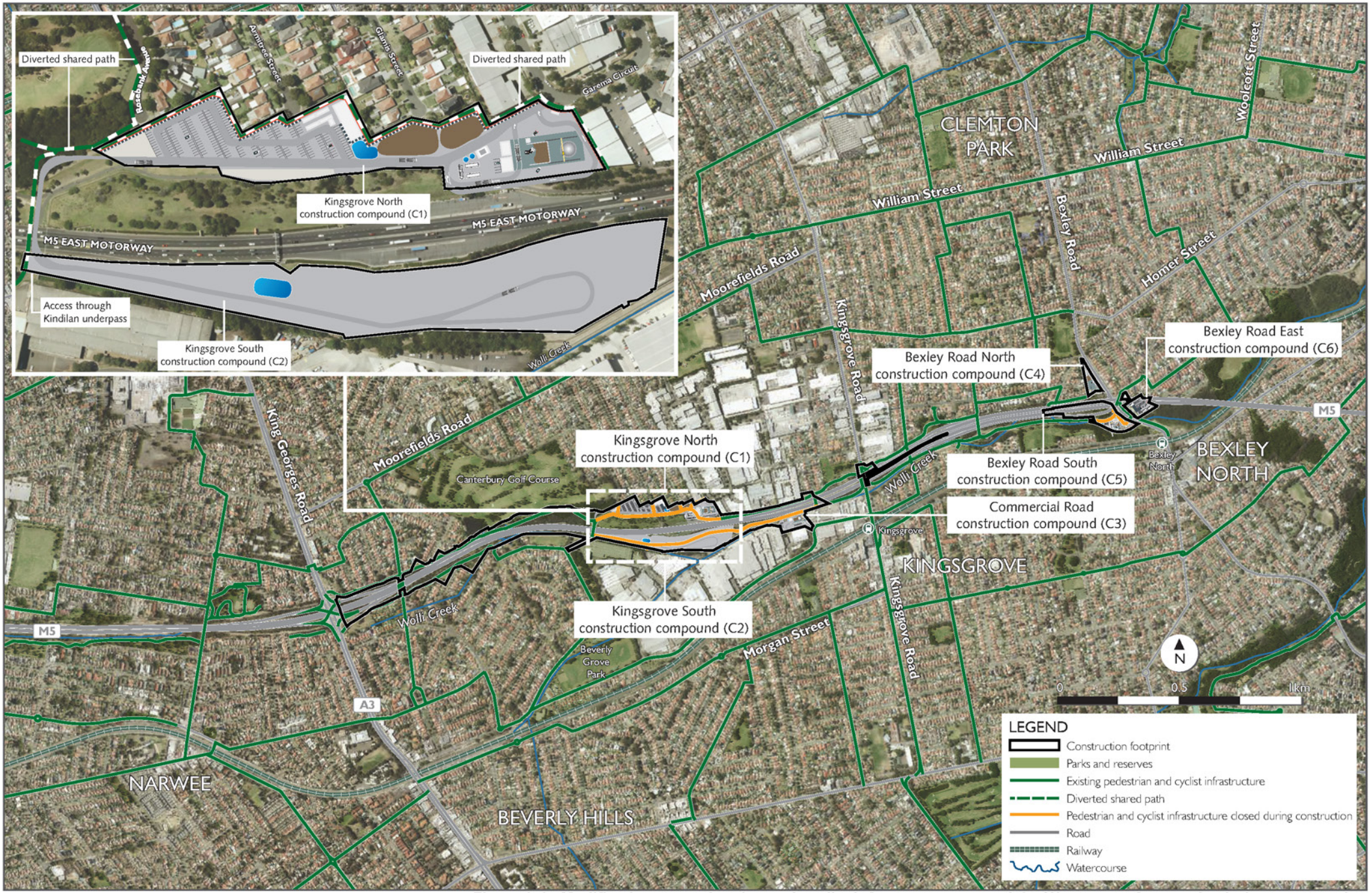

Figure 9-15 Modifications to pedestrian and cyclist infrastructure around the Western surface works during construction

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Arncliffe surface works

Construction traffic volumes and patterns

Table 9-29 presents construction compound access points and construction traffic volumes around the Arncliffe surface works.

The construction traffic volumes are the two-way volumes (inbound and outbound) associated with the peak construction period for each route. Construction haulage routes for the Arncliffe (C7) construction compound are shown in **Figure 9-16**.

Vehicle access to the Arncliffe (C7) construction compound would require the use of Marsh Street to connect to the wider arterial road and motorway networks.

A modification to the layout and traffic signals at the Marsh Street/ Flora Street intersection would be required to accommodate the proposed vehicle access to the Arncliffe construction compound. The current Airport West Precinct project being undertaken by Roads and Maritime would include the provision of a temporary right-hand turn storage lane of about 25 metres on Marsh Street, eastbound and a 20 metre taper on Marsh Street (westbound) to accommodate access for the construction of the Airport West Precinct project.

Further to planning approval of the Airport West Precinct project, access to the Arncliffe construction compound from the Marsh Street/ Flora Street intersection would be maintained for project construction traffic to enter the Arncliffe construction compound, subject to the Contractors Traffic Management and Safety Plan(s). The right turn bay on Marsh Street (eastbound) would also be required for permanent access to the Arncliffe motorway operations complex (MOC3) (refer to **Section 5.8**). Accordingly, the right turn bay would become part of the permanent WestConnex project. The Airport West Precinct project also includes the widening of Marsh Street to three westbound lanes between Giovanni Brunetti Bridge and the M5 East Motorway interchange. The intersection is anticipated to operate within its capacity at a level of service B and level of service A in the AM and PM peak hours respectively.

Table 9-29 Construction traffic routes, access points and volumes around the Arncliffe surface works

Construction traffic route	Vehicle type	Access point	Daily vehicles	AM peak (vehicles per hour)	PM peak (vehicles per hour)
Route 1	Light	Marsh Street / Flora Street signalised intersection	151	7	7
	Heavy		443	25	25
Route 2	Light	Marsh Street / Flora Street signalised intersection	48	2	2
	Heavy		116	7	7
Route 3	Light	Marsh Street / Flora Street signalised intersection	151	7	7
	Heavy		443	25	25
Route 4	Light	Marsh Street / Flora Street signalised intersection	24	1	1
	Heavy		55	3	3
Total	Light	Marsh Street / Flora Street signalised intersection	374	17	17
	Heavy		1055	60	60

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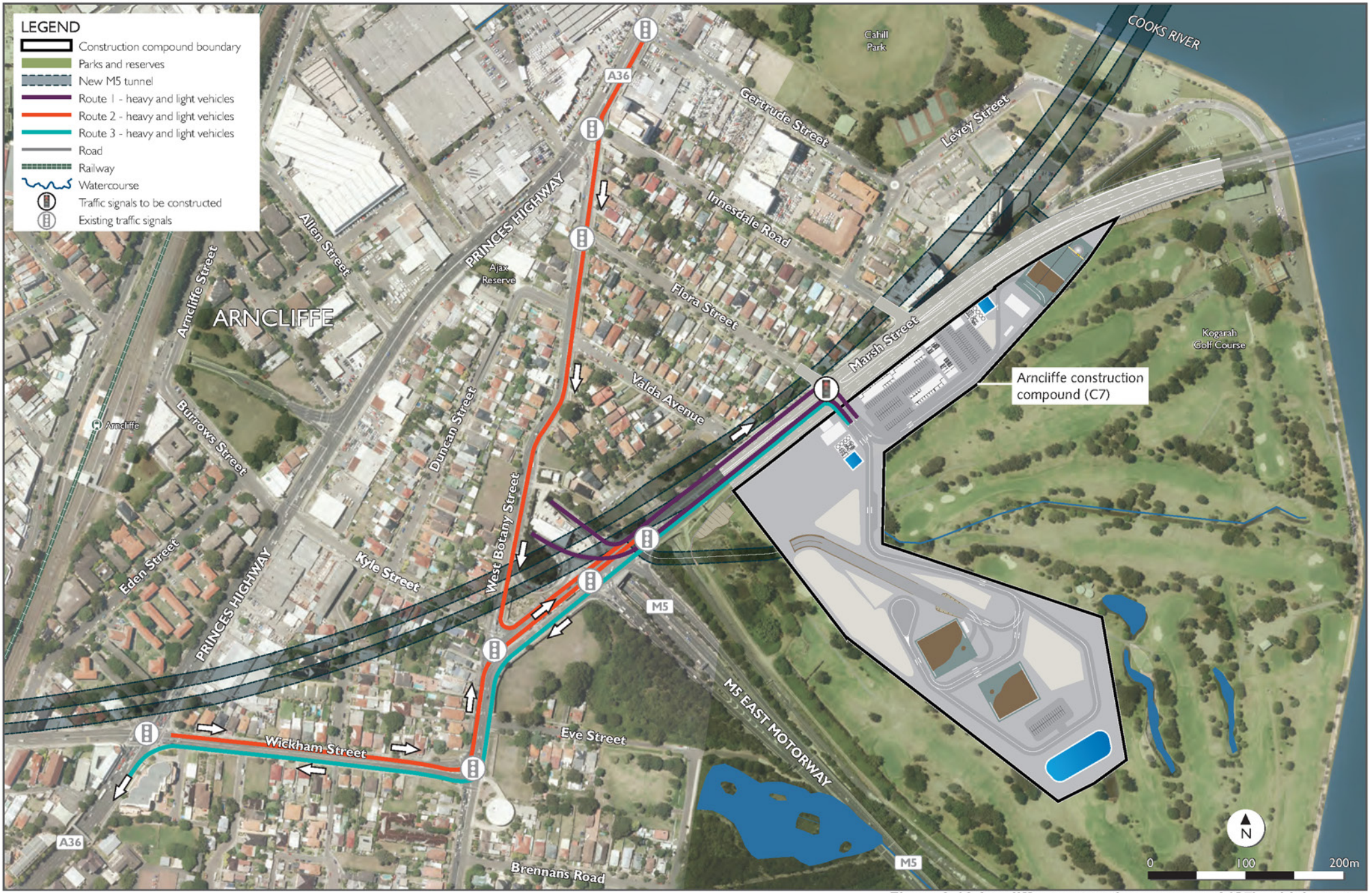

Figure 9-16 Arncliffe construction compound (C7) vehicle routes

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Network performance

Mid-block traffic volumes and level of service

Mid-block volume / capacity ratios around the Arncliffe surface works in 2016 with and without construction of the project are presented in **Table 9-30**.

The volume / capacity ratios show the mid-block level of service on the road network around the Arncliffe surface works area would remain the same with and without construction of the project. This is mainly due to the small volume of construction traffic relative to expected background traffic volumes in 2016.

Without construction, the performance of roads around the Arncliffe surface works area are generally expected to operate at a level of service D or better during the AM and PM peak, except:

- West Botany Street (northbound) between Marsh Street and Wickham Street, which would operate at a level of service F during the AM peak
- West Botany Street (eastbound) between the M5 East Motorway and Flora Street, which would operate at a level of service E during the AM peak.

Construction of the project would not change the level of service along key roads around the Arncliffe (C7) construction compound; however, a minor increase in the volume / capacity ratios along these roads would be experienced.

Intersection performance with and without construction of the project

Table 9-31 provides a summary of the intersection performance at key locations along construction traffic routes around the Arncliffe surface works area in 2016 with and without construction of the project. The analysis provides the average intersection delays and level of service for the worst performing movement at each intersection.

Without construction of the project, all intersections would operate at a level of service D or better during the AM and PM peak, with the exception of the Princes Highway / Wickham Street intersection, which would operate at a level of service F in the AM peak.

During construction, the performance of intersections along construction traffic routes to and from the Arncliffe (C7) construction compound are expected to generally operate at the same level of service expected without construction in 2016. The performance of the Marsh Street / Flora Street intersection would be reduced to a level of service B during the AM peak; indicating the intersection would still operate effectively.

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Table 9-30 Mid-block traffic and volumes and level of service (2016) with construction and without construction around the Arncliffe surface works

Location	Traffic direction	Mid-block capacity	2016 'without construction traffic'				2016 'with construction traffic'					
			LV	HV	v/c	LoS	LV	LV increase** (per cent)	HV	HV increase** (per cent)	v/c	LoS
AM peak												
Wickham Street (Princes Highway - West Botany St)	East	2400	1696	70	0.78	D	1703	<1%	95	135%	0.81	E
	West	2400	488	50	0.26	A	489	<1%	54	108%	0.26	B
West Botany Street (Marsh St -Wickham St)	North	2400	2310	92	1.06	F	2317	<1%	117	127%	1.09	F
	South	3600	734	72	0.26	A	735	<1%	76	105%	0.26	A
Marsh Street (M5 East Motorway-Flora Street)	East	3600	3047	96	0.92	E	3059	<1%	138	144%	0.95	E
	West	3600	1115	79	0.37	B	1120	<1%	96	121%	0.38	B
Princes Highway, south of Wickham St	North	3600	2645	56	0.77	D	2652	<1%	81	145%	0.79	D
	South	3600	903	55	0.29	B	904	<1%	59	107%	0.29	B
PM peak												
Wickham Street (Princes Highway - West Botany St)	East	2400	618	32	0.29	B	625	1%	57	178%	0.32	B
	West	2400	948	30	0.43	B	949	<1%	34	113%	0.43	C
West Botany Street (Marsh St -Wickham St)	North	2400	988	44	0.46	C	995	<1%	69	156%	0.49	C
	South	3600	2729	49	0.79	D	2730	<1%	53	8%	0.79	D
Marsh Street (M5 East Motorway-Flora Street)	East	3600	1265	63	0.39	B	1277	<1%	105	166%	0.43	C
	West	3600	2214	64	0.66	D	2219	<1%	80	125%	0.67	D
Princes Highway, south of Wickham St	North	3600	1223	30	0.36	B	1230	<1%	55	183%	0.38	B
	South	3600	2318	33	0.67	D	2319	<1%	37	112%	0.67	D

*increase in number of vehicles between 2016 'without construction traffic' scenario and 2016 'with construction traffic' scenario
LV – light vehicles HV – heavy vehicles LOS – level of service

Table 9-31 Intersection performance (2016) with construction and without construction (including spoil disposal) around the Arncliffe surface works

Intersection / peak	2016 – without construction				2016 – with construction			
	Light vehicles (vehicles per hour)	Heavy vehicles (vehicles per hour)	Average delay (seconds)	Level of service	Light vehicles (vehicles per hour)	Heavy vehicles (vehicles per hour)	Average delay (seconds)	Level of service
Princes Highway / Wickham Street								
AM Peak	5685	225	>100	F	5693	254	>100	F
PM Peak	5779	137	49.8	D	5787	166	52.5	D
Wickham Street / West Botany Street								
AM Peak	2893	157	23	B	2901	186	23.3	B
PM Peak	4175	82	11.9	A	4183	111	12.0	A
Marsh Street / West Botany Street								
AM Peak	3359	203	7.1	A	3368	236	7.2	A
PM Peak	3500	111	10.8	A	3509	144	10.8	A
Marsh Street / M5 East Motorway interchange								
AM Peak	4986	253	27.7	B	5003	312	27.9	B
PM Peak	4528	148	32.4	C	4545	207	32.5	C
Marsh Street / Flora Street								
AM Peak	4561	182	14.4	A	4580	243	16.6	B
PM Peak	3571	153	6.6	A	3590	214	11.4	A

Temporary road closures and changes to property access and on-street parking provisions

Construction traffic volumes around the Arncliffe surface works would be relatively low when compared to background traffic volumes in 2016. The increase in traffic volumes around the Arncliffe surface works due to construction traffic is not expected to affect the ability for road users to access existing properties along construction traffic routes. Motorists entering or exiting properties from roads along construction traffic routes may experience minor delays due to the increase in traffic volumes.

The use of the Arncliffe construction compound (C7) would require some minor, temporary road closures to allow the Marsh Street / Flora Street intersection to be modified. These works would require some lane closures at night-time, in accordance with a road occupancy licence and Construction Traffic Management and Safety Plan(s) to be prepared for the project.

Light vehicle parking for 220 vehicles would be provided at the Arncliffe construction compound (C7), minimising potential impacts to on-street parking (refer to **Section 6.5.3**). The use of the construction compound would not require the modification of existing on-street parking provisions.

Travel times and speeds

The speed limit on roads around the Arncliffe surface works may be temporarily reduced to 40 kilometres per hour to provide a safe road and working environment. Speed limits along local roads would be reduced where:

- There is a large volume of construction traffic, particularly heavy vehicles
- Construction of the project generates additional opposing turning movements or conflict points on the local road network
- Construction of the project creates additional road hazards, such as uneven road surfaces.

A reduction in the speed limit along roads around the Arncliffe surface works would not significantly impact on travel times along local and State roads.

Any reductions to speed limits along roads around the Arncliffe surface works would be undertaken in accordance with a Construction Traffic Management and Safety Plan(s) for the project.

Impacts to public and active transport facilities and infrastructure

Public transport

Increases in traffic flow on the existing road network around the Arncliffe surface works, particularly increases in heavy vehicle movements during construction would result in increased delays at intersections along the construction vehicle routes.

Buses would experience the same delays as general traffic at these intersections, as well as delays resulting from lower speed limits and/ or manual traffic control. Bus services around the Arncliffe surface works area would potentially experience some minor delays in line with that experienced by general traffic on the existing road network. Bus services that would experience some minor delays during construction of the project include:

- Route 400 (Bondi Junction to Burwood), which travels along Marsh Street and Wickham Street every 10 to 20 minutes during the weekday AM and PM peak periods
- Route 410 (Bondi Junction to Rockdale), which travels along Marsh Street and Wickham Street every 20 to 30 minutes during the weekday AM and PM peak periods
- Route 422 (Tempe/Kogarah to Sydney), which travels along the Princes Highway and West Botany Street every 10 to 15 minutes during the weekday AM and PM peak periods.

School buses operating on these roads would also be impacted

Construction of the project would not impact on the operation of passenger rail services on the Sydney metropolitan rail network.

Bus services along construction compound routes around the Arncliffe surface works are shown on **Figure 9-17**.

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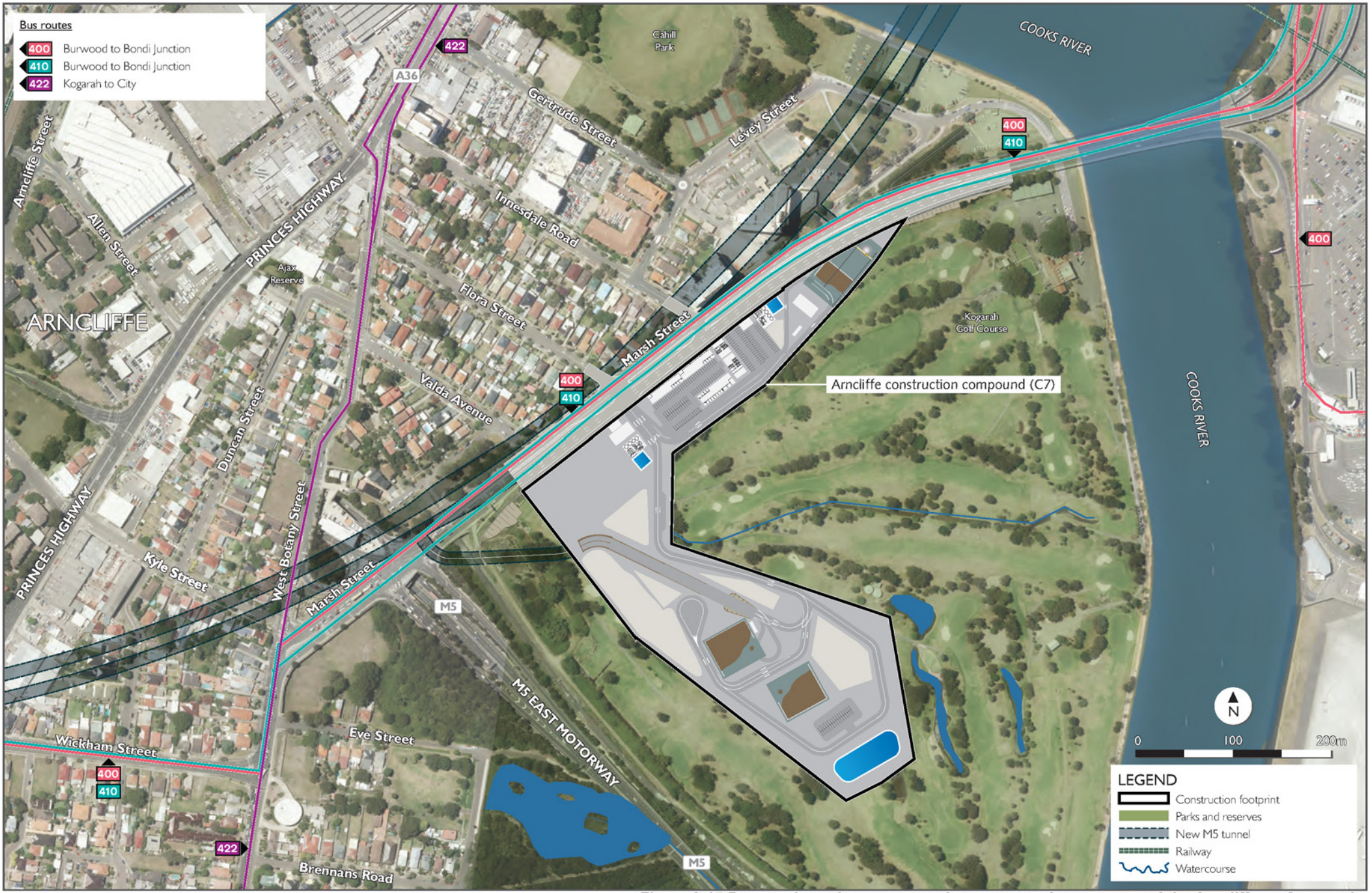

Figure 9-17 Bus services along construction compound routes around the Arncliffe surface works

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Active transport

Roads and Maritime is proposing to widen Marsh Street to three lanes in each direction as part of the Airport West Precinct component of the WestConnex enabling works around Sydney Airport. As part of these works, a dedicated cycleway would be constructed along the westbound carriageway of Marsh Street. Signalised pedestrian crossing facilities are also proposed at the Flora Street / Marsh Street intersection as part of the Airport West Precinct works. Modifications to the Flora Street / Marsh Street intersection would integrate with the Airport West Precinct, and would be constructed in consultation with Roads and Maritime.

A strategy for the maintenance of pedestrian and cyclist access during construction would be provided as part of the Construction Traffic Management and Safety Plan(s) for the project. The strategy would be prepared during the detailed design of the project and would incorporate management measures for pedestrian and cyclist access around the Arncliffe construction compound (C7).

Road safety

Construction traffic volumes are expected to be relatively low when compared with background traffic volumes on the roads around the Arncliffe surface works area.

Construction traffic during peak construction along Marsh Street would comprise less than two per cent of total expected traffic along Marsh Street in 2016.

Increases in traffic along Marsh Street as a result of construction of the project would be for the duration of construction only and are not expected to significantly impact on road safety around the Arncliffe surface works area.

St Peters interchange and local road upgrades surface works

The following compounds around the St Peters interchange and local road upgrades would generate construction traffic:

- Canal Road (C8) construction compound
- Campbell Road (C9) construction compound
- Landfill Closure (C10) construction compound
- Burrows Road (C11) construction compound
- Campbell Road bridge (C12) construction compound
- Gardeners Road bridge (C13) construction compound
- Sydney Park (C14) construction compound

These construction compounds would be used from around June 2016 to late 2019 to support:

- Closure of the former Alexandria Landfill (refer to **Section 6.5**)
- Construction of the local road upgrades (refer to **Section 6.5**)
- Construction of the main alignment tunnels (refer to **Section 6.5**)
- Construction of the St Peters interchange (refer to **Section 6.5**).

Additional detail on the construction compound layouts, construction activities and construction programs are provided in **Section 6.5.3** of this environmental impact statement.

Construction traffic volumes and patterns

Table 9-32 presents construction compound access points and construction traffic volumes around the St Peters interchange and local road upgrades. The construction traffic volumes are the two-way volumes (inbound and outbound) during the peak construction period for each route. Construction haulage routes for the seven construction compounds around the St Peters interchange and local road upgrades are shown in **Figure 9-18** to **Figure 9-20**.

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Figure 9-18 Canal Road construction compound (C8) vehicle routes

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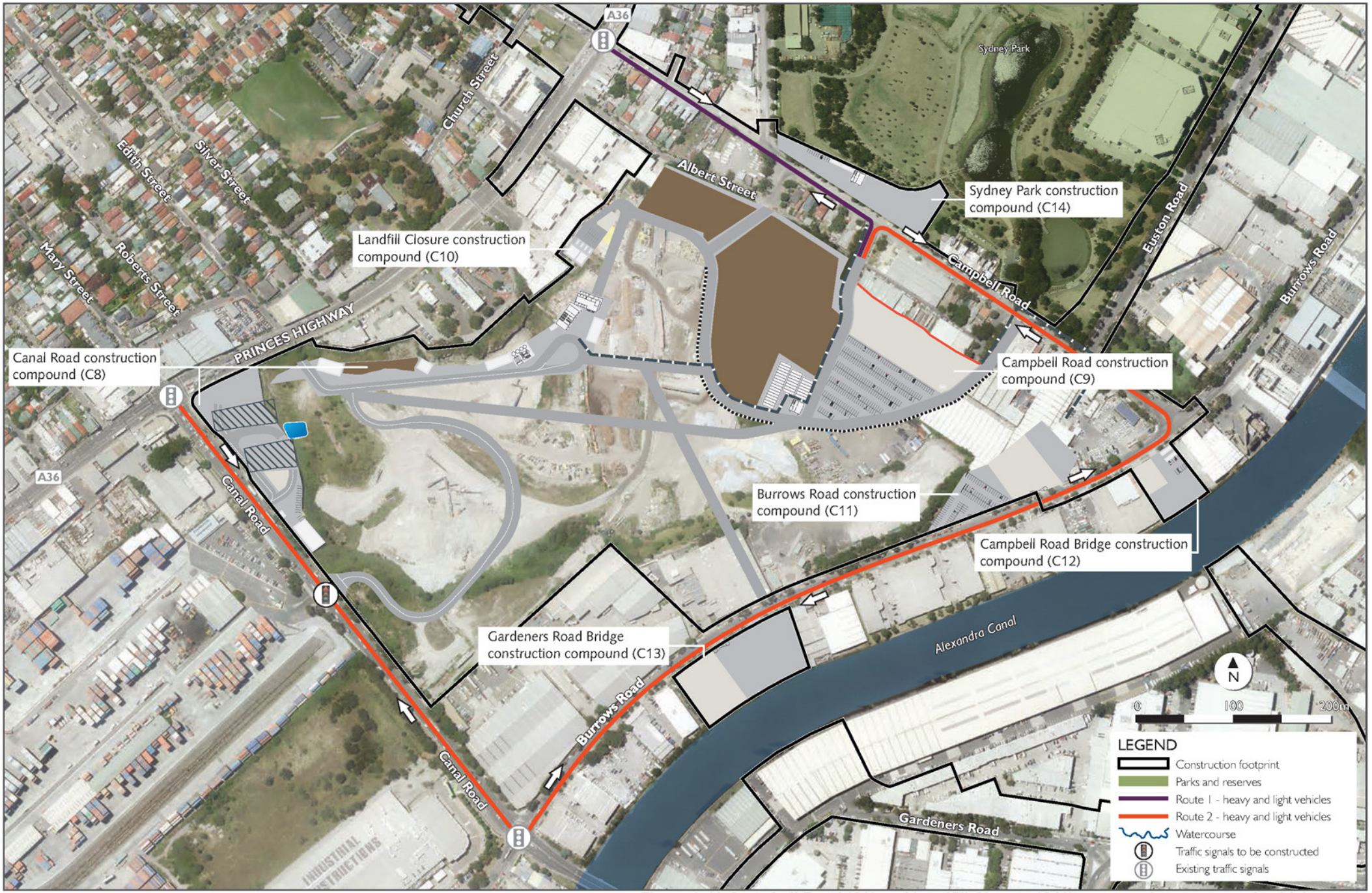

Figure 9-19 Campbell Road (C9) and Landfill Closure (C10) construction compound vehicle routes

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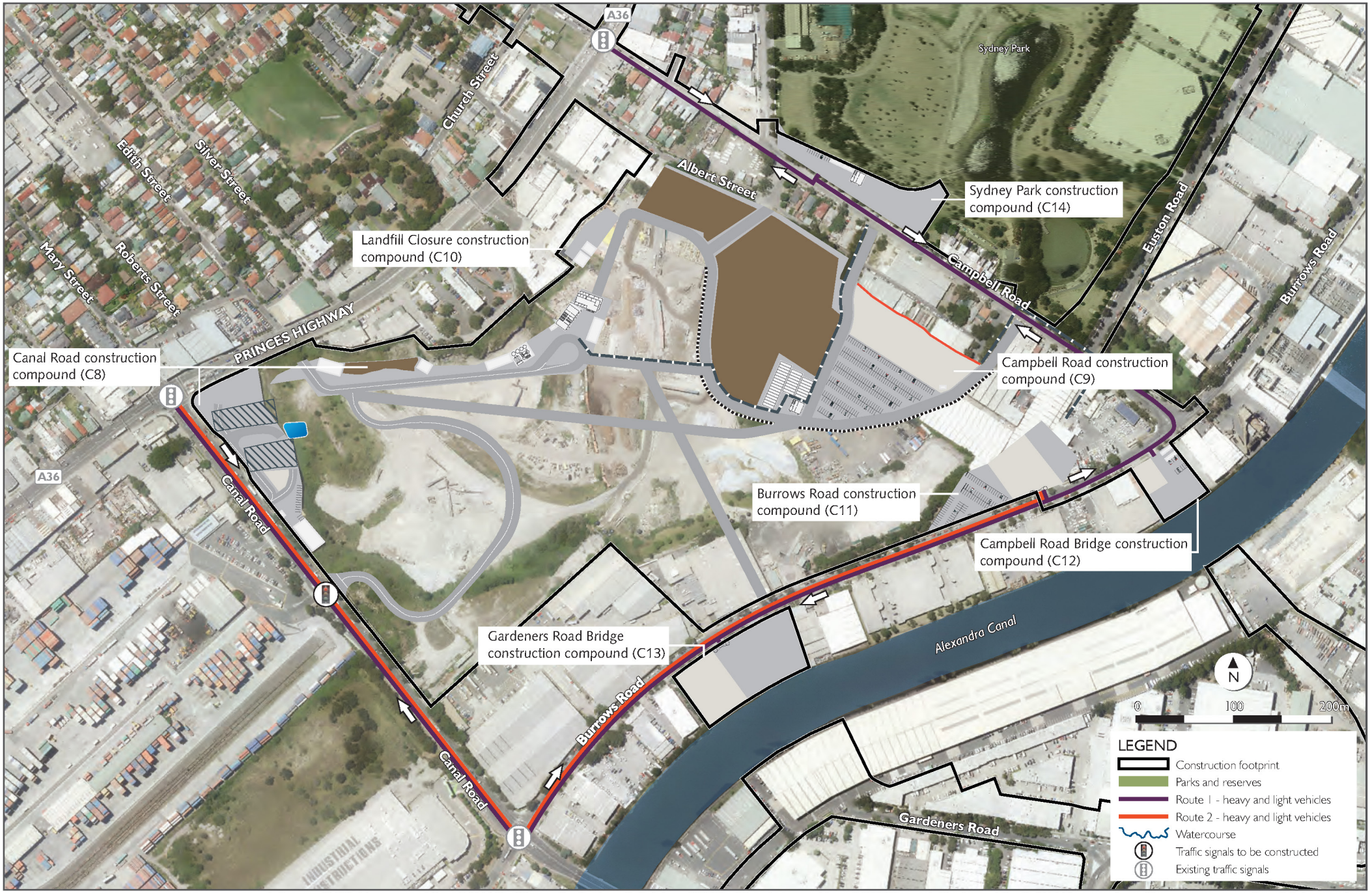

Figure 9-20 Burrows Road (C11), Campbell Road Bridge (C12), Gardeners Road (C13) and Sydney Park (C14) construction compound vehicle routes

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Table 9-32 Construction traffic routes, access points and volumes around the St Peters interchange and local road upgrades

Construction compound	Construction traffic route	Vehicle type	Access point	Daily vehicles	AM peak (vehicles per hour)	PM peak (vehicles per hour)
Canal Road (C8)	N/A	Light	Canal Road (left in right out from signalised intersection)	1132	40	54
		Heavy		710	50	50
Campbell Road (C9)	Route 1	Light	Campbell Road (left and right in, left and right out)	519	26	26
		Heavy		358	13	16
	Route 2	Light		519	26	26
		Heavy		358	13	16
Landfill Closure (C10)	N/A	Light	Campbell Road (left and right in, left and right out)	170	10	10
		Heavy		218	12	12
Burrows Road (C11)	Route 1	Light	Burrows Road (left and right in, left and right out)	130	6	7
		Heavy		100	4	5
	Route 2	Light		130	6	7
		Heavy		100	4	5
Campbell Road bridge (C12)	N/A	Light	Burrows Road (right in, left out)	79	4	4
		Heavy		117	5	4
Gardeners Road bridge (C13)	Route 1	Light	Burrows Road (left and right in, left and right out)	130	6	7
		Heavy		100	4	5
	Route 2	Light		130	6	7
		Heavy		96	4	4
Sydney Park (C14)	N/A	Light	Campbell Road (left and right in, left and right out)	96	4	4
		Heavy		61	4	4
Total	N/A	Light	As above	3035	134	152
		Heavy		2,218	113	121

Construction vehicles would use the existing arterial road network to access construction compounds as much as practically possible.

At locations where direct access to and from construction compounds via arterial roads is not feasible, or these roads cannot be used as a standalone access point for a construction compound, construction vehicles would use local roads. Impacts to the local road network from construction vehicle movements around the St Peters interchange would be minimised where reasonable and feasible, in accordance with a Construction Traffic and Safety Management Plan.

Vehicle access to the seven construction compounds around St Peters interchange and local road upgrades would require the use of some local roads, including Campbell Road, Canal Road and Burrows Road. The construction compound access requirements from local roads to these construction compounds are presented in **Table 9-33**.

Table 9-33 Local road access requirements around the St Peters interchange and local road upgrades

Local roads	Construction compound access from local roads						
	Canal Road (C8)	Campbell Road (C9)	Landfill Closure (C10)	Burrows Road (C11)	Campbell Road Bridge (C12)	Gardeners Road bridge (C13)	Sydney Park (C14)
Canal Road	✓						
Campbell Road		✓	✓				✓
Burrows Road				✓	✓	✓	

Network performance

Mid-block traffic volumes and level of service

Mid-block volume / capacity ratios around the St Peters interchange and local road upgrades in 2016 with and without construction of the project are presented in **Table 9-34**. The volume / capacity ratios show the operation of the road network would be similar with and without construction of the project.

The following roads would be operating at (or close to) design capacity in 2016 without construction traffic, largely as a result of background traffic growth:

- The Princes Highway (northbound), south of Canal Road, which would operate at a level of service F during the AM peak
- The Princes Highway (southbound), south of Canal Road, which would operate at a level of service E during the PM peak
- Campbell Road, (eastbound), east of the Princes Highway, which would operate at a level of service E during the AM peak.

With construction, road performance is generally expected to operate at a similar level of performance to the road network without constriction traffic. Road performance would generally operate a level of service D or better during the AM and PM peak, except:

- Campbell Road (eastbound), east of the Princes Highway, which would continue to operate at a level of service F during the AM peak
- The Princes Highway (northbound), south of Canal Road, which would operate at a level of service F during the AM peak
- The Princes Highway (southbound), which would continue to operate at a level of service E during the PM peak.
- Canal Road (westbound), between the Princes Highway and Burrows Road which would operate at a level of service E during the PM peak. Construction traffic would comprise less than four per cent of traffic along Canal Road at this location; however, the additional traffic would reduce the operation of the road network at this location, reducing the road performance from a level of service D without construction traffic to a level of service E.

When compared with background traffic volumes in 2016, total construction traffic during peak construction along roads around the St Peters interchange and local road upgrades would comprise a small proportion of total existing traffic on Canal Road, the Princes Highway, Burrows Road and Campbell Road.

As a result, construction of the project would have a minor, temporary impact on the mid-block performance of the road network around the St Peters interchange and local road upgrades.

Table 9-34 Mid-block traffic and volumes and level of service (2016) with construction and without construction around the St Peters interchange and local road upgrades

Location	Traffic direction	Mid-block capacity	2016 'without construction' LV	HV	v/c	LoS	2016 'with construction' LV	LV increase* (per cent)	HV	HV increase* (per cent)	v/c	LoS
AM peak												
Princes Highway, south of Canal Road	North	3600	3329	137	1.01	F	3396	2%	194	41%	1.06	F
	South	3600	1018	49	0.31	B	1085	6%	106	116%	0.36	B
Canal Road (Princes Highway - Burrows Road)	East	2400	1590	65	0.73	D	1621	2%	91	40%	0.76	D
	West	2400	1034	60	0.49	C	1065	3%	85	42%	0.53	C
Burrows Road, north of Canal Road	North	900	202	8	0.24	A	223	10%	21	163%	0.30	B
	South	900	520	19	0.62	C	541	4%	32	68%	0.68	D
Campbell Road, east of Princes Highway	East	900	822	34	1.00	E	848	3%	53	55%	1.07	F
	West	900	105	9	0.14	A	131	24%	28	211%	0.21	A
PM peak Hour												
Princes Highway, south of Canal Road	North	3600	1634	69	0.49	C	1710	4%	130	88%	0.55	C
	South	3600	2815	114	0.85	E	2891	3%	175	53%	0.90	E
Canal Road (Princes Highway - Burrows Road)	East	2400	862	39	0.40	B	897	4%	66	69%	0.44	C
	West	2400	1680	79	0.78	D	1716	2%	107	35%	0.83	E
Burrows Road, north of Canal Road	North	900	210	6	0.25	A	232	10%	21	250%	0.31	B
	South	900	537	21	0.64	D	559	4%	36	71%	0.70	D
Campbell Road, east of Princes Highway	East	900	373	17	0.45	C	400	7%	38	124%	0.53	C
	West	900	441	16	0.53	C	468	6%	37	131%	0.61	D

*increase in number of vehicles between 2016 'without construction traffic' scenario and 2016 'with construction traffic' scenario
LV – light vehicles HV – heavy vehicles LOS – level of service

Intersection performance with and without construction of the project

Table 9-35 summarises the intersection performance at key locations along construction traffic routes around the St Peters interchange and local road upgrades in 2016 with and without construction of the project. The analysis provides the average intersection delays and level of service for the worst performing movement at each intersection.

During construction of the project, intersections along construction traffic routes are expected to generally operate at a level of service similar to the operation of these intersections without construction in 2016. Although the level of service of these intersections around the St Peters interchange and local road upgrades would remain the same, the average delay may increase. The following intersections would operate at or above capacity both with and without construction:

- Princes Highway / Railway Road, which would operate at a level of service F during the AM and PM peak
- Princes Highway / Canal Road, which would operate at a level of service F during the AM and PM peak
- Canal Road / Burrows Road, which would operate at a level of service F during the PM peak.

Table 9-35 Intersection performance (2016) with construction and without construction (including spoil disposal) around the St Peters interchange and local road upgrades

Intersection / peak	2016 – without construction				2016 – with construction			
	Light vehicles (vehicles per hour)	Heavy vehicles (vehicles per hour)	Average delay (seconds)	Level of service	Light vehicles (vehicles per hour)	Heavy vehicles (vehicles per hour)	Average delay (seconds)	Level of service
Princes Highway / Railway Road								
AM Peak	4857	211	>100	F	4991	325	>100	F
PM Peak	5103	206	70.6	F	5255	328	88.8	F
Princes Highway / Canal Road								
AM Peak	5036	212	>100	F	5170	326	>100	F
PM Peak	5326	225	>100	F	5478	347	>100	F
Canal Road / Burrows Road								
AM Peak	3276	152	29.1	C	3318	178	49.6	D
PM Peak	2975	137	>100	F	3019	167	>100	F
Princes Highway / Campbell Road								
AM Peak	3146	121	28.9	C	3198	159	31.1	C
PM Peak	3437	148	26.7	C	3491	190	32.8	C
Campbell Road / Euston Road								
AM Peak	1014	157	17.9	B	1052	179	19.8	B
PM Peak	989	61	10.3	A	1029	87	11.5	A
Campbell Road / Burrows Road								
AM Peak	668	199	9.3	A	706	221	10.1	A
PM Peak	996	171	15.4	B	1036	197	18.4	B
Canal Road compound signalised access								
AM Peak	2625	325	N/A	N/A	2707	401	9.6	A
PM Peak	2542	318	N/A	N/A	2640	398	9.5	A

Road closures and changes to property access and parking provisions

Road closures

The project would require permanent and temporary road closures to enable construction of the local road upgrades (refer to **Section 5.7**). Road closures around the St Peters interchange and local road upgrades are summarised in **Table 9-36**.

Roads requiring permanent closure would be located within the footprint of the St Peters interchange. Prior to the commencement of construction, all properties along these roads would be acquired by Roads and Maritime in accordance with the *Land Acquisition (Just Terms Compensation) Act 1991* (refer to **Chapter 13** for additional detail).

Campbell Lane and Harber, Holland and Woodley Streets would be permanently closed as part of the project.

During construction, Brown Street and Florence Street would be partially closed at their intersections with Campbell Street to facilitate tie-in works to the upgraded Campbell Street. Alternative access to and from these streets would continue to be provided via Unwins Bridge Road. Temporary closures to Brown Street and Florence Street would be undertaken in accordance with a road occupancy licence, as required under the *Roads Act 1993*.

Minor, temporary partial closures may be required to roads around the St Peters interchange and local road upgrades to accommodate the installation of new barriers and road realignments, as well as to temporary and / or permanent traffic switches.

Partial closures would be intermittent and access to these roads and properties would be maintained. Roads potentially affected by these closures are summarised in **Table 9-36** below.

A Construction Traffic Management and Safety Plan(s) would be prepared for the project, detailing temporary road closures and including traffic control procedures, signage requirements, construction traffic management requirements of the relevant Roads and Maritime manuals and procedures and Australian Standards.

Lane closures

Temporary lane closures may be required to roads around the St Peters and local road upgrades to accommodate:

- The installation of traffic signals, new barriers and road realignments
- Temporary and / or permanent traffic switches.

These lane closures would be temporary and would be undertaken at night within approved times in accordance with a Road Occupancy Licence under the *Roads Act 1993*. Roads temporarily affected by temporary lane closures are summarised in **Table 9-36**.

A Construction Traffic Management and Safety Plan would be prepared for the project, detailing temporary lane closures and including traffic control procedures, signage requirements, construction traffic management requirements of the relevant Roads and Maritime manuals and procedures and Australian Standards.

Table 9-36 Road and lane closures around the St Peters interchange and local road upgrades

Road	Extent of road closure			Duration of closure		Temporary lane closures required
	Partial	Full	Temporary (short –term)	Temporary (medium to long term)	Permanent	
Bedwin Road	✓		✓			✓
Bourke Road / Bourke Street	✓		✓			✓
Brown Street	✓	✓*		✓		✓
Burrows Road	✓		✓			✓
Campbell Lane		✓			✓	
Canal Road						✓
Campbell Road / Campbell Street	✓		✓			✓
Church Street	✓		✓			✓
Euston Road	✓		✓			✓
Florence Street	✓	✓*		✓		✓
Gardeners Road	✓		✓			✓
Harber Street		✓			✓	
Holland Street		✓			✓	
Huntley Street	✓		✓			✓
Princes Highway	✓		✓			✓
St Peters Street	✓		✓			✓
Sydney Park Road	✓		✓			✓
Unwins Bridge Road	✓		✓			✓
Woodley Street		✓			✓	

*Road closures would be for a short period in accordance with a road occupancy licence

Property access

Construction of the St Peters interchange and local road upgrades may result in increases in traffic volumes around construction compounds and along construction traffic vehicle routes, as detailed above.

The increase in traffic volumes around the St Peters interchange and local road upgrades as a result of construction traffic is not expected to affect access to existing properties along construction traffic routes.

Motorists entering or exiting properties from roads along construction traffic routes may experience minor delays due to the increase in traffic volumes. Some commercial and industrial properties along Euston Road, Bourke Road, Burrows Road and Gardeners Road would require temporary modifications to driveways as part of the local road upgrades.

Parking provisions

Parking provisions in St Peters and Mascot would be temporarily reduced to allow safe access to construction compounds and to accommodate construction of the local road upgrades. The indicative temporary changes to on-street parking availability is summarised in **Table 9-37**. The final number of on-street parking spaces to be affected by construction of the project would be finalised during detailed design. The demand for parking is likely to reduce around St Peters interchange and the local road upgrades with the changes to land use.

Table 9-37 Indicative temporary impacts to parking during construction around St Peters interchange and the local road upgrades

Road	Indicative impact
Albert Street	Loss of 44 on-street spaces along both sides
Campbell Road, between Barwon Park Road and Burrows Road	Loss of 111 spaces along both sides
Euston Road, between Campbell Road and Sydney Park Road	Loss of 112 spaces along both sides
Burrows Road, south-west of Campbell Road	Loss of 38 spaces along both sides
Burrows Road, north-east of Campbell Road	Loss of 23 spaces along both sides
Euston Road, north of Sydney Park Road intersection	Loss of 24 spaces along both sides
Huntley Street, east of Euston Road	Loss of 32 spaces along both sides
Barwon Park Road, north of Campbell Road	Loss of 6 spaces
Princess Highway	Loss of 30 spaces along both sides
May Street	Loss of 50 spaces along both sides
Unwins Bridge Road	Loss of 39 spaces along both sides
Brown Street	Possible loss of up to 16 spaces during integration / tie-in works
Florence Street	Possible loss of up to 16 spaces during integration / tie-in works
St Peters Street	Possible loss of up to 12 spaces during integration / tie-in works
Hutchison Street	Possible loss of up to 10 spaces during integration / tie-in works
Gardeners Road, west of Bourke Street	Loss of 10 spaces
Gardeners Road, between Kent Road and cul-de-sac of Gardeners Road	Loss of 47 on-street spaces and 20 off-street spaces
Bunnings Mascot	Loss of 25 off-street spaces
Bourke Road, north of Bourke Street / Gardeners Road intersection	Loss of 26 off-street spaces

Light vehicle parking would be provided at construction compounds around the St Peters interchange and local road upgrades, minimising impacts on on-street parking.

Travel times and speeds

During construction, the speed limit on local roads may be reduced to 40 kilometres per hour to provide a safe road and working environment. Speed limits along local roads would be reduced where:

- There is a large volume of construction traffic, particularly heavy vehicles
- The relocation of pedestrian pathways requires a reduction in the speed limit
- Construction of the project generates additional opposing turning movements or conflict points on the local road network
- Construction of the project creates additional road hazards, such as uneven road surfaces.

A reduction in the speed limit along local roads would not significantly impact on travel times.

Any reductions to speed limits along local roads would be undertaken in accordance with a Construction Traffic Management and Safety Plan for the project.

Impacts to public and active transport facilities and infrastructure

Public transport

Some intersections along the construction vehicle routes identified in **Table 9-32** would experience increased delays during construction as a result of increased traffic on the road network, particularly heavy vehicles.

Buses would experience the same delays as general traffic at these intersections, and delays as a result of lower speed limits and/ or manual traffic control. Additionally, users of bus services may experience:

- Longer travel times to and from bus stops by supplementary travel modes, such as by car and walking
- A reduction in amenity for bus users waiting at bus stops and potential reductions to pedestrian roadside safety.

Bus services around the St Peters interchange surface works and local road upgrade area would potentially experience some minor delays including:

- Route 348 (Wolli Creek to Bondi Junction), which travels along Princes Highway every 30 minutes during the AM and PM peak periods
- Route 418 route (Bondi Junction to Burwood), which travels along Canal Road, every 15 to 20 minutes during the AM and PM peak periods
- Route 422 (Kogarah to Sydney City), which travel along a section of the Princes Highway, south of Canal Road, every 10 – 15 minutes the AM and PM peak periods.

School buses operating along these roads would also be impacted.

Bus services along construction compound routes around the St Peters interchange and local road upgrades are shown in **Figure 9-21**.

The existing bus stop on Euston Road northbound, south of the intersection with Maddox Street, would be temporarily relocated during the local road upgrades. The bus stop would be reinstated at the completion of construction.

The bus stop on the southbound side of Canal Road along route 418 (Burwood to Bondi Junction) near the intersection of the Princes Highway would be permanently relocated further south along Canal Road to accommodate construction vehicles accessing the Canal Road construction compound (C8) (refer to **Section 6.9** for additional detail). The final location of this bus stop would be determined during detailed design and in consultation with Transport for NSW.

Due to their location, the following bus stops would be temporarily removed at the start of construction and reinstated in a similar location at the earliest possible time during construction:

- Princes Highway (southbound) outside 136 Princes Highway, St Peters
- Bourke Road (northbound) outside 81A to 83 Bourke Road, Mascot
- Bourke Road (southbound) outside 520-530 Gardeners Road, Mascot
- Gardeners Road (eastbound) outside 538 to 540 Gardeners Road. Mascot.

Customers would be informed of the changes through a TfNSW-approved program of communication. The following impacts to bus services would also potentially be experienced during construction:

- Longer travel times to and from bus stops by supplementary travel modes (e.g. car passenger, walking to/from bus stop, etc) due to an increase in traffic volumes, slower travel speeds and increased intersection delays
- Reduced amenity for bus users waiting at stops; an increase in traffic would result in impacts including a reduction in pedestrian roadside safety.

Construction of the project would not impact on the operation of passenger rail services on the Sydney metropolitan rail network.

Bus stops requiring closure or relocation around the St Peters interchange and local road upgrades are shown on **Figure 9-22**.

Active transport

Construction of the project would require modifications to pedestrian and cycling facilities around the St Peters interchange and local road upgrades, including:

- Temporary diversion of the Bourke Road bicycle path around construction zones
- Relocation of existing and/ or provision of temporary access paths around construction zones
- Temporary diversions to alternative footpaths/ routes along Campbell Street/ Campbell Road, Bourke Road/ Bourke Street, Euston Road, Gardeners Road and the Princes Highway.

The project's Construction Traffic Management and Safety Plan would include a strategy to ensure the maintenance of pedestrian and cyclist access during construction. The strategy would be prepared during detailed design of the project and would incorporate management measures for pedestrian and cyclist access around the St Peters interchange and local road upgrades. This would include the installation of concrete barriers along construction traffic vehicle routes to provide a safe environment for pedestrians, cyclists and the general public.

On-road cyclists may experience delays at intersections due to an increase in traffic volumes around the St Peters interchange and local road upgrades. Additionally, journey times and distances for cyclists may be longer due to detours and changes in cycling routes.

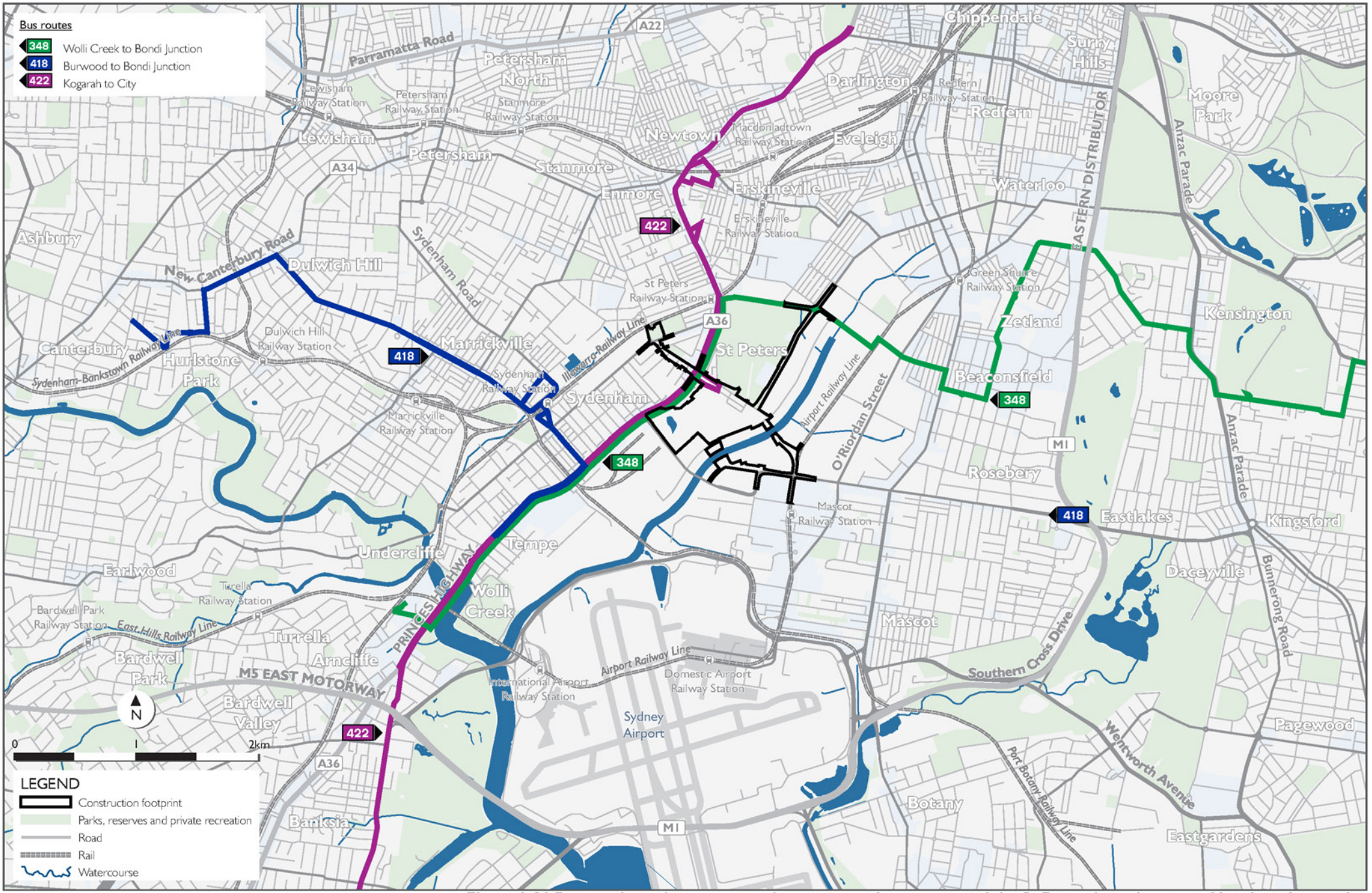

Figure 9-21 Bus services along construction compound routes around the St Peters interchange and local road upgrades

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Figure 9-22 Bus stops requiring closure or relocation during construction

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Road safety

Construction traffic along Campbell Road would comprise about 14 per cent of the total existing traffic. There is the potential that additional traffic incidents and crashes may occur as a result of this additional traffic. Construction traffic volumes along other local roads around the St Peters interchange and local road upgrades are generally expected to be low when compared to background traffic volumes. Increases in traffic as a result of construction of the project would be for the duration of construction only and are not expected to significantly impact on road safety around the St Peters interchange and local road upgrades.

Management measures to minimise traffic incidents would be implemented as part of a Construction Traffic Management and Safety Plan, with specific measure relating to road safety around the St Peters interchange and local road upgrades.

Spoil haulage

The project is expected to generate about 2.7 million cubic metres of surplus spoil, mostly from the excavation of the main alignment tunnels. Other spoil-generating construction activities would include the excavation of dive structures and ventilation shafts, as well as cut and fill activities for surface construction works around the western surface works and local road upgrades. The anticipated spoil generation is detailed in **Table 6.28** of **Chapter 6** (Construction works).

The assessment of impacts associated with construction traffic has taken into account heavy vehicle movements associated with spoil disposal. **Table 9-38** provides a summary of heavy vehicle movements at each construction compound, including spoil-related haulage and non-spoil related haulage.

Heavy vehicle movements from the construction compounds around the St Peters interchange would be required for the movement of spoil from tunnelling and the construction of the local road upgrades. Construction works as part of the closure of the former Alexandria Landfill are expected to have a cut/ fill balance. Should this change during detailed design, construction traffic impacts, including heavy vehicle movements would be revised.

It is expected that spoil haulage would comprise about 80 per cent of all heavy vehicle movements. Other heavy vehicle movements would be required for the delivery of materials, plant and equipment to construction compounds.

Table 9-38 Summary of heavy vehicle movements at construction compounds for the project

Construction compound	Heavy vehicle movements (spoil)			Heavy vehicle movements (other)		
	Daily vehicles	AM peak (vehicles per hour)	PM peak (vehicles per hour)	Daily vehicles	AM peak (vehicles per hour)	PM peak (vehicles per hour)
Kingsgrove North (C1)	1582	50	44	393	12	6
Kingsgrove South (C2)	48	2	2	24	1	1
Commercial Road (C3)	144	6	6	48	2	2
Bexley Road North (C4)	336	14	14	96	4	4
Bexley Road South (C5)	336	14	14	96	4	4
Bexley Road East (C6)	0	0	0	0	0	0
Arncliffe (C7)	726	47	27	469	13	13
Canal Road (C8)	575	40	40	135	10	10
Campbell Road (C9)	564	20	24	151	6	12
Landfill Closure (C10)	170	10	10	48	2	2
Burrows Road (C11)	151	6	8	48	2	4
Alexandra Canal bridge (C12)	93	4	3	24	1	0
Gardeners Road bridge (C13)	124	5	6	72	3	4
Sydney Park (C14)	24	1	1	37	3	3

Spoil disposal sites

Spoil would be reused on site where possible; however, excess spoil that cannot be re-used would require off-site management, including re-use and/ or disposal. Six potential spoil disposal sites have been identified for receiving excess spoil from the project, as summarised in **Table 9-39**. The feasibility of disposing of excess spoil at these locations is currently under investigation and final spoil disposal locations would be determined during detailed design. A final decision on a spoil management location(s) may include one or several of the potential spoil management sites that have been identified, or another suitable site(s) that may be identified during detailed design.

Sites identified as potential spoil disposal locations that do not currently have the necessary environmental planning approval to accept the materials would be subject to separate assessment and approval in accordance with the requirements of the EP&A Act and disposal of spoil from the project to particular locations would be undertaken in accordance with those other approvals.

Table 9-39 Potential spoil management sites

Spoil receiver site	Location	Distance from project* (kilometres)	Approximate capacity for spoil disposal (cubic metres)
CSR PGH Brick Pit	75 Townson Road, Schofields.	55	550,000
DHA Schofields	49 Manorhouse Boulevard, Quakers Hill	60	500,000
Austral Plant 2 or 3 clay shale pit	738-780 Wallgrove Road, Horsley Park	40	3,000,000
Riverstone West Sakkara Development	Land west of Riverstone	60	3,500,000
Sandy Point Quarry	Heathcote Road, Sandy Point	25	5,000,000
Kurnell Landfill Company	330 Captain Cook Drive, Kurnell	15	7,000,000

*Taken as Bardwell Valley Golf Course, about halfway along the tunnelling works to be undertaken as part of the project.

Spoil haulage routes

Spoil haulage routes to and from construction compounds have been identified with the aim of minimising impacts to local residential streets and maximising movements along State and regional roads.

The assessment of construction traffic impacts has taken into account heavy vehicle movements for spoil disposal. It is expected that spoil haulage would generally be undertaken using B-Doubles and super B-doubles.

B-Doubles are considered Restricted Access Vehicles (RAVs) under the Heavy Vehicle (Mass, Dimension and Loading) National Regulation, due to the restricted road network that can safely accommodate these vehicles. Spoil haulage using B-doubles would follow Roads and Maritimes' approved RAV routes. Super B-doubles are considered Higher Mass Limit (HML) vehicles, due to their longer length and would follow Roads and Maritime approved HML routes.

Restricted access vehicle routes around the project approved for B Double use are shown on **Figure 9-23** and higher mass limit vehicle routes around the project are shown on **Figure 9-24**.

It is expected that spoil would be transported from six construction compounds providing the main tunnel support functions during construction:

- Kingsgrove North (C1) construction compound
- Commercial Road (C3) construction compound
- Bexley Road North (C4) construction compound
- Bexley Road South (C5) construction compound
- Arncliffe (C7) construction compound
- Canal Road (C8) construction compound.

These construction compounds would have direct access to roads which form part of Roads and Maritime approved RAV and HML routes on the State and National road network as follows:

- Kingsgrove North construction compound (C1) via the M5 East Motorway
- Commercial Road construction compound (C3) via Commercial Road and Kingsgrove Road
- Bexley Road North (C4) and Bexley Road South (C5) via Bexley Road
- Arncliffe construction compound (C7) via Marsh Street, Wickham Street, West Botany Street and the Princes Highway
- Canal Road construction compound (C8) via Canal Road and the Princes Highway.

Spoil handling at construction compounds which provide tunnelling support would be undertaken 24 hours per day, seven days a week. Where practical, spoil would be moved during the day, outside of peak periods. Heavy vehicle movements outside of standard construction hours for the purpose of spoil haulage would be required. Construction road traffic noise impacts associated with works conducted outside of standard construction hours are described in **Section 12.3**.

A Spoil Management Strategy would be prepared and implemented for the project prior to the commencement of tunnelling activities, which would include procedures relating to spoil haulage and spoil management sites.

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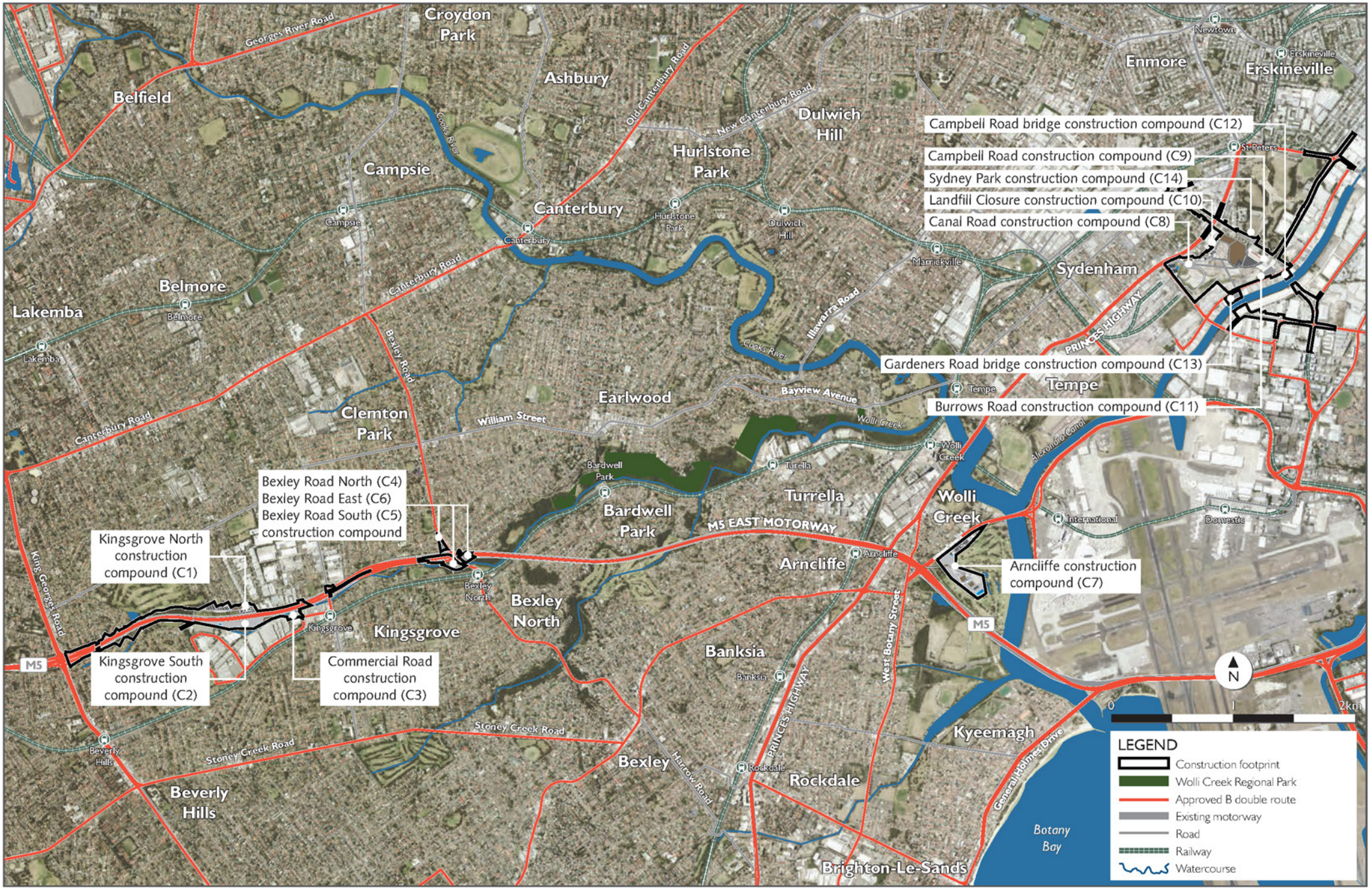

Figure 9-23 Restricted access vehicle routes approved for B double use around the project

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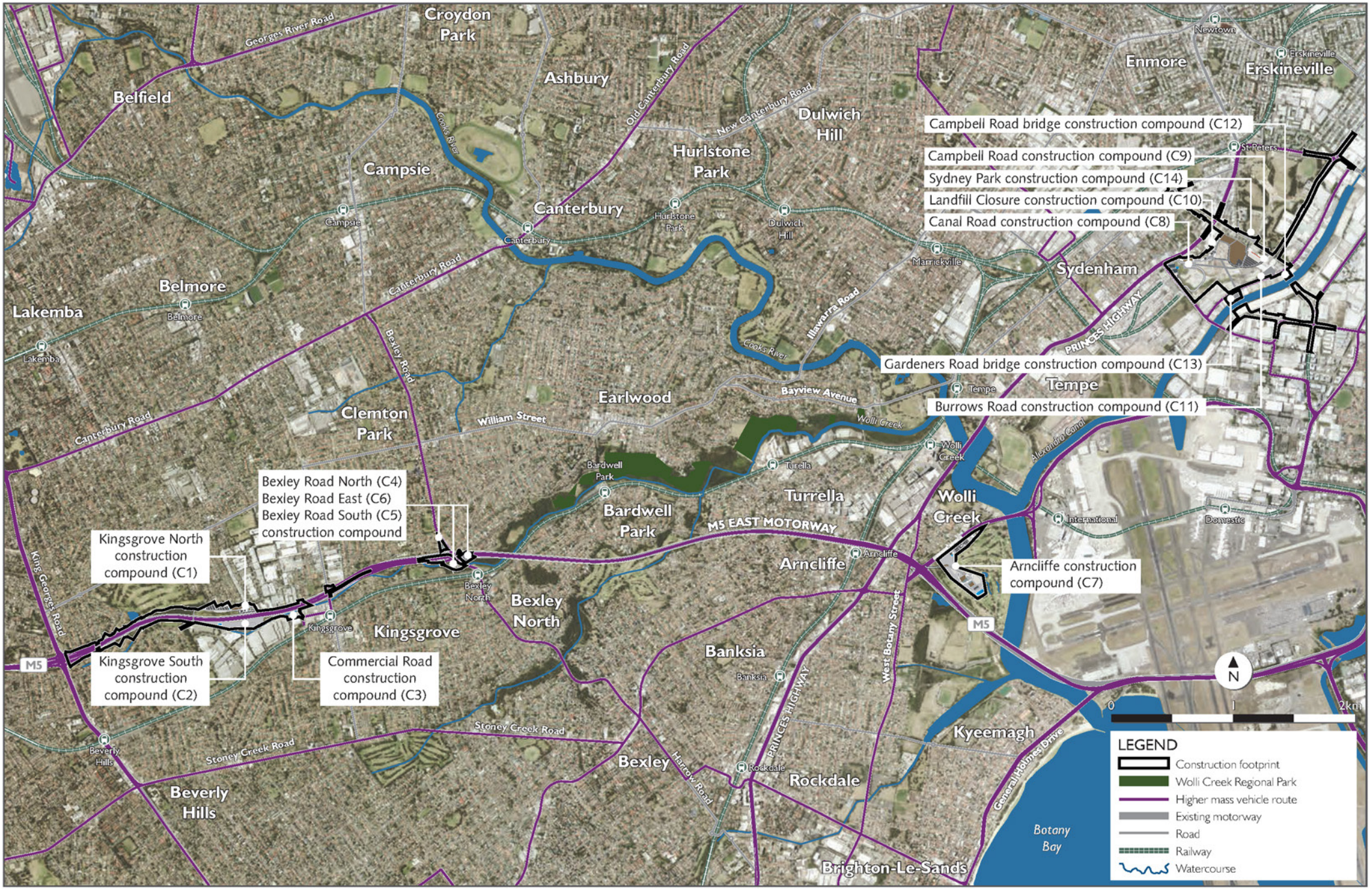

Figure 9-24 Higher mass limit vehicle routes around the project

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Emergency vehicles

The M5 East Motorway, arterial roads and the local road network are currently used by emergency services to travel to and from call-outs. Construction of the project may require temporary traffic diversions, road occupation, temporary road closures and alternative property access arrangements.

The Construction Traffic Management Plan(s) for the project would be developed in consultation with relevant emergency services, ensuring that procedures are in place to maintain safe, priority access for emergency vehicles through construction zones. Additionally, local emergency services would be periodically updated on the staging and progress of construction works.

Cumulative construction impacts

Construction of the project is expected to take place between 2016 and 2019. Based on the proposed construction program (refer to **Section 6.4** (Construction program) for more detail), there is the potential for construction of the project to occur at the same time as construction of other components of the WestConnex program of works, and other major developments near the project.

WestConnex program of works

There is the potential for construction of the project to occur at the same time as construction of the King Georges Road Interchange upgrade, the M4 East and future M4-M5 Link projects, all of which form part of the WestConnex program of works. A summary of the timing of these projects is provided in **Table 9-40**.

Table 9-40 Timing of projects that form part of the WestConnex program of works

WestConnex project	Commencement of construction	Commencement of operation
New M5	Mid 2016	Late 2019
King Georges Road Interchange Upgrade Project	Commenced July 2015	Late 2016/ early 2017
M4 East	Mid 2016	Early 2019
M4-M5 Link	2019	2023

King Georges Road Interchange Upgrade Project

Construction of the King Georges Road Interchange Upgrade project would potentially overlap with construction of the project for about three to six months in 2016 / 2017.

However, the project would not align with the peak construction period of the King Georges Road Interchange Upgrade project.

Construction vehicles from both projects would likely use common roads, such as King Georges Road and while there is likely to be some cumulative construction traffic impacts, these are likely to be short term and minor, due to the relatively low vehicle numbers predicted for the King Georges Road Interchange Upgrade project at this late stage of construction.

M4 East Project

Subject to environmental planning approval, the M4 East project has a projected construction program commencing in mid-2016 and continuing until early 2019. It is therefore likely that construction of the project would be undertaken concurrently with the M4 East.

It is expected that haulage and construction routes associated with the M4 East would include the M4 Motorway and adjacent arterial roads, and there is limited potential for cumulative construction traffic impacts with the project.

M4-M5 Link

Subject to environmental planning approval, there is the potential for construction of the future M4-M5 Link to commence in 2019 while the project is under construction.

It is expected that peak construction of the project would be complete, and the construction activities for the project at this time would largely comprise mechanical and electrical fit-out and landscaping and rehabilitation works.

There is the potential for localised cumulative construction works around the St Peters interchange, as a portion of the site may be used as a construction compound for the future M4-M5 Link.

There is likely to be some cumulative construction traffic impacts, these are likely to be short term. As both projects would be outside of peak construction periods, and the local road upgrades would be complete, it is expected the road network would have the capacity to accommodate construction vehicles from both projects at this location.

Should the M4-M5 Link project proceed, the environmental assessment of the project would include a traffic and transport impact assessment which would consider potential cumulative impacts of the project.

During construction, consultation would continue with local communities potentially affected by concurrent construction of projects that form part of the WestConnex program of works. Additionally, consultation would be undertaken with proponents of other (unrelated) nearby projects to increase the overall awareness of project timeframes and impact.

Additional information about consultation and cumulative impacts is provided in **Chapter 7** (Consultation) and **Chapter 27** (Cumulative impacts).

Other nearby major projects

The construction of nearby projects has the potential to result in additional construction traffic on the surrounding road network. Other major developments near the project include:

- Extension of the Marrickville Metro Shopping Centre
- Green Square development
- Mascot Station Town Centre precinct
- Wolli Creek redevelopment.

Extension of the Marrickville Metro Shopping Centre received approval from DP&E in April 2015. Although the construction program has not been confirmed, it is assumed construction would likely take place during the same period as construction of the project. Traffic from the construction of the extension of the Marrickville Metro Shopping Centre, north-west of Camdenville Park, may contribute to cumulative impacts, most notably during the construction of the St Peters interchange and local road upgrades.

The number of construction vehicles required for the construction of the extension of the Marrickville Metro Shopping Centre is not currently available, and as such, a quantitative assessment of potential cumulative traffic impacts has not been undertaken. While the Marrickville Metro Shopping Centre project would likely result in a localised increase in the number of vehicles, it is likely that the number associated with this development would not significantly contribute to overall traffic numbers.

Construction traffic for the extension of the Marrickville Metro shopping centre would largely use Edinburgh Road, Victoria Road, Enmore Road and Belmore Road. These roads would not be used as major routes for construction traffic for construction of the New M5. Intersections around the Marrickville Metro Shopping Centre would operate at a satisfactory level of service, provided the Marrickville Metro Shopping Centre incorporates the recommended improvements to Unwins Bridge Road, Bedwin Road, May and Campbell Street intersection, as well as providing a new roundabout to Edinburgh and Sydney Steel Road, as stated in the Environmental Assessment Report (July 2010) for the Marrickville Metro Shopping Centre Concept Plan Application (refer to http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=3734).

The Green Square Development, Mascot Station Town Centre Precinct Masterplan and Wolli Creek redevelopment area would all be developed progressively in a staged manner, and would generally be located away from areas potentially affected by construction of the project. Traffic from these developments is therefore unlikely to contribute substantially to cumulative traffic impacts near the project during construction.

Construction traffic management

Appropriate controls would be implemented to reduce and manage traffic-related impacts associated with construction of the project. This would include:

- Scheduling of works and traffic movements outside of peak traffic periods where feasible and reasonable
- Minimising road closure, especially during peak traffic periods
- Maintaining property access or providing an alternative access in consultation with property owners.

A Construction Traffic Management and Safety Plan(s) and traffic control plans would be developed in order to detail the site specific construction vehicle arrangements as well as the safe movement of motorists, cyclists and pedestrians around construction compounds and surface construction works.

Additional construction traffic management measures which would be considered during the development of the Construction Traffic Management and Safety Plan(s) and traffic control plans include:

- The use of temporary traffic signals at heavy vehicle access and egress points
- Siting heavy vehicle egress points where there are downhill grades, where feasible and reasonable
- Stipulating certain emission standards from heavy vehicles used as part of the project
- The use of larger trucks, with greater capacity to reduce the overall number of heavy vehicle movements.

Additional construction traffic management and mitigation measures are provided in **Section 9.4**.

9.3.2 Operation

The M5 Motorway corridor

Travel times and speeds

M5 East Motorway

Travel times and speeds along the M5 East Motorway under the 'with project' scenario in 2021 and 2031, and in 2031 with the complete WestConnex program of works and the future Southern extension have been provided from the WRTM and are presented in **Table 9-41**. Travel times and speeds would improve in 2021 and 2031 under the 'with project' scenario during the AM and PM peak in both directions when compared to the existing (2012) traffic conditions and forecast traffic conditions under the 'without project' scenario for the years 2021 and 2031.

Between 2021 and 2031 under the 'with project' scenario, average travel times on the M5 East Motorway would generally be halved and average travel speeds would generally double during the AM and PM peak in both directions. With the completion of the complete WestConnex program of works and the future Southern extension, average travel times and speeds would improve in both directions during the AM and PM peaks.

The New M5

Estimated average travel times and speeds along the New M5 between King Georges Road and St Peters interchange in 2021 and 2031, and in 2031 with the complete WestConnex program of works and the future Southern extension is presented in **Table 9-42**.

The New M5 would have a posted speed limit of 80 kilometres per hour. With the exception of westbound traffic during the PM peak in 2031 (without the full WestConnex program of works), travel times along the eastbound and westbound carriageways during the AM and PM peak would be about nine minutes at an average speed of about 68 kilometres per hour.

In 2031 westbound traffic during the PM peak would experience a slightly lower average travel speed of 62 kilometres per hour and average travel times of 10 minutes.

Table 9-41 Comparison of average travel times and speeds along the M5 East Motorway between the existing (2012) case, and 2021 and 2031 under the 'without project' and 'with project' scenarios

Direction	Existing (2012)		2021 (without project)		2021 (with project)		2031 (without project)		2031 (with project)		2031 (with full WestConnex program of works and the future Southern extension)	
	Average travel time (min)	Average speed (km)	Average travel time (min)	Average speed (km)	Average travel time (min)	Average speed (km)	Average travel time (min)	Average speed (km)	Average travel time (min)	Average speed (km)	Average travel time (min)	Average speed (km)
AM peak												
Eastbound	15	42	20	42	11	76	26	32	12	70	11	76
Westbound	10	68	17	49	11	76	23	37	12	70	11	76
PM peak												
Eastbound	12	55	18	47	10	84	26	32	13	65	10	84
Westbound	21	31	19	44	12	70	27	31	15	56	11	76

Source: WDA strategic transport model, 2015

Table 9-42 Comparison of average travel times and speeds along the New M5 in 2021 and 2031 (Kingsgrove to St Peters)

Direction	2021 (with project)		2031 (with project)		2031 (with full WestConnex program of works and the future Southern extension)	
	Average travel time (minutes)	Average speed (kilometres)	Average travel time (minutes)	Average speed (kilometres)	Average travel time (minutes)	Average speed (kilometres)
AM peak						
Eastbound	9	68	9	68	9	68
Westbound	9	68	9	68	9	68
PM peak						
Eastbound	9	68	9	68	9	68
Westbound	9	68	10	62	9	68

Source: WDA strategic transport model, 2015

Network performance

M5 East Motorway

Table 9-43 presents peak hour mid-block traffic volumes and levels of service under the 'with project' scenario for 2021 and 2031 and with the full WestConnex program of works and the future Southern extension. When compared to the mid-block performance in 2021 and 2031 under the 'without project' scenario, performance of the M5 East Motorway is generally shown to improve with the operation of the New M5. The improved level of service during the AM and PM peak in both directions corresponds to a reduction in traffic on the M5 East Motorway as a result of some traffic switching onto the New M5.

With the project, the M5 East Motorway would operate at a level of service D or greater, with the exception of the section between King Georges Road and Bexley Road, which would operate at a level of service E in the westbound direction during the AM peak and in the eastbound direction during the PM peak. This would be an improvement on the 'without project' scenario in 2031, as the M5 East Motorway is anticipated to be a level of service F without the New M5.

With the complete WestConnex program of works and the future Southern extension, the reduction in traffic volumes, and improved level of service along the M5 East Motorway is more apparent. With the full WestConnex program of works and the future Southern extension, the M5 East Motorway would operate at a level of service D or better in both directions during the AM and PM peak.

The traffic volumes presented in **Table 9-43** have been based on surveyed traffic flows under existing traffic conditions. It is recognised that the actual level of service may be lower than what has been predicted based on the surveyed traffic flows, as the level of service only represents the satisfied demand (capacity). As a result of congestion on other sections of the road network downstream of the surveyed locations, the actual demand may be underestimated. The level of service and volume/ capacity ratios should therefore be used as a comparison, or indication of change between scenarios, rather than absolute values.

Table 9-43 Mid-block traffic volumes and level of service along the M5 East Motorway in 2021 with the project and 2031 with the full WestConnex program of works

Location	Direction	2021 (without project)			2021 (with project)			2031 (without project)			2031 (with project)			2031 (with full WestConnex program of works and the future Southern extension)		
		LV	HV	LoS	LV	HV	LoS	LV	HV	LoS	LV	HV	LoS	LV	HV	LoS
AM peak																
M5 East Motorway, east of King Georges Road	Eastbound	2970	360	E	2110	180	C	2710	480	E	2110	300	C	1910	130	C
	Westbound	3390	360	E	2400	140	C	3560	350	F	3150	380	E	1990	50	C
M5 East Motorway, east of Bexley Road (in tunnel)	Eastbound	3370	440	F	2720	250	D	3200	550	F	2850	380	D	2500	200	D
	Westbound	2860	430	E	1790	170	C	2910	480	E	2360	400	D	1220	70	B
M5 East Motorway, at Cooks River	Eastbound	2510	380	D	2010	260	C	2360	500	D	2080	400	D	2580	480	D
	Westbound	2830	330	D	2320	150	C	3000	440	E	2740	340	D	2690	450	D
PM peak																
M5 East Motorway, east of King Georges Road	Eastbound	3390	230	E	2670	60	D	3630	200	E	3260	270	E	2980	30	D
	Westbound	3390	460	F	2730	240	D	3220	580	F	2780	400	D	2380	170	C
M5 East Motorway, east of Bexley Road (in tunnel)	Eastbound	3430	240	E	2300	40	C	3390	330	E	3110	260	D	2610	20	C
	Westbound	3100	360	E	2100	130	C	2950	460	E	2390	290	D	1620	50	B
M5 East Motorway, at Cooks River	Eastbound	2720	180	D	2450	110	C	3060	310	D	2940	310	D	3190	80	D
	Westbound	2390	320	D	1830	180	C	2340	430	D	2050	340	D	1520	140	B

LV-light vehicles, HV-heavy vehicles, LoS-Level of Service

The New M5

As the New M5 would be a new motorway, the theoretical mid-block capacity for a single lane of a freeway of 2250 passenger car units per hour per lane has been adopted.

The mid-block traffic volumes and levels of service under the 2021 'with project' and 2031 'with project' scenarios are presented in **Table 9-44** and show that the New M5 is forecast to operate at an acceptable level of service with spare capacity during the AM and PM peak in 2021 and 2031.

The mid-block traffic volumes and levels of service under the 2031 'with full WestConnex program of works and the future Southern extension' scenario are presented in **Table 9-45**.

With the introduction of a future Southern extension, traffic on the New M5 to the west of the future Southern extension is forecast to decrease with a corresponding improvement to the level of service.

Despite increases in traffic volumes on the section of the New M5 between the future Southern extension and the St Peters interchange are forecast to increase compared to the 2031 'with project' scenario, the New M5 is still expected to operate at a good level of service with spare capacity during the peak hours in 2031.

Table 9-44 Mid-block traffic volumes and level of service for the New M5 in 2021 and 2031

Location and direction		Theoretical mid-block capacity	2021				2031			
			LV	HV	v/c	LoS	LV	HV	v/c	LoS
AM peak										
New M5	Eastbound	4500	1260	160	0.36	B	1440	230	0.43	B
	Westbound	4500	490	80	0.15	A	640	120	0.20	A
PM peak										
New M5	Eastbound	4500	680	110	0.20	A	950	150	0.28	B
	Westbound	4500	1300	150	0.36	B	1590	230	0.46	C

LV – light vehicles, HV – heavy vehicles. LoS – level of service

Table 9-45 Mid-block traffic volumes and level of service for the New M5 in 2031 with the full WestConnex program of works and the future Southern extension

Location	Direction	Theoretical capacity	Light vehicles	Heavy vehicles	v/c	LoS
AM peak						
New M5, west of the future Southern extension	Eastbound	4500	850	120	0.25	A
	Westbound	4500	1160	140	0.32	B
New M5, between the future Southern extension and St Peters interchange	Eastbound	9000	3290	250	0.43	B
	Westbound	9000	1850	160	0.25	A
PM peak						
New M5, west of the future Southern extension	Eastbound	4500	750	90	0.21	A
	Westbound	4500	1440	220	0.42	B
New M5, between the future Southern extension and St Peters interchange	Eastbound	9000	1840	160	0.24	A
	Westbound	9000	4830	310	0.61	C

Impacts to the performance of the King Georges Road Interchange

The King Georges Road Interchange Upgrade project includes the provision of on ramps to, and off ramps from the New M5. The King Georges Road Interchange is expected to operate at a level of service F, irrespective of whether the New M5 is constructed or not.

The results of the traffic and transport assessment undertaken for the King Georges Road Interchange Upgrade project (Jacobs, 2014) indicated in 2027 (10 years after opening), the interchange would operate at a level of service F in the AM and PM peak without the upgrade and with all components of the WestConnex program of works completed, as well and the future Southern extension. With the completion of the WestConnex program of works and the future Southern extension, average traffic delays at the interchange would be reduced, despite it continuing to operate at a level of service F.

The New South Wales Government has committed funding to fix pinch points along key Sydney road corridors to improve road network performance. The pinch points program includes funding for works along King Georges Road at its intersection with Broadarrow Road and Stoney Creek Road. Details of potential upgrade works at these intersections have yet to be finalised, however it is expected any improvements to the operation of these intersections would likely contribute to improved performance of the King Georges Road Interchange.

Impacts to public and active transport infrastructure and facilities

As discussed in **Section 9.2.2**, there is a planned rapid bus route between Hurstville and Macquarie Park via Burwood (current route M41), with a commitment to deliver bus priority along the corridor, including on Stoney Creek Road and Bexley Road. The forecast increase in traffic volumes along these roads will be reviewed as part of an operational traffic review undertaken on the surrounding arterial roads and major intersections about 12 months after the commencement of operation of the project. Roads and Maritime and TfNSW will continue to work together to deliver Sydney's Bus Future, with the surface road network being adapted to include bus priority measures already identified, as well as those identified at a future date.

The configuration of carriageways within the M5 Motorway corridor would be modified to accommodate the western surface works and would involve reducing the width of the shoulders. As a result, cyclists would be unable to use the M5 Motorway corridor east of King Georges Road due to safety considerations. Cyclists would be diverted onto parallel off-road shared path facilities within Beverly Grove Park.

The shared path within Beverly Grove Park would be permanently realigned to the north and south to accommodate the western surface works and the Kingsgrove motorway operations complex (MOC1). The realignment of this shared path would not restrict its use. Modifications to pedestrian and cycling facilities around the western surface works as part of the project is described in more detail in **Section 5.4**.

Road safety

Forecast crash statistics along the M5 East Motorway corridor under the 'with project' and 'without project' scenarios in 2021 and 2031 are presented in **Table 9-46**. These forecasts have been prepared assuming that the future frequency, type and severity of crashes on the M5 East Motorway and the New M5 would be consistent with historic trends.

In the 2031 under the 'full WestConnex program of works and the future Southern extension' scenario, the total number and cost of crashes is roughly the same as under the 2031 'with project' scenario. While there is more traffic on the section of the New M5 between the St Peters interchange and the future Southern extension, this is balanced out by the reduction on the section between the western portals and the future Southern extension.

Forecast crash statistics show the number and cost of crashes would continue to increase, which is a result of general traffic growth. Given the forecast reduction in daily traffic on the M5 East Motorway with the implementation of the New M5, the number and cost of crashes would reduce. Operation of the project is not expected to have a significant impact on road safety

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Table 9-46 Forecast crash statistics along the M5 East Motorway corridor

Road	Section from	Section to	Section length (kilometres)	Average daily Traffic (vehicles)	Average annual crashes	Average annual cost ($AUD)
2021 'without project'						
M5 East Motorway	King Georges Road	General Holmes Drive	9.5	87,640	108	$17,880,031
2021 'with project'						
M5 East Motorway	King Georges Road	General Holmes Drive	9.5	67,170	82	$13,704,111
New M5	Western portal	St Peters interchange	8.8	28,900	11	$1,646,199
Total					93	$15,350,310
2031 'without project'						
M5 East Motorway	King Georges Road	General Holmes Drive	9.5	95,600	117	$19,503,875
2031 'with project'						
M5 East Motorway	King Georges Road	General Holmes Drive	9.5	81,390	100	$16,604,778
New M5	Western portal	St Peters interchange	8.8	34,230	39	$1,949,778
Total					139	$18,554,459
2031 'full WestConnex and the future Southern extension'						
M5 East Motorway	King Georges Road	General Holmes Drive	9.5	73,070	90	$14,907,512
New M5	Western portal	The future Southern extension	5.8	29,290	22	$1,095,741
New M5	The future Southern extension	St Peters interchange	2.9	80,520	30	$1,540,474
Total					142	$17,543,727

Impacts to the arterial road network

In 2021 and 2031 under the 'with project' scenario, changes to localised traffic volumes are expected within the traffic and transport study area. The project may result in some changes to daily traffic volumes and performance of the regional road network.

A screenline analysis has been undertaken to examine how traffic patterns along the adjacent arterial road network may change as a result of the operation of the project in 2021 and 2031, and with the operation of the full WestConnex program of works and the future Southern extension. Two screenlines, which represent theoretical boundaries specifically designed to collectively analyse directional and two-way traffic volume outputs from the different modelling scenarios have been established:

- The western screenline, which captures east-west traffic volumes on the M5 East Motorway corridor west of the New M5 tunnels and three parallel roads: Canterbury Road, Stoney Creek Road and Forest Road / Queens Road. The M5 East Motorway corridor location includes traffic using the New M5 in the 'with project' scenarios
- The eastern screenline, which captures traffic on the New M5 (east of the future Southern extension stub tunnels) and four parallel roads: the Princes Highway, Marsh Street, the M5 East Motorway and General Holmes Drive (all in the vicinity of the Cooks River).

A comparison of the two-way traffic volumes and traffic share in 2021 and 2031 with the project and full WestConnex program of works and the future Southern extension is provided in **Table 9-47**.

Impacts to the broader transport network in 2021 and 2031 under the 'with project' scenario

The project would result in changes to localised traffic volumes within the M5 East Motorway corridor under the 'with project' scenario in 2021 and 2031. These changes would be due to traffic switching to the New M5 and other parallel arterial roads, such as King Georges Road, Stoney Creek Road, Forest Road and Canterbury Road. It is expected that traffic switching to parallel arterial roads may be partly a result of the introduction of tolls onto the M5 East Motorway. This is likely to occur outside of peak traffic periods to avoid the proposed toll. This is not expected to have an impact from a traffic perspective in terms of congestion, as there is generally spare capacity across the network in off-peak periods.

Along the western screenline:

- The total two-way daily traffic volumes would reduce by about two per cent in 2021 and increase by about six per cent with the project in 2031
- The share of two-way daily traffic on the M5 East Motorway corridor would reduce by seven per cent in 2021 and a three per cent in 2031. This traffic is expected to shift to parallel arterial roads, mainly Stoney Creek Road and Canterbury Road. The increase in traffic on Stoney Creek Road with the project compared to without the project is less pronounced in the peak hours than over the course of the day as the peak hour spare capacity on Stoney Creek Road is limited.
- The M5 East Motorway corridor would continue to carry about 50 per cent of the total two-way traffic.
- Along the eastern screenline:
- The total two-way daily traffic volumes at the screenline would remain similar in 2021 with the project. In 2031, traffic volumes would increase by about four per cent with the project
- The M5 East Motorway share of two-way daily traffic would reduce by about six per cent with the project in 2021, and by about four per cent in 2031. Traffic shifting would include:
  - The shift of additional traffic to the New M5 and General Holmes Drive
  - A reduction in the share of traffic using the Princes Highway, and Marsh Street.

Impacts to the broader transport network in 2031 with the operation of the Full WestConnex program of works and the future Southern extension

With the operation of the full WestConnex program of works and the future Southern extension, traffic volumes and the share of total traffic along the western and eastern screenlines are expected to reduce due to the switching of traffic to the M4-M5 Link and the future Southern extension, and to parallel arterial roads.

Along the western screenline:

- The two-way daily traffic volumes at the screenline would be reduced by about 10 per cent as a result of traffic using the M4-M5 Link and the future Southern extension.
- Daily traffic on the M5 East Motorway corridor would reduce by about 24 per cent.
- The M5 East Motorway corridor share of two-way traffic is forecast to reduce by about eight per cent, with the majority of this traffic shifting on to Stoney Creek Road. The increase in traffic on Stoney Creek Road with the project compared to without the project is less pronounced in the peak hours than over the course of the day as the peak hour spare capacity on Stoney Creek Road is limited.

Along the eastern screenline:

- The New M5 share of two-way daily traffic crossing the screenline is forecast to be 21 per cent. The total 2031 two-way daily volume on the New M5 at the screenline is forecast to be about 134 per cent more than in the 2031 'with project' scenario. This is due to traffic using the M4-M5 Link and the future Southern extension.
- Once the full WestConnex program of works and the future Southern extension is operational, the total 2031 two-way daily volume at the screenline is forecast to be about two per cent more than in the 2031 'without project' scenario. These changes would be minimal and within daily traffic limits of traffic volume changes on the road network.
- Some of the traffic forecast to use the New M5 would shift from General Holmes Drive (six per cent decrease) and the M5 East Motorway (nine per cent decrease). The total 2031 two-way daily volume on the Princes Highway is forecast to be about 69 per cent less than in the 2031 'without project', resulting in a significant reduction.

Table 9-47 Two-way comparison of screenlines in 2021 and 2031 with and without the project and with the full WestConnex program of works in 2031

Location	2021					2031							
	Without project	Share (per cent)	With project	Share (per cent)	Per cent change (with project)	Without project	Share (per cent)	With project	Share (per cent)	Per cent Change (with project)	Full WestConnex program of works and the future Southern extension	Share (per cent)	Change (with project)
Western screenline													
Two-way Canterbury Road	47,849	22	51,583	24	8	55,958	23	57,163	22	2	56,799	26	2
M5 East Corridor (including M5 East Motorway and New M5)	115,889	53	98,528	46	-15	118,651	50	118,688	47	0	90,175	42	-24
Stoney Creek Road	27,045	12	36,297	17	35	32,820	14	47,068	18	43	38,420	18	17
Forest Road / Queens Road	28,731	13	28,800	13	0	32,066	13	31,610	12	-1	30,984	14	-3
Total	219,514		215,208		-2	239,494		254,530		6	216,379		-10
Eastern screenline													
Princes Highway	72,415	21	68,388	20	-6	79,085	20	75,628	19	-5	24,950	6	-69
New M5	–	–	29,339	9	–	–	–	34,748	9	–	81,739	21	
Marsh Street	75,979	22	66,723	19	-12	92,805	24	86,501	22	-7	97,563	25	5
M5 East Motorway	101,554	29	80,775	23	-20	109,634	28	95,208	24	-13	86,763	22	-21
General Holmes Drive	95,018	28	99,706	29	5	104,804	27	108,233	27	3	101,722	26	-3
Total	344,966		344,931		0	386,328		400,318		4	392,737		2

Area around the St Peters interchange and local road upgrades

Travel times

Table 9-48 provides a comparison of travel times through the network modelled around the St Peters interchange and local road upgrades in 2021 with and without the project, and in 2031 without the project and with the full WestConnex program of works and the future Southern extension.

In 2021 with the project, and in 2031 with the full WestConnex program of works and the future Southern extension, travel times along the New M5 to north of Euston Road would be significantly faster in comparison to travel times along the Princes Highway. In 2021, travel times along the Princes Highway in the AM peak would be similar with and without the project. There would be some minor travel time improvements along the Princes Highway during the PM peak with the project.

With the full WestConnex program of works and the future Southern extension in 2031, travel times would significantly improve along the Princes Highway during the AM and PM peak. Travel time savings along the Princes Highway would be due to a reduction in congestion as a result of traffic shifting from the Princes Highway to the WestConnex motorway network (including the Sydney Gateway).

Table 9-48 Comparison of average peak travel times along the Princes Highway and the New M5 in 2021 with and without the project and in 2031 without the project and with the Full WestConnex program of works and Southern extension during the AM and PM peak

From	To	Average travel time (minutes)				
		Existing (2012)	2021 'without project'	2021 'with project'	2031 'without project'	2031 'with full WestConnex program of works and the future Southern extension'
AM peak						
Princes Highway (south of Railway Road)	North of Euston Rd	10:30	22:00	21:30	25:30	24:30
WestConnex*	North of Euston Rd	-	-	6:00	-	6:00
Princes Highway North (King St)	Sydney Airport Domestic Terminal	13:00	14:00	14:00	44:30	15:00
PM peak						
Princes Highway (south of Railway Road)	North of Euston Rd	8:00	14:00	9:00	38:00	9:30
WestConnex*	North of Euston Rd	-	-	6:00	-	6:30
Princes Highway North (King St)	Sydney Airport Domestic Terminal	15:30	17:30	14:30	45:00	13:00

*Taken from an equivalent distance to the Princes Highway (south of Railway Road)

Network performance

Road network performance

The performance of local roads around St Peters interchange in 2021 under the 'with project' scenario compared to road network performance without the project in 2021 and 2031, and with the full WestConnex program of works and the future Southern extension in 2031 is presented in **Table 9-49**.

In 2021, the performance of the road network is similar under the 'with project' and 'without project' scenarios. During the AM peak, the average travel time per vehicle through the core modelled road network around the St Peters interchange with the project is similar to travel times without the project; however, there would be a minor increase in average traffic speeds (refer to **Table 9-49**). During the PM peak in 2021 under the 'with project' scenario, there would be a large improvement in road network performance on local roads around the St Peters interchange. The average travel times and speeds would improve during the PM peak, indicating a reduction in congestion (refer to **Table 9-49**).

Under the 'with project' scenario in 2031, local roads would only be able to accommodate about 80 per cent of the total traffic demand if not further capacity is added to the road network. This additional capacity could be achieved by completing the WestConnex program of works and the future Southern extension, particularly the M4-M5-Link.

By 2031, it is expected that with the project, traffic entering the local road network from St Peters interchange would increase the total traffic demand along local roads by about 20 per cent in the PM peak. In addition, it is expected that urban and residential development at Green Square, Mascot and nearby suburbs would generate additional traffic that would also need to be accommodated in the local road network.

The total network traffic demand between 2021 and 2031 under the 'with project' scenario would increase by about 17 per cent in the AM peak and 16 per cent in the PM peak. In the absence of the development of the full WestConnex program of works and the future Southern extension, additional network upgrades would be required to accommodate the 2031 'with project' traffic demand in the St Peters interchange area.

Under the 'full WestConnex program of works and the future Southern extension' scenario in 2031, there would be a significant increase in total traffic demand during the AM and PM peak (refer to **Table 9-49**). Although total traffic demand would increase, the completion of the WestConnex program of works and the future Southern extension, including the Sydney Gateway would provide enough additional capacity on the road network to effectively distribute and accommodate the predicted increases in traffic on the local road network around St Peters interchange. As a result, there would be significant increases in travel speeds through the local road network, and a reduction in the average travel times.

Table 9-49 Comparison of the road network performance for the in 2021 with and without the project and 2031 without the project and with the full WestConnex program of works and the future Southern extension on local roads around the St Peters interchange

Network measure	2021 (without project)	2021 (with project)	Per cent change (with project)	2031 (without project)	2031 (with full WestConnex program of works and the future Southern extension)	Per cent change (with full WestConnex program of works and the future Southern extension)
AM peak						
All vehicles						
Total traffic demand (vehicles)	23,800	25,290	+6	27,000	34,520	+28
Total vehicle kilometres travelled in network (km)	66,400	74,860	+13	72,500	117,330	+62
Total time travelled in network (hours)	3510	3380	-4	3,840	4,360	+14
Total number of stops	170,600	156,270	-8	160,600	175,140	+9
Average per vehicle						
Average vehicle kilometres travelled in network (km)	2.8	3.0	+6	2.7	4.6	+72
Average time travelled in network (minutes)	8.8	8.0	-9	8.5	7.6	-11
Average number of stops	7.2	6.2	-14	5.9	5.1	-14
Average speed (km/h)	18.9	22.1	+17	18.9	26.9	+42
Unreleased vehicles						
Unreleased demand (vehicles)	980	710	-27	2530	1,000	-60
Per cent of total traffic demand	4	3	-	9	3	-
PM peak						
All vehicles						
Total traffic demand (vehicles)	24,800	26,320	+6	27,600	36,720	+33
Total vehicle kilometres travelled in network (km)	67,000	76,720	+15	72,800	125,120	+72
Total time travelled in network (hours)	2900	2,860	-1	4470	4,420	-1
Total number of stops	124,100	129,480	+4	172,700	173,530	+0

Network measure	2021 (without project)	2021 (with project)	Per cent change (with project)	2031 (without project)	2031 (with full WestConnex program of works and the future Southern extension)	Per cent change (with full WestConnex program of works and the future Southern extension)
Average per vehicle						
Average vehicle kilometres travelled in network (km)	2.7	2.9	+8	2.6	4.8	+83
Average time travelled in network (minutes)	7.0	6.5	-7	9.7	7.2	-26
Average number of stops	5.0	4.9	-2	6.3	4.7	-25
Average speed (km/h)	23.1	26.8	+16	16.3	28.3	+74
Unreleased vehicles						
Unreleased demand (vehicles)	520	50	-90	2,200	270	-88
Per cent of total traffic demand	2	0	-	8%	1	-

Intersection performance on local roads around the St Peters interchange

A summary of intersection performance on local roads around the St Peters interchange in 2021 with the project and in 2031 with the full WestConnex program of works and the future Southern extension is shown on **Table 9-50**.

Under the 'with project' scenario in 2021, the performance of intersections along the Princes Highway with Campbell Street, Canal Road and Railway Road would operate at a level of service F as a result of additional traffic demand. The queuing at these intersections would impact on the performance of other intersections along the Princes Highway, including the Princes Highway / Sydney Park Road and Princes Highway / May Street intersections.

In 2031 under the 'full WestConnex program of works and the future Southern extension' scenario, intersection performance at intersections along the Princes Highway would improve due to the reduction in forecast traffic demand.

The Princes Highway/ Railway Road and Gardeners Road/ O'Riordan Street intersections would continue to operate at a level of service F in 2021 and 2031 under the 'with project' and 'without project' scenarios.

The New South Wales Government is committed to fixing pinch points along key Sydney road corridors to improve road network performance. Funding has been committed for works along the Princes Highway as part of the 'Gateway to the South', Sydney to Illawarra Pinch Point program. Details of this work have yet to be finalised, but it is expected that any improvements to the operation of these intersections would likely lead to improved performance to local roads around the St Peters interchange.

Two intersections have been included in the network performance modelling around the St Peters interchange and local road upgrades which would not be upgraded or modified as part of the project; the Sydney Park / Mitchell Road and the Princes Highway / May Street intersections.

Additional measures may be required at these two intersections to allow traffic to move around the local road network as modelled. The options, described below, are an example of the types of measures which could be implemented to deter any undesirable movements through the wider road network should they occur.

Roads and Maritime would monitor the traffic movements at these locations closely upon opening of the New M5 and, if required and subject to the successful outcome of further consultation with the local councils, stakeholders and community, plan to implement localised schemes, subject to separate assessment and approval.

The following describes a suggested intersection treatment at these locations and why they have been included in the modelling:

- Prohibition of right-hand turn movements from Mitchell Road into Sydney Park Road. The local road upgrades would result in the prohibition of right-hand turn movements from Sydney Park Road southbound onto Euston Road. As a result, some additional through traffic could travel through the area to the west of Euston Road. By restricting the right-hand turn at the intersection of Mitchell Road and Sydney Park Road, this movement would be prohibited for general traffic and would limit these additional movements through the area. This could also be achieved by implementing other alternative measures outside of the modelling area
- Alterations to the layout of the Princes Highway / May Street intersection to only allow left-in and left-out turning movements at May Street to prevent traffic travelling southbound to turn right onto May Street from the Princes Highway. As part of the project, an alternative route to provide access to May Street has been provided by allowing vehicles to turn right at the Princes Highway / Campbell Street intersection, which is currently prohibited.

Table 9-50 Intersection performance on local roads around the St Peters interchange in 2021 with the project and in 2031 with the full WestConnex program of works and the future Southern extension

Intersection	Existing (2012)	2021		2031	
		Without project	With project	Without project	Full WestConnex program of works and the future Southern extension
AM peak					
Princes Highway / Sydney Park Road	C	B	C	F	C
Princes Highway / May Street	E	B	C	C	A
Princes Highway / Campbell Street	D	C	E	D	F
Princes Highway / Canal Road	E	C	F	F	C
Princes Highway / Railway Road	F	F	F	F	F
Sydney Park Road / Mitchell Road	C	B	D	B	D
Euston Road / Sydney Park Road / Huntley Street	A	A	C	A	C
Unwins Bridge Road / Campbell Street	C	B	C	B	D
Campbell Road / Euston Road	A	A	C	A	D
Campbell Road / Bourke Road	-	-	C	-	D
Ricketty Street / Kent Street	-	-	C	-	B
Gardeners Road / Kent Street*	-	-	C	-	C
Gardeners Road / Bourke Road	C	C	D	D	D
Gardeners Road / O'Riordan Street	E	F	F	F	F
PM peak					
Princes Highway / Sydney Park Road	D	F	C	F	C
Princes Highway / May Street	D	D	A	D	A
Princes Highway / Campbell Street	D	C	E	F	E
Princes Highway / Canal Road	F	E	D	F	C
Princes Highway / Railway Road	E	F	D	F	F
Sydney Park Road / Mitchell Road	D	B	D	D	D
Euston Road / Sydney Park Road / Huntley Street	D	A	C	E	C

Intersection	Existing (2012)	2021		2031	
		Without project	With project	Without project	Full WestConnex program of works and the future Southern extension
Unwins Bridge Road / Campbell Street	C	C	D	F	D
Campbell Road / Euston Road	A	A	D	F	E
Campbell Road / Bourke Road	-	-	B	-	E
Ricketty Street / Kent Street	-	-	C	-	C
Gardeners Road / Kent Street*	-	-	B	-	C
Gardeners Road / Bourke Road	C	C	D	E	F
Gardeners Road / O'Riordan Street	D	D	F	F	F

Source: AECOM (2015)
* These intersections are either new or substantially changed as a result of the project and so were not reported on in the base or without project scenarios.

Impacts to road network performance on routes adjacent to the traffic and transport study area

Changes in peak hour traffic volumes on traffic routes adjacent to the traffic and transport study area in 2021 with the project, and in 2031 with the full WestConnex program of works and the future Southern extension is provided in **Table 9-51**.

With the operation of the project in 2021, increased peak hour volumes are forecast along Railway Road, Euston Road (north of Sydney Park Road), Edgeware Road and Gardeners Road in the AM and PM peak periods. Similar or slightly reduced peak hour volumes are generally forecast along King Street and Princes Highway (south of Railway Road) in the AM and PM peak periods.

In 2031 with the operation of the full WestConnex program of works and the future Southern extension, increased peak hour volumes are generally forecast along Railway Road, Euston Road (north of Sydney Park Road), Edgeware Road and Gardeners Road in both the AM and PM peak periods. Reduced peak hour volumes are forecast along Princes Highway (south of Railway Road), while similar or reduced flows along King Street northbound and increased flows along King Street southbound are forecast, in AM and PM peak periods.

Table 9-51 Changes to mid-block traffic flows on traffic routes adjacent to the traffic and transport study area near the St Peters interchange and local road upgrades in 2021 with the project and in 2031 with the full WestConnex program of works and the future Southern extension

Location	Direction	2021 'without project'	2021 'with project'	Change in flow (per cent)	2031 'without project'	2031 'full WestConnex program of works and the future Southern extension'	Change in flow (per cent)
AM peak							
King Street, south of Alice Street	Northbound	880	800	-10	1100	870	-21
	Southbound	560	620	11	450	730	62
Railway Road, west of Princes Highway	Eastbound	540	590	9	490	650	33
	Westbound	630	730	16	630	990	57
Princes Highway, south of Railway Road	Northbound	2,590	2580	0	2550	2180	-15
	Southbound	1060	980	-8	1150	550	-52
Euston Road, north of Sydney Park Road	Northbound	1050	1950	86	990	2120	114
	Southbound	790	1110	41	970	1580	63
Edgeware Road, west of Edinburgh Road	Eastbound	720	780	8	760	820	8
	Westbound	770	910	18	830	920	11
Gardeners Road, west of O'Riordan Street	Eastbound	1230	1350	10	1280	1790	40
	Westbound	1150	1150	0	1150	1410	23
PM peak							
King Street, south of Alice Street	Northbound	830	910	10%	890	940	6
	Southbound	1030	1010	-2%	980	1210	23
Railway Road, west of Princes Highway	Eastbound	640	910	42%	700	680	-3
	Westbound	1150	1490	30%	1280	1910	49
Princes Highway, south of Railway Road	Northbound	1710	1760	3%	1660	720	-57
	Southbound	2390	2360	-1%	2310	2110	-9
Euston Road, north of Sydney Park Road	Northbound	820	1280	56%	780	1530	96
	Southbound	1340	1940	45%	1500	2160	44
Edgeware Road, west of Edinburgh Road	Eastbound	1060	1090	3%	1030	1110	8
	Westbound	830	1030	24%	730	1040	42
Gardeners Road, west of O'Riordan Street	Eastbound	1410	1570	11%	1560	1650	6
	Westbound	1060	1270	20%	1140	1660	46

Impacts to property access and on-street parking

The operational footprint required to accommodate the local road upgrades would require permanent property acquisition, including land currently used for residential and commercial parking (refer to **Section 13.3.2**). A summary of the indicative impact on on-street (and some off-street) parking is summarised in **Table 9-52**. Most of the parking provisions that would be permanently removed would be located along non-residential roads. The final numbers would be confirmed during detailed design. Given the location of car parking spaces that would be lost, and the changes to land use (refer to **Section 13.3.2**).

Table 9-52 Indicative permanent changes to car parking around the local road upgrades

Road section	Indicative impact
Campbell Street, between Princes Highway and Unwins Bridge Road	Addition of 34 on-street and 26 off-street spaces
Albert Street	Loss of 44 spaces along both sides
Campbell Road, between Barwon Park Road and Burrows Road	Loss of 111 spaces along both sides
Burrows Road, south-west of Campbell Road	Loss of 8 spaces along both sides
Burrows Road, north-east of Campbell Road	Loss of 15 spaces along both sides
Euston Road, north of Sydney Park Road intersection	Loss of 24 spaces along both sides
Huntley Street, east of Euston Road	Loss of 28 spaces along both sides
Princess Highway	Loss of 18 spaces along both sides
May Street	Loss of 38 spaces along both sides
Unwins Bridge Road	Loss of 33 spaces along both sides
Gardeners Road, between Kent Road and cul-de-sac of Gardeners Road	Loss of 47 on-street spaces
Bourke Road, north of Bourke Street / Gardeners Road intersection	Loss of 16 off-street spaces

As part of the local road upgrades, the following car parking facilities would be provided following the opening of the project (refer to **Chapter 5** for more detail):

- On-street parking along Euston Road and Campbell Street
- A new car-park on Campbell Street, catering for 26 cars for use by St Peters Public School.

Impacts to public and active transport infrastructure and facilities

Changes to bus infrastructure

To accommodate construction of the project, some bus stops would be removed and / or relocated as part of the local road upgrades at St Peters and Mascot. Where bus stops are relocated, pedestrian access, including disabled access would be maintained.

The bus stop on Canal Road (southbound) near the corner of the Princes Highway would be permanently relocated further south to allow construction and operation of the Canal Road construction compound (C8) and St Peters motorway operations complex (MOC4).

The existing bus stop on Euston Road northbound, south of the intersection with Maddox Street, would be temporarily relocated throughout the upgrade of Euston Road and Maddox Street. The bus stop would be reinstated following upgrade of Euston Road.

Due to their location, the following bus stops would be temporarily removed at the start of construction and reinstated in a similar location at the earliest possible time during construction:

- Princes Highway (southbound) outside 136 Princes Highway, St Peters
- Bourke Road (northbound) outside 81A to 83 Bourke Road, Mascot
- Bourke Road (northbound) outside 520-530 Gardeners Road, Mascot
- Gardeners Road (eastbound) outside 538 to 540 Gardeners Road. Mascot.

Changes to bus services

Bus services operating through the St Peters study area may experience impacts as a result of the forecast changes in traffic volumes and local road upgrades. Modelling has been undertaken to assess the travel time impact for these buses.

A summary of the changed travel times for the bus routes planned to be in operation in 2021 with the project is provided in **Table 9-53**.

There are 22 bus services crossing the St Peters area, including several 'Suburban' tier strategic routes, identified in Sydney's Bus Future as among the city's most important bus corridors. Of these 22 services, 15 PM peak services would experience a travel time improvement in 2021 with the opening of the project. Six of these bus services would experience improvements in travel time by more than 20 per cent or better for the sections of the route running through the area, in comparison with a future scenario without the project in 2021. Ten bus services are expected to experience improved AM peak travel times in 2021 with the opening of the project through the area, in comparison with a future scenario without the project.

The travel times of some bus routes would increase, while others would improve. While some of the increased travel time is due to additional traffic, changed conditions on the network (eg Sydney Park Road / Euston Road intersection changing from the current roundabout control to traffic signals) would also affect bus travel times.

The travel times of some bus routes would increase, while others would improve. While some of the increased travel time is due to additional traffic, changed conditions on the network (eg Sydney Park Road / Euston Road intersection changing from the current roundabout control to traffic signals) would also affect bus travel times. It is also noted that the buses travelling through the modelled network have origins and destinations further afield and therefore the travel time changes (ranging from a saving of 9.6 minutes to an increase of 3.3 minutes) should be seen in the context of the longer journey times and distances.

Transport for NSW has identified the following planned 'Suburban' routes, which have target average speeds, including dwell times, of 18 to 25 kilometres per hour: These would be delivered under TfNSW's Bus Strategic Operations Plan.

- Burwood to Bondi Junction via Sydenham (current route 418)
- Burwood to Bondi Junction via Sydney Airport (current route 400)
- Lane Cove to Eastgardens via Botany Rd (new route)
- Chatswood to Sydney Airport via Botany Road (new route replacing the M20)
- Miranda to Bondi Junction via Sydney Airport (new route)
- Hurstville to Sydney CBD via Newtown (current route 423).

An increase in vehicles on the St Peters road network would result in lower travel speeds and associated increased delays at intersections.

If the New M5 project was not constructed, the following impacts to bus services around the St Peters interchange and local road upgrades would potentially be experienced:

- An increase in bus service travel times due to slower travel speeds and increased intersection delays
- More frequent delays to services caused by traffic incidents and congestion in the project area
- The potential for crashes caused by buses stopping to pick-up and drop-off passengers would increase in proportion to the expected growth in traffic
- Longer travel times to and from bus stops by supplementary travel modes (e.g. car passenger, walking to / from bus stop, etc) due to an increase in traffic volumes, slower travel speeds and increased intersection delays
- Reduced amenity for bus users waiting at stops. An increase in traffic would result in impacts including a reduction in pedestrian roadside safety.

The project offers a flexible design which does not preclude any bus priority measures being included in the future. Roads and Maritime and TfNSW will continue to work together to deliver *Sydney's Bus Future* in this area, and the surface road network can be adapted to include measures identified at a future date.

Table 9-53 Changes to bus travel times in 2021 with the project

Route	Direction	AM Peak		PM Peak	
		Travel time difference with the project (minutes)	Change in travel time (per cent)	Travel time difference with the project (minutes)	Change in travel time (per cent)
5	Northbound	0.6	5	0.7	6
	Southbound	1.4	11	-0.2	-1
305	Northbound	2.8	25	2.6	24
	Southbound	-0.2	-1	0.0	0
308	Eastbound	0.0	0	-3.4	-33
	Westbound	1.5	24	-0.1	-2
309	Northbound	0.6	6	-0.6	-5
	Southbound	-0.2	-2	-0.6	-6
310	Northbound	-0.1	-1	-1.0	-8
	Southbound	-0.4	-5	-0.6	-6
348	Eastbound	1.4	8	-6.0	-29
	Westbound	-0.7	-5	0.7	5
370	Eastbound	-0.6	-7	-3.8	-35
	Westbound	2.5	33	3.3	48
400	Eastbound	-0.8	-4	0.5	2
	Westbound	0.1	0	-3.6	-14
410	Eastbound	-0.6	-3	-1.4	-8
	Westbound	1.7	8	-0.6	-3
418	Eastbound	-6.0	-19	-9.6	-33
	Westbound	0.3	2	2.1	13
422	Northbound	1.4	9	-6.4	-36
	Southbound	-2.2	-15	-4.0	-26

Source: AECOM (2015)

Active transport

The local road upgrades would include new and upgraded pedestrian and cycle infrastructure. This infrastructure has been designed to maintain and enhance pedestrian and cyclist accessibility and connectivity, particularly around the St Peters interchange and Sydney Park.

The most significant new infrastructure would be the construction of a pedestrian and cycle bridge across the on and off ramps at the St Peters interchange and construction of a grade-separated pedestrian and cycle bridge across Campbell Road. This would provide east-west connectivity across Alexandra Canal connecting the Bourke Road cycleway to St Peters at Unwins Bridge Road.

Other key pedestrian and cycle infrastructure to be delivered as part of the local road upgrades would include:

- A shared path along the western side of Euston Road between Campbell Road and Sydney Park Road
- An on-road cycle lane along Bourke Road between Campbell Road and Church Avenue
- Retention of the on-road cycle lane on Bourke Road, north of the Campbell Road extension
- Provision of footpaths along all local roads upgraded as part of the project.

The upgrades to pedestrian and cycle infrastructure would provide for a safe cyclist and pedestrian environment by minimising the interface of cyclists and pedestrians with vehicular traffic, and would also provide a regional cycle connection between Mascot and Marrickville.

Three new pedestrian pathways would also be provided around the St Peters interchange to enhance pedestrian connectivity:

- Parallel to the Princes Highway along the north-western site boundary, providing a pedestrian connection between the Princes Highway at the intersection of Canal Road and Campbell Street, near the intersection of Albert Street
- Along the northbound (western) side of Canal Road
- Between the future Sydney Gateway and the Princes Highway, providing a pedestrian connection between the future Sydney Gateway crossing of Canal Road with the Princes Highway at the intersection with Canal Road.

Road safety

Forecast crash statistics on local roads around St Peters interchange under the ‘with project’ and ‘without project’ scenarios in 2021 and 2031, as well as 2031 under the ‘full WestConnex program of works and the future Southern extension’ scenario are presented in **Table 9-54**. The frequency of crashes would be expected to change in proportion to the forecast traffic changes, as well as the intersection and road upgrades planned as part of the project.

Daily traffic on the Princes Highway, Canal Road / Ricketty Street / Gardeners Road and Bourke Road is generally forecast to decrease in the 2021 under the ‘with project’ scenarios compared to the ‘without project’ scenarios. This in combination with the planned intersection upgrades would result in a decrease in the total number and cost of crashes.

About 85 per cent of crashes on Euston Road are at the Euston Road / Sydney Park Road intersection. This intersection would be signalised as part of the local road upgrades and would be an effective approach to reducing the number of incidents by an estimated 30 per cent. Nonetheless, an increase in the total number and cost of crashes is still expected on Euston Road due to an increase in forecast traffic.

In 2031 under the ‘full WestConnex program of work’ scenario, the forecast increase in traffic on Euston Road would result in an increase in the total number and cost of crashes on Euston Road, south of Sydney Park Road. However, the significant decrease in daily traffic forecast on the Princes Highway and Canal Road / Ricketty Street / Gardeners Road, in combination with the intersection upgrades as part of the local road upgrades to the local road network would result in a significant reduction in the total number and cost of crashes on these roads.

Table 9-54 Comparison of forecast crash statistics with and without the project in 2021 and 2031

Road	Section length (km)	ADT (vehicles)	Average annual crashes	Average annual cost
2021 (without project)				
Princes Highway between Enmore Road and Gannon Street	3.8	62,840	100	$22,289,840
Canal Road / Ricketty Street / Gardeners Road, between the Princes Highway and Botany Road	2.4	47,280	59	$11,410,421
Euston Road, between Sydney Park Road and Campbell Road	0.9	5,870	5	$1,325,584
Bourke Road, between Wyndham Street and Gardeners Road	2.1	15,250	18	$3,902,584
2021 (with project)				
Princes Highway between Enmore Road and Gannon Street	3.8	59,370	95	$21,059,607
Canal Road / Ricketty Street / Gardeners Road, between the Princes Highway and Botany Road	2.4	37,010	45	$8,711,249
Euston Road, between Sydney Park Road and Campbell Road	0.9	43,960	33	$7,062,407
Bourke Road, between Wyndham Street and Gardeners Road	2.1	11,250	12	$2,570,652
2031 (without project)				
Princes Highway between Enmore Road and Gannon Street	3.8	69,950	112	$24,810,976
Canal Road / Ricketty Street / Gardeners Road, between the Princes Highway and Botany Road	2.4	54,940	69	$13,257,922
Euston Road, between Sydney Park Road and Campbell Road	0.9	6,950	6	$1,569,242
Bourke Road, between Wyndham Street and Gardeners Road	2.1	17,350	21	$4,439,148
2031 (full WestConnex program of works and the future Southern extension)				
Princes Highway between Enmore Road and Gannon Street	3.8	18,080	29	$6,414,542
Canal Road / Ricketty Street / Gardeners Road, between the Princes Highway and Botany Road	2.4	22,120	27	$5,207,199
Euston Road, between Sydney Park Road and Campbell Road	0.9	51,500	39	$8,273,733
Bourke Road, between Wyndham Street and Gardeners Road	2.1	14,420	16	$3,295,414

9.4 Environmental management measures

Where possible, the project has been designed and planned in order to avoid and minimise impacts to traffic during construction. For example:

- Construction compounds which provide tunnelling support have been located adjacent to State and National roads to minimise impacts on the local road network
- Construction compounds have been designed to provide off-street car parking facilities to minimise impacts on access and parking for local residents.

Despite this, the project would result in impacts to the road network during construction. Mitigation and management measures would be implemented to avoid, minimise and/ or manage these impacts to the road network. These mitigation measures, as well as those proposed to be implemented throughout operation of the project are provided in **Table 9-55**.

Table 9-55 Environmental management measures – traffic and transport

Impact	No.	Environmental management measure	Timing
Construction			
General	TT01	A Construction Traffic Management and Safety Plan (CTMSP) would be prepared as part of the construction environmental management plan. The CTMSP would include the guidelines, general requirements and principles of traffic management to be implemented during construction, including: Signage requirements (eg temporary speed restrictions, changes to the road environment, traffic management controls) Lane possession and approval process during periods of online construction (eg line marking and temporary barriers) Traffic control devices such as traffic signals A local and regional communications strategy, including methods to provide advanced notice of any major or prolonged impacts (eg leaflets and local media), and real-time information regarding current impacts (eg variable message signs, radio traffic news) Details of both the general approach to be used for access and egress to construction compounds and the specific controls required at specific locations Any specific provisions required to manage potential impacts to sensitive users, such as schools, child care centres and health facilities. The CTMSP would be prepared in accordance with Austroads *Guide to Road Design* (with appropriate Roads and Maritime supplements), the RTA *Traffic Control at Work Sites* manual and AS1742.3: *Manual of uniform traffic control devices – Part 3:Traffic control for works on roads*, and any other relevant standard, guide or manual.	Pre-construction
Impacts to road network performance	TT02	Construction methods and staging would be designed to minimise road closures, subject to other project constraints, and ensure that disruptions to existing traffic are minimised as much as feasible and reasonable.	Construction

Impact	No.	Environmental management measure	Timing
(delays) and safety	TT03	Construction works would be carried out offline, where possible. Where offline construction is not practical, and for tie-ins between online and offline sections of the project, construction sequencing and any temporary works identified would aim to minimise user delay while providing sufficient flexibility for the selected contractor to safely and efficiently construct the project	Construction
	TT04	Works that would significantly reduce the performance of the road network would be scheduled for periods of typically lower traffic volumes where feasible and reasonable.	Construction
	TT05	Work areas would be isolated from general traffic using temporary safety barriers where possible.	Construction
	TT06	Temporary closed-circuit television (CCTV) and Variable Message Signs (VMS) would be provided at the outset of construction to link with the existing Transport Management Centre (TMC) network to facilitate monitoring and management of traffic impacts	Construction
	TT07	Traffic volume data would be analysed to identify capacity requirements, assess the potential impact of lane occupancies on traffic flows, plan lane occupancies to minimise the work area, and identify the best time to minimise inconvenience to road users. Restrictions and obstructions would be limited, road capacities maximised and peak traffic periods avoided where possible	Construction
	TT08	Impacts on pedestrian paths and cycle lanes would be minimised, and alternatives provided during construction where practical and safe to do so	Construction
	TT09	Impacts to bus stops would be identified and alternative locations and access would be provided. This would be undertaken in consultation with Transport for NSW and the relevant bus service provider	Construction
	TT10	Local road closures would be managed and adequate property access maintained. This would be undertaken in consultation with Roads and Maritime, local councils and property owners likely to be impacted	Construction
	TT11	A spoil management plan would be prepared with subsequent monitoring of heavy vehicle and haulage routes to ensure compliance and minimise impact on local roads off the arterial road network	Construction
	TT12	A road dilapidation report(s) would be prepared identifying existing conditions of local roads and mechanisms to repair damage to the road network caused by heavy vehicle movements associated with the project.	Construction
	TT13	Road occupancy licences would be obtained where required.	Construction
Impacts to emergency services	TT14	The CTSMP would be developed in consultation with local emergency services and procedures would be implemented to maintain priority access and a safe environment for emergency vehicles to travel through construction areas. The CTSMP would include measures to keep emergency services informed of the staging and progress of construction works.	Construction

Impact	No.	Environmental management measure	Timing
Operation			
Impacts to road safety	OpTT01	A road safety audit would be undertaken by a qualified auditor(s) as part of the detailed design, and again immediately prior to project opening, to examine the design from a road safety perspective and identify potential safety issues. This process would be undertaken in accordance with the Roads and Maritime Accident Reduction Guide Part 2: Road Safety Audits (RTA, 2005a).	Detailed design and prior to operation
Impacts to road network performance	OpTT02	An operational traffic review would be conducted 12 months following the commencement of operation to confirm the operational traffic impacts of the project on surrounding arterial roads and major intersections. The operational traffic review would be undertaken by a suitably qualified traffic specialist that is independent of the design and traffic studies undertaken as part of the environmental impact statement. The operational traffic review would include an assessment of the level of service at major intersections on local roads around the St Peters interchange, the King Georges Road interchange and changes in traffic levels on parallel arterial roads, such as Stoney Creek Road.	Operation