road civil and tunnel site to minimise impacts on existing on-street car parking and existing pedestrian access along and across Darley Road.

Chapter E1 (Environmental management measures)) describes measures which have been designed to manage potential traffic and transport impacts resulting from the construction of the project. A truck management strategy as part of the CTAMP will be developed for the project that:

- Identifies truck marshalling areas that can be used by project-related heavy vehicles

- Describes management measures for project-related heavy vehicles to avoid queuing and site-circling in local roads and other potential traffic and access disruptions
- Describes monitoring programs to demonstrate that project-related heavy vehicles are complying with the strategy (see environmental management measure TT16 in **Chapter E1** (Environmental management measures)).

To reduce the impact of heavy vehicles queuing on local roads, an additional construction ancillary facility is proposed at White Bay on land owned by the Port Authority of NSW (see **section C8.8.1** and **Chapter D2** (White Bay civil site (C11)) for further information).

The Darley Road civil and tunnel site (C4) would be required to support tunnelling construction activities. The use of mid-tunnel sites at Darley Road and Pyrmont Bridge Road assists in minimising the total duration of construction by enabling tunnelling to occur from both the ends and the middle sections of the mainline tunnel alignment. The indicative arrangement of permanent operational infrastructure at the Darley Road site, include land that would be subject to the relevant UDLP, is described in Chapter 5 (Project description) of the EIS.

B11.6.10 Realignment of Bignell Lane

Council objects to removal of part of Bignell Lane as part of the creation of the Pyrmont Bridge Road construction site.

Response

Bignell Lane, Annandale would not be removed as part of the project. The project is proposing to permanently realign Bignell Lane between Mallett Street and Pyrmont Bridge Road at Annandale to accommodate the Pyrmont Bridge Road tunnel site (C9). The reasons for requiring this realignment is to ensure that property owners have ongoing access to properties during construction and operation (refer to section 6.5.13 of the EIS). Short term, temporary closure of Bignell Lane would be required during construction to allow for the realignment works. Rear-access to commercial properties along Bignell Lane would be maintained. Connectivity between Mallet Street and Pyrmont Bridge Road and access to adjoining properties would be maintained.

B11.6.11 Construction impacts from The Crescent civil site (C6)

Part 4, p45

For The Crescent construction site, there is a need to ensure noise, dust, pedestrian access impacts on adjacent parks, marina, bay and light rail stop are minimised.

The Crescent civil site would be established immediately adjacent to Rozelle Bay and Whites Creek and would support construction activities (including bridge reconstruction and drainage works) in and adjacent to these waterways. Project trucks would enter the site via a left turn from The Crescent southbound and exit back onto The Crescent northbound via a right-turn.

Potential issues raised for Council in relation to this site are noise and access impacts on the adjacent marina and Federal Park, inclusion of Buruwan Park within the site boundary and potential impacts; traffic impacts of construction on already-congested intersections at City West Link Road and The Crescent and Johnston Street and The Crescent, and the potential for sediment pollution of Rozelle Bay.

Response

Access to the marina and Federal Park from Chapman Road at Annandale would be maintained during construction. The shared path through Buruwan Park connecting The Crescent with Bayview Crescent at Annandale would be permanently closed. Alternative access to the Rozelle Bay light rail stop from The Crescent, Johnston Street and Bayview Crescent would be maintained at all times.

The project would require the removal of Buruwan Park to facilitate the new alignment of The Crescent, resulting in a direct loss of about 0.3 hectares of public open space at Annandale. Buruwan Park is a passive open space area that is predominantly used by pedestrians and cyclists as an active transport link through from Brenan Street and Railway Parade to Rozelle Bay and for access to the Rozelle Bay light rail stop. The park also provides a visual landscaped buffer to the elevated light rail line and the residential area of Annandale to the south-west. The park currently has poor surveillance with evidence of anti-social behaviour in the form of graffiti, with no formalised outdoor furniture and limited grassed area. The amenity of the park is compromised by its proximity to City West Link and The Crescent, which are both heavily trafficked arterial roads.

As part of the project, parts of the Rozelle Rail Yards would be developed as open space, including a constructed wetland and pedestrian and cyclist infrastructure. Open space created at the Rozelle Rail Yards would be developed and implemented in accordance with the relevant UDLP for the project. This new open space would provide the community at Rozelle, Annandale and other surrounding suburbs with increased opportunities for active and passive recreational activities. In the area around Wattle Street and Campbell Road, the project would include new open space areas in line with the M4 East and New M5 UDLPs. This new open space would provide a compensatory offset to the open space affected at Buruwan Park.

It is anticipated that construction works at The Crescent civil site (C6) would be carried out during standard construction hours. The existing noise environment in this area is heavily dominated by traffic noise on City West Link and The Crescent. As discussed in section 10.3.3 of the EIS, no residential receivers are predicted to be highly noise affected by the works. One educational facility situated near The Crescent and Johnston Street intersection may experience noise management level exceedance of one to 10 dBA. The assessment of construction noise impacts indicated that construction traffic is unlikely to result in a noticeable increase in existing noise levels at receivers along the proposed traffic routes.

Surface construction activities may disturb soils and other materials that have the potential to create dust and impact water quality if not effectively managed. The management of construction dust is discussed in **Chapter E1** (Environmental management measures).

Disturbance of Rozelle Bay during bridge construction works as part of the realignment of The Crescent may lead to disturbance of contaminated sediments and erosion of exposed banks. Construction of new stormwater outlets to Rozelle Bay may cause localised mobilisation of potentially contaminated sediments. Erosion and Sediment Control Plans (ESCPs) will be prepared for all work sites in accordance with the Blue Book. ESCPs will be implemented in advance of site disturbance and will be updated as required as the work progresses and the sites change. Further measures to manage the potential for sediment pollution at Rozelle Bay are discussed in **section B11.15.3** and in **Chapter E1** (Environmental management measures).

B11.6.12 Construction impacts at the Iron Cove Link civil site (C8)

Part 4, p46

For the Iron Cove construction site, there is a need to minimise noise and dust impacts, assess road access arrangements and minimise walk/cycle diversions.

The Iron Cove Link civil site would mainly be used to support surface works for the Iron Cove Link, including tunnel portals and modifications to Victoria Road. Temporary site facilities would include offices, workshop, storage, water treatment, substation, worker facilities and parking. Post-construction, part of the site would be permanently occupied by a motorway management and ventilation facilities.

The Victoria Road site raises concerns about noise, dust, traffic and parking impacts on densely-developed residential areas surrounding the site. Numerous single-storey dwellings on the western side would be located directly adjacent to the site, and whilst these could be protected by noise barriers, multi-storey dwellings on the eastern side of the site could not be protected in this way.

Council is also concerned that proposed temporary and permanent closures of streets between Victoria Road and King George Park would create access difficulties for residents and park users. Proposed temporary walk/cycle path diversions are a further concern given proximity of this site to the Bay Run path and the high volume of pedestrian and cyclist traffic that use footpaths along this part of Victoria Road.

Response

The Iron Cove Link civil site (C8) would be located along the southern side of Victoria Road at Rozelle between Byrnes Street and Springside Street. The site would be located on land currently occupied by Victoria Road and residential and commercial properties that are to be acquired and subsequently demolished (refer to Chapter 12 (Land use and property) of the EIS).

Traffic impacts

Heavy and light vehicles would enter and exit the Iron Cove Link civil site (C8) via a left-in, left-out access points from the westbound Victoria Road carriageway. Light vehicles would also access the site via Toelle Street. The number of heavy vehicles at this site would be limited.

As part of the Iron Cove Link surface work, modifications would be made to the intersections between Victoria Road and Clubb Street, Toelle Street and Callan Street associated with widening of Victoria Road to accommodate the Iron Cove Link tunnel portals. This would comprise:

- The intersection of Clubb Street/Victoria Road would be permanently closed before the start of construction into a permanent cul-de-sac. Residents accessing Clubb Street and people accessing King George Park would use Toelle Street or Callan Street via Manning Street from Victoria Road. The redirection of traffic to other local streets would not have a material impact on the capacity and amenity of these local streets
- The intersection of Toelle Street and Callan Street with Victoria Road would generally remain open during construction. There would be instances where one of these roads would be closed temporarily to construct the permanent design, however these works would be short term and conducted during non-peak times, where practical. When construction is complete, these intersections would be reopened in the same arrangement as existing (ie left-in, left-out).

There would be short-term closures of adjoining local streets to facilitate utility installations or adjustments. The Byrnes Street cul-de-sac would be retained but would be moved a short distance to the southwest.

Construction workforce facilities and parking

The number of construction personnel at the Iron Cove Link civil site (C8) would vary over the duration of the construction program (refer to section 6.71 of the EIS). The peak construction workforce at the site is estimated to be about 200 personnel during the day, with smaller crews generally required for works required outside standard construction hours. Due to the constrained nature of the site, only minimal car parking for construction workers would be provided at this location. Parking of construction related vehicles in adjacent local roads would be required, particularly during site establishment.

It is anticipated that additional construction workforce parking would be provided at the Northcote Street civil site (C3a), Parramatta Road East civil site (C3b), Rozelle civil and tunnel site (C5) and the Campbell Road civil and tunnel site (C10). Additional construction workforce parking associated with the Parramatta Road West civil and tunnel site (C1b), Darley Road civil and tunnel site (C4) and the Pyrmont Bridge Road tunnel site (C9) is also proposed at a new site identified since the exhibition of the EIS (see **Chapter D2** (White Bay civil site (C11))). These facilities would be used to provide worker parking and shuttle bus transfers to other nearby construction sites. The construction workforce would be encouraged to carpool, or use the public transport on Victoria Road, which is a major transport corridor with multiple bus routes.

A car parking strategy would be developed as part of the CTAMP to limit impacts on parking for the surrounding communities. The CTAMP would be developed in consultation with the Inner West Council and would include the identification of potential offsite areas that could be used for construction workforce parking that would be investigated and secured for use during construction where required and possible, and implementation of car parking management strategies on surrounding local streets (refer to section 7.3.2 of the EIS as well as environmental management measures TT04 and TT01 in **Chapter E1** (Environmental management measures)).

Active transport connectivity

The key pedestrian and cycle route near the Iron Cove Link civil site (C8) connects Iron Cove Bridge shared path (on the southern side of Victoria Road), the shared paths on either side of Victoria Road and the Bay Run south of Victoria Road, which extends around Iron Cove.

During construction, a detour route would be provided for pedestrian and cyclists on the southern side of Victoria Road via Springside, McCleer, Callan, Manning and Byrnes streets. This would represent a travel distance of about 700 metres, 400 metres longer than the existing 300 metre section along Victoria Road. This would result in longer travel time and changes of grade along the diversion route. An alternative route for pedestrians and cyclists is to use the path along the northern side of Victoria Road, which would remain open and cross under Iron Cove Bridge to access King George Park and the Bay Run. The existing signalised crossings of Victoria Road at Terry, Wellington and Darling streets would be retained, as would the existing crossing under Iron Cove Bridge.

A temporary link would be provided that would maintain the connection between the Bay Run and Iron Cove Bridge. This temporary diversion would not change the distance or travel times for users of the Bay Run and Iron Cove Bridge and would not result in additional safety impacts, and would therefore have a negligible impact.

Construction noise impacts

As discussed in section 10.3.4 of the EIS, noise exceedances are predicted at a number of residential receivers along both sides of Victoria Road during construction. Key construction activities expected to result in exceedances include:

- Site establishment, including building demolition
- Utility works
- Surface road works.

Some of these works are likely to occur during the night time period.

Construction noise impacts would be managed using measures including scheduling of works, noise reduction measures for plant and equipment and provision of respite periods for sensitive receivers. Construction contractor(s) would be required to minimise time and duration of impacts to sensitive receivers and keep them proactively informed of likely timing and impacts of noisy activities.

The assessment of construction noise impacts at the Iron Cove Link civil site (C8) identified in-situ mitigation measures that should be included in this area. This included increasing site hoardings to the height of four metres around the construction site. Site hoarding along property boundaries may not be able to be installed until after the demolition of the acquired buildings has been completed. Refer to section 10.5 of the EIS and **Chapter E1** (Environmental management measures) for additional measures proposed to manage construction noise impacts.

Longer-term activities (up to the entire duration of the project) include onsite car parking, deliveries and storage and supporting infrastructure however the predicted noise impacts from these activities are typically minor (less than 10 dBA above NML). However up to three receivers were predicted with moderate (greater than 10 dBA above NML) exceedances during night-time supporting infrastructure activities.

Chapter E1 (Environmental management measures) identify a number of management measures to reduce and manage traffic and active transport access, noise, dust and construction workforce impacts from construction sites. This includes consideration of receivers that qualify for assessment for at receiver treatment in relation to operational noise, that are also predicted to experience significant exceedances of noise management levels due to construction, will be given priority preference for assessment for treatment based on the severity and timing of impact. Where the building owner accepts the at receiver treatment proposal, the treatments will be installed as soon as possible (see environmental management measure NV9 in **Chapter E1** (Environmental management measures).

B11.6.13 Beca's assessment of construction work contained in Inner West Council submission

Part 4, p47

Beca's assessment highlights the lack of detailed information in the EIS necessary to assess construction impacts.

Beca's has raised concerns about the EIS providing only an assessment of probable construction methodologies, while retaining flexibility for the contractor to refine the construction methodology following their appointment. Little detail on construction methods is presented in the EIS it is indicative only, and will be subject to further detailed development by the design and construction contractor(s).

The EIS states these construction methodology design changes may be subject to further assessment and consultation, if required by the Environmental Planning & Assessment (EP&A) Act. The EIS presents only a loose commitment to keep stakeholders informed. As part of the public exhibition of the Submissions and Preferred Infrastructure Report advocated in Part 1 of this submission, Council requests that details of construction methods around all construction sites be publicly exhibited. These details should show how each of the issues encountered in the poor management of construction for WestConnex Stages 1 and 2 will be improved.

Beca's assessment of general construction impacts raises also concerns that the EIS provides an assessment of probable construction methodologies whilst retaining flexibility for the contractors to later refine their methodology when appointed. Construction details in the EIS are thus indicative only and the EIS states they may be subject to further assessment and consultation.

Beca is of the view that the EIS presents only a loose commitment to keep stakeholders informed. The EIS lacks detail about consultation over construction impacts and proposes organisational framework identifying who is responsible for various actions and how local residents will be consulted throughout the construction period.

Beca has a number of other comments and recommendations that are relevant to construction impacts.

Response

Specific responses to the individual issues identified in Beca's assessment are provided in **section B12**.

Construction methodology

The delivery mechanism adopted for the M4 East and New M5 projects is different to the approach for the M4-M5 Link. For the M4 East and New M5 projects, a design and construction contractor(s) was appointed early (prior to the EIS being publicly exhibited) and therefore had direct input into the design development, EIS preparation and construction planning for those projects. Community and agency feedback during the M4 East and New M5 EIS exhibition period indicated a preference for the usual approach taken for projects of allowing the community to provide input into the scope of the project through the EIS public exhibition process before the detailed design of the project was undertaken and "locked in".

After considering the community feedback on the issue, the approach of assessing a concept design has been adopted for the M4-M5 Link project. This approach presents the community and stakeholders with an opportunity to consider and provide feedback on the project before the detailed design work for construction of the project is carried out. Recent State significant infrastructure (SSI) development in NSW that has been assessed on a concept design includes M4 Widening, CBD and South East Light Rail and Sydney Metro City and Southwest.

The construction methodology described in Chapter 6 (Construction work) of the EIS is indicative only as it is based on a concept design. The construction methodology adopted by the successful design and construction contractor(s) is not anticipated to change significantly, other than potential scheduling as a result of detailed design and construction planning. The design and methodology identified by the contractor(s) will need to be consistent with the environmental management measures in **Chapter E1** (Environmental management measures), conditions of approval for the project and other requirements identified during the assessment of the project by DP&E.

If any changes to the construction methodology are required which would result in significantly different impacts to the environment and community to those assessed in the EIS they would be subject to additional assessment and potentially further approval, and public exhibition where required as part of the regulatory framework.

Stakeholder and community notifications

Section 7.6.2 of the EIS provides an overview of the expected consultation during construction of the project. Together with the proponent (Roads and Maritime), the design and construction contractor(s) would be responsible for communication and consultation with stakeholders and the community during construction. This would focus on providing updates on construction activities and program, responding to enquiries and concerns in a timely manner. A number of environmental management measures and expected conditions of approval for the project contain requirements for consultation with NSW Government agency stakeholders during preparation of environmental management plans.

The role of the community relations team would be responsible for the preparation and implementation detailed of a Community Communication Strategy, as identified in the environmental management measure SE2 in **Chapter E1** (Environmental management measures). The strategy would include details of the:

- Procedures and mechanisms that will be implemented in response to the key social impacts identified for the project
- Property acquisition support services that will be provided
- Procedures and mechanisms to communicate to project stakeholders (including affected communities), the access and connectivity enhancements and new community and social facilities that will be delivered as part of the project through the Social Infrastructure Plan and to update stakeholders on delivery progress
- Procedures and mechanisms that will be used to engage with affected business owners to identify potential access, parking, business visibility and other impacts to develop measures to address potential impacts on a case by case basis.

Notifications to the community would be supported by:

- Face-to-face meetings with landowners as needed
- Regular community updates on the progress of the construction program
- Regular updates to the WestConnex website
- Media releases and project advertising in local and metropolitan English language and non-English language newspapers to provide contact information for the project team
- Site signage around construction ancillary facilities
- The provision of a 24 hour, toll-free project information and complaints line (1800 660 248), a dedicated email address and postal address.

As outlined in **section A2.5**, SMC and Roads and Maritime will continue to consult with the community and other key stakeholders during the ongoing refinement of the design, with a view to further minimising impacts of the project on communities. Further discussion of future consultation and information dissemination with the community and other key stakeholders is presented in **section B10.7.1**.

B11.7 Consultation

Refer to Chapter 7 (Consultation) of the EIS for details of consultation.

B11.7.1 Quality of consultation

Part 7, p58

Many believe that community consultation processes for the project are cursory and not genuine.

Response

Roads and Maritime and SMC have sought to provide genuine engagement prior to the exhibition of the EIS and during development of the project design and EIS. The consultation carried out for the EIS meets the SEARs for the project.

Following the NSW Government's announcement on 21 July 2016 regarding the Rozelle interchange, a comprehensive community engagement process was carried out, with a focus on identifying new ideas and understanding community needs and values in relation to the project. The feedback from consultation activities was collated and published on the WestConnex website in a community feedback report (November 2016).

In May 2017 the M4-M5 Link concept design was released for community consultation. Although this is not a statutory requirement, the concept design was open for comment from the community for a period of 12 weeks and a feedback report summarising the submissions made by the community was made available on the WestConnex website in August 2017.

Community feedback has been considered during the planning, design development and environmental assessment for the project. Table 7-2 of the EIS outlines how feedback from stakeholders and the community was used to influence design outcomes and avoid impacts. Table 7-10 of the EIS provides a summary of feedback received up until August 2017 from the community, community groups, businesses and adjoining and affected landowners during the preparation of the EIS. The feedback in the table is consolidated for the purpose of the EIS and provides a response or indicates where in the EIS the topic has been addressed.

During the public exhibition of the EIS a variety of consultation activities were undertaken to raise awareness of the EIS and the public exhibition period, inform community members how to make a submission and respond to queries. The consultation activities undertaken during exhibition of the EIS are summarised in **section A2.3** and included community information sessions, a series of briefings and meetings, and distribution of a range of information materials. The EIS was available to view and download on the DP&E Major Projects website and hardcopies available to the public at 19 locations across the communities affected. Five community information sessions were provided as well as a number of briefings and meetings with key stakeholders and community members.

The following aspects of the project were directly influenced by community feedback:

- Easton Park, Blackmore Park and Derbyshire Road were considered but not included as potential construction ancillary facility locations
- Removal of the Camperdown ramps
- Inclusion of a truck marshalling area near White Bay
- Provisions for a Utilities Coordinator during construction
- Key active transport links in and around the Rozelle Rail Yards and Iron Cove Link to better connect the surrounding suburbs
- Spoil haulage hours for the Darley Road civil and tunnel site (C4) would be limited to standard construction hours (ie no spoil haulage would occur during the night-time).

Section A2.4 sets out the future consultation activities for the project. The approach to be adopted includes lessons learned from other WestConnex projects including feedback provided by the community.

Further discussion of the adequacy and genuineness of the consultation is presented in **section B10.7.1**.

B11.7.2 Consultation on Preferred infrastructure report

Summary, p5

Lack of detail and clarity in the EIS on key issues. The EIS states that further detail and a final design will be included in a Preferred Infrastructure Report drafted by the proponent after the EIS has been determined. It is thus imperative that the Preferred Infrastructure Report is placed on public exhibition prior to any determination to ensure Council and the community can comment on the additional assessments sought and final project designs.

Part 1

There is a lack of clarity and detail on key issues in the EIS, prompting a need for public exhibition of final details in the Preferred Infrastructure Report and management plans prior to any determination.

Council has found that despite the substantial length of the EIS, there is lack of detail and/or on several key issues that are critical to Council and the Inner West community. The EIS states that further detail and a final design will be included in a Preferred Infrastructure Report drafted by the proponent after the EIS has been determined. Council is strongly of the view that because of the flaws in the EIS and the fact that project designs are likely to change substantially, it is imperative that the Preferred Infrastructure Report be placed on public exhibition prior to any determination. This will allow Council and the community to consider the additional assessments sought and the final designs prior to a determination.

The EIS has explained that for the Stage 3, design and construction contractors would be appointed to undertake the detailed design and construction planning following determination of the application for project approval, should it be approved. This means the detail of the design and construction approach presented in this EIS is indicative only and would be subject to detailed design to be undertaken by the successful contractors.

The EIS states that the design developed by the contractors would need to be consistent with any environmental management measures, changes identified in a Submissions and Preferred Infrastructure Report, the conditions of approval for the project and other RMS EIS requirements identified during the assessment of the project.

Part 2

Requesting that the Preferred Infrastructure Report for Stage 3 be publicly released prior to any assessment or approval.

Response

Concerns regarding the level of detail contained within the EIS are addressed in **section B11.2.1**.

The EIS does not state that the preferred infrastructure report would include the final design. In accordance with section 115Z(6) of the EP&A Act, a preferred infrastructure report has been prepared for the project (see **Part D** (Preferred infrastructure report)) which explains changes or refinements that have been identified to minimise environmental impacts or to address issues raised during exhibition of the EIS. The changes addressed in the Preferred infrastructure report comprise the inclusion of the White Bay civil site (C11) to provide a heavy vehicle marshalling facility and additional construction workforce parking for light vehicles, and the relocation of the bioretention facility at Rozelle. Consultation has been undertaken with key stakeholders, including government agencies, on the nature of the proposed project changes and the potential impacts identified in the preferred infrastructure report. This Submissions and preferred infrastructure report is available on the DP&E Major Projects website[7],

Exhibition of the preferred infrastructure report for public comment is at the discretion of the NSW Minister for Planning.

As described in section 1.1 of the EIS, the concept design presented in the EIS is indicative only and would be subject to detailed design and construction planning to be undertaken by the successful contractor(s) following determination of the project application, should it be approved. The design presented by the design and construction contractor(s) would need to be consistent with any environmental management measures, changes identified in a Submissions and Preferred infrastructure report, the conditions of approval for the project and other requirements identified during the assessment of the project. Issues raised during public consultation on the EIS or in the assessment of the project by DP&E would also be taken into account during the detailed design process.

Responses to submissions received on the M4-M5 Link EIS during the public exhibition period, as well as a description of any changes to the project, is included in this Submissions and Preferred infrastructure report. This includes where there are changed and/or additional environmental impacts associated with the items in **Part D** (Preferred infrastructure report).

[7] http://majorprojects.planning.nsw.gov.au/

If further assessment/approval is required due to project design changes, the applicable statutory process will be followed prior to the commencement of construction of the relevant aspect of the project. This may be in the form of a modification request lodged with DP&E, depending on the scale of the proposed modification and the potential for environmental or social impacts.

SMC and Roads and Maritime will continue to provide consultation opportunities for the community and other key stakeholders during the ongoing refinement of the design and during construction, as outlined in **section A2.5**, with a view to further minimising impacts of the project on communities as identified in the environmental management measures (**Chapter E1** (Environmental management measures)) and conditions of approval for the project.

B11.7.3 Construction notification procedures

Part 4, p37

There is a need to improve construction notification procedures. Residents have complained about inadequate lead times between notices being issued and the commencement of works. There have been instances where residents have been notified by leaflet distribution, but the notice has not been posted on the SMC website, leading to the situation where residents express their concerns to Council about forthcoming works to be told that Council has no knowledge of the matter. Council has repeatedly advocated to SMC the importance of all notices being posted on SMC's website in a timely manner so that Council and the wider community is kept informed.

Council is well aware of the processes that have been established to co-ordinate WestConnex construction activities between councils, State agencies, SMC and project contractors. However, Council's experiences with Stages 1 and 2 show there is much room for improvement. For example, Council has received several reports from Haberfield/Ashfield and St Peters residents of inconsistent information being disseminated by SMC and its contractors and inconsistent responses to complaints. In relation to project- related roadway changes such as the closure of Ramsay Street at Haberfield, there have been reports of inaccurate signage and Sydney Buses drivers being unaware of changes.

Response

The construction of the M4 East and New M5 projects, including notification of residents and stakeholders of these works, is subject to their respective conditions of approval and EPL conditions and are beyond the scope of the M4-M5 Link EIS. However, the feedback from stakeholders on lessons learned from the M4 East and New M5 construction and the opportunities for improvement have been considered in the preparation of this project, during design and the EIS. Inner West Council's comments are noted and will be considered during construction planning as appropriate.

Community feedback on the M4 East and New M5 projects has resulted in the M4-M5 Link project including provision for a Community Complaints Commissioner during construction. This would be an independent specialist to oversee the complaints management system for the project and to follow-up on any complaint where the public is not satisfied with the response (refer to section 7.6.2 of the EIS).

As outlined in **section A2.4**, SMC and Roads and Maritime will continue to consult with the community and other key stakeholders during the ongoing refinement of the design, with a view to further minimising impacts of the project on communities. During construction of the M4-M5 Link, a dedicated community relations team will deliver:

- A detailed Community Communication Strategy (identifying relevant stakeholders, procedures for distributing information and receiving/responding to feedback, and procedures for resolving stakeholder and community complaints during construction and operation)
- Notification letters and phone calls to residents and businesses directly affected by construction works, changes to traffic arrangements and out-of-hours works
- Face-to-face meetings with landowners as needed
- Regular community updates on the progress of the construction program
- Regular updates to the WestConnex website
- Media releases and project advertising in local and metropolitan English language and non-English language newspapers to provide contact information for the project team
- Site signage around construction ancillary facilities

- 24-hour, toll-free project information and complaints line, a dedicated email address and postal address.

In addition, a number of the identified environmental management measures would require further consultation with the community and project stakeholders. These are summarised in **Chapter E1** (Environmental management measures).

B11.7.4 Complaints handling

Part 4, p33

Council seeks improved co-ordination between State agencies and improved complaints procedures in relation to construction activities.

The effectiveness of enforcement has been hampered by the fact that contestable works are enforced by DP&E (responsible for conditions of approval) whilst non-contestable works are enforced by EPA through specific licenses or generic legislation such as the NSW *Protection of the Environment Operations Act 1997*.

The splitting of these functions has meant that complaints handling has been complex and not as effective as it might have been if a single agency assumed all enforcement responsibilities. In most instances residents have not been able to distinguish between contestable and non-contestable works (nor should they be expected to) so have unwittingly not followed correct complaints procedures.

Response

Inner West Council's concerns regarding the co-ordination of utilities works and the engagement of a Utilities Coordinator is discussed in **section B11.6.5**.

A Complaints Management System will be in place for the duration of construction. This system will include the recording of complaints and how the complaint was addressed (within a Complaints Register). The system, which would be consistent with ISO 10002:2014 (*Guidelines for complaint management in organisations*) would be developed for the M4-M5 Link project and implemented prior to the commencement of construction (refer to section 5 of Appendix G (Draft Community Consultation Framework) of the EIS). The system would be maintained during construction and operation by the relevant contractor(s) and would be made available to the Secretary of DP&E.

As noted in section 7.6.2 of the EIS, a Community Complaints Commissioner, who is an independent specialist, would oversee the system and would follow-up on any complaint where the public is not satisfied with the response.

As outlined in **section A2.4**, SMC and Roads and Maritime would continue to provide consultation opportunities for the community and other key stakeholders during the ongoing refinement of the design, with a view to further minimising impacts of the project on communities.

During construction, a dedicated community relations team will deliver:

- A detailed Community Communication Strategy (identifying relevant stakeholders, procedures for distributing information and receiving/responding to feedback, and procedures for resolving stakeholder and community complaints during construction and operation)
- Notification letters and phone calls to residents and businesses directly affected by construction works, changes to traffic arrangements and out-of-hours works
- Face-to-face meetings with landowners as needed
- Regular community updates on the progress of the construction program
- Regular updates to the WestConnex website
- Media releases and project advertising in local and metropolitan English language and non-English language newspapers to provide contact information for the project team
- Site signage around construction ancillary facilities
- 24-hour, toll-free project information and complaints line, a dedicated email address and postal address.

In addition, a number of the identified environmental management measures would require further consultation with the community and project stakeholders. These are summarised in **Chapter E1** (Environmental management measures).

B11.8 Traffic and transport

Refer to Chapter 8 (Traffic and transport) and Appendix H (Technical working paper: Traffic and transport) of the EIS for details of traffic and transport.

B11.8.1 Traffic and air quality modelling are flawed

Summary, p2

The EIS's traffic and air quality modelling are flawed and based on unrealistic assumptions – for example, recent diversions of traffic away from the newly-tolled widened M4 raises concerns about the EIS's toll sensitivity analysis.

Response

The accuracy and reliability of the traffic modelling process is discussed in **section B10.8.1.**

Toll road use

The WRTM uses current best practice methods for representing drivers' behaviour with respect to their willingness to pay tolls for road travel time savings for multiple toll roads and routes through the Sydney metropolitan network. The toll choice model was developed for the WestConnex project as an augmentation of standard traffic route modelling procedures that are normally used in planning and assessment of untolled roads. The toll choice model addresses private vehicle and commercial (truck) traffic behaviour, representing the different willingness of these vehicle users to pay for travel time savings in the context of total journey costs including tolls, travel times and distances available on competing routes.

Traffic demand data used in the traffic and transport assessment was taken from the WRTM, following assessment of the model calibration and validation by independent peer reviewers and agreement that the model is suitable for this purpose. The WRTM also considers that different motorists place different values on paying tolls to make time savings, including heavy vehicle motorists.

A reference tolling regime was developed for WestConnex and is explained in the *Updated Strategic Business Case*, released in November 2015. The reference tolling regime has been used in the traffic demand modelling, revenue figures and the economic and financial analysis within the business case.

The current tolls on all tolled roads in the Sydney metropolitan area are incorporated into the model. The model also considers future changes in perceived value of tolls taking into account escalation of tolls, effects of inflation and average weekly earning projections.

The diversion of traffic from the M4 Motorway to Parramatta Road as a result of the introduction of tolls has been generally been consistent with what was forecast in the traffic and transport assessments in the EISs for the M4 Widening and M4 East projects.

B11.8.2 Noise, safety and amenity impacts from construction traffic

Summary, p6

Particular concerns about noise, safety and amenity impacts from construction truck movements and ad-hoc stabling of trucks on streets.

Part 4, p28

Concerns about large numbers of construction trucks using local streets for stabling and travelling along local roads – with resulting noise, safety, parking and amenity impacts.

Response

Some use of local roads by heavy vehicles delivering materials and/or equipment may be required, however, this would be minimised where possible. An assessment of the potential construction impacts on local roads has been presented for each of the construction ancillary facilities in chapter 7 of Appendix H (Technical working paper: Traffic and Transport). In summary, this assessment identified that impacts to local roads for the following sites would be expected to be due to light vehicles only at:

- Walker Avenue
- Wolseley Street
- Alt Street
- Bland Street
- Darley Road
- Lilyfield Road
- Hornsey Street, which includes the removal of approximately four on-street parking spaces.

Temporary changes to the local road network would be required for works associated with the Iron Cove Link civil site (C8). Permanent changes, including the loss of a limited number of on-street parking spaces are also expected and would be confirmed following the appointment of the design and construction contractor(s). The local road impacts associated with the Iron Cove Link civil site are discussed in section 7.2.11 of Appendix H (Technical working paper: Traffic and transport) of the EIS.

No construction traffic impacts on local roads are expected to be associated with the Wattle Street civil and tunnel site (C1a) and The Crescent civil site (C6). Negligible impacts on local roads are expected. Heavy and light vehicles would need to cross over Albert Street to access Campbell Road, however traffic volumes along this section of Albert Street are expected to be low, and standard construction traffic management and measures would be used to minimise potential disruptions.

While no vehicle impacts are expected on local roads associated with heavy and light vehicle traffic from the Pyrmont Bridge Road tunnel site (C9), realignment of Bignell Lane between Mallett Street and Pyrmont Bridge Road is proposed. This would involve short-term, temporary closure of Bignell Lane to allow for the permanent realignment works.

In addressing issues raised by key stakeholders including the Inner West Council and the community around truck queuing and idling around construction sites, the Preferred infrastructure report introduces a truck marshalling facility (the White Bay civil site (C11)) near White Bay in Rozelle. This facility would reduce potential queuing and congestion on roads around construction ancillary facilities, as well as minimising traffic and noise disruptions to local streets surrounding the project and associated construction ancillary facilities. Further detail is provided in **Chapter D2** (White Bay civil site (C11)).

Appendix P (Technical working paper: Social and economic) of the EIS acknowledges that during construction of the project, the presence of heavy vehicles would affect access and general amenity for road users, residents, business owners, social infrastructure users and visitors. To reduce traffic and amenity impacts on local roads, construction trucks and spoil haulage vehicles will use, where possible, the M4 East and New M5 tunnels to reduce the impact on surface roads. When this is not possible, routes would operate mainly on arterial roads including City West Link, Victoria Road and Parramatta Road, Campbell Road and the Princes Highway. No local roads are proposed to be used for spoil haulage. The indicative spoil haulage routes may vary based on the final construction methodology and program.

In regard to noise, construction traffic is unlikely to result in a noticeable increase in noise levels at receivers along the proposed routes (refer to section 5 of Appendix J (Technical working paper: Noise and vibration) of the EIS).

In regard to safety, the construction traffic, including both heavy and light vehicles, represents a relatively small increase in traffic compared to background numbers. Where possible, heavy vehicle movements along local roads will be avoided. Therefore the project is unlikely to represent a significantly different safety risk above the existing situation. The potential for vehicle incidents to occur during construction as a result of heavy vehicles using the road network would be managed via the implementation of environmental management measures described in **Chapter E1** (Environmental management measures).

Long-term traffic control plans, temporary works and traffic staging plans will be subject to independent road safety audits that will be carried out in accordance with *Road Safety Audits Guide* (TC2003/RS03) (Roads and Maritime) and with reference to current practices outlined in the *Road Safety Audit Guide* (Austroads 2002). Road safety audits will assess the safety performance of any new or modified local road, parking, pedestrian and cycle infrastructure provided as part of the SSI (including ancillary facilities) to ensure that they meet the requirements of relevant design, engineering and safety guidelines, including Austroads *Guide to Traffic Engineering Practice*. The process for the carrying out of road safety audits would be detailed in the CTAMP that will be prepared for the project.

Issues identified in the road safety audit will be responded to by:

- Detailing actions taken/to be taken to address each of the issues raised
- Providing justification for proposals and actions on particular issues raised.

B11.8.3 Operational traffic impacts at Haberfield, Rozelle and St Peters interchanges

Summary, p6

Operational traffic impacts around the Haberfield, Rozelle and St Peters interchanges - with long-term consequences for residential amenity, pedestrian/cyclist safety and parking demand - and the need to protect affected streets from this traffic.

Response

The Inner West Council's concerns regarding operational traffic impacts and the affect this has on amenity (discussed in **section B11.8**), the safety of active transport users (discussed in **section B11.8.25**) and local parking demand (**section B11.8.26**) are addressed in the referenced sections.

B11.8.4 Operational traffic impacts on Anzac Bridge and The Crescent

Summary, p6

Particular concerns about operational traffic impacts on the Anzac Bridge and The Crescent / Johnston Street due to traffic increases on already congested roads and roads that are within residential or shopping areas

Response

Traffic impacts associated with Anzac Bridge are discussed in **section B10.8.6**.

As noted in section 11.2 of Appendix H (Technical working paper: Traffic and transport) of the EIS, The Crescent and Johnston Street (along with Ross Street) are forecast to experience increased levels of demand with the introduction of the project, with people travelling to and from the southern fringe of the Sydney CBD through the Annandale area. A strategy is being developed by Roads and Maritime to ensure the impacts of the project are minimised. The strategy will involve investigating and identifying capacity improvement and mitigation measures along The Crescent, Ross Street and Johnston Street. These measures will be implemented in a staged approach to accommodate forecast demand firstly for the M4-M5 Link and thereafter for the proposed future Western Harbour Tunnel project. Implementation of these measures will depend on the complexity of the measure and will be implemented at an appropriate stage to minimise impact on the community.

B11.8.5 Future public transport access

Summary, p6

Concerns that construction of WestConnex Stage 3 and the Western Harbour Tunnel (if built) could sever rights-of-way for future public transport, such as Sydney Metro West (rail) and a light rail link to White Bay and Balmain.

Part 5, p 55

Need to ensure that rights-of-way for future public transport are maintained.

As part of Council's general support for public transport, reassurance is sought that tunnelling alignments and other features of WestConnex Stage 3 and possibly the Western Harbour Tunnel would not impede rights-of-way for future public transport projects. These include Sydney Metro West (heavy rail) and link from the Inner West Light Rail to White Bay and Balmain.

Council has on several occasions written to relevant State agencies seeking such a reassurance, but has not been completely satisfied that the agencies are co-ordinating on this matter or have given it the priority it deserves. Council will continue to raise this issue at every opportunity.

The former-freight rail corridor which runs at-grade through the RRY site from the Lilyfield light rail stop to the Victoria Road Bridge underpass connects to Glebe Island and White Bay. Although the tracks are considered by the NSW Government to be redundant infrastructure, the right-of-way should be reserved for possible surface light rail expansion into the future. Council is concerned that unless the right-of-way is identified in all designs for the RRY site, a light rail link will be difficult to re-instate if WestConnex Stage 3 is constructed.

The light rail link could also complement to any future Sydney Metro West station in The Bays Precinct, which will likely require a large catchment of users to be viable. Sydney's light rail service, currently being extended, could feed passengers from across the region to this this Metro station. Even without a Metro, a light rail extension through the RRY site connecting the Bays Precinct with the existing Inner West light rail line would improve access to this precinct and would facilitate a future Victoria Road bus rapid transit corridor. It would also serve the heavily populated Balmain Peninsula.

Response

Potential impacts to existing and future public transport infrastructure were assessed in section 12.3.4 of the EIS.

Insufficient information is available at this time regarding the alignment of the proposed Sydney West Metro rail tunnels to determine whether there is any conflict of alignment (vertical and horizontal) with the M4-M5 Link project. Consultation has occurred and will continue to be undertaken with Transport for NSW regarding the potential interface of the two projects as the preliminary design for the Sydney West Metro project is developed. If required, adjustments to horizontal and vertical alignments of the tunnels can be made during the detailed design phase.

The project partially makes use of some of the closed former freight rail corridor within the Rozelle Rail Yards. The NSW Government's long term intention for the extension of the Inner West light rail line is identified strategically in the *Draft Greater Sydney Services and Infrastructure Plan* (Greater Sydney Commission 2017c), with a commitment to investigate the extension of the Inner West Light Rail to The Bays Precinct. This is anticipated to occur over a 10 to 20-year timeframe. The Draft Services and Infrastructure Plan does not identify a preferred route, and it is expected that a number of route options would be investigated as part of the NSW Government's commitment to investigate this extension.

As identified in section 3.1.12 of the EIS, while the operation of the project does not interact directly with the White Bay destination, the reduction in traffic and improvement in local traffic volumes on sections of Victoria Road east of Iron Cove Bridge as a result of the project (specifically the Iron Cove Link), and improvements in regional vehicle access to this destination (via the Rozelle interchange) for current and future uses, would support local economic activities. The project also includes new active transport links through the Rozelle Rail Yards which would enable connections to future developments at White Bay.

B11.8.6 Construction workforce parking

Part 4, p28

Concerns about the full range of construction impacts – including truck traffic, employee parking, construction noise and dust – around all Stage 3 construction sites

Part 4, p35

There is a need for significant improvement in the management of employee parking around construction sites.

Since construction of Stages 1 and 2 began, Haberfield/Ashfield and St Peters residents have continued to complain about kerbside parking pressures created by WestConnex construction. Whilst SMC has made some effort to address parking issues through actions such as creation of dedicated car parks, Haberfield/Ashfield residents have recently expressed their dismay that some of these car parks are largely unused, being located away from construction sites. There appear to be no penalties or incentives to encourage employees to use these facilities.

It is apparent to Council that conditions of approval for Stages 1 and 2 related to parking are vague and unenforceable. If Stage 3 proceeds, stronger conditions of approval (with penalties and incentives) are needed to enforce good-practice parking management. This is particularly important for Stage 3 areas, as the density of development and parking demand is generally greater than for Stage 1 and 2 areas.

Although employee parking demand would be expected to be an issue around most of the Stage 3 construction sites, parking pressures are expected to be greatest around the Darley Road site. This is because surrounding residential areas are densely-developed, there is little opportunity to park on the construction site, there are few other parking opportunities and the project would result in the loss of around 20 spaces. There are no details in the EIS of how parking demands from the project can be accommodated for this site.

Strictly enforced worker parking management would be needed, in association with temporary resident parking schemes. This would include requirements for employees to park elsewhere, such at the RRY site, and access the Darley Road site by light rail to the Leichhardt North light rail stop.

For all sites - particularly the Darley Road site - consideration should also be given to kerbside parking measures that will prohibit trucks parking on residential streets waiting for access to the construction sites. This would not only reduce parking pressures, but avoid noise and diesel emission impacts from trucks that park with their engines running.

This will need to be a consideration in the development of relevant construction traffic management plans. Other ways of reducing project truck parking impacts include enforceable licencing conditions for sub-contractors and specific kerbside parking controls such as No Parking – vehicles under 5m excepted.

Response

In response to issues raised during consultation with DP&E and agencies and the submissions received on the EIS, as well as lessons learnt from the preceding WestConnex projects (including community feedback), an additional construction ancillary facility (White Bay civil site (C11)) is proposed on a portion of land owned by the Port Authority of NSW land located near White Bay. This site would accommodate around 50 additional construction workforce parking spaces, as well as provide a truck marshalling area for around 40 heavy vehicles (see **Chapter D2** (White Bay civil site (C11))).

As identified in environmental management measure TT04 (see **Chapter E1** (Environmental management measures)), a car parking strategy will be prepared as part of the CTAMP for the project and will include the promotion of public transport and carpooling to reduce worksite-related vehicle movements. The car parking strategy described in the CTAMP will:

- Quantify construction workforce parking demand around project work sites and ancillary facilities during site establishment and the construction phase generally
- Identify public transport options and other management measures (such as carpooling and shuttle-buses) to reduce construction workforce parking demand
- Identify all locations that will be used for construction workforce parking
- Identify potential offsite areas that could be used for construction workforce parking that would be investigated and secured for use during construction where required and possible
- Identify exclusion zones, in consultation with potentially affected stakeholders, around construction sites and facilities where construction workforce parking would be restricted.

The car parking strategy will be prepared in consultation with local councils and stakeholders associated with any facilities adjacent to the project site. The strategy will also be developed in consultation with the M4 East and New M5 contractors to identify opportunities where possible to use existing parking arrangements associated with those projects during their respective construction periods and once those periods are completed.

It is anticipated that construction workforce parking would be primarily provided at the following construction ancillary facilities, with shuttle bus transfers provided to other nearby construction sites:

- Northcote Street civil site (C3a) – around 150 car parking spaces
- Parramatta Road East civil site (C3b) – around 140 car parking spaces
- Rozelle civil and tunnel site (C5) – around 400 car parking spaces
- Campbell Road civil and tunnel site (C10) – around 150 car parking spaces.

Due to the generally constrained nature of the other construction sites, only minimal car parking for construction workers would be provided at these locations. Typically, these sites would provide between four to 20 parking spaces intended to be used by engineers and other construction management staff. Some parking of construction-related vehicles in adjacent local roads would occur, particularly during site establishment. In addition to the car parking strategy, consideration of workforce car parking during site establishment (ie prior to the establishment of the majority of construction working parking spaces to be provided by the project) would be required as part of the AFMP to minimise impacts on local roads and residential on-street parking during these periods.

The implementation of temporary resident parking schemes would be at the discretion of the relevant local council. It would be a matter for DP&E as whether to impose additional conditions of approval on the project, with respect to employee and construction workforce car parking.

Impacts from truck traffic during construction are discussed in **section B11.8.1** and **section B11.8.10**.

Impacts from construction noise are discussed in **section B11.10.3**.

Impacts from construction dust are discussed in **section B11.9.14**.

B11.8.7 Operational traffic impacts on Wattle Street residents

Part 4, p30

An issue Council has raised previously in relation to Stage 1 that is relevant to Stage 3 is the current and future impact of WestConnex on residents of five dwellings at 14 to 24 Wattle Street, Haberfield. After suffering years of construction impacts, these residents will suffer operational traffic impacts to a higher degree than most residents in the area. Council seeks mitigation of these impacts to the satisfaction of all owners/residents of these dwellings.

Response

An operational traffic assessment has been undertaken for both the M4 East and M4-M5 Link projects which included an assessment of the operational traffic and transport impacts on Wattle Street.

For the Wattle Street interchange and surrounds, the operational traffic and transport assessment in section 10.3 of the Technical working paper: Traffic and transport at Appendix H of the EIS Wattle Street interchange and surrounds identified key constraints impacting the performance of the network on Frederick Street (southbound), Parramatta Road (eastbound) and City West Link (northbound) in the 'Without project' scenario. The capacity constraints on Parramatta Road and City West Link are generally reduced by the M4-M5 Link project, particularly in 2023.

It is expected that the M4 East Road Network Performance Review Plan would examine potential management measures at these locations following the collection of updated data.

Notwithstanding the above, Roads and Maritime proposes the following opportunity to manage operational impacts:

- The identified exit blocking from Frederick Street through the Parramatta Road/Wattle Street intersection in the 'With project' scenario arises from forecast increase in southbound demand, combined with capacity restrictions at downstream intersections and limited storage space on Frederick Street. Management measures to be investigated by Roads and Maritime, in consultation with relevant local councils, could include:
  - Queuing and capacity monitoring and management on the Frederick Street/Milton Street corridor
  - Managing lane use and utilisation to improve the operation of the corridor.

B11.8.8 Use of Hume Highway for construction trucks

Part 4, p36

Council is concerned about the impact on the Ashfield town centre of construction trucks using the Hume Highway. For the Haberfield/Ashfield construction sites, the EIS states that spoil pick up from the newly-acquired Parramatta Road West site on 24/7 basis, with spoil truck routes yet to be determined. However, as indicated in the EIS, a preliminary assessment of approach routes would have some 140 trucks per day using Centenary Drive – Hume Highway – Parramatta Road.

This route would bring these vehicles along Liverpool Road Hume Highway through the Ashfield town centre, Enfield shops, Homebush South shops, Burwood South shops, two child care centres/pre-schools, four schools, four religious centres/churches, one hospital and an aged housing facility.

Response

The EIS has proposed haulage routes (refer to section 6.6.5 of the EIS). It is proposed that construction vehicles would enter the Parramatta Road West civil and tunnel site (C1b) eastbound along the M4 Motorway, southbound along Centenary Drive, eastbound along the Hume Highway, then left onto Parramatta Road heading north into the site. Spoil haulage vehicles would be empty on entry to the construction site. Vehicles would exit the site directly onto Parramatta Road in a northbound direction. The spoil haulage route for the Parramatta Road West civil and tunnel site is shown in Figure 6-27 of the EIS (except during exceptional circumstances as outlined in section Table 6-24 of the EIS). No local roads are proposed to be used for spoil haulage in order to minimise the impact of the heavy vehicles on nearby receivers.

As required by environmental management measure TT16 in **Chapter E1** (Environmental management measures) a truck management strategy will be developed and implemented (as part of the CTAMP) that:

- Identifies truck marshalling areas that will be used by project-related heavy vehicles
- Describe management measures for project-related heavy vehicles to avoid queuing and site-circling in local roads and other potential traffic and access disruptions
- Describes monitoring programs to demonstrate that project-related heavy vehicles are complying with the strategy.

In addition, project-related heavy vehicle movements to and from sites will be monitored and managed with the aim of limiting any associated increases in road traffic noise levels during the night-time period to no more than 2 dBA. Any increases in road traffic noise of more than 2 dBA due to project-related vehicle movements will be managed in accordance with the *Construction Noise and Vibration Guideline* (Roads and Maritime 2016) (see environmental management measure TT17 in **Chapter E1** (Environmental management measures)).

B11.8.9 Management of road closures and diversions

Part 4, p37

Need for improved management of road closures and diversions. A more comprehensive approach to street closures is needed, as Haberfield/Ashfield residents have experienced many seemingly ad-hoc road closures and diversions implemented at short notice, with several of these having major implications for local residents and businesses. A blanket speed limit reduction around all construction sites of 30 or 40 kilometres per hour is also warranted, particularly on streets with residential and school uses.

Response

Speed limit reductions in work areas around construction sites will be enforced based on Roads and Maritime's *Traffic Control at Worksites* (Roads and Maritime 2010) guidelines. This may include reductions in traffic speed limits around construction areas. This would be confirmed during the development of the CTAMP. As detailed in the section 6.6 of the EIS, temporary closures and restrictions to some local roads would occur during the construction program. These may result in temporary inconvenience and an increase in travel time for some drivers; however access to all properties will be maintained during construction. In addition, some neighbouring streets may gain additional temporary traffic from diverted routes. Indicative temporary road network modifications during construction are described in **Table C8-2.**

Environmental management measure TT14 in **Chapter E1** (Environmental management measures) will require that local road closures and that property access be maintained. This will be undertaken in consultation with Roads and Maritime, local councils and property owners likely to be impacted. Road network modifications and traffic staging would be reviewed by the design and construction contractor(s) during the preparation of the CTAMP, with the objective of minimising disruptions to the road network. Appropriate signage for road closures or detours would be installed. Measures to manage these impacts are described in **Chapter E1** (Environmental management measures) and include environmental management measure TT11, which requires that robust community and stakeholder communication protocols regarding altered traffic conditions be developed and adopted.

B11.8.10 Monitoring and enforcement of construction traffic routes

Part 4, p 38

Need to improve monitoring and enforcement of dedicated construction traffic routes. Council has received many reports about project trucks departing from routes defined by conditions of approval and travelling along local residential streets – with resultant noise and traffic safety impacts. In some instances, project trucks have been reported travelling past and parking near primary schools in Haberfield (in breach of conditions) creating a traffic safety hazard. Simple measures to improve enforcement include easy-to-read identification numbers on project trucks and employment of a dedicated traffic-monitoring officer for the project.

Response

The indicative construction methodology has included the development of construction haulage routes that use arterial roads, thereby avoiding the use of local roads. Haulage routes will be refined prior to construction as part of the CTAMP.

As required by environmental management measure TT16 (**Chapter E1** (Environmental management measures)), a truck management strategy will be developed (as part of the CTAMP) that will:

- Identify truck marshalling areas that can be used by project-related heavy vehicles
- Describe management measures for project-related heavy vehicles to avoid queuing and site-circling in local roads and other potential traffic and access disruptions
- Describes monitoring programs to demonstrate that project-related heavy vehicles are complying with the strategy.

B11.8.11 Truck marshalling arrangements

Part 4, p38

Need to improve truck marshalling arrangements and assess the impact of routes between marshalling areas and construction sites. As has been discussed elsewhere in this submission, inadequate truck marshalling and queuing arrangements has created noise and traffic safety impacts. Residents of Haberfield/Ashfield and suburbs further afield have complained about what has appeared to be ad-hoc marshalling of trucks in residential streets, with sleep disturbances suffered from truck engines idling in the early morning period.

Lack of marshalling arrangements has led to circling of trucks around Haberfield/Ashfield streets and queuing of trucks on Parramatta Road at Haberfield/Ashfield as drivers await clearance to enter construction sites. This has raised noise and traffic safety issues. Council is aware that DP&E compliance staff have taken formal action on Parramatta Road queuing issues.

Given these Stage 1 issues, residents in the Stage 3 area are anxious about similar poorly-managed truck marshalling in their suburbs. Council has written several times to DP&E to raise these issues, suggesting that the DP&E develops strong conditions of approval to ensure marshalling areas are provided and are well-managed.

Council is also concerned about trucks using residential streets to travel between marshalling areas and construction sites. If the RRY site is used for marshalling as is expected, trucks are likely to use Johnston Street to access the Bridge Road construction site. The high frequency of truck movements, coupled with sensitive uses along Johnston Street (schools, residential areas and local shops) would result in unacceptable conflicts.

Response

In response to feedback provided by DP&E and the submissions received on the EIS, an additional construction ancillary facility, the White Bay civil site (C11), is proposed near White Bay in Rozelle to be used as a truck marshalling facility. This facility would assist in reducing potential queuing and congestion on streets around construction ancillary facilities, as well as minimise traffic and noise disruptions to local streets surrounding the project and associated construction ancillary facilities. Further detail is provided in **Chapter D2** (White Bay civil site (C11)). The truck marshalling facility would primarily be used by spoil haulage trucks accessing construction ancillary facilities at Haberfield/Ashfield, Darley Road and Pyrmont Bridge Road, where available space for on-site queuing is limited. Construction ancillary facilities for the Rozelle interchange have adequate space to marshal heavy trucks and accommodate construction workforce parking.

As reflected in environmental management measure TT16 in **Chapter E1** (Environmental management measures) a truck management strategy will be developed and implemented (as part of the CTAMP) that:

- Identifies truck marshalling areas that will be used by project-related heavy vehicles
- Describe management measures for project-related heavy vehicles to avoid queuing and site-circling in local roads and other potential traffic and access disruptions
- Describes monitoring programs to demonstrate that project-related heavy vehicles are complying with the strategy.

The appointed design and construction contractor(s) may choose to use all or some of the construction ancillary facilities identified in the EIS. The construction ancillary facilities proposed to be used by the design and construction contractor(s) will be documented in an AFMP which would be approved by the Secretary of DP&E.

Additional construction ancillary facilities may be proposed by the appointed design and construction contractor(s). Prior to the establishment of construction ancillary facilities that are not approved, the contractor(s) will need to comply with any relevant conditions of approval. Additional sites may be subject to separate environmental assessment and approval, subject to the extent of environmental and social impacts. Approval pathways are described further in Chapter 2 (Assessment process) of the EIS.

The impact of construction heavy vehicles using Johnston Street as a result of trucks accessing the White Bay civil site (C11) is assessed in the preferred infrastructure report in **section D2.4.1**.

B11.8.12 Congestion and road safety risks associated with construction traffic

Part 4, p39

Council is concerned about congestion and road safety risks created by construction trucks travelling in peak traffic periods and school travel periods.

For all construction sites, there is the potential for truck conflicts with other motor vehicles and bicycles on any road, and conflicts with pedestrians at pedestrian crossing and wherever trucks cross footpaths. Risks of these conflicts are at their greatest during the morning peak traffic periods and school travel periods. For this reason, working hours will need to avoid peak traffic periods, particularly where school travel safety issues are raised.

Response

The indicative construction methodology has included the development of construction haulage routes that use arterial roads, thereby avoiding the use of local roads. The locations of construction ancillary facilities and the indicative haulage routes have also been developed having regard to avoiding, where possible, potential conflicts with school routes and other vulnerable road users, as well as roads used more frequently by pedestrians and cyclists. Haulage routes will be refined prior to construction as part of the CTAMP.

Construction traffic volumes are expected to be low when compared to existing traffic volumes on key arterial roads connecting to the construction ancillary facility locations. The greatest increase is forecast to occur on City West Link, west of City West Link/James Street intersection, where, as a worst case scenario, construction would generate around 110 vehicles during the AM peak hour and around 220 vehicles during the PM peak hour. Compared to existing traffic volumes, total construction traffic would be the equivalent of around three per cent of peak hour traffic on City West Link at this location during the AM peak hour and five per cent of existing peak hour volumes during the PM peak hour.

As the volume of traffic generated by construction is expected to be low compared to existing traffic, the effects of this increase on the existing road network is not expected to represent a significantly different safety risk above the existing situation. There is still an elevated risk when construction-related vehicles are entering and leaving construction sites and the potential for vehicle incidents to occur during construction would be managed via the implementation of environmental management measures described in **Chapter E1** (Environmental management measures).

As required by environmental management measure TT16 (**Chapter E1** (Environmental management measures)) a truck management strategy will be developed (as part of the CTAMP) that will:

- Identify truck marshalling areas that can be used by project-related heavy vehicles
- Describe management measures for project-related heavy vehicles to avoid queuing and site-circling in local roads and other potential traffic and access disruptions
- Describes monitoring programs to demonstrate that project-related heavy vehicles are complying with the strategy.

An assessment of the safety impacts to pedestrians and cyclists during construction is included in section 8.3 and section 7.4.7 of Appendix H (Technical working paper: Traffic and transport) of the EIS. Safety considerations associated with pedestrian and cyclist movements around construction ancillary facilities will be considered as part of the CTAMP (see **Chapter E1** (Environmental management measures)). Where necessary, pedestrian and cyclist diversions have been identified and are outlined and assessed in section 7.4.7 and section 7.5.6 of Appendix H (Technical working paper: Traffic and transport) of the EIS.

Long-term traffic control plans, temporary works and traffic staging plans and pedestrian and cycle infrastructure will be subject to independent road safety audits that will be carried out in accordance with *Road Safety Audits Guide* (TC2003/RS03) (Roads and Maritime) and with reference to current practices outlined in the *Road Safety Audit Guide* (Austroads 2002). Road safety audits will assess the safety performance of any new or modified local road, parking, pedestrian and cycle infrastructure provided as part of the SSI (including ancillary facilities) to ensure that they meet the requirements of relevant design, engineering and safety guidelines, including the *Guide to Road Design* (Austroads 2010)The process for the carrying out of road safety audits would be detailed in the CTAMP that will be prepared for the project.

Issues identified in the road safety audit will be responded to by:

- Detailing actions taken/to be taken to address each of the issues raised
- Providing justification for proposals and actions on particular issues raised.

B11.8.13 Council input into construction traffic management

Part 4, p39

There is a need to increase [the] extent of Council's input into traffic and transport liaison groups to improve construction traffic management. Council's traffic management staff that have been involved in traffic and transport liaison groups for WestConnex Stages 1 and 2 have sought increased involvement by Council. These staff have recommended [the] relevant conditions for the Sydney Metro (rail) project as a guide.

Response

Environmental management measure TT01 stipulates that the CTAMP will be prepared in consultation with relevant transport stakeholders and local councils (see **Chapter E1** (Environmental management measures)). Conditions of approval are a matter for DP&E to consider during its assessment of the project.

B11.8.14 Road safety risks associated with the Darley Road civil and tunnel site (C4)

Part 4, p 39

Council has several serious concerns about the 7 Darley Road construction site. A civil and tunnel site, or 'mid-tunnel construction dive-site', is proposed for 7 Darley Road at Leichhardt. This site would be established primarily to support tunnelling, but would also accommodate permanent faculties [facilities], including a water treatment plant and substation. Road headers would be launched from this site and would excavate the temporary access tunnel and mainline tunnels.

Under the system proposed by the EIS, construction traffic would enter the site from the southern (westbound) carriageway of Darley Road via new temporary driveways. Temporary traffic diversions and removal of some kerbside parking along Darley Road would likely be required, as would the closure of the footpath on the northern side of Darley Road near the site. Traffic management would be implemented at key locations.

Council and local residents have been particularly concerned about impacts from this site due to its location within a densely-developed residential area and creation of unacceptable road safety risks around the site. Truck access to the Darley Road site involves negotiation of a steep, curving and heavily-trafficked intersection with City West Link Road, which has limited sightlines in Darley Road. At this intersection is a well-used signalised pedestrian crossing that provides access to the Leichhardt North Light Rail Stop. A particular road safety issue is the potential for conflicts between trucks, pedestrians, cyclists and general traffic.

Part 4, p 40

A detailed road safety audit is needed for the Darley Road site. Darley Road is a known accident 'blackspot' area. The movement of construction trucks and other construction vehicles will create an unacceptable risk of conflicts with vehicles on Darley Road and City West Link Road. It will also create risks for pedestrians walking along Darley Road and crossing that road to access the Leichhardt North light rail stop.

Pedestrian and cyclist traffic is also frequent due to the area providing access to Blackmore Oval, the Bay Run path, Leichhardt Aquatic Centre, the Canal Road industrial area and Richard Murden Reserve.

Response

Construction traffic on Darley Road would see an increase on total traffic on Darley Road over the construction period (100 heavy and 70 light vehicles one way, per day). This would however only apply to a section of Darley Road that is approximately 200 metres in length, between the Darley Road civil and tunnel site (C4) and the Darley Road/James Street/City West Link intersection. While there would be an increase in traffic as a result of construction, construction traffic only represents a small increase over background traffic levels and therefore the overall effect of the construction traffic on the operation of the road network in this location is minor.

As a result of ongoing construction planning and in response to submissions, a refinement to the Darley Road civil and tunnel site (C4) haulage route has been made. Heavy vehicles arriving to the site were previously assumed to turn right to James Street/Darley Road via a temporary right turn that would have been established from City West Link for the project (refer to section 6.5.8 of the EIS). The refinement to the haulage route for the Darley Road civil and tunnel site (C4) means that heavy vehicles will now arrive at the site by a left turn from City West Link westbound via the truck marshalling area at the White Bay civil site (C11) (see **Part D** (Preferred infrastructure report)) or a u-turn at the roundabout on James Craig Road. This revised spoil haulage route is shown in **Figure C4-1**.

Traffic and transport impacts associated with this change have been assessed in section D2.4.1 and Appendix A of **Part D** (Preferred infrastructure report). The forecast volumes of construction related heavy vehicles at the Darley Road civil and tunnel site (C4) as a result of this refinement are not expected to change from those forecast in Chapter 7 of Appendix H (Technical working paper: Traffic and transport) of the EIS.

The majority of construction traffic, including heavy vehicles, would access the Darley Road civil and tunnel site (C4) from the east, with the site ingress and egress points east of Charles Street/Canal Road. Direct impacts on Charles Street/Canal Road are therefore not anticipated.

As described in section D2.4.1 of **Part D** (Preferred infrastructure report), the change to the haulage route for the Darley Road civil and tunnel site (C4) would not result in a change in performance on Darley Road west of James Street relative to the 'With construction' scenarios in Chapter 7 of Appendix H (Technical working paper: Traffic and transport) of the EIS.

The mid-block operational performance of Darley Road, west of James Street, would remain relatively stable at Los C or LoS D, with a drop in performance only during the PM peak in the eastbound direction (LoS C without construction to LoS D with construction).

The City West Link/James Street intersection is forecast to operate at LoS F in the 'Without construction' and 'With construction' scenarios in the AM and PM peak in 2021, indicating that even without construction traffic, the performance of this intersection would be poor. Construction traffic is unlikely to result in a significant change to the performance of this intersection and/or access to and from Charles Street/Canal Road during the peak periods.

There is still a risk with construction traffic interacting with general traffic, with elevated risk when construction-related vehicles are entering and leaving construction sites. Any foreseen impacts on road safety for all users, including pedestrian and cyclists, during construction would be mitigated as much as possible through the provision of tailored traffic management plans and other measures detailed in **Chapter E1** (Environmental management measures).

Prior to construction, a CTAMP will be developed and implemented to manage the movement of vehicles to and from project sites and to ensure that vehicle movements are conducted in a manner that minimises impacts on local amenity, traffic flows and road safety. **Chapter E1** (Environmental management measures)) describes measures which have been designed to manage potential traffic and transport impacts resulting from the construction of the project. A truck management strategy as part of the CTAMP will be developed for the project that:

- Identifies truck marshalling areas that can be used by project-related heavy vehicles
- Describes management measures for project-related heavy vehicles to avoid queuing and site-circling in local roads and other potential traffic and access disruptions
- Describes monitoring programs to demonstrate that project-related heavy vehicles are complying with the strategy.

In addition, long-term traffic control plans, temporary works and traffic staging plans will be subject to independent road safety audits that will be carried out in accordance with *Road Safety Audits Guide* (TC2003/RS03) (Roads and Maritime) and with reference to current practices outlined in the *Road Safety Audit Guide* (Austroads 2002). Road safety audits will assess the safety performance of any new or modified local road, parking, pedestrian and cycle infrastructure provided as part of the SSI (including ancillary facilities) to ensure that they meet the requirements of relevant design, engineering and safety guidelines, including Austroads *Guide to Road Design* (Austroads 2010) *.* The process for the carrying out of road safety audits would be detailed in the CTAMP that will be prepared for the project.

Issues identified in the road safety audit will be responded to by:

- Detailing actions taken/to be taken to address each of the issues raised
- Providing justification for proposals and actions on particular issues raised.

B11.8.15 Road safety audit for the Pyrmont Bridge Road tunnel site (C9)

Part 4, p42

There is a need for a road safety audit for the Pyrmont Bridge Road construction site to ensure conflicts between construction trucks, buses, cyclists and pedestrians are minimised. Truck access to the site would be from the City-bound kerbside lane of Parramatta Road. Vehicles would enter via a new temporary driveway, travel in an anti-clockwise direction via an internal access road and exit the site onto Pyrmont Bridge Road via a new temporary signalised intersection. Despite the fact that minimal modifications to the existing road network would be needed, Council has concerns about walk/cycle diversions around site entry/exit points and potential conflicts between project trucks, buses, cyclists and pedestrians wherever trucks cross the paths of these other road users.

Response

Minor impact is anticipated for pedestrians and cyclists at this location (refer to section 8.3.1 of the EIS). Although there would be no requirement for diversions, there is the potential for interactions with construction vehicles, particularly where heavy vehicles enter the site from Parramatta Road and exit the site on to Pyrmont Bridge Road. Traffic management measures would be implemented at the entry and exit driveways on Parramatta Road and Pyrmont Bridge Road to manage potential interactions between construction traffic and pedestrians and cyclists.

The design and construction contractor(s) will select construction ancillary facility access and exit points which minimise interaction with pedestrian routes used by school children. Potential safety impacts to school children, including at Rozelle Public School and Bridge Road School are described in Appendix P (Technical working paper: Social and economic) of the EIS.

All long-term traffic control plans, temporary works and traffic staging plans will be subject to independent road safety audits as discussed in **section B11.8.14**.

B11.8.16 Construction traffic movements at the Pyrmont Bridge Road tunnel site (C9)

Part 4, p43

There is a need for an assessment of ‘go-around’ procedures for construction trucks accessing the Pyrmont Bridge Road site. Experience with construction trucks accessing Haberfield/Ashfield sites from Parramatta Road has shown that issues with on-site management can result in empty trucks travelling very slowly in the kerbside lane when the loading area is already occupied, to avoid being sent around the block. This inhibits traffic flow in the kerbside lane, delaying buses and compelling some drivers to make hazardous manoeuvres at short notice.

It is noted that the proposed Annandale/Camperdown site has no suitable ‘go-around’ route as the left turn from Mallet Street to Pyrmont Bridge Road and the left turn from Pyrmont Bridge Road to Parramatta Road cannot be negotiated by the likely construction vehicles. Layton and Barr Streets are too narrow to accommodate left turns, and large vehicles also cannot negotiate the left turn from Parramatta Road to Ross Street and Glebe Point Road is unsuitable for heavy vehicles.

Response

Prior to construction, a CTAMP will be developed and implemented to manage the movement of vehicles to and from project sites and to ensure that vehicle movements are conducted in a manner that minimises impacts on local amenity, traffic flows and road safety. **Chapter E1** (Environmental management measures)) describes measures which have been designed to manage potential traffic and transport impacts resulting from the construction of the project. A truck management strategy as part of the CTAMP will be developed for the project that:

- Identifies truck marshalling areas that can be used by project-related heavy vehicles
- Describes management measures for project-related heavy vehicles to avoid queuing and site-circling in local roads and other potential traffic and access disruptions
- Describes monitoring programs to demonstrate that project-related heavy vehicles are complying with the strategy.

An additional construction ancillary facility (the White Bay civil site (C11)) is proposed near White Bay in Rozelle to be used as a truck marshalling facility. This facility would assist in reducing potential queuing and congestion on streets around construction ancillary facilities, as well as minimise traffic and noise disruptions to local streets surrounding the project and associated construction ancillary facilities. Further detail is provided in **Chapter D2** (White Bay civil site (C11)).

The use of a marshalling area(s), in particular for spoil trucks would be investigated to further assist in staggering the arrival of vehicles to site. This is discussed further in **section B11.8.11**.

B11.8.17 Construction traffic impacts associated with Rozelle sites

Part 4, p43

There is a need to assess the traffic impacts of construction trucks turning to/from City West Link Road to The Crescent.

Should trucks accessing the Annandale/Camperdown site be stabled in the RRY site, the likely route to the Camperdown site would be via Johnston Street. The level of impact identified in the EIS does not appear to take into account the limited acceleration rates of fully-laden heavy vehicles, or the delay associated with right turning of fully-laden trucks exiting the RRY site turning from the City West Link Road into The Crescent.

Though the EIS seems to indicate very small increases in traffic delays from these kinds of movements, it has been observed from Stages 1 and 2 that construction trucks can significantly impede traffic flow, particularly when running in kerbside lanes. Potential use of Johnston Street by project trucks also raises concerns for Council due to the residential nature of this street, which includes schools and the Annandale neighbourhood shopping centre.

Part 4, p45

There is a need to assess the traffic impact of construction truck access to the Rozelle sites.

The Rozelle civil and tunnel site would be mainly located on the RRY site. Temporary construction facilities and activities on this site would primarily support tunnelling to create the Rozelle Interchange, Iron Cove Link and connections to the proposed Western Harbour Tunnel. After construction, permanent facilities would remain on the site, including ventilation facilities, a motorway control facility, electrical sub-stations and water treatment areas.

Project truck access to the Rozelle site would be via City West Link Road via new temporary slip lanes and driveways. This main concern raised is the impact of these access points on traffic flow on the congested City West Link Road.

Response

Construction traffic associated with the Rozelle civil and tunnel site (C5) would result in a forecast daily increase of 517 heavy vehicles and 350 light vehicles using City West Link daily. Table 7-19 of Appendix H (Technical working paper: Traffic and transport) of the EIS shows that several locations are forecast to exceed the theoretical roadway capacity with the increased background traffic and construction traffic in the 2021 AM and PM peak hours. However, traffic on the majority of these roads, including City West Link, would exceed their theoretical capacity even without the construction traffic, simply due to forecast growth in background traffic.

Construction traffic is forecast to change the mid-block LoS at four locations, including on City West Link, west of The Crescent, where the westbound mid-block LoS is forecast to decrease from LoS D to LoS E in the PM peak hour.

Intersection LoS for the intersections associated with the Rozelle civil and tunnel site are assessed in section 7.4.3 (Option A) and section 7.5.2 (Option B) of Appendix H (Technical working paper: Traffic and transport) of the EIS.

Section 7.4.3 of Appendix H (Technical working paper: Traffic and transport) identifies that in the 'With construction' scenario, the new eastern access road to the Rozelle civil and tunnel site (C5) is accommodated as the northern approach to City West Link/The Crescent intersection. Construction vehicles are only permitted to turn right out of this access road onto City West Link westbound. However, safe operation requires a new traffic signal phase. It is expected that this phase would only be required to run once every three cycles. In the AM peak, City West Link/The Crescent intersection LoS of service is forecast to drop from LoS D to LoS E with an increase in average delay of about 15 seconds. In the PM peak, the LoS is forecast to remain at LoS C.

A new temporary signalised intersection is also proposed on City West Link about 400 metres west of The Crescent, accommodating a second (western) site access to the Rozelle civil and tunnel site (C5). Construction vehicles are similarly only permitted to turn right out of this access road, with a traffic signal phase required to safely accommodate this movement. This new intersection is forecast to operate at LoS A in both AM and PM peak hours.

The EIS did not contemplate the use of Johnston Street as a construction haulage route for spoil trucks traveling to or from the Rozelle civil and tunnel site (C5). The initial design of construction access points for this site allow for entry and exit to and from City West Link via either a temporary signalised intersection (at the western end) or the introduction of an additional turning movement to the City West Link/The Crescent intersection. However, and associated with the introduction of a truck marshalling area for the project at the White Bay civil site (C11) that has been included in the Preferred infrastructure report (**Part D**), and an assessment of construction heavy vehicles using Johnston Street, including the City West Link/The Crescent intersection, has been included in the Preferred infrastructure report (**Part D**). Due to the introduction of the White Bay civil site (C11), spoil haulage vehicles accessing the Pyrmont Bridge Road tunnel site (C9) may use Johnston Street and The Crescent.

As reflected in environmental management measure TT16 in **Chapter E1** (Environmental management measures) a truck management strategy will be developed and implemented (as part of the CTAMP) that:

- Identifies truck marshalling areas that will be used by project-related heavy vehicles
- Describe management measures for project-related heavy vehicles to avoid queuing and site-circling in local roads and other potential traffic and access disruptions
- Describes monitoring programs to demonstrate that project-related heavy vehicles are complying with the strategy.

The appointed design and construction contractor(s) may choose to use all or some of the construction ancillary facilities identified in the EIS. The construction ancillary facilities proposed to be used by the design and construction contractor(s) will be documented in an AFMP which would be approved by the Secretary of DP&E.

Additional construction ancillary facilities may be proposed by the appointed design and construction contractor(s). Prior to the establishment of construction ancillary facilities that are not approved, the contractor(s) will need to comply with any relevant conditions of approval. Additional sites may be subject to separate environmental assessment and approval, subject to the extent of environmental and social impacts. Approval pathways are described further in Chapter 2 (Assessment process) of the EIS.

B11.8.18 Active transport connectivity and safety

Part 4, p46

There is a need to ensure that walk/cycle connectivity around the Victoria Road construction site is not severed. The Victoria Road civil site would be created by the demolition of existing buildings and other structures on the site to establish temporary site offices, a laydown area, workforce amenities and car parking. After construction, a portion of this site would become operational road infrastructure.

No particular issues are raised for Council by this site, but it would add to cumulative noise and traffic impacts in the area. Council is also concerned that use of the site post-construction to expand road capacity will have negative impacts on walk/cycle connectivity at that location.

Part 5, p53

The draft active transport strategy is welcomed, but Council is concerned that the project's construction and operational traffic impacts will have a negative impact on active transport overall. [duplicated text deleted] Council is however concerned that proposed construction activities will create safety issues for pedestrians and cyclists at a number of locations. Council is also concerned that by increasing traffic in the Inner West, through induced traffic, the project would result in a deterioration of conditions for walking and cycling in the long-term. It would also make it more difficult for Council to reclaim traffic lanes for dedicated bicycle lanes, particularly on State and Regional roads where they are usually most needed. These issues are discussed elsewhere in this submission.

Response

Section 6.6.2 of Chapter 6 (Construction work) of the EIS describes the indicative modifications to the pedestrian and cyclist network during construction. As noted, temporary, periodic closure of the shared paths on the eastern and western sides of Victoria Road at Rozelle would be required during construction of the project. Works would be staged so that the shared path on either the eastern or western side of Victoria Road at Rozelle would remain open at all times.

Pedestrian and cyclist access and connectivity would be maintained where possible, throughout the construction phase. Where it would not be feasible to use existing access, alternative routes would be provided and communicated to the community. Pedestrian and cyclist movements around construction ancillary facilities would be managed in accordance with a CTAMP (see **Chapter E1** (Environmental management measures)).

Further detail regarding potential safety and connectivity impacts on pedestrians and cyclists during construction is provided in **section B11.8.12**. Active transport connectivity during operation is discussed in **section B11.8.25**.

Appendix H (Technical working paper: Traffic and transport) of the EIS identifies that on non-motorway roads in the Inner West local government area (LGA) the vehicle kilometres travelled is forecast to reduce by about 12 per cent. The project would not preclude, and in many instances would support, the implementation of broader pedestrian and cyclist initiatives as identified in the Active transport strategy that has been prepared for the project (refer to Appendix N (Active transport strategy) of the EIS). Active transport connectivity once the construction works are completed is discussed in **section B11.8.25**.

B11.8.19 Residential street traffic

Part 4, p49

At a local level, Council is concerned about additional traffic from WestConnex on residential streets. At the local scale, Council is concerned about WestConnex-related traffic growth along residential streets in the Inner West Council area - particularly those around the Haberfield, Rozelle and St Peters interchanges. For Stage 3, much of that concern focuses on streets around the Rozelle Interchange.

Council is concerned that should Stage 3 proceed with entry/exit points from the Rozelle Interchange considerable additional traffic will spill onto the already congested Anzac Bridge and other significant streets such as The Crescent and Johnston Street. Additional traffic would continue onto other connecting streets further afield (including Ross Street, Glebe).

Even though Johnston Street is classified as a State Road, additional traffic is a concern to Council as it is essentially a residential street that also includes two schools, two churches, a number of community facilities and the Annandale local shopping centre. Further, in conflict with anticipated increased traffic volumes, the active transport section of the EIS identifies potential for a cycleway along Johnston Street.

For some time Council has been seeking to install separated bicycle lanes on Johnston Street at Annandale but RMS has not permitted this. This is feasible as two of the four traffic lanes could readily be converted to bicycle lanes. Council sees there is now an imperative to install these lanes to mitigate against road safety and traffic congestion impacts at the construction and operational stages of WestConnex Stage 3. Council's concerns about construction and operational traffic on Johnston Street are discussed elsewhere in this submission.

Of particular concern is that on streets like these and wherever there is additional traffic, RMS may consider widening or establishing clearways to accommodate the additional traffic - similar to what is now underway for Stage 2 at Campbell Street/Road, St Peters and Euston Road, Alexandra. Reconfiguring these roads in this way is always at the expense of neighbourhood liveability, residential amenity, business vitality and safety for pedestrians and cyclists.

Response

Concerns raised around operational traffic impacts on The Crescent, Anzac Bridge and Johnston Road are addressed in **section B11.8.4**. The provision of cycling lanes along Johnston Street at Annandale is outside the scope of the EIS. Notwithstanding this, the project would not preclude their establishment.

B11.8.20 Inner West Council's concept design submission

Part 5, p47

This section relates to EIS Chapter *8: Traffic & transport.* It also relates to Issues 8, 10, 12 and 14 in Council's Concept Design submission:

- Operational traffic impacts on Anzac Bridge & The Crescent - particular concerns about the Rozelle Interchange feeding additional traffic onto the already congested Anzac Bridge and onto Johnston Street and The Crescent at Annandale – these latter two streets being within densely developed residential areas. Need for a stronger commitment to reduction of traffic capacity for private vehicles, public and active transport improvements and amenity improvements wherever traffic is reduced by WestConnex – in particular, along Victoria Road and Parramatta Road.
- Need to further improve walk/cycle connectivity across Rozelle Rail Yards site - a greater number and improved quality of north-south walk/cycle connections needed across City West Link and the RRY site to link the Rozelle, Lilyfield and Annandale communities, and to ensure the RRY recreation area is readily accessible to the community.
- Need to consider impact on future public transport corridors - concerns that construction of WestConnex Stage 3 and the Western Harbour Tunnel (if built) may hamper implementation of Western Metro (rail) and sever future light rail links, such as the White Bay / Balmain link.

Response

Operational traffic impacts on Anzac Bridge and The Crescent are addressed in **section B11.8.4**.

Walking and cycling connectivity around the Rozelle Rail Yards is addressed in **section B11.8.25**.

The impact on future public transport corridors is addressed in **section B11.8.5**.

B11.8.21 Concerns regarding induced traffic

Part 5, p48

At a strategic level, Council is concerned about induced traffic from WestConnex. At the highest level, Council has had a long-standing concern about existing high levels of traffic through inner-Sydney and is further concerned regarding the increased traffic anticipated to result from WestConnex. As is evident from the discussion of strategic traffic/transport issues in Part 1 Justification for project above, the contribution of WestConnex to traffic growth through induced traffic is a major concern.

The WestConnex business case indicates that an increase of some 45,000 extra car trips per day, which is approximately 0.4% of the estimated total regional traffic in 2031, is likely to be induced, i.e. trips that have occurred because of WestConnex. This may underestimate the real situation - but in any event it represents a significant increase in traffic and illustrates the sensitivity of forecasts for regional traffic growth.

Beca has raised issues with the method of calculating induced traffic, and one of the recommendations of this submission is that further information be provided on this calculation. Additional information has also been requested to determine the degree to which this induced traffic is causing a mode-shift from public transport to private car use rather than simply generating additional road trips.

Response

Induced demand is discussed in section 4.2.1 of Appendix H (Technical working paper: Traffic and transport) of the EIS and is included in all of the forecast traffic demand; however the methodology for calculating it is not contained in the technical working paper.

The assessment of induced demand is made through the WRTM forecasting process. Induced demands are computed through application of the procedures described in the New Zealand Transport Agency Economic Evaluation Manual Appendix A11. The procedures were developed by international experts for the NZ Transport Agency. Roads and Maritime furthermore requested an independent peer review to be undertaken by Australian academic experts who verified the robustness and suitability for application to the WestConnex project.

The initial WRTM demand matrix without induced demand is called the fixed demand matrix. The steps in the approach consist of reviewing the travel times of the fixed demand matrix for each modelled forecast year with and without the project, deriving a new demand matrix that pivots from the fixed demand matrix using an elasticity formulation based on the ratio of the 'With project' travel times to the 'Without project' travel times, and assigning this new demand matrix to obtain revised travel times with the project. This procedure is repeated until a converged result is obtained. The elasticity parameters used were also part of the independent peer review undertaken, which verified their appropriate used for application in the WRTM induced demand procedures.

The reference in Appendix H is that induced demand equates to about 0.3 per cent additional daily trips in the Sydney metropolitan area in 2033. This percentage would vary by geographic location and assessment area.

Analysis of traffic demand on non-motorway links was undertaken as well as an examination of how general traffic patterns would change. **Table B11-1** presents the percentage changes in daily vehicle kilometres travelled (VKT), vehicle hours travelled (VHT) and average speed in 2033 with the project on non-motorway links in the LGAs closest to the project. The forecast percentage changes indicate that the Inner West LGA would experience reductions in both daily VKT and daily VHT of 12 per cent and 20 per cent respectively in 2033 as a result of the project. As can be seen, the project would cause traffic to shift from the surface (non-motorway) roads to the new motorway.

Table B11-1 Percentage change in daily travel distance, time and average speed by LGA in 2033

Local Government Area	Daily VKT	Daily VHT	Daily average speed
Bayside	1%	4%	-3%
Burwood	-2%	-3%	1%
Canada Bay	-1%	-1%	0%
Canterbury-Bankstown	-1%	-4%	3%
Inner West	-11%	-21%	14%
Strathfield	-1%	-4%	3%
Sydney	-2%	-2%	0%

Mode choice factors are incorporated into the Strategic Transport Model (STM) and are considered during the development of traffic demand forecasts, which are subsequently used to determine future year demand development. Refer to section 4.2.1 of Appendix H (Technical working paper: Traffic and transport) of the EIS for a detailed description of the traffic and transport assessment methodology.

B11.8.22 Travel time benefits of the project

Summary, p2

The travel-time benefits achieved by WestConnex are negligible, with analysis of network-wide distance travelled against time taken indicating that in 2033 with the total "cumulative" project operational, the estimated average vehicle speed will be 26.4kph. This is only 1.1kph faster than the "do minimum" scenario and approximately 7.4kph slower than today's network-wide average

Part 5, p48

The travel time benefits of WestConnex appear to be over-estimated, while the health costs are under-estimated. Council is also sceptical that the stated travel time reduction benefits of WestConnex are accurate – likely to be overstated. Analysis of the network-wide (motorway and other roads combined) distance travelled and time taken provided in the EIS indicates that, in 2033 the do minimum scenario is estimated to result in an average individual vehicle speed of 25.3kph, while the cumulative scenario from multiple planned projects including Stage 3 is estimated result in an average individual vehicle speed of 26.4kph. Noting that today's average speed across the total network is 33.8kph.

If these projections are correct, each individual driver using Sydney's road network will only experience an increased travel speed of 1.1kph and, further, their average speed will be 7.5kph slower than today's network-wide average.

This is considered to be of negligible benefit particularly when compared to the extensive health and other costs imposed by the project – discussed throughout this submission. It would thus appear that the real benefits of WestConnex have been overestimated and it has been argued elsewhere in this submission that the costs have been underestimated, particularly when the health costs of communities affected by the project have been ignored. Consequently the project's benefit-cost analysis must be questioned.

Further to this, there has been no assessment of public transport and demand management improvement that could be initiated to achieve that same congestion reductions and travel time savings. Council is particularly concerned about the likelihood of 'mode share leaching' from walking, cycling and public transport to private cars. This not only leads to increased traffic, but also can undermine the viability of public transport through reduced patronage. It is counter to numerous local, State and Federal government policies that all aim to reduce private car use and promote walking, cycling and use of public transport.

Response

Appendix H (Technical working paper: Traffic and transport) of the EIS includes an assessment of the predicted operational traffic impacts of the project on the local and arterial road network. The traffic assessment demonstrates the benefits of the project to reducing travel times and improving congestion on Sydney roads.

Network productivity

The addition of the M4-M5 Link provides a significant overall improvement to network productivity. As shown in Table B11-2, an overall increase in daily VKT and a reduction in daily VHT on the road network are forecast. This means that more trips could be made or longer distances travelled on the network in a shorter time. The forecast increase in VKT and reduction in VHT is mainly due to traffic using the new motorway, with reductions in daily VKT and VHT forecast on the non-motorway roads. This indicates the additional network capacity provided by the project would assist in accommodating the forecast growth in population and travel demand that would otherwise contribute to worsening road network and traffic conditions without the project. This trend continues in the 'Cumulative' scenario, with reduced daily VKT and VHT forecast for the non-motorway roads.

Table B11-2 Comparison of daily VKT and VHT for metropolitan Sydney under future scenarios

Scenario	Year	Daily VKT ('000 km)			Daily VHT ('000 hours)		
		Motorway	Other	Total	Motorway	Other	Total
Base case	2015	23,940	74,810	98,750	400	2,520	2,920
Do minimum (without project)	2023	26,880	86,520	113,400	470	3,160	3,630
With project		27,730	86,050	113,780	480	3,120	3,600
Cumulative		27,980	85,970	113,950	470	3,110	3,570
Do minimum (without project)	2033	31,030	101,900	132,930	590	4,670	5,560
With project		32,010	101,410	133,430	600	4,610	5,220
Cumulative		33,780	100,650	134,420	600	4,500	5,100

‘With project’ (2023)

The project provides a key link in the Sydney motorway network, connecting the M4 Motorway to the M5 Motorway, as well as to the Western Distributor, Cross City Tunnel and the M1 Motorway. With the inclusion of the project, a large volume of traffic is forecast to shift to the M4-M5 Link, including the Iron Cove Link, with significant reductions in daily traffic volumes forecast on Parramatta Road (east of the M4 East Parramatta Road ramps), City West Link and Victoria Road (south of Iron Cove Bridge). Increases in daily traffic are also forecast on the M4 East and Anzac Bridge/Western Distributor, as traffic accesses the M4-M5 Link. This can be seen by the thick red lines on the motorway network and the corresponding reduction in traffic on the surface network as illustrated by the green lines in Figure 8-13 in the EIS.

As a consequence of traffic using the project, reductions in traffic are forecast for the existing M5 East Motorway, Southern Cross Drive and King Georges Road, north of the existing M5 East Motorway. Traffic reductions are also forecast on roads through the Inner West, such as Stanmore Road and Sydenham Road, which link Parramatta Road to the St Peters and Mascot areas, as traffic shifts to the M4-M5 Link instead.

Increases in daily traffic on surface roads between the St Peters interchange and Sydney Airport are forecast, with traffic reductions projected for sections of the Princes Highway and Canal Road. Changes in operational performance on these surface roads close to the St Peters interchange are described in section 10.5 of Appendix H (Technical working paper: Traffic and transport) of the EIS.

With the inclusion of the M4-M5 Link, the WRTM is forecasting reductions in peak period travel times between the M4 corridor and the Sydney Airport/Port Botany precinct in 2023, with traffic shifting from the A3 (King Georges Road) corridor to the M4-M5 Link. For example:

- Between Parramatta and Sydney Airport, average peak period travel times are forecast to reduce by about 10 minutes. This saving is part of a 25 minute saving comparing the 2023 ‘With project’ scenario to a scenario without WestConnex
- Between Burwood and Sydney Airport, average peak period travel times are forecast to reduce by about five minutes. This saving is part of a 15 minute saving comparing the 2023 ‘With project’ scenario to a scenario without WestConnex
- Between Silverwater and Port Botany, average peak period travel times are forecast to reduce by about 10 minutes. This saving is part of a 15 minute saving comparing the 2023 ‘With project’ scenario to a scenario without WestConnex.

In 2023, with the inclusion of the project, road network productivity is forecast to improve as indicated by a drop in the daily VKT and VHT on the arterial (non-motorway) network, with an increase in kilometres and hours travelled along the motorway routes. Overall, the road network would accommodate more or longer trips in a shorter time. As shown in Table 10-1 of Appendix H (Technical working paper: Traffic and transport) of the EIS, the increase in daily VKT and drop in VHT is mainly due to traffic using the new motorway, with reductions in daily VKT and VHT forecast on non-motorway roads.

With project’ (2033)

Section 10.1.2 of Appendix H (Technical working paper: Traffic and transport) of the EIS shows bandwidth plots illustrating the forecast change in daily traffic volumes between the 2033 ‘With project’ and the ‘Without project’ scenarios. The changes shown represent differences in the forecast AWT between the modelled scenarios. Roads that are expected to carry less traffic in the future 2033 ‘With project’ scenario are shown in green and roads where volumes are forecast to increase are shown in red. The band thickness is indicative of the magnitude of this change. These forecast traffic volumes include both fixed and induced traffic demand.

The pattern of change highlighted in the 2023 comparison is generally the same as in the 2033 comparison. On some roads, the forecast increases in daily traffic volumes are less pronounced due to the growth in background traffic by 2033.

With the inclusion of the M4-M5 Link, the WRTM is forecasting reductions in peak period travel times between the M4 corridor and the Sydney Airport/Port Botany precinct in 2033 ‘With project’ scenario, with traffic shifting from the A3 (King Georges Road) corridor to the M4-M5 Link. For example:

- Between Parramatta and Sydney Airport, average peak period travel times are forecast to reduce by about 10 minutes. This saving is part of a 30 minute saving comparing the 2033 ‘With project’ scenario to a scenario without WestConnex

- Between Burwood and Sydney Airport, average peak period travel times are forecast to reduce by about five minutes. This saving is part of a 20 minute saving comparing the 2033 'With project' scenario to a scenario without WestConnex
- Between Silverwater and Port Botany, average peak period travel times are forecast to reduce by about 10 minutes. This saving is part of a 20 minute saving comparing the 2033 'With project' scenario to a scenario without WestConnex.

Road network productivity is forecast to improve in 2033 with the project, with the inclusion of the project. There is a drop in the daily VKT and VHT on the arterial (non-motorway) network with an increase in kilometres and hours travelled along the motorway routes, as seen in Table 10-3 of Appendix H (Technical working paper: Traffic and transport) of the EIS. The addition of the M4-M5 Link provides a significant overall benefit to the network where more or longer trips could be made on the road network in a shorter time.

A number of key benefits and improvements are forecast as a result of the project:

- Non-motorway roads in the Inner West local government area (LGA) are forecast to experience faster trips with the daily average speed increasing by about 10 per cent. Similarly, the vehicle distance travelled on non-motorway roads is forecast to reduce by about 12 per cent. This indicates that on average, these trips are fewer in number and faster
- Improved network productivity on the metropolitan network, with more trips forecast to be made or longer distances travelled on the network in a shorter time. The forecast increase in VKT and reduction in VHT is mainly due to traffic using the new motorway, with reductions in daily VKT and VHT also forecast on non-motorway roads
- The project, along with investment in other road, public transport and active transport projects, would help to accommodate the forecast growth in population and travel demand in the Sydney metropolitan area
- Reduced travel times are forecast on key corridors, such as between the M4 Motorway corridor and the Sydney Airport/Port Botany precinct
- Reduced traffic is forecast on sections of major arterial roads including City West Link, Parramatta Road, Victoria Road, King Street, King Georges Road and Sydenham Road
- Around 2,000 heavy vehicles are forecast to be removed from Parramatta Road, east of the M4 East Parramatta Road ramps, each weekday.

Where the project would connect to the existing road network, increased congestion is forecast in parts of Mascot, along Frederick Street at Haberfield, Victoria Road north of Iron Cove Bridge, Johnston Street at Annandale and on the Western Distributor. A number of these areas are forecast to improve when the proposed future Sydney Gateway and the proposed future Western Harbour Tunnel and Beaches Link are completed.

Project alternatives, such as public transport and demand management, are discussed in **section B11.4.**

An explanation of the cost benefit analysis undertaken for the project, as part of the WestConnex program of works, as well as a description of project benefits, is provided in **section B11.3.2**. Health impacts associated with the project are discussed further in **section B11.11**.

B11.8.23 Protection for streets which may be affected by additional traffic

Part 5, p50

Council seeks to protect streets that may be affected by additional traffic from WestConnex.

Council is developing a strategy to identify and traffic-calm other local roads that may be affected by additional traffic from WestConnex. The Crescent, Johnston Street, Waratah Street, Dalhousie Street, Street Ramsay Street and other adjoining streets are being examined as part of this strategy.

Council is concerned that 'rat-running' will occur as motorists either seek to avoid WestConnex tolls or where WestConnex has missing links - for example, when Stage 1 opens but there is no direct connection to destinations such as Sydney Airport. This would result in significant and potentially permanent adverse impacts on the amenity of Inner West residential neighbourhoods.

Conditions of approval for WestConnex Stages 1 and 2 acknowledge the need for monitoring and treatment of affected roads around WestConnex. For example, Stage 1 Condition E36 and Stage 2 Condition E40 requires the preparation of a Road Network Performance Review Plan which includes assessing the impacts of WestConnex on local roads. Development of the plan would not however commence until 12 months after the project is operational, potentially condemning residents to a period of traffic impacts before any remedial action is contemplated. Council considers this to be unacceptable, arguing that impacts should be projected through traffic modelling, and other prediction techniques and remediation measures put in place to avoid the impacts before they occur.

As a result, Council has commissioned its own traffic modelling, using the 'Zenith' model, which can apply to local roads. RMS is assisting Council with information from its WestConnex Road Traffic Model (WRTM), which applies to main roads. Scenarios being modelled include: base case 2011; base case 2021; project case 2021 – WestConnex Stages 1 & 2; project case 2031 – WestConnex Stages 1 & 2; and project case 2031 – WestConnex Stages 1, 2 & 3.

It is intended that the study be used to develop a program of works for traffic calming potentially affected streets (with input from local communities), then a request made to the NSW Government to fund these works. This is reasonable given there is a clear nexus between impacts from WestConnex and the need for these works. It is also important that these measures are in place prior to the opening of any stage of WestConnex.

Council's preliminary modelling results have highlighted the following streets may be affected by additional traffic from WestConnex: Johnston Street, Annandale; The Crescent, Annandale; Frederick Street, Ashfield; Ramsay Street, Haberfield; Marion Street, Haberfield; Alt Street, Ashfield; Bland Street, Ashfield; Waratah Street, Haberfield; Dalhousie Street, Haberfield; Campbell Street, St Peters; and Unwins Bridge Road, St Peters.

Response

Section 11.2.1 of Appendix H (Technical working paper: Traffic and transport) of the EIS outlines the changes to the surface road network that are proposed within the M4-M5 Link project design to complement and/or mitigate the impacts of the project. These include:

- Minor physical integration works with the surface road network at the Wattle Street interchange, including road pavement and line marking
- Minor physical integration works with the surface road network at the St Peters interchange, including road pavement and line marking
- The Rozelle interchange surface works, including:
  - Widening and realignment of City West Link, The Crescent and Victoria Road at Lilyfield and Rozelle
  - Realigning The Crescent at Annandale, including a new bridge for The Crescent to pass over Whites Creek and modifications to the intersections with City West Link and Johnston Street
  - Reconstructing the intersection of The Crescent and Victoria Road at Rozelle, including construction of a new bridge at Victoria Road, while maintaining the eastbound through movement to Anzac Bridge under the intersection
  - New active transport network infrastructure connecting the Rozelle Rail Yards with the wider pedestrian and cyclist network, including two north–south pedestrian and cyclist bridges over City West Link and an east–west underpass below Victoria Road
- The Iron Cove Link surface works, including:
  - Realignment of the westbound (southern) carriageway of Victoria Road between Springside Street and the eastern abutment of Iron Cove Bridge
  - Permanent closure of Clubb Street south of Victoria Road at the start of construction
  - Minor modifications to other intersections along the southern side of Victoria Road including Toelle Street, Callan Street and Springside Street. These streets would generally remain open during construction and would provide the same turning movements as the existing arrangement once works are complete
  - Minor changes to the right hand turn movement from Victoria Road into Terry Street
  - Upgrades and modifications to the shared pedestrian and cycle paths along the westbound

(southern) carriageway of Victoria Road.

A number of key benefits and improvements are forecast as a result of the project:

- Non-motorway roads in the Inner West LGA are forecast to experience faster trips with the daily average speed increasing by about 10 per cent. Similarly, the vehicle distance travelled on non-motorway roads is forecast to reduce by about 12 per cent. This indicates that on average, these trips are fewer in number and faster
- Improved network productivity on the metropolitan network, with more trips forecast to be made or longer distances travelled on the network in a shorter time. The forecast increase in VKT) and reduction in VHT is mainly due to traffic using the new motorway, with reductions in daily VKT and VHT also forecast on non-motorway roads
- The project, along with investment in other road, public transport and active transport projects, would help to accommodate the forecast growth in population and travel demand in the Sydney metropolitan area
- Reduced travel times are forecast on key corridors, such as between the M4 Motorway corridor and the Sydney Airport/Port Botany precinct
- Reduced traffic is forecast on sections of major arterial roads including City West Link, Parramatta Road, Victoria Road, King Street, King Georges Road and Sydenham Road
- Around 2,000 heavy vehicles are forecast to be removed from Parramatta Road, east of the M4 East Parramatta Road ramps, each weekday.

Where the project would connect to the existing road network, increased congestion is forecast in parts of Mascot, along Frederick Street at Haberfield, Victoria Road north of Iron Cove Bridge, Johnston Street at Annandale and on the Western Distributor. A number of these areas are forecast to improve when the proposed future Sydney Gateway and the proposed future Western Harbour Tunnel and Beaches Link are completed.

Appendix H (Technical working paper: Traffic and transport) of the EIS acknowledges that management of operational traffic and transport impacts around the three interchanges at Wattle Street, Rozelle and St Peters would be required. As with the M4 East and New M5 projects, Roads and Maritime would undertake a Road Network Performance Review, in consultation with Transport for NSW and relevant councils. This would confirm the operational traffic impacts of the M4-M5 Link on surrounding arterial roads and major intersections at both 12 months and five years after opening of the project. The assessment would be based on future updated traffic surveys taken during operation utilising an appropriate methodology following the relevant and industry accepted guidelines current at the time. Regardless, those areas that have been identified as being potentially impacted by the project have been identified in Appendix H (Technical working paper: Traffic and transport) of the EIS and would be addressed prior to these operational reviews, or as needed.

The Inner West Council's discussion of the traffic study it has commissioned and the intended actions as a result of the outcomes of the study is noted, but beyond the scope of the EIS and are a matter for the NSW Government.

B11.8.24 Concerns about the ability for WestConnex to remove heavy vehicles from the surface roads

Part 5, p52

Beca's assessment raises concerns about the ability of WestConnex to remove heavy vehicles from surface roads as originally planned.

Beca has pointed out that although one of the main original justifications for the WestConnex was to take airport and port related heavy vehicles off the surface roads, there is little evidence that this project aim remains valid. As indicated in the EIS, relatively few heavy vehicles in 2031 [2033] are likely to have a desire line between the eastern end of the M4 and the airport and port.

Further, the project now delivers vehicles at the surface at St Peters, some 5 km by road from the airport and some 15 km by road from Port Botany, thus requiring the construction of the Sydney Gateway an additional project (not part of this EIS) to gain access to the airport/port.

Nor has the EIS indicated the degree to which heavy vehicles will be attracted to the motorway regarding the sensitivity of heavy vehicle users to tolling regimes, the inability of dangerous good vehicles to be permitted to use tunnels or the likelihood of reduced surface road congestion to attract heavy vehicles to these surface roads.

Beca's traffic assessment raises a number of issues about EIS's traffic modelling, including lack of background information and flawed assumptions.

Response

Increases in daily traffic on surface roads between the St Peters interchange and Sydney Airport are forecast, with traffic reductions projected for sections of the Princes Highway and Canal Road. Changes in operational performance on these surface roads close to the St Peters interchange are described in section 10.5 of Appendix H (Technical working paper: Traffic and transport) of the EIS.

With the inclusion of the M4-M5 Link, the WRTM is forecasting reductions in peak period travel times between the M4 corridor and the Sydney Airport/Port Botany precinct in 2023, with traffic shifting from the A3 (King Georges Road) corridor to the M4-M5 Link. This is discussed further in **section B11.8.22**.

Some improvement in travel times between the Victoria Road corridor and the Sydney Airport/Port Botany precinct are also forecast in the 'With project' scenario.

In 2023, with the inclusion of the project, road network productivity is forecast to improve as indicated by a drop in the daily VKT and VHT on the arterial (non-motorway) network, with an increase in kilometres and hours travelled along the motorway routes. Overall, the road network would accommodate more or longer trips in a shorter time. As shown in Table 10-1 of Appendix H (Technical working paper: Traffic and transport) of the EIS, the increase in daily VKT and drop in VHT is mainly due to traffic using the new motorway, with reductions in daily VKT and VHT forecast on non-motorway roads.

The pattern of change highlighted in the 2023 comparison is generally the same as in the 2033 comparison. On some roads, the forecast increases in daily traffic volumes are less pronounced due to the growth in background traffic by 2033.

With the inclusion of the M4-M5 Link, the WRTM is forecasting reductions in peak period travel times between the M4 corridor and the Sydney Airport/Port Botany precinct in 2033, with traffic shifting from the A3 (King Georges Road) corridor to the M4-M5 Link. This is discussed further in **section B11.8.22**

Road network productivity is forecast to improve in 2033 with the inclusion of the project. There is a drop in the daily VKT and VHT on the arterial (non-motorway) network with an increase in kilometres and hours travelled along the motorway routes, as seen in Table 10-3 of Appendix H (Technical working paper: Traffic and transport) of the EIS. The addition of the M4-M5 Link provides a significant overall benefit to the network where more or longer trips could be made on the road network in a shorter time.

On-road freight

Forecast changes in daily road-based freight or heavy vehicle movements generally follow the same pattern as the general traffic movements. With the inclusion of the M4-M5 Link, the WRTM is forecasting reductions in peak period travel times between the M4 corridor and the Sydney Airport/Port Botany precinct in 2023, with traffic shifting from the A3 (King Georges Road) corridor to the M4-M5 Link. This is discussed further in **section B11.8.22**.

In 2023, with the inclusion of the project, road network productivity is forecast to improve as indicated by a drop in the daily VKT and VHT on the arterial (non-motorway) network, with an increase in kilometres and hours travelled along the motorway routes. Overall, the road network would accommodate more or longer trips in a shorter time. As shown in Table 10-1 of Appendix H (Technical working paper: Traffic and transport) of the EIS, the increase in daily VKT and drop in VHT is mainly due to traffic using the new motorway, with reductions in daily VKT and VHT forecast on non-motorway roads.

The pattern of change highlighted in the 2023 comparison is generally the same as in the 2033 comparison. On some roads, the forecast increases in daily traffic volumes are less pronounced due to the growth in background traffic by 2033.

With the inclusion of the M4-M5 Link, the WRTM is forecasting reductions in peak period travel times between the M4 corridor and the Sydney Airport/Port Botany precinct in 2033, with traffic shifting from the A3 (King Georges Road) corridor to the M4-M5 Link. This is discussed further in **section B11.8.22**

Road network productivity is forecast to improve in 2033, with the inclusion of the project. There is a drop in the daily VKT and VHT on the arterial (non-motorway) network with an increase in kilometres and hours travelled along the motorway routes, as seen in Table 10-3 of Appendix H (Technical working paper: Traffic and transport) of the EIS. The addition of the M4-M5 Link provides a significant overall benefit to the network where more or longer trips could be made on the road network in a shorter time.

Increases in daily heavy vehicle traffic are forecast on surface roads between the St Peters interchange and Sydney Airport. Reductions in daily heavy vehicle volumes are forecast on sections of the Princes Highway and Canal Road. Changes in operational performance on these surface roads close to the St Peters interchange are described in section 10.5 of Appendix H (Technical working paper: Traffic and transport) of the EIS.

In addition, if approved, the Sydney Gateway project would duplicate the Port Botany rail freight line, to get more freight on trains and off trucks[8].

See responses to Beca's assessment of traffic and transport issues in **Chapter B12** (Beca report).

B11.8.25 Active transport connectivity during operation

Part 5, p53

There is a need to improve north-south connectivity across the RRY [Rozelle Rail Yard] site

Council is keen to ensure the creation of the RRY recreation area results in significantly improved walk/cycle connectivity across this site. Council notes that north-south connectivity has been poor in the past due to lack of any public access to or through the RRY site, although some of these movements have been possible along a limited number of public roads that cross the site, such as Balmain Road and Catherine Street.

The wide and heavily-trafficked City West Link Road (and the inaccessible RRY site itself) have traditionally been a barrier to north-south connectivity. On either side of the RRY site, east-west movements have been possible along reasonably direct local streets such as Lilyfield Road, Railway Parade and Brenan Street, even though the City West Link Road is not available to pedestrians and cyclists. Creation of the RRY recreation area represents an important opportunity to improve this situation.

Although Council generally supports the walk/cycle routes proposed within the EIS's active transport strategy it is apparent further work is needed to ensure routes follow walk/cycle desire lines and are designed to a suitably high standard. Should Stage 3 proceed, it is anticipated that Council staff will continue to work with project staff and the community to refine these designs.

Council's main concerns at this stage are the need for a greater number of north-south walk/cycle connections, that walk/cycle bridges be constructed to a higher standard than shown and that the proposed land bridge from Buruwan Park not detrimentally affect the park or active transport links across The Crescent to Federal and Jubilee parks and the shared foreshore path network.

The two connections shown are welcomed, but a third (and possibly fourth) connection is warranted to ensure maximum connectivity. In the draft masterplan only one of the two bridges shown is a 'land bridge' – the other is a minimum-width bridge without landscaping. All bridges should be designed and constructed as land bridges to ensure the crossing of City West Link Road is as attractive and safe as possible. The added cost is warranted as the RRY recreation area is expected to generate considerable walk/cycle traffic. Prioritising walk/cycle access is also important to minimise the need to access the site by car, reducing the need to provide for parking within or near the site.

Part 5, p54

There is a need to integrate new walk/cycle routes across the RRY site with regional networks.

It is important that walk/cycle connections to and through the RRY site are integrated into the regional walk/cycle network defined by various active transport plans of the NSW Government and relevant councils.

[8] http://www.rms.nsw.gov.au/documents/projects/sydney-south/sydney-gateway/sydney-gateway-factsheet.pdf

Capacity capture opportunities on streets likely to experience reduced traffic from WestConnex (discussed above) should provide the ability to enhance connectivity to existing networks and desired future networks. These networks are defined in Council's bicycle plans and in the City of Sydney's Inner Sydney Regional Bike Network. A key route to address is the City West Cycle Link, which would run along the Inner West light rail corridor between The GreenWay / Bay Run and Anzac Bridge / Glebe Island Bridge.

A reinstated Glebe Island Bridge, a heritage-listed RMS asset, would be part of the wider GreenWay / Bays Precinct active transport network. Additionally the new (fenced-off) section of James Craig Road, an extension between White Bay and Glebe Island, would be part of a future public/active transport corridor to the City and Pyrmont from Balmain via the Glebe Island Bridge.

The project's active transport strategy should also consider standards set by Council for the abovementioned GreenWay – developed as part of Council's GreenWay 'missing links' strategy. This includes standards for landscaping using locally indigenous species, bike path widths, signage, lighting, public domain and street furniture for the Greenway missing links strategy. Paths should also incorporate public art wherever possible and commission works by local artists.

Part 5, p54

Need to maintain a walk/cycle connection from Railway Parade and The Crescent and more space for cyclists beneath the railway bridge at The Crescent.

Post-construction, there must be sufficient space at this location for a flat path to run on the southwest edge of the proposed slip-lane from Railway Parade to connect with The Crescent footpath. The project also provides an opportunity to widen the road shoulder or provide a dedicated bicycle path under the railway viaduct for cyclists using The Crescent.

Part 5, p55

There is a need for separated bicycle lanes along Victoria Road at Rozelle and clarification of plans for the existing walk/cycle bridge over Victoria Road.

Regarding the impact of pedestrian and cycling routes along Victoria Road at Rozelle, there appears to be a difference between the EIS's active transport strategy and other parts of the EIS. The active transport strategy refers to a separated cycleway along Victoria Road while EIS plans don't appear to indicate one. Further, the plans don't appear to indicate any public domain improvements along Victoria Road. From the EIS it is also unclear whether the walk/cycle bridge over Victoria Road near Lilyfield Road will remain. Removal of this bridge has a number of implications, including maintenance of pedestrian access to the White Bay bus stop.

Part 10, p70

There is a need for the design of the RRY recreation area to maximise walk/cycle connectivity to and consider rights-of-way for future public transport.

Council is also keen to maximise walk/cycle connectivity to/from all adjoining streets and Easton Park connecting to the new areas. There are many opportunities to do this on the northern site, but the City West Link Road is a barrier on the southern side and there will be reliance on three proposed bridge connections - two over City West Link Road and one over The Crescent. Three access points provided by these bridges is considered sufficient, as they are reasonably evenly spaced across the length of the RRY site.

It is also important that the existing walk/cycle connections over Victoria Road to the Anzac Bridge, to White Bay and to the Rozelle and Balmain area be improved by the project. Providing both ramp and stair links to the eastern and western sides of Victoria Road are also important.

Elsewhere in this submission Council has outlined its support for retention of rights-of-way for future public transport. Accordingly it is critical that the proposed walk/cycle link through the freight rail tunnel under Victoria Road should not preclude a future light rail link to White Bay. This issue must be considered now to ensure the right-of-way is not severed.

Response

An active transport strategy has been developed for the project and is provided in Appendix N (Technical working paper: Active transport strategy) of the EIS. The active transport strategy was developed in consultation with stakeholders and through analysis of current and proposed active transport routes and relevant active transport policies and guidelines. The project provides an opportunity to address poor active transport connectivity in the study area, including along Victoria Road and the Rozelle Rail Yards at Rozelle. In addition, the diverting of through traffic from local roads onto roads upgraded as part of the project around the interchanges and into the WestConnex tunnels would improve pedestrian and cyclist safety.

Key north–south connectivity would be established via the two new pedestrian and cyclist bridges over City West Link. These links would greatly improve accessibility between Glebe/Annandale and Rozelle/Lilyfield. They would also provide connectivity between Rozelle Bay and Iron Cove, through key green spaces of Bicentennial Park, open space at the Rozelle Rail Yards, Easton Park and Callan Park.

East–west connectivity would be provided through the site connecting to the Lilyfield Road cycleway adjacent to the CBD and South East Light Rail (CSELR) Rozelle maintenance depot at the western end of the Rozelle Rail Yards. A path would be provided that connects to the existing Anzac Bridge shared path by travelling underneath the Victoria Road/The Crescent intersection. This connection would provide future possibilities for connections into The Bays Precinct.

The project would improve connectivity and safety for pedestrians and cyclists, and would contribute to the active transport network in the region. Cyclist and pedestrian paths delivered by the project would create safe links that have reasonable grades and are separated from vehicular traffic. The final gradients of cyclist and pedestrian paths would be subject to detailed design.

Further discussion of active transport during operation associated with the Rozelle Rail Yards is provided in **section B13.6.1** and active transport at The Crescent and Victoria Road is presented in **section C13.10.1**.

B11.8.26 Car parking and traffic for the Rozelle Rail Yards

Part 10, p71

There is a need for careful management of car parking and traffic for the RRY recreation area.

In view of the expected high levels of walk/cycle traffic to and through the RRY recreation area, speed reductions should apply to all streets around the site. As far as possible, parking for the RRY recreation area should be on surrounding streets, not within the park, as Council is keen to ensure recreation space is not lost to parking. It is expected a high proportion of trips to the RRY recreation area would be by means other than car given the walk/cycle links to surrounding densely-developed residential areas and the ability to access the site by light rail.

Response

The final uses of the Rozelle Rail Yards, including parking, would be determined through the UDLPs in consultation with relevant stakeholders including Inner West Council.

B11.9 Air quality

Refer to Chapter 9 (Air quality) and Appendix I (Technical working paper: Air quality) of the EIS for details of air quality.

B11.9.1 Concerns regarding emissions from ventilation facilities

Part 3, p19

Air quality and visual impacts from ventilation facilities, including concerns about unfiltered ventilation facilities proposed for the Rozelle Rail Yards (RRY) site and Victoria Road near Terry Street – the latter facility raising particular concerns due to its proximity to densely developed residential areas

Part 3, p21

Council and the community are concerned about emissions from both ventilation facilities and roadside emissions. The EIS correctly states that surface road emissions would be reduced wherever vehicles are within WestConnex tunnels. This however should not be claimed as a benefit of the project, as these same emissions emerge at the ventilation facilities. The EIS claims that ventilation facility emissions do not represent a major impact on surrounding communities and are able to meet emission standards by dispersing pollutants into the regional air-shed. Council remains concerned about any contribution to air pollution at both the local and regional level.

It would appear that concerns about the Stage 3 ventilation facilities at the RRY site and on Victoria Road have been greater than the Stage 3 facilities proposed for St Peters and Haberfield/Ashfield. This is because the community has known about the Stage 1 and 2 facilities for some time. This does not necessarily mean that the actual impact of the Haberfield/Ashfield and St Peters ventilation facilities will be less than the Rozelle facilities – in fact, Council is concerned that the co-location of ventilation facilities at Haberfield/Ashfield and St Peters could result in higher cumulative emissions.

Council is strongly of the view that releasing emissions from these facilities unfiltered - as is proposed for all stages of WestConnex - is not acceptable, even if compliance with regional air quality standards can be achieved without filtration. Council is aware that filtration is costly, reduces the dispersal of emissions by slowing the velocity of air passing through the facility and is not currently applied (or proposed to be applied) to any motorway tunnel in Sydney.

At a local level, there has been particular concern in the community about air quality and visual amenity impacts from the ventilation facilities proposed for Stage 3 within the RRY site (near The Crescent) and on Victoria Road near Terry Street. The latter facility has raised concerns due to its proximity to densely-developed residential areas and the fact that residential areas on the eastern side of Victoria Road are elevated, so there is a possibility that some dwellings will be above the level of the facility outlet.

Similar concerns have been raised that some residential areas in Rozelle and Lilyfield would be above the level of ventilation facilities proposed for the RRY site near The Crescent. Rozelle Primary School and Sydney Secondary College Balmain are also within close proximity to the Victoria Road / Terry Street facility, and Council is aware that the school's Parents' and Citizens' Association (P&C) has raised concerns about air quality impacts on children. These and other schools in the area around the RRY could also potentially be above the level of the ventilation facility.

Although raising the height of ventilation facilities increases dispersal of emissions, it also increases visual impact. The height of the St Peters ventilation facilities has been limited by the Obstacle Limitation Surface for Sydney Airport, so reduced dispersal can be expected from these facilities. At St Peters, Council is also concerned that the dispersal of ventilation facility emissions may be affected by turbulence from passing aircraft.

Concerns have also been raised about emissions from the combined Stage 1 and Stage 3 ventilation facility on Parramatta Road at Haberfield affecting Haberfield Primary School, and emissions from the Stage 2 and 3 facilities at the St Peters Interchange affecting St Peters Primary School.

Recommendation: That Council requests that the DP&E require, prior to any determination, a further assessment of air quality impacts from ventilation facilities on nearby schools and to assess ventilation facility height, local topographical effects and weather effects on emissions (AQ4).

Part 3, p19

Air quality and visual impacts from ventilation facilities, including concerns about unfiltered ventilation facilities proposed for the Rozelle Rail Yards (RRY) site and Victoria Road near Terry Street – the latter facility raising particular concerns due to its proximity to densely developed residential areas.

Response

The Inner West Council's concerns about local and regional air quality are noted. A response to the Inner West Council's concern's regarding the non-filtration of ventilation outlets is provided in **section B11.9.3**.

Cumulative emissions arising from co-location in Haberfield and St Peters

The M4 East ventilation outlet was designed to accommodate the M4-M5 Link ventilation requirements with a separate outlet and plant room provided within the Parramatta Road ventilation facility at Haberfield. The fitout of that outlet would be undertaken by the design and construction contractor(s) to ensure that it is appropriate for project capacity requirements. The Campbell Road ventilation facility at St Peters would include a ventilation supply facility and ventilation outlet facility. During the assessment of the M4 East and New M5 projects, air quality impacts from the M4-M5 Link were considered in the cumulative assessments in the EISs for those projects.

The air quality assessment provides emission profiles for each ventilation outlet (refer to section I.1.3 of Annexure I of Appendix I (Technical working paper: Air quality). Detailed contour plots which map the predicted dispersion of airborne emissions from the ventilation outlets are provided in Annexure K of Appendix I (Technical working paper: Air quality) of the EIS, and the outlets from the preceding WestConnex projects are included in the cumulative scenarios modelled. The contour plots show annual mean and maximum 24 hour mean emission of oxides of nitrogen (NO_X), particulate matter 10 micrometres or less (PM_{10}) and particulate matter 2.5 micrometres or less ($PM_{2.5}$) for 2023 and 2033 for each ventilation outlet.

The assessment determined that emissions from the project ventilation outlets at Haberfield and St Peters, even in the regulatory worst case scenarios, would not result in any substantial impact on local air quality. Emissions from the ventilation outlets are predicted not to make any substantial contributions to air quality impacts at any existing receptors including on residents and sensitive community receptors such as schools and open space.

Ambient air quality monitoring will be carried out in the vicinity of the ventilation outlets installed as part of the project. Monitoring will occur at key representative locations, identified in consultation with an independent air quality specialist and an Air Quality Community Consultative Committee (AQCCC), to allow direct comparison of measured ambient air quality with dispersion model predictions. The monitoring will commence at least 12 months prior to and continue for at least two years following the commencement of operation. Monitoring results and a comparison of monitoring results against dispersion model predictions and relevant ambient air quality criteria will be made publicly available as reflected in environmental management measure AQ29 in **Chapter E1** (Environmental management measures).

All relevant air quality monitoring results will be made available to the public on the WestConnex website[9]. Historic results for the WestConnex program of works are currently available on this website.

At the regional level, the changes in the total emissions resulting from the project show minimal change between the 'Do minimum' ('Without project'), 'Do something' ('With project') and 'Do something cumulative' ('Cumulative') scenarios and all are significantly lower than the 'Base Year (2015)' emissions without any of the projects in operation as assessed in the 'Do something' and 'Do something cumulative' scenarios. For example:

- The increases in the NO_X emissions for the assessed road network in a given year ranged from 71 to 174 tonnes per year. These values equate to a very small proportion (around 0.3 per cent) of anthropogenic NO_X emissions in the Sydney airshed in 2016 (around 53,700 tonnes)
- The increases in NO_X in a given year are much smaller than the projected reductions in emissions between the base year (2015) and 2033 (around 2,340 tonnes per year)
- Changes to ground level ozone are below the NSW EPA's Screening Impact level criteria for ozone.

Filtration

A response to the Inner West Council's concerns regarding the non-filtration of ventilation outlets is provided in **section B11.9.3**

[9] https://www.westconnex.com.au/local-updates?default_view=2&project=14&updates=9

Elevated properties

An assessment was undertaken to determine the air quality impacts of the project on elevated receivers. The calculation of elevation considered the height of buildings and terrain (refer to section 9.7.5 of the EIS). The ventilation outlets were predicted not to result in adverse air quality impacts at any existing elevated receptors as there are no existing buildings 10 metres or higher located close to the proposed ventilation facilities. The results are shown in Figure 9-66 to Figure 9-68 in Chapter 9 of the EIS. The figure of 30 metres mentioned in Chapter 9 (section 9.7.5) of the EIS is a typographical error. This error has been corrected in **Chapter A4** (Clarifications).

As described in section 3.2 of Appendix I (Technical working paper: Air quality) of the EIS, the explanation for why no adverse impacts to elevated receivers are expected is as a result of the way the ventilation outlets work. They function by taking advantage of the turbulent mixing in the atmosphere which is assisted by the general increase in wind speed with height (Longley 2014a). The concentrations of pollutants at locations of potential exposure are determined by the emission rates of the pollutants and the effectiveness of the ventilation system at harnessing the dispersive capacity of the atmosphere. The concentrations of pollutants at ground level are progressively reduced as the height of the outlet increases. A combination of the design height of the outlet and the amount of fresh air that is mixed with the polluted air from the tunnel can be used to ensure appropriate dilution before the exhaust plume makes contact with the ground. The temperature of the air leaving tunnel ventilation outlets is also an important determinant of the dispersion of pollutants. Plumes with higher temperatures have higher buoyancy, which generally means that the plume is carried higher into the atmosphere, resulting in improved dispersion. The temperature of the plume is influenced by the number of vehicles moving through the tunnels, as some of the heat from the vehicle exhaust would be carried through to the ventilation outlets.

The height of the ventilation outlets was optimised to provide a balance between effective dispersion, visual impact while meeting the aviation safety requirements. Increased turbulence in the air increases dispersion, so any additional turbulence from aircraft passing over the plume would enhance dilution of the plume by increasing the mixing of the plume into the surrounding air. This would reduce the concentrations at receivers.

In summary, the contribution of tunnel ventilation outlets to ground level concentrations for all pollutants was found to be negligible. This is due to the effective dispersion that occurs when tunnel emissions are discharged at height and at velocity into the atmosphere.

The air quality assessment provides emission profiles for each ventilation outlet (refer to section I.1.3 of Annexure I of Appendix I (Technical working paper: Air quality) of the EIS). Detailed contour plots which map the predicted dispersion of airborne emissions from the ventilation outlets are provided in Annexure K of Appendix I (Technical working paper: Air quality) of the EIS. The contour plots show annual mean and maximum 24 hour mean emissions of NO_X, PM_{10} and $PM_{2.5}$ for the assessment year 2023 and 2033 for each outlet.

The effects of terrain and relative heights are taken into account in the dispersion modelling. The combined effect of the Rozelle interchange and Iron Cove Link outlets on the Rozelle Public School is shown in the EIS. For example, Figure 8-73 of Appendix I (Technical working paper: Air quality) of the EIS shows the contribution of the outlets to annual average $PM_{2.5}$ at the school.

The air quality impact assessment determined that emissions from the project ventilation outlets at Iron Cove and Rozelle, even in the regulatory worst case scenarios, would not result in any substantial impacts on local air quality. The ventilation outlet was predicted not to result in adverse air quality impacts at any existing receptors.

Dispersion model results will be verified by conducting ambient air quality monitoring at key representative locations around the ventilation outlets during operation as reflected in the environmental management measure AQ29 in **Chapter E1** (Environmental management measures).

The visual amenity aspects of the issue raised in Part 3, p19 is discussed in **section B11.3.9**.

B11.9.2 Cumulative impacts on Sydney's air quality from road projects

Part 3, p20

There is a need to reduce emissions from all sources and further assess the project's contribution to cumulative emission impacts.

It is noted from the EIS that Sydney's air quality is considered good by world standards. This is not disputed, but the statement that the NSW Government is committed to improving it by reducing emissions from vehicles (and all other sources) is disputed, as WestConnex will inevitably lead to traffic growth across a large part of Sydney. With more vehicles will come more emissions?

Induced demand created by WestConnex, i.e. car trips that happen purely as a consequence of the motorway being built, is anticipated to be 45,000 additional car trips per day. Increased traffic has the potential to create greater congestion at locations slightly removed from WestConnex, including Iron Cove Bridge and Anzac Bridge. Congestion would contribute to a further decline in air quality in Sydney. The EIS has not acknowledged that the air pollution created by these new congestion points would likely outweigh improvements achieved by improved traffic flows on the motorway and create 'hot-spots' of poor air quality at congestion points across Sydney.

The EIS argues that the contribution of car exhaust to total air pollution at the Sydney metropolitan scale is minor at only 0.75%, with solid fuel burning the largest contributor at 50.6%. The EIS has omitted other non-exhaust particulates emitted by vehicles (5.5%), light duty diesel exhaust (2.2%), industrial vehicles and equipment (1.4%), which would bring total vehicle emissions to almost 10%.

Even if this was considered to be a low proportion of the total, the EIS concedes that $PM_{2.5}$ vehicle emissions can have a health impact at any level, as can the cumulative impacts of all emissions. It could thus be argued that governments should be acting to reduce all types of emissions within all sectors, including transport. As is mentioned above, the long-term goal for transport emissions should be zero, through high-occupancy public transport powered by renewables.

Response

Congestion and induced traffic are considered in the traffic modelling carried out for the M4-M5 Link (refer to Appendix H (Technical working paper: Traffic and transport) of the EIS). The air quality assessment included detailed analysis of the predicted air quality from surface traffic during the operation of the project and takes congestion into account in the emission modelling.

The project has been designed to reduce surface road congestion, and hence vehicle emissions, noting that vehicles generate lower emissions under free flowing conditions compared with congested stop-start travel. The emissions and dispersion modelling carried out as part of the EIS predicts that changes in overall emissions from surface roads due to the project would be relatively small. There are predicted to be either small decreases or small increases (depending on the pollutant/scenario) on surface roads as a result of redistribution of traffic but there would be an overall decrease in emissions with the project in 2023 and 2033 compared with the base year of 2015, allowing for traffic growth. Increased pollutant concentrations are, however, predicted to the north of Iron Cove Link and near Anzac Bridge as a result of the general increase in traffic due to the project.

Non-exhaust particles are included in the emission estimates. The future regulation of non-exhaust particles is beyond the scope of the EIS.

The contour plots provided in Chapter 9 of the EIS (Figure 9-31 and 9-32 and Annexure K to Appendix I (Technical working paper: Air quality) of the EIS) show the changes in surface road emissions for the scenarios modelled in 2023 and 2033.

It has been shown that control of pollutants at the source, ie vehicle emissions controls, is significantly more effective in improving local and regional air quality (Advisory Committee on Tunnel Air Quality 2014 Technical Paper 08 (ACTAQ 2014), National Health and Medical Research Council (NHMRC) (2008). The NSW Government is also committed to continuing to work with the Australian Government to implement cleaner fuels and cleaner vehicles, hence reducing emissions at source.

B11.9.3 Filtration of ventilation emissions

Part 3, p22

Filtration is justified and a further assessment of filtration options is needed.

Beca concurs with the EIS that results of the modelling indicates that discharges from the ventilation facilities are unlikely to make a significant contribution to ambient air pollutant levels. However the primary impact will be from changes in surface road traffic volumes. This is predicted to be a spatially asymmetric effect. Compared to a 'Do minimum' traffic scenario prediction, air quality levels would potentially improve at some locations while deteriorate at others. The primary concern is predicted to be emissions of NO_2 and fine particulate matter.

Nonetheless, Council considers that filtration should be applied to all WestConnex ventilation facilities to ensure every effort is made to minimise air quality impacts. As far as Council is concerned, the added financial cost of filtration is justified to ensure the health costs of WestConnex are not passed on to the community. The added costs of filtration further highlights the need for a re-assessment of the project's benefits and costs.

Response

The assessment of the need for filtration determined that there was no beneficial impact on air quality by implementing tunnel air filtration (refer to section 9.2.3 of the EIS). The assessment demonstrated that any predicted impact on local air quality due to emissions from the ventilation outlets would be very small. The justification for this is based on the following conclusions from the assessment:

- Under expected traffic conditions, the predicted contribution of tunnel ventilation outlets to ground level pollutant concentrations was negligible for all receptors
- The assessment of filtration concluded that filtration would not provide a significant benefit in annual $PM_{2.5}$. The background concentration of $PM_{2.5}$ used in the assessment was taken to be the same as the NSW criterion of 8 µg/m^3. If outlet emissions were eliminated, the largest reduction in annual average $PM_{2.5}$ concentrations that people breathe would be 0.25 µg/m^3, with the reduction at most locations significantly less than this. A change in concentration of this magnitude cannot be measured because it is so small. The assessment concluded that filtration would not provide a significant benefit
- Filtration would not remove 100 per cent of pollutants and does not remove all pollutant types
- Including filtration in the ventilation facilities would result in no material change in air quality in the surrounding community when compared to the current project ventilation system and outlet design
- Any predicted changes in concentration were driven by changes in the traffic volumes on the modelled surface road network, not by the tunnel ventilation outlets
- The technology around tunnel air filtering systems for nitrogen dioxide is relatively new, and any benefit has yet to be sufficiently measured.

Very few tunnels around the world (new or under construction) are equipped with air treatment systems. There are around 75 installations of electrostatic precipitators to remove particulate matter, although many of them have not been activated. There are five installations of de-nitrification systems to remove nitrogen dioxide. Evidence to date suggests that the effectiveness of such controls when applied to road tunnels is limited to specific situations and that the technologies are rarely used. A French Government review of international tunnel air treatment, updated in December 2016[10], stated:

'recent tunnel projects often propose the use of air treatment systems in response to concerns expressed by local populations, who have reason to be worried about changes in their environment. Before turning to systems that may effectively provide an answer to a local pollution concern, conventional ventilation techniques (using fresh airflows to dilute pollutants) should still be considered by making use of the appropriate means, i.e. playing on the airflows and concentrations of the discarded vitiated air, as well as on the location and configuration of discharges and any other method likely to improve the dispersion of pollution and so protect the most at-risk areas'

[10] http://www.cetu.developpement-durable.gouv.fr/IMG/pdf/cetu_di_traitement_de_l_air-en-19_07_2017.pdf

'Very few tunnels in the world are equipped with air treatment systems. There are about sixty such tunnels in existence, three quarters of which are in Japan and eight in Norway.'

'several tunnels that have been equipped with electrostatic filters have subsequently used them very little,'

This is consistent with the Victorian Minister for Planning's recent determination for the Westgate Tunnel project which stated:

'I am not persuaded that requiring immediate installation of filtration equipment in the tunnels ventilation systems is justified or cost-effective, or will even deliver a measurably better outcome. Unless a better environmental outcome can be expected, requiring such a measure would be an expensive gesture, distracting both investment and attention from better, and better-targeted, measures.'

It has been shown that control of pollutants at the source, such as vehicle emissions controls, is significantly more effective in improving local and regional air quality ACTAQ 2014 and NHMRC. The NSW Government is committed to continuing to work with the Australian Government to implement cleaner fuels and cleaner vehicles, hence reducing emissions at source.

B11.9.4 Additional assessment of surface road emissions

Part 3, p22

Increased roadside emissions from WestConnex raises concerns and a further assessment of these emissions is needed.

Added to this are emissions from additional WestConnex-generated traffic travelling on surface roads around the three interchanges. It is apparent from the EIS that surface road emission reductions occur above tunnel routes, but increase around the ventilation facilities and on surface roads around the interchanges. Of particular concern are emission increases at Victoria Road from the Iron Cove Link tunnel portal at Rozelle through to Drummoyne; Anzac Bridge and Western Distributor; and Canal Road, Gardeners Road and adjoining major roads in the Mascot area.

Although most of the impacts at these locations are (respectively) within the Canada Bay, City of Sydney and Bayside Council areas, they are close to the Inner West, and the impacts on the Inner West are likely to be increased at times by local weather effects, such as wind – a point that has not been noted in the EIS. Council is concerned about emission impacts on all residential areas and other sensitive uses regardless of whether or not they are within Council's boundaries.

Emission impacts along the Anzac Bridge and Western Distributor are of particular concern as they will affect the substantial future residential and comment development planned for the Bays Precinct. It is critically important that this be taken into account now, before planning for that precinct has progressed further.

It may be appropriate that the amount and density of development planned for the Bays Precinct be reduced to account for WestConnex air pollution impacts. A further concern is the impact of these emissions on the existing area of high density residential (apartment) development on the southern (Bayside Council area) side of Gardeners Road around Mascot Railway Station.

Beca explains that although worst-case emissions from the ventilation discharges have been assessed, it is arguable that, in accordance with the Secretary's Environmental Assessment Requirements (SEARs) air quality requirement 2(d), that worst-case surface-road discharges, for at least the emissions from the roads, ramps and interchanges (which form part of the project) should also be assessed.

Response

Tables 9-30 and 9-31 of the EIS show the total and absolute changes in traffic emissions in the WestConnex study area. These are shown graphically in Figure 9-70 of the EIS which illustrates that there is predicted to be a significant reduction in CO, NO_X and THC (total hydrocarbons) between the 2015 Base Year and 2023, with smaller reductions in PM_{10} and $PM_{2.5,}$ both with and without the project. There are further reductions in carbon monoxide (CO), $NO_{X,}$ $PM_{2.5}$ and THC are predicted in 2033 for all project scenarios including the cumulative scenarios with other Sydney motorways included.

The forecast traffic growth is taken from the WRTM v2.3 traffic model. The air quality modelling includes peak hour congestion on the surface road network in the 24 hour traffic data used in the model, which is the worst traffic case on surface roads.

Concentration gradients in the vicinity of roads have been examined in various studies. Some examples of the results for different pollutants and periods of the day are shown in **Figure B11-1** (Annexure B to Appendix I technical working paper – air quality) which shows concentration gradients of ultrafine particles (UFP), black carbon (BC), which is a major component of $PM_{2.5}$, CO_2, NO and NO_2 at varying distances from a major highway in Toronto, Canada to illustrate the dispersion. In high winds, these pollutants would be significantly diluted and not simply blown into adjoining areas.

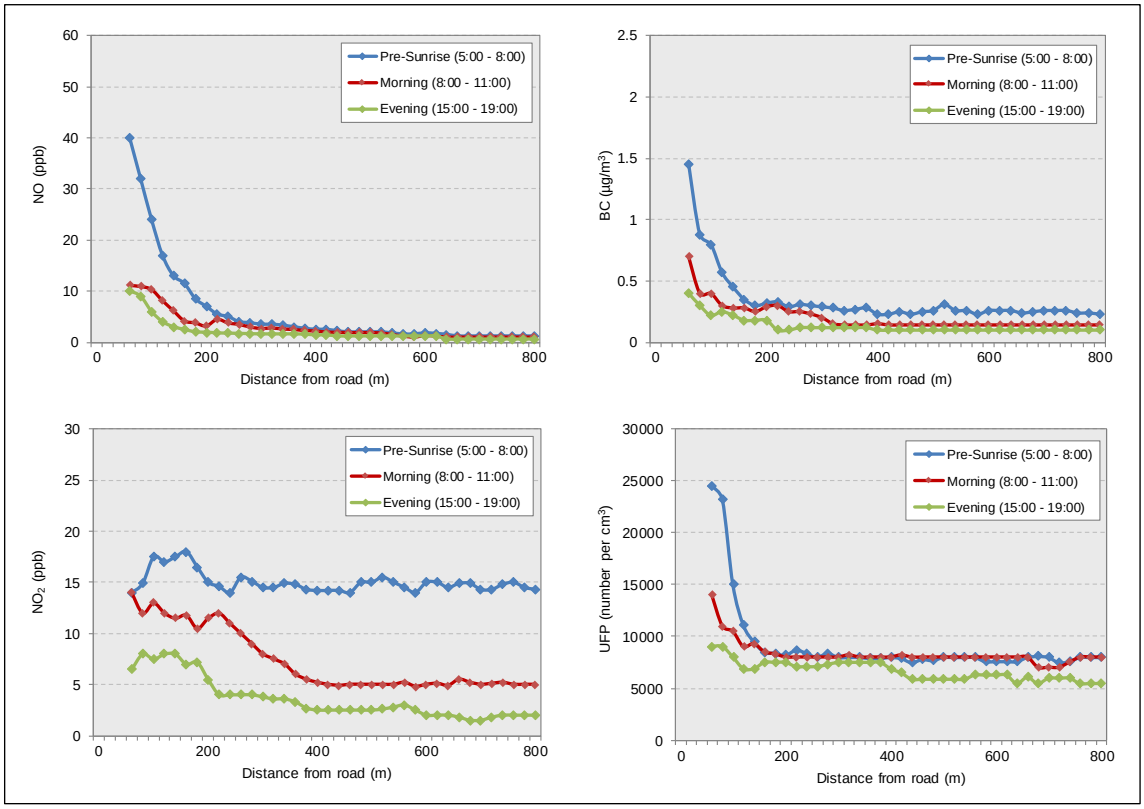

Figure B11-1 Median concentrations of pollutants in the vicinity of a major highway (adapted from Gordon et al. 2012)

There would be an increase in pollutant concentrations to the north of Iron Cove Link and near Anzac Bridge as a result of the general increase in traffic due to the project. It is not likely that the increase in pollutant concentrations would affect the substantial future development planned for The Bays Precinct. Any local increases in emissions need to be considered in the context of the overall citywide reduction in emissions.

Ambient air quality monitoring will be carried out in the vicinity of the ventilation outlets installed as part of the project. Monitoring will occur at key representative locations, identified in consultation with an independent air quality specialist and an AQCCC, to allow direct comparison of measured ambient air quality with dispersion model predictions. The monitoring will commence at least 12 months prior to and continue for at least two years following the commencement of operation. Monitoring results and a comparison of monitoring results against dispersion model predictions and relevant ambient air quality criteria will be made publicly available as reflected in environmental management measure AQ29 in **Chapter E1** (Environmental management measures).

All relevant air quality monitoring results will be made available to the public on the WestConnex website[11]. Historic results for the WestConnex program of works are currently available on this website.

Consideration of future rezoning is outside the scope of the project.

[11] https://www.westconnex.com.au/local-updates?default_view=2&project=14&updates=9

B11.9.5 In tunnel air quality and filtration

Part 3, p23

Council is also concerned about in-tunnel air quality and a further assessment of in- tunnel filtration options is needed.

Despite assurances within the EIS that WestConnex will include a state-of-the-art tunnel longitudinal ventilation system, experience with tunnels such as the existing M5 have shown that it is inherently difficult to achieve clean air within any road tunnel. Cars offer some protection from poor air quality, but this is not the case for motorcycles, and there is likely to a proportion of tunnel users that are sensitive to pollutants at any level, e.g. asthmatics – and it is noted that approximately one in nine Australians suffer from asthma.

Though the journey through WestConnex tunnels would for most drivers last for a relatively short period, there will be regular users of these tunnels that will be affected by pollutants over a long period. There will also be times when congestion slows traffic, increasing emissions and holding motorists within the tunnel for a longer period, increasing their exposure to pollutants.

Further, the EIS does not include any information about alternative in-tunnel ventilation should the main system fail or if there is a fire or similar emergency situation in the tunnel. In contrast, most of these issues do not apply to rail tunnels as there are no in-tunnel emissions.

Beca's assessment raises most concern about in-tunnel emissions. It explains that potential in-tunnel NO_2 effects have been estimated in the EIS using ACTAQ's 2016 In-Tunnel Air Quality (nitrogen dioxide) Interim Policy. This criteria level is consistent with limits used to assess other tunnel projects in NSW. Beca accepts that the ACTAQ criteria as being representative of 'best practice' in NSW given its general acceptance in this state. However, it is noted in the report that there are more stringent in-tunnel limits used internationally.

Response

The air quality criteria adopted by the NSW Government for the assessment of in-tunnel air quality is discussed in section 9.2.3 of the EIS. The route-averaged NO_2 criterion is amongst the most stringent currently in use internationally as shown in Table 9-4 of the EIS and the following extract from the report by the NSW Government Advisory Committee on Tunnel Air Quality "Criteria for In-Tunnel and Ambient Air Quality' Technical Report 11 (Longley 2014).

The World Road Congress has recommended an NO_2 limit of one part per million (ppm), not to be exceeded more than two per cent of the time (Permanent International Association of Road Congresses 2000 (PIARC)). More demanding NO_2 limits have been adopted in France and Hong Kong, with the most demanding limits proposed in Sweden. These are based on a precautionary approach in view of evidence that asthmatics are more susceptible to NO_2. However, this is based on evidence from exposures of 30 minutes or more and, unlike for CO, the significance for much shorter duration exposures to NO_2 is currently unknown. The Norwegian Public Roads Administration has a limit of 1.5 ppm at the tunnel end and 0.75 ppm at its mid-point (NPRA 2004). The New Zealand Transport Agency has adopted a design standard of one ppm (15 minute averaging time), but has not implemented a monitoring compliance standard, in part due to difficulties in monitoring in-tunnel NO_2. Even greater uncertainty exists surrounding the effects on health of brief exposure to PM, and especially UFPs, and the best way to quantify that risk. At the present time an appropriate level of protection from the effect of UFPs is likely to be provided through a combination of the existing CO and visibility limits.

The assessment of in-tunnel air quality used modelling scenarios that reflected the potential modes of operation of the tunnel ventilation system, and a worst case trip scenario for exposure to nitrogen dioxide (NO_2). This pollutant has become the critical vehicle exhaust pollutant for human health in tunnels and therefore for the design and operation of the tunnel ventilation system. The NO_2 criterion used is consistent with that prescribed in the *NSW Government In-Tunnel Air Quality (Nitrogen Dioxide) Policy* (February 2016), which states (page 30):

'An extensive review of the scientific literature commissioned by NSW Health found some evidence of health effects from short term exposure to nitrogen dioxide concentrations between 0.2 and 0.5 ppm. This review did not identify health effects from short term (20 – 30 minutes) exposure to nitrogen dioxide at levels below 0.2 ppm.

Modern cars with air vents set to recirculate can result in significantly lower in-cabin NO2 levels than in-tunnel levels. A study conducted in Sydney motorway tunnels found that vehicle ventilation systems can reduce in-tunnel levels by greater than 70 per cent, with reductions of greater than 90 per cent typical for newer vehicles.

The evidence indicates that application of a tunnel average criterion of 0.5 ppm as a rolling 15-minute average would result in an exposure of less than 0.2 ppm in passenger vehicles with the windows up and air vents set to recirculate ie. below the level where health effects have been identified'.

The modelling scenarios that were assessed comprise:

- Expected traffic scenarios - These scenarios represented the 24 hour operation of the tunnel ventilation system under day-to-day conditions of expected traffic demand in 2023 and 2033
- Regulatory demand (24 hour) traffic scenarios - In these scenarios, in-tunnel air quality was calculated with traffic scaled up to the maximum capacity of the tunnel to demonstrate that the in-tunnel air quality criteria would still be met
- Worst case traffic scenarios - These simulations addressed the most onerous traffic conditions for the ventilation system to manage air quality, based on traffic conditions between 20 and 80 kilometres per hour that included:
- Congestion (down to 20 kilometres per hour, on average)
- Breakdown or minor incident
- Free-flowing traffic at maximum capacity
- Travel route scenarios - All possible travel routes through the M4-M5 Link and the adjoining WestConnex tunnels (being the M4 East and New M5 tunnels) were identified for each direction of travel, and route-average NO_2 concentrations were assessed.

Consideration was given to peak in-tunnel concentrations of CO and NO_2, as well as the peak extinction coefficient (for visibility). The information presented in the report confirmed that the tunnel ventilation system would be designed to maintain in-tunnel air quality within the in-tunnel air quality criteria applicable to the tunnel for all scenarios.

A detailed description of the ventilation system and the in-tunnel air quality design criteria, including those for normal and maximum flow traffic conditions as well as emergency situations is provided in section 5.8.2 of the EIS. Relevant requirements and design criteria for fire and life safety as part of the tunnel design are provided in section 5.8.3 of the EIS. Emergency operations are also discussed in section 5.3.2 of Annexure L (Ventilation report) of Appendix I (Technical working paper: Air quality) of the EIS. Procedures for management of emergency situations such as tunnel fires and bomb threats are part of the detailed management plans and are developed in consultation with the NSW emergency services. The tunnel operating systems, including ventilation are designed to have redundancy to manage emergency situations with the key objective of protecting the lives of persons in the tunnel. Once people are evacuated the tunnel would be closed to enable it to be made safe and any repairs undertaken.

The environmental management measures include an in-tunnel air quality monitoring system to be finalised as part of the detailed design (see environmental management measure AQ27 in **Chapter E1** (Environmental management measures)). The system will monitor NO_X, NO_2, CO and visibility (as a minimum) throughout the tunnel. The locations of monitoring equipment will generally be at the beginning and end of each ventilation section. This will include, for example, monitors at each entry ramp, exit ramp, merge point and ventilation exhaust and supply point. The location of monitors will be governed by the need to meet the in-tunnel air quality criteria for all possible journeys through the tunnel system, especially for NO_2. This will require sufficient, appropriately placed monitors to calculate a journey average.

A response to the Inner West Council's concerns regarding filtration is provided in **section B11.9.3**. A discussion of tunnel design and response to emergency situations is provided in **section B11.25.1**.

B11.9.6 Impact of steep grades at Rozelle interchange on emissions

Part 3, p24

Council is concerned about the effect of steep grades of Rozelle Interchange ramps increasing emissions.

The tunnels that make up the Rozelle Interchange are a particular concern, as several would need to be constructed at steep grades to allow traffic to travel from some depth to the surface. As grades increase, so do emissions. The effect of grade on emissions has been an issue for the existing M5 East.

Response

The emissions model used to estimate vehicle emissions for the ventilation design of the M4-M5 Link project including the Rozelle interchange accounts for the effects of the different grades within the tunnel system and congested and slow moving traffic on the likely emissions.

Maximum limits on gradients of less than four per cent have generally been adopted in the mainline tunnel design as identified in section 5.3.6 of the EIS. However, there are some isolated locations, such as at the Rozelle and St Peters interchanges and Wattle Street interchange exit ramp, where there are localised constraints such as existing surface road elevations, or to minimise direct impacts on properties to ensure appropriate ground conditions gradients of greater than four per cent have been adopted.

The detailed design process would seek to optimise grades to ensure tunnels have longer, flatter sections to achieve optimal ventilation and heavy vehicle performance.

B11.9.7 Review of State and national air quality standards

Part 3, p24

There may be a need to review State and national standards to improve air quality.

Although the EIS argues that unfiltered emissions from WestConnex ventilation facilities complies with national air quality standards, it could also be argued there is a need to review these standards to ensure they a bringing about improved air quality in Australia's cities in the long-term.

Response

The review of air quality standards mentioned in the submission is beyond the scope of the EIS. However, the national air quality standards for particulate matter were updated in February 2016 and the NSW EPA criteria were also amended later that year (refer to section 9.2.3 of the EIS).

B11.9.8 Air quality monitoring

Part 3, p24

There is a need for air quality monitoring at sensitive land uses in consultation with Council and the community, and display real-time data.

Council will also continue to argue that monitoring of childcare centres, schools and aged housing is a priority, and the community is kept fully informed of the results of air quality monitoring established for all stages of WestConnex, including Stage 3. Council is represented on the Air Quality Community Consultative Committee (AQCCC) for Stages 1 and 2, so is aware the air quality monitoring stations are being established to monitor emissions in relation to those projects.

Through this committee, Council will continue to argue that monitoring of sensitive land uses be prioritised. Council will also continue to argue for the real-time online display of all air quality monitoring data, as has been established for monitoring of emissions from White Bay cruise ship terminal. Council has recently written to EPA to request this arrangement for WestConnex.

Response

Monitoring

Continuous monitoring will be undertaken in the ventilation outlets to demonstrate ongoing compliance with the emission limits. Monitoring would include exit velocity and temperature in addition to pollutants.

Ambient air quality monitoring will be carried out in the vicinity of the ventilation outlets installed as part of the project. Monitoring will occur at key representative locations, identified in consultation with an independent air quality specialist and an AQCCC, to allow direct comparison of measured ambient air quality with dispersion model predictions. The monitoring will commence at least 12 months prior to and continue for at least two years following the commencement of operation. Monitoring results and a comparison of monitoring results against dispersion model predictions and relevant ambient air quality criteria will be made publicly available as reflected in environmental management measure AQ29 in **Chapter E1** (Environmental management measures).

All relevant air quality monitoring results will be made available to the public on the WestConnex website[12]. Historic results for the WestConnex program of works are currently available on this website.

B11.9.9 Uptake of electric vehicles

Part 3, p25

A change from conventional to electric vehicles should [be] encouraged in the long-term to reduce emissions.

Although the EIS's air quality assessment does appear to have acknowledged a proportion of electric vehicles in the fleet, Council is sceptical that there will be noticeable proportion of these vehicles in the national fleet in the near future. The average age of cars in Australia is around 10 years - consequently it will take quite some time for the fleet to turn over and it cannot be known what rate of turnover the air quality modelling has predicted. As far as Council is aware, there are no clear State or national policies to encourage electric vehicles. Further, construction of motorways will encourage greater car use through the induced traffic effect, as has been pointed out throughout this submission.

In the foreseeable future, the Inner West community will continue to endure unacceptable air quality impacts from vehicles. It should also be acknowledged that even if at some point in the future the vehicle fleet is wholly (or almost wholly) in the form of electric vehicles, excessive traffic will continue to create problems of congestion, road safety risks, compromised liveability and poor land use / transport integration. Electric vehicles should nonetheless be encouraged to reduce emissions, and these vehicles should be powered by renewable sources.

Response

Alternative fuelled vehicles (ie low emission or zero emission) are excluded from the emissions estimation and ventilation analysis for the EIS. All vehicles are assumed to be either petrol or diesel powered. Further discussion about declines in pollutant levels due to changes in in-vehicle technology and a sensitivity analysis are provided in **section B2.1.3**.

The development of policies to increase the rate of uptake of electric vehicles is beyond the scope of this EIS.

B11.9.10 Consideration of non-tailpipe emissions

Part 3, p25

There is a need to consider all vehicle emissions, not just tailpipe emissions.

The EIS has also not adequately acknowledged that tailpipe emissions are not the only form of pollution generated by increase car use. Dispersal of particles from brakes and tyres for example doesn't appear to have been addressed. Nor has the EIS adequately considered vulnerable populations in its air quality assessment – for example, very young and older populations and those

[12] https://www.westconnex.com.au/local-updates?default_view=2&project=14&updates=9

with respiratory conditions such as asthma. For these vulnerable groups, construction dust is also a major consideration.

Response

As presented in Figure 9-13 of the EIS, non-exhaust particulate matter is the largest source of road transport PM_{10} (around 60 per cent) and $PM_{2.5}$ (around 46 per cent). However, there is currently no anticipated regulation of non-exhaust particles. Estimates of non-exhaust particles were included in the in-tunnel and ambient air quality assessment for the project and are presented in section 9.7.2 of the EIS for ambient air quality and section 9 of Annexure L of Appendix I (Technical working paper: Air quality) of the EIS for in-tunnel air quality, particularly as it relates to reduced visibility.

The method for non-exhaust PM_{10} and $PM_{2.5}$ emissions associated with ambient air quality was drawn from the EMEP/EEA Air Pollutant Emission Inventory Guidebook (European Environment Agency 2013 (EEA)), and included tyre wear, brake wear and road surface wear (refer to section E.2.4 of Annexure E in Appendix I Technical working paper: Air quality) of the EIS). Non-exhaust emissions associated with in-tunnel air quality was drawn from the PIARC 2012 methodology (refer to section 6.6 of Annexure L of Appendix I (Technical working paper: Air quality) of the EIS).

As noted in section B2.3 of Annexure B to Appendix I (Technical working paper: Air quality) of the EIS, it is possible that non-exhaust PM is less important for tunnels than for surface roads, as under normal operating conditions in many road tunnels there is probably less braking than on surface roads (eg fewer intersections), and less cornering (ie tyre wear). This is likely to result in less material being deposited on roads in tunnels than on roads in the external environment, resulting in a smaller contribution from resuspension. However, these effects are not well quantified at present.

As noted in section 4.6 of Appendix I Technical working paper: Air quality) of the EIS, ambient air quality standards are usually designed to protect human health, including for sensitive populations including children, the elderly and members of the community with respiratory diseases. Potential impacts from construction dust are discussed in **section B11.9.14**.

B11.9.11 Traffic modelling input into air quality modelling may be flawed

Part 3, p25

Although issues are not raised about the EIS's modelling method, there are concerns that traffic modelling inputs into the air quality model may be flawed. Beca's assessment of operational air quality points out that the modelling and assessment methodology used in the EIS varies from the NSW approved methods in a number of ways – for example, choice of dispersion model, the method used to construct the meteorological input file, and the method used to calculate NO2 concentrations.

However, the approach taken is generally consistent with other air quality assessments undertaken for current NSW infrastructure projects. Beca has not raised any issues overall with the EIS's methodology. Beca has however raised concerns that the flawed traffic modelling used in the air quality modelling may have led to an inaccurate assessment of air impacts overall.

Beca points out that the regional air quality impacts of Stage 3 have been assessed in the EIS in terms of the relative impact based on the estimated difference in total vehicle emissions for the 2023 and 2033 'Do minimum' and 'Do something' traffic scenarios, which are not predicted to increase impacts. Beca's concern here is that vehicle emission rates in the EIS incorporate only main roads, which are included in the EIS's traffic model.

The emission contribution from regional and local roads should also be considered in this assessment. This is appropriate as several of these lower-order roads are expected to experience increased traffic due to the project.

The key concern in relation to operational air quality impacts is that results of the EIS modelling indicate that the discharge of particulates and NO_2 may exceed criteria levels at impact receptors when surface roads are taken into account as well as the ventilation facilities. It is a major omission from the EIS that only emissions from ventilation facilities has been considered.

No mitigation or air quality monitoring has been proposed for the larger contribution from surface roads, particularly at the locations which are predicted to be significantly affected by additional traffic. On the basis of the EIS, these locations include Victoria Road from the Iron Cove Link tunnel portal at Rozelle through to Drummoyne; Anzac Bridge and Western Distributor; and Canal Road, Gardeners Road and adjoining major roads in the Mascot area.

Response

Modelling approach

Inner West Council's comment that the approach used is consistent with the approach used for NSW infrastructure projects is noted. The independent reviewers engaged by ACTAQ made the following comment on the assessment process used in the EIS:

'Our overall conclusion of the WestConnex EIS is that it constitutes a thorough review of high quality. It covers all of the major issues and areas that an EIS for a project of this scale should. The information presented is of suitable detail and logical in order. The choices made regarding data used and methods followed have been logical and reasonable and it is our view that the benefit of exploring alternative approaches would be questionable or marginal. …. We find that the assessment methodology is sound and represents best practice. All of the models and data used are appropriate and expertly used. We have found no significant errors nor important omissions, other than lack of inclusion of new information on NOx emissions from late-model diesel light-duty vehicles — discussed in detail below'.

The issue of the new information on NO_X emissions form late model vehicles has been addressed in the response to the Chief Scientist's submission (see **section B3.2.3**). Further comment on the use of the Graz Mesoscale Model/ Graz Lagrangian (GRAMM/GRAL) modelling system, the meteorological data file and modelling of short-term NO_2 is in **section B3.2.6** to **section B3.2.7**.

Consideration of regional and local roads in the modelling

The concern that only main or state roads are included in the traffic modelling is incorrect. The strategic traffic model that was used to provide the traffic demand forecasts includes State and Regional and some collector roads. In addition, this demand model is not constrained by road network capacity. This means that it forecasts traffic demand for future years, irrespective of whether the road network has capacity for that level of traffic, so it does not matter which classification of roads are included in the network, only the land uses and population growth and distribution that drives traffic growth.

Assessment of impact of surface roads and ventilation facilities

The statement that *'only emissions from ventilation facilities has been considered'* is not correct. Emissions from the surface roads in the very large (12 kilometres by 15 kilometres) area that was included in the air quality modelling included the surface road network, with the surface road network dominating the emissions and the changes in emissions across the study area. In contrast, the contribution from the ventilation outlets is very minor.

For each air quality pollutant, there are graphs showing the predicted contribution from surface roads to the pollutant concentrations at 40 community receptors (representative of the around 87,000 receptors modelled) and contour plots that show the predicted changes in emissions in surface road emissions with the project. The predicted emissions from local roads are too low to be seen in these plots due to the low traffic numbers on these roads. All of these graphs are either in 9.7.3 of the EIS or in Annexure K to Appendix I (Technical working paper: Air quality).

Management and mitigation of emissions due to existing surface roads

The most effective means of reducing emissions from surface roads are to reduce the emissions at source, ie the vehicle emissions. Improving vehicle emission standards which are the most direct way of improving emissions and are the responsibility of the Australian Government through the *Motor Vehicle Standards Act 1989* (Commonwealth), which requires that new road vehicles must comply with certain safety and emissions requirements as set out in Australian Design Rules (ADRs). The specific emission limits that apply to exhaust emissions from light-duty and heavy-duty vehicles, and their timetable for adoption in the ADRs, are listed on the Australian Government website[13], and further information is provided in Annexure C to Appendix I (Technical working paper: Air quality) of the EIS.

[13] http://www.infrastructure.gov.au/roads/environment/emission/.

B11.9.12 Clarification regarding expected NO_2 concentrations

Part 3, p26

There is a need to clarify expected maximum NO_2 concentrations at key monitoring points.

A key concern for Beca is that maximum 1-hour NO_2 concentrations at some of the receptors are predicted by the EIS exceed the National Environment Protection Council (NEPC) criteria by a factor of approximately two. The report has considered that these effects are likely to be overestimated due to a number of factors. Beca agrees with the EIS that the 1-hour average NO_2 are likely to be overestimated based on the results of ambient monitoring conducted in Sydney. However, it is still unclear in the assessment what the expected NO_2 maximum concentrations are predicted to be at these receptors.

Response

The results of the regulatory worst case scenario on surrounding receptors were that the predicted maximum one hour NO_2 concentrations were very high at some sensitive receptor locations. These receptors were mostly in the vicinity of Anzac Bridge, especially at the western end, with a small number alongside King Georges Road and there were also two receptors in the area of Sydney Airport. None of the receptors were especially sensitive in nature and are either 'industrial', 'commercial' or 'other', and most of the highest values occurred in 2023.

The elevated maximum levels listed are not considered to be representative of exposure concentrations that would occur within the study area. This is due to the combined effect of the approach adopted for converting NO_X to NO_2 (that overestimates short-term one-hour average concentrations), and the use of a contemporaneous assessment of background and project impacts. The contemporaneous approach assumes that the highest background concentrations may occur during the same hour as the maximum incremental change from the project. This results in a very high estimate of total NO_2 concentrations that is not likely to occur (refer to Appendix I (Technical working paper: Air quality) of the EIS for more detailed discussion).

The assessment demonstrated that the results for one hour NO_2 are overestimated. An additional round of NO_X/NO_2 modelling was undertaken at 18 discrete receptors to investigate the likely magnitude of the NO_2 overestimation. These 18 receptors are listed in Table 8-29 in Appendix I (Technical working paper: Air quality) of the EIS. They were selected to represent the range of concentrations across the domain. At each receptor the contemporaneous approach was used to calculate NO_2 concentrations, as with community receptors. The results of the additional modelling are shown for maximum one hour NO_2 concentrations in section 9.7.3 of the EIS.

B11.9.13 Influence of existing buildings, structures and topography in pollution dispersal

Part 3, p26

Although Beca has concluded that on the basis of the EIS, ventilation facilities are unlikely to make a significant contribution to maximum cumulative air pollutant levels, it is concerned that these predictions have not incorporated the effects that building structures in the vicinity of the stacks, which could be significant. It is acknowledged that the sensitivity of the predictions to building downwash effects is briefly discussed in the EIS. However these local factors on pollutant dispersion and ground level pollutant levels have not been identified and assessed in the EIS. As discussed elsewhere in this submission, Council has been particularly concerned about the proposed ventilation facility on Victoria Road at Terry Street for this reason.

Response

As noted in section 8.4.6 and Annexure B of Appendix I (Technical working paper: Air quality) of the EIS, there are only a small number of tall buildings in proximity to the proposed ventilation outlets which could potentially affect pollutant dispersion. As a result the effect of building downwash would be rather limited and as such was not considered in the assessment. Sensitivity analysis undertaken at Iron Cove and Rozelle has shown that the predicted total concentrations and the conclusions of the assessment would not change significantly with the inclusion of buildings (see **section B1.1.4** for further discussion of the sensitivity tests).

B11.9.14 Construction dust and emissions

Part 3, p27

Council is concerned about construction dust and other construction emissions. Beca's assessment of emission impacts from construction vehicles has not raised concerns, except for situations where construction trucks may be idling within close proximity to residential areas, schools or preschools. Conditions of approval should address these situations, along with diesel emissions from generators. Reducing the idling of trucks would also have noise-reduction benefits – discussed in Part 4 of this submission – Construction work.

Concerns are raised that the EIS's risk assessment determined that all sites were at high risk of being affected by dust soiling, and some sites were at high risk of experiencing adverse impacts on human health and ecology. This would fit with Council's experiences with dust impacts from Stages 1 and 2.

Beca considers it critical that the dust mitigation methods used for the project include all of the relevant methods included in the UK Institute of Air Quality Management (IAQM) guidance and that a robust system of monitoring the impacts of discharges to air from construction of the project is described in the project construction methodology and the construction air quality management plan. Further, Beca believes the impacts of discharges to air from blasting and any onsite concrete batching plants also needs to be identified and assessed, and appropriate mitigation measures included in the plan.

Beca points out that there is potential for nearby receptors to be impacted by dust from the proposed construction activities at times, even with the implementation of a construction air quality management plan. This raises the need for a best-practice monitoring system to be implemented in all areas where sensitive receivers are at medium to high risk of dust impacts. The need for improved management and continual monitoring of construction- related is consistent with Council's experience with resident complaints about dust from Stages 1 and 2. Monitoring should be undertaken in both indoor and outdoor environments.

Beca's assessment has pointed out that the EIS has identified that there is also potential for crystalline silica emissions to occur at the construction stage. The section does not however identify whether any other hazardous materials may be encountered during earthworks such as those that may arise from a contaminated site or how these materials would be managed if they were encountered.

Beca's assessment points out that the list of mitigation measures included in EIS does not include all of the items recommended by the IAQM for medium and high risk sites. Details of items Beca has assessed are not adequately considered are included within its air construction air quality assessment at Attachment 1.

Response

Truck marshalling areas would be used to reduce potential queuing and parking of heavy vehicles on streets around construction ancillary facilities, as well as minimise traffic and noise disruptions to local streets surrounding the project and associated construction ancillary facilities. In response to feedback provided by DP&E and submissions received on the EIS, an additional construction facility (the White Bay civil site (C11)) is proposed near White Bay in Rozelle which would include a truck marshalling area to accommodate up to about 40 heavy vehicles (see **Chapter D2** (White Bay civil site (C11)).

A truck management strategy will be developed and implemented as part of the CTAMP (see environmental management measure TT16 in **Chapter E1** (Environmental management measures)). The truck management strategy will:

- Identify truck marshalling areas that will be used by project-related heavy vehicles
- Describe management measures for project-related heavy vehicles to avoid queuing and site-circling in adjacent streets and other potential traffic and access disruptions
- Describe monitoring programs to demonstrate that project-related heavy vehicles are complying with the strategy.

Dust impacts, mitigation and monitoring

Management measures to minimise the generation and emission of dust and air pollutants during construction are described in **Chapter E1** (Environmental management measures). These include undertaking regular site inspections to monitor and record dust levels. A Construction Air Quality Management Plan (CAQMP) will be developed and implemented to monitor and manage potential air quality impacts associated with the construction for the project. The management plan will include controls required to reduce the emission of dust out of the door of acoustic sheds. The Plan will be implemented for the duration of construction (see environmental management measure AQ1 in **Chapter E1** (Environmental management measures)). Community consultation, including management of complaints, will continue during construction.

Management of airborne contaminated and/or hazardous materials

In the event of encountering unexpected finds of contamination (ie the observation of offensive odours, soil discoloration, buried waste or potential asbestos containing materials) during construction, work in the area would cease until an appropriately qualified environmental consultant can advise on the need for further assessment, remediation or other action, as deemed appropriate (see environmental management measure CM06 in **Chapter E1** (Environmental management measures)). Further assessment and management of contamination, if required, would be undertaken in accordance with section 105 of the *Contaminated Land Management Act 1997* (NSW) (see environmental management measure CM01 in **Chapter E1** (Environmental management measures)). Measures to manage potential airborne contaminated and/or materials will be included in the CAQMP and other relevant plans as required.

Environmental mitigation measures

Details of the monitoring methods, location, frequency and duration of the air quality monitoring are expected to be included in the CAQMP in accordance with the conditions of approval for the project.

The IAQM provides guidance on how to assess the sensitivity of receptors and the risk of impact on those receptors due to the various components of the project construction. It has also been used to provide additional guidance to the mitigation measures which have been included in **Chapter E1** (Environmental management measures) as presented in section 9.10.2 of the EIS. Most of the proposed measures are routinely employed as 'good practice' on construction sites and as such these have not been specifically included in the list of environmental management measures. This includes speed limits for sites and dust suppression which are included in the proposed mitigation actions by the IAQM. If an on-site concrete batching plant was to be installed as part of the construction, this would be subject to separate planning and environmental approvals.

Conditions of approval are a matter for DP&E to consider during its assessment of the project.

B11.9.15 Air quality impacts associated with the Pyrmont Bridge Road tunnel site (C9)

Part 4, p43

There is a need to minimise noise and dust impacts from the Pyrmont Bridge Road construction site on nearby dwellings, a nearby school and sensitive commercial uses.

Though the site is surrounded primarily by commercial uses, there is the potential for significant noise, dust and other impacts on nearby sensitive uses, i.e. five dwellings located at 67 to 77 Pyrmont Bridge Road and the Bridge Road school at 127 Parramatta Road directly opposite the site. There is also the potential for site activities to negatively affect sensitive commercial and healthcare uses, e.g. dust impacts on brewery adjacent to the site. Careful site management and physical buffering will be needed to protect these sensitive uses.

Response

The main air quality impact on receptors during construction would be from dust. The risks associated with construction dust emissions were assessed in the EIS for four types of activity and the main equipment used: demolition, earthworks, construction, and track-out. The assessment methodology considered three separate dust impacts: annoyance due to dust soiling, the risk of health effects due to an increase in exposure to PM_{10}, and harm to ecological receptors.

The results of the air quality assessment in relation to construction dust, was discussed in section 9.6.2 of the EIS. For dust soiling impacts, the sensitivity of all areas and all activities was determined to be 'high'. For human health impacts, the sensitivity of all areas and all activities was determined to be 'medium'. For ecological impacts, the sensitivity of activities and areas was either 'medium' or 'low'.

Acoustic sheds would surround tunnelling activities (including portal excavation) at the Pyrmont Bridge Road tunnel site (C9). These sheds would reduce dust being emitted and noise impacts from the tunnelling activities being undertaken at this location. Management measures to prevent the generation and emission of dust and air pollutants during construction are described in **Chapter E1** (Environmental management measures). These include undertaking regular site inspections to monitor dust levels. A CAQMP will be prepared for the project as a sub-plan to the CEMP which will describe how these management measures would be implemented during construction to minimise dust and air pollutant emissions.

B11.9.16 Construction impacts associated with the Campbell Road civil and tunnel site (C10)

Part 4, p44

Noise and dust buffering of dwellings near the Stage 3 St Peters Interchange construction site will be needed. The Campbell Road civil and tunnel site would be located within the St Peters Interchange site on the southern side of Albert Street and Campbell Road in St Peters – partly within the City of Sydney council area and partly within the Inner West council area. This site would use land currently being used as a Stage 2 construction site.

Construction at this site essentially involves continued use of part of the St Peters Interchange site, which raises concerns for Council about ongoing impacts on nearby dwellings on the northern side of Campbell Street and the southern end of Barwon Park Road and Crown Street, St Peters. This is particularly as residents in this location have endured impacts from Stage 2. Noise and dust buffering will continue to be needed to protect these dwellings.

Beyond health impacts, the dust creates a need for constant cleaning of windows and interior surfaces. Residents also report their concerns about inadequate and seemingly ad- hoc dust mitigation measures, and see a clear need to improve dust monitoring and compliance enforcement. Further discussion of dust impacts and Council's recommendation for improved dust monitoring is in Part 3 Air quality.

Response

Impacts of dust emissions and noise from construction works, as well as environmental management measures to minimise impacts, are described in **section B11.9.15**.

The results of the air quality assessment in relation to construction dust, was discussed in section 9.6.2 of the EIS. Several locations and activities were determined to be high risk to dust impacts including at the Campbell Road civil and tunnel site (C10). Consequently, a range of management measures have been proposed to mitigate the effects of construction works on local air quality at the impacted receptors such as nearby dwellings (see **Chapter E1** (Environmental management measures)).

B11.10 Noise and vibration

Refer to Chapter 10 (Noise and vibration) and Appendix J (Technical working paper: Noise and vibration) of the EIS for details of noise and vibration.

B11.10.1 Cumulative construction noise impacts from overlapping noise envelopes

Part 4, p34

There is a need for an assessment of the cumulative noise impacts from overlapping noise envelopes. A further cumulative construction impact issue has been overlapping of noise envelopes from project works from several construction areas – a particular issue for Haberfield/Ashfield residents located between several project work sites. It would appear the conditions of approval have considered the impacts of each work site in isolation without considering how noise, vibration and other impacts add together to become unacceptable. For Stage 3, this is an important issue for the Rozelle/Lilyfield/Annandale construction sites due to the number of construction sites and construction activities underway simultaneously within one area.

Part 4, p 37

Need to consider the altered noise profile for Stage 3 from works undertaken for Stage 1 at Haberfield/Ashfield and overlap between Stages 1 and 3. Importantly for the Haberfield/Ashfield construction sites, consideration of current levels of ambient noise has not been included. It is important to measure current levels as noise profiles have changed (increased) since commencement of construction of Stage 1 due building demolitions and removal of vegetation. Also at the Haberfield/Ashfield sites, there will be an overlap between construction of Stages 1 and 3, but this has not been adequately acknowledged and assessed in the EIS.

Response

With reference to the Industrial Noise Policy (NSW EPA 1999 (INP)), the background noise level is defined as the underlying level of noise present when all unusual extraneous noise (such as construction works) is removed. Additionally, the background noise levels used in the assessment were measured without the subject development or construction site operating. Hence, the exclusion of construction noise when establishing ambient noise levels (and subsequent noise management levels (NMLs)) therefore results in more conservative (or lower) NMLs, meaning the project is subject to more stringent requirements with respect the noise criteria that need to be adhered to during construction. In addition, this approach allows for consistent noise criteria to be established between each of the WestConnex projects.

Detailed discussion on the potential for longer duration construction noise impacts around Haberfield/Ashfield and St Peters is provided in **section 10.10.2**.

Chapter 26 (Cumulative impacts) of the EIS identifies that there would be overlapping construction periods at Haberfield and St Peters between the M4-M5 Link and the M4 East and New M5 projects. The assessment acknowledged that residents in the area may be impacted by prolonged amenity impacts, referred to as construction fatigue, as a result. Environmental management measures to minimise these longer duration construction impacts is provided in **Chapter E1** (Environmental management measures).

Appendix J (Technical working paper: Noise and vibration) of the EIS also includes an assessment of concurrent construction impacts for each of the M4-M5 Link construction sites along with an assessment of consecutive impacts where projects that are approved or currently under construction occur within close proximity to an M4-M5 Link project site.

A summary of the findings of this assessment is presented in **Table B11-3**.

Table B11-3 Summary of cumulative construction noise impacts

Concurrent construction impacts	Consecutive construction impacts
Cumulative construction noise impacts - Haberfield Option A	
Given the number of work sites associated with the project within the Haberfield area, it is likely that receivers would occasionally be subject to potential noise impacts from concurrent activities. This would most likely be apparent during the night-time period where predicted noise levels may exceed the NML by up to 10 dBA.	The M4 East project, together with the M4-M5 Link, tie in to Wattle Street at Haberfield, where receivers would likely be exposed to extended impacts associated with the consecutive construction of both projects. The receivers most likely to be affected by consecutive construction impacts are: • Receivers adjoining the Northcote Street civil site (C3a). This site is currently a tunnel site for the M4 East project, with an acoustic shed constructed across the site • Receivers adjoining Wattle Street and Walker Avenue, which have line of sight to the Wattle Street civil and tunnel site (C1a) and the Haberfield civil and tunnel site (C2a).
Cumulative construction noise impacts – Haberfield/Ashfield Option B	
As above, due to the number of construction sites in the Haberfield/Ashfield area, it is likely that receivers would occasionally be subject to night-time period cumulative impacts. This is predicted to exceed the NML by greater than 20 dBA within noise catchment area (NCA) NCA01.	As above, receivers most likely to be affected by consecutive construction impacts from the M4 East and M4-M5 Link projects are: • Receivers adjoining the Parramatta Road West civil and tunnel cite (C1b), Parramatta Road East civil site (C3b) and Haberfield civil site (C2b), between Walker Avenue and Chandos Street.
Cumulative construction noise impacts – Rozelle	
Tunnelling works activities for the M4-M5 Link and the proposed future Western Harbour Tunnel project may be carried out simultaneously. Cumulative construction noise impacts may be apparent during out-of-hours works periods where cumulative impacts are predicted to result in NML exceedances of up to 20 dBA during the night-time period.	The Rozelle area would likely be subject to construction impacts from works associated with other infrastructure projects, including the under construction CBD and South East Light Rail Rozelle maintenance depot. The receivers most likely to be affected by consecutive construction impacts are: • Receivers adjoining Lilyfield Road between Justin Street and Ryan Street (NCA16 and NCA19) • Receivers adjoining Brenan Street between Starling Street and White Street (NCA15).

Concurrent construction impacts	Consecutive construction impacts
Cumulative construction noise impacts – St Peters	
Given that tunnelling works activities may be carried out simultaneously at St Peters for the New M5 and M4-M5 Link projects, cumulative construction noise impacts may be apparent during out-of-hours works periods where cumulative impacts are predicted to result in NML exceedances of up to 20 dBA during the night-time period.	Excluding short-term works such as pavement and utility works, receivers located within NCA48 and NCA49, which front Campbell Road, are predicted to experience up to 10 dBA exceedances of the project NMLs (during the night-time period) during construction of the M4-M5 Link project. Whilst the magnitude of the predicted exceedance is relatively low, these impacts are predicted at receivers who would likely have been exposed to significant noise impacts from the New M5 project.

Mitigation and management measures for potential ambient noise and vibration impacts during construction are shown in **Chapter E1** (Environmental management measures).

A Construction Noise and Vibration Management Plan (CNVMP) will be prepared for the project. The plan will:

- Identify relevant performance criteria in relation to noise and vibration

- Identify noise and vibration sensitive receivers and features in the vicinity of the project
- Include standard and additional mitigation measures from the Construction Noise and Vibration Guideline (CNVG) (Roads and Maritime 2016b) and details about when each will be applied
- Describe the process(es) that will be adopted for carrying out location and activity specific noise and vibration impact assessments to assist with the selection of appropriate mitigation measures
- Include protocols that will be adopted to manage works required outside standard construction hours in accordance with relevant guidelines
- Detail monitoring that will be carried out to confirm project performance in relation to noise and vibration performance criteria.

The CNVMP will be implemented for the duration of construction of the project.

To minimise the construction noise impacts associated with longer duration construction impacts from the concurrent construction of the WestConnex component projects and to respond to issues raised during the construction of other WestConnex projects and in submissions on the M4-M5 Link EIS, the following strategies are proposed:

- Using the Northcote Street civil site (C3a) for construction workforce car parking and laydown. Currently this site is used as the main tunnelling site for the eastern end of the M4 East project
- Designing acoustic sheds with consideration of the activities that will occur within them and the relevant noise management levels in adjacent areas. Monitoring will be carried out to confirm that the actual acoustic performance of the sheds is consistent with predicted acoustic performance (see environmental management measure NV7 in **Chapter E1** (Environmental management measures))
- The appointment of a suitably qualified and experienced Acoustics Advisor, who is independent of the design and construction contractor(s), and who will be engaged for the duration of construction of the project (see environmental management measure NV1 in **Chapter E1** (Environmental management measures))
- Consideration of giving receivers that qualify for assessment for at-receiver treatment in relation to operational noise, that are also predicted to experience significant exceedances of noise management levels due to construction, priority preference for assessment for treatment based on the severity and timing of impact (see environmental management measure NV9 in **Chapter E1** (Environmental management measures)).

B11.10.2 Cumulative construction vibration impacts

Part 4, p37

Need to consider the long-term impacts of vibration on buildings, particularly at the Haberfield/Ashfield construction sites.

Council is also concerned that for Haberfield/Ashfield there has been no consideration of longer-term cumulative impacts of vibration from construction on local buildings. This is a particular issue at this location due to the extent of the construction period.

Part 6, p57

There is a need to include vibration in the required assessment of cumulative construction impacts.

Though Council and residents are repeatedly reassured by the proponent that tunnelling is not likely to create significant noise or vibration impacts, and only for a short period, Haberfield/Ashfield and St Peters residents already affected by general construction noise have also complained about tunnelling vibration impacts.

Response

The assessment methodology for determining the effects of vibration on buildings is outlined in section 4.1.5 of Appendix J (Technical working paper: Noise and vibration) of the EIS and can be divided into three main categories:

- Those in which the occupants or users of the building are inconvenienced or possibly disturbed (human comfort)

- Those where the building contents may be affected (effects on building contents)
- Those in which the integrity of the building or the structure itself may be prejudiced (structural damage).

Materials or structures can be impacted by vibration of certain magnitudes. Continuous, long-lasting vibration can cause weakening (fatigue) of materials and structures.

Vibration intensive activities are likely to be required at certain times and location. No equipment is required or activities proposed that will result in continuous vibration over extended durations sufficient to result in cumulative structural or cosmetic impacts to buildings and structures in the vicinity of the project footprint. However, the safe limits set for continuous vibration in DIN 4150 Structural vibration – Effects of vibration on structures (Deutsches Institut für Normung 1999), below which superficial cosmetic damage is not expected, have been used in the construction vibration assessment in the EIS (refer to Table 4-1 of Appendix J (Technical working paper: Noise and vibration) of the EIS).

Vibration can take the form of disturbing human comfort, affecting building contents or damaging the integrity of a building structure. Sources of vibration were modelled at the locations anticipated to form the construction areas for the project and to account for plant and equipment likely to be required to construct the project.

Based on expected plant and equipment to be used during surface work, the key vibration generating equipment are expected to be vibratory rollers and rockbreakers. This equipment has the potential to exceed:

- The human response vibration criterion within up to 100 metres (vibratory roller) and 73 metres (large hydraulic hammer)
- The cosmetic damage criterion within up to 25 metres (vibratory roller) and 22 metres (large rockbreaker).

Section C10.10.2 provides a summary of the potential impacts from surface work vibration related impacts. The predicted vibration levels for the locations assessed are representative of the worst case impacts where works are undertaken. For most construction activities, it is expected that the vibration from surface construction activities would frequently be lower than predicted at the most-exposed receiver as the levels presented in this report are based on a realistic worst case assessment for when equipment is operating at the shortest distance to the receiver.

Vibration impacts would be managed in accordance with relevant guidelines and contractor procedures. This would include location and activity specific assessments and monitoring of vibration-intensive activities likely to exceed relevant criteria. See **Chapter E1** (Environmental management measures) for details of how vibration impacts would be managed during construction of the project.

As noted in Appendix J (Technical working paper: Noise and vibration) of the EIS, the minimum working distances for vibration intensive plant varies substantially depending on the equipment and the specific threshold (cosmetic damage or human response). For all equipment likely to be employed for the project the human response distance is less than 100 metres. For the most common equipment such as jackhammers and roadheaders this distance is seven metres. As such the potential for impacts upon education facilities such as Rozelle Public School, Haberfield Public School and The Crescent Early Learning Centre is very low. Should works be required within these minimum working distances, the following measures are proposed for consideration to manage vibration impacts:

- Validation of predicted vibration levels at the nearest receiver buildings to the vibration intensive works
- Use of alternative methods that are likely to generate less vibration where feasible and reasonable
- Notification letterbox drops to receivers in the area around the works locations, detailing work activities, time periods over which these will occur, impacts and mitigation measures
- Respite periods may be offered to the affected residents during works where vibration intensive plant levels are predicted to be operated within the safe working distance for human comfort for an extended period of time on any one day.

In addition to this vibration trials and/or attended vibration monitoring would be undertaken prior to and during any works proposed within the minimum working distances for cosmetic damage to ensure that levels remain below the criteria. At locations where the predicted and/or measured vibration levels are greater than the nominated screening levels location and activity specific vibration assessments would be carried out to assist with the selection of appropriate management measures.

B11.10.3 Construction noise impacts and management

Part 4, p42

As the proposed acoustic shed at the Darley Road site is elevated in relation to dwellings to the south of the site, there is the potential that noise from loading of spoil within the shed will created a significant noise impact on residents. Given the density of residential development around the site, a high number of residents will [be] affected by the noise, including out-of-hours noise. For this reason, the acoustic shed at this location will need to be constructed to in a manner which ensures noise is fully contained, possibly requiring a double door system or air lock.

Part4, p43

There is a need to minimise noise and dust impacts from the Pyrmont Bridge Road construction site on nearby dwellings, a nearby school and sensitive commercial uses.

Though the site is surrounded primarily by commercial uses, there is the potential for significant noise, dust and other impacts on nearby sensitive uses, i.e. five dwellings located at 67 to 77 Pyrmont Bridge Road and the Bridge Road school at 127 Parramatta Road directly opposite the site. There is also the potential for site activities to negatively affect sensitive commercial and healthcare uses, e.g. dust impacts on brewery adjacent to the site.

Careful site management and physical buffering will be needed to protect these sensitive uses.

Part 4, p44

Noise and dust buffering of dwellings near the Stage 3 St Peters Interchange construction site will be needed.

The Campbell Road civil and tunnel site would be located within the St Peters Interchange site on the southern side of Albert Street and Campbell Road in St Peters – partly within the City of Sydney council area and partly within the Inner West council area. This site would use land currently being used as a Stage 2 construction site.

The site would primarily be put to temporary use to support mainline tunnel excavation and ramp construction to connect Stages 2 and 3. A portion of the site would be used permanently for motorway management and ventilation facilities, whilst uses for the remainder of the site would include community open space and associated facilities.

Minimal modifications to the road network or walk/cycle facilities would be needed to establish and operate this site, although there would be temporary walk/cycle diversions around key heavy vehicle entry/exit points.

Construction at this site essentially involves continued use of part of the St Peters Interchange site, which raises concerns for Council about ongoing impacts on nearby dwellings on the northern side of Campbell Street and the southern end of Barwon Park Road and Crown Street, St Peters. This is particularly as residents in this location have endured impacts from Stage 2. Noise and dust buffering will continue to be needed to protect these dwellings.

Part 6, p56

There is a need to acknowledge that conditions of approval and adoption of best- practice cannot fully mitigate against intolerable construction impacts on residents.

The EIS recognises that there will be significant construction impacts across multiple communities with all its Stage 3 proposals. From experience with Stages 1 and 2, residents of Haberfield/Ashfield and St Peters claim that even if best-practice construction methods are adopted (often not the case in reality) and complete compliance with conditions of approval is achieved, noise and vibration impacts are intolerable. Added to this are the cumulative impacts from a range of non-contestable construction activities that are not formally part of the project – as discussed in Part 4 Construction work above.

Residents affected by Stages 1 and 2 have learned that the project's noise mitigation measures are inadequate, and there is "project creep" that has seen work extend to operations on most days and most nights. The EIS claims that work is to be scheduled to avoid constant impacts is doubted, as residents affected by Stages 1 and 2 have been affected by constant impacts due to cumulative impacts. The standard response to complaints has been that the project can continue to operate in this way as it […] has approval to do so.

Response

A CNVMP will be prepared and implemented for the project in accordance with the environmental management measure NV1 and conditions of approval for the project.

Construction noise impacts at the Darley Road civil and tunnel site (C4)

Construction noise impacts from the project on receivers around the Darley Road civil and tunnel site (C4) are described in detail in **section C10.3.2**.

The assessment of construction impacts identified the following in-situ mitigation measures that should be included for Darley Road civil and tunnel site (C4):

- Increased site hoarding to a height of four metres around the construction ancillary facility
- Upgrading the acoustic shed performance
- Designing and constructing the acoustic shed to ensure that night-time noise management levels are not exceeded.

Environmental management measure NV7 commits to designing acoustic sheds with consideration of the activities that will occur within them and the relevant noise management levels in adjacent areas. Monitoring will be carried out to confirm that the actual acoustic performance of the sheds is consistent with predicted acoustic performance (see **Chapter E1** (Environmental management measures)).

Works outside standard construction hours will be regulated by the NSW EPA through a project EPL to minimise the potential for amenity impacts. The NSW EPA typically restrict the number of night per weeks on which works that are likely to generate noise levels above noise management levels can be undertaken. It is therefore in the contractor's best interests to design and install an acoustic shed that will ensure that relevant noise management levels are not exceeded, minimising the potential for amenity impacts for local residents.

In addition to this a CTAMP would be prepared for the project and would include a construction worker parking strategy. This strategy would aim to manage parking to reduce amenity impacts parking on local streets including during shift changeovers.

The preferred noise control strategy would be confirmed during detailed design. See **Chapter E1** (Environmental management measures) for further detail on the construction noise management measures.

Pyrmont Bridge Road tunnel site (C9)

As identified in section 5.5.2 of Appendix J (Technical working paper: Noise and vibration) of the EIS, Bridge Road School would be subject to worst case exceedances of 11 to 20 dBA above NMLs during the higher noise generating activities. However, these exceedances would occur during construction scenarios associated with site establishment and predicted to last less than two months (demolition of existing buildings and the pavement and infrastructure works). During site operation, no receivers in the vicinity, including the Bridge Road School, are predicted to be highly noise affected.

The highest noise levels and greatest NML exceedances for residential receivers in Pyrmont Bridge Road are predicted during demolition of existing buildings (PYR-01), which requires use of a concrete saw and rockbreaker, and pavement and infrastructure works (PYR-05) which requires use of a concrete saw. Up to six properties may also be highly noise affected during other works, including pavement and infrastructure works as identified in Table 5-117 of Appendix J (Technical working paper: Noise and vibration) of the EIS. The construction activities that have the potential to result in noise levels greater than 75 dB would, however, occur early in the overall program during site establishment. During site operation, no receivers in the vicinity are predicted to be highly noise affected.

St Peters interchange

Activities within the St Peters study area would occur within the Campbell Road civil and tunnel site (C10) located on the southern side of Albert Street and Campbell Lane in St Peters. The site is currently part of the Campbell Road construction compound for the New M5 project.

No residential receivers are predicted to be classified as highly noise affected (refer to section 5.6.2 of Appendix J (Technical working paper: Noise and vibration) of the EIS) as part of the M4-M5 Link project works. However, it is recognised that longer duration impacts to receivers around the St Peters interchange may occur and these are discussed in **section B1.3.3**.

Construction noise mitigation and management measures

Mitigation and management measures for potential ambient noise and vibration impacts during construction are shown in **Chapter E1** (Environmental management measures). A CNVMP will be prepared for the project as reflected in environmental management measure NV2 in **Chapter E1** (Environmental management measures). The plan will:

- Identify relevant performance criteria in relation to noise and vibration
- Identify noise and vibration sensitive receivers and features in the vicinity of the project
- Include standard and additional mitigation measures from CNVG and details about when each will be applied
- Describe the process(es) that will be adopted for carrying out location and activity specific noise and vibration impact assessments to assist with the selection of appropriate mitigation measures
- Include protocols that will be adopted to manage works required outside standard construction hours in accordance with relevant guidelines
- Detail monitoring that will be carried out to confirm project performance in relation to noise and vibration performance criteria.

The CNVMP will be implemented for the duration of construction of the project.

In addition, an Acoustics Advisor, who is independent of the design and construction contractor, will be engaged for the duration of construction of the project (see environmental management measure NV1 in **Chapter E1** (Environmental management measures)). The acoustics advisor for the project will be responsible for reviewing the implementation of noise mitigation measures including:

- Reviewing management plans related to noise and vibration and endorsing that they address all relevant conditions of approval and requirements of all applicable guidelines
- Reviewing location and activity specific noise and vibration impact assessments prepared during the project and endorsing the assessments and proposed mitigation measures
- Reviewing proposals regarding works outside standard construction hours, confirming that the works are appropriate and endorsing the proposed mitigation measures
- Monitoring noise and vibration from construction generally and:
    - Confirming that actual noise and vibration levels and impacts are consistent with predictions
    - Confirming that reasonable and feasible noise and vibration mitigation measures are being implemented
    - Suggesting additional reasonable measures to further reduce impacts
- Monitoring and providing advice in relation to compliance with conditions of approval and project commitments related to noise and vibration
- Providing advice in relation to complaints regarding noise and vibration impacts that cannot be resolved between the complaint and the project
- Reviewing and endorsing the proposed operational noise controls, the associated noise model and the proposed implementation program.

Consultation would occur with all sensitive receivers likely to experience elevated noise levels, including schools, and specific noise impacts would be considered and addressed where reasonable and feasible.

Acoustic sheds would be provided at tunnelling sites to reduce the impact of noise-generating activities at all times, including outside standard construction hours, with a view to complying with relevant noise goals, where reasonable and feasible. Acoustic sheds would be designed with consideration of the activities that would occur within them and the relevant noise management levels in adjacent areas, while ensuring the functionality of the respective construction ancillary facilities. While the use of acoustic sheds is not a mandatory part of the project, the design and construction contractor(s) would need to meet certain noise performance measures which may be best accomplished through the use of these sheds. It should also be noted that works exceeding noise management level outside standard construction hours would be regulated through an EPL.

As summarised in section 10.5 of the EIS, a suite of mitigation and management measures in addition to acoustic sheds were identified for potential ambient noise and vibration impacts during construction and operation. Additional temporary noise mitigation measures may include noise barriers and other temporary structures such as site buildings, which would be positioned to minimise effects from noise on surrounding properties. These management measures and the process via which they will be selected are summarised in **Chapter E1** (Environmental management measures).

Dust impacts at the Pyrmont Bridge Road tunnel site (C9) and the Campbell Road civil and tunnel site (C10), identified in this issue by Inner West Council, are discussed in **section B11.9.15** and **section B11.9.16** respectively.

B11.10.4 Noise monitoring

Part 6, p56

There is a need to improve noise monitoring and to account for the nature of noise impacts levels.

Actual measurements of some noise sources, such as a constantly operating jet-fan at a Haberfield/Ashfield site, shows exceedances of 'acceptable' levels defined in the EIS. Noise standards also don't account for the nature of the noise and how this may contribute to a resident's sense of annoyance.

Response

The use of jet fans was assessed as part of the operational infrastructure for the project, based on the concept design. While the assessment (refer to section 6.12.2 of Appendix J (Technical working paper: Noise and vibration) of the EIS) found that indicative source levels were not found to trigger the requirement to correct the predicted noise level due to low frequency or tonal components, tonal and/or low frequency noise is often observed from jet fans. The model predictions would therefore be revisited during detailed design, based on the actual specifications of the final selection of equipment.

During construction, and in accordance with environmental management measure NV6 in **Chapter E1** (Environmental management measures), monitoring will be carried out at the commencement of activities for which a location and activity specific noise and vibration impact assessment has been prepared to confirm that actual noise and vibration levels are consistent with noise and vibration impact predictions and that the management measures that have been implemented are appropriate

In addition, an Acoustics Advisor, who is independent of the design and construction contractor, will be engaged for the duration of construction of the project (see environmental management measure NV1 in **Chapter E1** (Environmental management measures)). The Acoustics Advisor for the project will be responsible for reviewing the implementation of noise mitigation measures including:

- Reviewing management plans related to noise and vibration and endorsing that they address all relevant conditions of approval and requirements of all applicable guidelines
- Reviewing location and activity specific noise and vibration impact assessments prepared during the project and endorsing the assessments and proposed mitigation measures
- Reviewing proposals regarding works outside standard construction hours, confirming that the works are appropriate and endorsing the proposed mitigation measures
- Monitoring noise and vibration from construction generally and:
    - Confirming that actual noise and vibration levels and impacts are consistent with predictions
    - Confirming that reasonable and feasible noise and vibration mitigation measures are being implemented
    - Suggesting additional reasonable measures to further reduce impacts
- Monitoring and providing advice in relation to compliance with conditions of approval and project commitments related to noise and vibration
- Providing advice in relation to complaints regarding noise and vibration impacts that cannot be resolved between the complaint and the project
- Reviewing and endorsing the proposed operational noise controls, the associated noise model and the proposed implementation program.

For operational noise, and in accordance with environmental management measure NV14 in **Chapter E1** (Environmental management measures), within 12 months of the commencement of the operation of the project, actual operational noise performance will be compared to predicted operational noise performance. The assessment will include identification of any further feasible and reasonable noise mitigation measures required to meet the relevant operational road traffic noise criteria, and identify timing and responsibilities for implementation

Commentary on the suitability of existing noise guidelines is outside the scope of the EIS.

B11.10.5 Further assessment of vibration impacts due to shallow depth tunnelling

Part 6, p57

There is a need to further assess the impacts of vibration on people and buildings wherever tunnels are at shallow depths.

The EIS states that operational noise and vibration would not be felt by residents at the surface. This may be the case where tunnel depths are at their greatest, but Council notes that in areas above underground interchanges and near portals, tunnel depths will be shallower, increasing the risk of operational noise and vibration impacts. Vibration from construction, ground settlement and possibly operation also puts all properties above and in vicinity of WestConnex tunnels at risk of cracking. This issue is further discussed in Part 13: Flooding, drainage and groundwater.

Response

Vehicles using the project tunnels during operation would not generate vibration transmitted through the tunnel and overlying rock at levels likely to lead to vibration or ground-borne impacts at the surface. This is because:

- Vehicles would generate relatively low intensity vibration, particularly relative to other project scenarios such as the use of road headers during construction tunnelling
- The road pavement wearing course would not have expansion joints and would therefore not generate the noise and vibration effects from jointed concrete pavements
- The vehicle vibration sources would not be in direct contact with the transmitting rock above the tunnel, with significant vibration attenuation provided by the tunnel structure and the air column within the tunnel
- The tunnel would be located at significant depth in most locations. By comparison, the more vibration intensive use of road headers for construction tunnelling only result in elevated ground-borne noise levels around tunnel portals and shallower sections of the project tunnels (reflecting the effect of deep tunnel locations and attenuation through significant rock depths).

The operational noise assessment in Chapter 6 of Appendix J (Technical working paper: Noise and vibration) of the EIS includes consideration of traffic noise emitted from tunnel portals.

Vibration from construction is discussed in **section B11.10.2**, with further discussion of ground settlement in **section B12.12.6**. **Section C10.5.2** provides a summary of the potential impacts from surface work vibration related impacts.

Possible settlement impacts are discussed in section 12.3.4 of the EIS.

B11.10.6 Beca's assessment

Part 6, p57

Beca's noise & vibration assessment [...] includes a number of comments about the EISs noise modelling and has recommendations designed to mitigate noise impacts.

Response

See responses to the assessment of noise and vibration impacts in Attachment 1 of the Inner West Council's submission in **Chapter B12**.

B11.11 Human Health risks

Refer to Chapter 11 (Human health risk) and Appendix K (Human health risk assessment) of the EIS for details of the human health risk assessment.

B11.11.1 High-level health impacts from main roads and motorways

Part 7, p57

At a strategic level, there is a need to acknowledge high-level health impacts of main roads and motorways.

Numerous studies worldwide indicate that the construction of urban motorways contributes to private car dependency. In turn, this increased dependency - with an estimated induced demand of 45,000 additional vehicle trips per day created by WestConnex - contributes to reduced human and community health through:

- Reduced air quality, potentially leading to increased incidence of respiratory illness
- Sleep disturbance due to construction activity and increased traffic noise, potentially contributing to stress levels of local residents, reduced immune response, increased personal irritability, reduced concentration span, increased levels of hyperactivity in children
- Psychological distress created by uncertainty of future circumstances including property acquisitions and property value fluctuations
- Reduced use of active transport, where there is direct access to a car in comparison to walking to a railway station or bus stop – potentially leading to increased obesity and corresponding increases in diabetes and cardiovascular illness.

While many of the physiological impacts are more prevalent in communities with larger proportions of vulnerable populations, including frail, aged and children, the psychological impacts may affect all groups. Of particular relevance, in relation to increased stress are young families who may experience the compounding effects of financial stress (due to property value fluctuations), long work hours combined with sleep disturbance when at home and concern over the well-being of their children.

Response

The potential health impacts from the project have been modelled, assessed and management measures proposed as discussed in Chapter 11 of the EIS and Appendix K (Human health risk assessment) of the EIS. The assessment was prepared in accordance with the SEARs for the project, in consultation with DP&E and key stakeholders, including NSW Health. In the NSW Health's submission on the EIS, it was noted that *'NSW Health is satisfied that for this particular project the HHRA has used a generally appropriate approach for the assessment of human health'* (see **Chapter B1** (NSW Health)).

B11.11.2 Health impacts from vehicle emissions

Part 7, p59

Council is concerned about the health impacts of vehicle emissions from the project even if they represent a marginal addition to background air pollution levels.

As mentioned elsewhere in this submission, should the project proceed, increased traffic volumes of 45,000 vehicles per day from induced traffic would contribute to reduced air quality. Council is of the view that any reduction in air quality is unacceptable and will contribute to reductions in the quality of human health. By the same argument, any increase in dust, noise and other impacts from the project will have adverse health impacts.

Numerous studies have examined the impacts of various pollutants on human health. In general terms, human health impacts associated with WestConnex fall into the following categories: particulate matter emissions (particulates); gaseous chemical emissions (e.g. NO_2); dust emissions; the mental or psychological impacts of noise; and the psychological impacts of behavioural disruption, sometimes leading to social isolation.

In 2015 the Woolcock Institute of Medical Research examined the health impacts of emission sources, types and levels of particulates in air pollution in ambient air in NSW. It stated that while ambient levels of particulates in urban NSW are low by world standards, evidence suggests that exposure to levels of particulates that currently exist in NSW will have measureable adverse impacts on health. This is particularly the case for vulnerable people such as individuals with chronic respiratory and cardiovascular diseases, the elderly, and children. Reductions in particulates in air pollution in NSW are likely to result in health benefits, particularly for these most vulnerable groups.

The review's main findings are:

- All particulates, regardless of source, should be considered detrimental to health;
- There is considerable evidence of adverse health impacts linked to exposure to particulates from combustion-related emissions, including coal-fired power stations, on- road vehicles, diesel exhaust, more so than other particulate sources;
- There is evidence that fine particles ($PM_{2.5}$) are more detrimental to health and have a wider range of health effects than larger particles. However, larger inhalable particles are not benign, and it has been demonstrated that coarse particles ($PM_{10-2.5}$) have detrimental health impacts and that these health impacts differ from those associated with smaller particles; and
- There is no evidence of a threshold level of ambient $PM_{2.5}$, below which further reductions in concentrations will not provide additional population health benefits.

The study states that increases in ambient $PM_{2.5}$ and PM_{10} are associated with increases in mortality and increases in cardiovascular and respiratory morbidity. Exposure to PM from combustion-related sources (coal -fired power stations, on-road vehicles, diesel exhaust) is associated with impacts on cardiovascular and respiratory health. There is thus sufficient evidence to indicate that particulates from on-road vehicles will increase risk of mortality, as well as cardiovascular and respiratory morbidity.

A 2014 study by Munzel et al *Cardiovascular effects of environmental noise exposure* published in the European Heart Journal found that long-term noise exposure may lead to cardiovascular problems, and night-time noise was particularly of concern. A 2013 study by Harding et al *The cost of hypertension-related ill-health attributable to environmental noise* published in the Noise Health Journal found that on-going exposure to high levels of environmental noise has the potential to influence community levels of dementia, stroke and heart attack.

A 2013 study by Tiesler et al *Exposure to road traffic noise and children's behavioural problems and sleep disturbance* published in the Environmental Research Journal indicates that a sample of over 850 10-year-old children living near busy roads in Germany presented with behavioural problems at greater levels than similar children living on quieter streets. These behavioural problems included hyperactivity, inattentiveness and anxiousness.

Council has advocated elsewhere in this submission that a health study, overseen by Health NSW, be undertaken prior to any determination which involves collection of data on the current health status of residents affected by Stages 1 and 2 at Haberfield/Ashfield and St Peters. This should include involvement of the NSW Department of Education for the collection of data on the health of school children. The study should also collect baseline health data on all areas affected by Stage 3.

Several other studies indicate broader impacts of traffic and construction noise on human health. A 2007 book by Professor Deepak Prasher of University College London *Noise and its effects* explains that even if people are habituated to on-going noise, the impacts of exposure can detrimentally affect human physiology, including endocrine, immune and cardiovascular systems.

A 2014 paper by Tzivian et al *Effect of long-term outdoor air pollution and noise on cognitive and psychological functions in adults* in the International Journal of Hygiene and Environmental Health found that on-going noise exposure contributes toward cognitive development in children, cognitive and psychological functions in adults which includes stress, aggravated depression, public conflict, loss of concentration and general exhaustion.

Other studies acknowledge that particulate emissions from on-road motor vehicles (diesel and non-diesel) represent only a relatively small proportion of the ambient particulate levels, but caution that any exposure to fine or coarse particulates has the potential to negatively influence human health.

Based on the above, it is Council's view that WestConnex has the potential to detrimentally impacts on individual and community health through the noise, vehicle and dust emissions and social disruption during construction and operational stages. Council contends that these health costs have not been included in any of the economic analysis associated with the project's business case, nor have they been adequately assessed in the Stage 3 EIS.

Response

It is recognised that the proposed construction activities within the Inner West LGA are adjacent to major roads and are therefore already subject to significantly elevated noise levels. Aircraft noise is also a factor for many receivers within the Inner West LGA, which contributes to the existing noise environment. Existing ambient air quality issues are also affected by the number of major roads within the LGA.

The potential health impacts from the project have been modelled, assessed and management measures proposed as discussed in Chapter 11 of the EIS and Appendix K (Human health risk assessment) of the EIS. The assessment was prepared in accordance with the SEARs for the project, in consultation with DP&E and key stakeholders, including NSW Health. In the NSW Health's submission on the EIS, it was noted that *'NSW Health is satisfied that for this particular project the HHRA has used a generally appropriate approach for the assessment of human health'* (see **Chapter B1**).

Air quality

The transfer of traffic from surface roads to tunnels as a result of the project would reduce exposure to vehicle emissions at ground level. Further, as emissions from the portals of major Sydney road tunnels opened since 2001 is not permitted, tunnel air would be exhausted from the nearest ventilation outlet. Exhausting tunnel emissions from elevated ventilation outlets at appropriate velocities is an effective dispersion mechanism resulting in reduced ground level concentrations of pollutants. The outlets for the project have been subject to sensitivity testing to determine the height appropriate for effective dispersion while meeting the requirements for aviation safety.

It is acknowledged that even small changes might have some health impacts on members of the community. However, the air quality health risk criteria established for the project has taken into consideration the potential for associated health impacts and are evidence based.

The assessment determined that as the majority of the project footprint would be underground, the operation of the project is predicted to result in a decrease in total pollutant levels in the community, with a redistribution of vehicle emissions associated with redistribution of the traffic on surface roads. For much of the community this would result in no change or a small improvement (ie decreased concentrations and health impacts). However, for some areas located near key surface roads, exceedances of the criteria for some air quality metrics (1-hour NO_2 and 24-hour PM_{10} and $PM_{2.5}$) were predicted to occur both with and without the project. However, where this is the case the total number of receptors with exceedances is predicted to decrease slightly with the project and in the cumulative scenarios. That is, the project would result in a better outcome than the 'Without project' scenario. In the case of $PM_{2.5}$, the background levels are already at or slightly above the criterion for both the annual and 24-hour means. However, in many locations there is a predicted decrease with the project because of the reduction in surface road traffic.

The methodology adopted for the conduct of the HHRA is in accordance with national and international guidance that is endorsed / accepted by Australian health and environmental authorities, and includes:

- Harris, P., Harris-Roxas, B., Harris, E. & Kemp, L., *Health Impact Assessment: A Practical Guide*, Centre for Health Equity Training, Research and Evaluation (CHETRE). Part of the UNSW Research Centre for Primary Health Care and Equity. University of NSW, Sydney (Harris 2007)
- *Health Impact Assessment Guidelines.* Published by the Environmental Health Committee (enHealth), which is a subcommittee of the Australian Health Protection Committee (AHPC) (enHealth 2001)
- *Environmental Health Risk Assessment: Guidelines for assessing human health risks from environmental hazards,* 2012 (enHealth 2012b)
- *Schedule B8 Guideline on Community Engagement and Risk Communication, National Environment Protection (Assessment of Site Contamination) Measure 1999* (National Environment Protection Council (NEPC) 1999 amended 2013a))

- *National Environmental Protection (Air Toxics) Measure, Impact Statement for the National Environment Protection (Air Toxics) Measure 2003* (NEPC 2003)
- *Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual* (Part F, Supplemental Guidance for Inhalation Risk Assessment), EPA-540-R-070-002, January 2009 (United States Environment Protection Agency (USEPA) 2009a)).

More specifically, in relation to the assessment of health impacts associated with exposure to nitrogen dioxide and particulate matter, guidelines available from the NEPC ((Burgers & Walsh 2002; NEPC 1998, 2002, 2003, 2009, 2010), World Health Organization (WHO) (Ostro 2004; WHO 2003 2006a, 2006b, 2013a) and the USEPA (USEPA 2005b, 2009b) have been used as required.

In addition, the following has been considered:

- Building Better Health, Health considerations for urban development and renewal in the Sydney Local Health District (NSW Health 2016)
- Healthy Urban Development Checklist, A guide for health services when commenting on development policies, plans and proposals (NSW Health 2009)
- Methodology for Valuing the Health Impacts of Changes in Particle Emissions (NSW EPA 2013)
- Air Quality in and Around Traffic Tunnels (National Health and Medical Research Council (NHMRC) 2008)
- State Environmental Planning Policy (SEPP) 33 - Hazardous and Offensive Development.

A detailed discussion of the methodology is provided in Chapter 3.2 of Appendix K (Human health risk assessment) of the EIS. Chapter 6 of Appendix K (Human health risk assessment) of the EIS discusses the assessment of changes in air quality on community health.

Noise

For over 60 per cent of the receptors evaluated in the study area, noise levels would be reduced as a consequence of the project, resulting in associated health benefits. However, the worst case assessment also predicts that noise criteria would be exceeded at a number of properties adjacent to the project footprint during construction and operation without mitigation measures, as well as vibration criteria for human comfort during construction.

The worst-case levels estimated are sufficiently high for some receptors during certain works, that health impacts are likely to occur. These properties are located south of Victoria Road adjacent to the Iron Cove Link tunnel portals, and to the west of Victoria Road near Lilyfield Road. These are primarily related to the new road alignment being closer to residential homes, and the removal of buildings closest to the road (that currently act as a barrier to noise from the roadway). A number of properties have also been identified where cumulative noise impacts are predicted exceed the relevant guidelines. Consequently, the management and mitigation of noise and vibration during the construction phase of the project will be essential. This is described in detail in **Chapter E1** (Environmental management measures). In consideration of lessons learnt from the preceding WestConnex projects (which are currently under construction or which have recently opened to traffic) including feedback from the community, as well as lessons learnt from other infrastructure projects in Sydney such as the Sydney Metro City and Southwest, additional construction noise and vibration mitigation has been proposed for the project. This includes the recommendation that an Acoustics Advisor be engaged for the duration of construction (NV1).

Mitigation measures considered during operation will principally involve the use of at-source and path treatments such as Open Graded Asphalt (or equivalent), noise mounds and noise barriers. Where these measures cannot be installed or do not provide sufficient mitigation, at-receiver treatments will be considered as reflected in environmental management measure NV9 in **Chapter E1** (Environmental management measures).

Refer to Chapter 8 of Appendix K (Human health risk assessment) of the EIS for further details on the potential health impacts from project noise.

Social aspects

A range of social aspects were identified and discussed in Chapter 10 of Appendix K (Human health risk assessment) of the EIS. As there is a wide range of complex positive and negative factors (acting and interacting at different scales and not in isolation) that can affect health and wellbeing in urban environments, these were represented graphically in Figure 10-1 of Appendix K based on the approach of the International Council for Science (ICSU 2011).

The figure illustrates the complexity of making definitive conclusions in relation to health impacts in the community. However, it is noted that where negative impacts have been identified, impacts to the community are minimised through the implementation of appropriate mitigation or management measures, as described in **Chapter E1** (Environmental management measures).

Social disruption during construction and operation are also discussed in **section B11.11.3**.

Economic impact of health costs

Human health risks and costs associated with the project are described in sections 11.4.1 (air quality) 11.4.2 (noise and vibration) and 11.6 (social and economic impacts) of the EIS.

Overall, the risk assessment in Appendix K (Technical working paper: Human health risk assessment) of the EIS found that the project is expected to result in a decrease in total pollutant levels in the community. The project is expected to result in a redistribution of impacts associated with vehicle emissions, specifically in relation to emissions derived from vehicles using surface roads. For much of the community this would result in no change or a small improvement (ie decreased pollutant concentrations and associated health impacts), however for some areas located near key surface roads, a small increase in pollutant concentration may occur. Potential health impacts associated with changes in air quality (specifically nitrogen dioxide and particulates) within the local community have been assessed and are considered to be acceptable.

On this basis it is not expected that health-related costs would increase as a result of the project.

B11.11.3 Longer duration construction impacts at Haberfield/Ashfield and St Peters

Part 4, p30

Council is particularly concerned about the extension of construction impacts on Haberfield/Ashfield and St Peters residents.

Stage 3 construction sites at or near the existing Stage 1 construction sites at Haberfield/Ashfield and St Peters raise particular concerns as Haberfield/Ashfield residents have already endured significant impacts from the construction of Stages 1 and 2.

Haberfield/Ashfield residents had initially anticipated that this would draw to a close as Stage 1 moves to completion. They are now distressed to learn Stage 1 worksites at Walker Avenue and Wattle Street will be used for Stage 3 construction – extending two or more years of impacts for a further three or more years. Although the EIS refers to construction impacts as “temporary”, a continuous construction period of five, six or more years would not feel like a temporary impact to these residents. Should the Western Harbour Tunnel proceed, residents of Rozelle and Lilyfield would also experience extended construction impacts.

Haberfield/Ashfield residents have already been subject to considerable impacts from Stage 1, and extending the construction for a further three years raises serious health concerns. It is thus imperative that if Stage 3 proceeds, DP&E, EPA and NSW Health must investigate all construction-related health issues and work collaboratively to ensure they are addressed in the EIS and that strong, comprehensive conditions of approval are drafted to minimise construction impacts across the project. A health study is recommended elsewhere in this submission.

An issue Council has raised previously in relation to Stage 1 that is relevant to Stage 3 is the current and future impact of WestConnex on residents of five dwellings at 14 to 24 Wattle Street, Haberfield. After suffering years of construction impacts, these residents will suffer operational traffic impacts to a higher degree than most residents in the area. Council seeks mitigation of these impacts to the satisfaction of all owners/residents of these dwellings.

Part 4, p31

A study of the health effects of construction impacts of Stages 1 and 2 on residents is needed to inform Stage 3.

As was pointed out in Council's submission on the Concept Design, the experience of the Inner West community with WestConnex Stages 1 and 2 has proved that construction activities can have profound negative impacts on individuals and neighbourhoods. This has been a particularly critical issue for residents around the Haberfield/Ashfield and St Peters interchange work sites. Even where construction activities comply with the project's conditions of approval and environmental licenses, many residents of Haberfield/Ashfield and some residents of St Peters have complained that impacts are intolerable.

The most pressing of these impacts has been noise from night-works, as residents continue to suffer health problems related to stress and sleep deprivation. The impacts have been particularly acute when night-works are undertaken over a long period without adequate respite. In most instances, residents in this position have not been offered alternative arrangements for respite such as suitable alternative accommodation, so have endured impacts over a long period, with health issues resulting.

Council is also concerned that extended working hours and night-works are being driven by RMS imperatives to keep roads open to traffic during the day and financial incentives for contractor(s) to complete project milestones on time - without regard for impacts on residents.

Under-reporting of health issues is likely, as residents speak of "complaint fatigue" – where they feel their repeated complaints have not resulted in positive responses. They eventually stop complaining and endure the impacts in silence. For some residents language has been barrier to making complaints, and under-reporting has arising from a proportion of complaints not being officially registered, e.g. verbal complaints to project construction staff.

The response by the proponent on health issues created by Stage 1 and 2 constructions has not been adequate, nor has the response from NSW Government agencies responsible for compliance and the health and well-being of Sydney's residents – DP&E, EPA and NSW Health.

Part 7, p58

There is a need to acknowledge the serious health impacts that construction of WestConnex Stages 1 and 2 has already imposed on residents of Haberfield/Ashfield and St Peters.

Council's experiences to date from discussions between staff and residents affected by Stages 1 and 2 proves Council's concerns about the human health impacts from WestConnex construction are based on residents' lived experiences since construction of WestConnex began. The key health impact has been stress and sleep deprivation from night-works, and the primary sources of these health impacts - noise, dust, vibration and air emissions - are discussed in other parts of this submission – mainly in Parts 3, 4 and 6 – *Air quality, Construction work and Noise & vibration*.

As mentioned elsewhere in this submission, cumulative construction impacts have been a major contributor to health problems. Haberfield/Ashfield residents located between a number of WestConnex work sites report they are regularly affected by noise even during so-called 'respite periods'. One resident stated: "when one worksite stops, another one starts".

Affected residents report to Council their "despair" at these impacts, frustrations with the complaints processes and consequently a "loss of faith in the democratic process". Many believe that community consultation processes for the project are cursory and not genuine. Residents also "despair" at the blighted appearance of their neighbourhood whilst works are progressing. They complain of "construction fatigue" from the constant interruptions to their peace of mind from construction noise and vibration, and the psychological impact of project trucks and employees "invading" their neighbourhoods.

Residents report "extraordinary amounts of dust" in their neighbourhoods. Dust, along with diesel emissions from construction vehicles and generators, has adverse health impacts on all affected residents, but this is particularly so for young and elderly people, where it more readily affects heart, vascular and lung health. Noise also adversely affects heart and vascular health as well as affecting cognitive functions. The health impact study requested by Council in this submission will need to investigate these impacts, integrating health data from schools, local doctors and other sources to monitor the health impact of project - at both construction and operational stages.

Beyond health impacts, the dust creates a need for constant cleaning of windows and interior surfaces. Residents also report their concerns about inadequate and seemingly ad-hoc dust mitigation measures, and see a clear need to improve dust monitoring and compliance enforcement. Further discussion of dust impacts and Council's recommendation for improved dust monitoring is in Part 3 *Air quality* above.

From Council staff discussions with affected residents, the project has affected their psychological health and has increased their general sense of insecurity. The constantly changing work schedules, changes to traffic arrangements and cumulative noise impacts has led to constant disruptions to the day-to-day lives of residents. For many Haberfield/Ashfield residents and some St Peters residents, the impacts of one to two years of construction is showing in the form of fatigue and poor health. Continuation of these impacts for Stage 3 would have a devastating health impact these residents.

Response

Longer duration construction impacts are expected where the project connects to the M4 East and New M5 projects at Haberfield/Ashfield and St Peters respectively. Chapter 26 (Cumulative impacts) of the EIS comprises a detailed cumulative impact assessment. Furthermore, respective technical working papers including traffic and transport (Appendix H (Technical working paper: Traffic and transport) of the EIS), noise and vibration (Appendix J (Technical working paper: Noise and vibration) of the EIS) and air quality (Appendix I (Technical working paper: Air quality) of the EIS) include consideration of consecutive and concurrent (cumulative) impacts during construction and operation of the project. The outcomes of the respective assessments of cumulative impacts were then used to inform the development of management and mitigation measures (see **Chapter E1** (Environmental management measures)).

Roads and Maritime acknowledge that the impacts from construction of the WestConnex program of works at Haberfield/Ashfield and St Peters are not short-term, as the consecutive construction of components of the WestConnex projects would extend the duration of impacts to a period of up to seven years for some receivers in these areas. The range and intensity of impacts have and would continue to vary during these periods as construction progresses, with the majority of impacts occurring, or expected to occur, as a result of certain construction activities and during certain times of the day (for example outside standard construction hours).

Key impacts resulting from longer duration construction in these areas may include noise and vibration, including ground-borne noise from tunnelling, construction traffic including spoil haulage, dust, visual impacts and impacts on parking on local streets around construction sites. Construction activities most likely to result in longer duration impacts as a result of 24 hours a day, seven days a week operation or over an extended period of time include surface road works, utility works, tunnelling and tunnelling support (such as spoil handling and transport).

The majority of intensive utility and civil construction works (including surface road works) around Haberfield/Ashfield and St Peters will be completed as part of the M4 East and New M5 projects respectively. In addition, in many instances, M4 East and New M5 construction will transition to less intensive works as the respective construction programs progress towards their conclusion and tunnelling is completed. These less intensive activities include mechanical and electrical fit-out, pavement and line-marking works and landscaping, which would occur prior to or at the same time as M4-M5 Link site establishment works commence. Areas where longer duration impacts are likely to be experienced around Haberfield/Ashfield and St Peters are shown in **Figure B2-4** to **Figure B2-6**.

This means that construction activities that overlap or occur consecutively from these projects and the M4-M5 Link would generally be less intensive and cause less disturbance to nearby communities. In addition, these works would be typically be expected to require less road occupations (except for line marking and pavement works) and therefore would be more likely to occur during standard construction hours. In addition, at the completion of construction of the M4 East and New M5 projects, permanent noise treatments would be established and/or installed as required by the conditions of approval for these respective projects. This would include (where required by the conditions) the installation of at-receiver treatments and the establishment of permanent noise barriers. The noise modelling that has informed these at-receiver treatments is based on a cumulative scenario that includes the additional traffic forecast for the M4-M5 Link project. These treatments would assist in ameliorating construction noise impacts on these receivers.

Around Haberfield and Ashfield, the majority of the above-ground infrastructure required for the M4-M5 Link project is currently being built by the M4 East project. The large civil construction works such as the construction of the Wattle Street and Parramatta Road entry and exit ramps and associated civil construction works on Wattle Street and Parramatta Road, as well as the Parramatta Road ventilation facility (including the outlet for the M4-M5 Link project) will be complete or nearing completion before construction of the M4-M5 Link commences. This includes the construction of the M4-M5 Link entry and exit ramps along Wattle Street, including the dive and cut-and-cover structure.

Around St Peters, clean-up of the Alexandria Landfill site, construction of the St Peters interchange as well as construction of a component of the above ground infrastructure required for the M4-M5 Link project is being carried out by the New M5 project. This includes construction of the M4-M5 Link entry and exit ramps, upgrades of the local roads (including Campbell Road) and the provision of a construction hardstand area and construction access driveway that will be reused for the Campbell Road civil and tunnel site (C10).

The M4-M5 Link project will need to carry out some civil construction works (including construction of the Campbell Road ventilation facility) and civil finishing works for infrastructure at Haberfield and St Peters. However, construction of surface infrastructure at both locations as part of the M4-M5 Link project has been minimised as much as practicable.

As described in section 6.4 of Chapter 6 (Construction work) of the EIS, site establishment activities associated with the M4-M5 Link project would include utility works, vegetation removal, the establishment of traffic management and environmental controls and demolition of buildings and structures to facilitate the establishment of construction ancillary facilities. Although these site establishment works are relatively intense in nature and thus are anticipated to generate amenity related impacts such as noise and vibration and dust, they would typically occur during standard day time construction hours, with scheduled respite periods that will be implemented in accordance with the conditions of approval and associated EPL. The majority of site establishment activities would also be relatively short in duration, with the exception of some activities such as utility works.

To further manage the impacts associated with longer duration construction impacts from the concurrent construction of the WestConnex component projects in these areas and to respond to issues raised during the construction of other WestConnex projects and in submissions on the M4-M5 Link EIS, the following strategies are proposed:

- Provision of additional off-street car parking for the construction workforce at Rozelle, with the use of the White Bay civil site which would provide around 50 parking spaces. This site is further described in **Chapter D2** (White Bay civil site (C11))
- Using the Northcote Street civil site for construction workforce car parking and laydown. Currently this site is used as the main tunnelling site for the eastern end of the M4 East project
- Reducing the surface construction footprint of the Wattle Street civil and tunnel site (C1a) to limit surface construction activities to the Wattle Street entry and exit ramps. Compared to the indicative layout presented in Chapter 6 (Construction work) of the EIS for this site, this would reduce potential construction impacts such as noise and vibration and dust during construction of the M4-M5 Link project and would also allow for realisation of the M4 East urban design and landscaping outcome for this area at the completion of the M4 East project
- Provision of a heavy vehicle truck marshalling facility at the White Bay civil site at Rozelle, which would cater for around 40 heavy vehicles and stage the release of trucks to the tunnelling sites to manage the arrival of trucks to construction ancillary facilities (see **Chapter D2** (White Bay civil site (C11)). Provision of a truck marshalling facility and additional construction workforce parking would result in several benefits for the community and the project, including:
  - Reducing potential queuing, idling, circling and congestion on local roads surrounding the project and associated construction ancillary facilities
  - Providing additional construction workforce parking spaces, which would minimise construction workers parking on local roads
  - Minimising disruptions to the road network around construction ancillary facilities and noise and other disturbance to the local community including residential, business and commercial properties

  - Improving safety for construction workers, motorists and the general public by providing a controlled area from which project traffic schedulers can manage trucks and direct truck drivers to the construction sites at an appropriate time

- Development of a car parking strategy that will quantify construction workforce parking demand, identify public transport options (and measures such as carpooling and shuttle-buses) and identify all locations that will be used for construction workforce parking (see environmental management measure TT04 in **Chapter E1** (Environmental management measures))
- Development and implementation of a truck management strategy that will identify potential truck marshalling areas that will be used by project-related heavy vehicles and describe management measures for project-related heavy vehicles to avoid queuing and site-circling in adjacent streets and other potential traffic and access disruptions (see environmental management measure TT16 in **Chapter E1** (Environmental management measures))
- Designing acoustic sheds with consideration of the activities that will occur within them and the relevant noise management levels in adjacent areas. Monitoring will be carried out to confirm that the actual acoustic performance of each shed is consistent with predicted acoustic performance (see environmental management measure NV7 in **Chapter E1** (Environmental management measures))
- The appointment of a suitably qualified and experienced Acoustics Advisor, who is independent of the design and construction personnel, and who will be engaged for the duration of construction of the project (see environmental management measure NV1 in **Chapter E1** (Environmental management measures))
- Use of the M4 East and New M5 tunnels for spoil haulage when they become available and where practicable, to minimise heavy vehicle movements on the surface road network
- Receivers that qualify for assessment for at receiver treatment in relation to operational noise, that are also predicted to experience significant exceedances of noise management levels due to construction, will be given priority preference for assessment for treatment based on the severity and timing of impact. Where the building owner accepts the at receiver treatment proposal, the treatments will be installed as soon as possible (see environmental management measure NV9 in **Chapter E1** (Environmental management measures)).

Specific management and mitigation will be documented in relevant construction environmental management sub-plans such as the AFMP and the CTAMP. This will include detailed consideration of the types of activities that would be most likely to cause longer duration impacts during construction of the project, the types of impacts already experienced by these communities as a result of M4 East and New M5 construction, and subsequent development and implementation of location and activity specific mitigation that considers the consecutive nature of construction at the locations shown in **Figure B2-4** to **Figure B2-6**.

B11.12 Land use and property

Refer to Chapter 12 (Land use and property) of the EIS for details of land use and property.

B11.12.1 Residual land at Rozelle Rail Yards

Summary, p6

Need for full delivery of the Rozelle Rail Yards recreation area and residual lands to Council at no cost, with all landscaping, paths and facilities constructed by the proponent according to final designs which have been the subject of a comprehensive community consultation program.

Part 8, p62

Need for full delivery of Rozelle Rail Yards recreation area to Council.

Part 8, p63

The Rozelle Rail Yards recreation area and other residual lands should be fully delivered to Council at the earliest opportunity. Whilst Council welcomes the creation of the RRY recreation area, it would prefer this area was created without WestConnex. Council expects the RRY recreation area to be delivered to Council for its ownership at no cost, and all landscaping, paths and facilities to be constructed by the NSW Government according to final designs. It is also expected that maintenance funding would be provided and Council and the community would be closely involved in development of a plan of management for this important site.

All residual lands should be delivered at zero cost to Council unburdened by contamination or any immediate need for maintenance. All landscaping, paths and other community infrastructure should be delivered to Council fully constructed and all buildings (if any) renovated before handover. Handover of residual lands should be in accordance with relevant conditions of approval that have been drafted in consultation with Council and affected communities. Further, the NSW Government should establish a fund that can be used by Council to maintain these lands for an initial period.

Council is also keen to ensure that construction and handover of the RRY recreation area and other residual lands is not delayed by construction of other projects, such as the proposed Western Harbour Tunnel if approved. In a similar way, construction of Stage 3 is delaying delivery of the St Peters Interchange recreation area and some of the residual lands in Haberfield/Ashfield. Council believes the community deserves the benefits of the RRY recreation area and other residual lands as soon as possible and certainly does not want to see land vacant for years awaiting use as a construction zone for another future project.

With the exception of the Pyrmont Bridge Road site, all residual lands should be devoted to open space and other community uses. Council would in general terms prefer all WestConnex residual lands, including the RRY recreation area, to be devoted to community use rather than sold for commercial gain. The exception is the Pyrmont Bridge Road site, which would be appropriately returned to a 'biomedical hub' use in keeping with the Parramatta Road Urban Transformation Strategy. It is important that surrounding communities who have suffered the negative impacts of WestConnex derive benefit from these lands.

Part 8, p64

All residual lands should be as useful to the community as possible, and Council does not seek to own problematic residual lands. It follows that all residual lands be as useful to the community as possible. Council seeks ownership of useful public space and facilities only. Council does not want to own and maintain useless or problematic residual areas created by WestConnex that are difficult to access and are blighted by motorway traffic. RMS should retain ownership of these problematic areas.

Response

Land required for the construction of the project that is not required for operation would be identified following detailed design and construction planning. This land would either be subject to the relevant UDLP or would become 'remaining project land'. Remaining project land would then be broken down further into:

- Land to be retained for future (separate) road infrastructure projects. Roads and Maritime would seek to minimise the areas of land that would be used for future separate infrastructure projects to government owned land, including land already owned by Roads and Maritime, as far as practicable
- Residual land – land required for the construction of the project that is not required for operation or for future (separate) infrastructure projects.

Remaining project land would be identified in the Residual Land Management Plan (RLMP) (see environmental management measure PL3 in **Chapter E1** (Environmental management measures)). The Residual Land Management Plan would be prepared in consultation with the relevant council and would identify (and consider) but not be limited to:

- Identification and illustration of all remaining project land following construction of the project, including the physical location, land use characteristics, size and adjacent land uses
- Identification of feasible uses for remaining project land including justification for the selected use
- Identification of timeframes for implementation of the actions in relation to the identified feasible uses.

An indicative summary of the locations of remaining project land at the end of construction is presented in **Table C12–3**.

Future use would be decided by Roads and Maritime and any future development would be subject to separate development assessment and approval. The project would not rezone or consolidate remaining project land and therefore there would be no changes to land use zoning or existing development controls that would guide future development. The measures and works identified in the UDLPs and RLMP would be delivered by Roads and Maritime.

Subject to future detailed design and the requirements of the project, parts of the project footprint not required for operational infrastructure and/or landscaping (ie the land that would be subject to UDLPs) may be contemplated for separate future redevelopment and is identified as remaining project land. UDLPs will be prepared in consultation with relevant councils, the community and affected landowners and businesses and will be implemented within one year of operation, unless otherwise required by the conditions of approval. Future development would be subject to separate development assessment and approval. The project would not rezone or consolidate remaining project land and therefore there would be no changes to land use zoning for future development controls that would guide future development. In some instances, areas of land may also be retained by Roads and Maritime for future (separate) road infrastructure projects. Where this is the case, the land would be rehabilitated and stabilised in preparation for the potential future use.

As noted in section 6.5.9 of the EIS, a section of the Rozelle Rail Yards around the proposed future Western Harbour Tunnel project entry and exit ramps would be kept as an area of hardstand, in anticipation of it being used to support construction of that project. As part of the M4-M5 Link project, this area would be physically separated from the remainder of the interchange to restrict access. The possible future use of this area would mean that landscaping and revegetation works may need to be staged.

Land associated with the Pyrmont Bridge Road tunnel site (C9) would, following construction, be rehabilitated to generally the existing ground level or as otherwise agreed with Roads and Maritime, as described in section 12.4.6 of the EIS. Future development would be decided by Roads and Maritime, and would be subject to separate development assessment and approval and the restrictions of the relevant consent authority. When considering potential reuse opportunities for this land, Roads and Maritime would have regard to the objectives of the *Parramatta Road Corridor Urban Transformation Strategy.*

As noted in section 5.1 of the EIS, ongoing motorway maintenance activities during operation do not form part of the project. This includes maintenance of residual land and land subject to UDLPs. Funding for maintenance is outside the scope of the EIS. However, responsibility for the maintenance of the open space at the Rozelle Rail Yards would be subject to an agreement between Roads and Maritime and relevant stakeholders, including Inner West Council. The entity responsible for the maintenance of the open space would prepare a plan of management, or similar, for the open space area.

Urban design considerations associated with the Rozelle Rail Yards are discussed in **section B11.13.1**.

B11.12.2 Need for significant improvement in compulsory acquisitions processes

Part 8, p61

Impact of compulsory acquisitions – primarily on residents and businesses along a section of Victoria Road at Rozelle required for construction of the Iron Cove Link tunnel portal onto Victoria Road, and on businesses adjacent to the RRY site and on Parramatta Road at Annandale/Camperdown.

Part 8, p62

There is a need for significant improvement in compulsory acquisition processes. As discussed above, compulsory acquisition of homes and businesses at Haberfield/Ashfield and St Peters for Stages 1 and 2 devastated the lives of many individuals, families/households and business operators and their employees. To make matters worse, some property owners have claimed the compensation they received was not sufficient to enable them to purchase equivalent properties within their neighbourhoods. Affected residents and business owners have reported their sense that acquisition processes are being poorly treated by RMS [Roads and Maritime] in negotiations over their properties.

The Victoria Road acquisitions also involve a number of businesses, and businesses are also being acquired in the Gordon Street industrial area at Lilyfield adjacent to the RRY site, in the block bounded by Parramatta Road, Pyrmont Bridge Road and Mallet Street at Annandale, at 7 Darley Road at Leichhardt (Dan Murphy's) and at 199 Parramatta Rd, Haberfield (Muirs Holden). Many of these businesses are well-established, so their relocation (or disappearance) will have a major impact on both their owners and employees. Loss of these businesses also raises concerns for Council about loss of employment lands in the Inner West.

The EIS recognises a range of negative impacts or "social risks" affecting residents and tenants as well as business owners whose properties need to be acquired by the project. The EIS states that the number of properties to be acquired during Stage 3 comprises 26 residential properties together with 24 commercial or industrial zoned properties and one mixed-use property with 48 businesses.

Recently a RMS spokeswoman confirmed that a total 427 properties are required to support the construction of all stages of the WestConnex project. Of these 427 properties, 111 were yet to be acquired. Given these figures supplied by RMS, the cost of properties acquisitions required by the WestConnex motorway is likely to exceed $1.5 billion. Council considers that the cumulative negative impacts of the project are aggravated by this expenditure of public money.

Whilst the EIS acknowledges that the impact of acquisitions on individual households and businesses is major, it claims that the number of acquisitions proposed "is relatively low for an infrastructure project of this scale" and that the impact is ameliorated by recent reforms to the NSW property acquisition system. The impact is deemed by the EIS to be "a moderate negative".

Numerous difficulties experienced by residents who were served with property acquisition notices have exposed cumulative negative experiences ranging from under-valuation of homes to dislocation of community life. Many households reported that they were severely disadvantaged by the acquisition process and, as a result, moved away from their local communities and support networks. This exodus also represented a major loss to the communities concerned.

As the evidence provided above demonstrates, the administration of property acquisitions during Stages 1 and 2 has been characterised by serious shortcomings. It is noted and agreed that the passing of the *Land Acquisition (Just Terms Compensation) Amendment Bill 2016* may help address some of these shortcomings.

Accordingly, Council requests the continued review of compulsory acquisition processes by the NSW Government, with a view to greater fairness for affected property owners. Council also requests similar improvements to voluntary acquisition procedures and allocation of sufficient funding for noise mitigation measures such as double-glazing and air conditioning.

Response

The project has been designed and developed to minimise the need for surface property acquisition and occupation. The need to reduce these impacts has been balanced with maximising opportunities for beneficial re-use of the areas required for construction that would be surplus to the operational needs of the project. Notwithstanding this design intent, construction and operation of the project would result in temporary and permanent impacts on property. Where land required for the construction and/or operation of the project is not currently owned by the NSW Government, discussions are being held with the affected landowners concerning the purchase, lease or licence of the land.

Inner West Council's request for continued review of compulsory acquisition processes by the NSW Government and similar improvements to voluntary acquisition procedures is outside the scope of the EIS. All compulsory acquisition required for the project will be carried out in accordance with the *Land Acquisition (Just Terms Compensation) Act 1991* (NSW), the *Land Acquisition Information Guide* (Roads and Maritime 2014) and the land acquisition reforms announced by the NSW Government in 2016 (NSW Government 2016b) as discussed in section 12.3 of the EIS. These aspects are reflected in environmental management measure PL1 in **Chapter E1** (Environmental management measures).

Land acquisition reforms were announced by the NSW Government in 2016 as a result of a review of the existing acquisition process, which demonstrated that although the legislative framework for land acquisitions was sound, there was more work to be done to ensure that a stressful and complex situation is made as easy as possible. The reformed position on land acquisitions strikes a more effective balance between the property rights of landowners and the public good derived from essential public infrastructure. Additional information about the 2016 reform, including changes that were introduced, is available at the NSW Department of Finance, Services and Innovation website[14].

Allocation of funding for noise mitigation measures is discussed in **section B11.11.3**.

B11.12.3 Pre-construction property condition surveys

Part 8, p64

There is a need to improve processes for pre-construction property conditions surveys.

Council has concerns about pre-construction property condition surveys or 'dilapidation reports' being carried out by the proponent, as this appears to be a conflict of interest. The EIS states that all properties within 50m of the outer edge of underground tunnels would be offered a property condition survey before construction with a follow up survey for the property after construction. This is to ensure there is a record of the property's condition before and after construction. If there is any damage attributed to the project, it would be repaired at no cost to the property owner. Council would like these surveys to be carried out by an independent body.

Response

As described in section 12.3 of the EIS, building condition surveys, to be conducted by a structural engineer, will be offered to property owners within the zone of influence of tunnel settlement (within 50 metres from the edges of the tunnels and ramps), or otherwise as directed by the Independent Property Impact Assessment Panel. In the event that damage occurs to a property as a result of the construction of the project, the damage will be appropriately rectified.

To ensure that conflicts arising from potential property damage are effectively managed, an Independent Property Impact Assessment Panel, comprising of geotechnical and engineering experts, will be established prior to the commencement of works with the potential to result in ground movement and settlement to independently review the building condition survey process, resolve any property damage disputes and overseeing ongoing settlement monitoring requirements (see environmental management measure PL11 in **Chapter E1** (Environmental management measures) for further details on the responsibilities of the panel).

B11.12.4 Ground settlement impacts from groundwater drawdown

Summary, p6

Risk of damage to buildings as a result of settling caused by tunnel-induced groundwater movements and need for independent verification of damage.

Part 12, p76

There is a need for a further assessment of the potential for cracking of buildings from ground settlement caused by groundwater withdrawal.

Potential impacts from groundwater withdrawal induced settlement on properties raises concern, and this has not been adequately addressed in the EIS. The EIS has not properly addressed Item 10(b) of the Secretary's Environmental Assessment Requirements (SEARS), as property or infrastructure where the predicted settlement criteria will be exceeded have not been identified. Settlement of this kind would be expected to occur over the operational life of WestConnex.

Nor does the EIS does prescribe responsibility for a construction-settlement monitoring program, but implies this may sit with the construction contractor, which would be a conflict of interest.

[14] https://www.finance.nsw.gov.au/sites/default/files/NSW_Government_Response.pdf

The EIS [s]tates that “The preliminary assessment shows that over the majority of the tunnel alignment predicted ground movement is less than 20 millimetres which would be consistent with the criteria.” This is misleading as the EIS recognises the potential impact on buildings due to settlement induced by groundwater withdrawal. Estimates of ground movement in the EIS exclude the impact of groundwater drawdown, as stated: “The preliminary assessment does not include prediction of settlement as a result of groundwater drawdown (consolidation settlement).”

The studies undertaken for the EIS predict ground water withdrawal will permanently impact ground water levels at the end of construction up to 500m either side of the tunnel alignment and up to 1.4km over the longer-term in some areas. This modelling predicts that at the end of construction, steep localised cones of depression will develop beneath Newtown and St Peters within the Ashfield Shale.

The EIS also states the risk of ground movement from groundwater drawdown is lessened where tunnelling is more than 35 metres. However, some tunnelling in areas near portal and underground interchanges will be far shallower than this. Steep gradients are likely to cause greater differential settlement with potential damage to buildings in the area. Localised modelling (required by the SEARS) is possible, but has been deferred to be undertaken by the construction contractor.

As this modelling has not been undertaken at the EIS stage, there is no information about which properties may be subject to potential exceedances of settlement criteria. The EIS does not state who will undertake the precondition surveys, how the findings will be published and who will be liable for ‘make good’ should the criteria be exceeded in practice. The EIS implies this may be the responsibility of the construction contractor, which again, would be a conflict of interest.

The EIS must prescribe responsibly for the settlement monitoring program, as settlement damage may continue for the operational life of the project, as groundwater withdrawal and settlement damage is likely to occur well after construction is completed.

Response

As noted in section 12.3.4 of the EIS, the preliminary assessment of ground movement does not include prediction of settlement as a result of groundwater drawdown (ie consolidation settlement). In contrast to predicting tunnel excavation-induced ground movement, which has a well-documented and accepted methodology, prediction of consolidation settlement relies on the prediction of induced groundwater drawdown, which is complex and subject to significant uncertainties.

Settlement that occurs due to groundwater drawdown is gradual and generally occurs at a slower rate (possibly over years). It can sometimes also be difficult to distinguish from settlement due to groundwater drawdown that may be naturally occurring; or occurring due to another influence; or occurring as a result of seasonal variations of soil moisture which can cause swelling or shrinkage of the soil. The extent of groundwater drawdown often occurs over a wider area beyond the location of the tunnels and results in a wider and shallower settlement trough which is less likely to result in differential settlement and tensile strain on buildings, minimising the potential for building damage.

Cumulative settlement impacts include the combined impacts of settlement from tunnel excavation induced ground movement and groundwater drawdown. Tunnel excavation induced ground movement is anticipated to be the prevalent mechanism causing ground movement given that the proposed tunnels are primarily located within competent bedrock (Hawkesbury Sandstone and Ashfield Shale). The risks associated with groundwater drawdown and induced settlement within the Ashfield Shale and Hawkesbury Sandstone which is the dominant geology of the project footprint is considered low because of the geotechnical properties of the rock. As water is removed from these rock types the structural integrity and strength of the rock remains due to its competent nature. Residual soil profiles developed on the weathered sandstone and shale bedrock are typically relatively thin, stiff and of low compressibility and as such would be less susceptible to ground settlement due to changes in groundwater levels.

In contrast, as groundwater drawdown occurs within the alluvium the structural integrity of the unconsolidated sediment is compromised resulting in more settlement than would be expected from the sandstone and shale. Cumulative settlement impacts in the alluvium would be minimised by including tanked tunnel sections through the alluvium or by aligning the tunnels beneath the palaeochannels, thereby minimising groundwater ingress into the tunnels, drawdown in adjacent soils and associated settlement.

Measures for ground settlement are reflected in environmental management measures PL6 through to PL12 in **Chapter E1** (Environmental management measures). This includes the provision for building condition surveys, which will be the responsibility of the design and construction contractor(s). An Independent Property Impact Assessment Panel, comprising of geotechnical and engineering experts, will be established prior to the commencement of works with the potential to result in ground movement and settlement to independently review the building condition survey process, resolve any property damage disputes and overseeing ongoing settlement monitoring requirements (see environmental management measure PL11 in **Chapter E1** (Environmental management measures) for further details on the responsibilities of the panel).

The design and construction contractor(s) will be responsible for the implementation of the environmental management measures, overseen by the proponent (Roads and Maritime). Roads and Maritime will ensure compliance requirements are followed through the implementation of a compliance tracking program.

B11.12.5 Land use and property impacts from construction ancillary facilities

Summary, p7

Objection to impacts on Buruwan Park from the construction site at The Crescent and loss of part of Bignell Lane from the Pyrmont Bridge Road construction site.

Response

As discussed in section 12.4.4 of the EIS, Buruwan Park at Annandale would be permanently acquired for road infrastructure, primarily to accommodate the realignment of The Crescent. This would be a direct loss of about 0.3 hectares of public open space at Annandale. Buruwan Park currently acts as passive recreation area for the community and as a pedestrian walkway that connects Bayview Crescent and The Crescent with the Rozelle Bay light rail stop. The change in land use from recreation land to infrastructure would have moderate to high local impact on land use. However, the provision of up to 10 hectares of new open space within the Rozelle Rail Yards and new pedestrian and cyclist bridges and paths to provide connectivity would more than offset the loss of Buruwan Park and is considered to be a beneficial outcome for the community.

During construction, equivalent access to the Rozelle Bay light rail stop would be provided prior to the closure and removal of Buruwan Park. The pedestrian and cycle path connection would be diverted along The Crescent, Johnston Street and Kentville Avenue during construction (note that this diversion was incorrectly described the EIS. The correct diversion, as noted above, is described in further detail in **Chapter A6** (Clarifications)).

During operation, connectivity between Bayview Crescent, The Crescent and the Rozelle Rail Yards would be improved through the provision of the pedestrian and cyclist bridge that would span The Crescent and City West Link, including new connections to the Rozelle Bay light rail stop. This new pedestrian and cycle bridge is described in Chapter 5 (Project description) of the EIS.

The design for the widening of Victoria Road at the eastern abutment of Iron Cove Bridge as described in the EIS would permanently impact around 1,494 square metres of King George Park. With the bioretention facility now proposed to be located in this area (see **Part D** (Preferred infrastructure report) for a description and assessment of this change), the project would permanently impact around 2,259 square metres of King George Park. This area comprises around five per cent of the total area of King George Park, leaving around 42,611 square metres (or around 95 per cent) of King George Park not permanently impacted by the project. During operation, this area would be landscaped and would appear as part of King George Park.

Bignell Lane would not be removed as part of the project. Bignell Lane would need to be realigned between Mallett Street and Pyrmont Bridge Road at Annandale in order to accommodate the Pyrmont Bridge Road tunnel site (C9). Short term, temporary closure of Bignell Lane would be required during construction to allow for the realignment works. Rear-access to commercial properties along Bignell Lane would be maintained. Connectivity between Mallet Street and Pyrmont Bridge Road, and access to adjoining properties, would be maintained.

B11.13 Urban design and visual amenity

Refer to Chapter 13 (Urban design and visual amenity) and Appendix O (Landscape and visual impact assessment) of the EIS for details of urban design and visual amenity.

B11.13.1 Urban design of Rozelle Rail Yards

Summary, p7

Need to improve the design of the Rozelle Rail Yards recreation area to limit the extent of motorway service areas, create more usable areas of open space and improve walk/cycle connectivity.

Part 10, p69

There is a need for involvement of Council and the community in the design of the RRY recreation area and other residual lands. The following comments focus on the RRY recreation area, given this is the main site that will be returned to public use from Stage 3. Though there is limited information within the EIS on urban design details for this site, Council expects that should the project proceed there will be opportunities for Council and the community to participate in the development of an urban design plan for the site. Hence comments in this submission are offered as initial comments only.

Council recognises there the need for open space and community facilities across the Inner West. Some areas have traditionally had a shortfall, and demand will increase into the future as the population increases through redevelopment. This is particularly the case for the RRY site, where densely-developed residential areas around the site have traditionally suffered a shortfall of open space, and future development at the Bays Precinct will bring substantial new development.

Council sees the need for a clear 'recreational needs' basis for the use of the area with reference to Council's Recreation & Open Space Needs Study. As is the case for the St Peters Interchange recreation area, Council is keen to boost the supply of much-needed active recreation areas. From the concepts in the EIS, there appears more opportunity to provide active recreational facilities.

Considerations in the design of residual lands include roadside or ventilation facility air quality impacts, walk/cycle desire lines, links to the wider network of paths and open spaces, safety-by-design, equity of access, aesthetics and public art. It is expected that should the project proceed, Council and the community will be involved the design of the RRY recreation area and other Stage 3 residual lands through development and implementation of urban design and residual lands plans, mandated by conditions of approval.

Given the RRY site is isolated by a number of barriers including roads, cliffs and the light rail line, active uses on the site (including evening uses) would provide security benefits from surveillance and enhance the community's enjoyment of this facility. This could include night-time sports and youth-focused outdoor and indoor recreation facilities.

Being a former creek-line, management of stormwater on the RRY site is a major task. All stormwater facilities should be integrated and where appropriate featured, with Water Sensitive Urban Design (WSUD) implemented. Wetlands (as proposed) are supported and these should be integrated into landscaping, not fenced. Use of concrete culverts should be minimised. Aboriginal and non-Aboriginal heritage should also be featured in landscape designs for the RRY recreation area.

Response

The land use requirements and the potential for limiting the extent associated with motorway operational complex at the Rozelle Rail Yards is discussed in **section B11.5.2**. A discussion of the residual land management plan for Rozelle Rail Yard is presented in **section B11.12.1**.The concept plan for the Rozelle Rail Yards presented in the EIS outlines how the key strategies presented in section 5.1.3 of Appendix L (Technical working paper: Urban design) of the EIS could be delivered at the site. The strategies include use of the old creek and swamp bed to employ WSUD to ecologically filter runoff before it enters the bay. Water would be treated at the site within vegetated swales and a constructed wetland that would be designed to integrate with the landscape.

The Leichhardt Recreation and Open Space Needs Study was considered during the development of the concept plan for Rozelle Rail Yards, which like UrbanGrowth NSW's Active Recreation Needs Study for the Bays Precinct, is referenced in section 6 of the Urban Design Report (Appendix L of the EIS).

The concept plan would be further refined during detailed design and would have regard to identifying opportunities to deliver outcomes that support and connect existing neighbourhoods, complement and stimulate local economies and provide opportunities for growth across existing and future local industries along and around Victoria Road at Rozelle.

As with all areas of open space and landscaping that will be provided by the project, UDLPs (as described in section 13.6 of the EIS) will be prepared. The process for finalising the urban design and landscaping outcome at the Rozelle Rail Yards would be detailed in the relevant UDLP that will be prepared for the project. The UDLPs will be prepared in consultation with relevant councils, stakeholders and the community.

As nominated in section 7 of Appendix L (Technical working paper: Urban design) of the EIS, active recreational facilities that would be provided by the project will be developed in consultation with Inner West Council via a recreational facilities needs analysis or similar. These facilities will subsequently be documented in the relevant UDLPs. Furthermore, a Social Infrastructure Plan will be prepared in consultation with the community and relevant councils and will detail the delivery of measures including:

- Community connectivity, including pedestrian and cycle access
- Local centre and street revitalisation works
- Provision of community and social facilities.

A number of opportunities for future uses of the remaining project land were identified in Appendix L (Technical working paper: Urban design) of the EIS. These include:

- Children's play spaces
- Active recreation to complement the Bay Run, such as outdoor gyms
- Infill housing development
- Community gardens.

Community input would be central to the ultimate decision on use of this land. All future uses could be designed in a manner to ensure that the existing amenity of the adjacent residences would be preserved. Creating more usable areas of open space at Rozelle Rail Yards is also discussed in **section C12.8.3**.

Heritage interpretation would also be included within the final urban design of the Rozelle Rail Yards. A number of elements that are being removed as part of the site management works at Rozelle as a separate project, would be reinstated in the final design. These elements include the former rail gantries, a lighting tower and some rail tracks. Future development possibilities at the Rozelle Rail Yards is presented in section 6.1 of Appendix L (Technical working paper: Urban design) of the EIS.

The project would support the realisation of *The Bays Precinct Transformation Plan* by providing new amenity for future residents and workers, including new open space and improved pedestrian and cyclist connections within and around the Rozelle Rail Yards. Improving walk/cycle connectivity at Rozelle Rail Yards is discussed in **section B11.8.25**.

Specific design measures at surface operational infrastructure for the M4-M5 Link will be identified and implemented to prevent crime based on principles of crime prevention through environmental design (CPTED).

B11.13.2 Urban design associated with the Iron Cove Link

Part 10, p69

The other area of importance for urban design is the area along Victoria Road near the Iron Cove Bridge that will be improved as a result residual lands from road widening and significant traffic reductions from the Iron Cove Link tunnel. As with all residual lands from WestConnex, Council wishes to avoid the creation of useless pieces of open space that could create safety or security issues.

Active edges to this strip of land through developments (business, residential or community uses) that front onto this space are needed to enhance security. This is preferred to the space being framed by blank side noise barriers or rear dwelling fences, although Council acknowledges there will be a need for some noise buffering. Being next to Victoria Road, indoor community uses may be appropriate as well as open spaces.

Response

As described in section 13.6 of the EIS, UDLPs will be prepared for areas of open space and landscaping that will be provided by the project, including south of Victoria Road near the eastern abutment of Iron Cove Bridge. Further discussion regarding the process for development of the UDLPs is provided in **section B11.13.1**.

Residual project land on the southern side of Victoria Road not required for permanent operational infrastructure provides the opportunity to create new open space and active transport connections for the community, which connect with King George Park to the west and the local street network. This land would be landscaped and developed in accordance with the UDLPs that will be prepared for the project. The UDLPs may also include permanent noise at source noise mitigation measures such as noise walls or barriers. These would again be subject to consultation with the community, relevant councils and affected landowners and businesses.

The forecast reduction in traffic along sections of Victoria Road resulting from the Iron Cove Link will likely create opportunities for future urban renewal, including a revitalised 'street' for businesses, locals and visitors. The future renewal of Victoria Road, however, is outside the scope of the project. Future development possibilities on Victoria Road are presented in section 6.2 of Appendix L (Technical working paper: Urban design) of the EIS. While such future development is not proposed to be delivered by the project, the project would help facilitate such development opportunities, including active recreational uses and urban renewal, which would be coordinated and delivered by others.

B11.13.3 Construction impact on visual amenity

Part 9, p65

The EIS also identifies the areas where high to moderate visual impacts can be expected. These are large areas of Easton Park, which has unimpeded views of the construction site including hoardings and other facilities, and Glebe Foreshore Parklands, with views that would be altered by construction works. Moderate to high visual impacts would need to be mitigated.

The EIS recognises the project's impact on amenity and notes that there will be increased areas of concrete walls, access ramps and related infrastructure. There will also need to be adequate plans for graffiti mitigation.

Response

Specific design measures at surface operational infrastructure will be identified and implemented to prevent crime, including graffiti, based on principles of CPTED. A principle of CPTED includes space management which ensures that space is appropriately utilised and well cared for through measures such as rapid repair of vandalism and graffiti.

Section 6 of Appendix O (Technical working paper: Landscape and visual impact) of the EIS assessed potential visual impacts on various receptors during construction. The sensitivity of recreational users at Easton Park would be moderate given the proximity to the Rozelle civil and tunnel site (C5) and its flat topography, which provides large areas with unimpeded views of the site. Currently the edge of the proposed construction site along Lilyfield Road comprises a number of industrial buildings, providing poor amenity. The magnitude of change during construction is considered to be high given the proximity, duration and extent of the construction site, and the number of construction elements that would likely be visible above the hoarding. Overall there would be a high-moderate visual impact to receptors at Easton Park.

The sensitivity of recreational users at Glebe Foreshore Parklands to the Rozelle civil and tunnel site (C5) and The Crescent civil cite (C6) would be high. Users of this space are engaged in both active and passive recreation activities, and are likely to be there for prolonged periods of time, and be present in high numbers. The site provides a sweeping panorama across Rozelle Bay comprising an extensive water element. The magnitude of change is considered to be moderate given that the works can be expected to be moderately visually prominent with the exception of taller elements such as the ventilation facility which would be highly visually prominent from this receptor location; and construction would take place over a period of up to five years. Overall there would be a high-moderate visual impact to receptors at Glebe Foreshore Parklands.

Mitigation and design measures that have been proposed for the project to minimise the identified high-moderate visual impacts are outlined in **Chapter E1** (Environmental management measures) and include developing ancillary facilities (including the locations of visible structures and plant perimeter fencing and treatment) to minimise visual impacts to adjacent receivers where feasible and reasonable. In addition, at construction ancillary facilities located in close proximity to sensitive receivers such as users of recreational space, high quality fencing suitable for parks and public space will be considered. Furthermore, during construction, regular maintenance of site hoarding and perimeter site areas will be undertaken, including the prompt removal of graffiti.

B11.13.4 Impact on existing public art

Part 9, p65

The EIS recognises there will be an impact on public art. Council has recognised that there are two items of public art that would be affected by the project - a mural in Buruwan Park, and the Guerrilla Gardeners Troll under the Johnston Street Bridge. These will need to be protected.

Response

No works to the light rail bridges at Buruwan Park or Johnston Street are proposed by the project and as such, no impacts to the Mural by Soraya Abidin at Buruwan Park or the Guerrilla Gardeners – Troll sculpture were identified during the development of the EIS and would be confirmed during detailed design.

Roads and Maritime acknowledges that public art and monuments contribute to neighbourhood identity and character, holding sentimental value for the community. Only two items of public art have been identified within the project footprint – the statues of soldiers on the approaches of Anzac Bridge and the mural along The Crescent between City West Link and Johnston Street. These items of public art, along with the Mural and the Guerrilla Gardeners – Troll sculpture would be retained or protected during construction of the project, resulting in negligible effects.

B11.13.5 Visual impact of signage

Part 10, p 72

There is a need to minimise the visual impact of directional signs and variable message signs associated with the project. A further visual impact issue Council has encountered in relation to Stage 1 is the erection of large standard directional signs and variable message signs. This has been a particularly important issue for Haberfield as this suburb is a Heritage Conservation Area. Council has argued that if they are to be erected, then the number, size, height and bulk should be minimised and they should be located to avoid sensitive locations.

Council recognises there are RMS standards for these signs, but has sought exemption from these standards to reduce their size and minimise visual impacts. Council has also sought to ensure sign footings do not obstruct to walk/cycle paths of travel on footways. These points should be considered for any signs proposed in relation to Stage 3.

Response

A range of road and tunnel signage, including directional and variable message signs would be incorporated within the tunnels and on surface roads at approaches to tunnels in accordance with Australian Standards and Roads and Maritime requirements.

As the focus on this signage is to provide a clear and unambiguous direction to motorists, it is important for the characteristics of these to be consistent with what road users, pedestrians and cyclists are accustomed to expecting. Readability and sight distances are an important safety consideration which affects the sizing of signage, as does the amount of content which needs to be included on the sign. These are important considerations as they allow for signage to be recognised early, thereby reducing the potential for late lane changes or in appropriate turns, which can cause accidents.

Variable message signs would be mounted on gantries along roads which approach the tunnels and would be used to advise motorists of traffic conditions. The variable message signs within the tunnels would comprise single-line-text advisory signs above traffic lanes.

Integrated speed and lane-use signs would be installed along the length of the project. These signs would generally display the regulatory speed limit along the project, and would be modified at the motorway control centre to display variable speed limits in response to incidents and congestion. The signs would be located around 200 metres before the tunnel portals, around 50 metres before each exit ramp and around 50 metres after each entry ramp. The M4 East and New M5 portals already have signage incorporated into the project and this would reduce the need for M4-M5 Link specific signage.

The location, sizing and characteristics of the signage will be finalised during detail design, considering the relevant standards, specifications and safety in design requirements and is expected to be audited as part of the Road Safety Audit. Any proposed signage outside of the project footprint would be subject to environmental assessment, which would include consideration of impacts on nearby receivers, including potential landscape and visual impacts.

A strategy for pedestrian and cyclist wayfinding, including new signage and changes to existing signage, would be developed as part of the UDLPs for the project. The draft UDLPs will be exhibited for community and stakeholders review and feedback, which would be considered in the finalisation of the UDLPs for the project.

B11.13.6 Visual impact of ventilation facilities

Part 3, p19

Air quality and visual impacts from ventilation facilities, including concerns about unfiltered ventilation facilities proposed for the Rozelle Rail Yards (RRY) site and Victoria Road near Terry Street – the latter facility raising particular concerns due to its proximity to densely developed residential areas.

Part 3, p20

At a local level, there has been particular concern in the community about air quality and visual amenity impacts from the ventilation facilities proposed for Stage 3 within the RRY site (near The Crescent) and on Victoria Road near Terry Street. The latter facility has raised concerns due to its proximity to densely-developed residential areas and the fact that residential areas on the eastern side of Victoria Road are elevated, so there is a possibility that some dwellings will be above the level of the facility outlet.

Part 10, p70

Considerations in the design of residual lands include roadside or ventilation facility air quality impacts, walk/cycle desire lines, links to the wider network of paths and open spaces, safety-by-design, equity of access, aesthetics and public art. It is expected that should the project proceed, Council and the community will be involved the design of the RRY recreation area and other Stage 3 residual lands through development and implementation of urban design and residual lands plans, mandated by conditions of approval.

Part 10, p71

There is a need for further assessment of options to reduce the visual impacts of all Stage 3 ventilation facilities. The proposed 20-30m tall ventilation facilities within the RRY recreation area near The Crescent will inevitably be a major visual intrusion. The extent of this intrusion should be minimised, noting that any reduction in the height of this facility would reduce its ability to disperse emissions. Similarly, the proposed facility at Victoria Road near Terry Street is located in a visually prominent position, and consideration should be given to an alternative facility design which would be less prominent and would be unlikely to direct its plume toward adjacent sensitive uses.

Response

Air quality impacts associated with the proposed ventilation facilities are discussed in **section B11.9**.

An assessment of the potential landscape character and visual impacts is presented in section 13.4 and section 13.5 of the EIS. The likely visibility of permanent project infrastructure (such as the ventilation facilities) from surrounding areas was broadly mapped to create a visual envelope. The mapping typically shows a 'Worst case' scenario. For example, some receptors may only see the tip of a ventilation facility while closer receptors may view a substantial part of the infrastructure. Visual impacts arising from the project primarily relate to new permanent operational infrastructure and landscape elements impacting on existing views. In particular, ventilation facilities at the Rozelle interchange, Iron Cove Link and St Peters interchange are of contrasting bulk, scale and form when compared to other built form elements within existing views. Key visual receptors subject to high visual impacts include:

- Residential and recreational receptors surrounding Easton Park at Rozelle, which would have open views of the Rozelle ventilation facility and outlets. Vegetation within the new open space created by the Rozelle interchange would eventually screen some of this view
- Recreational receptors at Glebe Foreshore Parklands, which would have views across Rozelle Bay and to the Rozelle ventilation facility and outlets. This view would be experienced in the context of other infrastructure visible in the skyline such as Anzac Bridge and the Glebe Island silos
- Residential, pedestrian and light rail patron receptors near the Rozelle Bay light rail stop, which would have new views toward the Rozelle interchange including ventilation outlets, new open space and associated active transport infrastructure. New views towards the city skyline would also be created
- Residential receptors along Terry Street at Rozelle, which would experience a change in view associated with the Iron Cove Link ventilation outlet encroaching into the existing, partial view to Callan Park.

Other key visual impacts comprise high view loss at two locations: free-standing dwellings located on Foucart Street near the corner of Lilyfield Road and residences within the vicinity of Hutcheson Street and Denison Street near Lilyfield Road. These dwellings look east across part of the Rozelle Rail Yards, and south across the western part of the Rozelle Rail Yards respectively with views to the city skyline.

While these locations would experience a change in skyline view, there would also be an enhancement of foreground view associated with the new open space and active transport connections through the Rozelle interchange, providing additional community benefits to these areas. For the Iron Cove Link, motorway infrastructure has been integrated within a well-considered streetscape setting, and the ventilation outlet would be located within the centre median of Victoria Road rather than abutting existing residential development.

The design of the ventilation facilities would be developed during detailed design, consistent with the projects urban design principles (refer to section 13.2.2 of the EIS). The height of the ventilation facilities has been optimised with regards to local terrain and topography, air safety requirements and the height of nearby elevated receivers.

Visual impacts of the project would be minimised through considered development and implementation of the urban design and landscaping features in accordance with UDLPs that will be developed for the project. The UDLPs will be prepared in consultation with relevant councils, stakeholders and the community. Urban design and landscape works would include the provision of landscape planting along and around key visible infrastructure such as ventilation facilities and motorway operations complexes. Over time and as this vegetation matures, the benefits provided by landscape planting will improve.

Annexure 2 of Appendix L (Technical working paper: Urban design) discusses the ventilation facility design review, which considers national and international approaches ventilation facility design and identify strategies to be considered during the detail design of the operational infrastructure.

The project generally provides a moderate to low level of visual impacts. This is due to the following elements which have been incorporated into the concept design through a process of design development which involved gradual refinement to avoid or minimise impacts where possible:

- Locating the majority of the road infrastructure at Rozelle Rail Yards underground, and provision of extensive and well-considered open space above including two major north-south pedestrian/cycle connections over City West Link, linking Lilyfield with Rozelle, and one east-west

pedestrian/cycle connection under Victoria Road, with potential for future connection to The Bays Precinct

- The integration of the Iron Cove Link within a well-considered streetscape setting, and locating of the ventilation outlet within the centre median rather than abutting existing residential development
- Integration of the Campbell Road ventilation facility within the New M5 portals and separated from nearby residences.

Mitigation and design measures proposed to minimise identified visual impacts are outlined in **Chapter E1** (Environmental management measures) and include:

- Integrating the new open space at Rozelle with the Lilyfield Road streetscape through considered tree planting and associated landscape works, in accordance with Austroads guidelines
- Investigating measures during detailed design to reduce the height, bulk and scale of ventilation outlets at Rozelle, Iron Cove and St Peters, and provide materials/finishes that reduce impacts to sensitive visual receiver locations
- Consulting with UrbanGrowth NSW to optimise compatibility in the area where the project interfaces with the White Bay Power Station precinct, so that the design achieves appropriate integration from a landscaping, visual, heritage and active transport connectivity perspective
- At the St Peters interchange making provision for soft landscape work within the motorway operations complex which has substantial areas of hardstand visible from the public domain.

B11.13.7 Future opportunities associated with spare road capacity

Part 5, p51

Council also seeks to capture spare road capacity on all roads where traffic may be reduced by WestConnex. One of the few benefits from WestConnex is the opportunity to reduce traffic capacity and make a range of surface improvements - including public transport improvements - wherever WestConnex reduces surface traffic. For Stage 3, the main opportunity is to improve Victoria Road at Rozelle – possible because of surface traffic reductions brought about by the Iron Cove Link. There is also an opportunity to make improvements to Parramatta Road, created by all stages of WestConnex.

Council's prior experience is that RMS will often resist traffic capacity reductions on main roads, even where traffic levels have been reduced. Council seeks to avoid a situation where increased road capacity below-ground has not resulted in captured capacity (use of spare capacity for sustainable transport and public domain improvements) above-ground. In particular, Council seeks assurance from SMC and the NSW Government that reduced traffic capacity along Victoria Road and Parramatta Road will result [in] increased capacity for public and active transport.

Council's preliminary assessment shows the following roads may have reduced traffic from WestConnex: Victoria Road, Rozelle (due to Iron Cove Link); Balmain Road/Darling Street, Rozelle; King Street, Newtown; Enmore Road, Enmore; Marrickville Road, Marrickville; Sydenham Road, Marrickville.

Though Council has not yet been able to confidently conclude that WestConnex will reduce traffic on Parramatta Road (for its full length through the Inner West Council area), it will continue to advocate traffic capacity capture and high-capacity public transport along that corridor. One of the public transport options Council has been investigating for Parramatta Road is Guided Electric Transit.

Response

The manner in which the project, as part of the WestConnex program of works, would facilitate urban renewal and potential public transport improvements is described in section 3.3.4, section 3.2.6, section 12.1.2 and section 12.4 of the EIS. This is consistent with the project objectives listed in section 3.3 of the EIS and the anticipated project benefit of creating opportunities for urban renewal along parts of the Parramatta Road and Victoria Road corridors as a result of substantial forecast reductions in traffic volumes along sections of these roads (refer to section 3.4 of the EIS).

The *Parramatta Road Corridor Urban Transformation Strategy* and associated Implementation Plan 2016-2023 identifies WestConnex as the enabler of opportunities to transform Parramatta Road through changed traffic volumes in some areas and the provision of an alternative route for trucks and heavy vehicles. The Implementation Plan acknowledges that these changes would free up road space for better public transport and amenity improvements along Parramatta Road and would encourage walking and cycling. The Implementation Plan also notes that the staging of land use change and development in certain parts of the Parramatta Road corridor is contingent on, and may need to await, the completion of WestConnex.

The provision of transport improvements along the Parramatta Road corridor will be carried out in accordance with the Transformation Strategy and supporting Implementation Plan, and in consideration of the *Sydney CBD to Parramatta Strategic Transport Plan* (Transport for NSW 2015). State transport agencies, Transport for NSW and Roads and Maritime will be responsible for the delivery of transport initiatives for the corridor outlined in the Implementation Plan through a best practice decision-making and strategic planning framework. Strategic transport initiatives would go through a government approval and funding process, subject to standard government considerations, including business cases and assurance reviews.

Section 10.1.1 and section 10.1.2 of Appendix H (Technical working paper: Traffic and transport) of the EIS identifies significant reductions in daily traffic volumes on Parramatta Road (east of the M4 East Parramatta Road ramps) in both 2023 and 2033. This forecast reduction is illustrated in Figure 10-1 and Figure 10-2 of Appendix H (Technical working paper: Traffic and transport) of the EIS, which shows the difference in average weekday traffic between the 'With project' and 'Without project' scenarios in 2023 and 2033. The forecast reduction in traffic along this section of the Parramatta Road corridor would support the objectives for urban renewal and public transport improvements outlined in the Transformation Strategy. A reduction in vehicles on this corridor may also result in greater safety for cyclists and pedestrians, making these alternative modes of transport more desirable.

The forecast reduction in daily traffic volumes along Victoria Road (south of Iron Cove Bridge) in the 2023 and 2033 future year scenarios aligns with the key project objective to relieve road congestion, particularly along existing arterial road corridors. As a result of this reduction, opportunities for urban renewal in this section of Victoria Road would be facilitated. NSW Government planning and policy documents do not identify Victoria Road as a priority for urban renewal, however, due to the extent of changes that would be brought about by the project, creating opportunities for urban renewal along Victoria Road would be of benefit to the local community. Public transport improvements along Victoria Road have been identified as a key element for consideration in the next 20 years in the *Revised Draft Eastern City District Plan* (Greater Sydney Commission 2017). Victoria Road east of Iron Cove Bridge is also identified as a strategic bus corridor in *The Bays Precinct Transformation Plan*. By reducing traffic congestion on parts of Victoria Road, the project would create opportunities for future public transport improvements in the area.

Furthermore, the reduction in daily traffic volumes along this section of Victoria Road would support the development of The Bays Precinct, which is identified as a Priority Growth Area in the *Draft Greater Sydney Region Plan 2017* (Greater Sydney Commission 2017). The forecast reduction in daily traffic volumes would support the objectives for improved connectivity, potentially enabling public transport improvements along this section of Victoria Road and supporting the movement of traffic to and from The Bays Precinct. The project would provide upgraded active transport connections around the Rozelle Rail Yards and White Bay Power Station, destinations as identified in *The Bays Precinct Transformation Plan*.

Further information regarding future opportunities that would be facilitated by the project is also provided in section 5.2.3 and section 6.2 of Appendix L (Technical working paper: Urban design) of the EIS.

B11.14 Social and economic

Refer to Chapter 14 (Social and economic) and Appendix P (Technical working paper: Social and economic) of the EIS for details of social and economic impacts.

B11.14.1 Negative social and economic impacts including equity impact of tolls

Part 2, p15

Council is concerned about the negative economic impacts of the financial cost of WestConnex and the equity impact of tolls.

Council is also concerned about the equity impacts of WestConnex, where the toll burden will fall primarily on lower-income earners in western Sydney. This is becoming an issue for western Sydney councils and their communities – not only through the direct impact of the tolls, but through revenue indirectly lost to western Sydney businesses, increased costs of living and a consequent decline in economic activity.

Response

Financial cost of the project

WestConnex is being delivered by a financing model which includes an initial contribution from the State and Australian Governments, with private sector debt and tolling revenue providing the remaining funding for the project. This financing strategy has allowed the NSW Government to recycle its equity investment in SMC by effectively using the sale proceeds from the initial stages to help fund the final stage. The NSW Government is contributing over $2 billion to fund the WestConnex program of works, while the Australian Government is providing contributions to the NSW Government of over $3.5 billion.

The economic analysis for the WestConnex program of works namely M4 Widening, M4 East, King Georges Road Interchange Upgrade, New M5 and the M4-M5 Link, determined that WestConnex would create benefits that would outweigh the upfront construction costs and ongoing operational costs. The economic analysis adopts the NSW Treasury definition for the BCR metric, defined as the present value of benefits less the present value of operating costs, divided by the present value of capital expenditure. The BCR is therefore a measure of net benefit to society derived from the capital investment in the project.

A sensitivity analysis was done as part of the economic appraisal to test potential changes to the BCR. The analysis showed that even with increased capital and operational costs of 30 per cent, WestConnex remained economically viable. The WestConnex Full Scheme: Economic Appraisal (KPMG 2015) provides additional information on the analysis approach and can be accessed from the WestConnex website[15].

A separate cost benefit analysis was done for the M4-M5 Link. The BCR has been calculated as $2.38 or $2.94 with wider economic benefits. This is for the whole project which includes the mainline tunnels, Rozelle interchange and Iron Cove Link. Further information on the business case and cost benefit analysis is provided in **section C3.3.1**.

Equity impacts

A tolled motorway applies a ‘user-pays’ principle to the provision of the faster alternative route compared to existing routes. This principle aims to fund the improved infrastructure through contributions from those who would benefit the most, rather than paying for the project out of general government revenue which is raised from tax payers across NSW, not just those in Sydney that would benefit. This model is considered fair by Transport for NSW as the NSW Government alone cannot fund all infrastructure investment required in NSW. This model also accords with the Australian Government’s *National Public Private Partnership Guidelines* (2015), which sets out the basic case for user charging, noting that this allows infrastructure investment to be brought forward. This in turn

[15] www.westconnex.com.au

provides for improved economic growth and efficiencies, providing benefits across the state in both the short and long term.

Key considerations in the approach to tolling are outlined in the *WestConnex Updated Strategic Business Case* (SMC 2015a) and include such elements as distance based tolling, higher tolls for heavy vehicles and minimum and maximum charges.

The WestConnex toll charges and cap of $8.60 in 2017 dollars for cars and light commercial vehicles is considered to represent good value based upon the substantial time savings offered for commuters travelling from western Sydney to the Sydney CBD. Tolls would be charged on all users, including heavy vehicles, and would apply in both directions. As such the toll would be incurred by motorists from a broad geographical cross section of Sydney, as well as by heavy vehicles travelling further afield within NSW and interstate, including those travelling to and from Sydney Airport and Port Botany.

The social and economic impact assessment presented in Appendix P (Technical working paper: Social and economic) of the EIS does indicate that lower income households in western Sydney may not be able to afford the tolls for the M4-M5 Link. The use of the motorway, however, would remain discretionary. Free, alternative traffic routes, such as Parramatta Road, City West Link, King Georges Rd, the Hume Highway, Stanmore Road, Sydenham Road and the Princes Highway, would remain available to those who choose not to use the tolled motorway. Motorists who choose to use the existing surface road network would still benefit as the capacity on these alternative routes is forecast to improve (as freight and commercial vehicles are expected to use the motorway tunnels). Individuals will have to weigh up the benefits of using the motorway, which includes travel time savings, a safer option with lower potential for traffic accidents and reduced vehicle operation and maintenance costs, with the financial cost of using the motorway.

It is acknowledged that users may only be prepared to pay up to a certain dollar value in tolls to save time. For the entire WestConnex motorway, tolling would be capped at a maximum amount of $8.60 (2017 dollars) for cars and light commercial vehicles, after around 16 kilometres, with the total length of the WestConnex motorway to be around 33 kilometres. The maximum toll for the M4-M5 Link section of the WestConnex motorway will be $6.50 (2017 dollars). Tolls would escalate up to a maximum of four per cent or the consumer price index (CPI) per year (whichever is greater) until 2040. After that, CPI would apply.

In November 2017, the NSW Premier announced a vehicle registration cashback scheme for motorists who spend more than $25 a week on tolls in NSW to claim free vehicle registration. The scheme (as announced) will be available for standard privately registered cars, utes, four-wheel-drives and motorcycles from 1 July 2018 and be backdated to July 2017. The scheme will not include trucks or other vehicles weighing more than 2,795 kilograms. This is expected to save the majority of motorists who apply to the scheme around $358 a year on registration costs, and some up to $715 a year.

The M4-M5 Link would enhance the benefits of the broader WestConnex program of works, particularly for travel between western Sydney and the Sydney CBD. For example, a person driving a car in 2017 from Penrith to the Sydney CBD (prior to the introduction of tolls on the M4 Motorway) currently has the option of travelling along the M4 Motorway, which ends at Concord, and then would need to travel on the congested surface road network to the Sydney CBD. An alternative route using the M4 Motorway, WestLink M7, the Hills M2 Motorway, Lane Cove Tunnel and the Sydney Harbour Bridge or the Sydney Harbour Tunnel would cost around $22.00 in tolls (in 2017 dollars) and is a distance of around 55 kilometres. After opening in 2023, the M4-M5 Link project would provide a journey using the M4 Motorway straight through to Anzac Bridge, via the M4-M5 Link, for a toll capped at $8.60 (in 2017 dollars) and a distance of around 40 kilometres. This would provide time and cost savings for motorists and increased access to employment centres.

B11.14.2 Consideration of lessons learnt from the social issues on earlier WestConnex stages

Part 9, p64

Need to learn from social issues encountered by residents affected by Stages 1 and 2 to improve social impact assessment for Stage 3. As is the case elsewhere in this submission, the discussion of social impacts draws on Council staff's discussions of issues with residents affected by WestConnex Stages 1 and 2. Inclusion of the main points from this dialogue is in Council's view critical to ensure lessons are learned from Stages 1 and 2 should Stage 3 proceed.

Council's recent discussions with a group of Haberfield tenants revealed they were suffering severe impact[s] from the construction of Stage 1. They reported serious impacts on their health and well-being as a result of noise, vibration and dust, that the complaints system was inefficient and ineffective and they felt frustration when dealing with this system, which added to the stress in their lives.

Response

The social and economic assessment (refer to Appendix P (Technical working paper: Social and economic) of the EIS) and design of the project has taken into consideration the impacts currently being experienced by those affected by the preceding stages of WestConnex, including the M4 East at Haberfield/Ashfield and the New M5 at St Peters. This has included seeking feedback from other SMC project teams and design and construction contractor(s) on community issues and concerns raised. Feedback has also been sought from DP&E and other relevant government agencies including NSW EPA, was sought on the M4 East and New M5 construction phases to identify lessons learnt and areas for improvements to work processes and mitigation measures to assist in addressing potential social impacts.

Multiple community and stakeholder consultation sessions were held for the M4-M5 Link project prior to and during preparation of the concept design report and EIS, and throughout the submissions report process for the project. This included hosting sessions in Haberfield and St Peters, where communities currently being affected by the M4 East and New M5 construction works were able to provide feedback to the project team. A detailed summary of community and stakeholder consultation undertaken for the project is included in Chapter 7 (Consultation) of the EIS.

In response to this feedback, the M4-M5 Link project has been designed to address the issues raised during the two other stages of WestConnex, and management measures have been identified to manage potential construction impacts, as below:

- The majority of the project, including the Rozelle interchange, is located below ground to minimise surface property acquisition and disturbance
- Where possible, areas that are within the project footprint of the M4 East and New M5 projects and government owned properties, such as at the Rozelle Rail Yards and Darley Road civil and tunnel site would be used
- A heavy vehicle truck marshalling facility would be provided at the White Bay civil site at Rozelle, which would cater for around 40 heavy vehicles and stage the release of trucks to the tunnelling sites to manage the arrival of trucks to construction ancillary facilities (see **Part D** (Preferred infrastructure report))
- A suitably qualified and experienced Acoustics Advisor will be appointed, who is independent of the design and construction personnel, and who will be engaged for the duration of construction of the project (see environmental management measure NV1 in **Chapter E1** (Environmental management measures))
- As noted in section 9.5 of the Utilities Management Strategy (refer to Appendix F (Utilities Management Strategy) of the EIS), a Utility Co-ordination Committee would be established to coordinate concurrent works associated with multiple overlapping projects and individual utility works to manage potential cumulative impacts and ensure that appropriate respite is provided for potentially affected residents and other sensitive receivers
- The M4 East and New M5 tunnels will be used for spoil haulage when they become available and where practicable, to minimise heavy vehicle movements on the surface road network
- Consideration of receivers that qualify for assessment for at receiver treatment in relation to operational noise, that are also predicted to experience significant exceedances of noise management levels due to construction, will be given priority preference for assessment for treatment based on the severity and timing of impact. Where the building owner accepts the at receiver treatment proposal, the treatments will be installed as soon as possible (see environmental management measure NV9 in **Chapter E1** (Environmental management measures)).

If the project is approved, a design and construction contractor(s) would be engaged to undertake the detailed design and construct the project. Together with Roads and Maritime, the design and construction contractor(s) would be responsible for communication and consultation with stakeholders and the community during construction. Communication and consultation with stakeholders and the community during construction would focus on providing updates on construction activities and program, responding to enquiries and concerns in a timely manner and minimising potential impacts where possible.

A Complaints Management System will be established for the duration of construction and community liaison would continue during the operational phase of the project via a Communications Plan that will be developed as a key part of the CEMP framework. This system will require a timely response to complaints and include the recording of complaints and how the complaint was addressed (within a Complaints Register). A Community Complaints Commissioner, who is an independent specialist, would oversee the system and would follow-up on any complaint where the public is not satisfied with the response. Further information regarding future community consultation is included in **section A2.4**.

B11.14.3 Consideration of the Leichhardt Healthy Ageing Plan

Part 9, p66

There is a need for an assessment of the project against the Leichhardt Healthy Ageing Plan. Regarding community safety, health and well-being impacts identified by EIS, Council is of the view that consideration be given to the key strategic objectives of the Leichhardt Healthy Ageing Plan. Objective 4.3 is that older people feel safe walking around. The construction phase is likely to make it difficult for older people to negotiate their way around construction zones. Objective 5.1 is that there are appropriate, affordable and well-located housing options close to services and shops for older people. Any acquisitions and subsequent relocations should consider this objective.

The Leichhardt Healthy Ageing Plan also supports the NSW Ageing Strategy action to “support implementation of local urban design solutions to create age-friendly communities, including benches, walkable pathways, clear signage, road crossings, age-appropriate public exercise equipment, seats and shelter at bus stops and accessible public toilets”. Any acquisitions and subsequent public domain improvements should consider this aim.

Response

Appendix P (Technical working paper: Social and economic) of the EIS included consideration of the *Leichhardt 2025+ – Community Strategic Plan* (Leichhardt Council 2013), which is the overarching planning document which lays out the strategic directions for the former Leichhardt Council and to which 10 year strategic services plans such as the Leichhardt Healthy Ageing Plan relate.

The EIS identifies that the safety and amenity of the pedestrian and cyclist environment surrounding the project would be affected during construction. The introduction of construction hoardings and ancillary construction infrastructure has the potential to reduce sightlines, create concealed locations or may encourage anti-social behaviour such as graffiti. These impacts are likely to be particularly felt by more vulnerable members of the community, including the frail, elderly and people with a disability or poor health.

Safety considerations associated with pedestrian and cyclist movements around construction ancillary facilities would be considered as part of the CTAMP (see **Chapter E1** (Environmental management measures)) and communicated to the community by the design and construction contractor(s). Pedestrian and cyclist connectivity would be maintained throughout construction to ensure community cohesion and social connectedness is maintained.

To minimise the consequence and likelihood of impacts on social infrastructure (which includes aged care facilities), a Social Infrastructure Plan would be implemented to manage, minimise and avoid potential construction effects (refer to section 7.10 of Appendix P (Technical working paper: Social and economic) of the EIS). This plan would:

- Identify social infrastructure that has the potential to be adversely affected by construction activities
- Develop, in consultation with the owners of the identified social infrastructure, measures that could be implemented to maintain appropriate vehicular and pedestrian access, management measures for noise exceedances and safety measures, particularly around areas where vulnerable members of the community are present.

Further, security guards would be present at construction ancillary facilities to patrol the premises. This often acts as a deterrent to criminal activity in the immediate area.

The detailed design of construction ancillary facilities would include consideration of the Crime Prevention Through Environmental Design (CPTED) principles which are applied to the permanent operational infrastructure for the project (refer to section 13.5.8 of the EIS).

As described in section 12.3 of the EIS, the project has been designed and developed to minimise the need for surface property acquisition and occupation. At Rozelle, four commercial/industrial properties would be acquired in relation to the surface works for the Rozelle interchange and twenty six residential properties would be acquired in relation to surface works for the Iron Cove Link (refer to Table 12-2 of the EIS). All compulsory acquisition required for the project would be undertaken in accordance with the *Land Acquisition (Just Terms Compensation) Act 1991* (NSW), the *Land Acquisition Information Guide* (NSW Government 2014) and the land acquisition reforms announced by the NSW Government in 2016 (NSW Government 2016), which can be viewed online at the NSW Department of Finance, Services and Innovation website[16].

In the context of the broader Rozelle area, property acquisition is considered negligible and the project would not affect existing access to appropriate, affordable and well-located housing options. Additional information on managing social and economic impacts from the property acquisition process is provided in **section C12.2.2**.

The provision of urban design solutions to create age-friendly communities would form part of the UDLPs for the project as relevant. This aligns with the urban design principle of providing for a 'multidimensional user force' that considers holistically how a diversity of users experience space including all ages, abilities and transport modes for a truly inclusive, universally accessible and safe outcome (refer to Table 13-23 in Chapter 13 (Urban design and visual amenity) of the EIS).

B11.14.4 Assessment of social infrastructure

Part 9, p65

There will need to be plans for social infrastructure provision by promoting an integrated approach to social infrastructure that includes health care, education, fresh food access, public open spaces and other community/cultural facilities. The EIS recognises that it is highly likely that operation of some social infrastructure will be affected by construction and affect the 'user experience'. Council recommends the proponent undertakes community consultation with the stakeholders affected by social infrastructure impacts to identify ways in which these can be mitigated.

In addition, it is recommended that the proponent do more 'fine grained' [analysis] to address the impacts on the identified 17 social infrastructure facilities located in close proximity to construction compounds, including impacts on residents and visitors to the Rozelle local centre. It is recommended that a social infrastructure plan be prepared prior to construction in consultation with Council and the local community to minimise impacts on social infrastructure.

Response

An assessment of the potential impacts to social infrastructure during construction of the project is provided in the following sections of Appendix P (Technical working paper: Social and economic) of the EIS:

- Section 7.3.3 – acquisition of open space
- Section 7.10 – construction impacts to social infrastructure facilities
- Section 8.2 – local amenity impacts (such as noise and vibration and air quality).

Table 7-5 of Appendix P (Technical working paper: Social and economic) of the EIS details the social infrastructure that has a higher likelihood of experiencing multiple effects of construction activity.

Chapter E1 (Environmental management measures) outlines the plans that will be developed to help manage potential social and economic impacts during construction and operation of the project. This will include:

[16] https://www.finance.nsw.gov.au/sites/default/files/NSW_Government_Response.pdf

- Preparing a Social Infrastructure Plan that details:
  - Measures that will be delivered as part of the project to improve community connectivity in areas affected by the project, including pedestrian and cyclist access
  - Community and social facilities, for example open space, that will be delivered or enhanced as part of the project
  - Community initiatives and programs that will receive support as part of the project, including the manner in which support will be provided.

The Social Infrastructure Plan will be prepared by a suitably qualified and experienced person in consultation with the community and relevant councils and implemented as part of the project, during construction and operation.

- Preparing a Community Communication Strategy for the construction stage that details:
  - Procedures and mechanisms that will be implemented in response to the key social impacts identified for the project
  - Property acquisition support services that will be provided
  - Procedures and mechanisms to communicate to project stakeholders (including affected communities), the access and connectivity enhancements and new community and social facilities that will be delivered as part of the project through the Social Infrastructure Plan and to update stakeholders on delivery progress
  - Procedures and mechanisms that will be used to engage with affected business owners to identify potential access, parking, business visibility and other impacts to develop measures to address potential impacts on a case by case basis.

B11.14.5 Assessment of impacts on businesses

Part 9, p67

The strategic economic impacts of WestConnex have been discussed in Part 2 Justification for project in this submission. These include the impact of the financial and opportunity cost of the project and the equity impact of tolls. At a local level, Council is disappointed that the EIS views the negative impact on local businesses as minor. From Council's recent experience with the impact of Stage 1 on Haberfield businesses, this was far from minor.

WestConnex Stages 1 & 2 have imposed a number of negative impacts on businesses which have failed to be identified and assessed in the EIS. These impacts include reduced accessibility for customers, staff and deliveries to business premises due to road closures/diversions, changes in public transport services and loss of parking as construction vehicles occupy spaces side streets. This has been the most critical issue, particularly in shopping centres such as Haberfield.

In addition, the quality of business operations has been reduced from vibration disturbance and noise and air pollution. There has been an impact on the brand image of businesses because of reduced visibility created by obstruction of views by construction materials and reductions in passing traffic. An example of the latter issue is the drop in business in the Haberfield shopping centre due to the temporary closure of Ramsay Street.

For businesses with outdoor trading and dining, there has been decreased amenity for customers due to construction noise and increased traffic on some local roads where drivers avoid construction areas. There has been increased likelihood that newly-established businesses will fail due to combinations of the above pressures.

Of all the impacts listed above, it is the changes to road access, public transport and parking that has had the largest impact on businesses. The EIS does not acknowledge that it is the customer (not just the business) that cannot adjust to change in environment brought about through road closures, changes to public transport and parking in the project work zone.

From Council's experience with Stages 1 and 2, there is a real need to improving directional signage related to road closures, diversions and modifications in areas around shopping centres and other business clusters. Signs should clearly outline to businesses and the public the changes to road access points into business villages and centres, providing drivers with detailed directions into and around business villages. Signage should direct people to temporary bus stops locations, and this

should be in large print and in languages additional to English. Open For Business signs are also helpful.

The parking demand impact of the project on local businesses is reduced wherever off-street parking is provided for project employees. In developing parking management plans, the proponent should consult with local businesses and business chambers. Other ideas include installation of bicycle lanes to encourage visitation to businesses, reduce vehicle speed limits and implement traffic calming (even if temporary) to enhance the footway environment at shopping strips.

Whilst it is acknowledged that the EIS recommends a business management plan be developed for Stage 3, there is also need for a dedicated full-time business manager, fully funded by the project, to implement the business management plan and to assist affected businesses on a day-to-day basis. This manager would work closely with Inner West Council and local businesses.

This manager would require access to funding to enable actions to be implemented, such as marketing campaigns to boost awareness of affected centres. Without this, responsibility for this kind of assistance to local businesses would fall on Council, as has been the case for Stages 1 and 2.

There is a need to assess the economic impact on business centres from extending or creating clearways and widening roads.

The possibility that clearways on roads through commercial centres could be created or extended is a major concern for the many main street businesses in the Inner West, as even minor changes can have a profound negative impact on these centres. The considerable opposition to any extension of clearways on King Street, Newtown provides a good example of the concerns of businesses and communities to this threat. Road widenings, such as that being undertaken currently on Euston Road, Alexandria are a further threat.

Elsewhere in this submission, Council has requested that the DP&E require in any conditions of approval that there be no new road widenings, clearways or extensions of clearways on streets around WestConnex. It has also been explained that Council seeks to implement, public and active transport improvements, traffic calming and amenity improvements on streets where traffic has been increased or reduced by WestConnex.

Finally, potential business opportunities should be identified in the development of the RRY recreation area, particularly as this area would improve walk/cycle connectivity between business centres in Rozelle, Lilyfield, Leichhardt and Annandale.

Response

Feedback from other SMC project teams, design and construction contractor(s) and DP&E was sought on the M4 East and New M5 construction phases to identify lessons learnt and areas for improvements to work processes and mitigation measures to assist in addressing potential construction impacts for the M4-M5 Link. Feedback and the lessons learnt from these earlier stages will also further guide the development of the detailed design. This response is further discussed in **section B11.1.4**.

Section 7.9 of Appendix P (Technical working paper: Social and economic) of the EIS identifies potential impacts on businesses and industry. There are a number of variables determining to what extent a business may be impacted including sensitivity to changes in amenity and accessibility and ability to adapt. This may affect business viability and turnover. To minimise the consequence and likelihood of impacts on businesses, a Business Management Plan will be prepared to manage, minimise and avoid potential construction impacts. However, large transport infrastructure projects, such as the M4-M5 Link, can also generate significant revenue for local and regional economies and stimulate employment opportunities and investment during both construction and operation. A number of convenience and food and beverage businesses, in close proximity to the construction sites, may in fact benefit from increased passing trade due to the additional construction workers in the locality. Construction activity directly benefits the economy, injecting economic stimulus benefits into the local, regional and state economies. It is estimated that based on a five-year construction period, around 14,300 direct (onsite) job years would be created between 2018 to 2023, which is equivalent to around 2,800 jobs per annum. Furthermore, about 42,300 indirect (off-site) job years would be generated, equivalent to around 8,400 jobs per annum based on the project period.

The economic multipliers also estimate that construction would generate a further $5.8 billion of activity in production induced effects and $7.7 billion in consumption induced effects. Total economic activity generated by the construction of the proposed development would be about $19.7 billion.

Access to businesses including changes to parking

To inform the SEIA, business surveys were undertaken to gain a better understanding of the main issues, perceptions and concerns of businesses in regard to the project during construction and operation (refer to Annexure A of Appendix P (Technical working paper: Social and economic) of the EIS which contains the details and results of these surveys). The surveys indicated a broad range of responses from local businesses in relation to potential project impacts on amenity, access and trade. This is reflective of the diverse range of businesses in and around the study area, including a number of industrial and specialist commercial businesses that rely less on passing trade or local amenity. These businesses generally indicated that construction of the project would not substantially alter their existing trade, with 49 per cent of respondents indicating no change in trade, 17 per cent indicating increase in trade and 32 per cent indicating a loss of trade.

The degree of impact upon individual businesses would be dependent upon the nature of the business and its specific location. A detailed construction car parking strategy will be prepared as part of the CTAMP and a Business Management Plan will be prepared that would include:

- Identification of businesses that have the potential to be adversely affected by construction activities that would occur as part of the project
- Management measures that would be implemented to maintain appropriate vehicular and pedestrian access during business hours and visibility of the business to potential customers during construction, including alternative arrangements for times when access and visibility cannot be maintained. These measures would be determined in consultation with the owners of the identified businesses.

A Community Communication Strategy would also be prepared for the project including procedures and mechanisms that would be used to engage with affected business owners and tenants to identify potential access, parking, business visibility and other impacts and to develop measures to address potential impacts on a case by case basis.

Construction workforce parking is discussed in **section B11.8.6**.

Business visibility

Businesses that rely on storefront exposure to attract customers may be affected by the presence of construction hoardings or reduced visibility of business advertising during construction. This has the potential to directly affect business revenue and turnover as customers do not see or are less inclined to enter a business due to construction activity.

A change in pedestrian or vehicle routes and traffic volumes may also affect the exposure of businesses to potential clients. Although people may not be inclined to access a business on the day they see it, they may remember a business and travel to it in the future. A reduction in business exposure due to construction hoardings or detours may reduce the number of future customers, affecting business revenue.

Business clusters may experience a slight reduction in business visibility due to people avoiding highly congested areas; however this reduction is likely to be negligible. Construction hoardings and compounds are unlikely to block sightlines to any of the business clusters.

Measures to maintain access and the visibility of businesses to potential customers during construction, including alternative arrangements for times when access and visibility cannot be maintained, will be developed and included in the Business Management Plan will be prepared to impacts. The Plan would be developed in consultation with the owners of the identified businesses and identify management measures that will be implemented to maintain appropriate vehicular and pedestrian access to businesses and business clusters during business hours and to maintain the visibility of the businesses and communicate access arrangements to potential customers during construction, including alternative arrangements for times when access and visibility cannot be maintained. (see environmental management measure SE1 in **Chapter E1** (Environmental management measures).

Impacts on businesses as a result of changes to public transport

Network performance is expected to be affected during construction due to temporary road closures, increased construction traffic and reduced performance of some intersections. This may affect employee and customer travel times (refer to section 7.9 of Appendix P (Technical working paper: Social and economic) of the EIS. However, patronage of public transport is not forecast to change as a result of construction, with existing and/or equivalent access to public transport facilities within or adjacent to the project footprint to be maintained at all times. Section 6.6.3 of the EIS identifies temporary changes to bus stop locations during construction. These changes would not result in significant changes to access to nearby businesses as the bus stops would be repositioned only a short distance from their present location and would be clearly signposted. All existing access to the Inner West light rail stops would be retained during construction. Any detours to pedestrian footpaths that affect access to public transport services will be clearly signposted.

Clearways and/or road widenings

No new clearways are proposed as part of the M4-M5 Link project. Road widening for the project, such as along Victoria Road near the eastern abutment of Iron Cove Bridge, is discussed in Chapter 5 (Project description) of the EIS.

A number of business clusters would experience a potential decline in nearby road network efficiency during construction. Specialised retailers may experience a greater decline in their customer base, as clients seek to avoid traffic delays, travelling instead to more accessible business centres that offer similar products. Business clusters including Chapman Road business cluster in Annandale, Annandale-Camperdown business cluster near Pyrmont Bridge Road and Parramatta Road, Annandale and Roberts Street business cluster in Rozelle may be more vulnerable to these changes.

Although employee travel time may increase slightly, there is adequate provision of public transport in most locations around the business clusters that provide alternative commuting options (for example, light rail instead of buses).

A Business Management Plan will be prepared and will include:

- Identification of businesses that have the potential to be adversely affected by construction activities that will occur as part of the project
- Management measures that will be implemented to maintain appropriate vehicular and pedestrian access to businesses and business clusters during business hours and to maintain the visibility of the businesses and communicate access arrangements to potential customers during construction, including alternative arrangements for times when access and visibility cannot be maintained. These will be determined in consultation with the owners of the identified businesses. (see environmental management measure SE1 in **Chapter E1** (Environmental management measures)).

Business impacts during operation

Upon operation, the project would deliver an integrated motorway and local road network that would provide substantial benefits to Greater Sydney and would create opportunity for future connections to western and south-western Sydney, Sydney Airport and Port Botany. The subsequent effects of the operation of the M4-M5 Link on businesses include:

- Improved connectivity
- Reduced travel times
- Improved active transport links
- Activity generated by new open space area at the Rozelle Rail Yards
- Opportunity for streetscape improvements along Victoria Road and Parramatta Road as a result of reduced surface traffic.

Further discussion on the costs and benefits of the project as part of the WestConnex program of works is provided in **section B11.1.7**.

Recommended conditions of approval

Conditions of approval are a matter for DP&E to consider during its assessment of the project.

B11.14.6 Local connectivity impacts during construction

Part 9, p65

The EIS states that temporary changes along City West Link, Victoria Road, The Crescent and Lilyfield Road are likely to negatively affect local connectivity during construction. Despite the EIS's proposing temporary alternatives to the existing pedestrian bridges, Council is still of the view that there will be adverse impacts on community cohesion, access and active participation.

The EIS notes that access and amenity of some parks will be adversely affected, with parts of King George Park being permanently used as transport infrastructure and some areas being temporarily affected and rehabilitated post-construction. The Inner West is already under supplied with open space, so an assessment of the value of lost parkland needs to be undertaken and Council should be appropriately compensated.

Response

The EIS acknowledges that during construction, temporary changes to parking, road, public transport and active transport networks would affect access and connectivity for road users, residents, business owners, social infrastructure users and visitors. These changes are likely to arise from the establishment and operation of construction sites, portals, interchanges and ancillary infrastructure that trigger alterations or disruptions to traffic and transport connections and access to properties, businesses and social infrastructure. The key impacts to local community during construction would be from those relating to the road network, such as connectivity and congestion. Impacts upon pedestrian and cyclist connectivity, parking and public transport are not anticipated to be significant during construction.

Impacts during construction would include traffic disruptions and diversions due to temporary, partial or full closures of roads, increased construction traffic (including heavy vehicles) and changes to speed limits near construction works. Direct and indirect traffic disruptions would be experienced on local and arterial roads in most suburbs that are in close proximity to construction sites. This would include the suburbs of Haberfield, Ashfield, St Peters, Camperdown, Annandale, Lilyfield, Leichhardt, Rozelle and Balmain. For most local roads, these modifications, while not short-term, would be temporary with full access reinstated upon completion of construction works. These impacts are necessary, however, to achieve the connectivity benefits that the project will provide for local communities and in the wider area once operational, as described below.

During operation, the project would deliver new active transport connections that would enhance access and connectivity for pedestrians and cyclists, particularly around the Rozelle, Annandale and Lilyfield communities. This would provide further socio-economic benefits through health benefits, increased opportunities for social interaction and community cohesion, reduced car dependency and reduced cost of travel.

The project would link pedestrians and cyclists to popular waterfront and open space areas, such as the proposed open space at Rozelle Rail Yards, Glebe Foreshore, Easton Park, the Bay Run and King George Park in Rozelle. This has the potential to increase patronage for businesses located on Victoria Road, Annandale Street and Darling Street. Pedestrians and recreational and commuter cyclists would enjoy improved safety and amenity (such as a reduction in noise and pollution) due to the location of routes further away from traffic, particularly through the Rozelle Rail Yards.

It is expected that these improvements would result in a significant, long-term change, at a local level, resulting in a major benefit for the communities of Annandale, Leichhardt, Lilyfield, Rozelle and Balmain. In addition, such improvements would contribute positively to the regional active transport network with the potential to affect a wider catchment of people.

The project would require the removal of Buruwan Park at Annandale and a section of King George Park south of Victoria Road. The area comprising Buruwan Park is required to facilitate the new alignment of The Crescent, resulting in a direct loss of about 0.3 hectares of public open space at Annandale. Buruwan Park is a passive open space area that is predominantly used by pedestrians and cyclists as an active transport link through from Brenan Street and Railway Parade to Rozelle Bay and for access to the Rozelle Bay light rail stop. The park also provides a visual landscaped buffer to the elevated light rail line and the residential area of Annandale to the south-west. The park currently has poor surveillance with evidence of anti-social behaviour in the form of graffiti, with no formalised outdoor furniture and limited grassed area. The amenity of the park is compromised by its proximity to City West Link and The Crescent, which are both heavily trafficked arterial roads. The shared path through Buruwan Park connecting The Crescent with Bayview Crescent at Annandale would be permanently closed. Alternative access to the Rozelle Bay light rail stop from The Crescent, Johnston Street and Bayview Crescent at Annandale would be provided at all times during construction.

The design for the widening of Victoria Road at the eastern abutment of Iron Cove Bridge as described in the EIS would permanently impact around 1,494 square metres of King George Park. With the bioretention facility now proposed to be located in this area (see **section D4.3.1** in Part D for a description and assessment of this change), the project would permanently impact around 2,259 square metres of King George Park. This area comprises around five per cent of the total area of King George Park, leaving around 42,611 square metres (or around 95 per cent) of King George Park not permanently impacted by the project. During operation, this area would be landscaped and would appear as part of King George Park. The area affected is primarily a landscaped embankment adjacent to the bridge and is not used for active recreation. The Bay Run connection between King George Park and Iron Cove Bridge would be maintained during construction with diversions provided around the construction area within King George Park. Following the completion of construction, the connection between the Bay Run and Victoria Road and Iron Cove Bridge would be reinstated in generally the same arrangement as existing. See **Chapter D3** (Relocation of the bioretention facility at Rozelle) for an assessment of the social and economic impacts associated with this project change.

As part of the project, parts of the Rozelle Rail Yards would be developed as open space, including a constructed wetland and pedestrian and cyclist infrastructure. Open space created at the Rozelle Rail Yards would be developed and implemented in accordance with the UDLPs for the project. This new open space would provide the community at Rozelle, Annandale and other surrounding suburbs with increased opportunities for active and passive recreational activities. In the area around Wattle Street and Campbell Road, the project would include new open space areas in line with the M4 East and New M5 UDLPs. This new open space would provide a compensatory offset to the open space affected at Buruwan Park and King George Park.

B11.14.7 Impacts of property acquisitions on individuals, families, households and businesses

Summary, p6

Social and economic impacts of compulsory acquisitions, which for Stage 3 largely applies to dwellings and businesses along Victoria Road at Rozelle, businesses adjacent to the Rozelle Rail Yards and businesses along Parramatta Road at Annandale.

Part 7, p61

There is a need to acknowledge the serious psychological impacts that property acquisitions has had on individuals, families, households and businesses. Beyond the abovementioned construction impacts, there have been short and long-term impacts on the psychological health and well-being on individuals from loss of friends and community members when residential properties in the St Peters, Haberfield/Ashfield and Rozelle area were compulsory acquired and individuals, households and families were lost to the community.

Residents of Haberfield/Ashfield tell of neighbours forced out of their homes not being able to rent or purchase equivalent homes within the area and becoming “refugees” in Sydney. This has long-term impacts the lives of individuals and families, with greatest the impacts usually felt by migrant families. The loss of attachment to a sense of place has been profound for both acquired residents and those left behind.

For Stage 3, this is currently the experience for residents whose homes are being compulsorily acquired along Victoria Road. It is also the experience of businesses being acquired at Haberfield, Leichhardt, Annandale/Camperdown, Lilyfield (next to the RRY site) and along Victoria Road at Rozelle. It is likely this impact will widen as voluntary acquisitions are also implemented around other construction sites.

Response

The social and economic impacts arising from property acquisition are described in section 7.3 of Appendix P (Technical working paper: Social and economic) of the EIS). The EIS recognises that there would be major impacts on some individuals, businesses and social infrastructure as a result of property acquisition, although it also recognises that the number of acquisitions is low for an infrastructure project of this scale. The project has been designed to minimise the need for property acquisition by locating the majority of the road infrastructure in tunnels below ground, using land within the footprints of the M4 East and New M5 projects, where possible, and using government owned land where possible. All compulsory acquisition required for the project would be undertaken in accordance with the *Land Acquisition (Just Terms Compensation) Act 1991* (NSW), the *Land Acquisition Information Guide* (NSW Government 2014) and the land acquisition reforms announced by the NSW Government in 2016 (NSW Government 2016).

While the impact on affected individuals or households would be major, the overall impact of property acquisition on the social and economic environment was considered to be a minor negative impact. Impacts on other social and economic elements of the community such as community cohesion, community safety and health, demographics, local amenity and community identity and character, were also assessed and are not expected to be substantially affected by the project based on the relatively low number of acquisitions. Owners of residential properties and/or businesses to be acquired have been engaged on an individual basis by Roads and Maritime, who will guide them through the property acquisitions process. Section 14.3.9 of Appendix P (Technical working paper: Social and economic) of the EIS outlines a number of support services that would be offered to individuals or households going through the acquisition process.

Regarding potential impacts to businesses from property acquisitions, the EIS identifies the potential for job losses associated with property acquisition (refer to section 7.3.2 of Appendix P (Technical working paper: Social and economic) of the EIS, however does not state the number of jobs potentially affected by these acquisitions as these changes are generally very difficult to accurately predict. The acquisition of a business property does not directly correlate to job losses as some businesses may relocate or transform their services. The degree of impact upon any particular business would be highly variable according to the business type, industry, location, customer base, size and connectivity with other outlets. In addition, the personality and nature of particular business operators may mean that certain businesses are more flexible than others in dealing with disruptions, further complicating the potential for accurate prediction of specific impacts such as job losses.

A Business Management Plan would be prepared and would identify businesses that have the potential to be adversely affected by construction activities that would occur as part of the project and management measures that would manage these potential impacts. These would be determined in consultation with the owners of the identified businesses.

It is noted that the M4-M5 Link project along with the other approved WestConnex projects aim to improve infrastructure, connections and access within the urban environment. Hence on a broader scale, the longer-term projects, while requiring long-term management to minimise construction impacts, may assist in reducing stress and associated physiological and mental health impacts within the urban environment.

B11.15 Soil and water

Refer to Chapter 15 (Soil and water quality) and Appendix Q (Technical working paper: Surface water and flooding) of the EIS for details of soil and water quality.

B11.15.1 Discharge criteria during construction

Part 11, p 74

Considering the highly disturbed nature of all receiving waterways and temporary nature of the construction phase, an Australian & New Zealand Environment Conservation Council (ANZECC 2000)

species protection level of 90 per cent for toxicants is considered appropriate for adoption as a discharge criterion, where practical and feasible. The discharge criteria for the treatment facilities should be included in the relevant project management plan.

Contrary to the statement in the EIS, the fact that the aquatic environments are highly disturbed emphasises the need to prevent polluted water entering watercourses during construction. Therefore, all water including runoff leaving the construction sites, and associated infrastructure must be managed and treated to achieve the BBWQIP targets.

Response

The potential impacts of stormwater pollutants and tunnel pollutant discharges have been assessed in section 6.3 of Appendix Q (Technical working paper: Surface water and flooding) of the EIS including stormwater pollutant loading to each waterway and potential treated groundwater discharge concentrations. Other potential pollutants of concern have been listed in sections 4.10, 5.3 and 6.3 of Appendix Q (Technical working paper: Surface water and flooding) of the EIS.

The potential impacts identified for each waste stream have been considered and appropriately managed within the design or as part of the environmental management measures. Pollutant concentrations from the non-groundwater and stormwater waste streams will be variable and as such design and management measures have been implemented to manage this risk. These are provided in **Chapter E1** (Environmental management measures). Further discussion on construction and operational water quality treatment and discharge is provided in response to the NSW EPA's submission on the EIS in **section B2.3**.

The selection of pollutants was prepared in accordance with the SEARs, NSW Water Quality Objectives and relevant guidelines as noted in section 15.1.4 of the EIS. The *Botany Bay Catchment Water Quality Improvement Plan* (BBWQIP) (SMCMA 2011) is discussed in **section B11.15.2**.

As noted in environmental management measure SW10 (see **Chapter E1** (Environmental management measures)) an ANZECC (2000) species protection level of 90 per cent is considered appropriate for adoption as discharge criteria for toxicants where practical and feasible. The discharge criteria for the treatment facilities will be included in the Construction Soil and Water Management Plan (CSWMP).

B11.15.2 Consideration of additional water quality policies and targets

Part 11, p 73

In developing management plans for water quality, stormwater and drainage, there are a number of policies that should be considered that will assist with implementation of best practice. These include: the Marrickville Strategy for a Water Sensitive Community 2012 – 2021; Marrickville Development Control Plan 2011, Chapter 2.17 Water-Sensitive Urban Design (WSUD) and Chapter 2.19 Green Roofs & Walls; and Opportunities for a Water Sensitive Greater Sydney - Greater Sydney Commission.

Council supports the EIS's position to achieve best practice water quality outcomes for the entire project. Council supports adopting the NSW Water Quality Objectives, Australian & New Zealand Environment Conservation Council (ANZECC) Water Quality Guidelines, Sydney Harbour and Botany Bay Water Quality Improvement Plans. However, the EIS shows the stormwater mean annual pollutant load reduction targets will not be achieved for the project or for the individual catchments based on the possible treatment measures.

The EIS shows Model for Urban Stormwater Improvement Conceptualisation (MUSIC) modelling results for operational water quality shows that the project fails to meet 20 out of 25 pollutant reduction targets. Council is concerned that at this early stage of developing the project design, the targets are apparently not a priority as there appears to be a lack of application by the project to meet suitable targets.

Council and the Cooks River Alliance councils currently apply the targets set by the *Botany Bay Water Quality Improvement Program* (BBWQIP) recommended by the NSW Government as they set the appropriate targets designed to improve water quality and reflect pollutant loads associated with the land uses in the catchment area, including for phosphorous and nitrogen.

Part 11, p74

NSW *Water Quality and River Flow Objectives* and ANZECC 2000 guidelines are not sufficient for avoiding impacts on the Cooks River and Parramatta River catchment. Council and the Cooks River Alliance councils currently apply the targets set by the Botany Bay Water Quality Improvement Program (BBWQIP) recommended by the NSW Government as they set the appropriate targets designed to improve water quality and reflect pollutant loads associated with the land uses in the catchment area, including for phosphorous and nitrogen.

All levels of government and catchment councils have invested significant resources and funding into improving the Parramatta and Cooks rivers, working to achieve the desire to "swim in the river." The project must avoid impacts on the Cooks River, Sydney Harbour and Parramatta River catchments. The construction and maintenance of WestConnex should be consistent with this objective. It must be noted that the Cooks River councils are working to make to Cooks River swimmable with the backing of the Commonwealth and State governments.

Response

Reference to the former Marrickville Council's policies is noted. There are, however, no M4-M5 Link treatment facilities proposed within catchments draining to the Cooks River. The BBWQIP (SMCMA 2011) is discussed in section 3.2.5 of Appendix Q (Technical working paper: Surface water and flooding) of the EIS. As the project will have only minor discharges of stormwater into catchments draining to Botany Bay, principally from roof runoff from the construction ancillary facility at St Peters interchange, the volume of water and pollutant loads are negligible. As noted in section 3.2.4 of Appendix Q (Technical working paper: Surface water and flooding), as the greater portion of the study area ultimately drains to Sydney Harbour, the *Sydney Harbour Water Quality Improvement Plan* (Greater Sydney Local Land Services 2015) applies to the project.

Construction

The potential impacts on surface water quality during the construction phase would be from erosion of exposed soils, sedimentation and associated sedimentation in waterways, contaminated stormwater runoff and poorly treated groundwater. Exposure of potential acid sulfate soils may result in generation of sulfuric acid and subsequent acidification of waterways and mobilisation of heavy metals into the environment, if poorly managed. Potential impacts on receiving waterways have been considered.

These potential impacts will be managed through implementation of a CSWMP which will include standard construction site mitigation measures such as stabilising disturbed ground and exposed soils, installation of sediment traps and basins, stormwater controls dust suppression, implementing secure bunding for storage of chemicals and fuels and monitoring and managing surface water quality. Erosion and Sediment Control Plans will also be prepared and implemented for all work sites (see **Chapter E1** (Environmental management measures)). These measures will be implemented in order to protect nearby waterways at all construction ancillary facilities where surface works would be carried out. Discharges from the project during construction will be regulated by the NSW EPA through the project's EPL.

Operation

Model for Urban Stormwater Improvement Conceptualisation (MUSIC) modelling was undertaken to assess the impact of the project and performance of the stormwater quality treatment measures. It is noted that Beca has not reviewed this modelling. The MUSIC modelling did give consideration to the Sydney Harbour and Parramatta River Catchment (SHPRC) water quality objectives and the project pollutant load reduction targets indicate that:

- The project as a whole would generally reduce the mean annual stormwater pollutant loads being discharged to the Sydney Harbour and the Parramatta River estuary when compared to the existing conditions
- The project would generally reduce the mean annual stormwater pollutant load being discharged to the five receiving waterways when compared to the existing conditions, with the exception of total phosphorus loading to Dobroyd Canal (Iron Cove Creek) which was slightly higher than the existing loading
- The stormwater mean annual pollutant load reduction targets were not quite achieved for the project or the individual catchments based on the treatment measures that could practically or readily be implemented.

By decreasing the mean annual stormwater pollutant load when compared to existing conditions, the project would provide a beneficial effect in terms of reducing stormwater pollutant loads to the SHPRC.

The pollutant load reduction targets were not achievable since primary and secondary treatment proprietary devices would be utilised within highly space constrained zones where implementation of vegetated water sensitive urban design (WSUD) or tertiary treatment devices is not considered reasonable. Oversizing other treatment measures to offset the reduced treatment within all the constrained zones was assessed and is not considered to be feasible and/or reasonable given that improvements in treatment performance diminish significantly with increasing footprint of the treatment devices.

The selection of pollutant load targets was prepared in accordance with the SEARs, NSW Water Quality Objectives and relevant guidelines as noted in section 15.1.4 of the EIS. Further details on treatment of identified pollutants of concern would be determined during detailed design. The discharge criteria will be developed in accordance with ANZECC Guidelines (2000)and the relevant NSW Water Quality (WQOs) and in consultation with relevant stakeholders (refer to environmental management measure OSW16 in **Chapter E1** (Environmental management measures)).

B11.15.3 Soil erosion and sedimentation during construction

Part 11, p74

During construction, soil erosion would nee[d] to be adequately managed in accordance with *Managing Urban Stormwater: Soils and Construction Volume 1* (Landcom 2004) and *Managing Urban Stormwater: Soils and Construction Volume 2* (NSW Department of Environment and Climate Change 2008a).

The EIS states that considering the existing groundwater quality and proposed treatment, impacts on ambient water quality within Rozelle Bay and Hawthorne Canal are likely to be negligible. There is potential for sediment to be scoured and mobilised where stormwater or wastewater is discharged to receiving waterways and bays including Hawthorne Canal, Dobroyd Canal (Iron Cove Creek), Rozelle Bay, Iron Cove and Whites Creek. This could increase turbidity and lead to mobilisation of contaminants that are bound to sediments. Net loss of any vegetation at re-establishment of Whites Creek should be avoided.

Part 11, p75

It is noted that new discharge outlets will be designed with appropriate energy dissipation and scour protection measures as required to minimise the potential for sediment disturbance and re-suspension in the receiving waters. Outlet design and energy dissipation/scour protection measures will be informed by drainage modelling. Mixing of contaminants would be likely in these conditions and would add to contamination present in the sediment from years of accumulation. This contamination would add to the bioaccumulation in local birds and other fauna, as well as vegetation. Therefore, Council supports energy dissipation and scour protection on drainage outlets.

This project combined with other smaller developments within the vicinity of the project area, are likely to be significant. For example, dust emissions have the potential to significantly reduce air quality, especially if weather conditions are dry. Increased construction traffic will have impacts on noise, air quality and safety, and construction will have impacts on water quality unless sediment and erosion controls are strictly enforced ongoing.

The EIS states that works at Whites Creek and Rozelle Bay during bridge construction may lead to disturbance of contaminated sediments and potentially erosion of exposed banks once the existing channel concrete lining has been removed and prior to construction of naturalised channel treatments. This could result in temporary impacts to water quality within Whites Creek and Rozelle Bay during construction. Impacts are likely to be temporary until settling occurs and would be managed in accordance with DPI guidelines.

Response

The use of *Managing Urban Stormwater – Soils and Construction, Volume 1* (Landcom 2004) and Volume 2D (NSW Department of Environment, Climate Change and Water 2008), commonly referred to as the ‘Blue Book’, and erosion and sediment control plans are referenced in environmental management measures SW01 and SW03 in **Chapter E1** (Environmental management measures) in relation to the CSWMP.

The Inner West Council's support for energy dissipation and scour protection measures is noted. New discharge outlets will be designed with appropriate energy dissipation and scour protection measures, as required, minimising the potential for sediment disturbance and resuspension in the receiving waters. Outlet design and energy dissipation/scour protection measures will be informed by drainage modelling (see environmental management measure OSW17 in **Chapter E1** (Environmental management measures)).

Mobilisation of sediments and contaminants within the sediments at outlet locations is a potential surface water quality impact (refer to Table 5-2 and section 6.3.4 of Appendix Q (Technical working paper: Surface water and flooding) of the EIS) which would be managed by the development and implementation of the CEMP.

A section of the riparian corridor of Whites Creek would also be improved as part of the integration of the Whites Creek naturalisation works planned by Sydney Water. Consultation with Sydney Water will be undertaken in relation to the naturalisation of Whites Creek as discussed in **section B11.18.4**.

B11.15.4 Construction water treatment facilities

Part 11, p 74

Temporary construction water treatment facilities within construction ancillary facilities should be designed to treat dirty construction water and groundwater and be based on the targets outlined in BBWQIP Section 15.1.5, which would be refined during detailed design. The level of treatment provided would consider the characteristics of the water body, any operational constraints or practicalities and associated environmental impacts and be developed in accordance with ANZECC (2000) and in consideration of the relevant NSW water quality objectives.

As highlighted in the EIS, water quality treatment should be installed in the construction area and/or the immediate vicinity. All water including runoff leaving the construction sites, rail corridors and associated infrastructure must be managed and treated to achieve the BBWQIP targets.

Response

A construction water treatment plant would be temporarily used to treat construction water and groundwater from tunnelling at the following construction ancillary facilities:

- Haberfield civil and tunnel site (C2a)
- Parramatta Road West civil and tunnel site (C1b)
- Darley Road civil and tunnel site (C4)
- Rozelle civil and tunnel site (C5)
- The Crescent civil site (C6)
- Iron Cove Link civil site (C8)
- Pyrmont Bridge Road tunnel site (C9)
- Campbell Road civil and tunnel site (C10).

The location of the construction water treatment facilities would be refined during detailed design.

Section 5.3.1 of Appendix Q (Technical working paper: Surface water and flooding) of the EIS states that iron, manganese, suspended solids, hydrocarbons and other settleable compounds and pH would likely be treated at construction water treatment plants and provides some details around the type of treatment processes. It is considered that there is no need to treat salinity as discharges are to tidal water bodies.

Based on review of the most recent groundwater quality data undertaken since the EIS was prepared, phosphorus, nitrogen, chromium, copper, nickel and zinc are also potential pollutants of concern. Chromium, copper, nickel and zinc only slightly exceeded the ANZECC slightly to moderately disturbed criteria and copper (Rozelle interchange wells) and zinc (mainline tunnel wells) exceeded the 90 per cent species protection levels (see **section B2.1.13** for the groundwater monitoring results which are presented in **Table B2–5** and **Table B2–6**). Given the concentrations of these metals and the mixing that would occur at discharge, impacts of untreated discharges would result in negligible impacts to water quality. Therefore, treatment of these low risk pollutants is unlikely to be required.

Phosphorus and nitrogen concentrations were elevated in relation to the ANZECC slightly to moderately disturbed criteria and generally slightly elevated in relation to water quality within the receiving waterways and bays. The groundwater concentrations for both nitrogen and phosphorus are, however, sufficiently low such that when considering dilution and mixing affects, discharges during construction are likely to result in negligible impacts to ambient water quality. Opportunities to treat phosphorus would be incorporated where feasible and reasonable, but nitrogen is not proposed to be treated during construction due to the need for advanced treatment methods.

Temporary construction water treatment plants will be designed and managed so that treated water will be of suitable quality for discharge to the receiving environment, as noted in environmental management measure SW10 in **Chapter E1** (Environmental management measures).

A CSWMP will be prepared for the project. Discharge criteria for the construction water treatment facilities will be included in the CSWMP.

A program to monitor potential surface water quality impacts due to the project will be developed and included in the CSWMP. The program will include the water quality monitoring parameters and the monitoring locations identified in Annexure E of Appendix Q (Technical working paper: Surface water and flooding) of the EIS where appropriate. The monitoring program will commence prior to any ground disturbance to establish appropriate baseline conditions and continue for the duration of construction until the waterway is returned to a condition consistent or better than the pre-construction condition (or as otherwise required by any project conditions of approval). Further details to be included in the program are outlined in Appendix Q (Technical working paper: Surface water and flooding) of the EIS.

B11.15.5 Operational water quality treatment systems

Part 11, p74

Stormwater runoff from the project should be controlled by a stormwater quality treatment system, designed in accordance with the project stormwater quality objectives based on pollutant load reduction consistent with the Sydney Harbour and Botany Bay water quality improvement plans rather than a specific rainfall event. All water including runoff leaving the construction sites and associated infrastructure must be managed and treated to achieve the BBWQIP targets.

Response

A discussion of the applicability of water quality targets in the Sydney Harbour Water Quality Improvement Plan and the Botany Bay Catchment Water Quality Improvement plan is provided in **section B11.15.2**.

The motorway operations complexes are described in section 5.8 of the EIS. Figure 5-44 to Figure 5-48 show their location, including indicative locations of the proposed water treatment infrastructure at each site. As discussed in section 15.4.2 of the EIS, pollutant load reduction targets were not achievable given the lack of available space within the highly constrained project footprint. It was concluded that oversizing other treatment measures to offset the reduced treatment for the project is not practical within the available project footprint.

The final design of the water treatment infrastructure would be informed by an assessment of the sensitivity of the receiving environments and supported by MUSIC modelling. Potential opportunities to further reduce the projects annual stormwater pollutant loading through the treatment of external catchments, to achieve the project pollutant load reduction targets, will be explored during detailed design.

Water treatment facilities for operation will be designed during detailed design in accordance with the ANZECC Guidelines (2000) and relevant NSW WQOs as noted in environmental management measure OSW16 in **Chapter E1** (Environmental management measures) and the conditions of approval for the project. The discharge criteria for the tunnel water treatment facilities will be included in the Operation Environmental Management Plan.

B11.15.6 Impacts on receiving waters from surface water runoff

Part 12, p76

It is noted from the EIS that measures will be implemented to ensure protection of sensitive marine species and nearby protected wetlands, both during and after construction. Key locations include Johnston's Creek, Iron Cove Creek, Hawthorn Canal/Long Creek and Whites Creek catchments and sensitive marine habitats in Rozelle Bay, White Bay and Iron Cove.

These locations are considered essential to both local and regional environments and must be protected from surface runoff, stormwater deluge and potential spills at construction sites. In preparing appropriate habitat protection strategies it is essential to recognise Sydney Water's on-going plans to naturalise watercourses within the Inner West, including Whites Creek and Iron Cove Creek.

Response

Section 15.2.2 of Chapter 15 (Soil and water quality) of the EIS outlines the sensitive receiving environments the project has the potential to interact with. Where impacts on sensitive receiving environments are considered likely, these impacts have been assessed in sections 15.3 and 15.4 of the EIS. This includes potential impacts on Johnstons Creek, Whites Creek, key fish habitat at Rozelle Bay, Iron Cove, White Bay, Alexandra Canal, Dobroyd Canal (Iron Cove Creek), Hawthorne Canal, Iron Cove and the Parramatta River Estuary. Potential impacts on other identified sensitive receiving environments (including Cooks River, Botany Bay and seagrasses in Botany Bay) were not considered likely.

Residual impacts to ambient water quality are generally predicted to be negligible with impacts localised to the zone near the outlet where discharges mix with receiving waters. In the context of the entire catchment draining to Sydney Harbour, the project is likely to have a negligible influence on achieving the water quality objectives. **Chapter E1** (Environmental management measures) outlines the management measures that would be implemented to manage potential impacts on sensitive receiving environments.

Consultation with Sydney Water will be undertaken in relation to the naturalisation of Whites Creek as discussed in **section B11.15.3**.

B11.16 Contamination

Refer to Chapter 16 (Contamination) and Appendix R (Technical working paper: Contamination) of the EIS for details of the contamination assessment.

B11.16.1 Disturbance of contaminants at the Rozelle Rail Yards

Part 11, p72

Council is concerned about disturbance of contaminants at the RRY site and requests monitoring and notification. The most critical area where issues around soil and water quality and contamination are likely to be encountered is around the RRY site and The Crescent construction areas. For the former site, requirements have already been imposed as part of the approval of the Review of Environmental Factors (REF) for the surface clean-up of the RRY site, but additional requirements are needed for the substantial works proposed by the EIS.

Council notes that extensive soil and groundwater contamination has been previously found throughout the entire RRY site due to past contaminating activities from its former railway uses. Contamination is to be managed via an environmental management plan. Should works reveal any unexpected finds relating to contamination Council should be notified.

For the RRY site, Council and the community are particularly concerned about disturbance of asbestos within the surface soils on the site. Council notes the proponent will continue to monitor airborne asbestos, and its disposal will be guided by appropriate management plans. Council recommends the proponent keeps Council and surrounding residents informed of the results of asbestos monitoring and any asbestos issues as they are encountered.

Response

The extent of contaminated soils present at the Rozelle Rail Yards has been thoroughly investigated as part of the preparation of the EIS (refer to Chapter 16 (Contamination) of the EIS and Appendix R (Technical working paper: Contamination) of the EIS) and for the Rozelle Rail Yards site management works, which was subject to assessment and approval under Part 5 of the EP&A Act as an REF (Roads and Maritime 2016). Potential contamination in the surface layers of the Rozelle Rail Yards will be removed as part of the site management works prior to the commencement of construction of the M4-M5 Link project. Following completion of the site management works, the 'finished site' would be managed and maintained in accordance with the management measures outlined in the REF. As a result, no cumulative impacts resulting from residual contamination are anticipated as noted in section 7.2.1 of Appendix R (Technical working paper: Contamination) of the EIS.

The management of contamination impacts at Rozelle during construction is presented in Table 8-2 of Appendix R (Technical working paper: Contamination) of the EIS, and includes:

- Based on the investigations, a Remediation Action Plan would be prepared, if required
- Site investigations for soil and fill materials proposed to be disturbed or excavated
- Hazardous material assessment and management plans for demolition works, including Asbestos Management Plans
- Development of a Construction Waste Management Plan to evaluate the suitability of reuse or if disposal to landfill and implementation of procedures for handling and storing potentially contaminated substances
- Investigations and management of potential acid sulfate soils.

In the event that previously unidentified contaminated materials are discovered, they will be managed in accordance with an unexpected contaminated lands discovery procedure, as outlined in the *Guideline for the Management of Contamination* (Roads and Maritime 2013) and detailed in the CEMP. The procedure will include:

- Ceasing work in the vicinity
- Initial assessment by an appropriately qualified environmental consultant
- Further assessment and management of contamination, if confirmed, will be in accordance with guidance prepared pursuant to section 105 of the *Contaminated Land Management Act 1997*.

The CEMP prepared for the project will include procedures and protocols to manage contamination as presented in Table 8-1 of Appendix R (Technical working paper: Contamination) of the EIS and the environmental management measures CM01 through to CM08, as well as dust management measures as outlined in **Chapter E1** (Environmental management measures). As required by environmental management measures CM02 and RW14, asbestos handling and management will be undertaken in accordance with an Asbestos Management Plan (as part of the Work Health and Safety Plan) and relevant NSW legislation, government policies and Australian Standards. The plan will include notification to adjacent communities and relevant stakeholders about potential hazards.

B11.16.2 Further information on the mobilisation of contaminants and erosion

Further information is sought about the mobilisation of contaminants and erosion potential on construction sites. Further concerns particularly concern is expressed that the following elements have not been adequately addressed, in terms of the impact of construction and the final design: mobilisation of contaminants during construction, including hydrocarbons, heavy metals, asbestos and other toxins, particularly in relation to the RRY site. A further assessment is needed on erosion potential both during and after construction, particularly in relation to the RRY and Darley Road sites.

Response

Table 5-1 of Appendix R (Technical working paper: Contamination) of the EIS identifies the potential for contaminated materials to be present in materials which are disturbed during construction at both the Rozelle Rail Yards and the Darley Road sites. Recent soil investigations completed at the Rozelle Rail Yards site identified concentrations of metals (lead, arsenic, cadmium and zinc) and poly aromatic hydrocarbons (PAHs) exceeding the land use criteria for open space and commercial/industrial scenarios in fill and also the presence of asbestos in fill. Petroleum sourced Light Non-Aqueous Phase Liquid (LNAPL) was detected in the centre of the site and has not been delineated or the source location identified. At the Darley Road site, previous investigations found that the site contained fill with slightly elevated metals and PAHs. An underground petroleum storage tank has also been decommissioned at the Darley Road site.

As noted in **section B11.16.1**, in the event that investigations identify that there are areas of potential contamination which pose a risk to human and/or ecological receptors, then Remediation Action Plans will be prepared.

The potential for erosion and off-site transport of sediment and contamination via overland flow and stormwater runoff is also identified in Table 5-1 of Appendix R (Technical working paper: Contamination) of the EIS. Erosion risk was assessed and discussed in Chapter 15 (Soil and water quality) of the EIS, by considering the soil landscape and characteristics. Erosion and sediment control would be focussed on areas of surface disturbance (ie surface road works, construction ancillary facility sites and areas of excavation and vegetation removal) and would consider the potential for encountering contaminated soils. Particular emphasis would be given to areas of surface disturbance near waterways, including at Rozelle Bay, where Whites Creek naturalisation and drainage works and the Easton Park drain outfall works would be undertaken.

Potential impacts to site workers and the neighbourhood of Rozelle from the mobilisation of contaminated soil and groundwater have been discussed in sections 15.3 and 19.3.4 the EIS. An assessment of the surrounding land use in close proximity to the Rozelle Rail Yards has been considered, including schools, parks, residential and commercial properties. The disturbance of contaminants of potential concern, such as lead and asbestos, via dust generated during construction demolition, has also been recognised as a potential impact to the local community. Environmental management measures CM01 through to CM08, SW03 through to SW07, FD01, B4 and RW11 in **Chapter E1** (Environmental management measures) have been developed to manage the potential contamination impacts during construction. These include the development of an Asbestos Management Plan (environmental management measure CM02), Construction Waste Management Plan (environmental management measure CM04), Construction Soil and Water Management Plan (environmental management measure CM07) and Erosion and Sediment Control Plans (environmental management measure SW03). A soil conservation consultant will also be engaged to provide advice regarding erosion and sediment control as reflected in environmental management measure SW04.

B11.17 Flooding and drainage

Refer to Chapter 17 (Flooding and drainage) and Appendix Q (Technical working paper: Surface water and flooding) of the EIS for details of flooding and drainage.

B11.17.1 Operational flooding and drainage impacts

Part 12, p75

Further details on flooding & drainage are needed to assess potential impacts areas surrounding all project sites. While the EIS proposes that the project will be prepared with recognition to the various flood management plans and policies currently in place, Council is not convinced that the many critical issues associated with flooding and drainage have adequately been addressed in the EIS.

It is acknowledged that it is in the interests of the project to ensure compliance with design protocols for flooding. However, as mentioned elsewhere in this submission, Council is concerned that the Stage 3 design as shown in the EIS is a draft that is likely to alter at a later stage in the planning process. Council cannot therefore determine with certainty that the project will not have a flooding and drainage impact on areas outside the project.

Part 12, p76

A detailed flood mitigation strategy should be submitted for Council, community, Sydney Water and State Emergency Services input prior to approval of the project. With such a strategy not worsening, and ideally improving, upon existing conditions. Comprehensive floodplain assessments and hydraulic modelling should be supported by a series of appropriate mitigation measures to ensure that no property (private or public) shall be disadvantaged or adversely affected.

Response

As reflected in environmental management measure FD01 in **Chapter E1** (Environmental management measures), a Flood Mitigation Strategy will be prepared by a suitably qualified and experienced person in consultation with directly affected landowners, DPI-Water, NSW Office of Environment and Heritage (OEH), State Emergency Services (SES), Sydney Water and the relevant local councils. It will be based on the detailed design and will include but not be limited to:

- Identification of flood risks to the project and adjoining areas, including consideration of local drainage catchment assessments and climate change implications on rainfall, drainage and tidal characteristics
- Identification of design and mitigation measures to protect proposed operations and not worsen existing flooding characteristics during construction and operation, including soil erosion and scouring
- Identification of drainage system upgrades
- The 100 year annual recurrence interval (ARI) flood level will be adopted in the assessment of measures which are required to mitigate flood risk to the project, as well as any adverse impacts on surrounding property
- Changes in flood behaviour under probable maximum flood (PMF) conditions will also be assessed in order to identify impacts on critical infrastructure and significant changes in flood hazards as a result of the project
- Consideration of limiting flooding characteristics to the following levels:
  - A maximum increase in inundation time of one hour in a 100 year ARI rainfall event
  - No inundation of floor levels which are currently not inundated in a 100 year ARI rainfall event
  - A maximum increase of 10 mm in inundation at properties where floor levels are currently exceeded in a 100 year ARI rainfall event
  - A maximum increase of 50 mm in inundation at properties where floor levels will not be exceeded in a 100 year ARI rainfall event
  - Or else provide alternative flood mitigation solutions consistent with the intent of these limits
  - Consideration of the EIS documents.

Hydrologic and hydraulic assessments will be carried out for all temporary project components (including construction ancillary facilities) and permanent design features that have the potential to affect flood levels in the vicinity of the project. The results of the assessment will inform the preparation of the Flood Mitigation Strategy (FD01) as well as the design development of temporary and permanent works.

Although the EIS is based on a concept design and is subject to detailed design and construction planning, the design developed during detailed design and construction planning will need to be consistent with the EIS, any environmental management measures, conditions of approval for the project and other requirements identified by DP&E in its assessment of the project.

B11.17.2 Management of impacts on the stormwater network

Part 12, p76

There is potential for impacts on the adjacent stormwater network, particularly during construction; noting that excess stormwater created by the tunnel should not be diverted into the existing stormwater system.

Stormwater, ground water and drainage monitoring should be operational prior to commencement of construction (establishing a hydraulic baseline) and should continue from that onward including a systematic review and rectification program.

Response

Controlled stormwater and tunnel water discharges into the stormwater network would occur during construction. During construction, the wastewater generated in the tunnel would be captured, tested and treated at a construction water treatment plant (if required) prior to reuse or discharge, or disposal offsite if required.

Stormwater would be managed in accordance with the principles and requirements in *Managing Urban Stormwater – Soils and Construction*, Volume 1 (Landcom 2004) and Volume 2D (Department of Environment, Climate Change and Water 2008), commonly referred to as the 'Blue Book'. Overloading of the capacity of the local drainage system is one of the typical impacts faced on most construction projects. Consideration of impacts to the drainage system would be undertaken during the detailed design and construction planning phases with appropriate management measures incorporated as described in section 8.1.2 of Appendix Q (Technical working paper: Surface water and flooding) of the EIS such as incorporation of storages to manage runoff. The effect of flows from the construction water treatment plants on the drainage network would also be considered (as reflected in environmental management measure FD13 in **Chapter E1** (Environmental management measures)).

A program to monitor potential surface water quality impacts due to the project will be developed and included in the CSWMP, which will commence prior to any ground disturbance to establish an appropriate baseline. A groundwater monitoring program will be prepared and implemented to monitor groundwater inflows in the tunnels and groundwater levels as well as groundwater quality in the three main aquifers and inflows during construction and operation.

No monitoring of hydrological attributes in surface water bodies was considered to be required for the project given that no surface water extraction from urban waterways would be undertaken and considering the tidal nature of the receiving waterways. No monitoring of other stormwater drainage pipes or culverts is proposed.

Further hydrological and hydraulic modelling based on the detailed design will be undertaken to determine the ability of the receiving drainage systems to effectively convey drainage discharges from the project once operational (see environmental management measures FD02 and FD11 in **Chapter E1** (Environmental management measures).

A flood review report will also be prepared after the first defined flood event affecting the project works for any of the following flood magnitudes – the five year ARI event, 20 year ARI event and 100 year ARI event, to assess the actual flood impact against those predicted in the design reports or as otherwise altered by the Flood Mitigation Strategy (as reflected in environmental management measure FD17 in **Chapter E1** (Environmental management measures)).

Ongoing consultation and coordination of activities will occur with Sydney Water to ensure that the services they provide are not unreasonably affected by the project and they can continue to access, operate and maintain their assets, such as the stormwater network.

B11.17.3 Sydney Water's Iron Cove Creek renewal project

There will also need to be consideration of the project's impact on Sydney Water's Iron Cove Creek renewal proposal at Haberfield / Five Dock and whether the combined Stage 1 and Stage 3 will delay its implementation or cause adverse impacts on this waterway.

Response

The project would not impact on the design or implementation of Sydney Water's proposed rehabilitation of Dobroyd Canal (Iron Cove Creek) east of Ramsay Street at Haberfield. Consultation with Sydney Water would be ongoing during the detailed design and construction phases of the project.

B11.18 Biodiversity

Refer to Chapter 18 (Biodiversity) and Appendix S (Technical working paper: Biodiversity Assessment Report) of the EIS for details of biodiversity.

B11.18.1 Biodiversity impacts at Rozelle Rail Yards

Summary, p6

Impact of clean-up of Rozelle Rail Yards site on heritage and biodiversity – concerns about lack of consideration of retention of rail heritage features in-situ and staging of site clearing to minimise biodiversity impacts.

Part 13, p78

There is a need to manage biodiversity impacts through staging of works at the RRY site and at other construction sites.

The key site affected by the project that raises biodiversity issues for Council is the RRY site. There are other smaller areas where biodiversity would be affected, but the principles that need to be applied to manage biodiversity within the RRY site can be applied to these other areas.

In its December 2017 [2016] submission on for the surface clean-up of the RRY site, Council also raised a number of site-specific issues including minimisation of biodiversity impacts. Council staff discussed these issues at a meeting with relevant project staff during the REF exhibition and at a June 2017 site visit. Although Council is satisfied that SMC is aware of these issues, concerns remain that they have not been resolved to Council's satisfaction.

The main concern is that there has not been sufficient consideration of how works can be staged to minimise impacts on fauna, particularly native reptiles and birds. In order to retain fauna on-site, it is critical that a minimum area of habitat be retained at each stage of the clean-up and other works on the RRY site. Council seeks reassurance that this can and will be achieved.

Council had noted in 2016 that whilst the proponent had not untaken a full fauna survey, it has undertaken a threatened species survey, and no threatened species have been found on the site. Notwithstanding, Council recommends that further fauna surveys be carried out to determine the presence of locally vulnerable species - named as "target species" in the report *Avian Biodiversity Monitoring & Bird Habitat Management* within the Leichhardt LGA (Saunders 2008). Further, that if present, these species are included in the Flora and Fauna Management Plan.

The RRY site contains the most extensive areas of native small bird habitat in the area. The plant species that make up this habitat are for the most part exotic weed species. It is a common practice in inner urban areas to preserve these habitats regardless of the fact that they are weedy. Preservation of this habitat should, where possible, be a priority in the flora and fauna management plan for the site.

The RRY site is recognised regionally as an important biodiversity corridor, i.e. the Greenway. Loss of species from the RRY site would undoubtedly compromise the biodiversity conservation outcomes Council expects for the Greenway.

Response

The site management works at the Rozelle Rail Yards are a separate project being carried out by Roads and Maritime. Notwithstanding this, discussion of the site management works is included in section 1.4.1 of Appendix S (Technical working paper: Biodiversity) of the EIS. This was used to inform the assessment of cumulative impacts on biodiversity of the site management works and the M4-M5 Link project, which is discussed in section 9.6 of Appendix S (Technical working paper: Biodiversity) of the EIS.

A biodiversity assessment was carried out for the site management works (refer to section 6.6 and Appendix F of the REF). This assessment assessed impacts to threatened species, populations and ecological communities listed under the *Threatened Species Conservation Act 1995* (NSW) (TSC Act) and the *Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth) (EPBC Act). The REF was carried out under Part 5 of the EP&A Act which requires a determining authority to consider critical habitats, threatened species, populations and ecological communities, and their habitats and any other protected fauna or protected native plants within the meaning of the *National Parks and Wildlife Act 1974* (NSW).

A submission from the Inner West Council was received by Roads and Maritime on the REF which raised similar concerns to the issue raised above regarding potential impacts to biodiversity at the Rozelle Rail Yards. A response to this submission is included in section 2.6 of the Site Management Works Submissions Report (2017). The Inner West Council submission on the REF identified a list of 'target species' that were defined in the report Avian Biodiversity Monitoring & Bird Habitat Management' within the Leichhardt LGA (Saunders 2008). It is noted that some species in Saunders (2008) are also listed under the TSC or EPBC Acts and have been assessed in the REF, such as the Powerful Owl (*Ninox strenua*). Roads and Maritime has further considered potential adverse impacts on the 'target species' (and other non-threatened species) and included additional mitigation and management measures to be applied through the implementation of the Flora and Fauna Management Plan as part of the site management works which are currently under construction.

The mitigation measures outlined in the REF submissions report will result in a reduced potential for adverse impacts and species would have the ability to seek other habitat through connecting biolinks in the vicinity, such as Whites Creek, the Inner West light rail corridor, Jubilee Park, Federal Park, Johnstons Creek, Leichhardt Park, Easton Park and Callan Park. In addition, a staged approach was recommended for the removal of vegetation as part of the site management works, with a break between the clearing of each stage occurring to reduce impacts to small bird habitat.

Before construction commences for the M4-M5 Link project, the site management works, which would remove the majority of vegetation from the Rozelle Rail Yards, would be completed. As part of Roads and Maritime's commitment to the Inner West Council in response to concerns around the loss of habitat at the Rozelle Rail Yards due to the site management works, a grant is in the process of being provided to the Inner West Council supporting habitat protection programs at the nearby location of Callan Park. These habitat protection programs have a specific focus on the protection of small bird species such as the superb fairy wren.

The Inner West Council *Greenway Strategy* documents were reviewed during the preparation of the M4-M5 Link Biodiversity Assessment Report (refer to section 4.1.1 of Appendix S (Technical working paper: Biodiversity) of the EIS) to assist with identifying the biodiversity values within the study area. As part of M4-M5 Link project, as many high retention value trees as possible will be retained during construction, thereby minimising the loss of habitat through removal of vegetation. In the event that tree removal cannot be avoided during the M4-M5 Link construction, a tree replacement strategy will be prepared (see environmental management measure B6 in **Chapter E1** (Environmental management measures)). The project will also deliver up to 10 hectares of open space at the Rozelle Rail Yards, which will provide a significant opportunity for replacement tree planting.

B11.18.2 Impacts to Eastern Bentwing-bat

Part 13, p79

The project will also need to generally consider impacts on species listed as vulnerable according to NSW Government legislation. These species include the Eastern Bentwing (EBW) Bat. Though the EIS has noted its likelihood of occurrence as 'moderate', Council is of the view that its likelihood of occurrence is 'high'.

Council has recorded EBW Bat regularly from 2014-2016 at Whites Creek, in Dulwich Hill in 2014 and regularly along the Cooks River from 2012 to 2017. Council has an EBW Bat winter roost site at Cadigal Reserve. The City of Sydney has also recorded Eastern Bentwing Bat sightings regularly at Sydney Park from 2013 to 2016. Council recommends the project include a bat box program and revegetation to offset potential future impacts.

Response

An assessment of likelihood of occurrence for the Eastern Bentwing-bat undertaken as part of the EIS determined the likelihood of this species occurring was 'moderate' as noted in Table 18-6 of the EIS (also refer to Annexure A of Appendix S (Technical working paper: Biodiversity Assessment Report). A 'moderate' likelihood of occurrence is defined as '*potential habitat is present in the study area. Species unlikely to maintain sedentary populations, however may seasonally use resources within the study area opportunistically or during migration. The species is unlikely to be dependent (ie. for breeding or important life cycle periods such as winter flowering resources) on habitat within the study area, or habitat is in a modified or degraded state'* as defined in Table A.1 of Appendix S (Technical working paper: Biodiversity) of the EIS. A 'high' likelihood is defined as *'it is highly likely that the species inhabits the study area and is dependent on identified suitable habitat (for breeding or important*

lifecycle periods), has been recorded recently in the location and is known or likely to maintain resident populations in the study area'.

No maternity colonies for the Eastern Bentwing-bat are known within the Sydney Metropolitan Catchment Management Authority Area (OEH 2016a). This species breeds at maternal roosting sites within karst (limestone) caves and migrate to Sydney along with other areas in the winter, returning to the maternal roost in summer. The Inner West Council has noted in its submission recordings of Eastern Bentwing-bat in sites outside the project footprint. As noted in section 5.2.3 of Appendix S (Technical working paper: Biodiversity) of the EIS, targeted surveys were carried out over several nights between September and October 2016 in the Rozelle Rail Yards and 102 positive recordings of the Eastern Bentwing-bat were recorded. As noted in section 18.2.4 of the EIS it is possible that the bats may be roosting in the cavities under the Victoria Road bridge, or using it as a flyway. Vegetation within the project footprint also likely provides suitable foraging habitat for the Eastern Bentwing-bat, although the small loss of foraging habitat (as a result of clearing for the project) would have a minor impact on the species. On this basis, a 'moderate' likelihood of occurrence is justified for the Eastern Bentwing-bat.

Environmental management measure B2 in **Chapter E1** (Environmental management measures) will be implemented to mitigate potential impacts on the Eastern Bentwing-bat. This includes inspections to confirm if Eastern Bentwing-bats are roosting in the cavities under the Victoria Road bridge and to develop measures to manage potential impacts in consultation with an appropriate microbat expert. These measures will be included in the CFFMP prior to the commencement of any work with the potential to disturb the roosting locations (as confirmed by the microbat expert).

B11.18.3 Damage and removal of vegetation and native habitat

Part 11, p 75

All damage and removal of vegetation and native habitat should be replaced on-site or at a minimum, offset locally with funding and resources provided to councils and others charged with responsibility to do this and manage the sites ongoing.

Part 13, p79

In the event of loss of vegetation, there should be local native vegetation replacement on site where possible, or offsets in consultation with Council. Offset plantings would be on a strategically-located Council biodiversity site in a similar way to that proposed in the EIS for a loss of trees by the EIS.

The EIS identifies 1,675 trees for removal. For any proposed removals, Council requests that an assessment is undertaken by a suitably qualified ecologist of the impact of tree removal on fauna habitat, e.g. bird nesting. This would be undertaken prior to removal and any fauna found be relocated.

Small and large logs should be stored for use as habitat in revegetation areas. Nest boxes should be installed for locally-significant fauna and threatened bats to offset loss of habitat. In the absence of suitable dense and complex native vegetation, weeds such as Lantana are providing important breeding and foraging habitat for locally-significant small birds and reptiles, which are declining in number. Council requests that the same hierarchy for trees is applied to other vegetation including weeds, i.e. retain, avoid, replace.

Response

The project has been designed with the aim of avoiding impacts to known areas of ecological sensitivity, where feasible. However, some impacts on areas of ecological sensitivity were unavoidable due to the required footprint of the project. Notwithstanding, opportunities to avoid and minimise the extent of vegetation clearing would continue to be considered during detailed design.

Offsets

Consistent with the SEARs, the project has been assessed using the Framework for Biodiversity Assessment (FBA). The FBA was developed by OEH and includes a standardised methodology for the calculation of offsets. The outcome of this assessment is that no biodiversity offsets are required for this project. Details of this assessment can be found in Appendix S (Technical working paper: Biodiversity) of the EIS.

As many high-retention trees as possible will be retained during construction. In the event that tree removal cannot be avoided, a tree replacement strategy will be prepared. Replacement trees will be included in the relevant UDLP for the project (see environmental management measure B6 in **Chapter E1** (Environmental management measures)).

Impact on flora and fauna

Biodiversity environmental management measures, documented in a Construction Flora and Fauna Management Plan (CFFMP), will be developed and implemented during construction as presented in environmental management measure B1 in **Chapter E1** (Environmental management measures). These measures include:

- Pre-disturbance inspections to identify features of biodiversity conservation significance including ones targeted at microbats for works associated with the Victoria Road bridge
- Consideration of fish habitat
- Unexpected threatened species finds procedures
- Specific measures associated with managing the impact on trees, including as discussed in the following section.

Protocols for the management of weeds are included in the CFFMP. The majority of the weeds are expected to be removed as part of the Rozelle Rail Yards site management works as discussed in **section B11.18.1**.

Impact on trees

As many high retention trees as possible would be retained during construction. The worst case disturbance footprint for the project as assessed in the EIS would require the removal of around 4.49 hectares of vegetation, including around 1,675 trees. This is likely to consist of a mixture of urban native and exotic vegetation. During construction of the project, vegetation removal would be bound by the prescribed limits of vegetation clearance outlined in the EIS and managed in accordance with the environmental management measures in **Chapter E1** (Environmental management measures) as well as any relevant conditions of approval.

The addition of the White Bay civil site (C11) for heavy vehicle marshalling and light vehicle parking (see **Chapter D2** (White Bay civil site (C11)) is not expected to result in the removal of additional trees which would require offsetting.

The CFFMP also includes measures (B1, B5 and B7) to assist in minimising any incidental vegetation removal. These include:

- Consideration of tree protection zones and, where required, preparation of tree management plans consistent with AS 4970-2009
- Consultation with an arborist for each tree proposed to be retained where there are works which have the potential to impact the root zone
- Ground protection measures for trees to be retained.

A tree replacement strategy will be prepared and implemented and included in the UDLPs. The UDLPs will be prepared in consultation with stakeholders including relevant councils and the community and used to guide the compensatory planting for trees removed by the project as reflected in environmental management measure OB9 in **Chapter E1** (Environmental management measures).

B11.18.4 Biodiversity impacts on receiving waters

Part 12, p76

It is noted from the EIS that measures will be implemented to ensure protection of sensitive marine species and nearby protected wetlands, both during and after construction. Key locations include Johnston's Creek, Iron Cove Creek, Hawthorn Canal/Long Creek and Whites Creek catchments and sensitive marine habitats in Rozelle Bay, White Bay and Iron Cove.

These locations are considered essential to both local and regional environments and must be protected from surface run-off, stormwater deluge and potential spills at construction sites. In preparing appropriate habitat protection strategies it is essential to recognise Sydney Water's on-going plans to naturalise watercourses within the Inner West, including Whites Creek and Iron Cove Creek.

Part 13, p79

Council is also concerned about potential loss of aquatic biodiversity from Whites Creek.

Response

The waterways identified by Inner West Council are recognised in the EIS as receiving waters as noted in Table 15-2 of the EIS.

Water quality impacts such that they would directly affect marine species, or their habitat, are not anticipated, however indirect impacts on aquatic habitat may occur as a result of impacts on water quality. Water quality could potentially be impacted by sediment runoff and deposition, polluted road runoff, high velocity runoff/discharge mobilising sediments, and oil and pollutant spills entering the waterway. Uncontrolled runoff or discharge can influence the water quality in waterways, such as water temperature, turbidity, pH, salinity and alkalinity. These impacts may reduce water quality, reduce light penetration through the water column, and smother benthic habitat with sediment. This could alter primary (plant) and secondary (animal) production that supports or regulates the aquatic food web. However, the receiving waterways are highly disturbed ecosystems and the project would generally reduce the mean annual stormwater pollutant loads being discharged to receiving waterways when compared to the existing conditions. Impacts on aquatic habitat as a result of water quality impacts during construction would be short term and would be minimised through the implementation of appropriate management measures.

Management measures will be implemented to ensure that the project has no adverse surface water quality impacts (see **Chapter E1** (Environmental management measures)), such as the requirement to produce site-specific Erosion and Sediment Control Plans for each work location associated with or in the vicinity of waterways and culverts that would be modified as part of the project. Therefore, water quality impacts such that they would affect marine species or their habitat, are not expected to occur (refer to Chapter 18 (Biodiversity) of the EIS).

Whites Creek

Whites Creek is a highly modified environment with limited ecological and aquatic habitat value. Whites Creek is currently concrete lined and the riparian vegetation largely consists of planted and landscaped native and exotic species that do not contribute significantly to the ecological functioning of the waterway. As Whites Creek is concrete lined, it is not considered key fish habitat and does not receive a waterway crossing classification for fish passage in accordance with the Fisheries Policy and *Guidelines for Fish Habitat Conservation and Management* – update 2013 (Fairfull 2013). It also has no valuable aquatic habitat mapped by DPI-Fisheries and the Sydney Harbour *Foreshores and Waterways Area Development Control Plan*: *Ecological Communities and Landscape Characters and Wetlands Protection Map*. It is also considered unlikely that there would be valuable or specific aquatic habitat for threatened aquatic/estuarine species present within Whites Creek. It is possible some species may opportunistically pass through Whites Creek, given the connectivity to the broader harbour and coastal habitats, but those species are unlikely to depend on the habitat within Whites Creek.

The new bridge proposed over Whites Creek would shade the aquatic habitat within the concrete channel of Whites Creek, creating less favourable conditions for barnacles and oysters attached to the wall. The increased bridge width is unlikely to act as a behavioural barrier to fish passage and is considered to have adequate clearance (two to three metres above water), depth (one to two metres) and width (nine metres) to encourage fish movement. However, during construction, the proposed works may temporarily obstruct fish passage. This impact would be minimal given the poor creek habitat in Whites Creek and fish passage would be restored during operation.

However, it is acknowledged that Sydney Water has a plan to naturalise sections of Whites Creek further upstream of the crossing at The Crescent. This provides an opportunity for the project to integrate and build on the Sydney Water's naturalisation plan and this is reflected in environmental management measure SW09 detailed in **Chapter E1** (Environmental management measures).

B11.19 Groundwater

Refer to Chapter 19 (Groundwater) and Appendix T (Technical working paper: Groundwater) of the EIS for details of groundwater.

B11.19.1 Soil salinity and water table changes

Part 12, p75

In addition to run-off there is potential for elevated soil salinity and induced water table changes resulting from both tunnelling activities (during construction) and the long term presence of deep tunnels. Such impacts could include impacts on local aquifers, potential for an elevated water table and redirection of groundwater flows.

Part 12, p77

Concerns are also raised about the potential for saline water intrusion into the foreshore areas due to depletion of groundwater table along the proposed tunnels. The impact of sea level rise on this has not been addressed adequately in the EIS.

Response

Soil salinity impacts during construction

Soil salinity during construction is discussed in section 5.5.5 of Appendix T (Technical working paper: Groundwater) of the EIS.

During construction of the M4-M5 Link project, there is potential for salts within the alluvium to be mobilised by local dewatering or associated with the tunnel construction program. However, the impact of the project on groundwater resources or hydrology based on the mobilisation of saline soils is likely to be negligible (refer to section 5.5.5 of Appendix T (Technical working paper: Groundwater) of the EIS).

Saltwater intrusion impacts during construction and operation

Saltwater intrusion during construction is discussed in section 5.5.6 and during operation in section 6.4.3 of Appendix T (Technical working paper: Groundwater) of the EIS. An initial impact assessment was conducted as part of the EIS in accordance with the *NSW Aquifer Interference Policy (AIP) Step by Step Guide* (NSW Office of Water 2013b). In accordance with the AIP, groundwater modelling (particle tracking) was conducted to assess the potential impacts of saline intrusion. A summary of the assessment is provided in Table 9-1 of Appendix T (Technical working paper: Groundwater) of the EIS for the Less Productive Fractured Rock Aquifer which covers much of the project footprint. The EIS also considered the Botany Sands, which although not intersected by the project, are in close proximity to the east and likely to be impacted by the project. A summary of the assessment for the Botany Sands is presented in Table 9-2 of Appendix T (Technical working paper: Groundwater) of the EIS for Highly Productive Coastal Aquifer. Further information on saltwater intrusion in also detailed in **section B5.1.2**.

Less Productive Fractured Rock Aquifer (Ashfield Shale and Hawkesbury Sandstone)

The AIP assessment for the Less Productive Fractured Rock Aquifer considered groundwater in both the Ashfield Shale and Hawkesbury Sandstone. The Ashfield Shale groundwater within the project footprint is typically poor quality and of low hydraulic conductivity, which limits the potential beneficial use. Groundwater from the Hawkesbury Sandstone is used for limited domestic and irrigation purposes. There is a reticulated water supply provided by Sydney Water to this area which limits the use of groundwater resources.

Groundwater between the tunnel and tidal water bodies is predicted to become more saline as saltwater intrusion occurs due to the drawdown effects in the Hawkesbury Sandstone from tunnel inflows reaching a saline shoreline. Saltwater intrusion occurs around the foreshore, with the salinity effects becoming less pronounced with increased distance from the edge of the saline water source. Groundwater modelling (particle tracking) has been used to predict the time taken for drawdown impacts to reach the shoreline, that is the time taken before saline intrusion starts to occur. As noted in section 6.8 of Annexure H of Appendix T (Technical working paper: Groundwater) of the EIS, the majority of water takes over 25 years to travel from the waterways to the tunnels. However, there is potential for saline intrusion of water from these watercourses to impact the water quality in areas intermediate between the source and the tunnels within the space of a few years, particularly at Rozelle.

Groundwater quality within the Ashfield Shale is highly variable but is typically brackish or saline, due to the marine salts contained within the shale. Groundwater quality is generally good within the Hawkesbury Sandstone, with low salinity except in the upper part of the aquifer which can be elevated due to leakage from the Ashfield Shale. Groundwater use across most of the project footprint is low as bore yields are typically low and the area has access to reticulated water. In the area between the tidal zones and the tunnels, no registered domestic or recreation water supply bores were identified in the tidal area that could become more saline.

Five domestic or recreation bores were identified in the NSW Department of Primary Industries (DPI) Water search; none were located between the project footprint and the tidal zones as noted in section 6.10 of Appendix T (Technical working paper: Groundwater) of the EIS. Two bores are located in the Botany Sands (GW106192 and GW111164), one at Redfern Park (GW71907) which is used for irrigation, one at Abbotsford (GW106159), and one at the University of Sydney (GW110247). There are also no groundwater dependent ecosystems (GDEs) in the project footprint, as discussed in in Table 9-1 of Appendix T (Technical working paper: Groundwater) of the EIS. A map of GDEs in relation to the project footprint is provided in Figure 4.8 of Appendix S (Technical working paper: Biodiversity) of the EIS.

In the broader area, it is predicted that it would take in the order of hundreds of years for saline water to travel from the alluvium in Whites Bay to the University of Sydney bore (GW110247), which is the closest to the tidal zone. The model also shows that the nearest high priority GDE (Lachlan Swamp and Botany wetlands at Centennial Park) will not be impacted by saltwater intrusion as saltwater would not be travelling towards these wetlands.

Given the limited groundwater use and the lack of GDEs or culturally significant sites within the *Greater Metropolitan Regional Groundwater Sharing Plan* which covers the project footprint and surrounds, it would be unlikely that there would be a lowering of the aquifer systems beneficial use category within the project footprint due to saltwater intrusion. As a result, a Level 1 assessment was considered appropriate for the Less Productive Fractured Rock Aquifer, as the criteria for this level were not exceeded.

Highly Productive Coastal Aquifer (Botany Sands)

Groundwater within the Botany Sands area has limited beneficial use potential. Although the Botany Sands aquifer contains a significant groundwater resource under natural conditions, due to contamination, DPI-Water has embargoed domestic groundwater use under the *Metropolitan Water Sharing Plan*. There is also a reticulated water supply provided by Sydney Water to this area, thereby limiting the usage of groundwater resources.

Groundwater modelling predicts that the only location where saline intrusion is likely to occur into the Botany Sands is the zone between Alexandra Canal and the project. This may increase the salinity of the groundwater resource in that area. Groundwater flow toward the project footprint from Alexandra Canal would be restricted by the cut-off wall which is to be installed as part of the New M5 project around the southeast perimeter of the Alexandria Landfill. Since groundwater from the Botany Sands can no longer be used for domestic use due to the degraded condition of the groundwater, the lowering of the aquifer system beneficial use category due to saltwater intrusion is unlikely.

The closest high priority ecosystems in the Botany Sands listed under Schedule 4 of the *Greater Metropolitan Regional Groundwater Sources Water Sharing Plan* are the Botany Wetlands including the Lachlan Swamps, Mill Pond, Mill Stream and Engine Pond. These ecosystems are located more than two kilometres from the project footprint. Groundwater modelling conducted as part of this investigation indicates that the water quality at these wetlands is unlikely to decline due to saltwater intrusion or any other influences due to the project (refer to section 5.4.1 of Appendix T (Technical working paper: Groundwater) of the EIS). This is because saltwater ingress due to depressurisation of the aquifer, induced by tunnel inflows, will occur along the foreshore where there is tidal interaction. Consequently, the majority of saltwater intrusion impacts will occur along the foreshore fringes, limiting impacts to groundwater resources further inland. Capture zone analysis undertaken as part of the groundwater modelling predicts that groundwater quality within the Botany Sands aquifer would increase in salinity slowly over time in the order of hundreds of years. At the St Peters interchange, the cut-off wall constructed around the southeast perimeter of the former Alexandria Landfill would further restrict saline water movement through the Botany Sands from the Alexandra Canal.

No culturally significant sites were identified within the *Greater Metropolitan Regional Groundwater Water Sharing Plan* that could be impacted by groundwater changes as a result of the project. Groundwater modelling predicted that no registered bores within a two kilometre radius of the tunnels that intersect alluvium are likely to be drawn down by more than two metres. As this is within Zone 2 of the Botany Sands Source Management Zone, domestic use of groundwater is banned, and as a result the drawdown impacts are not considered significant.

Groundwater monitoring has been carried out since June 2016 and this has provided a robust baseline monitoring dataset which has informed the modelling presented in Chapter 19 (Groundwater) and Appendix T (Technical working paper: Groundwater) of the EIS. As outlined in environmental management measure OGW10 (see **Chapter E1** (Environmental management measures)), the groundwater monitoring program prepared and implemented during construction will be augmented and continued during the operational phase. Groundwater will be monitored during the operations phase for a period of three years, or as otherwise required by the project conditions of approval. By this time, it is expected that forward trends in groundwater levels and quality would have become well established. The monitoring program will include trigger levels for response or remedial action based on monitoring results and relevant performance criteria (see environmental management measures OGW9 and OGW10 in **Chapter E1** (Environmental management measures)).

Water table changes

At the end of construction of the project (2023), drawdown on the water table is expected with major drawdown centred over the Rozelle interchange as noted in section 19.4.3 of the EIS. Drawdown of two metres or more extends no further than 600 metres either side of the tunnel corridor, with the widest areas being mid-way along the M4-M5 Link mainline tunnels around Newtown and at the interchanges.

As noted in section 19.4.3 of the EIS, construction of drained tunnels beneath the water table is expected to cause long-term, ongoing groundwater inflow to the tunnels, inducing groundwater drawdown along the tunnel alignment. Immediately after tunnelling is completed, groundwater inflows would be at their highest, but with time, groundwater inflow to the tunnel would decrease while the water table decline would continue to gradually expand outwards from the tunnels until equilibrium is reached. Rising of the water table is not expected except in some regions where the tunnels will be tanked, and local mounding may occur.

Potential impacts associated with subsurface components of the project intercepting and altering groundwater flows and levels will be considered in more detail during detailed design.

Management and mitigation measures

Groundwater monitoring will be carried out during construction in accordance with environmental management measures GW8 (see **Chapter E1** (Environmental management measures)). The groundwater monitoring program will be designed in consultation with the relevant stakeholders as required by the conditions of approval, and include monitoring in the alluvium, Hawkesbury Sandstone and Ashfield Shale of:

- Groundwater levels
- Groundwater quality
- Groundwater inflows to the tunnels.

The licensing and/or registration requirements associated with groundwater abstraction would be discussed with Crown Lands and Water during the detailed design and construction phases of the project. Consultation with key stakeholders would continue during the development of detailed design for the project in accordance with the Community Consultation Strategy (see environmental management measure SE2 in **Chapter E1** (Environmental management measures)) and conditions of approval.

The effect of sea level rise on groundwater is discussed in section 6.10 of Appendix T (Technical working paper: Groundwater) of the EIS.

B11.20 Non-Aboriginal heritage

Refer to Chapter 20 (Non-Aboriginal heritage) and Appendix U (Technical working paper: Non-Aboriginal heritage) of the EIS for details of non-Aboriginal heritage.

B11.20.1 Impacts on heritage items within Rozelle Rail Yards

Summary, p 6

Impact of clean-up of Rozelle Rail Yards site on heritage and biodiversity – concerns about lack of consideration of retention of rail heritage features in-situ and staging of site clearing to minimise biodiversity impacts.

Part 13, p79

Works around the Rozelle Railyard will require heritage and environmental safeguards, which are site specific and may not be currently covered by the conservation management plan for the canal within the site. Council must be included in consultations with the EPA and SMC on this matter. Although adaptive re-use of rail heritage fabric is proposed, there is a need to retain some rail heritage on the RRY [Rozelle Rail Yards] site in-situ.

Regarding rail heritage, Council was informed at the time the RRY site REF was being assessed that the significant rail heritage items would be re-used, i.e. integrated into the landscaping of the RRY recreation area. Council agrees there is a role for re-use but had argued that some of the more significant items be retained in-situ so the site's rail heritage more accurately interpreted by future users of the recreation area. The proponent has not agreed to the retention of rail heritage item in-situ.

Regarding heritage buildings on the RRY site, Council notes there are no listed heritage buildings or other items. Council previously expressed some concern any proposed demolition of the Port Authority building, as this could be a potential item of local heritage significance.

Response

Due to the scale of the works required within the Rozelle Rail Yards, including the relocation of the Victoria Road bridge, there is limited scope to retain features of heritage conservation significance in situ.

Roads and Maritime is carrying out site management works on part of the Rozelle Rail Yards site. The site management works were subject to a separate environmental assessment and do not form part of the M4-M5 Link project. The works were assessed in an REF which was approved by Roads and Maritime under Part 5 of the EP&A Act in April 2017. The works commenced in mid-2017 and will be carried out over a period of around 12 months.

Potential non-Aboriginal heritage impacts of the site management works are assessed in section 6.6 of the REF. A submission from the Inner West Council was received on the REF which raised similar concerns to the issues raised above regarding potential impacts to non-Aboriginal heritage values at the Rozelle Rail Yards. A response to this submission is included in section 2.6 of the Site management works Submissions report (March 2017).

Key features of the site management works relevant to the non-Aboriginal heritage values of the site include removal of existing above ground rail infrastructure including gantries, railway lines, ballast, sleepers and buildings (excluding the southern penstock, switching station, transformer and rail infrastructure to the east of the Victoria Road bridge). As part of the site management works, sections of the railway track have been salvaged and stored for potential future reuse. In addition, the lighting tower and overhead rail gantries have been removed and stored off-site for reuse consistent with the urban design and heritage interpretation plans for the site.

As discussed in the REF, retaining the rail tracks in situ would not allow the sleepers and ballast to be removed or for appropriate erosion and sediment control measures to be installed. It would also potentially constrain further contamination and service investigations to be carried out as part of the site management works. The heritage significance of the Port Authority building was assessed as part of the REF and it was determined that this building was of potential local heritage significance and that its removal would have a minor impact on the heritage values of the area. Archival recording of the Port Authority building was undertaken prior to its removal.

The potential reuse of rail-related infrastructure within the future urban design and landscaping setting for the Rozelle Rail Yards will be considered within an Interpretation Strategy, as defined in environmental management measure NAH02 (see **Chapter E1** (Environmental management measures)). The Interpretation Strategy will be developed and implemented as part of the project to identify and interpret the key heritage values and stories of the heritage areas affected by the project and inform the development of the relevant UDLPs for the project, in accordance with NSW Heritage Office *Interpreting Heritage Places and Items Guideline* August 2005. The Interpretation Strategy will explore how themes and stories, including the Rozelle railway's historic functions, trains and trams transport, industrialisation and the Rozelle-Darling Harbour Goods line, among other aspects of significance, can best be told. The strategy will also identify how the rail-related infrastructure salvaged from the Rozelle Rail Yards can be reused in implementing the Interpretation Strategy.

The biodiversity aspect of the issue raised in the summary is discussed in **section B11.18.1**

B11.20.2 Preservation of the heritage value of properties within the Iron Cove heritage study area

Regarding non-Aboriginal heritage, Council seeks retention and conservation of some buildings and preparation of a strategy for re-use of salvaged material. Outside the RRY site, Council's assessment of non-Aboriginal heritage concurs with most of the heritage conclusions in the EIS, particularly, where the EIS has found that the demolition of the identified heritage-significant properties would have a "major adverse" heritage impact.

The exceptions include some of the properties within the Iron Cove heritage study area (C8) where a greater proportion of the buildings are considered to have heritage significance than those acknowledged by the EIS – for example, 244 and 256 Victoria Road, Rozelle. These are two rare timber cottages, with grooves in their weatherboards to give the illusion they are built of stone. No. 244 is intact externally and internally.

With regard to landmark significance and ongoing conservation, it is noted that the former Bank of NSW Building at No.164 Parramatta Road at Annandale is not protected under any current local statutory heritage controls. However this landmark Parramatta Road building located within the Camperdown/ Parramatta Road Precinct demands special consideration for its retention and conservation.

Evidence within the EIS shows that this building was designed by well-known former Sydney Architectural Firm - Spain and Cosh, who designed Australia's tallest building prior to the commencement of World War I - the Culwulla Chambers, Pitt Street, Sydney. The firm also designed the heritage-significant Marcus Clark Building at Railway Square, amongst many other notable Sydney buildings. Conservation could be achieved by altering (enlarging) the ancillary facility boundaries of the Pyrmont Bridge Road construction site to provide for its conservation in situ. The loss of this building would have significant adverse historical and aesthetic impacts on the Parramatta Road corridor.

Response

Victoria Road sites

The property at 256 Victoria Road, Rozelle was assessed as part of the non-Aboriginal heritage assessment for the project (refer to Chapter 8 of Appendix U (Technical working paper: Non-Aboriginal heritage) of the EIS. The assessment concluded that although the building is of interest to the development of the area, it is highly modified and does not meet the threshold for local listing. All external finishes including cladding, roofing, guttering, timber joinery, external landscaping and fencing date from the 21st century. This item was not identified as a potential heritage item.

The property at 244 Victoria Road, Rozelle was not identified in the non-Aboriginal assessment as being a place with potential heritage values. This is because the property was inaccessible, obscured by tall fencing and vegetation the property which meant that it was unable to be assessed as part of the preliminary heritage assessment (refer to Annexure A of Appendix U (Technical working paper: Non-Aboriginal heritage) of the EIS) for the methodology used to for the preliminary heritage assessments of buildings subject to heritage assessment).

Former Bank of NSW Building

As discussed in section 20.3.3 of the EIS and Table 6-42 of Appendix U (Technical working paper: Non-Aboriginal heritage), the Former Bank of NSW building would be subject to a direct impact from the M4-M5 Link project through full demolition to allow for the construction of the project from the Pyrmont Bridge Road tunnel site (C9). The non-Aboriginal heritage assessment stated that this would result in the loss of a potential item of historic and aesthetic significance from the Parramatta Road streetscape and would be a major adverse heritage impact for the item.

The Pyrmont Bridge Road tunnel site (C9) is already constrained in size by Parramatta Road and Pyrmont Bridge Road, Mallet Street and Bignell Lane. The footprint of the site has been minimised to avoid impacts to adjacent buildings including the James Squire Brewery and the 7-Eleven petrol station, to the west of the site. Investigations into altering the layout of the Pyrmont Bridge Road site to retain the Former Bank of NSW identified that this would substantially reduce the available area for construction and associated elements including the acoustic shed, spoil handling areas, truck and light vehicles ingress and egress, as well as the site facilities, offices and amenities.

Photographic archival recording will be undertaken of the Former Bank of NSW in accordance with the NSW Heritage Office guidelines *Photographic Recording of Heritage Items Using Film or Digital Capture* (2006). The photographic recording will occur prior to any works that have the potential to impact upon the building and the process will include the identification of appropriate stakeholders to receive copies of the documentation (environmental management measure NAH03 in **Chapter E1** (Environmental management measures)).

A Heritage Salvage Strategy will also be prepared to identify the salvage potential of the fabric and features from heritage and potential heritage items that will be demolished to facilitate the project as reflected in environmental management measure NAH09 in **Chapter E1** (Environmental management measures). The strategy will also identify options and a process for dissemination of salvaged items to owners, community groups and interested parties.

Further, an Interpretation Strategy will be developed and implemented as part of the project to identify and interpret the key heritage values and stories of the heritage areas affected by the project and to inform the development of the UDLPs for the project, in accordance with NSW Heritage Office *Interpreting Heritage Places and Items Guideline* (2005) as reflected in environmental management measure NAH02 in **Chapter E1** (Environmental management measures).

B11.21 Aboriginal heritage

Refer to Chapter 21 (Aboriginal heritage) and Appendix V (Technical working paper: Aboriginal heritage) of the EIS for details of Aboriginal heritage.

B11.21.1 Unexpected finds protocols

There is a need to ensure 'unexpected find' protocols are in place to conserve Aboriginal places, objects or deposits. The EIS indicates that surveys and consultation have been undertaken in accordance with the prescribed Procedure for Aboriginal [Cultural] Heritage Consultation and Investigation (PA[C]HCI). These have revealed no directly-impacted sites of significance within the project's boundaries or area of influence. The absence of surface finds and recorded sites does not ensure the absence of sub-surface finds during construction.

Council concurs with the proposed EIS protocols that prior to construction a suitably qualified archaeologist should visit the one-recorded site outside the project area to confirm its current condition. Council also concurs with the procedure that should any unexpected finds of Aboriginal places, objects or deposits be identified during construction the Standard Management Procedure for Unexpected Heritage Items (RMS 2015) is to be followed.

Further to this, Council requests that should any unexpected finds be discovered, all disturbance of the area should cease immediately and the NSW Office of Heritage & Environment be informed in accordance with S89A of the *National Parks and Wildlife Act 1974*.

Response

Roads and Maritime acknowledges that Inner West Council concurs with the proposed EIS protocols for unexpected finds of Aboriginal places, objects or deposits.

The Aboriginal heritage assessment in the EIS concluded that the project is not anticipated to have any impact on any identified Aboriginal objects or places of Aboriginal heritage significance. However, mitigation and management measures will still be implemented to avoid, minimise or mitigate impacts on unidentified Aboriginal heritage objects or places, including any subsurface finds, during construction. This includes preparing an Unexpected Heritage Finds and Humans Remains Procedure for the project to be implemented in the event that an unidentified Aboriginal heritage item is discovered during construction (as reflected in environmental management measure AH1 in **Chapter E1** (Environmental management measures)).

The procedure will be based on the *Standard Management Procedure:* (*Unexpected Heritage Items* (Roads and Maritime 2015a) with guidance from the Heritage Council of NSW and the Heritage Division of OEH. It will also detail the requirements associated with the notification of relevant agencies and the NSW Police. Section 3.2.2 of Appendix V (Technical working paper: Aboriginal heritage) of the EIS also outlines that as the project has been declared State significant infrastructure, it is required to comply with section 89A of the *National Parks and Wildlife Act 1974* (NSW), which requires that the Director-General be notified of the location of identified Aboriginal objects within a reasonable time, with penalties for non-notification.

B11.22 Greenhouse gas

No issues raised in Inner West Council's submission were categorised under 'greenhouse gas'.

B11.23 Resource use and waste minimisation

Refer to Chapter 23 (Resource use and waste minimisation) of the EIS for details of resource use and waste minimisation.

B11.23.1 Spoil handling and transport for Darley Road civil and tunnel site

Part 4, p41

There is a need to investigate alternative spoil handling and transport and site access options for the Darley Road site to reduce impacts. For transport of spoil from the Darley Road site, there may be an opportunity to use an acoustically shielded conveyor belt to transport spoil to Iron Cove so it can be

transported by barge. Some of the spoil may also be appropriate for re-use in concrete for the Bays Precinct Redevelopment via the proposed Glebe Island concrete batching plant.

To reduce the number of vehicle movements, spoil could be dried and/or crushed on-site to reduce its weight and volume, and elements of spoil could be re-used within the tunnel for shotcrete. This would reduce the amount of raw material that would need to be transported (possibly to the proposed Glebe Island concrete batching plant) thus reducing the Bays Precinct redevelopment's demand for depleting silica sand resources used in concrete production. This would also reduce heavy vehicle traffic around the Bays Precinct. Glebe Island also provides an opportunity to load non-useable spoil onto barges (instead of trucks) for transport further afield, although there are not many barge-accessible spoil reuse sites available.

If use of barges proves to be infeasible, the proponent should investigate the option of creating an exit ramp and loading area from the westbound kerbside lane of City West Link Road into an area between City West Link and the light rail line, immediately to the west of the Leichhardt North Light Rail Stop, to provide truck access to the Darley Road site. In this way, trucks would not need to access Darley Road at all.

This option would also involve marshalling of empty trucks in the RRY site and spoil being conveyed, using an acoustically shielded conveyor belt over the light rail line, to overhead hopper(s). Trucks would load from the hopper and re-enter the City West Link Road immediately to the north of Charles Street. As there is a grade difference between the vacant land adjacent to the light rail line and City West Link, it may be necessary to construct an elevated platform/pad to create an appropriate loading area.

Response

The project has been designed to minimise the generation of construction traffic where feasible and reasonable. The assessment of construction traffic impacts has taken into account heavy vehicle movements (including spoil haulage) to and from construction ancillary facilities.

Trucks accessing the Darley Road civil and tunnel site would do so via Darley Road with connection directly to the City West Link which would then provide connection to the wider arterial road network.

The construction traffic and transport assessment in the EIS has taken into account heavy vehicle movements associated with spoil management during the peak construction period. Chapter 8 (Traffic and transport) of the EIS provides a summary of heavy vehicle movements at each construction ancillary facility, including spoil related haulage, presenting a worst case scenario where all spoil is hauled by road transport. The traffic and transport assessment undertaken does not preclude the design and construction contractor(s) from pursuing non-road opportunities for transportation of spoil, subject to it meeting safety, planning and environmental requirements.

Feedback from the community and stakeholders on the use of the Darley Road civil and tunnel site (C4) prior to and during exhibition of the EIS included issues related to site access, spoil haulage and general traffic management. The feedback obtained from the community and stakeholders has also led to the refinement of the heavy vehicle route to and from the Darley Road civil and tunnel site (C4) to address these concerns. An overview of these refinements is presented here and would be subject to detailed design and construction planning by the successful contractor:

- Changes to the haulage route for incoming construction traffic. Heavy vehicles would travel eastbound along City West Link, use James Craig Road to circle back to City West Link (westbound) and use the existing left turn into James Street (see **Figure C4-1**). As a result, the proposed right turn arrangement from City West Link into Darley Road would be removed
- Establishment of a dedicated right turn bay for heavy vehicles to enter the site from the existing westbound carriageway of Darley Road.

Further discussion on the concerns raised by the community and key stakeholders in relation to the Darley Road civil and tunnel site (C4) is presented in **section C6.9.1**.

The option of using City West Link for direct access to the Darley Road civil and tunnel site (C4) was investigated. While this option would remove heavy vehicle spoil traffic from Darley Road, it was not considered viable for the following reasons:

- Creating new access points to and from City West Link with associated heavy vehicle diverge and merge movements would create significant traffic safety issues

- Use of this new access arrangement would require building structures (a conveyor) over the light rail corridor to deliver spoil into trucks. This may result in safety issues for light rail users and may not be acceptable to Transport for NSW
- Building structures over the light rail corridor would potentially create a new elevated noise source and would also be visually prominent to a wider community
- Potential impact on an existing service corridor for the light rail corridor which is accessed from Charles Street
- Potential conflict with existing pedestrian paths which connect to the light rail stop from Charles Street and from the pedestrian bridge over City West Link
- Potential impact on existing traffic movements along Canal Road and Charles Street
- Requirement for the existing noise walls along the southern side of City West Link to be modified, potentially impacting on their effectiveness to nearby residents
- Removal of existing vegetation adjacent to the light rail corridor and along the Canal Road and Charles Street road reserves.

The suggestion to close a section of Darley Road during construction would not be feasible as it is an arterial road which provides an important connection to City West Link and has around 16,000 average two-way vehicle movements per day. Redirecting this level of traffic to alternative routes in the local area over the four year construction period would not be reasonable.

The Darley Road civil and tunnel site is considered to be an appropriate site for use of a construction ancillary facility to support construction of the mainline tunnel as it is located in relatively close proximity to the mainline tunnel alignment on land owned by the NSW Government, which would mean further property acquisition is not required. The site also has access to the arterial road network, using City West Link and Darley Road. However, the processing of tunnel spoil onsite for reuse is not feasible for the M4-M5 Link due to the large area required for such an operation and the constrained nature of the sites. Processing of tunnel spoil on site would result in an increase in the project footprint and additional property acquisitions.

Temporary traffic diversions to local streets from Darley Road may occur at night to minimise traffic safety impacts and disruption to the local traffic network. The diversions would only impact a limited section of Darley Road and would occur for limited periods, most likely for works to alter street conditions and create access into the Darley Road civil and tunnel site (C4) at the start and end of the construction period. This would require a road occupancy licence which would likely require works to be carried out outside standard construction hours when traffic volumes are low, to avoid traffic disruption. Such works would only be required early on in the construction program, and potentially again at the end of construction. The need to carry out works that would result in diversions on nearby roads would be limited as works would generally be able to be carried out within the confines of the site.

Where required, diversions would use local streets around Darley Road. Streets used for diversions would depend on the nature and location of the proposed works for which the diversions are required. Diversions would be implemented for the duration of the work shift and access along Darley Road would be reinstated at the completion of the work shift. Residents in the area would be provided with advanced notification of any diversions and traffic management would be implemented. Works outside of standard construction hours, including traffic diversions, are required to minimise potential impacts on the operational integrity and functionality of the road network. These works would be temporary and governed by the Transport Management Centre.

The Construction Waste Management Plan (CWMP) will document anticipated volumes of spoil that will be generated by the project, spoil storage locations within project sites and likely spoil disposal sites. The CWMP and spoil reuse opportunities will be regularly reviewed and updated during detailed design and project construction in accordance with environmental management measure RW7 in **Chapter E1** (Environmental management measures).

B11.24 Climate change risk and adaptation

Refer to Chapter 24 (Climate change and risk adaptation) and Appendix X (Climate Change Risk Assessment Framework) of the EIS for details of climate change and risk adaptation.

B11.24.1 Urban heat island

Part 15, p82

There is a need to assess the project's impact on climate change, including the 'heat island' effect from roads and associated facilities. Further, the EIS does not consider the 'heat island' impacts of road surfaces, ventilation facility surfaces, ventilation plumes and heat from additional traffic induced by WestConnex - engine heat, road surface friction etc. There is a need to soften surface of vents both visually and to reduce the heat island effect.

Urban heat island effect is recognised as an existing issue in the local urban environment in the Climate Change Plan 2015 – 2025 and Urban Heat Mapping (Landsat 5 TM derived land surface temperature, data sourced from Geoscience Australia and CSIRO). Therefore urban designs for the project should seek to mitigate urban heat through green infrastructure and creation of an urban tree canopy.

Response

The climate change risk and adaptation assessment in Chapter 24 (Climate change risk and adaptation) of the EIS has been carried out in accordance with the SEARs for the project. It assesses the impacts of climate change on the project and adaptation measures that have been incorporated in the design of the project, as well as recommendations for further development of adaptation options during the project's detailed design. Impacts of the project on climate change relate predominantly to greenhouse gas emissions generated from the construction and operation of the project. Greenhouse gas emissions have been assessed in Chapter 22 (Greenhouse gas) and Appendix W (Detailed greenhouse gas calculations) of the EIS.

The urban heat island effect results from the replacement of natural surfaces, including the tree canopy, with hard surfaces. It is also related to the urban canyon effect, where the narrow arrangement of buildings in urban areas absorb radiation and restrict wind flows which assist with cooling. Both can have negative effects on human health, plants, and animals in particular with regard to increased temperatures.

The majority of the project is underground in tunnels or involves replacing existing hard surfaces with new hard or previously cleared surfaces. The project therefore is likely to have only a minor impact on the urban heat island effect in the long term.

In the short term, approximately 4.49 hectares of vegetation to be removed during construction activities, which is mostly urban native and exotic vegetation, may result in highly localised impacts (in terms of the urban heat island effect) to residents directly adjacent to the vegetation, mostly due to the loss of shading that the trees provided.

Around 1,675 trees, predominantly around the Rozelle Rail Yards and within Port Authority of NSW land, are proposed to be removed by the project, although the project will seek to retain as many trees as possible. A tree replacement strategy will be prepared as reflected in the environmental management measure B6 (see **Chapter E1** (Environmental management measures)). On completion of the project, up to 10 hectares of new open space will be created at Rozelle.

The Urban Design Report provided in Appendix L of the EIS has identified the urban heat island effect as an element of the water sensitive urban design principles to be considered during the finalisation of the UDLPs (environmental management measure UD1 in **Chapter E1** (Environmental management measures)) for the project (section 5.5.6 of Appendix L (Technical working paper: Urban design) of the EIS) through:

- Maximising irrigation to green spaces to reduce local temperatures
- Retaining water and maximising areas of open water to provide cooling
- Maximising the use of trees and irrigating to encourage quick growth to establish the tree canopy
- Selecting pavement which can reduce the urban heat island effect and maximise cooling, where possible.

B11.24.2 Projects impact on climate change not assessed

Part 15, p 82

The SEARs only require the EIS to address the impact of climate change on the project, rather than the project's impact on climate change.

Response

As noted by the Inner West Council, the climate change risk assessment in the EIS assesses the risk of climate change events on the design and operation of the project as required by the SEARs.

The project's contribution to climate change is associated with the greenhouse gas emissions that are released during construction, operations and maintenance activities and the fuel consumed by road users. The most significant component of greenhouse gas emission is the embodied construction materials, released during construction (refer to Table 22-2 of the EIS).

As required by the SEARs (item 15.2 of sustainability), the project has been assessed against the following current guidelines which include targets and strategies to improve Government efficiency in use of water, energy and transport:

- *NSW* Sustainable *Design Guidelines* (Transport for NSW 2013)
- *NSW Climate Change Policy Framework* (OEH 2016b)
- *Draft Plan to Save NSW Energy and Money* (OEH 2016c).

To demonstrate that the project was assessed against these guidelines, the EIS presented a base case 'Do minimum' scenario (without the project) and projected savings for operation. This provides an opportunity for the project to assess the effectiveness of the initiatives implemented to reduce energy consumption outlined in the Energy Efficiency and Greenhouse Gas Emissions Strategy and the environmental management measures included in **Chapter E1** (Environmental management measures)). This would also demonstrate the project's performance in meeting the government efficiency targets.

The assessment of greenhouse gas emissions across construction and operation is also an important aspect of the Infrastructure Sustainability rating scheme, which is referenced in the Sustainability SEARs (15.1).

In considering these requirements in the SEARs, the project has undertaken an assessment of the project's greenhouse gas emissions, including the vegetation clearance, embodied energy associated with materials and the fuel consumed by road users, which is discussed in Chapter 22 (Greenhouse gas) of the EIS.

B11.24.3 Climate change risk assessment of "low" is not supported by indicators

Part 15, p 82

The EIS assessment of environmental (and climate change risk) simply indicates that the likelihood of the project being placed at risk by the environment is "low". How this rating is achieved is unclear in the EIS particularly given that the EIS's detailed risk assessment for 2090 under a high scenario identifies 17 ranks of medium or higher in the risk level assessment column.

Response

A 'low' likelihood criterion is only used in the climate change risk assessment (Chapter 24 of the EIS) as this is guided by the nomenclature used in the *Guidelines for Risk Management* (Roads and Maritime 2014) as noted in section 24.1.2 of the EIS.

As with the environmental risks assessment discussed in **section B11.28.1**, no overall risk rating has been determined for the project.

Section 4 of the climate change risk assessment framework (refer to Appendix X (Climate change risk assessment framework) of the EIS) discusses the risk assessment for the risk scenarios and identifies that there is one extreme, four high and 12 medium risks in relation to climate change impacts associated with project operation between 2030 and 2090. Section 24.4.1 of the EIS also identifies the extreme, high and medium rated risks and notes that the extreme and high risk items would be considered further during the detailed design in order to identify and implement adaptation measures to achieve as a minimum a medium risk rating.

B11.24.4 Sea level rise

The impact of sea level rise on this has not been addressed adequately in the EIS.

Response

Flood modelling for the project (refer to section 17.4.3 of Chapter 17 (Flooding and drainage) and section 6.2.2 of Appendix Q (Technical working paper: Surface water and flooding) of the EIS) has considered the impact of future sea level rise using the *Sea Level Rise Policy Statement* planning benchmarks of 0.4 metres by 2050 and 0.9 metres by 2100 (relative to 1990 mean sea level) (NSW Government 2009).

As discussed in section 6.2.2 of Appendix Q (Technical working paper: Surface water and flooding) of the EIS, the flood model developed for the flood assessment around the Rozelle interchange was used to assess potential changes in flood behaviour under the various climate change scenarios. Peak flood levels at key locations for present day (2016, when flood modelling commenced) as well as for the assessed climate change scenarios are summarised in Table 6-3 and the text that follows of Appendix Q (Technical working paper: Surface water and flooding) of the EIS.

A summary of the potential impacts has found that:

- Potential increases in rainfall intensities by up to 10 per cent would lead to flood level increases of approximately 0.06 metres for areas that are not affected by sea level rise in the 100 year ARI event. Increases in rainfall intensities by up to 30 per cent would lead to flood level increases of up to 0.15 metres. This means that more properties could be affected by flooding or experience more frequent flooding under future climate change conditions
- At the proposed bridge over Whites Creek at The Crescent, sea level rise would lead to increases in peak flood levels of between 0.26 metres and 0.82 metres in the 100 year ARI event. This would reduce the freeboard to the underside of the bridge. This means that properties adjacent to Whites Creek, in particular along Railway Parade, could experience much more frequent flooding under future climate change conditions
- At the tunnel portals for the Western Harbour Tunnel connection, the effect of sea level rise would be less pronounced than at The Crescent. Sea level rise would lead to increases in peak flood levels of between 0.1 metres and 0.67 metres in the 100 year ARI event. This would reduce the freeboard to the portal but peak flood levels would still be more than 0.5 metres below the PMF level
- At the new culverts under City West Link, sea level rise would lead to increases in peak flood levels of between 0.1 metres and 0.66 metres in the 100 year ARI event. Peak flood levels would still be more than 0.5 metres below the PMF level which would set the minimum level for the tunnel portal
- Potential increases in sea level rise would not lead to overtopping onto The Crescent or City West Link in the 100 year ARI event
- At the tunnel portal sea level rise would lead to minor increases in peak flood levels of between 0.01 metres and 0.04 metres in the PMF. Peak PMF flood levels at the tunnel portal are therefore not very sensitive to a sea level rise of up to 0.9 metres.

Sea level rise is also discussed in Chapter 24 (Climate change risk and adaptation) of the EIS.

B11.25 Hazard and risk

Refer to Chapter 25 (Hazard and risk) of the EIS for details of hazard and risk.

B11.25.1 Management plan for hazardous and emergency situations

Part 14, p 81, Recommendations, p94

There is a need to develop management plans for hazardous and emergency situations. Regarding hazard and risk, it is a concern to Council that the EIS does not appear to consider development of plans for situations such as traffic crashes, ventilation disruptions and tunnel fires.

Response

As with the operation of all roads, there is an inherent risk of vehicle collision in the project tunnels and surface roads. The M4-M5 Link tunnels would be well equipped to effectively manage a crash or incident. The tunnels will be continuously monitored, allowing for fast response times for emergency services. In the event of an accident on the surface road network, the M4-M5 Link would offer increased resilience to the road network by offering an alternative route.

Incident Response Plans will be developed as part of the Emergency Response Plan for the project and will be implemented in the event of an accident or incident. The response to incidents within the motorway would be managed in accordance with the memorandum of understanding between Roads and Maritime and the NSW Police Service, Fire and Rescue NSW and other emergency services.

Section 25.2.4 of the EIS provides an assessment of the potential impacts during operation as a result of incidents in the tunnels. The project has been designed to provide for efficient, free-flowing traffic with physical capacity to accommodate predicted traffic volume. The design has incorporated all feasible and reasonable design measures in relation to geometry, pavement, breakdown bays, lighting and signage. The design is consistent with current Australian Standards, road design guidelines and industry best practice, inherently minimising the likelihood of incidents and crashes.

Some of the key tunnel features designed to minimise the disruption caused by incidents and crashes include:

- Height detection system prior to the tunnel entry portals
- Tunnel barrier gates to prevent access in the event of tunnel closure
- Closed-circuit television (CCTV) throughout the tunnel and approaches
- Adjustable speed signs
- Appropriately spaced breakdown bays and emergency telephones.

Each project tunnel would be one-directional, reducing the risk of crashes through head-on collisions and simplifying smoke management and egress requirements. The transport of dangerous goods and hazardous substances would be prohibited through the mainline tunnels and entry and exit ramps, reducing the risk of very large fires or the release of toxic materials in the tunnel. Protocols and measures to be implemented in the event of a fire in the tunnel during operation would be developed and included in the Emergency Response Plan.

The project has also been designed to meet appropriate fire and life safety requirements in the event of an incident or accident in the tunnel (as described in Chapter 5 (Project description) of the EIS) Consultation has been undertaken and would be ongoing with Fire and Rescue NSW and other emergency services to ensure the fire and life safety requirements are achieved.

As noted in section 2.4.3 of Appendix I (Technical working paper: Air quality), in the event of an emergency situation, the tunnel ventilation system would be designed to operate continuously and flexibly in all operational circumstances including congested and major incident (emergency) conditions.

In the event of a fire within the tunnel, approaching traffic would be prevented from entering the mainline tunnels. Vehicle occupants at the location of the fire and upstream of the fire source would be instructed to stop their vehicles, and exit in the opposite direction through the section of carriageway that would be protected by the smoke management system, or through an exit door to a cross-passage leading to the other (‘non-incident’) fire separated tunnel.

Occupants downstream of the fire source would be encouraged to continue driving out of the tunnel. If this is not possible and they are forced to evacuate on foot, egress would be provided via an exit door to a cross-passage leading to the non-incident fire separated tunnel. Emergency services would be able to reach the fire source via the non-incident tunnel (by vehicle or foot), or from the upstream direction in the affected tunnel (by foot).

Section 25.2.6 of the EIS provides an assessment of potential impacts on surface roads during operation of the project. As discussed above, the project has been developed to inherently minimise the likelihood of incidents and crashes. Surface roads and infrastructure have been designed to provide an efficient and safe road network.

The implementation of environmental management measures for the project would minimise, to the greatest extent possible, risk to public safety and achieve the desired performance outcomes in relation to the hazards identified. These environmental management measures are outlined in **Chapter E1** (Environmental management measures).

B11.25.2 Criteria used for community attitude indicators in climate change assessment

Part 14, p 82

The EIS indicates that community attitude indicators for a Low Consequence rating is “complaints”. The community attitude indicators for high levels of risk are: medium rating – daily complaints; high rating – community protests; and extreme rating – severe community protests. Based on Council’s experience of the very high number of complaints and protests, it is clear that the community indicator for WestConnex should be regarded as substantially higher than merely “complaints”.

Response

Reference to community attitude is provided in Table 1-2 of Appendix X (Climate change risk assessment framework) of the EIS. The criteria used for the climate change risk assessment are from the *Guidelines for Risk Management* (Roads and Maritime 2014). As discussed in **section B11.28.1**, the nomenclature for the criteria in the guidelines used for the climate change risk assessment are not the same as the ones used for the risk assessment for other disciplines.

The intent of these tables are to guide the determination of the consequence rating for each of the risks identified in the climate change risk assessment. For example, a single impact which results in less than one complaint each day would have a low consequence if only the community attitude criterion was being used.

B11.26 Cumulative impacts

Refer to Chapter 26 (Cumulative impacts) and Appendix C (Cumulative Impact Assessment Methodology) of the EIS for details of the cumulative impact assessment.

B11.26.1 Need for an assessment of the background environmental factors

Part 4, p34, Recommendations, p88

There is a need for an assessment of background environmental factors that contribute to cumulative impacts.

There are a number of background environmental factors that have added to cumulative impacts – such as noise and air pollution from general vehicular traffic and aircraft. For residents living along heavily-trafficked Wattle Street and Dobroyd Parade at Haberfield, WestConnex [has] added to air and noise impacts that these residents already have endured for years. Similarly, for St Peters residents, WestConnex has added to the noise and air quality impacts they have endured for years from Sydney Airport flight paths.

Response

It is acknowledged that for some residents within the Inner West LGA the proposed works areas may have existing background noise from major roads and/or aircraft.

Background noise monitoring for the project was undertaken between July and November 2016. The location of the noise loggers deployed for the noise monitoring survey are outlined in Table 3-2 of Appendix J (Technical working paper: Noise and vibration) of the EIS. These were supplemented with data collected on behalf of the M4 East and New M5 projects. These measurements are considered to be representative of the existing background noise within the study area and, where relevant, would take into account existing background traffic and aircraft noise.

While aircraft noise is recognised as a feature of the existing local ambient noise environment, the assessment of impacts from aircrafts flyovers is not required to be assessed, as this project is a road infrastructure project only. Where aircraft flyover occurs simultaneously with construction, the lower of the two noise levels would generally be masked by the other. If noise levels from aircraft are 10 decibels higher than construction activities, then construction noise would be close to inaudible, though the duration of this masking would be limited to brief and intermittent flyover events.

Regarding air quality, several monitoring stations in the study area were used to determine appropriate background levels for the air quality dispersion modelling (refer to **section C9.1.3**). The locations of air quality monitoring stations used in the modelling provided representative roadside or background data suitable for the project area, including particulate matter.

The impact of air quality and noise impacts in relation to human health is discussed in section 11.5 of the EIS. Where these factors affect the technical disciplines, such as noise and air quality, an assessment of the existing environment for these aspects has been assessed in the respective technical working papers and chapters of the EIS.

This information on the existing environment, typically collected through monitoring and observation programs and historical records, is used to inform the impacts which are expected during construction and operation, as described in the assessment methodology section of each chapter and technical working paper. For example, section 3 of Appendix J (Technical working paper: Noise and vibration) of the EIS) describes the background noise levels for each of the noise monitoring locations, which includes the contributions from general vehicular traffic and, where relevant, aircraft flying over the monitoring location. The same approach is used for air quality, which takes into account meteorological data and air quality data from long term monitoring stations operated by the OEH and Roads and Maritime as identified in section 6.8.2 of Appendix I (Technical working paper: Air quality) of the EIS.

Further discussion of the longer duration construction impacts at Haberfield/Ashfield and St Peters is presented in **section B11.11.3**.

B11.26.2 Cumulative impacts from other construction activities

Part 4, p39, Recommendations, p91

Need to consider cumulative impacts from other construction activities in areas around WestConnex construction sites.

Stage 3 cumulative impacts could be expected from the combination of WestConnex with construction of development within the Bays Precinct, Balmain Power Station site, industrial developments/activity along James Craig Drive and possibly the Western Harbour Tunnel. This is in addition to a multitude of smaller commercial and residential redevelopments underway across the Inner West.

Part 4, p45, Recommendations, p89

There is a need to assess the cumulative impacts of the four construction sites proposed for the Rozelle/Lilyfield/Annandale area.

The EIS proposes four construction sites in the Rozelle/Lilyfield/Annandale area. These are the Rozelle civil & tunnel site, The Crescent Civil site, the Victoria Road civil site and the Iron Cove Link civil site. These sites are required to support construction of the Rozelle Interchange and Iron Cove Link. Not only is Council concerned about impacts from each of these sites, but also the cumulative impacts given all four sites are within close proximity to each other and area surrounded by densely-developed residential areas, schools and other sensitive uses.

Response

Appendix C (Cumulative impact assessment methodology) of the EIS provides a description of how projects were identified for consideration in the cumulative impact assessment. There are currently no NSW or Australian Government guidelines on undertaking cumulative impact assessments and therefore the approach and methodology for the cumulative impact assessment in the EIS was based on the requirements set out in the SEARs for the project.

Only projects considered to be of 'material' scale in the vicinity of the M4-M5 Link were included on the list of projects to be screened for inclusion in the cumulative impact assessment. The materiality threshold is defined as projects listed on the DP&E Major Projects website as State significant development, State significant infrastructure and known project proposals of relevant scale or resultant impact that involve activities that could result in a cumulative impact with the project, including proposed projects that directly interface with the project.

Following the identification of potentially relevant projects, the following criteria were applied to determine whether each project or strategic development should be included in the cumulative impact assessment:

- **Spatial relevance:** A project was considered to be spatially relevant where that project overlapped or was adjacent or proximal to the M4-M5 Link project footprint
  - A project was considered to be adjacent to the M4-M5 Link project where it was within 500 metres of the M4-M5 Link project footprint
  - A project was considered to be proximal to the M4-M5 Link project where it was within two kilometres of construction sites or within 10 kilometres of the M4-M5 Link project footprint
- **Temporal relevance:** A project was considered to be temporally relevant where the expected timing of the construction or operation of a project would be concurrent (ie overlap) with the timing of the construction or operation of the M4-M5 Link project
- **Publicly available information:** Projects under consideration must have publicly-available information (at the time of preparing this EIS), with an adequate level of detail. If a potential future project was known, but there was insufficient public data available to allow a qualitative assessment of the potential cumulative impacts, it was not able to be included in the cumulative impact assessment.

Based on the screening process described above and in section 1.1 of Appendix C (Cumulative impact assessment methodology) of the EIS, Table 1-2 and Table 1-3 in Appendix C lists the projects which were considered but not assessed in the cumulative impact assessment and the projects which were included in the cumulative impact assessment, respectively.

Planning is underway by Roads and Maritime for the proposed future Western Harbour Tunnel and Beaches Link program of works. The Western Harbour Tunnel project is proposed to link directly with the M4-M5 Link at the Rozelle interchange and the M4-M5 Link mainline tunnels. The Western Harbour Tunnel and Beaches Link projects have been included in multiple NSW Government planning and policy documents, including:

- *State Infrastructure Strategy 2012–2032* (Infrastructure NSW 2012)
- *A Plan for Growing Sydney* (NSW Government 2014)
- *Draft Towards our Greater Sydney 2056* (Greater Sydney Commission 2016).

The Western Harbour Tunnel and Beaches Link program of works consists of two components: the Western Harbour Tunnel and Warringah Freeway Upgrade project and the Beaches Link and the Gore Hill Freeway Connection project. Scoping reports for these two projects have been submitted to DP&E with SEARs issued to the proponent on 15 December 2017. EISs for each project are being prepared. The Western Harbour Tunnel and Beaches Link and the other proposed future projects discussed in Chapter 26 (Cumulative impacts) of the EIS would be required to prepare a cumulative impact assessment as part of their individual EISs and in accordance with relevant SEARs.

For the projects raised by the Inner West Council in its submission:

- The Bays Precinct, including the White Bay Power Station, was included in the cumulative impact assessment in the EIS

- The Balmain Power Station has been demolished and an apartment development has been built. No further plans for redevelopment are available publicly. It has not, therefore, been included in the cumulative impact assessment
- Industrial developments around Port Authority of NSW land in the Glebe Island/White Bay area were not included in the cumulative impact assessment, as full details of the proposal are not yet available. However, following consultation with the Port Authority of NSW regarding the use of land for the proposed White Bay civil site during construction of the project, the cumulative impacts of construction traffic from this site using ports roads, including James Craig Road and Sommerville Road, has been assessed and is discussed in **section B8.1.1** and **Part D** (Preferred infrastructure report)
- The proposed future Western Harbour Tunnel and Beaches Link projects are included in the cumulative assessment for the project.

As described in section 26.3.1 of the EIS, indicative programs for construction of the various M4-M5 Link project components and construction ancillary facilities are outlined in Chapter 6 (Construction work) of the EIS. Cumulative impacts from independent construction ancillary facilities operating concurrently have been considered by the various technical specialists and incorporated into the technical working papers of this EIS, with the outcomes presented in the technical assessment chapters of the EIS (Chapter 8 to Chapter 27). Final construction scheduling would be subject to the appointment of the successful design and construction contractor(s).

B11.27 Sustainability

Refer to Chapter 27 (Sustainability) of the EIS for details of sustainability.

B11.27.1 Development of road projects is unsustainable

Part 15, p 83

By promoting car use and urban sprawl, the project is inherently unsustainable.

Construction of an urban motorway project with an induced traffic demand of 45,000 additional car trips per day is considered counter to accepted best practice in the creation of liveable, sustainable cities.

Response

According to the Bureau of Transport Statistics' September 2014 Release Employment Forecasts (Bureau of Transport Statistics 2014), 60 per cent of jobs are outside of Sydney's major centres. Given the diffuse nature of employment and the diverse purposes of many trips, public transport is not able to provide a convenient alternative for a large proportion of travellers.

Around 70 per cent of commuters across metropolitan Sydney travel by car, while commuters only make up around 20 per cent of all trips across an average working day (Bureau of Transport Statistics 2014). The road network services a diverse array of transport purposes beyond transporting people to and from their place of employment, including:

- Commercial and freight users – large articulated trucks travel more than 25 billion tonne kilometres across the State per year, and rigid trucks around 10 billion kilometres per annum across the State (Transport for NSW 2013)
- Light commercial vehicles – smaller commercial vehicles like vans, which make four times as many trips as larger trucks, make over 1.1 million trips in an average weekday (Transport for NSW 2013).

In assessing the need for new road infrastructure, the 2012 *State Infrastructure Strategy* found that public transport was the best option for journeys to dense employment centres (such as the Sydney CBD and Parramatta), where public transport is already the preferred choice for many employees. However, the dispersed nature of the majority of Sydney's journeys means that the flexibility provided by the private car makes it the dominant choice. This demand pattern is the consequence of established land use patterns in Sydney and there is no indication in the available data that the patterns of demand would change in the future.

The infrastructure strategy found that private road transport is – and would remain – the only viable option for most journeys in Sydney most of the time, even with the targeted growth in public transport and rail freight sought by the Government, and the expected increase in the population density of the city. With this in mind, the Government is making substantial investment in strategically important roads and public transport.

The project would support the economic development of Sydney by providing a high quality and efficient road connection for business and freight vehicles between the global economic corridor including Port Botany and Sydney Airport to Global Sydney. This connectivity is identified in the priority actions to achieve the goals set in *A Plan for Growing Sydney*.

The project would contribute to liveable communities by contributing to reducing traffic on the existing road network and improving connectivity across Sydney (refer to Chapter 8 (Traffic and transport) of the EIS). The project would provide and facilitate improvements in pedestrian and cyclist connections, creating new active transport linkages and linking existing active transport networks with new connections. The project would also improve the amenity of streetscapes, providing a net increase in publicly accessible open space and creating opportunities for future urban renewal. Additional detail is provided in Chapter 8 (Traffic and transport), Chapter 12 (Land use and property), Chapter 13 (Urban design and visual amenity) and Appendix N (Technical working paper: Active transport strategy) of the EIS.

An assessment of the sustainability of the project was undertaken in Chapter 27 (Sustainability) of the EIS. The sustainability of the project was assessed against four principles of ecologically sustainable development:

- The precautionary principle
- Inter-generational equity
- Conservation of biological diversity and ecological integrity
- Improved valuation and pricing and incentive mechanisms.

The assessment reviewed the sustainability of the project and concluded that the project is consistent with the principles of ecologically sustainable development. In order to ensure that the principles of ecologically sustainable development are incorporated into the project, a Sustainability Management Plan will be prepared and include measures such as governance structures, processes and systems that ensure integration of all sustainability considerations (vision, commitments, principles, objectives and targets), initiatives, monitoring and reporting during the detailed design and construction phases of the project.

The overarching sustainability objectives for the project would be met through the implementation of a Sustainability Management Plan and project specific sustainability initiatives. As identified in section 27.3 (Infrastructure Sustainability Rating Scheme) of the EIS, the project is seeking Infrastructure Sustainability ‘Design’ and ‘As-Built’ ratings of ‘Excellent’.

In addition to the seeking of an Infrastructure Sustainability rating, the environmental management measure OGHG9 (see **Chapter E1** (Environmental management measures)), commits to at least six per cent of operational energy (electricity) required for the project to be sourced from an accredited GreenPower energy supplier and/or through renewable energy generated onsite. Opportunities for operational energy offset, in accordance with the Australian Government National Carbon Offset Standard, will be considered during detailed design. As required by environmental management measure GHG6, at least 20 per cent of construction energy (electricity) required for the project will be sourced from renewable energy generated onsite and/or an accredited GreenPower energy supplier, where possible. At least six per cent of construction energy (electricity) use will be offset, with any offset undertaken in accordance with the Australian Government National Carbon Offset Standard. Other measures outlined in Chapter 27 (Sustainability) of the EIS and the updated environmental management measures in **Chapter E1** (Environmental management measures), are proposed to optimise energy efficiency for the project, including operation of motorway infrastructure (see environmental management measures OGHG6 through to OGHG9).

B11.28 Environmental risk analysis

Refer to Chapter 28 (Environmental risk analysis) of the EIS for details of the environmental risk assessment.

B11.28.1 Indicators within EIS contradict risk rating of low

Part 14, p 82

Council is concerned that the EIS has defined the project as low risk, and yet indications within the EIS show key indicators that contradict this.

Response

The risk rating assigned for issues identified in Chapter 28 (Environmental risk analysis) of the EIS is based on a risk assessment process that is aligned with ISO31000 Risk Management, whereby the likelihood and consequence of an impact is assessed and this determines the risk rating (refer to section 28.1.1 of the EIS). Low risk issues are those which are either unlikely or likely however would have a minor consequence, for example, where there are minor effects on the built or natural environment or the community. A low risk may also be due to an unlikely event which has a moderate consequence.

For each of the identified issues, a level of assessment was undertaken commensurate with the potential degree of impact the project may have on that issue. This included an assessment of whether the identified impacts could be avoided or minimised (for example, through design amendments). Where impacts could not be avoided, environmental management measures (as included in **Chapter E1** (Environmental management measures) are proposed to manage impacts to acceptable levels. The final residual risk is identified after considering the likelihood, consequence and the proposed management and mitigation measures.

A cumulative assessment of the environmental risk from the whole project based on the outcomes from the assessment of each of the issues has not been performed. However, the intent of the environmental management measures which are proposed as part of an environmental impact assessment is to reduce the impact and hence lower the risk rating for each of the key environmental issues. Therefore, it is not improbable that the majority of the risks would have low or medium residual ratings.

The EIS for the M4-M5 Link was prepared using a conservative approach, which included assessing the worst case impacts and scenarios across study areas directly or indirectly affected by construction and operation of the project, as relevant to the methodology of each assessment. The assessment was undertaken using the best available technical information and good practice environmental standards, goals and measures to minimise environmental risks. The environmental risk analysis:

- Identified environmental issues, including key issues in the SEARs, and any other issues
- Examined potential impacts and proposed management and mitigation measures in relation to the identified issues
- Identified the impacts likely to remain after management and mitigation measures are applied (ie the residual impacts).

Mitigation measures for risks identified during the environmental risk analysis will be confirmed during detailed design and construction planning and would employ best practice environmental management measures in accordance with industry standards and the conditions of approval. See **Chapter E1** (Environmental management measures) for a summary of the environmental management measures proposed.

The outcome of the environmental risk assessment process is discussed in section 28.4 of the EIS. As identified in Table 28-6, there are 16 key impacts which remain at medium risk, which will be further reviewed during detailed design to ensure the risks can be suitably managed. Climate change risks were approached differently to the assessment of risk ratings for other disciplines. Climate change risks are assessed in accordance with the SEARs, which require that ‘relevant guidelines’ related to climate change risk assessment are used. These have a different set of criteria for consequence and likelihood as discussed in **section B11.24.3**.

B11.29 Environmental management measures

No issues raised in Inner West Council's submission to the M4-M5 Link EIS were categorised under 'environmental management measures'. Issued raised in the Beca report regarding environmental management measures are responded to in **Chapter B12** (Beca report).

Roads and Maritime has reviewed the environmental management measures proposed for the project with consideration of Inner West Council's recommendations and made amendments as appropriate.

B11.30 Recommendations

B11.30.1 Recommendations made by Inner West Council

Summary, p5

The recommendations from the assessment of local issues are designed to ensure that, should Stage 3 proceed in some form, appropriate conditions of approval and best-practice management practices would be implemented to protect the Inner West community against the multitude of negative local impacts. It would also ensure that all opportunities for positive outcomes are seized wherever they arise.

Throughout the submission, summarised in Recommendations section commencing on p83.

The Inner West Council made a number of recommendations to the NSW Premier, relevant Ministers and the DP&E in its submission.

Response

The recommendations by Inner West Council are noted and have been considered the response to submission as relevant. Roads and Maritime has reviewed the environmental management measures with consideration of Inner West Council's recommendations and made amendments as appropriate.

Conditions of approval are a matter for DP&E to consider during its assessment of the project. Recommendations for the NSW Premier and Ministers are beyond the scope of the EIS.

B11.31 Out of scope

B11.31.1 Impacts associated with Stages 1 and 2 if Stage 3 does not proceed

Summary, p2

There is no consideration in the EIS of measures to minimise traffic impacts associated with the opening of Stages 1 and 2 should Stage 3 not proceed.

Summary, p5

Further, should Stage 3 not proceed, conditions of approval and environmental licenses for Stage 1 and 2 should be reviewed to ensure that world's best practice is adhered to, flaws in the existing conditions (and licenses) are rectified and that any long term impacts (particularly those associated with operational traffic) resulting from the absence of Stage 3 should be addressed and rectified prior to the opening of Stages 1 and 2.

Response

Consideration of impacts associated with the M4 East and New M5 projects, should the M4-M5 Link not proceed, is beyond the scope of the EIS for the M4-M5 Link project as these impacts were considered and assessed in the EISs prepared for the M4 East and New M5 projects. The EISs for the M4 East and New M5 projects were assessed on their own merits and the conditions of approval and any environmental licences issued to these projects are beyond the scope of the M4-M5 Link EIS.

B12 Inner West Council - Beca report

The Inner West Council commissioned Beca to carry out an assessment of the M4-M5 Link EIS on their behalf. This submission is referred to as the Beca report. Responses to the issues raised by Beca on behalf of the Inner West Council are provided in this Chapter.

Where the Beca report (prepared on behalf of Inner West Council) has included a comment which summarises the content of the EIS and does not identify an issue (and therefore no response is required), this has not been included in this chapter.

Pages three to nine of the Beca report contain a summary of the Inner West Council's submission on the WestConnex M4-M5 Link Concept Design (May 2017). Feedback received from stakeholders including the Inner West Council on the M4-M5 Link concept design report was consolidated and responses presented in the Community feedback report, which is available on the project's website[1].

A number of the Inner West Council's issues raised on the M4-M5 Link concept design report were also raised in the Beca report or in the Inner West Council's submission. These have been responded to in this chapter, or in the response to the Inner West Council's submission in **Chapter B11** (Inner West Council).

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[1] https://www.westconnex.com.au/sites/default/files/JB000216%20M4-M5%20Link%20community%20feedback%20report_FA_DIGITAL_0_0.PDF

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B12.1 General

B12.1.1 Approach to submission

Attachment 1 (Beca report) Section 1.1, p10

IWC understands, as stated, that together with the other components of the WestConnex program of works and the proposed future Sydney Gateway, the project would facilitate improved connections between western Sydney, Sydney Airport and Port Botany and south and south-western Sydney, as well as better connectivity between the important economic centres along Sydney's Global Economic Corridor and local communities. IWC's position is that there are better and cheaper solutions to achieve these. The comments provided in this submission by IWC on the different EIS Chapters are from the third-tier position: Council's third-tier position on WestConnex Stage 3 are about detailed local issues that would need to be addressed in the finalisation of the EIS and resolved or appropriately conditioned/managed if the project was to proceed to detail design and implementation.

[Text from section 1.1 (page 1-2 to 1-3) of the EIS included in the submission has been omitted] This [the Beca report] review focuses on strategic issues, issues raised from the assessment of the Secretary's Environmental Assessment Requirements (SEARs) on the WestConnex M4-M5 Link State Significant Infrastructure Application Report (SSIAR) dated January 2016. It is important to emphasize Council's view that there have been issues with the consultation process – most notably insufficient details within the Concept Design Plan (CDP) to allow for a thorough assessment of issues; no response to the issues raised by IWC on the CDP; insufficient time to interrogate and respond to the details in the EIS. Council seeks an improved consultation process, with sufficient detail in the forthcoming approval processes when RMS will prepare a submissions report and Preferred Infrastructure Report.

Response

A range of alternatives to the M4-M5 Link were considered to identify the extent to which they could meet the project objectives (refer to section 3.3 of the environmental impact statement (EIS) for the project objectives) and how well they performed with reference to other transport, environmental, social and economic factors. Improvements to the existing arterial road network as an alternative to the project is described in section 4.4.1 of the EIS. Specific concerns on the assessment of alternatives raised in Attachment 1 (Beca report) to the Inner West Council's submission are addressed in **section B12.4**.

An overview of consultation which has occurred to date and future consultation which is proposed is presented in **section A2**.

Details relating to the timing of the public release of the M4-M5 Link concept design are provided in **section B11.2.2**. This consultation period sought to provide the community and other stakeholders with information about the M4-M5 Link project before the release of the EIS, as well as the opportunity for the community to provide feedback and engage directly in the process of understanding design considerations.

Consultation during development and assessment of the project is discussed in **section B12.7.2**. This section includes an overview of Inner West Council's concerns regarding consultation during the preparation of the concept design report and EIS.

Under the *Environmental Planning and Assessment Act 1979* (NSW) (EP&A Act), the statutory duration for the public exhibition period for EISs is a minimum of 30 (calendar) days. The Secretary of the NSW Department of Planning and Environment (DP&E) is responsible for determining the timing and duration of public exhibition periods for EISs. For the project, the Secretary of DP&E determined to extend the public exhibition period from the statutory minimum of 30 (calendar) days to a total of 60 (calendar) days (18 August to 16 October 2017). This was due to school holidays and the length and complexity of the EIS documentation. Multiple community information sessions and stakeholder meetings were held during the EIS exhibition period. Further discussion of the duration of the exhibition period is presented in **section B11.2.3**.

B12.1.2 Sizing of maps included in the EIS

Attachment 1 (Beca report) Section 1.7, p11

Maps in the EIS are provided for small sections. IWC request SMC to provide a continuous map of the M4-M5 Link layout indicating lane configuration and portals for better appreciation. Direction of flow is a small change but will be useful.

Attachment 1 (Beca report) Section 5.1.2, p28

As also mentioned in Section 1.12 [page 1.12 of the EIS], maps or figures provided in the EIS are small and difficult to appreciate the complete scale of the project. IWC request SMC to provide a continuous map of the M4-M5 Link layout with larger scale indicating lane configuration and portals for better appreciation.

Response

Figures 5-2 to 5-9 in Chapter 5 (Project description) of the EIS provide an overview of all aspects of the project, including lane configurations and portal locations. Figures 5-11, 5-12 and Figures 5-14 to 5-16 of the EIS provide indicative cross sections of the tunnels which demonstrate lane configurations whilst Figure 5-17 to Figure 5-22 of the EIS provide cross sections of the portals. Chapter 5 (Project description) of the EIS also contains more detailed maps of the Wattle Street interchange, Rozelle interchange, Iron Cove Link and St Peters interchange.

Geological long sections were also provided in Appendix E (Geological long-sections) of the EIS. High resolution versions of the EIS were also available on the NSW Major Projects website[2] which would enable readers to enlarge figures to review details which may have been difficult to view at smaller sizes.

The mainline tunnel would consist of twin tunnel tubes that would enable traffic flow in both directions.

B12.1.3 Timing of the public release of the concept design

Attachment 1 (Beca report) Section 1 Overall Evaluation, p11

The response on the M4-M5 Link Concept Design Plan (CDP) provided by IWC on 04/08/2017 could not have been taken fully into account in the EIS, as the EIS was released only 9 working days after the 04/08/2017 submission deadline for the CDP. Sydney Motorway Corporation (SMC) should assess IWC's response on the CDP and the EIS together. IWC's response to the CDP states "Although this submission [CDP] deals primarily with 'content' issues, the Concept Design Plan exhibition has also raised 'process' issues for Council and the community. The most important of these are the document's lack of detail and the possibility there will not be sufficient time between the close of exhibition of the Concept Design Plan and commencement of exhibition of the Environmental Impact Statement (EIS) to allow issues raised by the former document to influence the latter." It is important to emphasize Council's view that there have been issues with the consultation process – most notably insufficient details within the Concept Design Plan (CDP) to allow for a thorough assessment of issues; no response to the issues raised by IWC on the CDP; insufficient time to interrogate and respond to the details in the EIS. Council seeks an improved consultation process, with sufficient detail in the forthcoming approval processes when RMS will prepare a submissions report and PIR. Council request full participation in the assessment and approval of documents listed in this EIS that still need to be prepared in the final design. This includes Management Plans for areas described under the different chapters in this EIS.

Attachment 1 (Beca report) Section 4, p20

Section 4.0 notes that the project described and assessed in this EIS is based on a concept design that is subject to further refinement during detailed detail design and construction planning[.] To this end, IWC requests SMC again to fully assess and take action on the response provided on the Concept Design on 4 August 2017. A summary of the response issues is also provided in the first pages of this report [Attachment 1 (Beca report)].

[2] Chapter 5 (Project description) is found in https://majorprojects.accelo.com/public/c12dc60a1801fc21646f67294e802024/01.%20M4-M5%20EIS_Vol%201A%20_Chapters%201-8.pdf

Attachment 1 (Beca report) Section 6, p32

Construction activities for the proposed M4-M5 Link works have been emphasised in IWC's submission on the Concept Design Plan submitted on 4/08/2017. These concerns are repeated as Issues 1, 2, 3, 4, 5, and 7, at the start of this report [Attachment 1]. IWC's are high-lighting these again in response to the EIS and expects SMC to give close attention to the issues raised and provide IWC formal feedback.

Response

Details relating to the timing of the public release of the M4-M5 Link concept design and the manner in which comments received on the concept design report were incorporated into the EIS are provided in **section B11.2.2**. The consultation period associated with the concept design sought to provide the community and other stakeholders with information about the M4-M5 Link project before the release of the EIS, as well as the opportunity for the community to provide feedback and engage directly in the process of understanding design considerations. A summary of the consultation which occurred prior to the release of the EIS is presented in Table 7-3 of the EIS.

Feedback received from stakeholders including the Inner West Council and the community on the M4-M5 Link concept design report was consolidated and responses presented in the Community feedback report, which is available on the project's website[3]. The timing of the release of the concept design Community feedback report did not prevent the community's feedback from being genuinely considered with comments documented in the report and received during the concept design consultation period considered on a broad scale in the EIS.

B12.2 Assessment process

Refer to Chapter 2 (Assessment process) of the EIS for details of the assessment process.

B12.2.1 Timeline and response timeframes for issues raised on the EIS

Attachment 1 (Beca report) Section 1.4, p11

It is stated that Roads and Maritime will consider this feedback in the further development of the project and will respond to issues raised in a Submissions Report. The timeline and intended response target dates should be provided in more detail for better collaboration between SMC, RMS and stakeholders.

Response

All issues identified in submissions from agencies, councils and the community are responded to in this Submissions and preferred infrastructure report. A number of stakeholder meetings and community consultation sessions were held during the EIS exhibition period to discuss clarifications on the technical assessment findings in the EIS. A summary of when these meetings took place is provided in **section C7.1** and **Chapter A2** (Community and stakeholder). Consultation activities undertaken during the preparation of the Submissions and preferred infrastructure report is presented in **section A2.4**.

B12.2.2 Insufficient detail in the EIS for an assessment of the project

Attachment 1 (Beca report) Section 30.1.3, p168

The EIS has failed to inform stakeholders sufficiently as there are significant gaps to be addressed to be able to provide a basis for strong engagement with stakeholders to find a better solution for this project.

Attachment 1 (Beca report) Section 30.2, p168

It is clear that this EIS does not address the key issues to justify this project to proceed. Significant gaps in the EIS needs to be addressed in close consultation with IWC and others to reach a final basis of design before any work or contractual engagement on the M4-M5 Link can start.

[3] https://www.westconnex.com.au/sites/default/files/JB000216%20M4-M5%20Link%20community%20feedback%20report_FA_DIGITAL_0_0.PDF

Response

Concerns regarding the insufficient detail of the EIS are discussed in **section B11.2.1**. Inner West Council concerns regarding the consultation activities which have occurred are discussed in **section B12.7** and **section B11.7**. A discussion of the key issues identified by the Inner West Council in regards to the justification of the project is presented in **section B11.3.2**.

B12.2.3 Changes following approval of the project

Attachment 1 (Beca report) Section 6.1, p32 and Section 6 Overall Evaluation, p42

It is stated that this EIS aims to provide an assessment of probable construction methodologies, while retaining flexibility for the contractor to refine the construction methodology following their appointment. This means that the detail of the design and construction approach presented in this concept design is indicative only, and is subject to detailed design to be carried out by the design and construction contractor(s). It is further stated that changes made to the design may be subject to further assessment and consultation, if required by the EP&A Act. This is a very loose commitment to keep the stakeholders informed and a formal consultation plan is required as promised in Chapter 7.

This means that changes to design and constructability refinement from the selected contractor may change the information presented in this EIS. It is important that stakeholders are kept up to date with these changes and are allowed to assess and review these again before final construction starts. It is unclear how SMC intends to communicate and consult when the refinement and changes are known and presented in a "Submissions and Preferred Infrastructure Report", and how stakeholders will get the chance to review these.

Response

As described in section 1.1 of the EIS, the delivery mechanism adopted for the M4 East and New M5 projects is different to the approach for the M4-M5 Link. For the M4 East and New M5 projects, a design and construction contractor was appointed early (prior to the EIS being publicly exhibited) and therefore had direct input into the design development, EIS preparation and construction planning for those projects. Community and agency feedback during the M4 East and New M5 EIS submissions period indicated a preference for the usual approach of allowing the community to provide input into the scope of the project through undertaking the preparation of an EIS and the EIS public exhibition process before the detailed design of the project was undertaken and ‘locked in’. After considering the community and agency feedback on the issue, the approach of assessing a concept design has been adopted for the M4-M5 Link project. This approach presents the community and stakeholders with an opportunity to consider and provide feedback on the project before the detailed design work for construction of the project is carried out.

The Secretary’s Environmental Assessment Requirements (SEARs) required that the EIS provide a detailed description of the project and its construction in order that the impacts could be comprehensively addressed. The project is large scale critical State significant infrastructure. Chapter 5 (Project description) of the EIS describes the scope of the project for which approval is sought under Part 5.1 of the EP&A Act. The scope of the project as assessed in the EIS is, from an engineering and construction perspective, based on a concept design. As stated in the EIS, the detailed design of the project required for construction of the project will be undertaken following appointment of the design and construct contractor following determination of the Critical state significant infrastructure approval application.

The design presented by the design and construction contractor will need to satisfy all technical road design requirements and road functionality as described in the EIS, and to be consistent with the approved scope of the project, including the environmental management measures and conditions of approval for the project. This is the same process used for delivering other State significant infrastructure and development in NSW including Central Business District (CBD) and South East Light Rail and Sydney Metro City and Southwest projects.

The scope of the project presented in the EIS was assessed using a conservative approach, which included identifying the project components, the project footprint (refer to section 5.1.2 of the EIS) and assessing the worst case impacts and scenarios. The design of the project presented in the EIS, including tunnels and operational facilities, considered the best available technical information and adopted good practice environmental standards, goals and measures to minimise environmental risks. The construction methodology developed for the concept design has been based on input from constructability experts and technical specialists with appropriate expertise.

Detailed investigations, planning and surveys will be undertaken by a design and construction contractor(s) appointed following the determination of the EIS. The design and construction contractor(s) would be selected based on various criteria, included their proven ability to deliver large and complex projects, minimise environmental impacts and to provide value for money. The detailed design presented by the design and construction contractor(s) will need to satisfy all technical road design requirements and road functionality, consistent with the approved scope of the project as described in the EIS and the Submissions and preferred infrastructure report, including the environmental management measures and conditions of approval for the project. Aspects of the detailed design, including the Social Infrastructure Plan and Urban Design and Landscape Plans (UDLPs), will also be developed in consultation with the community.

As noted in section 2.6 of the EIS, where the detailed design is inconsistent with the approved project, further assessment and approval would be required under the EP&A Act. If further approval is required due to project design changes, the applicable statutory process will be followed prior to commencement of construction of the relevant aspect of the project. This may be in the form of a modification request lodged with DP&E, depending on the scale of the proposed modification and the potential for environmental or social impacts.

Future community and stakeholder consultation that would be carried out for the project, including consultation with the Inner West Council, is detailed in **section B10.7.6** and **section B11.7.2**.

B12.3 Strategic context and project need

Refer to Chapter 3 (Strategic context and project need) of the EIS for details of strategic context and project need.

B12.3.1 Proximity to urban renewal projects

Attachment 1 (Beca report) Section 3.1.1, p 15

The project traverses or is in proximity to three of the urban renewal precincts identified in the Parramatta Road Transformation Strategy – Taverners Hill, Leichhardt and Camperdown. The Camperdown precinct is directly affected by construction of the project.

Response

The *Parramatta Road Corridor Urban Transformation Strategy* and associated Implementation Plan 2016-2023, identifies WestConnex as the enabler of opportunities to transform Parramatta Road through changed traffic volumes in some areas and the provision of an alternative route for trucks and heavy vehicles. The Implementation Plan acknowledges that these changes would free up road space for better public transport and amenity improvements along Parramatta Road and would encourage walking and cycling. The Implementation Plan also notes that the staging of land use change and development in certain parts of the Parramatta Road corridor is contingent on, and may need to await, the completion of WestConnex. The Implementation Plan also notes that the staging of land use change and development in certain parts of the Parramatta Road corridor is contingent on, and may need to await, the completion of WestConnex (refer to section 3.1.11 of the EIS for a detailed discussion of the interaction between the M4-M5 Link project and the *Parramatta Road Corridor Urban Transformation Strategy*).

The Pyrmont Bridge Road tunnel site (C9) would require the acquisition of nine commercial/industrial properties within the Camperdown precinct as identified in the *Parramatta Road Corridor Urban Transformation Strategy*. Following construction, the site would be rehabilitated to generally the existing ground level or as otherwise agreed with NSW Roads and Maritime Services (Roads and Maritime). Future development would be determined by Roads and Maritime, and would be subject to separate development assessment and approval and the restrictions of the relevant consent authority as discussed in section 12.4.2 of the EIS.

The project would not rezone or consolidate remaining project land and therefore there would be no permanent changes to land use zoning for future development. Further details on the potential development and/or use of remaining project land at this location would be outlined in the Residual Land Management Plan that would be prepared for the project. When considering potential reuse opportunities for this land, Roads and Maritime would consider land use zoning and development controls and the relevant objectives of the *Parramatta Road Corridor Urban Transformation Strategy* for the Camperdown Precinct.

B12.3.2 Draft Future Transport Strategy

Attachment 1 (Beca report) Section 3.2.5, p18 and Section 8.1.1, p48

Has consultation and consideration of the *Future Transport Strategy*, undertaken by TfNSW, been considered as part of this EIS. The strategies listed within the EIS may be superseded and hence reconfirming the strategic alignment of WestConnex needed. IWC expects SMC to fully explain how TfNSW's Future Transport Strategy has been taken into account in the preparation of this EIS.

Response

The *Draft Future Transport Strategy* (NSW Government 2017) has re-iterated the need to plan and invest in the future of Sydney's motorway network as identified in the State Infrastructure Strategy Update (2014) and the State Infrastructure Strategy (2012). The *Draft Future Transport Strategy* recognises the role that the road network plays in providing vital infrastructure connections within and between travel demand corridors for private vehicles, public transport and freight. In doing so, it acknowledges that any investment in motorway infrastructure has to be aligned with supporting public transport initiatives to achieve an increase in capacity, while aiming to reduce the reliance on and demand for private vehicles on the future road network.

The importance of the project as part of the WestConnex program of works is further supported by the *Draft Greater Sydney Services and Infrastructure Plan* which notes that *'For all types of transport – public and private – roads will continue to perform an important function in transporting people and goods within Greater Sydney. Efficient, reliable and easy to understand journeys will be enabled through a clear road hierarchy that better separates different types of trips'*.

The project also complements the vision established in the *Draft Towards our Greater Sydney 2056* by providing an integrated transport solution to support population and commercial growth in western Sydney. The *Draft Future Transport Strategy* (NSW Government, 2017) was released by Transport for NSW in October 2017 and was open for feedback until 3 December 2017. The release date of the draft strategy did not allow time for it to be considered in the EIS.

B12.3.3 Sydney Gateway

Attachment 1 (Beca report) Section 3.2.3, p17

The EIS states[..] the project would enhance the benefits of the WestConnex program of works for travel between western Sydney and the Sydney CBD. For example, a person driving a car in 2017 from Penrith to the Sydney CBD [currently has the option of travelling along the M4 Motorway, which ends at Concord, and then would need to travel on the congested surface road network to the Sydney CBD]. It is expected that the benefits and an example of travelling to and from the Port should have been used to demonstrate the benefits of this project after such a huge investment of public money. The key original justification for WestConnex was the need to connect Port Botany and Sydney Airport to western Sydney – yet the current design does not achieve this. Instead it delivers traffic to St Peters some distance from these destinations, necessitating the use of surface roads for completion of the journey. Council notes the proposed Sydney Gateway is intended to provide this connection, but it is a separate project that would be delivered after WestConnex. Priorities has [have] therefore changed and the reasons for this need to be explained as described in the Overall evaluation below.

Attachment 1 (Beca report) Section 3.3, p19

The EIS states in Table 3.2, that the project supports Sydney's long-term economic growth through improved motorway access and connections linking Sydney's international gateways with western Sydney and places of business across the city. This statement in Table 3.2 is not true as the key original justification for WestConnex was the need to connect Port Botany and Sydney Airport to western Sydney – yet the current design does not achieve this. Instead it delivers traffic to St Peters some distance from these destinations, necessitating the use of surface roads for completion of the journey. Council notes the proposed Sydney Gateway is intended to provide this connection, but it is a separate project that would be delivered after WestConnex. Priorities [have] therefore changed and the reasons for this need to be explained as described in the Overall evaluation below.

Attachment 1 (Beca report) Section 3.4, p19

Dot point 4 in Section 3.4 states that one of the project benefits is to reduce travel times on key corridors, such as between the M4 Motorway corridor and the Sydney Airport/Port Botany precinct and [between the main centres on the Global Economic Corridor, including Sydney CBD, Sydney Olympic Park, Parramatta CBD and Norwest Business Park] See further comments on this on Chapters 8 and 14 respectively. Again, this is not true as this benefit will only be fully obtained as part of the Gateway project with improved access to the Port and Sydney Airport.

Attachment 1 (Beca report) Section 3.2.5, p18

The EIS states, irrespective of the timing and magnitude of these trends[,] there is still a need to provide for the growth in commercial and freight travel demand and to reduce congestion across the Sydney road network. The project would provide the road connections for the future range of vehicles, and in particular reduce through traffic on local surface roads by providing efficient alternative routes through the underground tunnel network. The project will have reduced congestion and provide road connections but not for the original [intent] and need to connect Port Botany and Sydney Airport to western Sydney, as stated above.

Attachment 1 (Beca report) Section 3 Overall Evaluation, p19 also Section 5 Overall Evaluation, p31, Section 8, Overall Evaluation, p68, Section 30.1, p167

It is stated and true that "The *NSW Transport Master Plan* recognises that WestConnex would support Sydney's long-term economic growth by supporting the growing freight task between Sydney's international gateways and greater western Sydney, facilitating the transfer of goods and services between Sydney's eastern and western economic centres by improving capacity and reducing travel times, and supporting the continued development of Sydney's global economic corridor." The real need for WestConnex, as was expressed in the initial stages of its planning, is the transfer of goods and better connections to the port and airport. The subsequent changes to WestConnex alignment and stages has put this need to the back-burner of the Plan, with Gateway project to provide these at a later stage. So, priority has shifted and the real reasons for the shift needs to be communicated in the EIS and perhaps in an updated Business Case.

Attachment 1 (Beca report) Section 4.1.1, p20

It is stated that the purpose of the [M4] East Motorway was to improve the east-west road transportation route between south-west Sydney and the Sydney CBD, Port Botany and Sydney Airport. As described in the Chapter 3 response, this purpose will not be fully addressed with this project as the purpose will only be fully realised as part of the Gateway project with improved access to the Port and Sydney Airport.

Attachment 1 (Beca report) Section 4.1.2, p20

The Marrickville Tunnel, as the first planning concept for this link, was intended to create a direct connection between the M4 East Motorway and Mascot, to provide a direct route for traffic between Port Botany, Sydney Airport and western Sydney. One option considered for this scheme was a truck only tunnel, recognising that the main function of this link would be to enhance freight access between Port Botany, Sydney Airport and north-western Sydney. Although this scheme was never progressed it surely recognised the importance of a direct link to the Port and Airport.

The EIS repeatedly states and recognises the importance of a direct link to the Port and Airport. This was the purpose and mainly so to take the freight traffic off the arterial road network. Somehow this purpose has been lost in subsequent planning culminating into the project (the subject of this EIS) that is not fulfilling the prime purpose but rather shifts this important purpose to a project planned for the future - the Gateway project. This raises the question of the real focus of the Business Case as mentioned in Chapter 3 under Overall evaluation.

Attachment 1 (Beca report) Section 4.1.4, p21

It is stated that the proposed future Sydney Gateway project would assist in addressing the high volumes of heavy vehicle traffic generated by the Sydney Airport and Port Botany precincts. This is the real need and should receive priority in the implementation of the program of WestConnex projects. See Chapter 3 under Overall evaluation [above].

Attachment 1 (Beca report) Section 4.2.4, p 21

The real need for WestConnex, as was expressed in the initial stages of its planning, is the transfer of goods and better connections to the port and airport. The subsequent changes to WestConnex alignment and stages has put this need to the back-burner of the Plan, with Gateway project to provide these at a later stage. So, priority has shifted and the real reasons for the shift needs to be communicated in the EIS and perhaps in an updated Business Case. See response in Chapter 8 on transport modelling and the need for additional sensitivity testing. This will have an impact on the business case outcomes and predictions for the traffic volumes - perhaps less for the M4 - M5 Link and more on the local roads in the areas of the proposed interchanges to and from the interchange portals.

Response

The M4-M5 Link is part of the WestConnex program of works. Its purpose is to link other key component projects to form the WestConnex motorway. The project objectives are consistent with the broader objectives of the WestConnex program of works, which have been developed to be aligned with the strategic objectives of national and NSW planning and policy documents. The project is a critical motorway link that contributes (together with the M4 East and New M5 projects) to connecting western Sydney's population and growth centres with employment and business opportunities in the Sydney CBD and the Sydney Airport and the Port Botany precinct, through a direct connection to the proposed future Sydney Gateway project at St Peters.

One of the project objectives is to enable long-term motorway network development by providing a connection to the proposed future Western Harbour Tunnel and Beaches Link program of works to the north (see section 3.3 of the EIS). Therefore, in addition to linking to other WestConnex projects, the M4-M5 Link is designed to allow for connections to the proposed future Western Harbour Tunnel and Beaches Link, Sydney Gateway (via the St Peters interchange) and F6 Extension (via the New M5) projects, should they be approved.

While these related projects have been considered in the cumulative impact assessment for the M4-M5 Link, summarised in Chapter 26 (Cumulative impacts) of the EIS, the M4-M5 Link is not dependent on any of these projects proceeding and is feasible as well as justified without them. A justification for the project is provided in Chapter 30 (Project justification and conclusion) of the EIS.

The importance of the role the M4-M5 Link plays in achieving the broader WestConnex program objectives is recognised in the EIS (refer to Table 3-2 of the EIS). This is reflected in the traffic impact assessment carried out for the project (refer to Appendix H (Technical working paper: Traffic and transport) of the EIS), which identified that additional road network augmentation would be required to achieve the full benefits of WestConnex.

The Sydney Gateway project is not part of the M4-M5 Link project. However, it has been considered as part of the cumulative impact assessment for both the 2023 and 2033 scenarios. An assessment of the travel time impacts as a result of the Sydney Gateway is expected to be included in the traffic and transport assessment for the Sydney Gateway undertaken as part of the EIS.

As noted in section 3.4.3 of the EIS, the *NSW Freight and Port Strategy* (Transport for NSW 2013) includes an action to connect and complete Sydney's motorway network including priority freight movements. It recognises the infrastructure provided through WestConnex, including the M4-M5 Link, would be a key component in expanding capacity on NSW roads that would provide benefits for freight movement, particularly around major freight activity centres such as Sydney's international gateways: Port Botany and Sydney Airport.

The NSW Government remains committed to delivering the Sydney Gateway. Roads and Maritime is currently working with key stakeholders, including Sydney Airport and port and rail authorities, to finalise the concept design for Sydney Gateway for consideration by government.

The proposed future Sydney Gateway project would be subject to its own business case and separate planning approval. Sydney Gateway is part of the WestConnex tolling regime for purposes of the M4-M5 Link traffic modelling and business case. In addition, it has been considered as part of the M4-M5 Link EIS to the extent that it relates to the broader strategic objectives of the WestConnex program of works and in relation to cumulative impacts.

B12.3.4 Identification of economic centres which benefit from the project

Attachment 1 (Beca report) Section 8.1.1, p48

It is stated that the project improves accessibility and reliability of commercial vehicle movement in the M4 and M5 corridors to economic centres, including to Sydney Airport and Port Botany economic zone. It is not clear, of the centres identified in Figure 8-1, which commercial centres and to what […] extent […]they provided with improved accessibility and reliability of total trip as a function of WestConnex. See also IWC's concern as described in Element 2 and Overall evaluation below.

Response

Strategic context

As noted in section 3.2 of the EIS, Sydney's population is forecast to increase from 4.3 to 5.9 million (an increase of around 37 per cent) by 2031 (NSW Government 2014), which equates to an average of about 80,000 additional residents per year. Moreover, by 2036, the number of trips made around Sydney each day is forecast to increase by 31 per cent from 16 to 21 million vehicle movements. This growth would place increasing pressure on the NSW transport network and the key travel demand corridors connecting regional cities and major centres across the greater Sydney metropolitan area, as shown in **Figure B12-1**.

Key corridors currently accommodate high levels of daily traffic including freight, commuter and leisure travel. Users of these corridors frequently experience congestion and delay, particularly during weekday and weekend peak periods. Both the *NSW Long Term Transport Master Plan* (Transport for NSW 2012) and the *State Infrastructure Strategy Update 2014* (*State Infrastructure Strategy*) (Infrastructure NSW 2014) identified the need to plan and invest in the future of Sydney's motorway network, which provides vital infrastructure connections within and between travel demand corridors. Any investment in motorway infrastructure has to be aligned with supporting public and active transport initiatives to achieve an increase in capacity, while aiming to reduce the reliance on and demand for private vehicles on the future road network.



Figure B12-1 Sydney travel demand corridors

Source: *NSW Long Term Transport Master Plan* (Transport for NSW 2012)

WestConnex was a key initiative recommended in the *NSW Government's State Infrastructure Strategy* (Infrastructure NSW 2012, updated in 2014), which was prepared by Infrastructure NSW to provide independent advice on the infrastructure needs of the State. WestConnex has been assessed as a program of work and a motorway network in the *Business Case* which was approved by Government in August 2013. In November 2015, the *Updated Business Case* was released, which consolidates the work undertaken in the original business case and incorporated further development in the program of works and feedback received from stakeholders.

Since the preparation of the EIS, the *Draft Future Transport Strategy 2056* (NSW Government 2017) was released for public comment in tandem with the *Draft Greater Sydney Region Plan* (Greater Sydney Commission 2017). The *Draft Future Transport Strategy 2056* is an update of the *Long Term Transport Master Plan* and sets the vision, direction and outcomes framework for commuter mobility in NSW and aims to guide transport investment over the longer term. The draft strategy identifies the WestConnex program of works, which includes the project, as a 'city-shaping' project.

Transport needs

Improved connectivity

To achieve the broad strategic objectives outlined in *A Plan for Growing Sydney* and the more detailed District Plans, Sydney's businesses and households require good access for workers and for the distribution of goods and services across the Sydney region. Improved connections for workers, suppliers, trades and customers through improvements to the transport network, including the strategic road network, are needed to support the growth of these centres and the 'global economic corridor'.

The WestConnex program of works is part of an integrated transport solution to the increasing pressure on Sydney's road network. The WestConnex program of works, including the project, would facilitate improved connections between western Sydney and Sydney Airport and Port Botany (via the St Peters interchange and the proposed future Sydney Gateway), as well as better connectivity between key employment hubs and local communities. The project would help deliver the transport connectivity required to meet future urban growth expectations as part of the transformation of Greater Sydney. The Australian Government is contributing around $3.5 billion to the development of the M4-M5 Link, which was identified as a 'high priority initiative' in the 2016 *Australian Infrastructure Plan: The Infrastructure Priority List.*

Congestion relief

The road network in the traffic and transport study area currently functions under high levels of traffic demand, which often exceeds the operational capacity, especially citybound during the AM peak period. Major routes in the traffic and transport study area, such as Parramatta Road, City West Link, Victoria Road, Anzac Bridge/Western Distributor, Southern Cross Drive, the Princes Highway and King Street, all experience significant congestion with resultant increase in travel time and variability, which can cause typical morning and evening peak hours to spread over longer periods, and extend the peak period.

The following four main travel demand corridors fall within the study area and would be served by the project:

- Parramatta to the Sydney CBD via Strathfield
- Parramatta to the Sydney CBD via Ryde
- Sydney Airport to the Sydney CBD
- Liverpool to Sydney Airport.

As demonstrated in section 3.1 of Appendix H (Technical working paper: Traffic and transport) of the EIS, volume to capacity ratios for car, bus and rail demand is forecast to increase by 2031. This illustrates the growth in demand on the key transport corridors that the project proposes to address.

The overall forecast growth in traffic demand is consistent with the forecast growth in population in the Sydney metropolitan area. Importantly, this growth in traffic is not confined to major routes – increased traffic on many roads in Sydney is forecast without the project in the 2023 and 2033 peak periods, as vehicles seek to avoid the congested arterial road network by travelling along lower order roads.

Without WestConnex, by 2031 travel speeds and congestion would significantly worsen on the road network serving western and southwestern Sydney (including the M4 Motorway, Parramatta Road, City West Link and the M5 Motorway corridor) and connections to Sydney Airport and Port Botany (eg the M1 corridor also known as Southern Cross Drive/Eastern Distributor). Congestion would also be a major issue on the key north–south links that connect the M4 and M5 motorway corridors (eg the A3 corridor also known as Centenary Drive/Roberts Road/King Georges Road), even with planned future public transport enhancements (Sydney Motorway Corporation (SMC) 2015).

A number of key benefits and improvements to the surface road network are forecast as a result of the project, including:

- Non-motorway roads in the Inner West local government area (LGA) are forecast to experience faster trips with the daily average speed increasing by about 10 per cent. Similarly, the vehicle distance travelled on non-motorway roads is forecast to reduce by about 12 per cent. This indicates that on average, these trips are fewer in number and faster
- Reduced traffic is forecast on sections of major arterial roads including City West Link, Parramatta Road, Victoria Road, King Street, King Georges Road and Sydenham Road
- Around 2,000 heavy vehicles are forecast to be removed from Parramatta Road, east of the M4 East Parramatta Road ramps, each weekday.

In addition, as a result of the additional road network capacity provided by the project, the two-way future year AWT traffic demand compared to a 'Without project' scenario is predicted to significantly decrease on:

- City West Link and Parramatta Road, east of the M4 East Wattle Street and Parramatta Road ramps respectively, by about 25 per cent in the 2023 and 2033 'With project' and 'Cumulative' scenarios
- King Street in St Peters by about 20 per cent in the 2023 and 2033 'With project' scenarios
- Stanmore Road in Stanmore by about 15 per cent in the 2023 and 2033 'With project' and 'Cumulative' scenarios
- Lyons Road in Russell Lea by about 15 per cent in the 2023 and 2033 'With project' scenarios, and about 20 per cent in the 2023 and 2033 'Cumulative' scenarios
- Southern Cross Drive and the Sydney Harbour Tunnel by about 20 per cent and 25 per cent respectively in the 2023 and 2033 'Cumulative' scenarios (refer to Chapter 9 of Appendix H (Technical working paper: Traffic and transport) of the EIS).

The M4-M5 Link would provide alternative parallel options to the roads listed above in the 'With project' scenario and with the proposed future Western Harbour Tunnel and Sydney Gateway (and Beaches Link and F6 Extension in 2033) in the 'Cumulative' scenarios. The screenline analysis, presented in Chapter 9 of the Appendix H (Technical working paper: Traffic and transport) of the EIS, found no major shifts in daily traffic onto parallel routes as a result of the project.

Key customers

An objective of the WestConnex program of works is to cater for the diverse travel demands along the key corridors identified in the *WestConnex Updated Strategic Business Case*. As identified in Table 3-2 of the EIS, the key customers who would benefit from the project include:

- Highly dispersed and long distance passengers
- Heavy and light freight and commercial services
- Businesses whose travel patterns are highly dispersed and diverse.

Whilst it is acknowledged that private vehicles, including single occupancy commuter vehicles, will use the motorway, the key customer markets identified for the project include highly dispersed and long distance passenger movements, as well as heavy and light freight and commercial services and businesses whose travel patterns are also highly dispersed and diverse in nature. These customers have highly varied requirements when it comes to the transfer of goods and services. These requirements include the transport of containerised freight by rigid and articulated trucks, light trucks, vans, utility vehicles and cars. Public transport would only partially address these customer demands. No feasible strategic transport alternatives such as heavy or light rail options or bus corridor enhancements would meet the diverse range of customer needs for travel in this corridor and address the project objectives as effectively as the project and the broader WestConnex program of works.

The transport demands of these customers, as well as short distance local passengers who use arterial roads in the project area are best served by an efficient motorway connection and an improved network of roads. The project would meet this WestConnex objective by relieving congestion on sections of the surface road network within and in proximity to the project footprint as well as facilitating efficient passenger and freight movements through the provision of new motorway capacity.

The reduction in traffic demand on parts of major parallel traffic routes such as the A3 corridor (Centenary Drive/King Georges Road), Sydenham Road, Parramatta Road and King Street at St Peters is likely to improve speed, journey reliability and safety on these corridors compared to a 'Without project' scenario. The project would also provide additional route options along the corridor and therefore increase network resilience in the event of accidents or network disturbances (refer to Chapter 9 of Appendix H (Technical working paper: Traffic and Transport) of the EIS).

B12.4 Project development and alternatives

Refer to Chapter 4 (Project development and alternatives) of the EIS for details of project development and alternatives.

B12.4.1 Assessment of existing arterial road network

Attachment 1 (Beca report) Section 4.4.1, p22

It is stated that there are currently no existing arterial roads that would directly link the M4 East Motorway at Haberfield with the New M5 Motorway at St Peters, both of which are currently under construction. In the absence of the project, motorists using these motorway tunnels wishing to travel north or south would be required to travel along local and sub-arterial roads or traverse the Sydney CBD to access existing key north-south corridors such as the M1 Motorway. This is true and in planning for the outer and inner ring-roads for Sydney it is important to find the best solution of linking the M4 and M5, now that these projects are under construction. Better use of the existing road network is possible as suggested in Attachment 1 to this worksheet [Attachment 1 to the Inner West Council's submission Attachment 1].

Response

There are currently no existing arterial roads that would directly link the M4 East Motorway at Haberfield with the New M5 Motorway at St Peters, both of which are currently under construction. The M4-M5 Link would provide both an east-west connection towards Anzac Bridge and the Sydney CBD, and a north-south connection toward St Peters. The project would also provide a connection to the Sydney Airport and Port Botany precinct with the addition of the proposed future Sydney Gateway, and a connection to the southern Sydney precincts with the proposed future F6 Extension. In addition, the project would enable long-term motorway network development by providing a connection to the proposed future Western Harbour Tunnel and Beaches Link project to the north. Together with the other components of the WestConnex program of works the project would facilitate improved connections between western Sydney (including the Parramatta Road corridor) and south and south-western Sydney (including the M5 South Western Motorway).

In the absence of the project, motorists using the M4 East and New M5 motorway tunnels wishing to travel north or south would be required to travel along local and sub-arterial roads or traverse the Sydney CBD to access existing key north–south corridors such as the M1 Motorway. Examples of existing routes that would provide connectivity to the north and south (as an alternative to the project) could include Parramatta Road, City Road/Kings Street/the Princes Highway, King Georges Road, M1 Motorway/Anzac Bridge/City West Link, Johnston Street/The Crescent, Edgeware Road, Shaw Street and Norton Street, as well as the local road network. The connectivity between the M4 East and the New M5 motorways provided by these routes is indirect and requires motorists to travel through many at-grade intersections and, in some cases, steep grades such as on parts of King Georges Road, or congestion and high pedestrian traffic such as on King Street at Newtown, which are not appropriate for freight vehicles. Notwithstanding this, these routes would remain available to those who choose not to use the M4-M5 Link motorway.

Without the project, passenger and commercial vehicles, trucks and buses travelling from Haberfield to the Sydney CBD would continue to use the already congested east–west arterial road network (ie Parramatta Road and City West Link). According to the *NSW Long Term Transport Master Plan* (Transport for NSW 2012a) (*Transport Master Plan)*, this is one of the most constrained strategic transport corridors in Sydney. Similarly, the north-south arterial road network between Drummoyne and the Sydney CBD via Victoria Road and Anzac Bridge is one of the most congested sections of the Sydney road network.

As a result of the M5 East Motorway currently operating over capacity for long periods of the day, connecting arterial roads such as King Georges Road and the remainder of the A3 corridor, perform a higher-order transport workload than they were originally intended for, particularly for heavy vehicles. Traffic flows on the A3 corridor between the M4 and M5 motorways vary from around 60,000 vehicles per day to nearly 100,000 vehicles per day. The result is increased congestion, travel time variability and a higher risk of traffic breakdowns and collisions.

The A3 corridor between the Hume Highway and the M5 Motorway is bordered by predominantly private residences, with many homes sited close to the road, and with clusters of businesses in some suburbs. Grade separation may result in potential visual impact issues and requires more land than at-grade intersections, which would require the acquisition of businesses and homes around each intersection. There are two grade separated and 17 signalised intersections along the A3 corridor between the M4 and M5 motorways. Heavy congestion on the corridor during peak periods reduced average travel speeds to around 25 kilometres per hour in 2015.

It would not be feasible to grade separate each intersection and therefore stop-start traffic at signalised intersections would continue. In general, adding to the number of heavy vehicles along this already busy corridor would reduce amenity for homes, schools (such as Wiley Park Public School), businesses and pedestrians and re-create the poor amenity experienced on Parramatta Road by the impact of congested traffic and high number of heavy vehicles.

In addition, the corridor is an important transit corridor for buses and any upgrades would need to consider the needs of buses and their ability to pull into and out of bus stops without conflicting with heavy vehicles.

The key advantages of the M4-M5 Link are that traffic, particularly heavy vehicle traffic, would be removed from the surface roads so that air quality, amenity and safety is improved for people living and working along surface routes such as the A3 corridor, and secondly, that travel would be more efficient in a tunnel, without intersections.

The M7 Motorway primarily serves Sydney's west and was developed to respond to a need to connect the M2, M4 and M5 motorways, complete a substantial part of the NSW Government's Sydney Orbital Strategy and reduce travel times across western Sydney. Although the M7 Motorway performs an important north-south connection function in Sydney's strategic, given its location in western Sydney, the M7 Motorway is not an alternative to the project, with both the M7 Motorway and the M4-M5 Link necessary to facilitate efficient movement of dispersed freight and commercial movements, as well as longer distance recreational trips.

Improvements to the road network through these corridors, as an alternative to the project, would require significant upgrades (eg road widening or road closures) and the implementation of traffic controls (eg clearways) to accommodate projected traffic volumes. Improvements to the existing arterial road network would:

- Result in potentially significant community and environmental impacts through increased traffic flows within residential areas leading to increased noise and detrimental air quality, and potential property acquisition impacts associated with road upgrades
- Make it difficult to achieve land use regeneration and urban renewal along parts of Parramatta Road or along Victoria Road (east of Iron Cove Bridge), or to upgrade public transport services along these corridors, as proposed by the NSW Government
- Not provide the connectivity to Sydney's international gateways at Sydney Airport and Port Botany through the St Peters interchange and the proposed future Sydney Gateway project
- Not enable direct and free flow connections to the proposed future Western Harbour Tunnel and Beaches Link program of works and F6 Extension project to provide a western bypass of the Sydney CBD.

Arterial road improvements alone would therefore not meet the project objectives. In order to improve the capacity and performance of the arterial road network across the Sydney metropolitan area, Roads and Maritime would continue to implement projects in addition to the M4-M5 Link, such as the Easing Sydney's Congestion program.

B12.4.2 Consideration of alternative designs

Attachment 1 (Beca report) Section 4.4, p22

IWC reluctantly accepts that WestConnex Stages 1 and 2 are approved and under construction and seeks a redesign of Stage 3 to reduce local traffic impacts, improve transport outcomes and reduce project costs. The first and second tier positions form the basis of Council's 'strategic position' on Stage 3. See Attachment 1 to this worksheet for a better understanding of IWC's position on the search for a better alternative for the M4-M5 Link.

Council acknowledges that WestConnex Stages 1 and 2 have been approved and are under construction, but Council is of the view at this stage that the proposed M4-M5 Link does not provide the transport solutions that will best serve the movement of vehicles and people in Sydney's Inner West. IWC therefore requests that, in view of the limitations of the current proposal, SMC and the State agree to engage and take Inner West Council's alternative proposal and other stakeholder comments and requests on board to develop a better alternative or enhance the current proposal.

Attachment 1 (Beca report) Sections 4.4.2 and 4.4.3, p22

IWC agrees [with alternative 2 – investment in alternative transport modes] and would like to see that the State re-allocate the substantial funding for this project to public transport and other demand-management (traffic reduction) options.

Attachment 1 (Beca report) Section 4.4.4, p23

It is stated that the lost opportunities from not proceeding with the project mean that the 'do nothing'/'do minimum' case is not a feasible or realistic alternative. Notwithstanding this, the M4-M5 Link, as part of the WestConnex program of works, is one part of a broader solution to these pressures. For these reasons, the NSW Government is also investigating and investing in light rail, metro, bus rapid transit and motorways to provide a multi-modal response to the future challenges. In response to this statement please note IWC's second-tier response in Attachment 1 to this worksheet.

Attachment 1 (Beca report) Section 30 Overall Evaluation, p169

IWC acknowledges that WestConnex Stages 1 and 2 have been approved and are under construction, but Council is of the view that the proposed M4-M5 Link does not provide the transport solutions that will best serve the movement of vehicles and people in Sydney's [i]nner [w]est. IWC therefore requests that, in view of the limitations of the current Plan, SMC and the State agree to engage with IWC to develop a better alternative or enhance the current proposal.

It is clear from the lack of detail provided in the different chapters of this EIS that there are significant gaps in the justification of the M4-M5 Link which will have extensive impact on local road users, residents and people living, working and enjoying the transport infrastructure in the IWC area. This lack of information includes, amongst others, the process of engaging IWC and other as stakeholders in the approval process of measures impacting on their neighbourhoods; the lack of detail to Management Plans and how clarity will be developed in a collegial process; and significant impact during construction and ongoing operational issues that needs further investigation and investment to mitigate.

Attachment 1 (Beca report) Section 4.4.5, p23

It is stated that various options for the components of the Rozelle interchange and the Iron Cove Link were scored and ranked against the MCA criteria with suitable options taken further for more in-depth technical and engineering investigation and analysis. As stated in the Overall evaluation section below, IWC request to work with SMC and State Government to re-assess the M4 - M5 Link proposal in detail, update the business case and EIS, and deliver a better outcome.

Attachment 1 (Beca report) Section 4 Overall Evaluation, p27

IWC's view is that there could be merit in promoting a joint effort between the Councils to work with SMC and State Government to re-assess the M4-M5 Link proposal in detail, update the business case and EIS, and deliver a better outcome for the people that will live, work, visit, commute, travel, deliver, cycle, play and walk in this space for many decades to come.

Response

The *State Infrastructure Strategy* states that, based on the economic and demographic forecasts, public transport is expected to experience strong growth, particularly around the Sydney CBD and other business centres. The Strategy also notes that the key challenges facing urban public transport relate to the following:

- The ability of the existing public transport network to serve a growing population while providing the mobility and connectivity necessary to sustain economic growth and productivity
- Improving access to the Sydney CBD
- Supporting growth in Sydney's emerging centres
- Optimising the performance of the existing public transport network
- Building future network capacity that keeps pace with demand and meets the needs of businesses and households.

While the use of public transport is expected to grow with the implementation of key public transport initiatives, most growth in transport demand over the next 20 years will continue to be met by roads.

Public transport is best suited to providing concentrated, high volume flows of people to and from established centres. It is less suited to providing dispersed cross-city or local trips. In 2014, around 17.6 million trips were made each average weekday in Sydney, with around 75 per cent of these by road. To meet this demand, the NSW Government has been investigating and investing in public transport, including committing more than $400 million in the NSW 2016-2017 budget to plan, develop and deliver enhancements to increase and improve rail services. Sydney Metro West is one of the key rail projects in the early planning phase, which would be a largely underground railway line between Sydney CBD and Parramatta. However, even with significant investment and high levels of patronage growth forecast for Sydney's public transport network, about 72 per cent of around 27.5 million journeys in 2031 are expected to be made on the road network each weekday by private vehicles, equal to an additional 4.3 million new trips compared to 2014 (Infrastructure NSW 2014).

Employment growth in the Sydney metropolitan area is expected to increase in keeping with a growing population. While Sydney has an extensive public transport network (with rail being the most popular mode used to access the Sydney CBD), the level of service can vary significantly. A key constraint to the expansion and development of the rail network is Sydney's geography, with large parts of the Sydney metropolitan area, such as outer western Sydney and the Northern Beaches region, being relatively poorly connected by public transport to Sydney's global employment centres. As major rail projects have a long lead time, the focus in the shorter term is to improve public transport services through the bus network, such as bus priority programs and bus rapid transit.

With about 60 per cent of employment dispersed across the Sydney metropolitan area, public transport alone cannot viably serve most of these locations. Even under the most ambitious scenarios for land use change and growth in public transport, the absolute number of car journeys will continue to increase (SMC 2015a).

Public transport improvements alone are therefore not a viable alternative to meeting the project objectives. Investment in integrated transport solutions that involve both roads and public transport is needed to cater for the concentrated population growth forecasts and associated increase in travel movements.

Notwithstanding, the NSW Government is committed to investing in a range of public transport projects, as identified by the recently released *Draft Future Transport Strategy 2056* (NSW Government, 2017) as well as the *State Infrastructure Strategy Update* (Infrastructure NSW 2014) as well as *A Plan for Growing Sydney* (NSW Government, 2014) and the *NSW State Priorities* (NSW Government 2015) which are discussed in section 4.4.2 of the EIS. These public transport projects include Sydney Metro Northwest, Sydney Metro City and Southwest CBD and South East Light Rail, Parramatta Light Rail and Sydney Metro West. The *Draft Future Transport Strategy* discusses a number of public transport initiatives, including the intermediate transit network, discussed on page 81 of the strategy which, combined with existing commitments such as the Sydney Metro West, will create opportunities in the community around The Bays Precinct by connecting them to major economic hubs in the Sydney CBD, Parramatta and Sydney Olympic Park.

In addition to the public transport initiatives, the *Draft Future Transport Strategy* (NSW Government 2017) has re-iterated the need to plan and invest in the future of Sydney's motorway network as identified in the State Infrastructure Strategy Update (2014) and the State Infrastructure Strategy (2012). It recognises the role that the road network plays in providing vital infrastructure connections within and between travel demand corridors for private vehicles, public transport and freight. In doing so, it acknowledges that any investment in motorway infrastructure has to be aligned with supporting public transport initiatives to achieve an increase in capacity, while aiming to reduce the reliance on and demand for private vehicles on the future road network.

The WestConnex program of works is one part of a broader solution to these emerging pressures. While public transport is also part of this solution, it is recognised that not all trips in Sydney can be served by public transport, such as trips to dispersed destinations, or commercial trips requiring the movement of large or heavy goods/materials. A congested road network also affects road-based public transport, increased bus travel times and variable journey times.

For these reasons, the NSW Government is also investigating and investing in light rail, metro, bus rapid transit and motorways to provide a multi-modal response to the future challenges. In this context, WestConnex is an enabler of integrated transport and land use planning, supporting the development of initiatives including The Bays Precinct, Victoria Road and Parramatta Road public transport improvements and the *Parramatta Road Corridor Urban Transformation Strategy*.

Inner West Council's detailed list of considerations for alternative design considerations as part of section 2.2 of Attachment 1 to its submission is noted. Consideration of the project against a range of strategic alternatives to identify the extent to which they could meet the project objectives (refer to section 3.3 of the EIS for the project objectives) and how well they performed with reference to other transport, environmental, social and economic factors has been undertaken in accordance with the SEARs and is presented in section 4.4 of the EIS.

As outlined in **section A2.4**, SMC and Roads and Maritime will continue to provide consultation opportunities for the community and key stakeholders during the ongoing refinement of the design and during construction, with a view to further minimising impacts of the project on communities.

B12.4.3 Alternative assessment framework

Attachment 1 (Beca report) Section 4.4, p22

Alternatives to the project have been discussed[.] Have these been considered as mutually exclusive options, or is there interdependencies[?] Also, it is not clear what framework has been utilised to assess the effectiveness of these alternatives against project objectives. IWC expects SMC to provide details on the evaluation framework used for assessing alternatives and whether there has been any consideration of combinations of alternatives.

Response

The EIS was prepared in accordance with the relevant provisions of the EP&A Act. It was prepared to address the SEARs and the relevant provisions of Schedule 2 of the EP&A Regulation. Consideration of the project against a range of strategic alternatives to identify the extent to which they could meet the project objectives (refer to section 3.3 of the EIS for the project objectives) and how well they performed with reference to other transport, environmental, social and economic factors has been undertaken in accordance with the SEARs and is presented in section 4.4 of the EIS. The strategic alternatives that were considered in section 4.4 of the EIS comprise:

- Alternative 1 – improvements to the existing arterial road network
- Alternative 2 – investment in alternative transport modes

- Alternative 3 – demand management
- Alternative 4 – the 'Do nothing'/'Do minimum' case
- Alternative 5 – development of the M4-M5 Link.

The need for investment in transport infrastructure in NSW, including the WestConnex program of works, has been established by the NSW Government at a strategic level in state planning and policy documents (see **section C3.1.1**). WestConnex is one of more than 80 projects outlined in the *Transport Master Plan* to address the state's complex transport needs. As part of a broader integrated transport and land use solution, WestConnex supports a coordinated approach to the management of freight, commercial and passenger movements, and is complementary to other modes of transport including rail, bus, ferries, light rail, cycling and walking. However, Sydney's freight, commercial and services tasks require distribution of goods and services across the Sydney basin, which relies on diverse and dispersed point-to-point transport connections that are most efficiently provided by the road network.

The WestConnex Updated Strategic Business Case 2015 was prepared to assess the viability of the WestConnex program of works as part of a broader integrated transport and land use solution for NSW and in consideration of the established transport and land use policy setting. Subsequent EISs for each stage of the WestConnex program of works, including the EIS for the M4-M5 Link, have therefore carried out an assessment of strategic alternatives in consideration of the strategic transport and land use policy context and the recognised need for the WestConnex program of works as set out in the WestConnex Updated Strategic Business Case 2015.

B12.4.4 Need for mid-tunnel construction dive sites

Attachment 1 (Beca report) Section 4.6.2, p27

Also refer to IWC's response on the Assessment of M4-M5 Link Mid-Tunnel Construction Dive-Site Options – for Inner West Council – see report from Holt, James (2017) in main report from IWC.

Response

A response to Inner West Council's is provided in **section B11.4.7**.

B12.4.5 Interchange design and locations

Attachment 1 (Beca report) Section 4.5.1, p24

This [section 4.5.1 of the EIS] suggests the removal from the Rozelle Interchange connections to Anzac Bridge and The Crescent. It should allow connection of the main Stage 3 tunnel to Victoria Road and Western Harbour Tunnel (if built) - but not to City West Link / Anzac Bridge or to Johnston Street / The Crescent, converting the Rozelle Interchange to a junction below the surface - whilst this will reduce local vehicular access to WestConnex, it will substantially reduce local traffic impacts and construction costs.

Consider to relocate and downgrade the St Peters Interchange, moving it closer to the Airport and Port and connect it to the main Stage 3 tunnel – to better connect the Airport and Port, reduce inner-urban traffic impacts, reduce project costs and allow the St Peters Interchange site to be put to a more productive use.

The Camperdown interchange is no longer a component of the project. IWC acknowledges this positive step. Similar to the reasons this interchange was removed to allow access to surface roads, it is also relevant for the removal of the Rozelle Interchange connections to Anzac Bridge and The Crescent. Also, relevant to these reasons are the relocation and scaled- down version of the St Peters Interchange.

Response

The Rozelle interchange is a key component of the project as it would provide connectivity with the local surface road network at City West Link, The Crescent and Victoria Road. In addition, it provides a north-south corridor between the New M5 at St Peters and Rozelle that would bypass the Sydney CBD. The Rozelle interchange would also facilitate future growth in Sydney's transport network by allowing for connections to the proposed future Western Harbour Tunnel and Beaches Link.

A number of key benefits and improvements to the surface road network are forecast as a result of the project, including:

- Non-motorway roads in the Inner West LGA are forecast to experience faster trips with the daily average speed increasing by about 10 per cent. Similarly, the vehicle distance travelled on non-motorway roads is forecast to reduce by about 12 per cent. This indicates that on average, these trips are fewer in number and faster
- Reduced traffic is forecast on sections of major arterial roads including City West Link, Parramatta Road, Victoria Road, King Street, King Georges Road and Sydenham Road
- Around 2,000 heavy vehicles are forecast to be removed from Parramatta Road, east of the M4 East Parramatta Road ramps, each weekday.

In addition, as a result of the additional road network capacity provided by the project, the two-way future year AWT traffic demand compared to a 'Without project' scenario is predicted to significantly decrease on:

- City West Link and Parramatta Road, east of the M4 East Wattle Street and Parramatta Road ramps respectively, by about 25 per cent in the 2023 and 2033 'With project' and 'Cumulative' scenarios
- King Street in St Peters by about 20 per cent in the 2023 and 2033 'With project' scenarios
- Stanmore Road in Stanmore by about 15 per cent in the 2023 and 2033 'With project' and 'Cumulative' scenarios
- Lyons Road in Russell Lea by about 15 per cent in the 2023 and 2033 'With project' scenarios, and about 20 per cent in the 2023 and 2033 'Cumulative' scenarios
- Southern Cross Drive and the Sydney Harbour Tunnel by about 20 per cent and 25 per cent respectively in the 2023 and 2033 'Cumulative' scenarios (refer to Chapter 9 of Appendix H (Technical working paper: Traffic and transport) of the EIS).

Road network connectivity to The Bays Precinct would be improved from the west and south as a result of the project. While there are existing north-south links between areas such as the Northern Beaches and Sydney Airport, the M4-M5 Link project, as part of a completed WestConnex program of works and the proposed future Western Harbour Tunnel and Beaches Link program of works, would provide a western bypass of the Sydney CBD, alleviating pressure on existing north−south corridors including Southern Cross Drive, the A1 (the Princes Highway) and A3 (Centenary Drive/Roberts Road/King Georges Road) corridors and the Sydney orbital network, as well as reducing traffic volumes on the Sydney Harbour Bridge and Sydney Harbour Tunnel. Screenline analysis undertaken for the traffic assessment in the EIS demonstrates that these existing links would be heavily congested in 2023 and 2033 without the project (refer to section 8.3.3 and Appendix H (Technical working paper: Traffic and transport) of the EIS).

A detailed description of the development of the M4-M5 Link concept, specifically the identification of the opportunity to design the WestConnex program of works to support connectivity to planned future motorway networks, including a northern extension that incorporates the Rozelle interchange, is provided in **section B10.3.6**.

The St Peters interchange is being delivered by the New M5 project which is approved and under construction and beyond the scope of the EIS. Support for the removal of the Camperdown interchange is noted.

B12.4.6 Support for Iron Cove Link

Attachment 1 (Beca report) Section 4.5.3, p25

IWC supports the connection of the main Stage 3 tunnel to Victoria Road via the Iron Cove Link tunnel, with amenity, active transport and public transport improvements implemented on the surface along that section of Victoria Road.

Response

The support for the Iron Cove Link by Inner West Council is noted.

B12.5 Project description

Items raised in the project description section of Attachment 1 to the Inner West Council's submission are addressed in the relevant sections of this document as they were more closely aligned with the impact assessment sections.

B12.6 Construction work

Refer to Chapter 6 (Construction work) of the EIS for the details regarding construction for the project.

B12.6.1 General comments

Attachment 1 (Beca report) Section 12, p107

Construction ancillary facilities

Each construction ancillary facility in Chapter 12 must be read in conjunction with Chapter 6 Construction work which provides information about what activities may be carried out at each site, workforce numbers, hours of operation, heavy and light vehicle access carparks, spoil management. Neither chapter provides a discussion or explanation of the potential impacts of those activities for each site. Section 12.3 provides a generic comment about construction impacts as being largely amenity issues across of these sites. Each construction worksite location will be subject to differing combinations of impacts (visual, noise, air quality, traffic, land use, truck movement conflicts and other). […P]otential impacts and avoidance/ impact minimisation measures for each location.

There is a need to identify the scale and nature of potential impacts for the areas in the vicinity of each construction work site so that it is clear as to whether sufficient attention has been given to avoiding or minimising adverse impacts. The nature and scale of impacts for each area will inform the acceptability or otherwise of size, location and proposed activities of each work site together with management measures.

Wattle Street options

Two options have been identified for the Wattle Street site but no comment is provided as to why there may have been a need to identify options and what their relative merits are. An explanation of why two options are identified for Wattle Street site is required together with each option's relative merits in terms of the project itself and also for mitigating any adverse impacts.

The use of acoustic sheds to manage construction impacts

Chapter 6 refers to where feasible and reasonable, acoustic sheds would be provided to control noise (p6-33). This statement provides no certainty for properties near Haberfield / Ashfield that noise will be adequately managed. What is feasible and reasonable?

Clarity is required as to what the meaning of feasible and reasonable is and who determines this? This requires further consultation to ensure that this is acceptable definition and process.

Response

Wattle Street options

As described in section 6.5.1 of the EIS, 12 construction ancillary facilities have been described and assessed in the EIS, including five sites within Haberfield and Ashfield, being the:

- Wattle Street civil and tunnel site (C1a)
- Haberfield civil and tunnel site (C2a)/ Haberfield civil site (C2b)
- Northcote Street civil site (C3a)
- Parramatta Road West civil and tunnel site (C1b)
- Parramatta Road East civil site (C3b).

To assist in informing the development of a construction methodology that would manage constructability constraints and the need for construction to occur in a safe and efficient manner, while minimising impacts on local communities, the environment, and users of the surrounding road and other transport networks, two possible combinations of construction ancillary facilities at Haberfield and Ashfield were assessed. Part of the justification for the inclusion of the Option B construction ancillary facilities is to minimise the extended duration of construction impacts on receivers adjacent to the Option A sites such as along Wattle Street, Walker Avenue and Northcote Street due to consecutive project construction for the M4 East and M4-M5 Link projects.

The number, location and layout of construction ancillary facilities would be finalised as part of detailed construction planning during detailed design and would consider the:

- General principles for construction outlined in section 6.1.1 of the EIS
- Environmental performance outcomes stated in Chapter 30 (Project justification and conclusion) of the EIS and this Submissions and preferred infrastructure report
- Relevant guidelines including noise goals identified in Chapter 10 (Noise and vibration) of the EIS
- Criteria for final construction site layouts and access arrangements as listed in section 6.5.1 of the EIS
- Environmental management measures identified in **Chapter E1** (Environmental management measures)
- Relevant conditions of approval.

The final construction site layouts and access arrangements would have regard to the amenity criteria in section 6.5.1 of the EIS where practicable, however consideration would be given to the various factors discussed above to determine the most beneficial option.

Based on community feedback and concerns raised in submissions on the EIS, a number of refinements to the construction ancillary facilities at Haberfield and Ashfield have been made to further minimise impacts on the community and sensitive receivers. This includes:

- Wattle Street civil and tunnel site – the area at the surface currently being used as a construction zone for the M4 East project would no longer be used. Construction activities would be limited to the Wattle Street entry and exit ramps
- Haberfield civil site – footprint reduced and site to be used as a civil site only as per the arrangement for the Haberfield civil site (C2b). The C2a option would therefore not be used for the construction of the project. No tunnelling from this site is proposed.

These refinements would allow landscaping and urban design works associated with the M4 East UDLP and Residual Land Management Plan in the area around Wattle Street and Walker Avenue at Haberfield to be carried out at the completion of M4 East construction.

The appointed design and construction contractor(s) may choose to use all or some of the construction ancillary facilities identified in the EIS.

Prior to the establishment of ancillary facilities not described in the EIS, the design and construction contractor(s) would need to satisfy criteria that would be identified in any relevant conditions of approval. Additional sites that do not satisfy any relevant criteria in the conditions of approval may be subject to separate environmental assessment and approval. Approval pathways are described further in Chapter 2 (Assessment process) of the EIS.

The use of acoustic sheds to manage construction impacts

It is recognised that residents and businesses around construction ancillary facilities would be subject to increased airborne noise impacts, including those at Haberfield, around the Iron Cove Link and Victoria Road, The Crescent and the Rozelle Rail Yards. These impacts would relate to a broad range of project scenarios and activities, including demolition and pavement and infrastructure works. These scenarios and their likely noise impact are outlined for each construction location in Appendix J (Technical working paper: Noise and Vibration) of the EIS.

Given the urban context and large scale of the project it is unavoidable that receivers in the vicinity of construction activities would experience elevated noise levels. Construction activities outside standard construction hours that are likely to generate noise levels above the relevant evening and night-time noise management levels are typically regulated by the NSW Environment Protection Authority (NSW EPA) through the project environmental protection licence. Licence conditions typically limit such works to no more than two to three nights per week in any location. Tunnelling, however, is proposed 24 hours per day. To facilitate tunnelling 24 hours per day the excavated material must be continually brought to the surface, due to the limited space within the tunnels to stockpile and handle excavated material.

Stockpiling and handling of tunnel spoil at the surface, without appropriate noise attenuation, is likely to exceed evening and night-time noise management levels and would therefore likely be restricted by the environmental protection licence to two to three nights per week at any location. To provide for tunnelling to occur 24 hours per day, required to achieve project delivery timeframes, it is therefore in the design and construct contractor's best interests to design and install an acoustic shed in which to stockpile and handle spoil. The establishment of an acoustic shed would ensure that night-time noise management levels are complied with at the most affected receivers so that the hours during which spoil stockpiling and handling can occur are not restricted. It is therefore likely that high performing acoustic sheds will be constructed at construction ancillary facilities associated with tunnel access points.

Where guidelines require consideration of 'feasible' and 'reasonable' noise mitigation and management measures, the *Interim Construction Noise Guideline* (ICNG) (NSW Department of Environment and Climate change (DECC) 2009) describes this term as:

- Feasible – a work practice or abatement measure is feasible if it is capable of being put into practice or of being engineered and is practical to build given project constraints such as safety and maintenance requirements
- Reasonable – selecting reasonable measures from those that are feasible involves making a judgment to determine whether the overall noise benefits outweigh the overall adverse social, economic and environmental effects of implementing the measure, including consideration of the cost of the measure.

King George Park

The design for the widening of Victoria Road at the eastern abutment of Iron Cove Bridge as described in the EIS would permanently impact around 1,494 square metres of King George Park. With the bioretention facility now proposed to be located in this area (see **Part D** (Preferred infrastructure report) for a description and assessment of this change), the project would permanently impact around 2,259 square metres of King George Park. This area comprises around five per cent of the total area of King George Park, leaving around 42,611 square metres (or around 95 per cent) of King George Park not permanently impacted by the project. During operation, this area would be landscaped and would appear as part of King George Park.

Asset transfer and maintenance requirements would be confirmed during detailed design, in consultation with affected stakeholder including the Inner West Council.

B12.6.2 Co-ordination of utilities works

Attachment 1 (Beca report) Section 5.1, p31

A Utilities Management Strategy has been prepared for the project and is included in Appendix F (Utilities Management Strategy). This does however not mention the incidents when utility companies decide when and where they will perform work without the coordination with the Project program for such work. A single point of contact is required for coordination of these activities so that stakeholders know who to talk to.

Attachment 1 (Beca report) Section 6.3, p34

It is stated that, in addition, utility works to support the project would occur within and outside the project footprint. The coordination of direct project related and non-direct project related works to utilities needs significant improvement as examples of un-coordinated activities lead to frustrated residents on Stage 1. See "Overall evaluation" below for the proposed establishment of a detailed Construction Impact and Implementation Plan wherein IWC will be allowed to participate as an approval authority of all Construction Management Plans before any construction starts.

Attachment 1 (Beca report) Section 6.4.5, p 35

The construction of these permanent operational infrastructure will have a significant portion of utilities to be connected, replaced or adjusted including ongoing maintenance activities of these assets especially the water treatment facilities. See also comments on drainage in Chapter 17.

Attachment 1 (Beca report) Section 30.1.3, p168

Table 30.4 states one of the EPA objectives as "To encourage the protection, provision and co-ordination of communication and utility services". This issue has proofed to be difficult to coordinate between utility organisations and although it is mentioned that a coordinating body is to be established to deal with this, it is not stated how IWC and others will form part of the process and approvals before work starts.

Response

Discussion of the co-ordination of utility works is provided in **section B11.6.5**.

B12.6.3 Alternatives to the Darley Road civil and tunnel site

Attachment 1 (Beca report) Section 6.5.8, p36

In Table 7-10 Feedback from the community, page 7-40, it is mentioned under "Design" heading that there is concern about the impact on residents of a tunnel dive site at Leichhardt and a preference to have no dive site at Leichhardt. The response to this, states, "During February and March 2017 there were numerous key stakeholder meetings regarding the proposed mid-tunnel construction site in the Leichhardt area and notifications were distributed to local residents and businesses. Consultation on the draft design, including the proposed location for a mid-tunnel dive site, would continue through the public exhibition of the EIS and during the detailed design phase, should the project be approved. The potential impacts of the construction ancillary facilities proposed for the project have been assessed throughout this EIS and are described in Chapter 4 (Project development and alternatives), Chapter 5 (Project description) and Chapter 6 (Construction work). In the same table under the heading "Construction" the concern is mentioned about the proposed mid-tunnel construction sites at Darley Road and Pyrmont Bridge Road including that the reasons for selecting these locations has not been adequately explained and that alternative sites have not been considered. The response to this was to "Refer to Chapter 4 (Project development and alternatives) and Chapter 5 (Project description). These chapters provide limited information and certainty of how and if alternative sites have been considered.

A desktop study was commissioned by Inner West Council in late 2016 to examine mid-tunnel construction dive site options in the Leichhardt/Lilyfield area for the proposed WestConnex M4-M5 Link. The summary of the findings was "The use of Darley Road or Derbyshire Road as construction sites for an extended period will be a controversial decision that will have lasting effects on residents, SMC and Inner West Council. Consideration needs to be given to finding a less controversial location than the Darley Road site - in which case, the western end of the Rozelle Rail Yards offers considerable possibilities. IWC expects that full consideration be given for the search of alternative sites. Also see Issue 3 at the start of this report. This proposed construction site is adjacent to residential properties they will need to deal with construction activities for more than three years if this project goes ahead. Apart from construction impact they will also be exposed to all the issues raised in chapters 8 to 12 (tabs 16 to 20) especially noise & vibration, air quality and health, with the potential having this impact imposed onto the value of their properties forever. Note also Issues 4 & 5 at the start of this report.

Response

Section B11.6.9 discusses the requirement for and location of tunnel dive site associated with the Darley Road civil and tunnel site (C4). **Section B11.6.9** also includes an overview of two options that have been investigated to provide heavy vehicle access to the Darley Road civil and tunnel site (C4) to/from City West Link. The requirement for, and location of, tunnel dive sites is also discussed in section 4.6.2 of the EIS. Table 4-7 of the EIS also identifies alternative construction ancillary facility options to the Darley Road site that were investigated.

With regard to construction impacts, see responses in the following sections:

- Construction impacts at mid-tunnel dive-sites are discussed in **section B11.6**
- Construction noise and vibration impacts are discussed in **section B12.10** and **section B11.10**

- Impacts on air quality and human health from construction of the project are discussed in **section B12.9**, **section B12.11** and **section B11.9**
- Impacts on property values are discussed in **section B10.14.12.**

B12.6.4 Consultation and approval of construction management plan

Attachment 1 (Beca report) Section 6.1.1, p33

As described in 6.1 above there is no mention of a follow-up consultation process after the final design to be incorporated into the Submissions and Preferred Infrastructure Report. This EIS is vague on the details of the consultation, planning, approval and monitoring of implementation to ameliorate impacts such as safety around work sites, heavy vehicle movements, dust, and coordination of construction works on other projects in the vicinity of the M4-M5 link worksites, coordination of utility services replacement, upgrading or maintenance. These activities will have to be assessed in detail in a detailed Construction Management Plan (CMP). SMC needs to consult IWC on the details of this plan and request to be an approval authority of these plans. See related comments in Chapter 8 on construction traffic impact expected at worksites.

Attachment 1 (Beca report) Section 6.1.2, p33

It is stated that further staging details would be confirmed when design and construction contractor(s) have been engaged. The EIS lacks clarity on further elaboration or commitment to a formal stakeholder engagement plan to inform the community about these details. These activities around staging will have to be assessed in detail in a detailed Construction Management Plan (CMP). SMC needs to consult IWC on the details of this plan and request to be an approval authority of these plans.

Attachment 1 (Beca report) Section 6.2, p33

An indicative construction program is shown in Table 6-2. IWC request an opportunity to provide formal feedback on the final construction program when completed by the selected contractor. SMC to consult IWC on the final construction program for approval. IWC requests that joint approval authority be granted to IWC to approve program, stages and CMP's for each construction site.

Response

As described in section 1.1 of the EIS, the concept design presented in the EIS is indicative only and would be subject to detailed design and construction planning to be undertaken by the successful design and construction contractor(s) following determination of the project application, should it be approved.

The design presented by the design and construction contractor(s) will need to satisfy all technical road design requirements and road functionality as described in the EIS, and to be consistent with the approved scope of the project, including the environmental management measures and conditions of approval for the project.

Issues raised during public consultation on the EIS or in the assessment of the project by DP&E would also be taken into account during the detailed design process. A response to submissions received on the M4-M5 Link EIS as well as a description of any changes to the project is included in this Submissions and preferred infrastructure report. This includes where there are changed and/or additional environmental impacts associated with the items in **Part D** (Preferred infrastructure report).

If the proponent (Roads and Maritime) requires changes to the project following approval, Roads and Maritime can apply to the NSW Minister for Planning. Any modification requests would be lodged with DP&E for assessment and would be appropriately notified and/or exhibited depending on the scale of the proposed modification and the potential for environmental or social impacts.

Further information on the EIS being based on a concept design is included in **section B10.1.4**.

Chapter 7 (Consultation) of the EIS provides a thorough description of the consultation activities undertaken prior to and during preparation of the EIS. This included community information sessions and agency stakeholder engagement workshops and briefings.

Environmental management measures that have been developed to address the specific concerns raised in this issue include:

- Safety around work sites – see environmental management measures TT03, TT05 and TT08 to TT11 in **Chapter E1** (Environmental management measures)
- Heavy vehicle movements – see environmental management measures TT15 to TT18 in **Chapter E1** (Environmental management measures)
- Dust – see environmental management measures AQ2 to AQ8, and AQ13 to AQ26 in **Chapter E1** (Environmental management measures)
- Utility works - managed via the Utilities Management Strategy (refer to Appendix F of the EIS).

As required by environmental management measure C1 in **Chapter E1** (Environmental management measures), the project will also maintain regular communication with other projects that have the potential to result in cumulative impacts with the M4-M5 Link, including projects approved during construction of the M4-M5 Link project and that have the potential to result in cumulative impacts (refer to the screening criteria described in section 1.1.2 of Appendix C (Cumulative impact assessment methodology) of the EIS).

Future community and stakeholder consultation that would be carried out for the project, including consultation with the Inner West Council, is detailed in **section B10.7.6** and **section B11.7.2**.

B12.6.5 Construction impacts at Rozelle civil and tunnel site

Attachment 1 (Beca report) Section 6.5.9

This [the Rozelle civil and tunnel site (c5)] will be a significant construction site that will [include] day-to-night, night-to-day and hour-to-hour planning, monitoring and control of construction activities impacting on all road users and people in the area that will be exposed to construction traffic, noise, air quality, noise and potential contamination of soil and groundwater.

Response

The Rozelle civil and tunnel site (C5) would be located between Lilyfield Road to the north, City West Link and The Crescent to the south, Victoria Road to the east and the Sydney CBD and South East Light Rail maintenance depot to the west. The site would be predominantly located on disused land that forms part of the Rozelle Rail Yards.

Given the project's size, duration and complexity, construction would generate a range of social, environmental and economic impacts. Table 7-5 of Appendix P (Technical working paper: Social and economic) of the EIS summarises the key changes to the surrounding environment as a result of the Rozelle civil and tunnel site (C5) as being day-time noise exceedances, vibration effects, construction dust, increased construction vehicles on Lilyfield Road. These impacts may reduce road safety along Lilyfield Road, increase competition for parking and generally reduce amenity in the surrounding area.

Chapter E1 (Environmental management measures) identify a number of management measures to reduce and manage traffic, noise, dust and contamination from construction sites.

Further, in response to community concerns and design constraints identified during the preparation of the EIS, a number of substantial changes have been made to the project design at Rozelle (refer to Chapter 4 (Project development and alternatives) of the EIS). These include the

- Adjustment of the project footprint to avoid using Easton Park , which would minimise impacts on Lilyfield Road and the heritage listed Sydney Water sewerage pumping station
- The selection of spoil haulage routes to primarily follow the arterial road network and avoid local roads.

B12.6.6 Construction ancillary facilities

Attachment 1 (Beca report) Section 12.2.8, p108

The term 'construction ancillary facilities' is inappropriate as the activities listed in Table 6-5 for each construction ancillary facilities could not be described as ancillary but are core facilities for construction of the M4-M5 Link. Change the term from construction ancillary facilities to construction site facilities or similar term which better reflects these facilities are key construction facilities for the M4-M5 Link project.

Response

Section 6.5.1 of the EIS identifies that 'construction ancillary facilities' are sites which would be used for a combination of civil surface works, tunnelling and tunnelling support, construction workforce parking and administrative purposes. This description accurately describes the activities which would be undertaken at the construction ancillary facilities and therefore this term is appropriate for these sites.

B12.7 Consultation

Refer to Chapter 7 (Consultation) of the EIS for details of consultation.

B12.7.1 Identification of key stakeholders

Attachment 1 (Beca report) Section p43

The consultation chapter refers to key stakeholders and peak bodies but does not identify who they are. There is no way of assessing if the consultation activities have adequately attempted to reach all interest groups, e.g. non-English speaking people, residential tenants associations, community centres, the disadvantaged, people with disabilities, parents of child care students and schools, special interest groups, local medical practitioners and health care centres, etc. In response to a consultation activity query, a written response has been provided that certain Aboriginal groups have been contacted as it is not clear from the consultation documentation. There is a need to identify who are the key stakeholders and peak bodies. There is a need to demonstrate that consultation activities have been planned and implemented to reach and engage with a broad array of interest groups.

Response

SMC and Roads and Maritime are committed to ensuring the community and stakeholders are kept informed on matters during the development, construction and operation of the M4-M5 Link project.

Table 7-6 of the EIS identifies industry and stakeholders, including peak bodies and community user groups, who were consulted with prior to and during the development of the EIS. Multiple community and stakeholder consultation sessions that were held for the M4-M5 Link project prior to and during preparation of the concept design report and EIS are outlined in Table 7-3 of the EIS.

Table 2 of Appendix G (Draft community consultation framework) of the EIS also provides a high-level list of stakeholders for the project. This list includes a range of stakeholders such as community service providers, peak industry groups as well as the local community, Council reference groups and local businesses. This list would be reviewed and additional stakeholders would be added to the listing in the Community Communication Strategy as they become known to the project.

As outlined in **section A2.4**, SMC and Roads and Maritime would continue to provide consultation opportunities for the community and other key stakeholders, including the Inner West Council, during the ongoing refinement of the design, with a view to further minimising impacts of the project on communities, in line with the draft Community Consultation Framework provided in the EIS, the environmental management measures (see **Chapter E1** (Environmental management measures)) and any future conditions of approval.

WestConnex communication materials, including the project website, are available in seven languages and translation services are also available through the Translating and Interpreting Service. A community relations support toll-free telephone line will be operated to respond to any community concerns or requests for translation services.

B12.7.2 Consultation during project development and assessment

Attachment 1 (Beca report) Section 2.2.2, p12

It is stated that City of Sydney and Inner West councils have been consulted during the development of the project and preparation of the EIS. In many instances this is not true - see Chapter 1, Section 1.1 and Overall Evaluation.

Attachment 1 (Beca report) Section 8.5 [7.5], p46

[In relation to] Table 7.8, pages 7.38 and 7.39 [of the EIS]: City of Sydney Council has made specific comments about land use and socio-economic considerations re: need for rezoning due to project impacts, community impacts and future development impacts. Further work needs to be undertaken to specifically address the concerns raised by City of Sydney Council.

Attachment 1 (Beca report) Section 7.6.1, p46

It is stated that, "Roads and Maritime would continue to engage with the community and stakeholders during the assessment process". There are no details to what extent IWC and others would be engaged in the assessment process. SMC to provide comprehensive details on how IWC and other will be involved in the assessment process at this point of the process as promised in this section.

Response

The following consultation was undertaken with City of Sydney and Inner West Councils during preparation of the EIS for the project:

- Three workshops with City of Sydney Council and the Inner West Council, including the councils which existed independently prior to the amalgamation, were held during the development of the project, with a particular focus on procuring input on the urban design master plans and active transport strategy. These were undertaken on 22 March 2016, 21 April 2016 and 30 May 2016
- A planning focus meeting with relevant government agencies, including Inner West Council and City of Sydney Council, to provide a briefing on the approach in preparation of the EIS was undertaken on 12 February 2016
- Meetings with the City of Sydney and Inner West Council have been held regularly during the development of the concept design and EIS, since April 2016. Prior to the Inner West council amalgamation on 12 May 2016, meetings were held with the former Ashfield, Leichhardt and Marrickville councils
- An active transport workshop was undertaken with City of Sydney and Inner West Council on 27 July 2016
- An update on the project was given to Inner West Council on 3 August 2016
- Ongoing liaison with Inner West Council regarding the Rozelle interchange design, EIS content and analysis, outcomes of the Camperdown Ramps options study, and the Rozelle concept design was undertaken on 12 December 2016
- A hardcopy of the concept design and an offer of a briefing, including follow up phone call was sent to both the Inner West Council and City of Sydney on the 12 May 2017. A briefing was held with the City of Sydney on 1 June 2017
- A Community Reference Group was established and was held monthly from February 2017 to provide a forum for discussion and feedback between the WestConnex project team and representatives of the community, stakeholder groups and local councils. Minutes from these meetings can be viewed on the WestConnex[4].

Responses to the City of Sydney's concerns related to rezoning, community impacts and future development impacts submission is located in the following locations of the EIS:

- Chapter 12 (Land use and property)
- Chapter 13 (Urban design and visual amenity)
- Chapter 14 (Social and economic)
- Appendix P (Technical working paper: Social and economic).

In particular, impacts on land use, including the potential need for re-zoning of land, is discussed in section 12.4 of the EIS.

Additional concerns raised by the City of Sydney Council in the council's submission on the EIS are responded to in **Chapter B10** (City of Sydney).

[4] https://www.westconnex.com.au/community-reference-group

The assessment process for the project includes the activities undertaken during the environmental assessment, exhibition and consultation phases as presented in Figure 2-1 of the EIS. This includes consultation since the assessment process phase commenced with the lodging of the State Significant Infrastructure Application Report in January 2016.

Future community and stakeholder consultation that would be carried out for the project, including consultation with the Inner West Council, is detailed in **section B10.7.6** with regards to the issues identified in the City of Sydney submission and section **B11.7.2** with regards to the issues identified in the Inner West Council submission**.**

B12.7.3 Consultation on the concept design

Attachment 1 (Beca report) Section 7.1, p44

In Table 7.1, SEAR 2 of Section 4 (Consultation) it is stated that, "The Proponent must document the consultation process, and demonstrate how the project has responded to the inputs received". As indicated in the "Overall evaluation" below the lack of compliance to this consent condition in the SEARs is blatantly ignored in the description in Section 7.1 and how SMC has consulted with IWC and provide feedback on the Concept Design Plan by taking the IWC's response on the Concept Design Plan, submitted on 4 August 2017, into account. SMC to demonstrate to IWC how the consultation process has been compliant to this consent condition in the SEARs to IWC, and how SMC will fulfil this condition in the response from IWC on the Concept Design Plan as well as the response on this EIS.

Attachment 1 (Beca report) Section 7.1.1, p44

It is stated in this section that, "During construction and operation of the project, the focus would be on keeping the community informed and providing clear channels for feedback or complaints about impacts. If SMC has failed to keep their promise in SEAR 2, Section 4 of Table 7.1, to the lead-up to the Concept Design Plan (CDP) exhibition, and failure to respond to IWC's comments to the CDP to consider these comments in the EIS, how trustworthy is this statement with such lack of detail of information as describe in our response to this EIS, including the requests and recommendations in Chapters 6 and 8?

Attachment 1 (Beca report) Section 7.1.2, p44

The project consultation overview is described in this section but there is no indication of how the responses received on the Concept Design Plan has been addressed and what the mechanism would be to consult with IWC and others in finalising the Preferred Infrastructure Report and several Management Plans before construction starts. SMC needs to demonstrate to IWC how IWC will be involved in the approval of the PIR and other Management Plans as described in the responses to different chapters in this document.

Attachment 1 (Beca report) Section 7.2, p44

IWC's responses on the Concept Design Plan were not taken into account? SMC to demonstrate to IWC how the consultation process has been compliant to this consent condition in the SEARs to IWC, and how SMC will fulfil this condition in the response from IWC on the Concept Design Plan as well as the response on this EIS.

Attachment 1 (Beca report) Section 7.3, p45

It is stated that, "Consultation and feedback received at both the program and project level have informed project development, the environmental assessment activities and ongoing communications". How can this statement be true if there was no consultation and no response on IWC submission on the Concept Design Plan submitted on 4 August 2017? SMC needs to explain how they can state this in the EIS if it is not true for several requests put to SMC through the Concept Design Plan response?

Attachment 1 (Beca report) Section 7.3.4, p45

Table 7.4 refers to consultation workshops with IWC. There was great expectation flowing from these workshops on the details that would be available in the Concept Design Plan (CDP). As stated above, the details in the CDP were limited, but which was more disappointing was that IWC presented a detailed response on the CDP which is not address in this table and no answers were given in the EIS why that was ignored?

Why did SMC ask for comments on the CDP and then select to ignore it when they prepared the EIS?

Attachment 1 (Beca report) Section 7.4, p46

There should have been a similar table to that of Table 7.7 with the details and number of responses recorded received from stakeholders on the CDP.

Why did SMC ask for comments on the CDP and then select to ignore it when they prepared the EIS?

Attachment 1 (Beca report) Section 7 Overall Evaluation, p46

The response on the M4-M5 Link Concept Design Plan (CDP) provided by IWC on 04/08/2017 could not have been taken fully into account in the EIS, as the EIS was released only 9 working days after the 04/08/2017 submission deadline for the CDP. Sydney Motorway Corporation (SMC) should assess IWC's response on the CDP and the EIS together. IWC's response to the CDP states "Although this submission (CDP) deals primarily with 'content' issues, the Concept Design Plan exhibition has also raised 'process' issues for Council and the community. The most important of these are the document's lack of detail and the possibility there will not be sufficient time between the close of exhibition of the Concept Design Plan and commencement of exhibition of the Environmental Impact Statement (EIS) to allow issues raised by the former document to influence the latter." It is important to emphasize Council's view that there have been issues with the consultation process – most notably insufficient details within the Concept Design Plan (CDP) to allow for a thorough assessment of issues; no response to the issues raised by IWC on the CDP; insufficient time to interrogate and respond to the details in the EIS. Council seeks an improved consultation process, with sufficient detail in the forthcoming approval processes when RMS will prepare a submissions report and Preferred Infrastructure Report. Council request full participation in the assessment and approval of documents listed in this EIS that still need to be prepared in the final design. This includes Management Plans for areas described under the different chapters in this EIS.

Response

See response in **section B11.1.3**. It should be noted that SEARs are not consent conditions; they are the environmental assessment requirements which are to be addressed in the EIS.

B12.7.4 Consultation during finalisation of the design

Attachment 1 (Beca report) Section 7.3.3, p45

It is stated in Table 7.3, page 7.21 that, "Feedback and ideas collected through this phase [Concept Design Plan] informed additional mitigation measures and design refinement to take place during detailed design. There is no indication of what the process would be to involve IWC and others to participate in the design process as the detail provided in […] the Concept Design Plan was limited. More detail was expected in the EIS but this is further referred to the development of the PIR and other Management Plans, leaving the stakeholders, including IWC and their residents without clear answers on what to expect from the impacts as described in the different chapters of this document. SMC needs to demonstrate to IWC how IWC will be involved in the approval of the PIR and other Management Plans as described in the responses to different chapters in this document.

Attachment 1 (Beca report) Section 7.6.3, p46

It is stated that, "Community liaison would continue during the operational phase of the project. A Communications Plan would be developed to support maintenance and operations of the motorway as a key part of the Operational Environmental Management Plan framework". No indication of how IWC and others will be part of the approval of the final design and management plans before construction starts.

Response

The project is declared critical State significant infrastructure under Part 5.1 of the EP&A Act and DP&E is the regulatory agency responsible for the relevant planning approval. As outlined in **section A2.4**, SMC and Roads and Maritime would continue to provide consultation opportunities for the community and other key stakeholders, including the Inner West Council, during the ongoing refinement of the design, with a view to further minimising impacts of the project on communities, in line with the draft Community Consultation Framework provided in the EIS, the environmental management measures (see **Chapter E1** (Environmental management measures)) and any future conditions of approval. Councils, agencies, stakeholders and the local community will be consulted for their input into relevant items subject to the conditions of approval and environmental management measures.

In accordance with section 115Z(6) of the EP&A Act, a preferred infrastructure report has been prepared for the project (see **Part D** (Preferred infrastructure report). The preferred infrastructure report explains changes or refinements that have been identified to minimise environmental impacts or to address issues raised during exhibition of the EIS.

The number, location and layout of construction ancillary facilities would be finalised as part of detailed construction planning during detailed design. The facilities would need to be generally consistent with the facilities as described in the EIS and the Submissions and preferred infrastructure report and satisfy any relevant conditions of approval as discussed in section 6.5.1 of the EIS.

Should the design and construction contractor(s) require further ancillary facilities, changes to tunnel excavation methods or there are significant impacts the proposals for these changes, these would be subject to additional assessment and approval processes in accordance with statutory requirements. If the proponent (Roads and Maritime) requires changes to the project following approval, Roads and Maritime can apply to the NSW Minister for Planning. Any modification requests would be lodged with DP&E for assessment and would be appropriately notified and/or exhibited depending on the scale of the proposed modification and the potential for environmental or social impacts.

Management plans for the project would be consistent with the environmental management measures detailed **Chapter E1** (Environmental management measures). The plans would be developed in consultation with relevant stakeholders as reflected in the environmental management measures and conditions of approval as well as being made publically available where required.

Under Part 5.1 of the EP&A Act, the DP&E is the regulatory agency responsible for the relevant planning approval. Councils, agencies, stakeholders and community will have input into relevant items subject to the conditions of approval and environmental management measures.

B12.7.5 Consultation on environmental management measures

Attachment 1 (Beca report) Section 7, p43

Many of the concerns raised through consultation are addressed by consideration and management measures being developed in the future. This does not give stakeholders the opportunity to comment upon the adequacy or otherwise of proposed management measures. The cumulative sum of these future management measures and further consultation activities may in total result in project implementation which is unacceptable. However, this EIS is requesting permission to proceed with the project without adequate management measures and safeguards put in place. For instance, whilst effort have been made to keep the project surface footprint to a minimum in terms of property acquisition, some of the remaining properties close to project boundaries may suffer considerable lowering of amenity due to the project construction and operation and should also be acquired. Minimising the project footprint is good for the project as it keeps property acquisition costs low but may not result in the best overall outcome for the locality and the local community. Stakeholder consultation comments factored into the project design.

Response

As outlined in **section A2.4**, SMC and Roads and Maritime would continue to provide consultation opportunities for the community and other key stakeholders, including the Inner West Council, during the ongoing refinement of the design and construction planning, with a view to further minimising impacts of the project on communities, in line with the draft Community Consultation Framework provided in the EIS, the environmental management measures (see **Chapter E1** (Environmental management measures)) and any future conditions of approval.

B12.7.6 Consultation on construction impact due to construction vehicles

Attachment 1 (Beca report) Section 6 Overall Evaluation, p42

Whilst this is required for developing the best design for implementation, there is very little detail on construction impact by construction vehicles and how impacts will be managed. Also, no indication of how stakeholders and IWC will be involved as an approval authority for impacts that effect their roads […] and the people that live, work, play, drive, walk cycle and do business in the areas around construction sites. The EIS presents a very loose commitment to keep the stakeholders informed. Chapter 7 uses all the right words but lacks the detail of what a consultation plan in terms of construction impact will deliver, what the organisation framework is to make it clear who is responsible for what and how people can feel consulted and listened to, throughout the implementation program. IWC requests the establishment of a detailed Construction Impact and Implementation Plan wherein IWC will be allowed to participate as an approval authority of all Construction Management Plans before any construction starts.

Response

A Construction Traffic and Access Management Plan (CTAMP) will be prepared, in consultation with councils and relevant transport stakeholders, as part of the Construction Environmental Management Plan (CEMP) and will be made publicly available. The CTAMP will be prepared in accordance with the conditions of approval and will include the relevant environmental management measures detailed in **Chapter E1** (Environmental management measures). The environmental management measures include requirements to develop project staging plans, a truck management strategy and a car parking strategy.

B12.8 Traffic and transport

Refer to Chapter 8 (Traffic and transport) and Appendix H (Technical working paper: Traffic and transport) of the EIS for details of traffic and transport.

B12.8.1 Land use forecasts used in traffic modelling

Attachment 1 (Beca report) Section 8.1.4, p49

It is stated in the EIS that LU14 landuse forecast as provided TPA (Transport Performance and Analytics business unit within Transport for NSW) have been used to inform the WRTM v2.3 modelled used for estimating forecast traffic and transport changes. These land use forecasts are provided for years corresponding to Census (i.e. 2011, 2016). Appendix H identifies that interpolation and extrapolation of 2012, 2021, 2026 and 2031 forecast have been used for the various scenarios. Have any sensitivity tests been undertaken to establish the effect of: Bias associated with interpolation of landuse trends between 2021 and 2026; extrapolation between 2026 and 2031 to reflect 2023 and 2033 landuses. That being landuse growth maybe under or over stated, as changes are not necessarily linear between these census years. Following the 2016 Census, landuse projection have been updated and provisional LU16 forecasts are now available. Has a sensitivity assessment been undertaken to establish to what extent these provisional populations have changed from LU14 and whether this has an effect on the modelling outcomes. IWC requests that sensitivity of changes to land-use forecasts on the modelling be undertaken as part of the EIS.

Attachment 1 (Beca report) Section 8.1.7, p51

Landuse projections based on LU14, as per previous comment (8.1.4). What effect does provisional LU16 landuse forecast have on the project?

Response

The land use version 16 (LU16) projections were released after the strategic traffic modelling for the EIS was completed. No comparison of the projections which were used in the EIS (version LU14) against the LU16 projections has been undertaken. No sensitivity analysis or updating of the EIS traffic modelling following the release of the LU16 forecasts has been undertaken.

B12.8.2 Traffic modelling inputs

Attachment 1 (Beca report) Section 8.1.4, p49

It is stated that the study area for operational modelling was identified from forecast changes in traffic associated with and without the project in the WRTM v2.3 model. No information is provided regarding what threshold was applied in considering whether the difference is big enough to warrant being included in the operational modelling study area? IWC requests that information be provided regarding thresholds for warrants for determination of operational study area extents.

Attachment 1 (Beca report) Section 8.1.5, p50

Within the EIS, Figure 8-3 illustrates the modelling process undertaken. It however does not illustrate whether the modelling sequence has been undertaken in a sequential or iterative process. That being the operational modelling influencing the strategic modelling and affecting traffic volumes, route choice or mode share. And if this has occurred has there been convergence (i.e. relative change between iterations). The route options and mode choices available within the model area indicate that this could be sensitive to changes in performance. IWC requests that further information be provided regarding the modelling process. Including information why this methodology has been adopted.

It is indicated that in the future (with and without the project), it is assumed "some new infrastructure and improvements to improve capacity and to cater for traffic growth". How has this been applied to the model and where has it been applied. What affect does this assumption have on the outcomes of the modelling results? Details are not provided in this EIS. IWC requests that details on assumed new infrastructure and upgrades included in modelling be provided that are not associated with the project.

None of the options listed in Table 8-2 indicate improvements to Public Transport, nor does any of the cumulative case scenarios include the provision of Sydney Metro West. As Sydney Metro West captures a similar catchment to WestConnex, it would be prudent to assess its influence on the project. It is recognised that in Appendix H, Sydney Metro West has been excluded from the STM modelling. However, given its scale it has the potential to influence the benefit realisation of this project and as such should be considered with regards to its sensitivity to WestConnex's benefit realisation. IWC requests that options that consider Public Transport Improvements be included in the model, including a sensitivity test of the effect of the inclusion of Sydney Metro West. This is a significant project that needs to be included in the modelling assessment.

Attachment 1 (Beca report) Section 8.1.6, p50 and p51

As per above, there appears to be no sensitivity test done to consider the effect of Sydney Metro West on WestConnex as well as the effect it will have on landuse and hence STM along its proposed alignment. IWC requests that options that consider Public Transport Improvements be included in the model, including a sensitivity test of the effect of the inclusion of Sydney Metro West. This is a significant project that needs to be included in the modelling assessment. See also IWC's concerns as discussed in Issue 13 at the start of this report.

It is indicated that the growth in WRTM has been pivoted off the base traffic volumes (i.e. applied to the base. Is it not possible to get demand flows from WRTM to then be used in the operational modelling?

Anticipated upgrades to road network, as per 8.1.5 above, what are these?

Attachment 1 (Beca report) Section 8.1.7, p51

It is not clear how much traffic is being induced by the project, it has been imbedded with population growth and improved travel time, equating to 0.3 percent. SEAR 2(f) requires the induced traffic of the project to be identified. IWC requests that the traffic induced by the project be indicated, (i.e. comparison between with and without project).

Why were Paramics and VISSIM used, and what is the rationale behind different packages for different locations?

Corridor selection, as mentioned above - what were the thresholds for selection of operational modelling study areas.

There are no details within the EIS regarding the outcomes of the calibration and validation, including the level of calibration achieved and comments received from the independent peer reviewer. IWC requests that the outcomes of the operational model calibration and validation process be provided. There should be a separate modelling report to cover calibration/validation.

As indicated previously, what is the rational for pivoting growth to base flows over using outputs from the strategic model?

The use of LinSig for modelling construction impacts is not going to capture wider network and mid-block effects. It is reasonable that for the scale of construction activities, Microsimulation traffic modelling may be more appropriate.

Attachment 1 (Beca report) Section 30.1, p167

The WestConnex EIS states that the proposed M4–M5 Link is a critical motorway link that contributes (together with the M4 East and New M5 projects) to connecting western Sydney's population and growth centres with employment and business opportunities in the Sydney CBD and in the Sydney Airport and Port Botany precinct. This statement is correct for home-work trips but this demand is better served by public transport options such as Sydney Metro West. The best solution to service the road transport demand for goods and better access to the Port and Airport is not provided for in this M4 – M5 Link design. The transport modelling and business case supporting this project have not answered the many questions on the modelling assumptions of which the biggest is perhaps to why the Sydney Metro rail project has not been taken fully into account for demand predictions.

Response

Operational modelling study area extent

Annexure B of Appendix H (Technical working paper: Traffic and transport) of the EIS presents the scope of the road network impacted by the project to provide justification of the nominated boundaries of the operational model areas. Operational modelling was focused around the areas of largest local impact in the AM and PM peak hours, which are generally around the motorway interchanges, namely the Wattle Street interchange, the Rozelle interchange and the St Peters interchange. The extents of the operational model areas generally covered roads where the change in traffic volumes would likely cause a significant operational impact. The forecast AM and PM peak hour traffic demand changes can be seen in Figure 3 and Figure 4 of Annexure B (Justification of modelled areas) of Appendix H (Technical working paper: Traffic and transport) of the EIS.

In addition, Chapter 9 presents the forecast future year traffic volumes and patterns with the project in both 2023 and 2033. This is a wider assessment using only traffic forecasting data (derived from the WRTM) as this provides evidence of high level patterns across parallel strategic corridors within and external to the study area for peak and daily time periods.

Modelling process

The assessment methodology is discussed in detail in section 4 of Appendix H (Technical working paper: Traffic and transport) of the EIS. Section 4.2.1 of Appendix H of the EIS provides details of the data inputs for the WRTM. In particular, Figure 4-1 of Appendix H of the EIS provides a graphical representation of how the operational and construction modelling was undertaken. Mode shift has been included in the WRTM as discussed in Chapter 8 and Appendix H (Technical working paper: Traffic and transport) of the EIS, which is then used to inform demand in the operational model. In the operational modelling, consideration of public transport mode shift is also influenced by the microsimulation algorithms.

Infrastructure and upgrades included in the modelling

As noted in section 4.2.1 of Appendix H (Technical working paper: Traffic and transport) of the EIS, the data inputs for the WRTM included recently completed and proposed future infrastructure project lists, including information from Transport for NSW. Transport for NSW is delivering and planning the following Sydney Metro projects:

- Sydney Metro Northwest (Rouse Hill to Chatswood) – under construction, the first stage of Sydney Metro would deliver eight new railway stations and 4,000 commuter car parking spaces to Sydney's Northwest and has been included in the future strategic modelling
- Sydney Metro City and Southwest (Chatswood to Bankstown) – the second stage of Sydney Metro would extend the metro rail across Sydney Harbour, through Sydney CBD and to Bankstown. It would deliver seven new railway stations, with the first stage (Chatswood to Sydenham) currently under construction and the second stage (Sydenham to Bankstown) in the planning phase. The Sydney Metro City and Southwest project has been included in the future strategic modelling

- Sydney Metro West was recently announced by NSW Government and is planned to link Parramatta and Sydney's CBDs and serve Sydney Olympic Park and The Bays Precinct along the route. This project is at the early stage of development and has not been included in the future strategic modelling (at the time of preparation) as sufficient definition of this project was not known to inform the traffic modelling for the EIS.

A set of future road infrastructure projects for the modelled Sydney metropolitan area for future years was developed and is consistent with its current funding and planning policies. These projects formed the basis for the future 'Do minimum' networks modelled in the WRTM and are described in section 4.2.1 of Appendix H (Technical working paper: Traffic and transport) of the EIS.

Induced Traffic

Induced traffic is discussed in **section B11.8.21**.

Use of Paramics and VISSIM for the operational modelling

An existing calibrated Paramics model, which was developed for the New M5, was updated and used for the St Peters interchange as noted in section 4.2.3 of Appendix H (Technical working paper: Traffic and transport) of the EIS. VISSIM modelling software was used for all other interchanges and was selected on the basis that it is appropriate software platform for this analysis.

Use of LinSig for modelling construction impacts

Base year construction models were developed in LinSig (a modelling software) as, unlike the interchanges assessed in the operational assessment, detailed interactions such as weaving and merging associated with the introduction of construction traffic are not prevalent. This is a similar approach to that used in the M4 East and New M5 EIS construction impacts assessments. The construction models were calibrated in a similar manner to that already described for the operational models.

The construction activity associated with the project would not result in a significant increase in vehicle numbers on the road network. Compared to existing traffic levels, construction traffic represents a very small increase in traffic which in most cases is less than one percent. Intersections would be expected to be limiting the traffic, and therefore it is more appropriate to model the intersections. Mid-block analysis of the input of construction vehicles based on changes in volume to capacity ratios are provided in section 7 of Appendix H (Technical working paper: Traffic and transport) of the EIS.

Peer Review

As discussed in **section B11.8.1** an integral part of the modelling process was the involvement of independent expert peer reviewers to examine the strategic model development, methodologies for the production of traffic forecasts and the traffic forecasts.

B12.8.3 Incorporation of public transport into the project

Attachment 1 (Beca report) Section 7.5, p46

Table 7.8, page 7.37: NSW Health has commented that emphasis on public transport should be encouraged. The response in the EIS says that this is addressed in Chapters 4, 5 and 12. This is not the case. Very little reference has been made to public transport in the EIS. Further work needs to be undertaken to specifically address how public transport is incorporated into this project.

Attachment 1 (Beca report) Section 8.1.1 p48

Within the EIS it is stated: "A congested road network also affects public transport; with bus travel times experiencing the same delays as other road users. Providing new, tunnel alternatives to sections of the arterial road network will improve road-based public transport travel times and provide opportunities for new rapid transit options." This is only true if based on a fully integrated bus system. If bus priority measures are provided, then there can be a difference in road based travel times. The EIS does not specifically discuss the opportunities provided for rapid or segregated public transport services. IWC expects the EIS to specifically discuss the opportunities provided for rapid or segregated public transport services and how it impacts the integrated system. IWC however accepts that road congestion also affects bus congestion, and that investment in motorway infrastructure should be accompanied by investment in public and active transport.

Response

Consideration of public transport in the EIS

WestConnex is one of more than 80 projects outlined in the *Transport Master Plan* to address the state's complex transport needs. As part of a broader integrated transport and land use solution, WestConnex supports a coordinated approach to the management of freight and passenger movements, and is complementary to other modes of transport including rail, bus, ferries, light rail, cycling and walking. However, Sydney's freight, commercial and services tasks require distribution of goods and services across the Sydney basin, which relies on diverse and dispersed point-to-point transport connections that are most efficiently provided by the road network.

Impacts to the integrated transport network are considered in Chapter 8 (Traffic and Transport) and in Appendix H (Technical working paper: Traffic and transport) of the EIS. This was done through consideration of the local and regional roads, cycling, public transport and freight transport which is summarised in section 8.3.3 of the EIS. Specific considerations of how the project would integrate with the public transport network around the Rozelle interchange, including the Inner West Light Rail line and the bus routes that run along Victoria Road and The Crescent are also discussed in section 5.6.8 of the EIS. Integration with public transport around Iron Cove Link is discussed in section 5.7.6 of the EIS.

Anticipated modifications to the public transport network needed to facilitate construction of the project are outlined in section 6.6.3 of the EIS.

Potential impacts on infrastructure including the Sydney Metro City and Southwest rail tunnels, Inner West Light Rail line and Sydney Metro West rail tunnels are discussed in section 12.3.4 of the EIS.

Land use and transport integration and opportunities adjacent to the surface works are discussed in section 12.4 of the EIS.

Active transport elements of the project are identified as a key component of the project as described in Chapter 5 (Project description) of the EIS. Details of the proposed pedestrian and cyclist facilities are described throughout section 5.6 of the EIS for the Rozelle interchange and in section 5.7.4 of the EIS for the Iron Cove Link. These sections also contain figures of the surface work locations which includes locations of the shared paths which form part of the project.

Specific consideration of public transport services and usage as discussed in **sectionB12.8.5.**

Future public transport opportunities

The construction of the M4-M5 Link also does not preclude public transport projects from being developed in the future. Roads and Maritime will continue to consult with Transport for NSW on the interface between the M4-M5 Link project and the Sydney Metro City and Southwest and Sydney Metro West projects.

The WestConnex project is one part of a broader solution to Sydney's emerging transport pressures. While public transport is also part of this solution, it is recognised that not all trips in Sydney can be served by public transport, such as trips to dispersed destinations, or commercial trips requiring the movement of large or heavy goods/materials. A congested road network also affects road-based public transport, increased bus travel times and variable journey times.

For these reasons, the NSW Government is investigating and investing in light rail, metro, bus rapid transit and motorways to provide a multi-modal response to the future challenges. In this context, WestConnex is an enabler of integrated transport and land use planning, supporting the development of initiatives including The Bays Precinct, and the Parramatta Road Corridor Urban Transformation Strategy.

The forecast reduction in general traffic demand on Victoria Road between Iron Cove Link and Anzac Bridge would provide the opportunity to improve public transport operations along the Victoria Road corridor. These improvements do not form part of the project and would be the responsibility of Transport for NSW.

The Parramatta Road corridor is an important bus route servicing the inner west. The reduction in traffic along sections of Parramatta Road as a result of the project would facilitate the opportunity for the future development of on-road public transport improvements as envisaged by the NSW Government. Further discussion on the manner in which the project would facilitate future public transport improvements as part of the *Parramatta Road Corridor Urban Transformation Strategy* is provided in **section B10.3.3**.

B12.8.4 Current road hierarchy map

Attachment 1 (Beca report) Section 8.2.1, p52

No current road hierarchy is provided in the EIS, indicating the various levels of roads within Study Area. This is needed to be able to assess how the changes of existing traffic conditions on various routes, the function of growth and the impact of the WestConnex Project will have on the hierarchy changes. It is important to indicate where [mismatches] in hierarchy jumps will occur. IWC requests that a road hierarchy map related to the project study area, including proposed changes to this hierarchy as part of WestConnex be provided.

Response

The study area presented in Figure 8-2 of the EIS includes road hierarchy details identifying arterial, subarterial and local roads. Forecast changes in traffic volumes associated with the project as presented in section 10 of Appendix H (Technical working paper: Traffic and transport) of the EIS may result in changes to the road hierarchy for some sections of roads affected by the project.

Changes to the road hierarchy would be determined as part of the review of operational network performance that will be undertaken 12 months and five years from the opening of the project to confirm the operational impacts of the project on surrounding arterial roads and major intersections in proximity to the Wattle Street interchange, Rozelle interchange and St Peters interchange.

B12.8.5 Existing public transport patronage

Attachment 1 (Beca report) Section 8.2.2, p52

Has the description of rail services, including changes to the Inner West Line frequency as part of TfNSW "More Train More Services Timetable" been] considered? No current patronage or usage from study area has been included, or an assessment on total customer journey times (including linked-in vehicle journey and waiting travel time) and how this compares to private vehicle use travel times. One of the project needs stated in the Executive Summary is that "not all trips across Sydney can be served by Public Transport, especially trips to dispersed destinations". Therefore, this comparison between Public Transport and Private vehicle travel time should provide an evidence-base for this identified project need. SEAR 2 (d) and (f) also requires an assessment of operational implications for public transport, therefore this benchmarking of existing Public Transport users is required to understand the implications the Project has on Public Transport.

Attachment 1 (Beca report) Section 8.2.2, p52, Attachment 1 (Beca report) Section 8.3.2, commencing p63

Bus Services: No information is provided regarding current bus patronage and total journey time for customers within the Study Area. This is required in order to be able to assess the operational implications of the project on Public Transport Users. IWC requests that an assessment of total customers from Study area using Bus as a mode of travel and their associated total travel time, including a comparison to private vehicle travel time to destinations, be provided. See also IWC concerns as discussed Issue 13 at the start of this report.

Attachment 1 (Beca report) Section 8.2.3, p54

SMC to provide an assessment of total customers from the Study area using public transport for the various modes of travel and their associated total travel time, including a comparison to private vehicle travel time to destinations and how this is impacted with the project. See also IWC concerns discussed in Issue 13 at the start of this report.

Attachment 1 (Beca report) Section 8.2.3, p54, Attachment 1 (Beca report) Section 8.2.5, p55

Public Transport: As per response discussed above, not enough details provided regarding Public Transport Users. SEAR 2 (d) and (f) requirements yet to be met. IWC requests that an assessment be provided of total customers from Study area using Rail, Light Rail and Bus as a mode of travel and their associated total travel time, including a comparison to private vehicle travel time to destinations.

Attachment 1 (Beca report) Section 8.3.1, p62, p63

SMC to provide an assessment of total customers from Study area using Rail, Light Rail and Bus as a mode of travel and their associated total travel time, including a comparison to private vehicle travel time to destinations and how this is altered by the proposed construction activities and indicate whether any mode changes, short term or long-term elasticities may occur?

Response

It is recognised that the Inner West LGA has a higher share of public transport due to the area's proximity to the Sydney CBD and frequent bus services as discussed in section 5.2.1 of Appendix H (Technical working paper: Traffic and transport) of the EIS.

Specific patronage numbers for each route were not included in the assessment. However, average weekday travel mode share for the Inner West LGA is provided for private vehicles, rail, bus, walk and other modes in Table 5-1 of Appendix H (Technical working paper: Traffic and transport) of the EIS, derived by combining data from the former Leichhardt, Ashfield and Marrickville LGAs with data from the NSW Bureau of Transport Statistics (BTS), *Household Travel Survey Report: Sydney 2012/13*, Nov 2014 Release. A breakdown of travel mode to work for each of the precincts relevant to the project was also provided in section 5.1 of Appendix P (Technical working paper: Social and economic) of the EIS.

Infrastructure, services and patronage of public transport services as they were at the time the EIS was produced have been included in the existing traffic and transport environment which is summarised in section 8.2 of the EIS and in section 5 of Appendix H (Technical working paper: Traffic and transport) of the EIS. This does not include the *More Train More Services Timetable* initiative which commenced in November 2017 following the release of the EIS for public exhibition.

The combined number of new road trips and trips reassigned from public transport as a result of the full WestConnex program of works is anticipated to be around 0.3 per cent of the total number of daily car trips on the WestConnex Road Traffic Model (WRTM) Sydney-wide network in 2033 (refer to section 4.2.1 of Appendix H (Technical working paper: Traffic and transport) of the EIS). This mode shift has been included in the WRTM and considered in the traffic modelling for the project described in Chapter 8 and Appendix H (Technical working paper: Traffic and transport) of the EIS.

B12.8.6 Impacts on bus services

Attachment 1 (Beca report) Section 6.6.3, p40

As noted in Chapter 8 on Public Transport, not enough details are provided regarding Public Transport Users. SEAR 2 (d) and (f) requirements yet to be met. It is mentioned in this Section that the proposed modifications to the public transport network would be reviewed during detailed design with the objective of minimising disruptions to public transport services and customers.

Any bus stop relocations would be agreed with Transport for NSW and all affected bus operators. SMC to involve IWC as an approval authority (see "Overall evaluation below) to be part of the review during detail design of these modifications.

Response

Construction impacts on public transport for each of the interchanges and corridors which are discussed in chapter 5 are presented in the relevant sections of chapter 7 of Appendix H (Technical working paper: Traffic and transport) of the EIS.

Temporary impacts on bus stop locations are detailed in section 7.4.6 of Appendix H of the EIS. Table 7-24 of Appendix H of the EIS of outlines the indicative changes to bus stop locations during construction.

The modifications and proposed temporary locations of the bus stops would be reviewed during detailed design with the objective of minimising disruptions to public transport services. Any bus stop relocations would be agreed with Transport for NSW and all affected bus operators, and would need to consider proposed pedestrian diversions during construction. The Inner West Council's request to be an approval authority is discussed in **section B12.8.17.**

A CTAMP would be prepared by the design and construction contractor(s) following approval of the project and would address the requirements of the conditions of approval and include the relevant commitments in the environmental management measures (see **Chapter E1** (Environmental management measures)). The CTAMP will also consider impacts to public transport services, such as impacts to, or on users of, the Leichhardt North and Rozelle Bay Light Rail stops and bus stops. Key stakeholders, including councils, will be consulted during the preparation of the CTAMP as appropriate and in accordance with the conditions of approval.

B12.8.7 Analysis of crash data and identification of causes

Attachment 1 (Beca report) Section 8.2.2, p53

The crash analysis only covers Parramatta Road. What was the rational for not including other routes within the Study Area given the likelihood that vehicles could be avoiding Parramatta Road and using local streets to avoid congestion? This could be resulting in safety issues that are not being captured as part of the assessment. This is also very relevant where there is a change in road hierarchy for example a level 2 road joining a level 4 road with sudden change in amenity – see comment on road hierarchy in 8.2.1. IWC requests SMC to undertake a safety assessment on the entire study area, including the local roads.

In Table 8-11 a crash rate as a proxy to crash risk within the Study Area has been provided. It indicates that crash rate of injury crashes along Parramatta Road is nearly twice that of the Sydney Metropolitan Area. Insufficient information is provided regarding why this is the case, the severity (severe or minor) of these crashes, whether clusters are occurring and whether the crashes are involving vulnerable road users. IWC requests SMC to undertake further safety assessments to understand the reasoning behind why the injury crash rate is higher than other parts of Sydney. Provide information on the severity of these crashes, whether clusters are occurring and if they are involving vulnerable road users.

Attachment 1 (Beca report) Section 8.3.3, p66

Traffic Crashes, as with the with-and-without scenarios, crash analysis does not provide information regarding what type of crashes are expected, their severity, whether they maybe involving vulnerable road users and if there are crash clusters. It is recommended that additional crash analysis and forecasting undertaken, as discussed previously. IWC requests SMC to undertake a road safety assessment on roads in the entire study area including local streets and to undertake further safety assessments to understand the reasoning behind injury crash rates. Also provide information on the severity of these crashes, whether clusters are occurring and if they are involving vulnerable road users, including expected changes associated with the project. See also IWC concerns discussed in Issue 10 at the start of this report.

Response

A discussion of crash statistics, crash rates and costs is presented for key roads around each of the project interchanges for the existing condition and the 'Without project' and 'With project' scenarios in Chapter 6, Chapter 8 and Chapter 10 of Appendix H (Technical working paper: Traffic and transport) of the EIS. In addition, section 10.2.2 of the Appendix H of the EIS includes an assessment traffic crashes along the M4-M5 Link Motorway. The scope of the assessment is consistent with that prepared for preceding WestConnex projects, including the M4 East and New M5 projects.

As described in section 3.1.1 of Appendix H of the EIS, the Parramatta to Sydney CBD via Strathfield corridor (which includes Parramatta Road) is one of the most constrained strategic transport corridors in Sydney, experiencing significant congestion with resultant increase in travel time and variability. Over the past five years, the majority of crashes on the major roads in the study area including Parramatta Road were rear-end crashes, which is consistent with roadways operating at or beyond capacity and on which significant queuing occurs.

More detailed crash analysis, including analysis of historic data, which identifies the types of crashes, severity, the parties involved in the incidents and the identification of root causes is beyond the scope of the EIS.

B12.8.8 'With' and 'Without project' scenarios on the impacts on public transport

Attachment 1 (Beca report) Section 8.3.1, p62

Table 8-46 and Table 8-47: What effect does worsening operational performance on the routes identified have on public transport users within the Study area. That being the number of customers affected and changes to their total travel time (including wait, in-vehicle and travel time reliability). As per SEAR 1(e).

Attachment 1 (Beca report) Section 8.3.2, p54

It is mentioned that reliability will be affected on bus services within the Do Minimum (2033) scenario. To what extent will reliability be affected, and on what services, and how does this effect variability in travel time for customers? As with the existing network, no information is provided regarding changes to public transport frequencies, projected patronage and the effect on total customer journey time going forward. This is needed to be able to access the comparable journey time between public transport and private vehicles for various destinations to assess if sensitivity to mode share may occur.

Comments on Public Transport for 2023 and 2033 With Project scenario are the same as those above for the existing and future Without scenarios. There is no information regarding changes to customer travel times on public transport and how this changes as a result of the project. Increasing congestion on Anzac Bridge and Western Distributor may affect overall travel time for public transport and private vehicle users. A comparison with alternative mode total travel time between origins and destinations will indicate the potential mode shifts associated with the project.

Attachment 1 (Beca report) Section 8.3.3, p66

No information is provided regarding how the relative bus travel times have been determined and why they are only isolated to some routes (i.e. Parramatta Road). As per above, more information is required regarding the effects on public transport.

Response

The manner in which the assessment of traffic and transport impacts has considered public transport patronage is provided in **section B12.8.5**. The combined number of new road trips and trips reassigned from public transport as a result of the full WestConnex program of works is anticipated to be around 0.3 per cent of the total number of daily car trips on the WRTM Sydney-wide network in 2033 (refer to section 4.2.1 of Appendix H (Technical working paper: Traffic and transport) of the EIS). This mode shift has been included in the WRTM and considered in the traffic modelling for the project described in Chapter 8 and Appendix H (Technical working paper: Traffic and transport) of the EIS.

Chapter 8, Chapter 10 and Chapter 12 of Appendix H (Technical working paper: Traffic and transport) of the EIS assess the impacts on bus travel times along key bus corridors around the Wattle Street, Rozelle and St Peters interchanges for the ‘Without project’, ‘With project’ and ‘Cumulative’ scenarios in both 2023 and 2033 respectively. The assessment includes forecast changes in average travel time for buses.

B12.8.9 Existing operational performance for the Wattle Street interchange and surrounds

Attachment 1 (Beca report) Section 8.2.2, p53

Network Performance: It is stated that "The Parramatta Road corridor currently functions under high levels of traffic demand often exceeding capacity on the road, especially eastbound during the AM Peak. Does this mean that peak spreading is extending the morning peak period? Or is this leading to a diversion of trips? And has there been an assessment of potential rat-running of streets that are operating in a similar direction of travel and parallel to Parramatta Road? IWC requests that an indication be provided of whether peak spreading is occurring already on Parramatta Road, and is this leading to a suppression of trips and is it leading to Rat-Running on parallel streets. See also IWC concerns as discussed in Issues 10 and 14 [on the Concept Design] at the start of this report.

Intersection performance: Table 8-8 indicates that the Wattle Street Interchange is operating at a LOS that exceeds saturation capacity. However, the information in Table 8-7 and the network performance chapter indicates that the study area is operating at or above saturation in the AM peak hour. What is causing the congestion within the study area if it is not the intersections? IWC requests that information be provided regarding the key causes of intersection congestion within the AM peak of the study area.

Response

A summary of the information available for the existing conditions at the Wattle Street and surrounds is provided in sections 5.2 and 6.2 of Appendix H (Technical working paper: Traffic and transport) of the EIS.

Peak periods and daily traffic volumes for key locations around the Wattle Street interchange are provided in Table 5-3 of Appendix H (Technical working paper: Traffic and transport). Section 5.2.4 of Appendix H (Technical working paper: Traffic and transport) notes that current conditions on Parramatta Road, west of Wattle Street, indicate the peak period traffic volumes show similar trends to daily figures with a fairly 'flat' profile of traffic throughout the day between the AM peak and PM peak periods. Section 5.2.4 also notes that city-bound Parramatta Road volumes in the AM peak are lower due to congestion at the Wattle Street intersection, which acts as a gating mechanism holding back traffic flow.

To assess intersection performance for the EIS, exit blocking constraints, applied in the microsimulation models to reflect network congestion beyond the modelled network extents, were removed (refer to section 4.3.2 of Appendix H (Technical working paper: Traffic and transport)). This allows for an assessment of intersections within the modelled network, irrespective of downstream queuing that may mask the actual operation of the intersection.

Consideration of the reasons behind the removal of exit blocking constraints may assist in the identification of the cause of network performance issues in the modelled area around the Wattle Street interchange. The key factors behind the decision to remove the exit blocking constraints included:

- Congestion is currently observed in the network, particularly eastbound in the AM peak period along Parramatta Road and Frederick Street from the underpass south of Elizabeth Street and also the Hume Highway / Frederick Street intersection due to the large volume of traffic using the route in caparison to the capacity. Causes of this congestion include:
  - The merging of traffic from three lanes to two lanes on Parramatta Road, east of Sloane Street
  - The merging of traffic from two lanes to a single lane on Frederick Street in both directions is likely to result in congestion on Parramatta Road
- Bus stops and traffic signals along Frederick Street, particularly in the single lane sections is likely to also likely contribute to the congestion
- The signalised intersection of James Street and City West Link eastbound, which is outside the study area, is likely to be contributing to congestion past the intersection of Timbrell Drive and City West Link, which was the extent of the study area.

It is expected that the M4 East Road Network Performance Review would examine potential management measures following the collection of updated (post-opening) data that would facilitate an understanding of actual project outcomes and update management measures, if necessary. Section 9.3 of Appendix H (Technical working paper: Traffic and transport) of the EIS presents a comparison of the forecast AWT volumes from WRTM at the east–west screenline location under the 2023 and 2033 ‘Without project’ and ‘With project’ scenarios.

The east–west screenline captures changes in east–west traffic movement and includes a location on the M4-M5 Link mainline between the Wattle Street and Rozelle interchanges, as well as on four parallel corridors (City West Link, Darley Road, Marion Street and Parramatta Road). This screenline also includes a location on Lyons Road, which would reflect any changes in traffic using Lyons Road to travel to and from Victoria Road.

When comparing the 2023 ‘Without project’ and ‘With project’ scenarios, as a consequence of traffic using the M4-M5 Link, two-way AWT on surface roads is forecast to decrease by just over 20 per cent in the ‘With project’ scenario. The largest decreases in two-way AWT occur on Parramatta Road, Marion Street and City West Link, which run parallel to the M4-M5 Link between the Wattle Street and Rozelle interchanges. Two-way AWT is forecast to decrease on Parramatta Road by 25 per cent (more than 15,000 vehicles), on Marion Street by 40 per cent (more than 2,000 vehicles) and on City West Link by 23 per cent (more than 14,000 vehicles). This pattern of change is broadly when comparing the 2033 ‘Without project’ and ‘With project’ scenarios.

B12.8.10 Existing operational performance for the Wattle Street interchange to Rozelle interchange corridor

Attachment 1 (Beca report) Section 8.2.3, p54

Mid-Block Traffic Volumes: It is stated that "This corridor is also one of the most congested road corridors in Sydney and one of Sydney's busiest bus corridors. As discussed previously, does this mean that peak spreading is occurring? Is there any diversion of trips onto alternative routes and any observed rat-running occurring? IWC requests that an indication be provided of whether peak spreading is occurring already on Parramatta Road, and is this leading to a suppression of trips and is it leading to Rat-Running on parallel streets. See also IWC concerns as discussed in Issues 10 and 14 at the start of this report.

In Table 8-13, it indicates that the count data is 2014 to 2016. What growth at these sites occurred over this duration?

Response

See the response in **section B12.8.9** for discussion on peak spreading and potential use of alternative routes around the Wattle Street interchange.

The data provided in Table 8-13 of the EIS (also presented in Table 5-4 of Appendix H of the EIS) is an average based on three years' of Roads and Maritime traffic surveys (2014 – 2016). In the case of the Wattle Street intersection, traffic conditions have been altered due to the construction of the M4 East project, which would be likely to influence the traffic count. As such, growth rates for the count data were not calculated.

B12.8.11 Existing operational performance for the Rozelle interchange and surrounds

Attachment 1 (Beca report) Section 8.2.4, p54

In Table 8-18, it indicates that the count data is 2014 to 2016, what growth at these sites occurred over this duration? In Table 8-18, what were the reasons that heavy vehicles were not captured on the Anzac Bridge?

Tables 8-21 and 8-22, average speed and travel time are provided for various mid-block locations. How does this correlate to mid-block density and level of service? IWC requests that the existing mid-block density and level of service be provided.

Response

A summary of the information available for the existing conditions at the Rozelle interchange and surrounds is provided in sections 5.4 and 6.4 of Appendix H (Technical working paper: Traffic and transport) of the EIS.

As noted in section 4.3.2 of Appendix H of the EIS, due to the existing congested traffic conditions experienced on the surface road network in the study area during peak periods, the EIS did not report on mid-block level of service for the surface road network, but rather the network performance and intersection level of service. Average mid-block traffic volumes for key locations around the Rozelle interchange are presented in Table 5-8 of Appendix H (Technical working paper: Traffic and transport) of the EIS.

The available traffic survey data on Anzac Bridge did not distinguish between light and heavy vehicles, as noted in section 5.4.4 of Appendix H of the EIS. This is why heavy vehicle data for Anzac Bridge has not been included in Table 8-18 of the EIS. Table 5-9 to Table 5-11 of Appendix H of the EIS also provide details of the average peak, daily and weekly traffic volumes recorded at three key locations, by direction and in combination, namely Victoria Road, City West Link and Anzac Bridge. Intersection level of service data is provided in Table 6-9 of Appendix H of the EIS.

As noted in **section B12.8.10**, annual growth rates for the three years of count data were not determined, including for the Rozelle interchange and surrounds.

B12.8.12 Existing operational performance for the Rozelle interchange to St Peters interchange corridor

Attachment 1 (Beca report) Section 8.2.5, p55

It is stated that "Several of the roads identified above are with the Sydney Airport to Sydney CBD[,] CBD travel demand corridor which experiences high levels of traffic congestion". As discussed previously, does this mean that peak spreading is occurring? Is there any diversion of trips onto alternative routes and any observed rat-running occurring? Provide an indication of whether peak spreading is occurring already on the identified corridors and is this leading to a suppression of trips and is it leading to Rat-Running on parallel streets. See also IWC concerns as discussed in Issues 10 and 14 at the start of this report.

Table 8-28, as previously stated average speed and travel time are provided for various mid-block locations. How does this correlate to mid-block density and level of service? IWC requests SMC to provide the existing mid-block density and level of service.

There appears to be variability in the years that the data is collect, and varies between 2012 and 2016. This could bring in some bias to the assessment.

Response

A summary of the information available for the existing conditions at the Rozelle to St Peters interchange and surrounds is provided in sections 5.5 and 6.5 of Appendix H (Technical working paper: Traffic and transport) of the EIS.

As noted in section 8.1.8 and section 4.3.2 of Appendix H (Technical working paper: Traffic and transport) of the EIS, due to the existing congested traffic conditions experienced on the surface road network in the study area during peak periods, the EIS did not report on mid-block level of service for the surface road network, but rather the network performance and intersection level of service.

Average mid-block traffic volumes for key locations between the Rozelle and St Peters interchanges are projected in Table 5-12 of Appendix H (Technical working paper: Traffic and transport) of the EIS. Data on the Level of Service performance of key intersections in the corridor are presented in Table 6-9 of Appendix H of the EIS for the area surrounding the Rozelle interchange and Table 6-18 of Appendix H of the EIS for the area surrounding the St Peters interchange

As noted in section 6.5 of Appendix H of the EIS, the *NSW Long Term Transport Master Plan* reported high levels of transport congestion on this corridor, with Southern Cross Drive reported to operate at capacity during the AM peak period.

An upper north-south screenline and a lower north-south screenline were assessed to capture changes in vehicle travel patterns on north–south links (refer to section 9.4 and section 9.5 of Appendix H (Technical working paper: Traffic and transport) of the EIS).

Changes in the daily distance and time on surface roads shown in Tables 10-2 and 10-4 of Appendix H (Technical working paper: Traffic and transport) demonstrates a 12 per cent reduction in the vehicle kilometres travelled for surface roads in the Inner West Council LGA in 2023, and 11 per cent in 2033.

The reduction in traffic demand on major traffic routes, including those outside the Inner West Council LGA is likely to improve speed, journey reliability and safety on these corridors compared to a 'Without project' scenario. The M4-M5 Link, combined with proposed future Sydney Gateway would improve connectivity between Sydney's international gateways (Sydney Airport and Port Botany), western Sydney and places of business across the Sydney region. The project would also provide additional route options along the corridor and therefore increase network resilience in the event of accidents or network disturbances.

There are significant reductions in forecast daily traffic volumes along Victoria Road (south of the proposed Iron Cove Link), King Georges Road, Stanmore Road, Addison Road and Sydenham Road compared to the 'Without project' scenario. A decrease in the daily volume of heavy vehicles on surface roads is also forecast, as heavy vehicles shift onto the M4-M5 Link. Daily heavy vehicle volumes on Parramatta Road and City West Link are forecast to drop by 40 to 50 per cent, and roads in the Inner West, such as Stanmore Road, Sydenham Road, Marrickville Road and King Street, are forecast to drop by 20 to 50 per cent.

With the project, 2023 and 2033 peak period travel times are forecast to reduce between the M4 corridor and the Sydney Airport/Port Botany precinct, with traffic shifting from the A3 (King Georges Road) corridor to the M4-M5 Link. Between Parramatta and Sydney Airport, average peak period travel times are forecast to reduce by about 10 minutes, which is part of a 25 to 30 minute saving comparing the 'project' scenario to a scenario without WestConnex.

Further reductions on this route would occur in the 2023 and 2033 'Cumulative' scenarios. Between Parramatta and Sydney Airport, average peak period travel times are forecast to reduce by a further 10 minutes in the 2023 'Cumulative' scenario. This saving is part of a 35 minute saving comparing the 2023 'Cumulative' scenario to a scenario without WestConnex. Average peak period travel times are forecast to reduce by a further five minutes in the 2033 'Cumulative' scenario. This saving is part of a 40 minute saving comparing the 2033 'Cumulative' scenario to a scenario without WestConnex.

In the 2033 'Cumulative' scenario, increases are forecast in daily two-way volumes on Johnston Street, north of Parramatta Road in Annandale (about five to 15 per cent in the 'With project' scenario and about 10 to 20 per cent in the 'Cumulative' scenario) and on Gladesville Bridge (about five per cent in the 'With project' scenario and 10 to 20 per cent in the 'Cumulative' scenario). These increases reflect the forecast demand to and from the Rozelle area due to the new connectivity being provided by the Rozelle interchange.

B12.8.13 Existing operational performance at St Peters interchange and surrounds

Attachment 1 (Beca report) Section 8.2.6, p55

There appears to be variability in the years that the data [was collected], and varies between 2012 and 2016. This could bring in some bias to the assessment.

Response

The St Peters interchange is being built by the New M5 project and as such the data provided in section 8.2.6 of the EIS was based on data included in the New M5 EIS.

Table 8-38 of the EIS presents data from 1 January 2009 to 31 December 2013 which was sourced from the New M5 EIS and produced in 2015.

B12.8.14 Existing operational performance – Wattle Street to St Peters interchange corridor

Attachment 1 (Beca report) Section 8.2.7, p55

Table 8-40, as previously stated average speed and travel time are provided for various mid-block location. How does this correlate to mid-block density and level of service? IWC requests SMC to provide the existing mid-block density and level of service.

Response

A summary of the information available for the existing conditions at the Wattle Street to St Peters interchange corridor is provided in sections 5.7 and 6.7 of Appendix H (Technical working paper: Traffic and transport) of the EIS.

As noted in section 4.3.2 of Appendix H of the EIS, due to the existing congested traffic conditions experienced on the surface road network in the study area during peak periods, the EIS did not report on mid-block level of service for the surface road network, but rather the network performance and intersection level of service.

Average mid-block traffic volumes for a key location in the Wattle Street to St Peters interchange corridor are presented in Table 5-17 of Appendix H (Technical working paper: Traffic and transport) of the EIS. Data on the Level of Service performance of key intersections in the corridor are presented in Table 6-2 of Appendix H of the EIS for the area surrounding the Wattle Street interchange and Table 6-18 of Appendix H of the EIS for the area surrounding the St Peters interchange.

B12.8.15 Without the project operational impacts

Attachment 1 (Beca report) Section 8.3.2, commencing p63

The exclusion of Sydney Metro West from the project assumptions and no sensitivity test, is expected to influence the travel time for residents within some areas of the Study area, influencing the outcomes of base network modelling. Therefore, it is recommended that consideration of Sydney Metro West be included. For the base this will be to assess whether worsening congestion will lead to increase mode shift associated with increasing convergence of total journey time of trips. SMC to consider Sydney Metro West and the effects that it has on the Operational Impacts without the project. See also IWC concerns discussed in Issue 13 at the start of this report.

Table8-56 indicates a "substantial" increase in travel time. What effect is this going to have? This is not discussed in the EIS. Are these users going to continue to be private vehicle users and accept the increase in travel time and potentially not going to complete their trip within their intended time frames, or is mode shift potentially occur as travel times become comparable. The assessment should assess this potential mode shift, including (if not already done) update the strategic model with updated operational performance information to assess the effects. SMC to assess the impacts of increasing vehicle travel times. See also IWC concerns discussed in Issue 8, Issue 10 and Issue 13 at the start of this report.

Table 8-57: There is an increase in vehicle kilometres travelled within the study areas between 2015 and 2023. Are these differences associated with changes to the network or is it that vehicles are diverting onto alternative routes to avoid increasing congestion, hence resulting in longer journeys? SMC to assess the impacts of increasing vehicle travel times. See also IWC concerns discussed in Issue 8, Issue 10 and Issue 13 at the start of this report.

Table 8-59 and Table 8-60: It is shown that growth in demand will continue to occur. Is that likely to actually occur given the road network is at saturation point and the majority of this additional demand is unreleased from the study area? SMC to assess the impacts of increasing vehicle travel times. See also IWC concerns discussed in 8, Issue 10 and Issue 13 at the start of this report.

Table 8-61: Increasing congestion on Parramatta Road has the potential vehicles to divert onto Local streets. No information has been provided within the EIS regarding potential rat-running and the effect of this. Why would performance at Wattle Street in AM Peak improve without the project? SMC to identify rat-running routes associated with increasing congestion within the study area. See also IWC concerns discussed in Issue 8, Issue 10 and Issue 13 at the start of this report.

Table 8-62 and 8-63; as per previously, is this increasing congestion likely to result in mode shift or increase in alternative mode share? SMC to assess the impacts of increasing vehicle travel times. See also IWC concerns discussed in Issue 8, Issue 10 and Issue 13 at the start of this report.

Table 8-65, as with Parramatta Road, increasing congestion on Victoria Road may result in rat-running on alternative routes to avoid congestion. SMC to identify rat-running routes associated with increasing congestion within the study area. See also IWC concerns discussed in Issue 8, Issue 10 and Issue 13 at the start of this report. What is causing a reduction of trips on Bathurst Street within the model?

Attachment 1 (Beca report) Section 8, p66

The effect on Sydney Metro West on the benefit realisation of the project has not been considered. It is recommended that a sensitivity test be undertaken to understand what effect Sydney Metro West may have on mode share within the study area and establish if this has an effect on the project benefit realisation. SMC to consider Sydney Metro West and the effects that it has on the Operational Impacts without the project. See also IWC concerns discussed in Issue 13 at the start of this report.

Sydney Metro West proposed alignment intersects with WestConnex near the proposed Western Harbour Tunnel extension near White Bay. There are restrictions on station depths associated with fire and life safety and vertical transit. Therefore, if the Western Harbour Tunnel is constructed too deep, then this could preclude potential stations in the study area and potentially the viability of the project. The proposed alignment of WestConnex and Sydney Metro West should be considered to ensure that no clashes occur and preclude each other. SMC to consider Sydney Metro West and the effects that it has on the Operational Impacts without the project. See also IWC concerns discussed in Issue 13 at the start of this report.

Attachment 1 (Beca report) Section 8.3.3, p66

Figure 8-13, The flow-plot indicates increased traffic on streets within the Inner West Council. Council is undertaking a study on Local Area Improvements to investigate treatment options for local streets expected to experience impact as a result of the project. It is recommended that as the need for this infrastructure is a result of the project that it be funded as part of the Capital Expenditure of the project. SMC or RMS needs to commit to funding of the Local Area Improvements within the Inner West Council LGA to counter the effects associated with impacts as a result of the project. See also IWC concerns discussed in Issue 10 at the start of this report.

Wattle Street Interchange: The deterioration of intersection performance shown in Table 8-81 is likely to cause vehicles to use alterative local streets to avoid congestion at this intersection (e.g. Alt Street and Bland Street). It is recommended that infrastructure options be investigated to avoid the occurrence of rat-running along these routes. SMC or RMS needs to commit to funding of the Local Area Improvements within the Inner West Council LGA to counter the effects associated with impacts as a result of the project. See also IWC concerns discussed in Issue 10 at the start of this report.

Cumulative impacts only assess project stages and other road projects associated with the project (i.e. F6 extension, Western Harbour Tunnel and St Peters Interchange). No consideration has been made regarding the cumulative impacts associated with Sydney Metro City and Southwest (including the St Peters tunnel portal which is in close proximity to Sydenham Station and the St Peters Interchange) or urban renewal projects at White Bay. Cumulative impacts to assess all major construction and development activities within the Study Area, not isolating them to those associated with Project Stages or other future road projects. See also IWC concerns discussed in Issue 10 at the start of this report.

Attachment 1 (Beca report) Section 8, p67

Comments regarding the assessment as per those provided previously stated for operational impacts of the 'With' and 'Without' project.

Response

Details about the traffic modelling inputs, including Sydney Metro West, are also provided in the response in **section B12.8.2**.

The combined number of new road trips and trips reassigned from public transport as a result of the full WestConnex program of works is anticipated to be around 0.3 per cent of the total number of daily car trips on the WRTM Sydney-wide network in 2033 (refer to section 4.2.1 of Appendix H (Technical working paper: Traffic and transport) of the EIS). This mode shift has been included in the WRTM and considered in the traffic modelling for the project described in Chapter 8 and Appendix H (Technical working paper: Traffic and transport) of the EIS. A detailed discussion of the without project and with project impacts are provided in Chapters 8 and 10 of Appendix H (Technical working paper: Traffic and transport) of the EIS respectively.

The transport network in Sydney is expected to be put under increasing pressure over the next 20 years. *A Plan for Growing Sydney* (NSW Government 2014) indicates that from 2011 to 2031, Sydney's population is forecast to increase from 4.3 to 5.9 million, which equates to an average of 80,000 additional residents per year. Moreover, by 2036, the number of trips made around Sydney each day is forecast to increase by 31 per cent from 16 to 21 million vehicle movements. This growth will place increasing pressure on the NSW transport network and the key travel demand corridors connecting regional cities and major centres across the greater Sydney metropolitan area.

The WestConnex program of works is one part of a broader solution to these emerging pressures. While public transport is also part of this mix, it is recognised that not all trips in Sydney can be served by public transport, especially trips to dispersed destinations or commercial trips requiring the movement of large or heavy goods/materials. A congested road network also affects road-based public transport, increasing bus travel times and journey time variability. For these reasons, the NSW Government is also investigating and investing in light rail, metro, bus rapid transit and motorways to provide a multi-modal response to the future challenges. In this context, WestConnex is an enabler of integrated transport and land use planning, supporting the development of initiatives including *The Bays Precinct Transformation Plan* (UrbanGrown NSW 2015) and the *Parramatta Road Corridor Urban Transformation Strategy* (UrbanGrowth NSW 2016).

A number of key benefits and improvements are forecast as a result of the project:

- Non-motorway roads in the Inner West LGA are forecast to experience faster trips with the daily average speed increasing by about 10 per cent. Similarly, the vehicle distance travelled on non-motorway roads is forecast to reduce by about 12 per cent
- Improved network productivity on the metropolitan network, with more trips forecast to be made or longer distances travelled on the network in a shorter time. The forecast increase in vehicle kilometres travelled (VKT) and reduction in vehicle hours travelled (VHT) is mainly due to traffic using the new motorway, with reductions in daily VKT and VHT also forecast on non-motorway roads
- The project, along with investment in other road, public transport and active transport projects, would help to accommodate the forecast growth in population and travel demand in the Sydney metropolitan area
- Reduced travel times are forecast on key corridors, such as between the M4 Motorway corridor and the Sydney Airport/Port Botany precinct
- Reduced traffic is forecast on sections of major arterial roads including City West Link, Parramatta Road, Victoria Road, King Street, King Georges Road and Sydenham Road
- Around 2,000 heavy vehicles are forecast to be removed from Parramatta Road, east of the M4 East Parramatta Road ramps, each weekday.

Where the project would connect to the existing road network, increased congestion is forecast in parts of Mascot, along Frederick Street at Haberfield, Victoria Road north of Iron Cove Bridge, Johnston Street at Annandale and on the Western Distributor. A number of these areas are forecast to improve when the proposed future Sydney Gateway and the proposed future Western Harbour Tunnel and Beaches Link are completed.

Without the project and given the predicted growth in traffic volumes, future peak periods would become longer in both the AM and PM peaks, spreading congestion over longer periods of the day. The Strategic Transport Model (STM), which is used to determine the base demand model, considers mode choice factors to produce vehicle traffic demands for both peak and off-peak periods.

An assessment of travel times, considering the base demand data from the STM, is provided as part of the assessment of operational performance for the without the project and with the project scenarios reported in Chapters 8 and 10 of Appendix H (Technical working paper: Traffic and transport) of the EIS.

Forecast increases in vehicle kilometres travelled within the operational modelling areas is a result of a greater demand for travel due to population increases and employment growth (discussed further in **section B10.3.1**). The Wattle Street interchange and surrounds is an example of this situation with the data provided in Table 8-57 of the EIS, showing there is a 15 per cent increase in the total traffic demand and a 14 per cent increase in the average vehicle kilometres travelled in the network. As noted in section 9.3 of Appendix H (Technical working paper: Traffic and transport) of the EIS, as a consequence of traffic using the M4-M5 Link, two-way average weekday traffic on surface roads is forecast to decrease, particularly due to a reduction in 'through' traffic demand along Parramatta Road in both the eastbound and westbound direction (refer to section 10.3.2 of Appendix H (Technical working paper: Traffic and transport) of the EIS).

Tables 8-59 and 8-60 demonstrate that unreleased demand is expected in both the 2023 and 2033 'Without project' scenarios. If the project was not to be constructed, it is expected that the current behaviour of drivers, including shifting their departure times, allowing more travel time or selecting alternative destinations to avoid congestion would continue. Options for addressing this unreleased demand as a result of the project not proceeding are beyond the scope of this EIS.

Table 10-2 of Appendix H (Technical working paper: Traffic and transport) of the EIS presents the forecast percentage change in daily VKT, VHT and average speed in 2023 with the project on non-motorway links in the LGAs closest to the project. The forecast percentage changes indicate that, apart from Bayside, all other LGAs would either benefit from reduced traffic on surface roads or there is no forecast change. Roads within the Inner West LGA would experience a 12 per cent reduction in daily VKT, a 20 per cent reduction in daily VHT and a 10 per cent increase in daily average speed in 2023.

The Inner West Council's concerns with regards to existing and potential rat-running are noted. However, the identification of rat-running routes associated with the project not being constructed is beyond the scope of the EIS. The Parramatta Road/Wattle Street intersection performance improvement 'Without project' is a result of the construction of the M4 East, which is expected to be operational from 2019.

In the 2033 'Without project' scenario, forecast demands show a reduction in demand to Bathurst Street and an increase in demand to Sussex Street. The Sussex Street exit ramp is not as constrained, and so this change in traffic patterns results in an improved northbound flow on the Western Distributor between Sussex Street and Sydney Harbour Bridge and a corresponding improvement in eastbound flow over Anzac Bridge (refer to section 8.3.2 of Appendix H (Technical working paper: Traffic and transport) of the EIS).

Cumulative impacts from other projects are discussed in **section B12.26.** Discussion of the Sydney Metro City and Southwest project is presented in **section B12.8.2**.

B12.8.16 Traffic considerations associated with The Bays Precinct

Attachment 1 (Beca report) Section 3.1.12, p15

It is stated that The Bays Precinct delivery is intended to be staged and coordinated with the planning and delivery of WestConnex and the expansion of the Sydney Light Rail network as well as the long-term considerations of The Bays Precinct's port uses. The Bays Precinct Transformation Plan recognises that an efficient transport system enables urban transformation, and that transport solutions for The Bays Precinct would need to be integrated with planning for a growing Sydney, including the consideration of varied transport modes.

The Bays Precinct will become more popular in [the] future and an attraction (trip generator) for more traffic during special events, weekends and holidays. The M4-M5 Link will provide good access to the area with the local roads leading to and from the Rozelle Interchange experiencing congestion. How did SMC plan and allow for [this] in the final design of these roads?

Attachment 1 (Beca report) Section 3.2.6

The EIS states, the project, as part of the WestConnex program of works, would act as a catalyst for urban renewal along parts of Parramatta Road and Victoria Road and would support the development of The Bays Precinct, as outlined in The Bays Precinct Transformation Plan (UrbanGrowth NSW 2015b). See our [Attachment 1 to the Inner West Council's] response in Section 3.1.12 above.

Response

Population and employment growth associated with development of The Bays Precinct was included in the WRTM and as a result traffic forecasts used in Appendix H (Technical working paper: Traffic and transport) of the EIS include consideration of the demand associated with the development (see section 3.4.5 of Appendix H (Technical working paper: Traffic and transport) of the EIS). The design of road upgrades or new roads to service development of The Bays Precinct is not within the scope of M4-M5 Link EIS.

The forecast reduction in daily traffic volumes along Victoria Road (south of Iron Cove Bridge) in the 2023 and 2033 future year scenarios aligns with the key project objective to relieve road congestion, particularly along existing arterial road corridors. As a result of this reduction, opportunities to rejuvenate this section of Victoria Road would be facilitated. NSW Government planning and policy documents do not identify Victoria Road as a priority for urban renewal, however, due to the extent of changes that would be brought about by the project, creating opportunities for urban renewal along Victoria Road would be of benefit to the local community. Public transport improvements along Victoria Road have been identified as a key element for consideration in the next 20 years in the *Revised* Draft *Eastern City District Plan* (Greater Sydney Commission 2017). Victoria Road east of Iron Cove Bridge is also identified as a strategic bus corridor in *The Bays Precinct Transformation Plan*. By reducing traffic congestion on parts of Victoria Road, the project would create opportunities for future public transport improvements in the area.

Furthermore, the reduction in daily traffic volumes along this section of Victoria Road would support the development of The Bays Precinct, which is identified as a Priority Growth Area in the *Draft Greater Sydney Region Plan 2017* (Greater Sydney Commission 2017). The forecast reduction in daily traffic volumes would support the objectives for improved connectivity, potentially enabling public transport improvements along this section of Victoria Road and supporting the movement of traffic to and from The Bays Precinct. Further, the project would provide upgraded active transport connections around the Rozelle Rail Yards and White Bay Power Station, destinations as identified in *The Bays Precinct Transformation Plan*.

Further discussion of The Bays Precinct is also presented in **section B11.7.24**.

B12.8.17 Construction traffic management planning

Attachment 1 (Beca report) Section 4.6.2, p26, similar text also provided in Attachment 1 (Beca report) Section 6.4, p34

It is stated that twelve construction ancillary facilities are described and assessed in this EIS. The number, location and layout of construction ancillary facilities would be finalised as part of detailed construction planning during detailed design and would meet the environmental performance outcomes stated in the EIS and the Submissions and Preferred Infrastructure Report and satisfy criteria identified in any relevant conditions of approval. More details on our response for each site, as per Chapter 6.

It is expected that for each of the proposed construction sites (and additional if required after detail design), a separate Construction Pedestrian and Traffic Management Plan (CPTMP) be prepared in line with the proposed works associated with each proposed construction site. This should include:

1. Location of the proposed work zone;

2. Haulage routes;

3. Construction vehicle access arrangements;

4. Construction program;

5. Consultation strategy for liaison with surrounding stakeholders;

6. Any potential impacts to general traffic, cyclists, pedestrians and bus services within the vicinity of the site from construction vehicles during the construction of the proposed works;

7. Mitigation measures. Should any impacts be identified, the duration of the impacts and measures proposed to mitigate any associated general traffic, public transport, pedestrian and cyclist impacts should be clearly identified and included in the CPTMP.

IWC request that the CPTMP be provided to Council for comment before the start of any construction activities.

Attachment 1 (Beca report) Section 6.1.1, p33

As described in 6.1 above there is no mention of a follow- up consultation process after the final design to be incorporated into the Submissions and Preferred Infrastructure Report. This EIS is vague on the details of the consultation, planning, approval and monitoring of implementation to ameliorate impacts such as safety around work sites, heavy vehicle movements, dust, and coordination of construction works on other projects in the vicinity of the M4-M5 link worksites, coordination of utility services replacement, upgrading or maintenance. These activities will have to be assessed in detail in a detailed Construction Management Plan (CMP). SMC needs to consult IWC on the details of this plan and request to be an approval authority of these plans. See related comments in **Chapter 8** on construction traffic impact expected at worksites.

Attachment 1 (Beca report) Section 6.2, p33

An indicative construction program is shown in Table 6-2. IWC request an opportunity to provide formal feedback on the final construction program when completed by the selected contractor. SMC to consult IWC on the final construction program for approval. IWC requests that joint approval authority be granted to IWC to approve program, stages and CMP's for each construction site.

Attachment 1 (Beca report) Section 6.4, p34

These activities are summarised in Table 6-3 and detailed in the respective sections of this chapter. It is important that a complete Construction Management Plan (CMP) be prepared that will include the impact assessment for each of the listed activities on all road users from a road safety and road operational perspective including the impacts as raised in Chapters 8 to 12. Also note Issues raised at the start of this report.

Attachment 1 (Beca report) Section 6.5.1, p36

It is stated that the number, location and layout of construction ancillary facilities would be finalised as part of detailed construction planning during detailed design. As mentioned in Section 6.1 above the final design details needs to be presented to IWC for comment.

Attachment 1 (Beca report) Section 6.6.1, p39

Under this section of "Traffic staging approach" it mentions the three key areas of the project which will require the preparation of detailed traffic staging plans during construction. It is further mentioned that these works would be carried out on parts of the arterial road network that are heavily trafficked and provide important network connectivity. The construction of these works would require the implementation of multiple traffic stages that meet the requirements of the design and construction contractor(s), Roads and Maritime, Transport Management Centre (TMC) and other key stakeholders. IWC requests to be closely involved in the development and approval of the staging approach as these roads are important roads within the IWC boundary. This should form part of the establishment of a detailed Construction Impact and Implementation Plan wherein IWC will be allowed to participate as an approval authority of all Construction Management Plans before any construction starts.

Attachment 1 (Beca report) Section 6.6.4, p40

It is mentioned that indicative access routes (as per Table 6.21) to and from construction ancillary facilities would be confirmed during detailed design and documented in the CTAMP that would be prepared for the project. Some anticipated impacts are mentioned in Section 6.5 above. See comments in Section 8.3, Chapter 8. All these changes and the integration into the existing road network should be subject to proper road safety audits for conceptual, preliminary design, detail design and pre-opening stages, taking into consideration all road users. The findings should be made available to IWC to discuss potential re-design and finalisation of Construction Management Plans for each site. Also see "Overall evaluation" below.

Response

A CTAMP will be prepared as part of the CEMP. The CTAMP will include the guidelines, general requirements and principles of traffic management to be implemented during construction. It will be prepared in accordance with *Austroads Guide to Road Design* (with appropriate Roads and Maritime supplements), the RTA Traffic Control at Work Sites manual and AS1742.3: Manual of uniform traffic control devices – Part 3: Traffic control for works on roads, and any other relevant standard, guide or manual.

The overarching strategy of the CTAMP will be to:

- Ensure relevant stakeholders are considered during all stages of the project
- Provide safe routes for pedestrians and cyclists during construction
- Develop construction methodologies so that interaction with existing road users is minimised thereby creating a safer work and road user environment
- Plan and stage works to minimise the need for road occupancy, where possible
- Develop project staging plans in consultation with relevant traffic and transport stakeholders
- Minimise the number of changes to the road users' travel paths and, where changes are required, develop and implement an effective community communication strategy, coupled with temporary wayfinding signage to warn, inform and guide. This will aim to minimise confusion by providing clear and concise traffic management schemes
- Comprehensively communicate changes in traffic conditions to emergency services, public transport operators, other road user groups and any other affected stakeholders
- Identify measures to manage the movements of construction-related traffic to minimise traffic and access disruptions in the public road network
- Minimise the use of local roads for heavy vehicle access

- Minimise the loss of on-road parking for local residents
- Describe a car parking strategy for construction staff at the various worksites and ancillary facilities.

The CTAMP will be prepared in consultation with relevant local councils, including Inner West Council.

The project has been assessed and displayed under Division 2, Part 5.1 of the EP&A Act as State significant infrastructure and also critical State significant infrastructure. The Minister for Planning is required to determine whether or not to grant approval under Part 5.1 of the EP&A Act following public exhibition of the EIS and consideration of submissions received before the project can be constructed.

Should the project be approved, the proponent (Roads and Maritime) and appointed contractors and sub-contractors must comply with all requirements of the conditions of approval for the project in order to implement all feasible and reasonable measures to prevent and/or minimise any harm to the environment that may result from the construction or operation of the project. Key stakeholders, including councils, will be consulted on the preparation and implementation of management plans as appropriate and in accordance with the conditions of approval.

B12.8.18 Management of road closures and diversions during construction

Attachment 1 (Beca report) Section 6.6.1, p39

A significant list of road network changes (only indicative) are provided in Table 6.19 that will need close attention to detail design and road safety assessment. All these changes and the integration into the existing road network should be subject to proper road safety audits for conceptual, preliminary design, detail design and pre-opening stages, taking into consideration all road users. The findings should be made available to IWC to discuss potential re-design and finalisation of Construction Management Plans for each site.

Attachment 1 (Beca report) Section 8 General, p63

As per SEAR 1 (e) and (f); what effect will the temporary road modifications have? These are not stated. Would Council be involved in the confirmation process associated with temporary closures given these could be on their network and/or are likely to result in impact on their road network?

SMC to commit to a process of including IWC on approval of planning and proposals impacting road network on IWC's roads. See also IWC concerns as discussed in Issue 10 at the start of this report.

Attachment 1 (Beca report) Section 8.3.1, p62

No temporary infrastructure works additional to those discussed above are proposed to mitigate the identified effects associated with construction works. SMC to assess need for additional infrastructure to mitigate identified effects associated with construction works.

Response

The road network changes provided in Table 6-19 of the EIS will be subject to indicative staging as summarised in Table 7-23 of Appendix H (Technical working paper: Traffic and transport) of the EIS and updates to this table are provided in **section B11.8.9**.

Detailed traffic staging plans along key roads would be developed during detailed design, in consultation with relevant traffic and transport stakeholders, as part of the CTAMP. The traffic staging plans would be prepared in accordance with the following principles:

- Provision of early notifications via Variable Message Signs or media announcements
- Undertaking the works in a staged manner to reduce traffic impacts
- Implementation of temporary speed restrictions within construction work zones
- Reduced shoulder widths and erection of traffic barriers along construction work zones, ensuring that any impacted pedestrian and cyclist facilities are adequately and safely replaced, and other road user facilities, such as bus stops and loading zones are adequately and safely relocated
- Provision of appropriate warning and advisory signposting
- Provision of temporary access arrangements with private landowners whose property is adjacent to construction activities
- Provision for public transport and emergency services to ensure disruption is minimised.

Long-term traffic control plans, temporary works and traffic staging plans, will be subject to independent road safety audits that will be carried out in accordance with *Road Safety Audits Guide* (TC2003/RS03) (Roads and Maritime) and with reference to current practices outlined in *Austroads Road Safety Audit Guide* (2nd Edition 2002). Road safety audits will assess the safety performance of any new or modified local road, parking, pedestrian and cycle infrastructure provided as part of the project (including ancillary facilities) to ensure that they meet the requirements of relevant design, engineering and safety guidelines, including *Austroads Guide to Road Design*. The process for the carrying out of road safety audits would be detailed in the CTAMP that will be prepared for the project.

Issues identified in the road safety audit will be responded to by:

- Detailing actions taken/to be taken to address each of the issues raised
- Providing justification for proposals and actions on particular issues raised.

Speed limit reductions in work areas around construction sites will be enforced based on Roads and Maritime's *Traffic Control at Worksites* (Roads and Maritime 2010) guidelines. As detailed in the section 6.6 of the EIS, temporary closures and restrictions to some local roads would occur during the construction program. These may result in temporary inconvenience and an increase in travel time for some drivers, however access to all properties will be maintained during construction. In addition some neighbouring streets may experience temporary additional traffic from diverted routes.

Road network modifications and traffic staging would be reviewed by the design and construction contractor(s) during the preparation of the CTAMP, with the objective of minimising disruptions to the road network. At all locations where road closures are required, access to retained properties would be maintained throughout the construction period.

Appropriate signage for road closures or detours would be installed. Measures to manage these impacts are described in **Chapter E1** (Environmental management measures) and include isolating work areas from general traffic (environmental management measure TT05), developing and implementing work methods to minimise delays and road user impacts, in consultation with the Transport Management Centre (environmental management measure TT06), providing temporary closed-circuit television (CCTV) and Variable Message Signs (VMS) to link with the existing Transport Management Centre (TMC) network to facilitate real time monitoring and management of impacts and traffic safety (environmental management measure TT07), scheduling construction-related transport movements to avoid peak traffic periods and adversely affecting congestion, where possible (environmental management measure TT10) and developing robust community and stakeholder communication protocols regarding altered traffic conditions be developed and adopted (environmental management measure TT11).

The impact of temporary closures of local roads due to construction of the project is discussed in **section C8.9.2**. Impacts on the local road network are discussed in **section C8.9.3**.

B12.8.19 Construction traffic impacts associated with Option A and Option B

Attachment 1 (Beca report) Section 8.3.1, p62

Table 8-46 Option A: As a number of the routes are predicted to be operating past their saturation point, there is the possibility that mode shift or changes in user behaviours may occur. Have these potential changes been considered? And to what extent will these shifts have on other modes? As per SEAR 1(e).

Attachment 1 (Beca report), p 63

Option B: comments as per Option A above.

Response

The combined number of new road trips and trips reassigned from public transport as a result of the full WestConnex program of works is anticipated to be around 0.3 per cent of the total number of daily car trips on the WRTM Sydney-wide network in (refer to section 4.2.1 of Appendix H (Technical working paper: Traffic and transport) of the EIS). This mode shift has been included in the WRTM and considered in the traffic modelling discussed in Chapter 8 and Appendix H of the EIS.

The construction of the project would not result in a significant increase in vehicle numbers on the road network. Compared to existing traffic levels, construction traffic represents a very small increase in traffic which in most cases is less than one per cent. The potential for widespread disruption is unlikely and only those specific roads that have been identified in the EIS for construction diversions or closures would be affected.

However, it is expected that drivers would shift their departure times, allow more travel time or select alternative destinations to avoid congestion and/or construction areas where traffic staging or temporary diversions are in place.

The project has been designed to minimise the generation of construction traffic where feasible and reasonable. The assessment of construction traffic impacts has taken into account heavy vehicle movements (including spoil haulage) to and from construction ancillary facilities.

Prior to construction, a CTAMP will be developed and implemented to manage the movement of vehicles to and from project sites and to ensure that vehicle movements are conducted in a manner that minimises impacts on local amenity, traffic flows and road safety. **Chapter E1** (Environmental management measures) describes measures which have been designed to manage potential traffic and transport impacts resulting from the construction of the project. A truck management strategy will be developed for the project (as part of the CTAMP) that:

- Describes management measures for project-related spoil haulage vehicles to avoid queuing and site-circling in local roads and other potential traffic and access disruptions
- Identifies truck marshalling areas that can be used by project-related spoil haulage vehicles
- Describes a monitoring strategy to demonstrate that project-related spoil haulage vehicles are complying with the strategy.

To reduce the impact of heavy vehicles queuing on local roads, an additional construction ancillary facility is proposed at White Bay on land owned by the Port Authority of NSW. See **Part D** (Preferred infrastructure report) for further information.

B12.8.20 James Street intersection

Attachment 1 (Beca report) Section 8.3.1, p62

The additional green time provided at the intersection - is this going to have any effect on pedestrian level of service at the intersection, and to what extent. Additionally, what impacts on pedestrian safety are expected? As per SEAR 1 (e). SMC to assess pedestrian effects associated with proposed changes. See also IWC concerns as discussed in Issue 1 and Issue 2 at the start of this report.

Response

The additional green time was a result of the new phase associated with a right hand turn for construction vehicles from City West Link into James Street. This change to the City West Link/James Street intersection has subsequently been removed from the project and an alternative spoil haulage route for heavy vehicles access the Darley Road civil and tunnel site (C4) has been developed (see **section D2.4.1**).

The impact to pedestrians associated with this revision to the spoil haulage route for the Darley Road civil and tunnel site (C4) would be minor as the cycle times and the number of opportunities to cross per cycle remains unchanged from the existing situation.

B12.8.21 Impact on local roads due to congestion during construction on City West Link

Attachment 1 (Beca report) Section 8.3.1, p62

City West Link: Are the increases to congestion and journey times along City West Link going to push traffic onto alternative routes, potentially local streets, within the Inner West Council area? SMC to assess whether congestion on City West link is sensitive to causing increases on local roads.

Response

The impact of construction traffic on roads in Rozelle is discussed in section 7 of Appendix H (Technical working paper: Traffic and transport) of the EIS, which notes that the construction traffic associated with the project would not result in significant increases in congestion.

Table 7-19 of Appendix H of the EIS summarising the mid-block operational performance of locations within the study area, including three locations along City West Link:

- City West Link west of Darley Road
- City West Link west of The Crescent
- City West Link east of The Crescent.

Of these locations, LoS deteriorates in the 'With construction' scenario compared to the 'Without construction' scenario in the following two locations and directions:

- City West Link west of Darley Road, westbound in the PM from LoS E to LoS F
- City West Link west of The Crescent, westbound in the PM from LoS D to LoS E.

Generally speaking the proposed vehicle numbers represent a very small increase in vehicle movement during peak hours above the background traffic levels. As a result the impact of construction traffic on the operation of the road network, including City West Link, is relatively minor with congestion already an issue regardless of the project. The potential for traffic to reassign to alternative routes during construction is therefore unlikely.

Prior to construction, a CTAMP will be developed and implemented to manage the movement of vehicles to and from project sites and to ensure that vehicle movements are conducted in a manner that minimises impacts on local amenity, traffic flows and road safety. **Chapter E1** (Environmental management measures)) describes measures which have been designed to manage potential traffic and transport impacts resulting from the construction of the project.

B12.8.22 Construction traffic impacts associated with Wattle Street civil and tunnel site (C1a)

Attachment 1 (Beca report) Section 8.3.1, p58

It is stated that reasonable and practical management strategies would be investigated to minimise the volume of heavy vehicle movements at night" Is it expected that these movements at night might be on local streets? Feedback from the community is that heavy vehicle movements at night is having an effect on residents within the local community. Council opposes the movement of heavy vehicles on the local road network, particularly outside typical work hours. SMC should consult and allow IWC to be an approving authority in the planning and approval processes for traffic management plans at each construction site to assess the local safety and operational issues and impact of heavy vehicle movements. An appropriate Road Safety Audit should be prepared and submitted to IWC as part of the approval process. See also IWC concerns as discussed in Issues 1, 2, 4, 5 and 7 at the start of this report.

It is discussed that light vehicles will access and egress the site onto Wattle Street. What sort of access control mechanisms are proposed to ensure the safe and efficient operation at this construction interface with the road network? SMC to provide details regarding access control onto Wattle Street.

Response

Indicative access routes and vehicle numbers for construction related heavy and light vehicles are described in section 6.6.4 of the EIS. Indicative spoil haulage routes are outlined in section 6.6.5 of the EIS.

Tunnel construction activities would operate 24 hours a day, seven days a week. During the peak construction periods spoil haulage would occur 24 hours a day, seven days a week at tunnelling support sites, with the exception of the Darley Road civil and tunnel site (C4) where spoil haulage would be restricted to standard construction hours. Heavy vehicle movements associated with the removal of spoil from tunnelling would occur via ingress and egress directly to and from the arterial road networks.

No local roads are proposed to be used for spoil haulage. Some use of local roads by heavy vehicles delivering materials and/or equipment may be required. Where this is the case, this would be expected to occur during standard construction hours. The use of local roads by heavy vehicles for deliveries would be minimised as far as practicable and would be managed in accordance with the conditions of approval and the CTAMP that will be prepared for the project. Spoil removal outside standard construction hours would meet the relevant noise criteria.

Construction traffic routes and specific access controls for construction ancillary facilities will be further developed in the CTAMP.

Long-term traffic control plans, temporary works and traffic staging plans, will be subject to independent road safety audits that will be carried out in accordance with *Road Safety Audits Guide* (TC2003/RS03) (Roads and Maritime) and with reference to current practices outlined in Austroads *Road Safety Audit Guide* (2nd Edition 2002). Road safety audits will assess the safety performance of any new or modified local road, parking, pedestrian and cycle infrastructure provided as part of the project (including ancillary facilities) to ensure that they meet the requirements of relevant design, engineering and safety guidelines, including Austroads *Guide to Road Design*. The process for the carrying out of road safety audits would be detailed in the CTAMP that will be prepared for the project.

Issues identified in the road safety audit will be responded to by:

- Detailing actions taken/to be taken to address each of the issues raised
- Providing justification for proposals and actions on particular issues raised.

Information pertaining to the consultation with relevant councils on the preparation of the CTAMP is provided in the response in **section B12.8.17**.

B12.8.23 Construction traffic impacts associated with Haberfield civil and tunnel site (C2a)

Attachment 1 (Beca report) Section 8.3.1, p58

When it says that all spoil would be transported below ground via the M4 East Mainline tunnels, is this for the spoil that is being re-used on site, or does it include the spoil that is being disposed off-site. If not, where do these truck movements occur? SMC to provide clarity on truck movements and impacts at this site.

Response

The proposal to use this site at Haberfield for tunnelling purposes as described in section 6.5.3 of the EIS has been revoked as a result of ongoing construction planning which has occurred following the preparation of the EIS.

B12.8.24 Construction traffic impacts associated with Northcote Street civil site (C3a)

Attachment 1 (Beca report) Section 8.3.1, p58

It is stated that works would be 24 hours a day and that "reasonable and practical management strategies would be investigated to minimise the volume of heavy vehicles using the layover area at night". What would these strategies include, and how would this process be developed and would Council be an approving entity? SMC should consult and allow IWC to be an approving authority in the planning and approval processes for traffic management plans at each construction site to assess the local safety and operational issues and impact of heavy vehicle movements. An appropriate Road Safety Audit should be prepared and submitted to IWC as part of the approval process. See also IWC concerns as discussed in Issues 1, 4, 5 and 7 at the start of this report.

Response

An indicative description of the proposed function of the Northcote Street civil site (C3a) is outlined in section 6.5.4 of the EIS. As indicated in Table 6-22 of the EIS, forecast indicative heavy vehicle volumes accessing the Northcote Street civil site would be relatively low (a maximum daily volume of 100 heavy vehicles), representing a very small increase in vehicle movement above the background traffic levels along Parramatta Road. Impacts on the road network during the night time would therefore be negligible.

As noted in section 6.5.4 of the EIS, feasible and reasonable management strategies would be investigated to minimise potential noise impacts associated with out-of-hours construction activities at the site, including minimising the volume of heavy vehicles using the laydown area at night. Potential noise impacts associated with the use of the Northcote Street civil site (C3a) are described in section 10.3.1 of the EIS. Information pertaining to the consultation with relevant councils on the preparation of the CTAMP is provided in the response in **section B12.8.17**.

B12.8.25 Impacts from heavy vehicles entering Parramatta Road

Attachment 1 (Beca report) Section 8.3.1, p59

No details are provided regarding the types of control associated with this access and egress points. Additionally, heavy laden slow moving heavy vehicles exiting onto Parramatta Road would be expected to influence general traffic performance, including public transport who would conflict on the nearside lane (most access and egress) location. Additionally, heavy vehicles may conflict with vulnerable road users if the access control is not designed in a safe and efficient manner. Has the effect of heavy vehicles access and exiting onto Parramatta Road been considered in the operational modelling? What steps are to be implemented to maintain the safety and efficiency of active mode and public transport users along Parramatta Road? SMC to provide details regarding access configuration onto Parramatta Road. SMC should consult and allow IWC to be an approving authority in the planning and approval processes for traffic management plans at each construction site to assess the local safety and operational issues and impact of heavy vehicle movements. An appropriate Road Safety Audit should be prepared and submitted to IWC as part of the approval process.

As per above, what is the effect of heavy vehicles on Parramatta Road? SMC to provide details regarding access configuration onto Parramatta Road.

It is stated that there is an effect on Alt Street. How are these minor inputs going to be managed to ensure local amenity is maintained and safety and efficiency for vehicles and active mode users of Alt Street is ensured? SMC to provide details on how amenity and safety will be maintained.

Response

Indicative access routes and vehicle numbers for construction related heavy and light vehicles are described in section 6.6.4 of the EIS. Indicative spoil haulage routes are outlined in section 6.6.5 of the EIS. Construction traffic routes and specific access controls for construction ancillary facilities will be further developed in the CTAMP.

Table 6-20 of the EIS identifies changes to pedestrian and cyclist facilities around the Parramatta Road West civil and tunnel site (C1b) and Parramatta Road East civil site (C3b), including:

- Periodic, short-term closures of footpaths on both sides of Alt Street on the eastern and western sides of Parramatta Road. These would be most likely to occur during site establishment, when access to these sites is being established
- Where a footpath is temporarily closed, the corresponding footpath on the other side of the road would remain open
- Traffic management measures would be implemented at the entry and exit driveways on Parramatta Road, Alt Street and Bland Street to manage potential interactions between construction traffic and pedestrians and cyclists.

Environmental management measure TT12 in **Chapter E1** (Environmental management measures) requires that impacts on the pedestrian paths and cycle lanes are minimised, and that timely alternatives during construction are provided where practical and safe to do so.

Long-term traffic control plans, temporary works and traffic staging plans, will be subject to independent road safety audits that will be carried out in accordance with *Road Safety Audits Guide* (TC2003/RS03) (Roads and Maritime) and with reference to current practices outlined in *Austroads Road Safety Audit Guide* (2nd Edition 2002). Road safety audits will assess the safety performance of any new or modified local road, parking, pedestrian and cycle infrastructure provided as part of the project (including ancillary facilities) to ensure that they meet the requirements of relevant design, engineering and safety guidelines, including *Austroads Guide to Road Design*. The process for the carrying out of road safety audits would be detailed in the CTAMP that will be prepared for the project.

Issues identified in the road safety audit will be responded to by:

- Detailing actions taken/to be taken to address each of the issues raised
- Providing justification for proposals and actions on particular issues raised.

B12.8.26 Construction traffic impacts associated with Haberfield civil site (C2b)

Attachment 1 (Beca report) Section 8.3.1, p59

As per above, what is the effect of heavy vehicles on Wattle Street. SMC to provide details regarding access control onto Wattle Street.

Response

Indicative access routes and vehicle numbers for construction related heavy and light vehicles are described in section 6.6.4 of the EIS. Construction traffic routes and specific access controls for construction ancillary facilities will be further developed in the CTAMP.

Long-term traffic control plans, temporary works and traffic staging plans, will be subject to independent road safety audits that will be carried out in accordance with *Road Safety Audits Guide* (TC2003/RS03) (Roads and Maritime) and with reference to current practices outlined in *Austroads Road Safety Audit Guide* (2nd Edition 2002). Road safety audits will assess the safety performance of any new or modified local road, parking, pedestrian and cycle infrastructure provided as part of the project (including ancillary facilities) to ensure that they meet the requirements of relevant design, engineering and safety guidelines, including *Austroads Guide to Road Design*. The process for the carrying out of road safety audits would be detailed in the CTAMP that will be prepared for the project.

Issues identified in the road safety audit will be responded to by:

- Detailing actions taken/to be taken to address each of the issues raised
- Providing justification for proposals and actions on particular issues raised.

B12.8.27 Construction traffic impacts associated with local streets

Attachment 1 (Beca report) Section 8.3.1, p60

It is indicated that there would be a loss of parking on Alt and Bland Street. Council is of the opinion that the loss of parking on local streets should not occur. SMC to provide details on how parking will be provided for without losing parking on local streets.

Response

As indicated in Table 6-19 of the EIS, kerbside parking along a section of Alt Street near the intersection with Parramatta Road would be removed to facilitate driveway access to the construction ancillary facilities. This parking is likely to be associated with the commercial premises along Parramatta Road at this location. The impact of this loss would therefore be negligible as these commercial premises would be removed to facilitate establishment of the Parramatta Road East and West construction ancillary facilities.

At the completion of construction kerbside parking on Alt Street would be reinstated.

B12.8.28 Construction traffic impacts associated with Darley Road civil and tunnel site (C4)

Attachment 1 (Beca report) Section 8.3.1, p60

It is stated that impacts on the kiss and ride parking area for the light rail stop will be considered in the Construction Traffic Access and Management Plan. SEAR 1 (e) requires that the impacts on public transport be assessed. See Section 6.5.8 in tab 14. SMC should consult and allow IWC to be an approving authority in the planning and approval processes for traffic management plans at each construction site to assess the local safety and operational issues and impact of heavy vehicle movements. An appropriate Road Safety Audit should be prepared and submitted to IWC as part of the approval process.

Response

Two kiss and ride zones are located near the Darley Road civil and tunnel site; a kiss and ride zone on the northern side of Darley Road that comprises around seven car spaces and extends between the pedestrian crossing and the driveway entrance to a commercial premises, Leichhardt North light rail stop, and a kiss and ride zone on the southern side of Darley Road that comprises two car spaces and extends west from Francis Street.

Construction access driveways to the Darley Road civil and tunnel site (C4) would be located to avoid interaction with the adjacent kiss and ride zone and traffic management measures would be implemented to manage interactions between construction vehicles and other motorists, pedestrians and cyclists. The kiss and ride zone on the southern side of Darley Road would not be affected by the project.

A CTAMP will be prepared by the design and construction contractor(s) following approval of the project in accordance with the conditions of approval and will include relevant commitments reflected in the environmental management measures (see **Chapter E1** (Environmental management measures). The CTAMP will also consider impacts to public transport services, such as impacts to, or on users of, the Leichhardt North light rail stop and associated kiss and ride zones. Key stakeholders, including councils will be consulted on the preparation and implementation as appropriate and in accordance with the conditions of approval.

Information pertaining to the consultation with relevant councils on the preparation of the CTAMP is provided in the response in **section B12.8.17**. Long-term traffic control plans, temporary works and traffic staging plans, will be subject to independent road safety audits that will be carried out in accordance with *Road Safety Audits Guide* (TC2003/RS03) (Roads and Maritime) and with reference to current practices outlined in *Austroads Road Safety Audit Guide* (2nd Edition 2002). Road safety audits will assess the safety performance of any new or modified local road, parking, pedestrian and cycle infrastructure provided as part of the project (including ancillary facilities) to ensure that they meet the requirements of relevant design, engineering and safety guidelines, including *Austroads Guide to Road Design*. The process for the carrying out of road safety audits would be detailed in the CTAMP that will be prepared for the project.

Issues identified in the road safety audit will be responded to by:

- Detailing actions taken/to be taken to address each of the issues raised
- Providing justification for proposals and actions on particular issues raised.

B12.8.29 Construction traffic impacts associated with Rozelle civil and tunnel site (C5)

Attachment 1 (Beca report) Section 8.3.1, p60

It is stated that five access points will be provided on Lilyfield Road. What impact does this have on the operation of Lilyfield Road? And are the access controls done in a safe and efficient manner? SMC should consult and allow IWC to be an approving authority in the planning and approval processes for traffic management plans at each construction site to assess the local safety and operational issues and impact of heavy vehicle movements. An appropriate Road Safety Audit should be prepared and submitted to IWC as part of the approval process.

Response

As noted in section 7.2.8 of Appendix H (Technical working paper: Traffic and transport) of the EIS, about 350 daily light vehicle trips are expected across the five access points on Lilyfield Road to the Rozelle civil and tunnel (C5). As a worst case, this would equate to an increase in two-way weekday daily vehicles of 10 to 15 per cent depending on the location on Lilyfield Road. Light vehicles would travel to and from these access points via routes to the west, east and north which would disperse potential traffic and transport impacts (ie not all light vehicles would travel in the same direction/through the same intersections). In addition, the commercial properties on Gordon Street and Lilyfield Road being removed as part of the project would have generated light vehicle traffic along this same section of Lilyfield Road.

Information pertaining to the consultation with relevant councils on the preparation of the CTAMP is provided in the response in **section B12.8.17**.

Long-term traffic control plans, temporary works and traffic staging plans, will be subject to independent road safety audits that will be carried out in accordance with *Road Safety Audits Guide* (TC2003/RS03) (Roads and Maritime) and with reference to current practices outlined in *Austroads Road Safety Audit Guide* (2nd Edition 2002). Road safety audits will assess the safety performance of any new or modified local road, parking, pedestrian and cycle infrastructure provided as part of the project (including ancillary facilities) to ensure that they meet the requirements of relevant design, engineering and safety guidelines, including *Austroads Guide to Road Design*. The process for the carrying out of road safety audits would be detailed in the CTAMP that will be prepared for the project.

Issues identified in the road safety audit will be responded to by:

- Detailing actions taken/to be taken to address each of the issues raised
- Providing justification for proposals and actions on particular issues raised.

B12.8.30 Construction traffic impacts associated with Victoria Road civil site (C7)

Attachment 1 (Beca report) Section 8.3.1, p60

Heavy vehicles enter Victoria Road: No details are provided regarding the types of control associated with this access and egress point. Additionally, heavy laden slow moving heavy vehicles exiting onto Victoria Road would be expected to influence general traffic performance, including public transport who would conflict on the nearside lane (entry and exit) location. Additionally, heavy vehicles may conflict with vulnerable road users if the access control is not designed in a safe and efficient manner. Has the effect of heavy vehicles access and exiting onto Victoria Road been considered in the operational modelling? What steps are to be implemented to maintain the safety and efficiency of active modes and public transport users along Victoria Road? SMC to provide details regarding access configuration onto Victoria Road. SMC should consult and allow IWC to be an approving authority in the planning and approval processes for traffic management plans at each construction site to assess the local safety and operational issues and impact of heavy vehicle movements. An appropriate Road Safety Audit should be prepared and submitted to IWC as part of the approval process. See also IWC concerns as discussed in Issue 1, Issue 4, Issue 5 and Issue 7 at the start of this report.

Response

Indicative access routes and vehicle numbers for construction related heavy and light vehicles are described in section 6.6.4 of the EIS. Construction traffic routes and specific access controls for construction ancillary facilities will be further developed in the CTAMP.

As indicated in Table 7-15 of Appendix H (Technical working paper: Traffic and transport) of the EIS, indicative heavy vehicle volumes accessing the Victoria Road civil site (C7) would be extremely low in the context of the existing traffic volumes along this section of Victoria Road (up to 42 one-way movements per day) and would therefore have a negligible impact on the operation Victoria Road.

Indicative modifications to pedestrian and cyclist infrastructure around the Victoria Road civil site (C7) are described in Table 6-20 of the EIS. This would include temporary, periodic closure of the shared paths on the eastern and western sides of Victoria Road at Rozelle. Works would be staged so that the shared path on either the eastern or western side of Victoria Road at Rozelle would remain open at all times.

Prior to construction, a CTAMP will be developed and implemented to manage the movement of vehicles to and from project sites and to ensure that vehicle movements are conducted in a manner that minimises impacts on local amenity, traffic flows and road safety. **Chapter E1** (Environmental management measures)) describes measures which have been designed to manage potential traffic and transport impacts resulting from the construction of the project.

Information pertaining to the consultation with relevant councils on the preparation of the CTAMP is provided in the response in **section B12.8.17**.

B12.8.31 Construction traffic impacts associated with Iron Cove Link civil site (C8)

Attachment 1 (Beca report) Section 8.3.1, p 61

SMC to provide details regarding access configuration onto Victoria Road. It is indicated that Clubb Street would be closed and access limited to King George Park. No information is provided regarding the effect that this will have on journey times and access for Clubb Street residents or users of King George Park. This is a requirement of SEAR 1 (f). SMC to provide details regarding access impacts on Clubb Street residents and users of King George Park.

Response

Details of access from the Iron Cove Link civil site (C8) are included in section 7.2.11 of Appendix H (Technical working paper: Traffic and transport) of the EIS.

Traffic surveys on Clubb Street were carried out in October 2017 during the weekday and weekend periods and indicate a maximum of 20 vehicles per hour exiting or entering Clubb Street at the Victoria Road intersection during peak periods. This volume of traffic is unlikely to cause a significant impact when reallocated to other roads, such as Toelle Street or Callan Street. As identified in section 12.4.8 of the EIS, journey times for residents along Clubb Street would increase slightly for westbound movements (as this intersection currently only allows for left-in, left-out movements to Victoria Road). Other movements (ie eastbound along Victoria Road) would not be expected to be affected. The creation of a cul-de-sac at the northern terminus of Clubb Street would also provide opportunities for amenity improvements along this street, as through traffic would be reduced. These amenity improvements would be further supported by the integration of pedestrian paths along Clubb Street with the upgraded east–west active transport network that would be provided along Victoria Road.

Heavy vehicle ingress and egress for heavy vehicles at the Iron Cove Link civil site (C8) would be directly to and from Victoria Road, with use of local roads by heavy vehicles to be minimised and likely to occur predominantly during site establishment, before the access driveways onto Victoria Road are established.

As described in **Part D** (Preferred infrastructure report), it is proposed to relocate the bioretention facility at King George Park around 150 metres north of the location presented in the EIS, to an area adjacent to Victoria Road at the eastern abutment of Iron Cove Bridge and within King George Park. This change would not result in substantial new construction traffic impacts on access roads to King George Park from Victoria Road including Toelle Street, Callan Street, Springside Street and Manning Street. In addition, the existing informal car park at Manning Street would therefore remain in its current condition and would not be altered by the project. See **section D2** for further information regarding the relocation of the bioretention facility.

Impacts associated with construction traffic around the Iron Cove Link civil site (C8), including changes to local roads and intersection arrangements around the Iron Cove Link civil site (C8) during construction (ie the closure of Clubb Street at Victoria Road), will be considered further in the CTAMP that will be prepared for the project as required by environmental management measure TT01 (see **Chapter E1** (Environmental management measures)). See **section B12.8.17** for further details about the CTAMP.

B12.8.32 Construction traffic impacts associated with the Pyrmont Bridge Road tunnel site (C9)

Attachment 1 (Beca report) Section 6.5.13, p38

The layout of this triangle-shaped site makes truck movements potentially difficult to manoeuvre sharp- angled turns with potential sight-distance issues for all road users in the area. Apart from construction impact, residents and business owners which properties have not been acquired, will be exposed to all the issues raised in Chapters 8 to 12 especially noise, air quality and health, with the potential having this impact imposed onto the value of their properties forever.

Attachment 1 (Beca report) Section 8.3.1, p61

[I]t is stated that works would be 24 hours a day and that "reasonable and practical management strategies would be investigated to minimise the volume of heavy vehicles using the layover area at night". What would these strategies include, and how would this process be developed and would Council be an approving entity? SMC should consult and allow IWC to be an approving authority in the planning and approval processes for traffic management plans at each construction site to assess the local safety and operational issues and impact of heavy vehicle movements. An appropriate Road Safety Audit should be prepared and submitted to IWC as part of the approval process.

It is stated that there will be the temporary closure of Bignell Lane and that rear access will be maintained. Have the effects of this closure been assessed and have the commercial entities been consulted with? SMC should consult and allow IWC to be an approving authority in the planning and approval processes for traffic management plans at each construction site to assess the local safety and operational issues and impact of heavy vehicle movements. An appropriate Road Safety Audit should be prepared and submitted to IWC as part of the approval process. See also IWC concerns as discussed in Issue 1, at the start of this report.

Response

The identification of construction ancillary facilities including the Pyrmont Bridge Road tunnel site (C9) has been carried out in consideration of an array of constructability requirements including ensuring for adequate and safe circulation by heavy vehicles. The Pyrmont Bridge Road tunnel site (C9) is appropriately sized to allow for these types of movements.

Long-term traffic control plans, temporary works and traffic staging plans, will be subject to independent road safety audits that will be carried out in accordance with *Road Safety Audits Guide* (TC2003/RS03) (Roads and Maritime) and with reference to current practices outlined in *Austroads Road Safety Audit Guide* (2nd Edition 2002). Road safety audits will assess the safety performance of any new or modified local road, parking, pedestrian and cycle infrastructure provided as part of the project (including ancillary facilities) to ensure that they meet the requirements of relevant design, engineering and safety guidelines, including *Austroads Guide to Road Design*. The process for the carrying out of road safety audits would be detailed in the CTAMP that will be prepared for the project.

Issues identified in the road safety audit will be responded to by:

- Detailing actions taken/to be taken to address each of the issues raised
- Providing justification for proposals and actions on particular issues raised.

Bignell Lane would need to be realigned between Mallett Street and Pyrmont Bridge Road at Annandale to accommodate the Pyrmont Bridge Road tunnel site (C9). Short term, temporary closure of Bignell Lane would be required during construction to allow for the realignment works. Rear-access to commercial properties along Bignell Lane would be maintained during construction. Connectivity between Mallet Street and Pyrmont Bridge Road, and access to adjoining properties, would be maintained. Consultation with affected property owners in relation to access impacts during construction would be carried out as part of the preparation of the CTAMP, which will be developed and implemented to manage the movement of vehicles to and from project sites and to ensure that vehicle movements are conducted in a manner that minimises impacts on local amenity, traffic flows and road safety. **Chapter E1** (Environmental management measures)) describes measures which have been designed to manage potential traffic and transport impacts resulting from the construction of the project.

Information pertaining to the consultation with relevant councils on the preparation of the CTAMP is provided in the response in **section B12.8.17**.

B12.8.33 Construction traffic impacts associated with Campbell Road civil and tunnel site (C10)

Attachment 1 (Beca report) Section 6.5.14, p39

The heavy and light vehicle ingress and egress are within a sensitive area across the park where walking and cycling activities will be in conflict with these construction movements. As stated before, a proper road safety audit need to be undertaken to assess these issues as input to a potential safer design and in liaison with IWC.

Attachment 1 (Beca report) Section 8.3.1, p61

It is stated that works would be 24 hours a day and that "reasonable and practical management strategies would be investigated to minimise the volume of heavy vehicles using the layover area at night". What would these strategies include, and how would this process be developed and would Council be an approving entity? SMC should consult and allow IWC to be an approving authority in the planning and approval processes for traffic management plans at each construction site to assess the local safety and operational issues and impact of heavy vehicle movements. An appropriate Road Safety Audit should be prepared and submitted to IWC as part of the approval process. See also IWC concerns as discussed in Issue 1, Issue 2 and Issue 3, at the start of this report.

Response

The approach to the management of traffic impacts associated with construction traffic at the Campbell Road civil and tunnel site (C10) would be the same as for the Pyrmont Bridge civil and tunnel site (C9) as discussed in **section B12.8.32**.

For pedestrians and cyclists using the new separated cycle path along Campbell Road, there would be the potential for interactions with construction vehicles entering and leaving the Campbell Road civil and tunnel site (C10). However, as part of the New M5 project, the Campbell Road/Albert Street intersection would be upgraded to a signalised intersection. This intersection would be used by M4-M5 Link construction traffic entering and leaving the Campbell Road civil and tunnel site (C10), with around seven one-way movements per hour during the AM and PM peak forecast. This signalised intersection would provide signalised crossing for pedestrians and cyclists using the new pedestrian and cyclist paths along the southern side of Campbell Road at St Peters. No diversions would be required. The impact on pedestrians and cyclists at this location would therefore be negligible.

Long-term traffic control plans, temporary works and traffic staging plans, will be subject to independent road safety audits that will be carried out in accordance with *Road Safety Audits Guide* (TC2003/RS03) (Roads and Maritime) and with reference to current practices outlined in *Austroads Road Safety Audit Guide* (2nd Edition 2002). Road safety audits will assess the safety performance of any new or modified local road, parking, pedestrian and cycle infrastructure provided as part of the project (including ancillary facilities) to ensure that they meet the requirements of relevant design, engineering and safety guidelines, including *Austroads Guide to Road Design*. The process for the carrying out of road safety audits would be detailed in the CTAMP that will be prepared for the project.

Issues identified in the road safety audit will be responded to by:

- Detailing actions taken/to be taken to address each of the issues raised
- Providing justification for proposals and actions on particular issues raised.

B12.8.34 Marshalling arrangements and construction traffic routes

Attachment 1 (Beca report) Section 6.6.4, p40

It is mentioned that indicative access routes (as per Table 6.21) to and from construction ancillary facilities would be confirmed during detailed design and documented in the CTAMP that would be prepared for the project. Some anticipated impacts are mentioned in Section 6.5 above. See comments in Section 8.3, Chapter 8. All these changes and the integration into the existing road network should be subject to proper road safety audits for conceptual, preliminary design, detail design and pre-opening stages, taking into consideration all road users. The findings should be made available to IWC to discuss potential re-design and finalisation of Construction Management Plans for each site. Also see "Overall evaluation" below.

Attachment 1 (Beca report) Section 6.6.5, p40

It is indicated in Table 6.22 that spoil haulage would occur 24 hours a day, seven days a week. This is not acceptable and construction activities should be kept to standard daytime construction hours as per surface construction activities times in Table 6.26. These route details should be documented in the CTAMP that would be prepared for the project. Some anticipated impacts are mentioned in Section 6.5 above. See comments in Section 8.3, Chapter 8. Spoil haulage routes should be planned to be properly integrated into the existing road network and should be subject to proper road safety audits for conceptual, preliminary design, detail design and pre-opening stages, taking into consideration all road users. The findings should be made available to IWC to discuss potential re-design and finalisation of Construction Management Plans for each site. [Also] see "Overall evaluation" below.

Attachment 1 (Beca report) Section 8.3, p56

Overview of construction traffic and vehicle routes. It is stated that "Construction traffic routes for the project would use the existing motorway and arterial road network as much as possible, reducing traffic related impacts on local roads. How have these been determined and where are they? There is no road hierarchy or routes discussed in the EIS?

IWC requests SMC to provide details of Road Hierarchy and intended construction traffic routes relative to these construction traffic routes. See also IWC concerns as discussed in Issues 10 and 14 at the start of this report.

Attachment 1 (Beca report) Section 8.3.1, p56

Table 8-42: The heavy vehicle movements associated with cut to disposal of spoil as discussed in the site selection identified in Table 8-41. Does this also include spoil haulage for cut to reuse (i.e. remaining on site) that may also use the road network when re-used?

Attachment 1 (Beca report) Section 8.3.1, p57

No details are provided regarding the stabling location of heavy vehicles as they wait to be processed on site or when they are not used. SMC to provide Parking strategy to include heavy vehicle lay-by location and parking during non-usage. See also IWC concerns as discussed in Issue 5 at the start of this report.

Access Routes: there is discussion around the marshalling of heavy vehicles to prevent queuing and parking on local streets. Council's position is that no construction related vehicles are to lay-by or park on local streets. SMC should consult and allow IWC to be an approving authority in the planning and approval processes for traffic management plans at each construction site to assess the local safety and operational issues and impact of heavy vehicle movements. An appropriate Road Safety Audit should be prepared and submitted to IWC as part of the approval process. See also IWC concerns as discussed in Issues 1, 2, 4, 5 and 7 at the start of this report.

Response

Road safety audits

Long-term traffic control plans, temporary works and traffic staging plans, will be subject to independent road safety audits that will be carried out in accordance with *Road Safety Audits Guide* (TC2003/RS03) (Roads and Maritime) and with reference to current practices outlined in *Austroads Road Safety Audit Guide* (2nd Edition 2002). Road safety audits will assess the safety performance of any new or modified local road, parking, pedestrian and cycle infrastructure provided as part of the project (including ancillary facilities) to ensure that they meet the requirements of relevant design, engineering and safety guidelines, including *Austroads Guide to Road Design*. The process for the carrying out of road safety audits would be detailed in the CTAMP that will be prepared for the project.

Issues identified in the road safety audit will be responded to by:

- Detailing actions taken/to be taken to address each of the issues raised
- Providing justification for proposals and actions on particular issues raised.

Spoil haulage routes and hours of operation

Indicative spoil haulage routes for each of the proposed construction ancillary facilities are described in section 6.6.5 and shown in Figure 6-26 to Figure 6-31 of the EIS. Construction traffic routes for the project would use the existing motorway and arterial road network as much as possible. Traffic movements on local roads would be necessary in some instances to gain access to the construction ancillary facilities due to their specific site constraints. Where access requires local roads to be traversed the project has sought to minimise the distance of local roads that needs to be traversed.

A change to the haulage route for the Parramatta Road West civil and tunnel site has been investigated to avoid the use of the Hume Highway around Ashfield. This change results in the indicative spoil haulage route for this site as identified in Table 6-23 of Chapter 6 (Construction work) of the EIS being revised to the following:

- Parramatta Road West civil and tunnel site – Entry: southbound along Parramatta Road, then left onto Tebbutt Street, left onto Hathern Street, left onto Brown Street, left onto Cook Street and left onto Parramatta Road northbound.

Depending on final spoil management sites, spoil haulage routes may be subject to change. In the development of the CTAMP, construction traffic routes for each construction ancillary facility will be refined in consultation with relevant councils to confirm appropriate route selection.

The project has been designed to minimise the generation of construction traffic where feasible and reasonable. The assessment of construction traffic impacts has taken into account heavy vehicle movements (including spoil haulage) to and from construction ancillary facilities.

In developing construction methodologies and a construction program for the project, the aim has been to minimise the duration of the construction period while maintaining an acceptable and manageable amenity outcome for surrounding receivers. This has required a balance between the speed of construction activities and the ability to reasonably and feasibly maintain impacts within acceptable limits. Opportunities to further reduce construction timeframes while protecting local amenity will be considered during the detailed design process.

Tunnel construction activities would operate 24 hours a day, seven days a week. During the peak construction periods spoil haulage would occur 24 hours a day, seven days a week at tunnelling support sites, with the exception of the Darley Road civil and tunnel site (C4) where spoil haulage would be restricted to standard construction hours. Heavy vehicle movements associated with the removal of spoil from tunnelling would occur via ingress and egress directly to and from the arterial road networks.

As required by environmental management measure TT16 (see **Chapter E1** (Environmental management measures)) a truck management strategy will be developed (as part of the CTAMP) that will:

- Describe management measures for project-related spoil haulage vehicles to avoid queuing and site-circling in local roads and other potential traffic and access disruptions
- Identify truck marshalling areas that can be used by project-related spoil haulage vehicles
- Describes monitoring strategy to demonstrate that project-related spoil haulage vehicles are complying with the strategy.

In addition, project-related heavy vehicle movements to and from sites will be managed to ensure that existing road traffic noise levels are not increased by more than 2 dB(A) outside standard construction hours (see environmental management measure TT17 in **Chapter E1** (Environmental management measures)).

Information pertaining to the consultation with relevant councils on the preparation of the CTAMP is provided in the response in **section B12.8.17**.

Marshalling arrangements

In response to feedback provided by DP&E and the submissions received on the EIS, an additional construction ancillary facility (the White Bay civil site (C11)) is proposed near White Bay at Rozelle to be used as a truck marshalling facility. This facility would assist in reducing potential queuing and congestion on streets around construction ancillary facilities, as well as minimise traffic and noise disruptions to local streets surrounding the project and associated construction ancillary facilities. Further detail is provided in **Chapter D2** (White Bay civil site (C11)). The truck marshalling facility would primarily be used by spoil haulage trucks accessing construction ancillary facilities at Haberfield/Ashfield, Darley Road and Pyrmont Bridge Road, where available space for on-site queuing is limited.

The use of a marshalling area(s) for spoil trucks would be further investigated to assist in staggering the arrival of vehicles to site as reflected in environmental management measure TT16 in **Chapter E1** (Environmental management measures). As is the case with the White Bay civil site (C11) It is expected that the marshalling areas would be located in non-residential areas, close to the arterial road network and construction ancillary facilities where tunnelling would occur. This measure would assist in preventing queuing and parking of heavy vehicles on local roads in the vicinity of the project. Marshalling area(s) and provisions for their use would be identified in the CTAMP.

B12.8.35 Road safety audits on temporary and permanent infrastructure

Attachment 1 (Beca report) Section 5.1.1, p28

Similar to the importance of providing a comprehensive incident management plan, as mentioned in Section 3.1.3, it is equally important, as it is the custom of RMS, to prepare a program of independent road safety audits to be undertaken for each stage of this project. It should include audits for concept design (this EIS), preliminary design, detail design, construction (all stages), pre- opening and also an after-opening audit an appropriate time after the opening of each stage. The findings from these audits should be made available to stakeholders.

Response

Long-term traffic control plans, temporary works and traffic staging plans, will be subject to independent road safety audits that will be carried out in accordance with *Road Safety Audits Guide* (TC2003/RS03) (Roads and Maritime) and with reference to current practices outlined in *Austroads Road Safety Audit Guide* (2nd Edition 2002). Road safety audits will assess the safety performance of any new or modified local road, parking, pedestrian and cycle infrastructure provided as part of the project (including ancillary facilities) to ensure that they meet the requirements of relevant design, engineering and safety guidelines, including *Austroads Guide to Road Design*. The process for the carrying out of road safety audits would be detailed in the CTAMP that will be prepared for the project.

Issues identified in the road safety audit will be responded to by:

- Detailing actions taken/to be taken to address each of the issues raised
- Providing justification for proposals and actions on particular issues raised.

B12.8.36 Construction workforce parking

Attachment 1 (Beca report) section 6.6.6 p40, sections 6.7 and 6.7.1, p41 and section 6.7.2 on p42

SMC to provide a construction parking strategy that shows that sufficient on-site parking, shuttle bus and measures are put in place. It is recommended that this should be undertaken in the form of a workplace travel plan that is developed with local councils being an approval body, it should include details on compliance, reporting or parking at designated locations, as well as measured utilised to encourage the use of public transport and active modes to the sites to minimise the amount of private vehicle usage. See also IWC concerns as discussed in Issue 1, Issue 2, Issue 4, Issue 5 and Issue 7 at the start of this report.

Attachment 1 (Beca report) Section 8.3.1, p56 -57

Construction Workforce Carparking: Is the carparking provided sufficient to cater for demand? All construction related traffic, including worker and visitor parking should be contained on site. SMC to provide a construction parking strategy that shows that sufficient on-site parking, shuttle bus and measures are put in place. It is recommended that this should be undertaken in the form of a workplace travel plan that is developed with local councils being an approval body, it should include details on compliance, reporting or parking at designated locations, as well as measured utilised to encourage the use of public transport and active modes to the sites to minimise the amount of private vehicle usage. See also IWC concerns as discussed in Issues 1, 2, 4, 5 and 7 at the start of this report.

It is stated that "Parking of construction-related vehicles in adjacent local roads would occur, particularly during site establishment. It is Council's position that this is unacceptable and all construction related parking and activities are to be contained to designated construction areas. SMC to provide a construction parking strategy that shows that sufficient on-site parking, shuttle bus and measures are put in place. It is recommended that this should be undertaken in the form of a workplace travel plan that is developed with local councils being an approval body, it should include details on compliance, reporting and parking at designated locations, as well as measures utilised to encourage the use of public transport and active modes to the sites to minimise the amount of private vehicle usage. See also IWC concerns as discussed in Issues 1, 2, 4, 5 and 7 at the start of this report.

It is stated that "The Construction workforce would be encouraged to use public transport. No information is provided regarding how this would be achieved and measures to encourage public transport usage. SMC to provide a construction parking strategy that shows that sufficient on-site parking, shuttle bus and measures are put in place. It is recommended that this should be undertaken in the form of a workplace travel plan that is developed with local councils being an approval body, it should include details on compliance, reporting and parking at designated locations, as well as measures utilised to encourage the use of public transport and active modes to the sites to minimise the amount of private vehicle usage. See also IWC concerns as discussed in Issues 1, 2, 4, 5 and 7 at the start of this report.

It is stated that "A car parking strategy would be developed as part of the Construction Traffic and Access Management Plan (CTAMP) to limit impacts on parking for the surrounding communities. The Council should be more than a consulted party in the development of this strategy as it would have direct implications on their network and community. SMC to provide a construction parking strategy that shows that sufficient on-site parking, shuttle bus and measures are put in place. It is recommended that this should be undertaken in the form of a workplace travel plan that is developed with local councils being an approval body, it should include details on compliance, reporting and parking at designated locations, as well as measures utilised to encourage the use of public transport and active modes to the sites to minimise the amount of private vehicle usage. See also IWC concerns as discussed in Issues 1, 2, 4, 5 and 7 at the start of this report.

Continual consultation with local residents needs to be included in any parking strategy developed. SMC to provide a construction parking strategy that shows that sufficient on-site parking, shuttle bus and measures are put in place. It is recommended that this should be undertaken in the form of a workplace travel plan that is developed with IWC being an approval body, it should include details on compliance, reporting or parking at designated locations, as well as measures utilised to encourage the use of public transport and active modes to the sites to minimise the amount of private vehicle usage. See also IWC concerns as discussed in Issues 1, 2, 4, 5 and 7 at the start of this report.

Response

The majority of the construction ancillary facilities nominated for the project would have parking provision for construction workers. However, this would not meet the full needs for construction workforce parking expected to be generated by the project. It is anticipated that construction workforce parking would be primarily provided at the following sites:

- Northcote Street civil site (C3a) – around 150 car parking spaces (Option A)
- Parramatta Road East civil site (C3b) – around 140 car parking spaces (Option B)
- Rozelle civil and tunnel site (C5) – around 400 car parking spaces
- Campbell Road civil and tunnel site (C10) – around 150 car parking spaces.

To reduce the impact of heavy vehicle queuing on local roads, an additional construction ancillary facility is proposed at White Bay on land owned by the Port Authority of NSW (see **Part D** (Preferred infrastructure report)). The provision of this site, the White Bay civil site (C11) would result in several benefits for the community and the project, including:

- Reducing potential queuing and congestion on local streets surrounding the project and associated construction ancillary facilities
- Providing additional construction workforce parking spaces (around 50 spaces), which would assist in minimising the loss of parking on local streets
- Minimising disruptions to the road network around construction ancillary facilities and noise and other disturbance to the local community including landowners and business and commercial properties
- Improving safety for construction workers, motorists and the general public by providing a controlled area from which project traffic schedulers can direct truck drivers to construction sites at an appropriate time.

To make use of the parking availability at these facilities, shuttle bus transfers would be provided to transport workers to other sites which do not have spare parking capacity. This would alleviate parking demand at other sites and further reduce parking impacts identified in the EIS.

The construction workforce would be encouraged to use public transport and carpool. Uptake of these modes of transport would be anticipated to reduce demand for worker parking. Victoria Road and Parramatta Road are major transport corridors that have multiple bus routes. The Inner West Light Rail Line runs along the southern side of City West Link with stops near the Rozelle Rail Yards at Rozelle Bay and Lilyfield; and at the Darley Road civil and tunnel site (Leichhardt North light rail stop). However, workers starting or ending shifts very early or very late would be more likely to use private vehicles. Prior to construction starting, potential off-site areas near construction ancillary facilities that could be secured for construction workforce parking will be investigated.

A construction workforce parking strategy will be prepared as part of the CTAMP to limit impacts on parking and property access for the surrounding communities. The strategy will be developed in consultation with local councils and stakeholders associated with sporting and other public facilities adjacent to project sites, as well as with the M4 East and New M5 project contractors to identify opportunities to use parking being used during their respective construction periods.

The car parking strategy will include items such as forecasting of construction parking demand, review of existing parking supply and use of local streets in the area, impact on existing parking, consultation activities and proposed mitigation measures, such as:

- Quantify construction workforce parking demand around project work sites and ancillary facilities during site establishment and the construction phase generally

- Identify public transport options and other management measures (such as carpooling and shuttle buses) to reduce construction workforce parking demand
- Identify all locations that will be used for construction workforce parking
- Identify potential off-site areas that could be used for construction workforce parking that would be investigated and secured for use during construction where required and possible
- Identify exclusion zones, in consultation with potentially affected stakeholders, around construction sites and facilities where construction workforce parking would be restricted.

Processes for monitoring, reporting and corrective actions would also be part of the strategy (see environmental management measure TT04 in **Chapter E1** (Environmental management measures) for further information regarding the car parking strategy). The strategy will be developed in consultation with the M4 East and New M5 contractors to identify opportunities to use existing parking arrangements associated with those projects during their respective construction periods and once those periods are completed.

B12.8.37 Active transport connectivity and safety during construction

Attachment 1 (Beca report) Section 6.6.2, p39

Similar to 6.6.1 above, this is a significant list of indicative modifications to pedestrian and cyclist facilities during construction as per Table 6.20. All these changes and the integration into the existing road network should be subject to proper road safety audits for conceptual, preliminary design, detail design and pre-opening stages, taking into consideration all road users. The findings should be made available to IWC to discuss potential re-design and finalisation of Construction Management Plans for each site.

Response

Long-term traffic control plans, temporary works and traffic staging plans, will be subject to independent road safety audits that will be carried out in accordance with *Road Safety Audits Guide* (TC2003/RS03) (Roads and Maritime) and with reference to current practices outlined in *Austroads Road Safety Audit Guide* (2nd Edition 2002). Road safety audits will assess the safety performance of any new or modified local road, parking, pedestrian and cycle infrastructure provided as part of the project (including ancillary facilities) to ensure that they meet the requirements of relevant design, engineering and safety guidelines, including *Austroads Guide to Road Design*. The process for the carrying out of road safety audits would be detailed in the CTAMP that will be prepared for the project.

Issues identified in the road safety audit will be responded to by:

- Detailing actions taken/to be taken to address each of the issues raised
- Providing justification for proposals and actions on particular issues raised.

As part of the CEMP, a CTAMP will be prepared in accordance with environmental management measures TT01 in **Chapter E1** (Environmental management measures) and the conditions of approval. The CTAMP will be developed in consultation with key stakeholders including relevant local councils.

B12.8.38 Operational traffic benefits from the mainline tunnel

Attachment 1 (Beca report) Section 3.2, p16

Council's second-tier position is that it reluctantly accepts that Stages 1 and 2 are approved and under construction and seeks a redesign of Stage 3 to reduce local traffic impacts, improve transport outcomes and reduce project costs. Should the project proceed the construction of the main Stage 3 tunnel between Haberfield and M5 to the southeast is required, as Council is concerned that without this link residents around the Haberfield and St Peters interchange sites will suffer unacceptable operational traffic impacts.

Attachment 1 (Beca report) Section 4.4.4, p23

It is stated that the M4-M5 Link would provide a significant overall improvement to network productivity. A number of key benefits and improvements are forecast as a result of the project (when compared to not proceeding with the project). These suggested benefits are listed on pages 4.30 and 4.31. Benefit 1: Faster and fewer trips can be expected on non-motorway roads in the Inner West LGA. Whilst this is generally better from a level-of-service perspective, it may increase the risk of speed-related crashes. It will also change traffic patterns on local roads with potential rat-running as drivers will find the shortest and most convenient route to and from the interchange portals of the motorway. See also comment in Section 3.1.10.

Attachment 1 (Beca report) Section 4.5.2, p24

A key element of Council's alternative proposal is that a modified version of the main Stage 3 tunnel would remain. IWC therefore supports the construction of the main Stage 3 tunnel between Haberfield and M5 to the southeast, as Council is concerned that without this link residents around the Haberfield and St Peters interchange sites will suffer unacceptable operational traffic impacts.

Response

Inner West Council's support for the construction of the mainline tunnel is noted.

A discussion of crash statistics, crash rates and costs is presented for key roads around each of the project interchanges for the existing condition and the 'Without project' and 'With project; scenarios in Chapter 6, Chapter 8 and Chapter 10 of Appendix H (Technical working paper: Traffic and transport) of the EIS. In addition, section 10.2.2 of the Appendix H of the EIS includes an assessment traffic crashes along the M4-M5 Link Motorway.

Crash rates on motorways are generally much lower than on arterial roads, as they are generally designed to provide for efficient, free flowing traffic with physical capacity to accommodate predicted traffic volumes with no at-grade intersections. It is predicted that there would be little change or marginal decrease in crash numbers and costs at surface roads surrounding the three interchanges. Anzac Bridge and a section of the Princes Highway (between Enmore Road and Gannon Street) show a marginal increase in crash numbers in the 'With project' scenario (refer to section 8.3.3 of the EIS). This is due to the forecast increase in daily traffic on these roads.

As a result of the additional road network capacity provided by the project, the two-way future year AWT traffic demand compared to a 'Without project' scenario is predicted to significantly decrease on:

- City West Link and Parramatta Road, east of the M4 East Wattle Street and Parramatta Road ramps respectively, by about 25 per cent in the 2023 and 2033 'With project' and 'Cumulative' scenarios
- King Street in St Peters by about 20 per cent in the 2023 and 2033 'With project' scenarios
- Stanmore Road in Stanmore by about 15 per cent in the 2023 and 2033 'With project' and 'Cumulative' scenarios
- Lyons Road in Russell Lea by about 15 per cent in the 2023 and 2033 'With project' scenarios, and about 20 per cent in the 2023 and 2033 'Cumulative' scenarios
- Southern Cross Drive and the Sydney Harbour Tunnel by about 20 per cent and 25 per cent respectively in the 2023 and 2033 'Cumulative' scenarios.

Further discussion on the operational impacts to local roads as a result of the project is discussed in **section B12.8.39**.

B12.8.39 Operational traffic impacts to local roads

Attachment 1 (Beca report) Section 3.1.10, p15

The EIS states for Network sustainability – traffic modelling indicates that the project (together with the other WestConnex projects) would remove a large number of heavy freight vehicles from Parramatta Road (between Haberfield and Camperdown), City West Link, Victoria Road (east of Iron Cove Bridge), King Georges Road and the existing M5 East Motorway, which would result in improved network operation and efficiency. The delivery of WestConnex would reduce travel time by improving capacity and reducing surface road traffic. From the modelling it seems true that traffic on some of the arterial and sub-arterial roads in the vicinity of the tunnel portals at the Haberfield, Rozelle and St Peters interchanges will be reduced opening up opportunities to "claim" back or restore the spare capacity on these roads. However, for local roads (lower order roads in the road hierarchy), further assessment undertaken by IWC shows possible rat-running occur along routes that do not currently have such traffic. IWC would like to work with SMC and RMS further assess the impact on these routes and request funding for the assessment, design, procurement and implementation of measures to minimise these impacts.

Attachment 1 (Beca report) Section 4.4.4, p23

It states further that where the project would connect to the existing road network, increased congestion is forecast in parts of Mascot, along Frederick Street at Haberfield, Victoria Road north of Iron Cove Bridge, Johnston Street at Annandale and on the Western Distributor. A number of these areas are forecast to improve when the WestConnex program of works and the proposed future Western Harbour Tunnel and Beaches Link are completed.

Attachment 1 (Beca report) Section 30.1.1, p168

It is stated that in addition the project will "Improve road safety by reducing traffic congestion on Sydney's arterial roads". This is not true for local roads in the vicinity of the interchanges as road users need to find routes to and from the interchange portals to avoid congestion which could lead to rat-running through IWC's neighbourhoods. The extent of this impact has not been addressed in the EIS, nor has it been quantified or a commitment made to address these impacts through mitigating measures. SMC needs to identify impacts on local roads as a result of WestConnex and needs to commit to fund the planning, design and implementation of mitigating measures. IWC will provide SMC with a list of roads where the impact is deemed to be critical. The process of how SMC or RMS will engage with IWC to facilitate this process is also not clear in the EIS.

The content of Tables 30.2 and 30.3 are avoiding the issue, as per our comment in Section 30.1.1, of the impact on local roads where these roads connect with the M4 - M5 arterial road network to and from the interchange portals. Our feedback on Chapter 8 elaborates on the lack of defining the impact of the change in road hierarchy and how discrepancies in the hierarchy will be identified and subsequent operational performance and road safety issues be addressed. A detailed assessment of impact on local roads, discrepancy in road hierarchy and subsequent operational performance and road safety issues, is required from SMC as this has been ignored in this EIS. IWC expects SMC to initiate and fund the assessment, budget for and implement mitigating measures. IWC further expects SMC to allow IWC full access to the planning process and proper consultation for approval of the mitigating schemes before it is implemented.

Response

As described in **section B12.8.38**, the screenline analysis found that as a result of the new roadway links provided by the project, the two-way future year AWT traffic demand compared to a 'Without project' scenario is predicted to significantly decrease on a number of parallel routes. This would be expected to be associated with the decreased use of local roads in proximity to the parallel routes.

In addition, certain intersections of local streets and arterial roads connected to interchanges are being upgraded as part project to ensure safe and efficient connections and provide the necessary additional capacity to cater for future traffic growth.

The management of operational traffic and transport impacts would be focused around the three interchanges at Wattle Street, Rozelle and St Peters. As with the M4 East and New M5 projects, Roads and Maritime would undertake a Road Network Performance Review, in consultation with Transport for NSW and relevant councils. This would confirm the operational traffic impacts of the M4-M5 Link on surrounding arterial roads and major intersections at both 12 months and five years after the commencement of operation of the M4-M5 Link. The assessment would be based on future updated traffic surveys taken during operation and the methodology used would be comparable with that used in this assessment.

Roads and Maritime will continue to work with council on network improvements, and will prepare similar network improvement strategies as per other projects.

B12.8.40 Incident management

Attachment 1 (Beca report) Section 3.1.3., p14

"Reducing road facilities", is the last point mentioned under this section of *NSW State Priorities*. It is true that M4 - M5 Link will reduce conflict points between vehicles with less exposure to crashes. This will however be the longest and largest road tunnel in Australia which will require challenging standard and current incident management procedures and the preparation of a comprehensive incident management plan. Other than what is described in Sections 5.8.4 to 5.8.7, very little details are given in Chapters 5 and 25 on incident management for this project. The preparation of a comprehensive Incident Management Plan, especially for the M4-M5 Link is suggested.

Attachment 1 (Beca report) Section 3.2.2, p17

The EIS states, congestion also reduces the safety of road networks as it results in more frequent vehicle crashes and traffic incidents that impact personal safety, property and road network performance. Rear-end [WestConnex M4-M5 Link and Roads and Maritime EIS] crashes result from stop−start conditions and are an indicator of road congestion. During the five-year period between 1 January 2011 and 31 December 2015, 60 per cent of crashes on key roads around the proposed Rozelle interchange, such as City West Link and Anzac Bridge, were rear-end crashes. This is consistent with roadways approaching capacity and on which a high level of queuing occurs.

With the reduction in congestion there is also a possibility of increase in speed which may increase speed-related crashes and also severity. It is suggested that SMC include a focused and ongoing crash assessment program that assess crashes to be able to implement mitigating measures immediately. As this statement (cell D28) is mostly relevant to arterial and sub-arterial roads it is also the responsibility of SMC and RMS to assess the impact on local roads (as described in Section 3.1.0 above)**.** Such a crash monitoring system could form part of an active incident management plan - as per Section 3.1.3 above [see **section B12.8.39** for the comments in relation to section 3.1.10 and 3.1.3 in this text].

Response

The M4-M5 Link mainline tunnels would join and integrate the M4 East and New M5 projects to form a continuous WestConnex Motorway. Prior to the project opening to motorists, M4 and M5 motorway operations would be transferred to the combined Traffic Control Room located in the WestConnex Motorway Control Centre (which would be located at the St Peters interchange).

The WestConnex Motorway would be operated by a ‘single operating entity’ which would:

- Operate, using the integrated traffic, plant and voice communication systems, a single seamless interface for the efficient management of WestConnex network traffic, facilities and equipment
- Manage traffic through the implementation of WestConnex network traffic and incident management strategies, the coordinated deployment of resources and the execution of traffic control plans through an integrated control system
- Provide motorist roadside assistance and incident response though a coordinated traffic control room to ensure the road user is provided with prompt and reliable breakdown assistance and incidents are cleared quickly
- Plan, train and respond to emergencies and threats. The Transport Management Centre (TMC) would liaise with the single operating entity to coordinate the wider network and community response to incidents and emergencies

- Have the resources and systems to manage one or more incidents/emergencies (including fire scenarios), while continuing to operate unaffected sections
- Coordinate resources and systems used to respond to incidents, emergency and threats across the WestConnex Motorway to provide a rapid and coherent response unconstrained by concession boundaries.

Section 5.8.3, section 5.8.4 and section 5.8.5 of Chapter 5 (Project description) of the EIS describes in detail the fire and life safety, operational management and coordinated operations approaches for the project and the broader WestConnex. The potential for incidents in the proposed tunnels are described in section 25.2.4 of the EIS.

Environmental management measure OpHR3 (see **Chapter E1** (Environmental management measures)) commits to the preparation of an Incident Response Plan that will be developed as part of the Emergency Response Plan for the project in consultation with emergency services.

B12.8.41 Operational management measures

Attachment 1 (Beca report) Section Overall Evaluation p68

There is limited information provided on what additional infrastructure measures are required to manage the identified effects.

No additional infrastructure to mitigate the identified issues with the "With project' scenario is provided. These include the Wattle Street/Parramatta Road intersection performance and potential use of local streets as rat-runs to avoid increasing congestion.

Response

Section 11.2 of Appendix H (Technical working paper: Traffic and transport) of the EIS identifies the management and mitigation measures that would manage operational traffic impacts from the project.

Operational traffic review

The traffic assessment has identified intersections where the operational performance would significantly change under the future traffic demands as modelled. This assessment has been based on forecast traffic demands derived from the WRTM and, consequently, the outcome may be affected by the limitations of the modelling process as described in Section 4.2 of Appendix H (Technical working paper: Traffic and transport) of the EIS.

By 2033, peak demand conditions with or without the project are likely to start earlier and finish later than today to accommodate greater forecast traffic demand arising from increased population and changes to land use. Due to forecast congestion, some of this traffic is predicted to not be able to start or finish their journey within the peak period. Some drivers will therefore choose to make their journey either earlier or later in the peak period to avoid delay. This behaviour called ‘peak spreading’ is consistent with what has occurred in Sydney and in other international cities.

As with the M4 East and New M5 projects, Roads and Maritime would undertake a review of network performance, in consultation with Transport for NSW and relevant councils, to confirm the operational traffic impacts of the M4-M5 Link on surrounding arterial roads and major intersections at both 12 months and at five years after the commencement of operation of the M4-M5 Link. The assessment would be based on updated traffic surveys at the time and the methodology used would be comparable with that used in this assessment.

Wattle Street interchange and surrounds

The analysis has identified key constraints impacting the performance of the network on Frederick Street (southbound), Parramatta Road (eastbound) and City West Link (northbound) in the ‘Without project’ scenario. The capacity constraints on Parramatta Road and City West Link are generally reduced by the M4-M5 Link project, particularly in 2023. It is expected that the M4 East Road Network Performance Review Plan would examine potential mitigation measures at these locations following the collection of updated data that would facilitate an understanding of actual project outcomes.

Notwithstanding the above, Roads and Maritime proposes the following opportunity to manage operational impacts:

- The identified exit blocking from Frederick Street through the Parramatta Road/Wattle Street intersection in the 'With project' scenario arises from forecast increase in southbound demand, combined with capacity restrictions at downstream intersections and limited storage space on Frederick Street. Management measures to be investigated by Roads and Maritime, in consultation with relevant local councils, could include:
  - Queuing and capacity monitoring and management on the Frederick Street/Milton Street corridor
  - Managing lane use and utilisation to improve the operation of the corridor.

Other management techniques and mitigation measures

Management of road network assets is a key function of Roads and Maritime, which uses network and corridor planning strategies to best manage and enhance these assets to maximise community benefits. Network and corridor planning is a process aimed at enhancing the capacity to manage the road network performance to meet community expectations. Integrated network and corridor planning processes are critical to working towards the vision of 'a safe, sustainable and efficient road transport system'.

The process involves a few key elements including:

- Setting network and corridor objectives in line with NSW and Australian Government strategies and community expectations
- Analysing anticipated performance against appropriate safety, traffic and asset measures
- Identifying strategic priorities to achieve appropriate safety, traffic and asset performance over the longer term within the context of limited funding.

As a key part of network management, network and/or corridor optimisation is a key tool in the management of project impacts. Together with the ongoing delivery of the Pinch Point Program through the Easing Sydney's Congestion office, which targets peak hour traffic hotspots, and other infrastructure measures previously discussed, network optimisation facilitates the management of impacts identified to ensure travel time savings are maintained to the greatest possible extent by minimising intersection and mid-block delays.

In addition to an optimisation strategy and potential infrastructure provision, the maintenance of the existing traffic control system is a key ingredient in providing Roads and Maritime with the tools to appropriately manage congestion on the network. A review of existing SCATS infrastructure at key intersections in the study area, including detectors, will be undertaken and upgrades implemented where appropriate.

B12.9 Air quality

Refer to Chapter 9 (Air quality) and Appendix I (Technical working paper: Air quality) of the EIS for details of air quality.

B12.9.1 Alignment with NSW EPA Approved Methods

Attachment 1 (Beca report) Section 9, p73

Overall the assessment methodology is generally consistent with previous NSW tunnel air quality assessments. The methodology does however vary from the NSW EPA Approved Methods (2016), notably in the choice of model, the NO_2 assessment procedures and the meteorological input file assumptions. The assessment methodology used is relativity complex, and has been varied to account for different pollutant and receptor types. However overall there appears to be no significant gaps in the assessment.

Attachment 1 (Beca report) Section I-8.4.7 I-G, p78

The method used in the assessment to estimate NO_2 concentrations is not a NSW EPA approved method (2016). However, information provided in the Appendix I Annexure G suggests that similar peak NO_2 concentrations would likely have been predicted if specific NSW EPA Approved Methods were used to calculate NO_2 levels instead of the method which was adopted. However, the high cumulative NO_2 concentrations suggest there are unidentified limitation to the approach. Review NO_2 predictions at location where concentration are predicted to exceed air quality levels.

Attachment 1 (Beca report) Section 9.5.9, p77

Assumed background pollutant levels have been based on ambient concentration levels measured in 2015. In general, this approach is consistent with the NSW Approved Methods (2016). This approach assumes that existing background levels will be comparable to those in modelled years 2023 and 2033. **Section 9.5.4** suggests that air quality in Sydney will to some extent vary due to changes in source emission rates. These effects have not been considered in the assessment. Although it is acknowledged that to do so would be complex and may not have a significant impact of the predicted cumulative pollutant level presented in the report it is recommended that the EIS at least notes that this has not been carried out.

Attachment 1 (Beca report) Section 9, p83

The modelling and assessment methodology used varies from the NSW approved methods in a number of ways e.g. choice of dispersion model, the method used to construct the meteorological input file, and the method used to calculate NO_2 concentrations. However, the approach taken is generally consistent with other air quality assessments undertaken for current NSW infrastructure projects. Overall no significant issues were identified in the methodology. The results of the modelling indicate that discharges from the tunnel stacks are unlikely to make a significant contribution to ambient air pollutant levels. The primary impact will be from changes in surface road traffic volumes. This is predicted to be a spatially asymmetric effect. Compared to a 'Do minimum' traffic scenario prediction, air quality levels would potentially improve at some locations while deteriorate at others. The primary concern is predicted to be emissions of NO_2 and fine particulate matter.

Attachment 1 (Beca report) Section 9.4.2, p75-76

The dispersion of pollutants has been modelled using the GRAL dispersion model. GRAL is not identified as an approved model by the NSW EPA (w.r.t [with respect to] Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales, 2016) but it has been used in previous Sydney infrastructure air quality assessments (i.e. WestConnex M4 and M5 tunnels). Although not an NSW EPA 'approved model' we consider GRAL to be an appropriate model in this instance.

The associated GRAMM meteorological modelling system has also been used to predict wind flow conditions in the modelling for the simulated year. GRAMM is similarly not identified as an NSW Approved Method, but has been used in previous assessments. An assessment of the meteorological model is included in an Appendix I Annexure but has not been reviewed in detail. However, the assessment has used a relatively old version of the GRAL/GRAMM model (version 14.11). The latest version is 17.9 has corrected a number of bugs in provision version and included revision algorithms. Notable changes have occurred to GRAMM meteorological model since v14.1. These changes will impact on the meteorological inputs used to simulate the dispersion of the emitted pollutants. The assessment should have been conducted with the most update version of the model. Some additional assessment should be conducted using the most updated version of the GRAL/GRAMM model, and the results compared to those presented in the report to identify any there is any significant difference between the versions and the assessed pollutant levels.

Response

The reasons for using GRAL instead of the models listed in the NSW EPA Approved methods on road projects are stated in Annexure I of Appendix I (Technical working paper: Air quality) of the EIS.

Annexure G of Appendix I (Technical working paper: Air quality) of the EIS specifically discusses the advantages and limitations of the various methods of NO_X to NO_2 conversion and the reasons for selecting the method used. NO_X emissions and concentration will tend to decrease in the future, making it less likely that very high values of will occur.

Background emissions

As noted in the Beca report, the assumed background pollutant levels have been based on ambient concentration levels measured in 2015 and the approach is consistent with the NSW Approved Methods (2016). The methods used are explained in Appendix I (Technical working paper: Air quality) of the EIS. Detailed assessment of future changes in emissions from background sources is beyond the scope of the EIS and, as noted in the submission, would not materially change the results.

GRAL and GRAMM

Section 8.4.2 of Appendix I (Technical working paper: Air quality) of the EIS notes that the GRAL version used was 14.11. However, this is an error. This error has been corrected in **Chapter A4** (Clarifications). The version used for the EIS was 16.8 which was released in August 2016. Whilst the models have subsequently been updated, the updates were not available at the time of modelling this project (e.g. v 17.9 was released in September 2017).

The GRAL model has been evaluated and calibrated for Australian conditions in a separate study commissioned by the Advisory Committee on Tunnel Air Quality (ACTAQ). This study is available on the ACTAQ website[5]. The report also discusses the use of the GRAMM meteorological module.

B12.9.2 Alignment with Institute of Air Quality Management (IAQM) guidance

Attachment 1 (Beca report) Section 9.6.2, p70

The risk assessment methodology used in the assessment is consistent with the methodology recommended by the IAQM and the results of the risk assessment are considered to be reasonable. The assessment identified that all sites were at high risk of dust impacts due to soiling and low to high risks of impacts on human health and ecology.

Attachment 1 (Beca report) Section 9 Overall Evaluation, p72

The assessment is consistent with the recommendations and guidance included in the IAQM. The risk assessment determined that all sites were at high risk of being impacted by dust soiling and some sites were at high risk of experiencing adverse impacts on human health and ecology. It is therefore considered critical that the dust mitigation methods used for the project include all of the relevant methods included in the [IAQM] guidance and that a robust system of monitoring the impacts of discharges to air from construction of the project is described in the project construction methodology and the CAQMP.

The impacts of discharges to air from blasting need to be identified and the effects assessed and appropriate mitigation.

The assessment does not include any consideration of the impacts of onsite concrete batching plants. If concrete is to be produced on site an assessment of the effects of the discharges to air from the plant or plants will need to be included and the proposed mitigation methods described.

Response

Inner West Council's comment in relation to the methodology and its consistency with the methodology recommended by IAQM is noted. A detailed CAQMP will be prepared as part of the CEMP for the project and would include the relevant environmental management measures as described in **Chapter E1** (Environmental management measures) and any additional measures required by the Conditions of Approval.

If blasting for the project it is required, it would be underground and there would be no direct emissions from blasting to the external air. It would also be subject to a Blast Management Strategy (see environmental management measure NV8 in **Chapter E1** (Environmental management measures)) and undertaken within the prescribed limits set by the NSW EPA and DP&E. No concrete batching plants are proposed for the project as noted in **section B12.9.10**.

[5] http://www.chiefscientist.nsw.gov.au/__data/assets/pdf_file/0011/125030/ACTAQ-GRAL-optimisation-MAIN.pdf

B12.9.3 Alignment with Advisory Committee on tunnel air quality policies

Attachment 1 (Beca report) Section 9.2.3, p73

Potential in-tunnel NO_2 effects have been estimated using the ACTAQ 'In Tunnel Air Quality (Nitrogen Dioxide) Interim Policy (2016). This criteria level is consistent with limits used to assess other tunnel projects in NSW. We have accepted that the ACTAQ criteria as being representative of 'best practice' in NSW given its general acceptance in NSW. However, it is noted in the report that there are more stringent in-tunnel limits used internationally.

Attachment 1 (Beca report) Section 9.7.1, p77

The ACTAQ NO_2 limit is based on the average concentration along the length of the tunnel. The modelling results presented in the report indicates that average NO_2 levels in the M4-M5 link tunnel, or between the furthest M4 and M5 portals would not exceed this limit during normal operating conditions. However, the modelling appears to indicate that for some hours during the day, average NO_2 concentrations could potentially exceed ACTAQ limits in the M4 tunnel. For slower vehicle speeds average M4 in-tunnel NO_2 concentrations are predicted to increase. However, it is perhaps questionable whether the concentration of pollutants in the M4 tunnel alone is within the scope of the SEARs Air Quality Requirements 2f and 2k.

Assess whether the M4 in-tunnel limits will be exceeded with the development of the Project, and propose mitigation method if they are.

From the information provided it would appear that the average in-tunnel NO_2 concentrations have been calculated from predicted 1-hour average NO_2 concentrations along the length of the tunnel network based on predicted average hourly traffic flows through the tunnel. The ACTAQ guidelines are calculated on a rolling 15-minute average basis. It is possible that higher short-term concentration can occur than those predicted due to short term surges in traffic levels or abnormal emission conditions. Assess the risk of higher short term NO_2 concentration occurring and their impact.

Attachment 1 (Beca report) Section 9.2.3, p74

A limitation of the ACTAQ Policy NO_2 criteria is that an average concentration along the tunnels and for different journeys is required to be calculated from various air quality monitoring points in the tunnel. This will require a relatively complex monitoring network which incorporates a post measurement averaging procedure.

Response

As required by environmental management measure AQ27 in **Chapter E1** (Environmental management measures), an in-tunnel air quality monitoring system will be included in the detailed design. The system will monitor NO_X, NO_2, carbon monoxide and visibility (as a minimum) throughout the tunnel.

Monitoring of each pollutant will be undertaken throughout the tunnel. The locations of monitoring equipment will generally be at the beginning and end of each ventilation section. This will include, for example, monitors at each entry ramp, exit ramp, merge point and ventilation exhaust and supply point. The location of monitors will be governed by the need to meet the in-tunnel air quality criteria for all possible journeys through the tunnel system, especially for nitrogen dioxide. Sufficient monitors for nitrogen dioxide would be placed appropriately to enable calculation of the length-weighted 15 minute averages.

All sections of the WestConnex tunnel system will be continuously monitored from the Motorway Operations Control Centre which includes real-time monitoring of all pollutant levels throughout the tunnels. A range of responses are available to tunnel operators to maintain the in-tunnel air quality below the criteria, including increasing ventilation rates if traffic is slow moving to exchanging more air at ventilation outlets and restricting traffic from entering the tunnel.

The M4 East, as well as the New M5 projects have been subject to previous assessments and approval and will be required to meet the in-tunnel criteria in accordance with the relevant conditions of approval. The inclusion of those tunnels in the in-tunnel air quality assessment is to demonstrate the cumulative effects on travelling through multiple tunnels to ensure that the in-tunnel NO_2 criteria would be met as required by the SEARs.

The NHMRC (2008) reported a range of average concentrations of nitrogen dioxide in tunnels in Sydney and around the world that range from 0.05 to 0.3 ppm with levels up to 0.4 ppm reported during peak periods. These levels are based on data with averaging times that vary from 30 seconds during travel through a tunnel, six minute averages, to long term data with (unspecified averaging times). At the downstream end of a tunnel (where exposure is very short, ie minutes) levels up to 0.8 ppm have been reported. Exposures to this level of NO_2 for a few minutes are not known to trigger health effects, and the levels within vehicle cabins are considerably lower than the levels in the tunnel if car windows are up and ventilation is set to recirculate (refer to Appendix K (Technical working paper: Human health risk assessment) of the EIS). Section 10 of Appendix K (Technical working paper: Human health risk assessment) of the EIS presents pollutant concentrations for a range of traffic conditions up to and including the peak capacity of the tunnel at varying levels of congestion. This section demonstrates that the tunnel ventilation system would maintain in-tunnel air quality indefinitely when continuously subject to the most onerous design traffic conditions.

B12.9.4 Compliance with the *Airports Act 1996*

Attachment 1 (Beca report) Section 2.4.2, p12

It is stated: "The exhaust plumes from all of the ventilation facilities have the potential to penetrate either or both the OLS [Obstacle Limitation Surface] or PANS-OPS [Procedures for Air Navigation Services – Aircraft Operations] levels. The project has been designed to satisfy requirements set by DIRD [Department of Infrastructure and Regional Development] in relation to erected structures (such as ventilation outlets), equipment manoeuvring and lighting. To determine whether plume rise resulting from the operation of these ventilation facilities would be a controlled activity as defined in section 183 of the *Airports Act 1996* (Commonwealth), a plume rise assessment would be carried out in accordance with the CASA [Civil Aviation Safety Authority] Advisory Circular Plume Rise Assessments AC 139-5(1) November 2012 prior to the operation of the project."

Response

Noted. Approval to operate the ventilation system outlets was received from the Australian Department of Infrastructure and Regional Development on 23 November 2017.

B12.9.5 Consideration of design changes on air quality assessment

Attachment 1 (Beca report) Section 9.7.2, p78

The report notes that a number of small changes have been made to the Project which are not incorporated in to the model. Overall these changes are not expected to have a significant effect on the predicted concentrations.

Response

Noted. The minor changes to the design made after the air quality assessment had been completed are discussed in in section 8.2.3 of Appendix I (Technical working paper: Air quality) of the EIS.

B12.9.6 Traffic modelling used in the air quality assessment

Attachment 1 (Beca report) Section 9.5.4, p76

The predicted air quality effects are driven by the traffic model predictions. (The traffic parameter which influence vehicle emission and therefore downwind pollutant levels are, traffic volumes, and the level of congestion and the proportion of the traffic which are heavy diesel vehicles). A number of uncertainties have been identified in the traffic model predictions. These uncertainties will have a direct impact on the predicted air quality levels. If significant uncertainties are identified in the traffic model predictions then the air quality effects of the project should be reassessed.

Attachment 1 (Beca report) Section 9.7.2, p78

The expected impact of surface road and tunnel stack discharges has been based on predicted average weekday traffic profiles. Generally, this is considered to be appropriate for the assessment of expected typical air quality effects of highway projects. But ideally weekend traffic profiles should also be considered in the assessment (although not necessarily modelled) to confirm that the expected peak ambient air quality levels have been assessed. However, it is our understanding that traffic modelling from which emissions can be estimated were only available for weekday traffic conditions.

Response

The traffic was modelled using the WRTM v2.3 incorporating the latest available land use and demographic data at the time as discussed in section 8.2.3 of Appendix I (Technical working paper: Air quality) of the EIS. The emission estimations were all based on the local fleet emissions profiles based on the NSW EPA emissions inventory. Given the conservatism of the air quality modelling it is unlikely that the uncertainties in the demand traffic figures would materially change the outcomes of the air quality assessment.

As noted in the key assumptions for the air quality modelling (section 8.4.13 of Appendix I (Technical working paper: Air quality) of the EIS), weekday traffic volumes were used for every day in the year in the modelling. Further discussion of the concerns regarding the use of the traffic modelling for the air quality assessment is discussed in **section B11.9.11**.

B12.9.7 Assessment of surface road emissions

Attachment 1 (Beca report) Section 9.7.2, p78

Although worst case emissions from the tunnel stacks discharges have [been] assessed, it is arguable that, in accordance with the SEARs air quality requirement 2d, that worst case surface roads discharges, for at least the emissions from the roads, ramps and interchanges, which form part of the Project, should also be assessed. Assess impact of surface road discharges.

Response

The surface road air quality modelling is based on emissions from traffic throughout a full 24 hour period and including congested traffic in peak hours, which would be the worst case surface road traffic.

B12.9.8 Exhaust emissions from on-site plant during construction

Attachment 1 (Beca report) Section 9.3, p69

We agree that the exhaust emissions from on-site plant and site traffic are unlikely to have a significant impact on local air quality in the majority of cases, but situations may arise when large stationary diesel engines may be used, or a number of smaller engines are used in areas that are in relatively close proximity to sensitive receptors. The assessment and/or the CAQMP should address the potential effects of these situations and include specific mitigation measures to minimise the impacts of these emission sources. Address the potential for diesel engines to have an impact on sensitive receptors in more detail.

Response

Measures for management of diesel emissions on construction sites are reflected in environmental management measures, including environmental management measures AQ11 and indirectly in environmental management measure GHG4 (see **Chapter E1** (Environmental management measures)).

B12.9.9 Dust monitoring during construction

Attachment 1 (Beca report) Section 9.6.2, p70

The report notes that there is a potential for nearby sensitive receptors to be impacted by dust from the proposed construction activities at times even with the implementation of a CAQMP. This raises the need for a monitoring system to be implemented in all areas where sensitive receptors are at medium to high risk of dust impacts. Address the requirement for onsite monitoring of dust.

Response

Measures to manage the impacts from the generation and emission of dust and air pollutants during construction are described in **Chapter E1** (Environmental management measures). These include undertaking regular site inspections to monitor and record dust levels. A CAQMP will be prepared for the project which will describe how these management measures will be implemented during construction to minimise dust and air pollutant emissions and the monitoring and reporting that would be undertaken to demonstrate the effectiveness of the measures.

B12.9.10 Batching plants

Attachment 1 (Beca report) Section 9.6.2, p70

It is not clear from the information provided whether the effects of concrete batching plants have been included in the effects associated with construction. The locations of the proposed concrete batching plants are not identified in Chapter 9. If on-site concrete batching plants will be part of the project the effects of their discharges to air will need to be included in the EIS.

Response

On-site batching plant are not proposed and therefore are not assessed as part of the EIS.

B12.9.11 Blasting

Attachment 1 (Beca report) Section 9.10.1, p72

Chapter 6 refers to the use of blasting. Blasting will generate discharges to air which may have impacts on ambient air quality. The effects of the discharges to air from blasting have not been assessed in Chapter 9. An assessment of the effects of the discharges to air from blasting needs to be included in Chapter 9.

Response

Blasting methods can significantly reduce potential exposure to noise and vibration for residents and businesses above the tunnels. If blasting is proposed, a Blast Management Strategy will be prepared in accordance with relevant guidelines before blasting begins. Blast patterns would be designed and sequenced to minimise impacts of vibration on properties above the tunnels and on existing below ground infrastructure such as utilities. Blasting would only be undertaken underground and only in locations where the geology is suitable for safe and effective use. Therefore there would be no direct emissions to ambient air from blasting as the underground air quality would be managed by an air quality management system to ensure safe working conditions for workers underground.

B12.9.12 Hazardous emissions during construction

Attachment 1 (Beca report) Section 9.10.1, p71

The description of construction impacts identifies that there is a potential for crystalline silica emissions to occur. The section does not however identify whether any other hazardous materials may be encountered during earthworks such as those that may arise from a contaminated site or how these materials would be managed if they were encountered. Identify any areas where hazardous air pollutants may be encountered and include mitigation measures to minimising the risk of these contaminants causing adverse effects on receptors.

Response

Any generation of silica dust would be managed as part of the Work Health and Safety Plan and relevant NSW legislation, government policies and Australian Standards. The discovery of previously unidentified contaminated material will be managed in accordance with an unexpected contaminated lands discovery procedure, as outlined in the *Guideline for the Management of Contamination* (Roads and Maritime 2013) and detailed in the CEMP.

B12.9.13 Review of in-tunnel ventilation design

Attachment 1 (Beca report) Section 9.4.1, p73

The assessment of in-tunnel effects assumes the ventilation system will work as proposed. Higher in-tunnel pollutant levels will occur to those predicted if the system is not appropriately designed. The ventilation system should be independently reviewed by specialist tunnel ventilation engineers.

Response

The design of the ventilation system was prepared by specialist tunnel ventilation engineers has been reviewed by independent international experts, including those engaged by ACTAQ.

B12.9.14 Filtration of ventilation emissions

Attachment 1 (Beca report) Section 4.6.1, p25

Refer to IWC's position on filtration of tunnel stacks. See further comments in our response on Chapter 9. It is stated on page 4.45 that the inclusion of filtration would result in no material change in air quality in the surrounding community when compared to the current project ventilation system and outlet design. Any predicted changes in the concentration of pollutants would be driven by changes in the surface road traffic. It is noted on page 4.44 [of the EIS] that no in-tunnel filtration system is proposed for the project because the modelling undertaken demonstrates that the ventilation system would be effective in ensuring compliance with the in-tunnel air quality criteria. This not acceptable in IWC's view.

Response

See **section B11.9.3** for a response regarding filtration of tunnel ventilation emissions.

B12.9.15 Effect of buildings on peak pollutant levels

Attachment 1 (Beca report) Section 9.4.2, p75

The assessment has not incorporated the effect of that the building which surround the may road sources are likely to have on the pollutant dispersion. In particular urban canyoning effect can restrict pollutant dispersion and result in higher pollutant levels. We agree that this would have been impractical for the large city-wide model which was constructed for the assessment and accept rational of the approach taken in the assessment. However, some further consideration of the effect building is appropriate at the location in the modelling domain where exceedances of the air quality criteria limits are predicted to occur. The GRAL dispersion model is ideally suited to modelling these effects. Consider the effect that buildings have on peak pollutant level in built-up urban area where exceedances of the air quality criteria levels are predicted to occur.

Attachment 1 (Beca report) Section I-8.4.7 I-G, p82

Based on the modelling results presented in the report we agree that emissions from the tunnel ventilation stacks are unlikely to make a significant contribution to maximum cumulative air pollutant levels. However, these predictions have not incorporated the downwash effects that building structures in the vicinity of the stacks, or the ventilation stack structures themselves (which are significant) may have pollutant dispersion. These effects can be. It is acknowledged that the sensitivity of the predictions to building downwash effects is briefly discussed in Appendix I Section 8.4.15. However, local factors can have very specific effects on pollutant dispersion and ground level pollutant levels, which should be identified and assessed. It is our understanding that GRAL does not incorporate stack tip downwash. The potential effects of nearby buildings on tunnel stack discharges should be identified and evaluated.

Response

There is no algorithm in the GRAL model to directly model the tip downwash.

Sensitivity tests have been conducted to investigate the effects of varying important model parameters on the predicted concentrations around project ventilation outlets. For each parameter the value used in GRAL was varied around a central estimate that was representative of the value used in the EIS (see **section B.1.1.4** for further discussion of the sensitivity tests).

The sensitivity tests were only conducted for the ventilation outlet contribution (ie background and surface road contributions were excluded), and for maximum 1-hour, maximum 24-hour $PM_{2.5}$ and annual mean $PM_{2.5}$.

The tests were mainly conducted for a sub-area of the M4-M5 Link GRAL domain of approximately three kilometres by three kilometres around the Rozelle ventilation facility (outlet H for Western Harbour Tunnel, and outlets I and J for M4-M5 Link/Iron Cove Link), as shown in (**Section B1.1.4**). Because there were few large buildings in the Rozelle domain, additional tests to examine the effects of buildings were undertaken for a similar domain around the northern outlet for Iron Cove Link (see **Section B1.1.4**). The effects of outlet temperature and height were not considered for the Iron Cove Link domain.

The building tests for the Rozelle and Iron Cove Link domains indicated that the exclusion of buildings is also unlikely to represent a large source of uncertainty in the overall predictions in the assessment, given the small absolute contribution to $PM_{2.5}$. The total predicted concentrations, and the conclusions of the assessment, would not change significantly with the inclusion of buildings.

B12.9.16 Receptors used in the assessment

Attachment 1 (Beca report) Section 9.4.2, p76

A variety of different methods have been used to assess cumulative effects and background levels. These have typically varied depending on the nature of the receptor (i.e. "community", and "residential workplace and community" (RWR) receptors). Generally, a more detailed approach has been used for the community receptors (due to the computational requirements). However, the different approaches make the assessment less consistent and problematic when comparing community and RWR receptor predictions.

Response

The 40 community receptors were included in the assessment of the 86,375 RWR receptors but were subject to an additional time series assessment to provide more detail of the predicted air quality at those locations. The background levels used were the same for all scenarios for each year, including the cumulative cases.

B12.9.17 Exceedance of pollutant criteria

Attachment 1 (Beca report) Section 9.7.2, p79

The results of the modelling show that cumulative PM2.5, PM10, and NO_2 concentration exceed air quality limits at different location (hot-spot) in the modelling domain as a result of the project.

Maximum 1-hour NO_2 concentrations at some of the RWR receptors are predicted exceed the NEPC criteria by up to a factor of approximately 2. The report has considered that these effects are likely to be overestimated due to a number of factors. Appendix I Section 8.4.14 provides reassessment of the concentrations at a small number of the receptors. We agree that the 1-hour average NO_2 are likely to be overestimated, based on the results of ambient monitoring conducted in Sydney. However, it is still unclear in the assessment what the expected NO_2 maximum concentrations are predicted to be at these receptors. Provide an assessment of where 1-hour NO_2 are not predicted to achieve the NEPC criteria.

Overall, we agree with the assessment that the discharge of air toxics and CO from the project and surrounding surface roads are unlikely to result in an exceedance of the air quality criteria levels.

Response

The exceedances of one hour NO_2 and particulate matter occur with and without the project, in the case of the particulate matter because of existing high background levels, and in some cases, in the cumulative cases as a result of future proposed projects, which would be subject to separate environmental assessments and approvals.

The predicted maximum one-hour NO_2 concentrations were very high at a small number of RWR locations. These elevated levels are not considered to be representative of concentrations that would occur within the study area. This is due to the combined effect of the approach adopted for converting NO_X to NO_2 (that overestimates short-term one-hour average concentrations), and the statistical method that was used for the 86, 375 RWR receptors. A more detailed analysis was sued for the 40 community receptors (refer to section 8.4.14 of Appendix I (Technical working paper: Air quality) of the EIS for more detailed discussion).

The assessment also demonstrated that the results for one hour NO_2 are overestimated. Annexure J (Figure J-11) presents evidence of how much the OLM is over-predicting maximum 1-hour NO_2 concentrations near roads. An additional round of NO_X/NO_2 modelling was undertaken at 18 discrete receptors to investigate the likely magnitude of the NO_2 overestimation. These 18 receptors are listed in Table 8-28 in Appendix I (Technical working paper: Air quality) of the EIS. They were selected to represent the range of concentrations across the domain. At each receptor the contemporaneous approach was used to calculate NO_2 concentrations, as with community receptors. The results of the additional modelling are shown for maximum one hour NO_2 concentrations are Figure 8-111 in Appendix I (Technical working paper: Air quality) of the EIS.

B12.9.18 Consideration of local roads in regional effects

Attachment 1 (Beca report) Section 9.8, p80

Regional effects have been assessed in terms of their relative effects, based on the estimated difference in total vehicle emissions for the 2023 and 2033 'Do minimum' and 'Do something' traffic scenarios (which are predicted to increase). It is noted that vehicle emission rates considered incorporate only the main roads which are included in the WRTM traffic model. It is noted that the contribution from the smaller roads should also be considered in this assessment which are also expected to be affected by the Project. The assessment of regional effects should also include consideration or discussion of the effects of local road sources.

Response

Traffic volumes on local roads are low given the constrained road capacity. The emissions forecasts are representative of the greater majority of the Sydney regional vehicle fleet. The forecast contribution from emissions to regional air quality per pollutant are shown in Figure 9-70 in Chapter 9 (Air Quality) of the EIS. The 'Do minimum' scenario is without the project.

B12.9.19 NO_2 modelling and monitoring

Attachment 1 (Beca report) Section 9.10.2, p80

The results of the modelling indicate that the discharge of particulates and NO_2 may exceed criteria levels at impact receptors. The management of ambient air quality operational effects has only considered pollutants emitted from the ventilation stacks. No mitigation or air quality monitoring has been proposed for the larger contribution from surface roads, particularly at the locations which are predicted to be significantly impacted by changes in traffic flows. Provide further details of proposed mitigation procedures to manage adverse ambient air quality levels and any appropriate ambient monitoring programmes.

The monitoring of NO_2 levels along the length of the tunnel will be critical in determining average NO_2 concentrations which can then be compared against the ACTAQ policy limit. Presently only limited information is available with regards to the proposed in-tunnel monitoring system. The report notes that a detailed monitoring programme will be undertaken once the tunnel design is developed. However, some additional information regarding the monitoring performance that will be achieved and a demonstration that the tunnel NO_2 averaging procedures can be successfully implemented would have been appropriate. Provide additional detail as to how the monitoring will be implemented.

Response

The most effective reduction in vehicle emissions from surface roads is at the source, that is, through regulation of vehicle emission standards.

Section 9.10.2 of the EIS provides information regarding the in-tunnel monitoring of NO_2. However, as noted, the detailed monitoring program will be developed in the detailed design phase, as reflected in environmental management measure AQ27 in **Chapter E1** (Environmental management measures).

B12.9.20 Underestimation of NOx concentrations from ventilation stacks

Attachment 1 (Beca report) Section I-8.4.7 I-G*, p81*

The predicted annual average NO_X concentrations for the ventilation stack discharges on p 147 appear to be under predicted when compared to the predicted annual PM10 concentration shown on p165. The modelled stack NO_X emission rates are generally ten times higher than PM_{10} emission rates which would mean NO_X predictions should be about 10 times higher than the PM_{10} prediction. However, the contour plots indicate than the NO_X concentrations are only 2 times higher than PM_{10} levels. Check annual average NO_X prediction.

Response

Current in-stack measurements for tunnels in Sydney show that the NO_X/PM_{10} ratio is – roughly speaking - between 20 and 30. For 'typical' tunnel conditions the NSW EPA emission model gives a ratio for current conditions of around 15-20, and around 10-15 for future years (e.g. 2023 and 2033). For the EIS, the ratio is more like 5-6 (rather than 2). This is seen in the average and maximum results for RWR receptors, and in the contour plots. It is essentially a consequence of the very conservative emission factors for non-exhaust $PM_{2.5}$ in the PIARC model used in the tunnel ventilation assessment. Emission rates for both NO_X and PM_{10} are likely to be conservative.

B12.9.21 Steep tunnel gradient at Rozelle interchange

Attachment 1 (Beca report) Section 4.6.1, p25

The Rozelle Interchange as designed is complex, with most access ramps underground, so would be difficult and costly to construct. Several of the interchange's ramps would need to be constructed with steep gradients to transfer traffic from significant depths to the surface. Council is concerned these steep gradients increase per-vehicle emissions, adding to air pollution impacts and necessitating larger ventilation facilities than would otherwise be needed.

Attachment 1 (Beca report) Section I-8.4.7 I-G, p81

Based on the information provided in Appendix I, Annexure L, it would appear that some sections of the tunnel have gradient of more 8 percent (e.g. the Rozelle interchange). The NSW Government Advisory Committee on Tunnel Air Quality (TP09: Evolution of road tunnel in Sydney, 2014) recommended minimising road gradient based on high vehicle emission associated with the M5 tunnel westbound tunnel exit (which has a gradient of 8 percent). Confirm whether the project alignments exceed the recommended 8 percent gradient.

Response

See **section B11.9.6** for a response regarding the impact of gradients at Rozelle interchange on vehicle emissions.

B12.9.22 Design of the tunnel ventilation stacks

Attachment 1 (Beca report) Section Appendix I – Annexure I, p83

It assumed that the final design tunnel ventilation stack heights and emissions parameters will be regulated to at least the minimum of those presented report. Confirm that the design of the ventilation stack and stack discharge conditions will at a minimum meet the criteria assumed in the assessment.

Response

The design of the ventilation stacks will be in accordance with the stack discharge criteria detailed in the conditions of approval for the project.

B12.9.23 Modelling of multiple ventilation stacks

Attachment 1 (Beca report) Section Appendix I-Annexure G, p82

The modelling has modelled multiple ventilation stack as a single equivalent stack. This is a common modelling approach to simulating the cumulative effect that multiple stack sources located close to each other have on plume rise (it assumes that all of the emission plumes fully merge in the on discharge). This approach is usually more applicable to buoyant emission plumes (e.g. discharges from boiler stacks). In this instance, plume rise is expected to be driven largely by momentum of emitted ventilation. The approach is likely to overestimate plume rise and therefore dispersion of the emitted pollutants, and underestimate pollutant levels, particularly for the sources which are assumed to be large stack diameters. Although these considerations are not expected to have a significant impact on cumulative levels, it is appropriate to consider the sensitivity of predictions to these assumptions. Provide some justification for the modelling approach. Particularly with regards to the proposed project stacks.

Response

The assumption that multiple outlets were modelled as one is incorrect and that is not stated anywhere in the EIS. There is no reference to any modelling of release of a 'single equivalent stack'. Each point of release was entered into the model separately, reflecting the design, for example outlets H, I and J at Rozelle were modelled individually. For example, for the Campbell Road ventilation facility, this is shown in Figures 4-16 and 5-51 of the EIS and in Table 8-15 of Appendix I (Technical working paper: Air quality) of the EIS, which gives the co-ordinates of each of the outlets in the model.

As far as the EIS/contour plots are concerned, not only does the EIS not show the results for any individual sub-outlet at a ventilation facility, it does not show the results for any individual outlet. The EIS only shows the results for all tunnel ventilation outlets across the whole domain combined. That is to say, for any given receptor location the 'outlet' contribution is from every ventilation outlet in the whole domain (obviously the contributions from distant outlets are tiny or zero). Whilst it is possible to show the results for individual outlets, this would have been time consuming and would not have resulted in a material difference to the relevant findings of the air quality assessment. In addition, it is not always the case that plume rise is driven by momentum (exit velocity) rather than temperature. The effects of the two depend on the assumptions that are made for temperature and exit velocity at any given stack location.

B12.9.24 Emissions from ventilation facilities

Attachment 1 (Beca report) Section 4.6.1, p26

There has been particular concern in the community about air quality and visual amenity impacts from the ventilation facilities proposed for Stage 3 within the RRY [Rozelle Rail Yard] site (near The Crescent) and on Victoria Road near Terry Street. The latter facility has raised particular concerns due to its proximity to densely developed residential areas. This is exacerbated by the fact that residential areas on the eastern side of Victoria Road are elevated, so there is a possibility that some dwellings will be above the level of the facility outlet. Rozelle Primary School is also within reasonable proximity to this latter facility, and Council is aware that the school's Parents' and Citizens' Association (P&C) has raised concerns about air quality impacts on children. Although raising the height of ventilation facilities increases dispersal of emissions, it also increases visual impact.

Response

See **section B11.9.1** for a response regarding the emissions from ventilation facilities.

B12.9.25 Construction management measures

Attachment 1 (Beca report) Section 9.10.1, p71

The list of mitigation measures included in Table 9-34 [of the EIS] does not include all of the items recommended by the IAQM for medium and high-risk sites. Of note are the requirement to carry out dust deposition, dust flux or real-time PM10 continuous monitoring during construction and demolition and to commence baseline monitoring at least 3 months before work commences, more details regarding the preparation and maintenance of the site in accordance with IAQM recommendations, the imposition of a maximum speed limit on site, suitable controls for the concrete batching plant, the requirement to avoid dry sweeping of large areas and the recommendation to use water-assisted dust sweeper to remove any tracked out material onto local and access roads, regular inspection of the integrity of haul routes and the instigation of repairs to the surface as soon as practicable, installation of hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems or mobile water bowsers and regularly cleaned, access gates to be located at least 10m from receptors where possible. Include the relevant additional mitigation measures into the list of project construction dust mitigation measures in Chapter 9.

The mitigation measures do not include any information on ambient air quality monitoring for the construction sites, other than daily observations. Continuous instrumental monitoring of dust and meteorological conditions at the construction sites is considered to be critical and recommend that a system is designed and implemented for each site which has been assessed as having a medium or high risk for impacts from construction discharges to air. The monitoring system should be capable of providing real time information on local meteorological conditions and dust concentrations downwind of the site in the vicinity of sensitive receptors and be suitable to be used for site dust control, response to complaints and compliance with consent conditions. Alert and alarm values should be established for dust concentrations and wind speed and directions which can be used for modification of site operations and dust control methods and also for stopping work if necessary. It is strongly recommended that the outline of the monitoring system for each construction site should be included in the assessment and the detailed design is included in the CAQMP. An outline of the monitoring system for meteorological conditions and dust concentrations is included in the EIS and a detailed design is developed and included in the CAQMP. See Attachment 2 for potential application for dust monitoring equipment which should be considered for application at construction sites.

Response

A range of environmental management measures in **Chapter E1** (Environmental management measures) have been designed to address the impacts of ambient air quality from dust generation and deposition.

These measures include a Construction Air Quality Management Plan will be developed and implemented to monitor and manage potential air quality impacts associated with the construction for the project in accordance with the environmental management measures identified in **Chapter E1** (Environmental management measures) and the conditions of approval for the project. The Plan will be implemented for the duration of construction.

The relevant recommended mitigation measures in the IAQM are typically implemented as part of business as usual management measures. To ensure that particular measures are developed as part of the construction activities, a number of environmental management measures already include the relevant aspects of the IAQM, such as:

- Regular communication to be carried out with sites in close proximity to ensure that measures are in place to manage cumulative dust impacts
- Regular site inspections will be conducted to monitor for potential dust issues. The site inspection, and issues arising, will be recorded
- Construction activities with the potential to generate dust will be modified or ceased during unfavourable weather conditions to reduce the potential for dust generation
- Use of mains electricity in favour of petrol or diesel generators
- Implementation of car parking strategy which also includes the promotion of public transport and carpooling.

Attachment 1 to the Inner West Council's example dust monitoring equipment in Attachment 2 of the Attachment 1 to the Inner West Council's to the Inner West Council's submission is noted. It will be the responsibility of the design and construction contractor(s) to identify and implement monitoring equipment, where required, which meets the requirements in the environmental management measures and conditions of approval.

B12.10 Noise and vibration

Refer to Chapter 10 (Noise and vibration) and Appendix J (Technical working paper: Noise and vibration) of the EIS for details of noise and vibration.

B12.10.1 Appropriateness of the assessment

Attachment 1 (Beca report) Section 10, p84

Assessment noted to be very comprehensive and generally addresses all required issues.

Attachment 1 (Beca report) Section 10.1.3, p89

Agree EPA INP is appropriate criteria for the assessment of noise from fixed facilities.

Attachment 1 (Beca report) Section J-7, J-7.1 7, p100

Haberfield impacts noted and discussed, however, reference elsewhere required to establish these impacts. Comments consistent with Sections 5.1.4 and 5.1.5. Confirming report consistency and conclusions agree.

Attachment 1 (Beca report) Section J-7.2, p100

Conclusions consistent with Sections 5.1.9 and 5.1.10. Confirming report consistency and conclusions agree.

Attachment 1 (Beca report) Section J-7.3, p100

Conclusions consistent with Sections 5.2.4 and 5.2.5. Confirming report consistency and conclusions agree.

Attachment 1 (Beca report) Section J-7.4, p100

Conclusions consistent with Sections 5.3.4 and 5.3.5. Confirming report consistency and conclusions agree.

Attachment 1 (Beca report) Section J-7.5, p100

Conclusions consistent with Sections 5.4.4 and 5.4.5. Confirming report consistency and conclusions agree.

Attachment 1 (Beca report) Section J-7.6, p100

Conclusions consistent with Sections 5.5.4 and 5.5.5. Confirming report consistency and conclusions agree.

Attachment 1 (Beca report) Section J-7.7, p100

Conclusions incomplete but consistent with Sections 5.6.4 and 5.6.5. Confirming report consistency and conclusions agree.

Response

Noted.

B12.10.2 Reference to Australian Standards

Attachment 1 (Beca report) Section J-4.1.1, p86

Lists relevant policies, guidelines and standards considered in the assessment of construction noise, however no reference to Australian Standard 2436 Guide to noise and vibration control on construction, demolition and maintenance sites (AS 2436) which is commonly referenced as a guide for the noise emissions of different construction plant, and notably, in some cases indicates higher emission values than referenced in subsequent sections of the assessment. Another common reference standard for construction plant emissions in Australia is the British Standard BS 5228. Both of these standards are referenced in the NSW Roads & Maritimes Services 2016 publication *Construction Noise and Vibration Guideline* (2016 CNVG)[.] Recommend reference to AS 2436 or statement of reason why this reference is not considered applicable in this instance.

Response

The CNVG is used as the overarching guideline for the noise assessment for this project. The CNVG references both AS 2436 and BS 5228.

B12.10.3 General comments

Attachment 1 (Beca report) Section 10.3.7, p97

Although this section refers to the main line tunnel alignment, other sections of the report such as [sections] 10.3.5 and 10.3.6 [of the EIS] also refer to the same section which does not specifically address impacts in each of these NCA areas. A rather general assessment is provided which may not be satisfactory for stakeholder consideration and discussion for each NCA may be preferable.

Attachment 1 (Beca report) Section J- 5.1.10, p99

We agree with authors that given the distances and low number of affected properties (see conditional comments above), that the BS6472-1 relaxation is reasonable. NB BS 6472-1 has not been fully referenced within the report.

Attachment 1 (Beca report) Section J-5.3.5, p99

Refer to Table 5-86. It is noted the construction vibration impacts at Rozelle (specifically NCA 25) are significant potentially over 100 affected receivers and 345 in total. As noted by the study, more detailed investigation will be required in this area once the specific alignment becomes known.

Attachment 1 (Beca report) Section J- 5.4.5, J- 5.5.5, J-5.6.5 Sections 5.4.5, 5.5.5, 5.6.5, p99

Similar comments as above may apply except for St Peters (5.6.5 references elsewhere are required just as per Haberfield Option A ([M4])). As noted by the study, more detailed investigation will be required in this area once the specific alignment becomes known.

Response

Noted.

As noted in the submission, BS 6472-1 has not been fully referenced within the Technical working paper: Noise and vibration (Appendix J of the EIS). This error has been captured in the clarifications chapter of this report (see **Chapter A4** (Clarifications)).The correct reference for BS 6472-1 is as follows:

BS 6472 Part 1-2008 Guide to evaluation of human exposure to vibration in buildings. Vibration sources other than blasting Part 1 (British Standards Institute (BSI) 2008).

Detailed noise assessments will be carried out for all ancillary facilities required for construction of the project as reflected in environmental management measure NV3 in **Chapter E1** (Environmental management measures). The assessment will consider the proposed site layouts and noise generating activities that will occur at the facilities and assess predicted noise levels against the relevant noise management levels determined in accordance with the requirements of the Interim Construction Noise Guideline (ICNG) (NSW Department of Environment and Climate Change NSW (DECC) 2009).

The assessments will be used to determine the appropriate heights and configurations of noise barriers, and other appropriate noise management measures, consistent with the requirements of the ICNG and the CNVG. Noise barriers, as confirmed through the noise assessments, will be installed as early as possible during site establishment and as a minimum prior to the commencement of excavation associated with tunnel access.

B12.10.4 Relationship between Interim Construction Noise Guideline and Construction Noise and Vibration Guideline

Attachment 1 (Beca report) Section J-4.1.2, p87

Discussion of criteria primarily based on *Interim Construction Noise Guideline* (ICNG), with no reference to the relationship between this document and the latest 2016 CNVG. Suggest inclusion of note in relation to the 2016 CNVG and any differences in procedure if applicable.

Response

As noted in the *Construction Noise and Vibration Guideline* (CNVG) (Roads and Maritime 2016) 'the NSW *Interim Construction Noise Guideline* calls for the application of feasible and reasonable measures to mitigate construction noise and vibration. This guideline provides the detail needed to identify feasible and reasonable noise mitigation measures for construction, minor works and maintenance projects'.

B12.10.5 Existing noise and vibration

Attachment 1 (Beca report) Section 11.3.4, p102

Reference made to construction noise management levels but with no detail or background. Add cross-reference to levels in noise and vibration chapter.

Concept of background noise levels during construction and operation not explained and unclear. Are these baseline noise levels at present, in which case what is the reference to construction / operation? If these are predicted levels for construction / operation, what are they doing in the existing section and why are they different for the construction and operation phase? Title misleading as no existing vibration text. Clarify description, how derived and explain differences in values. Add baseline vibration conditions.

Clarify description, how derived and explain differences in values. Add baseline vibration conditions.

Attachment 1 (Beca report) Section J-3.1, p98

Whilst baseline noise levels have been reported there has been no ambient vibration monitoring to indicate the existing weighted acceleration levels or VDV values occurring within the study area. Clarify why ambient noise was measured not ambient vibration.

Response

While noise goals for construction and operational fixed facilities are based on existing noise levels, vibration criteria are not. Hence, an existing vibration level survey was not undertaken.

Construction noise management levels (NMLs) for residential receivers have been outlined in the EIS in the following tables:

- Table 10-20 Residential NMLs for Haberfield Option A
- Table 10-26 Residential NMLs for Haberfield/Ashfield Option B
- Table 10-32 Residential NMLs for Darley Road
- Table 10-38 Residential NMLs for Rozelle
- Table 10-44 Residential NMLs for Iron Cove
- Table 10-50 Residential NMLs for Pyrmont Bridge Road
- Table 10-56 Residential NMLs for St Peters.

The construction NMLs for all commercial receivers in the noise catchment areas is 70 dBA.

As noted in section 4.1.2 of Appendix J (Technical working paper: Noise and vibration) of the EIS requires project specific noise management levels (NMLs) to be established for noise affected receivers. In the event construction noise levels are predicted to be above the NMLs, feasible and reasonable work practices are investigated to minimise noise emissions. The ICNG provides an approach for determining $L_{Aeq(15minute)}$ NMLs at adjacent residential receivers based on measured $L_{A90(15minute)}$ rating background noise levels (RBL), as described in Table 4-2 of Appendix J of the EIS.

As noted in section 4.8.2 of Appendix J (Technical working paper: Noise and vibration) of the EIS, operational noise modelling of the study area was carried out using the *Calculation of Road Traffic Noise* (CORTN) (UK Department of Transport 1988) algorithms. The modelling allows for traffic volume and mix, type of road surface, vehicle speed, road gradient, reflections off building surfaces, ground absorption and shielding from ground topography and physical noise barriers. The algorithm output of CORTN (designed as an L_{A10} predictor) has been modified to calculate the relevant daytime $L_{Aeq(15hour)}$ and night-time $L_{Aeq(9hour)}$ road traffic noise emission levels at noise sensitive receivers, as required by the *NSW Road Noise Policy* (RNP) (NSW Environment Protection Agency (NSW EPA) 2011).

B12.10.6 Baseline noise monitoring

Attachment 1 (Beca report) Section J-3.5.2, p86

The results at some locations indicate relatively high background noise levels (e.g. R.04 and R.05). While these levels may be representative of conditions at the location where the monitoring was undertaken, the high levels indicate they are likely to have been influenced by a source relatively close to the monitoring location (e.g. monitoring conducted in close proximity to a significant road). The introduction to the section notes that the background data has been used for a variety of purposes, including setting construction noise management levels. In some cases, the data is likely to be more suitable for certain applications than others e.g. high noise level locations best suited to model validation, rather than appraising the background noise levels of the most critical receptors in the vicinity of construction works. Unclear if this distinction has been accounted for in the assessment. Recommend additional commentary / clarification about the primary purpose of each measurement location.

Response

Variations in background noise throughout areas of apparently similar noise environment would be expected due to variables such as boundary fences providing differing levels of noise screening.

This would be the case for virtually every large infrastructure assessment using criteria based on Rating Background Levels (RBLs) as the large areas mean that an approximation is required for practicality reasons of deploying large numbers of loggers. For the baseline monitoring for the M4-M5 Link project, over 30 logger results were used for this project, at relatively close intervals in the study area. This number of monitoring locations is very high when compared to most other infrastructure projects even those with a greater linear study area.

Generally, loggers were located on the source side of the receiver, and while this is typically also the road side, it would also be most likely to be the worst-impacted when assessed against RBLs.

Loggers set back in the catchments were also used to check the appropriateness of the recommended mitigation measures at locations which were not exposed to the highest noise from either existing road sources, or proposed construction activities. Typically, construction noise sources approximate a point source which drops off at a faster rate with distance than either distant or nearby road traffic source noise. This was verified by the spot-checks undertaken for M4-M5 Link at Rozelle (refer to section 5.3.2 in Appendix J (Technical working paper: Noise and vibration) of the EIS. The purpose of each logger is summarised in section 3.3 of Appendix J (Technical working paper: Noise and vibration) of the EIS and how this data was used in the assessment is included in the following sections:

- Spot-checks for construction noise at Rozelle – section 5.3.2 of Appendix J of the EIS
- Operational noise model validation - section 4.8.3 of Appendix J of the EIS
- Construction noise goals (airborne) – Chapter 5 (defined for each construction area) of Appendix J of the EIS
- Operational fixed facilities – section 6.12 of Appendix J of the EIS.

B12.10.7 Construction noise methodology

Attachment 1 (Beca report) Section J-4.3, p87

Does not state the prediction standard used for the calculation of noise levels from construction traffic (e.g. unlike the preceding section on construction activities which clarifies that ISO 9613 was used for the predictions) Recommend clarification of prediction method for both equivalent and maximum noise levels.

Attachment 1 (Beca report) Section J-4.8.2, p87

Does not state the prediction method used for evaluating maximum noise levels. Recommend clarification of the prediction method used for the maximum noise level assessment.

Response

Noise modelling for construction traffic on public roads was carried out using the *Calculation of Road Traffic Noise* (CORTN) (UK Department of Transport, 1988) algorithms.

B12.10.8 Building floor levels used in the assessment

Attachment 1 (Beca report) Section J-4.10, J-6.12.1, p94

Apart from Table 4.31 "key assumptions" (indicating that all floors of multilevel receiver buildings have been included for the assessment of operational traffic noise), there is no indication of the relevant receptor location in the calculations for the fixed facilities. The directional nature of the noise from the ventilation outlets / inlets means that this is an important consideration. Operational noise at ground levels will be much lower than those on the upper levels of a nearby apartment building, or at a receptor elevated with respect to the ventilation station. The most affected receptors are not necessarily closest to the fixed facilities. The elevated source level, combined with the lower background noise levels at distant residential properties (refer existing noise level discussion above) means that noise impacts at distant properties are possible. This aspect has not been explored in adequately in the discussion in [section?] 6.12 [of the EIS]. While future detailed design must consider these aspects, the technical working paper has not demonstrated that the noise from the fixed facilities can comply with the project goals. Clarify locations and relative heights of receptors, coordinate with any revised background noise data necessary to address the items above, new conclusions and recommendations as necessary.

Attachment 1 (Beca report) Section J-5, p87

It is unclear if the construction noise assessment at each receiver accounts for all floors of all sensitive buildings. For example, the introduction of Chapter 6 in relation to operational noise specifically confirms the assessment has accounted for all floors of multi-storey dwellings. We have not been able to locate similar confirmation for the construction noise assessment. Recommend that confirmation is sought that the construction noise assessment accounts for all floors of multi-level sensitive receiver locations.

Response

The fixed facilities noise and construction noise assessments consider all floors and all facades of all buildings identified in the study area and presents the highest impact in the report.

B12.10.9 Airborne noise assessment during construction

Attachment 1 (Beca report) Section J-5.1.2, p87

Table 5-5 includes sound power levels for a range of activities which are generally in the range of achievable noise emissions, however some items are based on a relatively low assumed sound power levels compared to standard reference values noted in AS 2436 (see note above in relation to Section 4.1.1 of the report). For example, trucks associated with tunnelling and supporting works (which, importantly, could be a frequent source of night time noise) are assessed using an assumed sound power level of 103 dB, compared to the 107 - 117 dB values indicated in AS 2436 for trucks. The lower values which have been assumed in the assessment are desirable and may potentially be feasible for quieter equipment selections. However, this assessment approach for construction noise contrasts with that of the approach adopted in subsequent sections for operational traffic noise assessment which assesses the risk of impacts based on initial appraisal without mitigations i.e. to demonstrate the effect that could transpire if noise is not appropriately addressed. The assessment does present a separate assessment with separate path-based mitigation measures applied, however the assumption of generally lower sound power levels in the 'base modelling' effectively represents a form of source- based mitigation.

Recommend that additional information is provided to support the viability/basis of the selected emission values, and importantly, an indication of the mechanisms that will be used to ensure that the actual equipment selected and used in practice will achieve comparable emission values. These mechanisms should ideally document measures other than reliance on compliance monitoring. For a project of this scale involving such prolonged construction periods, a dedicated process for screening the selection of acceptable construction plant would be beneficial. A risk assessment as per the operational traffic noise assessment, based on higher emissions, for select locations, may also be informative to demonstrate the scale of the risk of high noise levels, and therefore the importance of mitigation measures for this project.

Attachment 1 (Beca report) Section J-5.1.2 5.1.2, p88

Generally suitable measures with respect to scheduling and source/path treatments, however no reference to measures for controlling or reducing the duration of the highest noise generating activities. As per note above, the long nature of the construction program means that the durations of the noise are potentially as or more important as the levels of noise and therefore warrant comparable attention/controls as applied to time and noise level of the works. Recommend inclusion or evaluation of opportunities to limit or reduce (even if it results in slightly higher noise levels) the duration of higher noise level activities.

Response

The noise model typically assumes that all noise sources are operating simultaneously at full power. For complex noise models with a large number of noise sources (especially mobile equipment typical for civil works) the predictions can overestimate a real world measured noise level as many of the noise sources do not operate continuously at full power and their operation may be intermittent or cyclical.

Recognition that all equipment will not operate 100 per cent of the time allows for the predicted results to be refined to represent a more realistic scenario. A de-rating factor has been applied to equipment identified not to work at 100 per cent of the time in any one 15-minute period to represent realistic noise operations. The de-rating factor is based on the anticipated duty of a source. The duty of a source is the assumed percentage of time that a source is likely to operate and has been estimated based on previous experience on projects of a similar scale and nature and the indicative construction methodology developed for the project (as described in Chapter 6 (Construction work) of the EIS).

Mitigation and management measures for noise and vibration impacts during construction are shown in **Chapter E1** (Environmental management measures).

A Construction Noise and Vibration Management Plan (CNVMP) will be prepared for the project. The plan will:

- Identify relevant performance criteria in relation to noise and vibration
- Identify noise and vibration sensitive receivers and features in the vicinity of the project
- Include standard and additional mitigation measures from CNVG and details about when each will be applied

- Describe the process(es) that will be adopted for carrying out location and activity specific noise and vibration impact assessments to assist with the selection of appropriate mitigation measures
- Include protocols that will be adopted to manage works required outside standard construction hours in accordance with relevant guidelines
- Detail monitoring that will be carried out to confirm project performance in relation to noise and vibration performance criteria.

The CNVMP will be implemented for the duration of construction of the project. In addition monitoring will be carried out at the commencement of activities for which a location and activity specific noise and vibration impact assessment has been prepared to confirm that actual noise and vibration levels are consistent with noise and vibration impact predictions and that the management measures that have been implemented are appropriate (see environmental management measure NV6 in **Chapter E1** (Environmental management measures)).

To minimise the construction noise impacts associated with longer duration construction impacts from the concurrent construction of the WestConnex component projects and to respond to issues raised during the construction of other WestConnex projects and in submissions on the M4-M5 Link EIS, the following strategies are proposed:

- Downgrading the function of the Northcote Street civil site at Haberfield to a construction workforce car park and laydown area. Currently this site is used as the main tunnelling site for the eastern end of the M4 East project
- Designing acoustic sheds with consideration of the activities that will occur within them and the relevant noise management levels in adjacent areas. Monitoring will be carried out to confirm that the actual acoustic performance of the sheds is consistent with predicted acoustic performance (see environmental management measure NV7 in **Chapter E1** (Environmental management measures))
- The appointment of a suitably qualified and experienced Acoustics Advisor, who is independent of the design and construction contractor(s), and who will be engaged for the duration of construction of the project (see environmental management measure NV1 in **Chapter E1** (Environmental management measures))
- Consideration of receivers that qualify for assessment for at-receiver treatment due to predicted operational road traffic noise, that are also predicted to experience exceedances of noise management levels during construction, for at-receiver treatments as a priority (see environmental management measure NV9 in **Chapter E1** (Environmental management measures)).

B12.10.10 Outlet sound

Attachment 1 (Beca report) Section 10.1.7, J-4.9.1, p89

There is an assumption that the breakout noise is 10 dB(A) less than that from outlet. Given that there is likely to be an open inlet or outlet plenum connection to the fans, the ventilation station construction will be a very significant consideration, and may ultimately impact on building size and layout. There is no consideration or detail as to how the breakout noise acoustic requirements may be achieved even at a conceptual level. Prepare conceptual analysis of breakout noise considerations.

Attachment 1 (Beca report) Section J-4.9.1, p93

There is no analysis or detail as to how the outlet sound power levels were derived. In order to achieve a given sound power level at the outlet, consideration of the likely fan sound power level is necessary together with relevant attenuation systems is required. The necessary attenuators normally required will consume significant space and there is no consideration as to how this may affect building sizing, layout and location. The spectra power spectra set out in Table 4-27 is indicative of that achieved by simply deducting the attenuator insertion losses from the fan sound power levels.

Outlet and inlet sound power levels are also determined by not only fan and attenuator selection but by noise generated downstream (exhaust) or upstream (supply) of the attenuators. As one of the operational requirements of the ventilation outlet is to expel air at a significant velocity to allow dispersion, there is significant risk of airflow generated noise through outlet and associated fittings, turning vanes and dampers. As the function of the ventilation station is to a large part reliant on the required air velocity, acoustic control measures are not easily provided in this respect, other than providing sufficient distance between the outlet and the nearest residential receptors. There is no assurance in the analysis that this assessment has been carried out. In the event that airflow noise exceeds the design goal at the residential or other sensitive receptors, the proposed location of the ventilation station(s) may become unfeasible. Prepare conceptual analysis of attenuator sizing and airflow generated noise to verify suitability of proposed location of ventilation station building and spatial allowances.

Response

For the purposes of the EIS, the use of jet fans with baffle-type attenuators located within the ventilation building and outlets similar to those proposed for the New M5 was used in the assessment. The design of the ventilation facilities, to be finalised during detailed design, would be required to comply with the criteria in the *Industrial Noise Policy* (EPA 2000).

The noise emissions from all fixed facility noise sources would be considered during detailed design to determine the appropriate mitigation options to ensure compliance with relevant operation noise criteria, which may include noise barriers, silencers, acoustically lined ductwork and/or acoustic louvres.

B12.10.11 Jet fan assumptions used in operational noise assessment

Attachment 1 (Beca report) Section 10.1.7, J-4.9.1, p89

Supply and exhaust to the tunnels are presumably managed by axial fans, not jet fans as described in this paragraph? Confirm fan type.

Attachment 1 (Beca report) Section 10.1.7, J-4.9.2, p90

The assumptions for jet fans indicate that allowance was made for the operation of 4 jet fans in the vicinity of each assessment location. This potentially means allowance for only 2 fans operating in in the vicinity of each portal. Congested traffic operating scenarios can mean that it is necessary to allow for a large number of jet fans operating simultaneously, even during the night time hours. Typically, there is little reduction with distance in jet fan noise within a road tunnel, meaning that even a jet fan 400-500 metres back from the portal can have some influence on environmental noise levels. The noise modelling must include a sufficient number of jet fans within the tunnel to ensure the project requirements can be met under all conditions. As jet fan types and locations are partially dictated by the required duty during congested conditions there is limited opportunity to increase setback distance from the portal or to provide significant noise control acoustic control measures, other than ensuring sufficient distance between the portal and the nearest residential receptors. The analysis in this assessment has not been carried out in a sufficiently robust manner to demonstrate compliance with the required project goals. In the event that noise from the portal exceeds the design goal at the residential or other sensitive receptors, the proposed location of the portal(s) may become unfeasible.

Ensure that the noise modelling includes sufficient jet fans within the tunnel to demonstrate that the project noise goals can be met with all necessary jet fans operating. To this end it will be necessary to cumulatively determine environmental noise levels due to each jet fan bank, until no further increase is calculated.

Response

To clarify, four fans have been assumed operational within each portal location.

The operational noise and vibration assessment considered impacts from road traffic and fixed facilities including: ventilation facilities, tunnel jet fans, substations and water treatment plants. The study area for the assessment was developed according to the impacts likely to arise from project activities, including those related to construction, operation and cumulative scenarios where several of these plant items are operating in close proximity. This assessment is provided in section 6.12 of Appendix J (Technical working paper: Noise and vibration) of the EIS, with indicative sound power levels provided in Table 4-27.

This indicates that there is only one location where an exceedance of the operational noise criteria would be incurred, at Iron Cove, where there is an exceedance of 12 dBA. If not addressed through design, this would affect three residential properties and one commercial property. The cumulative noise emissions from all fixed facility noise sources would be considered during detailed design to determine the appropriate mitigation options to ensure compliance with relevant operation noise criteria, which may include noise barriers, silencers, acoustically lined ductwork and/or acoustic louvres.

B12.10.12 Fixed facilities operational noise impacts

Attachment 1 (Beca report) Section 10.4.7, p91

This section concludes that the selected mechanical plant and equipment would be reviewed and assessed against the relevant operational criteria. We note that the relevant operational criteria the fixed facilities have not been adequately established within Noise and Vibration Working Paper - Appendix J. Adoption of the noise criteria in Table 10-63 may in some instances lead to operational noise that is in excess of the *Industrial Noise Policy* criteria for sensitive receptors at more distant points within the NCAs. It will be necessary, prior to any detailed design works to carry out additional surveys to demonstrate the appropriate residential criteria for the fixed facility noise sources. Carry out additional surveys in Centre of NCAs and re-establish Fixed Facilities criteria, prior to detailed design.

Attachment 1 (Beca report) Section 10.4.7, J-3.5.2, J-4.7.3, p92

The selected noise monitoring locations are generally close to traffic sources, limiting applicability for assessment of noise from fixed facilities at more distant premises. Specific instances are detailed below. Carry out additional surveys in Centre of NCAs and re-establish Fixed Facilities criteria.

Response

A spot-check of locations further back in the catchments was undertaken and is summarised in section 6.12.3 of Appendix J (Technical working paper: Noise and vibration) of the EIS. The spot check process indicated that predicted noise emissions from the fixed facilities at sensitive receivers further from the main roads would be compliant with the adopted noise criteria.

B12.10.13 Amenity criteria used in the operational assessment for fixed facilities

Attachment 1 (Beca report) Section J-4.7.3, p92

Amenity criteria not corrected for existing industrial noise or traffic. Correct for any existing industrial or traffic noise per EPA INP [Industrial Noise Policy] guidelines.

Response

Section 4.7.3 of Appendix J of the EIS notes that where existing transportation L_{Aeq} noise levels exceed the acceptable noise level by 10 dBA or more, and the existing noise level is unlikely to decrease in future, the noise criteria should be taken to be the existing noise level minus 10 dBA. This approach may be applicable to areas with high traffic noise.

B12.10.14 Noise catchment area (NCA) criteria

Attachment 1 (Beca report) Section J-4.7.3, J-6.12.1, p92

NCA01 criteria should be lower, per rationale Section 6.12.3 page 307. Establish NCA 01 criteria further back from Parramatta Road.

NCA02 criteria should be lower, per rationale Section 6.12.3 page 307. Establish NCA 02 criteria further away from Parramatta Road and Wattle Street.

NCA02 criteria should be lower, per rationale Section 6.12.3 page 307. Establish NCA 03 criteria further away from Wattle Street.

NCA02 criteria should be lower, per rationale Section 6.12.3 page 307. Establish NCA 06 criteria further away from Parramatta Road / Wattle Street.

NCA02 criteria should be lower, per rationale Section 6.12.3 page 307. Establish NCA 13 criteria further away from Darley Street.

Attachment 1 (Beca report) Section J-3.5.2, J-4.7.3, J-6.12.1, commencing p92

NCA 16 criteria should be based on R12 results, = criteria 37 not 45. Re-establish basis for NCA 16 criteria.

NCA 19 criteria should be based on R12 results, = criteria 37 not 45. Re-establish basis for NCA 19 criteria.

NCA 21 criteria should be based on R12 results, per rationale Section 6.12.3 page 307. Re-establish basis for NCA 21 criteria, particularly for residences in southern zone NCA 21.

NCA 24 criteria should be based on R12/13 results, per rationale Section 6.12.3 page 307. Re-establish basis for NCA 24 criteria, particularly for residences in northern zone NCA 24.

NCA 25 criteria should be lower, per rationale Section 6.12.3 page 307. Re-establish basis for NCA 25 criteria, particularly for residences in centre zone NCA 25.

NCA 36, 33 criteria should be based on I.03, per rationale Section 6.12.3 page 307. Re-establish basis for NCA 36/33 criteria, note residential land falls away from Victoria Road.

NCA34/35 criteria should be lower, per rationale Section 6.12.3 page 307. Establish NCA34/35 criteria further away from Victoria Road.

NCA49 criteria should be lower, per rationale Section 6.12.3 page 307. Establish NCA49 criteria further away from Campbell Street, toward Centre of NCA.

NCA51 criteria should be lower, per rationale Section 6.12.3 page 307. Establish NCA51 criteria further away from the Princes Highway, toward Centre of NCA.

Response

The NCAs identified for the project include a variety of land uses within and surrounding the project and assist in the identification of impacts upon groups of receivers likely to be affected by the same works. Table 3-1 of Appendix J (Technical working paper: Noise and vibration) of the EIS identifies the approximate minimum horizontal offset distance from the nearest receiver building facade (receiver of any type) to the nearest point that construction works are occurring to receivers, shown in Figure 3-1 to Figure 3-3 in Appendix J and in Annexure B-1 in Appendix J of the EIS. The criteria for the NCAs is consistent with the guidelines as presented in Table 4-1 of Appendix J (Technical working paper: Noise and vibration) of the EIS.

As noted in section 6.12.3 of Appendix J (Technical working paper: Noise and vibration) of the EIS, the noise logging locations R.12, R.13 and I.03 are further into the NCAs and as a result the rating background levels (RBLs) are lower than would be expected than receivers in the NCA closer to the construction ancillary facilities, resulting in lower (more conservative) noise goals.

B12.10.15 Operational impacts sensitivity analysis

Attachment 1 (Beca report) Section J-6.7, p88

The report notes that: "It is recommended that the subsequent operational noise assessment undertaken during detailed design adopt, as a minimum, a sensitivity allowance of +1 dB(A) to account for uncertainty in the source emission input parameters." This appears to be a reasonable and cautious approach, and appears to correspond to the typical magnitude of differences between predicted and measured levels. However, it is unclear if this margin should have been considered in the operational noise assessment, as per the recommendation that it be factored into future design assessments. Recommend clarification and comment on whether or not the impact assessment should be based upon the predicted noise levels, increased by the suggested margin increase of +1 dB.

Response

The noise and vibration impact assessment met the SEARs requirements without modification by inclusion of a sensitivity analysis factor. Notwithstanding, the sensitivity assessment in section 6.7 of Appendix J (Technical working paper: Noise and vibration) of the EIS is included to allow future management of risk associated with future certainty of noise modelling inputs. With refinements in design, the sensitivity of the detailed design assessments as the design inputs become more defined may vary from the EIS and should be considered specifically for those assessments.

Further discussion of the sensitivity analysis is provided in **section C10.10.1**.

B12.10.16 Alignment with vibration policy

Attachment 1 (Beca report) Section 10.1.3, p95

The chapter states that the NSW EPA Guideline assessing vibration provides criteria that are based on a Vibration Dose Value (VDV) rather than a continuous vibration level. This is not always correct as Section 2.1 of the guideline states that continuous and impulsive vibration should both be assessed on the basis of the weighted RMS acceleration values presented in Table 2.2. This is important because the response to RMS vibration that exceed these thresholds results in greater community feedback or complaint than VDV vibration thresholds.

Assess maximum vibration levels (weighted acceleration per NSW Technical Guideline Section 2.1 and Table 2.2) for road headers (which can be described as continuous) and jack hammers, excavators both of which are impulsive.

Response

The Assessing Vibration: a Technical Guideline (AVATG) (NSW EPA 2006) still uses metrics which have been based on AS 2670 and BS 6472.1992 both of which have been withdrawn.

Vibration Dose Values (VDV) are considered to correlate best with human comfort and annoyance. VDVs address the combined effect of vibration magnitude and exposure duration and as such are better suited for assessing vibration of any character.

B12.10.17 Use of DIN4150

Attachment 1 (Beca report) Section 10.1.3, p95

This section should also discuss DIN 4150 Part 3 (DIN 4150-3) which also nominates vibration guidance values for construction which apply not only to heritage and sensitive structures, but also to commercial buildings and residential dwellings. Refer to Table 1 of DIN 4150-3. DIN 4150 -3 should not only be used for assessing heritage or unsound buildings.

This Section infers that DIN 4150- 3 should only be used for buildings of particular sensitivity and which are structurally unsound. Table 1 and Table 3 of DIN 4150 -3 refer to structures which have particular sensitivity only and do not define whether they are structurally unsound or not. In particular, this standard may be applied to buildings of heritage value as well as those that are structurally unsound. Table 10.7 could be re-worded and amended as it infers that the phrase 'structurally unsound' is used within DIN 4150-3, which it is not. Correctly reference DIN 4150-3 Table 1.

Attachment 1 (Beca report) Section J-4.1.5, p98

DIN 4150 Table 4.7 should apply generally as the criteria are more stringent than BS 7385 and apply not only to heritage and vibration sensitive structures.

It is important to note that DIN 4150 is more stringent than BS 7385, explain why the BS 7385 is used.

Response

DIN4150-3 levels for all groups are included in the criteria nominated in section 4.5 and subsequently assessed for each site in Chapter 5 of Appendix J (Technical working paper: Noise and vibration) of the EIS.

BS 7385 states that a building of historical value should not (unless it is structurally unsound) be assumed to be more sensitive" and therefore the building should not automatically be assumed to be sensitive to vibration on the basis of being a heritage item.

In terms of the most recent relevant vibration damage criteria, British Standard 7385: Part 2-1993 'Evaluation and Measurement for Vibration in Buildings Part 2" is an internationally accepted standard against which the likelihood of building damage from ground vibration can be assessed. This is the Standard recommended in Australian Standard AS 2187: Part 2-2006 'Explosives - Storage and Use - Part 2: Use of Explosives' as the vibration guideline values and assessment methods 'are applicable to Australian conditions'.

German Standard DIN 4150: Part 3-1999 also provides guidelines for evaluating the effects of vibration on structures. For vibration frequencies of less than 10 Hz, the DIN Standard gives a “safe limit” of peak vibration for dwellings of 5 mm/s and for historic buildings (with preservation orders or the like) of 3 mm/s. As opposed to the ‘minimal risk of cosmetic damage’ approach adopted in BS 7385, the ‘safe limits’ given in DIN 4150 are the vibration levels up to which no damage due to vibration effects has been observed. Hence the guideline limits in DIN 4150 are somewhat lower than those in BS 7385.

Although there is a lack of reliable data on the threshold of vibration-induced damage in buildings both in countries where national standards already exist and in the UK, BS7385: Part 2 has been developed from an extensive review of UK data, relevant national and international documents and other published data. The standard sets guide values for building vibration based on the lowest vibration levels above which damage has been credibly demonstrated. These levels are judged to give a minimum risk of vibration-induced damage, where minimal risk for a named effect is usually taken as a 95 per cent probability of no effect.

B12.10.18 Vibration sensitive equipment

Attachment 1 (Beca report) Section 10.1.3, p96

The Policy and Guidelines Section makes no reference to sensitive equipment although these receivers are clearly identified within the CNVG. Annexure B-1 refers to a theatre, a recording studio, medical centres and places of worship. Chapter 10 should identify these highly sensitive receivers within the alignment including any high technology facilities with sensitive equipment e.g. medical centres, universities, recording studios and cinemas and provide appropriate vibration criteria for these spaces such as the ones detailed in the ASHRAE guidelines for sensitive equipment. If there are more affected, this should be clearly stated. Assess the risk to any sensitive equipment or facilities nearby.

Attachment 1 (Beca report) Section J-31, p98

The sensitive receivers detailed in Annexure B-1 should also include those facilities detailed in the CNVG document particularly those sensitive receivers with instrumentation and equipment that may be subject to vibration impacts and adversely impacted. (Refer to similar note above re Chapter 10). Assess the risk to any sensitive equipment or facilities nearby.

Attachment 1 (Beca report) Section J-38, p98

There is no mention or discussion of particular sensitive receivers which could be adversely affected by peak acceleration levels such as recording studios or theatres. Any impact on the Enmore Theatre could be dramatic.

Response

A CNVMP will be prepared for the project which will include the identification of noise and vibration sensitive receivers in the vicinity of the project.

Section 4.1.5 in Appendix J (Technical working paper: Noise and vibration) of the EIS refers to indicative vibration criteria for critical areas. At the detailed design stage, consultation with the affected receivers would also be undertaken in relation to specific vibration criteria for any sensitive equipment located adjacent to the works. As vibration limits for sensitive equipment are highly dependent on the site installation, information relating to the design vibration levels at the point of entry to the structure is required from the user/owner of each sensitive location.

The Enmore Theatre is not expected to be impacted by construction works.

B12.10.19 Ground borne noise and vibration impacts

Attachment 1 (Beca report) Section J-23, p98

The assessment of ground borne noise and vibration impacts around the tunnel access portals is not clearly defined or described in Appendix J. The use of road headers and excavation equipment can generate significant vibration and ground borne noise and specific activities in the early works and preparation for the tunnelling commencement is not clearly identified within the report. Expand on details at tunnel portals that should be provided in conjunction with Figures 4-4 to 4-6 [of the EIS].

Response

Both the vibration and ground-borne noise assessment included the tunnel access portals – further detail is found in Annexure I of Appendix J (Technical working paper: Noise and vibration) of the EIS, showing design and predicted ground-borne noise contours.

B12.10.20 Construction equipment included in the methodology

Attachment 1 (Beca report) Section J-4.5, p98

There is no reference here to scrapers, rock breakers or comparable earth moving equipment which should be included. Clarification required.

Response

The plant included in Table 4-12 of Appendix J (Technical working paper: Noise and vibration) of the EIS are intended to be representative of the vibration intensive plant expected to be used on the project, based on the CNVG.

B12.10.21 Data used in Figure 10.21 of the EIS

Attachment 1 (Beca report) Section

We presume the information in Figure 10.21 is drawn from the TBN ground borne noise level versus distance information provided in Figure 10.8 on page 10-33. If correct, a reference to this figure should be included.

Response

This is correct – the roadheader source data was used to assess the ground borne noise level versus distance.

B12.10.22 Ground borne noise impacts

Attachment 1 (Beca report) Section J-5.1.5, p99

Reference is required to another assessment (M4) although Option A may be the recommended alternative chosen. Needs more detail?

Attachment 1 (Beca report) Section J- 5.4.5, J- 5.5.5, J-5.6.5 Sections 5.4.5, 5.5.5, 5.6.5, p99

Similar comments as above may apply except for St Peters ([section?] 5.6.5 references elsewhere are required just as per Haberfield Option A (M5)). As noted by the study, more detailed investigation will be required in this area once the specific alignment becomes known.

Attachment 1 (Beca report) Section J-5.6.4, p99

Required to review another assessment to determine degree of impact. Needs more detail?

Response

Section 5.1.5 of the Appendix J (Technical working paper: Noise and vibration) refers to the M4 East project, the EIS for which is available on the NSW Major Project's website.

Section 5.6.5 of the Appendix J (Technical working paper: Noise and vibration) refers to the New M5 project, the EIS for which is available on the NSW Major Project's website.

B12.10.23 Noise and vibration impacts from mainline tunnelling

Attachment 1 (Beca report) Section J-5.7, p99

Refer Table 5-148. It is noted that tunnelling may affect up to 132 receivers in NCA 24 which is significant. As recommended by the study, more detailed analysis and mitigation measures will be required per the CNVG requirements.

Attachment 1 (Beca report) Section 5.7, p99

Report states that there are no receivers within the minimum distances - which cannot be verified. This compliance should be demonstrated by way of charts or plots to define these distances for easy reference.

Response

Noted.

Maps showing the buffer distances from proposed vibration intensive plant are shown in the Annexure J of Appendix J (Technical working paper: Noise and vibration) of the EIS.

B12.10.24 Assessment of construction impacts

Attachment 1 (Beca report) Section J-5, p99

Whilst each comparable section details impacts such as exceedance levels and number of affected properties there is insufficient resources to validate review or confirm these estimates. Refer Table 5-40 and succeeding tables. Prediction results cannot be verified.

Response

Noted. With a large project area and numerous receivers and works activities, the data required by the guidelines is large. The presentation of data in the report has been supplemented with graphical information in the annexures to Appendix J (Technical working paper: Noise and vibration) of the EIS.

B12.10.25 Reference for the site law used in the vibration assessment

Attachment 1 (Beca report) Section J-5.7.3, p100

References should be provided for the "site law". This is a relationship which cannot be verified. Other references provide different relationships for this forecast which creates uncertainty with respect to the vibration forecasts. Provide a reference for the site law.

Response

The site law was sourced from Report F51-R1 - *Vibration Site Laws Northern Driven Tunnels Sydney Harbour Tunnel*, July 1990, Richard Heggie Associates.

B12.10.26 Vibration management measures

Attachment 1 (Beca report) Section 10.3.3, p97

The mitigation measures detailed in this section broadly comply with the requirements of the ICNG although we note that the ICNG requirement for individual briefings for significantly affected (highly affected) receivers have not been identified nor is there any reference in this section to monitoring during construction also proposed by the ICNG. Although these measures may be proposed within the SEARS schedule or Appendix J we consider they should also be identified within this section of the report.

Attachment 1 (Beca report) Section 10.5, p98

The proposed mitigation and management measures for vibration such as NV6 appear reasonable but should explicitly define the reference guidelines or codes against which the impacts must be assessed. We note that NV8 specifically nominates the appropriate technical guideline or standards which are applicable and this should be the same for NV6. We also note that the heading for NV8 should be titled "Blast Vibration Impacts". In NV6 reference applicable standards, codes and guidelines, Amend Title to NV8.

Attachment 1 (Beca report) Section J-4.6.2, p99

Refer to Tables 4-15 and 4-16. Suggest that mitigation measures are inadequate for receivers exposed to levels 20 dB above the ground borne limit and exceeding human comfort criteria particularly for periods marked 00HW1 and 00HW2. At these levels may expect strong adverse community response. The community response to such levels will be much greater than these tables suggest.

Response

Section 10.3 of the EIS is an assessment of the potential construction impacts, with the management measures discussed in section 10.5 of the EIS.

The monitoring proposed in environmental management measure NV6 in **Chapter E1** (Environmental management measures) would be carried out to confirm that actual noise and vibration levels are consistent with noise and vibration impact predictions and that the management measures that have been implemented are appropriate, rather than to confirm compliance with noise goals. The Acoustics Advisor would oversee the monitoring process (see below).

The name of environmental management measure NV8 as Blast Management Strategy is appropriate as the environmental management measure is to prepare an implement a strategy if blasting is proposed.

Feasible and reasonable management and mitigation measures would be identified for the project as noted in the noise and vibration environmental management measures presented in **Chapter E1** (Environmental management measures). This includes the development of a CNVMP that will be prepared for the project (see environmental management measure NV2 in **Chapter E1** (Environmental management measures)) and will:

- Identify relevant goals in relation to construction noise and vibration in accordance with the *Interim Construction Noise Guidelines* (ICNG) (NSW EPA 2009)
- Identify noise and vibration sensitive receivers and features in the vicinity of the project
- Include standard and additional mitigation measures from the *Construction Noise and Vibration Guideline* (CNVG) (Roads and Maritime 2016) and details about when each will be applied
- Describe the process(es) that will be adopted for carrying out location and activity specific noise and vibration impact assessments to assist with the selection of appropriate mitigation measures
- Include protocols that will be adopted to manage works required outside standard construction hours in accordance with relevant guidelines
- Detail monitoring that will be carried out to confirm project performance in relation to noise and vibration performance criteria.

The CNVMP will be implemented for the duration of construction of the project.

Specific construction noise and vibration management and mitigation measures that will be applied during construction include the development of location and activity specific noise and vibration impact assessments, which will be carried out prior to (as a minimum) activities where the impacts have the potential to exceed criteria:

- With the potential to result in noise levels above 75 dBA at any receiver
- Required outside standard construction hours likely to result in noise levels greater than the relevant noise management levels
- With the potential to exceed relevant performance criteria for vibration.

The assessments will clarify predicted impacts at relevant receivers in the vicinity of the activities to assist with the selection of appropriate management measures, consistent with the requirements of ICNG and CNVG that will be implemented during the works.

In addition, and in accordance with environmental management measure NV1 (see **Chapter E1** (Environmental management measures)), a suitably qualified Acoustics Advisor will be engaged during construction and will:

- Review management plans related to noise and vibration and endorse that they address all relevant conditions of approval and requirements of all applicable guidelines
- Review location and activity specific noise and vibration impact assessments prepared during the project and endorse the assessments and proposed mitigation measures
- Review proposals regarding works outside standard construction hours, confirming that the work is appropriate and endorse the proposed mitigation measures
- Monitor noise and vibration from construction generally and:
  - Confirm that actual noise and vibration levels and impacts are consistent with predictions
  - Confirm that reasonable and feasible noise and vibration mitigation measures are being implemented

  - Suggest additional reasonable measures to further reduce impacts
- Review the noise and vibration management documents and assessments
- Confirm that proposed mitigation measures are appropriate and are implemented
- Suggest improvements that could be made to reduce noise and vibration.

B12.10.27 Noise management measures

Attachment 1 (Beca report) Section J-2.4 Noise and vibration specific aspects

Measures noted for the mitigation of construction noise generally suitable, but do not reference to measures targeted at optimising scheduling (for M4-M5 link in isolation, and with other consecutive / concurrent infrastructure projects), and most importantly, measures for minimising the duration of prolonged and / or high noise level activities. The duration of the works may be as important, or more important in some cases, than the level of the noise - particularly given the scale of the project and the duration of the construction program. The limited reference to duration-based controls is evident throughout the construction noise assessment, despite being acknowledged among the types of measures stated in subsequent sections of the report (e.g. Table 4-13 of Section 4.6.1)

Include reference to measures for addressing scheduling and reducing work periods where possible (or at minimum, measures for the avoidance of unnecessary prolongation of noise generating activities). In some cases, this may warrant consideration of processes or plant numbers which could increase the noise level, but ultimately give rise to a lower overall impact if the duration of the works can be significantly reduced. Duration and scheduling measures should ideally be picked up throughout the construction noise assessment, but at minimum, as part of the discussion of measures to be prioritised in the permitting and detailed design of the project.

Response

The duration of activities likely to generate elevated noise levels has been considered in the assessment. Generally, the activities with the potential to generate the highest noise levels and associated amenity impacts would not be required for significant durations at any one location. Noisy activities outside standard construction hours standard construction hours would be regulated by NSW EPA through the project's environmental protection licence.

A CNVMP will be prepared and implemented for the project in accordance with the environmental management measure NV2. The CNVMP will include standard and additional mitigation measures from the CNVG and will be prepared in consultation with relevant stakeholders as required by the conditions of approval for the project.

Acoustic shed design

Acoustic sheds will be designed with consideration of the activities that will occur within them and the relevant noise management levels in adjacent areas. Monitoring will be carried out to confirm that the actual acoustic performance of each shed is consistent with predicted acoustic performance as reflected in the environmental management measure NV7 in **Chapter E1** (Environmental management measures).

St Peters interchange

Activities within the St Peters study area would occur within the Campbell Road civil and tunnel site (C10) located on the southern side of Albert Street and Campbell Lane in St Peters. The site is currently part of the Campbell Road construction compound for the New M5 project.

No residential receivers are predicted to be classified as highly noise affected (refer to section 5.6.2 of Appendix J (Technical working paper: Noise and vibration) of the EIS) as part of the M4-M5 Link project works. However, it is recognised that longer duration impacts to residents and the community may occur and these are discussed in **section B12.11.14.**

Pyrmont Bridge Road tunnel site (Camperdown)

It should be noted that Bridge Road School is subject to exceedances arising from two construction scenarios, both of which are predicted to last less than two months (demolition of existing buildings and the pavement and infrastructure works). The vast majority of exceedances throughout the project would be less than 10 dBA.

The highest noise levels and greatest noise management level (NML) exceedances for residential receivers in Pyrmont Bridge Road are predicted during demolition of existing buildings (PYR-01), which requires use of a concrete saw and rock-breaker, and pavement and infrastructure works (PYR-05) which requires use of a concrete saw. Up to six properties may also be highly noise affected during other works, including pavement and infrastructure works as identified in Table 5-117 of Appendix J (Technical working paper: Noise and vibration) of the EIS. The construction activities that have the potential to result in noise levels greater than 75 dBA would, however, occur early in the overall program during site establishment. During site operation, no receivers in the vicinity are predicted to be highly noise affected.

Where potential noise levels are above 75 dBA at a receiver, a location specific noise and vibration impact assessment will be carried out which will clarify predicted impacts to assist with the selection of appropriate management measures consistent with the ICNG and the CNVG as reflected in environmental management measure NV4 in **Chapter E1** (Environmental management measures). As discussed in Chapter 10 (Noise and vibration) of the EIS, alternative accommodation options may be offered to affected residents for short periods of time if noise levels are predicted to exceed the noise management levels by 10 dBA or more during construction.

Dust impacts at the St Peters interchange as well as the Pyrmont Bridge civil and tunnel site identified in this issue by Inner West Council are presented in **section B11.9.15**.

B12.11 Human Health risks

Refer to Chapter 11 (Human health risk) and Appendix K (Technical working paper: Human health risk assessment) of the EIS for details of the human health risk assessment.

B12.11.1 General comments on the human health risk assessment

Attachment 1 (Beca report) Section 11, p101

The main EIS chapter is arguably over-long and it is difficult to extract the human health impacts. A summary annotated map would have been a useful communication tool to visually represent the spatial differences in human health impacts predicted for construction and operation phases of the Project. Consider use of mapping to provide visual representation of risks.

Attachment 1 (Beca report) Section 11 Overall Evaluation, p 106

The chapter addresses SEAR's requirements and specified guidelines were used. Residual risks following mitigation were not clear and not quantified. Opportunities to improve human health risk through the design process were only covered superficially. Various impacts were judged subjectively rather than quantifying impacts. There are strong linkages from this chapter to transport, air quality, noise & vibration, land use & property and socio-economic chapters. This review has not checked these chapters for consistency in terms of guidelines used, impacts predicted or mitigation measures used.

Response

Attachment 1 to the Inner West Council's comments in the overall evaluation are noted.

Mapping is used in Appendix K (Technical working paper: Human health risk assessment) of the EIS to represent the spatial differences in human health impacts predicted for the construction and operation phases of the project. Maps in Appendix K include:

- Figure 6-2 which shows the location of sensitive human receptors near the construction of the M4-M5 Link project
- Figure 6-5 which is a contour plot on a map showing the change in annual $PM_{2.5}$ concentrations associated with the project in 2023.

Chapter 8 (Traffic and transport), Chapter 9 (Air Quality), Chapter 10 (Noise and vibration), Chapter 12 (Land use and property) and Chapter 14 (Social and economic) of the EIS contain maps which may assist in visually representing impacts to human health.

B12.11.2 Post mitigation risk assessment

Attachment 1 (Beca report) Section 11, p101

The risk objectives laid out at the start of this chapter do not include an assessment of residual risks following mitigation measures. Assessment of residual risks following mitigation measures are required.

Response

Post mitigation assessment of residual risks is not required under the guidelines to the methodology of the assessment listed in the SEARS and reproduced below for assessment of human health risk and in particular:

- *Environmental Health Risk Assessment: Guidelines for Assessing Human Health Risks from Environmental Hazards: 2012* (enHealth 2012b)
- *Health Impact Assessment Guidelines* (enHealth 2001)
- *Health Impact Assessment: A Practical Guide* (NSW Health 2007)
- *Risk Assessment Guidance for Superfund: Volume I Human Health Evaluation Manual (Part F, Supplemental Guidance for Inhalation Risk Assessment)* (United States Environmental Protection Agency (USEPA) 2009b).

More specifically, in relation to the assessment of health impacts associated with exposure to nitrogen dioxide and particulate matter, guidelines available from the NEPC (Burgers & Walsh 2002; NEPC 1998, 2002, 2003, 2009, 2010), World Health Organization (WHO) (Ostro 2004; WHO 2003, 2006b, 2006a, 2013b) and the USEPA (USEPA 2005b, 2009b) have been used as required.

B12.11.3 Assessment against SEARs and current guidelines

Attachment 1 (Beca report) Section 11.1.1, p 101

The guidelines nominated include all those required in the SEAR's and are appropriate. These guidelines have not been checked for consistency with related chapters (e.g. air quality, noise & vibration). Nomination of appropriate guidelines for assessing other human health risks missing (e.g. pedestrian safety, subsidence issues, bushfire risks, dangerous goods handling etc.). Confirm guideline consistency and acknowledge cross-chapter linkages in section. Nominate guidelines for additional human health risk issues. Objectives include content requested in SEARS.

A sub-section summarising suitable guideline values / maximum acceptable limits for air quality, noise & vibration, blasting etc. would be useful. Reference can then be made to these guidelines so the impacts text does not sound subjective. Nominate guideline values / limits.

Response

As part of the human health risk assessment, the EIS was required to address human health risk issues identified in the SEARs, as formulated and issued by the Secretary of DP&E and reproduced in Table 11-1 of the EIS.

The following NSW Government agencies and bodies were consulted during the development and preparation of the human health risk assessment for the project:

- DP&E
- NSW EPA
- NSW Health
- Office of the NSW Chief Scientist and Engineer
- The NSW Government Advisory Committee on Tunnel Air Quality.

There has been substantial scrutiny and rigour in the review of the methodology of the human health risk assessment and supporting assessments (ie air quality assessment) completed for the EIS by independent reviewers including international experts engaged by ACTAQ. The air quality modelling was reviewed by SMC, independent peer reviewers for air quality and ventilation and Roads and Maritime subject matter experts. The EIS, including the air quality assessment report, has been reviewed by specialists from key government agencies including the NSW EPA, NSW Health, and independent international peer reviewers on behalf of the Office of the NSW Chief Scientist and Engineer. In its submission to the EIS, NSW Health commented that: '*NSW Health is satisfied that for this particular project the HHRA has used a generally appropriate approach for the assessment of human health'.*

As outlined in the assessment methodology for the human health risk assessment (refer to section 11.1.1 of the EIS), the methodology adopted is in accordance with national and international guidance that is endorsed or accepted by Australian health and environmental authorities. These are listed in the EIS and include, but are not limited to, the following:

- Air Quality in and Around Traffic Tunnels (National Health and Medical Research Council (NHMRC) 2008)
- *Environmental Health Risk Assessment: Guidelines for Assessing Human Health Risks from Environmental Hazards: 2012* (enHealth 2012b)
- *Health Impact Assessment Guidelines* (enHealth 2001)
- *Health Impact Assessment: A Practical Guide* (NSW Health 2007)
- *Australian Exposure Factors Guide (*enHealth 2012a)
- *Schedule B8 Guideline on Community Engagement and Risk Communication* (National Environment Protection Council Schedule (NEPC) 1999 amended 2013a)
- National Environmental Protection (Air Toxics) Measure, Impact Statement for the National Environment Protection (Air Toxics) Measure (NEPC 2003)
- *Risk Assessment Guidance for Superfund: Volume I Human Health Evaluation Manual (Part F, Supplemental Guidance for Inhalation Risk Assessment)* (United States Environmental Protection Agency (USEPA) 2009b)
- State Environmental Planning Policy (SEPP) No. 33 – Hazardous and Offensive Development (NSW).

B12.11.4 Content of section 11.2 of the EIS

Attachment 1 (Beca report) Section 11.2, p102

This section reads like an after-thought and is a missed opportunity to describe the design features that will have a nett benefit effect on the community and environment. Construction phase improvements based on the design have not been detailed at all. Health impacts other than air quality and noise have not been covered. Justification for ventilation outlets being more preferable than surface roads discharges have not been provided. Benefits of transport links and open space to human health have not been covered.

This section requires a more detailed treatise. A table of design features, health impact type minimisation, justification and cross reference to other specialist chapters would present information in a clearer way.

Response

The development of the concept design for the project has been undertaken in an iterative manner, with changes made to various aspects of the design to minimise impacts on the community, including on health and wellbeing. Some of the key design changes that have been incorporated into the project that have minimised impacts to community health include:

- The removal of the Camperdown ramps on Parramatta Road near Arundel Street
- Inclusion of the Iron Cove Link to remove surface road traffic from a section of Victoria Road
- Rozelle interchange design was adjusted to be largely below ground with at grade connections minimised and elevated roadways avoided

- No direct impacts to open space at Easton Park and Blackmore Park during construction
- No use of a potential site at Derbyshire Road located adjacent to an existing school for construction
- Use of existing M4 East and New M5 project footprints for construction sites at Haberfield and St Peters
- Provision of new active transport links at Rozelle and Iron Cove
- Creation of new open space areas at Rozelle, within the Rozelle Rail Yards and south of Victoria Road, near Iron Cove Bridge
- Beneficial reuse or recycling of spoil where practical and possible
- Use of the arterial road network for spoil transport to minimise impacts to local roads
- Use of M4 East tunnels if possible for spoil transport to reduce the impact on the surface road network.

The incorporation of health considerations into the project design is discussed in more detail in section 3.3 of Appendix K (Technical working paper: Human health risk assessment) of the EIS as well as in sections 4.5 and 4.6 of the EIS.

B12.11.5 Use of 2011 census data

Attachment 1 (Beca report) Section 11.3.1, p102

Data from census year 2011 has been used - this is now out of date. Has the population profile and population growth changed in 6 years? Assessment of the changes based on the 2016 census should have been conducted.

Response

The detailed 2016 census data was not released in time to allow for its inclusion in the EIS including the human health risk assessment. The first round of 2016 census data was released in April 2016. The official release of 2016 census data, which included a comprehensive dataset, was released in June 2017. Detailed census data on employment, qualifications and population mobility (including journey to work) was released in October 2017.

As a result, the 2011 census data was used for the assessment.

B12.11.6 Use of the phrase ‘risky alcohol drinking’

Attachment 1 (Beca report) Section 11.3.2, p102

Reference to 'risky alcohol drinking' (two occasions) is strange. How is this judged and by whom? Excessive alcohol consumption referencing national guidelines for alcohol consumption would seem more appropriate.

Consider rephrasing.

Response

Referring to drinking alcohol as ‘risky’ is consistent with the terminology used by the Australian I based on the National Health and Medical Research Council’s *Australian Guidelines to Reduce Health Risks from Drinking Alcohol*[6]. For males, ‘risky’ levels of alcohol consumption constitute more than four standard drinks per day. For females, ‘risky’ levels of alcohol consumption constitute more than two drinks per day.

B12.11.7 Description of ozone and particulate matter exceedances

Attachment 1 (Beca report) Section 11.3.3, p102

Summarising ozone & particulate matter spatial & temporal exceedance patterns would be useful to inform existing risks to human health. Consider addition of text describing where and when ozone & particulate matter exceedances occur?

[6] https://www.nhmrc.gov.au/_files_nhmrc/publications/attachments/ds10-alcohol.pdf

Response

Levels of ozone and particulate matter (PM_{10} and $PM_{2.5}$) exceed national standards on occasion across Sydney. Where these exceedances occur outside the project has not been identified as part of the assessment. The impact of the project on regional air quality is assessed in Chapter 9 of the EIS but it is beyond the scope of the project, and not required by the SEARS, to identify specific areas of exceedances across the Sydney region. Ozone was assessed using the NSW EPA's *Tiered Procedure for Estimating Ground Level Ozone Impacts from Stationary Sources* (ENVIRON 2011). Although this procedure does not relate specifically to road projects, it was applied here to give an indication of the likely significance of the project's effect on ozone concentrations in the broader Sydney region. The assessment concluded that the regional impacts of the project would be negligible, and undetectable in ambient air quality measurements at background locations.

B12.11.8 Air quality during construction

Attachment 1 (Beca report) Section 11.4.1, p103

Reference to 'project design' management measures but these are not discussed in earlier 'Project Design to Minimise Health Impacts' section. These should be incorporated to Section 11.2.

Impacts on the community generally temporary and short term. Is the magnitude of the impact and number / sensitivity of receptors important as well, no matter what the duration? Reconsider summary of air quality impacts to include other factors important in determining overall impact. Last sentence of sub-section is meaningless. What does minimised impacts on the health of the community mean? It shouldn't be assumed that the measures will always work and be correctly implemented on site. What if the measures are not effectively implemented (i.e. assessment of pre and post mitigation measures)[?] Reconsider this assessment structure to include pre and post mitigation measure implementation.

Response

Use of the term 'Project design'

The use of the phrase 'project design' in section 11.4.1 of the EIS refers to the broader design of the project, for example the selection of a tunnel solution rather than surface roads, and therefore air quality issues, such as dust are reduced. Section 11.2 of the EIS discusses specific design considerations which will reduce operational air quality impacts.

Magnitude, sensitivity of receivers and duration of impacts

Longer duration impacts are discussed in section 11.8 of the EIS and **section B12.11.14**.

Minimised impacts

The last sentence of section 11.4.1 of the EIS states that '[w]here the dust mitigation measures are effectively implemented, impacts on the health of the community would be minimised'. The impacts would be minimised through the use of management measures which address the likelihood, consequence and/or extent of the potential impact on the community which would experience human health issues due to air quality (dust) emissions.

Chapter 27 (Environmental risk analysis) of the EIS includes an environmental risk analysis. For each of the identified issues, a level of assessment was undertaken commensurate with the potential degree of impact the project may have on that issue. This included an assessment of whether the identified impacts could be avoided or minimised (for example, through design amendments). Where impacts could not be avoided, environmental management measures have been recommended to manage impacts to acceptable levels (see **Chapter E1** (Environmental management measures)). The final residual risk is identified after considering the likelihood, consequence and the proposed management and mitigation.

In the case of dust generated through construction, the impact was determined to be likely, but the consequences, after implementation of the management and mitigation measures, would be minor as it is typically a reasonably short term event affecting a relatively small area, which can be managed through implementing the environmental management measures AQ1 through to AQ26 identified in **Chapter E1** (Environmental management measures).

Structure of the assessment

The structure of the assessment is consistent with the approach used for the air quality aspects of human health impact assessments for other major infrastructure projects and the SEARs.

B12.11.9 Noise and vibration during construction

Attachment 1 (Beca report) Section 11.4.2, p103

- The modelling assumptions supporting the noise impacts have not been reviewed
- No noticeable increases in noise' statement is subjective and meaningless. What criteria are used for this evaluation? Clarify impact criteria for noise increases
- Ground-borne construction noise impacts during day not clear (evening and night commented upon), Assess impact during the day.
- Duration of exposure estimated to 'slightly increase' for a large decrease in roadheader advance rate. Can this be justified? Quantify increase in exposure and clearly justify. Clarify what receptors are affected by decreased rate / increased exposure around portals
- What are daytime and night-time ground-borne noise criteria? Cross-reference to criteria in new sub-section in Section 11.1.1 (see earlier comment)
- No consideration to change technique, equipment or timing to reduce noise impacts. These measures should at least be considered and accepted / ruled out on the basis of economic, project schedule, technology factors
- What are 'unacceptable levels of vibration'? Purely subjective and therefore meaningless. Consider referencing vibration limits and adding text to delineate what is acceptable and unacceptable
- What are blast limits? Cross-reference to criteria in new sub-section in Section 11.1.1 (see earlier comment)

Response

It is noted that the Inner West Council have not reviewed the assumptions which have been used in the assumptions for the noise assessment.

The assessment of noise and vibration impacts for the human health impact assessment references Appendix J (Technical working paper: Noise and vibration) of the EIS, as noted in section 11.4.2 of the EIS. Definition of what is considered a noticeable increase, as defined by the CNVG, in standard working hours and out of hours periods of 5 to 10 decibels above the rating background level as presented in Table 4-14 of Appendix J (Technical working paper: Noise and vibration) of the EIS.

The CNVG provides noise management levels for ground-borne noise, which are applicable when ground-borne noise levels are higher than the corresponding airborne construction noise levels. The CNVG provides ground-borne noise levels at residences for evening and night-time periods only, as the objectives aim to protect amenity and minimise potential sleep disturbance. As such, no assessment of potential ground-borne noise during the day has been carried out, nor is warranted.

As noted in section 10.3 of the EIS, there may be discreet site locations which require a longer duration of tunnelling works due to site conditions. In these locations, the duration of ground borne noise duration may slightly increase as a result of the reduction of excavation from between on average three to 3.6 metres per day (20 to 25 metres per week) to two metres per day.

Validation of predicted impacts from the noise and vibration modelling (which is based on a conservative worst-case assessment) would be undertaken during detailed design. Notifying the community of noise impacts anticipated at specific times would also be undertaken. As noted in section 11.4.2, two residential locations have been predicted to have night-time ground-borne noise which exceeds the criteria by 10 dBA or more. At these receivers, additional mitigation measures have been identified that include providing individual briefings on impacts and mitigation measures, providing respite periods, and alternative accommodation.

The overall effect of a project and the likelihood of adverse community reaction depends on both the level of noise and vibration as well as the duration of the works. While the assessment has been based on realistic worst case noise predictions, it is noted that noise and vibration levels will likely be less than the worst case level for significant periods of time. The proposed environmental management measures include the requirement for preparing location and activity specific noise impact assessments prior to activities required outside standard construction hours likely to result in noise levels greater than the relevant noise management levels (see environmental management measure NV3 in in **Chapter E1** (Environmental management measures)). Opportunities to identify and implement changes in the equipment, technique and timing of works to minimise impacts to the community would be considered during preparation of the assessments. Furthermore, it is expected that during the development of the CNVMP, the design and construction contractor(s) will assess the suitability of the identified opportunities which are capable of reducing impacts based on economic and technical considerations as this the current practice on projects.

Guidelines for assessing vibration are outlined in section 10.1.3 of the EIS. Vibration limits are dependent on what is being assessed. In general:

- When assessing human comfort vibration, *Assessing Vibration: a technical guideline* (NSW EPA 2006) provides guideline values for continuous transient and intermittent events that are based on a Vibration Dose Value. Effects on building contents generally use the same criterion as that used for human comfort vibration
- Structural damage vibration limits are based on AS 2187 and BS 7385 frequency-dependant vibration limits related to cosmetic damage.

Assessment of heritage and vibration sensitive structures is guided by the German Standard DIN 4150: Part 3-1999 Structural vibration – Effects of vibration on structures (*Deutsches Institut für Normung* 1999) (DIN 4150). The vibration criteria used to determine unacceptable levels, where the maximum value is exceeded, are also discussed in section 4.1.5 of Appendix J of the EIS.

Blasting limits are identified in section 10.1.3 of the EIS. In general:

- Guidance in relation to acceptable air blast overpressure (high energy impulse noise) and ground vibration from blasting is provided in the ICNG, which specifies that the assessment should be based on the levels in the *Technical Basis for Guidelines to Minimise Annoyance Due to Blasting Overpressure and Ground Vibration* (Australian and New Zealand Environment and Conservation Council (ANZECC) 1990)
- In terms of project blasting criteria relevant to vibration damage, AS 2187 recommends the frequency dependant guideline values and assessment methods given in BS 7385 Part 2-1993 as they ‘are applicable to Australian conditions’.

Recommended blasting hours are consistent with the standard hours of construction in NSW as recommended by the ICNG, being:

- 9.00 am to 5.00 pm Monday to Friday
- 9.00 am to 1.00 pm Saturday
- No blasting on Sundays and public holidays.

Blast criteria are also discussed in section 4.1.6 of Appendix J (Technical working paper: Noise and vibration) of the EIS.

B12.11.10 Public safety impacts during construction and operation

Attachment 1 (Beca report) Section 11.4.3, p103 and section 11.5.3, p105

Table 11-5 'risk to public safety' column needs to be quantified / justified. Add more detail to justify risk findings and cross- reference to relevant specialists’ chapters where appropriate.

Response

Public safety impacts during construction are discussed in detail in section 9.2.1 of Appendix K (Technical working paper: Human health risk assessment) of the EIS. As noted in section 9.2.1, the evaluation of public safety has considered the hazard and risk assessment, presented in Chapter 25 (Hazard and risk) of the EIS (also noted in section 11.4.3 of the EIS). **Table B12-1** Cross references to the EIS for public safety hazards.

Table B12-1 Public safety impacts during construction

Hazard: Public safety	Risk to public safety	Where addressed in the EIS
Storage and handling of dangerous goods on construction sites that may impact the community in the case of a spill or leak.	**Low**	Handling and use of dangerous goods are addressed in section 25.1.1 of the EIS
Incidents related to the transport of dangerous goods and hazardous substances on public roads.	**Low**	Transportation of dangerous goods and hazardous substances for the project are discussed in section 25.1.2 of the EIS. Transportation of dangerous goods and hazardous substances in project tunnels is discussed in sections 25.2.1 and 25.2.2. of the EIS.
Tunnel collapse that may affect areas overlying the tunnel alignment.	**Low**	Tunnel collapse is discussed in sections 25.1.3 of the EIS.
Potential acid sulfate soils may result in acidification and the mobilisation of metals, adversely impacting the water quality of waterways used by the public.	**Low**	The risk of acid sulfate soils being present in the project footprint, and the potential impacts from disturbing these materials, are described in Chapter 15 (Soil and water quality) and Chapter 16 (Contamination).
Contamination, specifically the presence of hazardous materials (such as asbestos) and works in areas where contamination is present in soil, which may result in contaminants migrating off-site onto neighbouring properties or into waterways.	**Low**	Chapter 16 (Contamination) also assesses whether land within the project footprint is contaminated, and whether remedial action is required.
Flooding of land downgradient of construction sites due to changes to local landform and/or water diversions.	**Low**	Hazards associated with flooding, including the risk of flooding in tunnels and cut-and-cover sections, are outlined in section 25.1.3 of the EIS and discussed further in Chapter 17 (Flooding and drainage) of the EIS. An assessment of the compatibility of the project with the flood hazard of the land is provided in Chapter 17 (Flooding and drainage).
Damage to underground utilities, affecting public roadways and services provided to the community.	**Low**	Section 25.1.4 of the EIS addresses potential impacts on utilities. Potential impacts on utilities are also addressed in Chapter 12 (Land use and property) of the EIS. A Utilities Management Strategy has been prepared for the project and is included in Appendix F of the EIS. The strategy considers issues associated with the need to relocate utilities, and identifies management strategies.

Hazard: Public safety	Risk to public safety	Where addressed in the EIS
Bushfire or fire risks that may spread off-site and affect neighbouring properties.	**Low**	Bushfire risks are addressed in sections 25.1.4 and 25.2.7 of the EIS.
Aviation risks, specifically works that may affect the safety of aircraft using Sydney Airport.	**Low**	Aviation risks are addressed in section 25.1.4 of the EIS.
Traffic and trucks on surface roads have the potential to increase the risk to public safety due to road incidents.	**Low**	Road user hazards are discussed in sections 25.1.4 of the EIS.
Changes to local roads and active transport pathways may affect pedestrian and cyclist safety.	**Low**	Pedestrian safety during construction and operation is addressed in Chapter 8 (Traffic and transport).
Subsidence.	**Low**	Subsidence risks are addressed in Chapter 12 (Land use and property) and Chapter 19 (Groundwater) of the EIS.

B12.11.11 Air quality impacts during operation

Attachment 1 (Beca report) Section 11.5.1, p104

- Should 'worst case scenario' for air quality include human health risk if the ventilation towers failed during a period of heavy traffic loading? Consider additional scenario. If no, justify why this is being excluded
- VOC / PAH's predicted to be lower for project than existing case but no explanation is provided. Explain why VOC / PAH exposure is lower for the project than existing / baseline case
- The calculation methodology supporting the air quality impacts have not been reviewed
- Chapter states that the exposures are for members of general public with no adverse health effects. Are there sensitive receptors with adverse health effects that will be affected? If so, how does this assumption affect the outcomes of the comparisons to guideline values / reported impacts?
- Justify use of one hour and annual modelled concentration time steps
- Justify use of 8 hr period
- Sentence starting 'Review of the incidence calculated…..' does not make sense. Rephrase
- Part of the project justification is a reduction in surface traffic, along with all the associated benefits including an improvement in air quality. The ‘Without project' and 'with project' table sets an unfair comparison because it assumes existing air quality would continue if the project didn't exist. This feels like double-counting - the project should be a mechanism for improvements in air quality, not an excuse for it to be only slightly worse. What about alternative options or improved mitigation measures? Clarification required regarding comparisons of 'without project' air quality
- Where is the 4.5 over-estimate of risks figure derived from?
- Is there a buffer zone recommended for >10m high buildings around ventilation stacks, based on unacceptable human health risks?

Attachment 1 (Beca report) Section 11.5.1, p105

- What are in-tunnel air quality limits[?] Cross-reference to criteria in new sub-section in Section 11.1.1 (see earlier comment)
- Calculation of length-weighted average for NO_2 not reviewed

- 80km per hr and 40 km per hr assumptions seem high. How realistic are these? What would change in impacts be for grid-lock scenario, for instance during a crash? Can the authors justify why this low speed scenario (20 km per hour) is unlikely? Clarification
- Have other vehicle type scenarios been considered in the modelling. For instance, short term impacts driving directly behind a large diesel truck? Long term exposure when riding a motorbike? Clarification

Response

- The regulatory worst case scenarios assessed emissions from the ventilation outlets only, with pollutant concentrations fixed at the regulatory limits, 24 hours a day, 7 days a week (refer to Chapter 8 of Appendix I (Technical working paper: Air quality) of the EIS. The scenarios represented the theoretical maximum changes in air quality for all potential traffic operations in the tunnel, including unconstrained and worst case traffic conditions from an emissions perspective, as well as vehicle breakdown situations. The assumptions underpinning these scenarios were very conservative, and resulted in contributions from project ventilation outlets that were much higher than those that could occur under any foreseeable operational conditions in the tunnel. Stringent requirements for reliability and redundancy of the tunnel systems would be applied
- A summary of the maximum predicted one-hour or annual average concentrations of VOCs and PAHs assessed on the basis of a threshold with comparison against acute and chronic health based guidelines is presented in Table 11-6 to Table 11-11 of the EIS
- These results show that the maximum increase in total VOCs and PAHs in the community is equal to or lower where the project is operating compared with a situation with no project
- It is noted that Inner West Council have not reviewed the calculation methodology
- The EIS states that ‘the health based guidelines adopted (identified on the basis of guidance from enHealth 2012) are relevant to exposures that may occur to all members of the general public (including sensitive individuals) with no adverse impacts’
- This means that if the guidance is adopted, no adverse impacts as a result of exposures would be experienced by the general public, including sensitive individuals
- For VOCs and PAHs where the health effects are associated with a threshold, the maximum predicted concentration from all sources associated with the project has been compared against public peer-reviewed health based guidelines (enHealth 2012) that are relevant to acute and chronic exposures (where relevant). The guidelines available relate to the duration of exposure and the nature of the health effects considered where:
  - Acute guidelines are based on exposures that may occur for a short period of time (typically between an hour or up to 14 days). Therefore, peak exposures based on the modelled one hour average concentration was used to represent acute exposure to VOCs in the air
  - Chronic guidelines are based on exposures that may occur all day, every day for a lifetime. Therefore, long-term exposure based on modelled annual average concentration was used to represent chronic exposure to VOCs and PAHs in the air
- An eight hour period is used because the calculation assumes that workers would be exposed to VOCs and PAHs for eight hours per day, 240 days per year, for 30 years
- This is a typographic error. The sentence should read ‘A review of the incidence calculated for the individual suburbs indicates that these predominantly relate to small decreases in the incidence *of health effects*, with some suburbs showing an increase in the incidence *of health effects*.’
- Alternatives to the project are discussed in Chapter 4 (Project development and alternatives) of the EIS. The air quality and human health risk assessments assess the preferred project. The ‘Without project’ or ‘Do minimum’ scenarios are provided to enable an assessment of the predicted changes in traffic, air quality and noise as a result of the project only in accordance with SEARs
- The ‘existing air quality’ referred to is the background air quality which is forecast to change between 2023 and 2033 and form the basis of the modelling scenarios for those future years, including the changes in emissions which are provided in Chapter 9 (Air quality) of the EIS and Appendix I (Technical working paper: air quality) of the EIS

- Management measures for air quality are provided in **Chapter E1** (Environmental management measures)
- Conversion of 365 days per year to 240 days per year and 24 hours per day to eight hours per day exposure (ie 365/240 x 24/8 = 4.5)
- Future developments to the height of 10 metres should be possible at all locations in the study area. This assumes that the changes in $PM_{2.5}$ concentration for heights between ground level and 10 metres are also acceptable. This is a reasonable assumption because the influence of surface roads diminishes by 10 metres, so that the largest changes at 10 metres were smaller than the changes at ground level
- The relevant in-tunnel air quality limits, has the same meaning as criteria and are shown in Table 9-5 of the EIS
- An average speed of 40 kilometres per hour was used instead of 20 kilometres per hour because achieving an average speed of 20 kilometres per hour along the 22 kilometres of tunnel would be very difficult, if not impossible. Therefore, the use of an average speed of 40 kilometres per hour to represent slower traffic speed in the tunnel provided a more realistic scenario
- In relation to travel by motorcycles, or passengers in vehicles where advice to keep windows up and ventilation on recirculation is not adopted, potential exposures to nitrogen dioxide within the tunnels during expected traffic conditions, over the various travel segments, varies between 0.009 to 0.47 ppm, with most of the concentrations in the range 0.1 to 0.3 ppm. The concentrations are below the 15-minute average guideline, which would be relevant for travel by motorcycle through most of the travel segments. Travel through longer segments (around 20 kilometres) may take longer, around 20 minutes (or slightly longer). The available health data does not suggest that exposures for a period of 20–30 minutes would be of greater concern than for 15-minutes. As such no significant health effects are expected to occur. The criteria are based on population level health impacts and individual circumstances such as travelling behind a truck are not considered, however the general recommendation to close windows and switch air ventilation to recycle would significantly reduce the exposure inside a car cabin. Motorcyclists are unlikely to travel behind a truck for long periods.

B12.11.12 Human health impacts from noise and vibration during operation

Attachment 1 (Beca report) Section 11.5.2, p105

A map showing where the 40% impacted receptors are situated would have been useful. Consider using mapping to communicate impact findings.

In property treatments such as keeping windows closed, door shut and minimal use of outdoors are not practical and contradict ethos of project which is to improve liveability. Onus needs to be on the proponent devising noise abatement measures not the local residents affected. Suggest other mitigation measures to counteract noise impacts.

Attachment 1 (Beca report) Section 11.8, p106

A map showing where the impacted receptors are situated would have been useful.

Response

A map showing the location of receivers who would be impacted by longer duration impacts is not available. Section 9.2.1 of Appendix P (Technical working paper: Social and economic) of the EIS outlines the duration of construction of other projects alongside construction of the M4-M5 Link project at Haberfield (Table 9-2 and Table 9-3 of Appendix P of the EIS) and St Peters (Table 9-4 of Appendix P of the EIS). These tables effectively communicate where receptors may be impacted by longer duration impacts.

Figure 10-22 in Chapter 10 (Noise and Vibration) of the EIS shows the approximately 35 per cent of receivers within the study area predicted to be impacted by an increase in noise levels. A total of 431 receivers (200 individual buildings) are predicted to have exceedances of the operational road traffic noise criteria for the project and are therefore eligible for consideration of additional noise mitigation. Forty-eight other sensitive receivers (27 individual buildings) are predicted to have exceedances of the operational road traffic noise criteria for the project and are therefore eligible for consideration of additional noise mitigation.

For residential buildings of two storeys or more, 64 per cent of the identified receivers are on the first two floors, with 15 per cent of the triggers being on level three, nine per cent being on level four, four per cent on level five, and eight per cent for all floors including and above level six. Noise emissions from fixed facilities in the Iron Cove area are predicted to exceed the criteria by up to 12 dBA at the most-affected receivers either side of Callan Street, Rozelle, adjacent to the substation. Proposed noise generating operational equipment would be reviewed at the detailed design stage of the project when specific plant selection is finalised and appropriate noise control measures can be determined to ensure compliance with relevant operational noise criteria.

A preferred noise mitigation option (Open Graded Asphalt or equivalent, noise barriers, architectural treatments, a combination, or other) would be determined during detailed design as reflected in environmental management measures NV9 through to NV12 in **Chapter E1** (Environmental management measures). This would take into account whole-of-life engineering considerations and the overall social, economic and environmental effects. The preference will be given to selecting noise mitigation measures that reduce outdoor noise levels and the number of at-receiver treatments. Detailed investigations would be carried out for the area around Victoria Road near Iron Cove Bridge to develop an optimum suite of mitigation options, in consultation with the community, to address the large predicted increases in road traffic noise at that location.

B12.11.13 Human health impacts associated with traffic and transport during operations

Attachment 1 (Beca report) Section 11.52, p105

No commentary on increase in traffic caused by construction workers and lack of available car parking facilities for these workers, resulting in disruption and inconvenience for local residents and businesses. Add detail on how construction workers transport to sites will be managed to reduce these impacts.

Operational reduction in travel time must be valid as this is a core reason for the project. Would expect quantification of these reductions for local residents and cross-reference to the traffic modelling work to support these findings. Cross-reference to traffic chapter.

Would expect more specific information regarding public transport disruption to be reported including train stations where passenger access would be restricted and alternatives. More information required.

Response

The impact of increased traffic and loss of available car parking caused by construction workers is discussed in section 8.3.1 of the EIS.

A CTAMP would be prepared as part of the CEMP. The CTAMP would propose a car parking strategy for construction staff at various worksites, in consultation with local councils and stakeholders associated with facilities adjacent to the site (including local residents and businesses). Also an investigation would be undertaken for potential offsite areas that could be used for construction workforce parking, including government owned land and other potential areas near to the construction ancillary facilities.

Operational reduction in travel time with the project is discussed in section 8.3.3 of the EIS.

In summary, key improvements in travel time forecasted as a result of the project include:

- Non-motorway roads in the Inner West LGA are forecast to experience faster trips with the daily average speed increasing by about 10 per cent. Similarly, the vehicle distance travelled on non-motorway roads is forecast to reduce by about 12 per cent. This indicates that on average, these trips are fewer in number and faster
- Improved network productivity on the metropolitan network, with more trips forecast to be made or longer distances travelled on the network in a shorter time. The forecast increase in VKT and reduction in vehicle hours travelled (VHT) is mainly due to traffic using the new motorway, with reductions in daily VKT and VHT forecast on non-motorway roads
- Reduced travel times are forecast on key corridors, such as between the M4 Motorway corridor and the Sydney Airport/Port Botany precinct.

More information regarding public transport is provided in section 8.3.1 of the EIS.

B12.11.14 Longer duration impacts and associated human health impacts

Attachment 1 (Beca report) Section 4.3.1, p21

Council's experience with WestConnex Stages 1 and 2 has proved that the project's construction impacts can have profound negative impacts on communities and individuals and the extended construction period the different elements for this project will exacerbate these negative impacts.

Attachment 1 (Beca report) Section 6, p32

As a general comment it is important to note that residents and local businesses in the IWC area will have to live with the impact of construction activities for many years. Some IWC residents continue to express their concerns to Council about the "intolerable" impacts they have endured without respite throughout 2016 -17 because of Stage 1. Most residents had anticipated that this would draw to a close in 2018 as Stage 1 moves to completion. They are now distressed to learn from the EIS that the Stage 1 worksites at Walker Avenue and Wattle Street could be used for construction of Stage 3 – extending "intolerable" impacts for a further three years. Haberfield residents have been particularly affected by out-of-hours works, which have resulted in health problems from sleep deprivation. On top of this early testing work on the proposed Western Harbour Tunnel has also started.

Attachment 1 (Beca report) Section 6.1.1, p32

Residents and local businesses in the IWC area will have to live with the impact of construction activities for many years. Some IWC residents continue to express their concerns to Council about the "intolerable" impacts they have endured without respite throughout 2016 -17 because of Stage 1. Most residents had anticipated that this would draw to a close in 2018 as Stage 1 moves to completion. They are now distressed to learn from the EIS that the Stage 1 worksites at Walker Avenue and Wattle Street could be used for construction of Stage 3 – extending "intolerable" impacts for a further three years. As is discussed elsewhere in this submission, Haberfield residents have been particularly affected by out-of-hours works, which have resulted in health problems from sleep deprivation. Also refer to Issues 1, 2, 3, 4, 5, and 7 at the start of this report.

Attachment 1 (Beca report) Section 6.4.4, p35

The construction of these permanent operational infrastructure will have a significant portion of utilities to be connected, replaced or adjusted including ongoing maintenance activities of these assets. This will add to the frustration around construction as already experienced in Stage 1 (Haberfield).

Attachment 1 (Beca report) Section 6.5.2, p36, similar comment in Section 6.5.11, p38

It is stated that "The Wattle Street civil and tunnel site would be located above and below ground along Wattle Street at Haberfield between Parramatta Road and Ramsay Street. This construction ancillary facility would use land above ground that is currently being used as a construction zone for the M4 East project". Refer to first comment above (6). This construction site is surrounded by residential properties and after having to deal with the Stage 1 construction, they will now need to deal with further construction activities for more than three years if this project goes ahead. Apart from construction impact they will also be exposed to all the issues raised in Chapters 8 to 12 especially noise & vibration, air quality and health, with the potential having this impact imposed onto the value of their properties forever. Note also Issues 4 & 5 at the start of this report.

Attachment 1 (Beca report) Section 6.5.12, p 38

Construction activities will be very close to properties at this site [Iron Cove Link civil site (C8)] and residents and business owners will need to deal with construction activities for the next three years if this project goes ahead. Apart from construction impact they will also be exposed to all the issues raised in chapters 8 to 12 (tabs 16 to 20) especially noise, air quality and health, with the potential having this impact imposed onto the value of their properties forever.

Attachment 1 (Beca report) Section 11.8, p 106

A map showing where the impacted receptors are situated would have been useful. Consider using mapping to communicate impact findings.

Response

A map showing the location of receivers that would be impacted by longer duration impacts is not available. Section 9.2.1 of Appendix P (Technical working paper: Social and economic) of the EIS outlines the duration of construction of other projects alongside construction of the M4-M5 Link project at Haberfield (Table 9-2 and Table 9-3 of Appendix P of the EIS) and St Peters (Table 9-4 of Appendix P of the EIS). These tables effectively communicate where receptors may be impacted by longer duration impacts.

Roads and Maritime recognise that major road construction has the potential to result in significant amenity impacts, particularly when they occur in urban areas like Haberfield/Ashfield and St Peters. Furthermore, Roads and Maritime acknowledges that the consecutive and concurrent projects at these locations are likely to extend the duration of amenity impacts over many years. Due to the close proximity of residents, there is limited opportunity to eliminate potential amenity impacts from the project completely.

It is also recognised that the proposed works areas within Inner West Council are adjacent to major roads and are already subject to significantly elevated noise levels due to traffic and associated emissions. As such, the project would be contributing to existing issues and this is discussed in incremental changes in exposure from the current background pollutant levels discussed in section 11.5 of the EIS and the cumulative health impacts are discussed in section 11.6 of the EIS.

Chapter 26 (Cumulative impacts) of the EIS provides a detailed overview of the cumulative impact assessment or the project, which considers the potential for consecutive and concurrent (cumulative) impacts during construction and operation of the project. Furthermore, respective technical working papers included in Appendix H (Technical working paper: Traffic and transport), Appendix J (Technical working paper: Noise and vibration) and Appendix I (Technical working paper: Air quality) of the EIS include consideration of cumulative impacts during construction and operation of the project. The outcomes of the respective assessments of cumulative impacts were then used to inform the development of management and mitigation measures (see **Chapter E1** (Environmental management measures)).

The range and intensity of impacts have and would continue to vary during these periods as construction progresses, with the majority of impacts occurring or expected to occur as a result of certain construction activities and during certain times of the day (for example outside standard daytime construction hours).

Key impacts resulting from longer duration construction in these areas may include noise and vibration, construction traffic, dust, visual impacts and impacts on parking on local streets around construction sites. Construction activities most likely to result in longer duration impacts include surface road works, utility works, tunnelling and tunnelling support (such as spoil handling and transport).

In many instances, M4 East and New M5 construction will transition to less intensive works as the respective construction programs progress towards their conclusion and tunnelling is completed. These less intensive activities include mechanical and electrical fitout, pavement and linemarking works and landscaping, which would occur prior to or at the same time as M4-M5 Link site establishment works commence.

This means that construction activities that overlap or occur consecutively from these projects and the M4-M5 Link would generally be less intensive and cause less disturbance to nearby communities. In addition, these works would typically be expected to require less road occupations (except for linemarking and pavement works) and therefore would be more likely to occur during standard construction hours. In addition, at the completion of construction of the M4 East and New M5 projects, permanent noise treatments would be established and/or installed as required by the conditions of approval for these respective projects. This would include (where required by the conditions) the installation of at-receiver treatments and the establishment of permanent noise barriers. The noise modelling that has informed these at-receiver treatments has included the additional traffic forecast for the M4-M5 Link project. These treatments would assist in ameliorating construction noise impacts on these receivers.

Around Haberfield and Ashfield, the majority of the above ground infrastructure required for the M4-M5 Link project is currently being built by the M4 East project. The large civil construction works such as the construction of the Wattle Street and Parramatta Road entry and exit ramps and the Parramatta Road ventilation facility (including the outlet for the M4-M5 Link project) will be complete or nearing completion before construction of the M4-M5 Link commences. This includes the construction of the M4-M5 Link entry and exit ramps along Wattle Street, including the dive and cut-and-cover structure.

Around St Peters, construction of the interchange is being carried out by the New M5 project. This includes construction of the M4-M5 Link entry and exit ramps, upgrades of the local roads (including Campbell Road) and the civil works associated with establishing a construction ancillary facility.

The M4-M5 Link project will need to carry out some civil construction works (including construction of the Campbell Road ventilation facility) and civil finishing works for infrastructure at Haberfield and St Peters. However, construction of surface infrastructure at both locations as part of the M4-M5 Link project has been minimised as much as practicable.

As described in section 6.4 of the EIS, site establishment activities associated with the M4-M5 Link project would include utility works, vegetation removal, the establishment of traffic management and environmental controls and demolition of buildings and structures to facilitate the establishment of construction ancillary facilities. Although these site establishment works are relatively intense in nature and thus are anticipated to generate amenity related impacts such as noise and vibration, they would typically occur during standard daytime construction hours, with scheduled respite periods that will be implemented in accordance with the conditions of approval and associated environment protection licence.

To minimise the impacts associated with longer duration construction impacts from the concurrent construction of the WestConnex component projects in these areas and to respond to issues raised during the construction of other WestConnex projects and in submissions on the M4-M5 Link EIS, the following strategies are proposed:

- Provision of additional off-street car parking for the construction workforce at Rozelle, with the use of the White Bay civil site which would provide around 50 parking spaces. This site is further described in **Chapter D2** (White Bay civil site (C11))
- Downgrading the function of the Northcote Street civil site at Haberfield to a construction workforce car park and laydown area. Currently this site is used as the main tunnelling site for the eastern end of the M4 East project
- Provision of a heavy vehicle truck marshalling facility at the White Bay civil site at Rozelle, which would cater for around 40 heavy vehicles and stage the release of trucks to the tunnelling sites to manage the arrival of trucks to construction ancillary facilities (see **Part D** (Preferred infrastructure report)
- Designing acoustic sheds with consideration of the activities that will occur within them and the relevant noise management levels in adjacent areas. Monitoring will be carried out to confirm that the actual acoustic performance of the sheds is consistent with predicted acoustic performance (see environmental management measure NV7 in **Chapter E1** (Environmental management measures))
- The appointment of a suitably qualified and experienced Acoustics Advisor, who is independent of the design and construction contractor(s), and who will be engaged for the duration of construction of the project (see environmental management measure NV1 in **Chapter E1** (Environmental management measures))
- Use of the M4 East and New M5 tunnels for spoil haulage when they become available and where practicable, to minimise heavy vehicle movements on the surface road network
- Consideration of receivers that qualify for assessment for at-receiver treatment due to predicted operational road traffic noise, that are also predicted to experience exceedances of noise management levels during construction, for at-receiver treatments as a priority (see environmental management measure NV9 in **Chapter E1** (Environmental management measures)).

Specific management and mitigation will be documented in relevant construction environmental management sub-plans such as the CTAMP and also in the Ancillary Facilities Management Plan (AFMP). This will include detailed consideration of the types of activities that would be most likely to cause longer duration impacts during construction of the project, the types of impacts already experienced by these communities as a result of M4 East and New M5 construction, and subsequent development and implementation of location and activity specific mitigation that considers the consecutive nature of construction at these locations. Relevant management sub-plans will be developed in consultation with the relevant local councils.

The number, location and layout of construction ancillary facilities would be finalised as part of detailed construction planning during detailed design and would meet the environmental performance outcomes stated in the EIS and the Submissions and preferred infrastructure report and satisfy criteria identified in any relevant conditions of approval. Further, additional ancillary facilities may be proposed by the contractor, once engaged. Prior to the establishment of ancillary facilities that are not identified in this EIS, the contractor would need to satisfy criteria that would be identified in any relevant conditions of approval.

B12.11.15 Signage to mitigate against human health impacts from air quality for motorists

Attachment 1 (Beca report) Section 11.5.1, p104

Closing windows and a/c set to recirculation are two important mitigation measures to reduce air quality impacts. Consider signage for tunnel entry points with instructions to drivers.

Response

All long tunnels in Sydney have signage displaying this advice. Similar signage will be installed in all WestConnex tunnels, including the M4-M5 Link tunnels. This will include signage at the tunnel entrances.

B12.12 Land use and property

Refer to Chapter 12 (Land use and property) of the EIS for details of land use and property.

B12.12.1 General comments

Attachment 1 (Beca report) Section 12, p107

Construction ancillary facilities

Each location needs to be assessed individually in recognition of the different land use conditions

Construction workforce parking

There is no mention made of locations, site access and lot sizes required for construction workforce car parking in the land use chapter. The land use chapter needs to detail proposed construction workforce car parking arrangements and discuss how this may impact upon land uses in the vicinity of the car parking sites.

Attachment 1 (Beca report) Section 12 Overall evaluation, p111

This chapter lacks detailed assessment of what happens in the vicinity of the construction sites and what the neighbouring uses to the construction sites and how these may be impacted. It should be noted that this is discussed in greater detail in Appendix P- Socio-economic assessment, however, these findings with respect to land use are not included in this chapter. With respect to operational impacts, the chapter identifies that *The Bays Precinct Transformation Plan* will be significantly affected, however, no suggestion is made that this plan will require revision. The project once completed will have a significant effect upon future land use which is a direct responsibility of Council. Further, there is likely to be impacts upon Council controlled land during construction and as part of operation, however, these impacts are not identified. For instance, the changes to King George Park, both during construction and following completion of construction are of direct interest to Council. Council is also likely to have increased maintenance costs associated with street and foot path repair which are not acknowledged as a property issue in this chapter. There is no mention made of what assets will be transferred to Council following completion of construction. Whilst this may not be able to be identified at this stage, a clear process setting out scope of issues and how this is to be negotiated and agreed needs to be set out.

Response

Identification of land use and property impacts from construction ancillary facilities section 12.3 and section 12.4 of the EIS assesses the potential implication of the proposed transport infrastructure, landscaping, construction ancillary facilities and construction activities on existing land uses, land use zonings and the development potential of land. This section also describes potential impacts on water users and land use impacts associated with utility works. An overshadowing assessment of permanent buildings and structures which have the potential to result in overshadowing on neighbouring residential properties is also included in Chapter 12 (Land use and property) of the EIS. Furthermore, the potential impacts of each of the construction ancillary facilities have been described in various chapters of the EIS as below:

- Visual impacts resulting from the construction ancillary facilities are described in section 13.4 of the EIS
- Noise and vibration impacts resulting from the construction ancillary facilities are described in section 10.3 of the EIS
- Air quality impacts resulting from the construction ancillary facilities are described in section 9.6 of the EIS
- Traffic impacts, including truck movements, resulting from the construction ancillary facilities are described in section 8.3.1 of the EIS.

Chapter E1 (Environmental management measures) includes measures which have been designed to manage potential impacts of the construction ancillary facilities.

Land use impacts associated with construction workforce parking

Construction workforce parking is described in section 6.6.6 of the EIS. It is anticipated that construction workforce parking would be primarily provided at the following sites:

- Northcote Street civil site (C3a) – around 150 car parking spaces (Option A)
- Parramatta Road East civil site (C3b) – around 140 car parking spaces (Option B)
- Rozelle civil and tunnel site (C5) – around 400 car parking spaces
- Campbell Road civil and tunnel site (C10) – around 150 car parking spaces.

These facilities would be used to provide worker parking and shuttle bus transfers to other nearby construction sites.

Due to the generally constrained nature of the other construction sites, only minimal car parking for construction workers would be provided at these locations. Typically, these sites would provide between four to 20 parking spaces intended to be used by engineers and other construction management staff.

Construction workforce parking as presented in the EIS would therefore be located within the boundaries of the construction ancillary facilities identified in section 6.5 of the EIS. As such, section 12.3 and section 12.4 of the EIS identifies potential property and land use impacts associated with construction workforce parking.

In addition, the preferred infrastructure report (see **Part D** (Preferred infrastructure report)) proposes an additional construction ancillary facility (the White Bay civil site (C11)), which would include around 50 additional car parking spaces for the construction workforce. The land use and property impacts associated with the proposed White Bay civil site (C11) is provided in **section D2.4.3** of **Part D** (Preferred infrastructure report).

Construction workforce parking is discussed in **section B12.8.36**.

The Bays Transformation Plan

The project would not significantly affect the realisation of *The Bays Precinct Transformation Plan*.

The Bays Precinct Transformation Plan identifies the Rozelle Rail Yards as a long-term priority destination and the potential for the Rozelle Rail Yards to reconnect areas to the north and south. The Bays Precinct Transformation Plan identifies potential features for the Rozelle Rail Yards as a long-term priority of the plan. **Table B12-2** lists the features identified in the plan and discusses the consistency of the project with these features.

Table B12-2 Consistency of the M4-M5 Link with The Bays Precinct Transformation Plan

Features for the Rozelle Rail Yards, identified in *The Bays Precinct Transformation Plan*	Consistency with the M4-M5 Link
Intersecting with major infrastructure	*The Bays Precinct Transformation Plan* acknowledges that the Rozelle Rail Yards is subject to the WestConnex project and the CBD and South East Light Rail stabling yard.
Providing greater housing choice	The M4-M5 Link does not propose future housing within the Rozelle Rail Yards. The NSW Government (announced in July 2016) that the project would deliver up to 10 hectares of new open space and active transport links for the community that would transform the Rozelle Rail Yards, providing much needed open space for forecast residential and commercial development in the region, including the White Bay Power Station Destination identified in *The Bays Precinct Transformation Plan*.
Creating new open space and nature reserves to link to the Harbour	The M4-M5 Link would deliver up to 10 hectares of new open space at the Rozelle Rail Yards including new active transport connections that would connect Balmain, Lilyfield, Rozelle and Annandale to Rozelle Bay and the Glebe parklands.
Integrating and reconnecting communities	The delivery of up to 10 hectares of new open space and active transport links at the Rozelle Rail Yards would create a connection between the previously disconnected communities of Annandale, Glebe and Rozelle Bay, the foreshore and CBD.
Providing new pedestrian and cycle links between Lilyfield and Rozelle	New pedestrian and cyclist links to be provided around the Rozelle interchange would connect with the Lilyfield Road cycleway currently being planned by the Inner West Council, and would also link the Bay Run, The Bays Precinct and the GreenWay in the west to Anzac Bridge and the CBD in the east. Refer to the Active Transport Strategy for the project for further detail (Appendix N of the EIS).
Raising awareness of and interpreting heritage of rail transport	An Interpretation Strategy will be developed and implemented to identify and interpret the key heritage values, including rail transport at the Rozelle Rail Yards, affected by the project and inform the development of the relevant UDLP for the project. The Interpretation Strategy would include themes and stories of the Rozelle railways historic functions, trains and trams transport and

Features for the Rozelle Rail Yards, identified in *The Bays Precinct Transformation Plan*	Consistency with the M4-M5 Link
	will identify how the rail related infrastructure will be reused. See environmental management measure NAH02 in **Chapter E1** (Environmental management measures).

The reduction in traffic on sections of Victoria Road east of Iron Cove Bridge as a result of the project (specifically the Iron Cove Link), and improvements in regional vehicle access to this destination (via the Rozelle interchange) for current and future uses, would support ongoing development of adjacent destinations in The Bays Precinct such as White Bay and Rozelle Bay.

King George Park

The design for the widening of Victoria Road at the eastern abutment of Iron Cove Bridge as described in the EIS would permanently impact around 1,494 square metres of King George Park. With the bioretention facility now proposed to be located in this area (see **Part D** (Preferred infrastructure report) for a description and assessment of this change), the project would permanently impact around 2,259 square metres of King George Park. This area comprises around five per cent of the total area of King George Park, leaving around 42,611 square metres (or around 95 per cent) of King George Park not permanently impacted by the project. During operation, this area would be landscaped and would appear as part of King George Park.

B12.12.2 Justification of how the State objectives are met

Attachment 1 (Beca report) Section 12.1.2, p108

EIS identifies nine separate State transport / strategic planning policy documents and states that EIS supports various State objectives. Objectives are not identified and statement that EIS presents opportunities to support objectives is not evidenced. There is a need to summarise objectives from each document and identify project contribution to each objective otherwise ambit claim.

Response

Section 12.1.2 of the EIS lists key transport and land use plans, policies and strategies relevant to the project. These strategic plans and policies provide goals and objectives for land use planning within the Sydney metropolitan area, including consideration of the role of transport infrastructure in accommodating the future housing, transport, employment and amenity needs of Sydney's growing population. As noted in section 12.1.2 of the EIS, the project presents opportunities to support Sydney's integrated land use and transport planning objectives by:

- Together with other WestConnex projects, creating motorway connections between key employment hubs and local communities, and providing links to population growth centres at Parramatta and western Sydney
- Providing a new underground motorway link between the M4 East at Haberfield and the New M5 at St Peters to assist in easing congestion on parts of existing north–south and east–west surface roads
- Providing connections between the extended M4 and M5 motorways and supporting connections to the proposed future Sydney Gateway project (via the St Peters interchange), ultimately improving access to Sydney's international gateways at Sydney Airport and Port Botany
- Facilitating future urban renewal in precincts adjoining the project, including along Parramatta Road (east of Haberfield) and Victoria Road (between Iron Cove Bridge and The Crescent). The urban design and landscaping works to be implemented as part of the project within the Rozelle Rail Yards and the Iron Cove Link surface works (as described in Chapter 5 (Project description)) would assist in creating opportunities for improved connectivity to these possible future urban renewal projects, including improved connectivity and permeability for pedestrians and cyclists to locations such as The Bays Precinct
- Reducing travel times and improving reliability for bus services as well as, business, personal and freight journeys
- Improving local traffic movements, in particular north–south movements across the Parramatta Road corridor between Haberfield and Camperdown and north–south movements across Victoria

Road and The Bays Precinct at Rozelle. These improvements to local traffic movements could facilitate the delivery of future public transport improvements, particularly along Parramatta Road and Victoria Road

- Upgrading and improving facilities for pedestrians and cyclists including the delivery of active transport links around permanent operational infrastructure. This would include two new bridges over City West Link connecting the communities of Rozelle, Balmain, Lilyfield, Glebe and Annandale, and an upgraded east–west connection between Lilyfield Road, the Rozelle Rail Yards, The Bays Precinct and Anzac Bridge.

Providing connections to the proposed future Western Harbour Tunnel and Beaches Link project to the north (via the Rozelle interchange) and to the proposed future Sydney Gateway project at St Peters (via the St Peters interchange) to assist in improving connectivity in Sydney's transport network. These proposed future projects would be subject to separate assessment and approval.

Existing NSW Government policies, plans and programs relevant to the nature of the project and the project footprint were also reviewed and reported on in Chapter 3 (Strategic context and project need) of the EIS. The review considered potential positive and negative effects of the project on policy decisions and government initiatives. Delivery of the project is largely consistent with all applicable government policies, plans and programs with respect to transport infrastructure, urban growth initiatives and connectivity.

The project is listed as a 'high priority initiative' in the *Australian Infrastructure Plan: The Infrastructure Priority List* (Infrastructure Australia 2016). The project is also part of the NSW Government's commitment to deliver WestConnex for Sydney in response to the recommendations from the *State Infrastructure Strategy* 2012-2032 (Infrastructure NSW 2012), the *State Infrastructure Strategy Update* 2014 (Infrastructure NSW 2014), the *Long Term Transport Master Plan* (Transport for NSW 2012), the *NSW State Priorities* announced in September 2015 (NSW Government 2015) and the *NSW Freight and Port Strategy* (Transport for NSW 2013).

The WestConnex program of works, which includes the project, has the potential to be a catalyst for major urban renewal and complements *A Plan for Growing Sydney* (NSW Government 2014) and the Draft *Central District Plan* (Greater Sydney Commission 2016). The project also complements the vision established in *Towards our Greater Sydney 2056* (Greater Sydney Commission 2016) and the draft *District Plans* (Greater Sydney Commission 2016), specifically the Draft *Central District Plan,* by providing an integrated transport solution to support population and commercial growth in western Sydney.

Since the preparation of the EIS, the *Draft Future Transport Strategy 2056* (NSW Government 2017) was released for public comment in tandem with the Draft *Greater Sydney Region Plan* (Greater Sydney Commission 2017). The *Draft Future Transport Strategy 2056* is an update of the *Long Term Transport Master Plan* and sets the vision, direction and outcomes framework for commuter mobility in NSW and aims to guide transport investment over the longer term. The draft strategy identifies the WestConnex program of works, which includes the project, as a 'city-shaping' project.

The *Draft Greater Sydney Region Plan* sets the vision for a growing and changing Greater Sydney and its transformation into a 'metropolis of three cities'. The draft plan proposes that urban renewal investigation opportunities consider alignment with key infrastructure, such as the WestConnex program of works, to ensure connectivity between these cities.

The project, as part of the WestConnex program of works, is therefore consistent with the vision outlined in both the *Draft Future Transport Strategy 2056* and the Draft *Greater Sydney Region Plan.* These draft plans are expected to be finalised in 2018.

The *Sydney City Centre Access Strategy* (Transport for NSW 2013) (*City Centre Access Strategy*) is the NSW Government's long term strategy to deliver a fully integrated transport network in Sydney's city centre that meets the growing transport needs for all transport modes. The *City Centre Access Strategy* aims to prioritise and allocate street space for public transport, general traffic, pedestrians, cyclists, taxis and service vehicles.

The anticipated impacts of the project, and the objectives and actions contained in the *City Centre Access Strategy*, have been considered together to determine potential transport interactions between the project and the strategy. The planned actions contained in the *City Centre Access Strategy* are reflected in the Strategic Travel Model (STM). STM is operated by Transport for NSW Transport Performance and Analytics and is used to project travel patterns in Sydney, Newcastle and Wollongong under different land use, transport and pricing scenarios. STM provided the trip forecasts used in WRTM, and therefore the planned actions contained in the *City Centre Access Strategy* are accounted for in the project evaluation.

Traffic forecasts show that the project is generally anticipated to have little impact, or to reduce traffic on some roads that are identified in the strategy as city centre bypass routes, such as the Cahill Expressway. However, other roads identified as city centre bypass routes are forecast to have increased traffic as a result of the project, including the Western Distributor, and the Cross City Tunnel. While these forecast increases are not counter to the *City Centre Access Strategy*, changes in traffic volumes on these roads should be considered in the planning and implementation of the traffic and bypass priority routes. There is little impact forecast on the roads within the CBD, while reductions are forecast for access roads to the CBD from the south, such as Broadway and City Road.

B12.12.3 Residual land

Attachment 1 (Beca report) Section 12, p107

This table [Table 12-.3 of the EIS] indicates that no remaining project land which will be subject to a residual land management plan although this section does not clearly state this. If the concept design does not result in any residual land then this section should clearly state that. Clear statement as to whether or not there is any residual land resulting from the concept design.

Residual land management plan defers consideration of what may occur with residual project land. Difficult to comment effectively about either quantum of land or proposed future uses. Provide plan indicating location and indicative size of residual land parcels and their context following completion of construction.

Response

Table 12-3 of the EIS identifies an indicative summary of land uses at the end of construction of the project, including remaining project land that would be subject to the Residual Land Management Plan that will be prepared for the project. This includes land that will be retained by Roads and Maritime for future infrastructure projects, being land adjacent to The Crescent at Annandale, and land that would be subject to separate future development and/or use.

As identified in section 12.3.1 of the EIS, remaining project land would be subject to the provisions of a Residual Land Management Plan that would be prepared in consultation with the relevant council and would identify (and consider), but not be limited to:

- Identification and illustration of all remaining project land, including the location, land use characteristics, size and adjacent land uses
- Identification of feasible uses for remaining project land including justification for the selected use
- Timeframes for implementation of the actions in relation to the identified feasible uses.

Future development would be subject to separate development assessment and approval. The project would not rezone or consolidate remaining project land and therefore there would be no changes to land use zoning for future development.

In addition, as identified in section 12.3.1 of the EIS, remaining project land around the Wattle Street interchange at Haberfield and the St Peters interchange at St Peters would be managed to be consistent with the M4 East and New M5 projects' respective Residual Land Management Plans and UDLPs, including the M4 East Legacy Project (as required by the conditions of approval for the M4 East and New M5 projects). The project would not impact on the implementation of these plans, but may impact the timing in which in the plans are carried out.

B12.12.4 Subsurface acquisitions

Attachment 1 (Beca report) Section 12.2.3, p108

A general statement is made that subsurface acquisition would not affect future use of property at the surface and that any future use would be subject to council regulations and approvals. This is not supported by any information about the depth of tunnel or areas where shallow subsurface acquisition may be required. Clear identification of where shallow subsurface acquisitions may be required and what depths are likely. This is required to substantiate statements made in the EIS that property impacts are unlikely.

Response

As identified in section 12.3.3 of the EIS, in addition to the properties affected by surface activities, land (or interests in land, such as easements) below the surface of the ground would be acquired to accommodate the tunnels and entry and exit ramps. This is called subsurface (or substratum) acquisition.

The *Land Acquisition (Just Terms Compensation) Act 1991* (NSW) provides that compensation is not payable for the majority of subsurface acquisition of land or easements, unless specific circumstances as detailed in that Act apply. Appendix C of the Roads and Maritime *Land Acquisition Information Guide* (Roads and Maritime 2014) sets out in detail the compensation provisions of the Act relating to subsurface acquisition and the land acquisition reforms announced by the NSW Government in 2016, which can be viewed online[7].

This subsurface acquisition would be a stratum acquisition envelope around the tunnels, including any associated ground support that may be required. The introduction of the subsurface stratum, and the tunnel itself, has the potential to limit development above the alignment in some circumstances. The tunnel depth is generally shallowest at tunnel portals. Tunnel portal locations are described in Chapter 5 (Project description) of the EIS.

In most cases, subsurface acquisition would not affect the future use of property at the surface. Subject to council regulations and approvals, landowners would generally be able to:

- Carry out improvements, such as installing a swimming pool
- Dig deeper foundations for a new building or second storey additions
- Undertake property development.

Where subsurface acquisition is required, Roads and Maritime would contact owners of directly affected properties at the relevant time. If private property is directly affected, Roads and Maritime has the authority to acquire the subsurface land, under the *Roads Act 1993* (NSW), by a compulsory acquisition process. Subsurface acquisition for the project would be confirmed during detailed design.

B12.12.5 Ground settlement

Attachment 1 (Beca report) Section 12.3.4, p109

- A specialist geotechnical engineer would be required to provide commentary on appropriate application of the SEARs and the technical rigour of this section.
- ‘Majority' of tunnel alignment is predicted to be within acceptable ground movement criteria. Need clear nexus between statement of 'majority' (what does this mean?) and predictive mapping. Clarify the predicted size of areas / nature of sensitive properties to be impacted beyond settlement criteria stated in Table 12-4.
- Potential impacts on buildings and open space - what structures are referenced by the term 'building'? Clarify what is meant by the term building. Does it include retaining walls, garden sheds, swimming pools, landscape features, and sculptures?
- Notes on indicative angular distortion contours provide a number of exceptions to interpretation of the predicted contours. The EIS is meant to address cumulative impacts and yet that is specifically accepted from these maps. Given the extent of tunnel projects, attempts to address cumulative impacts should be made. Also, this refers to 'conservative estimates' - it is unclear

[7] https://www.finance.nsw.gov.au/sites/default/files/NSW_Government_Response.pdf

what the term 'conservative estimates' means? Clarify what conservative estimate refers to in the notes for the angular distortion contour figures

Response

Inner West Council's comment that a specialist geotechnical engineer would be required for their review is noted.

Settlement for the project is likely, however over the majority of the project the predicted settlement is within acceptable settlement criteria for adjoining WestConnex projects. The preliminary settlement assessment of tunnel excavation induced settlement (excluding groundwater drawdown induced settlement) in section 12.3.4 of the EIS shows that over the majority of the tunnel alignment predicted ground movement is less than 20 millimetres, which is consistent with the most stringent maximum settlement criterion that has been specified in the conditions of approval for recent tunnelling projects in Sydney. These include the WestConnex M4 East and New M5 projects and the NorthConnex project. Criteria for maximum angular distortion and tensile strain are also included. These are a function of the settlement distribution across the ground surface, noting that differential settlement (small discrete areas of settlement which may impact the relative level of one component of a structure compared to a different component) can potentially contribute to building damage. Criteria for limiting tensile strain has not been included for all recent tunnelling projects in Sydney, however it has recently been included as an amendment for the conditions of approval for the New M5 project because it is considered a key measure for potential property damage.

These criteria are summarised in **Table B12-3**. As outlined above, the criteria represent the most stringent settlement criterion for other recent tunnelling projects.

Table B12-3 Settlement criteria

Beneath structure/facility	Maximum settlement	Maximum angular distortion (gradient of slope)	Limiting tensile strain (percent)
Buildings – Low or non-sensitive properties (i.e. less than or equal to two levels and carparks)	30 mm	1 in 350	0.1
Buildings – High or sensitive properties (i.e. greater than or equal to 3 levels and carparks)	20 mm	1 in 500	0.1
Roads and parking areas	40 mm	1 in 250	N/A
Parks	50 mm	1 in 250	N/A

For the majority of the proposed alignment the tunnels are located at depths of greater than 35 metres below ground level and within competent bedrock. As a result the risk of ground movement is limited. However, at a number of locations where the tunnels are rising to meet the surface roads the tunnelling is shallower, at depths of less than 20 metres below ground level. As the tunnels are required to meet the surface roads to connect with the metropolitan road network, it is unavoidable that some sections of the tunnel involve shallow tunnelling. Shallower tunnelling has a higher potential to cause settlement impacts.

Settlement may induce damage to overlying structures such as cracking through concrete, masonry or plasterwork that result from tensile stain induced in the structure. Tensile strain depends on where the building is located with respect to areas of settlement.

The manner in which a building or structure responds to ground movement depends on its size, design, materials, foundations and age. For instance, a timber or steel framed structure may be flexible, deflecting as the ground moves whereas a masonry building if subject to similar ground movement may behave differently. Other relevant factors may include the overall height (number of storeys) of the building and whether the building has basement levels. As identified in **Table B12-3**, sensitive properties (such as listed heritage items or otherwise older buildings) would be subject to a lower maximum settlement and angular distortion criteria compared to non-sensitive properties.

A preliminary assessment has been carried out to assess the potential for ground movement and angular distortion as a result of the project. The method adopted to predict ground movement is the volume loss approach as described by Mair, Taylor and Burland 1996. The results of this preliminary assessment are presented as ground movement contours and angular distortion contours and are shown in Figure 12-16 to Figure 12-30 of the EIS.

Cumulative settlement impacts are discussed in section 12.3.4 of the EIS. Cumulative settlement impacts include the combined impacts of settlement from tunnel excavation induced ground movement and groundwater drawdown. Tunnel excavation induced ground movement is anticipated to be the prevalent mechanism causing ground movement given that the proposed tunnels are primarily located within competent bedrock (Hawkesbury Sandstone and Ashfield Shale). Residual soil profiles developed on the weathered sandstone and shale bedrock are typically relatively thin, stiff and of low compressibility and as such would be less susceptible to ground settlement.

The risks associated with groundwater drawdown and induced settlement within the Ashfield Shale and Hawkesbury Sandstone is considered low because of the geotechnical properties of the rock. As water is removed from these rock types the structural integrity and strength of the rock remains due to its competent nature. As a result, cumulative settlement impacts are not anticipated to be an issue for tunnels excavated in the Hawkesbury Sandstone or Ashfield Shale.

In contrast, as groundwater drawdown occurs within the alluvium the structural integrity of the unconsolidated sediment is compromised resulting in more settlement than would be expected from the sandstone and shale. Cumulative settlement impacts in the alluvium would be minimised by including tanked tunnel sections through the alluvium or by aligning the tunnels beneath the palaeochannels thereby minimising groundwater leakage.

Ground settlement will be managed to comply with the accepted settlement, angular distortion and limiting tensile strain criteria (see **Table B12-3**) wherever possible. Prior to and during construction a range of management measures would be implemented to ensure that ground movement impacts are managed including:

- Further assessment of potential settlement impacts, including numerical modelling, will be undertaken during detailed design. In areas where ground movement in excess of settlement criteria is predicted, an instrumentation and monitoring program to measure settlement, distortion or strain will be implemented. Feasible and reasonable measures will be investigated and implemented to ensure where possible that the predicted settlement is within the criteria. Measures that will be considered are outlined in section 12.3.4 of the EIS.
- A Settlement Monitoring Program will be prepared that will provide details on:
  - Settlement criteria and predictions
  - Location of monitoring points
  - Duration of monitoring
  - Data collection and review
  - Triggers and corrective actions
- Settlement monitoring will be carried out in accordance with the Settlement Monitoring Program for the period starting prior to commencement of tunnel construction through to until all settlement has stabilised following completion of tunnel construction. The results of settlement monitoring will be compared to predicted settlement
- Building condition surveys will be offered to landowners within the zone of influence of tunnel settlement (within 50 metres from the edges of the tunnels and ramps, or as otherwise directed by the Independent Property Impact Assessment Panel)
- In the event that damage occurs to a property as a result of the construction of the project, the damage will be appropriately rectified. Any disputes between a property or infrastructure owners regarding damage and rectification will be referred to the Independent Property Impact Assessment Panel for resolution
- An Independent Property Impact Assessment Panel, comprising geotechnical and engineering experts, will be established prior to the commencement of works with the potential to result in ground movement and settlement. The panel will be responsible for:
  - Independently reviewing the building condition survey process

  - Resolving any property damage disputes
  - Overseeing on-going settlement monitoring requirements
- Prior to construction, interface agreements will be entered into with the owners of infrastructure and utility services likely to be impacted by construction of the project. The agreements will likely identify:
  - Minimum separation distances and appropriate settlement criteria for utility infrastructure
  - Settlement monitoring requirements during construction of the project
  - Contingency actions in the event that settlement limits are exceeded.

Management measures that would be implemented to control groundwater inflows (which influence groundwater drawdown and therefore groundwater movement) during construction and operation are summarised in section 19.5 of the EIS and in **Chapter E1** (Environmental management measures).

The 50 metre boundary (from the edges of the tunnels and ramps) for building condition surveys is representative of the expected worst-case zone of influence of tunnel settlement. As per section 12.3.2 of the EIS, the Independent Property Impact Assessment Panel, comprising of geotechnical and engineering experts was established to confirm that surveys are being offered to and carried out for the appropriate properties. It is unlikely however, that settlement impacts would occur outside of the zone influence of tunnel settlement.

Generally, a 'building' refers to a structure of one or more stories which can be entered. Therefore retaining walls, swimming pools, landscape features and sculptures are not regarded as 'buildings'.

B12.12.6 Land use and property impacts from construction ancillary facilities

Attachment 1 (Beca report) Section 12.4.1, p109

Reference is made to loss of parkland during construction and then gain following completion of construction. How much is lost and how much is gained - where and for what purpose? This needs to be clearly articulated. Who is it transferred to or will this be subject to the residual land management plan?

These aspects need to be further discussed so that there is a clear explanation to the community and stakeholders of what the open space benefits will be beyond the Rozelle railyards redevelopment.

Response

As discussed in section 12.4.4 of the EIS, Buruwan Park at Annandale would be permanently acquired for road infrastructure, primarily to accommodate the realignment of The Crescent. This would be a direct loss of about 0.3 hectares of public open space at Annandale. Buruwan Park currently acts as passive recreation area for the community and as a pedestrian walkway that connects Bayview Crescent and The Crescent with the Rozelle Bay Light Rail stop. The change in land use from recreational land to infrastructure would have moderate to high local impact on land use. However, the provision of up to 10 hectares of new open space by the project within the Rozelle Rail Yards and new pedestrian and cyclist bridges and paths to provide connectivity would more than offset the loss of Buruwan Park and is considered to be a beneficial outcome for the community. The loss of Buruwan Park is therefore not substantial in the local and regional context.

In addition, **section D3.4.1** describes the impacts on open space at King George Park at Rozelle associated with the revised location of the bioretention facility. The design for the widening of Victoria Road at the eastern abutment of Iron Cove Bridge as described in the EIS would permanently impact around 1,494 square metres of King George Park. With the bioretention facility now proposed to be located in this area, the project would permanently impact around 2,259 square metres of King George Park. This area comprises around five per cent of the total area of King George Park, leaving around 42,611 square metres (or around 95 per cent) of King George Park not permanently impacted by the project. During operation, this area would be landscaped and would appear as part of King George Park.

This area is currently landscaped, provides public seating and is used for passive recreation (see **Figure D3–2**). The Bay Run would be slightly realigned to accommodate the construction and operation of the bioretention facility. The change in alignment compared to that assessed in the EIS would be negligible. The existing park seating would be relocated to a nearby location.

Considering that King George Park comprises numerous areas of passive open space and that no areas of active open space or recreational facilities would be impacted (ie children's playgrounds), this impact is considered minor and would not significantly affect the use of this area of King George Park. Further, this area would be offset through the provision of land south of the realigned Victoria Road carriageway (between Springside Street and Byrnes Street) that may include areas of open space such as passive recreational facilities. The urban design and landscape concept for this land would be determined during the development of the UDLP for this area. Refer to Chapter 13 (Urban design and visual amenity) of the EIS for further details about open space that would be provided at this location.

B12.12.7 Consistency with The Bays Precinct Transformation Plan

Attachment 1 (Beca report) Section 12.4.3, p110

Whilst not part of this project, *The Bays Precinct Transformation Plan* needs to be amended to reflect the significantly changed development intent of this area. At present, there is a disconnect between the project and this plan with lack of certainty about what will happen to this area.

Commentary about requesting review of the Precinct plan in parallel with preparation of the residual management plan should be included in the EIS.

Response

Noted. Changes to *The Bays Precinct Transformation Plan* are a matter for the NSW Government and is outside of the scope of this EIS. See **section B12.12.1** for an overview of the manner in which the project is consistent with *The Bays Precinct Transformation Plan*.

B12.12.8 Impacts on car parking at King George Park

Attachment 1 (Beca report) Section 12.4.6, p110

Provision of 30 car parks at King George Park is mentioned. It states that this is a positive outcome. How many car parks are there currently? Is there a loss or gain of car parking? Detail of loss and gain of car parking during construction and following construction needs to be spelt out in the EIS. This should be provided not only for King George Park but all areas impacted through changes in car parking arrangements during construction and following construction.

Response

The EIS proposed formalisation of the existing informal car park within King George Park, adjacent to Manning Street at Rozelle. Due to the proposed relocation of the bioretention facility (see **Chapter D3** (Relocation of the bioretention facility at Rozelle)), formalisation of this car park is no longer proposed as part of the project. The existing informal car park would remain in its current condition and will not be impacted by the project.

B12.12.9 Access impacts

Attachment 1 (Beca report) Section 12.4.8, p110

Mention is made of a new east-west underpass below Victoria Road for pedestrian and cycle infrastructure. No mention is made as to whether or not it will meet CPTED [Crime Prevention Through Environmental Design] principles. This is an issue as underpasses are generally not favoured as they cannot easily be surveyed.

Detailed explanation needs to be provided as to what measures will be taken to ensure that underpasses such as that below Victoria Road meet CPTED principles.

Response

The underpass at Victoria Road would be designed in accordance with the relevant principles of CPTED. The extent of the underpass under the Victoria Road bridge structure would be limited to a distance of around 50 metres. The underpass would be a relatively open space with a generous clearance height to the underside of the bridge structure and a generous width between the bridge pylons. It would also be relatively straight with a clear line of sight provided between the entry and exit points. Adequate lighting and surveillance would be provided in and around the underpass for safety and security.

The underpass would follow the grade of the finished ground level at this location and would connect to the active transport links which run:

- To the west through the new open space area at the Rozelle Rail Yards
- To the east to connect with Anzac Bridge, the opposite (east) side of Victoria Road and with potential for a future connection into The Bays Precinct area.

The underpass is considered to be a more effective and user friendly option for crossing Victoria Road by comparison to the existing elevated overpass.

B12.12.10 Overshadowing

Attachment 1 (Beca report) Section 12.4.13, commencing p110

No assessment of noise barriers required during construction and resultant overshadowing has been identified. This is a concept design and subject to refinement, particularly with respect to construction site boundaries and detailed construction methodology. Consequently, overshadowing by construction and potentially operational noise barriers could still occur. Ensure that the management measures of the EIS specify that despite ongoing design and construction methodology refinements which may occur, there will be no additional properties impacted

Overshadowing appears to be an issue at the Iron Cove site, Rozelle. Should the height of the ventilation stack increase, then this problem will worsen. Given that this is only a concept design and detailed design is likely to change the stack height and footprint, then there is a risk that the management measures will be inadequate in mitigating overshadowing on residential properties Overshadowing at the Iron Cove site needs to be further discussed. There are potentially residential properties blighted by this overshadowing and the suggested management measure does not adequately mitigate the impact.

Response

Overshadowing impacts are assessed in section 12.4.13 and Appendix M (Shadow diagrams and overshadowing and) of the EIS.

No assessment was undertaken of overshadowing for potential operational noise barriers as no noise barriers are proposed as part of the concept design. During construction, and as defined by environmental management measure NV3 (see **Chapter E1** (Environmental management measures)), detailed noise assessments will be undertaken for all ancillary facilities and will be used to identify where the use of noise barriers would be appropriate. Environmental management measure LV1 (see **Chapter E1** (Environmental management measures)), requires that ancillary facilities, including the locations of visible structures and plant and perimeter fencing and treatments, will be developed to minimise visual impacts for adjacent receivers where feasible and reasonable. Measures to minimise visual impacts for adjacent receivers will be implemented progressively during the site establishment phase.

Potential operational noise performance of the project based on the detailed design will be assessed in accordance with NSW Road Noise Policy (DECCW 2011) and appropriate management measures, such as noise barriers, will be confirmed and implemented (see environmental management measure NV13 in **Chapter E1** (Environmental management measures)). The potential for overshadowing and other visual impacts will be considered during the assessment of any proposed noise barriers.

Refinements to the project during detailed design may also result in changes to overshadowing impacts. Regardless of changes made during detailed design, the same requirements as outlined by environmental management measure PL4 in **Chapter E1** (Environmental management measures)) would apply.

Shadows from the ventilation outlet would impact on an adjoining residential property on the west side of Callan Street in the mid-morning. The shadows would be likely to affect habitable rooms and private open space of these properties for up to two hours in the worst-case shadow scenario (21 July).

Any refinements to the ventilation outlet during detailed design would be restricted by environmental management measure PL4:

- Existing residential properties (and approved residential developments) that are affected by overshadowing from the final detailed design of the project (including any noise mitigation measures) are to receive a minimum of three hours of direct sunlight in habitable rooms and in at least 50 per cent of the principal private open space area between 9.00 am and 3.00 pm on 21

June. Such properties must be identified for further consideration by the Proponent in a Solar Access and Overshadowing Report which addresses compliance with these requirements:

– Where existing residential development currently receives less than the required amount of solar access, existing access to sunlight during operation should not be unreasonably reduced

– Where affected properties include dwellings held under strata or community title, these requirements must be interpreted in relation to individual units within those properties.

B12.13 Urban design and visual amenity

Refer to Chapter 13 (Urban design and visual amenity) and Appendix O (Landscape and visual impact assessment) of the EIS for details of urban design and visual amenity.

B12.13.1 Compliance with the guidelines

Attachment 1 (Beca report) Section

The applied methodology for visual assessment in accordance with Environmental Impact Assessment Practice Note – Guidelines for Landscape Character and Visual Impact Assessment has been clearly demonstrated in the reporting. The guideline itself is accepted for use in RMS road projects under the EP&A Act Part 3A and Part 5. It has also been used to assess State Significant Infrastructure projects in the past, however its original use was intended for broad scale landscape character and visual impact assessment, not specifically for fine-grain urban environments (but it has been widely adopted for this use).

Response

The guidelines used for the M4-M5 Link have been used in landscape and visual impact assessments (LVIAs) for other major road projects including preceding WestConnex stages (M4 Widening, M4 East, New M5 and the King Georges Road Interchange Upgrade). The guideline was developed by the Roads and Maritime Centre for Urban Design, to be used across NSW.

B12.13.2 General comments

Attachment 1 (Beca report) Section 13, p112

The presented landscape character and visual impact assessment reporting (Appendix O (Technical working paper: Landscape and visual impact) of the EIS) for the identification of character zones, identification of sensitive receivers and mapping of local context appear to generally conform to the guidelines provided in the SEARs, however a thorough testing of the completeness, accuracy of presented facts and adequacy of identified impacts requires a review process that would effectively duplicate the site review and mapping of the assessment process. This was not possible in a short form desktop review. It is recommended that a selected replication mapping process is carried out if a full review is required.

Response

The LVIA was completed in full by accredited contractors, in accordance with *Beyond the Pavement: Urban Design Procedures and Design Principles* (Roads and Maritime 2014a) and associated guidelines. In addition, the LVIA has been reviewed by DP&E to confirm that it addressed the SEARs prior to being finalised and placed on public exhibition, including a review by DP&Es peer reviewer for urban design.

B12.13.3 Landscape character and visual impact assessment

Attachment 1 (Beca report) Section 13.2, p112

Identification of Landscape Character Zones (LCZ's) in urban areas is often difficult to determine as defining characteristics and separators in highly varied urban settings often rely on subjective assessment of contributing factors in determining boundaries. Of particular influence is the potential fine-grain of varying housing heights, the presence or absence of significant trees and localised landform peculiarities. The LCZ boundaries play an important part in the combined visual impact magnitude. The boundaries for the presented LCZ's should be reviewed / mapped further to test the stated assumptions and desktop review process described in Appendix O (Technical working paper: Landscape and visual impact) of the EIS.

Attachment 1 (Beca report) Section 13.2, p112

Completeness in the identification of existing views of the development is difficult to assess without replicating the modelling or identification methodology. Sensitive receivers and visual envelopes have been `broadly mapped' which may provide some discrepancies with actual receivers if missed. The mapping and identification of sensitive receivers should be reviewed in detail to determine the accuracy of the reported positions.

Response

The likely visibility of the permanent project infrastructure from surrounding areas (visual catchment) has been broadly mapped, to create a visual envelope (refer to Appendix O (Technical working paper: Landscape and visual impact) of the EIS). This is considered appropriate as the mapping typically shows the 'worst case' as it primarily related to existing landform, and does not allow for the obscuring effect of vegetation. For example, the visual envelope may suggest some receptors have visibility of a ventilation facility, however due to the location of existing vegetation and the receptor's orientation to the infrastructure, the view may be obscured.

Section 3.2.2 of the Appendix O (Technical working paper: Landscape and visual impacts) of the EIS discusses how the landscape character zones (LCZs) were determined. In order to assess landscape character impact, the LCZs were identified across the project footprint in areas where surface works are proposed. The LCZs are defined as areas of landscape with similar properties or strongly defined spatial qualities, which are distinct from adjoining areas. As much of the project would comprise of tunnelled motorway, the landscape character units were focussed around areas of proposed surface works, including the interchanges and the ventilation facilities.

Descriptions, desired future character and mapping of the LCZs have drawn either directly or with some modification (where appropriate) from DCPs, which identify and map distinct areas by virtue of topography, estate and street pattern or building form. The DCPs that apply to the project are the Leichhardt DCP, Marrickville DCP and Sydney DCP. It was also noted that although Ashfield Council, Leichhardt Council and Marrickville Council have now been amalgamated as part of the Inner West Council, a combined DCP is yet to be released and so the existing DCPs still apply. Further discussed of the interaction between the LCZs and DCPs is presented in section 5.3 of Appendix O of the EIS).

A list of all LCZs are provided in Table 5-1 of Appendix O (Technical working paper: Landscape and visual impact) of the EIS. Detailed description of each LCZ is provided in section 5.3.1 to section 5.3.4 of Appendix O (Technical working paper: Landscape and visual impact) of the EIS. Maps of each of the LCZs are provided in Appendix O (Technical working paper: Landscape and visual impact) of the EIS.

B12.13.4 Visualisations used in the EIS

Attachment 1 (Beca report) Section 13.5, p 113

Visualisations are representative of building massing only and do not represent the potential materiality / colour or articulation of final built form. While this may provide a 'worst case' scenario, they do not represent an actual proposed design.

Key visual impacts are generally centred on visualising operational infrastructure which is subject to change in the detailed design phase. This has the potential to render the current assessment redundant or unsupportable.

Response

The landscape and visual impact assessment presented in Chapter 13 (Urban design and visual amenity) of the EIS is based on the concept design for the project. The concept design defines:

- A definition of property acquisition requirements sufficient to allow construction to proceed
- A project footprint, including for construction and operation
- A clear description of the urban design principles, extent of impacts and impact management requirements
- A sound and clear basis for later development of the detailed design to a standard required to support project delivery.

If the project is approved, the conditions of approval will require that the M4-M5 Link is constructed generally in accordance with the project as described in the EIS and as amended in the preferred infrastructure report (see **Part D** (Preferred infrastructure report)).

Appendix L (Technical working paper: Urban design) of the EIS provides the urban design principles by which the project would demonstrate design excellence during detailed design and integrate with surrounding neighbourhoods. The urban design principles would be developed in detailed designs under the UDLPs for the various components of the project. The potential materiality, colour or articulation of the final built form would be developed in line with the urban design principles during detailed design and presented in the UDLPs for the project. The UDLPs would be prepared in accordance with relevant commitments in the EIS and in consultation with relevant councils, stakeholders and the community. An Urban Design Review Panel would be established to provide advice and guidance regarding the UDLPs.

The UDLPs would be prepared prior to the commencement of permanent built surface and/or landscape works. The community and other stakeholders would be able to comment on the draft UDLPs during an exhibition period and the feedback would be considered in the final UDLPs.

B12.13.5 Urban design objectives and principles

Attachment 1 (Beca report) Section L-3.2, L-5.1.3, p114

The Urban Design Principles are stated to follow the project adopted 'WestConnex Urban Design Framework'. Full testing and cross referencing of the effective application of these principles has not been possible in the current short form desktop review. Testing of the application of the urban design principles in detailed outcomes.

Response

The urban design principles and objectives developed as part of the *WestConnex Motorway Urban Design Framework* (Roads and Maritime 2013) include the following:

- Objective 1: Leading edge environmental responsiveness – Planning, design, construction and long term management shall be based upon a natural systems approach which is responsive to the environment and promotes the highest levels of sustainability
- Objective 2: Connectivity and legibility – Build connectivity across the city, beyond the boundaries of the motorway corridor and promote increased legibility of places, buildings, streets and landmarks
- Objective 3: Place-making – Create beautiful places, streets, structures and landscapes that draw their form, character and materiality from local context, the intrinsic natural and cultural qualities of each locale
- Objective 4: Urban renewal and liveability – Enable opportunities for urban renewal and provide high levels of urban amenity and liveability
- Objective 5: Memorable identity and a safe, enjoyable experience – Provide a memorable project identity and experiences for road users and adjacent stakeholders which are safe, convenient and enjoyable
- Objective 6: A new quality benchmark – Provide design and construction quality of world class standard. WestConnex shall establish a new benchmark for integrated sustainability, engineering, art, architecture and urban design.

As outlined in section 13.2.2 and section 5.4 Appendix L (Technical working paper: Urban design) of the EIS, key objectives from the WestConnex Urban Design Framework as well as the Roads and Maritime guidelines Beyond the Pavement: Urban Design Procedures and Design Principles informed the development of guiding principles for the urban design for the M4-M5 Link.

The implementation of the urban design principles during detailed design is discussed in **section B12.13.4**.

B12.13.6 Urban design of Rozelle Rail Yards

Attachment 1 (Beca report) Section 3.1.12, p16

While the project is consistent with *The Bays Precinct Transformation Plan* vision [.....], it is inconsistent with the Plan with respect to the development of the Rozelle Rail Yards for mixed housing and potentially also for employment uses. The EIS states, should the project not proceed, the Rozelle Rail Yards would likely be developed in accordance with *The Bays Precinct Transformation Plan,* including the provision of public spaces, employment uses and mixed housing. If the project proceeds, how do SMC plan to restore the opportunity for the development of mixed housing and potential employment uses?

Attachment 1 (Beca report) Section L-3.2, L-5.1.3, p114

The mapping and application of the urban design strategies outlined in Section 5.1.3 is not immediately apparent in the presented concept plan for the Rozelle Rail Yards area. In particular the plan does not appear to respond to the fine-grain scale of the existing open space edges adjacent to Lilyfield Road - Strategy 6 Respond to the local character or the arrangement and alignment of the existing road network - Strategy 5 Integrate the motorway. There is insufficient detail on local road proposals in this Appendix to provide further comment of the application of Strategy 7 Revitalise Streets for equality of mobility. Full review of the conceptual design response is required to assess the responsiveness of the proposed design in the Rozelle Rail Yards. The plan for the Rozelle Rail Yards is based on a concept design and outlines how the key strategies presented in section 5.1.3 of Appendix O (M4-M5 Link Urban Design Report) could be delivered on the site. The final design and arrangement of urban design elements at the Rozelle Rail Yards will be detailed in a series of UDLPs for the project. These plans will be based on the key strategies developed and will include detailed master plans for the site and be subject to consultation with the community and stakeholders.

Attachment 1 (Beca report) Section L-5.4, p115

The assessment of the urban design principles against the proposed outcomes is generic and not easily followed. In particular the application of Principle 4 - 'A motorway integrated within its context' and Principle 5 - 'Place sensitive design' are not clearly demonstrated in the proposed concept designs. A detailed breakdown of where these inadequacies occurs was not possible within the short form review. A detailed concept design review of both Rozelle Rail Yards and Iron Cove Link is recommended to focus commentary on detailed outcomes.

Response

The Bays Precinct Transformation Plan establishes the strategy for how The Bays Precinct would be developed over 20 years for residential, employment, entertainment and open space uses. The Bays Precinct, located about two kilometres west of the Sydney CBD, encompasses the areas surrounding Blackwattle Bay, Rozelle Bay and White Bay. The Bays Precinct comprises eight ‘Destinations’, including the Rozelle Rail Yards, White Bay Power Station, White Bay and the Rozelle Bay and Bays Waterways.

The NSW Government’s ambition for The Bays Precinct is ‘to drive an internationally competitive economy, through the creation of great destinations on Sydney Harbour that would transform Sydney, NSW and Australia’ (UrbanGrowth NSW 2015b). The NSW Minister for Planning has determined that the urban renewal of land within The Bays Precinct is a matter of state planning significance and has agreed to investigate the area as a State Significant Precinct. The Bays Precinct delivery is intended to be staged and coordinated with the planning and delivery of WestConnex and the expansion of the Sydney Light Rail network as well as the long term considerations of The Bays Precinct’s port uses. *The Bays Precinct Transformation Plan* recognises that an efficient transport system enables urban transformation, and that transport solutions for The Bays Precinct would need to be integrated with planning for a growing Sydney, including the consideration of varied transport modes.

The Bays Precinct Transformation Plan identifies the Rozelle Rail Yards as providing an opportunity for mixed housing as well as public spaces and employment uses. *The Bays Precinct Transformation Plan* also identifies the potential for opportunities provided by the redevelopment of the Rozelle Rail Yards for integration and connection of communities to the north and south through the creation of public open space and improved connections between Lilyfield and the waterfront.

While the project is consistent with *The Bays Precinct Transformation Plan* vision for the creation of new open spaces, provision of new pedestrian and cyclist links, and the acknowledgment of the rail heritage of the area, it is inconsistent with the Plan with respect to the development of the Rozelle Rail Yards for mixed housing. Should the project not proceed, the Rozelle Rail Yards would likely be developed in accordance with *The Bays Precinct Transformation Plan*, including the provision of public spaces, employment uses and mixed housing, supplementing other areas in The Bays Precinct which can also provide these functions.

The works that would be carried out at the Rozelle interchange would include (but not be limited to):

- Detailed review and finalisation of the architectural treatment of the motorway operational infrastructure
- Reshaping of the landform at the site around the motorway operational infrastructure
- Provision of pedestrian and cyclist paths and bridges
- Provision of new open space within the Rozelle Rail Yards, including landscape works
- Revegetation and planting, including tree planting, at key locations including:
  - Around motorway operational infrastructure such as the ventilation facility
  - Around the constructed wetland, bioretention swale and the drainage channels
  - Adjacent to pedestrian and cyclist paths
  - Around the perimeter of the Rozelle Rail Yards.

The following urban design principles as presented in section 5.1.3 of Appendix L (Technical working paper: Urban design) of the EIS would be applied in the development of the UDLP for the Rozelle interchange:

- Connect and provide for communities
- Enhance green links
- Integrate water sensitive urban design (WSUD)
- Integrate active transport links
- Integrate the motorway
- Respond to local character
- Revitalise streets for equality of mobility
- Sensitive economic revitalisation.

A review of the Rozelle interchange against urban design principles for the project is presented in Table 13-23 of the EIS. Further discussion of the urban design of the Rozelle Rail Yards is presented in **section B11.14.1**.

B12.13.7 Urban design associated with the Iron Cove Link

Attachment 1 (Beca report) Section L-3.2, L-5.2.3, p114

The mapping and application of the urban design strategies outlined in Section 5.2.3 is not immediately apparent in the presented concept plan for the Iron Cove area. In particular the plan does not appear to respond to the fine-grain scale of the existing built form / housing adjacent to Victoria Road and leaves residual open space that does not respond to - Strategy 6 Respond to the local character or the arrangement of the existing road network - Strategy 5 Integrate the motorway. There is insufficient detail on local road proposals in this Appendix to provide further comment of the application of Strategy 7 Revitalise Streets for equality of mobility. Full review of the conceptual design response is required to assess the responsiveness of the proposed design in the [Iron Cove Link].

Response

A review of the Iron Cove Link against urban design principles established for the project is presented in Table 13-23 of the EIS. As described in section 13.6 of the EIS, UDLPs will be prepared for areas of open space and landscaping that will be provided by the project, including south of Victoria Road near the eastern abutment of Iron Cove Bridge. UDLPs would be prepared in consultation with relevant Councils, the community and affected landowners and businesses and must be approved by the Secretary of DP&E. UDLPs will present an integrated urban and landscape design consistent with the urban design principles and objectives established in Chapter 13 (Urban design and visual amenity) of the EIS. UDLPs will be implemented within one year of operation, unless otherwise required by the conditions of approval.

The plan for the Iron Cove Link is based on a concept design and outlines how the key strategies presented in section 5.2.3 of Appendix L (Technical working paper: Urban design) of the EIS could be delivered on the site. As discussed in **section B12.13.4**, if the project is approved, the conditions of approval will require that the M4-M5 Link is constructed generally in accordance with the project as described in the EIS and as amended in the preferred infrastructure report. The principles for delivery at each of this site include:

- Connect and provide for communities
- Enhance green links
- Integrate WSUD
- Integrate active transport links
- Integrate the motorway
- Respond to local character
- Revitalise streets for equality of mobility
- Sensitive economic revitalisation.

Residual project land on the southern side of Victoria Road not required for permanent operational infrastructure provides the opportunity to create new open space and active transport connections for the community, which connect with King George Park to the west and the local street network. This land would be landscaped and developed in accordance with the UDLPs that will be prepared for the project.

A number of opportunities for future uses of the residual land were identified in Appendix L (Technical working paper: Urban design) of the EIS. These include:

- Children's play spaces
- Active recreation to complement the Bay Run such as outdoor gyms
- Infill housing development
- Community gardens.

Community input would be central to the ultimate decision on use of this land. All future uses could be designed in a manner to ensure that the existing amenity of the adjacent residences would be preserved.

The forecast reduction in traffic along sections of Victoria Road resulting from the Iron Cove Link will likely create opportunities for future urban renewal, including a revitalised 'street' for businesses, locals and visitors, along Victoria outside the project footprint. Future urban renewal opportunities in Victoria Road the project footprint, however, are outside the scope of the project. The siting of the ventilation outlet in the middle of Victoria Road and the ventilation facility and substation at the eastern perimeter on the southern side of Victoria Road would create a contiguous parcel of land (albeit interrupted by Callan, Toelle and Clubb streets) to enable connections between Springside Street, King George Park and Iron Cove Bridge. This would be supported by the provision of an improved active transport connection as part of the project.

Future development possibilities on Victoria Road is presented in section 6.2 of Appendix L (Technical working paper: Urban design) of the EIS. While such future development is not proposed to be delivered by the project, the project would help facilitate such development opportunities, including active recreational uses and urban renewal, which would be coordinated and delivered by others.

B12.13.8 Visual impact of signage

Attachment 1 (Beca report) Section 5.8.9, p30

The implementation of new directional signage and changes to existing signage for guidance of drivers and all road users should be investigated in detail. This includes connecting roads and paths to and from new connections to the M4–M5 Link. Draft designs of these directional signs should be provided to IWC and the local community for comment before being finalised.

Attachment 1 (Beca report) Section 6.4.7, p35

It is stated that Finishing works will include "Erection of directional and other signage and other roadside furniture such as street lighting" As requested in the CDP submission, IWC would like to have input to the final design of directional signage. This is important to ensure the signage cover the directional signage for the collector roads that feed into and distribute from the interchanges. This also relates to the request to get a proper understanding of the future road hierarchy as a result of WestConnex implementation - see Section 8.3.

IWC requests to be involved in the approval of directional signage design for collector roads that feed into, or distribute from, the interchanges to accommodate the directional signage needs on these roads in the IWC area. This assessment will have to take the future road hierarchy changes into account as requested in Chapter 8.

Response

Wayfinding signage for the road infrastructure will be developed to the satisfaction of Roads and Maritime. Consultation will occur with the relevant local council regarding road signs for council roads. Signage for road infrastructure will be installed prior to the commencement of operation.

Traffic, locational, directional, warning and variable message signs would be incorporated within the tunnels and on surface roads at approaches to the tunnels. Variable message signs would be located within or directly adjacent to areas of operational infrastructure for the project and the existing adjacent arterial road network. Directional signage would be installed in accordance with the Austroads and Roads and Maritime standards, with a focus on providing clear and unambiguous direction to motorists.

The location, sizing and characteristics of the signage will be finalised during detail design, considering the relevant standards, specifications and safety in design requirements and is expected to be audited as part of the Road Safety Audit.

B12.13.9 Crime prevention through environmental design

Attachment 1 (Beca report) Section L-5.5.8, p115

It is unclear why the strategy for CPTED would be in accordance with CPTED by Queensland Government 2007. The relevant guidelines under section 79C of the EP&A Act 1979 are generally applicable. The proposed concept designs for Rozelle Rail Yards, Iron Cove and interchange precincts have not been assessed / audited against the guidelines and do not demonstrate compliance with the principles. A CPTED audit of current concepts should be carried out.

Response

The strategy for Crime Prevention Through Environmental Design (CPTED) would be in accordance with *Crime Prevention Through Environmental Design* (Queensland Government 2007) as these were the guidelines stipulated by DP&E in the SEARs for the project. This strategy was also used for other projects in NSW such as Sydney Metro (City and Southwest).

Principles of CPTED would be considered and incorporated into the urban design through the preparation of the UDLPs for the project. During detailed design, specific design measures at surface operational infrastructure would be identified to prevent crime as reflected in the environmental management measure UD3 in **Chapter E1** (Environmental management measures).

B12.13.10 Visual impact of ventilation facilities

Attachment 1 (Beca report) Section L-5.5.4, p115

The ventilation facilities remain undefined, while the urban design report outlines 4 strategies and Annexure 2 provides benchmarked examples, the form, scale and materiality of these critical elements remains undefined. The visualisations provided in Appendix O are not representative of any of the potential forms, with several types noted in Figure 5-35 demonstrating the potential to exceed the functional height requirements (for example `camouflage' and `sculptural artwork') Requirement for further definition of ventilation facilities should be a priority.

Response

As discussed in section 5.5.4 of Appendix L (Technical working paper: Urban design) of the EIS the ventilation facilities would form a dominant marker of the project within the landscape. A Ventilation Facility Design Review has been undertaken to examine national and international examples of ventilation facility design (see Annexure 2 of Appendix L (Technical working paper: Urban design) of the EIS). The review provides key criteria by which the detailed design of ventilation facilities for the project would be developed. Across the history of ventilation facility design there appear to be four fundamental approaches by way of expression. In some cases, the (historical) approach appears as a representation of the spirit of the time - perhaps an expression of an attitude towards a new form of transport or technology. In many cases the approach appears rooted in the nearby physical context. More recently there appears to be a tendency towards a more stylistic form of expression, as demonstrated by Figure 5.35 of Appendix L (Technical working paper: Urban design) of the EIS.

The relevant UDLP will contain the ventilation facility designs in accordance with the following themes:

- The design strategy employed for the ventilation facility should be intrinsically linked to the community and its immediate context
- By understanding the ventilation facility as a ‘signifier’ for the wider project, there is an opportunity where appropriate for these structures to celebrate infrastructure, as opposed to disguising it
- Embedding an additional function could provide additional benefit to the surrounding context, and also help mitigate the negative associations with ventilation facilities in general [pollution, visual impact]. This addition can also be of social value to the community
- Distance from residential areas is often the point of strongest contention. By locating the ventilation outlet close to the portals the amount of impact from the community’s perspective could be reduced.

Visual impacts of the project would be minimised through considered development and implementation of the urban design and landscaping features in accordance with UDLPs that will be developed for the project. The UDLPs will be prepared in consultation with relevant councils, stakeholders and the community. Urban design and landscape works would include the provision of landscape planting along and around key visible infrastructure such as ventilation facilities and motorway operations complexes. Over time and as these trees mature, the benefits provided by landscape planting will improve.

Mitigation and design measures that have been proposed for the project to minimise identified visual impacts are outlined in **Chapter E1** (Environmental management measures) and include:

- Integrating the new open space at Rozelle with the Lilyfield Road streetscape through considered tree planting and associated landscape works
- Investigating measures during detailed design to reduce the height, bulk and scale of ventilation outlets at Rozelle, Iron Cove and St Peters, and provide materials/finishes that reduce impacts to sensitive visual receiver locations
- Consult with UrbanGrowth NSW regarding the interface between the project footprint and the White Bay Power Station precinct. Design the interface to optimise compatibility between the two areas from a landscaping, visual, heritage and active transport connectivity perspective
- At the St Peters interchange making provision for soft landscape work within the motorway operations complex which has substantial areas of hardstand visible from the public domain.

Further discussion regarding the visual impact of ventilation facilities is provided in **section B11.14.6**.

B12.13.11 Operational lighting impacts

Attachment 1 (Beca report) Section 13.2.3, L- 5.5.5, p113

The lighting design for the facility sites and residual open spaces remains undefined, while the urban design report outlines 5 strategies, the lighting types, proximity to sensitive receivers and materiality of these critical elements remains undefined. The visual impact reporting allows only for broad scale assumptions (not documented), with the potential for new public open space to impact on sensitive receivers. Requirement for further definition of lighting outcomes should be a priority.

Response

Lighting design for the operational ancillary facilities and open spaces will be finalised during detailed design. All lighting would be designed to meet the requirements of Australian Standards AS4282: Control of the obtrusive effects of outdoor lighting and as appropriate AS/NZS 1158: Lighting for roads and public spaces.

Operational lighting installed as part of the project would be the minimum necessary to meet security, user/customer safety and, when required on site, worker safety requirements. The lighting would be designed and installed to minimise light spill outside the project footprint, and to maintain existing amenity where feasible and reasonable as listed in **Chapter E1** (Environmental management measures).

A summary of night lighting impacts during operation is provided in Table 7-76 of Appendix O (Technical working paper: Landscape and visual impact) of the EIS.

B12.13.12 Future opportunities

Attachment 1 (Beca report) Section L-6, p115, Attachment 1 (Beca report) Section L-6.2, p115

The section on future opportunities at Rozelle Rail Yards and Iron Cove provides a layer of open space programming and localised responses that appear more appropriate for the project response, not as future projects. The coordination and inclusion of offset type projects, integration at project edges, visual mitigation and fulfilment of the applied urban design principles and project objectives are clearly tied to the project activities. Further review of the identified future opportunities is required to assess their application to project mitigation and offset obligations.

Response

The EIS acknowledges that future projects at the Rozelle Rail Yards and associated with the Iron Cove Link would capitalise on the opportunities provided by the project. Figure 5-6 in Appendix L (Technical working paper: Urban design) of the EIS is a concept plan showing what the project will deliver at Rozelle Rail Yards. The concept plan was developed to incorporate the key strategies for Rozelle Rail Yards, as outlined in section 5.1.3 of Appendix L (Technical working paper: Urban design) of the EIS.

Figure 5-24 in Appendix L (Technical working paper: Urban design) of the EIS is a concept plan showing what the project will deliver at Iron Cove. The concept plan was developed to incorporate the key strategies for Iron Cove, as outlined in section 5.2.3 of Appendix L (Technical working paper: Urban design) of the EIS.

As part of the UDLP, an urban design master plan for the Rozelle interchange would identify opportunities to deliver outcomes that support and connect existing neighbourhoods, complement and stimulate local economies and provide opportunities for growth across existing and future local industries along and around Victoria Road at Rozelle.

The implementation of the urban design principles during detailed design is discussed in **section B12.13.4**.

B12.14 Social and economic

Refer to Chapter 14 (Social and economic) and Appendix P (Technical working paper: Social and economic) of the EIS for details of social and economic impacts.

B12.14.1 Social and economic assessment is flawed

Attachment 1 (Beca report) Section 14 Overall Evaluation, p120

This chapter is flawed in that the impact consequence definitions are ambiguous. The impacts are likely to have significant 'local' impacts directly and indirectly affect a larger area of Inner West Council. As such, the impacts could be considered major as extensive mitigation measures need to be applied. Further, the general nature of the mitigation measures suggested masks the marked impacts in certain localities where multiple moderate impacts will occur and where there may be a need for a much more focussed approach to mitigation measures rather than single issue such as noise and vibration. The EIS is based upon a concept design and given that the socio-economic impacts are significant, it is critical that clear boundaries be set in the mitigation measures for the construction phase as to what is acceptable and unacceptable, particularly in certain locations. The operational aspects are heavily dependent upon detailed design outcomes in terms of improved connectivity, CPTED, active transport linkages, improved amenity, and opportunity creation for improved business environments. Whilst the EIS includes statements and supporting design sketches that all this will improve with operations, it is difficult to objectively assess and confirm that this will be the case. It is critical that Inner West Council as a key stakeholder and likely eventual asset manager for a number of the improvements be involved in collaborating on the detailed design and acceptance of assets and their management.

Response

The social and economic impact assessment (SEIA) was undertaken in accordance with the Roads and Maritime *Environmental Impact Assessment Practice Note: Social and economic assessment Roads and Maritime* (Roads and Maritime 2013), as required by the SEARs. The practice note provides a framework for assessing social and economic impacts to ensure these assessments are carried out consistently, to a high standard, and are properly integrated with other environmental assessments, design development and management processes. The SEIA framework to determine the overall significance of socio-economic impacts of project is described in section 3.6 of Appendix P (Technical working paper: Social and economic) of the EIS.

The EIS was subject to a consistency review against the SEARs prior to being finalised for public exhibition and was reviewed by subject matter experts from SMC, Roads and Maritime and peer reviewers. Numerous rounds of consultation with the community, local councils, key stakeholders and agencies also informed the preparation of the EIS.

The assessment of a concept design in an EIS is a common approach and has been applied to other recent major infrastructure projects in NSW including Sydney Metro City and Southwest and CBD and South East Light Rail. While the SEIA is based on a concept design, the study area for the assessment is broader than the project footprint, thereby capturing a larger number of potentially affected people, communities and businesses. The study area for SEIA is shown in Figure 14-1 of Chapter 14 (Social and economic) of the EIS.

Should the project be approved, the proponent (Roads and Maritime) and appointed design and construction contractor(s) and sub-contractors must comply with all requirements of the conditions of approval for the project. This will require implementing all of the updated environmental management measures described in this report and other feasible and reasonable measures to prevent and/or minimise any harm to the environment that may result from the construction or operation of the project.

For the M4-M5 Link project, a design and construction contractor(s) will be appointed to undertake the detailed design and construction planning following determination of the project application, should it be approved. The design presented by the design and construction contractor(s) would need to be consistent with any environmental management measures described in **Chapter E1** (Environmental management measures) to mitigate impacts from the construction and operation of the project such that health and environmental impacts are minimised. The environmental management measures detail the specific monitoring programs that are proposed to be implemented to ensure compliance, including for noise and vibration.

Given the project's size, duration and complexity, construction would generate a range of social and economic impacts. In response to community concerns and design constraints identified during the preparation of the EIS, a number of substantial changes have been made to the project design (refer to sections 4.5 and 4.6 of the EIS. Some of the project design alterations which have been adopted to reduce potential social and economic construction impacts include:

- Adjustment of the project footprint to avoid using Easton Park at Rozelle during construction and to minimise impact on Lilyfield Road and the heritage listed Sydney Water sewerage pumping station
- Adjustment of the project footprint to avoid using areas around Blackmore Park, Leichhardt during construction
- Deletion of a construction site in Derbyshire Road, Leichhardt, adjacent to Sydney Secondary College (Leichhardt campus) to prevent amenity, traffic and heritage impacts
- As a result of the deletion of the Camperdown interchange, adjustment of the mainline tunnel alignment further to the west which has avoided construction impacts on the Royal Prince Alfred Hospital and the University of Sydney
- The selection of spoil haulage routes to primarily follow the arterial road network and avoid local roads
- The restriction of hours for spoil haulage from the Darley Road civil and tunnel site (C4) to standard construction hours to avoid noise, traffic and amenity impacts on local residents.

The SEIA acknowledges and assesses the potential construction impacts of the project. Where possible, these issues have been designed out as outlined above, or appropriate management measures have been identified to reduce the impacts during construction. The design and proposed management measures have also been informed by lessons learnt from the implementation of previously approved WestConnex projects to ensure that impacts are thoroughly considered and management measures are sound.

A preferred infrastructure report has been prepared that outlines proposed design refinements and measures to minimise any additional associated environmental impacts identified since the exhibition of the EIS, with consideration of community and agency feedback received (see **Part D** (Preferred infrastructure report)). The report provides details regarding the inclusion of the White Bay civil site (C11) to provide a heavy vehicle marshalling facility and additional construction workforce parking, and the relocation of the bioretention facility at Rozelle. With regard to the social and economic environment, this would minimise impacts form trucks queuing and circling on local roads around construction sites and reduced availability of on-street parking by the construction workforce.

Upon operation, the project is likely to result in an overall major positive social and economic impact within the study area and broader region. This would result from an enhanced network capacity and connectivity between the Sydney CBD, inner west, south, south-western and western Sydney. The positive impact of the operation of the project would benefit future generations. Providing an underground motorway alternative would reduce congestion on the surface road network, allowing for increased use of surface roads by pedestrians and cyclists and for public transport. This would also improve the safety conditions along the majority of local roads surrounding the project.

Principles of CPTED would be considered and incorporated into the urban design through the preparation of the UDLPs for the project to reduce opportunities for crime around operational infrastructure. Refer to section 13.5.8 of Chapter 13 (Urban design and visual amenity) of the EIS for further information regarding the incorporation of principles of CPTED into the UDLPs for the project as reflected in environmental management measure UD2 in **Chapter E1** (Environmental management measures).

The detailed design will be prepared based on the project approval, including the EIS, the Submissions and preferred infrastructure report and conditions of approval, to determine whether the detailed design is consistent with the approved project. Where the detailed design is inconsistent with the approved project, further assessment (including where relevant the identification of any additional or changed management and mitigation measures) and approval would be required under the EP&A Act. If further assessment/approval is required due to project design changes, the applicable statutory process will be followed prior to commencement of construction of the relevant aspect of the project. This may be in the form of a modification request lodged with DP&E, depending on the scale of the proposed modification and the potential for environmental or social impacts.

Relevant councils will be consulted during the development of the CEMP for the project as required by the conditions of approval. In addition, operational plans such as UDLPs and the Social Infrastructure Plan will also be prepared in consultation with relevant councils. Commitments to where management measures and plans would be developed in consultation with the Inner West Council are included in **Chapter E1** (Environmental management measures).

Asset transfer and maintenance requirements would be confirmed during detailed design, in consultation with affected stakeholders, including the Inner West Council.

B12.14.2 Assessment methodology

Attachment 1 (Beca report) Section 14.1.5, p117

Table 14-3 sets out the categories of significance of social and economic impacts and refers the reader to Appendix P [of the EIS] for explanation of the details of the assessment methodology. The assessment methodology sets out that a moderate consequence of impact may have variable spatial extent and would usually respond to mitigation or enhancement. A major impact spatial extent is at LGA or regional level and negative impacts would require extensive mitigation. This is extremely important in describing the degree of socio-economic impacts for the project area. The resulting impact assessment described in detail in Appendix P [of the EIS] for identifies many moderate impacts during the construction period, particularly around the construction sites and many are described as partial mitigation. The moderate impact description is too ambiguous and understates the degree of impact. The spatial extent of the impacts is seen to significantly affect a large area of Inner West Council and therefore are better classified as a major impact.

The assessment methodology with respect to classification of moderate and major impact requires further work. In Council's view, the socio-economic impacts of the construction phase will have a major impact upon the Inner West Council. The EIS should be structured to clearly describe all impacts at and around each construction site so that the total impacts can be clearly identified. Given that a number of the localities experience 'moderate impacts' across a range of specific issues e.g. traffic, loss of vegetation, loss of visual amenity, noise, dust, it is highly likely that this would further increase the impact consequence to major. The resultant mitigation measures will also require review.

Response

The SEIA methodology has been developed according to the SEARs and the Roads and Maritime *Socio-economic Assessment Guideline EOA-N05* (Roads and Maritime 2013). Section 3.6 of Appendix P (Technical working paper: Social and economic) of the EIS, outlines the assessment framework that was employed to determine the overall significance of socio-economic impacts. The report notes that:

'*Project data and knowledge and professional judgement has been applied on a case-by-case basis to identify the duration extent, spatial extent, severity, consequence, likelihood and ultimately the significance of impact on the socio-economic environment for each identified impact*'.

Figure B12-2 outlines the assessment framework that was employed to determine the overall significance of socio-economic impacts.

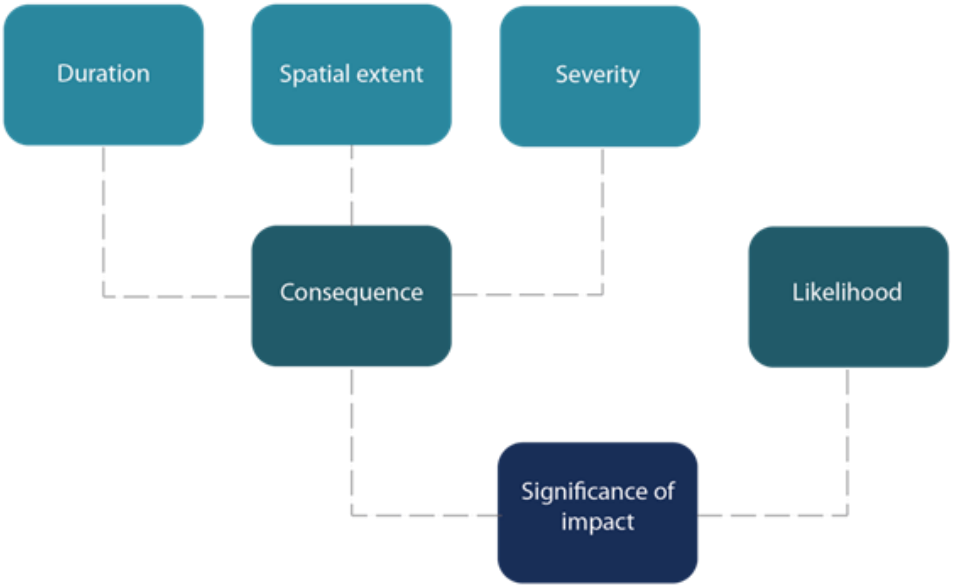

Figure B12-2 Socio-economic assessment framework

The significance of impact is determined by examining both the level of consequence and the likelihood of impact. The level of consequence is determined by assessing:

- The duration of impact
- The spatial extent of impact and
- The severity of impact.

Determining the severity of impact the assessment has considered whether the impact is reversible and whether it is likely to respond to mitigation.

Table 3-6 of Appendix P (Technical working paper: Social and economic) of the EIS includes an assessment matrix that uses consequence and likelihood to determine the significance of the impact in the socio-economic environment. Two examples are provided below to demonstrate how the methodology was applied to assess socio-economic impacts associated with construction aspects of the project:

- Construction noise - effects would be intermittent in nature, however, would extend for a medium to long term duration. The severity of impact on individual receivers would vary depending on their proximity to the construction sites. The severity of impact would be significant and highly likely at a locality level resulting in a large change to the baseline conditions. The likelihood and consequence of impact would however dissipate the further the receiver is from the construction site. With consideration of these factors, the overall impact to the socio-economic environment would be moderate negative
- Construction traffic - effects would extend for a medium duration and would potentially affect the efficiency of the road network across the broader LGA. The effects would reflect a medium change from the existing baseline road network condition. The consequence of these changes is moderate with impacts having a high likelihood of occurring. The overall significance on the socio-economic environment would therefore be a moderate negative.

In consideration of the submissions received from the community and stakeholders regarding various potential construction related impacts associated with the project, Roads and Maritime is proposing an additional environmental management measure. This measure will require the establishment of a Community Consultative Committee(s) to provide a forum for discussion between the proponent, the design and construction contractor(s), the community and local councils in regard to project related construction impacts and management. The Community Consultative Committee would be established and operated generally in accordance with the *Community Consultation Committee Guidelines for State Significant Projects* prepared by DP&E (2016).

Roads and Maritime acknowledge that the impacts from construction of the WestConnex program of works at Haberfield/Ashfield and St Peters are not short term, as the consecutive construction of components of the WestConnex projects would extend the duration of impacts to a period of up to seven years for some receivers in these areas. The range and intensity of impacts have and would continue to vary during these periods as construction progresses, with the majority of impacts occurring or expected to occur as a result of certain construction activities and during certain times of the day (for example outside standard daytime construction hours). Further discussion of longer duration impacts is presented in **section B11.12.3** and **section B2.1.5**.

To minimise the impacts associated with longer duration construction impacts from the concurrent construction of the WestConnex component projects in these areas and to respond to issues raised during the construction of other WestConnex projects and in submissions on the M4-M5 Link EIS, the following strategies are proposed:

- Provision of additional off-street car parking for the construction workforce at Rozelle, with the use of the White Bay civil site which would provide around 50 parking spaces. This site is further described in **Chapter D2** (White Bay civil site (C11))
- Downgrading the function of the Northcote Street civil site at Haberfield to a construction workforce car park and laydown area. Currently this site is used as the main tunnelling site for the eastern end of the M4 East project
- Provision of a heavy vehicle truck marshalling facility at the White Bay civil site at Rozelle, which would cater for around 40 heavy vehicles and stage the release of trucks to the tunnelling sites to manage the arrival of trucks to construction ancillary facilities (see **Part D** (Preferred infrastructure report)
- Designing acoustic sheds with consideration of the activities that will occur within them and the relevant noise management levels in adjacent areas. Monitoring will be carried out to confirm that the actual acoustic performance of each shed is consistent with predicted acoustic performance (see environmental management measure NV7 in **Chapter E1** (Environmental management measures))
- The appointment of a suitably qualified and experienced Acoustics Advisor, who is independent of the design and construction personnel, and who will be engaged for the duration of construction of the project (see environmental management measure NV1 in **Chapter E1** (Environmental management measures))
- Use of the M4 East and New M5 tunnels for spoil haulage when they become available and where practicable, to minimise heavy vehicle movements on the surface road network
- Consideration of receivers that qualify for assessment for at-receiver treatment due to predicted operational road traffic noise that are also predicted to experience exceedances of noise management levels during construction for at-receiver treatments as a priority (see environmental management measure NV9 in **Chapter E1** (Environmental management measures)).

Construction of a transport infrastructure project within an established urban area would inevitably generate a range of localised impacts. The benefits of the project must be balanced against these impacts, and the project must be able to demonstrate an overall net community benefit. The benefits and impacts of the project are comprehensively assessed in the EIS and associated technical papers, and management measures are proposed to minimise impacts.

Specific management and mitigation will be documented in relevant construction environmental management sub-plans such as the CTAMP and also in the AFMP. This will include detailed consideration of the types of activities that would be most likely to cause longer duration impacts during construction of the project, the types of impacts already experienced by these communities as a result of M4 East and New M5 construction, and subsequent development and implementation of location and activity specific mitigation that considers the consecutive nature of construction at these locations.

The number, location and layout of construction ancillary facilities would be finalised as part of detailed construction planning during detailed design and would meet the environmental performance outcomes stated in the EIS and the Submissions and preferred infrastructure report and satisfy criteria identified in any relevant conditions of approval. Further, additional ancillary facilities may be proposed by the contractor, once engaged. Prior to the establishment of ancillary facilities that are not identified in this EIS, the contractor would need to satisfy criteria that would be identified in any relevant conditions of approval and in accordance with an AFMP.

B12.14.3 Assessment of the neighbourhood identity and character

Attachment 1 (Beca report) Section 14.3.2, p118

Neighbourhood identity and character - this is assessed as being a moderate negative impact. Given that during construction, construction sites will be screened and there will be a large number of trucks, construction workforce parking, loss of significant trees and landscaping and loss of heritage assets and then with operation introduction of large ventilation stacks and control centres/ substations and signage into the locality, then this is likely to be a major impact rather than moderate. As this is a concept design, little detail is provided as to how this will be mitigated other than management plans for biodiversity, heritage, and visual impact and landscaping. The danger is that the actual detailed design and construction will result in greater impacts that foreseen by the concept design and the suggested mitigation measures would be inadequate.

Greater attention needs to be given to the nature and extent of likely impacts and mitigation measures which have better focus on addressing the specific nature of the impact. For example, construction hoardings with advertising of the project is unacceptable and hoarding should be community based or art based.

Response

The impact assessment framework that was employed to determine the overall significance of socio-economic impacts is described in section 3.6 of Appendix P (Technical working paper: Social and economic) of the EIS. The significance of impact is derived from the consequence of the impact (duration, spatial extent and severity of change are the underlying criteria that contribute to the overall consequence level) and the likelihood of the impact occurring.

The assessment of construction impact on neighbourhood identity and character is discussed in section 7.4.1 of Appendix P (Technical working paper: Social and economic) of the EIS. Overall, construction of the project would directly affect values held by the community around neighbourhood identity and character. Although the impacts would generally be confined to localities around construction compounds, they would be medium-long term and reflect a medium change to the existing baseline environment (refer to section 5 of Appendix P (Technical working paper: Social and economic) of the EIS. The likelihood of impacts occurring ranges from possible to highly likely and the consequence on the socio-economic environment would be moderate. As such, the overall significance of impact upon neighbourhood identity and character during construction would be moderate negative. With respect to community identity and character, construction impacts for the M4-M5 Link project would be mainly contained in proximity to the proposed construction ancillary facilities. Areas further afield such as the Sydney CBD and other areas of the inner west (such as those to the east of Haberfield/Ashfield), are unlikely to be substantially affected by the construction of the project.

Key features of community character that would be affected by the project include:

- Vegetation – Trees contribute to the identity of a neighbourhood, provide protection from the elements and provide intermittent or consistent screening and privacy for residents. The vegetation to be removed by the project is modified and disturbed and comprises exotic species, weeds and planted species, however may nonetheless open up views of construction hoarding in some locations for adjacent residents. The UDLPs that would be prepared and implemented for the project would guide the compensatory planting for trees removed by the project. New open space provided at Rozelle would also be vegetated and provide a new open space for the communities in and Rozelle and Lilyfield and surrounds
- Public art and monuments – Two items are located in the project footprint; the statues of soldiers on the approaches of Anzac Bridge and the mural along The Crescent between City West Link and Johnston Street. These items of public art would be retained and protected during construction of the project
- Heritage places – Heritage impacts include the demolition of three statutory heritage items of local significance (with one item being partly demolished), a minor encroachment into the State Heritage Register listed White Bay Power Station curtilage (with no direct impact on the associated buildings) and the demolition of some items considered to be potential heritage items. These impacts would be managed via archival recording, salvage of heritage items and the implementation of a heritage interpretation strategy.

Where possible, some potential impacts have been avoided or minimised during development of the concept design, or appropriate management measures have been identified to reduce the impacts during construction. The design and proposed management measures have also been informed by lessons learnt from the implementation of previously approved WestConnex projects to ensure that impacts are thoroughly considered and management measures are sound. This has included the White Bay civil site (C11) as well as an Acoustics Advisor (see environmental management measure NV1) and Independent Property Impact Assessment Panel (see environmental management measure PL11). When implemented, the environmental management measures listed in **Chapter E1** (Environmental management measures) would contribute to maintaining the neighbourhood identity and character during construction.

The detailed design will be prepared based on the project approval, including the EIS, the Submissions and preferred infrastructure report and conditions of approval, and will be reviewed to determine whether the detailed design is consistent with the approved project. Where the detailed design is inconsistent with the approved project, further assessment (including where relevant the identification of any additional or changed management and mitigation measures) and approval would be required under the EP&A Act. If further assessment/approval is required due to project design changes, the applicable statutory process will be followed prior to commencement of construction of the relevant aspect of the project. This may be in the form of a modification request lodged with DP&E, depending on the scale of the proposed modification and the potential for environmental or social impacts.

The design of construction hoardings by the design and construction contractor(s) would be in accordance with contractual requirements and is expected to be similar to other WestConnex projects. As required by environmental management measure LV1, ancillary facilities, including perimeter fencing and treatments, will be developed to minimise visual impacts for adjacent receivers where feasible and reasonable (see **Chapter E1** (Environmental management measures)).

B12.14.4 Assessment of community health and wellbeing

Attachment 1 (Beca report) Section 14.3.2, p119

Community health, safety and wellbeing- this is assessed as being moderate negative impact and covers a broad range of issues occurring during construction from light spill, dust, traffic, noise and vibration and consequent loss of amenity, increased stress and anxiety, reduced air quality and consequent health effects, potential adverse impacts upon disabled, elderly and young. Greater attention needs to be given to the nature and extent of likely impacts and mitigation measures which have better focus on addressing the specific nature of the impact. For instance, if bus stops are to be moved in certain locations, then where is the best location and on what basis.

Response

Detail on the impacts of construction on community health, safety and wellbeing is outlined in section 7.4.2 of Appendix P (Technical working paper: Social and economic) of the EIS. The SEIA is informed by the outcomes of the various technical working papers that have been prepared for the project, including the air quality, urban design, traffic and transport, noise and vibration, landscape and visual impacts, and human health technical working papers.

Where construction impacts occur for extended periods of time, there is the potential that increased levels of stress and anxiety may also continue for extended periods of time. See **section C14.2 for** a response to concerns raised regarding potential construction impacts to communities. See **section C14.6** for a response to concerns raised regarding potential impacts to communities during operation of the project.

Mitigation measures focusing on specific impacts such as negative impacts of light spill, dust, traffic, noise and vibration and consequent loss of amenity are listed in **Chapter E1** (Environmental management measures). This includes, for example, the specific mitigation measure for the relocation of bus stops (ie identify impacts on bus stops and provide alternative locations and access in consultation with Transport for NSW as reflected in environmental management measure TT13 in **Chapter E1** (Environmental management measures)). See **section C14.14** for a response to concerns raised regarding management measures to mitigate potential social and economic impacts of the project.

B12.14.5 Assessment of community cohesion

Attachment 1 (Beca report) Section 14.3.2, p119

Community cohesion - this is assessed as being minor negative impact. Whilst the localities have existing severance issues due to major roads and private property, during construction this could be further worsened if inadequate care is given to ensuring safe and convenient linkages. Mitigation measures for known risk areas for community severance need to be specified.

Response

Mitigation measures that would manage impacts due to loss of access resulting in loss of community severance are included in **Chapter E1** (Environmental management measures). These include:

- A CTAMP would be prepared as part of the CEMP. This would include guidelines, general requirements and principles of traffic management to be implemented during construction, including but not limited to:
  - Provide safe routes for pedestrians and cyclists during construction
  - Minimise the number of changes to the road users' travel paths and, where changes are required, implement a high standard of traffic controls which would effectively wars, inform and guide
- Develop and adopt robust community and stakeholder communication protocols regarding altered traffic conditions
- Minimise impacts on the pedestrian paths and cycle lanes, and provide timely alternatives during construction where practical and safe to do so
- Identify impacts on bus stops and provide alternative locations and access in consultation with Transport for NSW
- Manage local road closures and maintain adequate property access. This will be undertaken in consultation with Roads and Maritime, local councils and property owners likely to be impacted.
- A Social Infrastructure Plan will be prepared that details:
  - Measures that will be delivered as part of the project to improve community connectivity in areas affected by the project, including pedestrian and cyclist access
  - Community and social facilities, for example open space, that will be delivered or enhanced as part of the project
  - Community initiatives and programs that will receive support as part of the project, including the manner in which support will be provided.

The Social Infrastructure Plan will be prepared by a suitably qualified and experienced person in consultation with the community and relevant councils and implemented as part of the project.

See **section B11.15.6** and **section C14.2.2** for further responses to concerns raised regarding potential impacts to access, connectivity and community cohesion during construction.

B12.14.6 Assessment of amenity

Attachment 1 (Beca report) Section 14.3.3, p119

Amenity - this is assessed as being moderate and covers a broad range of issues including noise and vibration (minor negative), air quality(low), human health risk, traffic and transport, urban design and amenity (moderate negative) as well as cumulative impacts such as construction fatigue. No locational information is provided as to where these impacts may be greater or lesser and consequently there are no specific mitigation measures provided for particular localities. Greater attention needs to be given to the nature and extent of likely impacts and mitigation measures which have better focus on addressing the specific nature of the impact.

Response

Construction of a transport infrastructure project within an established urban area would inevitably generate a range of localised impacts. The benefits of the project must be balanced against these impacts, and the project must be able to demonstrate an overall net community benefit. The benefits and impacts of the project are comprehensively assessed in the EIS and associated technical papers, and management measures are proposed to minimise impacts.

Construction related amenity impacts are discussed in some detail for each of the localities surrounding the construction sites in the following sections of the EIS:

- Traffic and access impacts - Chapter 8 (Traffic and transport) and Appendix H (Technical working paper: Traffic and transport) of the EIS
- Air quality impacts – Chapter 9 (Air quality) and Appendix I (Technical working paper: Air quality) of the EIS
- Noise and vibration impacts – Chapter 10 (Noise and vibration) and Appendix J (Technical working paper: Noise and vibration) of the EIS
- Human health impacts – Chapter 11 (Human health risk) and Appendix K (Human health risk assessment) of the EIS
- Visual impacts and urban design – Chapter 13 (Urban design and visual amenity) and Appendix O (Technical working paper: Landscape and visual impact) and Appendix L (Technical working paper: Urban design) of the EIS.

The development of the environmental management measures considered the approval conditions determined for the M4 East and New M5 projects. The environmental management measures include a number of sub-plans to be prepared as part of the CEMP in consultation with relevant councils and stakeholders. These would be required to be adhered to by the design and construction contractor(s) and associated sub-contractors.

The environmental management measures detail the specific programs that are proposed to be implemented to monitor project performance, including for noise and vibration, air quality, soil and water, traffic and transport and cumulative impacts.

See **section C14.2.3** for further responses to concerns raised regarding potential impacts from construction noise, dust and cumulative construction impacts on amenity during construction.

B12.14.7 Assessment of social infrastructure

Attachment 1 (Beca report) Section 14.3.4, p119

Social infrastructure - this has been assessed as being moderate negative impact. Given that these facilities are important for community life and wellbeing, the moderate negative impact is an issue and needs to be specifically addressed.

Greater attention needs to be given to the nature and extent of likely impacts and mitigation measures which have better focus on addressing the specific nature of the impact at each facility.

Response

Section 7.10 of Appendix P (Technical working paper: Social and economic) of the EIS assesses the impact of construction of the project on social infrastructure, including schools, aged care facilities, child care facilities and medical centres. The assessment identified 17 social infrastructure facilities as having a higher likelihood of experiencing multiple effects of construction amenity impacts, including seven childcare centres and four educational facilities.

Potential construction impacts to these facilities include changes to local amenity such as access and parking, as well as impacts upon individuals such as disruptions to concentration capacity or sleep. In addition to these locations, other social infrastructure facilities are also likely to be affected to a lesser degree by isolated impacts such as changes to local air quality, noise and vibration or the visual landscape (refer to Table 7.5 of Appendix P (Technical working paper: Social and economic) of the EIS).

See **section C14.3.2** for further responses to concerns raised regarding specific social infrastructure at Camperdown, Annandale, Leichhardt, Rozelle, Balmain and Haberfield.

Chapter E1 (Environmental management measures) outlines the plans that will be developed to help manage potential social and economic impacts during construction and operation of the project. This will include:

- A Social Infrastructure Plan that details:
  - Measures that will be delivered as part of the project to improve community connectivity in areas affected by the project, including pedestrian and cyclist access
  - Community and social facilities, for example open space, that will be delivered or enhanced as part of the project
  - Community initiatives and programs that will receive support as part of the project, including the manner in which support will be provided.

  The Social Infrastructure Plan will be prepared by a suitably qualified and experienced person in consultation with the community and relevant councils and implemented as part of the project.
- A Community Communication Strategy that details:
  - Procedures and mechanisms that will be implemented in response to the key social impacts identified for the project
  - Property acquisition support services that will be provided
  - Procedures and mechanisms to communicate to project stakeholders (including affected communities), the access and connectivity enhancements and new community and social facilities that will be delivered as part of the project through the Social Infrastructure Plan and to update stakeholders on delivery progress
  - Procedures and mechanisms that will be used to engage with affected business owners to identify potential access, parking, business visibility and other impacts to develop measures to address potential impacts on a case by case basis.

Chapter E1 (Environmental management measures) also outlines mitigation and management measures to address other potential impacts that would minimise potential social and economic impacts, including:

- Traffic management and safety, access and parking management
- Air quality management
- Noise and vibration management
- Human health risk management
- Urban design and visual amenity management.

B12.14.8 Assessment of impacts on businesses

Attachment 1 (Beca report) Section 14.3.4, p119

Business and industry -The tone of this section suggests that minor impacts may be experienced by businesses and industry during construction despite loss of parking, changes in services and deliveries, loss of amenity. The reason why it is regarded as being low impact is because many of the businesses are regarded as being reliant upon customers who are not passing trade or seek good amenity. This chapter is silent about the loss of car parking in the vicinity of construction sites which will definitely have a negative impact upon business.

Insufficient information is provided about loss of car parking and increased demand for construction worker car parking as well as car parking from displaced from their normal car parking. Further consideration needs to be given to car parking in the EIS.

Response

A range of potential impacts on businesses during construction are discussed in section 7.9 of Appendix P (Technical working paper: Social and economic) of the EIS, including loss of parking, changes in services and deliveries, reduced amenity and passing trade.

Appendix P (Technical working paper: Social and economic) of the EIS acknowledges that removal or increased competition for car parking for businesses has the potential to influence decisions by customers/clients to use a certain business and may therefore affect business productivity. The business survey results identified that 60 per cent of employees were driving to work with 55 per cent of businesses having off-street parking available. Of this off-street parking, 31 per cent had less than five spaces, five per cent had between five and ten spaces and 15 per cent had more than ten spaces. The remainder of respondents indicated no off-street parking was available or did not respond to the question. Refer to section 2.4 and Annexure A of Appendix P (Technical working paper Social and economic) of the EIS, for the business survey approach and the questions asked in the business survey respectively.

Fifty per cent of businesses surveyed did not think that construction of the project would have any impact on customer parking for their business. Similarly, 70 per cent of businesses did not believe that construction of the project would have adverse impacts on employee parking. Changes to parking accessibility as a result of the project are identified in section 7.1.2 of Appendix P (Technical working paper Social and economic) of the EIS.

Businesses along Parramatta Road in Haberfield, Canal Road Lilyfield Road in Lilyfield, James Craig Road and Victoria Road in Rozelle, and Euston Road in Alexandria may all experience increased competition for car parking in the surrounding area. As the majority of these businesses would have their own private parking, it is unlikely that a reduced supply in car parking would have a substantial impact on employee or customer access.

A Business Management Plan will be prepared that will include management measures that will be implemented to maintain appropriate vehicular and pedestrian access to impacted businesses and business clusters during business hours and to maintain the visibility of the businesses and communicate access arrangements to potential customers during construction (see environmental management measure SE1 in **Chapter E1** (Environmental management measures)).

B12.14.9 Access, parking and connectivity impacts during construction

Attachment 1 (Beca report) Section 14.3.6, p120

Negative impacts include increased traffic congestion, travel times, reduced accessibility of local areas and efficiency of freight, commercial vehicles and public transport movements. Given that this impacts upon all travel arrangements for residents and businesses in the Inner West Council area and that the impact is moderate negative, then it is considered that insufficient detail has been provided as to how to mitigate these impacts.

Insufficient information is provided about the socio- economic impacts and their mitigation in the EIS. Greater attention needs to be given to the nature and extent of likely impacts and mitigation measures which have better focus on addressing the specific nature of the impact. For example, the provision of 700 car parks for construction workers is considered insufficient given that the total construction workforce is estimated as being 14,000 workers working across a spread of shifts and several construction worksites.

Response

As section 7.6.1 of Appendix P (Technical working paper: Social and economic) of the EIS notes it is estimated that based on a five-year construction period, around 14,300 direct (onsite) job years would be created between 2018 to 2023, which is equivalent to around 2,800 jobs per annum, across all of the worksites.

The EIS acknowledges that during construction, temporary changes to parking, road, public transport and active transport networks would affect access and connectivity for road users, residents, business owners, social infrastructure users and visitors. These changes are likely to arise from the establishment and operation of construction sites, portals, interchanges and ancillary infrastructure that trigger alterations or disruptions to traffic and transport connections and access to properties, businesses and social infrastructure.

Impacts during construction would include traffic disruptions and diversions due to temporary, partial or full closures of roads, increased construction traffic (including heavy vehicles) and changes to speed limits near construction works. Direct and indirect traffic disruptions would be experienced on local and arterial roads in most suburbs that are in close proximity to construction sites. This would include the suburbs of Haberfield, Ashfield, St Peters, Camperdown, Annandale, Lilyfield, Leichhardt, Rozelle and Balmain. For most local roads, these modifications would be temporary with full access reinstated upon completion of construction works.

Environmental management measures to reduce the potential for, or impact of congestion and access issues due to construction activities are presented in **Chapter E1** (Environmental management measures). These include the development of a CTAMP which will identify measures to manage the movements of construction related traffic to minimise traffic and access disruptions in the public road network. A strategy for construction workforce parking would also be included in the CTAMP and be prepared in consultation with local councils and stakeholders with facilities adjacent to the project site.

The key impacts to local community during construction would be from those relating to the road network, such as connectivity and congestion. Impacts upon pedestrian and cyclist connectivity, parking and public transport are not anticipated to be significant during construction. Minimising impacts on the pedestrian paths and cycle lanes, and provide timely alternatives during construction where practical and safe to do so would be adopted during construction as identified in environmental management measure TT12 in **Chapter E1** (Environmental management measures). The identification of impacts on bus stops and provide alternative locations and access in consultation with Transport for NSW would also be undertaken (see environmental management measure TT13 in **Chapter E1** (Environmental management measures)).

Active transport connectivity during construction is further discussed in **section B12.8.37**.

During operation, the project would deliver new active transport connections that would enhance access and connectivity for pedestrians and cyclists, particularly around the Rozelle, Annandale and Lilyfield communities. This would provide further socio-economic benefits through health benefits, increased opportunities for social interaction and community cohesion, reduced car dependency and reduced cost of travel.

The project would link pedestrians and cyclists to popular waterfront and open space areas, such as the proposed open space at Rozelle Rail Yards, Glebe Foreshore, Easton Park, the Bay Run and King George Park in Rozelle. This has the potential to increase patronage for businesses located on Victoria Road, Johnston Street and Darling Street. Pedestrians and recreational and commuter cyclists would enjoy improved safety and amenity (such as a reduction in noise and pollution) due to the location of routes further away from traffic, particularly through the Rozelle Rail Yards.

It is expected that these improvements would result in a significant, long-term change, at a local level, resulting in a major benefit for the communities of Annandale, Leichhardt, Lilyfield, Rozelle and Balmain. In addition, such improvements would contribute positively to the regional active transport network with the potential to affect a wider catchment of people.

As part of the project, parts of the Rozelle Rail Yards would be developed as open space, including a constructed wetland and pedestrian and cyclist infrastructure. Open space created at the Rozelle Rail Yards would be developed and implemented in accordance with the UDLPs for the project. This new open space would provide the community at Rozelle, Lilyfield, Annandale and other surrounding suburbs with increased opportunities for active and passive recreational activities. In the area around Wattle Street at Haberfield and Campbell Road at St Peters, the project would include new open space areas in line with the M4 East and New M5 UDLPs. This new open space would provide a compensatory offset to the limited areas of existing open space affected at Buruwan Park and King George Park.

To reduce the impact of construction workforce parking and heavy vehicle queuing on local roads, an additional construction ancillary facility (the White Bay civil site (C11)) is proposed at White Bay on land owned by the Port Authority of NSW (see **Chapter D2** (White Bay civil site (C11))). The facility would provide around 50 spaces for construction workforce parking and a truck marshalling area for around 40 heavy vehicles. The facility would also provide additional space to store construction plant, machinery and materials at the site. The provision of the White Bay civil site (C11) would result in several benefits for the community and the project, including:

- Minimising disruptions to the road network around construction ancillary facilities and noise and other disturbance to the local community including landowners and business and commercial properties
- Improving safety for construction workers, motorists and the general public by providing a controlled area from which project traffic schedulers can direct truck drivers to construction sites at an appropriate time.

B12.15 Soil and water

Refer to Chapter 15 (Soil and water quality) and Appendix Q (Technical working paper: Surface water and flooding) of the EIS for details of soil and water quality.

B12.15.1 General comments

Attachment 1 (Beca report) Section 15, p122

The SEARS content and nominated guidelines appear to have been addressed in the chapter but due to the inter-related nature of soils and waters, these are addressed in a number of different chapters rather than their being one definitive source for each issue. Aligning the EIS structure to the SEARS would have allowed an easier comparison of the content against content and guideline requirements. It would also allow for easier identification of the project issues most relevant to the investigation area.

There are some typo's / grammar errors in the chapter which undermine the technical content of the report Spell-check and proof-read.

Attachment 1 (Beca report) Section 15.1.3, p122

Useful delineation of study area by sub-catchment but the spatial extent of study area not justified. Down- gradient receptors may also be impacted. For instance, Sydney Harbour and Botany Bay do not seem to be considered? Noting that the end receptors are tidal, upstream transport of contaminants is also possible, potentially affecting the Parramatta River and Georges River, respectively. Consideration of a larger study area, especially if local receptors are impacted. Justification for not considering potential receptors is required.

Attachment 1 (Beca report) Section Overall Evaluation p127

The chapter is fairly comprehensive and indeed there is a good deal of duplicated information that could be removed / combined to reduce the overall size of the document. There are some deficiencies in the approach used and some missing information that makes it difficult to assess the appropriateness and robustness of the assessment. The foundation for the design criteria for pollutant reduction is not clear and assumptions in the comparison of load reductions against existing loads need to be clarified. The monitoring program for baseline assessment appears to be weak with no information presented regarding watercourse flows (volume or velocities), no ASS sampling to ground truth mapping, no testing of sediments where mobilisation could be an impact and a lack of explanation regarding the temporal representativeness of water sampling. Furthermore, no treatise of hydrological flow regime change (including comparison to the river flow objectives listed in Table 15-3 and subsequent impact on water quality has been conducted.

Response

The study area for the surface water and flooding assessment (refer to Appendix Q (Technical working paper: Surface water and flooding) of the EIS) included the projects surface footprint, as well as catchments where potential surface water and flooding impacts could occur as result of construction or operation of the project. This is defined in section 1.4 of Appendix Q (Technical working paper: Surface water and flooding) of the EIS. Given the minor surface footprint of the project in relation to entire Sydney Harbour and Botany Bay catchments the adopted study area is considered appropriate. The assessment has demonstrated that the impacts to the receiving waters are manageable. Therefore further assessment of downstream impacts is not considered warranted.

The baseline hydrological regime and geomorphology of the waterways of interest is provided in section 4.1 and 4.2 of Appendix Q (Technical working paper: Surface water and flooding) of the EIS, which states that the waterways are concrete lined, tidal channels or anthropogenic estuarine bays. As the waterways are dominated by tides and protected from erosion by concrete, risks associated with increases in volumes and velocities are not of major concern and any potential scour and associated water quality impacts (through mobilisation of sediment and contaminants into the water column) can be adequately managed by standard mitigation such as dissipation or scour protection where required as outlined in section 6.2.4 of Appendix Q (Technical working paper: Surface water and flooding) of the EIS and environmental management measures OSW17 and OSW18 (see **Chapter E1** (Environmental management measures)). Baseline flow monitoring was therefore not considered to be required.

It is widely accepted and current industry practice (including the practice of the former Leichardt and Marrickville councils) to set pollutant load reduction targets for TSS, TP and TN to manage stormwater quality. The targets set align with the councils within the study area and with the principles of the Sydney Harbour Water Quality Improvement Plan (Sydney Metropolitan Catchment Management Authority (SMCMA) 2010).

Table 3-3 of Appendix Q (Technical working paper: Surface water and flooding) of the EIS outlines the sections of the report that are relevant to the river flow objectives. While the NSW River Flow Objectives have been considered, they are not a specific requirement of the SEARs for the project, and are more relevant to the broader catchment than the project. Therefore a direct response to each objective is not considered necessary.

As construction and operational tunnel water discharges would be continuous, temporal water quality patterns were not considered to be of major concern.

The EIS was prepared based on a concept design, meaning that the detail of the design and construction approach is indicative only and would be subject to detailed design and construction planning. The final design of the project, if approved, would be generally consistent with the project as described in the EIS and the environmental management measures, changes identified in this Submissions and preferred infrastructure report, the conditions of approval for the project and other requirements identified during the assessment of the project. The assessment of a concept design in an EIS is a common approach and has been applied to other recent major infrastructure projects in NSW. Further information is provided in **Chapter C2** (Assessment process).

Discharge criteria for the treatment facilities during construction and operation of the project are discussed in detail in **section B2.4**.

Environmental management measures have been established to manage sediment mobilisation with the potential to impact on receiving waterways (see **Chapter E1** (Environmental management measures)). Specifically:

- Environmental management measure SW01 requires that a Construction Soil and Water Management Plan (CSWMP) will be prepared for the project. The plan will include the measures that will be implemented to manage and monitor potential surface water quality impacts during construction. The CSWMP will be developed in accordance with the principles and requirements in *Managing Urban Stormwater – Soils and Construction, Volume 1* (Landcom 2004) and Volume 2D (NSW Department of Environment, Climate Change and Water 2008), commonly referred to as the 'Blue Book'
- Environmental management measure SW02 requires that a program to monitor potential surface water quality impacts due to the project will be developed and included in the CSWMP. The program will include the water quality monitoring parameters and the monitoring locations identified in Annexure E of Appendix Q (Technical working paper: Surface water and flooding) of the EIS where appropriate. A program to monitor potential surface water quality impacts due to the project will be developed and included in the CSWMP. The program will include the water quality monitoring parameters and the monitoring locations identified in Annexure E of Appendix Q (Technical working paper: Surface water and flooding) to the EIS where appropriate. The monitoring program will commence prior to any ground disturbance to establish appropriate baseline conditions and continue for the duration of construction and until the affected waterways are rehabilitated to an acceptable condition as certified by a suitably qualified and experienced independent expert (or as otherwise required by any project conditions of approval). Further details to be included in the program are outlined in Appendix Q (Technical working paper: Surface water and flooding) of the EIS
- Environmental management measure CM01 requires that potentially contaminated areas directly affected by the project will be investigated and managed in accordance with the requirements of guidance endorsed under section 105 of the *Contaminated Land Management Act 1997* (NSW) (CLM Act). This includes further investigations in areas of potential contamination identified in the project footprint. If contamination posing a risk to human or ecological receptors is identified, a Remediation Action Plan will be prepared.

B12.15.2 Clarification regarding contradictory paragraphs

Attachment 1 (Beca report) Section 15.4.2, p126

Two paragraphs seem to contradict- SEARS ask for a rainfall event that the treatment system is designed for. Para 1 states system is designed to achieve particular water quality objectives and by implication is not designed according to event size. However, para 2 refers to 3-month recurrence event. Larger events would bypass the treatment system (i.e. no treatment would occur at the very time when it could be most needed). Without data on chemistry variation through the storm profile it is unfounded to argue that concentrations would be diluted during larger storms and indeed chemicals loads would probably be larger in magnitude. It is not clear if load calculations have allowed for lack of treatment in bypass flows.

Clarify discrepancy between tow [two] paras. Consideration for increased treatment capacity to store / treat water during larger events than 3- month recurrence. Justification for design sizing including reference to guidelines and treatment required to maintain / protect environmental values. Consideration for impact of bypass events on loads presented in Table 15-12 [of the EIS].

Response

It is widely accepted and current industry practice (including the practice of the former Leichardt and Marrickville Councils which set pollutant load reduction targets) to focus treatment systems on reducing mean annual pollutant loads, as demonstrated by MUSIC modelling, rather than systems being oversized to treat major storm events which contribute only a minor portion of the total load per year.

In some cases (such as for gross pollutant traps), high flow bypasses may be utilised subject to detailed design. This has been accommodated within the modelling (by using a three month average recurrence interval (ARI) high flow diversion for gross pollutant traps) as have overflows from other systems due to their capacity, however this has a negligible impact on the results. Justification of the stormwater quality objectives are discussed in section 3.2.11 of Appendix Q (Technical working paper: Surface water and flooding) of the EIS.

B12.15.3 Discharge criteria

Attachment 1 (Beca report) Section 15.1.2, p122

MUSIC model constrains parameters to sediment & nutrients. Are these the only pollution reduction targets for the operation phase? Consider using other modelling packages if other highway-derived chemical parameters are of interest such as fuel / oil, metals and PAH's.

Attachment 1 (Beca report) Section 15.1.5, p123

What is the rationale behind pollutant reduction targets both in terms of chemical parameters and efficacy levels? Who were they developed by and what process was followed to quantify the treatment values. Nutrients are covered but it is not clear what the source of these contaminants are, other than particulate- bound to highway-derived sediments. Why were more salient chemical parameters for a road project, like metals and PAH's not considered? I would expect the chemical parameters to align with protection of the Environmental Values and Water Quality Objectives. Do treatment levels consider the condition of the receiving environment and the water quality objectives for these in terms of the \'no deterioration' concept? Clarification on design criteria for treatment of operational runoff required.

What degree of protection should be afforded for aquatic ecosystems? Clarify and justify percent protection level.

Response

The potential impacts of stormwater pollutants and tunnel pollutant discharges have been assessed in section 6.3 of Appendix Q (Technical working paper: Surface water and flooding) of the EIS including stormwater pollutant loading to each waterway and potential treated groundwater discharge concentrations. Other potential pollutants of concern have been listed in sections 4.10, 5.3 and 6.3 of Appendix Q (Technical working paper: Surface water and flooding) of the EIS.

The potential impacts identified for each waste stream have been considered and appropriately managed within the design or as part of the environmental management measures. Pollutant concentrations from the non-groundwater and stormwater waste streams will be variable and as such design measures have been implemented to manage this risk. See environmental management measures SW10 and OSW16 in **Chapter E1** (Environmental management measures) for construction and operational water treatment plant discharge details. Further discussion on construction and operational water quality treatment and discharge is provided in response to the NSW EPA's submission on the EIS in **section B2.3**.

While there is potential for other pollutants to be present in stormwater, it is a widely accepted and current industry standard practice to use MUSIC modelling of TN, TP and TSS for assessing the performance of stormwater management systems for road infrastructure projects. This approach is also consistent with the previously assessed WestConnex projects including the M4 East and New M5. The measures proposed including gross pollutant traps, hydrodynamic separators, bioretention systems and wetlands along with spill management and emergency response procedures are considered to manage stormwater quality appropriately.

As noted in environmental management measure SW10 (see **Chapter E1** (Environmental management measures) an ANZECC (2000) species protection level of 90 per cent is considered appropriate for adoption as discharge criteria for toxicants where practical and feasible. The discharge criteria for the treatment facilities will be included in the CSWMP.

The operational water treatment facilities will be designed and managed such that effluent will be of suitable quality for discharge to the receiving environment as described in environmental management measure OSW16 in **Chapter E1** (Environmental management measures). Discharge criteria will be developed in accordance with ANZECC (2000) with consideration of the species protection levels for slightly to moderately disturbed marine waters and relevant NSW Water Quality Objectives. The discharge criteria for the treatment facilities will be nominated during detailed design in consultation with relevant stakeholders and included in the OEMP.

B12.15.4 MUSIC modelling not assessed

Attachment 1 (Beca report) Section 15.1.7, p123

The MUSIC modelling has not been reviewed as part of this commission. This would require more time and is outside the scope of this review. The following factors should be considered: appropriate model package, model construction & boundary conditions, input data series, calibration & validation procedures.

Response

Noted.

B12.15.5 Details regarding baseline monitoring

Attachment 1 (Beca report) Section 15.1.7, p123

The text provides no details about the monitoring programmes that are reported. For instance, sampling techniques, parameters recorded / analysed, frequency, duration, number of samples collected. In addition, context for the May - Sept collection period should be given by comparison of rainfall / flow records set against seasonal / inter-annual variations. Summarise monitoring program and cross- reference to more detail in appendix. Comment on bias of sample collection period compared to typical temporal variations and evaluate representativeness of sampling program.

Response

Section 4.5 of Appendix Q (Technical working paper: Surface water and flooding) of the EIS provides a summary of the baseline surface water monitoring program which was undertaken as part of the M4-M5 Link project for each of the receiving waters, with summary tables provided in Annexure B of Appendix Q (Technical working paper: Surface water and flooding) of the EIS.

The monitoring program includes a minimum of 12 months of baseline monitoring conducted at tidal and non-tidal locations with samples collected up to twice monthly including one monthly dry weather sampling event in the same week of each month and one wet weather sampling event following rainfall events (more than 15 millimetres over a 24 hour period) when they occurred.

B12.15.6 Details regarding the existing environmental flows

Attachment 1 (Beca report) Section 15.2, p124

No discussion of the existing environmental flows for named watercourses in this chapter. Nor is there any evaluation of changes in flows based on project design, which may dramatically alter both water quality and sedimentation impacts.

Include reference to expected changes in flow volumes and interpret impact on water quality (residence time, flushing, and velocities). Comparison to river flow objectives detailed in Table 15.3.

Response

Indicative daily discharge rates are provided in Table 2-4 of Appendix Q (Technical working paper: Surface water and flooding) of the EIS for each of the construction sites proposed in the EIS. Annual discharge volumes for stormwater and tunnel water during operation are provided in Table 6-8 of Appendix Q (Technical working paper: Surface water and flooding) of the EIS.

Impacts associated with the modified discharge volumes to the flow regime including environmental water availability and flow variability, and associated impacts to water quality from potential sediment disturbance is discussed within section 5.2.2 and 6.2.4 of Appendix Q (Technical working paper: Surface water and flooding) of the EIS for construction and operation respectively. Impacts to flows are considered to be negligible during construction and operation. The receiving waterways are all tidally influenced and the channels are concrete lined. Scour protection and energy dissipation measures would adequately manage sediment disturbance.

B12.15.7 Upstream and downstream water quality monitoring

Attachment 1 (Beca report) Section 15.1.7, p123

All major watercourse within project footprint monitored at appropriate upstream and downstream locations from road infrastructure. The map doesn't demonstrate if water quality sampling locations are appropriate for construction / dive sites. Add construction sites to map.

Response

Water quality monitoring locations are located upstream and downstream of construction ancillary facilities, as shown in Figure 15-2 of the EIS and listed in Table 15-5 of the EIS. Further detail is provided in Appendix Q (Technical working paper: Surface water and flooding) of the EIS. These monitoring locations were chosen to provide general characterisation of the waterways.

Whilst the construction sites were not identified on Figure 15-2 of the EIS, they are provided regularly through the EIS and included in Figure 2-2 of Appendix Q (Technical working paper: Surface water and flooding) of the EIS.

B12.15.8 Acid sulfate soil risk

Attachment 1 (Beca report) Section 15.2.1, p124

Baseline review shows high risk of ASS in some locations. This will need to be managed appropriately on a site-specific basis. Cross-reference to mitigation measures section.

SEARS requests 'verification' of ASS risk. This should be interpreted as a site investigation to ground truth indicative ASS mapping but no soil sampling has been undertaken / presented here. Would have expected data from an ASS monitoring program to have been presented.

Response

Chapter 15 (Soil and water quality) of the EIS identifies locations likely to contain acid sulfate soils (or potential acid sulfate soils) within the project footprint, including:

- Rozelle civil and tunnel site (C5) – mapped as Class 1, 3 and 5 acid sulfate soil risk. Potential acid sulfate soils have been detected within the alluvial sediments across the Rozelle Rail Yards
- The Crescent civil site (C6) – mapped as Class 1 and 3 acid sulfate soil risk
- Surface works at Rozelle near Rozelle Bay
- Bioretention facility at Manning Street – southern part of the site mapped as Class 2 acid sulfate soil risk

- Campbell Road civil and tunnel site (C10) – mapped as Class 3 and 5 acid sulfate soil risk.

The design of the project would be finalised during detailed design, which is when further environmental investigation work, such as to verify acid sulfate soils, would be undertaken. As described in **section D3.2** of the preferred infrastructure report, it is proposed to relocate the bioretention facility around 150 metres north of the location presented in the EIS, to an area adjacent to Victoria Road at the eastern abutment of Iron Cove Bridge and within King George Park. The proposed bioretention facility would be located within an area identified as Class 5: Acid sulfate soils (acid sulfate soils are not typically found in Class 5 areas).

Impacts from the disturbance of acid sulfate soils would be managed through the implementation of environmental management measure SW11 in **Chapter E1** (Environmental management measures), which requires procedures, prepared in accordance with the requirements of the Acid Sulfate Soil Manual (Acid Sulfate Soil Management Advisory Committee 1998), to be included in the CSWMP and implemented in the event that acid sulfate soils, rocks or monosulfidic black oozes are encountered during construction of the project.

B12.15.9 Consideration of key fish habitats

Attachment 1 (Beca report) Section 15.2.2, p124

Key fish habitat cross-referenced in biodiversity chapter has not been reviewed but the water quality requirements of the species present should be outlined in this chapter. Identify favourable conditions / sensitivities to changes in water quality for resident fish population.

Response

As identified in Chapter 15 (Soil and water quality) of the EIS, Rozelle Bay, Iron Cove, White Bay, Alexandra Canal and downstream portions of Dobroyd Canal (Iron Cove Creek) and Hawthorne Canal are mapped as Key Fish Habitat, as defined in the Fisheries Policy and Guidelines for Fish Habitat Conservation and Management (update 2013) (Fairfull 2013). These waterways are highly disturbed and are not considered to provide suitable habitat for threatened fish species (refer to Table 18-3 of the EIS).

The proposed surface water management measures outlined in **Chapter E1** (Environmental management measures) aim to minimise impacts on receiving waterways due to the project. With the implementation of these management measures, and in the context of the overall catchment, any potential impacts are unlikely to have a material impact on ambient water quality within the receiving waterways which would affect fish species.

B12.15.10 Tidal zones within Dobroyd Canal

Attachment 1 (Beca report) Section 15.2.2, p124

At the moment the information in this table [Table 15-9] is meaningless with subjective descriptions of data. Dobroyd Canal referred to as having tidal and non-tidal zones but sample points approximately 500m apart. Is there a flow obstruction structure between the two points that controls tidal incursion? This was not identified in Table 15-8.

Table could be improved by providing quantitative data (average concentrations) and comparison to trigger levels. Tidal limits for all watercourses should be identified in text.

Response

It is assumed that the comment is in relation to Table 15-9 of the EIS, as this includes a description of the water quality. The intent of this table was to give a description of the water quality as noted in the text preceding the table which also identifies that the full water quality monitoring results are presented in Annexure B of Appendix Q (Technical working paper: Surface water and flooding) of the EIS. There is no flow obstruction between the two sample points.

Tidal limits for all watercourses were not identified as the purpose of the water quality monitoring was to obtain baseline data for the surface water prior to construction.

B12.15.11 Existing sedimentation characteristics

Attachment 1 (Beca report) Section 15.2.2, p124

No physical or chemical characterisation of bed sediments in channels where mobilisation may become an issue e.g. Whites Creek and Rozelle Bay. No estimates of unconsolidated sediment mass in these systems has been presented. No understanding of contamination status of these sediments is covered. A monitoring program for bed sediments should have been conducted including sediment deposition depths, particle size, total metals / nutrients / hydrocarbons and leachable metals / nutrients / hydrocarbons (as a surrogate for release of particulate-bound contaminants into the dissolved phase).

Response

Sediment investigations were conducted in areas of proposed intrusive construction works at The Crescent and adjacent Rozelle Bay where a high potential for contamination was identified to be present as a result of historical land use activities as discussed in section 4.9.9 of Appendix R (Technical working paper: Contamination) of the EIS. In addition, scouring and mobilisation of sediments at discharge points is discussed in sections 5.3.2 (Table 5-2) and 6.3.4 of Appendix Q (Technical working paper: Surface water and flooding) of the EIS.

New discharge outlets will be designed with appropriate energy dissipation and scour protection methods as required to minimise the potential for sediment disturbance and resuspension of receiving waters. Existing drainage outlets that will be subject to increased inflow from the project will assessed and if necessary, energy dissipation or scour protections will be added to prevent sediment disturbance and resuspension in receiving waters (see environmental management measures OSW17 and OSW18 in **Chapter E1** (Environmental management measures)).

B12.15.12 Identification of sensitive water courses

Attachment 1 (Beca report) Section 15.2.2, p124

No information has been provided on why these watercourses are sensitive nor what water quality conditions they require for protection of environmental values. Provide rationale for sensitivity, designation type (if relevant) and water quality conditions that could lead to deterioration of habitat.

Response

Sensitive receiving environments are those that:

- Have high conservation or community value
- Support ecosystem or human uses of water
- Are particularly sensitive to pollution or degradation of water quality.

The project has the potential to interact with the sensitive receiving environments listed in section 15.2.2 of the EIS.

A description of each of the catchments and watercourses within the project footprint, including those listed as sensitive receiving environments, are described in section 4.1 of Appendix Q (Technical working paper: Surface water and flooding) of the EIS.

B12.15.13 Construction water treatment facilities

Attachment 1 (Beca report) Section 15.3.2, p125

How do estimated daily discharge rates compare with existing stormwater discharges [in Table 15-10] at these points? Without this information, it is difficult to judge the significance of the discharges. Additional existing environment sub-section with stormwater discharge estimates.

No information on where these treatment facilities would be located are given in this text. Indicative locations for wastewater treatment should be presented.

Response

Discharge points would be via stormwater network to tidal water bodies. Given the receiving waterways are tidally affected artificial hard lined channels and estuarine anthropogenic bays associated with the Parramatta River Estuary and Sydney Harbour, with large urbanised catchments, discharge volumes would not impact the natural flow variability or environmental water availability and would only be a small fraction of the flow in the waterways during stormwater events (refer to section 5.2.2 of Appendix Q (Technical working paper: Surface water and flooding) of the EIS). Impacts associated with increase in flow on stormwater drainage system would be investigated and managed during detailed design.

A construction water treatment plant would be temporarily used at the following construction ancillary facilities as described in EIS section 6.5:

- Parramatta Road West civil and tunnel site (C1b). Figure 6-18 in the EIS shows the indicative location of the construction water treatment facilities for this site
- Darley Road civil and tunnel site (C4)
- Rozelle civil and tunnel site (C5). Figure 6-21 in the EIS shows the indicative location of the construction water treatment facilities for this site
- Iron Cove Link civil site (C8). Figure 6-23 in the EIS shows the indicative location of the construction water treatment facilities for this site
- Pyrmont Bridge Road tunnel site (C9)
- Campbell Road civil and tunnel site (C10).

The location of the construction water treatment facilities would be confirmed during detailed design.

A program to monitor potential surface water quality impacts due to the project will be developed and included in the CSWMP. The program will include the water quality monitoring parameters and the monitoring locations identified in Annexure E of **Appendix Q** (Technical working paper: Surface water and flooding) of the EIS where appropriate.

B12.15.14 Assessment of potential construction impacts

Attachment 1 (Beca report) Section 15.3, p 125

Other impacts are envisaged that are not included in this section: spillage of chemicals stored on site, wastewater from toilet facilities for construction workforce & impact of changes to hydrological regime (increased surface-groundwater connectivity, alteration in land storage capacities for rainfall events, construction site water requirements, change in retention, residence times, flushing for waterbodies). Consideration of other impacts and project- specific issues should be provided.

Attachment 1 (Beca report) Section 15.3.1, p 125

Other impacts are envisaged that are not covered in this section - wind-blown dust, reduction in aesthetic value, access issues. In addition, the information here is very generic and should tie in with soil types to provide information on locations, timing and individual site issues. The importance of rainfall events in driving soil erosion issues is not covered at all - what events lead to degradation of soil structure, transfer of soils from plots and damage to surrounding land value? Consideration of other impacts and project- specific issues should be provided.

Response

Further detail on the assessment of potential construction impacts on soils and surface water quality are included in section 5 of Appendix Q (Technical working paper: Surface water and flooding) of the EIS. A summary of construction water quality impacts is provided in Table 5-2 of Appendix Q (Technical working paper: Surface water and flooding) of the EIS. Construction water requirements are provided in Table 23-2 in section 23.3.1 of the EIS.

A CSWMP would be prepared for the project as reflected in **Chapter E1** (Environmental management measures). The plan would include the measures that will be implemented to manage and monitor potential surface water quality impacts during construction. The CSWMP will be developed in accordance with the principles and requirements in *Managing Urban Stormwater – Soils and Construction, Volume 1* (Landcom 2004) and *Volume 2D* (NSW Department of Environment, Climate Change and Water 2008), commonly referred to as the 'Blue Book'.

A program to monitor potential surface water quality impacts due to the project would also be developed and included in the CSWMP as reflected in environmental management measure SW02 in **Chapter E1** (Environmental management measures). The program will include the water quality monitoring parameters and the monitoring locations identified in Annexure E of Appendix Q (Technical working paper: Surface water and flooding) of the EIS where appropriate. The monitoring program will commence prior to any ground disturbance to establish appropriate baseline conditions and continue for the duration of construction, as well as for a minimum of three years following the completion of construction or until the affected waterways are certified by a suitably qualified and experienced independent expert as being rehabilitated to an acceptable condition (or as otherwise required by any project conditions of approval). Further details to be included in the program are outlined in Appendix Q (Technical working paper: Surface water and flooding) of the EIS.

Erosion and Sediment Control Plans (ESCPs) will be prepared for the work sites and implemented in advance of site disturbance and updated as required. A soil conservation specialist will be engaged for the duration of the construction to provide advice regarding erosion and sediment control. The extent of ground disturbance will be minimised to the greatest extent practicable to minimise the potential for erosion. Disturbed ground and exposed soils will be permanently stabilised and proposed landscape areas will be suitably profiled and vegetated to minimise potential erosion. See environmental management measures SW03, SW04, SW05, SW06 and SW07 in **Chapter E1** (Environmental management measures).

B12.15.15 Heat suppression

Attachment 1 (Beca report) Section 15.3.2, p125

What is 'heat suppression water', where and when will it be used?

Response

Heat suppression water would be used during tunnelling works to minimise high temperatures within the tunnels due to certain construction activities which generate heat.

B12.15.16 Operational water quality treatment systems

Attachment 1 (Beca report) Section 15.4.2, p125

There has been no discussion on locations or sizing of water treatment systems in the document but a space constraint is now identified which limits achievement of the pollutant load reduction targets. The reasoning given for not considering larger systems (larger footprint results in reduced treatment performance) is flawed as the relationship is not necessarily a 1:1 linear correlation and it has not been sufficiently demonstrated that attempts have been made to fit the treatment into the current footprint without sacrificing road infrastructure or open space area. Clearer description of the water quality treatment systems, size and justification for excluding larger systems that can achieve pollutant reduction targets.

Attachment 1 (Beca report) Section 15.4.2, p126

The chemical composition of tunnel drainage water has not been presented. Without this information, it is unclear how treatment efficacy was calculated. Clarification required.

Response

The motorway operations complexes (MOCs) are described in section 5.8 of the EIS. Figure 5-44 to Figure 5-48 of the EIS show the locations of the MOCs, including indicative locations of the proposed water treatment infrastructure at the Darley Road MOC (MOC1) and Rozelle East MOC (MOC3).

As discussed in section 15.4.2 of the EIS, pollutant load reduction targets were not achievable due to the following:

- Highly constrained nature of the existing project footprint particularly the surface roads adjacent to Rozelle Bay, which limits potential treatment options to the use of proprietary devices
- The assumptions applied in the model for proprietary devices (used in highly constrained catchments) were conservative due to uncertainty in the practicality, feasibility and type of device which might be implemented at detailed design. Opportunities for potential improvements in treatment performance in highly constrained catchments will be investigated further during detailed design

- Oversizing other treatment measures further to offset the reduced treatment for the project is not generally practical within the available project footprint, given that this would reduce the area available for operational road infrastructure and/or open space.

Opportunities to further reduce pollutant loads will be explored during detailed design, as discussed below.

As detailed in environmental management measure OSW12 (see **Chapter E1** (Environmental management measures), stormwater from the project during operation will be treated prior to discharge. Where space is available, bioretention systems or constructed wetlands will be installed. Where space is not available, other smaller devices, such as proprietary stormwater treatment devices, will be installed. The final design of treatments will be supported by MUSIC modelling and water sensitive urban design principles.

The operational water treatment facilities will be designed and managed such that effluent will be of suitable quality for discharge to the receiving environment. Opportunities to incorporate nutrient treatment within the plant at Darley Road will be investigated during detailed design. Discharge criteria will be developed in accordance with ANZECC (2000), with consideration of the species protection levels for slightly to moderately disturbed marine waters and relevant NSW Water Quality Objectives, and will also include the following discharge criteria:

- 0.3 milligrams per litre for iron
- 1.9 milligrams per litre for manganese.

The discharge criteria for the treatment facilities will be nominated during detailed design in consultation with relevant stakeholders and included in the OEMP, as noted in environmental management measure OSW16 in **Chapter E1** (Environmental management measures).

Stormwater discharge quality and tunnel discharge quality are discussed in section 6.3.2 and section 6.3.3 of Appendix Q (Technical working paper: Surface water and flooding) of the EIS, respectively. A summary provided in Tables 4-5 and 4-6 of Appendix Q (Technical working paper: Surface water and flooding) of the EIS where it notes that groundwater quality is indicative of what the quality of tunnel water will be.

B12.15.17 Water quality impacts to Hawthorne Canal

Attachment 1 (Beca report) Section 15.4.2, p127

Hawthorne Canal water quality impacts are stated to be negligible and localised to near the outlet. This combination does not make sense. Consider rephrasing sentence.

Response

Water quality impacts associated with treated groundwater discharges will be localised to near the outlet and are expected to be negligible in regard to existing water quality within Hawthorne Canal.

B12.15.18 Comparison of existing residual load against operational residual load

Attachment 1 (Beca report) Section 15.4.2, p126

The comparison of existing residual load against operation residual load following treatment needs further explanation. This appears to assume that the entirety of existing load will be removed in the operational phase and no longer discharge to the receiving environment and that it will all be captured by the treatment systems. A worst case might be that existing residual load + operation residual load following treatment = a more reliable total load. Justification for the comparison is required - it is highly unlikely that the existing residual load will be captured by the treatment systems.

Response

Two models were developed for the operational project footprint only (ie roads and ancillary facilities): one for existing conditions based on a review of existing land use within the operational project footprint and one for operational conditions including proposed treatment measures. The results were directly compared to determine the impact. Areas outside the project footprint within the wider catchment were not considered, given the project would not influence these areas and loads would remain unchanged.

B12.15.19 Soil erosion and sedimentation during operation

Attachment 1 (Beca report) Section 15.4.2, p127

Impacts to scour and geomorphology would be easier to quantify if sediment depths, particle size and flow changes had been quantified. A more quantitative description of scour and geomorphology change is required.

Response

The impacts to scour and geomorphology have been assessed in line with the SEARs set for the project. Flow changes are stated in section 6.2.4 of Appendix Q (Technical working paper: Surface water and flooding) of the EIS. Given the receiving waterways are tidal bays or tidal concrete channels, the approach of undertaking a qualitative assessment is considered to be appropriate. Scour protection will manage any localised impacts at outlets to bays. No further assessment is considered necessary.

B12.15.20 Maintenance requirements of the constructed wetland

Attachment 1 (Beca report) Section 15.4.2, p127

Maintenance requirements for constructed wetlands not described. Presumably, dredging of deposited sediments would be required? Are these going to be suitable for beneficial re-use? If contaminated, removal to a waste facility would be required and this is an impact that has not been covered in this section. Consideration of maintenance requirements for water treatment systems and subsequent impacts is needed.

Response

As required by environmental management measure OSW13 in **Chapter E1** (Environmental management measures), maintenance requirements for all stormwater treatment systems and devices installed as part of the project will be identified and included in relevant operational maintenance schedules/systems. A maintenance plan for the management of all stormwater treatment devices will be developed during detailed design. The maintenance plan would outline future maintenance responsibilities, maintenance frequency and specific tasks to be undertaken.

B12.15.21 Environmental management measures

Attachment 1 (Beca report) Section 15.5, p127

No mention of the most pertinent conditions and triggers for capture of monitoring data during construction. Rainfall event monitoring should be emphasised.

Other ESC [erosion and sedimentation control] measures should be considered such as clean / dirty water delineation, flow barriers / swales, protection of stormwater system, stabilised entry / exit points, wet weather work policy, decrease stockpile heights / angles, benching etc. A range of possible ESC options should be presented for determination in the site specific ESCP's.

Response

Rainfall event monitoring was considered in the baseline surface water monitoring program undertaken as part of the M4-M5 project. The monitoring program included a minimum of 12 months of baseline monitoring conducted at tidal and non-tidal locations with samples collected up to twice monthly including one monthly dry weather sampling event in the same week of each month and one wet weather sampling event following rainfall events (rainfall of more than 15 millimetres over a 24 hour period) when they occurred.

A program to monitor potential surface water quality impacts due to the project will be developed and included in the CSWMP. A program to monitor potential surface water quality impacts due to the project will be developed and included in the CSWMP. The program will include the water quality monitoring parameters and the monitoring locations identified in Annexure E of Appendix Q (Technical working paper: Surface water and flooding) of the EIS where appropriate. The monitoring program will commence prior to any ground disturbance to establish appropriate baseline conditions and continue for the duration of construction and until the affected waterways are rehabilitated to an acceptable condition as certified by a suitably qualified and experienced independent expert (or as otherwise required by any project conditions of approval). Further details to be included in the program are outlined in Appendix Q (Technical working paper: Surface water and flooding) of the EIS.

ESCPs will be prepared for all work sites in accordance with the Blue Book. The Blue Book includes standard soil and water controls such as clean water diversions, stabilised access points, surface stabilisation methods, sediment interception and capture methods and site shutdown protocols. The ESCPs will be implemented in advance of site disturbance and will be updated when required as the work progresses and the sites change. Erosion and sediment control measures suitable for each of the sites would be included in the ESCPs, as required by environmental management measure SW03 (see **Chapter E1** (Environmental management measures)).

B12.16 Contamination

Refer to Chapter 16 (Contamination) and Appendix R (Technical working paper: Contamination) of the EIS for details of the contamination assessment.

B12.16.1 General comments

Attachment 1 (Beca report) Section 16.1.1, p128

The WestConnex contaminated land technical working papers [paper] for contamination are aligned with relevant NSW legislation and provides a preliminary assessment of contamination risks associated with the surface disturbance areas of the project in accordance with the following legal framework: *Contaminated Land Management Act 1997* (NSW), *Protection of the Environment Operations Act 1997* (NSW), *Environmentally Hazardous Chemicals Act 1985* (NSW), State Environmental Planning Policy No. 55 - Remediation of Land.

Attachment 1 (Beca report) Section 16.1.2, p128

The technical assessments considered appropriate guidelines applicable to contaminated land investigation and remediation as provided in the cells above. Assessments have provided a qualitative assessment of the potential for contamination in soils and groundwater (including discussion of human health risks), have provided specific remediation actions for construction ancillary facilities, have committed to undertaking and implementing Remediation Action Plans (RAPs). This is consistent with SEARs requirements.

Attachment 1 (Beca report) Section 16.1.3, p129

Preliminary desk top studies and inspection were undertaken for the project footprint. Stage 1 Preliminary Site Investigations (PSIs) were undertaken where ancillary facilities and ground disturbance works are proposed within the project footprint. Based on the findings from the PSIs, intrusive site investigations (Stage 2) were undertaken where gaps were identified. These were at selected sites were the Stage 1 had identified a high potential for contamination. This is considered to align with design of CL investigations as outlined in the adopted guidelines and is consistent with SEARs requirements.

Attachment 1 (Beca report) Section R-1-5, p130 and Attachment 1 (Beca report) Section R-1-6, p130

Impact of disturbance of contaminated GW and the tunnels re mobilisation of contaminated GW and/or prevent contaminated GW flow not assessed as part of this review. Needs to be undertaken in parallel with Appendix T (Groundwater).

SEARs requirements under "Soils" require assessment of surface water. This is contained in Appendix Q and has not been reviewed as part of this technical discipline

Attachment 1 (Beca report) Section R-1-8, p131

OPERATION Further site investigations are recommended upon completion of the construction work for divestment/redevelopment. RAP developed should residual contamination be identified. A NSW EPA Accredited Site Auditor would review all contamination reports. An Operational Environmental Management [Plan] (OEMP) would be prepared to manage impacts on groundwater and surface water. This is consistent with SEARs requirements.

Further investigations for high risk sites to be designed in accordance with NSW EPA Sampling Design Guidelines and the SAQP reviewed by the independent NSW EPA accredited site auditor prior to undertaking site investigations. This is consistent with SEARs requirements.

Attachment 1 (Beca report) Section 16 Overall Evaluation, p132

Comprehensive technical papers that meet SEARs requirements (apart from those technical disciplines noted as being excluded from this review (contaminated groundwater mobility, salinity, surface water)). Detailed desk top study of a large number of properties, clear breakdown of risk categorisation and summary of risk profile for construction and operation.

No provision of SAQP of intrusive investigations for review. Reliance on extensive existing intrusive investigations undertaken by various other consultants which have not been sited or reviewed as part of this review. Assumes such investigations have been undertaken in accordance with appropriate guidelines and technical guidance. Multiple overlapping management plans containing similar controls and the difficulty this would present a contractor in understanding practically what needs to be done on site. Recommendation is to consolidate controls and procedures into one plan to ensure clarity if possible.

Response

Impacts of disturbance of contaminated groundwater are summarised in relevant areas throughout section 5 of Appendix R (Technical working paper: Contamination) of the EIS. Further discussion of the impact of intercepting contamination groundwater during construction is provided in section 5.5.2 of Appendix T (Technical working paper: Groundwater) of the EIS).

As described in environmental management measure CM01 in **Chapter E1** (Environmental management measures, further investigation in areas of potential contamination identified in the project footprint will be undertaken and where contamination prosing risk to human or ecological receptors is identified, a Remediation Action Plan will be prepared.

B12.16.2 Referencing of previous studies

Attachment 1 (Beca report) Section R-1-4, p129

The technical working papers provide the findings from various desk top studies and intrusive investigations. The paper also refers to intrusive investigations undertaken by AECOM. These are not provided in the technical papers and have not been cited. It is assumed they have been undertaken in accordance with appropriate guidelines and technical guidance. Provide further references.

Response

The previous intrusive investigations undertaken to inform the assessment have been cited in section 4.1.2 of Appendix R (Technical working paper: Contamination) of the EIS and are also included in the references section at the end of the technical working paper. These investigations were undertaken in accordance with relevant guidelines made and/or endorsed by the NSW EPA.

B12.16.3 Environmental management measures

Attachment 1 (Beca report) Section R-1-8, p130

CONSTRUCTION A Construction Environmental Management Plan (CEMP) would be prepared which would include management for areas within the project footprint that have the potential to be contaminated. The CEMP would include an Asbestos Management Plan and management of acid sulphide soils. Sites assessed to be low risk are proposed to be managed using the CEMP. Sites assessed to contain contaminated soil or groundwater and that pose an unacceptable risk to human health or ecological receptors are proposed to have further intrusive investigation. Management procedures for these specific sites should be developed and contained in the Construction Soil and Water Management Plan (CSWMP) to inform appropriate management during construction. It is not clear which plans are associated with which stage of works, and how these plans will be cross-referenced. RAPs may be required dependant on the findings of the additional investigations. Management plan structure needs clarification and cross-referencing between, the CEMP, CWMP, asbestos management, acid sulphate management and RAP. Also needs to align with Section 9.3 of Appendix K (Technical working paper: Human health risk assessment) of the EIS.

As discussed in the Resource Use and Waste Minimisation technical review, as a general comment the technical working papers rely heavily on management plans which are all interconnected and will manage similar and overlapping issues. Consideration should be given as to how management of these issues will practically occur on site, if the requirements are split over separate plans. It does not make it easy to follow what is required by a contractor, leading to the potential risk that something will be missed unintentionally. Also as management plans get updated, it will mean that four plans need to be checked for consistency each time, at a cost.

Attachment 1 (Beca report) Section 23.3.2, p149

It is noted that there will be a Construction Soil and Water Management Plan prepared where procedures to manage acid sulphate soils would be included as well as management measures regarding runoff and sedimentation associated with stockpiles (noted to also include contaminated material stockpiles) (cross-ref Chapter 16, p16-40). Cross-referencing with the CWMP is required to ensure no mismatched procedures. Construction Soil and Water Management Plan needs to cross-reference the CWMP regarding controls specified for acid sulphate soils, general stockpiles and contaminated material stockpiles.

General comment regarding the above four management plans which are all interconnected and will manage similar and overlapping issues. Consideration should be given as to how management of these issues will be implemented practically on site, if the requirements are split over four plans. It does not make it easy to follow what is required by a contractor, leading to the potential risk that something will be missed unintentionally. Also as management plans get updated, it will mean that four plans need to be checked for consistency each time, at a cost. Where there are overlapping controls and procedures, consider whether there is the ability to consolidate these into one plan, two at the most. Typical best practice would be to provide these as appendices to an overarching CEMP (Construction Environmental Management Plan). This process would ensure consistency through the various plans.

Attachment 1 (Beca report) Section 16.5, p150

By way of cross-referencing, there will also be Remedial Action Plans (RAP's) developed for specific sites where there is a human health or environmental risk posed (Chapter 16). These will be site specific, and contain specific excavation, handling, management and disposal requirements, dust, sediment, leachate and stockpile controls. The RAPs may take priority over generic information detailed in the CWMP, AMP, CSWMP and will require cross-referencing to ensure no mismatched procedures. Make it clear when controls and procedures in the RAPs in relation to contaminated materials will take precedence over those in the CWMP, AMP and CSWMP and ensure cross-referencing.

Response

Figure 29-1 in the EIS shows the environmental management plan framework for the project. As identified in the framework, the CSWMP and the Construction Waste Management Plan (CWMP) are both sub-plans to the CEMP.

It will be the responsibility of the design and construction contractor(s) to prepare the CEMP and associated sub-plans to ensure that overlapping issues remain consistent amongst all of the sub-plans within the CEMP. The CSWMP would form part of the CEMP which would be prepared during the detailed design. The CSWMP would include procedures to manage acid sulfate soils. The Asbestos Management Plan would be incorporated in the CEMP. The CEMP and associated sub-plans will be reviewed by Roads and Maritime.

Potentially contaminated areas directly affected by the project will be investigated and managed in accordance with the requirements of guidance endorsed under section 105 of the *Contaminated Land Management Act 1997* (NSW) (CLM Act). This includes further investigations in areas of potential contamination identified in the project footprint. If contamination posing a risk to human or ecological receptors is identified, a Remediation Action Plan will be prepared. This is in line with section 9.3 of Appendix K (Technical working paper: Human health risk assessment) of the EIS.

B12.16.4 Further explanation of overall effects of the project on contamination

Attachment 1 (Beca report) Section R-1-9, p132

Overall conclusions - a number of properties located within the project footprint have been identified as having a high risk of contamination which should be investigated during project planning. Potential for localised areas of soil, sediment, and groundwater and acid sulphate soils that may be encountered during construction that are likely to be encountered in near surface excavation works. There is also the potential that contamination arising from tunnel construction could adversely impact soil, groundwater and surface water if not managed appropriately. The disturbance and management of contaminated soil, fill, sediment, surface water and groundwater as a result of construction an operational activity are unlikely to have a more significant impact on ecological and human health receptors that they would if undertaken as discrete projects. This is not quantified. Risks to human health and the environment would be mitigated through management plans. Further explanation of overall effects of the project on contamination is required.

Response

Further explanation of the overall impact of the project on contamination is provided in sections 5, 6, 7 and 9 of Appendix R (Technical working paper: Contamination) of the EIS and sections 16.3 and 16.4 of the EIS.

As described in environmental management measure CM01 (see **Chapter E1** (Environmental management measures), potentially contaminated areas directly affected by the project will be investigated and managed in accordance with the requirements of guidance endorsed under section 105 of the *Contaminated Land Management Act 1997* (NSW) (CLM Act). This includes further investigations in areas of potential contamination identified in the project footprint. If contamination posing a risk to human or ecological receptors is identified, a Remediation Action Plan will be prepared.

In addition, the discovery of previously unidentified contaminated material will be managed in accordance with an unexpected contaminated lands discovery procedure, as outlined in the *Guideline for the Management of Contamination* (Roads and Maritime 2013) and detailed in the CEMP. The procedure will include:

- Cease work in the vicinity
- Initial assessment by an appropriately qualified environmental consultant
- Further assessment and management of contamination, if confirmed, in accordance with section 105 of the CLM Act.

A CSWMP will be prepared for the project. The plan will include the measures that will be implemented to manage and monitor potential surface water quality impacts during construction. The CSWMP will be developed in accordance with the principles and requirements in *Managing Urban Stormwater – Soils and Construction, Volume 1* (Landcom 2004) and *Volume 2D* (NSW Department of Environment, Climate Change and Water 2008), commonly referred to as the 'Blue Book'.

B12.17 Flooding and drainage

Refer to Chapter 17 (Flooding and drainage) and Appendix Q (Technical working paper: Surface water and flooding) of the EIS for details of flooding and drainage.

B12.17.1 General comments

Attachment 1 (Beca report) Section 17.1.3, p133

Range of storm events modelled is appropriate to represent the 'full-range' required by SEARS and NSW Floodplain Development Manual. Given the increase in flood impacts outside of the project footprint during the PMF event *(when compared to the 100-year ARI), it may be prudent to include an additional run of an intermediate event at detailed design. References for each of the hydrologic standards should be included.

Attachment 1 (Beca report) Section 17.2.3, p134

The text isn't explicit as to whether a quantitative assessment is required / undertaken for Iron Cove Link, whereas it is explicit for the other locations. The same is true for Darley Road and Pyrmont Bridge Road. Clarity is provided when you get to Table 17.3.

Attachment 1 (Beca report) Section 17.4.1, p134

Good that the EIS acknowledges that the model will need to be refined at detailed design stage. Generally, benefits outside of the project area in the 100-year ARI event, but not in the PMF event.

Attachment 1 (Beca report) Section 26.4.10, p135

Though flood related cumulative effects are low or negligible, they must continue to be reviewed and included in flood modelling at detailed design.

Attachment 1 (Beca report) Section 17 Overall evaluation, p136

A lot of the text in Chapter 17 is drawn directly from Appendix Q. The chapter clearly outlines the areas of concern, with reasonable information provided on the existing and post-development flood risks. However, future flood risk due to climate change is only considered at a high level. This, along with other issues highlighted in the EIS, will need to be considered in more detail at the detailed design stage. The issues raised in *IWC Review submission* - (items, 6:10, 6:11, 6:12, and 6:23) have generally been considered or acknowledged in the EIS. Annex C of Appendix Q *Flood Model Development* is a high-level description of the flood model inputs and parameters. It is not a detailed model report. Chapter 26 considers the cumulative effects of the WestConnex projects. A comment is made in the list above regarding the flood related cumulative effects.

Response

References for each of the hydrologic standards are provided in section 17.1 (p.17-11) of the EIS. The standards adopted in the assessment of transverse drainage and flood mitigation measures were established in accordance with the Floodplain Development Manual (NSW Office of Environment and Heritage (OEH) 2005) and current Roads and Maritime standards.

Table 17-3 of the EIS makes it clear that further quantitative assessment is required to assess flood risk and impacts of the development of the operational surface features at the Rozelle interchange, Iron Cove Link and Darley Road. Sections 3.2.8 and 6.2.2 of Appendix Q (Technical working paper: Surface water and flooding) of the EIS discuss climate change impacts, including both sea level change and changes to rainfall.

As noted in environmental management measures FD01 and FD15 in **Chapter E1** (Environmental management measures), climate change implications due to rainfall, drainage and tidal characteristics will be considered in the Flood Mitigation Strategy and hydrological and hydraulic assessments of the permanent design respectively.

B12.17.2 Suggested amendment to chapter

Attachment 1 (Beca report) Section 17.3, p134

Could add 'Additional people (construction workers) in flood prone areas' to bullet point list of activities to be mitigated.

Response

‘Additional people (construction workers) in flood prone areas’ is not an activity and therefore has not been added to the list of construction activities associated with the project that could result in impacts in not mitigated (refer to section 17.3 of the EIS).

B12.17.3 Relevance of previous studies

Attachment 1 (Beca report) Section 17.1.3, p133

How relevant are the 1990 and 1995 Whites Creek and Jacksons [Johnstons] Creek studies? I assume superseded by the Leichardt Flood Study?

Response

It is assumed that the submission is referring to the Johnstons Creek SWC55 Capacity Assessment study prepared by Sydney Water in 1995.

A number of previous studies were reviewed to identify various aspects of surface water and flooding in the study area. Amongst other key studies, previous studies reviewed included:

- Whites Creek Catchment Management Study (Sydney Water 1990)
- Johnstons Creek SWC55 Capacity Assessment (Sydney Water 1995)
- Leichhardt Flood Study (Leichhardt Council 2014).

The Leichhardt Flood Study notes that the Whites Creek Catchment Management Study and the Johnstons Creek Capacity Assessment are ‘the governing documents for the determination of flood levels for Johnstons Creek and White Creek’ and were used to calibrate the model in the Leichhardt Flood Study. As a result, they are considered to be relevant to the study undertaken for the EIS.

B12.17.4 Missing watercourse listing

Attachment 1 (Beca report) Section 17.2.1, p133

Affected watercourses are listed, but the list doesn't include Alexandra Canal or Eastern Channel; Both of which are then described on pages 17-17 &18.

Response

Alexandra Canal and Eastern Channel are discussed in sub-headings on pages 17-17 and 17-18 of the EIS respectively. No surface works or discharges, surface operational facilities or surface operational facilities or surface carriageways are proposed within the Eastern Channel catchment. The project is not anticipated to impact the Eastern Channel and so no further assessment of the Eastern Channel in relation to flooding and drainage impacts was undertaken.

B12.17.5 Condition of drainage infrastructure

Attachment 1 (Beca report) Section 17.2.2, p133

Reference to receiving stormwater infrastructure potentially being in poor / unknown condition. How sensitive is project flood performance to the condition of the receiving infrastructure?

Response

As discussed in section 17.2.2 of the EIS, the likelihood of the receiving drainage infrastructure being in poor condition is a consequence of age and lack of maintenance. The flood performance of the project is dependent on the condition of the downstream stormwater systems, in particular where the downstream system consists of piped drainage lines. Because of concerns with regards to the condition of these drainage system, mitigation measures have been developed to determine the ability of the receiving drainage systems to effectively convey drainage discharges from the project so as to not overload any systems that are already at capacity.

All construction works would have the potential to impact local overland flow paths and local receiving stormwater infrastructure. Disruption of existing flow mechanisms, both of constructed drainage systems or those of overland flow paths, could occur as a consequence of the various construction activities and facilities. Specific causes of these impacts could include:

- Disruption of existing drainage networks during decommissioning, upgrade or replacement of drainage pits and pipes
- Interruption of overland flow paths by installation of temporary ancillary construction facilities
- Sediment entering into drainage assets and causing blockages
- Overloading the capacity of the local drainage system due to the generation of additional runoff.

These are typical impacts faced on most construction projects and can be addressed by adopting industry standard mitigation measures. Consideration of these impacts would be included during future detailed design and construction planning phases, along with consideration of the typical mitigation measures (see **Chapter E1** (Environmental management measures)).

Where the operational sites propose to connect directly into existing drainage infrastructure, flow rates from the sites would match existing flow rates where possible so as not to overload the existing drainage system or cause adverse flood impacts on adjoining properties.

B12.17.6 Source of flood mapping data

Attachment 1 (Beca report) Section 17.2.3, p134

It is unclear at this point in the chapter whether these existing flood maps [Figures 17-10 to 17-17] are outputs from modelling undertaken for the Project or are outputs from previous modelling studies

Response

The flood maps included in Chapter 17 of the EIS were based on modelling undertaken for the project, but considered information from previous flood studies referenced in section 17.1.3 of the EIS.

B12.17.7 Reordering of table contents

Attachment 1 (Beca report) Section 17.2.3, p134

Why aren't the sites listed in the same order as they are in the text [in Table 17-3 of the EIS]. Pyrmont Bridge Road not included in the table. Re-order table and include Pyrmont Bridge Road.

Response

Table 17-3 in section 17.2.3 of the EIS is about operational surface features and arranged in that manner. Hence it does not include the area at Pyrmont Bridge Road which is proposed to be used as a construction site only for the project.

B12.17.8 Existing flood conditions for Wattle Street and St Peters interchanges

Attachment 1 (Beca report) Section 17.2., p133

On the basis of work for other WestConnex projects, no quantitative assessment has been undertaken for Wattle Street and St Peters Interchange. References to the flood studies for those reports should be provided.

Response

The 'existing' flood conditions at the Wattle Street interchange were taken from the post-construction situation assessed in the M4 East project's EIS. The mitigation measures provided by the M4 East project mean that the risk of flooding to the M4-M5 Link project at this location from a probable maximum flood (PMF) is considered to be low. As the M4-M5 Link would not change the design surface layout or levels of the interchange, the impact of the project is considered to be negligible and no additional mitigation measures are necessary at this location. Therefore, a quantitative assessment of impacts at this location was not undertaken as part of the EIS.

The 'existing' flood conditions at the St Peters interchange were taken from the post-construction situation assessed in the New M5 project's EIS. The design of the New M5 project is providing enabling works for the M4-M5 Link project construction site within the St Peters interchange, including provision of flood mitigation measures. As a result, the risk of flooding to the M4-M5 Link project from a PMF is considered to be low and no additional mitigation measures are necessary for the project at this location. Therefore, a quantitative assessment of impacts at this location was not undertaken as part of the EIS.

References used in the surface water and flooding assessment are provided in section 10 of Appendix Q (Technical working paper: Surface water and flooding) of the EIS. In relation to the Wattle Street and St Peters interchange, the flood studies referenced are:

- M4 East EIS (September 2015) Appendix Q - Surface water, flooding and drainage) of the EIS
- New M5 EIS (November 2015) Appendix P - Technical working paper: Flooding) of the EIS.

B12.17.9 Consideration of climate change

Attachment 1 (Beca report) Section 17.2., p133

No mention of climate change in this part of the chapter [section 17.2 of the EIS].

Attachment 1 (Beca report) Section 17.2.3, p134

No mention of storm surge and climate change for Rozelle (climate change mentioned briefly later in the chapter [of the Inner West Council table]).

Attachment 1 (Beca report) Section 17.4.3, p135

All previous figures and discussion relate to existing climate. For Rozelle, rainfall and tide level increases are provided and commentary provided as to the potential impacts on flood risk. The risk for other sites is described as negligible. No maps are provided and the assessments are very high level. More detailed analysis is required.

Provide additional climate change flood depth and change maps, either in the chapter or refer to Chapter 6.2.2 of Appendix Q.

Response

Sections 3.2.8 and 6.2.2 of Appendix Q (Technical working paper: Surface water and flooding) of the EIS describes potential impacts of future climate change on flood behaviour. Figures showing the potential climate change impact at Rozelle interchange, Iron Cove Link and Darley Road are provided in section 6.2.2 of Appendix Q (Technical working paper: Surface water and flooding) of the EIS. Additional analysis of climate change impacts on flood risk is provided in Chapter 24 (Climate change risk and adaption) of the EIS.

B12.17.10 Consideration of pluvial and tidal events

Attachment 1 (Beca report) Section 17.2.3, p134

Given the low ground levels (2m - 7m AHD [Australian Height Datum]), coincidence of significant pluvial and tidal events should be considered. Provide confirmation that coincidence of pluvial and tidal events has been undertaken and how joint ARI's were derived.

Response

The effect of higher tailwater levels due to tidal events was considered as part of a sensitivity analysis for the project for both the 100 year ARI event and PMF. The sensitivity analysis showed that higher tailwater levels would not affect the required flood immunity of the tunnel portals, nor City West Link or The Crescent. Therefore, adopting a tailwater level of one metre AHD (High High Water Solstices Springs (HHWSS)) was considered appropriate.

B12.17.11 Flood model development

Attachment 1 (Beca report) Section Q-C Annexure C, p135

General comment: This is not a full flood model report. Rather is broadly describes the input parameters and references/sources, but does not provide detailed information. Provide reference to full model reports.

Response

The previous flood assessment reports reviewed to inform the investigation are identified in section 1.1, section 2.1 and section 3.1 of Annexure C of Appendix Q (Technical working paper: Surface water and flooding) of the EIS. This annexure is considered to provide sufficient detail of the hydrologic and hydraulic modelling undertaken to establish existing flood conditions and assess potential flood risks associated with the project. The flood model development information is provided for the Rozelle interchange, Iron Cove Link and Darley Road.

B12.17.12 Australian Rainfall and Runoff edition

Attachment 1 (Beca report) Section Q-C1.4, p136

Design rainfalls were derived from ARR 1987, which is replaced by ARR 2016. As the model was 'adopted' by the project, it may be that the model hydrology pre-dates the ARR update. It is assumed that rainfall losses were also derived from ARR 1987. Review use of ARR 1987 against ARR 2016 for rainfall and losses. Re-run models with ARR 2016 inputs if significantly different.

Attachment 1 (Beca report) Section Q-C1.8, p 136

Text states that blockage parameters calculated using latest ARR guidance, which is appropriate but calculations not provided.

Response

The 1987 edition of Australian Rainfall and Runoff has been adopted for this project for the following reasons:

- To be consistent with other WestConnex projects, which to date have all been based on the 1987 edition of Australian Rainfall and Runoff
- To enable direct comparison against other existing flood studies, which are based on the 1987 edition of Australian Rainfall and Runoff.

The approach to and results of the blockage factor calculations have been provided in Annexure C of Appendix Q (Technical working paper: Surface water and flooding) of the EIS. Presenting the full calculations to demonstrate how blockage factors have been derived is not considered appropriate for an EIS report.

B12.17.13 Opportunity for ground truthing modelling

Attachment 1 (Beca report) Section Q-C1.5, p136

Data not available to calibrate models, but validation undertaken and considered appropriate. However, there is a window of opportunity before detailed design to collect data. That means that if there is a significant flood (>5-year ARI?) in that window, then the validity of the modelling can be strengthened. Peak water levels or debris marks should be surveyed following significant flood events (prior or during detailed design) and the model re-run to improve calibration. It may be appropriate to consider installing water level recorders at key locations on Whites Creek and Easton Park Drain.

Response

As reflected in the environmental management measures in **Chapter E1** (Environmental management measures), hydrologic and hydraulic assessments will be carried out for all temporary project components (including ancillary facilities) and permanent design features that have the potential to affect flood levels in the vicinity of the project (environmental management measure FD02). The results of the assessment will inform the preparation of the Flood Mitigation Strategy (environmental management measure FD01) as well as the design development of temporary and permanent works.

Hydrologic and hydraulic assessments will be carried out for all temporary project components (including ancillary facilities) and permanent design features that have the potential to affect flood levels in the vicinity of the project. The results of the assessment will inform the preparation of the Flood Mitigation Strategy (see environmental management measure FD01) as well as the design development of temporary and permanent works (see environmental management measure FD11).

B12.17.14 Impact of temporary construction works on flood risk

Attachment 1 (Beca report) Section 17.3.1, p134

Potential for temporary construction works to increase flood risk. Need more detailed assessment of risks prior to commencement of works.

Response

Flood risks associated with the construction ancillary facilities is discussed in section 5.2 and Table 5-1 of Appendix Q (Technical working paper: Surface water and flooding) of the EIS. Consideration of impacts on temporary works required for construction is reflected in the environmental management measure FD02 in **Chapter E1** (Environmental management measures). Environmental management measure FD02 states that: *'Hydrologic and hydraulic assessments will be carried out for all temporary project components (including ancillary facilities) and permanent design features that have the potential to affect flood levels in the vicinity of the project. The results of the assessment will inform the preparation of the Flood Mitigation Strategy (FD01) as well as the design development of temporary and permanent works*'.

B12.17.15 Management of stormwater drainage during construction

Attachment 1 (Beca report) Section 17.3.1, p134

No mention of management of on-site stormwater drainage. Only flooding is mentioned.

Response

Management of on-site stormwater drainage is discussed in section 17.3.1 of the EIS, under the *Localised flooding and drainage* subheading. As noted in section 17.3.1 of the EIS, all construction works would have the potential to impact local overland flow paths and existing minor drainage paths. Disruption of existing flow paths, both of constructed drainage systems or those of overland flow paths, could occur as a result of:

- Disruption of existing drainage networks during decommissioning, upgrade or replacement of drainage pits and pipes
- Interruption of overland flow paths by installation of temporary construction ancillary facilities

- Sediment entering drainage assets and causing blockages
- Overloading the capacity of the local drainage system.

These are typical impacts faced on most construction projects and would be addressed by adopting industry standard mitigation measures. Consideration of these impacts would be included during future detailed design and construction planning phases, along with consideration of the typical mitigation measures described in section 17.5 and Appendix F (Utilities Management Strategy) of the EIS. Assessment and mitigation of sedimentation is provided in Chapter 15 (Soil and water quality) of the EIS.

Runoff generated from project construction and operational facilities will be managed to mitigate risk of overloading the receiving drainage system as reflected in environmental management measure FD13 in **Chapter E1** (Environmental management measures). Entry points to the stormwater used by or immediately downgradient from the project sites will also be inspected regularly for blockages and cleaned as required to maintain performance as reflected in environmental management measure FD14.

B12.17.16 Design of local drainage paths

Attachment 1 (Beca report) Section 17.3.1, p134

Local drainage paths not considered at this stage (deferred to detailed design).

Response

Due to the EIS being based on a concept design, the disruption of existing flow paths would be considered further during future detailed design and construction planning phases, along with consideration of the typical mitigation measures described in **Chapter E1** (Environmental management measures).

B12.17.17 Operational flooding and drainage impacts

Attachment 1 (Beca report) Section 17.4.1, p134

Figure 17.26 [of the EIS] doesn't differentiate flood depth increases of >0.1m, but the text says that there is a 0.4mm increase. Plot needs to show greater differentiation. Provide additional flood depth/change category.

Attachment 1 (Beca report) Section 17.4.1, p135

Maps [Figures 17-35 and 17-36] show increases in flood depth of less <0.1m, but text says increases of up to 0.3 m (and describes that as minor). Clarification required. Provide additional flood depth/change category.

Attachment 1 (Beca report) Section 17.4.4, p135

It's proposed to match post-development drainage peak flows to pre-development flows. That doesn't account for the effects of increased runoff volume (due to additional impermeable surfaces). Has consideration being given to the effects of increased volume, or to restricting peak flows to 80% of pre-development flows, so as to mitigate the increased runoff volume?

Response

It is assumed that reference to 0.4 millimetres was intended to be 0.4 metres as stated section 17.4.1 of the EIS. Due to the scale and amount of detail already provided in Figure 17-26, 17-35 and 17-36 of the EIS, further differentiation would jeopardise the readability of the figures.

As reflected in the environmental management measures in **Chapter E1** (Environmental management measures), hydrologic and hydraulic assessments will be carried out for all temporary project components (including ancillary facilities) and permanent design features that have the potential to affect flood levels in the vicinity of the project (environmental management measure FD02). The results of the assessment will inform the preparation of the Flood Mitigation Strategy (environmental management measure FD01) as well as the design development of temporary and permanent works.

Further hydrological and hydraulic modelling (incorporating both changes in flow and volume), based on the detailed design, will also be undertaken to determine the ability of the receiving drainage systems to effectively convey drainage discharges from the project once operational as reflected in environmental management measure FD11. The modelling must be undertaken in consultation with the relevant councils. It will include, but not be limited to:

- Confirming the location, size and capacity of all receiving drainage systems affected by the operation of the project
- Assessing the potential impacts of drainage discharges from the project drainage systems on the receiving drainage systems
- Identifying all feasible and reasonable mitigation measures to be implemented where drainage discharge from the project is predicted to adversely impact on the receiving drainage systems.

Due to the scale and amount of detail already provided in Figures 17-26, 17-35 and 17-36 of the EIS, further differentiation would jeopardise the readability of the figure as it would increase the number of colours used in the figure to differentiate the afflux, without providing additional information which is provided in the respective peak flood depth figures.

B12.17.18 Management of operational impacts

Attachment 1 (Beca report) Section 17.4.5, p135

Last paragraph. Not clear that mitigation will result in flooding having "no impact on properties in the 100-year ARI" (event). It appears that there is a missing word after "no impact on properties in the 100-year ARI". Add "flood" or "event" after "no impact on properties in the 100-year ARI".

Attachment 1 (Beca report) Section 17.5, p135

FD17 [in Table 17-5] - Who will be responsible for preparing post-flood studies following handover of the project? Confirm responsibility for producing post-handover flood reports.

Response

The flood modelling, as shown in Figure 17-25, Figure 17-30 and Figure 17-35 of the EIS, suggests that the mitigation measures would minimise impacts on surrounding properties for the 100 year ARI event and therefore satisfies the required design standards.

The sentence in section 17.5 of the EIS should read 'there is no impact on properties in the 100 year ARI *event'*. This error has been corrected in **Chapter A4** (Clarifications). Roads and Maritime is the proponent for the project and are therefore responsible for fulfilling the conditions of approvals.

B12.18 Biodiversity

Refer to Chapter 18 (Biodiversity) and Appendix S (Technical working paper: Biodiversity) of the EIS for details of biodiversity.

B12.18.1 General Comment

Attachment 1 (Beca report) Section 18, p137

An annotated map showing presence of sensitive habitat / species would be useful to summarise the chapter.

Response

The following maps are included in Appendix S (Technical working paper: Biodiversity) of the EIS, showing the presence of sensitive habitat/species:

- Figures 3.1 to 3.7 show the landscape values of the project footprint
- Figures 4.1 to 4.6 show the existing vegetation within the project footprint
- Figure 5.2 shows the locations of the recorded threatened species (database and survey records) within the project footprint
- Figure 5.3 shows the aquatic values and key fish habitat within the project footprint.

B12.18.2 Compliance with guidelines

Attachment 1 (Beca report) Section 18.1.2, p137

All guidelines stated in SEARs have been incorporated into the assessment.

Response

Noted.

B12.18.3 Assessment of biodiversity receptors outside of the project footprint

Attachment 1 (Beca report) Section 18.1.1, p137

Why are surveys only stated within the Project footprint? What about sensitive biodiversity receptors outside the footprint? E.g. down-gradient aquatic systems. Receptors outside the project footprint have also been considered in this assessment. The text needs to be revised to reflect this large spatial extent.

Response

The study area for the biodiversity assessment comprises a 550 metre buffer around the project footprint, as required by the *Framework for Biodiversity Assessment* (FBA) (OEH 2014b). The study area includes existing roads, motorways, residential areas, industrial areas, urban landscaped areas and exotic vegetation (shown in Figure 18-1 of the EIS). Some desktop assessment tools for biodiversity have a minimum search area of a 10 kilometre radius.

A desktop review was undertaken to identify the potential presence of any threatened species, populations or ecological communities listed under the *Threatened Species Conservation Act 1995* (TSC Act) and *Fisheries Management Act 1994* (FM Act), as well as matters of national environmental significance (MNES) listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) within the study area.

Based on the desktop assessment, further assessment was undertaken to determine how likely a particular species is to occur within the project footprint. A likelihood ranking was then assigned to each species, according to whether the species was ‘known’, ‘likely’, ‘possible’, ‘unlikely’ or ‘absent’. The likelihood of occurrence assessment was used to guide and inform the field surveys that were undertaken for the project. Refer to Annexure A of Appendix S (Technical working paper: Biodiversity) of the EIS for the likelihood of occurrence assessment and description of likelihood rankings.

B12.18.4 Assessment of aquatic receptors

Attachment 1 (Beca report) Section 18.1.4, p137

Only field surveys were conducted Whites Creek and Rozelle Bay. All other aquatic receptors were only considered via a desktop assessment. Provide justification for limited field survey.

Response

The desktop assessment concluded that it is unlikely that there is valuable or specific aquatic habitat for threatened aquatic/estuarine species, populations or communities listed under the FM Act, TSC Act and EPBA Act within the project footprint. An assessment of aquatic habitat was carried out within Whites Creek and the foreshore at Rozelle Bay, as these areas were considered the only potential habitat for species within the project footprint. It is possible some species may opportunistically pass near the project footprint in estuarine bays given the connectivity to the broader harbour and coastal habitats, but they are unlikely to depend on the habitat within the project footprint. Considering this, a field survey for the entire aquatic footprint was not deemed necessary.

Following the desktop assessment, a site visit was conducted of Whites Creek and its confluence with Rozelle Bay on 26 September 2016 and 30 May 2017. Other sites were considered in the desktop assessment but were not visited as part of the aquatic methodology. In the case of the Iron Cove Bridge abutment, this is reclaimed land with seawall and the project footprint was beyond the riparian buffer at Iron Cove at Haberfield, Johnstons Creek at Camperdown, Hawthorne Canal at Darling Road and the Alexandra Canal at St Peters.

B12.18.5 Biodiversity impacts in Rozelle Bay

Attachment 1 (Beca report) Section 18.2.2, p137

Rozelle Bay could potentially be impacted by contaminated sediment resuspension. The treatise for this impact is superficial and not quantified sufficiently. Cross-reference to Soils & Water chapter. An assessment on the impact of contaminated sediment resuspension on resident / transitory aquatic species should be conducted in more detail.

Attachment 1 (Beca report) Section 18.2.5, p138

Anoxic conditions close to sediment - it does not appear that this was measured and is totally unfounded. It is questionable that the whole of Rozelle Bay sediments would be anoxic at all times, given the tidal prism, flow inputs and mixing. This is not a valid reason to rule out impacts based on habitat being unsuitable. Further investigation is required into habitat suitability in terms of permanency and spatial extent of anoxic zones around depositional areas of the bay (caused by input of organic materials which exert a BOD on the water when they are decomposing).

Response

Sediment investigations for Rozelle Bay are discussed in sections 4.9.9 and 9 of Appendix R (Technical working paper: Contamination) of the EIS. The potential impacts associated with the transport of sediment during construction are also noted in Table 5-1 of Appendix R (Technical working paper: Contamination) of the EIS.

Construction works at Rozelle including Rozelle civil and tunnel site (C5) and wider Rozelle surface works (as identified in Table 16-23 of the EIS) have the following potential impacts on Rozelle Bay:

- Mobilisation of sediments and contaminants within the sediments at outlet locations
- Exposure of acid sulfate soils or contaminated soils which, if mobilised via stormwater runoff, could acidify or pollute waterways
- Exposure of underlying ground surface following removal of vegetation, ballast stockpile and excavated spoil resulting in the potential mobilisation of contamination that may be present within the site
- Impacts as a result of sediment basins interacting with groundwater on the site resulting in dewatering and potential contamination of groundwater
- Contamination resulting from potential leaks and spills from equipment and plant
- Erosion and off-site transport of sediment and contamination via overland flow and stormwater runoff, affecting the water quality of Rozelle Bay
- Discharge of contaminated surface water and extracted groundwater to the stormwater system and ultimately Rozelle Bay
- Disturbance of actual or potential acid sulfate soils at the western end of the site which could impact local soil and water quality.

During operation there is potential for water quality at Rozelle Bay to be impacted by scour and mobilisation of contaminated sediments at proposed new drainage outlet locations and increased flow to existing locations.

The sediment at the outflow area is likely anoxic due to the amount of detritus decomposing on the sediment surface. Appendix S (Technical working paper: Biodiversity) of the EIS does not state that the whole of Rozelle Bay is anoxic. If modelling of the post-construction outflow is not different to the current outflow, and is below the ANZECC thresholds, then there is likely to not be impacts adverse to development guidelines in the aquatic environment.

Chapter E1 (Environmental management measures), describes further measures which have been designed to manage potential impacts by contaminated sediment resuspension on Rozelle Bay.

B12.18.6 Fish habitat in Rozelle Bay

Attachment 1 (Beca report) Section 18.2.5, p138

Statement that Rozelle Bay '…….does not provide suitable habitat for fish life' is unfounded. While habitat might not be favourable, there is plenty of anecdotal information that fish species are present in the vicinity (e.g. bream, flathead, skipjack) and this should have been investigated further in the assessment. Presence of fish in Rozelle Bay needs to be acknowledged and appropriate assessment of impacts conducted.

Response

The aquatic assessment was undertaken in accordance with the SEARs and DPI-Fisheries requirements for the Biodiversity Assessment Report. This included identification the listed protected and threatened species and populations included in the FM Act. Rozelle Bay is mapped as key fish habitat, as defined in the *Fisheries Policy and Guidelines for Fish Habitat Conservation and Management – update 2013* (Fairfull 2013).

Appendix S (Technical working paper: Biodiversity) of the EIS did not claim that there were no fish in Rozelle Bay. However, it does note that there is no habitat for threatened fish in the study area. As stated in section 5.4.1 of Appendix S (Technical working paper: Biodiversity) of the EIS, a desktop assessment and subsequent site visit of Whites Creek and its confluence with Rozelle Bay was carried out to identify habitat for threatened fish species.

Section 5.4.2 of Appendix S (Technical working paper: Biodiversity) of the EIS summarises the outcomes of this assessment, concluding that it is considered unlikely that there is valuable or specific aquatic habitat for threatened aquatic/estuarine species, populations or communities listed under the FM Act, TSC Act and EPBC Act within the project footprint. It is possible some species may opportunistically pass near the project footprint in estuarine bays given the connectivity to the broader harbour and coastal habitats, but they are unlikely to depend on the habitat within the project footprint.

B12.18.7 Impacts on Iron Cove and Hawthorne Canal

Attachment 1 (Beca report) Section 18.2.2, p138

Iron Cove and Hawthorne Canal stated as not directly impacted by the project but a hydrological connectivity is confirmed. This seems contradictory. Clarification required.

Response

Section 5.9.1 of the EIS acknowledges that options for discharge of treated water from the Darley Road water treatment plant include:

- Direct discharge to Hawthorne Canal, which would require a pipe to be installed along Canal Road and the construction of a new outlet in the wall of the Hawthorne Canal
- Direct discharge to the existing stormwater pipework in an adjoining road (ie Canal Road), which would require a pipe to be installed to connect to existing piped drainage
- Direct discharge into the sewer system located on the site, which would require a Trade Waste Agreement with Sydney Water.

Further detail regarding these discharge options is included in Appendix F (Utilities Management Strategy) of the EIS. The preferred option for treated water discharge from the Darley Road water treatment plant would be confirmed during detailed design.

As described in **Chapter D3** (Relocation of the bioretention facility at Rozelle), it is proposed to relocate the bioretention facility around 150 metres north of the location presented in the EIS, to an area adjacent to Victoria Road at the eastern abutment of Iron Cove Bridge and within King George Park.

There is potential to connect the bioretention facility to an existing drainage outlet to Iron Cove near Iron Cove Bridge to avoid the need to construct a new outlet. The suitability of connecting to this existing outlet would be confirmed during detailed design. The installation of a new underground drainage connection and outlet at Iron Cove has been assessed in the event that connecting to the existing outlet is not feasible. Although the Utilities Management Strategy did not contemplate these drainage works at Iron Cove (refer to Chapter 5 in Appendix F (Utilities Management Strategy) of the EIS), if required, the new drainage connection would be subject to the requirements outlined in the Utilities Management Strategy.

During operation, water quality impacts would be consistent with those assessed in the EIS, however at a new location closer to Iron Cove Bridge. Therefore no operational impacts on biodiversity from changes in water quality at Iron Cove are expected (see **section D3.4.2** for further detail).

B12.18.8 Macrophyte, macro-invertebrate and semi-aquatic species

Attachment 1 (Beca report) section 18.2.2, p138

Focus for rivers & streams appears to be on fish habitat and species. Consider macrophyte, macro-invertebrate and semi-aquatic species presence in landscape features.

Response

The consideration of rivers and streams is a prescribed section of the FBA. The aquatic assessment was conducted in accordance with the SEARs and DPI – Fisheries requirements for the Biodiversity Assessment report. This included identification the listed protected and threatened species and populations included in the FM Act.

The desktop assessment of the aquatic environment (refer to section 5.4.2 of Appendix S (Technical working paper: Biodiversity) of EIS) included a review of the state-wide mapping of estuarine macrophytes (mangrove, saltmarsh and seagrass) by DPI – Fisheries. The assessment of the impact on the aquatic environment as a result of the project, including potential impacts to fish habitats, macrophytes and macroalgae, is discussed in section 9.4.1 of Appendix S (Technical working paper: Biodiversity) of the EIS.

B12.18.9 Artificial waterbodies

Attachment 1 (Beca report) Section 18.2.2, p138

Artificial waterbodies (ponds / basins) are mentioned but not assessed in any detail. Despite being man-made, these systems could potentially provide important biodiversity value for a range of endemic and introduced species that should be considered in the baseline and impact assessment. Incorporate assessment of artificial waterbodies into assessment.

Response

As noted in section 3.1.4 of Appendix S (Technical working paper: Biodiversity) of the EIS, artificial waterbodies are scattered across the study area and surrounds as detention basins and ponds. These artificial waterbodies are not expected to be impacted as a result of the project.

B12.18.10 Native vegetation

Attachment 1 (Beca report) Section 18.2.2, p138

Confusing statement 'As the native vegetation within the study area does not meet the definition for native vegetation…..'. Clarification required referencing the 'Vegetation Cover' row and appropriate definition reference.

Response

The sentence in the change in area to perimeter ratio of Table 18-3 of the EIS should read “As the vegetation within the study area does not meet the definition for native vegetation *under the FBA*, the proportional change in the area to perimeter ratio could not be assessed”. This error has been corrected in **Chapter A4** (Clarifications).

B12.18.11 Impact on terrestrial flora

Attachment 1 (Beca report) Section 18.2.3, p138

Distance given as criteria for lack of impact. Question if this is the only criteria that may affect flora? What about wind-blown dust or vegetation use of contaminated sub-surface water as water source? More clarification / justification for lack of impact required.

Response

Distance is given in section 18.2.3 of the EIS as a reason for lack of impact in relation to threatened ecological communities.

The study area for the biodiversity assessment comprises a 550 metre buffer around the project footprint, as required by the FBA (OEH 2014b). The study area includes existing roads, motorways, residential areas, industrial areas, urban landscaped areas, and exotic vegetation (shown in Figure 18-1 of the EIS).

Desktop searches identified three threatened ecological communities listed under the TSC Act and/or EPBC Act previously mapped as being within around two kilometres of the project footprint, but none within the project footprint.

Desktop searches identified 38 threatened flora species as potentially occurring within the locality of the project. An assessment of likelihood for these threatened flora species to occur within the study area is provided in Annexure A of Appendix S (Technical working paper: Biodiversity) of the EIS.

No threatened flora was considered likely to occur within the biodiversity study area, or was recorded opportunistically, during the vegetation and fauna surveys. This means that no threatened flora are considered likely to occur within 550 metres of the project footprint and so no substantial impacts are likely to occur.

Distance is therefore the most relevant criterion for lack of impact in this context.

B12.18.12 Riparian vegetation

Attachment 1 (Beca report) Section 18.2.5, p138

More justification required as to why Whites Creek and Hawthorne Canal riparian vegetation does not provide ecological value Clarification required.

Response

Both Whites Creek and Hawthorne Canal riparian corridors are highly modified environments, consisting of concrete channels with vertical walls and concrete base. The riparian vegetation does not contribute to the ecological functioning of the waterways and is of limited habitat for fauna species as discussed in section 5.4.3 of Appendix S (Technical working paper: Biodiversity) of the EIS.

B12.18.13 Impact on existing trees

Attachment 1 (Beca report) Section 18.3.1, p138

Number of affected trees provided as requested in SEARS but hierarchy of controls (avoid, minimise, mitigate) not explored fully in this section. Alternatives to the design using hierarchy of controls should have been documented.

Attachment 1 (Beca report) Section 18.5, p139

Steps to avoid and minimise tree loss are not detailed. Consider addition of guidance for design considerations that adhere to the hierarchy of avoiding and minimising impacts.

Response

An arboriculture impact assessment for the project was undertaken by Eco Logical Australia Pty Ltd (refer to Annexure G of Appendix S (Technical working paper: Biodiversity) of the EIS).

A tree retention assessment was undertaken in accordance with the Institute of Australian Consulting Arboculturalists (IACA)'s Significance of a Tree Assessment Rating System (STARS) and each tree or group of trees was given a retention value of Low, Medium and High. About 540 subject trees were identified within the study area that can be retained, 21 of which had been identified as having a high retention value. The assessment was undertaken in line with the SEARs requirement to minimise impacts following the hierarchy of avoid, minimise and mitigate impacts to trees. The assessment was based on the current project footprint and concept design for the project.

Around 1,675 trees potentially require removal to facilitate the project. Around 100 trees were identified as high retention value. Opportunities for retaining these high retention value trees would be investigated during detailed design.

A further 355 trees were identified to be investigated further during detailed design to determine their suitability for retention, 34 of which were identified as having a high retention value. Trees adjacent to the light rail corridor at the corner of The Crescent and City West Link are to be investigated for retention as reflected in environmental management measure LV18 in **Chapter E1** (Environmental management measures). Other areas identified for further investigation include groups of trees along Lilyfield Road that may offer visual screening, and the approaches to Anzac Bridge.

Further opportunities to retain trees may emerge during detailed design. All opportunities for retaining additional trees through tree sensitive design and construction methods would be considered. Where retention of trees is not possible, compensatory planting would be carried out. Replacement trees would be planted within, or close to, the project footprint where feasible and practical.

The environmental management measures B5, B6, B7, B8 and OB9 in **Chapter E1** (Environmental management measures) outline the approach to be used to minimise tree loss and to replace trees which are lost.

B12.18.14 Foraging range for Grey-headed Flying-fox

Attachment 1 (Beca report) Section 18.3.2, p139

Lack of impact concluded due to foraging habitat availability within GHFF range. State / reference typical foraging range for GHFF and identify alternative habitat within this range.

Response

An assessment of the potential impact on the Grey-headed Flying-fox is discussed in Annexure E of Appendix S (Technical working paper: Biodiversity) of the EIS.

The foraging range for the Grey-headed Flying-fox can be up to 50 kilometres from a camp in an evening. According to the draft Recovery Plan for the Grey-headed Flying-fox (Department of the Environment and Energy 2017), habitat critical to the survival of the population (not the species, given the Australian population is one and the same) is that which is within 50 kilometres of a camp that has over 30,000 individuals. An estimate of the native vegetation habitat within 50 kilometres of the Gordon camp (which had more than 30,000 individuals in 2014) was about 77,000 hectares of native vegetation. This would not have included street trees, urban fruit trees and palms.

Foraging habitat within 50 kilometres of Rozelle would include all of Royal National Park, Heathcote National Park, most of the Holsworthy Military Area, parts of Georges River National Park and the Illawarra Escarpment Recreation Area to the south; Ku-ring-gai Chase National Park, Marramarra National Park, Garigal, Brisbane Waters National Park, Lane Cove National Park and Berowra Valley Regional Park to the north. These are all large tracts of contiguous native canopy. There would also be many smaller lands to the west which are in the conservation reserve system as well as non-native canopy. The 4.49 ha of potential foraging habitat is about 0.006 per cent of the 77,000 hectares of native vegetation within 50 kilometres of the Gordon camp.

As noted in Annexure E of Appendix S (Technical working paper: Biodiversity) of the EIS, the Grey-headed Flying-fox has not been recorded on site but is known from within close proximity to the study area. The vegetation within the study area provides marginal potential foraging habitat in the form of individual Fig Trees (*Ficus* sp.) and limited flowering eucalyptus (planted street scapes). It is considered likely that this species would use the site and adjacent areas on occasion for foraging purposes. No roosting camps are located within the site.

The foraging habitat to be impacted by the works occurs within and on the edge of the subject site. Potential foraging habitat for this species is abundant throughout the locality, and the species is known to travel large distances for food sources. Whilst the habitat may contribute as a ‘stepping stone’ for this highly mobile species to other more substantial foraging habitat sites, this function is unlikely to be significantly inhibited by the works. Furthermore, this species has been recorded in urban environments and is likely to continue to forage adjacent to the site and across the broader locality. Therefore, the works will not fragment an existing important population into two or more populations.

The habitat to be removed consists of individual trees representing a negligible amount of potential foraging resources within the species foraging range. A number of areas providing potential habitat for this species are present in close proximity to the site, at nearby local parks and across the broader landscape. In consideration of the species foraging activity, widely across the landscape on a variety of vegetation, the loss of 4.49 hectares of potential foraging habitat within the project footprint is unlikely to cause a decline in the species.

B12.18.15 Impact on aquatic ecology

Attachment 1 (Beca report) Section 18.3.3, p139

The argument of no aquatic ecology impact based on annual mean pollutant loads given in the soils and water chapter is predicated on (1) Validity of those calculations which have been questioned in this review (2) Likely impacts being chronic rather than acute. Update section following revision to soil and water chapter calculations and consider acute toxicity issues in the assessment.

Response

Section 9.4.1 of Appendix S (Technical working paper: Biodiversity) of the EIS notes that no impacts on aquatic biodiversity due to water quality are likely to occur as a result of the project. Appendix Q (Technical working paper: Surface water and flooding) of the EIS has concluded that no adverse cumulative surface water quality impacts are anticipated with implementation of appropriate management measures as part of the project and the residual risk to the environment would be low.

In accordance with environmental management measure SW01 (see **Chapter E1** (Environmental management measures)) a CSWMP will be prepared for the project. The plan will include the measures that will be implemented to manage and monitor potential surface water quality impacts during construction. The CSWMP will be developed in accordance with the principles and requirements in *Managing Urban Stormwater – Soils and Construction, Volume 1* (Landcom 2004) and Volume 2D (NSW Department of Environment, Climate Change and Water 2008), commonly referred to as the 'Blue Book'.

Further, and in accordance with environmental management measure SW02 (see **Chapter E1** (Environmental management measures)) a program to monitor potential surface water quality impacts due to the project will be developed and included in the CSWMP. A program to monitor potential surface water quality impacts due to the project will be developed and included in the CSWMP. The program will include the water quality monitoring parameters and the monitoring locations identified in Annexure E of Appendix Q (Technical working paper: Surface water and flooding) to the EIS where appropriate. The monitoring program will commence prior to any ground disturbance to establish appropriate baseline conditions and continue for the duration of construction and until the affected waterways are rehabilitated to an acceptable condition as certified by a suitably qualified and experienced independent expert (or as otherwise required by any project conditions of approval). Further details to be included in the program are outlined in Appendix Q (Technical working paper: Surface water and flooding) of the EIS.

The Construction Flora and Fauna Management Plan (environmental management measure B1 in **Chapter E1** (Environmental management measures)) also includes the standard precautions and mitigation measures of the *Policy and Guidelines for Fish Habitat Conservation and Management Update 2013* (DPI-Fisheries 2013). This includes the use of appropriate management measures such as silt curtains or booms. Therefore, water quality impacts such that they would affect marine species or their habitat, are not expected to occur (refer to Chapter 18 (Biodiversity) of the EIS).

B12.18.16 Biodiversity impacts from sediment

Attachment 1 (Beca report) Section 18.3.3, p139

No mention of contaminated sediment resuspension from bridge works and subsequent release of particulate-bound contaminants into the water column which may be more bioavailable. Further work required for both chronic and acute toxicity plus physical smothering impacts.

Response

Sediment investigations were conducted in areas of proposed intrusive construction works at The Crescent and adjacent to Rozelle Bay where a high potential for contamination was identified to be present as a result of historical land use activities (see section 4.9.9 of Appendix R (Technical working paper: Contamination) of the EIS).

Water quality could potentially be impacted by sediment runoff and deposition, polluted road runoff, high velocity runoff/discharge mobilising sediments, and oil and pollutant spills entering the waterway. Uncontrolled runoff or discharge can influence the water quality in waterways, such as water temperature, turbidity, pH, salinity and alkalinity. These impacts may reduce water quality, reduce light penetration through the water column, and smother benthic habitat with sediment. This could alter primary (plant) and secondary (animal) production that supports or regulates the aquatic food web. However, the receiving waterways are highly disturbed ecosystems and the project would generally reduce the mean annual stormwater pollutant loads being discharged to receiving waterways when compared to the existing conditions. Impacts on aquatic habitat as a result of water quality impacts during construction would be short term and would be minimised through the implementation of appropriate management measures.

Management measures will be implemented to ensure that the project has no adverse surface water quality impacts (see **Chapter E1** (Environmental management measures)), such as the requirement to produce site-specific ESCPs for each work location associated with or in the vicinity of waterways and culverts that would be modified as part of the project. The Construction Flora and Fauna Management Plan (environmental management measure B1) also includes the Standard precautions and mitigation measures of the *Policy and Guidelines for Fish Habitat Conservation and Management Update 2013* (DPI-Fisheries 2013). This includes the use of appropriate management measures such as silt curtains or booms. Therefore, water quality impacts such that they would affect marine species or their habitat, are not expected to occur (refer to Chapter 18 (Biodiversity) of the EIS).

B12.18.17 Groundwater dependent ecosystems

Attachment 1 (Beca report) Section 18.3.4, p139

Minimum depth stated as 2m and statement that this means it is not sole source of water for plants.

Further investigation required. What are the groundwater depths at the specific locations where sensitive flora currently reside? Further exploration of water dependence for the specific flora found here in terms of effective root zone and with reference to dry periods when plant lysimeter studies have demonstrated that plants switch to alternative deeper water sources at times of high demand.

Response

A review of the *Water Sharing Plan for the Greater Metropolitan Region Groundwater Sources* (2011) and the *National Atlas of Groundwater Dependant Ecosystems* (viewed 22 August 2016) indicated there are no high priority groundwater dependant ecosystems within the study area. The nearest high priority wetlands are the Botany Wetlands and Lachlan Swamps within the Botany Sands, located at Centennial Park, around five kilometres east of the easternmost point of the project footprint, and beyond the range of potential impact.

There is a manmade wetland constructed at Whites Creek Valley Park at Annandale, immediately west of Whites Creek. This wetland is unlikely to have any groundwater dependence as it continually receives low flows from Whites Creek. Groundwater levels within the Whites Creek alluvium are unlikely to be adversely impacted during construction because the tunnels are below the alluvium. Groundwater levels are predicted to be drawn down in the Hawkesbury Sandstone but are unlikely to have any groundwater dependence in this area.

B12.18.18 Aquatic monitoring

Attachment 1 (Beca report) Section 18.5, p139

Aquatic impact monitoring (e.g. water quality monitoring with subsequent ecological monitoring if an impact is detected) not considered. Aquatic monitoring important, especially focussed on bridge dredging / piling activities.

Response

A program to monitor potential surface water quality impacts due to the project would be developed and included in the CSWMP as reflected in environmental management measure SW01 in **Chapter E1** (Environmental management measures). The program would include the water quality monitoring parameters and the monitoring locations identified in Annexure E of Appendix Q (Technical working paper: Surface water and flooding) of the EIS where appropriate. The monitoring program would commence prior to any ground disturbance to establish appropriate baseline conditions and continue for the duration of construction, as well as for a minimum of three years following the completion of construction or until the affected waterways are certified by a suitably qualified and experienced independent expert as being rehabilitated to an acceptable condition (or as otherwise required by any project conditions of approval). Further details to be included in the program are outlined in Appendix Q (Technical working paper: Surface water and flooding) of the EIS.

B12.18.19 Pest species

Attachment 1 (Beca report) Section 11.6.3, p106

Assessment of introduction of habitat for pest species has not been covered. For instance, increased waterscapes could increase breeding for mosquitos and provide refuge for vermin. Increased tress may also attract flying foxes / possums. This issue should be summarised in this section [human health risk] with cross-reference to the biodiversity chapter where more detailed information would be expected.

Response

Invasion and spread of weeds, pests, pathogens and disease was assessed in sections 9.4.7, 9.4.8 and 9.4.9 of Appendix S (Technical working paper: Biodiversity) of the EIS.

B12.19 Groundwater

Refer to Chapter 19 (Groundwater) and Appendix (Technical working paper: Groundwater) of the EIS for details of groundwater.

B12.19.1 Compliance with the guidelines

Attachment 1 (Beca report) Section 19.1, p140

Guidance document listed are appropriate and cover requirements listed in SEARS.

Attachment 1 (Beca report) Section 19.1.3, p140

Groundwater bore locations justified. Duration, frequency (or hourly resolution for automatic depth loggers) and tested parameters are all deemed to be sufficient.

Attachment 1 (Beca report) Section 19.1.5, p140

The groundwater model has not been reviewed as part of this review. Model guidelines, work flow logic, model package and scenario runs are all deemed to be appropriate.

Attachment 1 (Beca report) p142

This groundwater assessment is generally comprehensive, addresses the content of the SEARS and utilises appropriate guidelines for assessing impacts. Surface water runoff contributions to the watercourses should be presented in tandem with baseflow contributions and the proportion of decrease compared again to assess significance. Lack of a geotechnical model to predict ground movement is a shortfall in the study and exclusion at this stage is not justified.

Attachment 1 (Beca report) Section 19.1.1, p140

No justification for study area / model domain spatial extent is provided. This should be based on potential receptor impacts.

Response

Noted.

A preliminary assessment of ground movement is included in section 12.3.4 of the EIS. Further assessment of settlement impacts, including numerical modelling, is to be undertaken during detailed design as reflected in environmental management measure PL7 in **Chapter E1** (Environmental management measures).

Indicative daily volumes of wastewater at each site and associated indicative discharge points are shown in Table 2-4 of Appendix Q (Technical working paper: Surface water and flooding) of the EIS. The impact of discharged water on base flow rates of receiving waterways is discussed in **section B12.19.7**.

The study area or model domain extends over 121 square kilometres (11 by 11 kilometres) which covers all potential receptor impacts and was determined in consultation with the NSW Department of Primary Industries – Water. The active domain is centred on the mainline tunnel and fully covers the project footprint, including interface areas with the M4 East and New M5 projects.

B12.19.2 Groundwater flow directions

Attachment 1 (Beca report) Section 19.2.5, p140

No generalised flow directions for the different geological units are presented. A map delineating flow pathway would be expected.

Response

The review of the groundwater level contours for the Hawkesbury Sandstone shows the dominant groundwater flow direction is similar to the Ashfield Shale, flowing towards Botany Bay and Sydney Harbour. Groundwater flow directions are described in section 4.9 of Appendix T (Technical working paper: Groundwater) of the EIS. These are illustrated graphically in Figures 4-10 and 4-11 of Appendix T of the EIS for the alluvium, Figures 4-12, 4-13 and 4-14 of Appendix T (Technical working paper: Groundwater) of the EIS for the Ashfield Shale and Figure 4-17 for Hawkesbury Sandstone.

B12.19.3 Hydraulic conductivity

Attachment 1 (Beca report) Section 19.2.5, p141

No hydraulic conductivity data was collected for alluvium. This is important as it controls connectivity in valleys associated with drainage channels that could potentially discharge contaminated groundwater into the surface water environment. Justification for not using literature values for hydraulic conductivity in alluvium required.

Response

Section 4.11.1 of Appendix T (Technical working paper: Groundwater) of the EIS notes that typical hydraulic conductivity values for similar lithologies across the Sydney Basin would be expected to range from 0.001 metres per day for clayey alluvium up to 1 metre per day for sandy alluvium. The hydraulic conductivity of alluvium in a similar depositional environment associated with Wolli Creek is noted to be between 0.2 and 0.8 metres per day based on slug tests (CDM Smith 2016). As these hydraulic conductivity values were derived from the CDM Smith report, literature values have been used.

B12.19.4 Status of domestic bores

Attachment 1 (Beca report) Section 19.2.8, p141

Unknown if four domestic bores are still operating. Clarification required.

Response

As discussed in section 4.10 of Appendix T (Technical working paper: Groundwater) of the EIS, four domestic bores are located within the study area, ranging in distance between 210 metres and 1,480 metres from the tunnel corridor. It is not known if these bores are still used for domestic use or have been abandoned. One registered domestic bore, at the University of Sydney at Camperdown (GW110247), is known to be still in use as noted in section 19.2.8 of the EIS. As noted in section 19.4.3 of the EIS, two of the bores are located within Botany Sands (GW106192 and GW111164) and no longer permitted to be used for domestic purposes. The use of a shallow bore at Abbotsford (GW106159) is unknown. These bores were still considered in the assessment, regardless of whether or not they are in use.

B12.19.5 Groundwater dependent ecosystems

Attachment 1 (Beca report) Section 19.2.9, p141

Justify range of potential impact and therefore exclusion of Botany Wetlands / Lachlan Swamps GDE's from assessment. Clarification required based on connectivity and scale of physical / chemical impacts.

Attachment 1 (Beca report) Section 19.3.3, p140

Whites Creek Valley Park wetland is not acknowledged earlier in Section 19.2.9. Rationale for no groundwater dependence needs more detail - low flows from Whites Creek - does not necessarily preclude inflows from groundwater being important as well. Further information on lack of groundwater dependence required.

Attachment 1 (Beca report) Section 19.4.3., p142

Rozelle Rail Yards vegetation may be shallow rooted and dependant on groundwater. This groundwater dependency should be considered in the selection of appropriate plants for the open space area.

Response

The human-made wetland constructed at the Whites Creek Valley Park at Annandale is located immediately west of Whites Creek. This wetland is unlikely to have significant groundwater dependence as it continually receives low flows from Whites Creek. Groundwater levels within the Whites Creek alluvium are unlikely to be adversely impacted during construction because the tunnels are located at depth below the alluvium. Groundwater levels are predicted to be drawn down in the Hawkesbury Sandstone, but ecosystems are unlikely to have any groundwater dependence in this area.

The Botany Wetlands and Lachlan Swamps within the Botany Sands, located at Centennial Park, are located around five kilometres east of the easternmost point of the project footprint, and beyond the range of potential groundwater impact, These wetlands are at a sufficient distance from the project footprint to not be impacted by the project and potential impacts to these wetlands and groundwater dependant ecosystems due to the New M5 were assessed in the New M5 EIS.

The selection of vegetation for the open space area in Rozelle Rail Yards would be identified in the UDLP, in consultation with relevant stakeholders and the community.

B12.19.6 Quantification of groundwater level drawdown

Attachment 1 (Beca report) Section 19.3.3, p141

No quantification of groundwater level drawdown is provided. Figure is difficult to interpret and no baseline water table elevations are provided for comparison. Summarise drawdown levels predicted and provided percentage change in drawdown levels on map.

Response

During construction, the regional extent of drawdown impacts due to tunnel construction would be minimal, even though groundwater inflows are high. This is due to the generally low hydraulic conductivity of the Ashfield Shale and the Hawkesbury Sandstone restricting the extent of drawdown during the relatively short construction timeframe. Given the scale of the study area (11 kilometres by 11 kilometres) and a drawdown of two metres or more extending no more than 600 metres from the tunnel the mapping of percentage changes would not aid in the assessment of the impact as, for absolute water level, they do not have any relevant meaning.

Predicted drawdown levels at project opening are shown graphically in Figures 6-1, 6-2, 6-3 and 6-4 of the EIS and is discussed in section 6.3 of Appendix T (Technical working paper: Groundwater) and section 6.2 of Annexure H of Appendix T (Technical working paper: Groundwater) of the EIS. Drawdown levels for the year 2100 are shown in Figure 6-5 of Annexure H of Appendix T (Technical working paper: Groundwater) and discussed in section 6.2.2 of Annexure H of Appendix T (Technical working paper: Groundwater) of the EIS. Figure 19-6 in the EIS is incorrect and should be replaced with Figure 5-7 from Annexure H of Appendix T (Technical working paper: Groundwater) of the EIS. This error has been corrected in **Chapter A4** (Clarifications).

B12.19.7 Surface water runoff

Attachment 1 (Beca report) Section 19.3.3, p141

It is difficult to interpret if changes to baseflow are significant to local watercourses without also knowing flows derived from surface water runoff. Flows from surface water runoff should also be presented and the significance of reductions in baseflow should be re- evaluated on the basis of proportion of overall flow.

Response

No information is available on baseflows to these watercourses. The creeks and canals are artificial/heavily modified (concrete lined channels), are located in built up urban areas and serve large catchments. This significantly influences flow volumes, durations and velocities during rainfall events. As a result, the baseflows are highly variable.

As discussed in section 5.2.1 of Appendix Q (Technical report: Surface water and flooding) of the EIS, discharge of treated construction water would have a minor increase in base flow rates of receiving waterways. Daily discharge rates are provided in section 2.4.1 of Appendix Q (Technical report: Surface water and flooding) of the EIS. The locations of discharge points in Dobroyd Canal, Hawthorne Canal, Easton Park drain and Alexandria Canal, all artificial waterways, are reaches that are tidally influenced. As the flow variability within the study area is dominated by tides and given the urban setting and artificial nature of the waterways, it is not considered likely that project discharges during construction would significantly impact on the natural flow variability or environmental water availability at these locations.

B12.19.8 Potential acid sulfate soils

Attachment 1 (Beca report) Section 19.3.4, p141

Two sites are identified with PASS compared to five sites in the Soils and Water Chapter. Check for consistency.

Response

The list of sites identified in Chapter 15 (Soil and water quality) of the EIS lists five areas within the project footprint identified to contain acid sulfate soils or potential acid sulfate soils (PASS). Of these sites, only the Rozelle civil and tunnel site (C5) is identified as containing PASS.

In Chapter 19 (Groundwater) of the EIS, two areas are identified as containing PASS, being Rozelle Rail Yards and Leichhardt. The area identified within Leichhardt (surrounding the Hawthorne Canal) was mistakenly shown as containing PASS as it is not part of the project footprint. Therefore, there is only one identified PASS site (Rozelle).

B12.19.9 Ground settlement

Attachment 1 (Beca report) Section 19.3.8, p142

No geotechnical modelling has been conducted to date to predict the impacts of volume loss / groundwater drawdown on ground movement. Without this knowledge it is difficult to assess the magnitude of impact nor the suitability of management measures for this issue. Resulting subsidence could cause damage to heritage buildings, residential buildings, impact functioning of pathways and reduce property prices. Justification for not conducting robust assessment of ground movement at this stage is required.

Response

As noted in section 12.3.4 of the EIS, the preliminary assessment of ground movement does not include prediction of settlement as a result of groundwater drawdown (ie consolidation settlement). In contrast to predicting tunnel excavation-induced ground movement, which has a well-documented and accepted methodology, prediction of consolidation settlement relies on the prediction of induced groundwater drawdown, which is complex and subject to significant uncertainties.

Settlement that occurs due to groundwater drawdown is gradual and generally occurs at a slower rate (possibly over years). It can sometimes also be difficult to distinguish from settlement due to groundwater drawdown that may be naturally occurring; or occurring due to another influence; or occurring as a result of seasonal variations is soil moisture which can cause swelling or shrinkage of the soil. The extent of groundwater drawdown often occurs over a wider area beyond the location of the tunnels and results in a wider and shallower settlement trough which is less likely to result in differential settlement and tensile strain on buildings, minimising the potential for building damage.

The risks associated with groundwater drawdown and induced settlement within the Ashfield Shale and Hawkesbury Sandstone is considered low because of the geotechnical properties of the rock. As water is removed from these rock types the structural integrity and strength of the rock remains due to its competent nature. As a result, cumulative settlement impacts (ie settlement due to both the removal of material and groundwater drawdown) are not anticipated to be an issue for tunnels excavated in the Hawkesbury Sandstone or Ashfield Shale. In contrast, as groundwater drawdown occurs within the alluvium the structural integrity of the unconsolidated sediment is compromised resulting in more settlement than would be expected from the sandstone and shale. Consolidation settlement impacts in the alluvium would be minimised by including tanked tunnel sections through the alluvium or by aligning the tunnels beneath the palaeochannels thereby minimising groundwater inflows into the tunnels.

Further assessment of potential settlement impacts, including numerical modelling, will be undertaken during detailed design. In areas where ground movement in excess of settlement criteria is predicted, an instrumentation and monitoring program to measure settlement, distortion or strain will be implemented. Feasible and reasonable measures will be investigated and implemented to ensure where possible that the predicted settlement is within the criteria. See environmental management measure PL7 in **Chapter E1** (Environmental management measures) for further detail. Discussion of ground settlement impacts from groundwater drawdown and the proposed environmental management measures are also presented in **section B11.13.4**.

B12.19.10 Monitoring and modelling durations

Attachment 1 (Beca report) Section 19.4.3, p142

Explain why model simulation runs to 2100. Clarification required. Justify monitoring duration of 3 years and number of wells. Clarification required.

Response

The groundwater model provides output for the year 2100 to represent groundwater conditions associated with the long term operation of the project.

Three years represents a time period by which it is expected that forward trends in groundwater levels and quality would have become well established, and therefore forward predictions can be made with greater reliability. The monitoring program will include trigger levels for response or remedial action based on monitoring results and relevant performance criteria. A three year monitoring period is also consistent with that adopted in conditions of approval for other tunnelling projects of this scale including the M4 East and New M5 projects.

B12.20 Non-Aboriginal heritage

No issues raised in the Inner West Council attachment to the Inner West Council submission was categorised under ‘Non-Aboriginal heritage’.

B12.21 Aboriginal heritage

Refer to Chapter 21 (Aboriginal heritage) and Appendix V (Technical working paper: Aboriginal heritage) of the EIS for details of Aboriginal heritage.

B12.21.1 Consideration of heritage values

Attachment 1 (Beca report) p160

The Draft *Central District Plan* sets out priorities and actions across the areas of productivity, liveability and sustainability. For liveability, a priority or action is the conservation and enhancement of environmental heritage, including Aboriginal heritage. Chapter 20 (Aboriginal Heritage) did not identify any items, objects, areas or places or intangible cultural heritage values identified within the specific works footprint that would require mitigation or avoidance. The chapter does however provide a summary of the rich cultural ethnographic heritage of the wider environment prior to European settlement. Chapter 13 (Urban Design and Visual Amenity) contains a table on page 13-72 that outlines the urban design principles adopted by the project, and how these have been implemented. For the principle of 'Place sensitive design', this is described as 'celebrating and working with the character of each place and destination, responding to their unique histories, materiality, architecture, built fabric, cultural context, landform and topography'. The identified project responses to this principle appear only to respond to non-Aboriginal, European settlement culture and historical context. To fulfil the Draft Central District Plan priority, and a key urban design principle, the urban design for the project should seek to enhance the Aboriginal cultural context and unique history of the wider area, including significant landform features, alongside non-Aboriginal heritage of the area.

Response

The Urban Design Principle's 'place sensitive design' requirement directs that new infrastructure responds appropriately to the existing character of the landscape where it is situated. Prior Aboriginal occupation is represented in 'unique histories, materiality, architecture, built fabric, cultural context, landform and topography'. Reducing it to an equation with 'significant landform features' perpetuates outdated stereotypes of Aboriginal people as being 'nature's children'. The appropriate mechanism for ensuring that the complexity and richness of Aboriginal occupation and its significant values are communicated is the Heritage Interpretation Strategy, which is prescribed in environmental management measure NAH02 (see **Chapter E1** (Environmental management measures)). The Strategy will inform the development of the UDLP. It will be prepared in accordance with NSW Heritage Office *Interpreting Heritage Places and Items Guideline August 2005*.

B12.22 Greenhouse gas

Refer to Chapter 22 (Greenhouse gas) and Appendix W (Detailed greenhouse gas calculations) of the EIS for details of Greenhouse gas.

B12.22.1 General comment

Attachment 1 (Beca report) Section 22 Overall Evaluation, p146

Methodology Section 22 and Appendix W of the EIS have set out the greenhouse gas inventory including calculation methodology for the M4-M5 link project (the project). There are no requirements in the SEARS for the project environmental assessment which are specific to greenhouse gas emissions. A greenhouse gas inventory has been prepared for the project based on the technical guidelines listed in cell C5. It is noted that these standards are generally applied to emissions inventories prepared in Australia. The standards have been used for the development of greenhouse gas inventories on similar projects including WestConnex M4 East and New M5 projects.

The TAGG Workbook is a methodology prepared by the Transport Authorities Greenhouse Group, a group of Australian state and New Zealand Transport authorities, to assist the preparation of greenhouse gas inventories for the construction, operation and maintenance of road projects. This methodology considers emissions sources of 'typical' road projects that are material to a project. The author has noted in Appendix W that the TAGG Workbook materiality checklist has been used to develop the list of material emissions sources used for this emissions inventory. It is not noted whether there are any 'non-typical' project emissions sources which also require consideration. Materiality is defined as contributing 5% or greater of the total emissions profile, and therefore minor emissions sources would not be included in this assessment.

Emissions from road users during operation have been calculated based on traffic modelling for 2023 and 2033 scenarios. The author has assumed continued improvements in vehicle fuel efficiency will be achieved for these scenarios. Modelling of traffic volumes is reviewed in other sections of this report and hence not included in assessment of this section. Emissions associated with vehicle use on project roads are compared to the 'do minimum' scenario (using the existing road network) to assess the cumulative effect on national and state emissions projections at 2023 and 2033 scenarios. Emissions from vehicle use have been calculated based on the methodology outlined in the NGER Act and applying the current NGA Factors. This methodology appears to be appropriate for this study.

Overall, the methodology used to prepare the greenhouse gas inventory for this project appears to be suitable. This review has not included an assessment of the completeness and accuracy of individual emissions source calculations, although it is noted that (as per Appendix W) the emissions factors and calculation methodology generally appear to align to the NGER calculation methodology, being the relevant Australian reporting guidelines. Minor emissions sources contributing less than 5% of total project emissions have not been included in the author's calculations, and hence may impact the net project emissions. However, any impact from exclusion of these minor sources is likely to be below the level of materiality.

Response

Inner West Council's comments regarding the methodology are noted.

Minor emissions, those which contribute less than 5 per cent are not considered to material in the assessment and the exclusion of these in the assessment is consistent with the approach as described in section 2.3.2 of the *Greenhouse Gas Assessment Workbook for Road Projects* (the TAGG Workbook) (Transport Authorities Greenhouse Group (TAGG) 2013). The justification for this approach is provided in section 1.1 of Appendix W (Detailed greenhouse gas calculations) of the EIS.

B12.22.2 Use of traffic modelling in the greenhouse gas assessment

Attachment 1 (Beca report) Section 22, p143

A number of concerns have been raised of the underlying traffic & transport assessment, which has been addressed in this review of EIS Chapter 8. The greenhouse gas assessment does not provide a comparison to public transport improvements, nor do any of the cumulative case scenarios include impacts of Sydney Metro West which has a similar catchment area to WestConnex. Improvements to the public transport network would be expected to have a positive net benefit per passenger kilometre travelled compared to travel by car for CO_2- equivalent emissions. It is also noted that there is an increase in vehicle kilometres travelled within the study area between 2015 and 2023. Further investigation is recommended as to why this increase is projected. There is a risk that daily vehicle kilometres travelled is overstated, which would impact the estimated carbon- equivalent savings reported on in Chapter 22. Commensurate with SEARs Key Issues and Desired performance outcome 1 (Transport and Traffic), greenhouse gas assessment should give regard to "considerations of opportunities to improve public transport" (2-f) as an alternative baseline.

Attachment 1 (Beca report) Section 22, p144

Overall, the greenhouse gas assessment is highly dependent on the traffic modelling, in particular the following projections: - traffic volumes on WestConnex; - reductions in traffic volumes on other roads; - travel and vehicle efficiencies[.] For further details on the traffic & transport section refer to Chapter 8 of this assessment. It is recommended that the greenhouse gas calculations are re-calculated as a result of any revisions recommended as part of this review to the traffic model.

Response

The greenhouse gas (GHG) assessment was based on a conservative approach, assessing the GHG contribution from the project as proposed in the EIS. This is in line with relevant GHG reporting legislation and international reporting guidelines including the *Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard* (World Council for Sustainable Business Development and World Resources Institute 2005). The assessment does not compare GHG emissions of the project with alternative modes such as public transport, since these modes are intended to be complementary, rather than exclusive.

As noted in section 3.2 of the EIS, Sydney's population is forecast to increase from 4.3 to 5.9 million by 2031 (NSW Government 2014), which equates to an average of 80,000 additional residents per year. Moreover, by 2036, the number of trips made around Sydney each day is forecast to increase by 31 per cent from 16 to 21 million vehicle movements. Increases in the number of vehicle movements would also increase the vehicle kilometres travelled in the study area.

The discussion provided in section 22.5 of the EIS acknowledges that savings in emissions would reduce over time as traffic volumes increase in line with forecast population growth. However, improvements in fuel efficiency and increased uptake of vehicles that do not release GHG emissions, including electric vehicles are likely to offset some of the increased emissions due to increases in the vehicle kilometres travelled.

Section B12.8.2 provides responses to issues raised relating to the adequacy of the methodology for the traffic forecasts and modelling raised by Inner West Council. The traffic and transport assessment for the project utilised an industry standard strategic transport model administered by Roads and Maritime. An integral part of the traffic modelling process was the involvement of independent expert peer reviewers to examine model development, traffic forecasts and associated methodologies. It is therefore considered that the traffic model comprised the best available input for calculating GHG emissions from vehicles and no revision of the traffic or greenhouse gas emissions model are proposed. Concerns with regards to the traffic modelling undertaken for the project are also discussed in **Chapter C8** (Traffic and transport).

B12.22.3 Emissions from tunnel excavation

Attachment 1 (Beca report) Section 22.7.1, p145

"Reduced energy and resource consumption, and spoil generation, during tunnel excavation, through selection of roadheaders and drill and blast for excavation, as opposed to the use of a tunnel boring machine". This statement is vague and it is not clear or quantified what is the expected impact on the project in terms of reduction in greenhouse emissions. Please provide supporting information to validate this statement and in particular, how it impacts on estimated quantities of greenhouse gas emissions.

Response

A number of tunnel construction methods were considered and are described in section 4.6.3 of the EIS. Methods considered included using a tunnel boring machine, drill and blast and roadheader excavation. A combination of roadheader excavation and drill and blast methods were proposed for the following reasons:

- The combination would generate less spoil than a tunnel boring machine
- The combination would take less time than a tunnel boring machine
- The combination would take less time than if the work was undertaken solely with roadheaders.

Tunnel boring machines consume more electricity, potable water and concrete, and generate more spoil in comparison to the use of roadheaders and drill and blast for excavation of the tunnels. Therefore, the use of the roadheaders and drill and blast combination would involve reduced energy, and hence less greenhouse emissions, less resource consumption and spoil generation during excavation compared to the use of a tunnel boring machine.

B12.22.4 Consideration of active transport

Attachment 1 (Beca report) Section 22.7.1, p145

"The project would facilitate improvements to pedestrian and cyclist paths, linking existing active transport networks with new connections at Rozelle and St Peters, and reducing the need for reliance on road transport between these communities". This statement is vague and it is not clear or quantified what is the expected impact on the project in terms of reduction in greenhouse emissions.

Have these pedestrian and cycling linking efficiencies been included in the greenhouse gas calculations? If so, to what extent have these efficiencies been quantified? Include evidence on how this would be addressed by the project.

Response

The GHG assessment was based on a conservative approach, assessing the GHG contribution from the project as proposed in the EIS. Therefore, the assessment does not compare GHG emissions of the project with alternative modes such as active transport.

Increased rates of active transport, facilitated by improved active transport links to be provided by the project at Rozelle and St Peters, for short duration journeys between St Peters and Rozelle would likely only result in a very minor reduction in the contribution in the greenhouse gas emissions of the project, and therefore would not make a material difference to the assessment.

B12.22.5 Sensitivity analysis of scope 3 emissions estimate

Attachment 1 (Beca report) Section W-6.1, p144

It is noted by the author in Appendix W that there is some uncertainty around the accuracy of the fuel consumption coefficients provided in the *Austroads Guide to Project Evaluation Part 4: Project Evaluation Data, Part 6* (2008). This would impact the Scope 3 road use emissions estimated in this assessment and the assumptions used to generate traffic forecasts as part of the WRTM. Conduct a sensitivity analysis of impacts on emissions savings calculated.

Response

The GHG assessment was based on a conservative approach, in line with relevant GHG reporting legislation and international reporting guidelines including the *Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard* (World Council for Sustainable Business Development and World Resources Institute 2005). Appendix W (Detailed greenhouse gas calculations) of the EIS provides the assumptions that were used to inform the assessment of GHG emissions, with conservative emissions factors and default quantity factors used where inputs were unavailable or unknown during preparation of the EIS.

The discussion provided in section 22.5 of the EIS acknowledges that savings in emissions would reduce over time as traffic volumes increase in line with forecast population growth. Improvements in vehicle fuel efficiency and increased uptake of vehicles which do not release GHG emissions, including electric vehicles, are likely to improve average fuel consumption coefficients.

B12.23 Resource use and waste minimisation

Refer to Chapter 23 (Resource use and waste minimisation) of the EIS for details of resource use and waste minimisation.

B12.23.1 Compliance with SEARS

Attachment 1 (Beca report) Section 23, p147

Wastes have been classified in accordance with the Waste Classification Guidelines: Part 1 Classifying Waste (NSW EPA 2014). Estimates of quantities of waste have been provided for spoil, which is the biggest waste stream that will require management, indicative wastewater volumes have also been provided. Whilst no other estimates of waste streams have been provided, it is considered that these will not be significant compared to the spoil stream. Details have been provided regarding segregation of uncontaminated and contaminated spoil, as well as other special wastes. Spoil stockpile locations and volumes have been provided. Potential spoil reuse locations have been identified. Principles relating to the waste hierarchy are planned to be followed. The requirement for contingency management of unexpected waste has been addressed. Where required, off-site disposal locations for contaminated spoil and other special wastes would be at appropriately licenced facilities. All of the above is considered to be in accordance with the SEARs. Further detail would be provided in a Construction Waste Management Plan (CWMP). This will document all waste handling, storage and disposal procedures, and include specifics regarding waste storage locations, segregation systems, labelling and signage.

Attachment 1 (Beca report) Section 23 Overall Evaluation, p150

Comprehensive document and meets all SEARs requirements. Good identification of spoil re-use sites, plus cumulative effect assessment, and mitigation response. Sustainable remediation principles referenced for contaminated land. Chapters for Air, Noise, Soil and Water and Contamination have not been reviewed in this section in detail to inform the above comments. Overall comment is regarding the issue of multiple overlapping plans containing similar controls and the difficulty this would present a contractor in understanding practically what needs to be done on site. This presents a risk that the correct controls may not be applied. Recommendation is to consolidate controls and procedures into one plan to ensure clarity if possible. Typical best practice would be to provide these as appendices to an overarching CEMP. This process would ensure consistency through the various plans.

Response

Noted.

B12.23.2 Impacts associated with wastes

Attachment 1 (Beca report) Section 23.3.1, p148

Environmental impacts of excavation, handling, storage and transport of waste has been assessed throughout the EIS document. Specific chapters relating to dust impacts, noise impacts, sediment control have been prepared and these have been assessed in detail by others.

Response

Noted.

B12.23.3 Supply chain

Attachment 1 (Beca report) Section 23.3.1, p148

More detail could be provided regarding how the authors would influence supply chain sourcing of materials and equipment. Current wording indicates 'sustainability' would be factored into a procedure for procurement and management of subcontractors. Suggest clarifying this, in line with principles documented in Chapter 23 or potentially those included in Chapter 27. Clarify which principles would be factored into supply chain sourcing of materials and equipment.

Response

The EIS states that ‘a procedure for the procurement and management of subcontractors that factors in sustainability would be developed and delivered’ (refer to section 23.3.1 of the EIS). It is expected that the design and construction contractor(s) will consider sustainable procurement taking into consideration of the procurement and purchasing category in the Infrastructure Sustainability rating scheme.

While it would be the responsibility for the design and construction contractor(s) to determine how these will be embedded into supply chain requirements, this will include the items identified in Table 27-3 of the EIS. The design and construction contractor(s) may also consider the adoption of other requirements which support the principles of the resource management hierarchy discussed in section 23.2 of the EIS. This may include the selection of construction materials which are environmentally labelled, a requirement for suppliers to provide construction materials which are not packaged or are returnable for reuse, or value engineering during the design which results in reduced consumption of virgin resources.

B12.23.4 Asbestos management

Attachment 1 (Beca report) Section 23.3.2, p148

It is noted that there will be a specific Asbestos Management Plan for these types of waste that will document excavation, handling, storage, movement and disposal - is it the intention that this plan will also contain controls relating to airborne particles (environmental and human exposure) as opposed to the Construction Air Quality Management Plan? If so this could be made clearer.

Clarify whether this plan will contain controls relating to airborne particles (environmental and human exposure) as opposed to the Construction Air Quality Management Plan.

Response

Asbestos Management Plans would contain controls relating to airborne particles (environmental and human exposure) in accordance with the legislation, standards and codes of practice identified in the special wastes subsection of section 23.3.2 of the EIS and any conditions of approval for the project.

B12.23.5 Operational waste management

Attachment 1 (Beca report) Section 24.4.1, p149

Operational impacts identified in this section do not include materials consumption nor waste generation from any more major works that could be required - e.g. pavement resurfacing. If the project (tunnel) has a 100 yr design life, with pavement considered to be less, then it is likely resurfacing would be required. It is noted that maintenance and repair activities would be subject to separate assessment processes, however there are no considerations as to how the principles and practices in the construction phase should be continued in the operational phase.

Provide specific guidance regarding the separate maintenance and repair assessment process for materials and waste, what principles and procedures should be included.

Response

Ongoing motorway maintenance activities during operation are not included in the project. Major maintenance and repair work would be subject to separate approvals processes, and would include the identification of the management measures associated with materials and waste.

B12.23.6 Wastewater re-use

Attachment 1 (Beca report) Section 23.5, p149

Table is missing wastewater re-use and discharge as an impact during construction (this aspect is discussed in the text of the preceding sections). Add wastewater re-use and discharge as an impact in the [t]able.

Response

Wastewater re-use was included in environmental management measures ORW3 and ORW4 in Table 23-11 of the EIS in line with the discussion of wastewater reuse in section 23.4 of the EIS.

B12.24 Climate change risk and adaptation

Refer to Chapter 24 (Climate change and risk adaptation) and Appendix X (Climate Change Risk Assessment Framework) of the EIS for details of climate change and risk adaptation.

B12.24.1 General comments

Attachment 1 (Beca report) Section 24, p151

A requirement of the SEARs is that - "The Proponent must assess the risk and vulnerability of the project to climate change in accordance with the current guidelines"

Attachment 1 (Beca report) Section 24 Overall Evaluation, p153

Generally, the assessment addresses the key climate risks expected for a project of this nature, noting that a more detailed climate risk assessment will be undertaken in detailed design. It is understood that the key climate variables (increased rainfall intensity and extreme sea level rise) have been accounted for in flood modelling and drainage design (reviewed in other sections). The climate change projection data used does not meet the requirements of the SEARs for localised data, and does not address the 100 year design life of the project. Further consideration in regard to these matters is recommended. Some of the climate change projections, presented in the climate adaptation section do not appear to have been incorporated into the "Current Guidelines" listed in the SEARs do not cover all the relevant guidelines that would normally be expected to be referenced in an assessment of this nature. For example, AS 5334-2013 Climate change adaptation for settlements and infrastructure – A risk based approach.

Response

The current guidelines referred to in the SEARs (dated 3 May 2017) were:

- Australian Government's *Climate Change Impacts and Risk Management – A Guide for Business and Government* (2006)
- AS/NZS 3100:2009 *Risk Management – Principles and Guidelines*
- *Technical Guide for Climate Change Adaptation for the State Road Network* (Roads and Maritime in draft).

As noted in section 24.1 of the EIS, AS5334-2013 *Climate change adaptation for settlements and infrastructure – A risk based approach* was referenced as a current guideline during the climate change risk assessment for the project.

The use of localised (10 kilometre resolution data) is discussed in **section B12.24.2**. Consideration of impacts over the 100 year design life is discussed in **section B12.24.3**, and in the case of sea level rise, in **section B12.24.4**.

B12.24.2 Climate change projections

Attachment 1 (Beca report) Section 24, p151

The EIS notes that the importance of a single source of projections being used to ensure that the future climate presented with a consistent set of assumptions, scenarios and modelling methods applied to each projection to represent the complex interactions that occur between climate variables within the climate system is presented. As such, only the Commonwealth Scientific and Industrial Research Organisation (CSIRO) and Bureau of Meteorology (BoM) projections have been used and are standardised to represent regional projections. However, they do not provide climate projections to a 10km resolution as required in the SEARs. Whilst the NARCLIM provides climate projections for some climate variables (temperature, rainfall) to within a 10km resolution at the site, it does not cover other critical climate variables for the project such as sea level rise, storm surge and rainfall intensity which would be needed to assess the climate change risks for the project. Site specific modelling and other processes may be developed to provide climate projections for these variables to the resolution required in the SEARs. To meet the requirements of the SEARs, higher resolution data should be used where possible, or sensitivity analysis undertaken to demonstrate that this is not required.

Response

An alternative source of climate change projections was available from the NSW and the Australian Capital Territory (ACT) Regional Climate Modelling (NARCliM) project (2014), which was published in collaboration with OEH. These projections provide downscaled climate change data for a 10 kilometre resolution specific to NSW and the ACT. However, as discussed in section 24.2.2 of the EIS, while both sets of projections provide robust information on possible changes to the NSW climate, NARCliM projections are not yet available for a number of key climate variables (extreme rainfall, sea level rise, storm surge, wind speed), are based on earlier climate models used for the IPCC's Fourth Assessment Report (AR4), and the 'far future' projections are limited to the period 2060 to 2079. This presented limitations when considering potential climate change impacts on road planning and design, particularly the potential impacts of sea level rise on the project. As a result, the climate change assessment in the EIS was based on CSIRO and BoM projections and the difference between the sources of projections is not considered to have impacted the development of risk scenarios for the project.

B12.24.3 Consideration of impacts over the full design life

Attachment 1 (Beca report) Section 24.2.2, p152

It is acknowledged in the EIS that the project has a design life of 100 years (i.e. up until approximately 2025) [2125]. Noting that some individual assets (i.e. pavements) will not have a design life of 100yrs, most structures / assets should be designed to withstand projected conditions up to 2025 [2125]. Climate projections presented in the EIS do not extend beyond 2090 (approximately 65 yrs. from construction completion). We note that climate projections are generally not available up to 2025. In this case, the precautionary principle should be adopted, and extrapolation or assumptions presented. Generally, this might involve erring on the side of cautious and rounding up 2090 projections. See for example comment re: sea level allowance below.

Response

The year 2090 was selected for the initial climate change risk assessment included the EIS because it was the available projection for the time horizon closest to the end of the project design. As discussed in **section B12.24.4**, a sea level rise of 0.9 metres is considerably conservative for the compared to the current CSIRO and BoM projections of 0.88 metres for the 'High' scenario, and is likely to represent sea level changes for a time period beyond 2100.

A detailed climate change risk assessment will be undertaken during detailed design as reflected in the environmental management measure CC2 in **Chapter E1** (Environmental management measures).

B12.24.4 Sea level rise

Attachment 1 (Beca report) Section 24.2.2, p152

The vertical allowance for extreme sea level rise for the Sydney shoreline by 2090 is presented in the EIS as 0.84m under a "high emissions" scenario. The proponent has adopted a figure of 0.9m sea level rise for the project. It is noted that CSIRO and BOM (2015b) state "for the East Coast ... the vertical allowances along the cluster coastline are in the range of ... 0.78 to 0.89 m for RCP8.5 ("high emissions" scenario) by 2090". An allowance of more than 0.89 [m] should therefore be considered for the project to meet the 100yr design life requirement. An allowance of more than 0.89 should therefore be considered for the project to meet the 100yr design life requirement.

Response

Vertical allowance for extreme sea level has been calculated by CSIRO and BOM (2015b). The allowance takes into account the nature of extreme levels along the coastline, influenced by factors such as astronomical tides, storm surges and wind waves. For 2090, the vertical allowance for the Sydney shoreline ranges from 0.59 metres under an 'Intermediate' emissions scenario to 0.84 metres under a 'High' emissions scenario.

Even so, sea level rise benchmarks used in the flood risk assessment were conservative in comparison to current sea level rise and extreme sea level rise projections, and a benchmark of 0.9 metres of sea level rise by 2100 was used in the sensitivity testing undertaken for the project.

B12.24.5 Climate change consideration at Rozelle

Attachment 1 (Beca report) Section Q-C1.5, p136

No mention of climate change in Boundary Condition for Rozelle, but they are mentioned for Iron Cove Link (C 2-5) Confirm that climate change has been taken account of in the modelling. CH17 text implies that it has, and it is described in App Q Chapter 6.2.2, but that needs referencing explicitly.

Response

Section 6.2.2 of Appendix Q (Technical working paper: Surface water and flooding) of the EIS identifies that the Rozelle interchange is located in close proximity to Rozelle Bay and discusses how climate change impacts on both sea level rise and potential increases in rainfall intensity could affect the flooding in the vicinity of the interchange.

A summary of the potential impacts has found that:

- Potential increases in rainfall intensities by up to 10 per cent would lead to flood level increases of approximately 0.06 metres for areas that are not affected by sea level rise in the 100 year ARI event. Increases in rainfall intensities by up to 30 per cent would lead to flood level increases of up to 0.15 metres. This means that more properties could be affected by flooding or experience more frequent flooding under future climate change conditions
- At the new bridge over Whites Creek at The Crescent, sea level rise would lead to increases in peak flood levels of between 0.26 metres and 0.82 metres in the 100 year ARI event. This would reduce the freeboard to the underside of the bridge. This means that properties adjacent to Whites Creek, in particular along Railway Parade could experience much more frequent flooding under future climate change conditions
- At the tunnel portals for the Western Harbor tunnel connection, the effect of sea level rise would be less pronounced than at The Crescent. Sea level rise would lead to increases in peak flood levels of between 0.1 metres and 0.67 metres in the 100 year ARI event. This would reduce the freeboard to the portal but peak flood levels would still be more than 0.5 metres below the PMF level
- At the new culverts under City West Link, sea level rise would lead to increases in peak flood levels of between 0.1 metres and 0.66 metres in the 100 year ARI event. Peak flood levels would still be more than 0.5 metres below the PMF level which would set the minimum level for the tunnel portal
- Potential increases in sea level rise would not lead to overtopping of The Crescent or City West Link in the 100 year ARI event

- At the tunnel portal sea level rise would lead to minor increases in peak flood levels of between 0.01 metres and 0.04 metres in the PMF. Peak PMF flood levels at the tunnel portal are therefore not very sensitive to a sea level rise of up to 0.9 metres.

Sea level rise is also discussed in Chapter 24 (Climate change risk and adaptation) of the EIS.

B12.25 Hazard and risk

Refer to Chapter 25 (Hazard and risk) of the EIS for details of hazard and risk.

B12.25.1 Alignment with AS/NZS ISO 31000:2009

Attachment 1 (Beca report) Section 25, p154

The hazard and risk assessment does not seem to have been undertaken in accordance with AS/NZS ISO 31000:2009. That being a qualitative, quantitative or semi-quantitative assessment identifying hazards, and estimating the relative probability and consequence. It is noted that the probability of occurrence is identified for some hazards, however others have not. There is no discussion of consequence. Undertake a comprehensive risk assessment of identified construction and operational hazards and assess the risks using guidelines within AS/NZS ISO 31000: 2009.

Response

As noted in Table 28-6 of the EIS, consequence and likelihood has been identified for all key issues.

The risk rating assigned for issues is based on a risk assessment process that is aligned with ISO 31000:2009 *Risk Management*, whereby the likelihood and consequence of an impact is assessed and this determines the risk rating (refer to section 28.1.1 of the EIS) and aligned with the approaches used for similar motorway projects including the M4 East and New M5 projects.

For each of the identified issues, a level of assessment was undertaken commensurate with the potential degree of impact the project may have on that issue. This included an assessment of whether the identified impacts could be avoided or minimised (for example, through design amendments). Where impacts could not be avoided, environmental management measures (as included in **Chapter E1** (Environmental management measures)) have been proposed to manage impacts to acceptable levels. The final residual risk is identified after considering the likelihood, consequence and the proposed management and mitigation.

Details of the methodology and process used for the risk assessment process are provided in section 28.1 of the EIS.

B12.25.2 Safety of vulnerable road use

Attachment 1 (Beca report) Section 25.1, p154

Pedestrian safety risk not specifically discussed in Chapter 8 [of the EIS]. A discussion of the effects was related to net changes to expected crashes and rates. No dissemination of vulnerable road users was undertaken[.] Quantify the safety effects associated with vulnerable road users as a result of construction and operation of the project.

Response

Vulnerable road users referred to in the Inner West Council's submission are assumed to be pedestrians, bicycle users, motorcyclists, older road users and young people in line with the definition in the *NSW Road Safety Strategy 2012 – 2021* (Transport for NSW 2012).

An assessment of the safety impacts to pedestrians and cyclists during construction is included in section 8.3 and section 7.4.7 of Appendix H (Technical working paper: Traffic and transport) of the EIS. Safety considerations associated with pedestrian and cyclist movements around construction ancillary facilities would be considered as part of the CTAMP (see **Chapter E1** (Environmental management measures)).

Long-term traffic control plans, temporary works and traffic staging plans and pedestrian and cycle infrastructure will be subject to independent road safety audits that will be carried out in accordance with *Road Safety Audits Guide* (TC2003/RS03) (Roads and Maritime) and with reference to current practices outlined in *Austroads Road Safety Audit Guide* (2nd Edition 2002). Road safety audits will assess the safety performance of any new or modified local road, parking, pedestrian and cycle infrastructure provided as part of the SSI (including ancillary facilities) to ensure that they meet the requirements of relevant design, engineering and safety guidelines, including *Austroads Guide to Road Design*. The process for the carrying out of road safety audits would be detailed in the CTAMP that will be prepared for the project.

Issues identified in the road safety audit will be responded to by:

- Detailing actions taken/to be taken to address each of the issues raised
- Providing justification for proposals and actions on particular issues raised.

Further detail regarding potential safety and connectivity impacts on pedestrians and cyclists during construction is provided in **section B11.9.12**. Active transport connectivity during operation is discussed in **section B11.9.25**.

B12.25.3 Hazardous goods

Attachment 1 (Beca report) Section 25.1.1, p154

No information is provided regarding how these numbers of hazardous goods identified in Table 25-2 will be check[ed] for compliance. Will there be audits of the processes, by who and when?

Response

The information provided in Table 25-2 is indicative, based on the concept design assessed in the EIS, and would be confirmed during finalisation of the design and construction planning and managed in accordance with the environmental management measures HR1, HR4 and HR5 in **Chapter E1** (Environmental management measures).

B12.25.4 Operational risks

Attachment 1 (Beca report) Section 25.1.3, p154

These hazards are only listed as construction risks, is there a possibility that these will be ongoing active operational risk (albeit lower)?

Response

Where these hazards potentially also pose a risk during construction, they have been described in section 25.1.3 of the EIS. The potential hazards and risk which may be associated with the project during operation are described in section 25.2 of the EIS. These include incidents in the tunnels and the probability of tunnel fires.

B12.25.5 Dangerous goods routes

Attachment 1 (Beca report) Section 25.2.3, p155

It is discussed that hazardous goods will not be allowed within the mainline tunnels. No details are provided of alternative at-grade routes identified to cater for these movements or the potential risks to residential areas associated with movements within these areas.

Indication of hazardous good routes and the risks associated to residents along these routes.

Response

It is expected that hazardous goods transport would occur on surface road routes in accordance with the *Dangerous Goods (Road and Rail Transport) Act 2008*, the Dangerous Goods (Road and Rail Transport) Regulation 2014 and the Australian Dangerous Goods code as they would currently, in absence of the project.

B12.26 Cumulative impacts

Refer to Chapter 26 (Cumulative impacts) and Appendix C (Cumulative impact assessment methodology) of the EIS for details of the cumulative impact assessment.

B12.26.1 Consideration of Sydney Metro City and Southwest project

Attachment 1 (Beca report) Section 26.2, p155

It is mentioned in Table 26.1 that one of the projects assessed for cumulative impact is the Sydney Metro City and Southwest. This project however has not been taken into account in the strategic and operational modelling for future scenarios of the project. The impact that mode choice and trip distribution will have on the model because of this project could be significant and need to be tested in an updated model. It can also have cumulative effects in the business case output.

Response

As noted in **section B12.8.2**, the Sydney Metro City and Southwest project has been included in the future strategic modelling. The WRTM version 2.3, which was developed and operated by Roads and Maritime, provided the platform to understand changes in future weekday travel patterns under different land use, transport infrastructure and pricing scenarios.

Available data was used as the primary input for the development of the WRTM including recently completed and future infrastructure project lists. This included information from Transport for NSW on the Sydney Metro projects. It is noted in section 8.4.6 of Appendix H (Technical working paper: Traffic and Transport) of the EIS that Sydney Metro would not serve the two closest stations to the study area – St Peters and Mascot stations. The closest metro station would be Sydenham Station.

Section 12.1 of Appendix H (Technical working paper: Traffic and transport) of the EIS details the forecast traffic performance of the study area during the cumulative scenarios. The detailed assessment was also undertaken using the forecast traffic volumes produced using the WRTM. The Sydney Metro City and Southwest was included in all future strategic modelling scenarios.

B12.26.2 Cumulative impact from smaller construction projects

Attachment 1 (Beca report) Section 26.2, p156

The list of projects in Table 26.1 refer to major projects. The cumulative impacts around current proposed construction sites (refer Chapter 6) could be smaller projects such as new buildings, upgrading works from utility companies and maintenance related works on infrastructure. These smaller type projects can have a significant impact on noise, dust, traffic, contamination and general access residents and business owners in the IWC area.

Attachment 1 (Beca report) Section 26.3.1, p157

See Section 26.2. The construction impacts around the identified areas (Haberfield/Ashfield, Rozelle and St Peters) has been discussed in detail in Chapter 6. As stated in Section 26.2 above, the construction impact of M4-M5 Link and other major projects (listed in Table 26.1), is perhaps addressed here, but those smaller projects that can add significant cumulative impact are totally ignored. The extended periods of these projects will increase the exposure to more cumulative impact.

Attachment 1 (Beca report) Section 26.2, p156 and Attachment 1 (Beca report) Section 26.3.1, p157

Planning and coordination to ameliorate cumulative impacts as a result of smaller projects in the same area as proposed construction sites should be addressed in more detail in this EIS.

Response

It is not reasonable or practical to assess all projects within the study area of the M4-M5 Link project. As discussed in section 1.1.1 of Appendix C (Cumulative impact assessment methodology) of the EIS, only projects considered to be of 'material' scale in the vicinity of the M4-M5 Link were included on the list of projects to be screened. The materiality threshold for the cumulative impact assessment in the EIS was defined as projects listed on the NSW Major Projects website as State significant development, State significant infrastructure and known project proposals of a relevant scale or resultant impact that involve activities that could result in a cumulative impact, including proposed projects that interface with the project.

Environmental compliance on smaller projects in the vicinity of the M4-M5 Link is the responsibility of the respective proponents and the relevant consent authority.

B12.26.3 Assessment of noise and traffic cumulative impacts

Attachment 1 (Beca report) Section 26.3.2, p157

The additional impact from a traffic and noise perspective when the project is completed needs to be measured against the base-case which is before any construction starts. SMC should provide before and after measurements and criteria of remediation if unacceptable impact is ongoing after the completion of the project. Engagement with IWC and the transparent consultation with the community in this regard is of utmost importance. The processes how this will be implemented and how information be made available, is critical.

Response

A review of operational network performance will be undertaken 12 months and five years from the opening of the project to confirm the operational impacts of the project, as reflected in environmental management measure OpTT1 in **Chapter E1** (Environmental management measures).

Within 12 months of the commencement of the operation of the project, actual operational noise performance will be compared to predicted operational noise performance as reflected in environmental management measure NV14 in **Chapter E1** (Environmental management measures). The need for any additional management measures to address any identified operational performance issues and meet relevant operational noise criteria will be assessed and implemented where reasonable and feasible.

B12.26.4 Management of cumulative impacts

Attachment 1 (Beca report) Section 26.4, p157

The issues most relevant to cumulative impact are related to project staging, hours of work, ongoing consultation, coordination of all construction activities and ongoing measurement of impacts to be able to compare the cumulative impacts between the With and With-out project scenarios.

Attachment 1 (Beca report) p158

See comments for the areas below [in other chapters] in the relevant chapters. For cumulative impact it is important to coordinate all project related works including works to be undertaken by utility companies and by other developers on smaller construction projects in the areas mostly impacted.

Table 26.11 [of the EIS] displays very limited information on how cumulative impacts will be mitigated. This response shows the lack of detail of how SMC intends to mitigate cumulative impacts. It is suggested that a proper and comprehensive Cumulative Impact Mitigation Plan be prepared as part of finalising the design. IWC needs to participate in the approval of this plan.

Response

Mitigation measures for managing cumulative impacts are outlined in each of the study disciplines presented in the EIS (and in **Chapter E1** (Environmental management measures)). Is it intended that the practical mitigation measures for each study discipline would already be in place, and so the cumulative mitigation in Table 26-11 of the EIS is focussed on a broader level, including opportunities around inter-project coordination and communication with stakeholders.

Works undertaken within the project footprint by utility companies which are unrelated to the project have been considered and assed in the EIS (refer to Appendix F (Utilities Management Strategy)) of the EIS. It is proposed that a Utility Co-ordination Committee will be established to ensure that the potential cumulative impacts associated with proposed utility works are effectively managed (refer to section 9.5 of Appendix F (Utilities Management Strategy) of the EIS).

B12.27 Sustainability

Refer to Chapter 27 (Sustainability) of the EIS for details of sustainability.

B12.27.1 Capacity building and the use of social enterprises

Attachment 1 (Beca report) Section 27.2.3, 27.2.11, p160

Greater Sydney Commission (2016) identifies three priority areas, including 'a resilient city: adapting to climate change, minimising exposure to natural hazards and strengthening social, organisational and infrastructure capacity'. The Project response to 'strengthening social...capacity' includes an overarching sustainability objective in the WestConnex Sustainability Framework of 'maximising equitable training and employment opportunities'. Implementation of this objective includes a Training Management Plan to be prepared before construction, and the work being done by Sydney Motorway Corporation regarding a Reconciliation Action Plan is noted. The response is limited in detail and does not consider design phase opportunities. Socio-economic development of disadvantaged groups is not considered to have been given significant focus, when compared to the focus that has been given to wider city economic development as a result of the project, as well as significant focus on mitigation of environmental impacts. Consideration should be given as to whether there are opportunities during the design phase for inclusion of youth, Aboriginal and Torres Straight Islanders, particularly those who live locally. Consideration should also be given to identification of and engagement with local educational facilities, identify industry partnerships and government training programmes that can upskill a workforce. Consideration should be given to social enterprises as well as small to medium enterprises in the procurement of goods and services.

Response

As noted in section 7.6.1 of Appendix P (Technical working paper: Social and economic) of the EIS, the WestConnex Training Academy has been established to service WestConnex program of works aims to deliver 500 apprenticeships/traineeships during the life of the program. A portion of this number would be trained on the M4-M5 Link project. In addition to offering new opportunities for employment, the WestConnex Training Academy is providing training, resulting in accreditation or certification in tunnelling, to people who have transferrable skills from other industries, like the natural resources sector. This would allow people with experience from other sectors, like mining and heavy industry, to join the workforce.

The WestConnex Sustainability Strategy also incorporates initiatives to improve Aboriginal and Torres Strait Islander participation in construction and provide opportunities to Aboriginal and Torres Strait Islander enterprises. Under the Aboriginal Participation in Construction Policy, a percentage of the total estimated value of the contract must be directed to Aboriginal related employment and education activities, procurement of goods or services from recognised Aboriginal businesses or other programs.

B12.27.2 General comments

Attachment 1 (Beca report) Section 23, p147, Section 27.2.11, p161

WestConnex Sustainability Framework has been prepared to align with Transport for NSW Environmental and Sustainability Policy Framework, as well as the Roads and Maritime Environmental Sustainability Strategy and other relevant government sustainability instruments as documented. This includes aspects such as use of water, energy and transport. Whilst the NSW Sustainable Design Guidelines are designed to specifically apply to rail infrastructure projects, the sustainability initiatives outlined in the guidelines are consistent with those put forward in the WestConnex Sustainability Framework. This is consistent with SEARs requirements.

Attachment 1 (Beca report) Section 27 Overall Evaluation, p163

Overall this chapter is considered to be thorough and comprehensive in responding to the policies, objectives and targets set out in the various framework, legislative and guideline documents. Sustainability covers a very broad range of aspects, and multiple other chapter documents have been referenced where further detail is provided - these have not been reviewed as part of this process as others are reviewing in detail. Rather the review is based on the summary information provided in Chapter 27. There may be detail contained in other chapters that responds to the noted comments above that can be brought forward into this summary chapter for clarity. The main observation regarding Chapter 27 is the potential gap regarding celebration and enhancement of the wider area's Aboriginal heritage and culture, and the limited detail on how to enhance socio-economic development of disadvantaged groups through design and construction, particularly in the Inner West area. These issues should be considered further, which would assist in redressing the overall perceived balance of focus in Chapter 27 from managing environmental impact and promoting city-wide economic development, to inclusion of additional local people and Aboriginal culture focused initiatives. There may be a need to review Chapters 13 and 20 in this context, as well as Chapter 14.

Response

As noted in Inner West Council's comment, sustainability aspects, such as heritage (including Aboriginal heritage and cultural values) have been considered as part of the working papers for the technical areas in which they align to and not duplicated in Chapter 27 (Sustainability) of the EIS. In relation to Aboriginal heritage and culture, Inner West Council's concerns are discussed in **section B12.21.1**. Socio-economic development, through capacity building, is discussed in **section B12.27.1**.

B12.27.3 Consideration of environmental sustainability aspects

Attachment 1 (Beca report) Section 27.2.11, p158

The table [Table 27-3] identifies an overarching sustainability objective of 'protecting and enhancing the natural environment and local heritage'. The summary of how this objective has been applied on the project identifies how design and construction would primarily avoid, mitigate and minimise impacts on the natural environment. Other than increasing publicly accessible open space (considered a modified urban environment), it is not clear without reading all technical documents in detail, how the project proposes to 'enhance' the natural environment (i.e. net positive environmental outcomes).

Consider documenting how the project proposes to 'enhance' the existing natural environment (i.e. net positive environmental outcomes).

Response

As stated in section 27.2.11 of the EIS, Table 27-3 provides a summary of how the project would meet or, where possible, exceed the objectives and targets outlines in the WestConnex Sustainability Strategy. In relation to the natural environment, the targets set for the M4-M5 Link are to proactively manage any impacts on flora and fauna and to ensure no serious pollution incidents during construction. This approach was selected as the surface project footprint is a highly urbanised environment, with most natural terrestrial and aquatic environment having limited ecological value.

However, it is noted that Sydney Water is planning to naturalise sections of Whites Creek further upstream of the crossing at The Crescent. This provides an opportunity for the project to integrate and build on the Sydney Water naturalisation plan and this is discussed in section 15.4.2 of the EIS, section 4.2.1 of Appendix Q (Technical working paper: Surface water and flooding) of the EIS and reflected in environmental management measure SW09 in **Chapter E1** (Environmental management measures).

B12.27.4 Tracking of Infrastructure Sustainability rating progress

Attachment 1 (Beca report) Section 27.2.11 p162

Workshops and discussions have been undertaken and actions have been documented for planning and design considerations. The project is seeking an IS rating for the Project of 'Excellent'. It is not clear as to whether this is a rating requirement specified by the client, or whether this is a rating determined as being 'achievable' for the project by the EIS author. Some detail is provided on which areas of the project have had specific focus, and categories where initiatives have been identified. There is no indication as to how the project is currently tracking, other than the design and construction contractor(s) would be responsible for ensuring the IS 'Excellent' rating is achieved. Whilst not specified, it is considered highly likely that the use of the tools provided by ISCA, including the IS rating tool Scorecard, will have been used. Consistent with SEARs requirements.

Response

As identified in the SEARs, 'the Proponent must assess the sustainability of the project in accordance with the Infrastructure Sustainability Council of Australia (ISCA) Infrastructure Sustainability Rating Tool and recommend an appropriate target rating for the project'. The project will be required to achieve a rating of 'Excellent' for the design and construction phases under the ISCA rating system in order to be in line with the WestConnex Sustainability Strategy (SMC 2015). A new environmental management measure has been added to capture this commitment.

Registration for the Infrastructure Sustainability (IS) Rating for both the Design and As-built ratings is expected to be the responsibility of the design and construction contractor(s) as is the case for other WestConnex projects.

It is anticipated that the registration for the design phase would occur shortly after the signing of the contract for the design and construction of the project, at which time tracking of the project's progress against the credit requirements will commence.

B12.27.5 Consideration of economic sustainability aspects

Attachment 1 (Beca report) Section 27.4.4, p158

Under the *Environmental Planning and Assessment Act 1979*, four principles are detailed including 'Improved valuation and pricing and incentive mechanisms' to encourage ecologically sustainable development. The information provided in this section is not considered to directly respond to this principle. Further consideration of how this principle could be applied in a Sustainable Procurement context for supply chain goods and services, including pricing and incentive mechanisms regarding closed loop procurement such that a whole-of-life approach is prioritised.

Response

As noted in the NSW planning reforms: sustainable development: Briefing Paper (NSW Parliamentary Research Service 2013) the 'improved valuation, pricing and incentive mechanisms, such as the polluter pays principle' are associated with the valuation of assets and services and therefore are not associated with sustainable procurement activities conducted as part of the design and construction of assets.

Sustainable procurement is an important aspect of the WestConnex Sustainability Strategy (SMC 2015) and the project's approach to it is identified in Table 27-3 of the EIS. As reflected in Table 27-3, the IS rating scheme has four credits (in version 1.2 of the tool) which aim to promote sustainable procurement during the delivery of infrastructure projects.

B12.28 Environmental risk analysis

Refer to Chapter 28 (Environmental risk analysis) of the EIS for details of the environmental risk assessment.

B12.28.1 General comment

Attachment 1 (Beca report) Section 28 Overall Evaluation, p164

The environmental risk analysis process is built into the overall environmental risk assessment for the project and generally meets the broad requirements of the SEARs. Some general questions have been raised in regard to the risk analysis process. Due to time constraints, this review has focused on the environmental risk analysis process, not reviewing each individual risk. The preliminary environmental assessment, that was carried out as part of the State significant infrastructure (SSI) application report [Roads and Maritime2016] and subsequent addendums to the SSI application report, have not been assessed as part of this review. No assessment has been made as to the accuracy of projects listed for the purposes of assessing cumulative impacts.

Response

Section B10.27.1 discusses the method used for assessing the risk rating used in the EIS whilst specific concerns raised by the Inner West Council are addressed in **Chapter B11** (Inner West Council). A discussion regarding concerns raised by the community in relation to the accuracy of projects listed in the cumulative impact assessment is presented in **section C26.1.1**. Concerns regarding projects which were not included in the cumulative impact assessment are discussed in **section C26.1.2**.

B12.28.2 Involvement of stakeholders in risk characterisation

Attachment 1 (Beca report) Section 28, p164

Setting aside risks identified in the SEARs, it is not clear who was involved in undertaking the Environmental Risk Analysis at this stage and who has contributed to and agreed the outcomes. In particular which stakeholders and specialists were involved in agreeing the determination of 'residual impacts' that ultimately require further mitigation? Appropriate and timely involvement of stakeholders and in particular decision makers is considered a key part of the risk assessment process. Please confirm if referral authorities, designers, construction personnel or other stakeholders were involved or consulted in the risk characterisation stage?

Response

The assessment in the EIS was undertaken using an environmental risk analysis process using a likelihood and consequence approach (refer to Chapter 28 (Environmental risk analysis) of the EIS), the best available technical information and adopted good practice environmental standards, goals and measures to minimise environmental risks similar to other major infrastructure projects including the M4 East and New M5 projects.

Roads and Maritime is the proponent for the project and has commissioned SMC to deliver WestConnex, on behalf of the NSW Government. SMC has prepared the EIS consistent with relevant Roads and Maritime criteria and guidance. Baseline monitoring programs to collect data for the EIS were approved by Roads and Maritime. Further, subject matter experts from Roads and Maritime were involved with reviewing the approach and methodology for quantitative modelling undertaken for the EIS and for reviewing the outcomes of the various technical assessments for the EIS. SMC is responsible for preparing the planning approval applications and associated documents in respect to the project (including the EIS) on behalf of Roads and Maritime under Part 5.1 of the EP&A Act. The EIS was prepared by a team of qualified professionals to provide a balanced, unbiased, merit-based environmental impact assessment.

The EIS, including detailed technical studies, was also reviewed by DP&E and key NSW Government agencies to confirm that it addressed the SEARs prior to being finalised, lodged and placed on public exhibition. DP&E also commissioned independent technical peer reviews of key technical studies presented in the EIS to inform its assessment, including traffic and transport, air quality groundwater and urban design studies. The delivery mechanism adopted for is the M4-M5 Link different to the approach for the M4 East and New M5 projects. For the M4 East and New M5 projects, a design and construction contractor was appointed early (prior to the EIS being publicly exhibited) and therefore had direct input into the design development, EIS preparation and construction planning for those projects. This has not been the case for the M4-M5 Link.

B12.28.3 Risk assessment process

Attachment 1 (Beca report) Section 28, p164

A key part of a risk analysis is understanding and making allowance for uncertainty (in the science or the data). Limited reference or comment is made in regard to uncertainty and how it affects - understanding of physical systems and likely impacts effectiveness of proposed controls Contingency measures where risk/uncertainty remains. Please provide commentary regarding how uncertainty is accounted for in the risk analysis process

A three-level risk assessment process (i.e. three likelihoods and three consequence levels) was chosen instead of a five-level process. For a project of this scale a five-level process would provide greater detail and ability to determine the importance of residual impacts that need to be further assessed.

Please confirm why a three-level risk assessment process (i.e. three likelihoods and three consequence levels) was chosen instead of a five-level process. For a project of this scale a five-level process would provide greater detail and ability to determine the importance of residual impacts that need to be further assessed.

Response

The assessment was undertaken using an environmental risk analysis process using a likelihood and consequence approach (refer to Chapter 28 (Environmental risk analysis) of the EIS), the best available technical information and adopted good practice environmental standards, goals and measures to minimise environmental risks similar to other major infrastructure projects including the M4 East and New M5 projects. The environmental risk analysis was carried out part of an exhaustive environmental impact assessment process in which all potential environmental risks were considered and environmental management measures were developed to address all identified impacts. The approach adopted for the environmental risk analysis is therefore appropriate.

It is noted that the Inner West Council's submission identified that the technical guidelines for which their review was conducted against (as referenced in page 164 of Attachment 1) were not included in the current guidelines identified in the SEARs. However, neither ISO 31000:2009 *Risk Management* nor HB 203:2012 *Managing environment related risk* specify the use of a particular consequence and likelihood categories. To account for uncertainty, a qualitative risk analysis was undertaken, rather than a quantitative analysis.

B12.28.4 Identification of new environmental risks during design and construction

Attachment 1 (Beca report) Section 28.3, p165

[The EIS states that] "The identified management measures will be reassessed during the detailed design for their appropriateness". Please confirm the process for capturing and documenting environmental risk mitigation in the Detailed Design Phase? Who will review and approve final mitigation responses?

What is the process for capturing and documenting new environmental risks that develop or are identified during subsequent phases of the project (e.g. as the design progresses or changes)[?]

Response

Construction environmental management measures will be captured in a CEMP and associated sub-plans as well as in standalone construction management plans and strategies for the project. The CEMP will include management of the detailed design and 'pre-construction' activities, as well as the construction activities. The CEMP will be updated as required to capture environmental risk mitigation identified in the detailed design stage.

The design and construction contractor(s) will be responsible for preparing the CEMP, which will be reviewed by Roads and Maritime. This includes responsibility for the identification of environmental risks and appropriate management measures to address these risks including the establishment of procedures and processes to review and update the CEMP. During operation, the operator would be responsible for the identification and management of risks.

B12.29 Environmental management measures

Refer to Chapter 29 (Environmental management measures) of the EIS for details of environmental management measures proposed in the EIS. The updated environmental management measures are presented in **Chapter E1** (Environmental management measures).

B12.29.1 Compliance with SEARs

Attachment 1 (Beca report) Section 29, p166

The EIS does not refer to any requirements of the SEARs relating to a summary of the environmental management measures. Requirement 1q (Performance Outcome 2 Environmental Impact Statement) requires a compilation of the proposed measures associated with each impact to avoid or minimise or offset impacts. This requirement should be referenced in this section.

Attachment 1 (Beca report) Section 29 Overall Evaluation, p166

The environmental management process is built into the overall project. There are no requirements of the SEARs specific to environmental management. Some general questions have been raised in regard to the environmental management process.

Response

Noted. Whilst there is no reference to the SEARs, particularly requirement 1(q) in Chapter 29 (Summary of environmental management measures), as there is in other chapters, Table 29-1 of the EIS provides a consolidated register of the environmental management measures.

B12.29.2 Responsibility for implementing management measures

Attachment 1 (Beca report) Section 29, p166

A number of parties are listed as having responsibility for implementation of the management measures. However, it is not clear who is responsible for implementing the specific environmental management measures set out in the EIS. Further what level of reporting / audit will be required to ensure compliance.

Response

The environmental management measures applicable to the project are summarised in Table 29-1 of the EIS. Some of the measures have been revised in response to the submissions received on the EIS and are in **Chapter E1** (Environmental management measures).

The responsibility for the implementation of the environmental management measures would be assigned to multiple parties, as noted in Chapter 29 (Summary of environmental management measures) of the EIS. This will occur through project contractual documentation and in the CEMP.

Notwithstanding, Roads and Maritime is the proponent for the project and will be responsible for meeting the requirements of the conditions of approval and for the project, should it be approved, including compliance with the environmental management measures outlined in the EIS.

It is expected that if the project is approved, the conditions of approval will require that the project is carried out in accordance with the EIS, this Submissions and preferred infrastructure report and the conditions of approval. This includes all procedures, commitments, mitigations measures set out in these documents. Reporting and auditing of compliance with the will be undertaken in accordance with the compliance monitoring and tracking section of the Instrument of Approval.

B13 Canada Bay Council

This chapter addresses issues raised by the Canada Bay Council.

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B13.1 General

B13.1.1 General support for the project

The City of Canada Bay (CCB) welcomes the opportunity to respond to the WestConnex M4-M5 Environmental Impact Statement (hereafter referred to as the EIS). Council generally supports the linking of the M4 to the M5 and continues to be involved in the implementation of M4 East to ensure the best outcome for the users of the new transport route and those living, working and playing in the vicinity.

Council would welcome the opportunity to continue working with WestConnex to help ensure the project best meets the needs of the growing CCB community.

Response

The CCB Council's support for the project and the proposal to link the M4 East to the New M5 is noted. The CCB Council's request for ongoing consultation is also noted. Consultation with relevant councils will occur where identified in the environmental management measures (see **Chapter E1** (Environmental management measures)) and the conditions of approval.

B13.2 Project development and alternatives

Refer to Chapter 4 (Project development and alternatives) of the EIS for details of project development and alternatives.

B13.2.1 Extension of Iron Cove Link

An extension of the proposed tunnel through to Huntleys Point would appear to provide significant benefits to both the CCB and through traffic.

Response

Community consultation undertaken during preparation of the concept design and EIS for the project raised the possibility of extending the Iron Cove Link further to the north, to the southern side of the Gladesville Bridge at Drummoyne (refer to section 4.5.3 of the EIS). This possible extension was not considered further as part of the M4-M5 Link project, as it:

- Could not be delivered within the project budget
- Is not currently identified as a policy priority of the NSW Government
- Would likely require additional property acquisition
- Would require further investigation, including a cost benefit analysis.

Many of the reasons which led to an extension to the Gladesville Bridge not being further considered as part of the project would also be applicable for a tunnel which extended to Huntleys Point, given its proximity to the Gladesville Bridge and likely similar construction methodology. Although the option of a tunnel to Huntleys Point is outside the scope of the M4-M5 Link project, the development of the Iron Cove Link as part of the project does not preclude a further tunnel connection to the north at some stage in the future.

B13.3 Traffic and transport

Refer to Chapter 8 (Traffic and transport) and Appendix H (Technical working paper: Traffic and transport) of the EIS for details of traffic and transport.

B13.3.1 Limited information on impact at Victoria Road and Lyons Road intersection

Whilst the proposed Rozelle Interchange has the potential to bring improvements to some areas, it is apparent that there may be significant negative impacts to the CCB. In particular it is noted that the EIS adopts the approach that without the project, intersections such as Victoria Road at Lyons Road will operate at a Level of Service F and that because of this, even with the project it can't get much worse during peak periods. There is however limited information provided on this. With such an expenditure on infrastructure as is proposed, this is not a satisfactory outcome to Council and improvements must be obtained.

Response

Sydney's transport network is expected to be put under increasing pressure over the next 20 years, with Sydney's population forecast to increase from 4.3 million in 2011 to 5.9 million by 2031 (NSW Government 2014). By 2036, the number of trips made around Sydney each day is forecast to increase by 31 per cent from 16 to 21 million vehicle movements. This growth will place increasing pressure on the NSW transport network and the key travel demand corridors connecting regional cities and major centres across the greater Sydney metropolitan area.

In response to this forecast future demand, a range of infrastructure, transport and planning strategies have been released, including:

- *State Infrastructure Strategy* (Infrastructure NSW 2012, updated 2014)
- *NSW Long Term Transport Master Plan* (Transport for NSW 2012)
- Draft *Future Transport Strategy 2056* (NSW Government 2017)
- *Sydney CBD to Parramatta – Strategic Transport Plan* (Transport for NSW 2015)
- *A Plan for Growing Sydney* (NSW Government 2014)
- *Parramatta Road Corridor Urban Transformation Strategy* (UrbanGrowth NSW 2016).

The transport projects identified in these strategies, along with NSW Roads and Maritime Services (Roads and Maritime) projects including Easing Sydney's Congestion, are designed to deliver improvements in network performance in response to both current and future demands.

The approach used to determine the 'Without project' scenario is described in section 8.12 of the EIS. This approach is consistent with the modelling adopted for the preceding M4 Widening, M4 East and New M5 EISs, making use of projections of changes to populations and employment (produced by the NSW Department of Planning and Environment (DP&E)), observed traffic count data as the basis for modelling future year travel demand, traffic volumes and patterns. More specifically, this approach provides the most accurate representation of how the modelled increase in future traffic would affect the performance of the existing road network.

Table 6-9 of Appendix H (Technical working paper: Traffic and transport) of the EIS shows that the Victoria Road/Lyons Road intersection operates at a level of service (LoS) D in the AM and PM peak hours in the base case (2015) scenario. Table 10-19 and Table 12-18 of Appendix H (Technical working paper: Traffic and transport) of the EIS show that the LoS at this intersection is forecast to deteriorate to LoS F in the 'Without project', 'With project' and 'Cumulative' scenarios in both 2023 and 2033. This deterioration in LoS in the 'Without project', 'With project' and 'Cumulative' cases is a result of increasing traffic demand through the Victoria Road/Lyons Road intersection resulting from forecast growth in Sydney's population.

Notwithstanding this, two-way average weekday traffic (AWT) volumes on Lyons Road are forecast to decrease by around 14 per cent and 17 per cent in the 2023 and 2033 'With project' scenarios respectively when compared to the 'Without project' scenarios (refer to Table 9-1 in Appendix H (Technical working paper: Traffic and transport) of the EIS). In the 'Cumulative' scenario, decreases of 19 per cent and 20 percent in 2023 and 2033 respectively are forecast on Lyons Road compared to the 'Without project' scenario (refer to Table 9-2). This forecast decrease can be attributed to the Iron Cove Link and the M4-M5 Link, which would provide alternative routes to Lyons Road for motorists travelling from the north and south of the harbour via the Gladesville Bridge.

In addition, and as shown in **Table B13-1** (forecast average delays at the Victoria Road/Lyons Road intersection for the AM and PM peak hours in 2023 and 2033), when compared to the 'Without project' scenario, the project is forecast to result in a reduction in average delay times at this intersection in the 2023 AM and PM peak and the 2033 AM peak periods.

Figure B13-1 and **Figure B13-2** show forecast changes to the AM and PM peak one-hour traffic volumes along Lyons Road in the 'With project' and 'Cumulative' scenarios compared to the 'Without project' scenario for 2023 and 2033. These figures show a significant redistribution of traffic on Lyons Road in the 'With project' scenarios. The forecasts indicate that the impact of the project on peak hour traffic volumes are similar to the impacts forecast for AWT volumes, with traffic shifting from surface roads (crossing the screenline) and onto the M4-M5 Link.

As with the M4 East and New M5 projects, Roads and Maritime would undertake a Road Network Performance Review, in consultation with Transport for NSW and relevant councils. This would confirm the operational traffic impacts of the M4-M5 Link on surrounding arterial roads and major intersections at both 12 months and five years after opening of the project. The assessment would be based on future updated traffic surveys taken during operation utilising an appropriate methodology following the relevant and industry accepted guidelines current at the time. Regardless, those areas that have been identified as being potentially impacted by the project have been identified in Appendix H (Technical working paper: Traffic and transport) of the EIS and would be addressed prior to these operational reviews, or as needed.

The Victoria Road/Lyons Road intersection will be included in the review of network performance (see management measure OpTT1 in **Chapter E1** (Environmental management measures)).

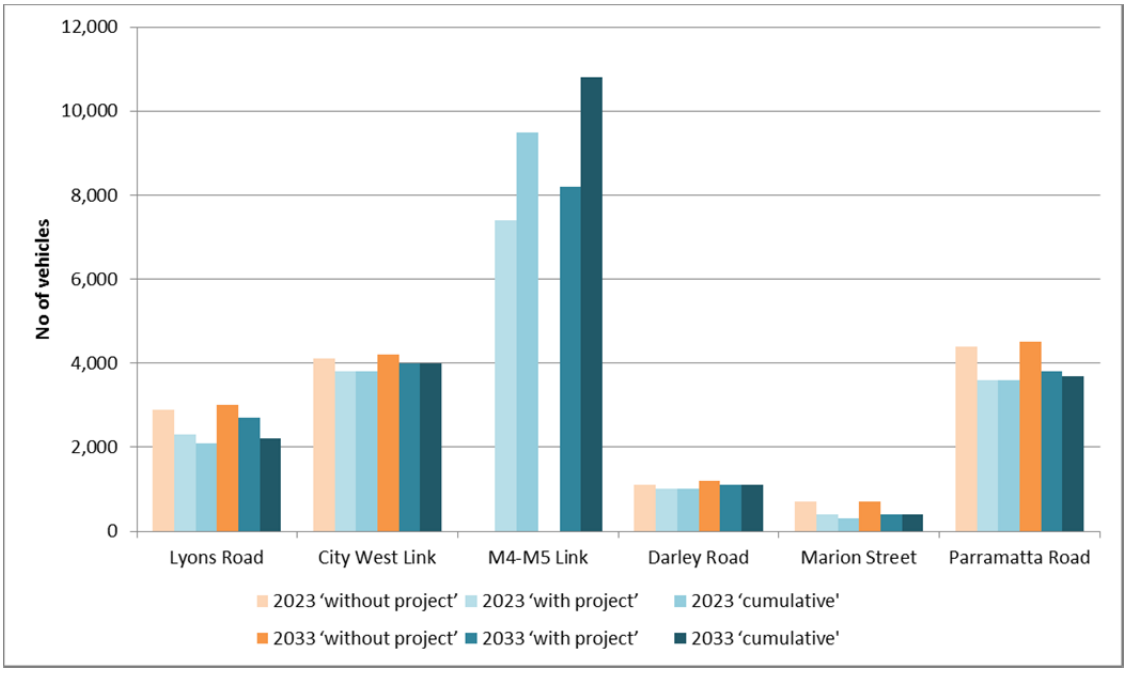

Figure B13-1 East–west screenline: comparison of two-way AM peak one hour volumes

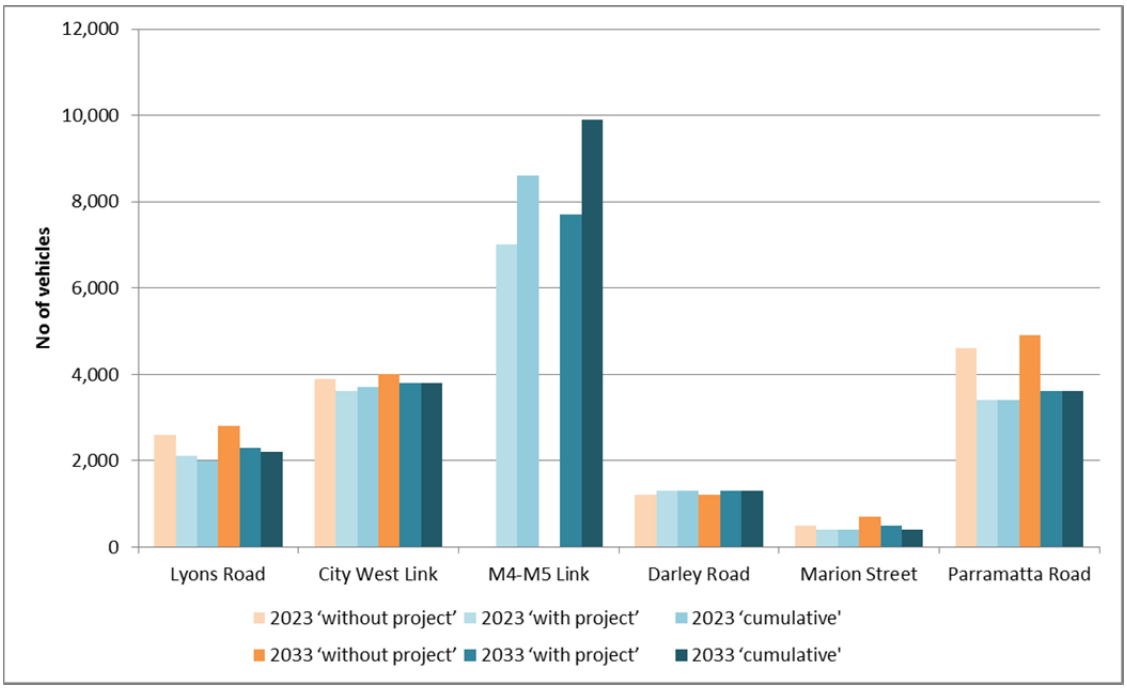

Figure B13-2 East–west screenline: comparison of two-way PM peak one hour volumes

B13.3.2 Average delay at intersections

The M4 East EIS provided additional details on modelling such as Average Delay at intersections. In the M4-M5 EIS there are many general references to changes in Average Delay however the actual Average Delays are not provided. It is also noted that despite Table 6-18 only containing Level of Service information, the EIS states “Table 6-18 presents the AM and PM peak hour intersection average delays and LoS for the existing situation at St Peters".

The exclusion of Average Delay data prevents an informed review of the EIS being undertaken and according it is requested that this information be provided. These details may well show that the Average Delay at the intersection of Victoria Road and Lyons Road would increase as a result of the proposal. It is also noted that despite there being a number of intersections along Victoria Road in Drummoyne, details of their performance are not provided even for significant intersections such as where Victoria Road meets Westbourne Street.

Response

As discussed in Annexure B of Appendix H (Technical working paper: Traffic and transport) of the EIS, operational modelling (which was used to derive intersection delay) was focused around the areas of largest local impact in the AM and PM peak hours, which are generally around the motorway interchanges associated with the project (the Wattle Street interchange, the Rozelle interchange and the St Peters interchange).

Bandwidth plots illustrating the forecast change in AM and PM peak hour traffic volumes between the 2033 ‘With project’ and ‘Without project’ scenarios were assessed and are shown in **Figure B13-3** and **Figure B13-4**. These figures show that the change in forecast demand on Victoria Road north of the Iron Cove Bridge is relatively small. Notwithstanding this, the intersection of Victoria Road/Lyons Road was selected as the location for LoS modelling in consultation with DP&E and Roads and Maritime on the basis that it is the main location where two arterial roads intersect in the Drummoyne area, used by both local residents and non-residents travelling through to locations such as Five Dock and Parramatta Road.

In addition to operational modelling, assessment of the wider network impacts outside of the operational model boundaries was also undertaken through screenline analysis, Sydney metropolitan network plots and travel time analysis (refer to Appendix H (Technical working paper: Traffic and transport) of the EIS).

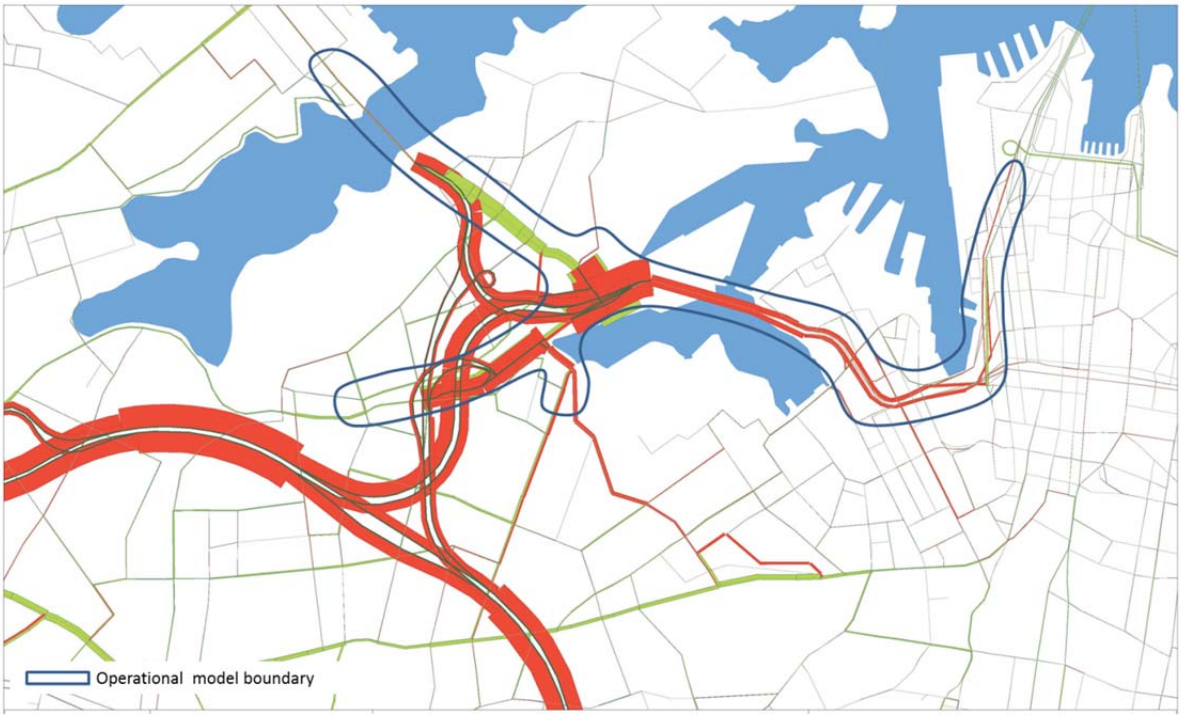

Figure B13-3 Rozelle interchange: comparison of 2033 AM peak hour volumes with and without the project



Figure B13-4 Rozelle interchange: comparison of 2033 PM peak hour volumes with and without the project

Average delay is used to assess the operational performance of intersections, with LoS used as an index which categorises the average delay per vehicle to assist with describing the general characteristics of the traffic flow. In doing so, it provides an assessment of the delay. A summary of the intersection LoS criteria included the average delay per vehicles (seconds per vehicle) for intersections that are shown in Table 4-3 of Appendix H (Technical working paper: Traffic and transport) of the EIS.

Intersection performance for Victoria Road/Lyons Road is discussed in detail in the following sections of Appendix H (Technical working paper: Traffic and transport) of the EIS:

- Section 6.4.2 for the existing performance (2015 base case)
- Section 8.3.3 for 'Without project'
- Section 10.4.3 for 'With project'
- Section 12.5.3 for 'Cumulative' scenario.

As described in the response in **section B13.3.1**, the Victoria Road/Lyons Road intersection is forecast to operate at LoS F with average delays shown in **Table B13-1** for the 'Without project' and 'With project' cases in the AM and PM peak hours in 2023 and 2033.

Table B13-1 Average delays at the Victoria Road/Lyons Road intersection for the AM and PM peak hours in 2023 and 2033

	'Without project' Average delay[1]	'With project' Average delay[1]
AM peak hour		
2023	More than 150 seconds	110 seconds
2033	More than 150 seconds	140 seconds
PM peak hour		
2023	More than 150 seconds	100 seconds
2033	More than 150 seconds	More than 150 seconds

Note:
1. Average delays have been rounded to the nearest 10 seconds.

Two-way AWT volumes on Lyons Road are forecast to decrease by around 14 per cent and 17 per cent in the 2023 and 2033 'With project' scenarios respectively when compared to the 'Without project' scenarios (refer to Table 9-1 in Appendix H (Technical working paper: Traffic and transport) of the EIS). This forecast decrease can be attributed to the Iron Cove Link and the M4-M5 Link, which would provide alternative routes to Lyons Road for motorists travelling from the north and south of the harbour via the Gladesville Bridge.

In addition, and as shown in **Table B13-1** (forecast average delays at the Victoria Road/Lyons Road intersection for the AM and PM peak hours in 2023 and 2033), when compared to the 'Without project' scenario, the project is forecast to result in a reduction in average delay times at this intersection in the 2023 AM and PM peak and the 2033 AM peak periods.

Furthermore, Figure 10-8 and Figure 10-9 of Appendix H (Technical working paper: Traffic and transport) of the EIS illustrate expected travel time improvements in the westbound (away from the Sydney central business district (CBD)) direction in the AM and PM peaks along the section of Victoria Road between Anzac Bridge and the Iron Cove Bridge in both the 2023 and 2033 future years. However, there would be an increase in travel times in the AM peak and PM peak eastbound (toward the Sydney CBD) in 2023 and in the AM peak in 2033, due primarily to flow breakdown on the Western Distributor, which would cause queuing back onto Victoria Road.

It is acknowledged that there are a number of intersections along Victoria Road in Drummoyne. As described in **section B13.3.2** and shown in **Figure B13-3** and **Figure B13-4**, the change in forecast demand on Victoria Road north of the Iron Cove Bridge is relatively minor. The intersection of Victoria Road/Lyons Road was selected as the location for the LoS modelling in consultation with DP&E and Roads and Maritime. This intersection was selected on the basis that this is the main location where two arterial roads intersect in the Drummoyne area, used by both local residents and non-residents travelling through to locations such as Five Dock and Parramatta Road.

Roads and Maritime will undertake a review of network performance, in consultation with the relevant road authorities, to confirm the operational traffic impacts of the M4-M5 Link on surrounding arterial roads and major intersections at both 12 months and at five years after the commencement of operation of the M4-M5 Link. The assessment would be based on updated traffic surveys at the time and the methodology used would be comparable with that used in this assessment. The results of the review will be considered in future operational network performance planning carried out by Roads and Maritime. The Victoria Road/Lyons Road intersection will be included in the review of network performance (see management measure OpTT1 in **Chapter E1** (Environmental management measures)).

B13.3.3 Rat running in Drummoyne

Due to the identified limited capacity on Victoria Road, by directing traffic onto/off Victoria Road at the southern end of the Iron Cove Bridge it is likely to bring a return of significant 'rat running' issues in Drummoyne that resulted from previous delays in the RMS providing sufficient capacity along this route.

Response

Table 8-73 and Table 8-75 of Chapter 8 (Traffic and transport) of the EIS present percentage changes in daily travel distance, time and average speed on non-motorway links for local government areas in the vicinity of the project (for 2023 and 2033 respectively). No net changes in daily travel distance, time and average speed are predicted for surface roads within the CCB local government area for 2023 and a one per cent reduction in both distance and time are predicted for 2033, with no change in average speed (as shown in Table 8-73 and Table 8-75 of the EIS).

In addition, and as described in **section B13.3.2** and shown in **Figure B13-3** and **Figure B13-4**, the change in forecast demand on Victoria Road and adjacent roads north of the Iron Cove Bridge is relatively small. This small change in forecast demand on this section of Victoria Road indicates that 'rat-running' by motorists seeking to avoid Victoria Road in Drummoyne is not likely to result from changes in traffic volumes associated with the project.

B13.3.4 Peak traffic volumes

The EIS does acknowledge that volumes outside of peak periods are likely to increase yet modelling information has not been provided regarding how this is accommodated.

Response

Table 5-9 to Table 5-11 of Appendix H (Technical working paper: Traffic and transport) of the EIS show details of the average peak, daily and weekly traffic volumes recorded at three key locations around the Rozelle interchange, by direction and in combination, namely Victoria Road, City West Link and Anzac Bridge. In addition, each table displays traffic volumes and patterns for an average daily and weekly profile. The tables show that AWT and average daily traffic (ADT) volumes are similar to each other at all three locations, indicating that average daily weekend traffic is generally at similar levels to the ADT. Therefore, these roads accommodate consistently high volumes of traffic that are not biased towards weekday work related trip purposes. However, the weekday peak hour traffic flows are higher than the weekend peak hour flows. As such, the road network needs to be able to accommodate consistently high volumes of traffic throughout the week, including at weekends.

Increases in off-peak volumes are likely, as peak hour spare capacity on the roads is limited and therefore drivers may adjust their travel times to avoid congestion (as noted in section 5.4.4 of Appendix H (Technical working paper: Traffic and transport) of the EIS), and this behaviour is anticipated to continue in the future (as discussed in section 11.2.2 of Appendix H (Technical working paper: Traffic and transport) of the EIS). The project creates a significant increase in network capacity, allowing more trips to be completed at peak times. Some roads may experience increased numbers of trips outside of peak hour. Typically, such increases still result in traffic volumes lower than the peak hour.

B13.3.5 Changes to on-street parking

It is noted that on weekdays outside of peak periods kerbside parking is permitted along Victoria Road. Whilst it is noted that the RMS is currently investigating the introduction of weekend clearways, CCB is not aware of any current proposal to remove parking on weekdays.

In the absence of modelling to demonstrate otherwise, it is apparent that in the future the RMS may well move to remove weekday parking on Victoria Road to accommodate increased traffic flows outside of peak periods. This parking on Victoria Road plays a significant role in the viability and vibrancy of businesses in the area and accordingly its removal is likely to be strongly objected to. Council therefore raises strong opposition to any proposals to further reductions in parking remaining along Victoria Road.

In consideration of the above CCB requests that further consideration be given to the management of traffic and parking in the Drummoyne area.

Response

No new clearways are proposed as part of the M4-M5 Link project. The project is not proposing to remove parking on Victoria Road at Drummoyne. The management of traffic and parking in the Drummoyne area is outside the scope of the project.

B13.3.6 The Bay Run

The Bay Run is an important piece of active transport infrastructure with very high utilisation. At present the majority of the Bay Run is in the form of a separated path with a portion dedicated to pedestrians and a portion dedicated to cyclists. The section of the Bay Run along the Iron Cove Bridge under the care and control of the RMS is however at odds with this arrangement as it is in the form of a shared path. This creates the potential for confusion and resulting conflict between path users. It is requested that consideration be given to changing the Iron Cove Bridge and its approaches to an off-road separated path as part of the Rozelle Interchange project.

Due to the very high utilisation of the path it is critical that should the project proceed, during construction works the impact on path users is minimised.

Response

The CCB Council's request for consideration of the Bay Run and its approaches to the Iron Cove Bridge to be a separated path is noted.

During construction of the project, a section of King George Park would be used to support the widening works along Victoria Road and the construction of the bioretention facility (see **Chapter D3** (Relocation of the bioretention facility at Rozelle)). As described in section 7.4.7 of Appendix H (Technical working paper: Traffic and transport) of the EIS, a temporary diversion would be provided that would connect the Bay Run and the Iron Cove Bridge during construction. To minimise potential disruption to pedestrians and cyclists that use this link, a temporary ramp to the Iron Cove Bridge shared path would be provided to connect the Bay Run and the Iron Cove Bridge. This temporary link is shown indicatively on Figure 7-22 of Appendix H (Technical working paper: Traffic and transport) of the EIS. The existing link underneath the Iron Cove Bridge that connects the Iron Cove Bridge southern shared path with the Victoria Road northern shared path would not be impacted during construction of the project.

Upon operation of the project, a section of the Bay Run near the terminus at Victoria Road/Byrnes Street would be permanently realigned. The realignment would be minor (less than five metres) and would not affect the use of this section of the Bay Run. Further detail is provided in **Part D** (Preferred infrastructure report).

The project would not significantly impact on the existing shared path along the Iron Cove Bridge other than a small section of the path at the eastern end of the bridge where it ties in with the Bay Run (as described above). The existing shared path on the Iron Cove Bridge is outside the project footprint, and therefore the project does not intend to change the current arrangement. The connection between the Bay Run, Victoria Road and the Iron Cove Bridge would be reinstated in generally the same arrangement as existing.

B13.3.7 Impacts on roads in City of Canada Bay

It is apparent that further consideration is required as to what legacy the M4-M5 Link and Rozelle Interchange will leave the CCB. In particular Council is greatly concerned with the potential impacts of additional traffic on Victoria Road between Gladesville Bridge and the Iron Cove Bridge, along with surrounding local residential streets in Drummoyne. Further, Council vehemently opposes any reductions in parking on Victoria Road through the Drummoyne shopping precinct.

Response

As noted in **section B13.3.1**, the EIS acknowledges that in both the 2023 and 2033 future years, the intersection of Victoria Road and Lyons Road will operate at a LoS F during the AM and PM peak periods in the 'Without project', 'With project' and 'Cumulative' scenarios (refer to Table 10-19 and Table 12-18 of Appendix H (Technical working paper: Traffic and transport) of the EIS). This is a result of forecast traffic demand on Victoria Road, which in turn results in congestion at the Victoria Road/Lyons Road intersection.

Notwithstanding this, two-way average weekday traffic (AWT) volumes on Lyons Road are forecast to decrease by around 14 per cent and 17 per cent in the 2023 and 2033 'With project' scenarios respectively when compared to the 'Without project' scenarios (refer to Table 9-1 in Appendix H (Technical working paper: Traffic and transport) of the EIS). In the cumulative case, decreases of 19 per cent and 20 percent in 2023 and 2033 respectively are forecast compared to the 'Without project' scenario (refer to Table 9-2 in Appendix H (Technical working paper: Traffic and transport) of the EIS). This forecast decrease can be attributed to the Iron Cove Link and the M4-M5 Link, which would provide alternative routes to Lyons Road for motorists travelling from the north and south of Sydney Harbour via the Gladesville Bridge.

The forecast reduction in daily traffic volumes along Victoria Road (south of the Iron Cove Bridge) in the 2023 and 2033 future year scenarios aligns with the key project objective to relieve road congestion, particularly along existing arterial road corridors. As a result of this reduction, future opportunities to rejuvenate this section of Victoria Road would be facilitated.

Furthermore, the reduction in daily traffic volumes along this section of Victoria Road would support the development of The Bays Precinct, which is identified as a Priority Growth Area in the *Draft Greater Sydney Region Plan 2017* (Greater Sydney Commission 2017). The forecast reduction in daily traffic volumes would support the objectives for improved connectivity, potentially enabling public transport improvements along this section of Victoria Road and supporting the movement of traffic to and from The Bays Precinct.

Indicative active transport links being delivered as part of the project around the Iron Cove Link are listed in **Table B13-2**. The active transport links would maintain and enhance the links between communities on either side of the interchanges for the project. Active transport being delivered as part of the project would be complemented by other active transport projects being delivered separately by others as summarised in Table 7-1 of Appendix N (Technical working paper: Active transport strategy) of the EIS.

Table B13-2 Indicative active transport links around the Iron Cove Link being delivered as part of the project

Route	Benefits	Type	Approximate length (m)
Victoria Road – Iron Cove Link Links the northern suburbs of Drummoyne and Russel Lea and Chiswick to The Bays Precinct and the Sydney CBD	Connecting the eastern side of the Rozelle Rail Yards along Victoria Road to the intersection of Robert Street	Separated cycle path	250
	Linking the intersection of Springside Street to the Iron Cove Bridge and the Bay Run	Separated cycle path	450
	Connecting Victoria Road to The Crescent over the Rozelle Rail Yards	Bridge	200
	Connecting Victoria Road to The Crescent	Shared path	400
	Connecting The Crescent to James Craig Road existing active transport network	Shared path	500

The CCB Council's concerns with regards to potential traffic impacts on Victoria Road in Drummoyne are noted and discussed further in **section B13.3.1**. No changes to parking on Victoria Road at Drummoyne are proposed as part of the project, as discussed in **section B13.3.5**.

Roads and Maritime will undertake a review of network performance, in consultation with the relevant road authorities, to confirm the operational traffic impacts of the M4-M5 Link on surrounding arterial roads and major intersections at both 12 months and at five years after the commencement of operation of the M4-M5 Link. The assessment would be based on updated traffic surveys at the time and the methodology used would be comparable with that used in this assessment. The results of the review will be considered in future operational network performance planning carried out by Roads and Maritime. The Victoria Road/Lyons Road intersection will be included in the review of network performance (see management measure OpTT1 in **Chapter E1** (Environmental management measures)).

B13.3.8 Public transport

Additional consideration is also required into adopting public transport that can have a transformative impact on the areas surrounding both Victoria Road and Parramatta Road as opposed to focusing on a private vehicle dominated future.

Response

The NSW Government is committed to investing in a range of public transport projects, as identified by the recently released the *Draft Future Transport Strategy 2056* (NSW Government 2017) as well as the *State Infrastructure Strategy Update* (Infrastructure NSW 2014), *A Plan for Growing Sydney* (NSW Government 2014) and the *NSW State Priorities* (NSW Government 2015), which are discussed in section 4.4.2 of the EIS.

The *Draft Future Transport Strategy 2056* (NSW Government 2017) discusses a number of public transport initiatives, including the intermediate transit network, discussed on page 81 of the strategy which, combined with existing commitments such as the Sydney Metro West will create opportunities in the community around the Bays Precinct at Rozelle by connecting them to major to economic hubs in the Sydney CBD, Parramatta and Sydney Olympic Park.

Key corridors in the Sydney metropolitan area currently accommodate high levels of daily traffic including freight, commuter and leisure travel. Users of these corridors frequently experience congestion and delay, particularly during weekday and weekend peak periods. A congested road network also affects road-based public transport, increased bus travel times and variable journey time. In addition to public transport initiatives, the *Draft Future Transport Strategy 2056* (NSW Government 2017) reiterates the need to plan and invest in the future of Sydney's motorway network as identified in the *NSW Long Term Transport Master Plan* (Transport for NSW 2012) and the *State Infrastructure Strategy Update 2014* (State Infrastructure Strategy) (Infrastructure NSW 2014). These documents identify the need to plan and invest in the future of Sydney's motorway network, which provides vital infrastructure connections within and between travel demand corridors. Any investment in motorway infrastructure has to be aligned with supporting public and active transport initiatives to achieve an increase in capacity, while aiming to reduce the reliance on, and demand for, private vehicles on the future road network.

The WestConnex project is one part of a broader solution to these emerging pressures. While public transport is also part of this solution, not all trips in Sydney can be served by public transport, such as trips to dispersed destinations, or commercial trips requiring the movement of large or heavy goods/materials. In this context, WestConnex is an enabler of integrated transport and land use planning, supporting the development of initiatives including The Bays Precinct Transformation Plan, the Victoria Road transport improvements and the Parramatta Road Corridor Urban Transformation Strategy, which is discussed in **section B13.3.10**.

B13.3.9 Victoria Road public transport

It is noted from the EIS that while the project, specifically the Iron Cove Link, would result in reduced surface traffic on Victoria Road (east of Iron Cove Bridge), this does not imply an improvement in bus travel times inbound.

To support a growing community in Drummoyne there needs to be access to good public transport services, particularly given that the EIS itself identifies congestion issues on Victoria Road which may encourage people to consider alternate modes of transport. It is requested that further consideration be given as to how public transport along Victoria Road can be made faster and more efficient.

Response

Roads and Maritime will develop a strategy to ensure appropriate network integration in areas surrounding the Rozelle interchange, including Anzac Bridge and the Western Distributor, which will include a review of capacity improvements (environmental management measure OpTT3 in **Chapter E1** (Environmental management measures)), which is expected to have benefits for all road users, including public transport services.

The project has also committed to a review of network performance, in consultation with the relevant road authorities, to confirm the operational traffic impacts of the M4-M5 Link on surrounding arterial roads and major intersections at both 12 months and at five years after the commencement of operation of the M4-M5 Link. The assessment would be based on updated traffic surveys at the time and the methodology used would be comparable with that used in this assessment. The Victoria Road/Lyons Road intersection will be included in the review of network performance (see environmental management measure OpTT1 in **Chapter E1** (Environmental management measures)). The results of the review will be considered in future operational network performance planning carried out by Roads and Maritime.

In addition to these measures, the forecast reduction in general traffic demand on Victoria Road between Iron Cove Link and Anzac Bridge would provide the opportunity to investigate improving public transport operations along the Victoria Road corridor. These improvements do not form part of the project and would be the responsibility of Transport for NSW.

B13.3.10 Parramatta Road public transport

As part of M4 East a commitment was made to provide two lanes on Parramatta Road for public transport. Whilst the EIS introduces the concept that freed up space on surface roads may create opportunities for light rail, outside of the EIS there remains no commitment beyond bus services.

There is significant concern that bus services will not provide the capacity and certainty that is required to bring about the modal shift to public transport required for the success of the Parramatta Road Urban Transformation areas.

Further transparent consideration should be given to light rail and other alternatives such as a Guided Electric Transit System on Parramatta Road. Attention is drawn to the Parramatta Road Public Transport Opportunities Study commissioned by Inner West and Canada Bay Councils and supported by all inner west Councils which endorses a Guided Electric Transit System (GETS) as the best option for public transport on Parramatta Road.

Response

The *Parramatta Road Corridor Urban Transformation Strategy* (November 2016) identifies WestConnex as a catalyst for the restoration of the Parramatta Road corridor, as it is forecast to reduce through traffic on the surface roads in the corridor. The reduction in traffic, particularly trucks, would provide opportunities to improve public and active transport along Parramatta Road and in its immediate surrounds.

A key element of the *Parramatta Road Corridor Urban Transformation Strategy* is the delivery of improved public transport services along Parramatta Road, including the potential development of bus rapid transit. The M4-M5 Link project, together with the M4 East project, is forecast to reduce traffic on Parramatta Road between Burwood and the Sydney CBD, which would in turn allow for potential improvements in public transport priority along Parramatta Road.

Key bus-related infrastructure opportunities relevant to the project include the proposed Parramatta Road on-street rapid transit. Other improvements to the bus network along Parramatta Road, such as the introduction of bus ‘superstops’ and increasing the frequency of some buses were also announced in the *Parramatta Road Corridor Urban Transformation: Infrastructure Schedule* (UrbanGrowth NSW 2016).

Roads and Maritime will continue to work with Transport for NSW and relevant councils on the implementation of the *Parramatta Road Corridor Urban Transformation Strategy*.