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Inner West Council - WestConnex M4 - M5 Link: Environmental Impact Statement (EIS) - 16 October 2017

Beca assisted IWC to provide a response to Sydney Motorway Corporation (SMC) on the review of WestConnex Stage 3, M4 - M5 Environmental Impact Statement (EIS).

The review was undertaken by Beca personnel specialising in the different discipline areas contained in the 30 chapters of the EIS.

The EIS chapters for review are listed below, including the Appendices.

A	Appendix A – Project synthesis
B	Appendix B – Secretary's Environmental
C	Appendix C – Cumulative impact assessment methodology
D	Appendix D – Environmental Planning and Assessment Regulation 2000 (NSW) checklist
E	Appendix E – Geological long-sections
F	Appendix F – Utilities Management Strategy
G	Appendix G – Draft community consultation framework
H	Appendix H – Technical working paper: Traffic and transport
I	Appendix I – Technical working paper: Air quality
J	Appendix J – Technical working paper: Noise and vibration
K	Appendix K – Technical working paper: Human health risk assessment
L	Appendix L – Technical working paper: Urban design
M	Appendix M – Shadow diagrams and overshadowing
N	Appendix N – Technical working paper: Active transport strategy
O	Appendix O – Technical working paper: Landscape and visual impact
P	Appendix P – Technical working paper: Social and economic
Q	Appendix Q – Technical working paper: Surface water and flooding
R	Appendix R – Technical working paper: Contamination
S	Appendix S – Technical working paper: Biodiversity
T	Appendix T – Technical working paper: Groundwater
U	Appendix U – Technical working paper: Non-Aboriginal heritage
V	Appendix V – Technical working paper: Aboriginal heritage
W	Appendix W – Detailed greenhouse gas calculations
X	Appendix X – Climate change risk assessment framework.

The criteria used to categorise the significance of issues raised for this EIS are described below.

Significance level definitions	Description
Typo / grammar	As described, please suggest recommended alternative
Minor	Small technical issue that does not undermine the project findings and does not need to be addressed
Moderate	An intermediate technical issue that could undermine the project findings and needs to be clarified / addressed by the author
Critical	A substantial technical issue that undermines the project findings and needs to be addressed by the author

Pages 3 to 9 covers the issues raised in IWC's response to the M4 – M5 Link Concept Design Plan and are summarised here as it is still critical and relevant issues to the EIS.

Pages 10 to 167 cover the response detail summarised for each chapter.

M4 - M5 Link Concept Design Plan

Issues - Details

Issue 1: Overall construction impacts

Concerns about the full range of construction impacts – including, traffic, parking, noise and dust – around all Stage 3 construction sites;

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. Even where construction activities comply with the project's conditions of approval, many residents of Haberfield and some residents of St Peters have complained over a long period about unacceptable and at times "intolerable" impacts.

The most pressing of these is noise from night-works, as residents continue to suffer health problems from sleep deprivation. The impacts are particularly acute when night-works are undertaken over a long period without adequate respite periods. They are also acute when there are cumulative impacts from overlapping noise envelopes from several construction areas, and where contestable project works are undertaken at the same time as non-contestable project-related utility relocations and geotechnical investigations. Added to this is noise from trucks idling in residential streets, noise/vibration from tunnelling. For Stage 3, these issues need to be addressed in the EIS, resulting in conditions of approval that are stronger and more comprehensive than those applied to Stages 1 and 2.

A further pressing construction issue is project-related parking demands. Since construction of Stages 1 and 2 began, Haberfield and St Peters residents have complained 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 residents have recently expressed their dismay that some of these car parks are largely unused, being located away from construction sites. 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, strong conditions of approval with penalty provisions 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 is the case for Stage 1 and 2 areas.

In response to the range of construction issues being raised by the community and at WCLF meetings, Council has recently written to the DP&E to request the following WestConnex construction issues from Stages 1 and 2 be handled differently for Stage 3:

- lack of NSW Government compliance resources for this very large, high-impact project, with some conditions not sufficiently strong or clear to enable adequate enforcement and penalties for non-compliance weak or non-existent;
- cumulative impacts from contestable project works being undertaken at the same time as non-contestable utility relocation and geotechnical investigation works (Council has also raised this issue with the EPA);
- the priority SMC appears to give to meeting project completion dates at the expense of managing construction impacts on the community – for example, by scheduling night-works to speed up construction;
- employees' cars and other project vehicles continuing to be parked in residential streets, even when off-street parking facilities have been provided;
- instances where there has been not been adequate lead time to inform Council, community and other stakeholders about forthcoming works;
- instances where there has not been co-ordination between staff from State agencies, SMC and the Joint Venture (JV) in disseminating information to the community and in managing altered traffic /transport arrangements;
- project trucks departing from routes defined by conditions of approval and travelling along local residential streets – with resultant noise and traffic safety impacts; and
- inadequate arrangements for the marshalling and queuing of project trucks, resulting in ad-hock marshalling and consequently noise and traffic safety impacts.

For 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.

Issue 2: Particular concerns about construction impacts from dive-sites

Particular concerns about noise, dust and traffic impacts from the mid-tunnel construction dive-sites proposed for Darley Road, Leichhardt and Bridge Road / Parramatta Road, Annandale.

Throughout 2016-17 Council, community groups and individuals have been raising issues and expressing opposition to Stage 3 mid-tunnel construction dive-sites proposed for Darley Road, Leichhardt and Bridge Road / Parramatta Road at Camperdown/Annandale. Both of these sites are within densely developed areas that include sensitive land uses. As is discussed above, WestConnex construction activities at Stage 1 construction dive-site at Haberfield have had a major impact on Haberfield residents. The Darley Road and Bridge Road dive sites would have an even greater impact, as surrounding development is within closer proximity and at a higher density. Around both sites are residential areas, while a primary school is located on the opposite side of Parramatta Road to the Bridge Road site. Major concerns are raised about the noise, dust and truck traffic impacts on surrounding residents and school students.

Traffic safety issues are a particular concern for both sites. Truck access to the Darley Road site involves negotiation of a steep, curving and heavily-trafficked intersection with City West Link Road. At this intersection is a well-used signalised pedestrian crossing that provides access to the Leichhardt North Light Rail Stop. Although truck access to the Bridge Road site would be to/from main roads (Parramatta Road and Bridge Road), these are also heavily-trafficked and there is potential for conflict between spoil trucks and the numerous buses that run along the kerbside lane on Parramatta Road. For both sites, there is the potential for truck conflicts with cars and bicycles on any road and conflicts with pedestrians wherever trucks cross footpaths.

Issue 3: Opposition to dive-sites & preference for potentially lower-impact alternatives

Opposition to the Darley Road and Bridge Road dive sites, with a preference for no dive sites, or a potentially lower-impact dive site option at the western end of the Rozelle Rail Yards (RRY) site.

As a result of Council's concerns about the Darley Road and Bridge Road sites, Council has continued express its opposition to these sites, with a preference that there be no mid-tunnel dive-sites for Stage 3. In expressing this view, Council recognises that if there were no mid-tunnel sites, all spoil would need to be removed from portals at Haberfield and in the RRY site over a longer construction period, which would extend construction impacts at the Haberfield and RRY site portals. Council has consequently argued that a site at the western end of the RRY site could offer a lower-impact alternative to the Darley Road, Bridge Road and no dive-site options.

In early 2017, Council undertook its own assessment of dive-site options, assisted by a consulting engineer. The engineer's assessment confirmed that the RRY site was potentially a lower-impact option compared to Darley Road, and could technically be implemented. However, the report raised a number of queries about future use of the site - such as its future use for light rail stabling - which Council had referred to SMC to answer. To date Council has not received a satisfactory response even though the Concept Design states that SMC will continue to investigate the RRY option. Council requests that SMC responds to its queries prior to release of the EIS.

Issue 4: Continuation of construction impacts at Haberfield

Concerns about continued use of existing Stage 1 works compounds at Haberfield for Stage 3, resulting in an extension of construction impacts – a particularly important issue as Haberfield residents have already endured significant impacts from the construction of Stage 1.

Haberfield residents continue to express their concerns to Council about the "intolerable" impacts they have endured without respite throughout 2016 -17. 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 Concept Design Plan that the Stage 1 worksites at Walker Avenue and Wattle Street will 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.

Council is concerned that the response by SMC on health issues created by Stage 1 construction 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. Council is also concerned about under-reporting of these health issues, 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.

Recently Council has become aware that in Haberfield some elderly residents in public housing accommodation have reported they had withheld making complaints as they feared there may be reprisals from their NSW Government landlord. For other residents, language has been barrier to making complaints. A further issue is that a certain number of complaints are not likely to have been registered, as residents had not made them in an 'official' manner, e.g. complaints made to project ground staff – a further contributing factor to under-reporting.

Council is firmly of the view that that Haberfield residents have already been subject to "intolerable" 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.

Issue 5: Provision of truck marshalling areas & management of impacts

Concerns about noise, safety and amenity impacts from truck stabling on streets, and consequently a requirement that off-street stabling areas be provided.

Throughout 2016 and 2017 the community has been raising issues about inadequate arrangements for truck marshalling. Although it has not been such an issue for Stage 2 as the St Peters Interchange site has been able to accommodate this function, it has been a major issue for Stage 1. Residents of Haberfield and suburbs further afield have complained about what has appeared to be ad-hoc marshalling of trucks in residential streets, at times in the early morning. Lack of marshalling arrangements has led to circling of trucks around Haberfield streets and queuing of trucks on Parramatta Road at Haberfield 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 the Parramatta Road queuing issue.

Given these Stage 1 issues, residents in the Stage 3 area are anxious about similar poorly-managed truck marshaling in their suburbs. Council has recently been disappointed to learn that the White Bay port area has not been secured for the proposed M4-M5 Link, contrary to previous indications. Council has recently written to the DP&E to raise this issue, suggesting that the DP&E develops strong and comprehensive conditions of approval for Stage 3 to ensure suitable marshalling areas are provided and are well managed.

Issue 6: Air quality & visual impacts from ventilation facilities

Air quality and visual amenity concerns from unfiltered ventilation facilities proposed for the RRY site and Victoria Road near Terry Street – the latter facility raises particular concerns due to its proximity to densely developed residential areas.

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 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.

Council is of the view that releasing emissions from these facilities unfiltered - as is proposed for all stages of WestConnex - is not acceptable, even if compliance is achieved with regional air quality standards. 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. Nonetheless, Council will continue to argue that filtration 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.

Council will also continue to argue that the community is kept fully informed of the results of air quality monitoring established for all stages of WestConnex, including Stage 3. This should include the real-time online display of air quality monitoring data, as has been established for monitoring of emissions from passenger cruise ships berthed at the White Bay terminal. Council has recently written to EPA to request this arrangement for WestConnex.

At a strategic level, Council's preference for public transport is partly 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. 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.

Issue 7: Construction & operational traffic impacts around the Rozelle Interchange

Concerns about increased construction and operational traffic in the area around the proposed Rozelle Interchange, with consequences for residential amenity, pedestrian and cyclist safety and parking demand;

Above Council has raised its concerns about the full range of construction impacts from the community's experience with WestConnex Stages 1 and 2. Even where construction activities comply with the project's conditions of approval, residents complain that construction impacts can be "intolerable". Construction traffic is a major contributor. Should Stage 3 proceed, it is imperative this situation not be repeated for Stage 3 construction areas, particularly as the density of residential development around Stage 3 construction areas is higher than around Stage 1.

Above it was explained that Council is particularly concerned about construction impacts from dive-sites proposed for Darley Road and Bridge Road due to frequent spoil truck movements over a long period, and the particular constraints and sensitivities of those sites. Pedestrian and cyclist safety would be compromised around those sites at signalised pedestrian crossings, along bicycle routes and wherever construction traffic crosses footpaths.

Operational traffic is a further concern. At the regional scale, Council is concerned about WestConnex promoting traffic growth across Sydney. At the local scale, Council is concerned about WestConnex-related traffic growth across the Inner West Council area - particularly on streets around the Haberfield, Rozelle and St Peters interchanges. For Stage 3, that concern focuses on the Rozelle Interchange. Council's alternative proposal seeks to delete the entry/exit points from the Rozelle Interchange to Anzac Bridge and The Crescent / Johnston Street and relocate the St Peters Interchange to avoid local traffic impacts around these two interchanges.

Issue 8: 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 Johnstone Street and The Crescent at Annandale – these latter two streets being within densely developed residential areas.

Council is concerned that should Stage 3 proceed with entry/exit points from the Rozelle Interchange considerable additional traffic would spill onto the already congested Anzac Bridge and onto residential streets The Crescent and Johnston Street. Additional traffic would also flow to other connecting streets further afield. This may prompt RMS to consider reconfiguring and The Crescent and Johnston Street 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 would be at the expense of residential amenity and active transport.

Above it was explained that Council is currently developing a Local Area Traffic Improvement Strategy to identify and traffic-calm local roads that may be affected by additional traffic from WestConnex. The Crescent, Johnston Street and adjoining roads will be investigated as part of this strategy. Above it was also explained that although removal of these two points would reduce local vehicular access to WestConnex, this loss of convenience would be far outweighed by the benefits of preventing WestConnex traffic spilling onto residential streets and the Anzac Bridge. Locals would also derive access benefits from lower traffic levels on the Anzac Bridge and local roads.

Issue 9: Impact of compulsory acquisitions

Impacts from property acquisitions on residents and businesses along a section of Victoria Road at Rozelle from the Iron Cove Bridge to Springside Street – required for construction of the Iron Cove Link tunnel portal onto Victoria Road.

In the early stages of Stages 1 and 2, compulsory acquisition of homes and properties at Haberfield and St Peters devastated the lives of many families, business operators and individuals. To make matters worse, some property owners have claimed the compensation they have received is not sufficient to enable them to purchase equivalent properties within their neighbourhoods. Remaining residents have grieved the loss of families, individuals and businesses that have been forced out of their communities by the project. Council is concerned that owners of properties along the western side of Victoria Road near the Iron Cove Bridge will suffer a similar fate.

Issue 10: Need for a stronger commitment to surface road improvements

Lack of commitment to traffic capacity reductions and public transport improvements wherever traffic is reduced by WestConnex – in particular, along Victoria Road and Parramatta Road.

Above it was explained that one of the few benefits from WestConnex is the opportunity to reduce traffic capacity and make a range of surface improvements - particularly public transport improvements - wherever WestConnex reduces surface traffic. For Stage 3, the main opportunity is to improve Victoria Road between the Iron Cove Bridge and Springside Street – 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.

As explained above, the challenge for Council will be to ensure that in every instance reduced traffic results in reduced capacity for private vehicles and increased capacity public transport, active transport and amenity improvements. Council's prior experience is that RMS will usually resist traffic capacity reductions on main roads, even where traffic levels have been reduced. Council seeks to avoid a situation increased road capacity below-ground has not resulted in a reduction in capacity above-ground.

Issue 11: Impact of clean-up of Rozelle Rail Yards site on heritage and biodiversity

For the RRY site, lack of consideration of retention of rail heritage features in-situ and staging of site clearing to minimise biodiversity impacts.

In its December 2017 submission on Review of Environmental Factors (REF) for the surface clean-up of the RRY site, Council did not object to the clean-up, but stated its preference for this to occur without WestConnex. Council also raised a number of site-specific issues, including retention of rail heritage and minimisation of biodiversity impacts. Council staff discussed these issues at a meeting with relevant project staff during the REF exhibition and at June 2017 site visit. Although Council is satisfied that SMC is aware of these two issues, they have not been resolved to Council's satisfaction.

Regarding rail heritage, Council has been informed that significant items will be re-used, i.e. integrated into the landscaping of the Rozelle Interchange recreation area. Council agrees there is a role for re-use but has 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. Regarding biodiversity, Council is concerned that there has not been sufficient consideration given to 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. Council seeks reassurance that this can and will be achieved.

Issue 12: 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 site recreation area is readily accessible to the community.

Council is keen to ensure the creation of the RRY site 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 has also created 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 Rozelle Interchange recreation area represents an important opportunity to improve this situation.

Although Council generally supports the walk/cycle routes proposed within the draft RRY masterplan (within the Concept Design), it is apparent further work is needed to ensure routes follow (where feasible) walk/cycle desire lines and are designed to a high standard. Should Stage 3 proceed, it is anticipated that Council staff will continue to work with project staff to refine these designs. Council's main concerns at this stage are firstly the need for a greater number of north-south walk/cycle connections and secondly, that these be constructed to a higher standard than shown.

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 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 in or near the site.

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. It follows that Council supports the development of the Stage 3 Active Transport Plan described in the Concept Design Plan, and anticipates that Council staff will have the opportunity to refine this plan should Stage 3 proceed.

Issue 13: 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.

In its first-tier position, Council expresses a preference for public transport over motorway solutions to Sydney's traffic problems. It follows that Council seeks reassurance that tunnelling alignments and other features of WestConnex Stage 3 and possibly the Western Harbour Tunnel would not create barriers to implementation of future public transport in the area, such as the Western Metro (rail) and link from the Inner West Light Rail to White Bay and Balmain. Earlier in 2017, Council wrote to Transport for NSW and UrbanGrowth NSW seeking such a reassurance, but has not been completely satisfied that relevant NSW Government 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.

Issue 14: Other local issues

A range of other less-critical (but nonetheless important) local issues, some raised by community groups and members of the community.

Beyond the local issues discussed above, a number of less-critical but nonetheless important local issues have been raised by Council staff and the community in relation to WestConnex Stage 3. These issues include:

- Concerns from residents and local sporting groups about impacts of road closures at Byrnes and Clubb Streets proposed in the Iron Cove Link concept plan (within the Concept Design). Concerns are raised about traffic impacts on residential amenity and reduced vehicular access to King George Park.
- Concerns from residents of Lilyfield and Rozelle about dust (and the possibility this could include asbestos particles) from the clean-up of the RRY being carried by the wind into surrounding residential areas.
- A number of issues raised by Council staff about site contamination and flooding and water quality impacts – particularly as they relate to the RRY site and its surrounds. Council staff discussed these issues directly with SMC staff and their specialist consultants when the RRY REF was on public exhibition at the end of 2017. Written comments from Council staff on these issues were also included in Council's submission on the REF. Recent comments are in the attached Beca assessment.
- Concerns from Council and the community about information guiding SMC's assessment of Stage 3 mid-tunnel construction dive-sites – particularly the Darley Road, Derbyshire Road, and RRY (western end) options - not being freely available to the community.

	Chapter 1	Introduction			
	This chapter provides an overview of the project, its scope and location				
	Technical guidelines reviewed against		N/A		
	Section reference	**Page number**	**Comments**	**Significance level**	**Additional work recommended**
1	**Introduction**	1.1		Blank	
1.1	Project Overview	1.1	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.	Critical	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.
1.1	Project Overview (Cont.)	1.2	For the M4-M5 Link project, 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 based on a concept design and would be subject to detailed design and construction planning to be undertaken by the successful contractors. However, 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 WestConnex M4-M5 Link and Roads and Maritime Services Environmental Impact Statement requirements identified during the assessment of the project. Issues raised during public consultation on the EIS or in the assessment of the project by NSW Department of Planning and	Critical	This 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

			Environment (DP&E) would also be taken into account during the detailed design process.		forthcoming approval processes when RMS will prepare a submissions report and Preferred Infrastructure Report.
1.2	Project location	1.5	No comment	Blank	
1.3	Project features	1.5	The main concerns around project features are listed as project issues in **tab 6.**	Critical	
1.3.1	Staged construction and opening of the project	1.7	Refer to response on Chapter 6 - **tab 14.**	Blank	
1.4	Purpose of this EIS	1.10	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 respond target dates should be provided in more detail for better collaboration between SMC, RMS and stakeholders.	Moderate	
1.5	Directions used in this EIS	1.10	No comment	Blank	
1.6	Timing for implementation of management measures	1.10	No comment	Blank	
1.7	Structure of this EIS	1.12	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.	Moderate	
	Overall evaluation				
	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.				
	Reviewer	BP			
	Date	22/09/2017			

	Chapter 2	Assessment process			
	Outlines the statutory assessment requirements and explains the steps in the assessment and approval process				
	Technical guidelines reviewed against		N/A		
	Section reference	**Page number**	**Comments**	**Significance level**	**Additional work recommended**
2	**Assessment process**	2.1	No comment	Blank	
2.1	Approval framework	2.1	No comment	Blank	
2.2	Environmental planning instruments	2.9	No comment	Blank	
2.2.1	State environmental planning policies	2.9	No comment	Blank	
2.2.2	Local environmental plans	2.11	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**.	Critical	
2.3	Other NSW legislation	2.12	No comment	Blank	
2.4	Commonwealth legislation	2.13	No comment	Blank	
2.4.1	Environment Protection and Biodiversity Conservation Act 1999	2.13	No comment	Blank	
2.4.2	Airports Act 1996	2.14	It is stated: "The exhaust plumes from all of the ventilation facilities have the potential to penetrate either or both the OLS or PANS-OPS levels. The project has been designed to satisfy requirements set by DIRD 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 Advisory Circular Plume Rise Assessments AC 139-	Critical	

			5(1) November 2012 prior to the operation of the project." **See detailed response in Chapter 9, tab 17.**		
2.5	Site management works at the Rozelle Rail Yards	2.15	No comment	Blank	
2.6	Modifications to the project approval	2.16	No comment	Blank	
	Overall evaluation				
	See Chapter 1 - Overall Evaluation.				
	Reviewer	BP			
	Date	22/09/2017			

	Chapter 3	Strategic context and project need			
	Provides the strategic context and explains the need for the project				
	Technical guidelines reviewed against		N/A		
	Section reference	**Page number**	**Comments**	**Significance level**	**Additional work recommended**
3	**Strategic context and project need**	3.1	No comment	Blank	
3.1	Strategic planning and policy framework	3.2	No comment	Blank	
3.1.1	Overview	3.2	No comment	Blank	
3.1.2	Australian Infrastructure Plan: The Infrastructure Priority List	3.3	No comment	Blank	
3.1.3	NSW State Priorities	3.3	"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.	Critical	The preparation of a comprehensive Incident Management Plan, especially for the M4-M5 Link is suggested.
3.1.4	State Infrastructure Strategy	3.4	No comment	Blank	
3.1.5	NSW Long Term Transport Master Plan	3.5	See note in **Overall evaluation** below.	Critical	
3.1.6	Sydney City Centre Access Strategy	3.7	No comment	Blank	
3.1.7	A Plan for Growing Sydney	3.7	No comment	Blank	

3.1.8	Towards our Greater Sydney 2056	3.11	No comment	Blank	
3.1.9	Draft Central District Plan	3.11	No comment	Blank	
3.1.10	NSW Freight and Ports Strategy	3.12	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.	Critical	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. See further detail of this in our response on **Chapter 8.**
3.1.11	Parramatta Road Corridor Urban Transformation Strategy	3.13	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. Please our response to construction impact in **Chapter 7.**	Critical	
3.1.12	The Bays Precinct Transformation Plan	3.13	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	Moderate	The Bays Precinct will become more popular in 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

			solutions for The Bays Precinct would need to be integrated with planning for a growing Sydney, including the consideration of varied transport modes.		did SMC plan and allow for in the final design of these roads?
	The Bays Precinct Transformation Plan (cont.)	3.14	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.	Moderate	If the project proceeds, how do SMC plan to restore the opportunity for the development of mixed housing and potential employment uses?
3.1.13	Action for Air	3.15	See response of **Chapter 9.**	Blank	
	Project need and justification	3.16	The EIS states that while the development of the project would have unavoidable impacts (associated with, for example, property acquisition, construction impacts from heavy vehicle traffic, noise, vibration and dust, access disruptions and visual impacts) and in some areas, reduced road capacity and travel times, overall, the project would deliver a large number of benefits. See overall evaluation below.	Critical	
3.2	Project need and justification (cont.)	3.16	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.	Critical	
3.2.1	Improved connectivity	3.16	See our response on **Chapter 5.**	Blank	

3.2.2	Easing congestion	3.17	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 Services Environmental Impact Statement 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.	Critical	With the reduction in congestion there is a 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.
	Easing congestion (cont.)	3.18	The EIS states 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.	Critical	See IWC's concern as described **Overall evaluation** below**.**
3.2.3	Viable economic proposal	3.19	See comment in **Overall evaluation** below.	Critical	
3.2.3	Viable economic proposal (cont.)	3.20	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…….	Critical	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 therefore changed and the reasons for this need to be explained as described in the **Overall evaluation** below.
3.2.4	Opportunities for public transport improvements	3.20	The EIS states, traffic modelling undertaken for the project shows that around 100,000 vehicles would use the project each day in 2033. This would free up space on surface roads, which may create opportunities for dedicated public transport lanes for buses and light rail. See our response to this on **Chapter 8.**	Blank	
3.2.5	Future trends in transport		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.	Critical	The project will have reduced congestion and provide road connections but not for the original intend and need to connect Port Botany and Sydney Airport to western Sydney, as stated above.
3.2.5	Future trends in transport (cont.).	3.2	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.	Critical	IWC expects SMC to fully explain how TfNSW's Future Transport Strategy has been taken into account in the preparation of this EIS.
3.2.6	Facilitating urban renewal	3.21	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 response in **Section 3.1.12** above.	Moderate	

3.3	Project objectives	3.22	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.	Critical	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 has therefore changed and the reasons for this need to be explained as described in the Overall evaluation below.
3.4	Benefits of the project	3.25	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…… See further comments on this on **Chapters 8 and 14** respectively.	Critical	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.
	Overall evaluation				
	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.				
	Signature of reviewer	BP			
	Date	22/09/2017			

	Chapter 4	**Project development and alternatives**			
	Describes the alternatives to the M4-M5 Link project, as well as the options that were considered as part of the design development process.				
	Technical guidelines reviewed against		N/A		
	Section reference	**Page number**	**Comments**	**Significance level**	**Additional work recommended**
4	**Project development and alternatives**	4.1	**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…..	Critical	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.
4.1	History of WestConnex, the M4-M5 Link and related projects	4.2	No comment	Blank	
4.1.1	The M4 Motorway	4.2	It is stated that the purpose of the M5 East Motorway was to improve the east-west road transportation route between south-west Sydney and the Sydney CBD, Port Botany and Sydney Airport.	Critical	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.
4.1.2	The M5 Motorway	4.3	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.	Critical	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**.
4.1.3	Link between the M4 Motorway and M5 Motorway	4.3	See our response of **Chapter 5.**	Blank	
4.1.4	Sydney Gateway	4.4	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.	Critical	See **Chapter 3** under **Overall evaluation**.
4.2	Development of M4-M5 Link concept	4.6	No comment	Blank	
4.2.1	State Infrastructure Strategy	4.6	No comment	Blank	
4.2.2	2013 WestConnex Business Case	4.6	No comment	Blank	
4.2.3	State Infrastructure Strategy Update 2014	4.7	No comment	Blank	
4.2.4	WestConnex Updated Strategic Business Case 2015	4.8	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.	Critical	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.
4.3	Staging	4.13	No comment	Blank	
4.3.1	Staging of the WestConnex program of works	4.13	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.	Critical	
4.3.2	Staging of the M4-M5 Link	4.14	Our response on construction of these stages are construction as per **Chapter 6.**	Blank	

4.4	Strategic alternatives	4.15	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.	Critical	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.
4.4	Strategic alternatives (cont.)	4.15	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.	Critical	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.
4.4.1	Alternative 1 – Improvements to the existing arterial road network	4.15	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.	Critical	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,
4.4.2	Alternative 2 – Investment in alternative transport modes	4.16	IWC agrees 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.	Critical	
4.4.3	Alternative 3 – Travel demand management	4.27	SWC agrees 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.	Critical	

4.4.4	Alternative 4 – The 'do nothing'/'do minimum' case	4.30	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.	Critical	**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.**
	Alternative 4 – The 'do nothing'/'do minimum' case (cont.)	4.30	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.	Critical	See also comment in **Section 3.1.10.**
	Alternative 4 – The 'do nothing'/'do minimum' case (cont.)	4.31	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.	Critical	In response to this statement please note IWC's second-tier response in **Attachment 1** to this worksheet.
4.4.5	Alternative 5 – Development of the M4-M5 Link	4.31	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,	Critical	

			update the business case and EIS, and deliver a better outcome.		
4.5	Project evolution and design refinements	4.32	See response below.	Blank	
4.5.1	Interchanges (Rozelle)	4.33	This 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 Johnstone 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.	Critical	
4.5.1	Interchanges (St Peters)	4.33	**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.	Critical	
4.5.1	Interchanges (Camperdown)	4.33	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.	Critical	
4.5.2	Mainline Tunnel	4.38	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.	Critical	

4.5.3	Iron Cove Link	4.40	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.	Critical	
4.5.4	Construction of connections to the proposed future Western Harbour Tunnel and Beaches Link at Rozelle	4.41	No comment	Blank	
4.6	Other project options considered	4.42	No comment	Blank	
4.6.1	Ventilation facilities	4.42	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.	Critical	It is noted on **page 4.44** 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.
4.6.1	Ventilation facilities (cont.)	4.42	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.	Critical	

4.6.1	Ventilation facilities (cont.)	4.42	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 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.	Critical	
4.6.2	Construction ancillary facility locations	4.49	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.** Also see IWC's response on the CDP as per **Issues 1, 2, 3, 4, 5, 7, 9 and 14** at the start of this report.	Critical	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.
4.6.2	Construction ancillary facility locations (cont.)	4.49	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.	Critical	
4.6.3	Tunnel construction methodologies	4.54	Comments on vibration issues are provided on **Chapter 10.**	Blank	
4.6.4	Spoil storage, transport and disposal options	4.55	Our response on spoil storage, transport and disposal options are provided on truck movements in **Chapter 8.**		
	Overall evaluation				
	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.				
	Signature of reviewer	BP			
	Date	22/09/2017			

	Chapter 5	Project Description			
	This chapter describes the M4-M5 Link project, including the project tunnels, interchanges and associated infrastructure, and ancillary facilities. It also describes the design standards and construction activities required to deliver the project.				
	Technical guidelines reviewed against		N/A		
	Section reference	**Page number**	**Comments**	**Significance level**	**Additional work recommended**
5	**Project description**	5.1	Our responses to the project as described in here are already provided in the responses on **Chapters 3 and 4**. Other related traffic responses are provided for **Chapter 8.**	Blank	
5.1	The project	5.3	Our responses to the project as described in here are already provided in the responses on **Chapters 3 and 4**. Other related traffic responses are provided for **Chapter 8.**	Blank	
5.1.1	The completed project	5.5	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.	Critical	
5.1.2	Project footprint	5.7	As also mentioned in **Section 1.12,** 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.	Moderate	
5.1.3	Staged construction and opening of the project	5.7	See additional response in **Chapter 6** on construction staging.	Blank	
5.2	Urban design objectives and principles	5.18	See our response in **Chapter 13** on construction staging.	Blank	
5.3	Tunnels	5.19	No comment	Blank	

5.3.1	Mainline tunnels	5.19	No comment	Blank	
5.3.2	Rozelle interchange and Iron Cove Link tunnels	5.25	No comment	Blank	
5.3.3	Emergency and breakdown facilities	5.25	No comment	Blank	
5.3.4	Connections to the proposed future Western Harbour Tunnel and Beaches Link	5.26	No comment	Blank	
5.3.5	Tunnel portals	5.32	No comment	Blank	
5.3.6	Tunnel vertical alignments	5.32	No comment	Blank	
5.4	Integration with other WestConnex projects	5.40	See our response in **Chapter 8** on traffic related issues.	Blank	
5.4.1	Connection to the M4 East mainline tunnel	5.40	No comment	Blank	
5.4.2	Connection to the Wattle Street interchange	5.40	No comment	Blank	
5.4.3	Connection to the New M5 mainline tunnel	5.40	No comment	Blank	
5.4.4	Connection to the St Peters interchange	5.40	No comment	Blank	
5.5	Connectivity	5.41	See our response on **Chapter 8** on traffic related issues.	Blank	
5.6	Rozelle surface works	5.44	See our response on **Chapter 8** on traffic related issues.	Blank	
5.6.1	Upgrade, widening and intersection works along City West Link and The Crescent	5.49	See our response on **Chapter 8** on traffic related issues.	Blank	
5.6.2	New intersection to connect City West Link to the New M5 and the St Peters interchange	5.49	See our response on **Chapter 8** on traffic related issues.	Blank	
5.6.3	Realignment of The Crescent at Annandale	5.49	See our response on **Chapter 8** on traffic related issues.	Blank	
5.6.4	Reconstruction of Victoria Road at Rozelle	5.50	See our response on **Chapter 8** on traffic related issues.	Blank	
5.6.5	Victoria Road/Anzac Bridge approaches	5.51	See our response on **Chapter 8** on traffic related issues.	Blank	
5.6.6	Bridges and cut-and-cover structures at the Rozelle interchange	5.51	See our response on **Chapter 8** on traffic related issues.	Blank	
5.6.7	Urban design and landscape	5.58	See our response on **Chapter 13** on related issues.	Blank	

5.6.8	Integration with public transport	5.58	See our response on **Chapter 8** on traffic related issues.	Blank	
5.6.9	Potential future uses of remaining project land around the Rozelle surface works	5.59	See our response on **Chapter 8** on traffic related issues.	Blank	
5.7	Iron Cove Link surface works	5.66	See our response on **Chapter 8** on traffic related issues.	Blank	
5.7.1	Overview	5.66	See our response on **Chapter 8** on traffic related issues.	Blank	
5.7.2	Bridges and structures at the Iron Cove Link surface works	5.67	See our response on **Chapter 8** on traffic related issues.	Blank	
5.7.3	Victoria Road intersection modifications	5.67	See our response on **Chapter 8** on traffic related issues.	Blank	
5.7.4	Pedestrian and cyclist facilities	5.71	See our response on **Chapter 8** on traffic related issues.	Blank	
5.7.5	Urban design and landscape	5.71	See our response on **Chapter 13** on related issues.	Blank	
5.7.6	Integration with public transport	5.71	See our response on **Chapter 8** on traffic related issues.	Blank	
5.7.7	Potential future uses for remaining land around the Iron Cove Link surface works	5.72	See our response on **Chapter 8** on traffic related issues.	Blank	
5.8	Motorway operational ancillary infrastructure	5.75	No comment	Blank	
5.8.1	Motorway operations complexes	5.75	No comment	Blank	
5.8.2	Ventilation system and facilities	5.82	See our response on **Chapter 9** on traffic related issues.	Blank	
5.8.3	Fire and life safety	5.90	No comment	Blank	
5.8.4	Operational management	5.94	See comment in **Section 3.1.3.**	Blank	
5.8.5	Coordinated operations	5.94	See comment in **Section 3.1.4.**	Blank	
5.8.6	Traffic monitoring and management systems	5.95	See comment in **Section 3.1.5.**	Blank	
5.8.7	Air quality monitoring and management systems	5.95	See comment in **Section 3.1.6.**	Blank	
5.8.8	Motorway tolling infrastructure	5.96	No comment	Blank	
5.8.9	Lighting, roadside furniture and signage	5.96	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.	Blank	

5.9	Drainage and water treatment facilities	5.97	See our response on **Chapter 17** on related issues.	Blank	
5.9.1	Tunnel drainage and treatment infrastructure	5.98	See our response on **Chapter 17** on related issues.	Blank	
5.9.2	Surface water drainage and management infrastructure	5.98	See our response on **Chapter 10** on related issues.	Blank	
5.9.3	Noise attenuation	5.101	See our response on **Chapter 17** on related issues.	Blank	
5.10	Utility services	5.102	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.	Blank	
5.10.1	Electricity	5.102	No comment	Blank	
5.10.2	Water	5.105	No comment	Blank	
5.11	Property access and acquisition	5.105	See our response on **Chapter 12** on related issues.	Blank	
	Overall evaluation				
	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.				
	Signature of reviewer	BP			
	Date	22/09/2017			

	Chapter 6	**Construction work**			
	This chapter describes the proposed approach to the construction of the project. It outlines the proposed construction program, footprint, methodology, working hours, materials, equipment, traffic management, spoil haulage routes, and temporary construction ancillary facilities. The description of the construction work provided in this chapter is based on methodologies developed to construct the project described in Chapter 5.				
	Technical guidelines reviewed against		N/A		
	Section reference	**Page number**	**Comments**	**Significance level**	**Additional work recommended**
6	**Construction work**	6.1	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.	Critical	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**.** 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.
6.1	Construction strategy	6.3	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	Critical	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 made to the design may be subject to further assessment and consultation, if required by the Environmental Planning and Assessment Act 1979 (NSW) (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**.		changes are known and presented in a "Submissions and Preferred Infrastructure Report", and how stakeholders will get the chance to review these.
6.1.1	General principles of the construction strategy	6.5	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.	Critical	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.
6.1.2	Construction staging	6.4	It is stated that further staging details would be confirmed when construction contractors 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.	Critical	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.
6.2	Construction program	6.7	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.	Critical	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.

6.3	Project footprint	6.9	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.	Critical	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.
6.4	Project construction activities	6.20	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.	Critical	
6.4	Project construction activities (cont.)	6.20	As per our Concept Design Plan response, and now for the EIS, it is expected that for each of the proposed construction sites (and additional if required after detailed design) and for all the activities listed in **Table 6-3, page 6.20**, a separate Construction Traffic Management Plan (CTMP) 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	Critical	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. IWC requests that, as per RMS guidelines, a Road Safety Audit be prepared for each site and submitted to IWC for consideration as part of the CMP for approval.

			identified and included in the CTMP. IWC request that the CTMP be provided to Council for comment before the start of any construction activities.		
6.4.1	Site establishment and establishment of construction ancillary facilities	6.21	It is stated (**6.4.1**) that "Site establishment works for major infrastructure are typically commenced before the start of substantial construction to make ready the key construction sites, including construction ancillary facilities, and provide protection to the public".	Critical	
6.4.2	Tunnelling	6.21	Refer to **Chapter 8**. Also refer to comment on **Section 8.3.1** in **Chapter 8.**	Moderate	
6.4.3	Bridge works	6.28	No comment	Blank	
6.4.4	Construction of permanent operational infrastructure	6.28	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).	Moderate	
6.4.5	Drainage and water management infrastructure	6.31	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**.	Moderate	
6.4.6	Road pavement works	6.32	No comment	Blank	
6.4.7	Finishing works	6.32	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.**	Moderate	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.**

6.5	Construction ancillary facilities	6.32	No comment	Blank	
6.5.1	Overview	6.32	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.	Critical	
6.5.2	Wattle Street civil and tunnel site (C1a)	6.36	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.	Critical	See **comment 8.3.1, Chapter 8.**
6.5.3	Haberfield civil and tunnel site (C2a)	6.40	Note **Issues 4 & 5** at the start of this report.	Critical	See **comment 8.3.1, Chapter 8.**
6.5.4	Northcote Street civil site (C3a)	6.43	Note **Issues 4 & 5** at the start of this report.	Critical	See **comment 8.3.1, Chapter 8.**
6.5.5	Parramatta Road West civil and tunnel site (C1b)	6.45	Note **Issues 4 & 5** at the start of this report.	Critical	See **comment 8.3.1, Chapter 8.**
6.5.6	Haberfield civil site (C2b)	6.48	Note **Issues 4 & 5** at the start of this report.	Critical	See **comment 8.3.1, Chapter 8.**
6.5.7	Parramatta Road East civil site (C3b)	6.50	Note **Issues 4 & 5** at the start of this report.	Critical	

6.5.8	Darley Road civil and tunnel site (C4) - cont.	6.51	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 Refer to **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.	Critical	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.
6.5.8	Darley Road civil and tunnel site (C4)	7.51	Note **Issue 2** at the start of this report.	Critical	See **comment 8.3.1, Chapter 8.**
6.5.9	Rozelle civil and tunnel site (C5)	6.55	Note **Elements 3, 7 & 8.** This will be a significant construction site that will 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	Critical	See **comment 8.3.1, Chapter 8.**

			traffic, noise, air quality, noise and potential contamination of soil and groundwater.		
6.5.10	The Crescent civil site (C6)	6.59	Note **Elements 3, 7 & 8**.	Critical	
6.5.11	Victoria Road civil site (C7)	6.62	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 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.	Critical	See **comment 8.3.1, Chapter 8.**
6.5.12	Iron Cove Link civil site (C8)	6.63	Construction activities will be very close to properties at this site 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.	Critical	See **comment 8.3.1, Chapter 8.**
6.5.13	Pyrmont Bridge Road tunnel site (C9)	6.66	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.	Critical	See **comment 8.3.1, Chapter 8.**

6.5.14	Campbell Road civil and tunnel site (C10)	6.69	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.	Critical	See **comment 8.3.1, Chapter 8.**
6.6	Traffic management and access	6.72	See comments in **Sections 6.6.1 to 6.6.6** below.	Blank	
6.6.1	Changes to the road network during construction	6.72	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.	Critical	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.
6.6.1	Changes to the road network during construction (cont.).	6.78	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 construction contractor, Roads and Maritime, Transport Management Centre (TMC) and other key stakeholders.	Critical	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.
6.6.2	Changes to pedestrian and cyclist facilities	6.78	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.**	Critical	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.

6.6.3	Changes to the public transport network	6.80	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.	Critical	SMC to involve IWC as an approval authority (see "**Overall evaluation** below) to be part of the review during detail design of these modifications.
6.6.4	Access routes and vehicle numbers	6.81	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**.	Critical	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.
6.6.5	Spoil haulage routes	6.84	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**.	Critical	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. Allso see "**Overall evaluation"** below.
6.6.6	Construction workforce parking	6.92	See comments in **Section 8.3, Chapter 8**.	Moderate	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.
6.7	Construction workforce numbers and work hours	6.92	See comments in **Section 8.3, Chapter 8**.	Moderate	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.
6.7.1	Construction workforce	6.92	See comments in **Section 8.3, Chapter 8**.	Moderate	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.

6.7.2	Construction hours	6.93	See comments in **Section 8.3, Chapter 8**.	Moderate	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.
6.8	Construction noise attenuation	6.97	Refer to **Chapter 10** for comments on noise issues.	Blank	
6.9	Construction plant and equipment	6.97	No comment	Blank	
6.1	Construction waste management	6.100	Refer to **Chapter 23** for comments on waste management issues.	Blank	
6.1.1	Construction resource use and management	6.100	Refer to **Chapter 23** for comments on resource use and management issues.	Blank	
	Overall evaluation				
	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 Environmental Planning and Assessment Act 1979 (NSW) (EP&A Act). 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 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.				
	Signature of reviewer	BP			
	Date	22/09/2017			

	Chapter 7	Consultation			
	This chapter provides an overview of the consultation activities undertaken before and during the preparation of this environmental impact statement (EIS), and outlines the activities planned during the public exhibition of the EIS as well as before and during the construction stage of the M4-M5 Link project.				
	Technical guidelines reviewed against		N/A		
	Section reference	**Page number**	**Comments**	**Significance level**	**Additional work recommended**
7	**Consultation**	7.1		Blank	
	General		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.	Moderate	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.
	General		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	Moderate	Stakeholder consultation comments factored into the project design.

			as it keeps property acquisition costs low but may not result in the best overall outcome for the locality and the local community.		
7.1	Community and stakeholder engagement overview	7.4	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.	Critical	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.
7.1.1	The project as part of the WestConnex program of works	7.4	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**?	Critical	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.
7.1.2	Project consultation overview	7.5	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.	Critical	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.
7.1.3	Consultation objectives	7.8	No comment	Blank	
7.2	Overview of design changes and commitments in response to early feedback	7.8	IWC's responses on the Concept Design Plan were not taken into account?	Critical	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.
7.3	Project consultation process and activities	7.1	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?	Critical	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?
7.3.1	Communication and engagement channels and tools	7.11	See response to **Section 7.3.3** below.	Blank	
7.3.2	Consultation chronology	7.11	See response to **Section 7.3.3** below.	Blank	
7.3.3	Summary of key consultation activities and communication tools	7.12	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 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.	Critical	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.
7.3.4	Consultation with local, state and Commonwealth Government agencies and elected representatives.	7.27	**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?	Critical	Why did SMC ask for comments on the CDP and then select to ignore it when they prepared the EIS?
7.3.5	Consultation with utility and service providers	7.31	No comment	Blank	
7.3.6	Consultation with directly impacted land owners and residents	7.33	No comment	Blank	
7.3.7	Other industry and stakeholder consultation	7.33	No comment	Blank	

7.3.8	Aboriginal cultural heritage consultation	7.35	No comment	Blank	
7.4	Contact summary	7.35	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.	Critical	Why did SMC ask for comments on the CDP and then select to ignore it when they prepared the the EIS?
7.5	Responding to early feedback	7.36	**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.	Moderate	Further work needs to be undertaken to specifically address how public transport is incorporated into this project
8.5	Responding to early feedback (cont.)	7.38	**Table 7.8, pages 7.38 and 7.39:** 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.	Moderate	Further work needs to be undertaken to specifically address the concerns raised by City of Sydney Council
7.6	Future consultation	7.57	No comment	Blank	
7.6.1	Consultation during the exhibition of the EIS	7.57	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.	Moderate	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.
7.6.2	Consultation during construction of the project	7.58	See comments provided on **Chapter 6**.	Blank	
7.6.3	Ongoing consultation during operation of the project	7.59	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.	Critical	See response in "**Overall evaluation**" below.
	Overall evaluation				
	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.			
	Signature of reviewer	JM		
	Date	22/09/2017		

	Chapter 8	Traffic and transport			
	This chapter outlines the potential traffic and transport impacts associated with the M4-M5 Link project.				
	Technical guidelines reviewed against		N/A		
	Section reference	**Page number**	**Comments**	**Significance level**	**Additional work recommended**
8	**Traffic and transport**	8.1	No comment	Blank	
8.1	Assessment methodology	8.3	No comment	Blank	
8.1.1	Strategic transport context	8.3	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.	Moderate	IWC expects SMC to fully explain how TfNSW's Future Transport Strategy has been taken into account in the preparation of this EIS.
8.1.1	Strategic transport context	8.3	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.	Minor	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.
8.1.1	Strategic transport context	8.4	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 the extent are they provided with improved accessibility and reliability of total trip as a function of WestConnex.	Moderate	See also IWC's concern as described in **Element 2** and Overall evaluation below.

8.1.2	Traffic forecasting and modelling process	8.5	Review of this section is based on details from **Appendix H**.	Blank	
8.1.3	Relevant guidelines and policies	8.5	No comment	Blank	
8.1.4	Study area	8.5	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: A) Bias associated with interpolation of landuse trends between2021 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. B) 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.	Moderate	IWC requests that sensitivity of changes to land-use forecasts on the modelling be undertaken as part of the EIS.
8.1.4	Study area (cont.)	8.5	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?	Moderate	IWC requests that information be provided regarding thresholds for warrants for determination of operational study area extents.

8.1.5	Approach to traffic modelling	8.7	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.	Critical	IWC requests that further information be provided regarding the modelling process. Including information why this methodology has been adopted.
8.1.5	Approach to traffic modelling	8.7	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.	Moderate	IWC requests that details on assumed new infrastructure and upgrades included in modelling be provided that are not associated with the project.
8.1.5	Approach to traffic modelling	8.9	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.	Critical	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 **Element 9, tab 4** and **Issue 13, tab 6**.
8.1.6	Strategic modelling	8.10	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.	Critical	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.

8.1.6	Strategic modelling (cont.)	8.10	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?	Moderate	
8.1.6	Strategic modelling (cont.)	8.10	Anticipated upgrades to road network, as per **8.1.5** above, what are these?	Moderate	
8.1.6	Strategic modelling (cont.)	8.10	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.	Moderate	IWC requests that the traffic induced by the project be indicated, (i.e. comparison between with and without project).
8.1.6	Strategic modelling (cont.)	8.10	Landuse projections based on LU14, as per previous comment (**8.1.4**). What effect does provisional LU16 landuse forecast have on the project?	Moderate	
8.1.7	Operational modelling	8.11	Why were Paramics and VISSIM used, and what is the rationale behind different packages for different locations?	Minor	
8.1.7	Operational modelling (cont.)	8.11	Corridor selection, as mentioned above - what were the thresholds for selection of operational modelling study areas.	Moderate	
8.1.7	Operational modelling (cont.)	8.11	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.	Critical	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.
8.1.7	Operational modelling (cont.)	8.11	As indicated previously, what is the rational for pivoting growth to base flows over using outputs from the strategic model?	Moderate	
8.1.7	Operational modelling (cont.)	8.11	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.	Moderate	
8.1.8	Measures of network performance	8.16	No comment	Blank	
8.2	Existing environment	8.18	No comment	Blank	

8.2.1	Summary	8.19	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 miss-matches in hierarchy jumps will occur.	Critical	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. See also IWC concerns as discussed in **Issue 14** at the start of this report.
8.2.2	Wattle Street interchange and surrounds	8.19	**Rail Services:** Has the description of rail services, including changes to the Inner West Line frequency as part of TfNSW "More Train More Services Timetable" be considered?	Moderate	
8.2.2	Wattle Street interchange and surrounds (cont.)	8.20	**Rail Services**: 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.	Critical	IWC requests that an assessment of total customers from the Study area, using Rail as a mode of travel and their associated total travel time, including a comparison of private vehicle travel time to destinations, be provided. See also IWC concerns as discussed **Issue 13** at the start of this report.
8.2.2	Wattle Street interchange and surrounds (cont.)	8.20	**Bus Services:** As with Rail 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.	Critical	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.

8.2.2	Wattle Street interchange and surrounds (cont.)	8.21	**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?	Moderate	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.
8.2.2	Wattle Street interchange and surrounds (cont.)	8.21	**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?	Moderate	IWC requests that information be provided regarding the key causes of intersection congestion within the AM peak of the study area
8.2.2	Wattle Street interchange and surrounds (cont.)	8.22	**Crash Analysis:** 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**.	Critical	IWC requests SMC to undertake a safety assessment on the entire study area, including the local roads. See also IWC concerns as discussed in **Issues 10** and **14** at the start of this report.
8.2.2	Wattle Street interchange and surrounds (cont.)	8.23	**Crash Analysis**: 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.	Critical	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. See also IWC concerns as discussed in **Issues 10** and **14** at the start of this report.

8.2.3	Wattle Street interchange to Rozelle interchange corridor	8.24	**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?	Moderate	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.
8.2.3	Wattle Street interchange to Rozelle interchange corridor (cont.)	8.24	In **Table 8-13**, it indicates that the count data is 2014 to 2016. What growth at these sites occurred over this duration?	Moderate	
8.2.3	Wattle Street interchange to Rozelle interchange corridor (cont.)	8.24	**Public Transport:** As per responds discussed above, not enough details provided regarding Public Transport Users. SEAR 2 (d) and (f) requirements yet to be met	Critical	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. See also IWC concerns as discussed **Issue 13** at the start of this report.
8.2.4	Rozelle interchange and surrounds	8.29	In **Table 8-18**, it indicates that the count data is 2014 to 2016, what growth at these sites occurred over this duration?	Moderate	
8.2.4	Rozelle interchange and surrounds (cont.)	8.29	In **Table 8-18**, what was the reasons that heavy vehicles were not captured on the ANZAC Bridge?	Moderate	
8.2.4	Rozelle interchange and surrounds (cont.)	8.31	**Tables 8-21 and 8-22**, average speed and travel time are provided for various mid-block location. How does this correlate to mid-block density and level of service?	Moderate	IWC requests that the existing mid-block density and level of service be provided.
8.2.4	Rozelle interchange and surrounds (cont.)	8.31	Crash Analysis, as per the comments above, no indication of crashes on other routes within the study area, information regarding crash trends, severity, clusters and involvement of vulnerable road users?	Critical	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. See also IWC concerns as discussed in **Issues 10** and **14** at the start of this report.

8.2.5	Rozelle to St Peters interchange corridor	8.33	It is stated that "Several of the roads identified above are with the Sydney Airport to Sydney CBD CBD travel demand corridor which experiencing 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?	Moderate	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.
8.2.5	Rozelle to St Peters interchange corridor (cont.)	8.35	**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?	Moderate	IWC requests SMC to provide the existing mid-block density and level of service.
8.2.5	Rozelle to St Peters interchange corridor (cont.)	8.35	**Public Transport**: As per responses discussed above, not enough details are provided regarding Public Transport Users. SEAR 2 (d) and (f) requirements yet to be met.	Critical	IWC requests 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. See also IWC concerns as discussed **Issue 13** at the start of this report.
8.2.6	St Peters interchange and surrounds	8.35	Crash Analysis, as per the comments above, no indication of crashes on other routes within the study area, information regarding crash trends, severity, clusters and involvement of vulnerable road users?	Critical	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. See also IWC concerns as discussed in **Issues 10** and **14** at the start of this report.
8.2.6	St Peters interchange and surrounds (cont.)	8.35	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.	Moderate	
8.2.7	Wattle Street interchange to St Peters interchange corridor	8.41	**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?	Moderate	IWC requests SMC to provide the existing mid-block density and level of service.

8.3	Assessment of potential impacts	8.42	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?	Moderate	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.
8.3.1	Construction	8.42	**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?	Moderate	
8.3.1	Construction	8.44	**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.	Moderate	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.
8.3.1	Construction	8.44	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.	Moderate	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.

8.3.1	Construction	8.44	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.	Moderate	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.
8.3.1	Construction	8.44	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.	Moderate	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.
8.3.1	Construction	8.44	Continual consultation with local residents needs to be included in any parking strategy developed.	Moderate	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.

8.3.1	Construction	8.44	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.	Moderate	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.
8.3.1	Construction	8.46	**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.	Moderate	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.
8.3.1	Haberfield Option A – Wattle Street civil and tunnel site (C1a)	8.50	**Wattle Street and Tunnel Site (C1a)**: 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.	Critical	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.
8.3.1	Haberfield Option A – Wattle Street civil and tunnel site (C1a)	8.50	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?	Moderate	SMC to provide details regarding access control onto Wattle Street. See also IWC **Issues 1, 2, 4** and **5** at the start of this report.
8.3.1	Haberfield Option A – Haberfield civil and tunnel site (C2a)	8.50	**Haberfield civil and tunnel site (C2a)**, 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?	Moderate	SMC to provide clarity on truck movements and impacts at this site. See also IWC **Issues 1, 2, 4** and **5** at the start of this report.
8.3.1	Haberfield Option A – Northcote Street civil site (C3a)	8.51	**Northcote Street civil site (C3a):** 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	Moderate	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

			area at night". What would these strategies include, and how would this process be developed and would Council be an approving entity?		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.
8.3.1	Haberfield and Ashfield Option B – Parramatta Road West civil and tunnel site (C1b)	8.51	**Heavy vehicles entering Parramatta Road:** 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?	Moderate	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. See also IWC concerns as discussed in **Issues 1, 4, 5** and **7** at the start of this report.
8.3.1	Haberfield and Ashfield Option B – Parramatta Road West civil and tunnel site (C1b)	8.51	**Parramatta Road West Civil and tunnel site**: As per above, what is the effect of heavy vehicles on Parramatta Road	Moderate	SMC to provide details regarding access configuration onto Parramatta Road. See also IWC concerns as discussed in **Issues 1, 4, 5** and **7** at the start of this report.
8.3.1	Haberfield and Ashfield Option B – Parramatta Road West civil and tunnel site (C1b)	8.51	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?	Moderate	SMC to provide details on how amenity and safety will be maintained. See also IWC concerns as discussed in **Issues 1, 4, 5** and **7** at the start of this report.
8.3.1	Haberfield and Ashfield Option B – Haberfield civil site (C2b)	8.52	**Haberfield civil site (C2b):** As per above, what is the effect of heavy vehicles on Wattle Street.	Moderate	SMC to provide details regarding access control onto Wattle Street. See also IWC concerns as discussed in **Issues 1, 4, 5** and **7** at the start of this report.

8.3.1	Haberfield and Ashfield Option B – Haberfield civil site (C2b)	8.52	Local Streets, it is indicator 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.	Critical	SMC to provide details on how parking will be provided for without losing parking on local streets. See also IWC concerns as discussed in **Issues 1, 4, 5** and **7** at the start of this report.
8.3.1	Darley Road civil and tunnel site (C4)	8.52	**Darley Road Civil and Tunnel Site.** 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.**	Critical	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.
8.3.1	Rozelle civil and tunnel site (C5)	8.53	**Rozelle civil and tunnel site (c5)**: It is stated that 5 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?	Moderate	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.
8.3.1	Victoria Road civil site (C7)	8.54	**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	Moderate	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.

			active modes and public transport users along Victoria Road?		
8.3.1	Iron Cove Link civil site (C8)	8.55	**Iron Cove Line civil site (C8):** See comment re Victoria Road as above.	Moderate	SMC to provide details regarding access configuration onto Victoria Road.
8.3.1	Iron Cove Link civil site (C8)	8.55	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).	Moderate	SMC to provide details regarding access impacts on Clubb Street residents and users of King George Park. See also IWC concerns as discussed in **Issue 1** and **Issue 14**, at the start of this report.
8.3.1	Pyrmont Bridge Road tunnel site (C9)	8.55	**Pyrmont Bridge Road Tunnel site (c9)**, 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?	Moderate	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 7** at the start of this report.
8.3.1	Pyrmont Bridge Road tunnel site (C9)	8.56	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?	Moderate	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.
8.3.1	Campbell Road civil and tunnel site (C10)	8.56	**Campbell Road civil and tunnel site (c10)**: 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?	Critical	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.
8.3.1	Construction impact assessment - Option A	8.57	**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).	Critical	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? See also IWC concerns as discussed in **Element 9**, in **tab 4** and **Issue 1, Issue 2** and **Issue 7** at the start of this report.
8.3.1	Construction impact assessment - Option A	8.59	**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).	Critical	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? See also IWC concerns as discussed in **Issue 1, Issue 2** and **Issue 7** at the start of this report.
8.3.1	Construction impact assessment - Option A	8.60	**James Street Intersection:** 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).	Critical	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.
8.3.1	Construction impact assessment - Option A	8.61	**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?	Moderate	SMC to assess whether congestion on City West link is sensitive to causing increases on local roads. See also IWC concerns as discussed in **Issue 1, Issue 2, Issue 7** and **Issue 10** at the start of this report.
8.3.1	Construction impact assessment - Option A	8.61	No temporary infrastructure works additional to those discussed above are proposed to mitigate the identified effects associated with construction works.	Moderate	SMC to assess need for additional infrastructure to mitigate identified effects associated with construction works. See also IWC concerns as discussed in **Issue 1, Issue 2, Issue 7** and **Issue 10** at the start of this report.

	General		As per SEAR 1 (e) and (f); what effect will the temporary road modifications have? These are not stated.	Critical	SMC to state what effect will the temporary road modifications have on the road network. See also IWC concerns as discussed in **Issue 1, Issue 2, Issue 7** and **Issue 10** at the start of this report.
	General		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?	Moderate	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.
8.3.1	Walking and Cycling	8.70	**Table 8-50:** What are the triggers and warrants for the determination of safety effects; these seem to be based on a subjective assessment. Interactions between heavy vehicles and pedestrians; although there may be a low exposure to the risk, the consequence is high. Therefore, increasing heavy vehicles may have a safety implication that needs to be considered.	Critical	SMC to provide evidence on safety assessment for active modes. See also IWC concerns as discussed in **Issue 1, Issue 2, Issue 7** and **Issue 12** at the start of this report.
	Construction impact assessment - Option B	8.77	**Option B:** comments as per **Option A** above.	Critical	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? See also IWC concerns as discussed in **Issue 1, Issue 2** and **Issue 7** at the start of this report.
8.3.2	Operational impacts without the project	8.83	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.	Critical	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.

8.3.2	Operational impacts without the project	8.86	**Table 8-56** 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.	Critical	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.
	General		**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 without the project.	Critical	SMC to provide 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 and how this is impacted without the project. See also IWC concerns discussed in **Issue 8, Issue 10** and **Issue 13** at the start of this report.
8.3.2	Operational impacts without the project	8.88	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?	Critical	SMC to provide 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 and how this is impacted without the project. See also IWC concerns discussed in **Issue 8, Issue 10** and **Issue 13** at the start of this report.
8.3.2	Operational impacts without the project	8.88	**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?	Critical	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.
8.3.2	Operational impacts without the project	8.90	**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?	Critical	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.

8.3.2	Operational impacts without the project	8.91	**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?	Moderate	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.
8.3.2	Operational impacts without the project	8.93	**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?	Critical	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.
8.3.2	Operational impacts without the project	8.95	**Table 8-65**, as with Parramatta Road, increasing congestion on Victoria Road may result in rat-running on alternative routes to avoid congestion.	Moderate	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.
8.3.2	Operational impacts without the project	8.96	What is causing a reduction of trips on Bathurst Street within the model?	Moderate	
8.3.2	Operational impacts without the project	8.97	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.	Critical	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.
8.3.2	Operational impacts without the project	8.97	St Peters Interchanges, Comments as per above.	Blank	
8.3.3	Assessment of operational impacts of the project.	8.102	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	Critical	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.

			and destinations will indicate the potential mode shifts associated with the project.		
	General		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.	Critical	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.
	General		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.	Critical	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.
8.3.3	Assessment of operational impacts of the project.	8.105	**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.	Moderate	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.
8.3.3	Assessment of operational impacts of the project.	8.116	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.	Critical	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.

8.3.3	Assessment of operational impacts of the project.	8.117	**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.	Moderate	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..
8.3.3	Assessment of operational impacts of the project.	8.122	Travel time for buses. 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.	Critical	
8.3.4	Assessment of cumulative impacts	8.145	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 renewals projects at White Bay.	Critical	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.
	General	8.145	Comments regarding the assessment as per those provided previously stated for operational impacts of the 'With' and 'Without' project	Moderate	
8.4	Road network optimisation	8.157	No comment	Blank	
8.5	Management of impacts	8.157	There is limited information provided on what additional infrastructure measures are required to manage the identified effects.	Critical	
8.5.1	Project design features that would manage impacts	8.157	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.	Moderate	
8.5.2	Cumulative scenario mitigation	8.158	Comments as per 'With' and 'Without' project operational impacts	Blank	

8.5.3	Environmental management measures	8.158	No comment	Blank	
	Overall evaluation				
	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.				
	Signature of reviewer	AW			
	Date	22/09/2017			

	Chapter 9	Air Quality - Construction			
	This chapter describes the methodology used to assess the impacts of the M4-M5 Link project on regional, local and in-tunnel air quality, the results of that assessment and proposed mitigation measures to avoid or reduce the impacts.				
	Technical guidelines reviewed against		No guideline methods are specified in the SEARS for construction effects on air quality. The assessment used guidance published by the Institute of Air Quality Management (2014) and the NSW EPA Local Government Air Quality Toolkit, which is considered to be appropriate.		
	Section reference	**Page number**	**Comments**	**Significance level**	**Additional work recommended**
9	**Air quality**	9.1	No comment	Blank	
9.1	Introduction	9.1	No comment	Blank	
9.2	Assessment approach	9.3	No comment	Blank	
9.2.1	Overview	9.3	No comment	Blank	
9.2.2	Terminology	9.4	No comment	Blank	
9.2.3	Air quality criteria	9.4	No comment	Blank	
9.2.4	Tunnel ventilation outlets	9.9	No comment	Blank	
9.2.5	Tunnel portal emission restrictions	9.10	No comment	Blank	
9.2.6	Pollutants and metrics not assessed	9.10	No comment	Blank	
9.2.7	Modelling scenarios	9.11	No comment	Blank	
9.2.8	Accuracy and conservatism	9.14	No comment	Blank	
9.3	Construction assessment methodology	9.15	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.	Moderate	Address the potential for diesel engines to have an impact on sensitive receptors in more detail.
9.4	Operational assessment methodology	9.17	No comment	Blank	
9.4.1	In-tunnel air quality assessment	9.17	No comment	Blank	
9.4.2	Ambient air quality assessment	9.17	No comment	Blank	
9.5	Existing environment	9.32	No comment	Blank	
9.5.1	Terrain and land use	9.32	No comment	Blank	
9.5.2	Climate	9.33	No comment	Blank	

9.5.3	Meteorology	9.33	No comment	Blank	
9.5.4	Emissions	9.34	No comment	Blank	
9.5.5	In-tunnel air quality	9.40	No comment	Blank	
9.5.6	Ambient air quality	9.40	No comment	Blank	
9.5.7	Data from monitoring sites in the study area	9.40	No comment	Blank	
9.5.8	Project-specific air quality monitoring	9.42	No comment	Blank	
9.5.9	Assumed background concentrations	9.42	No comment	Blank	
9.6	Assessment of potential construction impacts	9.43	No comment	Blank	
9.6.1	Overview	9.43	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.	Blank	
9.6.2	Construction surface works and scenarios	9.43	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**.	Moderate	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.
9.6.3	Mitigation	9.50	No comment	Blank	
9.6.4	Significance of risks	9.51	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.	Moderate	Address the requirement for onsite monitoring of dust.
9.7	Assessment of potential operational impacts	9.51	No comment	Blank	
9.7.1	In-tunnel air quality	9.51	No comment	Blank	
9.7.2	Ambient air quality	9.58	No comment	Blank	
9.7.3	Results for expected traffic scenarios (ground-level concentrations)	9.59	No comment	Blank	
9.7.4	Reasons for unrealistically high ground level concentrations at some RWR receptor locations	9.100	No comment	Blank	

9.7.5	Results for expected traffic scenarios (elevated receptors)	9.101	No comment	Blank	
9.7.6	Results for regulatory worst-case scenarios	9.106	No comment	Blank	
9.7.7	Sensitivity tests	9.108	No comment	Blank	
9.8	Regional air quality	9.109	No comment	Blank	
9.9	Odour	9.111	No comment	Blank	
9.9.1	Overview	9.112	No comment	Blank	
9.10	Environmental management measures	9.112	No comment	Blank	
9.10.1	Construction impacts	9.112	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.	Moderate	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.
9.10.1	Construction impacts	9.112	The list of mitigation measures included in **Table 9-34** 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.	Moderate	Include the relevant additional mitigation measures into the list of project construction dust mitigation measures in **Chapter 9**.

9.10.1	Construction impacts	9.112	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.	Critical	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.
9.10.2	Operational impacts	9.115	No comment	Blank	
6.4.1	Site establishment and establishment of construction ancillary facilities	6.210	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**.	Moderate	An assessment of the effects of the discharges to air from blasting needs to be included in **Chapter 9**.
	Overall evaluation				
	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 AIQM 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.				
	Signature of reviewer	PH			
	Date	22/09/2017			

	Chapter 9	**Air Quality - Operational**			
	This chapter describes the methodology used to assess the impacts of the M4-M5 Link project on regional, local and in-tunnel air quality, the results of that assessment and proposed mitigation measures to avoid or reduce the impacts.				
	Technical guidelines reviewed against		Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales (NSW EPA, 2016), In-tunnel Air Quality (Nitrogen dioxide) Policy (Advisory Committee on Air Quality, 2016)		
	Section reference	**Page number**	**Comments**	**Significance level**	**Additional work recommended**
	General comment	N/A	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 NO2 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.	Blank	
9	**Air quality**	9.1	No comment	Blank	
9.1	Introduction	9.1	No comment	Blank	
9.2	Assessment approach	9.3	No comment	Blank	
9.2.1	Overview	9.3	No comment	Blank	
9.2.2	Terminology	9.4	No comment	Blank	
9.2.3	9.2.3	9.8	Potential in-tunnel NO2 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.	Blank	

9.2.3	Air quality criteria	9.8	A limitation of the ACTAQ Policy NO2 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.	Blank	
9.2.4	Tunnel ventilation outlets	9.9	No comment	Blank	
9.2.5	Tunnel portal emission restrictions	9.10	No comment	Blank	
9.2.6	Pollutants and metrics not assessed	9.10	No comment	Blank	
9.2.7	Modelling scenarios	9.11	No comment	Blank	
9.2.8	Accuracy and conservatism	9.14	No comment	Blank	
9.3	Construction assessment methodology	9.15	No comment	Blank	
9.4	Operational assessment methodology	9.17	No comment	Blank	
9.4.1	In-tunnel air quality assessment	9.17	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.	Critical	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.

9.4.2	Ambient air quality assessment	9.17	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 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.	Moderate	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.
9.4.2	Ambient air quality assessment (cont.).	9.17	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	Moderate	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.

			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.		
9.4.2	Ambient air quality assessment (cont.).	9.21	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.	Minor	
9.5	Existing environment	9.32	No comment	Blank	
9.5.1	Terrain and land use	9.32	No comment	Blank	
9.5.2	Climate	9.33	No comment	Blank	
9.5.3	Meteorology	9.33	No comment	Blank	
9.5.4	Emissions	9.34	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.	Critical	If significant uncertainties are identified in the traffic model predictions then the air quality effects of the project should be reassessed.
9.5.5	In-tunnel air quality	9.40	No comment	Blank	
9.5.6	Ambient air quality	9.40	No comment	Blank	
9.5.7	Data from monitoring sites in the study area	9.40	No comment	Blank	
9.5.8	Project-specific air quality monitoring	9.42	No comment	Blank	

9.5.9	Assumed background concentrations	9.42	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.	Minor	
9.6	Assessment of potential construction impacts	9.43	No comment	Blank	
9.6.1	Overview	9.43	No comment	Blank	
9.6.2	Construction surface works and scenarios	9.43	No comment	Blank	
9.6.3	Mitigation	9.50	No comment	Blank	
9.6.4	Significance of risks	9.51	No comment	Blank	
9.7	Assessment of potential operational impacts	9.51	No comment	Blank	
9.7.1	In-tunnel air quality	9.55	The ACTAQ NO2 limit is based on the average concentration along the length of the tunnel. The modelling results presented in the report indicates that average NO2 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 NO2 concentrations could potentially exceed ACTAQ limits in the M4 tunnel. For slower vehicle speeds average M4 in-tunnel NO2 concentrations are predicted to increase. However, it is perhaps questionable whether the concentration of pollutants in the M4 tunnel alone	Critical	Assess whether the M4 in-tunnel limits will be exceeded with the development of the Project, and propose mitigation method if they are.

			is within the scope of the SEARs Air Quality Requirements 2f and 2K.		
9.7.1	In-tunnel air quality	9.55	From the information provided it would appear that the average in-tunnel NO2 concentrations have been calculated from predicted 1-hour average NO2 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.	Moderate	Assess the risk of higher short term NO2 concentration occurring and their impact.
9.7.2	Ambient air quality	9.58	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.	Minor	
9.7.2	Ambient air quality	9.58	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.	Minor	
9.7.2	Ambient air quality	9.58	Although worst case emissions from the tunnel stacks discharges have 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.	Moderate	Assess impact of surface road discharges

9.7.2	Ambient air quality (cont.).	9.58	The results of the modelling show that cumulative PM2.5, PM10, and NO2 concentration exceed air quality limits at different location (hot-spot) in the modelling domain as a result of the project.	Critical	
9.7.2	Ambient air quality (cont.).	9.58	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.	Blank	
9.7.2	Results for expected traffic scenarios (ground-level concentrations) (Appendix I 8.4.14)	9.70, Appendix I	Maximum 1-hour NO2 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 NO2 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 NO2 maximum concentrations are predicted to be at these receptors.	Critical	Provide an assessment of where 1-hour NO2 are not predicted to achieve the NEPC criteria.
9.7.4	Reasons for unrealistically high ground level concentrations at some RWR receptor locations	9.100	See above for discussion on NO2 exceedances.	Blank	
9.7.5	Results for expected traffic scenarios (elevated receptors)	9.101	No comment	Blank	
9.7.6	Results for regulatory worst-case scenarios	9.106	No comment	Blank	
9.7.7	Sensitivity tests	9.108	No comment	Blank	

9.8	Regional air quality	9.109	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.	Minor	The assessment of regional effects should also include consideration or discussion of the effects of local road sources.
9.9	Odour	9.111	No comment	Blank	
9.9.1	Overview	9.112	No comment	Blank	
9.10	Environmental management measures	9.112	No comment	Blank	
9.10.1	Construction impacts	9.112	No comment	Blank	
9.10.2	Operational impacts	9.115	The results of the modelling indicate that the discharge of particulates and NO2 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.	Critical	Provide further details of proposed mitigation procedures to manage adverse ambient air quality levels and any appropriate ambient monitoring programmes.
9.10.2	Operational impacts	9.116	The monitoring of NO2 levels along the length of the tunnel will be critical in determining average NO2 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 NO2 averaging	Moderate	Provide additional detail as to how the monitoring will be implemented.

			procedures can be successfully implemented would have been appropriate.		
I-8.4.7 I-G	Appendix I	p147, 165	The predicted annual average NOX 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 NOX emission rates are generally ten times higher than PM10 emission rates which would mean NOX predictions should be about 10 times higher than the PM10 prediction. However, the contour plots indicate than the NOX concentrations are only 2 times higher than PM10 levels.	Moderate	Check annual average NOX prediction.
I-8.4.7 I-G	Appendix I - Annexure L	I-122, I-G1	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).	Critical	Confirm whether the project alignments exceed the recommended 8 percent gradient.
I-8.4.7 I-G	Appendix I - Annexure G	I-122, I-G1	The method used in the assessment to estimate NO2 concentrations is not a NSW EPA approved method (2016). However, information provided in the Appendix I Annexure G suggests that similar peak NO2 concentrations would likely have been predicted if specific NSW EPA Approved Methods were used to calculate NO2 levels instead of the method which was adopted. However, the high cumulative NO2 concentrations suggest there are unidentified limitation to the approach.	Moderate	Review NO2 predictions at location where concentration ate predicted to exceed air quality levels.

I-8.4.7 I-G	Appendix I - Annexure I	I-122, I-G1	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.	Critical	The potential effects of nearby buildings on tunnel stack discharges should be identified and evaluated.
	Appendix I - Annexure I	I-122, I-G1	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.	Moderate	Provide some justification for the modelling approach. Particularly with regards to the proposed project stacks.

	Appendix I - Annexure I	I-122, I-G1	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.	Moderate	Confirm that the design of the ventilation stack and stack discharge conditions will at a minimum meet the criteria assumed in the assessment.
	Overall evaluation				
	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 NO2 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 NO2 and fine particulate matter.				
	Signature of reviewer	MN			
	Date	22/09/2017			

	Chapter 10	Noise and Vibration - A: Construction and Operational Airborne Noise			
	This chapter outlines the potential noise and vibration impacts associated with the M4-M5 Link project				
	Technical guidelines reviewed against		Construction Noise and Vibration Guideline (Roads and Maritime, 2016), Noise Criteria Guideline (Roads and Maritime, 2015), NSW Road Noise Policy.		
	Section reference	**Page number**	**Comments**	**Significance level**	**Additional work recommended**
	General	N/A	Assessment noted to be very Comprehensive and generally addresses all required issues. See further comments on construction noise issues in our response on **Chapter 6.**	Blank	
10	**Noise and vibration**	10.1	No comment	Blank	
10.1	Assessment methodology	10.2	No comment	Blank	
10.1.1	Overview	10.2	No comment	Blank	
10.1.2	Study area	10.3	No comment	Blank	
10.1.3	Policy framework	10.13	No comment	Blank	
10.1.4	Background noise monitoring	10.26	No comment	Blank	
10.1.5	Construction noise prediction methodology	10.27	No comment	Blank	
10.1.6	Operational noise prediction methodology	10.35	No comment	Blank	
10.1.7	operational noise prediction methodology for fixed facilities	10.42	No comment	Blank	
10.1.8	Construction and operational noise mitigation	10.43	No comment	Blank	
10.1.9	Key assumptions	10.44	No comment	Blank	
10.2	Existing environment	10.45	No comment	Blank	
10.2.1	Noise and vibration sensitive receivers	10.45	No comment	Blank	
10.2.2	Noise catchment areas	10.49	No comment	Blank	
10.2.3	Existing noise levels	10.49	No comment	Blank	
10.3	Assessment of potential construction analysis	10.49	No comment	Blank	
10.3.1	Haberfield	10.49	No comment	Blank	

10.3.2	Darley Road	10.73	No comment	Blank	
10.3.3	Rozelle	10.99	No comment	Blank	
10.3.4	Iron Cove	10.99	No comment	Blank	
10.3.5	Pyrmont Bridge Road	10.110	No comment	Blank	
10.3.6	St Peters	10.120	No comment	Blank	
10.3.7	Mainline tunnel alignment	10.126	No comment	Blank	
10.3.7	Mainline tunnel alignment	10.128	No comment	Blank	
10.3.8	Utility works	10.131	No comment	Blank	
10.4	Assessment of operational road traffic impacts	10.132	No comment	Blank	
10.4.1	Operational noise predictions without mitigation	10.132	No comment	Blank	
10.4.2	Receivers considered for additional noise mitigation	10.136	No comment	Blank	
10.4.3	Maximum noise levels	10.136	No comment	Blank	
10.4.4	Operational assessment at Haberfield/Ashfield Option B	10.137	No comment	Blank	
10.4.5	Operational impacts at either end of the project footprint	10.139	No comment	Blank	
10.4.6	Minor changes to project design	10.140	No comment	Blank	
10.4.7	Fixed facilities operational noise impacts	10.140	No comment	Blank	
10.5	Environmental management measures	10.142	No comment	Blank	
J-2.4	Noise and vibration specific aspects	J-19	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	Critical	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.

			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**)		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.
J-3.5.2	Noise monitoring results	J-31	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.	Moderate	Recommend additional commentary / clarification about the primary purpose of each measurement location.
J-4.1.1	List of guidelines	J-33	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)	Moderate	Recommend reference to AS 2436 or statement of reason why this reference is not considered applicable in this instance.

J-4.1.2	Airborne noise	J-33	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.	Minor	Suggest inclusion of note in relation to the 2016 CNVG and any differences in procedure if applicable.
J-4.3	Construction road traffic noise prediction methodology	J-45	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)	Minor	Recommend clarification of prediction method for both equivalent and maximum noise levels.
J-4.8.2	Modelling	J-68	Does not state the prediction method used for evaluating maximum noise levels.	Minor	Recommend clarification of the prediction method used for the maximum noise level assessment.
J-5	Assessment of construction impacts	J-81	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.	Minor	Recommend that confirmation is sought that the construction noise assessment accounts for all floors of multi-level sensitive receiver locations.
J-5.1.2	Airborne noise – Option A and all subsequent sections detailing noise emission data (i.e. sound power levels) for different types of construction plant	J-86	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	Moderate	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

			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.		informative to demonstrate the scale of the risk of high noise levels, and therefore the importance of mitigation measures for this project.
J-5.1.2	5.1.2 Airborne noise – Option A, Table 5-14 and all other subsequent sections which discuss proposed construction noise mitigation measures.	J-100	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.	Moderate	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.
J-6.7	Sensitivity analysis	J-302	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.	Minor	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.
	Overall evaluation				
	No additional comments				
	Signature of reviewer	JA			
	Date	22/09/2017			

	Chapter 10	Noise and Vibration - B: Fixed Facilities			
	This chapter outlines the potential noise and vibration impacts associated with the M4-M5 Link project				
	Technical guidelines reviewed against		NSW Environment Protection Authority, Industrial Noise Policy		
	Section reference	**Page number**	**Comments**	**Significance level**	**Additional work recommended**
10	Noise and vibration	10.1	No comment	Blank	
10.1	Assessment methodology	10.2	No comment	Blank	
10.1.1	Overview	10.2	No comment	Blank	
10.1.2	Study area	10.3	No comment	Blank	
10.1.3	Policy framework	10.13	No comment	Blank	
10.1.3	Policy framework	10.14	No comment	Blank	
10.1.3	Policy framework	10.15	No comment	Blank	
10.1.3	Policy framework	10.25	Agree EPA INP is appropriate criteria for the assessment of noise from fixed facilities.	Moderate	
10.1.4	Background noise monitoring	10.26	No comment	Blank	
10.1.5	Construction noise prediction methodology	10.27	No comment	Blank	
10.1.6	Operational noise prediction methodology	10.35	No comment	Blank	
10.1.7, J-4.9.1	Operational noise prediction methodology for fixed facilities Ventilation facilities	10.42, J-78	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.	Moderate	Prepare conceptual analysis of breakout noise considerations
10.1.7, J-4.9.1	Operational noise prediction methodology for fixed facilities Ventilation facilities	10.42, J-78	Supply and exhaust to the tunnels are presumably managed by axial fans, not jet fans as described in this paragraph?	Typo / grammar	Confirm fan type

10.1.7, J-4.9.2	Operational noise prediction methodology for fixed facilities Tunnel jet fans	10.43, J-79	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.	Moderate	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.
10.1.8	Construction and operational noise mitigation	10.43	No comment	Blank	
10.1.9	Key assumptions	10.44	No comment	Blank	
10.2	Existing environment	10.45	No comment	Blank	
10.2.1	Noise and vibration sensitive receivers	10.45	No comment	Blank	
10.2.2	Noise catchment areas	10.49	No comment	Blank	
10.2.3	Existing noise levels	10.49	No comment	Blank	

10.3	Assessment of potential construction analysis	10.49	No comment	Blank	
10.3.1	Haberfield	10.49	No comment	Blank	
10.3.2	Darley Road	10.73	No comment	Blank	
10.3.3	Rozelle	10.99	No comment	Blank	
10.3.4	Iron Cove	10.99	No comment	Blank	
10.3.5	Pyrmont Bridge Road	10.110	No comment	Blank	
10.3.6	St Peters	10.120	No comment	Blank	
10.3.7	Mainline tunnel alignment	10.126	No comment	Blank	
10.3.7	Mainline tunnel alignment	10.128	No comment	Blank	
10.3.8	Utility works	10.131	No comment	Blank	
10.4	Assessment of operational road traffic impacts	10.132	No comment	Blank	
10.4.1	Operational noise predictions without mitigation	10.132	No comment	Blank	
10.4.2	Receivers considered for additional noise mitigation	10.136	No comment	Blank	
10.4.3	Maximum noise levels	10.136	No comment	Blank	
10.4.4	Operational assessment at Haberfield/Ashfield Option B	10.137	No comment	Blank	
10.4.5	Operational impacts at either end of the project footprint	10.139	No comment	Blank	
10.4.6	Minor changes to project design	10.140	No comment	Blank	
10.4.7	Fixed facilities operational noise impacts	10.141	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	Moderate	Carry out additional surveys in Centre of NCAs and re-establish Fixed Facilities criteria, prior to detailed design.

			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.		
10.4.7, J-3.5.2, J-4.7.3	Fixed facilities operational noise impacts Noise monitoring results Operational fixed facilities	10.141, J-31, J-67	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.	Moderate	Carry out additional surveys in Centre of NCAs and re-establish Fixed Facilities criteria.
10.5	Environmental management measures	10.142	No comment	Blank	
J-4.7.3	Operational fixed facilities	J-67	Amenity criteria not corrected for existing industrial noise or traffic.	Moderate	Correct for any existing industrial or traffic noise per EPA INP guidelines.
J-4.7.3, J-6.12.1	Operational fixed facilities Noise assessment	J-67, J-306	NCA01 criteria should be lower, per rationale **Section 6.12.3 page 307**.	Moderate	Establish NCA 01 criteria further back from Parramatta Road.
J-4.7.3, J-6.12.1	Operational fixed facilities Noise assessment	J-67, J-306	NCA02 criteria should be lower, per rationale **Section 6.12.3 page 307**.	Moderate	Establish NCA 02 criteria further away from Parramatta Road and Wattle Street.
J-4.7.3, J-6.12.1	Operational fixed facilities Noise assessment	J-67, J-306	NCA02 criteria should be lower, per rationale **Section 6.12.3 page 307**.	Moderate	Establish NCA 03 criteria further away from Wattle Street.
J-4.7.3, J-6.12.1	Operational fixed facilities Noise assessment	J-67, J-306	NCA02 criteria should be lower, per rationale **Section 6.12.3 page 307**.	Moderate	Establish NCA 06 criteria further away from Parramatta Road / Wattle Street.
J-4.7.3, J-6.12.1	Operational fixed facilities Noise assessment	J-67, J-306	NCA02 criteria should be lower, per rationale **Section 6.12.3 page 307**.	Moderate	Establish NCA 13 criteria further away from Darley Street.
J-3.5.2, J-4.7.3, J-6.12.1	Noise monitoring results Operational fixed facilities Noise assessment	J-31 J-67, J-306	NCA 16 criteria should be based on R12 results, = criteria 37 not 45.	Moderate	Re-establish basis for NCA 16 criteria.
J-3.5.2, J-4.7.3, J-6.12.1	Noise monitoring results Operational fixed facilities Noise assessment	J-31 J-67, J-306	NCA 19 criteria should be based on R12 results, = criteria 37 not 45.	Moderate	Re-establish basis for NCA 19 criteria.
J-3.5.2, J-4.7.3, J-6.12.1	Noise monitoring results Operational fixed facilities Noise assessment	J-31 J-67, J-306	NCA 21 criteria should be based on R12 results, per rationale **Section 6.12.3 page 307**.	Moderate	Re-establish basis for NCA 21 criteria, particularly for residences in southern zone NCA 21.
J-3.5.2, J-4.7.3, J-6.12.1	Noise monitoring results Operational fixed facilities Noise assessment	J-31 J-67, J-306	NCA 24 criteria should be based on R12/13 results, per rationale **Section 6.12.3 page 307**.	Moderate	Re-establish basis for NCA 24 criteria, particularly for residences in northern zone NCA 24.

J-3.5.2, J-4.7.3, J-6.12.1	Noise monitoring results Operational fixed facilities Noise assessment	J-31 J-67, J-306	NCA 25 criteria should be lower, per rationale **Section 6.12.3 page 307**.	Moderate	Re-establish basis for NCA 25 criteria, particularly for residences in centre zone NCA 25.
J-3.5.2, J-4.7.3, J-6.12.1	Noise monitoring results Operational fixed facilities Noise assessment	J-31 J-67, J-306	NCA 36, 33 criteria should be based on I.03, per rationale **Section 6.12.3 page 307**.	Moderate	Re-establish basis for NCA 36/33 criteria, note residential land falls away from Victoria Road.
J-3.5.2, J-4.7.3, J-6.12.1	Noise monitoring results Operational fixed facilities Noise assessment	J-31 J-67, J-306	NCA34/35 criteria should be lower, per rationale **Section 6.12.3 page 307**.	Moderate	Establish NCA34/35 criteria further away from Victoria Road.
J-3.5.2, J-4.7.3, J-6.12.1	Noise monitoring results Operational fixed facilities Noise assessment	J-31 J-67, J-306	NCA49 criteria should be lower, per rationale **Section 6.12.3 page 307**.	Moderate	Establish NCA49 criteria further away from Campbell Street, toward Centre of NCA.
J-3.5.2, J-4.7.3, J-6.12.1	Noise monitoring results Operational fixed facilities Noise assessment	J-31 J-67, J-306	NCA51 criteria should be lower, per rationale **Section 6.12.3 page 307**.	Moderate	Establish NCA51 criteria further away from Princes Highway, toward Centre of NCA.
J-4.9.1	Ventilation facilities (Table 4-27)	J-78	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	Moderate	Prepare conceptual analysis of attenuator sizing and airflow generated noise to verify suitability of proposed location of ventilation station building and spatial allowances.

			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.		
J-4.10, J-6.12.1	Key assumptions, Noise assessment (Table 6.8)	J-80, J-306	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 **6.12**. 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.	Moderate	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.
	Overall evaluation				
	No additional comments				
	Signature of reviewer	SC			
	Date	22/09/2017			

	Chapter 10	Noise and Vibration - C: Vibration			
	This chapter outlines the potential noise and vibration impacts associated with the M4-M5 Link project				
	Technical guidelines reviewed against		NSW Interim Construction Noise and Guideline, Transport Roads and Maritime Services Construction Noise and Vibration Guideline, EPA Technical Guideline Assessing Vibration (DECC, 2006)		
	Section reference	**Page number**	**Comments**	**Significance level**	**Additional work recommended**
10	Noise and vibration	10.1	No comment	Blank	
10.1	Assessment methodology	10.2	No comment	Blank	
10.1.1	Overview	10.2	No comment	Blank	
10.1.2	Study area	10.3	No comment	Blank	
10.1.3	Policy framework	10.13	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.	Critical	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.
10.1.3	Policy framework	10.14	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.	Moderate	**DIN 4150 -3** should not only be used for assessing heritage or unsound buildings.
10.1.3	Policy framework	10.15	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	Typo / grammar	Correctly reference **DIN 4150-3 Table 1**.

			be re-worded and amended as it infers that the phrase 'structurally unsound' is used within DIN 4150-3, which it is not.		
10.1.3	Policy framework	10.16	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.	Critical	Assess the risk to any sensitive equipment or facilities nearby.
10.1.4	Background noise monitoring	10.26	No comment	Blank	
10.1.5	Construction noise prediction methodology	10.27	No comment	Blank	
10.1.6	Operational noise prediction methodology	10.35	No comment	Blank	
10.1.7	Operational noise prediction methodology for fixed facilities	10.42	No comment	Blank	
10.1.8	Construction and operational noise mitigation	10.43	No comment	Blank	
10.1.9	Key assumptions	10.44	No comment	Blank	
10.2	Existing environment	10.45	No comment	Blank	
10.2.1	Noise and vibration sensitive receivers	10.45	No comment	Blank	
10.2.2	Noise catchment areas	10.49	No comment	Blank	
10.2.3	Existing noise levels	10.49	No comment	Blank	
10.3	Assessment of potential construction analysis	10.49	No comment	Blank	
10.3.1	Haberfield	10.49	No comment	Blank	
10.3.2	Darley Road	10.73	No comment	Blank	

10.3.3	Rozelle	10.99	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.	Typo / grammar	
10.3.4	Iron Cove	10.99	No comment	Blank	
10.3.5	Pyrmont Bridge Road	10.110	No comment	Blank	
10.3.6	St Peters	10.120	No comment	Blank	
10.3.7	Mainline tunnel alignment	10.126	Although this section refers to the main line tunnel alignment, other sections of the report such as **10.3.5 and 10.3.6** 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,	Moderate	
10.3.7	Mainline tunnel alignment	10.128	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.**	Minor	If correct, a reference to this figure should be included.
10.3.8	Utility works	10.131	No comment	Blank	
10.4	Assessment of operational road traffic impacts	10.132	No comment	Blank	
10.4.1	Operational noise predictions without mitigation	10.132	No comment	Blank	
10.4.2	Receivers considered for additional noise mitigation	10.136	No comment	Blank	
10.4.3	Maximum noise levels	10.136	No comment	Blank	
10.4.4	Operational assessment at Haberfield/Ashfield Option B	10.137	No comment	Blank	
10.4.5	Operational impacts at either end of the project footprint	10.139	No comment	Blank	
10.4.6	Minor changes to project design	10.140	No comment	Blank	
10.4.7	Fixed facilities operational noise impacts	10.140	No comment	Blank	

10.5	Environmental management measures	10.142	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".	Typo / grammar	In NV6 reference applicable standards, codes and guidelines, Amend Title to NV8.
J-2.3	Construction activities	J-13, J-14, J-15, J- 63	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.	Moderate	Expand on details at tunnel portals that should be provided in conjunction with **Figures 4-4 to 4-6**.
J-3.1	Noise and vibration sensitive receivers	J-20	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**).	Moderate	Assess the risk to any sensitive equipment or facilities nearby.
J-3.1	Existing environment	J- 29 and J-30	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.	Moderate	Clarify why ambient noise was measured not ambient vibration.
J-4.1.5	Vibration	J-38	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	Moderate	Any Impact on the Enmore Theatre could be dramatic.
J-4.1.5	Vibration	J-39	**DIN 4150 Table 4.7** should apply generally as the criteria are more stringent than BS7385 and apply not only to heritage and vibration sensitive structures.	Typo / grammar	it is important to note that DIN 4150 is more stringent than BS 7385, explain why the BS7385 is used.
J-4.5	Construction and vibration methodology	J-48	There is no reference here to scrapers, rock breakers or comparable earth moving equipment which should be included.	Moderate	Clarification required.

J-4.6.2	Additional mitigation measures	J-53 and J-54	Refer to **Tables 4-15 and 4-16**. Suggest that mitigation measures are inadequate for receivers exposed to levels 20dB 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.	Moderate	The community response to such levels will be much greater than these tables suggest.
J-5.1.5	5.1.5 Haberfield Option A ground borne noise impacts	J-105	Reference is required to another assessment (M4) although Option A may be the recommended alternative chosen.	Moderate	Needs more detail?
J-5	Assessment of construction impacts	J-131 (& others)	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.	Moderate	Prediction results cannot be verified.
J-5.1.10	Haberfield vibration Option B	J-133	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.	Typo / grammar	
J-5.3.5	Rozelle vibration	J-201, J-203	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.	Moderate	As noted by the study, more detailed investigation will be required in this area once the specific alignment becomes known.
J-5.4.5, J-5.5.5, J-5.6.5	Sections 5.4.5, 5.5.5, 5.6.5	J-226, J- 250, J-270	Similar comments as above may apply except for St Peters (**5.6.5** references elsewhere are required just as per Haberfield Option A (M5)).	Moderate	As noted by the study, more detailed investigation will be required in this area once the specific alignment becomes known.
J-5.6.4	Ground borne noise impacts St Peters	J-270	Required to review another assessment to determine degree of impact.	Moderate	Needs more detail?
J-5.7	Mainline tunnel alignment GBN	J-274	Refer **Table 5-148**. It is noted that tunnelling may affect up to 132 receivers in NCA 24 which is significant.	Moderate	As recommended by the study, more detailed analysis and mitigation measures will be required per the CNVG requirements.
J-5.7.2	Mainline tunnel alignment - vibration	J-277	Report states that there are no receivers within the minimum distances - which cannot be verified.	Moderate	This compliance should be demonstrated by way of charts or plots to define these distances for easy reference.

J-5.7.3	Rock breaking and blasting	J-279	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.	Typo / grammar	Provide a reference for the site law.
J-7, J-7.1	7 Summary of impacts and management; 7.1 Haberfield - Option A	J-311	Haberfield impacts noted and discussed, however, reference elsewhere required to establish these impacts. Comments consistent with **Sections 5.1.4 and 5.1.5**.	Blank	Confirming report consistency and conclusions agree.
J-7.2	Haberfield Option B	J-315	Conclusions consistent with **Sections 5.1.9 and 5.1.10**.	Blank	Confirming report consistency and conclusions agree.
J-7.3	Darley Road	J-319	Conclusions consistent with **Sections 5.2.4 and 5.2.5.**	Blank	Confirming report consistency and conclusions agree.
J-7.4	Rozelle	J-324	Conclusions consistent with **Sections 5.3.4 and 5.3.5**.	Blank	Confirming report consistency and conclusions agree.
J-7.5	Iron Cove	J-329	Conclusions consistent with **Sections 5.4.4 and 5.4.5.**	Blank	Confirming report consistency and conclusions agree.
J-7.6	Pyrmont Bridge Road	J-333	Conclusions consistent with **Sections 5.5.4 and 5.5.5**.	Blank	Confirming report consistency and conclusions agree.
J-7.7	St Peters	J-335	Conclusions incomplete but consistent with **Sections 5.6.4 and 5.6.5.**	Blank	Confirming report consistency and conclusions agree.
	Overall evaluation				
	No additional comments				
	Signature of reviewer	TM			
	Date	22/09/2017			

	Chapter 11	Human health risk			
	Provides the strategic context and explains the need for the project				
	Technical guidelines reviewed against		Air Quality in and Around Traffic Tunnels (National Health and Medical Research Council, 2008); Environmental Health Risk Assessment: Guidelines for Assessing Human Health Risks from Environmental Hazards, 2012); Health Impact Assessment Guidelines (enHealth 2001); Health Impact Assessment: A Practical Guide (NSW Health 2007); State Environmental Planning Policy (SEPP) No. 33 – Hazardous and Offensive Development (NSW); Methodology for Valuing the Health Impacts of Changes in Particle Emissions (NSW Environment Protection Authority, 2013); various other guidelines nominated by authors		
	Section reference	**Page number**	**Comments**	**Significance level**	**Additional work recommended**
	General comment	N/A	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.	Blank	Consider use of mapping to provide visual representation of risks
11	**Human health risk**	11.1	The risk objectives laid out at the start of this chapter do not include an assessment of residual risks following mitigation measures	Critical	Assessment of residual risks following mitigation measures are required
11.1.1	Assessment methodology	11.2	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.).	Moderate	Confirm guideline consistency and acknowledge cross-chapter linkages in section. Nominate guidelines for additional human health risk issues.
11.1.1	Assessment methodology	11.3	Objectives includes content requested in SEARS	Blank	No action
11.1.1	Assessment methodology	N/A	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.	Minor	Nominate guideline values / limits
11.1.2	Study area	11.3	No comment	Blank	
11.1.3	Sensitive receivers	11.4	No comment	Blank	

11.2	Project design to minimise health impacts	11.8	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.	Critical	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.
11.3	Existing environment	11.8	No comment	Blank	
11.3.1	Population profile	11.8	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?	Critical	Assessment of the changes based on the 2016 census should have been conducted.
11.3.2	Health of existing population	11.9	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.	Minor	Consider rephrasing.
11.3.3	Existing air quality	11.1	Summarising ozone & particulate matter spatial & temporal exceedance patterns would be useful to inform existing risks to human health.	Minor	Consider addition of text describing where and when ozone & particulate matter exceedances occur?
11.3.4	Existing noise and vibration	11.10	Reference made to construction noise management levels but with no detail or background	Minor	Add cross-reference to levels in noise and vibration chapter
11.3.4	Existing noise and vibration	11.10	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.	Moderate	Clarify description, how derived and explain differences in values. Add baseline vibration conditions.
11.4	Assessment of potential construction impacts	11.10	No comments	Blank	

11.4.1	Air quality	11.10	Reference to 'project design' management measures but these are not discussed in earlier 'Project Design to Minimise Health Impacts' section.	Minor	These should be incorporated to Section 11.2 (see comment above).
11.4.1	Air quality	11.10	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?	Moderate	Reconsider summary of air quality impacts to include other factors important in determining overall impact.
11.4.1	Air quality	11.10	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).	Critical	Reconsider this assessment structure to include pre and post mitigation measure implementation.
11.4.2	Noise and vibration	11.11	The modelling assumptions supporting the noise impacts have not been reviewed.	Blank	
11.4.2	Noise and vibration	11.11	No noticeable increases in noise' statement is subjective and meaningless. What criteria are used for this evaluation?	Moderate	Clarify impact criteria for noise increases.
11.4.2	Noise and vibration	11.11	Ground-borne construction noise impacts during day not clear (evening and night commented upon),	Moderate	Assess impact during the day.
11.4.2	Noise and vibration	11.11	Duration of exposure estimated to 'slightly increase' for a large decrease in roadheader advance rate. Can this be justified?	Critical	Quantify increase in exposure and clearly justify. Clarify what receptors are affected by decreased rate / increased exposure around portals.
11.4.2	Noise and vibration	11.11	What are daytime and night-time ground-borne noise criteria?	Minor	Cross-reference to criteria in new sub-section in Section 11.1.1 (see earlier comment)
11.4.2	Noise and vibration	11.11	No consideration to change technique, equipment or timing to reduce noise impacts.	Moderate	These measures should at least be considered and accepted / ruled out on the basis of economic, project schedule, technology factors.
11.4.2	Noise and vibration	11.11	What are 'unacceptable levels of vibration'? Purely subjective and therefore meaningless.	Moderate	Consider referencing vibration limits and adding text to delineate what is acceptable and unacceptable.
11.4.2	Noise and vibration	11.12	What are blast limits?	Minor	Cross-reference to criteria in new sub-section in **Section 11.1.1** (see earlier comment)
11.4.3	Public safety	11.12	**Table 11-5** 'risk to public safety' column needs to be quantified / justified.	Moderate	Add more detail to justify risk findings and cross-reference to relevant specialists' chapters where appropriate.

11.5	Assessment of potential operational impacts	11.14	No comments	Blank	
11.5.1	Air quality	11.15	Should 'worst case scenario' for air quality include human health risk if the ventilation towers failed during a period of heavy traffic loading?	Moderate	Consider additional scenario. If no, justify why this is being excluded.
11.5.1	Air quality	11.15	VOC / PAH's predicted to be lower for project than existing case but no explanation is provided.	Minor	Explain why VOC / PAH exposure is lower for the project than existing / baseline case.
11.5.1	Air quality	11.15	The calculation methodology supporting the air quality impacts have not been reviewed.	Blank	No action
11.5.1	Air quality	11.16	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?	Minor	Clarification
11.5.1	Air quality	11.16	Justify use of one hour and annual modelled concentration time steps.	Minor	Clarification
11.5.1	Air quality	11.2	Justify use of 8 hr period.	Minor	Clarification
11.5.1	Air quality	11.25, 11.32	Sentence starting 'Review of the incidence calculated…..' does not make sense.	Typo / grammar	Rephrase
11.5.1	Air quality	11.26	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?	Moderate	Clarification required regarding comparisons of 'without project' air quality.
11.5.1	Air quality	11.32	Where is the **4.5** over-estimate of risks figure derived from?	Minor	Clarification
11.5.1	Air quality	11.34	Is there a buffer zone recommended for >10m high buildings around ventilation stacks, based on unacceptable human health risks?	Moderate	Clarification

11.5.1	Air quality	11.34	What are in-tunnel air quality limits	Minor	Cross-reference to criteria in new sub-section in **Section 11.1.1** (see earlier comment)
11.5.1	Air quality	11.34	Calculation of length-weighted average for NO2 not reviewed.	Blank	No action
11.5.1	Air quality	11.34	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?	Moderate	Clarification
11.5.1	Air quality	11.34	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?	Moderate	Clarification
11.5.1	Air quality	11.34	Closing windows and a/c set to recirculation are two important mitigation measures to reduce air quality impacts.	Minor	Consider signage for tunnel entry points with instructions to drivers.
11.5.2	Noise and vibration	11.39	A map showing where the 40% impacted receptors are situated would have been useful.	Minor	Consider using mapping to communicate impact findings.
11.5.2	Noise and vibration	11.39	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.	Moderate	Suggest other mitigation measures to counteract noise impacts.
11.5.3	Public safety	11.40	Table 11-5 'risk to public safety' column needs to be quantified / justified.	Moderate	Add more detail to justify risk findings and cross-reference to relevant specialists chapters where appropriate.
11.6	Assessment of potential social impacts on health	11.41	No comment	Blank	
11.6.1	Changes to traffic and transport	11.42	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.	Moderate	Add detail on how construction workers transport to sites will be managed to reduce these impacts.

11.6.1	Changes to traffic and transport	11.42	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.	Minor	Cross-reference to traffic chapter.
11.6.1	Changes to traffic and transport	11.42	Would expect more specific information regarding public transport disruption to be reported including train stations where passenger access would be restricted and alternatives.	Minor	More information required.
11.6.2	Property acquisitions	11.43	No comments	Blank	
11.6.3	Green space	11.44	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.	Moderate	This issue should be summarised in this section with cross-reference to the biodiversity chapter where more detailed information would be expected.
11.6.4	Changes in community	11.45	No comment	Blank	
11.6.5	Visual changes	11.45	No comment	Blank	
11.6.6	Equity	11.46	No comment	Blank	
11.7	Economic aspects	11.47	No comment	Blank	
11.7.1	Road tolling	11.47	No comment	Blank	
11.8	Construction fatigue	11.48	A map showing where the impacted receptors are situated would have been useful.	Minor	Consider using mapping to communicate impact findings.
11.9	Stress and anxiety issues	11.49	No comment	Blank	
11.10	Management of impacts	11.5	Management of impacts in other chapters not reviewed.	Blank	
	Overall evaluation				
	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.				
	Signature of reviewer	DE			
	Date	22/09/2017			

	Chapter 12	Land use and property			
	This chapter considers the potential land use and property implications of constructing and operating the M4-M5 Link project.				
	Technical guidelines reviewed against		SEARs		
	Section reference	**Page number**	**Comments**	**Significance level**	**Additional work recommended**
	General comment	N/A	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). Each location needs to be assessed individually in recognition of the different land use conditions, potential impacts and avoidance/ impact minimisation measures for each location.	Critical	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.
	General comment	N/A	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.	Minor	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.
	General comment	N./A	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?	Moderate	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.
	General comment	N/A	There is no mention made of locations, site access and lot sizes required for construction workforce car parking in the land use chapter.	Critical	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.
12	**Land use and property**	12.1	No comment	Blank	
12.1	Assessment methodology	12.4	No comment	Blank	
12.1.1	Overview	12.4	No comment	Blank	
12.1.2	Strategic land use and planning context	12.5	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.	Moderate	There is a need to summarise objectives from each document and identify project contribution to each objective otherwise ambit claim
12.2	Existing context	12.6	No comment	Blank	
12.2.1	Regional context	12.6	No comment	Blank	
12.2.2	Local context	12.11	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	Minor	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
12.2.2	Local context (table 12-3)	12.33	This table 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.	Minor	Clear statement as to whether or not there is any residual land resulting from the concept design.
12.3	Potential impacts - property	12.31	No comment	Blank	
12.3.1	Remaining project land	12.32	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.	Moderate	Provide plan indicating location and indicative size of residual land parcels and their context following completion of construction
12.3.2	Potential impacts on Crown land	12.34	No comment	Blank	
12.2.3	Subsurface acquisition	12.35	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.	Moderate	Clear identification of where shallow subsurface acquisitions may be required and what depths are likely. This is required

			This is not supported by any information about the depth of tunnel or areas where shallow subsurface acquisition may be required.		to substantiate statements made in the EIS that property impacts are unlikely.
12.3.4	Ground movement	12.36	A specialist geotechnical engineer would be required to provide commentary on appropriate application of the SEARs and the technical rigour of this section.	Blank	
12.3.4	Ground movement	12.39	Majority' of tunnel alignment is predicted to be within acceptable ground movement criteria.	Minor	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.
12.3.4	Ground movement	12.39	Potential impacts on buildings and open space - what structures are referenced by the term 'building'?	Minor	Clarify what is meant by the term building. Does it include retaining walls, garden sheds, swimming pools, landscape features, and sculptures?
12.3.4	Ground movement	12.57	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 what the term 'conservative estimates' means?	Minor	Clarify what conservative estimate refers to in the notes for the angular distortion contour figures
12.4	Potential impacts - land use	12.63	No comment	Blank	
12.4.1	Potential impacts - land use	12.63	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?	Moderate	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.
12.4.2	Parramatta Road West civil and tunnel site (C1b) and the Parramatta Road East civil site (C3b)	12.63	No comment	Blank	

12.4.3	Darley Road surface works	12.64	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.	Moderate	Commentary about requesting review of the Precinct plan in parallel with preparation of the residual management plan should be included in the EIS.
12.4.3	Darley Road surface works	12.64	No comment	Blank	
12.4.4	Rozelle surface works	12.65	No comment	Blank	
12.4.5	Iron Cove Link surface works	12.67	No comment	Blank	
12.4.6	Pyrmont Bridge Road surface works	12.68	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?	Minor	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.
12.4.7	St Peters interchange surface works	12.69	No comment	Blank	
12.4.8	Access impacts	12.71	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 principles. This is an issue as underpasses are generally not favoured as they cannot easily be surveyed.	Moderate	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.
12.4.9	Impacts on water users	12.71	No comment	Blank	
12.4.10	Utility works	12.72	No comment	Blank	
12.4.11	Ground level development	12.73	No comment	Blank	
12.4.12	Elevated receptor locations	12.73	No comment	Blank	
12.4.13	Overshadowing	12.74	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.	Moderate	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

12.4.13	Overshadowing	12.74	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.	Moderate	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.
12.4.13	Overshadowing	12.75	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	Moderate	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.
12.4.13	Overshadowing	12.75	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	Critical	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.
12.5	Management of impacts	12.76	No comment	Blank	
	Overall evaluation				
	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.				
	Signature of reviewer	JM			
	Date	22/09/2017			

	Chapter 13	Urban design and visual amenity			
	This chapter provides an assessment of the urban design, landscape character and visual amenity for the M4-M5 Link project				
	Technical guidelines reviewed against		Environmental Impact Assessment Practice Note – Guidelines for Landscape Character & Visaul Impact Assessment (EIAG) (NSW Roads & Maritime Services, 2013)		
	Section reference	**Page number**	**Comments**	**Significance level**	**Additional work recommended**
	General - Chapter 13 and Appendix O	N/A	The presented landscape character and visual impact assessment reporting (**Appendix O**) 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.	Moderate	It is recommended that a selected replication mapping process is carried out if a full review is required.
13	**Urban design and visual amenity**	13.1	No comment	Blank	
13.1	Assessment methodology	13.4	No comment	Blank	
13.2	Landscape character and visual impact assessment	13.4	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.	Moderate	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**.
13.2	Landscape character and visual impact assessment	13.2	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.	Moderate	The mapping and identification of sensitive receivers should be reviewed in detail to determine the accuracy of the reported positions.

13.2.1	Legislation and policy framework	13.5	No comment	Blank	
13.2.2	Urban and landscape design	13.5	No comment	Blank	
13.2.3, L-5.5.5	Approach to the assessment of potential impacts, Lighting	13.8, L-53	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.	Critical	Requirement for further definition of lighting outcomes should be a priority.
13.2.3	Approach to the assessment of potential impacts	13.7	No comment	Blank	
13.3	Existing environment	13.8	No comment	Blank	
13.3.1	Landscape character zones	13.8	No comment	Blank	
13.3.2	Existing night lighting environment	13.15	No comment	Blank	
13.4	Assessment of potential construction impacts	13.16	No comment	Blank	
13.4.1	Visual impacts on sensitive receivers	13.17	No comment	Blank	
13.4.2	Construction lighting impacts	13.19	No comment	Blank	
13.5	Assessment of operational impacts (and Appendix L)	13.33	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.	Moderate	
13.5	Assessment of operational impacts (and Appendix L)	13.33	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.	Critical	
13.5.1	Wattle Street interchange	13.33	No comment	Blank	
13.5.2	Darley Road	13.34	No comment	Blank	
13.5.3	Rozelle interchange	13.37	No comment	Blank	

13.5.4	Iron Cove Link	13.53	No comment	Blank	
13.5.5	St Peters interchange	13.63	No comment	Blank	
13.5.6	Mainline tunnels	13.68	No comment	Blank	
13.5.7	Remaining project land	13.68	No comment	Blank	
13.5.8	Crime prevention through environmental design	13.69	No comment	Blank	
13.5.9	Urban design and landscape assessment	13.69	No comment	Blank	
13.6	Environmental management measures	13.74	No comment	Blank	
L-3.2, L-5.1.3	Urban design objectives and principles, Rozelle Rail Yards strategies	L-9, L-19	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.	Moderate	Testing of the application of the urban design principles in detailed outcomes.
L-3.2, L-5.1.3	Urban design objectives and principles, Rozelle Rail Yards strategies	L-9, L-19	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.	Critical	Full review of the conceptual design response is required to assess the responsiveness of the proposed design in the Rozelle Rail Yards.
L-3.2, L-5.2.3	Urban design objectives and principles, Iron Cove strategies	L-40	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.	Critical	Full review of the conceptual design response is required to assess the responsiveness of the proposed design in the Rozelle Rail Yards.

L-5.4	Assessment of the M4-M5 Link against the urban design principles	L-48	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.	Moderate	A detailed concept design review of both Rozelle Rail Yards and Iron Cove Link is recommended to focus commentary on detailed outcomes.
L-5.5.4	Ventilation facility design	L-52	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')	Critical	Requirement for further definition of ventilation facilities should be a priority.
L-5.5.8	Crime prevention through environmental design	L-56	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.	Moderate	A CPTED audit of current concepts should be carried out.
L-6	Future Opportunities	L-57	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.	Critical	Further review of the identified future opportunities is required to assess their application to project mitigation and offset obligations.
L-6.2	Future opportunities on Victoria Road	L-58	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.	Critical	Further review of the identified future opportunities is required to assess their application to project mitigation and offset obligations.

O-3.1	Overview	O-31	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).	Minor	
	Overall evaluation				
	No other comments				
	Signature of reviewer	SB			
	Date	22/09/2017			

	Chapter 14	Social and economic			
	This chapter outlines the potential social and economic impacts associated with the M4-M5 Link project				
	Technical guidelines reviewed against		SEARs		
	Section reference	**Page number**	**Comments**	**Significance level**	**Additional work recommended**
14	**Social and economic**	14.10	No comment	Blank	
14.1	Assessment methodology	14.30	No comment	Blank	
14.1.1	Overview	14.30	No comment	Blank	
14.1.2	Guideline and policy framework	14.30	No comment	Blank	
14.1.3	Desktop assessment	14.30	No comment	Blank	
14.1.4	Study area	14.40	No comment	Blank	
14.1.5	Business surveys	14.70	**Table 14-3** sets out the categories of significance of social and economic impacts and refers the reader to Appendix P 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 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	Moderate	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.

			Council and therefore are better classified as a major impact.		
14.1.6	Stakeholder consultation	14.60	No comment	Blank	
14.1.7	Assessment approach	14.60	No comment	Blank	
14.2	Existing environment	14.70	No comment	Blank	
14.2.1	Demographic profile	14.80	No comment	Blank	
14.2.2	Community values	14.11	No comment	Blank	
14.2.3	Social infrastructure	14.12	No comment	Blank	
14.2.4	Employment centres	14.25	No comment	Blank	
14.2.5	Access and connectivity	14.29	No comment	Blank	
14.3	Assessment of potential construction impacts	14.30	No comment	Blank	
14.3.1	Demographic profile	14.30	No comment	Blank	
14.3.2	Community values	14.31	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	Moderate	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.

14.3.2	Community values	14.31	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.	Moderate	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.
14.3.2	Community values	14.31	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.	Moderate	Mitigation measures for known risk areas for community severance need to be specified.
14.3.3	Amenity	14.33	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.	Moderate	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.
14.3.4	Social infrastructure	14.35	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.	Moderate	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.
14.3.4	Social infrastructure	14.36	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	Moderate	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.

			customers who are not passing trade or seek good amenity. This chapter silent about the loss of car parking in the vicinity of construction sites which will definitely have a negative impact upon business.		
14.3.5	Business and industry	14.36	No comment	Blank	
14.3.6	Access and connectivity	14.38	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.	Moderate	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 14000 workers working across a spread of shifts and several construction worksites.
14.3.7	Economy	14.40	No comment	Blank	
14.3.8	Utilities	14.42	No comment	Blank	
14.3.9	Property acquisition	14.42	No comment	Blank	
14.4	Assessment of potential operational impacts	14.45	No comment	Blank	
14.4.1	Demographic profile	14.45	No comment	Blank	
14.4.2	Community values	14.45	No comment	Blank	
14.4.3	Amenity	14.46	No comment	Blank	
14.4.4	Business and industry	14.47	No comment	Blank	
14.4.5	Access and connectivity	14.48	No comment	Blank	
14.4.6	Economy	14.50	No comment	Blank	
14.4.7	Future land use	14.51	No comment	Blank	
14.5	Environmental management measures	14.53	No comment	Blank	
	Overall evaluation				
	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.	
	Signature of reviewer	JM
	Date	22/09/2017

	Chapter 15	Soil and water quality			
	This chapter describes the environmental values relating to soil and water quality and identifies the potential impacts on these values as a result of the construction and operation of the M4-M5 Link.				
	Technical guidelines reviewed against		NSW Water Quality & River Flow Objectives, Using ANZECC guidelines and water quality objectives (DECC, 2006), ANZECC / ARMCANZ 2000, Approved Methods for Sampling & Analysis (DECC, 2008), Managing Urban Stormwater (Landcom, 2004), Acid Sulfate Soils Assessment (DoP, 2008), Acid Sulfate Soils Manual (ASS Management Advisory Committee 2008), Managing Land Contamination (DUAP & EPA, 1998); Urban & Regional Salinity (DLWC, 2002).		
	Section reference	**Page number**	**Comments**	**Significance level**	**Additional work recommended**
	General document comment	N/A	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.	Minor	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.
	General document comment	N/A	There are some typo's / grammar errors in the chapter which undermine the technical content of the report	Typo / grammar	Spell-check and proof-read
15	**Soil and water quality**	15.1	No comment	Blank	
15.1	Assessment methodology	15.6	No comment	Blank	
15.1.1	Soils	15.6	No comment	Blank	
15.1.2	Water quality	15.7	MUSIC model constrains parameters to sediment & nutrients. Are these the only pollution reduction targets for the operation phase?	Moderate	Consider using other modelling packages if other highway-derived chemical parameters are of interest such as fuel / oil, metals and PAH's.
15.1.3	Study area (Figure 15.1)	15.8	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.	Moderate	Consideration of a larger study area, especially if local receptors are impacted. Justification for not considering potential receptors is required.

15.1.4	Legislative and policy framework	15.9	No comment	Blank	
15.1.5	Design criteria	15.10	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?	Critical	Clarification on design criteria for treatment of operational runoff required.
15.1.5	Design criteria (Table 15-3)	15.11	What degree of protection should be afforded for aquatic ecosystems?	Minor	Clarify and justify percent protection level
15.1.6	Desktop assessment	15.13	No comment	Blank	
15.1.7	Field assessment (Table 15-4 and Figure 15-2)	15.14	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.	Minor	Add construction sites to map
15.1.7	Field assessment	15-14	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.	Blank	
15.1.7	Field assessment	15-14	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	Moderate	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.

			given by comparison of rainfall / flow records set against seasonal / inter-annual variations.		
15.2	Existing environment	15.17	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.	Critical	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**.
15.2.1	Soils	15.19	Baseline review shows high risk of ASS in some locations. This will need to be managed appropriately on a site-specific basis.	Blank	Cross-reference to mitigation measures section.
15.2.1	Soils	15.19	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.	Critical	Would have expected data from an ASS monitoring program to have been presented.
15.2.2	Water quality	15.24	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.	Moderate	Identify favourable conditions / sensitivities to changes in water quality for resident fish population.
15.2.2	Water quality (Table 15-9)	15.25	At the moment the information in this table 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**.	Minor	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.
15.2.2	Water quality	15.26	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.	Critical	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).
15.2.2	Water quality	15.27	No information has been provided on why these watercourses are sensitive nor what water quality conditions they require for protection of environmental values.	Moderate	Provide rationale for sensitivity, designation type (if relevant) and water quality conditions that could lead to deterioration of habitat.

15.3	Assessment of potential construction impacts	15.27	No comment	Blank	
15.3	Assessment of potential construction impacts	15.27	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).	Moderate	Consideration of other impacts and project-specific issues should be provided.
15.3.1	Soils	15.28	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?	Moderate	Consideration of other impacts and project-specific issues should be provided.
15.3.2	Water quality	15.29	What is 'heat suppression water', where and when will it be used?	Minor	Clarification
15.3.2	Water quality	15.29	Wastewater volume calculations have not been reviewed here.	Blank	
15.3.2	Water quality (Table 15-10)	15.29	How do estimated daily discharge rates compare with existing stormwater discharges at these points? Without this information, it is difficult to judge the significance of the discharges.	Moderate	Additional existing environment sub-section with stormwater discharge estimates.
15.3.2	Water quality	15.30	No information on where these treatment facilities would be located are given in this text.	Minor	Indicative locations for wastewater treatment should be presented.
15.4	Assessment of potential operational impacts	15.35	No comment	Blank	
15.4.1	Soils	15.36	No comment	Blank	
15.4.2	Water quality	15.36	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	Moderate	Clearer description of the water quality treatment systems, size and justification for excluding larger systems that can achieve pollutant reduction targets.

			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.		
15.4.2	Water quality (Table 15-12)	15.37	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.	Critical	Justification for the comparison is required - it is highly unlikely that the existing residual load will be captured by the treatment systems.
15.4.2	Water quality	15.38	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.	Moderate	Clarify discrepancy between tow 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.
15.4.2	Water quality	15.38	The chemical composition of tunnel drainage water has not been presented. Without this information, it is unclear how treatment efficacy was calculated.	Minor	Clarification required.

15.4.2	Water quality	15.39	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.	Moderate	Consideration of maintenance requirements for water treatment systems and subsequent impacts is needed.
15.4.2	Water quality	15.39	Hawthorne Canal water quality impacts are stated to be negligible and localised to near the outlet. This combination does not make sense.	Minor	Consider rephrasing sentence.
15.4.2	Water quality	15.40	Impacts to scour and geomorphology would be easier to quantify if sediment depths, particle size and flow changes had been quantified.	Moderate	A more quantitative description of scour and geomorphology change is required.
15.5	Environmental management measures (Table 15-13)	15.42	No mention of the most pertinent conditions and triggers for capture of monitoring data during construction.	Minor	Rainfall event monitoring should be emphasised.
15.5	Environmental management measures (Table 15-13)	15.42	Other ESC 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.	Minor	A range of possible ESC options should be presented for determination in the site specific ESCP's
	Overall evaluation				
	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.				
	Signature of reviewer	DE			
	Date	22/09/2017			

	Chapter 16	Contamination			
	This chapter assesses the potential contamination impacts associated with the M4-M5 Link project. This chapter has been informed by Appendix R (Technical working paper: Contamination).				
	Technical guidelines reviewed against		Guidelines on the Duty to report Contamination under the Contaminated Land Management Act 1997 (NSW EPA 2015); Guidelines for the Site Auditor Scheme (NSW Department of Environment and Conservation (DEC) 2006; Guidelines for the Assessment and Management of Groundwater Contamination (DEC 2007); National Environmental Protection (Assessment of Site Contamination) Measure (ASC NEPM) 2013 (National Environment Protection Council (NEPC) 1999; Environmental Guidelines: Solid waste Landfills Second Edition (NSW EPA 2016); Guidelines for Consultants Reporting on Contaminated Sites (NSW Office of Environment and Heritage (OEH 2011); Guidelines for the Assessment and Management of Sites Impacted by Hazardous Ground Gases (NSW EPA 2012); National Water Quality Management Strategy, Paper No.4 Australian and NZ Guidelines for Fresh and Marine Water Quality, Volume 1, The Guidelines (Australian and NZ Environment and Conservation Council (ANZECC) and Agriculture and Resource Management Council of Australia and NZ (ARMCANZ) 2000; Acid Sulphate Soils Assessment Guidelines, Acid Sulphate Soils Management Advisory Committee (ASSMAC) 1998.		
	Section reference	**Page number**	**Comments**	**Significance level**	**Additional work recommended**
16.1.1	Relevant legislation and policies	16-1	The WestConnex contaminated land technical working papers 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.	Blank	
16.1.2	Relevant guidelines	16-3	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	Blank	

			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.		
16.1.3	Study Area	16-3	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.	Blank	
16.1.4	Methodology	16-5	No comment	Blank	
16.2	Existing Environment	16-6	No comment	Blank	
16.3	Assessment of potential construction impacts	16-24	No comment	Blank	
16.4	Assessment of potential operational impacts	16-35	No comment	Blank	
R-1-1	Technical Working Paper: Contamination. Introduction	R-1-1	No comment	Blank	
R-1-2	The Project	R-1-7	No comment	Blank	
R-1-3	Assessment Methodology	R-1-17	No comment	Blank	
R-1-4	Existing environment	R-1-24	The technical working papers provide the findings from various desk top studies and intrusive investigations. The paper also refers to intrusive	Minor	Provide further references.

			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.		
R-1-5	Assessment of construction impacts	R-1-141	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)	Blank	
R-1-5	Assessment of construction impacts	R-1-141	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	Blank	
R-1-6	Assessment of operational impacts	R-1-165	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).	Blank	
R-1-6	Assessment of operational impacts	R-1-165	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.	Blank	
R-1-7	Assessment of cumulative impacts	R-1-174	No comment	Blank	
R-1-8	Management of impacts	R-1-178	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 recommended 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 recommended to have further intrusive investigation. Management	Moderate	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** (Human Health Risk Assessment).

			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.		
R-1-8	Management of impacts	R-1-179	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 Olan (OEMP) would be prepared to manage impacts on groundwater and surface water. This is consistent with SEARs requirements.	Blank	
R-1-8	Management of impacts	R-1-179	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.	Blank	
R-1-8	Management of impacts	R-1-179	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	Minor	Consideration of combining management plans into the CEMP.

			that four plans need to be checked for consistency each time, at a cost.		
R-1-9	Conclusions	R-1-195	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.	Minor	Further explanation of overall effects of the project on contamination is required.
	Overall evaluation				
	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.				
	Signature of reviewer	EL			
	Date	22/09/2017			

	Chapter 17	Flooding and drainage			
	This chapter describes the potential flooding and drainage impacts associated with the project.				
	Technical guidelines reviewed against		SEARS, Australian Rainfall & Runoff (ARR, 1987), NSW Government, Floodplain Development Manual. April 2005		
	Section reference	**Page number**	**Comments**	**Significance level**	**Additional work recommended**
17	**Flooding and drainage**	17.1	No comment	Blank	
17.1	Assessment methodology	17.5	No comment	Blank	
17.1.1	Relevant legislation, policies and guidelines	17.5	No comment	Blank	
17.1.2	Study area	17.6	No comment	Blank	
17.1.3	Method of assessment	17.8	How relevant are the 1990 and 1995 Whites Creek and Jacksons Creek studies? I assume superseded by the Leichardt Flood Study	Minor	
17.1.3	Method of assessment	17.9	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.	Minor	
17.1.3	Method of assessment (Table 17-2)	17.11	References for each of the hydrologic standards should be included.	Minor	
17.2	Existing environment	17.11	No comment	Blank	
17.2.1	Catchments and watercourses	17.12	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**.	Minor	
17.2.2	Drainage	17.18	Reference to receiving stormwater infrastructure potentially being in poor / unknown condition. How sensitive is project flood performance to the condition of the receiving infrastructure?	Minor	
17.2.3	Hydrology and flooding	17.19	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	Minor	

			those reports should be provided. No mention of climate change in this part of the chapter.		
17.2.3	Hydrology and flooding	17.21	No mention of storm surge and climate change for Rozelle (climate change mentioned briefly later in the chapter). Given the low ground levels (2m - 7m AHD), coincidence of significant pluvial and tidal events should be considered	Moderate	Provide confirmation that coincidence of pluvial and tidal events has been undertaken and how joint ARI's were derived.
17.2.3	Hydrology and flooding (Figures 17-10 to 17-17)	17.23	It is unclear at this point in the chapter whether these existing flood maps are outputs from modelling undertaken for the Project or are outputs from previous modelling studies	Minor	
17.2.3	Hydrology and flooding	17.27	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.**	Minor	
17.2.3	Hydrology and flooding (Table 17-3)	17-37 to 39	Why aren't the sites listed in the same order as they are in the text. Pyrmont Bridge Road not included in the table.	Minor	Re-order table and include Pyrmont Bridge Road.
17.3	Assessment of potential construction impacts	17.39	Could add 'Additional people (construction workers) in flood prone areas' to bullet point list of activities to be mitigated.	Minor	
17.3.1	Flooding and drainage	17.40	2nd to last paragraph. Potential for temporary construction works to increase flood risk. Need more detailed assessment of risks prior to commencement of works.	Minor	
17.3.1	Flooding and drainage (Table 17.4)	17.41	No mention of management of on-site stormwater drainage. Only flooding is mentioned.	Moderate	
17.3.1	Flooding and drainage	17.45	Local drainage paths not considered at this stage (deferred to detailed design).	Minor	
17.3.2	Hydrological impacts	17.45	Hydrological processes covered in Soil & Water chapter review.	Blank	
17.4	Assessment of potential operational impacts	17.46	No comment	Blank	
17.4.1	Operational flood risks (and Figure 17-26)	17-48	**Figure 17.26** 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.	Minor	Provide additional flood depth/change category.
17.4.1	Operational flood risks	17.48	Good that the EIS acknowledges that the model will need to be refined at detailed design stage.	Blank	

17.4.1	Operational flood risks (Figures 17-25 and 17-26)	17.52	Generally, benefits outside of the project area in the 100-year ARI event, but not in the PMF event.	Minor	
17.4.1	Operational flood risks (Figures 17-35 and 17-36)	17.60	Maps show increases in flood depth of less <0.1m, but text says increases of up to 0.3m (and describes that as minor). Clarification required.	Minor	Provide additional flood depth/change category.
17.4.2	Emergency management and response procedures	17.66	No comment	Blank	
17.4.3	Potential impacts of future climate change	17.66	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.	Moderate	Provide additional climate change flood depth and change maps, either in the chapter or refer to **Chapter 6.2.2** of **Appendix Q**.
17.4.4	Impact on existing drainage infrastructure	17.67	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?	Moderate	
17.4.5	Hydrological impacts	17.68	Last paragraph. Not clear that mitigation will result in flooding having "no impact on properties in the 100-year ARI" (event).	Minor	
17.4.5	Hydrological impacts	17.68	It appears that there is a missing word after "no impact on properties in the 100-year ARI".	Typo / grammar	Add "flood" or "event" after "no impact on properties in the 100-year ARI".
17.5	Management of impacts	17.68	No comment	Blank	
17.5	Management of impacts (Table 17-5 FD17)	17.72	FD17 - Who will be responsible for preparing post-flood studies following handover of the project?	Moderate	Confirm responsibility for producing post-handover flood reports.
26.4.10	Surface water flooding and drainage	26.30	Though flood related cumulative effects are low or negligible, they must continue to be reviewed and included in flood modelling at detailed design.	Minor	
Q-C	Annexure C - Flood Model Development	C-1	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.	Minor	Provide reference to full model reports.

Q-C1.2	Approach	C-1	Use of TUFLOW is appropriate for modelling.	Blank	
Q-C1.4	Hydrology	C-1	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.	Moderate	Review use of ARR 1987 against ARR 2016 for rainfall and losses. Re-run models with ARR 2016 inputs if significantly different.
Q-C1.5	Hydraulics	C-3	No mention of climate change in Boundary Condition for Rozelle, but they are mentioned for Iron Cove Link (C 2-5)	Moderate	Confirm that climate change has been taken account of in the modelling. CH17 text implies that it has, and it is described in AppQ Chapter 6.2.2, but that needs referencing explicitly.
Q-C1.5	Hydraulics	C-4	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.	Minor	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.
Q-C1.8	Sensitivity	C-5	Text states that blockage parameters calculated using latest ARR guidance, which is appropriate but calculations not provided.	Minor	
	Overall evaluation				
	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.				
	Signature of reviewer	ML			
	Date	22/09/2017			

	Chapter 18	Biodiversity			
	This chapter provides a summary of the biodiversity impacts associated with the M4-M5 Link project				
	Technical guidelines reviewed against		NSW Biodiversity Offsets Policy for Major Projects (OEH 2014a), Guidelines for Fish Habitat Conservation and Management (update 2013) (DPI 2013), Why do Fish Need to Cross the Road? Fish Passage Requirements for Waterway Crossings (Fairfull and Witheridge 2003), Risk Assessment Guidelines for Groundwater Dependent Ecosystems (DPI 2012), NSW Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities – Working Draft November 2004 (NSW DEC 2004), NSW Threatened species survey and assessment guidelines: field survey methods for fauna (Amphibians) (NSW DECC 2009), NSW Sustainable Design Guidelines Version 3.0 (Transport for NSW 2013), Aquatic Ecology in Environmental Impact Assessment – EIA Guideline (Marcus Lincoln Smith 2003), Commonwealth Survey Guidelines for Australia's Threatened Frog (Australian Government, Department of the Environment, Water, Heritage and the Arts (DEWHA) 2010a), Commonwealth Survey Guidelines for Australia's Threatened Bats (DEHWA 2010b), Matters of National Environmental Significance Significant Impact Guidelines 1.1 Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth of Australia 2013), Referral guideline for management actions in Grey-Headed and Spectacled Flying-fox camps (Commonwealth of Australia 2015).		
	Section reference	**Page number**	**Comments**	**Significance level**	**Additional work recommended**
	General document comment	N/A	An annotated map showing presence of sensitive habitat / species would be useful to summarise the chapter.	Blank	
18	Table 18-1	18-1	SEARS are recorded accurately	Blank	
18.1.1	Assessment methodology - overview	18-2	Why are surveys only stated within the Project footprint? What about sensitive biodiversity receptors outside the footprint? E.g. down-gradient aquatic systems.	Minor	Receptors outside the project footprint have also been considered in this assessment. The text needs to be revised to reflect this large spatial extent.
18.1.2	Legislation & Policy Framework	18-6	All guidelines stated in SEARS have been incorporated into the assessment.	Blank	
18.1.4	Field Surveys - fauna	18-8	Only field surveys were conducted Whites Creek and Rozelle Bay. All other aquatic receptors were only considered via a desktop assessment.	Moderate	Provide justification for limited field survey
18.2.2	Table 18-3 Biodiversity landscape features of the study area	18-9	Rozelle Bay could potentially be impacted by contaminated sediment resuspension. The treatise for this impact is superficial and not quantified sufficiently.	Critical	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.

18.2.2	Table 18-3 Biodiversity landscape features of the study area	18-9	Iron Cove and Hawthorne Canal stated as not directly impacted by the project but a hydrological connectivity is confirmed. This seems contradictory.	Minor	Clarification required.
18.2.2	Table 18-3 Biodiversity landscape features of the study area	18-9	Focus for rivers & streams appears to be on fish habitat and species.	Minor	Consider macrophyte, macro-invertebrate and semi-aquatic species presence in landscape features.
18.2.2	Table 18-3 Biodiversity landscape features of the study area	18-9	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.	Moderate	Incorporate assessment of artificial waterbodies into assessment.
18.2.2	Table 18-3 Biodiversity landscape features of the study area	18-10	Confusing statement 'As the native vegetation within the study area does not meet the definition for native vegetation…..'.	Minor	Clarification required referencing the 'Vegetation Cover' row and appropriate definition reference.
18.2.3	Terrestrial flora - Threatened ecological communities	18-10	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?	Moderate	More clarification / justification for lack of impact required.
18.2.5	Aquatic biodiversity	18-14	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.	Critical	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).
18.2.5	Aquatic biodiversity	18-14	More justification required as to why Whites Creek and Hawthorne Canal riparian vegetation does not provide ecological value	Minor	Clarification required.
18.2.5	Aquatic biodiversity	18-15	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.	Critical	Presence of fish in Rozelle Bay needs to be acknowledged and appropriate assessment of impacts conducted.
18.3.1	Terrestrial Flora - Loss of vegetation	18-6	Number of affected trees provided as requested in SEARS but hierarchy of controls (avoid, minimise, mitigate) not explored fully in this section.	Moderate	Alternatives to the design using hierarchy of controls should have been documented.

18.3.2	Terrestrial Fauna	18-17	Lack of impact concluded due to foraging habitat availability within GHFF range	Minor	State / reference typical foraging range for GHFF and identify alternative habitat within this range.
18.3.3	Loss of Aquatic Biodiversity	18-18	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.	Critical	Update section following revision to soil and water chapter calculations and consider acute toxicity issues in the assessment.
18.3.3	Loss of Aquatic Biodiversity	18-19	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.	Critical	Further work required for both chronic and acute toxicity plus physical smothering impacts.
18.3.4	Impact of Groundwater Dependant Ecosystems	18-20	Minimum depth stated as 2m and statement that this means it is not sole source of water for plants.	Moderate	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.
18.5	Environmental Management Measures	18-23	Aquatic impact monitoring (e.g. water quality monitoring with subsequent ecological monitoring if an impact is detected) not considered.	Moderate	Aquatic monitoring important, especially focussed on bridge dredging / piling activities.
18.5	Environmental Management Measures	18-23	Steps to avoid and minimise tree loss are not detailed.	Moderate	Consider addition of guidance for design considerations that adhere to the hierarchy of avoiding and minimising impacts.
	Overall evaluation				
	No further comment				
	Signature of reviewer	DE			
	Date	29/09/2017			

	Chapter 19	Groundwater			
	This chapter outlines the potential groundwater impacts associated with the M4-M5 Link project.				
	Technical guidelines reviewed against		NSW Aquifer Interference Policy (DPI, 2012), Risk Assessment Guidelines for GDE's (Office of Water, 2012), NSW Water Quality Objectives, Using ANZECC guidelines and water quality objectives (DECC, 2006), ANZECC / ARMCANZ 2000, Approved Methods for Sampling & Analysis (DECC, 2008)		
	Section reference	**Page number**	**Comments**	**Significance level**	**Additional work recommended**
19	**Groundwater**	19.1	No comment	Blank	
19.1	Assessment methodology	19.3	Guidance document listed are appropriate and cover requirements listed in SEARS	Blank	
19.1.1	Study area	19.4	No justification for study area / model domain spatial extent is provided. This should be based on potential receptor impacts.	Minor	Clarification required.
19.1.2	Desktop review	19.5	No comment	Blank	
19.1.3	Field investigation	19.7	Groundwater bore locations justified. Duration, frequency (or hourly resolution for automatic depth loggers) and tested parameters are all deemed to be sufficient.	Blank	
19.1.4	Groundwater dependant ecosystems	19.9	No comment	Blank	
19.1.5	Groundwater modelling	19.9	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.	Blank	
19.1.6	Cumulative impact assessment	19.1	No comment	Blank	
19.2	Existing environment	19.11	No comment	Blank	
19.2.1	Existing and proposed infrastructure	19.11	No comment	Blank	
19.2.2	Topography and drainage	19.14	No comment	Blank	
19.2.3	Geological setting	19.16	No comment	Blank	
19.2.4	Groundwater recharge	19.16	No comment	Blank	
19.2.5	Hydrogeological setting	19.19	No generalised flow directions for the different geological units are presented.	Moderate	A map delineating flow pathway would be expected.

19.2.5	Hydrogeological setting	19.21	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.	Moderate	Justification for not using literature values for hydraulic conductivity in alluvium required.
19.2.6	Groundwater quality	19.22	No comment	Blank	
19.2.7	Contamination	19.25	No comment	Blank	
19.2.8	Existing groundwater users	19.27	Unknown if four domestic bores are still operating.	Minor	Clarification required.
19.2.9	Groundwater dependent ecosystems	19.27	Justify range of potential impact and therefore exclusion of Botany Wetlands / Lachlan Swamps GDE's from assessment.	Blank	Clarification required based on connectivity and scale of physical / chemical impacts.
19.3	Assessment of potential construction impacts	19.27	No comment	Blank	
19.3.1	Reduced groundwater recharge	19.28	No comment	Blank	
19.3.2	Tunnel inflow	19.28	No comment	Blank	
19.3.3	Groundwater level decline (and Figure 19-6)	19.29	No quantification of groundwater level drawdown is provided. Figure is difficult to interpret and no baseline water table elevations are provided for comparison.	Moderate	Summarise drawdown levels predicted and provided percentage change in drawdown levels on map.
19.3.3	Groundwater level decline	19.32	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.	Moderate	Further information on lack of groundwater dependence required.
19.3.3	Groundwater level decline (Tables 19-8 and 19-10)	19.33, 19.46	It is difficult to interpret if changes to baseflow are significant to local watercourses without also knowing flows derived from surface water runoff.	Critical	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.
19.3.4	Groundwater quality	19.36	Two sites are identified with PASS compared to five sites in the Soils and Water Chapter.	Minor	Check for consistency.
19.3.5	Groundwater monitoring	19.37	No comment	Blank	
19.3.6	Ancillary infrastructure	19.37	No comment	Blank	
19.3.7	Utility works	19.38	No comment	Blank	

19.3.8	Ground movement (settlement)	19.38	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.	Critical	Justification for not conducting robust assessment of ground movement at this stage is required.
19.4	Assessment of potential operation impacts	19.40	No comment	Blank	
19.4.1	Reduced groundwater recharge	19.41	No comment	Blank	
19.4.2	Tunnel inflow	19.41	No comment	Blank	
19.4.3	Groundwater level decline	19.42	Explain why model simulation runs to 2100.	Minor	Clarification required.
19.4.3	Groundwater level decline	19.45	Rozelle Rail Yards vegetation may be shallow rooted and dependant on groundwater.	Minor	This groundwater dependency should be considered in the selection of appropriate plants for the open space area.
19.4.4	Groundwater quality	19.47	No comment	Blank	
19.4.5	Groundwater monitoring	19.49	Justify monitoring duration of 3 years and number of wells	Minor	Clarification required.
19.4.6	Ancillary infrastructure	19.49	No comment	Blank	
19.4.7	Barriers to groundwater flow from operational infrastructure	19.50	No comment	Blank	
19.4.8	Groundwater management	19.50	No comment	Blank	
19.4.9	Groundwater balance	19.51	No comment	Blank	
19.5	Environmental management measures	19.51	No comment	Blank	
	Overall evaluation				
	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.				
	Signature of reviewer	DE			
	Date	22/09/2017			

	Chapter 22	Greenhouse Gas			
	This chapter outlines the legislative and policy framework for the control of greenhouse gas emissions. It provides an assessment of greenhouse gas emissions anticipated to be generated during the construction and operation stages of the M4-M5 Link project.				
	Technical guidelines reviewed against		Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard (World Council for Sustainable Business Development and World Resources Institute 2005), National Greenhouse and Energy Reporting Act 2007 (Commonwealth), AS/ISO 14064.1:2006 Greenhouse Gas Part 1: Specification with guidance at the organisational level for quantification and reporting of greenhouse gas emissions and removals, The current Australian National Greenhouse Accounts: National Greenhouse Accounts Factors (NGA Factors) (Department of the Environment 2016), Greenhouse Gas Assessment Workbook for Road Projects (the TAGG Workbook) (Transport Authorities Greenhouse Group (TAGG) 2013).		
	Section reference	**Page number**	**Comments**	**Significance level**	**Additional work recommended**
	General	N/A	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 CO2-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**.	Moderate	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.

	General	N/A	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.	Moderate	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.
22	**Greenhouse gas**	22.1	No comment	Blank	
22.1	Assessment methodology	22.1	No comment	Blank	
22.1.1	Greenhouse gas assessment boundary	22.2	No comment	Blank	
22.2	Existing environment	22.3	No comment	Blank	
22.2.1	International policy setting	22.3	No comment	Blank	
22.2.2	National and State policy setting	22.4	No comment	Blank	
22.2.3	GHG emissions reporting	22.5	No comment	Blank	
22.3	Assessment of potential construction impacts	22.5	No comment	Blank	
22.3.1	Construction ancillary facilities: Option A	22.6	No comment	Blank	
22.3.2	Construction ancillary facilities: Option B	22.7	No comment	Blank	
22.3.3	Construction GHG emissions results	22.7	No comment	Blank	
22.4	Assessment of potential operational impacts	22.9	No comment	Blank	
22.4.1	Emissions from road infrastructure operation and maintenance	22.9	No comment	Blank	
22.4.2	Emissions from vehicles during operation	22.10	No comment	Blank	
22.5	Combined project GHG emissions	22.14	No comment	Blank	
22.6	Assessment of cumulative impacts	22.16	No comment	Blank	

22.6.1	Cumulative construction emissions	22.16	No comment	Blank	
22.6.2	Cumulative operational emissions	22.16	No comment	Blank	
22.7	Management of impacts	22.17	No comment	Blank	
22.7.1	Management of emissions through design	22.17	"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.	Moderate	Please provide supporting information to validate this statement and in particular, how it impacts on estimated quantities of greenhouse gas emissions.
22.7.1	Management of emissions through design	22.17	"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.	Moderate	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.
22.7.2	Next steps for emissions reduction	22.17	No comment	Blank	
W-6.1	Appendix W - Methodology	W-21	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.	Moderate	Conduct a sensitivity analysis of impacts on emissions savings calculated.

	Overall evaluation	
	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.	
	Signature of reviewer	LH
	Date	22/09/2017

	Chapter 23	Resource use and waste minimisation			
	This chapter describes the resources and materials, including potential sources and expected quantities that would be used to construct the M4-M5 Link.				
	Technical guidelines reviewed against	NSW EPA's Waste Classification Guidelines (2014), NSW Sustainable Design Guidelines Version 3.0 (TfNSW 2013), Managing Urban Stormwater (Landcom 2004).			
	Section reference	**Page number**	**Comments**	**Significance level**	**Additional work recommended**
	General document comment	N/A	WestConnex Sustainability Framework has been prepared to align with Transport for NSW Environmental and Sustainability Policy Framework, as well as the Roads and Maritime Services Environmental Sustainability Strategy, as well as other relevant government sustainability instruments as documented. 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, and this includes resource use and waste management. This is consistent with SEARs requirements.	Blank	
	General document comment	N/A	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	Blank	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.

			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.		
	General document comment	N/A	Environmental impacts of excavation, handling, storage and transport of waste has been assessed throughout the document. Specific Chapters relating to dust impacts, noise impacts, sediment control have been prepared and these have been assessed in detail by others.	Blank	
23	**Resource use and waste minimisation**	23.1	No comment	Blank	
23.1	Assessment methodology	23.2	No comment	Blank	
23.2	Legislative and policy framework	23.2	No comment	Blank	
23.3	Assessment of construction impacts	23.3	No comment	Blank	
23.3.1	Construction resource consumption	23.4	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**.	Minor	Clarify which principles would be factored into supply chain sourcing of materials and equipment.
23.3.2	Construction waste management	23.14	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.	Moderate	Clarify whether this plan will contain controls relating to airborne particles (environmental and human exposure) as opposed to the Construction Air Quality Management Plan.

23.3.2	Construction waste management	23.10, 23.14	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.	Moderate	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 document comment	N/A	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.	Moderate	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.
23.4	Assessment of operational impacts	23.16	No comment	Blank	
24.4.1, 24.4.2	Operational resource consumption, Operational waste management	23.16, 23.17	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.	Minor	Provide specific guidance regarding the separate maintenance and repair assessment process for materials and waste, what principles and procedures should be included.
23.5	Environmental management measures (Table 23-11)	23.19	Table is missing wastewater re-use and discharge as an impact during construction (this aspect is discussed in the text of the preceding sections).	Minor	Add wastewater re-use and discharge as an impact in the Table.

16.5	Management of impacts (Table 16-25)	16.40	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.	Moderate	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.
	Overall evaluation				
	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.				
	Signature of reviewer	GS			
	Date	22/09/2017			

	Chapter 24	Climate change risk and adaptation			
	This chapter outlines the methodology adopted to assess 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.				
	Technical guidelines reviewed against		SEARS (3rd May 2017), - 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		
	Section reference	**Page number**	**Comments**	**Significance level**	**Additional work recommended**
	General comment	N/A	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"	Blank	
	General comment SEARs requirement - "The Proponent must quantify specific climate change risks with reference to the NSW Government's climate projections at 10 km resolution (or lesser resolution if 10 km projections are not available) and incorporate specific adaptation actions in the design"	N/A	The EIS presents that "It is important that a single source of projections is used as this ensures an 'internally consistent climate future' is 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. As such, only the CSIRO and BoM projections have been used" CSIRO and BoM projections are standardised to represent regional projections (and do not provide climate projections to a 10km resolution as required in the SEARS. NARCLIM provides climate projections for some climate variables (temperature, rainfall) to within a 10km resolution at the site but does not cover other critical climate variables for the project such as sea level rise, storm surge and rainfall intensity. Site specific modelling and other processes may be developed to provide climate projections for these variables to the resolution required in the SEARs.	Minor	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.

24	**Climate change risk and adaptation**	24.1	No comment	Blank	
24.1	Assessment methodology	24.2	No comment	Blank	
24.1.1	Pre-screening	24.2	No comment	Blank	
24.1.2	Screening	24.3	No comment	Blank	
24.1.3	Detailed risk assessment	24.3	No comment	Blank	
24.1.4	Risk evaluation	24.4	No comment	Blank	
24.1.5	Adaptation (risk treatment)	24.4	No comment	Blank	
24.2	Existing environment	24.4	No comment	Blank	
24.2.1	Policy setting	24.5	No comment	Blank	
24.2.2	Future climate	24.5	It is acknowledged in the EIS that the project has a design life of 100 years (i.e. up until approximately 2025). 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. 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.	Moderate	
24.2.2	Future climate	24.9	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	Moderate	An allowance of more than 0.89 should therefore be considered for the project to meet the 100yr design life requirement.

			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 should therefore be considered for the project to meet the 100yr design life requirement.		
24.3	Assessment of potential construction impacts	24.1	No comment	Blank	
24.3.1	Risk evaluation	24.1	No comment	Blank	
24.4	Assessment of potential operational impacts	24.11	No comment	Blank	
24.4.1	Risk evaluation	24.11	No comment	Blank	
24.5	Management of impacts	24.13	No comment	Blank	
24.5.1	Adaptation for climate change	24.13	No comment	Blank	
24.5.2	Next steps for adaptation	24.14	No comment	Blank	
	Overall evaluation				
	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 100year 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.				
	Signature of reviewer	SM			
	Date	22/09/2017			

	Chapter 25	Hazard and risk			
	This chapter identifies potential hazards that could pose a risk to the surrounding community or the environment and outlines measures to avoid, mitigate or manage those risks.				
	Technical guidelines reviewed against		AS/NZS ISO 31000:2009		
	Section reference	**Page number**	**Comments**	**Significance level**	**Additional work recommended**
25	**Hazard and risk**	25.1	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	Critical	Undertake a comprehensive risk assessment of identified construction and operational hazards and assess the risks using guidelines within AS/NZS ISO 31000: 2009.
25.1	Assessment of construction impacts	25.3	Pedestrian safety risk not specifically discussed in Chapter 8. A discussion of the effects was related to net changes to expected crashes and rates. No dissemination of vulnerable road users was undertaken	Moderate	Quantify the safety effects associated with vulnerable road users as a result of construction and operation of the project.
25.1.1	Storage and handling of dangerous goods and hazardous substances	25.10	No information is provided regarding how these numbers of hazardous goods identified in **Table 25-2** will be check for compliance. Will there be audits of the processes, by who and when?	Moderate	
25.1.2	Transport of dangerous goods and hazardous substances	25.10	No comment	Blank	
25.1.3	Safety hazards	25.18	These hazards are only listed as construction risks, is there a possibility that these will be ongoing active operational risk (albeit lower)?	Moderate	
25.1.4	Road user and general public hazards	25.19	No comment	Blank	
25.2	Assessment of operational impacts	25.22	No comment	Blank	

25.2.1	Storage and handling of dangerous goods and hazardous substances	25.22	No comment	Blank	
25.2.2	Transport of dangerous goods and hazardous substances for the project	25.22	No comment	Blank	
25.2.3	Transport of dangerous goods and hazardous substances in project tunnels	25.26	It is discussed that hazardous good will not be allowed within the main-line 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.	Critical	Indication of hazardous good routes and the risks associated to residents along these routes
25.2.4	Incidents in the tunnels	25.26	No comment	Blank	
25.2.5	Probability of tunnel fires	25.27	No comment	Blank	
25.2.6	Incidents on surface roads	25.30	No comment	Blank	
25.2.7	Road user and general hazards	25.30	No comment	Blank	
25.3	Environmental management measures	25.31	No comment	Blank	
	Overall evaluation				
	No further comments				
	Signature of reviewer	AW			
	Date	22/09/2017			

	Chapter 26	Cumulative impacts			
	This chapter provides an overview of the potential cumulative impacts associated with the construction and operation of the M4-M5 Link project.				
	Technical guidelines reviewed against		N/A		
	Section reference	**Page number**	**Comments**	**Significance level**	**Additional work recommended**
26	**Cumulative impacts**	26.1	No comment	Blank	
26.1	Introduction	26.1	No comment	Blank	
26.2	Projects assessed	26.1	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.	Moderate	
26.2	Projects assessed (cont.).	26.1	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.	Critical	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.
26.3	Nature of cumulative impacts	26.6	See **Section 26.2.**	Moderate	

26.3.1	Construction phase cumulative impacts	26.6	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.	Critical	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.
26.3.2	Operational phase cumulative impacts	26.13	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.	Critical	SMC should provide before and after measurements and criteria of remediation if un-acceptable 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.
26.3.3	Type of assessment	26.13	No comment	Blank	
26.4	Assessment of potential cumulative impacts	26.14	See comments for the areas below 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.	Moderate	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.
26.4.1	Traffic and transport	26.14	See comments on **Chapter 8**.	Blank	
26.4.2	Air quality	26.19	See comments on **Chapter 9**.	Blank	
26.4.3	Noise and vibration	26.21	See comments on **Chapter 10**.	Blank	
26.4.4	Human health	26.23	See comments on **Chapter 11**.	Blank	
26.4.5	Urban design and visual amenity	26.25	See comments on **Chapter 13**.	Blank	
26.4.6	Social and economic	26.24	See comments on **Chapter 14**.	Blank	
26.4.7	Non-Aboriginal heritage	26.26	See comments on **Chapter 20**.	Blank	
26.4.8	Biodiversity	26.27	See comments on **Chapter 18**.	Blank	

26.4.9	Soil and water quality	26.28	See comments on **Chapter 15**.	Blank	
26.4.10	Surface water flooding and drainage	26.28	See comments on **Chapter 17**.	Blank	
26.4.11	Groundwater	26.30	See comments on **Chapter 19**.	Blank	
26.4.12	Aboriginal heritage	26.31	See comments on **Chapter 21**.	Blank	
26.5	Management of cumulative impacts	26.31	**Table 26.11** display very limited information on how cumulative impacts will be mitigated.	Critical	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.
	Overall evaluation				
	No further comments				
	Signature of reviewer	BP			
	Date	Blank			

	Chapter 27	Sustainability			
	This chapter explains how sustainability aims and principles have been applied to the design, construction and operation of the M4-M5 Link project.				
	Technical guidelines reviewed against		Policy framework documents including: NSW Long Term Transport Master Plan (Transport for NSW 2012a)		
			A Plan for Growing Sydney (DP&E 2014)		
			Towards our greater Sydney 2056 (Greater Sydney Commission 2016)		
			Draft Central District Plan (Greater Sydney Commission 2016)		
			NSW Climate Change Policy Framework (NSW Office of Environment and Heritage November 2016)		
			NSW Government Resource Efficiency Policy (OEH 2014a)		
			NSW Waste Avoidance and Resource Recovery Strategy 2014-21 (NSW Environmental Protection Authority 2014b)		
			NSW Sustainable Design Guidelines Version 3.0 (Transport for NSW 2013)		
			Roads and Maritime Environmental Sustainability Strategy 2015-2019 (NSW Roads and Maritime Services 2016)		
			Transport Environment and Sustainability Policy (Transport for NSW 2015)		
			WestConnex Sustainability Strategy (Sydney Motorway Corporation 2015)		
	Section reference	**Page number**	**Comments**	**Significance level**	**Additional work recommended**
27	**Sustainability**	27.1	No comment	Blank	
27.1	What is sustainability?	27.1	No comment	Blank	
27.2	Sustainability policy framework	27.2	No comment	Blank	
27.2.1	Long Term Transport Master Plan	27.2	No comment	Blank	
27.2.2	A Plan for Growing Sydney	27.3	No comment	Blank	

27.2.3, 27.2.11	Towards our Greater Sydney 2056, WestConnex Sustainability Strategy (Table 23-7)	27.4, 27.18	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.	Moderate	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.
27.2.4	Draft Central District Plan, and Chapters 20 and 13 (Note: Chapters 20 and 13 have not been reviewed in entirety)	27.5	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.	Moderate	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.
27.2.5	NSW Climate Change Policy Framework	27.5	No comment	Blank	

27.2.6	NSW Government Resource Efficiency Policy	27.5	No comment	Blank	
27.2.7	NSW Waste Avoidance and Resource Recovery Strategy 2014-21	27.6	No comment	Blank	
27.2.8	Transport Environment and Sustainability Policy Framework and Statement	27.6	No comment	Blank	
27.2.9	NSW Sustainable Design Guidelines	27.7	No comment	Blank	
27.2.10	Roads and Maritime Services Environmental Sustainability Strategy 2015-2019	27.7	No comment	Blank	
27.2.11	WestConnex Sustainability Strategy	27.9	WestConnex Sustainability Framework has been prepared to align with Transport for NSW Environmental and Sustainability Policy Framework, as well as the Roads and Maritime Services 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.	Blank	
27.2.11	WestConnex Sustainability Strategy (Table 27-3)	p27-11	The table 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).	Minor	Consider documenting how the project proposes to 'enhance' the existing natural environment (i.e. net positive environmental outcomes).

27.2.11, 27.3	WestConnex Sustainability Strategy (Table 27-3), Infrastructure Sustainability Rating Scheme	27.11, 27.19	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 construction contractor 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.	Blank	
27.2.12	Additional strategic planning documents	27.19	No comment	Blank	
27.3	Infrastructure Sustainability Rating Scheme	27.19	See above (27.2.11, 27.3)	Blank	
27.4	Ecologically sustainable development	27.20	No comment	Blank	
27.4.1	Precautionary principle	27.20	No comment	Blank	
27.4.2	Inter-generational equity	27.21	No comment	Blank	
27.4.3	Conservation of biological diversity and ecological integrity	27.24	No comment	Blank	
27.4.4	Improved valuation and pricing and incentive mechanisms	27.24	Under the Environmental Planning 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.	Minor	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.
27.5	Sustainability management on the project	27.25	No comment	Blank	

27.5.1	Sustainability Management Plan	27.25	No comment	Blank	
	Overall evaluation				
	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**.				
	Signature of reviewer	GS			
	Date	21/09/2017			

	Chapter 28	Environmental risk analysis			
	An environmental risk analysis for the M4-M5 Link project was carried out as part of this environmental impact statement (EIS). This chapter outlines the environmental risk analysis process and identifies the key environmental issues as determined by the analysis.				
	Technical guidelines reviewed against		HB 203:2012, Managing Environmental Risk AS/NZS ISO 31000:2009 Risk management - Principles and guidelines		
	Section reference	**Page number**	**Comments**	**Significance level**	**Additional work recommended**
	General comment	N/A	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.	Moderate	Please confirm if referral authorities, designers, construction personnel or other stakeholders were involved or consulted in the risk characterisation stage?
	General comment	N/A	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	Moderate	Please provide commentary regarding how uncertainty is accounted for in the risk analysis process
28	**Environmental risk analysis**	28.1	No comment	Blank	
28.1	Environmental risk analysis process	28.2	No comment	Blank	
28.1.1	Likelihood and consequence analysis	28.3	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.	Minor	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.
28.2	Identification of key issues and risks	28.4	No comment	Blank	
28.3	Risk analysis approach	28.4	"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?	Minor	Please confirm the process for capturing and documenting environmental risk mitigation in the Detailed Design Phase? Who will review and approve final mitigation responses?
28.3	Risk analysis approach	28.4	"The identified management measures will be reassessed during the detailed design for their appropriateness"	Minor	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).
28.4	Risk analysis outcomes	28.23	No comment	Blank	
28.4.1	Medium residual risk	28.23	No comment	Blank	
28.4.2	Low residual risk	28.23	No comment	Blank	
	Overall evaluation				
	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 (NSW Roads and Maritime Services, 2016) 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.				
	Signature of reviewer	SM			
	Date	22/09/2017			

	Chapter 29	Summary of environmental management measures			
	This chapter collates the environmental management measures for the M4-M5 Link that were identified through the impact assessment process, as described in Chapter 8 through to Chapter 28.				
	Technical guidelines reviewed against		N/A		
	Section reference	**Page number**	**Comments**	**Significance level**	**Additional work recommended**
29	**Summary of environmental management measures**	29.1	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.	Minor	
29	**Summary of environmental management measures**	29.3	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.	Minor	
	Overall evaluation				
	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.				
	Signature of reviewer	SM			
	Date	22/09/2017			

	Chapter 30	Project justification and conclusion			
	This chapter presents a justification for the project and a conclusion to the environmental impact statement (EIS). The justification is based on the strategic need for the project and in particular, how it would fulfil the project objectives outlined in Chapter 3 (Strategic context and project need).				
	Technical guidelines reviewed against		N/A		
	Section reference	**Page number**	**Comments**	**Significance level**	**Additional work recommended**
30	**Project justification and conclusion**	30.1		Blank	
30.1	Justification	30.2	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.	Critical	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 the 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 in an updated Business Case.

30.1.1	Summary of strategic need and justification	30.2	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.	Critical	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.
30.1.2	Achieving WestConnex program objectives	30.3	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.	Critical	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.
30.1.3	Objectives of the Environmental Planning and Assessment Act 1979 (NSW)	30.8	**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.	Critical	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.
30.2	Conclusion	30.11	It is clear that this EIS does not address the key issues to justify this project to proceed.	Critical	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.

	Overall evaluation			
	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 Inner West. 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.			
	Signature of reviewer	BP		
	Date	6/10/2017		

ATTACHMENT 1:

Summary of WestConnex Stage 3 (M4-M5 Link) Environmental Impact Statement (EIS) Review

Facilitated by Beca Australia to assist Inner West Council (IWC) in its response submitted on:

16 October 2017

1 Introduction

Roads and Maritime Services (RMS) proposes to construct and operate the M4-M5 Link (the project); which would comprise a new, tolled multi-lane road link between the proposed M4 East at Haberfield and the proposed New M5 at St Peters. The project would also include an interchange at Rozelle.

The project is one component of the WestConnex program of works as undertaken by Sydney Motorway Corporation (SMC). WestConnex is a 33 kilometre motorway that is intended to link Sydney's west with the airport and the Port Botany precinct. The WestConnex program of works is proposed to be delivered as a series of projects, each subject to a stand- alone planning assessment and approvals process in accordance with the requirements of the Environmental Planning and Assessment Act 1979 (EP&A Act) and other relevant legislation.

The M4-M5 Link EIS (WestConnex Stage 3) was released by WestConnex for community feedback on 18 August 2017. The design has been informed by the results of technical investigations and community feedback to date. As part of the release the WestConnex website states:

"You are invited to make a submission on the M4-M5 Link Environmental Impact Statement, which is on exhibition from 18 August to 16 October.

Roads and Maritime will consider all submissions received and provide a Preferred Infrastructure Report in response to the issues raised. The report will be submitted to the NSW Department of Planning and Environment and helps to inform the Minister for Planning's decision on the project".

Beca has been appointed to assist Inner West Council (IWC) with the drafting of its feedback on this EIS to SMC.

2 IWC's Strategic Position on the proposed M4 – M5 Link EIS

Whilst the IWC is opposed to urban motorways on a strategic and environmental basis it recognises that both Stage 1 and Stage 2 of WestConnex have been approved by the NSW State Government and that construction has commenced on both of these projects. IWC opposes inner-Sydney motorways, but recognises the creation of an ring-road around inner-Sydney may be appropriate. The creation of an inner-ring road that provides better access to Port Botany and the Airport is also needed as per the original purpose of WestConnex.

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 West rail project has not been taken fully into account the demand predictions.

IWC would argue that the M4–M5 Link could better achieve this function by a redesign and a multifaceted transport solution that includes all transport options and a more careful selection of priority projects for implementation. In the context of these priorities, consideration should be given to:

- **Firstly**, increase public transport and reduce car demand by implementing metro-rail projects, and encourage commuter private trips towards rail and bus trips.
- **At the same time** assess the benefits of the implementation of travel demand management measures; reduction in car dependency; balancing station access fees; road pricing; freight movement; carparking; opportunity cost, and the removal of possible barriers to the implementation of current planned public transport projects to ensure the implementation of this M4–M5 Link will not jeopardise the long-term viability of these other schemes.
- **Also,** making use of upgraded existing roads connections to improve connectivity.
- **Then** find, test and compare other alternative inner ring road links with the proposed M4–M5 Link to establish whether the current proposed project is best or whether an alternative to provide better connection to the Airport and Port and create improved south-west connections, should be considered as part of Stage 3.

In response to the proposed WestConnex M4 – M5 Link EIS, IWC therefore has a three-tier response as summarised below:

2.1 IWC Strategic Position – First Tier Response

Council's continued opposition to WestConnex and preference for public transport and other 'demand management' (traffic reduction) solutions to Sydney's traffic problems as a priority.

Public transport solutions should be the State Government's priority to improve transport in Sydney and for Inner West residents.

SGS Economics and Planning has undertaken a transport modelling project for the City of Sydney in May 2015 reviewing the WestConnex proposal in terms of the potential traffic flows that may occur in the future as a result of the project. In particular, the impacts on the local road network resulting from the proposed Stage 2 (New M5 and St Peters Interchange located at Alexandria landfill site), as well as the flow-on urban amenity impacts.

The study concluded that WestConnex is a series of projects designed to upgrade and link two existing motorways in Sydney's south west (the M5) and west (the M4). However, Sydney's traffic congestion will worsen with or without the M4 – M5 Link, with the project making only minor differences to Sydney's traffic.

A recommendation was then tabled at Sydney Council (Item 3.5 – file no. S112830 on 27/04/20-15) to resolve that Council oppose the current WestConnex project based on the key conclusions in the independent report "WestConnex Transport Modelling Summary Report" by SGS Economics and Planning.

The above is supported as part of IWC's first tier response.

2.2 IWC Strategic Position – Second Tier Response

Council 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 Inner West. 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.

IWC's re-thinking and input to such an alternative proposal should include consideration of the following:

- It can be assumed that, should Stage 1 (M4 Extension) and Stage 2 (New M5) be completed without a link between them the potential exists for a significant increase in vehicle numbers on local roads in Sydney's inner

western suburbs, negatively impacting quality of life and damaging existing dense urban fabric in areas such as Haberfield, Rozelle, St Peters and Marrickville. Additionally, should a subterranean link be provided, Council could work with WestConnex and the State to capitalise on opportunities to provide environmental and public domain improvements to adjacent surface roads such as Parramatta Road and Victoria Road.

- With a view to minimising the impact of Stages 1 and 2 on Sydney's inner western suburbs, IWC proposes the following concepts to be considered for the development of a better alternative:

    - The proposed new M5 be realigned to provide direct subterranean connection to Sydney Airport and Port Botany. Associated with this, IWC would consider the opportunity to work with the City of Sydney and State Government to find an appropriate site for a relocated and downgraded St Peters Interchange.

    - A new motorway tunnel be built to connect the Stage 1 tunnel at Haberfield to the realigned New M5 Tunnel. This new "link tunnel" should not have any surface access at Rozelle Railyards and should not be constructed using any mid-tunnel construction sites other than Rozelle Railyards.

      The central point is that the Rozelle Interchange should have no portals to the surface at Rozelle. This means that traffic will not spilled onto local streets at Rozelle and should reduce traffic to the Anzac Bridge which is already at capacity. It will encourage the whole motorway to be primarily used for what it was designed for - access to the Airport and Port;

    - Upon completion of the "link tunnel" construction, the entire Rozelle Railyards site should be delivered as fully operational parkland designed in conjunction with Council and the community. This parkland would assist in off-setting the existing low rate of provision of open space, particularly active open space, in the area and in catering for the increased demand resulting from the Bays Precinct redevelopment proposals.

    - The proposed Iron Cove Link should be constructed between Iron Cove Bridge and the proposed subterranean junction in Rozelle Railyards and resultant spare capacity on Victoria Road should be used to provide enhanced public transport, active transport and public domain improvements. The opportunity should also be ceased to use the benefits of less traffic on surface roads to invest in improving amenity on Parramatta Road and Victoria Road, in a way similar to King Street Gateway at St Peters. This should include the investigation of opportunities to reduce traffic flow and provide more on-street parking to support local business;

    - Included in the public transport opportunities, presented by the construction of the proposed Iron Cove Link and removal of surface road access at Rozelle Railyards, should be extension of bus lanes on Anzac Bridge;

    - Coinciding with completion of this proposed new Stage 3 tunnel, enhanced public transport, active transport and public domain improvements should be introduced along the Parramatta Road Corridor between Strathfield and Central Station;

    - Preservation of public transport corridors on both Parramatta Road and Victoria Road for future light rail or new technology services;

    - Provide Local Area Improvement Schemes for all local neighbourhoods in the vicinity of WestConnex Portals and tunnels to protect adjacent areas and encourage through-traffic to use appropriate roads (including WestConnex). The cost for planning, design, procurement and implementation of these improvements should be included in the WestConnex budget.

- Whilst it is recognised that the removal of surface connection to the motorway at Rozelle will inhibit local access to the motorway it is considered that the resultant environmental improvements, reduction of potential "rat runs" and reduced demand on surface roads will provide the local community with an improved environment and readily available alternative routes on the surface road network.

2.3 IWC Strategic Position – Third Tier Response

Should the project proceed as proposed in the M4-M5 Link EIS, there are numerous project issues to be addressed and taken on board in the Final Design of this project.

A response to specific issues are provided in detail for each Chapter of the EIS in the worksheet (main response report) accompanying this Attachment. Some prominent issues are listed below:

- Concerns about the transport modelling and the approach of how operational modelling influences the strategic modelling and affecting traffic volumes, route choice or mode-share. It seems that an iterative modelling approach combined with sensitive testing, including the accommodation of significant projects such as the Sydney Metro West was not taken fully into account in the modelling. It further seems that a very small percentage of daily trips in the Sydney region will benefit from the huge cost of connecting the M4 and M5 as proposed in the EIS. IWC's view is the proposed M4–M5 Link is favouring the increase of private vehicle use to benefit toll revenue rather than (as intended in the Transport Master Plan) to plan link roads for better freight and service vehicle movements.
- IWC's view is that the updated business case (2015) has not properly considered the major demand effects of the Western Sydney Airport and Sydney Metro West projects.
- IWC's view is that the M4 – M5 Link as proposed will not significantly improve the connectivity to Port Botany, as was one of the original aims of WestConnex. It instead directs trucks to St Peters seven kilometers from Port Botany and then to already congested airport approaches and into residential areas in the inner city. It also threatens major roads including the Anzac Bridge and Western Distributor with significant extra traffic during peak periods.
- IWC expects the EIS to specifically discuss the opportunities provided for rapid or segregated public transport services and how it impacts the integrated system. Priority for investment should be assessed comparing motorway infrastructure to public and active transport.
- The traffic and environmental impacts at the proposed 12 construction sites will be significant. The EIS mentioned the preparation of a number of management plans, including a Construction Traffic Management Plan. The EIS does not address the impact in detail which will supposedly to be covered by the management plans. IWC needs to be part of the fine-tuning and approval of these plans as there are significant potential for safety, health and environmental compliance issues to be dealt with in these plans, for example air quality, human health risk, noise & vibration and road safety.
- IWC Meeting of 28 February 2017, Item 1 stated: Council's Administrator is concerned that the Minister's response (December 2016) does not include any substantial new commitments to better manage the construction impacts of the project. Council's Administrator has recently written to the new Minister for WestConnex to relate Council's position of opposition to WestConnex and preference for public transport solutions to Sydney's traffic problems. The letter also raises some key WestConnex issues, specifically to the proposed M4 – M5 Link, including:
    - Need for enhanced resources for compliance monitoring and enforcement;
    - A commitment to no M4-M5 Link mid-tunnel construction dive site in the Leichhardt area;
    - A commitment to funding and implementing traffic calming schemes in areas that will experience increased traffic due to WestConnex;
    - Facilitating full access to Roads & Maritime Services traffic modeling data to assist Council to target its traffic calming scheme plans;
    - Commitment to dedication of all residual lands from WestConnex to parkland or other community uses;
    - Implementation of a 40kph school zone along Campbell Street, St Peters near St Peters Public School; and
    - Retention of rail tracks within Rozelle Rail Yards until corridors for future light rail extensions have been

identified and protected.

- Currently compliance monitoring for all stages of the WestConnex project is undertaken by a single DP&E WestConnex Compliance Officer. This is not considered to be adequate given the high number of compliance issues raised by construction of the M4 East over the past year and a recent increase in New M5 compliance issues now that construction of this stage of the project is underway.
- It is requested that this officer also ensures all comments presented to WestConnex on the M4–M5 Link Concept Design Plan need timely and appropriate engagement with IWC and comprehensive feedback to (and liaison with) Council's WestConnex Community Liaison Forum (WCLF).
- The level of service for traffic entering and leaving a motorway on ramps can be a difficult attribute to determine, but given the complexity of Rozelle Interchange and the potential for significant traffic impacts on densely-developed surrounding neighbourhoods, it is particularly important that this attribute be carefully assessed from concept through to implementation. It is expected that SMC will undertake this analysis through comprehensive modelling of all entry/exit ramps, junctions and streets to and from the interchange. IWC would like to view and understand these findings with areas of low expected levels of service highlighted in the EIS.
- Concern is further expressed over increased traffic (both construction and operational) in the area around the Rozelle Interchange. This traffic will impact on local amenity, accessibility and pedestrian/cyclist safety. Additionally, it is highly likely that the construction phases of the M4-M5 Link will extend the duration of the already highly disrupted environment that the Inner West Community has been attempting to deal with for the past 3+ years.
- The SMC's proposal for the M4–M5 Link also has significant impacts for residents and businesses along Victoria Road, Rozelle, many of which are in the process of having their properties acquired; consequently, impacting on both those directly affected and the broader community.
- The expected reduction in traffic on Victoria Road, post construction of the Iron Cove Link, may present an opportunity for environmental and safety enhancements, however it has the potential to simply increase road capacity in Sydney's Inner West. The rationale for SMC is to improve amenity on surface roads such as Parramatta Road and Victoria Road to revitalize streetscape. There appears to be very little commitment to actually doing this on Victoria Road, and the concern is that RMS will encourage the same or greater traffic volumes in the future.
- The proposed location of portals and ramps has the potential to encourage increased traffic on Johnston Street and The Crescent - particularly as these streets would provide direct access from the Inner West to a future Western Harbour Tunnel. Additionally, it could result in increased traffic on connecting streets such as Booth Street, Mallet Street and Northumberland Avenue.
- The development of mid-tunnel construction sites at Darley Road, Leichhardt and Pyrmont Bridge Road, Camperdown is likely to result in truck traffic, noise and dust in the vicinity of these sites. These will impact on local residents, businesses, pedestrians, cyclists and bus operations. (Noting that previous documents state that Rozelle Rail Yards (western end) will be considered as a possible alternative to Darley Road, Council has proposed that containing the mid-tunnel construction operations within the Rozelle railyards would be preferable, however given the site is likely to result in issues for residents on Lilyfield Road and will have potential consequences for traffic congestion on the City West Link).
- Mid-tunnel construction sites are also likely to result in reduced safety (vehicle, cycle and pedestrian), increased traffic congestion and noise associated with the stabling and queuing of heavy vehicles.
- The proposal creates and provides open space, within the Rozelle Railyards site, however it provides only very limited pedestrian access from the south (Annandale and Leichhardt) via two small pedestrian bridges. In order to best serve the community significant land bridges should be provided to physically link the open space to adjacent suburbs. See also IWC's comments on how the EIS addresses the Council's active transport strategy and specific elements of cycle paths.
- No consideration appears to have been given to the heritage aspects of the Rozelle Rail Yards site.

- Concern is expressed over the proximity of the Iron Cove Link ventilation facilities to adjacent residential areas (particularly noting existing medium-density residential developments at and around Balmain Shores and Terry Street) and the potential air quality impacts of the proposed ventilation towers on Rozelle Railyards Park; the bulk and scale of the proposed ventilation facilities will result in a significant visual impact on the park. This is particularly a problem for the stack in Terry Street adjacent to the Iron Cove Bridge where the stack is very close to local residential property.
- The implementation of new directional signage and changes to existing signage for driver guidance for all road users along connecting roads and paths to and from new connections to the M4 – M5 Link should be investigated in detail and submitted to IWC for review. This is normally included in the detail design for main arterial routes, but sub-arterial and local roads need to be included and design need to be undertaken in collaboration with Council.
- In terms of pedestrian and cycling facilities the IWC report "SMC - M4-M5 Link Community feedback" of 21 July – 31 August 2016 stated:

  Easton Park - The community provided significant feedback and ideas on pedestrian and cycle connectivity within the project area. As a result, we are developing an Active Transport Strategy for the M4-M5 Link, with a focus on the missing links within the existing pedestrian and cycle network, particularly in areas where we will be working on the surface to deliver the project.
  Active transport - The community provided significant feedback and ideas on pedestrian and cycle connectivity within the project area. As a result, we are developing an Active Transport Strategy for the M4-M5 Link, with a focus on the missing links within the existing pedestrian and cycle network, particularly in areas where we will be working on the surface to deliver the project**.**
- In general, it seems that none of the ventilation stacks have filtration. This can potentially have a huge impact on people's health with a motorway that brings more cars to the Inner West which brings more particulates, more nitrous oxide, more carbon monoxide and other polluting gases. Council is also concerned that the additional traffic generated by WestConnex will lead to a decline in regional air quality across Sydney.

Attachment 2: Example Dust Monitoring Conditions

General

10.0 The contaminants that may be discharged to air when the consent holder is undertaking works / activities in accordance with this consent are limited to emissions from the following activities:
- a. Earthworks and activities associated with the construction of the Proposal;
- b. Combustion of diesel to power stationary engines;
- c. Crushing and screening of aggregate;
- d. Concrete batching;

Commented [DE1]: This list would need to be amended for the most relevant 'dust generating activities' associated with each construction site

10.1 There shall be no discharge of dust, smoke or the products of combustion, as a result of the exercise of this consent (either during construction or following the completion of all construction) that is noxious, dangerous, offensive or objectionable beyond the property boundaries of the construction site on which the discharge occurs, and which are not owned by the consent holder.

Air Quality Management Plans

11.3 The purpose of the Dust Management Plan (DMP) is to describe the procedures to be used to monitor and minimise the effects of dust generated during the construction and operation of the [INSERT PROJECT NAME] in order to ensure compliance with the conditions [LIST CONDITION REFERENCE].

11.4 The DMP shall include:
- a. Identification of the staff and / or experts responsible for implementing and reviewing the DMP;
- b. A description of staff training and induction requirements that will be undertaken to ensure that the DMP is followed by all acting in accordance with this resource consent;
- c. A description of the site and the local receiving environment;
- d. The dust mitigation and prevention methods that will be implemented to achieve condition [LIST CONDITION REFERENCE] of this consent;
- e. A description of the dust monitoring that will be undertaken by the consent holder during all construction works / activities associated with the Proposal;
- f. The contingency methods that will be used by the Consent Holder for controlling dust when the Total Suspended Particulate (TSP) and wind speed alert levels included in conditions [LIST CONDITION REFERENCE] of this resource consent (inclusive) are exceeded.

11.5 The dust monitoring required by [LIST CONDITION REFERENCE] of this resource consent shall, as a minimum, include:
- a. Continuous instrumental monitoring of TSP at one location. The instrument shall be installed and operated at a location that provides a representative sample of the TSP concentrations at the boundary of the construction site in the immediate vicinity of the closest house to the construction activity associated with the [INSERT PROJECT SITE NAME];
- b. An inspection of all actual and potential dust sources within the construction site at least once per day; and
- c. Wind speed and direction, as measured by the site meteorological monitoring instruments (installed in accordance with [LIST CONDITION REFERENCE] of this consent).

General Dust Mitigation Measures

12.1 The methods used to mitigate and prevent fugitive dust emissions shall include, as a minimum, the following:

a. Carry out earthworks in strips across the construction site such that the area of the active construction zone is limited to an area of no more than 75 hectares, which is 25 percent of the total construction zone area.
b. That all potentially dusty surfaces (including roads) shall be stabilised using (as necessary) one or more of the following methods:
    i. water;
    ii. chemical dust suppressants;
    iii. compaction;
    iv. straw mulching;
    v. temporary vegetation;
    vi. gravelling; or
    vii. other surface modification methods;
c. Existing vegetation is to be retained for as long as practicable and areas where works are complete shall be revegetated as soon as practicable;
d. Vehicle speeds are to be controlled on site to not more than 20 kilometres per hour;
f. The height and slope of stockpiles associated with the Proposal are not to exceed 3 (three) m, and are to be minimised;
g. Paved roads and yard areas are to be kept clean using either washing or vacuum sweepers;
h. A rumble grid and a sealed area of road are to be provided prior to all the site exits onto public roads;
i. Drop heights are to be minimised when loading and unloading vehicles; and
j. An adequate on-site supply of water and equipment for watering all potentially dusty areas of the site shall be provided and maintained at all times.

12.2 The consent holder:

a. Shall review dust sources and dust control measures and implement additional dust control methods when TSP concentrations (as measured by the instrument installed and operated in accordance with [LIST CONDITION REFERENCE]):

    i. Exceed a 1-hour average concentration of 200 µg/m^3; or

    ii Exceed a 24-hour average concentration of 80 µg/m^3.

b. Shall cease the works / activities authorised by this resource consent when TSP concentrations:

    i. Exceed a 1-hour average concentration of 220 µg/m^3; or

    ii. Exceed a 24-hour average concentration of 120 µg/m^3.

c. May only recommence works once TSP concentrations, measured over two consecutive ten-minute periods, are less than 200 µg/m^3.

12.3 Dust sources and dust control measures shall be reviewed and additional dust control measures shall be implemented when hourly average wind speeds exceed 5 (five) m/s and winds are blowing towards an inhabited dwelling located within 500m of construction activities and potential sources of dust.

12.4 The additional dust measures referred to in [LIST CONDITION REFERENCE] include, but are not limited to:
a. Reducing vehicle speeds within the construction site;
b. Increasing the water application rate on dusty surfaces within the construction site;

Commented [DE2]: These trigger limits are for a rural area. For more sensitive areas these would be reduced

Commented [DE3]: These conditions were for the construction of a 30m high embankment hence the large distance. This distance would more usually be 100 – 200m

c. Ceasing dusty activities within the construction site, such as the stripping and spreading of topsoil.

12.5 Potentially dusty activities that are taking place within 500m downwind of an inhabited dwelling shall cease, except for dust mitigation activities, when gust wind speeds (two-minute average or less) exceed 10 m/s during two consecutive ten-minute periods. The term 'potentially dusty activities' means, for the purpose of this resource consent, the following activities:

a. Stripping of potentially dusty materials such as topsoil and silt;
b. Formation of embankments surrounding water storage facilities using soil or silt;
c. Formation of soil and silt stockpiles;
d. Spreading of topsoil; and
e. Movement or working of topsoil for the purpose of vegetating the embankments.

The potentially dusty activities may recommence when wind gusts (two-minute average or less) are less than 7.5 m/s during the previous two consecutive ten-minute periods.

Commented [DE4]: As above

Commented [DE5]: This list would need to be amended for the most relevant 'dust generating activities' associated with each construction site

Concrete Batching Plant Specific Measures

13.1 The capacity of any concrete batching plant used to construct the Proposal shall not exceed 70 cubic metres per hour.

13.2 The Consent Holder shall take all practicable measures to minimise the discharge of dust from any concrete batching plant used to construct the Proposal. These measures shall include:

a. The concrete batching plant cement silos are to be fitted with fabric filters to control the discharge of dust during filling and batching operations;
b. The cement silo fabric filters are to be regularly maintained in order to maintain effective operation at all times in accordance with the manufacturer's instructions;
c. The cement silos are to be fitted with over-fill warning devices;
d. The filtration system on the cement silos operates at all times when the concrete batching plant is in operation;
e. Aggregates being conveyed to and within the concrete batching plant are to be sprayed with water, as required, to minimise dust emissions;
f. Fine aggregate materials such as crusher dust shall be stored in three sided bins;
g. Cement transferred to trucks from the concrete batching plant is to be via an enclosed control system that collects and treats cement dust; and
h. Any spillages associated with the handling of sand, aggregate or cement materials involved in the batching process shall be cleaned up as soon as practicable following the spill.

Crushing and Screening Specific Measures

14.0 The rate of aggregate crushing and screening on site shall not exceed 200 tonnes per hour.

14.1 The Consent Holder shall take all practicable measures to minimise the discharge of dust from crushing and screening aggregates. These measures shall include:

a. Using water sprays on all transfer points and crushing and screening equipment;
b. Wetting of the aggregate as required to reduce the discharge of dust to air; and
c. Minimising 'drop heights' when the aggregates are being unloaded and/or stockpiled.

Figure 1 - A single dust monitor on the left measures emissions from an unsealed road

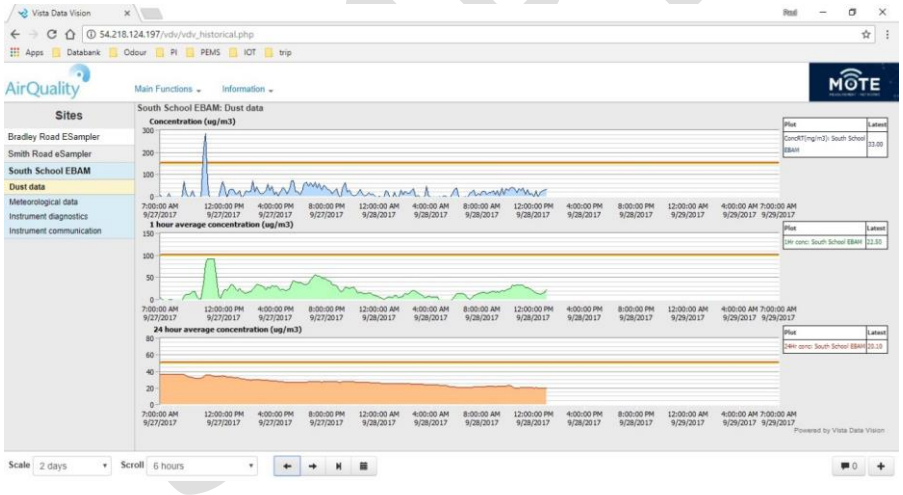

Figure 2 - Typical view of output from a real-time dust monitor. In this case the operator has to comply with three limits. A 5 minute limit, a 1 hour limit and a 24 hour limit. We also have the ability to specify a lower 'warning' limit to alert an operator in the event that dust from the site is getting close to a permit limit. The alarms are normally sent via email and text and can include multiple recipients.

Disclaimer: Please note that this document details typical conditions for a DMP. These have not been drafted for specific use in the WestConnex M4-M5 Link Project, or any other project, and should only be used by Inner West Council for information purposes. It is the responsibility of the proponent to develop a DMP to the satisfaction of the regulatory authorities.