



Hickson Road South Upgrade and Refurbishment

Transport Assessment

Prepared for:

Infrastructure NSW

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PROJECT INFORMATION

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1 Introduction

1.1 Background

This transport impact assessment report has been prepared by JMT Consulting to support the Review of Environmental Factors (REF) for the Hickson Road South upgrade and refurbishment (the Activity).

The **Hickson Road South** (refer Figure 1) upgrade and refurbishment design comprises of the upgrade of Hickson Road from the northern side of the Napoleon Street intersection connecting to the existing road upgrade north of the High Street Steps, along with utility upgrades running adjacent to Barton Street and intersection upgrades.

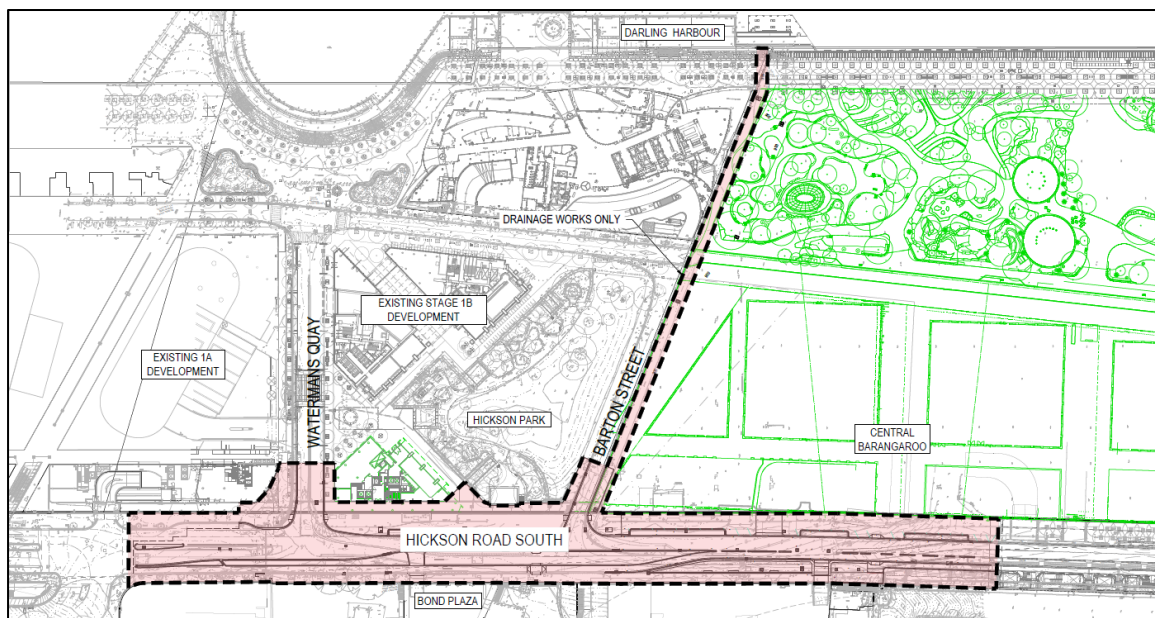


Figure 1 Site context plan

This report has been prepared to consider the following items with respect to the proposed works:

- Traffic volumes
- Traffic circulation arrangements
- Pedestrian movements
- Public transport arrangements
- Hickson Road design, including measures to maintain good levels of pedestrian safety and connectivity

1.2 Overview of works

This report accompanies a Review of Environmental Factors that seeks approval for the Hickson Road upgrade and refurbishment, which involves the following works:

- Adjustment to horizontal geometry of the existing Hickson Road, enabling the provision of:
 - Additional short term parking bays along the western side of the roadway;
 - A new two-way separated cycleway along the eastern edge of the roadway;
- Provision of two (2) un-signalised pedestrian crossings along Hickson Road, creating a pedestrian connection to Hickson Park and Central Barangaroo;
- Adjustments to two (2) existing un-signalised pedestrian crossing intersections along Waterman's Quay and Barton Street respectively;
- Installing of a formal left turn slip lane into Waterman's Quay from the north-bound approach on Hickson Road ;
- Constructing new footpaths on the western and eastern sides of Hickson Road to match the already completed footpath works to the north and south of the existing extent of proposed works;
- Provision of permeable paving to accommodate existing trees;
- Landscaping works including the establishment of low-median planting between the eastern edge of the road carriageway and eastern footpath and installation of additional medium sized trees along both the eastern and western footpaths and within the landscape medians;
- Relocation and augmentation of utilities where necessary, including electrical, gas, water and telecommunications;
- Final roadworks, including kerb and gutters, road and footpath pavements, signage, lighting and line marking;
- Installation of new stormwater drainage pit and pipe infrastructure, including a trunk drainage line running adjacent Barton Street to an existing outlet to Sydney Harbour;
- Ancillary works for the project including, but not limited to, road furniture, tie-in works, earthworks, adjustments to existing stormwater drainage infrastructure and flood mitigation works

The Review of Environmental Factors prepared by Ethos Urban provides a full description of the proposed works.

1.3 Key findings

Based on the identification of potential issues, and an assessment of the nature and extent of the impacts of the proposed development, it is determined that:

- The extent and nature of potential impacts are low and will not have significant adverse effects on the locality, community and the environment;
- Potential impacts relating to traffic movements during construction and operation can be appropriately mitigated or managed by means of management plans and appropriate design outcomes to ensure that there is minimal effect on the locality, community.

2 Transport Assessment

2.1 Traffic volumes

Traffic counts were undertaken in August 2025 to understand the current extent of traffic flows on Hickson Road. The outcomes of the counts are illustrated below, indicating a peak hourly traffic flow (per direction) of less than 300 vehicles per day and a daily traffic flow of between 6,000 and 7,500 vehicles per day.

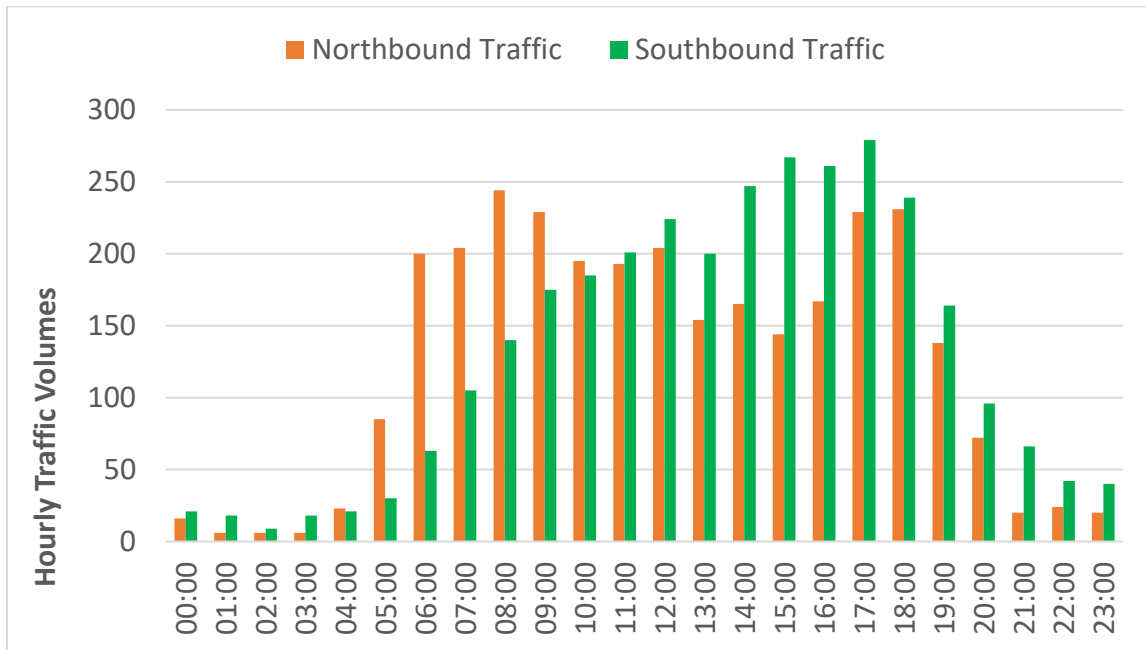


Figure 2 Hickson Road weekday hourly traffic movements

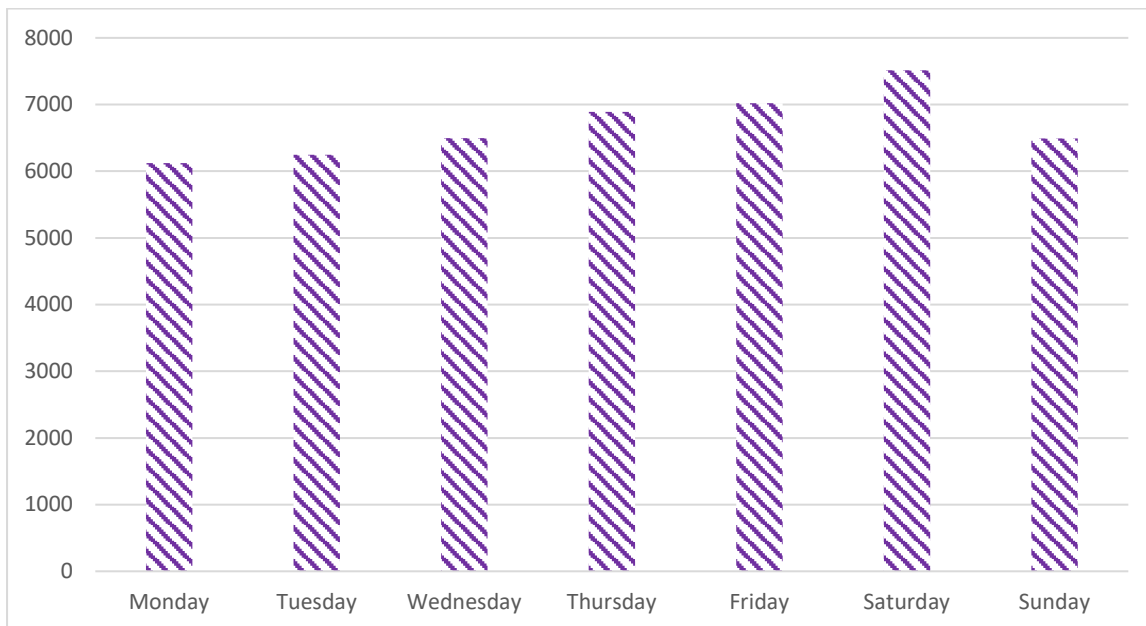


Figure 3 Hickson Road daily traffic movements

Peak hour traffic counts were also undertaken at the two key intersections on Hickson Road the proposed works, those being at Watermans Quay and Barton Street. The outcomes of these peak hour traffic counts are presented in Figure 4 and Figure 5.

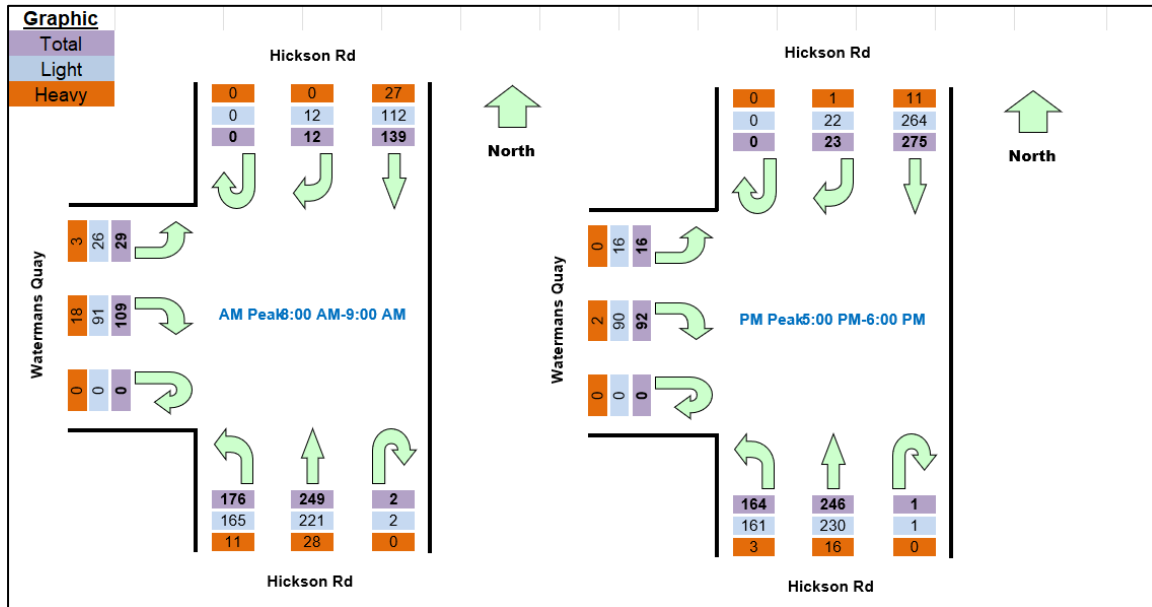


Figure 4 Peak hour traffic counts – Hickson Road / Watermans Quay

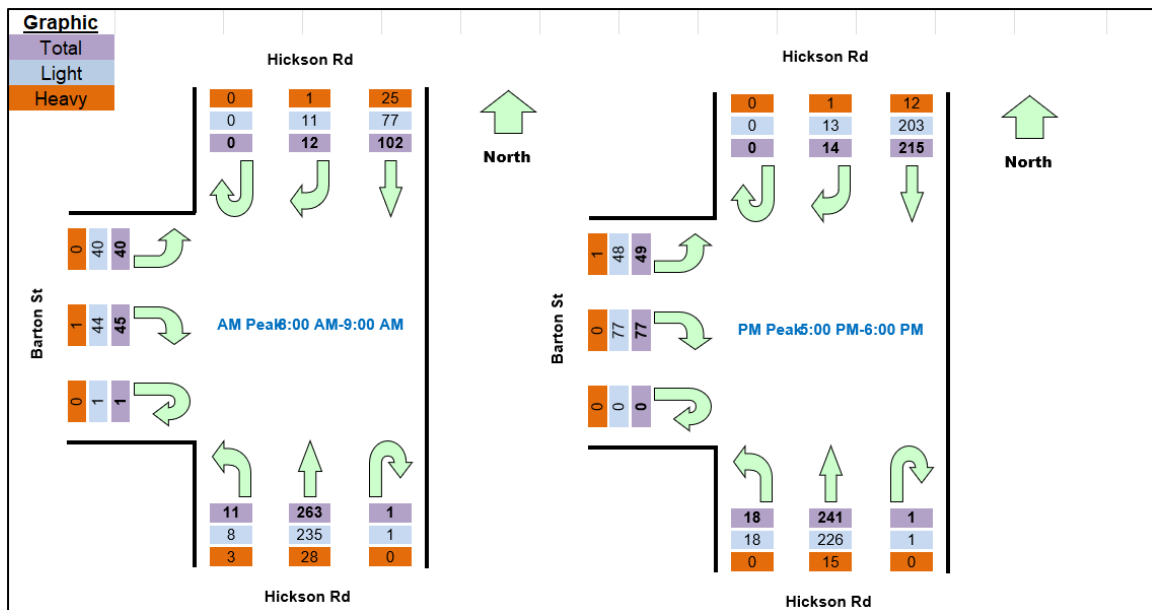


Figure 5 Peak hour traffic counts – Hickson Road / Barton Street

2.2 Road design

The proposal involves the upgrade of Hickson Road as indicated in Figure 6 below.

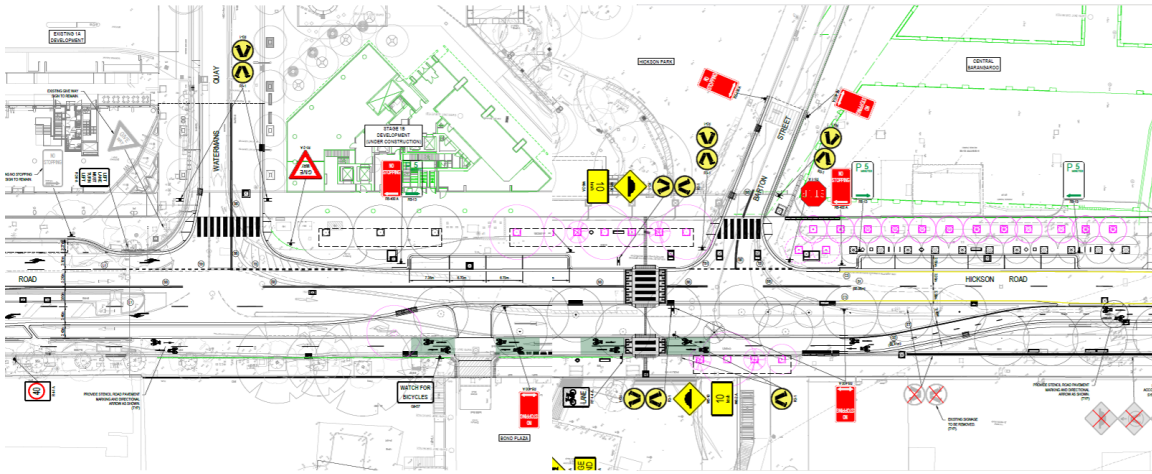


Figure 6 Overall plan of proposed works

Source: Enspire Solutions Pty Ltd

Key features of the design are as follows:

- Provision of a single lane of traffic in both the northbound and southbound directions
- Introduction of a dedicated, bi-directional bicycle lane on the eastern side of Hickson Road between Napoleon Street and the existing cycleway to the north of Barton Street.
- Upgrades to the Hickson Road / Watermans Quay intersection. This includes the removal of the existing left turn slip lane into Watermans Quay while retaining a dedicated left turn lane. It is noted that this left turn lane has been in place for a number of years and was the subject of a previous assessment for the original upgrade of Hickson Road. From a traffic movement perspective retention of the left turn lane from Watermans Quay into Hickson Road is preferred. Due to the location of the marked pedestrian crossing in Watermans Quay adjacent to Hickson Road there would be no storage provision for left turning vehicles to queue within Watermans Quay to wait for pedestrian movements. This would potentially result in queues within Hickson Road blocking all northbound movements including bus movements. Providing a left turn lane allows queuing within Hickson Road whilst maintaining all northbound movements. It is noted that since the opening of the Barangaroo metro station there has been significant increases in pedestrian flows along Hickson Road and crossing Watermans Quay. This high level of pedestrian activity would delay vehicles turning left from Hickson Road as drivers give way to pedestrians. Should no left turn lane be provided delays to public transport and other users of Hickson Road would eventuate – potentially impacting the operation of the nearby signalised intersection on Napoleon Street.

- Introduction of a new raised pedestrian crossing of Hickson Road immediately south of Barton Street
- Five minute parking zone on the western kerb of Hickson Road
- Minor modifications to the existing Hickson Road / Napoleon Street signalised intersection to accommodate the future separated cycleway. Works will include a new detector loop and amendments to the existing signal lantern to incorporate a crossing light for cyclists.

Vehicle turning paths have been prepared by Enspire Solutions Pty Ltd, with relevant analysis presented on the following page of this document. The turning paths confirm the suitability of the road design to accommodate the necessary design vehicle including 8.8m service vehicles turning into and out of Watermans Quay – prepared in accordance with Austroads guidelines.

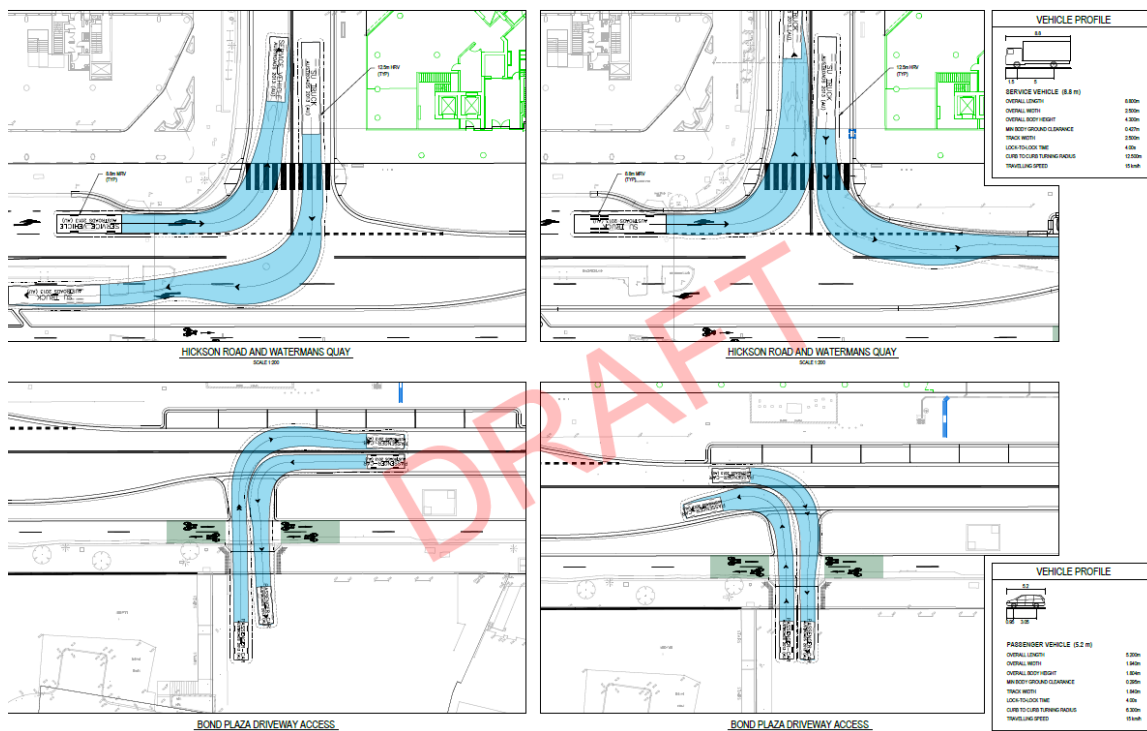


Figure 7 Vehicle turning paths

Source: Enspire

2.3 Road network performance

2.3.1 Hickson Road capacity

The Hickson Road upgrade and refurbishment will complement the existing and future road layout and not compromise the operation of the surrounding road network. The upgrade works propose only minor modifications to the existing signalised intersection of Hickson Road at Napoleon Street through the introduction of a new detector loop and amendments to the existing signal lantern to incorporate a crossing light for cyclists. The operation of the intersection with respect to traffic movements will not change as a result of the works, with the cyclist crossing phase to run concurrently with the pedestrian phase.

Traffic movements on Hickson Road are currently less than 300 vehicles per hour in each direction during peak periods (see Section 2.1). This is well below the typical urban road capacity of 750-900 vehicles per hour. As summarised in Figure 8 below there is significant spare capacity along Hickson Road to accommodate future traffic growth from the remaining stages of the Barangaroo development.

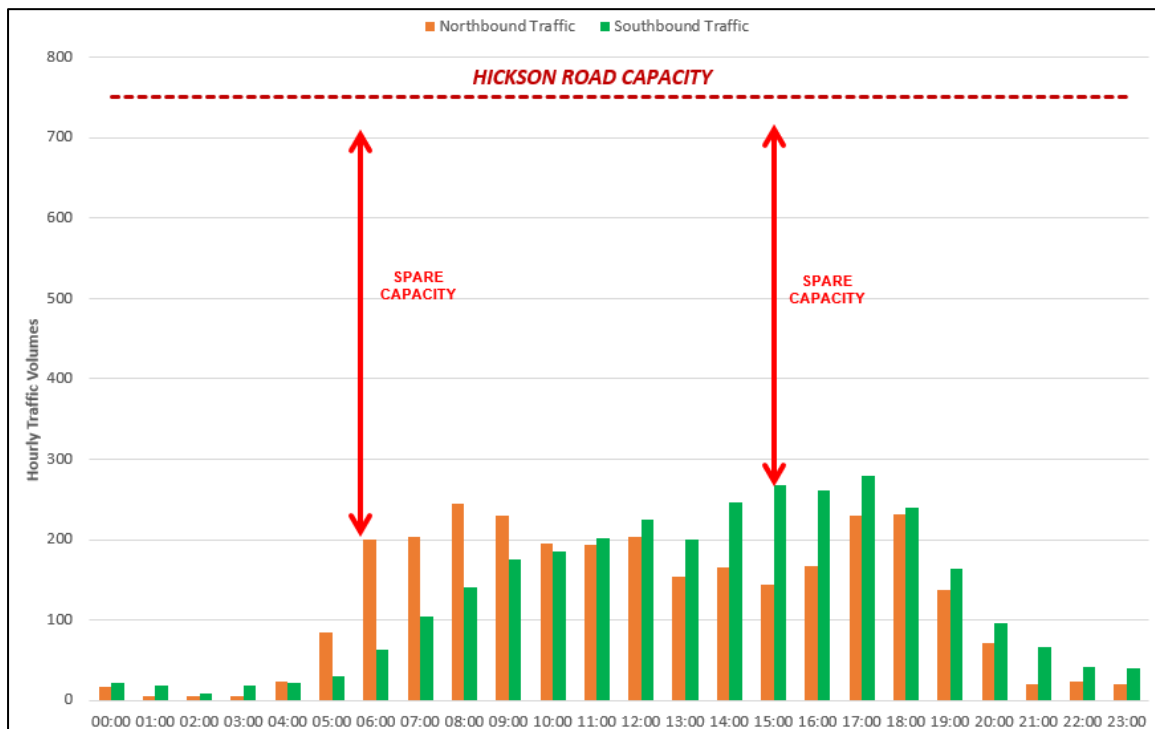


Figure 8 Hickson Road traffic flows relative to road capacity

2.3.2 Intersection performance

Traffic modelling has been undertaken to consider the current and future performance of the Hickson Road / Watermans Quay and Hickson Road / Barton Street intersections. The traffic modelling undertaken to support the project has been conducted using the TfNSW approved 'SIDRA'¹ modelling package.

The traffic modelling metric used to analyse the performance of the road network is Level of Service (LOS). Level of Service is a measure that uses the average delay experienced by vehicles to categorically assign each approach and movement with a qualitative ordinal grade (A through F, with A being the best and F being the worst). RMS Traffic Modelling Guidelines indicate the average delay relating to each grade, this is outlined in Table 1. In typical urban environments it is typical for intersections to operate at Level of Service D or E and still remain within acceptable performance levels.

Table 1 Level of service grades / description

Level of service grade	Average delay (seconds)	Description
A	Less than 14	Good operation
B	15 to 28	Good with acceptable delays and spare capacity
C	29 to 42	Satisfactory
D	43 to 56	Operating near capacity
E	57 to 70	At capacity. At signals, incidents will cause excessive delays. Roundabouts require other control mode
F	Greater than 71	Unsatisfactory with excessive queuing

To take into consideration traffic growth associated with future development in Barangaroo a background traffic growth rate of 2.0% per annum over a 10 year period has been applied. This background traffic growth represents an increase of approximately 200 vehicles per hour compared to current conditions which is reflective of anticipated movements associated with future stages of development within the Barangaroo precinct.

¹ Version 9.1

The forecast performance of the road network is summarised in Table 2 and Table 3, with detailed traffic modelling outputs provided as Appendix A of this document. The modelling demonstrates that, even taking into future traffic growth, the intersection under the proposed road design will operate at a strong level of service with spare capacity for additional growth.

Table 2 Road network performance – AM Peak Hour (8am – 9am)

Intersection	Intersection Approach	Intersection performance – Existing Conditions		Intersection performance – With 10 years growth	
		Degree of Saturation	Level of Service*	Degree of Saturation	Level of Service*
Hickson Road / Watermans Quay	Southern approach – Hickson Road	0.13	A	0.16	A
	Western approach – Watermans Quay	0.24	A	0.34	A
	Northern approach – Hickson Road	0.05	A	0.06	B
Hickson Road / Barton Street	Southern approach – Hickson Road	0.16	A	0.19	A
	Western approach – Barton Street	0.10	A	0.13	A
	Northern approach – Hickson Road	0.08	A	0.09	A

Table 3 Road network performance – PM Peak Hour (8am – 9am)

Intersection	Intersection Approach	Intersection performance – Existing Conditions		Intersection performance – With 10 years growth	
		Degree of Saturation	Level of Service*	Degree of Saturation	Level of Service*
Hickson Road / Watermans Quay	Southern approach – Hickson Road	0.14	A	0.18	A
	Western approach – Watermans Quay	0.24	A	0.36	A
	Northern approach – Hickson Road	0.27	B	0.35	B

Intersection	Intersection Approach	Intersection performance – Existing Conditions		Intersection performance – With 10 years growth	
		Degree of Saturation	Level of Service*	Degree of Saturation	Level of Service*
Hickson Road / Barton Street	Southern approach – Hickson Road	0.15	A	0.18	A
	Western approach – Barton Street	0.17	A	0.23	A
	Northern approach – Hickson Road	0.14	A	0.16	A

2.4 Public transport

The Hickson Road upgrade and refurbishment will support access to public transport services by enhancing existing active transport infrastructure such as widened footpaths, a new separated bicycle lane and improved public domain features. These active transport improvements will facilitate enhanced access to existing bus stops on Hickson Road as well as the Barangaroo metro station. The works proposed do not alter any propose any changes to existing bus routes or stops along Hickson Road.

Travel lanes on Hickson Road are 3.2m wide which is of sufficient width to enable northbound and southbound bus movements. Traffic capacity is to be maintained along Hickson Road and therefore there not expected to be any impacts to bus travel times as a result of the works.

2.5 Walking and cycling

The Hickson Road upgrade and refurbishment involves a number of enhancements to the walking and cycling network in the area, including:

- Separated cycleway on the eastern side of Hickson Road. The cycleway will provide a connection to the existing cycling facility south of Napoleon Street and ultimately provide for bi-directional travel upon completion of the remaining stage (Stage 4) of the Hickson Road upgrade project. The cycleway, including relevant buffer zones, has been designed in accordance with relevant City of Sydney and Transport for NSW requirements.
- A new raised zebra (wombat) crossing of Hickson Road immediately south of Barton Street to provide improved connectivity between Hickson Park and 30 The Bond.
- Relocated pedestrian (zebra) crossing across Barton Street adjacent to the Hickson Road intersection to align with the pedestrian desire line.

- Retention of existing pedestrian (zebra) crossing across Hickson Road at the northern end of the works site
- Significantly widened footpath on the western side of Hickson Road, complemented by enhanced public domain treatments such as street trees and furniture – providing an improved outcome for pedestrians.

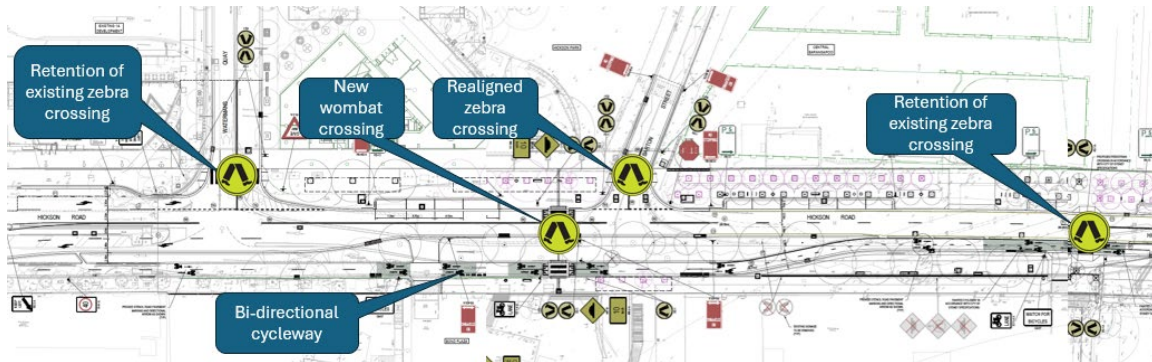


Figure 9 Walking and cycling features of the project

2.6 Pick up and drop off

The works include the provision of four indented parking areas for the use of short term drop off and pick up. These areas are noted on the engineering plans to be ‘5 minute parking’ which will provide flexibility in terms of use, with taxis, Ubers and general drop off / pick up permitted under this proposed control. Up to 16 vehicles can be accommodated across these four short term parking zones which will support improved visitor access to the Barangaroo precinct.

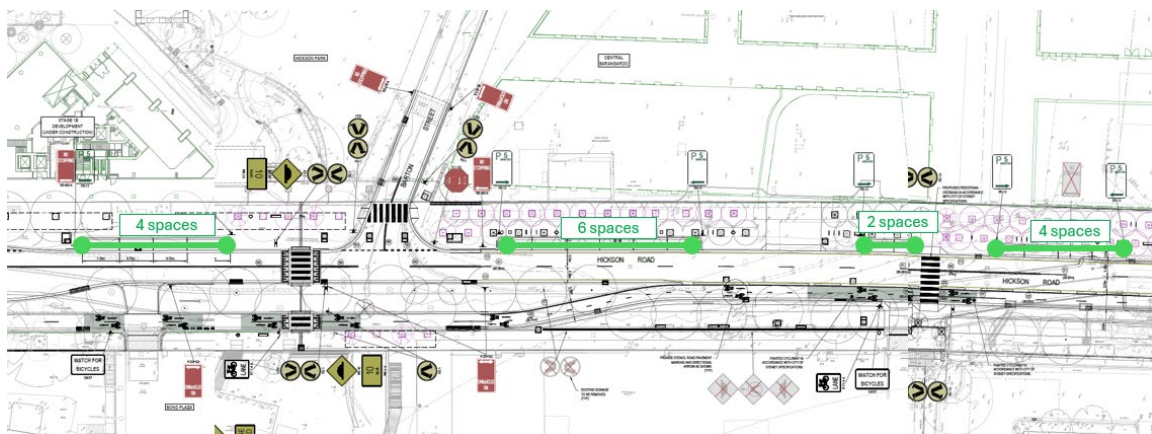


Figure 10 Future drop off and pick up opportunities

2.7 Construction traffic impacts

Detailed CTMP

The contractor (once appointed) will be required to prepare a detailed Construction Traffic Management Plan (CTMP) prior to the commencement of works in accordance with Safe Work Australia Guidelines General Guide for Workplace Traffic Management and the Traffic Management Guide: Construction Work, to the satisfaction of Port Authority. The CTMP will include the following:

- Traffic Control Plans;
- Site specific traffic control measures (including signage) to manage and regulate traffic movement (road users, cyclists and pedestrians) within the area;
- Vehicle turning paths;
- Site compound layout and access;
- Driver facility areas; and
- Additional work zones / road closures.

Mitigation Measures

Mitigation measures will be adopted to ensure traffic movements have minimal impact on surrounding land uses and the community in general, and would include the following:

- All construction vehicles to approach the site via the broader arterial road network and minimise the use of local residential streets.
- Traffic controllers would be in place at the site access and egress points to manage conflicts with pedestrians using the footpath.
- Temporary fencing and hoardings will be installed along the site frontage to manage pedestrian movements and ensure the safety of pedestrians walking adjacent to the construction site.
- No queueing of vehicles to take place on roads outside of Hickson Road .
- Vehicles to enter and exit the site in a forward direction under traffic control;
- Pedestrian movements across construction access driveways will be managed and controlled by site personnel where required;
- Pedestrian warning signs and construction safety signs/devices to be utilised in the vicinity of the site and to be provided in accordance with WorkCover requirements;
- Construction activity to be carried out in accordance with the approved hours of work;
- Materials would be delivered during standard construction hours; and

- Construction traffic movements to/from the site to be minimised in peak traffic periods, where feasible, to reduce the impact on the wider road network.

The appointed contractor will include the following in all subcontract procurement packages:

- a copy of the approved truck routes as previously detailed in this document;
- the approved maximum truck size; and
- any other entry restrictions, or site access restrictions as agreed to by the authorities.

The appointed contractor will be responsible for managing all site access points and monitoring subcontractor behaviour and subcontractor truck access arrangements to ensure compliance with conditions of the contract. They will be responsible for ensuring there is no access to or from the site before or after approved construction hours and no queueing occurs outside of Hickson Road.

All staff employed on the head contractor (including sub-contractors) would be required to undergo a site induction. The induction would include permitted access routes to and from the construction site for site staff and delivery vehicles, limited parking arrangements, as well as standard environmental, workplace health and safety, driver protocols and emergency procedures. The approved work hours must be included as part of this induction.

Potential Cumulative Impacts

There may be other construction projects occurring at the same as the proposed works, of relevance being the Barangaroo Central development. Ongoing review of cumulative heavy vehicle traffic generation and coordination of heavy vehicle routes used by these projects will be undertaken on a regular basis between the appointed contractor, INSW and TfNSW to minimise impacts on the road network. The contractor responsible for the Hickson Road works will be required to liaise with these stakeholder to identify measures that can minimise cumulative traffic impacts. As other CTPMPs become available for adjacent projects, these will also be reviewed by the contractor and discussions held with relevant stakeholders.

3 Summary

This document has been prepared by JMT Consulting to support a Review of Environmental Factors (REF) to assess the potential environmental impacts that could arise from the Hickson Road upgrade and refurbishment works along the eastern edge of Barangaroo South and Central Barangaroo (the site). Key findings arising from the assessment are as follows:

- The road design will adequately accommodate existing and future traffic flows on Hickson Road and complement the previously upgraded section of Hickson Road south of Napoleon Street.
- Traffic modelling indicates that the proposed intersection configurations at Watermans Quay and Barton Street will be suitable and result in acceptable operational performance during peak hours.
- The works will not impact the operation of the Hickson Road / Napoleon Street signalised intersections from a traffic movement perspective nor will any new signalised intersections be introduced on Hickson Road.
- The project will provide for significant enhancements to the transport environment, including:
 - Widened footpath on the western side of Hickson Road supported by an improved public domain to support access to bus stops and the Barangaroo metro station
 - Enhanced pedestrian crossing points of Hickson Road and Watermans Quay
 - Extension of the existing separated cycleway on Hickson Road from Napoleon Street to connect with the existing cycleway north of Barton Street
 - Improved drop off and pick up opportunities for visitors travelling by taxi and ride-share to the Barangaroo precinct
- The impacts of the works can be appropriately mitigated through the provision of suitable road design (as documented in the civil engineering drawings) and via the development of a Construction Traffic Management Plan for the construction phase of the project.

The proposed works are therefore considered to provide for a significantly improved transport environment serving the Barangaroo precinct. The extent and nature of potential impacts are low (via the provision of mitigation measures) and will not have significant adverse effects on the locality, community and the environment.

Appendix A: Traffic Modelling Outputs

MOVEMENT SUMMARY

STOP Site: [101] AM Existing (Watermans Quay Intersection)
 Output produced by SIDRA INTERSECTION Version: 10.0.5.217

New Site
 Site Category: (None)
 Stop (Two-Way)
 Site Scenario: 1 | Local Volumes

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed
			[Total HV]	[Total HV]	[Total HV]	[Total HV]	v/c	sec		[Veh.]	[Dist]				km/h
			veh/h	%	veh/h	%				veh	m				
South: Hickson Road (S)															
1	L2	All MCs	174	6.7	174	6.7	0.111	5.7	LOS A	0.5	3.6	0.06	0.53	0.06	52.7
2	T1	All MCs	233	12.7	233	12.7	0.129	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach			406	10.1	406	10.1	0.129	2.5	LOS A	0.5	3.6	0.03	0.22	0.03	56.6
North: Hickson Road (N)															
8	T1	All MCs	146	19.4	146	19.4	0.048	0.1	LOS A	0.1	0.8	0.06	0.07	0.06	59.3
9	R2	All MCs	13	0.0	13	0.0	0.048	6.5	LOS A	0.1	0.8	0.14	0.17	0.14	55.7
Approach			159	17.9	159	17.9	0.048	0.6	NA	0.1	0.8	0.07	0.08	0.07	59.0
West: Watermans Quay															
10	L2	All MCs	27	11.5	27	11.5	0.237	9.9	LOS A	0.9	7.5	0.58	0.95	0.59	47.9
12	R2	All MCs	96	19.8	96	19.8	0.237	15.2	LOS B	0.9	7.5	0.58	0.95	0.59	47.5
Approach			123	17.9	123	17.9	0.237	14.0	LOS A	0.9	7.5	0.58	0.95	0.59	47.6
All Vehicles			688	13.3	688	13.3	0.237	4.1	NA	0.9	7.5	0.13	0.32	0.14	55.2

Site Level of Service (LOS) Method: Delay (NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
 Vehicle movement LOS values are based on average delay per movement.
 Minor Road Approach LOS values are based on average delay for all vehicle movements.
 NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
 Two-Way Sign Control Capacity Model: SIDRA Standard.
 Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
 Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
 Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
 HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
 Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

STOP Site: [2] AM Existing + Growth (Watermans Quay Intersection)
 Output produced by SIDRA INTERSECTION Version: 10.0.5.217

New Site
 Site Category: (None)
 Stop (Two-Way)
 Design Life Analysis (Final Year): Results for 10 years
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed
			[Total HV]	%	[Total HV]	%	v/c	sec		[Veh.]	[Dist]				km/h
			veh/h		veh/h					veh	m				
South: Hickson Road (S)															
1	L2	All MCs	208	6.7	208	6.7	0.133	5.7	LOS A	0.6	4.4	0.07	0.52	0.07	52.7
2	T1	All MCs	279	12.7	279	12.7	0.155	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach			488	10.1	488	10.1	0.155	2.5	LOS A	0.6	4.4	0.03	0.22	0.03	56.6
North: Hickson Road (N)															
8	T1	All MCs	176	19.4	176	19.4	0.058	0.2	LOS A	0.1	1.0	0.07	0.08	0.07	59.2
9	R2	All MCs	15	0.0	15	0.0	0.058	6.7	LOS A	0.1	1.0	0.16	0.18	0.16	55.6
Approach			191	17.9	191	17.9	0.058	0.7	NA	0.1	1.0	0.07	0.09	0.07	58.9
West: Watermans Quay															
10	L2	All MCs	33	11.5	33	11.5	0.338	11.3	LOS A	1.6	12.5	0.66	1.04	0.83	46.1
12	R2	All MCs	115	19.8	115	19.8	0.338	18.8	LOS B	1.6	12.5	0.66	1.04	0.83	45.7
Approach			148	17.9	148	17.9	0.338	17.2	LOS B	1.6	12.5	0.66	1.04	0.83	45.8
All Vehicles			826	13.3	826	13.3	0.338	4.7	NA	1.6	12.5	0.15	0.34	0.18	54.8

Site Level of Service (LOS) Method: Delay (NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
 Vehicle movement LOS values are based on average delay per movement.
 Minor Road Approach LOS values are based on average delay for all vehicle movements.
 NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
 Two-Way Sign Control Capacity Model: SIDRA Standard.
 Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
 Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
 Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
 HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
 Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

STOP Site: [3] PM Existing (Watermans Quay Intersection)
 Output produced by SIDRA INTERSECTION Version: 10.0.5.217

New Site
 Site Category: (None)
 Stop (Two-Way)
 Site Scenario: 1 | Local Volumes

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed
			[Total HV]	[Total HV]	[Total HV]	[Total HV]	v/c	sec		[Veh.]	[Dist]				km/h
			veh/h	%	veh/h	%				veh	m				
South: Hickson Road (S)															
1	L2	All MCs	173	1.8	173	1.8	0.140	6.7	LOSA	0.6	4.1	0.38	0.60	0.38	51.8
2	T1	All MCs	259	6.5	259	6.5	0.138	0.0	LOSA	0.0	0.0	0.00	0.00	0.00	59.9
Approach			432	4.6	432	4.6	0.140	2.7	LOSA	0.6	4.1	0.15	0.24	0.15	56.4
North: Hickson Road (N)															
8	T1	All MCs	24	4.3	24	4.3	0.013	0.0	LOSA	0.0	0.0	0.00	0.00	0.00	60.0
9	R2	All MCs	289	4.0	289	4.0	0.271	7.0	LOSA	1.2	9.0	0.42	0.65	0.42	51.3
Approach			314	4.0	314	4.0	0.271	6.5	NA	1.2	9.0	0.39	0.60	0.39	51.9
West: Watermans Quay															
10	L2	All MCs	17	0.0	17	0.0	0.243	9.5	LOSA	1.0	7.0	0.64	0.99	0.68	47.5
12	R2	All MCs	97	2.2	97	2.2	0.243	15.7	LOS B	1.0	7.0	0.64	0.99	0.68	47.3
Approach			114	1.9	114	1.9	0.243	14.8	LOS B	1.0	7.0	0.64	0.99	0.68	47.3
All Vehicles			859	4.0	859	4.0	0.271	5.7	NA	1.2	9.0	0.30	0.47	0.31	53.4

Site Level of Service (LOS) Method: Delay (NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
 Vehicle movement LOS values are based on average delay per movement.
 Minor Road Approach LOS values are based on average delay for all vehicle movements.
 NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
 Two-Way Sign Control Capacity Model: SIDRA Standard.
 Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
 Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
 Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
 HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
 Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

STOP Site: [4] PM Existing + Growth (Watermans Quay Intersection)
 Output produced by SIDRA INTERSECTION Version: 10.0.5.217

New Site
 Site Category: (None)
 Stop (Two-Way)
 Design Life Analysis (Final Year): Results for 10 years
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Qued	Eff. Stop of Cycles	Number of Cycles to Depart	Aver. Speed
			[Total HV]	%	[Total HV]	%	v/c	sec		[Veh.]	[Dist]		Rate		km/h
South: Hickson Road (S)															
1	L2	All MCs	207	1.8	207	1.8	0.178	7.1	LOS A	0.7	5.3	0.43	0.64	0.43	51.6
2	T1	All MCs	311	6.5	311	6.5	0.166	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach			518	4.6	518	4.6	0.178	2.8	LOS A	0.7	5.3	0.17	0.25	0.17	56.3
North: Hickson Road (N)															
8	T1	All MCs	29	4.3	29	4.3	0.015	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
9	R2	All MCs	347	4.0	347	4.0	0.346	7.6	LOS A	1.8	12.8	0.49	0.70	0.52	50.9
Approach			376	4.0	376	4.0	0.346	7.0	NA	1.8	12.8	0.45	0.64	0.48	51.5
West: Watermans Quay															
10	L2	All MCs	20	0.0	20	0.0	0.362	11.1	LOS A	1.6	11.6	0.73	1.07	0.94	45.2
12	R2	All MCs	116	2.2	116	2.2	0.362	20.2	LOS B	1.6	11.6	0.73	1.07	0.94	45.0
Approach			136	1.9	136	1.9	0.362	18.9	LOS B	1.6	11.6	0.73	1.07	0.94	45.0
All Vehicles			1031	4.0	1031	4.0	0.362	6.5	NA	1.8	12.8	0.35	0.50	0.39	52.8

Site Level of Service (LOS) Method: Delay (NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
 Vehicle movement LOS values are based on average delay per movement.
 Minor Road Approach LOS values are based on average delay for all vehicle movements.
 NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
 Two-Way Sign Control Capacity Model: SIDRA Standard.
 Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
 Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
 Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
 HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
 Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

STOP Site: [5] AM Existing (Barton Street Intersection)

Output produced by SIDRA INTERSECTION Version: 10.0.5.217

New Site

Site Category: (None)

Stop (Two-Way)

Site Scenario: 1 | Local Volumes

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed
			[Total HV] veh/h	[Total HV] %	[Total HV] veh/h	[Total HV] %				[Veh.] veh	[Dist] m				
South: Hickson Road (S)															
1	L2	All MCs	12	27.3	12	27.3	0.159	5.9	LOS A	0.0	0.0	0.00	0.02	0.00	55.9
2	T1	All MCs	277	10.6	277	10.6	0.159	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	59.7
Approach			288	11.3	288	11.3	0.159	0.3	NA	0.0	0.0	0.00	0.02	0.00	59.6
North: Hickson Road (N)															
8	T1	All MCs	107	24.5	107	24.5	0.076	0.3	LOS A	0.1	1.0	0.11	0.13	0.11	58.9
9	R2	All MCs	13	8.3	13	8.3	0.076	7.1	LOS A	0.1	1.0	0.11	0.13	0.11	55.7
Approach			120	22.8	120	22.8	0.076	1.0	NA	0.1	1.0	0.11	0.13	0.11	58.5
West: Barton Street															
10	L2	All MCs	47	2.2	47	2.2	0.102	9.5	LOS A	0.4	2.6	0.42	0.90	0.42	50.4
12	R2	All MCs	42	0.0	42	0.0	0.102	9.9	LOS A	0.4	2.6	0.42	0.90	0.42	50.3
Approach			89	1.2	89	1.2	0.102	9.6	LOS A	0.4	2.6	0.42	0.90	0.42	50.4
All Vehicles			498	12.3	498	12.3	0.159	2.1	NA	0.4	2.6	0.10	0.21	0.10	57.4

Site Level of Service (LOS) Method: Delay (NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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Project: Not Saved

MOVEMENT SUMMARY

STOP Site: [6] AM Existing + Growth (Barton Street Intersection)
 Output produced by SIDRA INTERSECTION Version: 10.0.5.217

New Site
 Site Category: (None)
 Stop (Two-Way)
 Design Life Analysis (Final Year): Results for 10 years
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance														
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Qued	Eff. Number of Cycles to Depart	Aver. Speed
			[Total HV]	[Total HV]	[Total HV]	[Total HV]	v/c	sec		[Veh.]	[Dist]			km/h
			veh/h	%	veh/h	%				veh	m			
South: Hickson Road (S)														
1	L2	All MCs	14	27.3	14	27.3	0.191	5.9	LOS A	0.0	0.0	0.00	0.02	0.00
2	T1	All MCs	332	10.6	332	10.6	0.191	0.1	LOS A	0.0	0.0	0.00	0.02	0.00
Approach			346	11.3	346	11.3	0.191	0.3	NA	0.0	0.0	0.00	0.02	0.00
North: Hickson Road (N)														
8	T1	All MCs	129	24.5	129	24.5	0.093	0.3	LOS A	0.2	1.3	0.12	0.15	0.12
9	R2	All MCs	15	8.3	15	8.3	0.093	7.5	LOS A	0.2	1.3	0.12	0.15	0.12
Approach			144	22.8	144	22.8	0.093	1.1	NA	0.2	1.3	0.12	0.15	0.12
West: Barton Street														
10	L2	All MCs	57	2.2	57	2.2	0.134	9.8	LOS A	0.5	3.4	0.47	0.93	0.47
12	R2	All MCs	51	0.0	51	0.0	0.134	10.6	LOS A	0.5	3.4	0.47	0.93	0.47
Approach			107	1.2	107	1.2	0.134	10.2	LOS A	0.5	3.4	0.47	0.93	0.47
All Vehicles			597	12.3	597	12.3	0.191	2.3	NA	0.5	3.4	0.11	0.22	0.11

Site Level of Service (LOS) Method: Delay (NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
 Vehicle movement LOS values are based on average delay per movement.
 Minor Road Approach LOS values are based on average delay for all vehicle movements.
 NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
 Two-Way Sign Control Capacity Model: SIDRA Standard.
 Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
 Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
 Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
 HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
 Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

STOP Site: [7] PM Existing (Barton Street Intersection)

Output produced by SIDRA INTERSECTION Version: 10.0.5.217

New Site

Site Category: (None)

Stop (Two-Way)

Site Scenario: 1 | Local Volumes

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed
			[Total HV]	[Total HV]	[Total HV]	[Total HV]	v/c	sec		[Veh.]	[Dist]				km/h
			veh/h	%	veh/h	%				veh	m				
South: Hickson Road (S)															
1	L2	All MCs	19	0.0	19	0.0	0.146	5.6	LOS A	0.0	0.0	0.00	0.04	0.00	57.1
2	T1	All MCs	254	6.2	254	6.2	0.146	0.0	LOS A	0.0	0.0	0.00	0.04	0.00	59.5
Approach			273	5.8	273	5.8	0.146	0.4	NA	0.0	0.0	0.00	0.04	0.00	59.3
North: Hickson Road (N)															
8	T1	All MCs	226	5.6	226	5.6	0.135	0.1	LOS A	0.1	1.1	0.07	0.08	0.07	59.4
9	R2	All MCs	15	7.1	15	7.1	0.135	7.0	LOS A	0.1	1.1	0.07	0.08	0.07	56.2
Approach			241	5.7	241	5.7	0.135	0.6	NA	0.1	1.1	0.07	0.08	0.07	59.2
West: Barton Street															
10	L2	All MCs	52	2.0	52	2.0	0.168	9.3	LOS A	0.6	4.3	0.46	0.92	0.46	50.1
12	R2	All MCs	81	0.0	81	0.0	0.168	10.7	LOS A	0.6	4.3	0.46	0.92	0.46	49.9
Approach			133	0.8	133	0.8	0.168	10.2	LOS A	0.6	4.3	0.46	0.92	0.46	50.0
All Vehicles			646	4.7	646	4.7	0.168	2.5	NA	0.6	4.3	0.12	0.24	0.12	57.1

Site Level of Service (LOS) Method: Delay (NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

STOP Site: [8] PM Existing + Growth (Barton Street Intersection)
 Output produced by SIDRA INTERSECTION Version: 10.0.5.217

New Site
 Site Category: (None)
 Stop (Two-Way)
 Design Life Analysis (Final Year): Results for 10 years
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Qued	Eff. Stop of Cycles	Number of Cycles to Depart	Aver. Speed
			[Total HV]	%	[Total HV]	%	v/c	sec		[Veh.]	[Dist]		Rate		km/h
South: Hickson Road (S)															
1	L2	All MCs	23	0.0	23	0.0	0.175	5.6	LOS A	0.0	0.0	0.00	0.04	0.00	57.1
2	T1	All MCs	304	6.2	304	6.2	0.175	0.0	LOS A	0.0	0.0	0.00	0.04	0.00	59.5
Approach			327	5.8	327	5.8	0.175	0.4	NA	0.0	0.0	0.00	0.04	0.00	59.3
North: Hickson Road (N)															
8	T1	All MCs	272	5.6	272	5.6	0.163	0.2	LOS A	0.2	1.4	0.08	0.09	0.08	59.3
9	R2	All MCs	18	7.1	18	7.1	0.163	7.4	LOS A	0.2	1.4	0.08	0.09	0.08	56.2
Approach			289	5.7	289	5.7	0.163	0.6	NA	0.2	1.4	0.08	0.09	0.08	59.1
West: Barton Street															
10	L2	All MCs	62	2.0	62	2.0	0.225	9.7	LOS A	0.8	5.9	0.52	0.94	0.52	49.6
12	R2	All MCs	97	0.0	97	0.0	0.225	11.8	LOS A	0.8	5.9	0.52	0.94	0.52	49.5
Approach			159	0.8	159	0.8	0.225	11.0	LOS A	0.8	5.9	0.52	0.94	0.52	49.5
All Vehicles			776	4.7	776	4.7	0.225	2.7	NA	0.8	5.9	0.14	0.24	0.14	56.9

Site Level of Service (LOS) Method: Delay (NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
 Vehicle movement LOS values are based on average delay per movement.
 Minor Road Approach LOS values are based on average delay for all vehicle movements.
 NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
 Two-Way Sign Control Capacity Model: SIDRA Standard.
 Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
 Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
 Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
 HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
 Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.