

Transport
for NSW

WestConnex M8: Preliminary Road Network Performance Review Plan

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Executive summary

- This report is a preliminary report only and potential mitigations to impacts identified have not yet been determined. As such, the potential mitigations section (Section 6) of the report is not currently populated. Once the plan has been completed following further consultation with council, the final Road Network Performance Review Plan will be submitted to DPE and made publicly available.
- The WestConnex M8 Motorway provides 9km twin tunnels from the M5 East at Kingsgrove to St Peters Interchange. It is the second stage of the WestConnex motorway network, doubling the capacity of the M5 East Tunnels, saving motorists about 30 minutes travel time on journeys between southwest Sydney and the CBD. The project was opened to traffic on Sunday, 5 July 2020.
- The WestConnex M8 Motorway project was approved by the Department of Planning and Environment (formerly known as Department of Planning, Industry and Environment), provided that the Conditions of Approval (CoA) were satisfied.
- CoA E40 requires that at both 12 months and 5 years after the commencement of operation of the M8 Motorway, a Road Network Performance Review Plan (RNPRP) must be prepared in consultation with relevant Councils.
- The plan focuses on identifying how the opening of the M8 Motorway has impacted the adjoining road network and roads that could be used as alternative routes. The M8 Motorway Road Network Performance Review (The Review) was carried out by comparing traffic volumes and speeds before and after the opening of the M8 Motorway (M8).
- The below criteria were used to identify locations impacted by M8 opening:
 - An increase in traffic volumes of less than five per cent and/or less than a 5km per hour decrease in traffic speed is considered part of normal growth and day-to-day variations on the road network and therefore is not deemed to have been impacted by the opening of the M8.
 - An increase in traffic volumes greater than five per cent and an associated decrease in traffic speed of more than 5km per hour has been assessed as a change. The change could be due to the opening of the M8 Motorway, land use changes, or a result of other Transport for NSW (Transport) projects.
- Where a change is a result of the opening of the M8 Motorway, this plan will outline a mitigation for the impact.
- The impact of the Covid pandemic on road usage and traffic volumes has been taken into consideration as part of the RNPRP.
- A summary of The Review's key findings is below and further detailed in Section 4.1 of this plan.
 - The opening of the M8 Motorway has doubled the capacity of the M5 East Tunnels, saving motorists about 30 minutes travel time on journeys from southwest Sydney to the CBD.
 - Following the opening of the M8, less drivers are choosing to exit the M5 at King Georges Road during the morning peak period. Motorists on the M5 East Motorway appear to be willing to pay tolls to commute in the peak direction of travel
 - Additional traffic on Stoney Creek Road and Forest Road in peak periods, including an increase in the number of heavy vehicles and a decrease in speed at some intersections.

- There is less traffic on Princes Highway/King Street, north of Campbell Road and on Sydney Park Road as motorists choose to use the upgraded Euston Road and Campbell Road.
- An increase in traffic, as expected, on roads adjoining the St Peters Interchange. These corridors were upgraded in preparation for the M8 Motorway and are adequately handling the demands.
- Travel speeds have improved on some roads in the Dulwich Hill, Beverly Hills, Sydenham and St Peters as well as some sections of the Princes Highway.
- Transport consulted with Georges River Council, Bayside Council, City of Canterbury Bankstown Council, Inner West Council and the City of Sydney Council on The Review findings and the RNPRP.
- Sites that meet the criteria for further investigation as part of the M8 RNPRP include the following intersections:
 - Stoney Creek Road, Kingsgrove Road and Croydon Road
 - Stoney Creek Road, Forest Road and Kingsland Road
 - Forest Road, Bexley Road and Harrow Road
 - Princes Highway, Wickham Street and Forest Road
 - Marsh Street and M5 Motorway Ramps
 - Princes Highway, The Seven Ways and Bay Street
 - Campbell Street, Bedwin Road, May Street and Unwins Bridge Road
 - Gardeners Road and Botany Road.

1 Introduction

1.1 Background

Transport for NSW (Transport) is required to prepare a Road Network Performance Review Plan (RNPRP) in consultation with relevant Councils to assess the impacts of the M8 Motorway on the adjoining road network at both 12 months and 5 years after opening. This RNPRP is prepared to respond to the State Significant Infrastructure (SSI) Conditions of Approval for the opening of the M8 Motorway.

1.2 WestConnex

WestConnex is a significant investment in the future of Sydney's road infrastructure by the NSW and Australian governments. It comprises a series of interconnected motorways and road upgrades to increase the capacity of the M4 and M5 and provides a vital underground link between the motorways.

WestConnex is 33 kilometres in length, which includes new sections of motorway as well as capacity improvements on existing motorways. Please refer to Figure 1 for an overview of the WestConnex project.

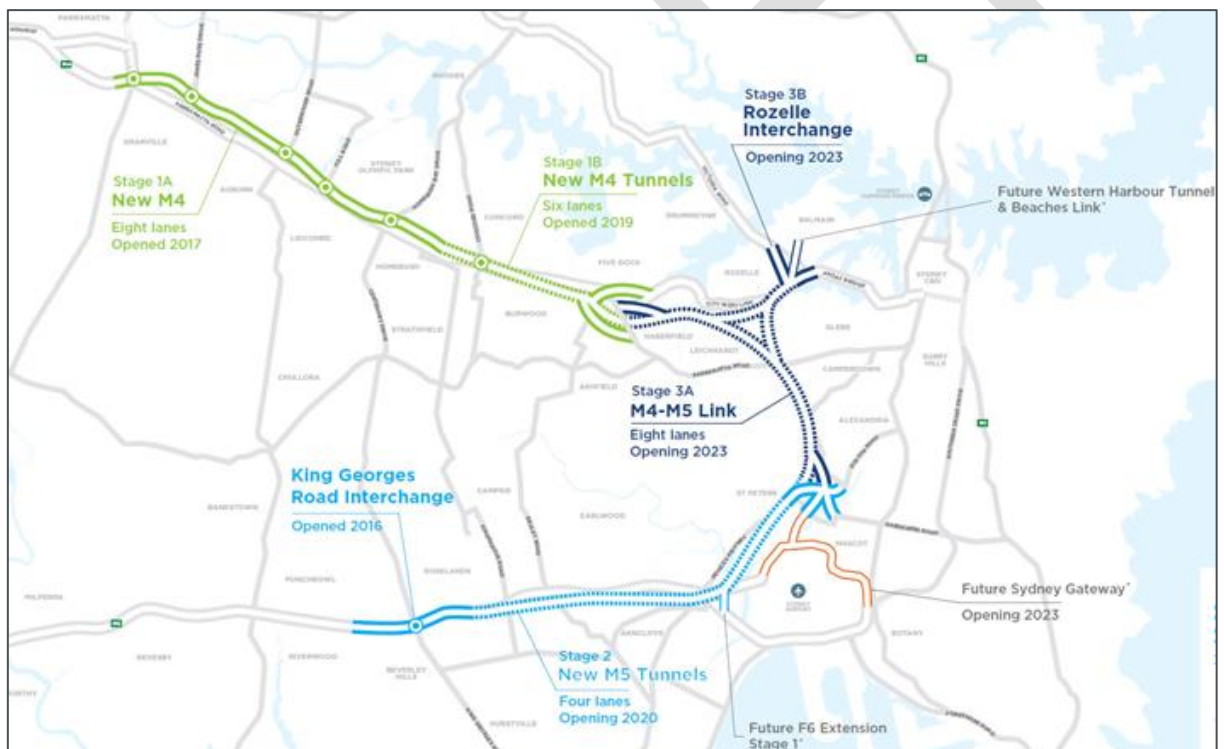


Figure 1: WestConnex project overview

The key objective of WestConnex is to improve access to, and connectivity with, NSW's international gateways, Port Botany and Sydney Airport, which are vital economic assets. Efficient and reliable access to and from these gateways supports some of the state's most important economic journeys and is a critical element in sustaining the future productivity and global competitiveness of Sydney and NSW.

With more than two-thirds of WestConnex consisting of underground tunnels, the project will ease congestion on surface roads and improve productivity and efficiency for all road users, including buses, freight and light commercial vehicles.

WestConnex is being delivered in three stages. Stage 1, the M4 Widening and the M4 East is complete and open to traffic. Stage 2, the New M5 tunnels (now called M8) is also complete, and Stage 3, which comprises the now open extensions of the M4 and M8, and the Rozelle Interchange which is currently in delivery. The schedule for WestConnex delivery is provided in Figure 1.

1.3 M8 Motorway

The WestConnex M8 Motorway opened on Sunday, 5 July 2020 and provides 9km twin tunnels from the M5 East at Kingsgrove to the St Peters Interchange. It is the second stage of the WestConnex motorway network.

Upon opening of the M8 Motorway, tolling was introduced to the existing M5 East Motorway from Beverly Hills to Marsh Street in Arncliffe. M5 East, between Marsh Street and General Holmes Drive, has remained toll free in both directions.

This major transport infrastructure connects to the local road network at St Peters and the M5 Motorway. It is designed to integrate with future projects, such as, the M4-M5 Link Tunnels (extensions of the M4 and M8, opened to traffic in January 2023), Rozelle Interchange (expected to open to traffic late 2023), Sydney Gateway (expected to open to traffic late 2024), and the M6 to the south of Sydney (expected to open to traffic late 2025).

The M8 Motorway project was approved by the Department of Planning and Environment (formerly known as Department of Planning, Industry and Environment), provided that the Conditions of Approval (CoA) were satisfied. Further details on the conditions that apply to this project are provided in Section 2.1 of this plan.

2 Purpose of Road Network Performance Review Plan

2.1 Conditions of Approval

Analysis of the potential impacts in the study area that relate to the opening of the M8 Motorway and correspond to the SSI 6788 conditional approval has been carried out and is documented in this plan.

The SSI (number 6788) approval for WestConnex Stage 2, which comprises of the M8 Motorway, lists the following conditions relevant to this RNPRP.

2.1.1 Condition of Approval E40

Condition E40 states that at both 12 months and 5 years after the commencement of operation of the SSI, or as otherwise agreed to by the Secretary, the Proponent must prepare a RNPRP in consultation with Transport and relevant Councils that includes:

- (a) an updated analysis, including modelling of traffic impacts to the adjoining road network (including impacts on local roads and rat-running), as a consequence of the SSI. This must include a review of new information available about potential land use changes, and any traffic changes as a result of other major road projects within the project area.
- (b) further detailed investigations at the following intersections or sections of the road network:
 - (i) potential 'pinch-points' where the merging of tunnel exit traffic and surface traffic would occur at the King Georges Road Interchange and the Saint Peters Interchange
 - (ii) King Street, between Sydney Park Road and Enmore Road
 - (iii) Euston Road, between Sydney Park Road and Botany Road
 - (iv) Princes Highway and Campbell Street
 - (v) Princes Highway and Canal Road
 - (vi) Princes Highway and Railway Road
 - (vii) Gardeners Road and O'Riordan Street
 - (viii) Sydney Park Road and Mitchell Road
 - (ix) Gardeners Road and Bourke Road
 - (x) Unwins Bridge Road and Campbell Street; and
 - (xi) Campbell Road and Euston Road.

- (c) updated consideration of potential mitigation measures to manage any predicted traffic performance deficiencies in association with the investigations undertaken under (b).
- (d) the predicted traffic performance improvements from these measures, including any cumulative improvements.
- (e) details on bus priority measures.
- (f) a comparison of the pre- and post-road network performance for all road users including, but not limited to, vehicles, freight, public transport and active transport.
- (g) justification of why the predicted 'do minimum' performance for any road users of any intersection on the adjoining road network cannot be maintained (if necessary); and
- (h) an updated description and proposed timing of potential mitigation measures, including measures to remove or limit any adverse impacts on any road user groups impacted by the SSI.

The Proponent is responsible for the implementation of the identified measures, if required. The RNPRP must be submitted to the Secretary, Transport (in relation to impacts on bus services) and to relevant Council(s) within 60 days of its completion and made publicly available.

The purpose of the RNPRP is to optimise road network performance, including public transport access and times, and to manage the performance impacts of the SSI on the adjoining road network by identifying or confirming mitigation improvements that are required in areas where traffic performance may be unsatisfactory at time of construction being completed.

2.1.2 Condition of Approval E41

Condition E41 states that the Proponent must liaise with relevant Councils during detailed design to improve integration of the project with the local and regional road network. The outcomes of this consultation will be reported and incorporated into the RNPRP required under condition E40.

2.2 Purpose of this plan

The RNPRP documents the findings of The Review 12 months after the opening of the M8 Motorway, as required by the Department of Planning and Environment (formerly known as Department of Planning, Industry and Environment) to meet CoA E40.

The aim of the RNPRP is to:

- Identify locations where road performance on the adjoining road network has been impacted by the opening of the M8
- Identify potential mitigation measures to optimise road network performance at impacted locations
- Support the integration of the M8 Motorway into the broader transport network.

3 Study area and methodology

3.1 Study area

The study area is shown in Figure 2 and includes key roads that adjoin to the M8 Motorway or could be used as alternative routes. These locations have been assessed for impacts based on data that was collected prior to and 12 months after the motorway opening. The study area includes:

1. King Georges Road and adjoining roads that interface with St Peters Interchange (SPI);
2. Roads that could be used as alternative routes to the M8 Motorway; and
3. Roads specified for inclusion in the Conditions of Approval.



Figure 2: WestConnex project overview

3.2 Methodology

The M8 Road Network Performance Review (The Review) has been carried out by comparing traffic volumes and speed before and after the opening of the M8 Motorway (June 2020 to June 2021) on roads identified in the study area.

The impacts of the Covid pandemic on road usage and traffic volumes have been taken into consideration as part of the RNPRP. Pre-pandemic traffic volumes were compared to volumes from before the motorway opened, which were influenced by the pandemic. Where the percentage of traffic volume change exceeded normal traffic fluctuations on the road network (greater than 5%), this percentage (Covid Correction Factor) was applied to after the motorway opening volumes and a sensitivity analysis was undertaken, where required.

A process flow diagram outlining the methodology is provided in Figure 3.

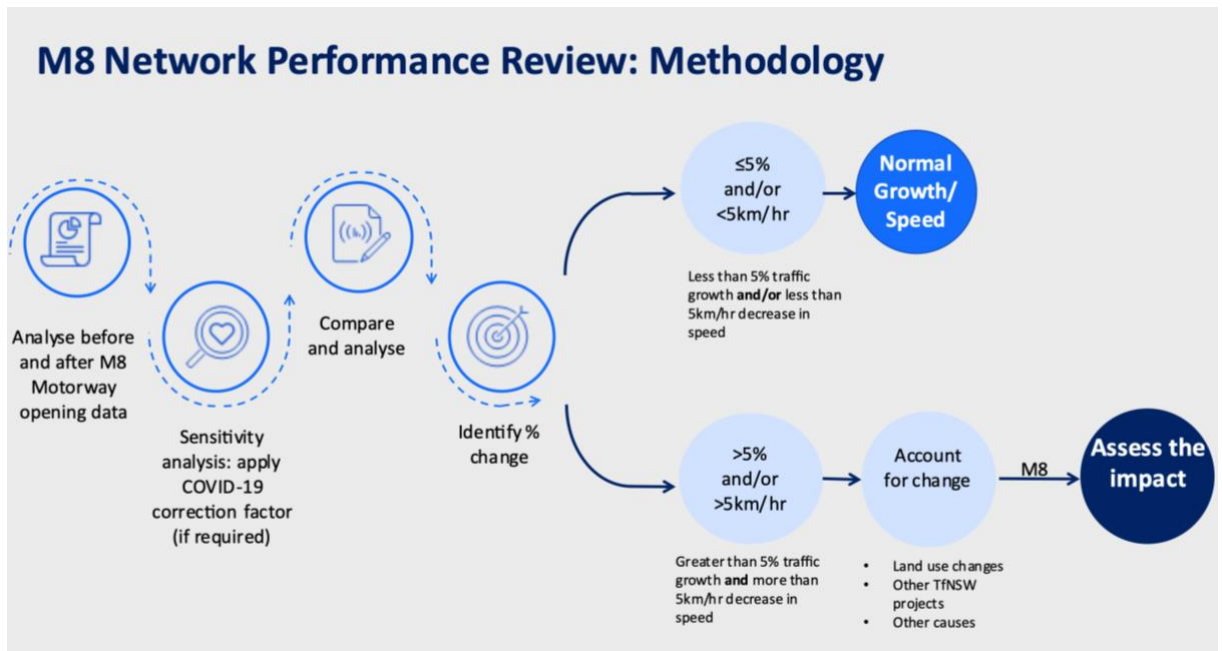


Figure 3: M8 Motorway Road Network Performance Review methodology

Section 4 of the RNPRP summarises the key findings of the preliminary analysis and intersections identified with an increase in traffic volumes of greater than 5% and a speed reduction of more than 5km per hour when comparing pre and post opening data.

A detailed traffic analysis was carried out for sites identified as being impacted, in Section 5, to understand intersection performance post-M8 opening and identify mitigation measures to address impacts, where appropriate.

Based on available traffic data, the change in heavy vehicle volumes during the AM and PM peak periods were assessed and the percentage of heavy vehicles before and after the opening of the M8 Motorway was calculated, allowing corridors with an increase in heavy vehicle volumes to be identified.

A safety analysis was also undertaken of the study area in order to identify any safety issues. Two years' of crash data was analysed, one year before M8 Motorway opening and one year post M8 Motorway opening. The total number of crashes, pre and post M8 Motorway opening, was analysed to establish any trends in crashes, including the percentage of crashes that involved heavy vehicles.

As public transport was heavily impacted by Covid and cannot be reliably analysed, this is not considered as part of the 12-month post opening review. The RNPRP does, however, consider opportunities to improve public transport and active transport infrastructure at locations of identified impact.

4 Road Network Performance Review findings

4.1 Key findings of review

Traffic data for roads identified in the study area, before and after the opening of the M8 Motorway (June 2020 and July 2021) was compared to identify areas of change on the road network. Key findings of the M8 Motorway Road Network Performance Review (The Review) include:

- The opening of the M8 Motorway has doubled the capacity of the M5 East Tunnels, saving motorists about 30 minutes travel time on journeys from southwest Sydney to the CBD.
- There is a 14% reduction of traffic exiting the M5 at King Georges Road in the AM peak. Motorists on the M5 East Motorway appear to be willing to pay tolls to commute in the peak direction of travel
- An 8% to 14% increase in traffic volumes on Canterbury Road in the counter-peak direction of travel in the AM and PM peak respectively but no corresponding decreases in speed greater than 5km per hour. The road is coping with the additional traffic demand.
- Additional traffic on Stoney Creek Road/Forest Road in peak periods, including an increase in the number of heavy vehicles and a decrease in speed at some intersections.
 - Increase in traffic by up to 20% in the AM peak and 23% in the PM peak
 - On average, 62 additional heavy vehicles in AM peak hour and 25 in PM peak hour on Stoney Creek Road/Forest Road
- Reduction in traffic volumes on Bexley Road (up to 8%) and Kingsgrove Road (up to 3%)
- An increase in traffic and a corresponding decrease in speed at the intersection of Princes Highway and Bay Street in the AM peak
- An increase in traffic, as expected, on roads adjoining St Peters Interchange; Campbell Road, Euston Road and Gardeners Road. These corridors were upgraded as part of preparation for the M8 Motorway and are adequately handling the demands.
- Up to 24 additional heavy vehicles on Gardeners Road each peak hour
- There has been an 14% decrease in traffic on Princes Highway/King Street, north of Campbell Road and a corresponding decrease of up to 27% of traffic on Sydney Park Road as motorists choose to use the upgraded Euston Road and Campbell Road.
- Slight increase in traffic volumes along Edgeware Road in the AM peak. The road is coping with the additional traffic demand (no decrease in traffic speed of more than 5km per hour)
- Improvements in travel speed (increase in speed above 5km per hour) on King Georges Road at Beverly Hills, New Canterbury Road between Campsie and Dulwich Hill, Railway Road at Sydenham, Canal Road at St Peters and on some sections of the Princes Highway.

4.1.1 Intersections identified for traffic analysis

Intersections where traffic volumes increased by 5 per cent or more and where travel speeds have decreased by 5km per hour or more after the M8 Motorway opened, were identified as sites that required a detailed traffic analysis.

The intersections flagged for further traffic analysis included the following intersections:

1. Stoney Creek Road, Kingsgrove Road and Croydon Road
2. Stoney Creek Road, Forest Road and Kingsland Road
3. Forest Road, Bexley Road and Harrow Road
4. Princes Highway, Wickham Street and Forest Road
5. Marsh Street and M5 Motorway Ramps
6. Princes Highway, The Seven Ways and Bay Street
7. Campbell Street, Bedwin Road, May Street and Unwins Bridge Road
8. Gardeners Road and Botany Road.

4.2 Road safety performance

A safety analysis was undertaken of the study area. Two years' crash data was analysed, including one year from before the M8 Motorway opened and one year post M8 Motorway opening. Key trends identified from the safety review include:

1. A 41% reduction in all crashes and 50% reduction in serious injury crashes on the M5 East in the year after the opening of the M8 Motorway;
2. A 5% reduction in the number of crashes across the study area road network in the 12-month period after the M8 Motorway opened;
3. The severity of crashes decreased
4. Road corridors that showed an increased number of crashes following the opening of the M8 Motorway were assessed by the Centre for Road Safety and Transport's Network Safety team. This included Stoney Creek Road and Forest Road, Canterbury Road, King Georges Road and Moorefield's Road. The assessment found that:
 - crashes were isolated incidents with no clusters identified; and
 - crashes were largely congestion related (rear end, lane change) and resulted in minor or non-casualty injuries.

Transport will continue to monitor safety across the road network.

5 Traffic analysis

Traffic analysis was undertaken to capture the post opening performance of the intersections that met the review criteria. This involved intersections that experienced an increase in traffic volumes greater than 5% and a decrease in speed of more than 5km per hour following the opening of the M8 Motorway. These locations are listed below and shown in Figure 4.

1. Stoney Creek Road, Kingsgrove Road and Croydon Road
2. Stoney Creek Road, Forest Road and Kingsland Road
3. Forest Road, Bexley Road and Harrow Road
4. Princes Highway, Wickham Street and Forest Road
5. Marsh Street and M5 Motorway Ramps
6. Princes Highway, The Seven Ways and Bay Street
7. Campbell Street, Bedwin Road, May Street and Unwins Bridge Road
8. Gardeners Road and Botany Road.

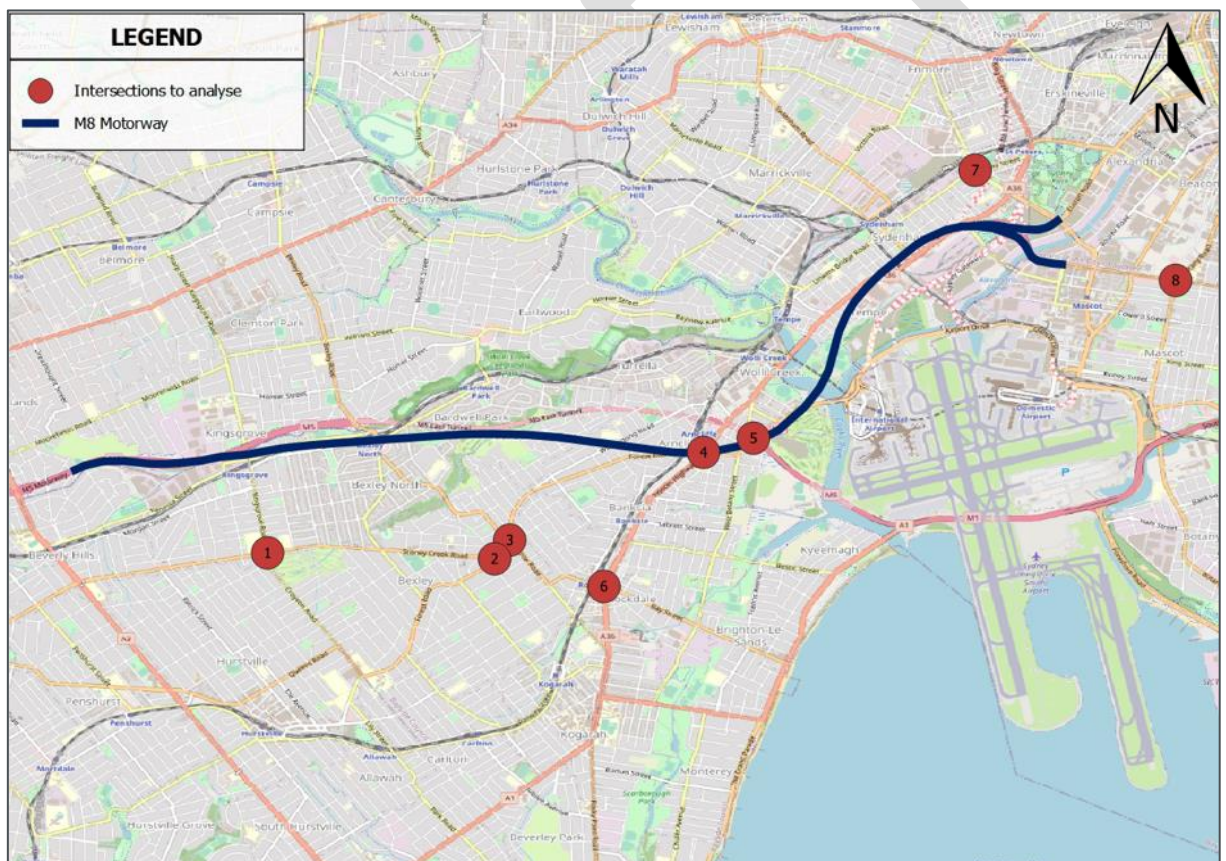


Figure 4: Intersections identified for traffic analysis

A traffic model was developed for each intersection to understand traffic performance changes. Post-opening traffic counts were conducted in November 2021.

5.1 Stoney Creek Road and Forest Road Corridor

The first four intersections identified as being impacted are located along the Stoney Creek Road and Forest Road corridor, in the suburbs of Kingsgrove, Bexley and Arncliffe. This corridor was identified as experiencing an increase in heavy vehicle volumes, on average 28% in the AM peak period and 16% in the PM peak as well as a slower road environment post M8 Motorway opening. The performance of each intersection has been analysed and is detailed below.

5.1.1 Croydon Road, Stoney Creek Road and Kingsgrove Road

Croydon Road, Stoney Creek Road and Kingsgrove Road is an offset T-intersection comprising two signalised T-intersections with the Kingsgrove Road connection to the north and Croydon Road to the south. The two signalised intersections are coordinated. The site is located in the suburb of Kingsgrove and can be viewed in Figure 5. The M8 Motorway is located to the north.



Figure 5: Croydon Road, Stoney Creek Road and Kingsgrove Road signalised intersection in 2021

The site was chosen for an analysis of impact, as the intersection traffic volumes have increased by 10% and 13% in the AM and PM peaks respectively post-opening; travel speeds have also decreased by 5km per hour eastbound and 8km per hour westbound along Stoney Creek Road at this location in the PM peak.

Table 1 below summarises the performance of the intersection of Stoney Creek Road and Kingsgrove Road using traffic volumes from before and after M8 Motorway opening.

Table 1: Stoney Creek Road and Kingsgrove Road performance pre and post M8 Motorway opening

Stoney Creek Road and Kingsgrove Road						
Performance metrics	Pre M8 Opening		Post M8 Opening		Difference	
	AM	PM	AM	PM	AM	PM
Maximum Queue Length (m)	294.3	>500	394	> 500	+99.7	N/A
Average Delay Time (sec)	105.0	116.6	165.4	277.8	+60.4	+161.2
Degree of Saturation	1.2	1.5	1.3	1.5	+0.1	0
Intersection Level of Service	F	F	F	F	N/A	

Table 2 below summarises the performance of Stoney Creek Road and Croydon Road using traffic volumes pre and post M8 Motorway opening.

Table 2: Stoney Creek Road and Croydon Road performance pre and post M8 Motorway opening

Stoney Creek Road and Croydon Road						
Performance metrics	Pre M8 Opening		Post M8 Opening		Difference	
	AM	PM	AM	PM	AM	PM
Maximum Queue Length (m)	>500	>500	> 500	> 500	N/A	N/A
Average Delay Time (sec)	197.1	101.9	224.5	171.6	+27.4	+69.7
Degree of Saturation	1.6	1.2	1.7	1.6	+0.1	+0.3
Intersection Level of Service	F	F	F	F	N/A	

The analysis indicates that the increased traffic volumes along the Stoney Creek Road corridor post M8 Motorway opening has worsened intersection performance. While the site was already saturated pre-opening, this has deteriorated further due to the increase in demand, which causes issues for traffic attempting to enter the corridor from the side roads of Croydon Road and Kingsgrove Road. Heavy vehicle volumes at this site have risen by 38% in the AM peak. As a result, the site continues to perform at a LoS F with increased queue lengths and vehicle delays post-opening. Delay times reach 3 minutes and 45 seconds in the AM peak and 2 minutes and 52 seconds in the PM peak.

Future potential improvements and mitigation measures for this intersection are discussed in Section 6 of this RNPRP.

5.1.2 Forest Road, Stoney Creek Road and Kingsland Road

Forest Road, Stoney Creek Road and Kingsland Road is a three-way signalised intersection, operating with three phases. The intersection is located in the suburb of Bexley and can be viewed in Figure 6. The intersection is located south of the M8 Motorway.

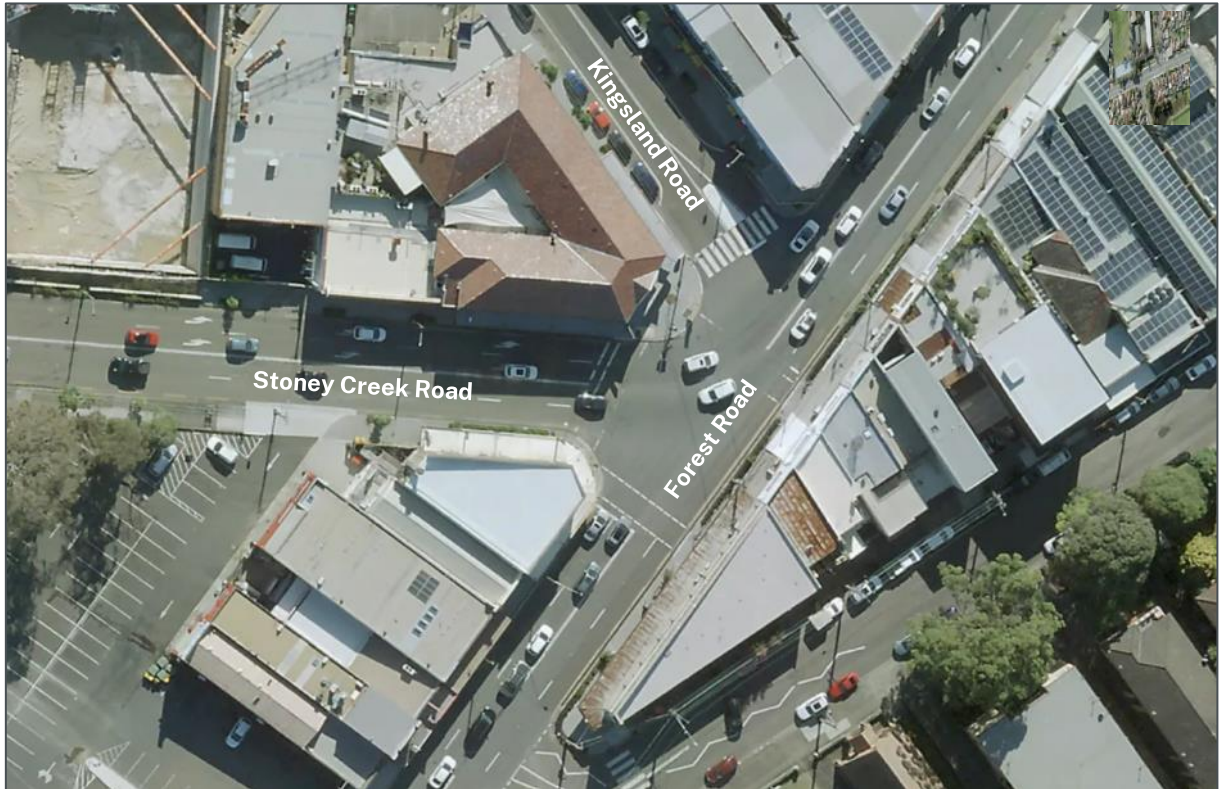


Figure 6: Forest Road, Stoney Creek Road and Kingsland Road signalised intersection in 2021

The site was chosen for an analysis of impact as intersection traffic volumes increased by 10% in the AM peak and 14% in the PM peak, while speeds decreased by 8km per hour eastbound along Stoney Creek Road in the AM peak and decreased by 8km per hour southbound along Forest Road in the PM peak.

Table 3 below summarises the performance of the intersection using traffic volumes pre and post M8 Motorway opening.

Table 3: Forest Road, Stoney Creek Road and Kingsland Road performance pre and post M8 Motorway opening

Performance metrics	Pre M8 Opening		Post M8 Opening		Difference	
	AM	PM	AM	PM	AM	PM
Maximum Queue Length (m)	150	>500	284	310	+160	N/A
Average Delay Time (sec)	31.1	105.2	42.0	31.6	+10.9	-73.6
Degree of Saturation	0.9	1.3	1.0	0.9	+0.1	-0.4
Intersection Level of Service	C	F	C	C	N/A	

Following the opening of the M8 Motorway, the analysis indicates that the Forest Road, Stoney Creek Road and Kingsland Road signalised intersection operates satisfactorily, performing at LoS C in both the AM and PM peaks.

The PM peak has seen a significant reduction in queue lengths and vehicle delay, and improved intersection performance when comparing pre and post-opening volumes.

The performance of the intersection operating worse than a LoS C may be due to the high degree of saturation which is an indicator of congestion and the increase in heavy vehicle volumes which creates a slower road environment. The delay experienced by vehicles, which determines level of service, is however minimal due to optimised signal phasing, particularly for the Stoney Creek Road approach, which only experiences an average delay time of 28.3 seconds in the AM peak period.

5.1.3 Forest Road, Bexley Road and Harrow Road

Forest Road, Bexley Road and Harrow Road is a four-way signalised intersection operating with three phases. The intersection is located in the suburb of Bexley and can be viewed in Figure 7. It is located south of the M8 Motorway.



Figure 7: Forest Road, Bexley Road and Harrow Road signalised intersection in 2021

The site was chosen for an analysis of impact due to travel speeds decreasing by 5km per hour southbound along Bexley Road and by 9km per hour northbound along Forest Road in the AM peak, while speeds northbound along Harrow Road decreased by 5km per hour in the PM peak. It is noted that this intersection is in close proximity to the town centre.

Table 4 summarises the performance of the intersection using traffic volumes pre and post M8 Motorway opening.

Table 4: Forest Road, Bexley Road and Harrow Road intersection performance pre and post M8 Motorway opening

Performance metrics	Pre M8 Opening		Post M8 Opening		Difference	
	AM	PM	AM	PM	AM	PM
Maximum Queue Length (m)	195	223	149	206	-46	-17
Average Delay Time (sec)	36.4	38.3	34.1	31.8	-2.3	-6.5
Degree of Saturation	0.9	0.9	0.9	0.7	0	-0.2
Intersection Level of Service	C	C	C	C	N/A	

Following the opening of the M8 Motorway, the analysis indicates that the Forest Road, Bexley Road and Harrow Road signalised intersection operates satisfactorily, performing at LoS C in both the AM and PM peaks with no apparent increase in vehicle delays post-opening, despite the above noted decrease in travel speed in the PM peak.

The satisfactory performance of this intersection can be attributed to the introduction of a right turn ban at Bexley Road turning into Forest Road in February 2020, which was introduced as a measure to ease congestion and delay at this intersection before the M8 Motorway opened. These results indicate that Transport's upgrade was successful in supporting the increased traffic volumes associated with the M8 Motorway opening. No further investigation at this intersection is required as the intersection operates at a satisfactory level of service.

5.1.4 Princes Highway, Wickham Street and Forest Road

Princes Highway, Wickham Street and Forest Road is a four-way signalised intersection operating with four phases. The intersection is located in the suburb of Arncliffe and can be viewed in Figure 8. The intersection is situated above a portion of the M8 Motorway tunnel.



Figure 8: Princes Highway, Wickham Street and Forest Road signalised intersection in 2021

The site was chosen for further analysis, as traffic volumes increased by 15% and 6% in the AM and PM peaks respectively, while travel speeds decreased by 8km per hour eastbound along Forest Road and by 6km per hour southbound along the Princes Highway in the AM peak.

Table 5 below summarises the performance of the intersection using traffic volumes pre and post M8 Motorway opening.

Table 5: Princes Highway, Wickham Street and Forest Road performance pre and post M8 Motorway opening

Performance metrics	Pre M8 Opening		Post M8 Opening		Difference	
	AM	PM	AM	PM	AM	PM
Maximum Queue Length (m)	>500	310.8	281.0	261.5	N/A	-49.3
Average Delay Time (sec)	76.3	51.3	47.1	47.5	-29.2	-3.8
Degree of Saturation	1.2	0.9	1.0	0.9	-0.2	0
Intersection Level of Service	F	D	D	D	N/A	

An existing peak hour right turn ban was extended to a 24 hour ban from Forest Road into Princes Highway in February 2020. This was introduced as a measure to ease congestion and delay at this intersection before the M8 Motorway opened.

Following the opening of the M8 Motorway, the analysis indicates that the Princes Highway, Wickham Street and Forest Road signalised intersection has improved from LoS F to LoS D in the AM peak. In the PM peak, the intersection operates at LoS D pre and post M8 opening. The intersection's performance has not deteriorated post M8 Motorway opening, as vehicle delay times have improved in the AM peak and stayed relatively constant in the PM peak. Furthermore, queue lengths have significantly reduced compared to pre-opening. Therefore, the opening of the M8 Motorway does not appear to have diminished the operation of this intersection and further investigation at this site is not recommended.

5.2 Marsh Street and M5 Motorway Ramps

Marsh Street and M5 Motorway Ramps is a four-way signalised intersection operating with five phases. The intersection is located in the suburb of Arncliffe and can be viewed in Figure 9. The intersection is situated above a portion of the M5 Motorway tunnel.

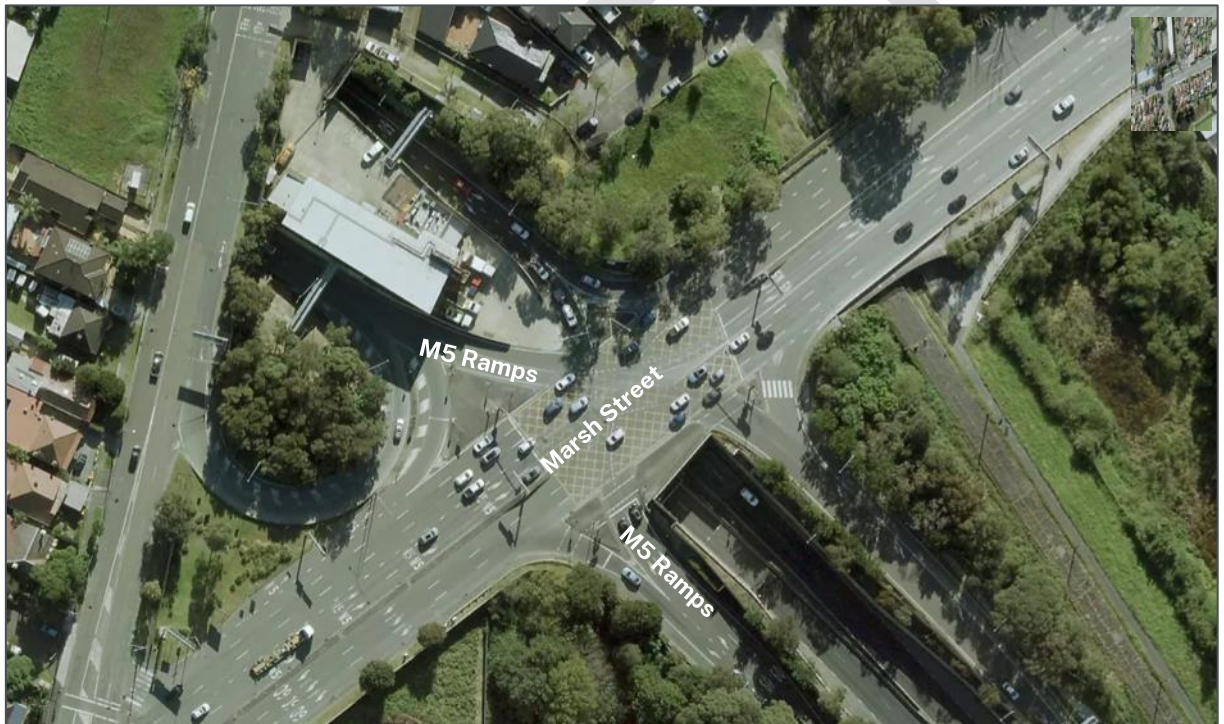


Figure 9: Marsh Street and M5 Motorway Ramps signalised intersection in 2021

The intersection was chosen for further analysis, as traffic volumes increased by 18% in the AM peak and 16% in the PM peak, while speeds decreased by 6km per hour westbound along Marsh Street in the AM peak.

Table 6 below summarises the performance of the intersection using traffic volumes pre and post M8 Motorway opening.

Table 6: Marsh Street and M5 Motorway Ramps performance pre and post M8 Motorway opening

Performance metrics	Pre M8 Opening		Post M8 Opening		Difference	
	AM	PM	AM	PM	AM	PM
Maximum Queue Length (m)	316	>500	112	>500	-204	N/A
Average Delay Time (sec)	34.9	98.2	31.4	66.1	-3.5	-32.1
Degree of Saturation	1.0	1.4	0.8	1.1	-0.2	-0.3
Intersection Level of Service	C	F	C	E	N/A	

Following the opening of the M8 Motorway, the analysis indicates that the Marsh Street and M5 Motorway Ramps signalised intersection operates satisfactorily in the AM peak, performing at LoS C. In the PM peak, the performance at the intersection improves from LoS F to LoS E.

In the AM peak, the intersection experiences a significant decrease in queue lengths and a slight decrease in vehicle delay times following the opening of the M8 Motorway. While the analysis highlights that the intersection is still oversaturated in the post-opening PM peak, volumes have decreased westbound along Marsh Street, which has improved congestion along this approach. Further investigation at this site is discussed in Section 6 of this plan.

5.3 Princes Highway, The Seven Ways and Bay Street

Princes Highway, The Seven Ways and Bay Street is a four-way signalised intersection operating with four phases. The intersection is located in the suburb of Rockdale and can be viewed in Figure 10. The intersection is located south of the M8 Motorway.



Figure 10: Princes Highway, The Seven Ways and Bay Street signalised intersection in 2021

The intersection was chosen for further analysis as traffic volumes increased by 6% in the AM peak, while speeds decreased by 5km per hour along The Seven Ways in the AM peak.

Table 7 summarises the performance of the intersection using traffic volumes pre and post M8 Motorway opening.

Table 7: Princes Highway, The Seven Ways and Bay Street performance pre and post M8 Motorway opening

Performance metrics	Pre M8 Opening		Post M8 Opening		Difference	
	AM	PM	AM	PM	AM	PM
Maximum Queue Length (m)	225	290	259	279	+34	-11
Average Delay Time (sec)	35.8	35.4	35.2	34.4	-0.6	-1.0
Degree of Saturation	0.9	0.7	0.8	0.7	-0.1	0
Intersection Level of Service	C	C	C	C	N/A	

Following the opening of the M8 Motorway, traffic analysis indicates that the Princes Highway, The Seven Ways and Bay Street signalised intersection operates satisfactorily, performing at LoS C in both the AM and PM peaks. The intersection experiences relatively consistent queue lengths and vehicle delay times when comparing pre and post-opening volumes.

5.4 Campbell Street, Bedwin Road, May Street and Unwins Bridge Road

Campbell Street, Bedwin Road, May Street and Unwins Bridge Road is a four-way signalised intersection operating with four phases. The intersection is located in the suburb of St Peters. The St Peters Interchange ramps of the M8 are located to the south-east of this intersection.

The intersection was improved by Transport prior to the opening of the M8 Motorway, along with other intersections in the St Peters and Mascot region. The changes of the intersection layout pre and post M8 opening can be compared in Figure 11 and Figure 12, highlighting the substantial upgrades implemented to support the opening of the M8 Motorway.



Figure 11: Campbell Street, Bedwin Road, May Street and Unwins Bridge Road signalised intersection pre M8 opening



Figure 12: Campbell Street, Bedwin Road, May Street and Unwins Bridge Road signalised intersection post M8 opening

The intersection was chosen for further analysis since traffic volumes increased by 25% and 7 in the AM and PM peaks respectively, while travel speeds decreased by 5km per hour southbound along Bedwin Road in the PM peak.

Table 8 below summarises the performance of the intersection using traffic volumes post M8 Motorway opening. No pre-opening comparisons were made due to significant lane geometry changes at this intersection as a result of the M8 Motorway upgrades to Euston Road and Campbell Road.

Table 8: Campbell Street, Bedwin Road, May Street and Unwins Bridge Road performance post M8 Motorway opening

Performance metrics	Post M8 Opening	
	AM	PM
Maximum Queue Length (m)	324	326
Average Delay Time (sec)	36.1	36.5
Degree of Saturation	0.892	0.859
Intersection Level of Service	C	C

Following the opening of the M8 Motorway, the analysis indicates that the Campbell Street, Bedwin Road, May Street and Unwins Bridge Road signalised intersection operates satisfactorily, performing at LoS C in both the AM and PM peaks, despite the above noted increase in traffic volumes and the decrease in travel speeds. These results indicate that Transport's upgrade was successful in supporting the increased traffic volumes associated with the M8 Motorway opening. No further investigation at this intersection is required.

5.5 Gardeners Road and Botany Road

Gardeners Road and Botany Road is a four-way signalised intersection operating with four phases. The intersection is located in the suburb of Mascot and can be viewed in Figure 13. The intersection is situated to the east of the M8 Motorway ramps at St Peters Interchange.



Figure 13: Gardeners Road and Botany Road signalised intersection in 2021

The intersection was chosen for further analysis since traffic volumes increased by 19% in the AM peak and 13% in the PM peak, while speeds decreased by 5km per hour northbound along Botany Road in the AM peak.

Table 9 summarises the performance of the intersection using traffic volumes pre and post M8 Motorway opening.

Table 9: Gardeners Road and Botany Road performance pre and post M8 Motorway opening

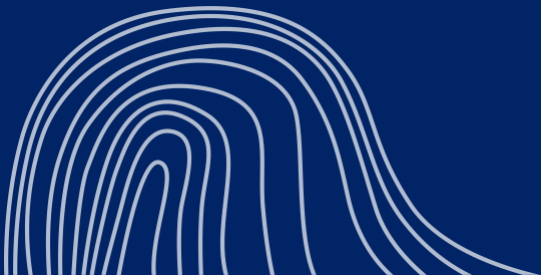
Performance metrics	Pre M8 Opening		Post M8 Opening		Difference	
	AM	PM	AM	PM	AM	PM
Maximum Queue Length (m)	471	202	280	222	-191	+20
Average Delay Time (sec)	63.9	38.7	46.5	41.3	-17.4	+2.6
Degree of Saturation	1.0	0.8	0.9	0.9	-0.1	+0.1
Intersection Level of Service	E	C	D	C	N/A	

Following the opening of the M8 Motorway, the analysis indicates that the Gardeners Road and Botany Road signalised intersection operates satisfactorily, performing at LoS D in the AM peak and LoS C in the PM peak. The intersection's performance in the AM peak has improved significantly, with improved saturation levels and decreased queue lengths for northbound traffic along Botany Road. These results indicate that Transport's upgrades at Mascot, delivered in October 2020, were successful in supporting the expected increase in traffic volumes associated with the opening of the M8 Motorway. No further investigation at this intersection is required.

6 Potential mitigations and delivery priority

This report is a preliminary report only and potential mitigations to impacts identified have not yet been determined. As such, the potential mitigations section (Section 6) of the report is not currently populated. Once the plan has been completed following further consultation with council, the final Road Network Performance Review Plan will be submitted to DPE and made publicly available.

DRAFT



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