Response to submissions

St Peters concrete plant and materials handling facility - Modification 11

Prepared for Boral Resources (NSW) Pty Limited | 11 September 2018

St Peters Modification 11

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St Peters Modification 11

Final

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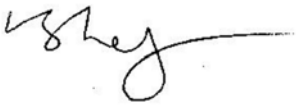
Signature			Signature		
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1 Introduction

This report provides a response to submissions on Boral Resources (NSW) Pty Limited's (Boral's) proposed modification (Modification 11) to Development Consent DA 14/96 for Boral's concrete batching plant (concrete plant) and construction materials handling facility (materials handling facility) at 25 Burrows Road South, St Peters (the site).

The site is legally described as Lot 1 in Deposited Plan (DP) 866946. It is a completely modified industrial site surrounded by industrial land uses and located within the Inner West local government area (LGA). Refer to Section 1.3 of the environmental assessment prepared for the proposed modification (St Peters Mod 11 EA) for further details on site location and surrounding land uses.

1.1 Overview

On 17 July 2018, Boral lodged an application to the NSW Department of Planning and Environment (DPE) to modify Development Consent DA 14/96. The proposed modification is to increase concrete production and increase the throughput of the materials handling facility.

The approved production limit for concrete at the site is 280,000 cubic metres (m^3) per annum. A concrete production limit of 750,000 m3 per annum is being sought for the site, which is an increase of 470,000 m3 per annum. To achieve this increase, the existing concrete plant would be upgraded to include an additional two alleys, with an additional six silos for cement storage and widening of existing raw material storage.

It is proposed to increase the throughput of the materials handling facility to 1 million tonnes per annum (Mtpa), which is an increase of 240,000 tonnes per annum (tpa) over the existing limit of 760,000 tpa. Some changes to the layout and function of the materials handling facility are proposed to facilitate the increase in throughput.

The proposed modification also includes the construction of a new aggregate reclaiming conveyor, an upgrade to the site's surface water management system, and installation of a second weighbridge.

Between 31 July and 13 August 2018, the proposed modification was placed on public exhibition by the DPE. The exhibition period was advertised in the Inner West Courier on Tuesday 31 July 2018 and in the Sydney Morning Herald and the Daily Telegraph GNB on Wednesday 1 August 2018. It was also notified to a number of government agencies and the Inner West Council (Council).

Twenty public submissions were received in response to the exhibition. Nine government agencies and organisations responded including DPE, Council, Sydney Airport Corporation Limited (SACL), NSW Environment Protection Authority (EPA), Office of Environment and Heritage (OEH), and Roads and Maritime Service (RMS). Three of those responded with no additional comments, including Transport for NSW (TfNSW), TransGrid and WaterNSW.

1.2 Purpose of this report

This response to submission document (RTS) has been prepared in accordance with the Draft Environmental Impact Assessment Guidance Series Responding to Submissions June 2017 (DPE). The purpose of the document is to consider and respond to agency and public submissions and change the proposed modification where relevant.

2 Overview of the exhibited project

Table 2.1 provides an overview of the existing site infrastructure and the proposed site infrastructure elements.

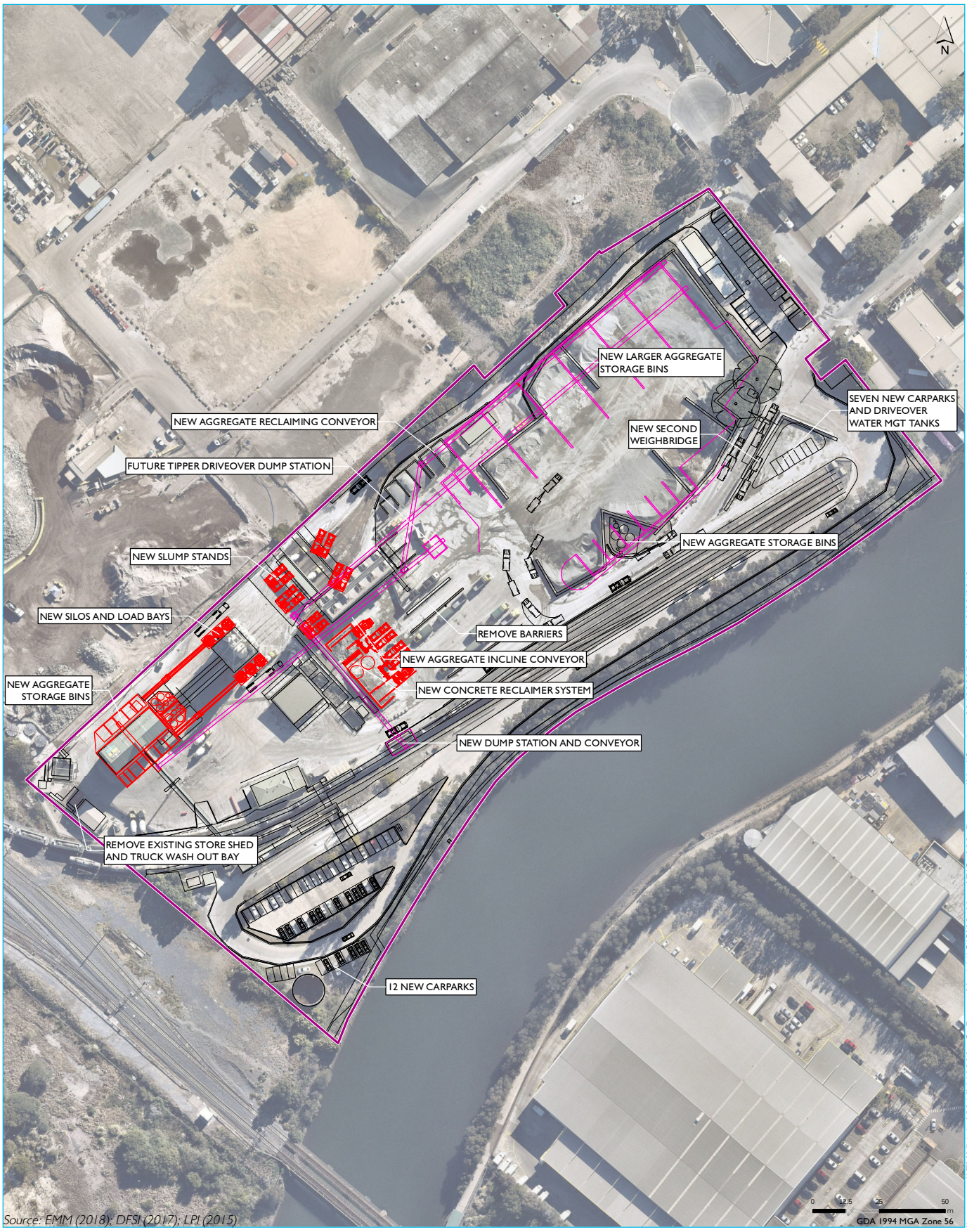
Additionally, Figure 2.1 is replicated from the St Peters Mod 11 EA and outlines the proposed site infrastructure to be read in conjunction with Table 2.1.

Table 2.1 Existing and proposed site infrastructure

Existing site infrastructure	Proposed site infrastructure
Materials handling facility	
A rail unloading area (for sand and aggregate material received by rail) and conveyor	A new rail unloading station (dump station) and conveyor that leads up to the bunkers in the existing elevated storage bins
Five elevated aggregate and sand storage bins	Bins to be demolished as they are no longer required. Consolidated into the reconfigured bunkers.
A truck standing area	Remove barriers at truck standing area
Aggregate and sand stockpiles	Reconfiguration of stockpiles within the existing materials handling facility area to include bunkers with wall heights of (between 10-17 m high) made of concrete in the north of the materials handling facility. The bunkers will be filled via a new overhead conveyor with a tripper car. This conveyor will be connected to the existing conveyor from the train unloading area and will eliminate the need for the larger bins to be filled by front-end loaders and trucks which currently occurs.
A weighbridge	A new second weighbridge
An office	No changes proposed
27 car park spaces	7 new car park spaces and drive over management tanks
-	New open aggregate storage bins in the south of the materials handling facility; these will be filled by trucks delivering aggregates and sand
-	New aggregate reclaiming conveyor along the north-western wall
-	New tipper drive over dump station
-	New aggregate incline conveyor from the new tipper drive over dump station to the concrete plant aggregate storage bins.
Concrete plant	
A rail unloading area (for sand and aggregate material received by rail) and conveyor	This will be removed, as it becomes redundant with the new aggregate reclaiming conveyor along the north-western wall. This will service the concrete plant aggregate storage bins.
An unloading facility for internal offsite trucks for sand and aggregates	The existing unloading facility will be removed and is replaced with the new tipper drive over dump station in the materials handling facility.
40 car park spaces	19 new car park spaces
An office	No proposed changes
A truck wash	To be removed if required by future Sydney Gateway roadworks.
12 elevated aggregates and storage bins	Widening the existing storage bins at their current location
Six elevated cement and flyash silos and two load	Two new conveyors to two new load alleys and six new

Table 2.1 Existing and proposed site infrastructure

Existing site infrastructure	Proposed site infrastructure
alleys	elevated cement and flyash silos
Two double position slump stands	An additional three new double position slump stands
Four agitator wash out bays	No proposed changes
-	New concrete reclaimer system.



Source: EMM (2018); DFSI (2017); LPI (2015)

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KEY

- Site layout
- Concrete plant feature (proposed)
- Material handling plant feature (proposed)
- Site location

Proposed modification

Response to submissions

Modification 11

Boral St Peters

Figure 2.1

EMM creating opportunities

3 Analysis of submissions

3.1 Submission Matrix

The St Peters Mod 11 EA public exhibition commenced on 31 July 2018 and ended on 13 August 2018 (two weeks). A total of 29 submissions were lodged via the DPE major projects' website during the exhibition period. Table A-1 in Appendix A provides a matrix of the types of submissions and the key issues raised. The matrix separately considers submissions from:

- agencies and government corporations (9 submissions); and
- public submissions from local residents and adjacent industrial land users (20 submissions).

The matrix notes which submissions are comments and which submissions are objections. The DPE major projects website allows the submitter to choose between "comment" or "objection", and in two cases, submitters have selected "comment", when their submissions appear to be objections. Both have been treated as objections in this RTS. Including these, 20 objections were received from the public (including local residents and adjacent industrial land users).

3.2 Submission Themes

The submissions matrix included as Table A-1 in Appendix A summarises the issues raised in the submissions. The themes of these submissions are as follows:

1. Air quality – dust and emissions: 21 submissions were concerned about the impact of dust generation and increased emissions on homes, health, machinery and amenities.
2. Surface water: 3 submissions were concerned about the impacts to surface water quality and potential flooding.
3. Stormwater: 3 submissions were concerned about the impacts on stormwater drainage and treatment from the site.
4. Noise: 7 submissions were concerned about the impact of increased production on noise levels.
5. Heritage – Alexandra Canal: 3 submissions were concerned about the impact on heritage values of Alexandra Canal.
6. Heritage – other local heritage items: 1 submission was concerned about whether all heritage items in the area were taken into consideration.
7. Traffic – road quality: 5 submissions were concerned about the impact of increased truck movements on the road surface, in particular Burrows Road South.
8. Traffic – road safety: 4 submissions were concerned about the impact of increased truck movements on the safety of other vehicles, cyclists and pedestrians using Burrows Road, Ricketty Street, Canal Street and the Princes Highway.
9. Traffic – parking / congestion: 20 submissions were concerned about the impact of increased truck movements on parking and traffic delays for vehicles using Burrows Road, Ricketty Street, Canal Street and the Princes Highway.

10. Construction / construction details: 3 submissions were concerned about the development process and construction design of the modification.

11. Management plans: 2 submissions were concerned about the management plans in place, including incident triggers and notification protocols.

12. Local business productivity: 8 submissions were concerned about the impacts of traffic and dust on local business productivity.

Figure 3.1 provides an overview of the number of submissions that commented in some way on each theme and whether they were a public or agency submission.

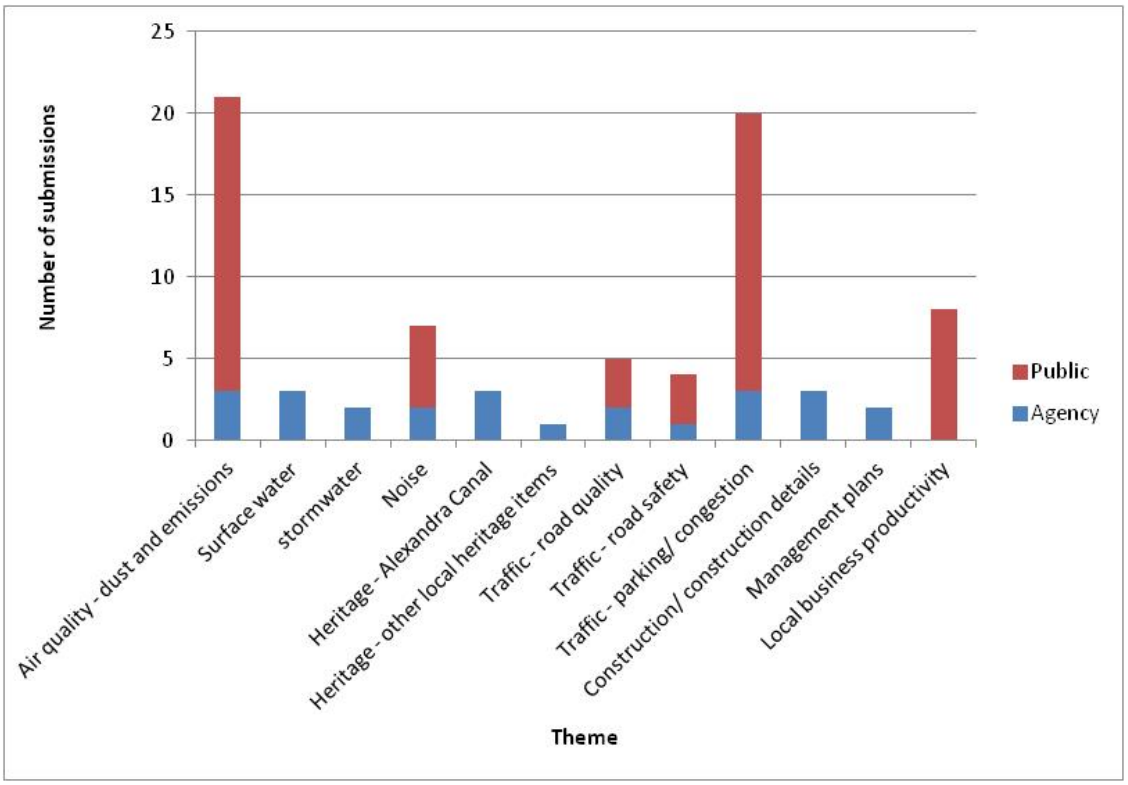


Figure 3.1 Number of submissions categorised into themes

4 Updates to the Project

For the purpose of this RTS, 'the Project' refers to the current site and operations at Boral's concrete plant and materials handling facility at 25 Burrows Road, St Peters, as approved under Development Consent 14/96 and modified under Modifications 1 to 10 (refer to Table 2.1 of the St Peters Mod 11 EA for a summary of modifications to Development Consent DA 14/96).

4.1 Clarifications from the EIS

4.1.1 Swept path analysis

DPE flagged in their submission that the swept path analysis at Appendix A (Drawing No. TX.01 Rev 02, dated 15 June 2018) of the Traffic Impact Assessment (TIA) (Appendix F of the St Peters Mod 11 EA) has a note recommending the amendment of three of the proposed car parking spaces in the north-east corner of the site. To clarify, this note was made in case Boral intends to use that particular traffic route around site. Detailed design has confirmed that no vehicle would use that particular route around site, however, to ensure the recommendation can be achieved in ongoing design phases, a new car park configuration option has been prepared in conjunction with the current design at this location, keeping the proposed seven car parks.

4.1.2 Number of proposed new slump stands

DPE asks for further clarification with respect to the number of additional slump stands. Section 3.3 of the St Peters Mod 11 EA states there are two additional stands, however, Figure 3.1 appears to show three additional stands.

The reference to two additional stands in Section 3.3 of the St Peters Mod 11 EA was a typographical error. Boral confirms that there will be three additional double position slump stands as outlined in Section 3.1.

4.2 Changes to mitigation measures

Table 4.1 outlines the additional mitigation measures Boral has committed to in response to the agency and public submissions.

Table 4.1 Additional mitigation measures

	Updated mitigation measure	Reference in this document
Dust management	Boral will commit to the development of an Air Quality Management Plan that will incorporate 1 - 3 real-time dust monitoring devices. These devices have the capacity to measure indicative TSP and PM_{10} in real-time with data available via a web portal back to the operations. This data can be linked back to weather station data (such as Sydney Airport Weather station) for analysis and also incorporated into an Air Quality Trigger Action Response Management Plan.	Section 5.2.1
Flood management	The Emergency Response Procedures for the site will be updated for the proposed modification.	Section 5.8.15 Section 5.8.18

4.3 Changes to conditions of approval

Table 4.2 outlines the proposed changes to the existing conditions of approval as part of the proposed modification.

Table 4.2 Proposed changes to the conditions of approval

Condition no	Condition summary	Proposed wording
5	The annual production of the concrete batching plant must not exceed 280,000 cubic metres and the annual throughput of the materials handling facility must not exceed 760,000 tonnes.	The annual production of the concrete batching plant must not exceed ~~280,000~~ 750,000 cubic metres and the annual throughput of the materials handling facility must not exceed ~~760,000~~ 1 million tonnes.
36a	Prior to any increase in production at the concrete batching plant (as approved under Mod 10 to this consent), an off-site dust deposition monitor shall be established on Burrows Road South in the vicinity of sensitive receptors R3 and R4. The location of the monitor shall be approved by the EPA.	The Applicant must prepare an Air Quality Management Plan for the development to the satisfaction of the Secretary. This plan must: (a) be submitted to the Secretary for approval within 6 months of the determination of Modification 11, unless otherwise agree by the Secretary; (b) describe the measures to be implemented to ensure: • general compliance with the air quality criteria and operating conditions of this consent; • best practice management is being employed; and • the air quality impacts of the development are minimised during adverse meteorological conditions and extraordinary events; (c) describe the proposed air quality management system; (d) include an air quality monitoring program that: • is capable of evaluating the performance of the development and informing day to day management decisions; • includes a protocol for determining general exceedances of the relevant conditions of consent; and • effectively supports the air quality management system. The Applicant must implement the approved Air Quality Management Plan as approved by the Secretary.

5 Response to agencies, government corporations and council

5.1 Introduction

All responses from agencies, government corporations and Council are addressed individually as follows. In some instances, responses are identical to those offered for other authority requests, and where this is the case, a cross reference is provided to the first response.

5.2 Department of Planning and Environment (DPE)

5.2.1 Dust Monitoring

DPE notes that the predicted dust deposition levels are close to the criterion. Further, DPE refers to previous correspondence on the non-representativeness of the existing static dust gauge monitoring network. Finally, DPE requires that an alternative means of monitoring off-site dust deposition be provided.

There are limitations to the type of dust monitoring devices that can be installed in the area, primarily due to overshadowing by buildings and other structures that do not allow compliance with the Australian Standards and approved methods. Boral's St Peters Concrete and Rail Terminal Annual Review 1 November 2016 – 31 October 2017 was forwarded to DPE on 22 December 2017 and raised the problem of the existing static dust gauge network.

Boral will commit to the development of an Air Quality Management Plan that will incorporate 1-3 real-time dust monitoring devices. Due to the surrounding land-use and limitations on available space for placement of monitors, it is proposed (if agreed to by landlords and lease holders via access agreements) to install real-time monitors such as an Eco Tech Neighbour Monitor or a Dustrak (or similar) on roof tops or suitable available locations. These monitors have the capacity to measure indicative TSP and PM_{10} in real-time with data available via a web portal back to the operations. This data can be linked back to weather station data (such as Sydney Airport Weather station) for analysis and also incorporated into an Air Quality Trigger Action Response Management Plan.

It needs to be stressed that the purpose of these monitors would not be to measure if the site meets compliance limits, more as a management tool with triggers to escalate appropriate control measures as these units may not meet current approved methods for siting and analysis.

5.2.2 Dust Management

DPE notes that Condition 33a of the consent, as modified, requires Boral to review and improve the current dust control measures at the site. DPE requests evidence that this review has been undertaken.

The St Peters site currently reviews dust impacts via the site specific Environmental Permit Planner and Environmental Inspection Checklist.

The Environmental Permit Planner outlines Development Consent DA 14/96 condition of approval requirements, required action to accompany each condition of approval and evidence used to verify each requirement has been fulfilled. The Environmental Permit Planner also includes the frequency of each action required and a section outlining whether the action has been completed on a monthly basis.

The Environmental Inspection Checklist indentified a number of checklist items including:

- general site requirements;
- water management;
- land management;
- waste management;
- noise management;
- air management;
- hydrocarbon / spill management;
- flora and fauna management; and
- heritage management.

The Environmental Inspection Checklist is actioned every month, with findings documented in the checklist.

5.2.3 Dust Modelling

DPE refers to the emission scenario and assumptions described in Section 6.2 of the Air Quality Impact Assessment (AQIA) (Appendix E of the St Peters Mod 11 EA) and asks whether emissions scenario also account for the increase in throughput at the materials handling facility.

Appendix 2 of the AQIA provides a detailed emissions inventory, on which modelling is based. Table A2.1 shows clearly that train un-loading and other aspects of the materials handling facility have been considered.

5.2.4 Environmental Management and Monitoring Plan

DPE notes that Condition 36 of the consent, as modified by Modification 10 to Development Consent DA 14/96 (MOD 10), requires the site Environmental Management and Monitoring Plan to be updated to show how dust, noise and water impacts will be measured, monitored, managed and mitigated. This plan was provided to the DPE on 28 August 2018.

5.2.5 Predicted Dust Emission Data

DPE refers to Section 6.4 of the AQIA that provides a comparison of the emissions from the proposed modification with the emissions calculated for the MOD 10 site operations. DPE requests *"a table which quantifies the changes in emissions illustrated in Figure 6-3 and Table 6-1, showing both existing (MOD 10) and predicted (MOD 11) annual emissions numerically and in percentages."*

As requested by DPE, the following table provides a source by source breakdown of annual emissions and the relative change between MOD 10 and MOD 11. It is noted that due to changes in site processes associated with MOD 11, not all emission sources are applicable for both MOD 10 and MOD 11. In these instances, the difference is either +100% or -100%.

In preparing this table, a typographical error was found in Table 6-1 of the AQIA regarding presented total annual PM_{10} and $PM_{2.5}$ emissions from the totals that were actually modelled. This typographical error

also extended into Figure 6-3 of the AQIA. The revised Table 6-1 and Figure 6-3 is presented below in Table 5.1 and Figure 5.1 respectively.

Table 5.1 Annual emissions inventory – proposed MOD 11 operations

Site area	Emission source	Annual emissions (kg/year) MOD10			MOD11			Difference between MOD10 and MOD11 (%)		
		TSP	PM_{10}	$PM_{2.5}$	TSP	PM_{10}	$PM_{2.5}$	TSP	PM_{10}	$PM_{2.5}$
CBP	Cement/ Admix Delivery - Paved	126.4	24.3	5.9	476.8	91.5	22.1	277%	277%	277%
	Aggregate Unloading from train	421.2	199.2	30.2	475.7	225.0	34.1	13%	13%	13%
	Sand Unloading from train	90.4	42.8	6.5	120.4	56.9	8.6	33%	33%	33%
	Aggregate Conveyor Transfer	601.8	284.6	43.1	-	-	-	-100%	-100%	-100%
	Sand Conveyor Transfer	129.2	61.1	9.3	-	-	-	-100%	-100%	-100%
	Aggregate Transfer to Storage	204.6	96.8	14.7	646.9	306.0	46.3	216%	216%	216%
	Sand Transfer to Storage	43.9	20.8	3.1	163.7	77.4	11.7	273%	273%	273%
	Cement unloading to silos	55.5	18.9	1.9	138.8	47.2	4.7	150%	150%	150%
	Aggregate transfer storage to weigh hopper	204.6	96.8	14.7	511.5	241.9	36.6	150%	150%	150%
	Sand transfer storage to weigh hopper	43.9	20.8	3.1	109.8	51.9	7.9	150%	150%	150%
	Weigh hopper loading	243.1	121.6	18.4	607.8	303.9	46.0	150%	150%	150%
	Mixer Loading (Truck Mixer)	620.5	172.1	27.8	1,551.2	430.1	69.4	150%	150%	150%
	Agitator Truck Dispatch - Paved	1,051.4	201.8	43.0	2,978.9	571.8	121.9	183%	183%	183%
Materials Storage Area	Aggregate truck Unloading to stockpiles	40.8	19.3	2.9	9.6	4.5	0.7	-76%	-76%	-76%
	Sand truck Unloading to stockpiles	73.1	34.6	5.2	17.2	8.1	1.2	-76%	-76%	-76%
	Aggregate Unloading from train	434.8	205.7	31.1	769.4	363.9	55.1	77%	77%	77%
	Sand Unloading from train	123.2	58.3	8.8	182.8	86.5	13.1	48%	48%	48%
	Aggregate Conveyor Transfer	621.2	293.8	44.5	-	-	-	-100%	-100%	-100%
	Sand Conveyor Transfer	176.0	83.2	12.6	-	-	-	-100%	-100%	-100%
	Aggregate Elevated Conveyor Transfer	-	-	-	769.4	363.9	55.1	100%	100%	100%

Table 5.1 Annual emissions inventory – proposed MOD 11 operations

Site area	Emission source	Annual emissions (kg/year) MOD10			MOD11			Difference between MOD10 and MOD11 (%)		
		TSP	PM_{10}	$PM_{2.5}$	TSP	PM_{10}	$PM_{2.5}$	TSP	PM_{10}	$PM_{2.5}$
	Sand Elevated Conveyor Transfer	-	-	-	213.3	100.9	15.3	100%	100%	100%
	Aggregate tripper car to stockpiles	-	-	-	3,077.6	1,455.6	220.4	100%	100%	100%
	Sand tripper car to stockpiles	-	-	-	731.3	345.9	52.4	100%	100%	100%
	Aggregate to internal truck	1,242.3	587.6	89.0	-	-	-	-100%	-100%	-100%
	Sand to internal truck	352.0	166.5	25.2	12.0	5.7	0.9	-97%	-97%	-97%
	Aggregate/Sand internal transport to new dump station	1,044.1	200.4	48.2	84.4	16.2	3.9	-92%	-92%	-92%
	Aggregate unloading to stockpiles	869.6	411.3	62.3	-	-	-	-100%	-100%	-100%
	Sand unloading to stockpiles	246.4	116.5	17.6	-	-	-	-100%	-100%	-100%
	Sand to new dump station	-	-	-	48.2	22.8	3.4	100%	100%	100%
	Aggregate/Sand internal transport to CBP- Paved	1,004.3	192.8	46.3	-	-	-	-100%	-100%	-100%
	Aggregate handling at stockpiles	247.3	117.0	17.7	-	-	-	-100%	-100%	-100%
	Sand handling at stockpiles	98.7	46.7	7.1	-	-	-	-100%	-100%	-100%
	Aggregate truck loading - sales	684.8	323.9	49.0	200.8	95.0	14.4	-71%	-71%	-71%
	Sand truck loading - sales	269.0	127.2	19.3	78.9	37.3	5.6	-71%	-71%	-71%
	Aggregate/Sand delivery and dispatch - Paved	1,384.1	265.7	63.8	726.5	139.5	33.5	-48%	-48%	-48%
	Wind Erosion - Storage Bins	2,888.3	1,444.1	216.6	836.7	418.3	62.8	-71%	-71%	-71%
Diesel Combustion	Diesel Combustion – mobile plant	389.7	389.7	357.2	528.9	528.9	484.9	36%	36%	36%
	Diesel Combustion - trucks	75.0	75.0	68.8	138.7	138.7	127.2	85%	85%	85%
	Diesel Combustion – locomotive engines	885.0	885.0	858.4	885.0	885.0	858.4	0%	0%	0%
Total		**16,986.3**	**7,405.6**	**2,273.3**	**17,092.2**	**7,420.5**	**2,417.7**	**1%**	**0%**	**6%**

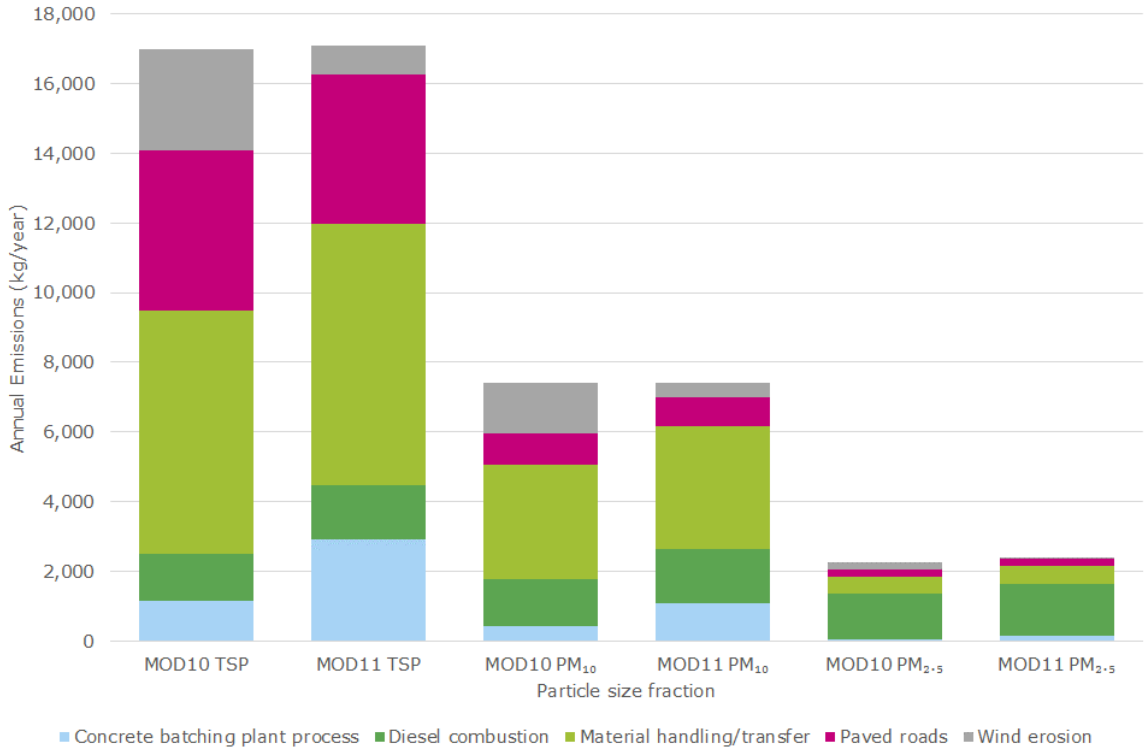


Figure 5.1 MOD 10 vs MOD 11 operational emission comparison

5.2.6 Predicted Traffic Delays on Burrows Road and Ricketty Street/Canal Road Intersection

DPE refers to the TIA and specifically the SIDRA analysis for the intersection of Burrows Road and Ricketty Street/Canal Road and asks whether the analysis was for a worst-case scenario and requests further consideration of the intersection operation. This issue of increasing congestion was also raised by Council and in several public submissions.

The SIDRA analysis which was included in the St Peters MOD 11 EA for the intersection of Burrows Road and Ricketty Street/Canal Road considered the worst-case scenario which assumed a right hand turning arrow from Burrows Road South into Ricketty St, and was the default setting in SIDRA. This scenario is referred to as the variable phasing scenario. Additional SIDRA analysis has since been undertaken with three extra options considered as follows:

1. Optimal phasing scenario which assume no right hand turn arrow into Ricketty St;

2. Variable phasing scenario (right hand turning arrow into Ricketty St) with an expanded no stopping zone along Burrows Road South back from the intersection with Canal Road/Ricketty St; and

3. Optimal phasing scenario with the above expanded no stopping zone.

The full results of the further SIDRA modelling is provided in Appendix B and the resulting levels of service (LoS) are summarised below. LoS categories range from A (very good with average vehicle delays <14.5 seconds) to F (over capacity with average vehicle delays >70.5 seconds). For a full list of LoS definitions refer to Table 8.2 of the TIA.

Table 5.2 Resulting LoS for the Burrows Road and Ricketty Street/Canal Road intersection

Traffic scenario	AM peak existing	AM peak proposed	PM peak existing	PM peak proposed
Variable phasing scenario (SIDRA default)	F	F	F	F
Variable phasing with extended no stopping	C	D	C	D
Optimal phasing scenario	B	C	C	D
Optimal phasing scenario with extended no stopping	B	B	C	C

The above results show that the most appropriate solution is the optimal phasing scenario with the extended "No stopping" zones in the short term until WestConnex is operational and improves the local road network in this area. See Appendix B for full SIDRA modelling results.

Additionally, there are a number of interrelated issues around concrete delivery and traffic congestion. Firstly, there are the constraints around concrete itself as follows:

1. Concrete is a perishable product – once water is added into the concrete agitators, there is a small window for delivery before the concrete begins to set. Typically, this timeframe is 60-90 minutes, however RMS stipulate a 35 minute window for all concrete delivered to their projects.

2. The typical peak demand for concrete batching plants is in the morning.

3. Operating hours past 6 pm are typically for larger roadworks/infrastructure projects. It is not expected that the concrete plant will be operating beyond 6 pm every evening, but rather the site requires this flexibility to be able to supply nearby works.

4. Boral does not expect that the concrete batching plant will be operating at peak production at all times – production is based on demand, which fluctuates with the economy, building projects and the weather.

Due to the short lifespan of freshly made concrete, Boral does not send loads out when the delivery route is congested, as the loads would most likely be rejected on arrival to the customer. To prevent this occurrence, the agitator drivers report traffic congestion back to the plant operator and concrete deliveries are either delayed or where possible, re-routed to other projects. This process cannot easily be modelled and the SIDRA analysis considers the worst case scenario.

Note that related issues have been raised by Council and are also discussed in Section 5.8.1.

5.2.7 Kent Road/Ricketty Street Intersection

DPE asks why no SIDRA analysis was undertaken for Kent Road/Ricketty Street Intersection, despite being requested by RMS in the Secretary's Environmental Assessment Requirements.

Section 4.1 of the EA noted that the majority of the future site-generated traffic is unlikely to be travelling in that direction. To clarify this, very few Boral trucks turn off Ricketty Road onto Kent Road, as eastbound deliveries (apart from to the airport) are easier via Gardeners Road. Further to this, modelling shows that the Project would add only 1.1 % to the existing peak daily traffic at this point. Additionally there is an existing Boral concrete batching plant at Botany that does and will continue to supply the Mascot area. Therefore an analysis of the intersection is not justified.

5.2.8 Swept Path Analysis

DPE notes that the swept path analysis at Appendix A (Drawing No. TX.01 Rev 02, dated 15 June 2018) of the TIA (Appendix F) recommends the amendment of three of the proposed car parking spaces in the north-east corner of the site.

This note was made in case Boral intends to use that particular route around site. Detailed design has subsequently confirmed that no vehicle would use that particular route. However, to ensure the recommendation can be achieved in ongoing design phases, a new car park configuration at this location can be achieved keeping the seven car parks.

5.2.9 Slump Stands

DPE asks for further clarification with respect to the additional slump stands. It is also unclear whether there are two or three additional double position slump stands. Section 3.3 of the St Peters Mod 11 EA states there are two additional stands, however, Figure 3.1 appears to show three additional stands.

The reference to two additional stands in Section 3.3 of the St Peters Mod 11 EA was a typographical error. Boral confirms that there will be three additional double position slump stands as outlined in Section 3.1.

5.2.10 Burrows Road and Ricketty Street/Canal Road Intersection Upgrade

DPE notes that …"*Given the predicted increase of up to 42.9% in traffic movements on Burrows Road South as a result of the proposed modification, the Department supports Inner West Council's recommendation for Boral to upgrade Burrows Road South (refer to Council's submission dated 10 August 2018) between the site exit driveway and the intersection with Burrows Road, Canal Road and Ricketty Street*"

This is a key impact of the Project and Boral notes that there are intersection operation issues with the very short "No Stopping" zones on the Burrows Road (north and south) approaches to the intersection with Ricketty Street/Canal Road. This situation is exacerbated in the early mornings due to the illegal parking of trucks along Burrows Road South, which is used as a de-facto marshalling area by various transport companies not associated with Boral's operations in the area. Observations show that numerous trucks park in the "No Stopping" zones and across driveways overnight.

As discussed in Section 5.2.6, additional SIDRA analysis has been undertaken to consider the effect of longer "No Stopping" zones and other SIDRA intersection phasing options from the default variable phasing option (including removing all phases which included a right turn arrow northbound). The additional SIDRA analysis concludes that the most appropriate solution is to extend the "No stopping" zones in the short term (until Westconnex is operational and improves the local road network in this area). The SIDRA analysis outputs are provided in Appendix B.

5.2.11 MUSIC Modelling and Surface Water Quality

The MUSIC model and an explanatory note will be provided to DPE separately via email.

5.2.12 Probable Maximum Flooding

DPE notes that the site has the potential to flood to depths of up to 0.7 m in a Probable Maximum Flood (PMF) event and supports Council's request for additional details regarding flood management and a Flood Emergency Response Plan (FERP).

The original development consent (prior to MOD 10) included Condition 37 that required the preparation of an "*a Plan for the management of people, plant, equipment and materials in the event of fire, flood or explosion* including evacuation." This requirement was removed from the consent on approval of MOD 10 as the Emergency Response Plan for the site was provided to Marrickville Council in July 1997 and approved by the DPE as a part of the Building Application documentation. Notwithstanding this previous approval from DPE, Boral will update the plan as part of operations for MOD 11.

5.2.13 Impacts on Alexandra Canal

DPE referred to Council's concerns about the potential for construction and operational impacts on the heritage listed Alexandra Canal. OEH likewise raised the question of vibration impacts from construction and operation on the canal.

During the development of the St Peters Mod 11 EA, consultation with the Heritage Office was undertaken to provide the heritage office with further information on the proposed modification and seek clarification as to the required level of assessment expected in the environmental assessment. The Heritage Office stated that as long as construction works are not within the vicinity of the canal and do not directly impact the canal and (taking into consideration visual amenity etc), a discussion on this is to be reflected in the heritage assessment component of the environmental assessment. These points have been addressed in Section 10.5 of the St Peters Mod 11 EA.

Additionally, the St Peters Mod 11 EA notes the following:

The site adjoins the Alexandra Canal, which is listed as a heritage item on the State Heritage Register (SHR) and the Marrickville LEP. The canal is also listed on Botany Bay and Sydney City's LEPs. The listing on the SHR states:

Alexandra Canal is of high historic, aesthetic and technical/research significance. Historically, it is a rare example of 19th century navigational canal construction in Australia, being one of only two purpose built canals in the State, with one other known example in Victoria. It has the ability to demonstrate the NSW Government's initiative to create water transport as a means of developing an industrial complex in the Alexandria and Botany areas and exploiting the use of unemployed labour to achieve its scheme. It played a seminal role in the changing pattern and evolution of the occupation and industrial uses of the local area and nearby suburbs, which included filling large areas of low lying land for development.

The site is highly modified due to years of industrial activity by both Boral and previous users on the site and immediate surrounds. The modification would result in an increase in truck traffic associated with concrete transport, however it would not result in any changes to the site that would affect its visual character that might affect the aesthetic significance of the Alexandra Canal. Given the nature of the site, the potential for historic heritage impacts is very low. The modification is not expected to have any impact on the heritage significance of the Alexandra Canal.

The potential for vibration impacts from the proposed modification on the canal stems from the transit of trucks along Burrows Road South and the use of vibration producing construction equipment has been reviewed.

Vibration impacts on human amenity or structural damage from road traffic is rarely an issue, as evidenced by the common location of houses alongside roads. Burrows Road South currently has on average 800 truck movements per weekday, which would rise to 1,116 as a result of the proposed modification. The closest part of Burrows Road South to Alexandra Canal is approximately 70 m.

For comparison, Canal Road west of Alexandra Canal has on average 2,010 truck movements per weekday and crosses over the canal. If truck induced vibration was to be an issue for the canal structure, this would be evidenced at the Canal Road crossing which has much higher traffic flows and is much closer to the canal. No such damage to the fabric has been reported.

Vibration producing equipment such as vibratory rollers and sheet piling rigs may be used during construction.

The German Standard DIN 4150-3, which OEH suggests may be appropriate, provides some guide as to the safe distance with which one can use vibration generating plant/equipment in proximity to heritage buildings. While this guideline refers to foundations and is dependent on the type of plant used and local geotechnical conditions, it does provide some guidance.

A technical paper by Johnson and Hannen (Vibration Limits for Historic Buildings and Art Collections, Journal of Preservation Technology 46:2-3 2015) notes the following with respect to DIN 4150-3:

"*There is no known scientific basis for the lower nature of the German limits. As for an importance factor, it seems that an extra degree of conservatism is already built into the German standard, although this is not transparent or explained as such in the standard*."

The Construction Noise Strategy (Transport for NSW, 2012c) provides indicative safe working distances for different types of construction equipment based on achieving vibration standards for structural integrity and human comfort. For a small vibrator roller, the Strategy notes the safe working distance to prevent cosmetic structural damage is 5 m, while for a vibratory piling rig, this is 2 to 20 m.

The Office of Environment and Heritage website describes Alexandra Canal as being of fascine dyke sandstone construction. A fascine dyke is essentially an earthen structure that is reinforced with rod shaped materials, which in modern cases would be plastic or metal pipes, but in this case, most likely consists of sticks or reeds. Sydney Water's website discusses the canal's heritage listing and notes that

"Its banks are formed by pitching, comprising sloping dry sandstone capped with a sandstone coping. It extends from approximately 0.5 metres below low water mark to approximately 1.5 metres above highwater mark. It is spanned by 4 bridges: Shell Pipeline Bridge, Sydenham to Botany Railway line, Canal Road Bridge and a small footbridge. The upper reaches of the canal are quite intact, with some localised failures of sandstone ashlar masonry. Lower reaches have been rebuilt in a variety of 20th century materials including concrete block, shotcrete over rubble and fabricon and range from good to poor condition. The south-western walling of the canal beyond the Shell Bridge is rendered rubble walling. The south-eastern face is rendered rubble walling almost to the railway bridge. These alterations to original fabric reflect alterations to the course of the canal near its junction with the Cooks River during the three phases of airport expansion."

A fascine dyke overlain with pitched sandstone block lining is a relatively flexible structure and not particularly sensitive to minor vibration from construction equipment. Most planned works are well outside the safe working zone, but the following are closer to the canal:

1. New car park in the southwest corner of the site corner (vibratory rolling);

2. New dump station (possible sheet piling to prevent groundwater inflows);

3. Underground water storage tanks in the northeast corner (possible sheet piling to prevent groundwater inflows); and

4. New bioretention ponds in the southwest corner of the site (possible sheet piling to prevent groundwater inflows).

The new southwest car park is more than 5 m from the edge of the canal and therefore beyond the safe working distance recommended in the Construction Noise Strategy (Transport for NSW, 2012c) for a small vibratory roller.

The new dump station is approximately 40 m from the canal. If sheet piling is required to prevent groundwater inflows, the work site is beyond the 2 to 20 m safe working distance recommended in the Construction Noise Strategy for a vibratory piling rig.

The new underground water storage tanks will be located approximately 30 m from the canal and if sheet piling is required, the work site is beyond the 2 to 20 m safe working distance recommended in the Construction Noise Strategy for a vibratory piling rig.

The new bioretention ponds in the southwest corner of the site nearest the canal is within 5 m and therefore is within the 2 to 20 m safe working distance recommended in the Construction Noise Strategy for a vibratory piling rig. To address this potential vibration impact on the canal, a Noise and Vibration Management Plan will be prepared for the proposed modification that investigates the following:

- the potential to re-locate the pond to further from the canal;
- the need for sheet piling during construction;
- lower impact vibratory piling in this location; and
- the need for cautionary vibration monitoring during construction.

No measurable effects are expected for the majority of construction works, with the exception sheet piling to facilitate the excavation of the bioretention ponds. If sheet piling is required, the potential effects of vibration will be managed in accordance with the Noise and Vibration Management Plan.

5.2.14 Existing and Proposed Site Infrastructure

DPE requests a table “that clearly describes the existing and proposed site infrastructure to support the description provided in Sections 2 and 3 of the EA, including any increases in heights or widths of aggregate storage bins, new walls.”

Table 2.1 of this RTS provides a table that describes the existing and proposed site infrastructure to support the description provided in Sections 2 and 3 of the St Peters Mod 11 EA.

5.2.15 Hours of Operation

DPE noted that the St Peters Mod 11 EA did not specify the existing or proposed hours of operation. The original EIS (Smits and Associates 1996) specified 24 hour 7 days per week operations. Condition 2 of the original consent (DA 14/96) refers to this Option A put forward in this EIS and accordingly the approved hours are 24/7.

No change to the approved hours is being sought in Modification 11.

5.2.16 Excavation Depths

DPE requested estimated construction excavation depths.

The construction excavation depths are provided on the site drawings in Appendix C (drawing number: STP001) and summarised below:

- piles under the aggregate bin widening (approximately 15 m deep x 750 millimetres (mm) diameter);
- piles under the new elevated silos (approximately 20 m deep x 750 mm diameter);
- reclaimer conveyor under rear of aggregate bins (4 m wide x 4 m deep);
- wall footings for the stockpile areas (3 m wide x 3 m deep);
- aggregate bin wall footings (3 m deep piers x 750 mm diameter); and
- dump station (5 m depth).

5.2.17 A3 Layout Plans

DPE requested A3 versions of site layout plans. A3 versions of the site layout plans (Appendix C) were included in Version 3 of the St Peters Mod 11 EA, provided to DPE on 17 July 2018.

Copies of the A3 plans will also be provided in Appendix D of this RTS.

5.3 Transport for NSW

TfNSW reviewed the St Peters Mod 11 EA and had no comments.

5.4 TransGrid

TransGrid confirmed that it had no objections to the application as it does not affect TransGrid's infrastructure.

5.5 WaterNSW

WaterNSW confirmed that it had no comment on the application.

5.6 Sydney Airport Corporation Limited (SACL)

SACL noted that should the height of any temporary structure and/or equipment be greater than 7.62 MAEGH, a new approval must be sought in accordance with the Civil Aviation (Buildings Control) Regulations Statutory Rules 1988 No. 161. SACL further noted that construction cranes may be required to operate at a height significantly higher than that of the proposed development and consequently, may not be approved under the Airports (Protection of Airspace) Regulations.

Boral notes the advice from SACL and fully expects that the current approval will suffice for construction and operation of the facility.

5.7 Environment Protection Authority (EPA)

5.7.1 Scheduled Activity for Lime and Cement Plants

The EPA covering letter notes that the *Protection of the Environment Operations Act 1997* (POEO Act) requires licensing of lime and cement facilities that handle more than 30,000 tonnes per year. The inference drawn from this letter is that the St Peters facility is a lime or cement facility and therefore requires licencing.

Schedule 1 of the POEO Act specifically requires licensing for cement or lime works (that either produce or handle cement of lime in quantities more than 150 tonnes per day or 30,000 tonnes per year. The St Peters facility, like most other concrete batching plants in NSW exceed these quantities.

The same schedule requires that concrete works that handle more than 30,000 tonnes per year of concrete products be licensed. Of note though, this definition specifically excludes the production of pre-mixed concrete, which is the primary activity at the St Peters site. In other words, concrete batching plants that handle more than 30,000 tonnes per year of concrete are not required to be licensed.

The site receives cement by train and flyash by road tanker. All these products are used in the St Peters concrete plant and are not distributed off site. Accordingly, the site is not a cement or lime works as defined, but a site to produce pre-mixed concrete and is therefore exempt from POEO Act licensing requirements.

5.7.2 Estimation Conservatism

The EPA states that "*The EA identifies some potential to increase ambient particulate matter concentrations off-site, and increased depositional dust at receivers R3 and R4 of up to 1.9 g/m2/month, which are conservative estimates; actual impacts may be greater*."

To clarify this possible misunderstanding of the results, the EA says in relation to dust deposition results "*…the dust removal effect of rainfall is not accounted for in the modelling. There are on average 129 rain days in the St Peters region. Consequently, dust deposition predictions should be viewed as conservative*."

In this modelled scenario, conservative means worst-case and accordingly actual impacts are predicted to be less when rain days are factored in.

5.7.3 Depositional Dust Gauges

The EPA notes that the current Development Consent DA 14/96 requires placement of depositional dust gauges and that the proposal to remove them has not been discussed with the EPA.

The EPA is not an approval body for this project as it is not a licensed facility. The request to remove this consent condition was sent to DPE in December 2017 as part of the annual review. Section 5.2.1 of this RTS discusses further the matter of dust monitoring.

5.7.4 Modelled Dust Emissions

The EPA notes that the St Peters Mod 11 EA predicts that all pollutants and averaging periods are expected to be below the applicable NSW EPA assessment criteria at all neighbouring receptors, as would all predicted cumulative pollutant concentrations.

This observation is noted.

5.7.5 Dust Monitoring Locations

The EPA notes that the EA does not identify the locations of dust monitors nor how they (Boral) might resolve any issues for off-site receptors

The EPA is not an approval body for this project as it is not a licensed facility. Section 5.2.1 of this RTS document discusses further the matter of dust monitoring.

5.7.6 Operational Noise Monitoring

The EPA notes that the proposed structures are generally in keeping with best practice noise management at concrete batching plants and that predicted noise levels are within relevant criteria. The EPA requests however, operational noise monitoring with publication of results.

While the EPA is not an approval body for this project, it is noted that the closest residences to the Boral operations are on the northern side of the Princes Highway and are heavily affected by both traffic and aircraft noise. Despite this, Boral agrees to undertake operational noise monitoring within six months of commissioning and will provide the results to DPE.

5.7.7 Vibration Impacts

The EPA notes that there may be offsite impacts from vibratory rolling and suggest scheduling to minimise human impact.

Boral notes these suggestions and will implement scheduling during construction.

5.7.8 Water Quality Objectives

The EPA suggest that Boral should be mindful of water quality impacts and objectives or the receiving environment.

Boral notes these observations.

5.7.9 Water Quality Improvement and Compliance Monitoring

The EPA submission appears to support Boral's planned improvements to its site water management system and planned ongoing water quality monitoring.

5.7.10 POEO Act Section 20

The EPA notes that Boral needs to be aware of the strict liability provisions of the POEO Act, in particular, section 120 – pollution of waters.

Boral notes this observation.

5.7.11 Site Training

The EPA recommends that all "*site personnel must be aware of the details of any works plans, environmental legislation/guidelines and associated pollution controls before and during the undertaking of relevant activities*."

Boral notes this recommendation and further notes that training and inductions, including basic environmental awareness, environmental legislation/guidelines and associated pollution controls are provided to site staff and subcontractor staff. Training records are maintained, and readily available in either hard copy and/or electronic copy, as verification that personnel have received the appropriate training, and are competent to fulfil their roles.

5.7.12 Incident Triggers and Notification Protocols

The EPA notes the requirement for Boral to notify the relevant authority of any pollution incident. While the St Peters facility is not a scheduled activity, a Pollution Incident Response Management Plan (PIRMP) has been prepared to ensure site personnel are aware of the relevant procedures in case of a pollution incident. The PIRMP is attached in Appendix C.

5.7.13 Environmental Management and Monitoring Plan

The EPA requests that the site Environmental Management and Monitoring Plan be updated following approval of MOD 11 and further requests a copy for its records.

Boral will update the Environmental Management and Monitoring Plan within six months of commissioning the new plant components. Reviews of the plan will be conducted by the environmental manager in consultation with the site managers to ensure suitability and adequacy of the Environmental Management and Monitoring Plan and associated compliances tools.

5.7.14 Proposed Condition Amendments

The EPA recommends the following consent condition amendments (responses are in bold):

- *Construction vibratory rolling must be limited to INCG standard hours and work generating high vibration levels must be scheduled to avoid extended periods in the same locality.* **Noted**.

- *33c Noise generated by the development is to be measured in accordance with the relevant requirements, and exemptions (including certain meteorological conditions), of the Noise Policy for Industry (2017).* **Noted**.

- 36d the management of any vibration transmitted to a place of another land user and any sound level at any point on the boundary of the site greater than the levels specified in the NPfL. **Noted**

- 36a Prior to any increase in production at the concrete batching plant (as approved under MOD 11 to this consent), an off-site dust deposition monitor must be established on Burrows Road South

near sensitive receptors R3 and R4 (as identified in Figure 7.1 of the Environmental Assessment for MOD 11). The location of the monitor must be approved by the EPA. If a suitable location cannot be determined for the monitor, the EPA must be consulted on, and approve, any alternative measures. **See response in Section 5.2.1**.

5.8 Inner West Council

5.8.1 Traffic Delays at Burrows Road and Ricketty Street/Canal Road Intersection

Council's letter refers to the predicted delays at the intersection of Canal Road, Burrows Road and Mary Street. These roads do not actually intersect as Mary St is simply the northwesterly continuation of Canal Road, which in itself is a northwesterly continuation of Ricketty St. The Council submission refers to level of service (LOS) F, which indicates that Council was referring to the Burrows Road and Ricketty Street/Canal Road Intersection.

Assuming Council meant the intersection of Burrows Road and Ricketty Street/Canal Road, Council's response is a correct summary.

5.8.2 Clarification of Average Truckloads

Council noted a discrepancy between the Preliminary Environmental Impact that supported the request for SEARs and the St Peters Mod 11 EA.

Table 3.1 of the SEARs referred to 638 agitator truck deliveries per day (annual average). Table 8.4 of the St Peters Mod 11 EA referred to a revised (downwards) figure of 500 agitator truck deliveries per day (annual average). This revision is not unexpected during the detailed design phase.

5.8.3 Cumulative SIDRA Analysis

Council states that it is not clear whether the SIDRA analysis is cumulative and whether the traffic associated with the construction of the WestConnex M4-M5 link has been included in these calculations. Council has asked for these points to be clarified.

The intersections have been modelled as stand-alone intersections.

The traffic specialists confirmed that if the WestConnex construction traffic numbers are included in the traffic analysis it would potentially be double-counting, as much of the current traffic that has been counted and incorporated into the traffic assessment is already associated with WestConnex.

5.8.4 418 Bus Service

Council notes that the 418 bus service is the only service operating in the area, running along Canal Road through the Princes Highway, Burrows Road and Ricketty Street and Kent Street intersections.

There will be minimum impact on through traffic movements at these intersections, as bus 418 does not turn in and out of Burrows Road. The site contribution to the Canal Road and Ricketty Street traffic increases is just over 1%, therefore, the likely impact on the bus 418 service will be negligible.

5.8.5 Ricketty and Kent St Intersection Analysis

Council noted that no analysis of the intersection or Ricketty and Kent St was undertaken. Reference to Section 5.2.7 shows that very few Boral trucks turn off Ricketty Road onto Kent Road, as eastbound

deliveries (apart from to the airport) are easier via Gardeners Road. Further to this, modelling shows that the Project would add only 1.1 % to the existing peak daily traffic at this point.

5.8.6 Cyclist Safety

Council offered some concerns as to the safety or cyclists using Burrows Road, Ricketty Street, Canal Street and the Princes Highway. Reference to the Inner West Council Cycle Map shows that neither Canal Road/Ricketty St or Burrows Road/Burrows Road South is a designated bicycle route. Likewise, the Princes Highway is not a designated cycle path apart from a short section of shared path between Bellevue and Smith Street.

Canal Road and Ricketty St have 34,600 and 34,200 average estimated daily traffic movements. Boral will contribute at most an additional 672 vehicles per day, which is an insignificant contribution with regards road user safety. The Princes Highway, south of Canal Road has 53,900 average estimated daily traffic movements, while the segment north of Canal Road has 30,100 movements. On a maximum production day, the Project is predicted to add 225 truck movements to each segment, which again is insignificant.

5.8.7 Cement Tanker and Agitator Destinations

Council requested additional information on the delivery destinations of cement tankers and concrete agitator trucks.

Flyash is delivered to the site in pneumatic road tankers, while cement arrives in trains. Neither flyash nor cement is despatched from the site.

Agitator trucks deliver concrete to widespread construction projects within an hour's drive from the site. Agitator truck haulage routes do and will vary according to the delivery location.

5.8.8 Burrows Road Pavement

Council noted that the road pavement on Burrows Road South is in a poor state and will need to be reconstructed by Boral.

In 1997, Boral paid Council $50,077.80 as Section 94 contributions for Boral's use of Council roads. Council recently approached Boral with plans to reseal Burrows Road South and upgrade the driveways and kerbs. Boral notes that the driveway and kerb works has been undertaken by Council's contractors, but the resealing works has not occurred. Despite this, Boral is prepared to contribute to the cost to repair the Burrows Road South pavement.

5.8.9 Car, Truck and Bicycle Parking

Council requests clarification of car and bicycle parking on site for staff, and truck drivers and further that parking should comply with Section 2.10 of the Marrickville Development Control Plan (DCP) 2011.

There are currently 64 employees (including the concrete plant and materials handling facility operations and delivery staff). This will increase to 93 employees. Staggered shift changes at the site means that 93 employees are never on site at the same time and the 86 proposed car parks will be sufficient

The Marrickville DCP does not apply to the proposed modification, however, there is more than adequate bicycle parking at the office. Currently, one employee regularly rides a bicycle to work.

5.8.10 Dust and Best Practice Management

Council requests that DPE investigates dust impacts and ensures that adequate and best practice dust suppression measures are incorporated into Boral's operations to minimise such impacts.

Refer to response in Section 5.2.4.

5.8.11 Cumulative Dust Impacts with WestConnex Ventilation Stacks

Council requests that air quality modelling be revised to include pollution created by both the modified facility and the WestConnex ventilation facilities.

Dispersion modelling of air quality impacts from the two St Peters-area ventilation outlets was completed by Pacific Environment for the M4-M5 Link of the WestConnex project. Results of the modelling are presented in WestConnex – M4-M5 Link Technical working paper: Air quality August 2017 (PEL, 2017).

This report presents the model predictions for 24-hour maximum and annual average PM_{10} and $PM_{2.5}$ concentrations generated by the St Peters ventilation outlets (St Peters Interchange and Campbell Road). Of relevance to the comments raised by Council regarding cumulative particulate matter impacts, for the 11 sensitive receptor locations adopted in the AQIA prepared for the St Peters Mod 11 EA:

- Figure 8-70 of PEL 2017 shows the 24-hour maximum PM_{10} concentrations range between 0.4 and 0.8µg/m³;
- Figure 8-61 of PEL 2017 shows the annual average PM_{10} concentrations range between 0.1 and 0.2µg/m³;
- Figure 8-88 of PEL 2017 shows the 24-hour maximum $PM_{2.5}$ concentrations range between 0.2 and 0.5µg/m³; and
- Figure 8-79 of PEL 2017 shows the annual average $PM_{2.5}$ concentrations range between 0.05 and 0.1µg/m³.

It is noted that the receptor with the highest predicted impacts from WestConnex ventilation outlet emissions is receptor R2 in the AQIA, which is predicted to have the lowest impacts from MOD 11 operations.

When these concentrations are combined with the incremental and cumulative concentrations presented in Section 8 of the MOD 11 AQIA, there is no exceedance of applicable criteria predicted and the conclusions of the report do not change.

5.8.12 Noise Assessment

Council noted that the local noise environment is influenced by "Princes Highway traffic, aircraft noise and other industrial noise" and requested that an "exhaustive assessment should be completed" and that noise increases should be mitigated at the source.

The St Peters Mod 11 EA Appendix D provides a complete noise assessment in accordance with the Interim Construction Noise Guidelines (DECC 2009) and the Noise Policy for Industry (EPA 2017).

Modelling shows the project will meet all relevant noise criteria.

The noise assessment was prepared by trained and very experienced staff. The senior acoustics team member on the Project was Najah Ishac, who is an acoustics expert, with over twenty years of experience in providing services to clients in government and the resources, infrastructure and property sectors. He has expertise in environmental noise, architectural acoustics and expert testimony. Najah has served on the NSW Department of Planning and Infrastructure's Independent Hearing and Assessment Panel (IHAP) on a number of occasions, and has provided expert testimony in the NSW Land and Environment Court on many occasions.

5.8.13 Train Noise Assessment

Council is concerned that the assessment "failed to consider the increased noise generated from freight trains."

There are two aspects of trains noise. The first is trains noise from within the Project site, such as when trains are unloading. The St Peters Mod 11 EA considered this aspect of train noise and Table 5.3 of the St Peters Mod 11 EA Appendix D specifically lists locomotives at the materials handling facility. The methodology of the operational site noise model means that the actual daily number of trains is irrelevant, as the model assumes one trains set is at site discharging at any time.

The other aspect of train noise is pass-by noise when the train is on the main line, in this case the Botany Goods Line. Pass-by noise is influenced by a range of factors including proximity to the line, locomotive and train set type, and the frequency and speed of train movements.

Discussions with Australian Rail Track Corporation (ARTC) and a review of the Sydney Botany Metropolitan Freight Network timetable reveals that there are typically 23 timetabled trains both ways on the freight line at or adjacent to Boral's St Peters concrete plant site. These timetabled paths are mostly used according to ARTC. Of these 23 paths, Boral typically uses 3 paths each day Mon Fri in and out of the plant (2 x quarry trains plus 1 x cement train).

Boral trains typically take from 6 to 10 hours to unload, so in a given day it is infeasible to accept more than three trains. To provide additional sand, aggregate and cement to feed the proposed plant upgrade, Boral intends to increase trains length rather than increase peak daily movements. In other words, peak train frequency to the St Peters facility will not change as a result of the Modification and will continue to contribute approximately 13% of rail movements in the short term.

Boral's St Peters facility is accessed off the Port Botany rail line, which is a dedicated freight line, primarily serving the container terminals in and around Port Botany. In the long term, duplication of the Port Botany Line is listed as a 'high priority initiative' in Infrastructure Australia's Infrastructure Priority List and the NSW Government is currently exploring potential partnerships and funding arrangements for this project. The November 2017 Communique from Port Botany Rail Optimisation Group noted 2016/17 annual container shipping rates of 436,748 twenty foot equivalents (TEU). The planned duplication is to cater for increasing container freight volumes.

5.8.14 Flooding

Council states that "*the site must comply with the controls under Part 2.22 Flood Management of the Marrickville Development Control Plan (DCP) 2011. An assessment of compliance against the controls must be submitted to and approved by Council prior to modification of the facility*."

As the Project was approved under Part 3a of the Environment Planning and Assessment Act, 1979 and as this proposed modification is being processed under the transitional arrangements for S75W of the Act, the Marrickville Development Control Plan 2011 does not apply, nor is approval by Council required.

Council further requested that the St Peters Mod 11 EA consider the Cooks River Floodplain Risk Management Plan 2015 as well as the Alexandra Canal Flood Study (WMA 2017). It is noted that Council's assessment requirements dated 17 October 2016 specified that the model results from the Alexandra Canal Flood Study (WMA 2017) were to be used to establish flood levels at the site. No mention of the Cooks River Floodplain Risk Management Plan 2015 was made.

The Alexandra Canal Flood Study (WMA 2017) applied tail water conditions sourced from the Cooks River Floodplain Risk Management Plan 2015. Hence, it is unclear why Cooks River Floodplain Risk Management Plan 2015 needs to be considered. The Cooks River Floodplain Risk Management Plan 2015 does not appear to be publically available so could not be reviewed.

On the assumption that Cooks River tail water conditions are not adequately represented in the Alexandra Canal Flood Study (WMA 2017), the Cooks River tail water levels that were applied to the Alexandra Canal Flood Study (Cardno 2014) were reviewed. These levels were sourced from the Cooks River Flood Study (MWH + PB 2009). Table 4.2 from the Surface Water Assessment (Appendix G of the St Peters Mod 11 EA) has been updated to include these levels. The updated table is provided as Table 5.3

Table 5.3 Peak flood levels on land adjoining the site

	Flood levels from the Alexandra Canal Flood Study (WMA 2017)			Cooks River Flood Levels[1] (backwater flooding)
	Alexandra Canal	Area to the north of the site	Burrows Road	
20% AEP	1.68 m AHD	2.22 m AHD	2.51 m AHD	2.0 m AHD
5% AEP	1.93 m AHD	2.34 m AHD	2.56 m AHD	2.15 m AHD
1% AEP	2.02 m AHD	2.46 m AHD	2.59 m AHD	2.5 m AHD
PMF	3.27 m AHD	3.42 m AHD	3.43 m AHD	3.95 m AHD

Notes: *1.Peak flood levels were extracted from Alexandra Canal Flood Study (WMA 2017) model results provided by Council at locations adjacent to the site.*

2. Flood levels sourced from Table 4.14 from the Alexandra Canal Flood Study (2014), which referenced the Cooks River Flood Study (MWH +PB, 2009)

With reference to Table 5.3, the flood levels at Burrows Road from (WMA 2017) govern for the 20, 5 and 1% AEP events. The PMF level from Cooks River backwater flooding is 0.52 m higher than the peak level provided in the 2017 study. Hence, consideration Cooks River tail water levels will require the PMF level to be revised from 3.43 m AHD to 3.95 m AHD. This represents a flood depth of approximately 1.2 m. However, council should clarify which PMF level is correct. Nonetheless PMF floodwaters in this locality will be slow flowing and provide little risk to Boral's infrastructure.

In any event, the findings of the St Peters Mod 11 EA remain unchanged and the proposed modification will not contribute to additional flooding or measurable change in flood behaviour.

5.8.15 Flood Emergency Response Plan

Council states that "*A Flood Emergency Response Plan (FERP) for the site must be submitted for review in accordance with Part 2.22 of the Marrickville DCP 2011. The FERP shall also consider evacuation and emergency response during a PMF flood*."

Marrickville DCP 2011 does not apply to the Project. Furthermore, The Emergency Procedures for the site were provided to Marrickville Council in July 1997 as a part of the Building Application documentation for Modification 10 works. Notwithstanding this previous approval from Council, Boral will update the plan as part of operations for Modification.

5.8.16 MUSIC Modelling

Council requests to review the MUSIC model prepared in the St Peters Mod 11 EA and states that "*stormwater treatment shall comply with Part 2.17 Water Sensitive Urban Design of the Marrickville DCP 2011*."

Section 5.2.11 of this RTS discusses MUSIC modelling. The pollutant load reductions specified in Marrickville DCP 2011 have been addressed, although the Marrickville DCP 2011 does not apply to the Project.

5.8.17 Stormwater Management

Council states that the "*stormwater drainage system must comply with Part 2.25 Stormwater Management of the Marrickville DCP 2011*.

Marrickville DCP 2011 does not apply to the Project.

It is proposed to modify the existing stormwater drainage system as described in EA Section 5.2.3 and shown in Figure 5.2 of the Surface Water Assessment (Appendix G of the St Peters Mod 11 EA).The modifications will substantially increase the system capacity and stormwater capture for use in the concrete batching process. The piped drainage capacity will be constrained by the capacity of the existing piped drainage system. Specifically, the existing 600 mm conduit that will convey runoff from the majority of the site (catchments DC2, DC3, DC4, DC6 and DC7) under the rail sidings and into the Alexandra Canal. This conduit is estimated to have a 20% AEP capacity (relative to the 5% AEP capacity specified in Marrickville DCP 2011). Increasing the capacity of this pipe would require significant cost given it is beneath a series of rail sidings.

It is also noted that only overland flows from catchments DC3 (0.09 ha), DC7 (0.14 ha) and part of DC8 (0.56 ha) will flow offsite onto Burrows Road when the piped drainage capacity is exceeded. The proposed modifications will substantially reduce the frequency and magnitude of these overflows. Overland flows from all other catchments (which have a collective area of 3.06 ha) will either pond onsite or flow directly into the Alexandra Canal.

5.8.18 Flood Planning Levels

Council notes some flood planning requirements for the site.

The existing consolidated consent contains Condition 26, which states:

Buildings, plant and equipment including material storage areas shall be set at a minimum height of 500 mm above the 1% Annual Exceedance Probability (AEP) flood event for Alexandra Canal. Details of existing and proposed site levels and means of providing 500 mm freeboard above the 1% AEP flood event shall be submitted to Council with the Building Application. Variations below 500 mm shall only be with the written agreement of Council's Director, Technical Services.

These flood planning levels will be adopted for all new structures.

5.8.19 Drainage Covenants

Council requested that drainage covenants be prepared for the site. Condition 25 of original consent (approved April 1996) required an easement for drainage. Correspondence at that time noted that an

easement would not be required as no major storm event surface flow paths cross the site. This consent condition was later deleted as part of a consent modification (see attached link).

https://majorprojects.accelo.com/public/70db5283784846f8f772191e54fbf8e8/Boral%20St%20Peters%20Consolidated%20_MOD%201_%2010_.pdf

5.8.20 Alexandra Canal

Council notes some concerns about the potential for flooding and water management issues damaging the canal.

Alexandra Canal is an artificial waterway following the previous alignment of Sheas Creek. The canal is a waterway and as such floods and accepts flood waters, as it has done since its construction in the late 19th century. As noted in the St Peters Mod 11 EA, the St Peters facility is above 1% AEP flood levels and the modification will not change flood behaviour in the canal.

The proposed water management modifications aim to improve water quality entering the canal and no changes are proposed that would increase flows into the canal.

5.9 Office of Environment and Heritage

The Heritage Council within the OEH presented concerns that the St Peters Mod 11 EA provides insufficient analysis of the potential impacts of the modification on the State Heritage Register listed Alexandra Canal.

To address these concerns, Boral has undertaken additional analysis of predicted impacts, which are detailed in Section 5.2.13 of this RTS.

5.10 Roads and Maritime Services

5.10.1 Queues along Canal Road

RMS states that the distance between Burrows Road signals and Princes Highway is approximately 560 m, and the modelling indicates existing and proposed queues along Canal Road exceed this length (and are worse in future scenarios). RMS asks if there has been any consideration to the network effects and changes at and along the Princes Highway.

Discussions regarding the additional SIDRA analysis completed for the Burrows Road intersection with Canal Road and Ricketty Street are provided in Section 5.2.6. When using the default phasing option (worst case scenario), which was used in the St Peters Mod 11 EA TIA, the SIDRA analysis has overestimated the queue lengths. If this intersection operates on the optimal phasing then the queues are much shorter both for existing and proposed queues. The existing queues are 328 m and 183 m in the AM and PM peaks respectively, this would change to the proposed queues of 333 m and 169 m in the AM and PM peaks respectively.

5.10.2 Network effects along Ricketty Street and WestConnex/Gardeners Road

RMS states that the distance to Kent Road signals is around 580 m and the proposed WestConnex signal is around 800 m, indicating that the existing and proposed queues along Canal Road easily exceed this length. RMS asks what consideration has been given to the network effects.

Similar to the approach discussed in Section 5.10.1, when using the default phasing option (worst case scenario) which was used in the St Peters Mod 11 EA TIA, the SIDRA analysis indicates that the existing queues are currently 148 m and 913m for the AM and PM peak times respectively. Increased traffic due to Modification 11 would increase queues to 177 m and 1,177 m for the AM and PM peak times respectively. However, when the SIDRA optimal phasing scenario is used, the existing queues are currently 111 m and 430 m for the AM and PM peak times respectively. This would change to proposed queues of 107 mm and 473 m due to MOD 11 for the AM and PM peak times respectively.

Therefore, the queue range is dependent on the phasing used and whilst the worst case scenario was assessed in the St Peters Mod 11 EA, the range for the optimal phasing provides a much more favourable outcome.

5.10.3 Timeframes

RMS seeks clarifications as to what year the future scenario is being modelled and if it includes the Westconnex reduction.

It was assumed the proposed modification would be operated in conditions similar to the current traffic scenarios. Westconnex was considered to have longer-term affects to future traffic scenarios and therefore as such the St Peters Mod 11 TIA did not quantify Westconnex numbers in its analysis.

5.10.4 Model cycle lengths

RMS states that the report does not justify for the cycle length values that have been used in the modelling.

The TIA used the default SIDRA settings, which provides optimal cycle length. This is an accepted approach for modelling in NSW.

5.10.5 Peak flow factor that was used in the modelling

RMS seeks clarification as to the peak flow factor that was used in the modelling.

The TIA used the default peak flow which was a 5% addition.

5.10.6 Phasing and timing that was used in the modelling

RMS seeks clarification as to the phasing and timing that was used in the modelling.

The TIA used default variable phasing. Timing was ‘optimal cycle time-minimum delay’.

5.10.7 Saturation flows that was used in the modelling

RMS seeks clarification as to the saturation flows that were used in the modelling.

The TIA used the default saturation flows in the modelling.

6 Response to community submissions

This section responds to community submissions that raised matters relating to potential environmental impacts of the current operations and the proposed modification. Community submissions are addressed by themes outlined in Section 3.2.

6.1 Air quality- dust and emissions

Matter

A number of community submissions expressed concern about the dust generation from the current operations and the proposed modification, and the impact this could have on their homes, health, businesses and amenities.

Some of the key issues raised involved:

- the lack of maintenance and street sweeping in the streets surrounding the site;
- lack of wheel wash at the site and trucks subsequently tracking dust onto Burrows Road South;
- concerns about cement dust covering the surrounding area and accumulating over vehicles, homes, machinery and amenities; and
- current dust accumulation in the area, potential increase in dust due to the proposed modification and long-term health effects.

Response

Current and planned air quality and dust control measures:

As outlined in Section 2.7.1 of the St Peters Mod 11 EA, Boral currently employs a number of environmental management and mitigation measures on site to address air quality impacts. Current mitigation measures target wheel generated dust, material handling, concrete plant processes, and wind erosion of stockpiles and exposed surfaces, and include:

- watering all internal roads with a water cart;
- use of water sprays and sprinklers on stockpiles, loading areas, sales area and on fixed plant;
- cessation or reduction of dust generating activities in unfavourable meteorological conditions such as high winds;
- covering vehicle loads;
- enclosing aggregate and sand storage silos;
- pneumatic loading of cement silos with dust filters;
- installing dust extraction systems in concrete plant;
- using fully enclosed conveyors and storage bins; and

- daily street sweeping for onsite and offsite roads.

Photograph 2.7, Section 2.4.1 of the St Peters Mod 11 EA, shows alleys underneath the batching plant where material is gravity dispensed into concrete agitators. The sliding doors roll down, fully enclosing the alleys before the dispensing process takes place and making sure that aggregate dust and particulates are contained in the process.

Furthermore, all concrete agitators are washed at the slump stand and pass over a vibration grid before leaving the site. Installation of a wheel wash for tipper vehicles is planned to occur during the 2018 Christmas shutdown period, or during upgrade works as part of the Project (whichever is sooner).

In addition to the above, as mentioned in Section 5.2.1, Boral will also commit to the development of an Air Quality Management Plan that will incorporate 1–3 real-time dust monitoring devices (refer to Section 5.2.1).

Surrounding environment

Based on a review of existing land uses in the vicinity of the proposed modification, the existing air quality area is considered to be characteristic of an urban environment. The site is located within an existing industrial precinct and has historically been used for significant industrial and commercial land uses.

There are several transport corridors located within the vicinity of the site, including the Princes Highway, Canal Road and Ricketty Street, all of which are traversed by many vehicles that contribute to air emissions within the area. Major surrounding infrastructure includes the Sydney Airport and the Botany Goods Line (railway line immediately west of the site) which also contribute to the background air quality.

By way of example, based on NSW EPA Earlwood air quality monitoring station data, the local annual average total suspended particulates (TSP) background was calculated as 38.1 µg/m³ annual average. Modelling presenting in the Modification 11 EA predicted the site contribution to range from 0.1 to 2.6 µg/m³ annual average, which is a very small fraction of the background levels. The annual average TSP criterion is 90 µg/m³.

Air quality impact assessment

The air quality impact assessment (AQIA) prepared for the St Peters Mod 11 EA concluded that the predicted dust concentrations and deposition rates arising from the operations at the site are below applicable NSW EPA impact assessment criteria at all surrounding receptors, suggesting that the control of these particle size fractions is effective at managing potential particulate matter-related impacts. Model predictions of pollutant concentrations for relevant averaging periods were compared with applicable EPA impact assessment criteria (refer to the AQIA in Appendix E of the St Peters Mod 11 EA). The adopted assessment criteria, listed within the EPA *Approved Methods for the Modelling and Assessment of Air Pollutants in NSW,* are designed to maintain an ambient air quality that allows for adequate protection of human health and well-being.

Boral's proposes commitment to new dust monitoring in the local area is outlined in Section 5.2.1.

6.2 Noise and vibration

Matter

Some community respondents were concerned about the impact of increased production on noise and vibration levels. One respondent expressed concern about the noise and vibration from the number of existing trucks on Burrows Road South.

Response

The noise assessment (NVIA) prepared for the St Peters Mod 11 EA provides an exhaustive assessment along with proposed management and mitigation measures. The noise modelling undertaken for the NVIA was prepared by a suitably qualified and independent acoustic specialist. As noted in Section 6.10 of the St Peters Mod 11 EA, the assessment showed that the proposed modification will result in an increase in site noise levels of no greater than 1 dB compared to existing operations. Further, noise levels from the proposed modification are predicted to be significantly less than existing ambient noise levels at the assessed locations where road traffic noise dominates the existing noise environment. The assessment concludes that noise levels from the modification are therefore not expected to cause adverse impacts at any assessment location.

Refer to Section 5.2.13 for further details about vibration impacts.

6.3 Traffic – road quality

Matter

One of the community respondents noted that Burrows Road South is in poor condition and has had minimal maintenance and upgrades to accommodate heavy traffic that currently uses the road. Another community respondent noted that the road surface is full of pot holes.

Response

As already noted in Section 5.8.8, the Burrows Road pavement is partially patched and shows some pavement cracking. While no dilapidation survey has been undertaken, the road surface appears to be in poorer condition than Burrows Road north of the intersection with Canal Road. Refer to Section 5.8.8 for further details on current estimated daily traffic and the predicted increase with the proposed modification.

The Council has announced that it has future plans to upgrade the road. They have shared road upgrade designs with Boral, and contractors for the works have already been selected. In 1997, Boral paid Council $50,077.80 as Section 94 contributions for Boral's use of Council roads. Boral has offered to assist in costs of resealing Burrows Road.

6.4 Traffic – road safety

Matter

Some community submissions raised concern about the limited visibility on Burrows Road South due to the current volume of trucks. It was noted by a number of community respondents that the current condition poses a safety risk to pedestrians, staff and customers. This risk was particularly noted for the reported trucks, tippers and B double trailers that park on either side of the road.

Another respondent noted that the speed limit on Burrows Road South should be reviewed.

Response

The existing intersection traffic congestion and traffic delays are adversely affected by the on street parking which is currently permitted on both the northern and southern approaches of Burrows Road to the intersection, at all times of the day, apart from short "No Stopping" zones. The situation is further exasperated in the early mornings due to the illegal parking of trucks along Burrows Road South, which is used as a de-facto marshalling area. Observations show that numerous trucks park in the "No Stopping" zones and across driveways overnight.

Based on the SIDRA analysis results detailed in Section 5.2.6, the optimal scenario would be to extend the current "No Stopping" zones on Burrows Road South and Burrows Road. This is a matter best dealt with in collaboration with Council. The extension of the "No Stopping" zones would improve the current congestion and parking situation along the road, and thus the safety along both Burrows Road South and Burrows Road.

Refer to Section 5.8.8 for further information about the intersection and traffic volumes.

The speed limit on Burrows Road South is 50 km/hr. On the major roads in the locality, such as Canal Road, Ricketty Street and Princes Highway, the speed limit is generally higher (60 km/hr). Any speed limit reviews would need to be considered by local Council and RMS.

6.5 Traffic – parking / congestion

Matter

A number of community submissions raised concerns about the impact of increased truck movements on parking and traffic delays for vehicles using Burrows Road South. Some respondents noted that vehicle movements in and out of Burrows Road South are already at capacity, and were concerned about increasing traffic up to 1,066 more truck movements daily.

Response

Section 8.3.1 of the St Peters Mod 11 EA assesses the impact of site traffic generation from the proposed modification.

In comparison to the existing site daily truck loads moved on an average production day (which is 279 deliveries), there would be approximately 336 additional daily truck deliveries (672 additional truck movements) on a future average production day and 533 additional daily truck deliveries (1,066 additional truck movements) on a future maximum production day. The additional concrete production would not result in any additional road transport of bulk sand or aggregate materials to the site.

Refer to Section 5.2.6, which explains how due to the short lifespan of freshly made concrete, Boral does not send loads out when the delivery route is congested, as the loads would most likely be rejected. To prevent this occurrence, the agitator drivers report congestion back to the plant operators and concrete deliveries are either delayed or re-routed to other consumers. This process cannot easily be modelled and the SIDRA analysis considers the worst case scenario. Related issues are also addressed in Section 5.8.1.

Matter

Some respondents noted that the recent upgrade to Canal Road / Burrows Road intersection has not been effective in alleviating previous issues. It was reported that vehicles turning right out of Burrows Road South have to merge with vehicles turning left out of Burrows Road. The traffic management light cycles on the intersection between Burrows Road, Burrows Road South and Canal Road need to be reassessed to provide better flows for right turning traffic from all directions.

Response

Refer to responses in Sections 5.2.10 and 6.5 about Canal Road/ Burrows Road intersection impacts and planned road upgrades.

Matter

One community respondent noted that with the construction of the Westconnex and an additional 1,000 apartments that are currently under construction in Erskineville/Alexandria area, there will be more traffic on the roads surrounding Burrows Road.

Response

Construction of WestConnex does add traffic to local roads in the short-term but will provide long-term benefits to traffic flow. Section 8.2.5 of the St Peters Mod 11 EA discusses the significant future road traffic changes predicted from all three stages of the Westconnex project on a number of roads in the Alexandria, St Peters and Mascot areas. Significant increased road traffic volumes are expected to occur on some routes (Euston Road) and significantly reduced traffic volumes are expected on other routes (Canal Road).

The forecast future traffic changes are outlined in Appendix F of the St Peters Mod 11 EA. Appendix F shows the predicted future daily traffic volume changes over large areas of the Inner West Sydney road network as a result of the Westconnex project. This includes the Canal Road and Ricketty Street route through St Peters and Mascot. It is noted in Section 8.2.5 of the St Peters Mod 11 EA that along this route there will be a significant future daily traffic reduction of over 10,000 daily vehicle movements, which is forecast to occur immediately following the completion of the Westconnex Stage 1 and 2 projects in 2023. A further forecast reduction of between 5,000 t0 10,000 daily vehicles, which is also forecast to occur following the subsequent completion of the Westconnex Stage 3 project in the years after 2023.

The intention of WestConnex is alleviate traffic congestion in the region, including the traffic contributed by the increase in Sydney's population and housing supply.

6.6 Local businesses

Matter

Some community respondents noted that the proposed modification will decrease their ability to run business effectively, and that the traffic level impedes access for their couriers and deliveries.

Response

The traffic delays currently experienced along Burrows Road South and Burrows Road, and the intersection delays are partly caused by the inadequate "No Stopping" zones along the roads and the illegal parking. This is discussed in Section 6.4.

6.7 Other

Matter

A community respondent noted that the expansion of the crusher has contributed to concrete production on site.

Response

A crusher is not a part of the current operations on site, nor is it part of the proposed modification.

7 Project evaluation and conclusion

Boral's St Peters concrete plant and materials handling facility has been operating since 1996 as a major supplier of construction materials. It receives bulk construction materials (aggregate, sand and cement) predominantly by rail to make concrete, or for later road distribution within the Sydney metropolitan area.

Housing and infrastructure construction are continuing to drive record demand in the Sydney construction materials market. A healthy residential housing market along with a pipeline of fully funded infrastructure works including North West Rail Link, WestConnex, NorthConnex, the CBD and South East Light Rail and Sydney Metro is driving the demand for aggregate and concrete products.

An application under section 75W of the EP&A Act (Modification 11) is proposed to modify the site's development consent to:

- increase production at the concrete plant from 280,000 m^3 to 750,000 m^3 per annum;
- increase the throughput of the materials handling facility from 759,000 tpa to 1 Mtpa; and
- upgrade the concrete and materials handling facility to facilitate these increases.

Detailed modelling and assessment focussed on increased traffic, surface water management, noise and air quality. Modelling and assessment showed that the modification could be carried out without significant additional impacts on local residents and industrial land users while still providing the booming Sydney construction market.

Subject to implementation of the existing environmental mitigation, management and monitoring measures applied at the site, the concrete production increase and increasing the materials handling facility would not result in significant adverse environmental impacts.

The site is surrounded by industrial land uses which correspond with the site's and surrounding properties' zoning as IN1 General Industrial under the *Marrickville Local Environmental Plan 2011* (Marrickville LEP). The St Peters area has long been a focus of industrial activity, certainly since the 1890s with the construction of the Bedford Brickworks and the commencement of the Alexandra Canal for cargo shipping. The proposed modification sits well with the historical and current industrial nature of the site and immediate surrounds.

Unlike many industrial land-uses, concrete batching must be undertaken very close to the market as the short life-span of wet concrete does not allow lengthy transport. If Sydney is to continue to grow and redevelop for rising populations, as well as to build and repair infrastructure, it will continue to need large concrete batching plants within industrial areas in suburbs such as St Peters.

Appendix A

Submissions Matrix

St Peters Modification 11 Response to Submissions - Submissions matrix

Submitter	Reference number	Location	Stakeholder type	View	Form letter / petition	Air quality - dust and emissions	Surface water	Stormwater	Noise	Heritage - Alexandra Canal	Heritage - other local heritage items	Traffic - road quality	Traffic - road safety	Traffic - parking/ congestion	Construction/ construction details	Management plans	Local business productivity
Agencies																	
TfNSW	276528		agency	comments													
Transgrid	277153		agency	comments													
WaterNSW			agency	comments													
Inner West Council	276017		agency	comments		1	1	1	1	1		1	1	1			
Sydney Airport	276533		agency	comments											1		
EPA	277155		agency	comments		1	1	1	1						1	1	
OEH	276523		agency	comments						1	1						
RMS	277151		agency	comments										1			
DPE			agency	comments		1	1			1		1		1	1	1	
Public submissions																	
Fjaj Group PTY LTD	275237	St Peters	org	object	letter	1								1			1
Auto Acoustics	275223	St Peters	org	object	letter	1						1		1			1
Horgans	275859	St Peters	org	object	letter	1			1					1			1
Next Printing	275172	St Peters	org	object	letter	1							1	1			1
Adox	275646	St Peters	org	object	letter	1						1		1			1
Megatop Cargo Pty Ltd	275365	St Peters	org	object	letter	1							1	1			1
R.W. Winning Pty Ltd	275747	Alexandria	org	object	letter	1								1			
Lindy McLeod	275909	St Peters	indiv	object	letter	1								1			
Patrick George	275111	St Peters	indiv	object	letter	1								1			
Walter Mezger	275291	St Peters	indiv	comments but appears to object	letter	1											
Peter Simpson	275422	Sydenham	indiv	object	letter	1			1								
Name withheld	275676	St Peters	indiv	object	letter	1								1			1
Name withheld	275417	Erskineville	indiv	object	letter	1			1					1			
Name withheld	275915	St Peters	indiv	object	letter	1						1	1	1			1
Name withheld	275316	St Peters	indiv	object	letter	1			1					1			
Name withheld	275359	Erskineville	indiv	object	letter									1			
Name withheld	275357	Erskineville	indiv	object	letter									1			
Name withheld	275121	Sydenham	indiv	object	letter	1											
Name withheld (Maren)	275221	Alexandria	indiv	comments but appears to object	letter	1								1			
Name withheld	275211	St Peters	indiv	object	letter	1			1					1			
Sub-totals																	
Agency (9 submissions)						3	3	2	2	3	1	2	1	3	3	2	0
Public (20 submissions)						18	0	0	5	0	0	3	3	17	0	0	8
Total						**21**	**3**	**2**	**7**	**3**	**1**	**5**	**4**	**20**	**3**	**2**	**8**

Appendix B

SIDRA Analysis on Burrows Road and Canal Road and Ricketty Street

Attachment A

Further analysis of SIDRA results

Further analysis of SIDRA Results

Traffic Scenario	AM Peak Existing Traffic D/SAT DEL LOS	AM Peak Proposed Traffic D/SAT DEL LOS	PM Peak Existing Traffic D/SAT DEL LOS	PM Peak Proposed Traffic D/SAT DEL LOS
Variable Phasing (Default Option)	1.480 94.9 F	1.923 151.8 F	1.146 132.4 F	1.324 216.8 F
Variable Phasing (with Parking Restrictions)	0.986 37.4 C	0.987 46.4 D	0.894 38.1 C	0.917 43.6 D
No RT Arrow Northbound (as with existing intersection)	0.855 25.7 B	0.892 39.4 C	0.961 29.3 C	0.937 45.8 D
No RT Arrow Northbound (with parking restrictions)	0.847 25.7 B	0.887 27.6 B	0.874 31.8 C	0.897 35.3 C

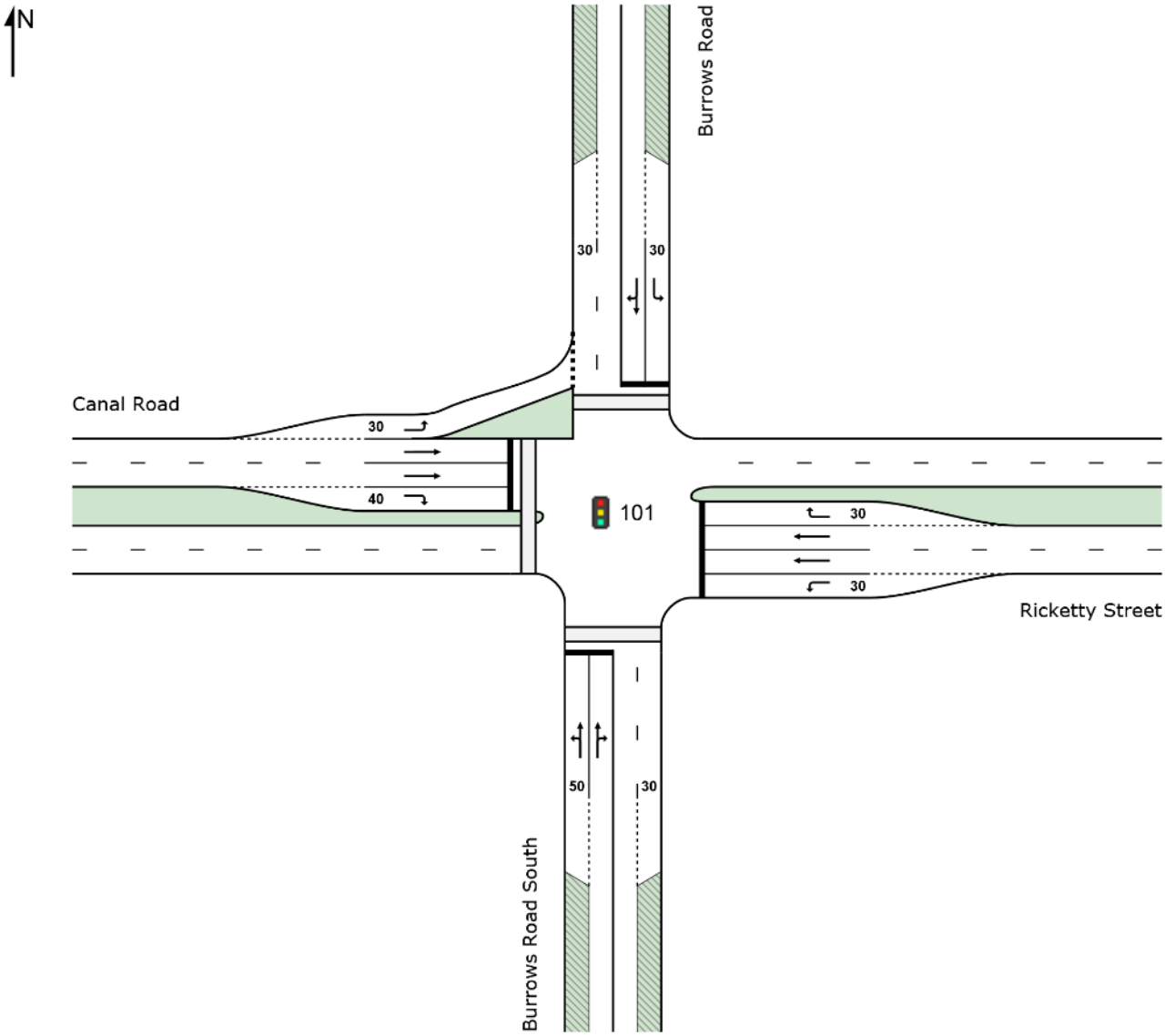
Attachment B

SIDRA intersection analysis results (as in St Peters Mod 11 EA)

SITE LAYOUT

Site: 101 [Canal Road/Burrows Road/Ricketty Street AM Peak 2017]

Four way traffic signal controlled intersection
Site Category: (None)
Signals - Fixed Time Isolated



MOVEMENT SUMMARY

Site: 101 [Canal Road/Burrows Road/Ricketty Street AM Peak 2017]

Four way traffic signal controlled intersection
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 130 seconds (Site Optimum Cycle Time - Minimum Delay)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Burrows Road South												
1	L2	35	51.5	0.227	55.6	LOS D	3.2	32.6	0.89	0.73	0.89	30.9
2	T1	34	56.3	0.832	55.3	LOS D	3.2	32.6	0.92	0.78	1.07	30.5
3	R2	34	59.4	0.832	74.7	LOS F	3.0	31.7	1.00	0.90	1.48	26.6
Approach		102	55.7	0.832	61.8	LOS E	3.2	32.6	0.94	0.80	1.15	29.3
East: Ricketty Street												
4	L2	40	28.9	0.053	24.0	LOS B	1.3	11.3	0.55	0.68	0.55	41.6
5	T1	895	4.6	0.550	23.3	LOS B	20.4	148.5	0.72	0.63	0.72	43.4
6	R2	105	11.0	0.993	109.5	LOS F	9.0	68.6	1.00	1.10	1.79	21.2
Approach		1040	6.2	0.993	32.1	LOS C	20.4	148.5	0.74	0.68	0.82	39.2
North: Burrows Road												
7	L2	114	3.7	0.292	51.7	LOS D	6.1	43.8	0.88	0.78	0.88	31.9
8	T1	29	39.3	1.480	479.7	LOS F	17.9	170.4	1.00	1.59	3.58	6.3
9	R2	59	42.9	1.480	485.8	LOS F	17.9	170.4	1.00	1.59	3.58	6.3
Approach		202	20.3	1.480	240.8	LOS F	17.9	170.4	0.93	1.13	2.06	11.4
West: Canal Road												
10	L2	174	13.3	0.120	6.1	LOS A	0.7	5.3	0.12	0.58	0.12	53.3
11	T1	1777	2.8	1.058	126.4	LOS F	103.3	740.2	1.00	1.47	1.70	19.3
12	R2	57	9.3	0.530	73.4	LOS F	3.7	28.1	1.00	0.75	1.00	26.8
Approach		2007	3.9	1.058	114.5	LOS F	103.3	740.2	0.92	1.38	1.54	20.6
All Vehicles		3352	7.2	1.480	94.9	LOS F	103.3	740.2	0.87	1.13	1.34	23.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	11	22.2	LOS C	0.0	0.0	0.58	0.58
P3	North Full Crossing	11	22.2	LOS C	0.0	0.0	0.58	0.58
P4	West Full Crossing	21	56.4	LOS E	0.1	0.1	0.93	0.93
All Pedestrians		42	39.3	LOS D			0.76	0.76

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 101 [Canal Road/Burrows Road/Ricketty Street AM Peak Future]

Four way traffic signal controlled intersection
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 150 seconds (Site Optimum Cycle Time - Minimum Delay)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Burrows Road South												
1	L2	49	66.0	0.270	57.4	LOS E	5.0	54.3	0.86	0.74	0.86	30.4
2	T1	42	65.0	0.990	63.9	LOS E	5.2	57.6	0.89	0.81	1.08	28.5
3	R2	46	70.5	0.990	115.0	LOS F	5.2	57.6	1.00	1.07	1.84	20.5
Approach		138	67.2	0.990	78.7	LOS F	5.2	57.6	0.92	0.87	1.26	25.7
East: Ricketty Street												
4	L2	53	46.0	0.082	30.1	LOS C	2.1	20.7	0.59	0.70	0.59	38.6
5	T1	895	4.6	0.600	30.3	LOS C	24.4	177.3	0.76	0.67	0.76	40.1
6	R2	105	11.0	1.097	184.8	LOS F	12.9	99.1	1.00	1.21	2.06	14.3
Approach		1053	7.3	1.097	45.8	LOS D	24.4	177.3	0.78	0.73	0.88	33.9
North: Burrows Road												
7	L2	114	3.7	0.236	51.5	LOS D	6.5	46.6	0.83	0.77	0.83	32.0
8	T1	38	52.8	1.923	883.7	LOS F	27.1	265.5	1.00	1.90	4.08	3.7
9	R2	59	42.9	1.923	889.7	LOS F	27.1	265.5	1.00	1.90	4.08	3.7
Approach		211	23.5	1.923	436.0	LOS F	27.1	265.5	0.91	1.29	2.32	7.1
West: Canal Road												
10	L2	174	13.3	0.120	6.2	LOS A	0.8	6.0	0.11	0.58	0.11	53.4
11	T1	1777	2.8	1.146	203.3	LOS F	135.0	967.8	1.00	1.70	1.98	13.6
12	R2	72	27.9	0.770	88.6	LOS F	5.7	49.1	1.00	0.86	1.23	24.0
Approach		2022	4.6	1.146	182.3	LOS F	135.0	967.8	0.92	1.57	1.79	14.7
All Vehicles		3423	9.1	1.923	151.8	LOS F	135.0	967.8	0.88	1.27	1.52	16.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	11	27.6	LOS C	0.0	0.0	0.61	0.61
P3	North Full Crossing	11	27.6	LOS C	0.0	0.0	0.61	0.61
P4	West Full Crossing	21	56.4	LOS E	0.1	0.1	0.87	0.87
All Pedestrians		42	42.0	LOS E			0.74	0.74

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 101 [Canal Road/Burrows Road/Ricketty Street PM Peak 2017]

Four way traffic signal controlled intersection
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 150 seconds (Site Practical Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Burrows Road South												
1	L2	56	22.6	0.212	59.0	LOS E	4.3	36.2	0.87	0.74	0.87	30.1
2	T1	23	22.7	0.778	58.5	LOS E	4.3	36.2	0.91	0.78	1.04	29.6
3	R2	33	32.3	0.778	74.8	LOS F	2.9	25.3	1.00	0.84	1.37	26.8
Approach		112	25.5	0.778	63.5	LOS E	4.3	36.2	0.92	0.78	1.05	29.0
East: Ricketty Street												
4	L2	34	25.0	0.051	32.9	LOS C	1.4	12.1	0.62	0.69	0.62	37.8
5	T1	1707	4.4	1.146	203.8	LOS F	125.7	913.4	1.00	1.69	1.98	13.5
6	R2	91	2.3	0.743	85.3	LOS F	7.0	49.8	1.00	0.84	1.16	24.7
Approach		1832	4.7	1.146	194.8	LOS F	125.7	913.4	0.99	1.63	1.91	14.0
North: Burrows Road												
7	L2	178	4.7	0.411	44.1	LOS D	9.4	68.6	0.78	0.77	0.78	34.2
8	T1	25	58.3	1.120	200.4	LOS F	26.1	214.7	1.00	1.37	2.09	13.4
9	R2	169	14.9	1.120	206.1	LOS F	26.1	214.7	1.00	1.37	2.09	13.3
Approach		373	13.0	1.120	128.4	LOS F	26.1	214.7	0.89	1.08	1.46	18.8
West: Canal Road												
10	L2	84	17.5	0.059	6.1	LOS A	0.3	2.4	0.10	0.57	0.10	53.3
11	T1	1001	5.0	0.756	39.9	LOS C	30.9	226.0	0.89	0.79	0.89	36.3
12	R2	51	20.8	0.781	92.1	LOS F	4.1	33.7	1.00	0.86	1.29	23.5
Approach		1136	6.7	0.781	39.8	LOS C	30.9	226.0	0.83	0.78	0.85	36.2
All Vehicles		3452	6.9	1.146	132.4	LOS F	125.7	913.4	0.93	1.26	1.49	18.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	11	31.4	LOS D	0.0	0.0	0.65	0.65
P3	North Full Crossing	11	34.0	LOS D	0.0	0.0	0.67	0.67
P4	West Full Crossing	21	59.9	LOS E	0.1	0.1	0.89	0.89
All Pedestrians		42	46.3	LOS E			0.78	0.78

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 101 [Canal Road/Burrows Road/Ricketty Street PM Peak Future]

Four way traffic signal controlled intersection
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 150 seconds (Site Practical Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Burrows Road South												
1	L2	71	38.8	0.249	54.1	LOS D	5.4	50.9	0.84	0.75	0.84	31.2
2	T1	32	43.3	0.913	59.5	LOS E	5.4	50.9	0.89	0.82	1.09	29.4
3	R2	45	51.2	0.913	92.7	LOS F	4.4	44.2	1.00	0.99	1.69	23.6
Approach		147	43.6	0.913	67.1	LOS E	5.4	50.9	0.90	0.84	1.15	28.0
East: Ricketty Street												
4	L2	46	45.5	0.090	39.1	LOS C	2.2	21.3	0.69	0.71	0.69	35.3
5	T1	1707	4.4	1.324	356.9	LOS F	162.0	1177.0	1.00	2.21	2.63	8.5
6	R2	91	2.3	0.826	89.4	LOS F	7.2	51.5	1.00	0.89	1.29	24.0
Approach		1844	5.4	1.324	335.8	LOS F	162.0	1177.0	0.99	2.11	2.51	9.0
North: Burrows Road												
7	L2	178	4.7	0.368	39.5	LOS C	8.8	64.2	0.73	0.76	0.73	35.7
8	T1	34	68.8	1.219	278.3	LOS F	32.4	273.3	1.00	1.56	2.43	10.3
9	R2	169	14.9	1.219	284.1	LOS F	32.4	273.3	1.00	1.56	2.43	10.2
Approach		381	14.9	1.219	169.4	LOS F	32.4	273.3	0.87	1.19	1.63	15.3
West: Canal Road												
10	L2	84	17.5	0.059	6.1	LOS A	0.3	2.4	0.10	0.57	0.10	53.3
11	T1	1001	5.0	0.873	56.1	LOS D	36.6	267.5	0.96	0.94	1.08	31.2
12	R2	65	38.7	1.121	205.0	LOS F	8.6	79.7	1.00	1.22	2.22	13.1
Approach		1151	7.9	1.121	60.9	LOS E	36.6	267.5	0.90	0.93	1.07	29.8
All Vehicles		3523	8.8	1.324	216.8	LOS F	162.0	1177.0	0.94	1.57	1.89	12.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

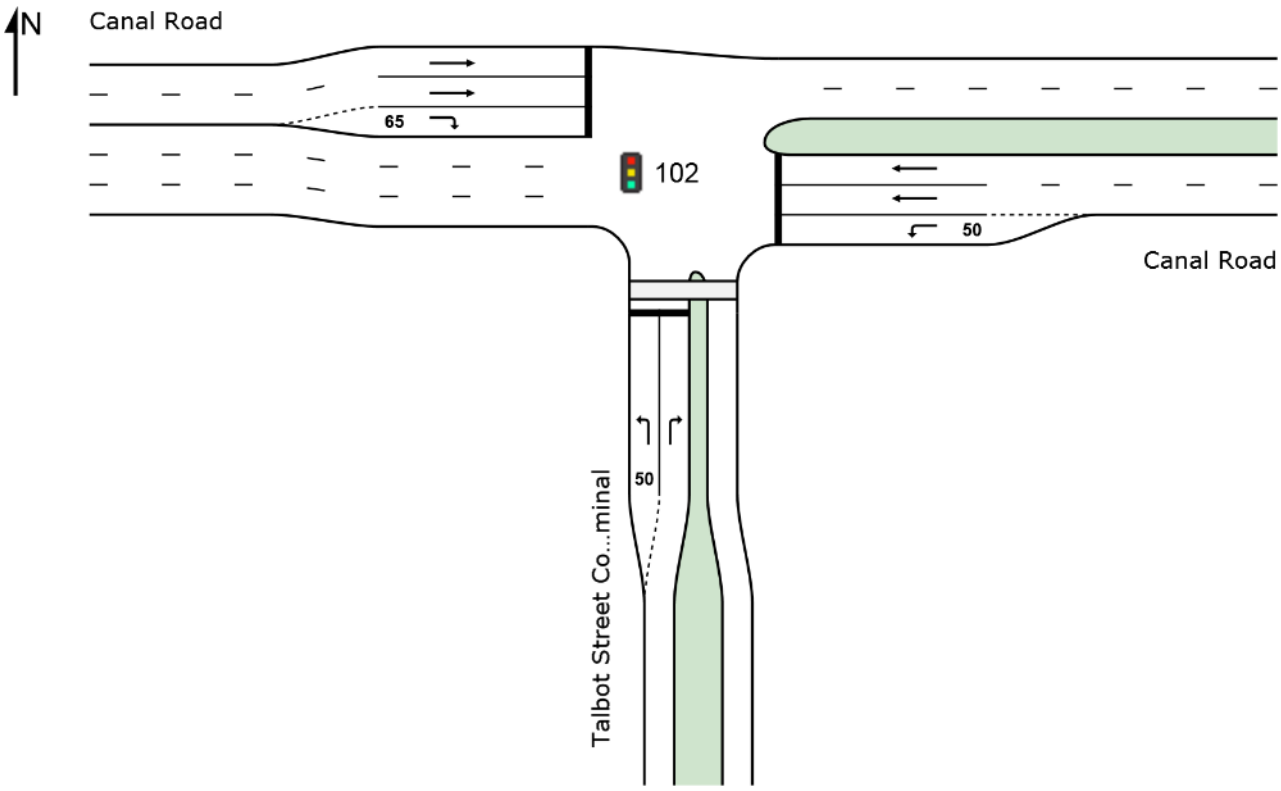
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	11	36.8	LOS D	0.0	0.0	0.70	0.70
P3	North Full Crossing	11	38.9	LOS D	0.0	0.0	0.72	0.72
P4	West Full Crossing	21	53.8	LOS E	0.1	0.1	0.85	0.85
All Pedestrians		42	45.8	LOS E			0.78	0.78

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

SITE LAYOUT

Site: 102 [Canal Road/Container Terminal 2017 AM Peak]

Existing Three Way intersection
Site Category: (None)
Signals - Fixed Time Isolated



MOVEMENT SUMMARY

Site: 102 [Canal Road/Container Terminal 2017 AM Peak]

Existing Three Way intersection
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 150 seconds (Site User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Talbot Street Container Terminal												
1	L2	14	92.3	0.102	71.8	LOS F	0.9	11.5	0.92	0.70	0.92	26.4
3	R2	21	95.0	0.475	91.1	LOS F	1.7	21.3	1.00	0.73	1.02	23.2
Approach		35	93.9	0.475	83.5	LOS F	1.7	21.3	0.97	0.72	0.98	24.4
East: Canal Road												
4	L2	9	77.8	0.009	7.6	LOS A	0.1	0.9	0.13	0.59	0.13	49.7
5	T1	979	7.8	0.330	4.3	LOS A	9.4	70.6	0.29	0.26	0.29	56.1
Approach		988	8.5	0.330	4.3	LOS A	9.4	70.6	0.29	0.27	0.29	56.0
West: Canal Road												
11	T1	2025	2.8	0.606	2.4	LOS A	18.6	133.5	0.28	0.26	0.28	57.7
12	R2	17	12.5	0.247	86.0	LOS F	1.3	9.9	1.00	0.70	1.00	24.6
Approach		2042	2.8	0.606	3.1	LOS A	18.6	133.5	0.28	0.27	0.28	57.1
All Vehicles		3065	5.7	0.606	4.4	LOS A	18.6	133.5	0.29	0.27	0.29	55.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	11	5.1	LOS A	0.0	0.0	0.26	0.26
All Pedestrians		11	5.1	LOS A			0.26	0.26

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 102 [Canal Road/Container Terminal AM Peak Future]

Existing Three Way intersection
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 150 seconds (Site User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Talbot Street Container Terminal												
1	L2	14	92.3	0.102	71.8	LOS F	0.9	11.5	0.92	0.70	0.92	26.4
3	R2	21	95.0	0.475	91.1	LOS F	1.7	21.3	1.00	0.73	1.02	23.2
Approach		35	93.9	0.475	83.5	LOS F	1.7	21.3	0.97	0.72	0.98	24.4
East: Canal Road												
4	L2	9	77.8	0.009	7.6	LOS A	0.1	0.9	0.13	0.59	0.13	49.7
5	T1	994	9.2	0.338	4.3	LOS A	9.7	73.0	0.30	0.27	0.30	56.0
Approach		1003	9.9	0.338	4.3	LOS A	9.7	73.0	0.29	0.27	0.29	56.0
West: Canal Road												
11	T1	2040	3.5	0.613	2.4	LOS A	19.0	137.1	0.28	0.27	0.28	57.7
12	R2	17	12.5	0.247	86.0	LOS F	1.3	9.9	1.00	0.70	1.00	24.6
Approach		2057	3.5	0.613	3.1	LOS A	19.0	137.1	0.29	0.27	0.29	57.1
All Vehicles		3095	6.6	0.613	4.4	LOS A	19.0	137.1	0.30	0.28	0.30	55.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	11	5.1	LOS A	0.0	0.0	0.26	0.26
All Pedestrians		11	5.1	LOS A			0.26	0.26

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 102 [Canal Road/Container Terminal 2017 PM Peak]

Existing Three Way intersection
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 150 seconds (Site User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Talbot Street Container Terminal												
1	L2	16	73.3	0.092	68.0	LOS E	1.0	11.7	0.90	0.71	0.90	27.3
3	R2	40	94.7	0.601	87.9	LOS F	3.1	39.7	1.00	0.79	1.09	23.7
Approach		56	88.7	0.601	82.3	LOS F	3.1	39.7	0.97	0.77	1.04	24.6
East: Canal Road												
4	L2	37	97.1	0.038	7.8	LOS A	0.3	4.2	0.13	0.59	0.13	49.0
5	T1	1896	4.1	0.653	7.6	LOS A	30.9	223.8	0.48	0.45	0.48	53.3
Approach		1933	5.9	0.653	7.6	LOS A	30.9	223.8	0.47	0.45	0.47	53.2
West: Canal Road												
11	T1	1171	3.0	0.356	2.2	LOS A	8.4	60.1	0.22	0.20	0.22	57.9
12	R2	2	50.0	0.038	85.0	LOS F	0.2	1.6	0.98	0.62	0.98	24.5
Approach		1173	3.1	0.356	2.4	LOS A	8.4	60.1	0.22	0.20	0.22	57.8
All Vehicles		3161	6.3	0.653	7.0	LOS A	30.9	223.8	0.39	0.36	0.39	53.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	5	5.9	LOS A	0.0	0.0	0.28	0.28
All Pedestrians		5	5.9	LOS A			0.28	0.28

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 102 [Canal Road/Container Terminal PM Peak Future]

Existing Three Way intersection
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 150 seconds (Site User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Talbot Street Container Terminal												
1	L2	16	73.3	0.092	68.0	LOS E	1.0	11.7	0.90	0.71	0.90	27.3
3	R2	40	94.7	0.601	87.9	LOS F	3.1	39.7	1.00	0.79	1.09	23.7
Approach		56	88.7	0.601	82.3	LOS F	3.1	39.7	0.97	0.77	1.04	24.6
East: Canal Road												
4	L2	37	97.1	0.038	7.8	LOS A	0.3	4.2	0.13	0.59	0.13	49.0
5	T1	1911	4.8	0.661	7.7	LOS A	31.5	230.0	0.49	0.46	0.49	53.3
Approach		1947	6.6	0.661	7.7	LOS A	31.5	230.0	0.48	0.46	0.48	53.2
West: Canal Road												
11	T1	1185	4.2	0.363	2.2	LOS A	8.6	62.0	0.22	0.20	0.22	57.9
12	R2	2	50.0	0.038	85.0	LOS F	0.2	1.6	0.98	0.62	0.98	24.5
Approach		1187	4.3	0.363	2.4	LOS A	8.6	62.0	0.22	0.20	0.22	57.7
All Vehicles		3191	7.2	0.661	7.0	LOS A	31.5	230.0	0.39	0.37	0.39	53.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

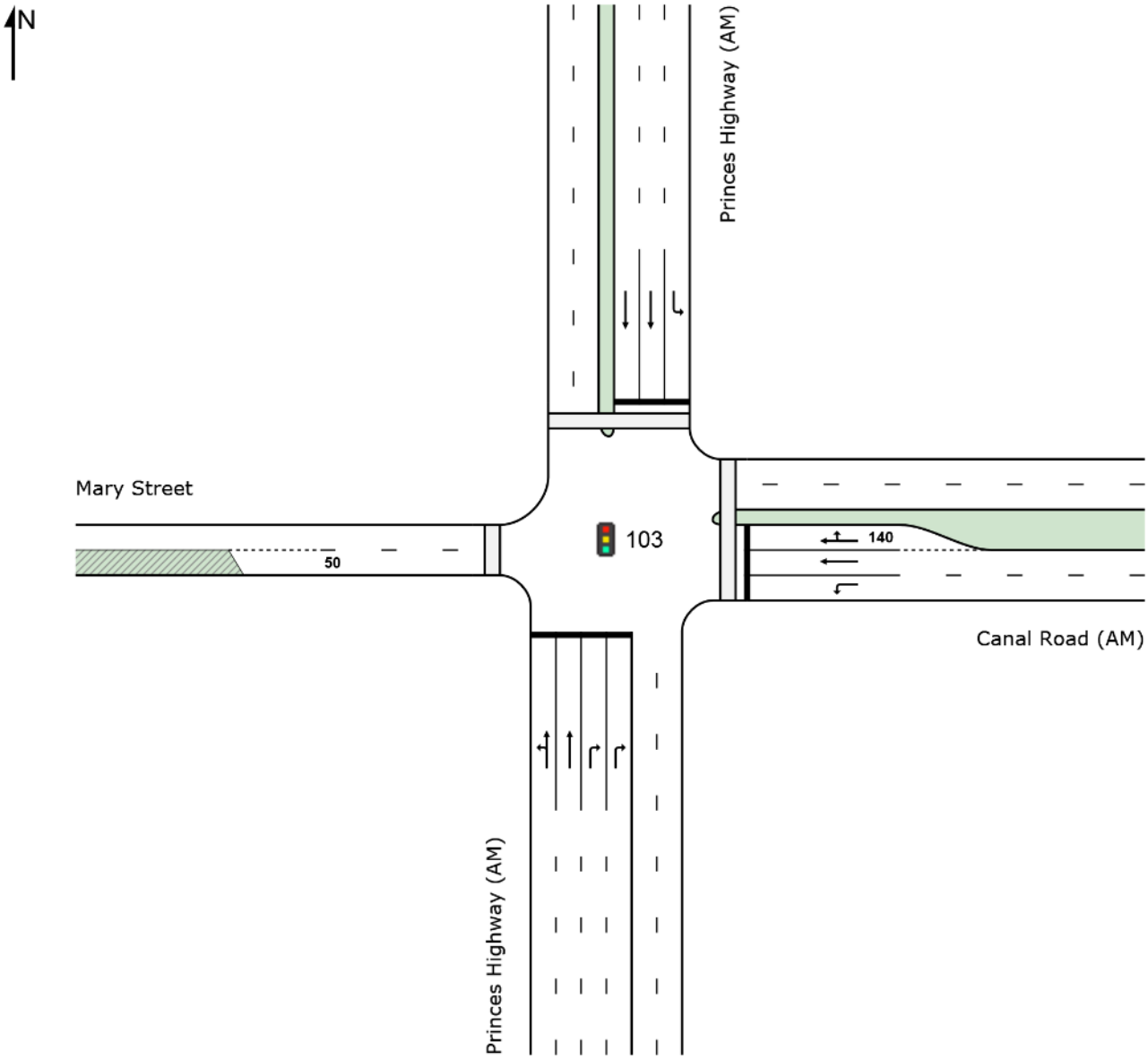
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	5	5.9	LOS A	0.0	0.0	0.28	0.28
All Pedestrians		5	5.9	LOS A			0.28	0.28

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

SITE LAYOUT

Site: 103 [Princes Highway/Canal Road 2017 AM Peak]

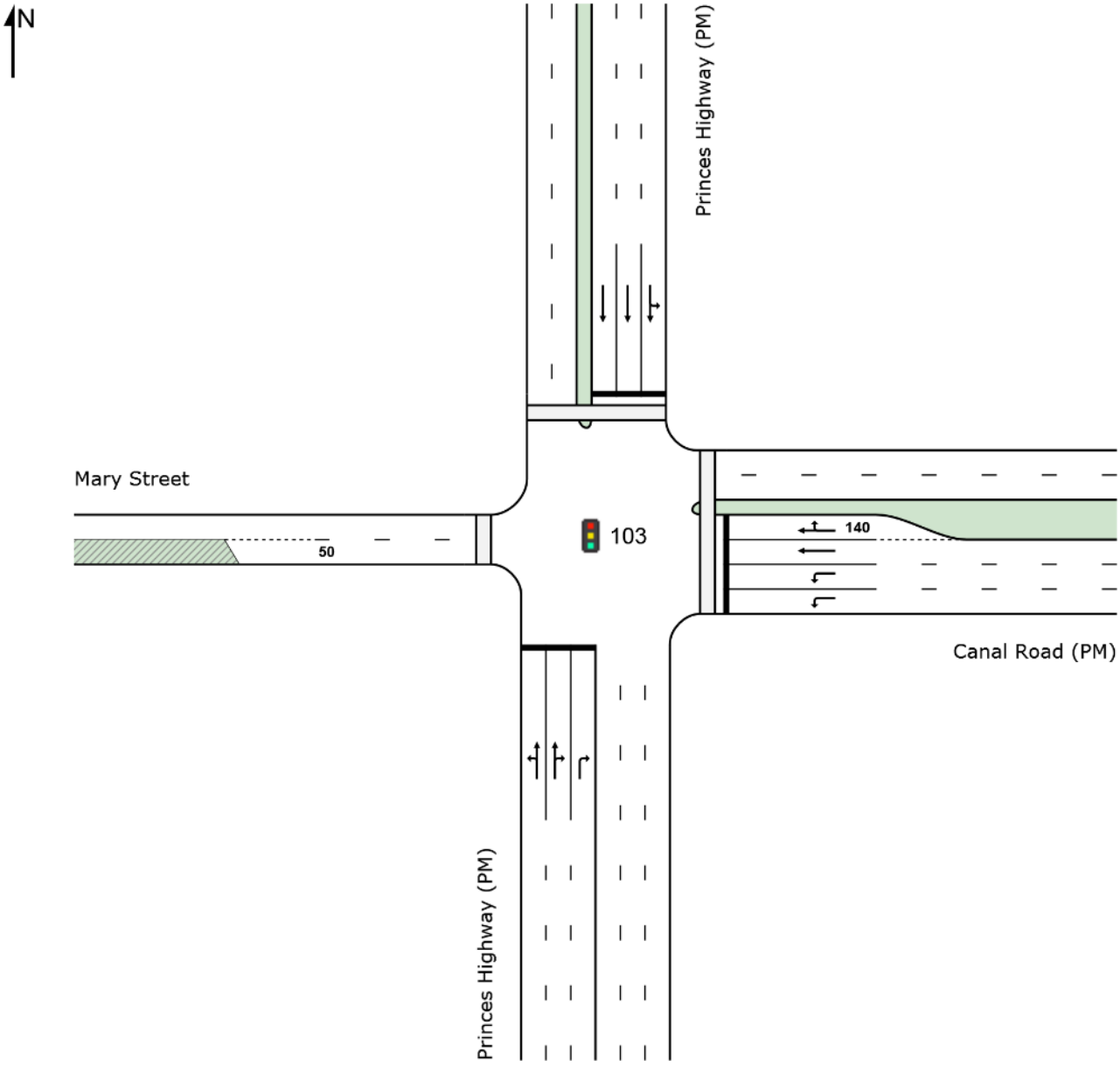
Existing Four Way Intersection with Tidal Flow
Site Category: (None)
Signals - Fixed Time Isolated



SITE LAYOUT

Site: 103 [Princes Highway/Canal Road 2017 PM Peak]

Existing Four Way Intersection with Tidal Flow
Site Category: (None)
Signals - Fixed Time Isolated



MOVEMENT SUMMARY

Site: 103 [Princes Highway/Canal Road 2017 AM Peak]

Existing Four Way Intersection with Tidal Flow
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 150 seconds (Site Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Princes Highway (AM)												
1	L2	91	0.0	0.545	14.8	LOS B	24.2	172.1	0.48	0.48	0.48	50.4
2	T1	1441	2.3	0.545	9.3	LOS A	24.3	173.2	0.48	0.46	0.48	51.9
3	R2	1879	2.6	0.931	54.9	LOS D	74.2	530.8	1.00	0.99	1.12	31.2
Approach		3411	2.4	0.931	34.5	LOS C	74.2	530.8	0.77	0.75	0.84	38.0
East: Canal Road (AM)												
4	L2	506	16.2	0.390	11.2	LOS A	11.4	91.0	0.34	0.69	0.34	49.1
5	T1	374	0.0	0.927	75.3	LOS F	28.1	199.8	0.97	0.97	1.18	26.8
6	R2	75	8.5	0.927	89.6	LOS F	28.1	199.8	1.00	1.08	1.31	24.8
Approach		955	9.3	0.927	42.4	LOS C	28.1	199.8	0.64	0.83	0.75	34.9
North: Princes Highway (AM)												
7	L2	163	5.2	0.651	72.7	LOS F	11.5	84.4	1.00	0.82	1.01	27.0
8	T1	484	7.2	0.928	88.3	LOS F	20.7	154.2	1.00	1.07	1.37	24.6
Approach		647	6.7	0.928	84.3	LOS F	20.7	154.2	1.00	1.01	1.27	25.1
All Vehicles		5013	4.3	0.931	42.5	LOS C	74.2	530.8	0.77	0.80	0.88	35.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P2	East Full Crossing	15	69.2	LOS F	0.1	0.1	0.96	0.96
P3	North Full Crossing	21	62.6	LOS F	0.1	0.1	0.91	0.91
P4	West Full Crossing	6	59.9	LOS E	0.0	0.0	0.89	0.89
All Pedestrians		42	64.5	LOS F			0.93	0.93

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 103 [Princes Highway/Canal Road AM Peak Future]

Existing Four Way Intersection with Tidal Flow
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 150 seconds (Site Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Princes Highway (AM)												
1	L2	91	0.0	0.550	15.3	LOS B	24.8	176.4	0.49	0.49	0.49	50.1
2	T1	1441	2.3	0.550	9.8	LOS A	24.9	177.5	0.49	0.47	0.49	51.5
3	R2	1886	3.0	0.949	62.9	LOS E	79.7	572.2	1.00	1.01	1.17	29.2
Approach		3418	2.6	0.949	39.2	LOS C	79.7	572.2	0.77	0.77	0.87	36.2
East: Canal Road (AM)												
4	L2	514	17.4	0.399	11.3	LOS A	11.7	94.1	0.35	0.69	0.35	49.0
5	T1	374	0.0	0.921	73.6	LOS F	28.2	204.0	0.97	0.95	1.17	27.1
6	R2	82	16.7	0.921	87.9	LOS F	28.2	204.0	1.00	1.06	1.29	25.0
Approach		969	10.6	0.921	41.8	LOS C	28.2	204.0	0.64	0.82	0.74	35.2
North: Princes Highway (AM)												
7	L2	171	9.3	0.699	74.2	LOS F	12.3	92.9	1.00	0.84	1.04	26.6
8	T1	484	7.2	0.928	88.3	LOS F	20.7	154.2	1.00	1.07	1.37	24.6
Approach		655	7.7	0.928	84.6	LOS F	20.7	154.2	1.00	1.01	1.28	25.1
All Vehicles		5042	4.8	0.949	45.6	LOS D	79.7	572.2	0.78	0.81	0.90	34.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P2	East Full Crossing	15	69.2	LOS F	0.1	0.1	0.96	0.96
P3	North Full Crossing	21	61.7	LOS F	0.1	0.1	0.91	0.91
P4	West Full Crossing	6	59.9	LOS E	0.0	0.0	0.89	0.89
All Pedestrians		42	64.0	LOS F			0.92	0.92

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 103 [Princes Highway/Canal Road 2017 PM Peak]

Existing Four Way Intersection with Tidal Flow
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 150 seconds (Site Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Princes Highway (PM)												
1	L2	109	0.0	0.775	19.5	LOS B	48.5	343.5	0.69	0.67	0.69	47.4
2	T1	964	1.4	0.775	14.0	LOS A	48.5	343.5	0.69	0.67	0.69	48.5
3	R2	974	3.4	0.915	77.5	LOS F	40.3	290.5	1.00	0.98	1.21	26.3
Approach		2047	2.3	0.915	44.5	LOS D	48.5	343.5	0.84	0.82	0.94	34.6
East: Canal Road (PM)												
4	L2	1183	4.1	0.615	31.3	LOS C	29.5	213.8	0.75	0.82	0.75	38.9
5	T1	379	0.0	0.916	71.7	LOS F	29.5	206.3	0.97	0.94	1.15	27.4
6	R2	100	0.0	0.916	85.6	LOS F	29.5	206.3	1.00	1.05	1.27	25.5
Approach		1662	2.9	0.916	43.8	LOS D	29.5	213.8	0.81	0.86	0.87	34.5
North: Princes Highway (PM)												
7	L2	197	1.1	0.907	64.8	LOS E	52.5	371.3	1.00	1.00	1.14	29.7
8	T1	1828	1.3	0.907	59.1	LOS E	53.1	375.8	1.00	1.01	1.13	30.5
Approach		2025	1.2	0.907	59.6	LOS E	53.1	375.8	1.00	1.01	1.13	30.4
All Vehicles		5735	2.1	0.916	49.6	LOS D	53.1	375.8	0.89	0.90	0.99	33.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P2	East Full Crossing	22	39.6	LOS D	0.1	0.1	0.73	0.73
P3	North Full Crossing	20	60.8	LOS F	0.1	0.1	0.90	0.90
P4	West Full Crossing	5	31.4	LOS D	0.0	0.0	0.65	0.65
All Pedestrians		47	47.7	LOS E			0.79	0.79

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 103 [Princes Highway/Canal Road PM Peak Future]

Existing Four Way Intersection with Tidal Flow
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 150 seconds (Site Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Princes Highway (PM)												
1	L2	109	0.0	0.782	20.2	LOS B	49.7	351.8	0.71	0.69	0.71	47.0
2	T1	964	1.4	0.782	14.6	LOS B	49.7	351.8	0.71	0.69	0.71	48.1
3	R2	981	4.1	0.927	80.9	LOS F	41.7	302.0	1.00	1.00	1.24	25.7
Approach		2055	2.6	0.927	46.6	LOS D	49.7	351.8	0.85	0.83	0.96	33.9
East: Canal Road (PM)												
4	L2	1191	4.7	0.613	30.7	LOS C	29.4	214.1	0.74	0.82	0.74	39.1
5	T1	379	0.0	0.911	70.2	LOS E	29.6	210.6	0.96	0.93	1.13	27.8
6	R2	107	6.9	0.911	84.1	LOS F	29.6	210.6	1.00	1.04	1.26	25.7
Approach		1677	3.8	0.911	43.0	LOS D	29.6	214.1	0.81	0.86	0.86	34.7
North: Princes Highway (PM)												
7	L2	204	4.6	0.929	72.0	LOS F	55.5	396.4	1.00	1.03	1.19	28.0
8	T1	1828	1.3	0.929	66.0	LOS E	56.6	400.4	1.00	1.05	1.18	28.8
Approach		2033	1.6	0.929	66.6	LOS E	56.6	400.4	1.00	1.04	1.18	28.7
All Vehicles		5764	2.6	0.929	52.6	LOS D	56.6	400.4	0.89	0.92	1.01	32.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P2	East Full Crossing	22	40.4	LOS E	0.1	0.1	0.73	0.73
P3	North Full Crossing	20	59.9	LOS E	0.1	0.1	0.89	0.89
P4	West Full Crossing	5	32.0	LOS D	0.0	0.0	0.65	0.65
All Pedestrians		47	47.7	LOS E			0.79	0.79

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

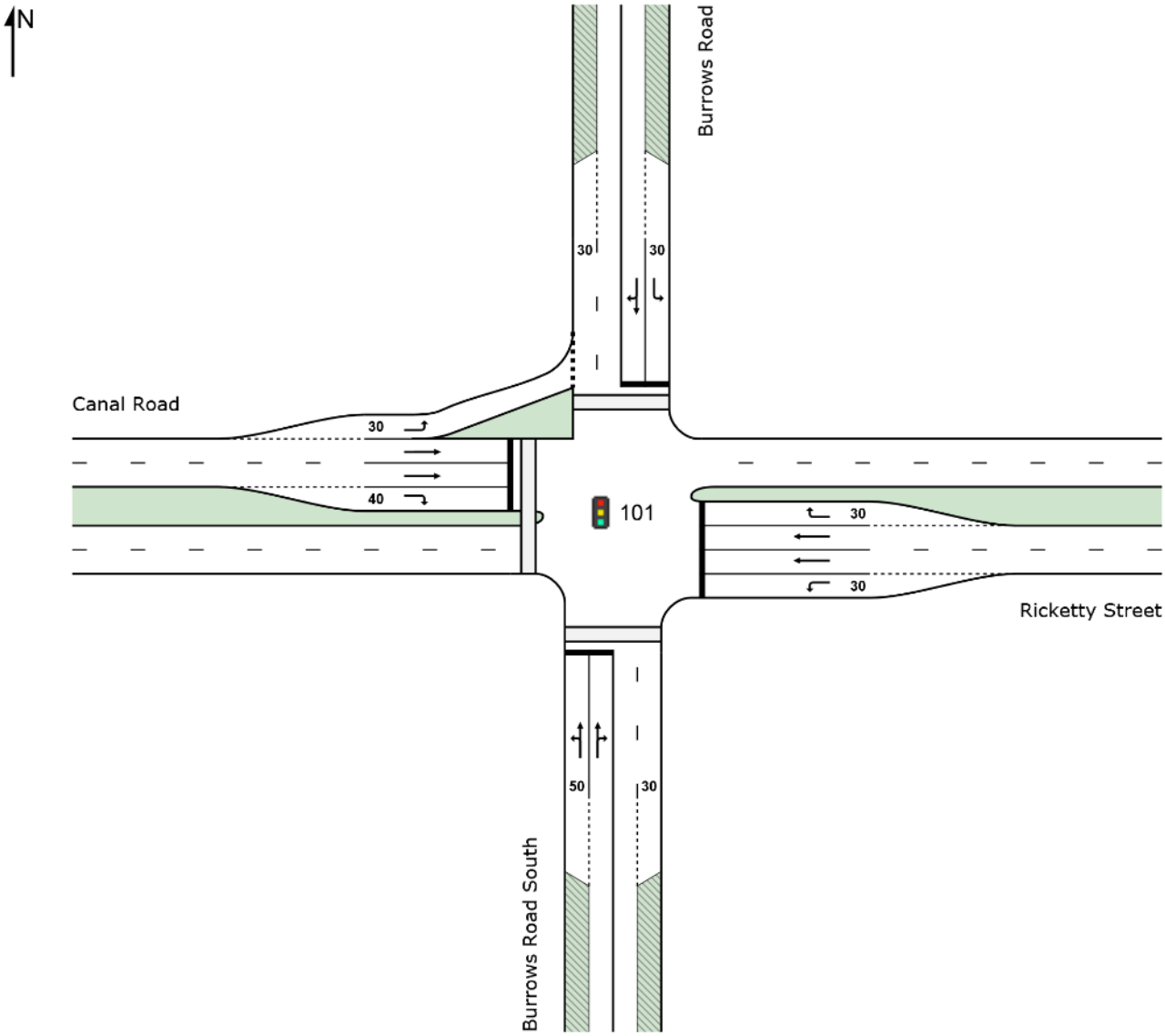
Attachment C

Additional SIDRA intersection analysis results no right turn arrow northbound

SITE LAYOUT

Site: 101 [Canal Road/Burrows Road/Ricketty Street AM Peak 2017]

Four way traffic signal controlled intersection
Site Category: (None)
Signals - Fixed Time Isolated



Organisation: EMM CONSULTING | Created: Tuesday, 28 August 2018 2:29:12 PM
Project: P:\SIDRA RESULTS\Boral St Peters MOD 11\Burrows Road Canal Road 2017 No Right Turn Arrow NB.sip8

MOVEMENT SUMMARY

Site: 101 [Canal Road/Burrows Road/Ricketty Street AM Peak 2017]

Four way traffic signal controlled intersection
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 125 seconds (Site Optimum Cycle Time - Minimum Delay)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Burrows Road South												
1	L2	35	51.5	0.400	71.3	LOS F	2.2	22.1	1.00	0.74	1.00	26.9
2	T1	34	56.3	0.798	71.7	LOS F	4.6	48.1	1.00	0.92	1.34	27.1
3	R2	34	59.4	0.798	77.9	LOS F	4.6	48.1	1.00	0.92	1.34	26.3
Approach		102	55.7	0.798	73.6	LOS F	4.6	48.1	1.00	0.86	1.22	26.8
East: Ricketty Street												
4	L2	40	28.9	0.043	16.2	LOS B	1.0	8.4	0.42	0.66	0.42	45.6
5	T1	895	4.6	0.444	13.3	LOS A	15.3	111.0	0.55	0.49	0.55	49.3
6	R2	105	11.0	0.849	77.2	LOS F	7.2	54.8	1.00	0.93	1.36	26.1
Approach		1040	6.2	0.849	19.9	LOS B	15.3	111.0	0.59	0.54	0.63	45.1
North: Burrows Road												
7	L2	114	3.7	0.357	55.0	LOS D	6.2	44.6	0.92	0.78	0.92	31.0
8	T1	29	39.3	0.818	70.6	LOS F	6.0	57.1	1.00	0.94	1.34	27.1
9	R2	59	42.9	0.818	76.7	LOS F	6.0	57.1	1.00	0.94	1.34	26.5
Approach		202	20.3	0.818	63.6	LOS E	6.2	57.1	0.96	0.85	1.11	29.0
West: Canal Road												
10	L2	174	13.3	0.123	7.2	LOS A	1.6	12.2	0.21	0.60	0.21	52.6
11	T1	1777	2.8	0.855	22.6	LOS B	45.8	328.2	0.80	0.77	0.83	43.8
12	R2	57	9.3	0.453	68.9	LOS E	3.5	26.5	1.00	0.75	1.00	27.7
Approach		2007	3.9	0.855	22.5	LOS B	45.8	328.2	0.75	0.75	0.78	43.7
All Vehicles		3352	7.2	0.855	25.7	LOS B	45.8	328.2	0.72	0.70	0.77	42.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	11	13.9	LOS B	0.0	0.0	0.47	0.47
P3	North Full Crossing	11	13.9	LOS B	0.0	0.0	0.47	0.47
P4	West Full Crossing	21	56.7	LOS E	0.1	0.1	0.95	0.95
All Pedestrians		42	35.3	LOS D			0.71	0.71

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

PHASING SUMMARY

Site: 101 [Canal Road/Burrows Road/Ricketty Street AM Peak 2017]

Four way traffic signal controlled intersection
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 125 seconds (Site Optimum Cycle Time - Minimum Delay)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

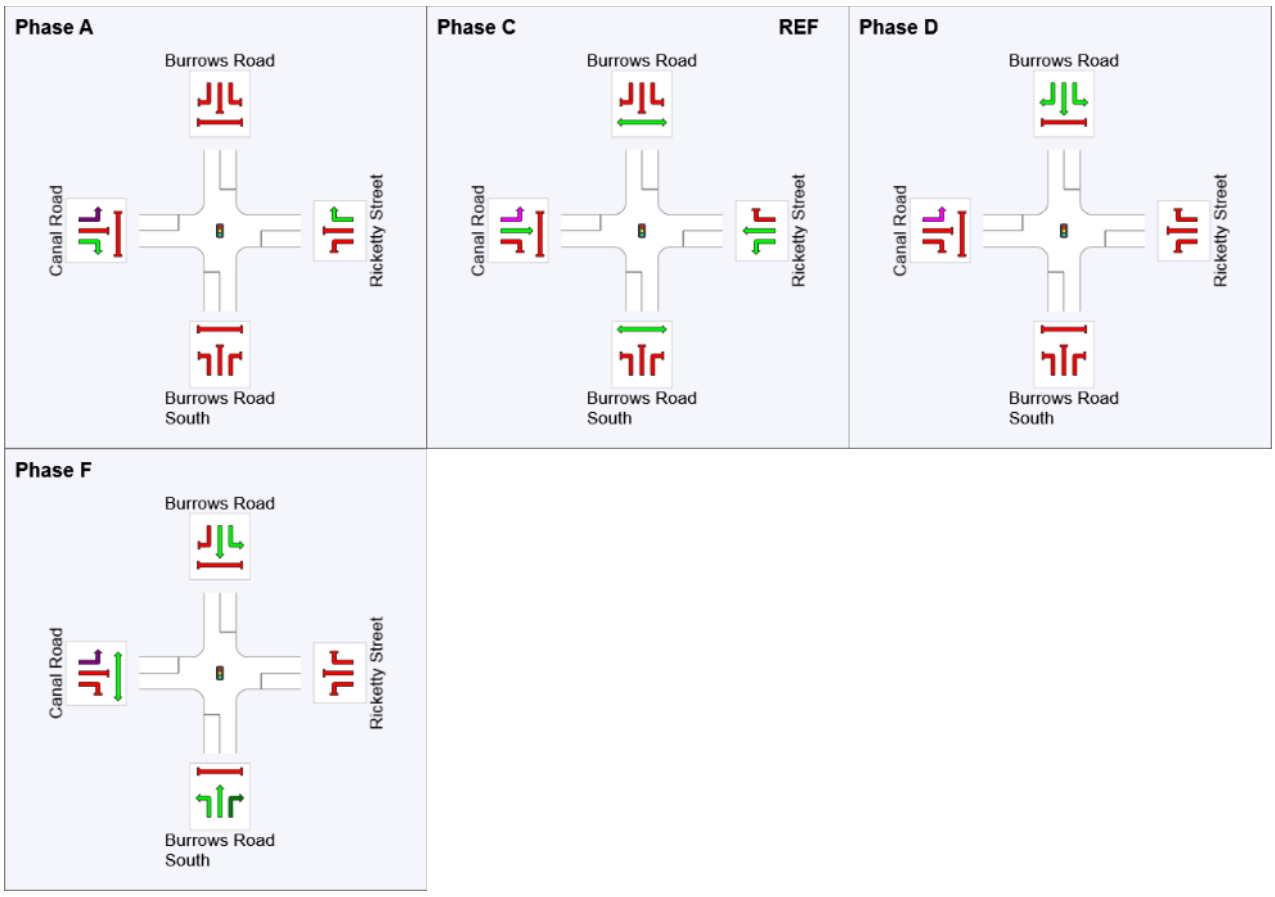
Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Green Split Priority has been specified
Phase Sequence: Variable Phasing
Reference Phase: Phase C
Input Phase Sequence: A, B1*, B2*, C, D, F
Output Phase Sequence: A, C, D, F
(* Variable Phase)

Phase Timing Summary

Phase	A	C	D	F
Phase Change Time (sec)	110	0	82	96
Green Time (sec)	9	76	8	8
Phase Time (sec)	15	82	14	14
Phase Split	12 %	66 %	11 %	11 %

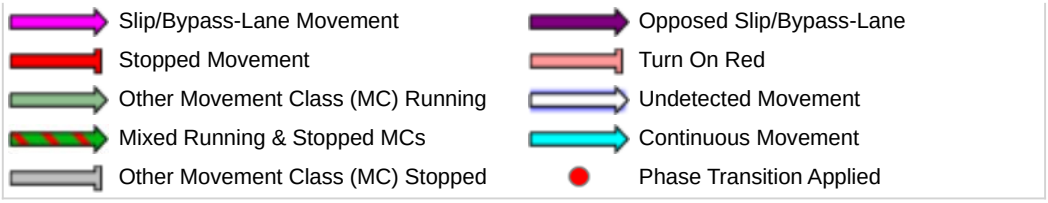
See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase

Normal Movement Permitted/Opposed



MOVEMENT SUMMARY

Site: 101 [Canal Road/Burrows Road/Ricketty Street PM Peak 2017]

Four way traffic signal controlled intersection
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 150 seconds (Site Practical Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Burrows Road South												
1	L2	56	22.6	0.238	67.6	LOS E	3.7	30.6	0.92	0.76	0.92	27.9
2	T1	23	22.7	0.553	77.4	LOS F	4.2	36.5	1.00	0.77	1.01	25.9
3	R2	33	32.3	0.553	83.4	LOS F	4.2	36.5	1.00	0.77	1.01	25.4
Approach		112	25.5	0.553	74.2	LOS F	4.2	36.5	0.96	0.76	0.97	26.7
East: Ricketty Street												
4	L2	34	25.0	0.040	22.8	LOS B	1.1	9.6	0.49	0.67	0.49	42.3
5	T1	1707	4.4	0.892	38.2	LOS C	59.3	430.9	0.91	0.89	0.97	36.9
6	R2	91	2.3	0.619	80.7	LOS F	6.7	47.8	1.00	0.79	1.03	25.5
Approach		1832	4.7	0.892	40.0	LOS C	59.3	430.9	0.91	0.88	0.97	36.2
North: Burrows Road												
7	L2	178	4.7	0.300	35.2	LOS C	8.2	59.9	0.68	0.75	0.68	37.3
8	T1	25	58.3	0.888	76.5	LOS F	15.4	126.6	0.96	0.98	1.29	25.7
9	R2	169	14.9	0.888	82.3	LOS F	15.4	126.6	0.96	0.98	1.29	25.4
Approach		373	13.0	0.888	59.4	LOS E	15.4	126.6	0.83	0.87	1.00	30.0
West: Canal Road												
10	L2	84	17.5	0.059	6.8	LOS A	0.7	5.3	0.15	0.58	0.15	52.8
11	T1	1001	5.0	0.593	26.9	LOS B	25.1	183.2	0.73	0.65	0.73	41.6
12	R2	51	20.8	0.781	92.1	LOS F	4.1	33.7	1.00	0.86	1.29	23.5
Approach		1136	6.7	0.781	28.3	LOS B	25.1	183.2	0.70	0.66	0.72	40.9
All Vehicles		3452	6.9	0.892	39.4	LOS C	59.3	430.9	0.83	0.80	0.89	36.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	11	20.8	LOS C	0.0	0.0	0.53	0.53
P3	North Full Crossing	11	24.1	LOS C	0.0	0.0	0.57	0.57
P4	West Full Crossing	21	69.2	LOS F	0.1	0.1	0.96	0.96
All Pedestrians		42	45.8	LOS E			0.75	0.75

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

PHASING SUMMARY

Site: 101 [Canal Road/Burrows Road/Ricketty Street PM Peak 2017]

Four way traffic signal controlled intersection
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 150 seconds (Site Practical Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Green Split Priority has been specified
Phase Sequence: Variable Phasing
Reference Phase: Phase C
Input Phase Sequence: A, B1*, B2*, C, D, F
Output Phase Sequence: A, B2*, C, D, F
(* Variable Phase)

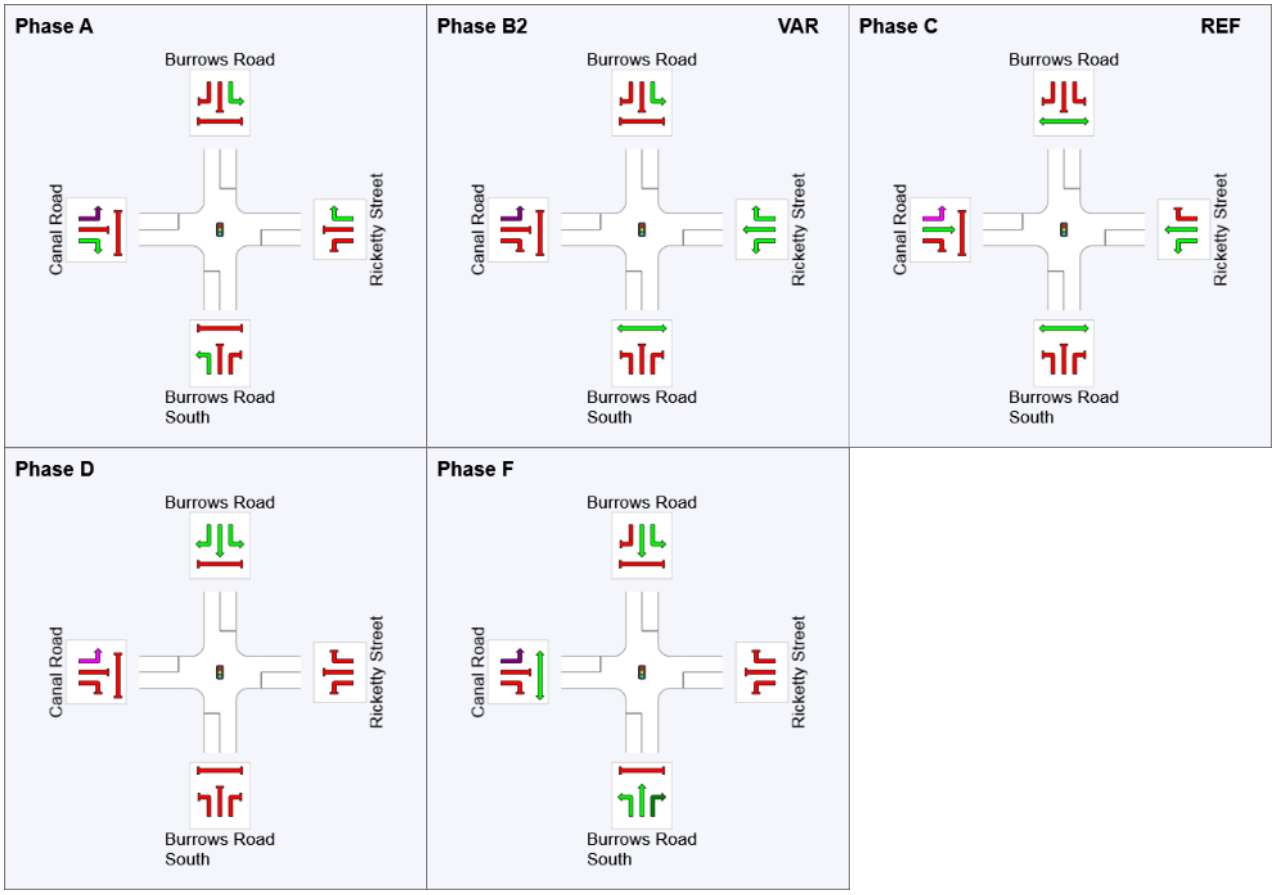
Phase Timing Summary

Phase	A	B2	C	D	F
Phase Change Time (sec)	132	144	0	81	116
Green Time (sec)	6	***	75	29	10
Phase Time (sec)	12	6	81	35	16
Phase Split	8 %	4 %	54 %	23 %	11 %

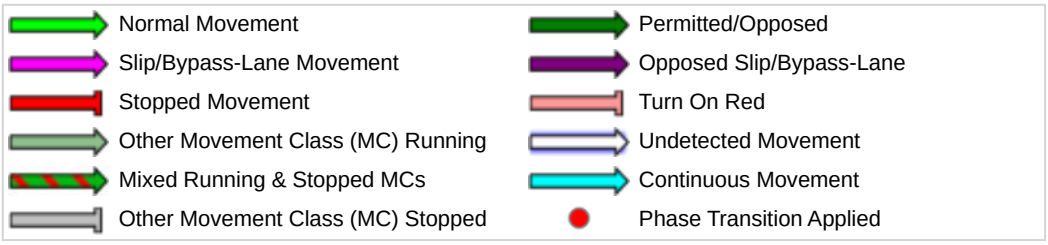
See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

*** No green time has been calculated for this phase because the next phase starts during its intergreen time. This occurs with overlap phasing where there is no single movement connecting this phase to the next, or where the only such movement is a dummy movement with zero minimum green time specified.
If a green time is required for this phase, specify a dummy movement with a non-zero minimum green time.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



MOVEMENT SUMMARY

Site: 101 [Canal Road/Burrows Road/Ricketty Street AM Peak Future]

Four way traffic signal controlled intersection
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 110 seconds (Site Optimum Cycle Time - Minimum Delay)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Burrows Road South												
1	L2	49	66.0	0.262	50.3	LOS D	2.7	29.2	0.91	0.75	0.91	31.8
2	T1	42	65.0	0.961	77.5	LOS F	5.8	64.5	0.99	1.08	1.71	25.9
3	R2	46	70.5	0.961	89.2	LOS F	5.8	64.5	1.00	1.13	1.84	24.3
Approach		138	67.2	0.961	71.7	LOS F	5.8	64.5	0.96	0.98	1.47	27.1
East: Ricketty Street												
4	L2	53	46.0	0.067	17.6	LOS B	1.3	12.3	0.48	0.67	0.48	44.5
5	T1	895	4.6	0.483	14.6	LOS B	14.7	107.2	0.61	0.54	0.61	48.4
6	R2	105	11.0	0.961	85.5	LOS F	7.2	55.4	1.00	1.09	1.77	24.6
Approach		1053	7.3	0.961	21.8	LOS B	14.7	107.2	0.65	0.60	0.72	44.0
North: Burrows Road												
7	L2	114	3.7	0.209	36.5	LOS C	4.5	32.9	0.79	0.76	0.79	36.8
8	T1	38	52.8	0.864	65.8	LOS E	6.0	59.1	1.00	1.00	1.47	28.1
9	R2	59	42.9	0.864	71.9	LOS F	6.0	59.1	1.00	1.00	1.47	27.4
Approach		211	23.5	0.864	51.7	LOS D	6.0	59.1	0.88	0.87	1.10	32.0
West: Canal Road												
10	L2	174	13.3	0.134	8.5	LOS A	2.1	16.6	0.28	0.62	0.28	51.6
11	T1	1777	2.8	0.888	28.7	LOS C	46.6	333.8	0.83	0.86	0.95	40.8
12	R2	72	27.9	0.508	60.3	LOS E	3.9	33.7	0.99	0.77	0.99	29.4
Approach		2022	4.6	0.888	28.0	LOS B	46.6	333.8	0.79	0.83	0.89	41.0
All Vehicles		3423	9.1	0.961	29.3	LOS C	46.6	333.8	0.76	0.77	0.88	40.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	11	15.3	LOS B	0.0	0.0	0.53	0.53
P3	North Full Crossing	11	13.8	LOS B	0.0	0.0	0.50	0.50
P4	West Full Crossing	21	49.2	LOS E	0.1	0.1	0.95	0.95
All Pedestrians		42	31.9	LOS D			0.73	0.73

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

PHASING SUMMARY

Site: 101 [Canal Road/Burrows Road/Ricketty Street AM Peak Future]

Four way traffic signal controlled intersection
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 110 seconds (Site Optimum Cycle Time - Minimum Delay)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Green Split Priority has been specified
Phase Sequence: Variable Phasing
Reference Phase: Phase C
Input Phase Sequence: A, B1*, B2*, C, D, F
Output Phase Sequence: A, B1*, C, D, F
(* Variable Phase)

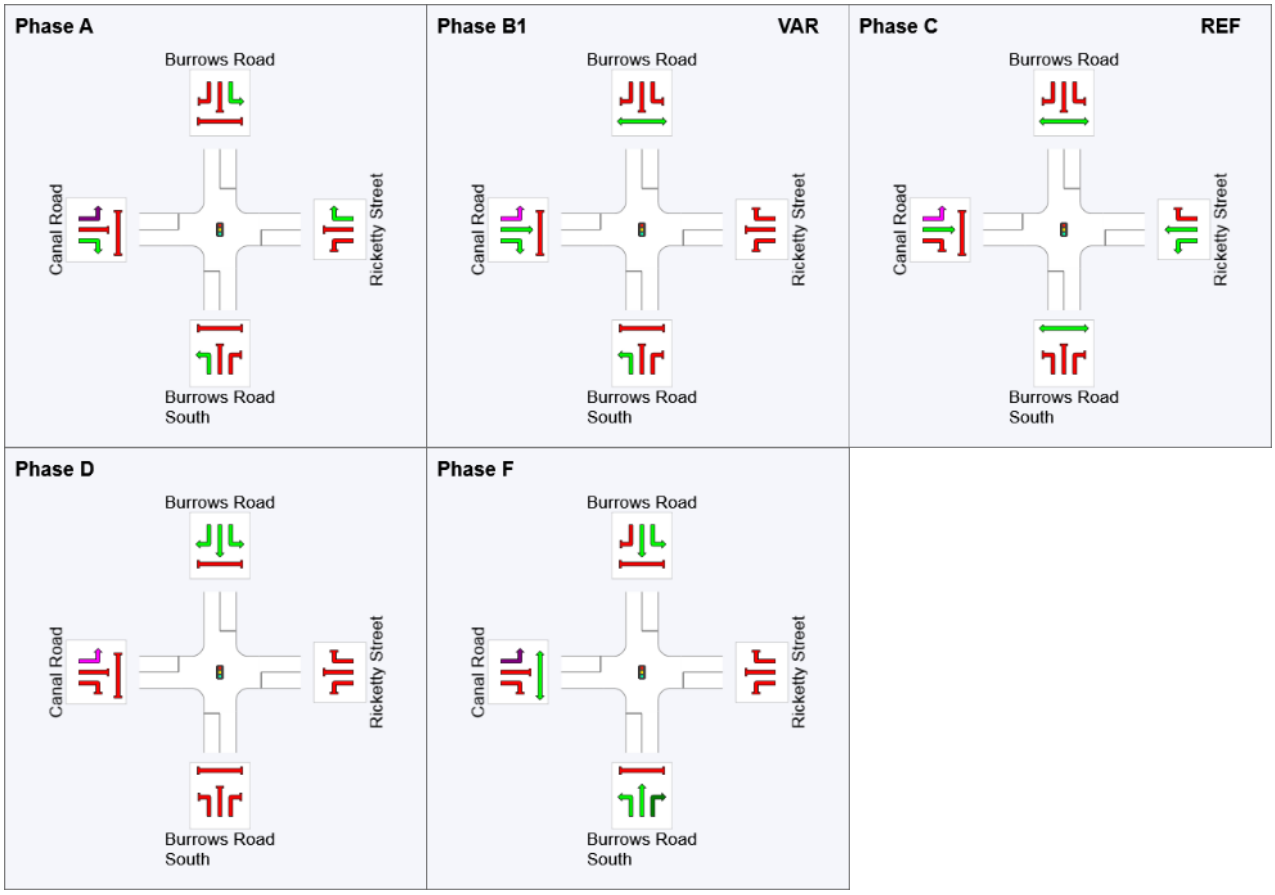
Phase Timing Summary

Phase	A	B1	C	D	F
Phase Change Time (sec)	94	107	0	68	81
Green Time (sec)	7	***	62	7	7
Phase Time (sec)	13	3	68	13	13
Phase Split	12 %	3 %	62 %	12 %	12 %

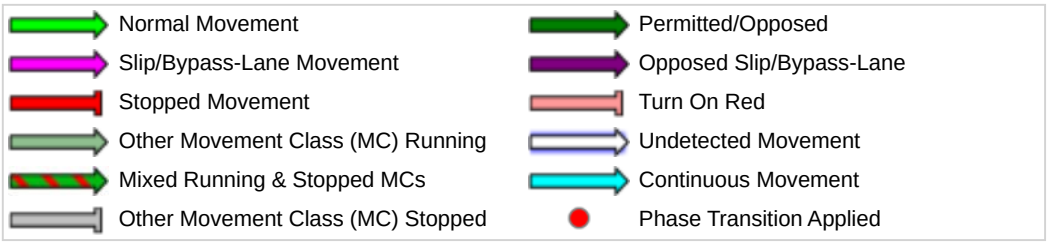
See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

*** No green time has been calculated for this phase because the next phase starts during its intergreen time. This occurs with overlap phasing where there is no single movement connecting this phase to the next, or where the only such movement is a dummy movement with zero minimum green time specified.
If a green time is required for this phase, specify a dummy movement with a non-zero minimum green time.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



MOVEMENT SUMMARY

Site: 101 [Canal Road/Burrows Road/Ricketty Street PM Peak Future]

Four way traffic signal controlled intersection
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 150 seconds (Site Practical Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Burrows Road South												
1	L2	71	38.8	0.303	66.9	LOS E	4.6	43.2	0.93	0.77	0.93	27.9
2	T1	32	43.3	0.825	85.0	LOS F	6.2	61.4	1.00	0.93	1.32	24.6
3	R2	45	51.2	0.825	91.1	LOS F	6.2	61.4	1.00	0.93	1.32	24.0
Approach		147	43.6	0.825	78.2	LOS F	6.2	61.4	0.96	0.85	1.13	25.9
East: Ricketty Street												
4	L2	46	45.5	0.063	24.3	LOS B	1.6	15.8	0.51	0.68	0.51	41.1
5	T1	1707	4.4	0.925	48.6	LOS D	65.1	472.9	0.94	0.97	1.07	33.4
6	R2	91	2.3	0.929	100.1	LOS F	7.7	55.3	1.00	0.99	1.53	22.4
Approach		1844	5.4	0.929	50.6	LOS D	65.1	472.9	0.93	0.96	1.07	32.7
North: Burrows Road												
7	L2	178	4.7	0.334	38.0	LOS C	8.6	62.8	0.71	0.76	0.71	36.2
8	T1	34	68.8	0.937	89.3	LOS F	17.5	147.4	0.97	1.05	1.42	23.6
9	R2	169	14.9	0.937	95.0	LOS F	17.5	147.4	0.97	1.05	1.42	23.3
Approach		381	14.9	0.937	67.9	LOS E	17.5	147.4	0.85	0.92	1.09	28.0
West: Canal Road												
10	L2	84	17.5	0.059	6.9	LOS A	0.7	5.7	0.16	0.58	0.16	52.7
11	T1	1001	5.0	0.574	24.1	LOS B	23.2	169.7	0.69	0.62	0.69	43.0
12	R2	65	38.7	0.841	93.4	LOS F	5.3	49.9	1.00	0.92	1.38	23.2
Approach		1151	7.9	0.841	26.8	LOS B	23.2	169.7	0.67	0.63	0.69	41.6
All Vehicles		3523	8.8	0.937	45.8	LOS D	65.1	472.9	0.84	0.84	0.95	34.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	11	21.9	LOS C	0.0	0.0	0.54	0.54
P3	North Full Crossing	11	21.9	LOS C	0.0	0.0	0.54	0.54
P4	West Full Crossing	21	69.2	LOS F	0.1	0.1	0.96	0.96
All Pedestrians		42	45.5	LOS E			0.75	0.75

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

PHASING SUMMARY

Site: 101 [Canal Road/Burrows Road/Ricketty Street PM Peak Future]

Four way traffic signal controlled intersection
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 150 seconds (Site Practical Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

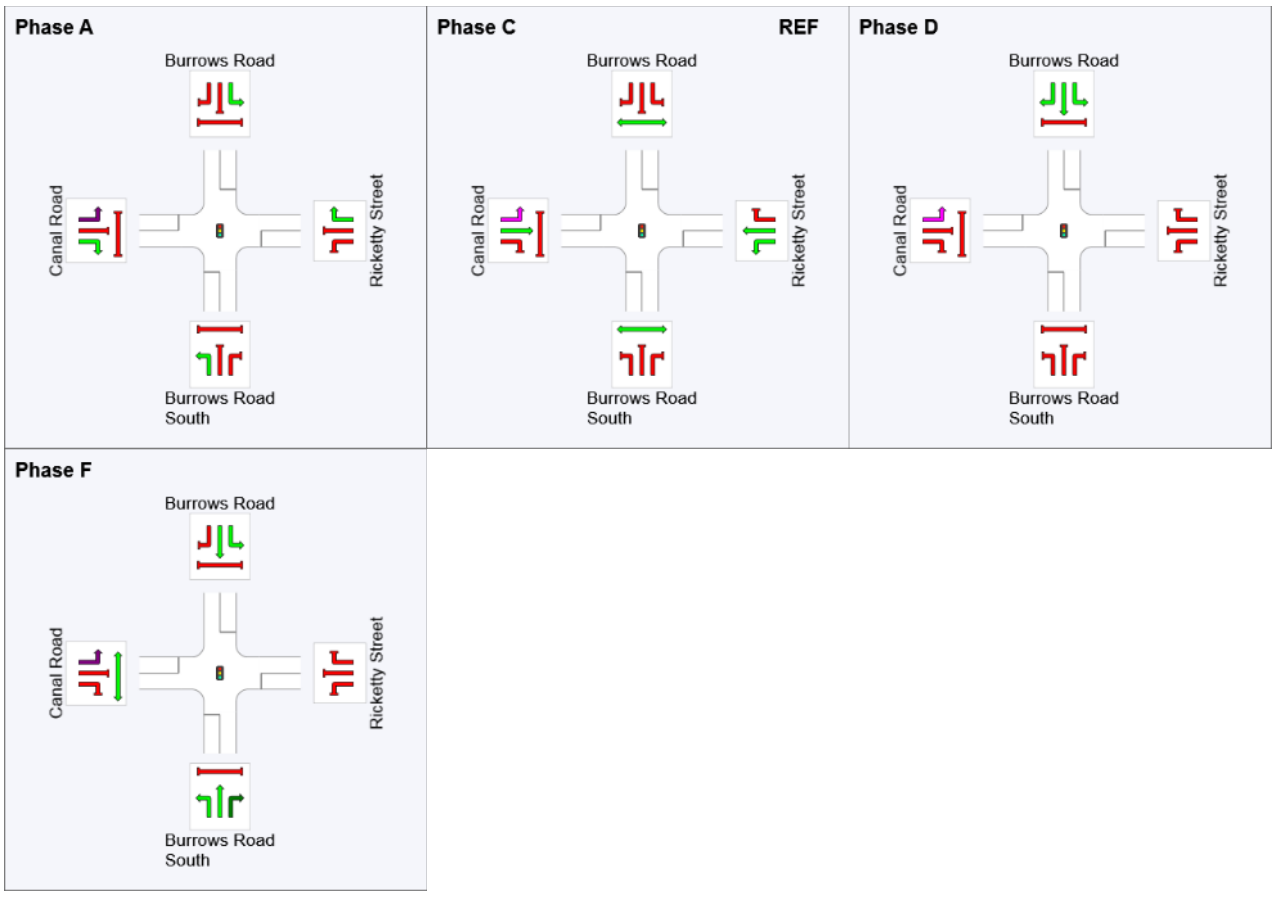
Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Green Split Priority has been specified
Phase Sequence: Variable Phasing
Reference Phase: Phase C
Input Phase Sequence: A, B1*, B2*, C, D, F
Output Phase Sequence: A, C, D, F
(* Variable Phase)

Phase Timing Summary

Phase	A	C	D	F
Phase Change Time (sec)	136	0	85	120
Green Time (sec)	8	79	29	10
Phase Time (sec)	14	85	35	16
Phase Split	9 %	57 %	23 %	11 %

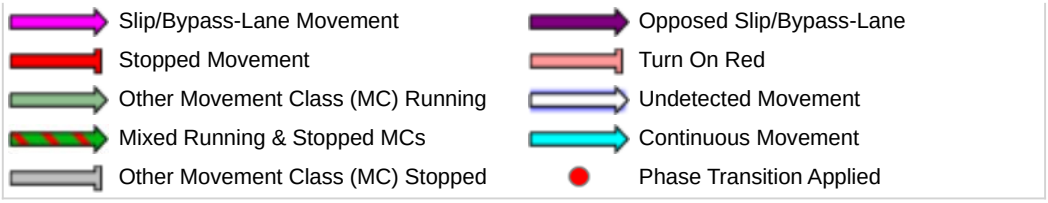
See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase

Normal Movement Permitted/Opposed



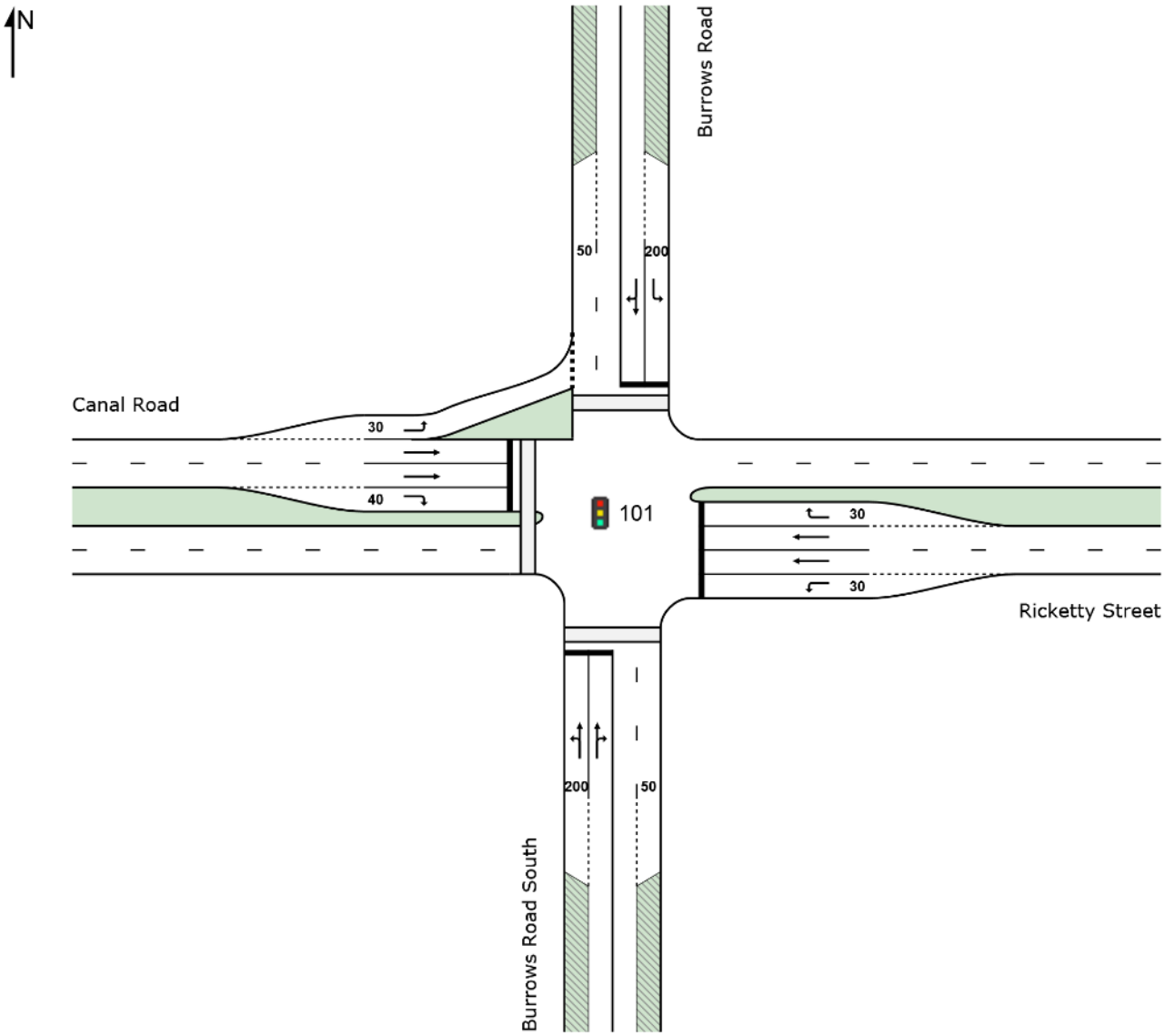
Attachment D

SIDRA intersection analysis results – all results no right turn arrow northbound with restricted parking

SITE LAYOUT

Site: 101 [Canal Road/Burrows Road/Ricketty Street with Parking Restrictions AM Peak 2017]

Four way traffic signal controlled intersection
Site Category: (None)
Signals - Fixed Time Isolated



Organisation: EMM CONSULTING | Created: Thursday, 30 August 2018 12:08:57 PM
Project: P:\SIDRA RESULTS\Boral St Peters MOD 11\Burrows Road Canal Road 2017 No Right Turn Arrow with Parking Restrictions.sip8

MOVEMENT SUMMARY

Site: 101 [Canal Road/Burrows Road/Ricketty Street with Parking Restrictions AM Peak 2017]

Four way traffic signal controlled intersection
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 135 seconds (Site Optimum Cycle Time - Minimum Delay)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Burrows Road South												
1	L2	35	51.5	0.384	75.6	LOS F	2.3	23.6	0.99	0.74	0.99	26.0
2	T1	34	56.3	0.778	75.7	LOS F	4.9	51.2	1.00	0.90	1.28	26.3
3	R2	34	59.4	0.778	81.9	LOS F	4.9	51.2	1.00	0.90	1.28	25.6
Approach		102	55.7	0.778	77.7	LOS F	4.9	51.2	1.00	0.84	1.19	26.0
East: Ricketty Street												
4	L2	40	28.9	0.042	16.6	LOS B	1.0	8.9	0.41	0.66	0.41	45.4
5	T1	895	4.6	0.440	13.8	LOS A	16.2	117.5	0.54	0.48	0.54	48.9
6	R2	105	11.0	0.825	80.6	LOS F	7.6	58.0	1.00	0.90	1.29	25.4
Approach		1040	6.2	0.825	20.7	LOS B	16.2	117.5	0.59	0.53	0.62	44.6
North: Burrows Road												
7	L2	114	3.7	0.353	58.5	LOS E	6.6	47.9	0.92	0.78	0.92	30.1
8	T1	29	39.3	0.797	74.3	LOS F	6.4	60.6	1.00	0.92	1.28	26.4
9	R2	59	42.9	0.797	80.4	LOS F	6.4	60.6	1.00	0.92	1.28	25.8
Approach		202	20.3	0.797	67.2	LOS E	6.6	60.6	0.96	0.84	1.08	28.2
West: Canal Road												
10	L2	174	13.3	0.123	7.2	LOS A	1.7	12.9	0.20	0.60	0.20	52.6
11	T1	1777	2.8	0.847	21.1	LOS B	46.5	333.4	0.79	0.74	0.80	44.6
12	R2	57	9.3	0.440	73.2	LOS F	3.8	28.4	1.00	0.76	1.00	26.8
Approach		2007	3.9	0.847	21.4	LOS B	46.5	333.4	0.74	0.73	0.75	44.3
All Vehicles		3352	7.2	0.847	25.7	LOS B	46.5	333.4	0.71	0.68	0.74	42.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	11	14.2	LOS B	0.0	0.0	0.46	0.46
P3	North Full Crossing	11	14.2	LOS B	0.0	0.0	0.46	0.46
P4	West Full Crossing	21	61.7	LOS F	0.1	0.1	0.96	0.96
All Pedestrians		42	38.0	LOS D			0.71	0.71

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

PHASING SUMMARY

Site: 101 [Canal Road/Burrows Road/Ricketty Street with Parking Restrictions AM Peak 2017]

Four way traffic signal controlled intersection
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 135 seconds (Site Optimum Cycle Time - Minimum Delay)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

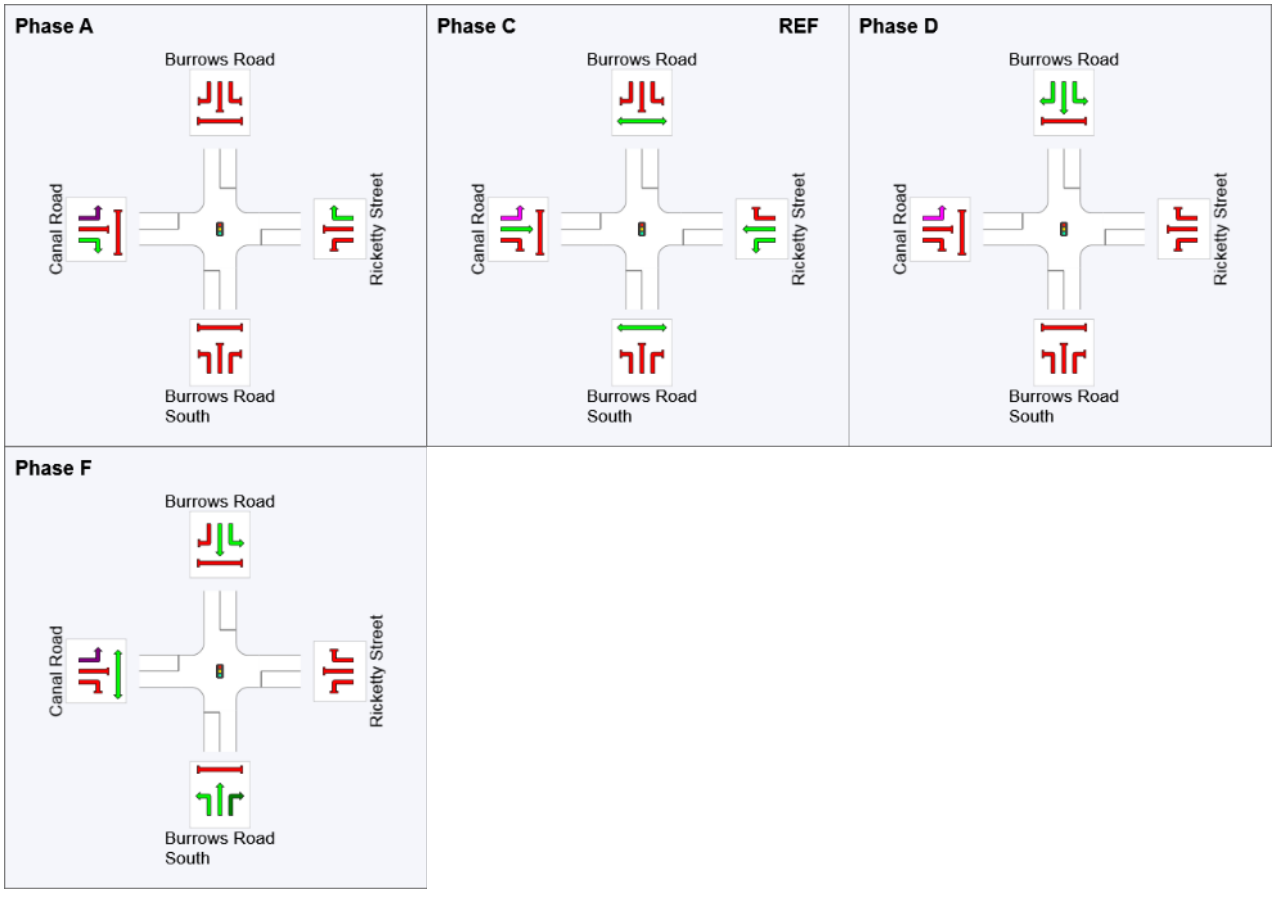
Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Green Split Priority has been specified
Phase Sequence: Variable Phasing
Reference Phase: Phase C
Input Phase Sequence: A, B1*, B2*, C, D, F
Output Phase Sequence: A, C, D, F
(* Variable Phase)

Phase Timing Summary

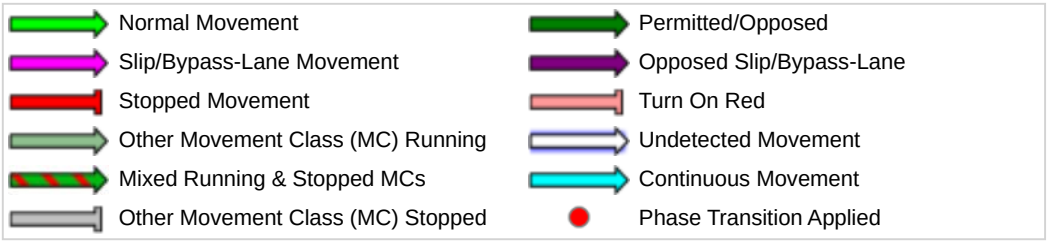
Phase	A	C	D	F
Phase Change Time (sec)	119	0	89	104
Green Time (sec)	10	83	9	9
Phase Time (sec)	16	89	15	15
Phase Split	12 %	66 %	11 %	11 %

See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



Organisation: EMM CONSULTING | Processed: Thursday, 30 August 2018 11:49:41 AM
Project: P:\SIDRA RESULTS\Boral St Peters MOD 11\Burrows Road Canal Road 2017 No Right Turn Arrow with Parking Restrictions.sip8

MOVEMENT SUMMARY

Site: 101 [Canal Road/Burrows Road/Ricketty Street with Parking Restrictions AM Peak Future]

Four way traffic signal controlled intersection
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 130 seconds (Site Optimum Cycle Time - Minimum Delay)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Burrows Road South												
1	L2	49	66.0	0.314	61.7	LOS E	3.4	36.9	0.94	0.76	0.94	28.9
2	T1	42	65.0	0.887	75.4	LOS F	6.0	66.3	0.99	0.97	1.40	26.3
3	R2	46	70.5	0.887	86.3	LOS F	6.0	66.3	1.00	1.02	1.51	24.7
Approach		138	67.2	0.887	74.1	LOS F	6.0	66.3	0.97	0.91	1.27	26.6
East: Ricketty Street												
4	L2	53	46.0	0.062	17.0	LOS B	1.3	13.0	0.43	0.66	0.43	44.8
5	T1	895	4.6	0.450	13.8	LOS A	15.6	113.4	0.55	0.49	0.55	48.9
6	R2	105	11.0	0.883	82.7	LOS F	7.6	58.2	1.00	0.96	1.44	25.1
Approach		1053	7.3	0.883	20.9	LOS B	15.6	113.4	0.59	0.55	0.64	44.5
North: Burrows Road												
7	L2	114	3.7	0.209	41.9	LOS C	5.3	38.6	0.79	0.76	0.79	34.9
8	T1	38	52.8	0.828	73.0	LOS F	6.8	67.0	1.00	0.95	1.33	26.7
9	R2	59	42.9	0.828	79.1	LOS F	6.8	67.0	1.00	0.95	1.33	26.0
Approach		211	23.5	0.828	57.9	LOS E	6.8	67.0	0.89	0.85	1.04	30.3
West: Canal Road												
10	L2	174	13.3	0.121	6.6	LOS A	1.2	9.3	0.16	0.59	0.16	53.0
11	T1	1777	2.8	0.866	24.4	LOS B	47.5	340.7	0.80	0.77	0.84	42.8
12	R2	72	27.9	0.668	74.7	LOS F	4.8	41.6	1.00	0.82	1.12	26.4
Approach		2022	4.6	0.866	24.7	LOS B	47.5	340.7	0.75	0.76	0.79	42.6
All Vehicles		3423	9.1	0.887	27.6	LOS B	47.5	340.7	0.72	0.71	0.78	41.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	11	14.3	LOS B	0.0	0.0	0.47	0.47
P3	North Full Crossing	11	14.3	LOS B	0.0	0.0	0.47	0.47
P4	West Full Crossing	21	59.2	LOS E	0.1	0.1	0.95	0.95
All Pedestrians		42	36.8	LOS D			0.71	0.71

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

PHASING SUMMARY

Site: 101 [Canal Road/Burrows Road/Ricketty Street with Parking Restrictions AM Peak Future]

Four way traffic signal controlled intersection
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 130 seconds (Site Optimum Cycle Time - Minimum Delay)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

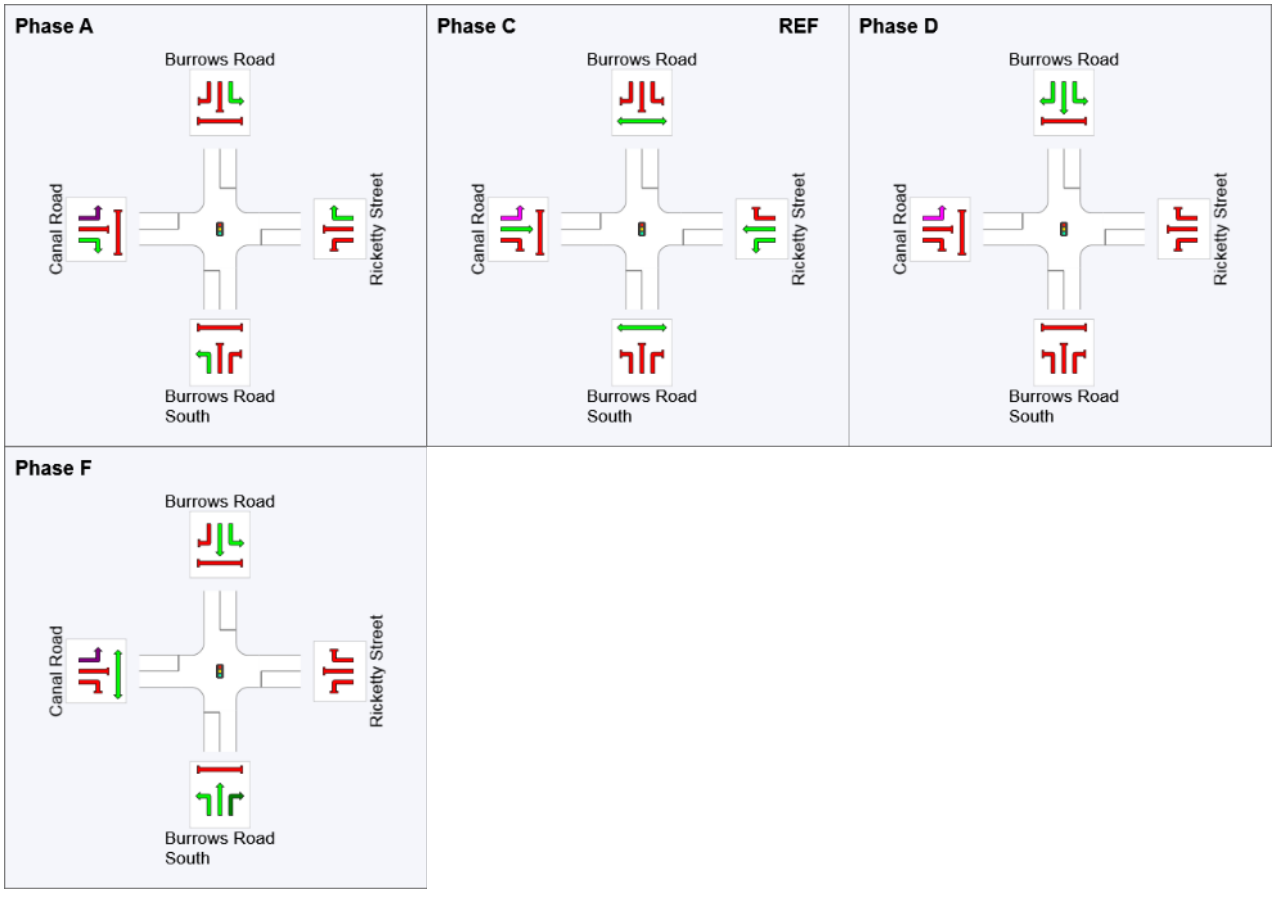
Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Green Split Priority has been specified
Phase Sequence: Variable Phasing
Reference Phase: Phase C
Input Phase Sequence: A, B1*, B2*, C, D, F
Output Phase Sequence: A, C, D, F
(* Variable Phase)

Phase Timing Summary

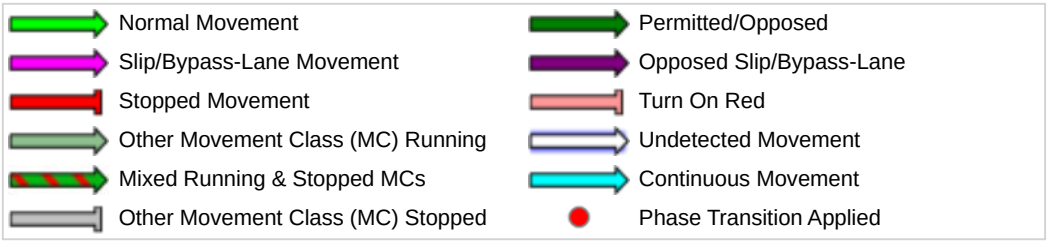
Phase	A	C	D	F
Phase Change Time (sec)	115	0	85	100
Green Time (sec)	9	79	9	9
Phase Time (sec)	15	85	15	15
Phase Split	12 %	65 %	12 %	12 %

See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



Organisation: EMM CONSULTING | Processed: Thursday, 30 August 2018 11:51:18 AM
Project: P:\SIDRA RESULTS\Boral St Peters MOD 11\Burrows Road Canal Road 2017 No Right Turn Arrow with Parking Restrictions.sip8

MOVEMENT SUMMARY

Site: 101 [Canal Road/Burrows Road/Ricketty Street with Parking Restrictions PM Peak 2017]

Four way traffic signal controlled intersection
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 120 seconds (Site Practical Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Burrows Road South												
1	L2	56	22.6	0.209	53.1	LOS D	2.9	24.0	0.90	0.75	0.90	31.3
2	T1	23	22.7	0.541	62.7	LOS E	3.4	29.6	1.00	0.76	1.02	28.9
3	R2	33	32.3	0.541	68.7	LOS E	3.4	29.6	1.00	0.76	1.02	28.3
Approach		112	25.5	0.541	59.7	LOS E	3.4	29.6	0.95	0.76	0.96	29.9
East: Ricketty Street												
4	L2	34	25.0	0.039	18.9	LOS B	0.9	7.5	0.48	0.66	0.48	44.3
5	T1	1707	4.4	0.874	30.6	LOS C	47.5	345.0	0.89	0.88	0.97	39.9
6	R2	91	2.3	0.595	65.8	LOS E	5.4	38.5	1.00	0.79	1.03	28.4
Approach		1832	4.7	0.874	32.2	LOS C	47.5	345.0	0.89	0.87	0.96	39.2
North: Burrows Road												
7	L2	178	4.7	0.258	32.6	LOS C	7.1	51.4	0.73	0.76	0.73	38.3
8	T1	25	58.3	0.873	66.4	LOS E	12.9	106.5	1.00	0.99	1.34	27.7
9	R2	169	14.9	0.873	72.1	LOS F	12.9	106.5	1.00	0.99	1.34	27.3
Approach		373	13.0	0.873	52.9	LOS D	12.9	106.5	0.87	0.88	1.05	31.7
West: Canal Road												
10	L2	84	17.5	0.060	6.8	LOS A	0.6	4.6	0.18	0.59	0.18	52.8
11	T1	1001	5.0	0.569	20.2	LOS B	19.3	141.3	0.71	0.63	0.71	45.0
12	R2	51	20.8	0.625	71.9	LOS F	3.2	26.3	1.00	0.79	1.12	27.0
Approach		1136	6.7	0.625	21.5	LOS B	19.3	141.3	0.68	0.63	0.69	44.2
All Vehicles		3452	6.9	0.874	31.8	LOS C	47.5	345.0	0.82	0.79	0.88	39.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	11	17.1	LOS B	0.0	0.0	0.53	0.53
P3	North Full Crossing	11	19.3	LOS B	0.0	0.0	0.57	0.57
P4	West Full Crossing	21	54.2	LOS E	0.1	0.1	0.95	0.95
All Pedestrians		42	36.2	LOS D			0.75	0.75

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

PHASING SUMMARY

Site: 101 [Canal Road/Burrows Road/Ricketty Street with Parking Restrictions PM Peak 2017]

Four way traffic signal controlled intersection
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 120 seconds (Site Practical Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Green Split Priority has been specified
Phase Sequence: Variable Phasing
Reference Phase: Phase C
Input Phase Sequence: A, B1*, B2*, C, D, F
Output Phase Sequence: A, B2*, C, D, F
(* Variable Phase)

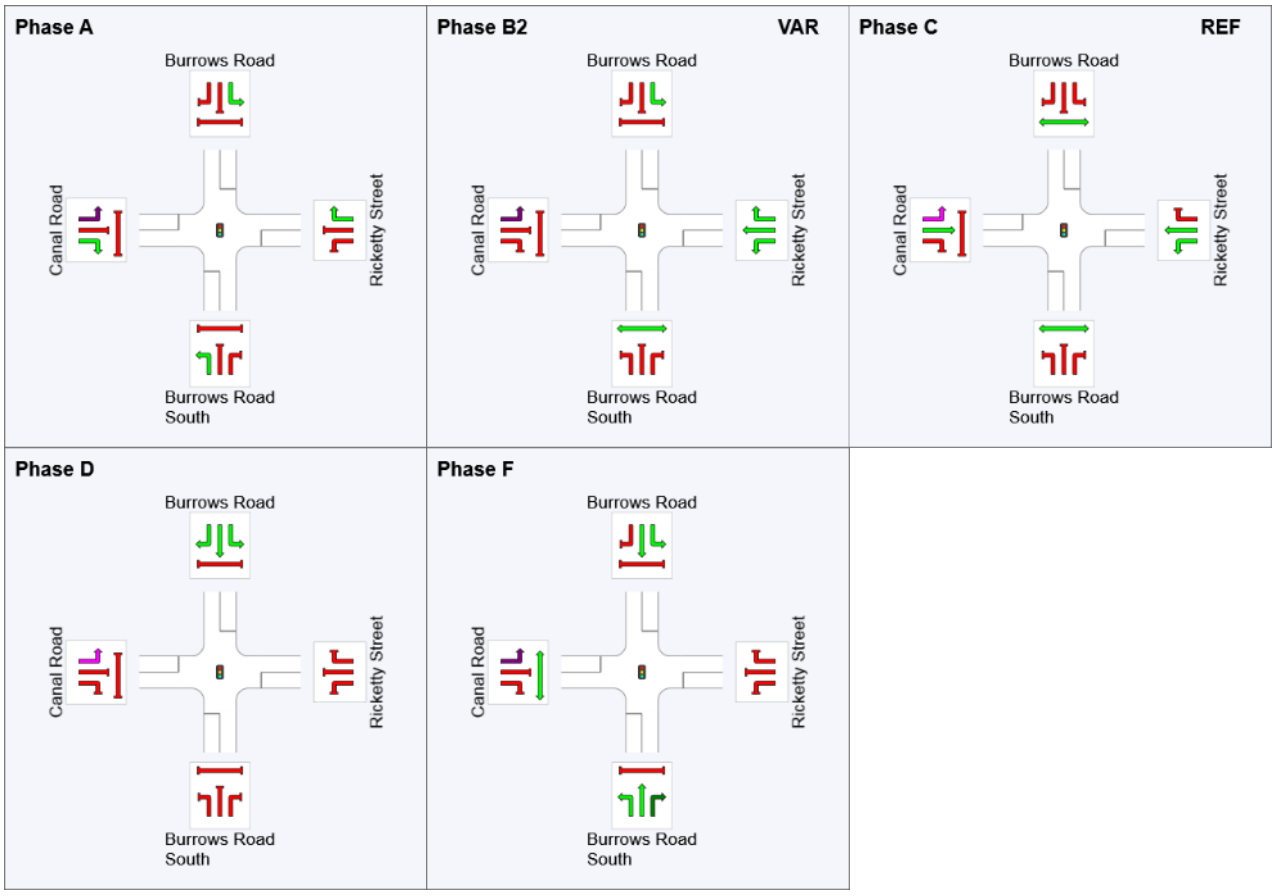
Phase Timing Summary

Phase	A	B2	C	D	F
Phase Change Time (sec)	104	116	0	68	90
Green Time (sec)	6	***	62	16	8
Phase Time (sec)	12	4	68	22	14
Phase Split	10 %	3 %	57 %	18 %	12 %

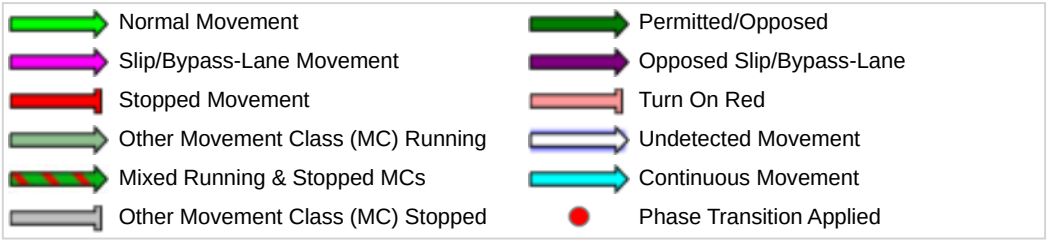
See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

*** No green time has been calculated for this phase because the next phase starts during its intergreen time.
This occurs with overlap phasing where there is no single movement connecting this phase to the next, or where the only such movement is a dummy movement with zero minimum green time specified.
If a green time is required for this phase, specify a dummy movement with a non-zero minimum green time.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



MOVEMENT SUMMARY

Site: 101 [Canal Road/Burrows Road/Ricketty Street with Parking Restrictions PM Peak Future]

Four way traffic signal controlled intersection
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 120 seconds (Site Practical Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Burrows Road South												
1	L2	71	38.8	0.291	54.3	LOS D	3.7	34.6	0.92	0.76	0.92	30.8
2	T1	32	43.3	0.804	68.4	LOS E	5.0	49.5	1.00	0.92	1.34	27.7
3	R2	45	51.2	0.804	74.6	LOS F	5.0	49.5	1.00	0.92	1.34	26.9
Approach		147	43.6	0.804	63.6	LOS E	5.0	49.5	0.96	0.85	1.14	28.8
East: Ricketty Street												
4	L2	46	45.5	0.061	19.8	LOS B	1.3	12.3	0.50	0.68	0.50	43.3
5	T1	1707	4.4	0.897	35.8	LOS C	50.2	364.8	0.91	0.93	1.03	37.8
6	R2	91	2.3	0.595	65.8	LOS E	5.4	38.5	1.00	0.79	1.03	28.4
Approach		1844	5.4	0.897	36.9	LOS C	50.2	364.8	0.90	0.92	1.01	37.3
North: Burrows Road												
7	L2	178	4.7	0.253	31.9	LOS C	7.0	50.7	0.72	0.76	0.72	38.6
8	T1	34	68.8	0.866	65.0	LOS E	13.4	112.8	1.00	0.99	1.31	28.0
9	R2	169	14.9	0.866	70.8	LOS F	13.4	112.8	1.00	0.99	1.31	27.6
Approach		381	14.9	0.866	52.1	LOS D	13.4	112.8	0.87	0.88	1.03	31.9
West: Canal Road												
10	L2	84	17.5	0.061	6.8	LOS A	0.6	4.7	0.18	0.59	0.18	52.8
11	T1	1001	5.0	0.590	21.0	LOS B	19.5	142.4	0.72	0.64	0.72	44.7
12	R2	65	38.7	0.897	82.1	LOS F	4.5	42.2	1.00	0.99	1.60	25.0
Approach		1151	7.9	0.897	23.4	LOS B	19.5	142.4	0.70	0.66	0.73	43.2
All Vehicles		3523	8.8	0.897	35.3	LOS C	50.2	364.8	0.83	0.82	0.93	37.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	11	17.6	LOS B	0.0	0.0	0.54	0.54
P3	North Full Crossing	11	19.8	LOS B	0.0	0.0	0.58	0.58
P4	West Full Crossing	21	54.2	LOS E	0.1	0.1	0.95	0.95
All Pedestrians		42	36.5	LOS D			0.75	0.75

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

PHASING SUMMARY

Site: 101 [Canal Road/Burrows Road/Ricketty Street with Parking Restrictions PM Peak Future]

Four way traffic signal controlled intersection
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 120 seconds (Site Practical Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Green Split Priority has been specified
Phase Sequence: Variable Phasing
Reference Phase: Phase C
Input Phase Sequence: A, B1*, B2*, C, D, F
Output Phase Sequence: A, B2*, C, D, F
(* Variable Phase)

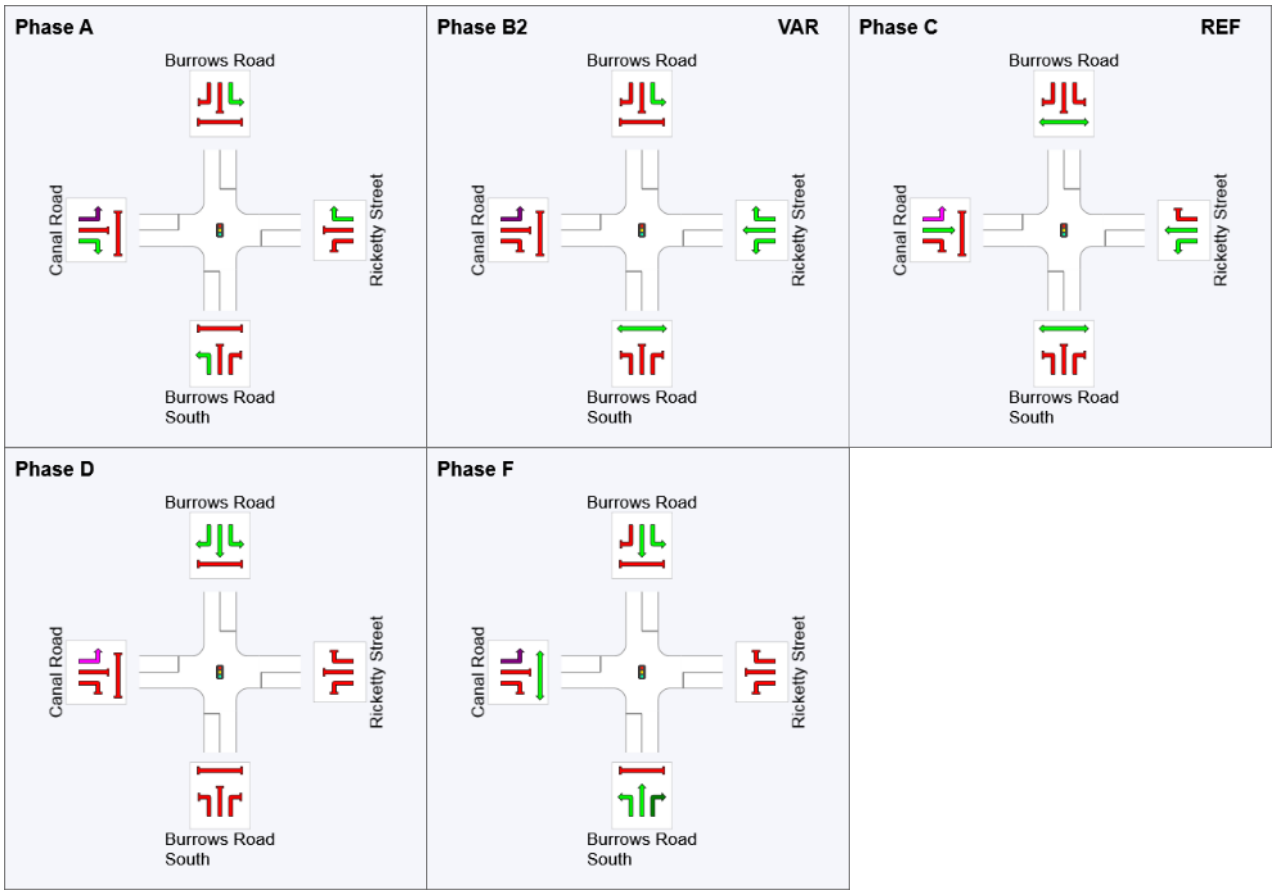
Phase Timing Summary

Phase	A	B2	C	D	F
Phase Change Time (sec)	104	116	0	67	90
Green Time (sec)	6	***	61	17	8
Phase Time (sec)	12	4	67	23	14
Phase Split	10 %	3 %	56 %	19 %	12 %

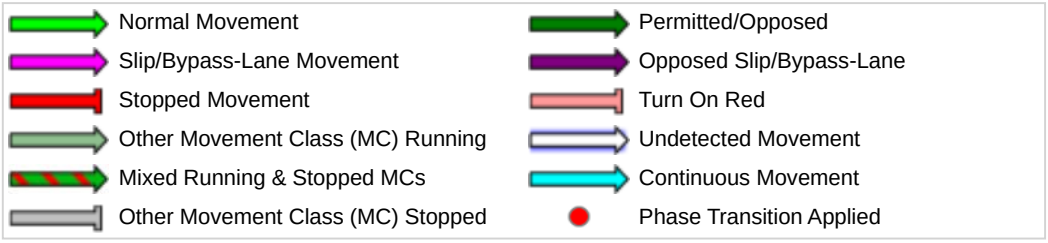
See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

*** No green time has been calculated for this phase because the next phase starts during its intergreen time. This occurs with overlap phasing where there is no single movement connecting this phase to the next, or where the only such movement is a dummy movement with zero minimum green time specified.
If a green time is required for this phase, specify a dummy movement with a non-zero minimum green time.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



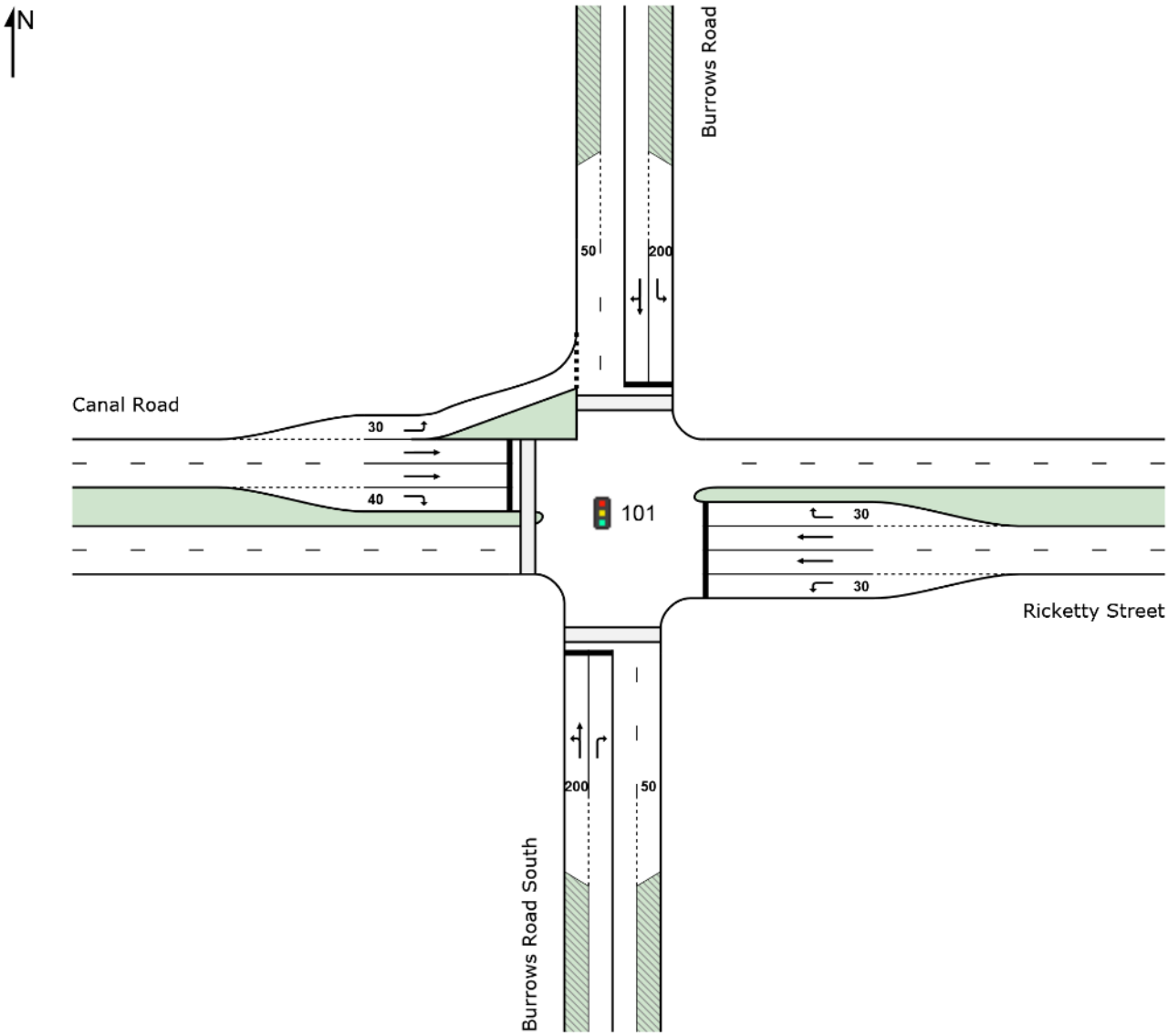
Attachment E

SIDRA intersection analysis results – all results variable phasing with parking restrictions

SITE LAYOUT

Site: 101 [Canal Road/Burrows Road/Ricketty Street Parking Restrictions AM Peak 2017]

Four way traffic signal controlled intersection
Site Category: (None)
Signals - Fixed Time Isolated



Organisation: EMM CONSULTING | Created: Thursday, 30 August 2018 12:58:04 PM
Project: P:\SIDRA RESULTS\Boral St Peters MOD 11\Burrows Road Canal Road 2017 Variable Phasing With Parking Restrictions.sip8

MOVEMENT SUMMARY

Site: 101 [Canal Road/Burrows Road/Ricketty Street Parking Restrictions AM Peak 2017]

Four way traffic signal controlled intersection
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 135 seconds (Site Optimum Cycle Time - Minimum Delay)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Burrows Road South												
1	L2	35	51.5	0.737	80.0	LOS F	4.9	49.9	1.00	0.87	1.21	25.7
2	T1	34	56.3	0.737	73.9	LOS F	4.9	49.9	1.00	0.87	1.21	26.6
3	R2	34	59.4	0.581	81.8	LOS F	2.4	25.5	1.00	0.77	1.10	25.1
Approach		102	55.7	0.737	78.6	LOS F	4.9	49.9	1.00	0.84	1.17	25.8
East: Ricketty Street												
4	L2	40	28.9	0.046	19.3	LOS B	1.1	9.9	0.46	0.67	0.46	44.0
5	T1	895	4.6	0.475	17.2	LOS B	18.0	130.8	0.61	0.54	0.61	46.8
6	R2	105	11.0	0.986	109.5	LOS F	9.1	69.6	1.00	1.09	1.75	21.2
Approach		1040	6.2	0.986	26.7	LOS B	18.0	130.8	0.64	0.60	0.72	41.6
North: Burrows Road												
7	L2	114	3.7	0.446	64.0	LOS E	7.0	50.6	0.96	0.79	0.96	28.8
8	T1	29	39.3	0.865	79.7	LOS F	6.7	63.4	1.00	0.99	1.43	25.4
9	R2	59	42.9	0.865	85.8	LOS F	6.7	63.4	1.00	0.99	1.43	24.9
Approach		202	20.3	0.865	72.6	LOS F	7.0	63.4	0.98	0.88	1.17	27.0
West: Canal Road												
10	L2	174	13.3	0.117	6.3	LOS A	0.9	6.9	0.13	0.58	0.13	53.3
11	T1	1777	2.8	0.914	39.1	LOS C	61.5	441.0	0.88	0.91	1.00	36.6
12	R2	57	9.3	0.489	74.7	LOS F	3.8	28.8	1.00	0.75	1.00	26.5
Approach		2007	3.9	0.914	37.3	LOS C	61.5	441.0	0.82	0.88	0.93	37.2
All Vehicles		3352	7.2	0.986	37.4	LOS C	61.5	441.0	0.78	0.79	0.88	37.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	11	17.1	LOS B	0.0	0.0	0.50	0.50
P3	North Full Crossing	11	17.1	LOS B	0.0	0.0	0.50	0.50
P4	West Full Crossing	21	61.7	LOS F	0.1	0.1	0.96	0.96
All Pedestrians		42	39.4	LOS D			0.73	0.73

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

PHASING SUMMARY

Site: 101 [Canal Road/Burrows Road/Ricketty Street Parking Restrictions AM Peak 2017]

Four way traffic signal controlled intersection
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 135 seconds (Site Optimum Cycle Time - Minimum Delay)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

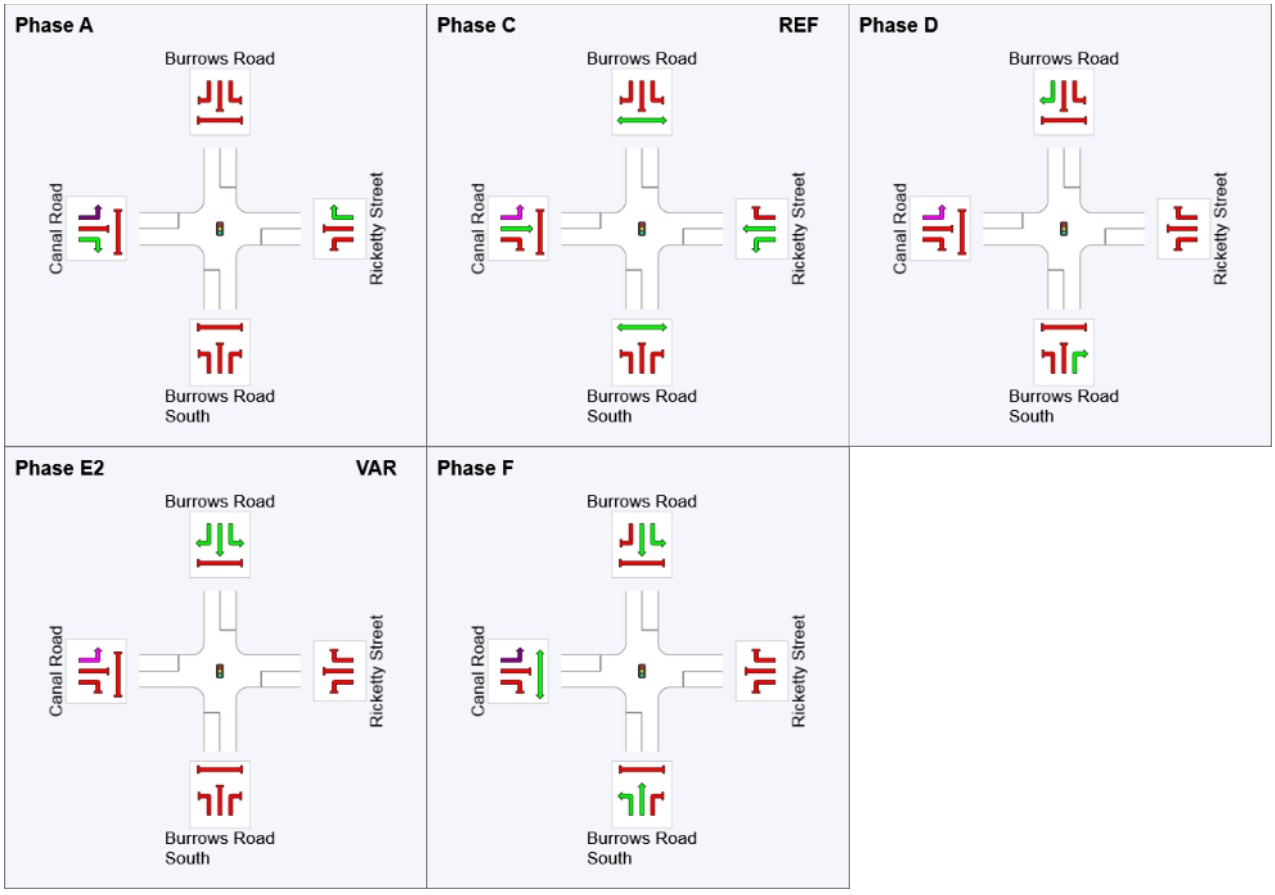
Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Green Split Priority has been specified
Phase Sequence: Variable Phasing
Reference Phase: Phase C
Input Phase Sequence: A, B1*, B2*, C, D, E1*, E2*, F
Output Phase Sequence: A, C, D, E2*, F
(* Variable Phase)

Phase Timing Summary

Phase	A	C	D	E2	F
Phase Change Time (sec)	120	0	83	95	105
Green Time (sec)	9	77	6	4	9
Phase Time (sec)	15	83	12	10	15
Phase Split	11 %	61 %	9 %	7 %	11 %

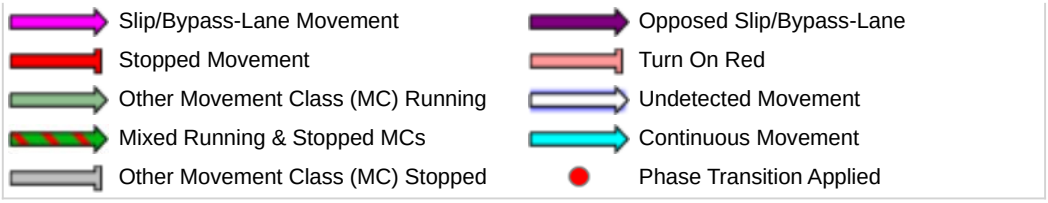
See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase

Normal Movement Permitted/Opposed



MOVEMENT SUMMARY

Site: 101 [Canal Road/Burrows Road/Ricketty Street Parking Restrictions AM Peak Future]

Four way traffic signal controlled intersection
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 135 seconds (Site Optimum Cycle Time - Minimum Delay)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Burrows Road South												
1	L2	49	66.0	0.943	98.7	LOS F	7.5	82.1	1.00	1.10	1.64	22.7
2	T1	42	65.0	0.943	92.4	LOS F	7.5	82.1	1.00	1.10	1.64	23.4
3	R2	46	70.5	0.843	88.7	LOS F	3.5	39.6	1.00	0.93	1.48	23.9
Approach		138	67.2	0.943	93.4	LOS F	7.5	82.1	1.00	1.04	1.59	23.3
East: Ricketty Street												
4	L2	53	46.0	0.068	20.7	LOS B	1.6	15.3	0.49	0.68	0.49	42.9
5	T1	895	4.6	0.494	18.5	LOS B	18.2	132.6	0.63	0.56	0.63	46.1
6	R2	105	11.0	0.987	109.7	LOS F	9.1	69.7	1.00	1.09	1.75	21.2
Approach		1053	7.3	0.987	27.7	LOS B	18.2	132.6	0.66	0.61	0.73	41.1
North: Burrows Road												
7	L2	114	3.7	0.404	61.7	LOS E	6.9	49.5	0.95	0.79	0.95	29.4
8	T1	38	52.8	0.899	83.2	LOS F	7.5	73.5	1.00	1.03	1.50	24.8
9	R2	59	42.9	0.899	89.3	LOS F	7.5	73.5	1.00	1.03	1.50	24.3
Approach		211	23.5	0.899	73.3	LOS F	7.5	73.5	0.97	0.90	1.20	26.9
West: Canal Road												
10	L2	174	13.3	0.118	6.4	LOS A	1.0	7.7	0.14	0.58	0.14	53.2
11	T1	1777	2.8	0.950	53.4	LOS D	69.4	497.2	0.91	1.01	1.13	32.0
12	R2	72	27.9	0.693	78.1	LOS F	5.0	43.4	1.00	0.83	1.14	25.8
Approach		2022	4.6	0.950	50.2	LOS D	69.4	497.2	0.84	0.97	1.04	32.9
All Vehicles		3423	9.1	0.987	46.4	LOS D	69.4	497.2	0.80	0.86	0.98	33.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	11	18.2	LOS B	0.0	0.0	0.52	0.52
P3	North Full Crossing	11	18.2	LOS B	0.0	0.0	0.52	0.52
P4	West Full Crossing	21	61.7	LOS F	0.1	0.1	0.96	0.96
All Pedestrians		42	39.9	LOS D			0.74	0.74

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

PHASING SUMMARY

Site: 101 [Canal Road/Burrows Road/Ricketty Street Parking Restrictions AM Peak Future]

Four way traffic signal controlled intersection
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 135 seconds (Site Optimum Cycle Time - Minimum Delay)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

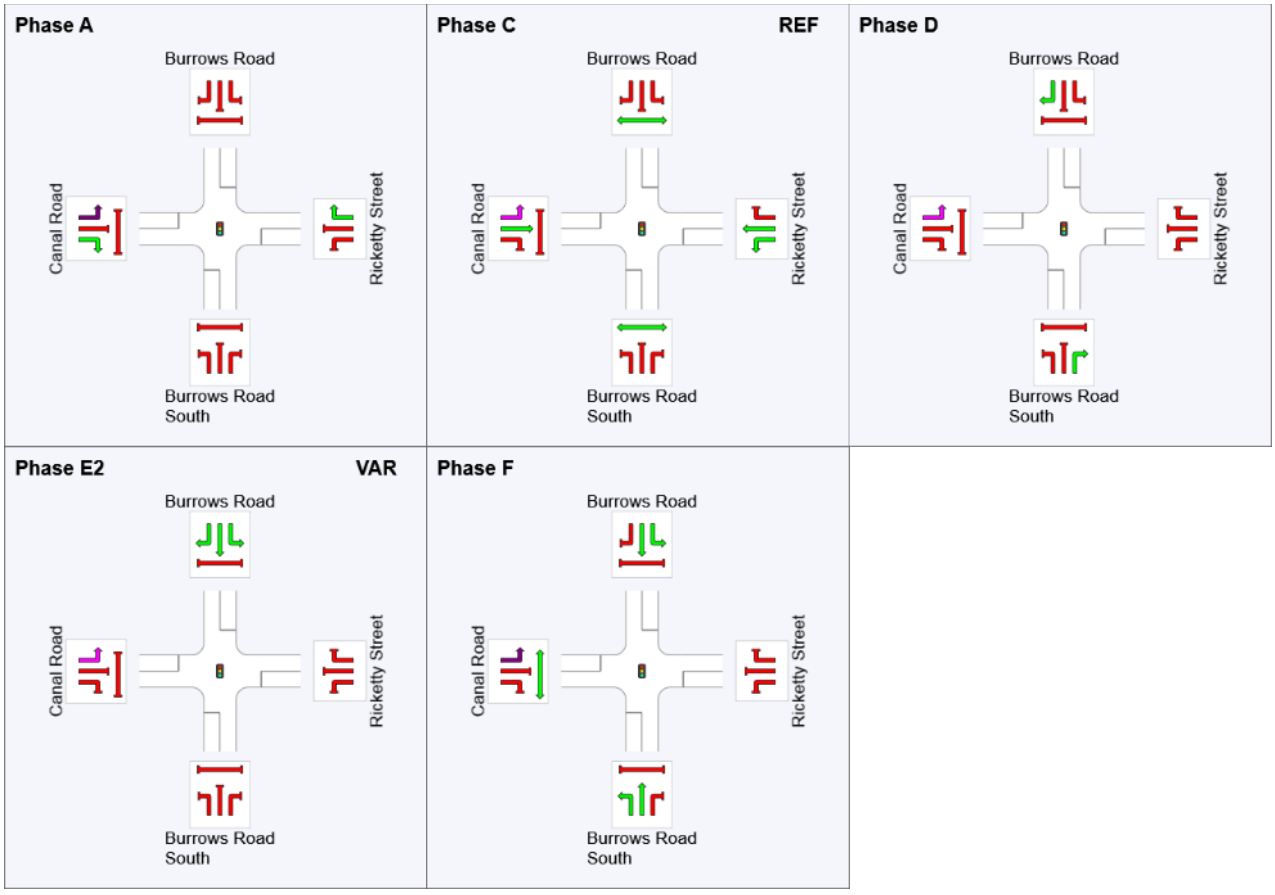
Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Green Split Priority has been specified
Phase Sequence: Variable Phasing
Reference Phase: Phase C
Input Phase Sequence: A, B1*, B2*, C, D, E1*, E2*, F
Output Phase Sequence: A, C, D, E2*, F
(* Variable Phase)

Phase Timing Summary

Phase	A	C	D	E2	F
Phase Change Time (sec)	120	0	81	93	104
Green Time (sec)	9	75	6	5	10
Phase Time (sec)	15	81	12	11	16
Phase Split	11 %	60 %	9 %	8 %	12 %

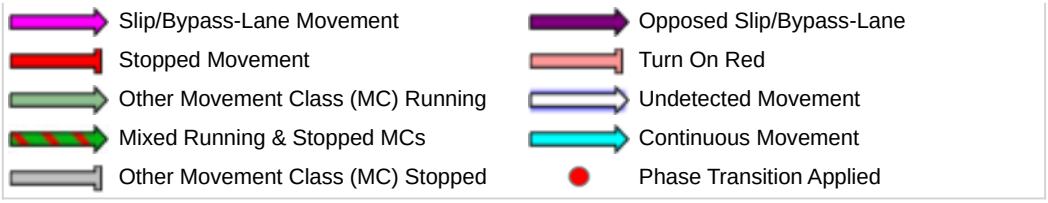
See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase

Normal Movement Permitted/Opposed



MOVEMENT SUMMARY

Site: 101 [Canal Road/Burrows Road/Ricketty Street Parking Restrictions PM Peak 2017]

Four way traffic signal controlled intersection
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 130 seconds (Site Practical Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Burrows Road South												
1	L2	56	22.6	0.701	75.1	LOS F	5.3	44.4	1.00	0.84	1.15	26.7
2	T1	23	22.7	0.701	69.2	LOS E	5.3	44.4	1.00	0.84	1.15	27.3
3	R2	33	32.3	0.468	76.8	LOS F	2.2	19.6	1.00	0.73	1.00	26.2
Approach		112	25.5	0.701	74.4	LOS F	5.3	44.4	1.00	0.81	1.10	26.7
East: Ricketty Street												
4	L2	34	25.0	0.040	20.7	LOS B	1.0	8.3	0.49	0.67	0.49	43.3
5	T1	1707	4.4	0.894	36.6	LOS C	53.9	391.6	0.91	0.92	1.01	37.5
6	R2	91	2.3	0.586	70.2	LOS E	5.8	41.4	1.00	0.78	1.01	27.5
Approach		1832	4.7	0.894	38.0	LOS C	53.9	391.6	0.91	0.91	1.00	36.9
North: Burrows Road												
7	L2	178	4.7	0.536	58.0	LOS E	10.4	75.4	0.96	0.81	0.96	30.3
8	T1	25	58.3	0.893	74.1	LOS F	14.2	117.1	1.00	1.01	1.36	26.2
9	R2	169	14.9	0.893	79.8	LOS F	14.2	117.1	1.00	1.01	1.36	25.8
Approach		373	13.0	0.893	69.0	LOS E	14.2	117.1	0.98	0.92	1.17	27.8
West: Canal Road												
10	L2	84	17.5	0.058	6.2	LOS A	0.3	2.5	0.11	0.57	0.11	53.2
11	T1	1001	5.0	0.590	23.4	LOS B	21.7	158.8	0.73	0.65	0.73	43.3
12	R2	51	20.8	0.677	78.4	LOS F	3.5	28.7	1.00	0.81	1.17	25.8
Approach		1136	6.7	0.677	24.6	LOS B	21.7	158.8	0.70	0.65	0.71	42.6
All Vehicles		3452	6.9	0.894	38.1	LOS C	53.9	391.6	0.85	0.82	0.92	36.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	11	18.9	LOS B	0.0	0.0	0.54	0.54
P3	North Full Crossing	11	21.6	LOS C	0.0	0.0	0.58	0.58
P4	West Full Crossing	21	59.2	LOS E	0.1	0.1	0.95	0.95
All Pedestrians		42	39.7	LOS D			0.76	0.76

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

PHASING SUMMARY

Site: 101 [Canal Road/Burrows Road/Ricketty Street Parking Restrictions PM Peak 2017]

Four way traffic signal controlled intersection
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 130 seconds (Site Practical Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Green Split Priority has been specified
Phase Sequence: Variable Phasing
Reference Phase: Phase C
Input Phase Sequence: A, B1*, B2*, C, D, E1*, E2*, F
Output Phase Sequence: A, B2*, C, D, E2*, F
(* Variable Phase)

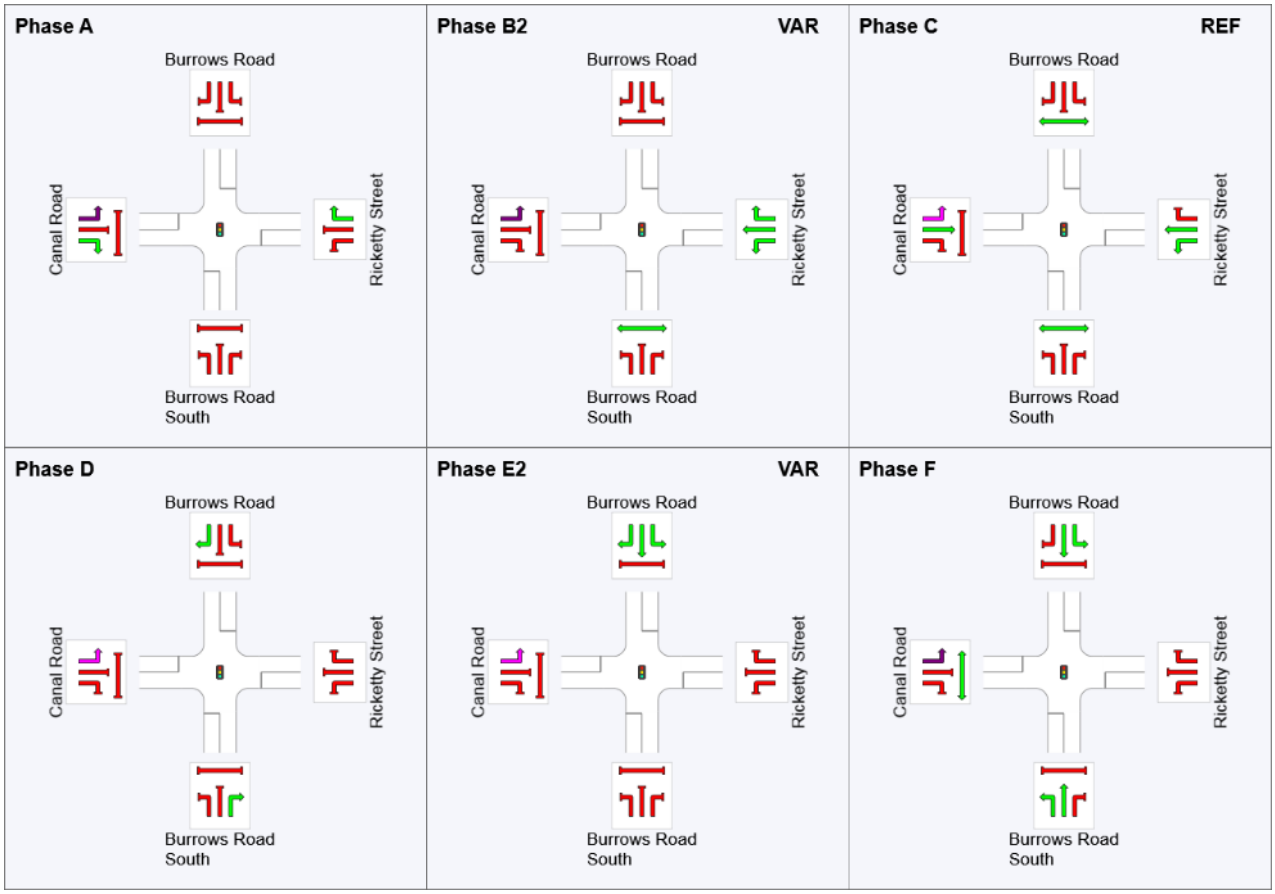
Phase Timing Summary

Phase	A	B2	C	D	E2	F
Phase Change Time (sec)	113	125	0	71	83	98
Green Time (sec)	6	***	65	6	9	9
Phase Time (sec)	12	5	71	12	15	15
Phase Split	9 %	4 %	55 %	9 %	12 %	12 %

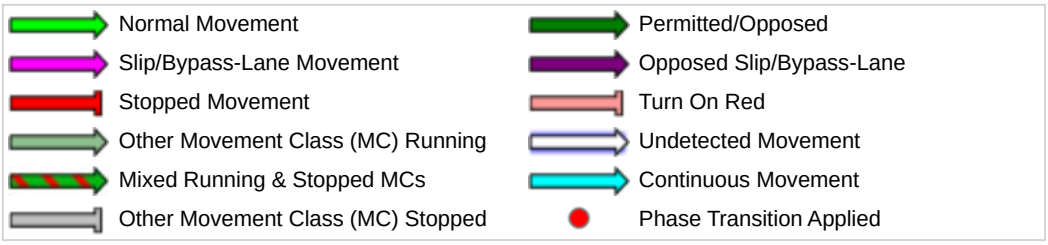
See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

*** No green time has been calculated for this phase because the next phase starts during its intergreen time. This occurs with overlap phasing where there is no single movement connecting this phase to the next, or where the only such movement is a dummy movement with zero minimum green time specified.
If a green time is required for this phase, specify a dummy movement with a non-zero minimum green time.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



MOVEMENT SUMMARY

Site: 101 [Canal Road/Burrows Road/Ricketty Street Parking Restrictions PM Peak Future]

Four way traffic signal controlled intersection
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 150 seconds (Site Practical Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Burrows Road South												
1	L2	71	38.8	0.865	92.0	LOS F	8.4	78.8	1.00	0.98	1.36	23.7
2	T1	32	43.3	0.865	86.0	LOS F	8.4	78.8	1.00	0.98	1.36	24.3
3	R2	45	51.2	0.832	95.8	LOS F	3.8	37.9	1.00	0.90	1.42	22.9
Approach		147	43.6	0.865	91.9	LOS F	8.4	78.8	1.00	0.95	1.38	23.6
East: Ricketty Street												
4	L2	46	45.5	0.061	23.3	LOS B	1.6	15.3	0.50	0.68	0.50	41.6
5	T1	1707	4.4	0.902	40.4	LOS C	59.8	434.2	0.91	0.90	0.99	36.1
6	R2	91	2.3	0.572	79.0	LOS F	6.6	47.1	1.00	0.78	1.00	25.8
Approach		1844	5.4	0.902	41.9	LOS C	59.8	434.2	0.90	0.89	0.98	35.5
North: Burrows Road												
7	L2	178	4.7	0.479	62.2	LOS E	11.5	83.8	0.93	0.81	0.93	29.2
8	T1	34	68.8	0.917	87.9	LOS F	17.4	146.6	1.00	1.02	1.37	23.8
9	R2	169	14.9	0.917	93.6	LOS F	17.4	146.6	1.00	1.02	1.37	23.5
Approach		381	14.9	0.917	78.5	LOS F	17.4	146.6	0.97	0.92	1.17	25.9
West: Canal Road												
10	L2	84	17.5	0.058	6.2	LOS A	0.4	3.2	0.11	0.57	0.11	53.2
11	T1	1001	5.0	0.597	26.2	LOS B	24.2	176.6	0.72	0.65	0.72	42.0
12	R2	65	38.7	0.841	93.4	LOS F	5.3	49.9	1.00	0.92	1.38	23.2
Approach		1151	7.9	0.841	28.6	LOS C	24.2	176.6	0.69	0.66	0.72	40.7
All Vehicles		3523	8.8	0.917	43.6	LOS D	59.8	434.2	0.85	0.82	0.93	34.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	11	20.8	LOS C	0.0	0.0	0.53	0.53
P3	North Full Crossing	11	23.5	LOS C	0.0	0.0	0.56	0.56
P4	West Full Crossing	21	69.2	LOS F	0.1	0.1	0.96	0.96
All Pedestrians		42	45.7	LOS E			0.75	0.75

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

PHASING SUMMARY

Site: 101 [Canal Road/Burrows Road/Ricketty Street Parking Restrictions PM Peak Future]

Four way traffic signal controlled intersection
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 150 seconds (Site Practical Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Green Split Priority has been specified
Phase Sequence: Variable Phasing
Reference Phase: Phase C
Input Phase Sequence: A, B1*, B2*, C, D, E1*, E2*, F
Output Phase Sequence: A, B2*, C, D, E2*, F
(* Variable Phase)

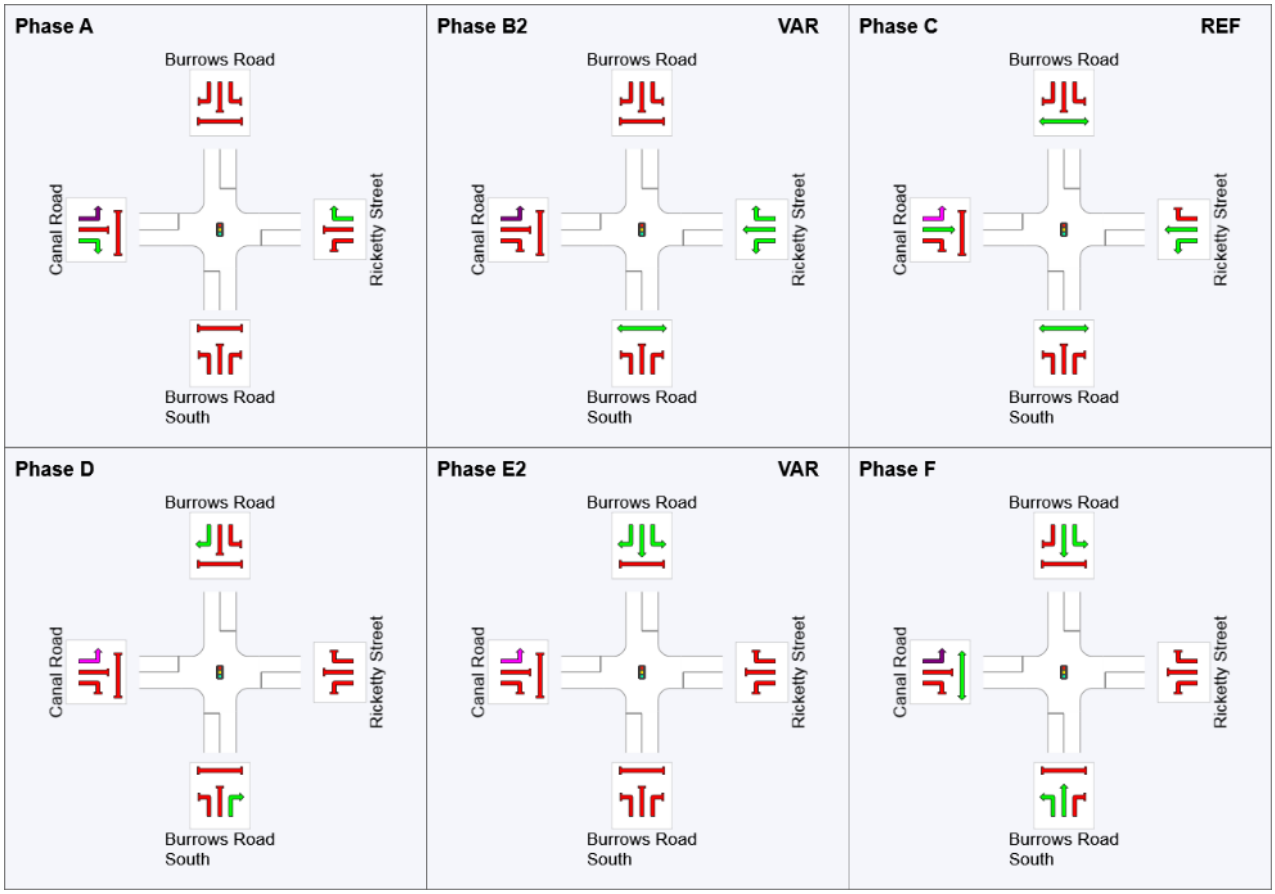
Phase Timing Summary

Phase	A	B2	C	D	E2	F
Phase Change Time (sec)	131	145	0	82	94	113
Green Time (sec)	8	***	76	6	13	12
Phase Time (sec)	14	5	82	12	19	18
Phase Split	9 %	3 %	55 %	8 %	13 %	12 %

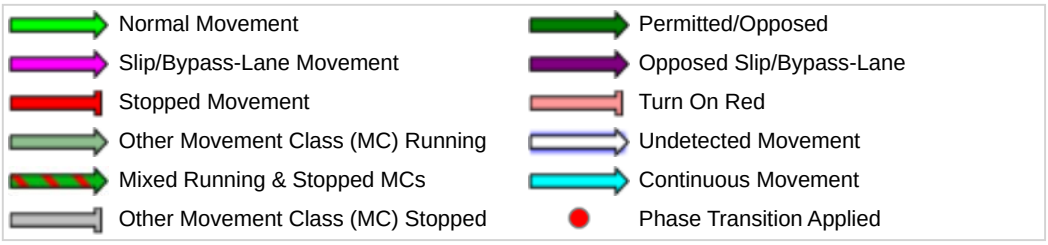
See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

*** No green time has been calculated for this phase because the next phase starts during its intergreen time. This occurs with overlap phasing where there is no single movement connecting this phase to the next, or where the only such movement is a dummy movement with zero minimum green time specified.
If a green time is required for this phase, specify a dummy movement with a non-zero minimum green time.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



Appendix C

Pollution Incident Response Management Plan - August 2018

BORAL RESOURCES (NSW) PTY LIMITED
Build something great ™

ST PETERS TERMINAL & CONCRETE BATCHING PLANT

Pollution Incident Response Management Plan – August 2018

Control Sheet

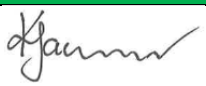
Document Information

Document name	St Peters Terminal and Concrete plant PIRMP
Document file name	180905 St Peters terminal and concrete plant PIRMP
Document location	G66/NSW/Projects/St Peters/Project Library/Technical reports

Change History

Author Title	Date	Change Description	Version
Peter Scioscia Environment Manager	5 August 18	Update	1

Review

Reviewer Title	Signature	Date	Change (Y/N)
Kate Jackson		7 Sept 2018	Y

Authorisation

Authorised by	Title	Signature	Date
Peter Scioscia	HSE Advisor		7 Sep 2018

Distribution: Internal Distribution ONLY

Distributed to	Date	Department / Section
St Peters rail terminal and concrete plant	7 Sep 2018	Quarries/Concrete

Table of Contents

1 Purpose

The purpose of the St Peters site pollution incident response management plan (PIRMP) is to:

- Provide direction to the staff at Boral St Peters in responding to pollution incidents at the St Peters operations;
- Ensure timely communication about a pollution incident is provided to:
    - staff at the premises;
    - the Environment Protection Authority (EPA);
    - other relevant authorities specified in the *Protection of the Environment Legislation Miscellaneous Amendments Act 2017* (POELMA Act) including Inner West Council, NSW Health, SafeWork NSW, and Fire and Rescue NSW; and
    - persons outside the operations who may be affected by the impacts of a pollution incident;
- Minimise and control the risk of a pollution incident at Boral St Peters by identifying key risks and planned actions to minimise and manage those risks; and
- Detail the training requirements for this plan, identifying persons responsible for implementing it, and ensuring that the plan is regularly tested for accuracy, currency and suitability.

2 Legislative requirements

The specific requirements for a PIRMP are set out in Part 5.7A of the *Protection of the Environment Operations Act 1997* (POEO Act) and the *Protection of the Environment Operations (General) Regulation 2009* (POEO Regulation). In summary, this provision requires the following:

- All holders of environment protection licences (EPL) must prepare a pollution incident response management plan (section 153A, POEO Act).
- The plan must include the information detailed in the POEO Act (section 153C) and be in the form required by the POEO Regulation (clause 98B).
- Licensees must keep the plan at the premises to which the environment protection licence relates (section 153D, POEO Act).
- Licensees must test the plan in accordance with the POEO Regulation (clause 98E).
- if a pollution incident occurs in the course of an activity so that material harm to the environment is caused or threatened, licensees must immediately implement the plan (section 153F, POEO Act)

While the St Peters terminal and concrete facility is not required to hold an EPL, given the scale of the operations, a PIRMP was considered the most appropriate way to ensure site

personnel are provided direction and the risk of a pollution incident is minimised and controlled.

3 Definition of 'pollution incident'

The definition of a pollution incident is:

"pollution incident means an incident or set of circumstances during or as a consequence of which there is or is likely to be a leak, spill or other escape or deposit of a substance, as a result of which pollution has occurred, is occurring or is likely to occur. It includes an incident or set of circumstances in which a substance has been placed or disposed of on premises, but it does not include an incident or set of circumstances involving only the emission of any noise."

A pollution incident is required to be notified if there is a risk of 'material harm to the environment', which is defined in section 147 of the POEO Act as:

a) harm to the environment is material if:

   i. it involves actual or potential harm to the health or safety of human beings or to ecosystems that is not trivial, or

   ii. it results in actual or potential loss or property damage of an amount, or amounts in aggregate, exceeding $10,000 (or such other amount as is prescribed by the regulations), and

b) loss includes the reasonable costs and expenses that would be incurred in taking all reasonable and practicable measures to prevent, mitigate or make good harm to the environment.

Under this PIRMP, Boral St Peters is required to report pollution incidents immediately to the EPA, NSW Health, Fire and Rescue NSW, SafeWork NSW, and the local council.

4 Scope

This PIRMP must be followed by employees, contractors, and visitors to the Boral St Peters site, to assist in the early response to and reporting of a pollution incident.

5 Potential polluting substances

The main hazards to human health and the environment at Boral St Peters are included in the following table.

Table 1 List of polluting substances storages/uses at site: initial assessment

Name /description	Hazardous chemicals class/MSDS	Amount stored	Location of storage	Need for early warning[1]	Current controls	Risk Ass. & PIRMP Response Action
Chemicals/fuels/lubricant (raw materials and products which can cause pollution)						
Diesel (mobile tanker – when refuelling onsite)	Class 2	Up to 700 L	Variable (go-line)	N/A	• PMP • Training • Spill kits • SOP • Inductions • Fire fighting equipment • Security	Incident 1
Oils/fuel	Class 2	Variable	Plant	N/A	• PMP • Training • Spill kits • SOP • Inductions • Fire fighting equipment • Security	Incident 2
Gases	Class 2	Variable	Mobile plant	N/A	• Fire extinguishers • Containment cages & cabinets	Incident 2
Oils/solvents/lubricants	Class 3	Packaged goods up to 100 L	Workshop	N/A	• Bunding • PMP • Training • Flammable cabinet • Spill kits • Inductions • Fire fighting equipment • Security	Incident 2
Admixture chemicals	Class 3	Variable	Site		• Bunding	Incident 3

Name /description	Hazardous chemicals class/MSDS	Amount stored	Location of storage	Need for early warning[1]	Current controls	Risk Ass. & PIRMP Response Action
					• PMP • Training • Flammable cabinet • Spill kits • Inductions • Fire fighting equipment • Security	
Materials (eg stockpiles, silos, bulk solids etc)						
Aggregate stockpiles	N/A	Variable	Dedicated on site	N/A	• Water sprays • Water cart • Maintain manageable levels • Security • PMP • Training • Spill kits • SOP • Inductions • Fire fighting equipment • Security	Incident 4 Incident 5 Incident 6 Incident 12
Cement/Fly ash	Class 3	Variable	Silos	N/A	• PMP • Training • Spill kits • SOP • Inductions • Fire fighting equipment • Security • Water carts • Maintain manageable levels	Incident 7 Incident 12

Name /description	Hazardous chemicals class/MSDS	Amount stored	Location of storage	Need for early warning[1]	Current controls	Risk Ass. & PIRMP Response Action
Recycled water tanks/pits	N/A	Variable		N/A	• Continue to use for dust suppression • Ensure pumps are maintained through scheduled maintenance • Discharge monitoring	Incident 8 Incident 12
Stormwater drains	N/A	Variable	Site	N/A	• Straw bales • Rubber & earthen berms • Audits & inspections	Incident 8
Mobile plant (MES)	Class 3	Variable	Dedicated on site	N/A	• Spill kits • Pre start checks • PMP • Training	Incident 9
Mobile plant (contractor/visitor)	Class 3	Variable	Variable locations	N/A	• Spill kits • Training • Inductions	Incident 10
Car parking	Class 3	Variable	Site office	N/A	• Spill kits • Training	Incident 11
Traffic areas (dust, chem. leaks & loss	Class 3	N/A	Dedicated on site	N/A	• Training • Water cart • Spill kits	Incident 11

[1] Early warnings relate to informing neighbours who may be affected by the emission of this substance. If this substance is of a type and quantity which may reach neighbours then early warning assessment of actions is required to be undertaken.

6 Roles and responsibilities

Table 2 Roles and responsibilities

Position	Responsibility
Employees and contractors	Following the procedures outlined in the PIRMP and related documents Immediately alerting Supervisors or Team Leaders of any environmental incidents or near-misses.
Team leaders / front line supervisors	Following the procedures outlined in the PIRMP and related documents Immediately alerting Site Manager or, in case of their unavailability, Environmental Representative or Environment Manager of any potentially material environmental incidents or near-misses. Conducting incident investigations.
Site / operations manager and/or site environmental coordinator and/or environment manager	Authorisation of the PIRMP Administration, maintenance and implementation of the PIRMP Assessing whether the incident has caused or threatens "material environmental harm" and, if so, immediately notifying all appropriate regulatory authorities. Ensuring that investigations are undertaken to a level corresponding to the level of risk and impact.

7 Internal pollution incident reporting

Any pollution incident satisfying the **material harm** threshold must be immediately reported to relevant statutory authorities by either the Site/Operations Manager, or Environment Manager.

In cases where "material harm" level cannot be immediately assessed or insufficient information comes to hand on the severity of the incident, the general advice is to err on the side of caution and notify the relevant authorities with a qualification that the situation could not yet be fully assessed.

Until further notice the following procedure needs to be followed:

1. When a pollution incident occurs, a person who has become aware of it must immediately bring it to the attention of his/her immediate supervisor or manager

2. If necessary, first ring " 000 " for Emergency Services

3. At least one of the following Boral Australia personnel must be contacted **immediately**

Table 3 Emergency contact personnel

Name	Function	Phone number	Mobile number
Geoff McDonnell	Metro Concrete Operations manager	02 9033 5104	0401 895 776
James Collings	Metro Quarries Operations Manager	02 9033 5155	0401 897 601
Mark Pizzol	St Peters Concrete Production Manager	02 9517 2498	0481 002 734
Cameron Madeira	St Peters Rail Terminal Manager		0401 893 012
Peter Scioscia	HSE Advisor- Sydney metro		0401 895 380
Rod Wallace	Environment Manager – NSW/ACT		0411 659 271

4. Mark Pizzol/Cameron Madeira or in case of their unavailability one of the senior management personnel listed above, is to **immediately** notify all appropriate regulatory authorities specified in Section 4.3.

5. In borderline situations, where the exceedance of the trigger level of "material harm" of a pollution incident may not be clear, a quick assessment including consultation with Boral environmental personnel should be undertaken to help the decision whether to notify or not.

6. Boral's senior management must be informed promptly of the fact of immediate notification to the authorities. This includes environmental personnel listed above, as well as Robert Giddings (0401 895 741), David Bolton (0401 984831), Greg Price (0401895895), and Dr Richard Strauch (0401 897280).

8 External pollution incident reporting

As the legislation requires that notification must be done immediately upon becoming aware of the pollution incident, it is unlikely that a detailed picture will be available for reporting. Notwithstanding, is seems that some of the government authorities prepared a detailed questionnaire which is being filled at the time of this initial notification. Under the stress of incident handling it could be easy to provide a hasty, inaccurate estimate of the situation when answering these questions.

Therefore, the notification should be restricted to the facts known and nothing should be assumed or guessed. The details will be provided to the asking authority later when more information comes to hand.

The initial notification should include as much of the following information (if known) as possible:

- location and time of the pollution incident;

- type of the incident (spill, fire, unlicensed harmful discharge, etc);
- assessed level of incident gravity: “it seems to be…” (e.g. “a relatively minor spill”, “major fire”, “explosion limited to one building”, etc.); and
- whether the Emergency Services have been required to attend.

Unless known for a fact, the answers to other questions should be politely deferred until a better assessment of the situation can be made.

The Boral person who is responsible for notifying the authorities (site/operations manager or environment manager) about the incident must prepare a notification log (a suitable form is attached) with the details of time of notifications and the persons who took to the call. The authorities are expected to log the calls but early indications are that this is not always the case.

Notification of all appropriate government authorities (at least 5 entities) may take considerable time. Delays may be experienced connecting to the right person or no contact may be possible after hours. All such instances should be recorded in the notification log.

9 Pollution incident authority contact list

Government authority – compulsory notification	Emergency notification phone number
EPA – Environment Line	131 555 or (02) 9995 5555
Fire and Rescue NSW (FRNSW)	1300 729 579
Inner West Council	(02) 9335 2222
Public Health Unit (Camperdown) – Sydney South West AHS	HealthLink (24 hr): 0 - 1800 063 635 Head Office – Camperdown: 0 - (02) 9515 9420
SafeWork NSW	131050 Company ABN if asked: 51 000 187 002
Government Authority - ring if relevant	**Emergency notification phone number**
Police & Ambulance	000
Roads and Maritime Services (road spills)	132 701
NSW Office of Water	8838 7885
Bush Fire Control Officer	1800 049 933
Poisons Information Centre	131 126
Ausgrid (power line emergencies)	13 13 88

Communication with the local community may also be undertaken depending on the circumstances of the pollution incident. Boral St Peters would consider the following options for providing early warning and ongoing information to the community on pollution incidents:

- Direct phone contact with any local residents directly impacted by the pollution incident;

- Letter box drops of incident information and site contacts to local residents impacted by the pollution incident; and
- Face to face notification with neighbours or other public stakeholders by a Boral staff representative.

The stakeholder relations manager (Paul Jackson, 0401 894097) can assist in the process of communicating with the community.

10 Incident response training

Boral St Peters will implement the PIRMP by training or providing information to relevant employees and contractors in relevant areas of the plan.

Training or information will be provided on the following;

- The contents and intent of this PIRMP,
- The roles and responsibilities of site staff in relation to this PIRMP;
- Spill response procedures;
- General environmental awareness; and / or
- Hazardous materials awareness.

11 PIRMP audit

The objectives of an audit are to maintain compliance with this plan. Internal audits of this plan will be undertaken every 3 years.

Routine testing of the plan will be conducted annually, and can be completed through the following methods:

- Simulated environmental emergency, or
- Desktop simulations.

12 PIRMP review

Revisions are to be coordinated by the site manager and environmental representative (HSE advisor or manager).

The objectives of a review are to:

- maintain compliance with the statutory requirements, and

- identify opportunities for improvement in the PIRMP, and reduce the risk to human health and the environment

12.1 Event based

Events which may trigger a review of this PIRMP or its associated documents include:

- Within 1 month of reporting to the nominated parties in accordance with the plan, after a pollution incident, or
- Modification/improvement to the system

12.2 Time based

Boral St Peters will review this management plan routinely every 12 months. The PIRMP review will include:

- This document, and
- Legislation, approval and licence changes.

APPENDIX 1.

RISK ASSESSMENT on POTENTIAL IMPACTS

Hazard and likelihood risk assessment and corrective control measures								
Site: Boral St Peters			**Responsible person:** Operations manager / site manager			**Review Date:** 31st August 2018		
Name / ref of pollutant/ chemicals	**Description of Hazard / Incident leading to hazard**	**Consequence**	**Likelihood**	**Risk**	**Impact on neighbours[1]**	**Control Measures Corrective Action Coverage under other Plans**	**Responsible person**	**Action date**
Diesel (mobile tanker – *when on site*)	**Incident 1** Loss of Fuel due to filling and refuelling from mobile tanker.	2	3	M(6)	N/A	Consequence: (Minor): Failure resulting in loss / leakage from re-fuelling of hose would land on unsealed areas, with potential for minor soil contamination, however spill kits & dust stockpiles would be used to contain spill and clean up (and land farm material). Likelihood: (Possible): Due to location outside of bunded area, it is possible for spills to occur at some occasions. Spill kits and checked regularly and replenished as required. Regular maintenance programs are in place for inspections on mobile plant.	As per PIRMP action plan	When required
Oils/Solvents/ Lubricants	**Incident 2** Loss of oils, solvents or lubricants inside container during delivery and or use	1	3	L(3)	N/A	Consequence: (Incidental): Failure resulting in loss of oils/solvents from packaged goods would be captured entirely by portable bunds with no release to soil or water. Likelihood: (Possible): Spillage during delivery could potentially occur. Hoses and decanting equipment are maintained in good structural integrity with low risk of failure.	As per PIRMP action plan	When required
Admixture chemicals	**Incident 3** Loss of admixture chemicals inside container during delivery and or use	1	3	L(3)	NA	Consequence: (Incidental): Failure resulting in loss of admixture chemicals from packaged goods would be captured entirely by bunds with no release to soil or water. Likelihood: (Possible): Spillage during delivery could potentially occur. Hoses and decanting equipment are maintained in good structural integrity	As per PIRMP action plan	When required

[1] If the incident may impact on neighbours then it will need to trigger the early warnings assessment and actions

						with low risk of failure.		
Aggregate Stockpiles	**Incident 4** Excessive airborne dust from stockpiled material	2	3	M(6)	Yes	Consequence: (Minor): Excessive dust from stockpile during high winds causing nuisance to surrounding area. Likelihood: (Possible): Excessive airborne dust could possibly leave site during windy conditions. Stockpiles are maintained to a manageable level on a monthly basis (below 8 metres). Use of water canon and water cart onsite during windy periods to minimise airborne dust. Stockpile sprays in place to assist in dust suppressions. Sprinklers used during munching operations. Operations cease in high wind conditions.	As per PIRMP action plan	When required
Aggregate Stockpiles	**Incident 5** Loading of stockpiled aggregate into trucks	2	3	M(6)	Yes	Consequence: (Minor): Excessive dust from stockpile during high winds causing nuisance to surrounding area. Likelihood: (Possible): Excessive airborne dust could possibly leave site during windy conditions. Stockpiles are maintained to a manageable level on a monthly basis (below 8 metres). Use of water cannon and water cart onsite during windy periods to minimise airborne dust. Trucks are loaded in a safe and manageable way to ensure minimal dust is created. They are also loaded in the middle of the yard to minimise dust travelling offsite. Stockpile sprays in place to assist in dust suppressions. Sprinklers used during munching operations. Operations cease in high wind conditions.	As per PIRMP action plan	When required
Aggregate Stockpiles	**Incident 6** Unloading of raw material (aggregate) from trains	2	3	M(6)	Yes	Consequence: (Minor): Excessive dust from unloading of raw material during high winds causing nuisance to surrounding area. Likelihood: (Possible): Excessive airborne dust could possibly leave site during windy conditions throughout delivery	As per PIRMP action plan	When required
Cement/ Flyash	**Incident 7** Loading of cement/flyash in silos from mobile tankers	3	2	M(6)	Yes	Consequence: (Incidental): Failure resulting in release of cement/flyash from silos when being filled by mobile cement tankers. Likelihood: (Unlikely): Release during delivery could potentially occur. Hoses, pipes and equipment are maintained in good structural integrity with low risk of failure. Silo savers are also installed so if there is a failure, there would be a small release of product that is released to the ground notifying employees of a failure.	As per PIRMP action plan	When required

Recycled Water Tanks	**Incident 8** Catastrophic failure of one or more recycled water tanks/pits releasing large volumes of water into off-site water courses (i.e. creek/canal).	3	2	M(6)	Yes	Consequence: (moderate): Catastrophic failure of one or more recycled water tanks/pits are likely to result in off-site impacts to water courses which would predominantly reduce water quality over a short period of time. Likelihood: (unlikely): Tanks/pits are frequently monitored and inspected for levels and integrity. Tanks/pits are segregated from mobile plant and operations. **Note:** For PIRMP purposes overflow events during extreme wet weather will not be immediately reported.	As per PIRMP action plan	When required
Mobile Plant (Boral)	**Incident 9** Mobile plant, hydraulic hose or fuel tank failure	2	3	M(6)	No	Consequence: (minor): Failure from fuel tank or hydraulic hoses would be maintained to a small localised area on site. Minor potential for soil contamination. Likelihood: (possible): Hose or fuel tank failure from mobile plant would be minimal as prestart and regular maintenance programs are in place to capture and prevent such occurrences. Spills kits also maintain and available in various areas. Dust stockpiles used to prevent spillages spreading.	As per PIRMP action plan	When required
Mobile plant (Contractor, visitor)	**Incident 10** Mobile plant, hydraulic hose or fuel tank failure	2	3	M(6)	No	Consequence: (minor): Failure from fuel tank or hydraulic hoses would be maintained to a small localised area on site. Likelihood: (possible): Hose or fuel tank failure from mobile plant would be minimal as prestart and regular maintenance programs are in place to capture and prevent such occurrences. Spills kits also maintain and available in various areas. Dust stockpiles used to prevent spillages spreading. Inductions for all contractors demonstrating their accountabilities and responsibilities for reporting environmental incidents.	As per PIRMP action plan	When required
Traffic areas (dust)	**Incident 11** Surface dust from mobile plant	2	3	M(6)	Yes	Consequence: (minor): Dust generated would only cause minor concern to surrounding neighbours. The area is light industrial with no sensitive neighbours. Likelihood: (possible): Dust created from continuous mobile plant operations across site. Main areas watered with water cart & sprinklers in high wind conditions. Cease operations in excessive wind conditions.	As per PIRMP action plan	When required
Mobile Plant (Agitator trucks)	**Incident 12** Loading of agitator trucks	1	3	L(3)	Yes	Consequence: (incidental): Failure from loading of cementitious material would be maintained to a small localised area around the agitator truck or on site. Minor potential for soil contamination. Likelihood: (possible): Spills kits or water carts are available in various areas if a release was to occur. Controlled and safe batching of product into agitator trucks minimise the risk of material being released.	As per PIRMP action plan	When required

APPENDIX 2.

PIRMP RESPONSE ACTIONS

Incident No 1

Incident 1	Loss of fuel due to filling and refueling from mobile tanker (when on site). Actions Required: • Contact all relevant people/department (refer to Immediate Reporting Contact Sheet) • Contact service provider (Caltex No. 1800033111 or Transpacific 02 96007185) to assist in clean up • Area to be restricted to Incident Response Personnel • Ensure spill kit available for any release • Utilise dust stockpiles to help prevent spreading of spillages • If any release onto unsealed soil/surface water - Environmental consultants to be engaged to investigate and remediate contamination. • Repair/replace tanks
Alarm raising	Any personnel involved or witnessing incident to report to immediate supervisor and PIRMP actions to be implemented.
Emergency Controller	• Mark Pizzol/Cam Madeira- Site Manager • Call service provider (Operations Manager) • Spill Kit manager (Supervisor)
Scale of incident	Incident would be restricted to diesel refueling area with minimal external impact. However, potential for spills or failure may result in soil and surface water contamination that will require specialist investigation/remediation.
Evacuate	• Only if fire or explosion potential exists. Site Manager / Operations Manager and any advice provided by Fire Dept as part of attendance after immediate notification.
Communications	Internal: • Geoff McDonnell - Operations Manager • Peter Scioscia – Environmental Representative External mandatory: • Immediate Reporting Contact Sheet to be used External non-mandatory: N/A

Rescuer / respondent + safety checks	As per Site Emergency Plan or Fire Department as part of Immediate Reporting
Rescue + First Aid	As per Site Emergency Plan or Fire Department as part of Immediate Reporting
Clean up and Waste disposal	Service Provider to dispose of diesel and advise on required clean-up.
Reporting and re-preparedness	See SOPs: • Incident Notification SOP (BCM NSW-HSEQ-3-02)

Incident No 2

Incident 2	Loss of oils, solvents or lubricants inside container during delivery and or use. Actions Required: • Contact all relevant people/department (refer to Immediate Reporting Contact Sheet) • Ensure bunds are capturing full volume of oils, solvents or lubricants • Ensure bund integrity is sound throughout the entire period of incident (i.e. periodic inspections) • Contact service provider (Caltex No. 1800033111 (or 1300 255 677) or Transpacific 02 96007185 (or) 02 8748 0900) to pump-out bund contents • Area to be restricted to Incident Response Personnel • Ensure spill kit available for any release from bund • If any release from bund onto unsealed soil/surface water - Environmental Consultants to be engaged to investigate and remediate contamination. • Repair/replace tanks • Inspect bund for ongoing serviceability
Alarm raising	Any personnel involved or witnessing incident to report to immediate supervisor and PIRMP actions to be implemented.
Emergency Controller	• Mark Pizzol/Cameron Madeira- Site Manager • Call service provider (Operations Manager) • Spill Kit manager (Supervisor) • Periodic inspections and update reporting of site and bund (Operations Manager)

Scale of incident	Incident would be restricted to chemical storage area with minimal external impact. However, potential for bund overflow or failure may result in soil and surface water contamination that will require specialist investigation/remediation.
Evacuate	• Only if fire or explosion potential exists. Operations Manager and any advice provided by Fire Dept as part of attendance after immediate notification.
Communications	Internal: • Geoff McDonnell - Operations Manager • Peter Scioscia – Environmental Representative External mandatory: • Immediate Reporting Contact Sheet to be used External non-mandatory: N/A
Rescuer / respondent + safety checks	As per Site Emergency Plan or Fire Department as part of Immediate Reporting
Rescue + First Aid	As per Site Emergency Plan or Fire Department as part of Immediate Reporting
Clean up and Waste disposal	Service Provider to dispose of diesel and advise on required clean-up.
Reporting and re-preparedness	See SOPs: • Incident Notification SOP (BCM NSW-HSEQ-3-02)

Incident No 3

Incident 3	Loss of admixture chemicals inside container during delivery and or use Actions Required: • Contact all relevant people/department (refer to Immediate Reporting Contact Sheet) • Ensure bunds are capturing full volume of admixture chemicals • Ensure bund integrity is sound throughout the entire period of incident (i.e. periodic inspections) • Contact service provider (Sika) to pump-out bund contents • Area to be restricted to Incident Response Personnel • Ensure spill kit available for any release from bund • If any release from bund onto unsealed soil/surface water - Environmental Consultants to be engaged to investigate and remediate contamination. • Repair/replace tanks • Inspect bund for ongoing serviceability
Alarm raising	Any personnel involved or witnessing incident to report to immediate supervisor and PIRMP actions to be implemented.
Emergency Controller	• Mark Pizzol/Cameron Madeira- Site Manager • Call service provider (Operations Manager) • Spill Kit manager (Supervisor) • Periodic inspections and update reporting of site and bund (Operations Manager)
Scale of incident	Incident would be restricted to chemical bund area with minimal external impact. However, potential for bund overflow or failure may result in soil and surface water contamination that will require specialist investigation/remediation.
Evacuate	• Only if fire or explosion potential exists. Operations Manager and any advice provided by Fire Dept as part of attendance after immediate notification.
Communications	Internal: • James Collings – Metro Quarries Operations Manager • Geoff McDonnell - Operations Manager • Peter Scioscia – Environmental Representative External mandatory: • Immediate Reporting Contact Sheet to be used External non-mandatory: N/A

Rescuer / respondent + safety checks	As per Site Emergency Plan or Fire Department as part of Immediate Reporting
Rescue + First Aid	As per Site Emergency Plan or Fire Department as part of Immediate Reporting
Clean up and Waste disposal	Service Provider to dispose of chemicals and advise on required clean-up.
Reporting and re-preparedness	See SOPs: • Incident Notification SOP (BCM NSW-HSEQ-3-02)

Incident No 4

Incident 4	Excessive airborne dust from stockpiled material. Actions Required: • Employees, Contractor/Visitor to notify site representative of issue immediately. (induction) • Daily monitoring to be undertaken to assess weather and site conditions • Contact all relevant people/department (refer to Immediate Reporting Contact Sheet) • Dust suppression activity to commence immediately on stockpiles
Alarm raising	Any personnel involved or witnessing incident to report to immediate supervisor and PIRMP actions to be implemented.
Emergency Controller	• Mark Pizzol/Cameron Madeira - Site Manager • Call service provider (Operations Manager) • Spill Kit manager (Supervisor) • Periodic inspections and update reporting of site and bund (Operations Manager)
Scale of incident	Incident would be localised to the area surrounding stockpile area, with minimal external impact.
Evacuate	• Only if fire or explosion potential exists. Operations Manager and any advice provided by Fire Dept as part of attendance after immediate notification.

Communications	Internal: • James Collings – Metro Quarries Operations Manager • Geoff McDonnell - Operations Manager • Peter Scioscia – Environmental Representative External mandatory: • Immediate Reporting Contact Sheet to be used External non-mandatory: N/A
Rescuer / respondent + safety checks	As per Site Emergency Plan or Fire Department as part of Immediate Reporting
Rescue + First Aid	As per Site Emergency Plan or Fire Department as part of Immediate Reporting
Clean up and Waste disposal	Service Provider to dispose of diesel and advise on required clean-up.
Reporting and re-preparedness	See SOPs: • Incident Notification SOP (BCM NSW-HSEQ-3-02)

Incident No 5

Incident 5	Loading of stockpiled aggregate into trucks Actions Required: • Employees, Contractor/Visitor to notify site representative of issue immediately. (induction) • Daily monitoring to be undertaken to assess weather and site conditions • Contact all relevant people/department (refer to Immediate Reporting Contact Sheet) • Dust suppression activity to commence immediately on stockpiles

Alarm raising	Any personnel involved or witnessing incident to report to immediate supervisor and PIRMP actions to be implemented.
Emergency Controller	• Cameron Madeira - Site Manager • Call service provider (Operations Manager) • Spill Kit manager (Supervisor) • Periodic inspections and update reporting of site and bund (Operations Manager)
Scale of incident	Incident would be localised to the area surrounding stockpile area, with minimal external impact.
Evacuate	• Only if fire or explosion potential exists. Operations Manager and any advice provided by Fire Dept as part of attendance after immediate notification.
Communications	Internal: • James Collings – Metro Quarries Operations Manager • Geoff McDonnell - Operations Manager • Peter Scioscia – Environmental Representative External mandatory: • Immediate Reporting Contact Sheet to be used External non-mandatory: N/A
Rescuer / respondent + safety checks	As per Site Emergency Plan or Fire Department as part of Immediate Reporting
Rescue + First Aid	As per Site Emergency Plan or Fire Department as part of Immediate Reporting
Clean up and Waste disposal	Service Provider to dispose of diesel and advise on required clean-up.
Reporting and re-preparedness	See SOPs: • Incident Notification SOP (BCM NSW-HSEQ-3-02)

Incident No 6

Incident 6	Unloading of raw material (aggregate) from trains Actions Required: • Employees, Contractor/Visitor to notify site representative of issue immediately. (induction) • Daily monitoring to be undertaken to assess weather and site conditions • Contact all relevant people/department (refer to Immediate Reporting Contact Sheet) • Dust suppression activity to commence immediately on stockpiles
Alarm raising	Any personnel involved or witnessing incident to report to immediate supervisor and PIRMP actions to be implemented.
Emergency Controller	• Cameron Madeira - Site Manager • Call service provider (Operations Manager) • Spill Kit manager (Supervisor) • Periodic inspections and update reporting of site and bund (Operations Manager)
Scale of incident	Incident would be localised to the area surrounding stockpile area, with minimal external impact.
Evacuate	• Only if fire or explosion potential exists. Operations Manager and any advice provided by Fire Dept as part of attendance after immediate notification.
Communications	Internal: • James Collings – Metro Quarries Operations Manager • Geoff McDonnell - Operations Manager • Peter Scioscia – Environmental Representative External mandatory: • Immediate Reporting Contact Sheet to be used External non-mandatory: N/A
Rescuer / respondent + safety checks	As per Site Emergency Plan or Fire Department as part of Immediate Reporting
Rescue + First Aid	As per Site Emergency Plan or Fire Department as part of Immediate Reporting

Clean up and Waste disposal	Service Provider to dispose of diesel and advise on required clean-up.
Reporting and re-preparedness	See SOPs: • Incident Notification SOP (BCM NSW-HSEQ-3-02)

Incident No 7

Incident 7	Loading of cement/flyash in silos from mobile tankers Actions Required: • Contact all relevant people/department (refer to Immediate Reporting Contact Sheet) • Area to be restricted to Incident Response Personnel • Ensure spill kit available for small release, and water carts for large release • If any release onto unsealed soil/surface water - Environmental Consultants to be engaged to investigate and remediate contamination. • Repair/replace silo filters • Inspect silos for ongoing serviceability
Alarm raising	Any personnel involved or witnessing incident to report to immediate supervisor and PIRMP actions to be implemented.
Emergency Controller	• Mark Pizzol/Cameron Madeira - Site Manager • Call service provider (Operations Manager) • Spill Kit manager (Supervisor) • Periodic inspections and update reporting of site and bund (Operations Manager)
Scale of incident	Incident would be restricted to silo area with minimal external impact. However, potential for bund overflow or failure may result in soil and surface water contamination that will require specialist investigation/remediation.
Evacuate	• Only if fire or explosion potential exists. Operations Manager and any advice provided by Fire Dept as part of attendance after immediate notification.

Communications	Internal: • Geoff McDonnell - Operations Manager • Peter Scioscia – Environmental Representative External mandatory: • Immediate Reporting Contact Sheet to be used External non-mandatory: N/A
Rescuer / respondent + safety checks	As per Site Emergency Plan or Fire Department as part of Immediate Reporting
Rescue + First Aid	As per Site Emergency Plan or Fire Department as part of Immediate Reporting
Clean up and Waste disposal	Service Provider to dispose of diesel and advise on required clean-up.
Reporting and re-preparedness	See SOPs: • Incident Notification SOP (BCM NSW-HSEQ-3-02)

Incident No 8

Incident 8	Catastrophic failure of one or more recycled water tanks/pits releasing large volumes of water into off-site water courses (i.e. creek/canal). Actions Required: • Contact all relevant people/department (refer to Immediate Reporting Contact Sheet) • Contact local neighbours if going to be in inundated by rise of water • Area to be restricted to Incident Response Personnel • If any release from site onto unsealed soil/surface water - Environmental Consultants to be engaged to investigate and remediate contamination if any
Alarm raising	Any personnel involved or witnessing incident to report to immediate supervisor and PIRMP actions to be implemented.
Emergency	• Mark Pizzol/Cameron Madeira - Site Manager

Controller	• Call service provider (Operations Manager) • Spill Kit manager (Supervisor) • Periodic inspections and update reporting of site and bund (Operations Manager)
Scale of incident	Catastrophic failure of one or more recycled water tanks/pits are likely to result in off-site impacts to water courses which would predominantly reduce water quality over a short period of time. As such, impact to the environment/human health is not considered to be significant.
Evacuate	• Only if flood potential exists. Operations Manager and any advice provided by Fire Dept as part of attendance after immediate notification.
Communications	Internal: • Geoff McDonnell - Operations Manager • Peter Scioscia – Environmental Representative External mandatory: • Immediate Reporting Contact Sheet to be used External non-mandatory: N/A
Rescuer / respondent + safety checks	As per Site Emergency Plan or Fire Department as part of Immediate Reporting
Rescue + First Aid	As per Site Emergency Plan or Fire Department as part of Immediate Reporting
Clean up and Waste disposal	Consultants to be contacted to advise on required clean-up.
Reporting and re-preparedness	See SOPs: • Incident Notification SOP (BCM NSW-HSEQ-3-02)

Incident No 9

Incident 9	Mobile plant, hydraulic hose or fuel tank failure. Actions Required: • Contact all relevant people/department (refer to Immediate Reporting Contact Sheet) • Area to be restricted to Incident Response Personnel • Ensure spill kit available for any release from mobile plant & equipment • Utilise fine aggregate / sand stockpiles to prevent spreading of spillages. • If any release from bund onto unsealed soil/surface water - Environmental Consultants to be engaged to investigate and remediate contamination. • Call service provider to inspect plant & equipment for serviceability
Alarm raising	Any personnel involved or witnessing incident to report to immediate supervisor and PIRMP actions to be implemented.
Emergency Controller	• Mark Pizzol/Cameron Madeira - Site Manager • Call service provider (Operations Manager) • Spill Kit manager (Supervisor) • Periodic inspections and update reporting of site and bund (Operations Manager)
Scale of incident	Incident would be localised to the area with no external impact.
Evacuate	• Only if fire or explosion potential exists. Site Manager and any advice provided by Fire Dept as part of attendance after immediate notification.
Communications	Internal: • Geoff McDonnell - Operations Manager • Peter Scioscia – Environmental Representative External mandatory: • Immediate Reporting Contact Sheet to be used External non-mandatory: N/A

Rescuer / respondent + safety checks	As per Site Emergency Plan or Fire Department as part of Immediate Reporting
Rescue + First Aid	As per Site Emergency Plan or Fire Department as part of Immediate Reporting
Clean up and Waste disposal	Service Provider to dispose of diesel and advise on required clean-up.
Reporting and re-preparedness	See SOPs: • Incident Notification SOP (BCM NSW-HSEQ-3-02)

Incident No 10

Incident 10	Mobile plant, hydraulic hose or fuel tank failure from contractors / visitors. Actions Required: • Contractor/Visitor to notify site representative of issue immediately. (induction) • Contact all relevant people/department (refer to Immediate Reporting Contact Sheet) • Area to be restricted to Incident Response Personnel • Ensure spill kit available for any release from mobile plant & equipment • If any release from bund onto unsealed soil/surface water - Environmental Consultants to be engaged to investigate and remediate contamination. • Call service provider to inspect plant & equipment for serviceability
Alarm raising	Any personnel involved or witnessing incident to report to immediate supervisor and PIRMP actions to be implemented.
Emergency Controller	• Mark Pizzol/Cameron Madeira - Site Manager • Call service provider (Operations Manager) • Spill Kit manager (Supervisor) • Periodic inspections and update reporting of site and bund (Operations Manager)
Scale of incident	Incident would be localised to the area with no external impact.

Evacuate	• Only if fire or explosion potential exists. Operations Manager and any advice provided by Fire Dept as part of attendance after immediate notification.
Communications	Internal: • Geoff McDonnell - Operations Manager • Peter Scioscia – Environmental Representative External mandatory: • Immediate Reporting Contact Sheet to be used External non-mandatory: N/A
Rescuer / respondent + safety checks	As per Site Emergency Plan or Fire Department as part of Immediate Reporting
Rescue + First Aid	As per Site Emergency Plan or Fire Department as part of Immediate Reporting
Clean up and Waste disposal	Service Provider to dispose of contaminates.
Reporting and re-preparedness	See SOPs: • Incident Notification SOP (BCM NSW-HSEQ-3-02)

Incident No 11

Incident 11	Dust from traffic areas. Actions Required: • Employees, Contractor/Visitor to notify site representative of issue immediately. (induction) • Daily monitoring to be undertaken to capture weather and site conditions • Contact all relevant people/department (refer to Immediate Reporting Contact Sheet) • Dust suppression activity to commence immediately on unsealed roads & dusty areas of site
Alarm raising	Any personnel involved or witnessing incident to report to immediate supervisor and PIRMP actions to be implemented.
Emergency Controller	• Mark Pizzol/Cameron Madeira - Site Manager • Operations Manager to instruct site personnel (Operations Manager)
Scale of incident	Incident would be localised to the area with minimal external impact.
Evacuate	Only if fire or potential exists. Operations Manager and any advice provided by Fire Dept as part of attendance after immediate notification.
Communications	Internal: • Geoff McDonnell - Operations Manager • Peter Scioscia – Environmental Representative External mandatory: • Immediate Reporting Contact Sheet to be used External non-mandatory: N/A
Rescuer / respondent + safety checks	As per Site Emergency Plan or Fire Department as part of Immediate Reporting
Rescue + First Aid	As per Site Emergency Plan or Fire Department as part of Immediate Reporting
Clean up and Waste disposal	N/A
Reporting and re-preparedness	See SOPs: • Incident Notification SOP (BCM NSW-HSEQ-3-02)
Alarm raising	Any personnel involved or witnessing incident to report to immediate supervisor and PIRMP actions to be implemented.

Incident No 12

Incident 12	Loading of agitator trucks Actions Required: • Contractor/Visitor to notify site representative of issue immediately. (induction) • Contact all relevant people/department (refer to Immediate Reporting Contact Sheet) • Area to be restricted to Incident Response Personnel • Ensure spill kit available for any release from mobile plant & equipment • If any release from bund onto unsealed soil/surface water - Environmental Consultants to be engaged to investigate and remediate contamination. • Call service provider to inspect plant & equipment for serviceability
Alarm raising	Any personnel involved or witnessing incident to report to immediate supervisor and PIRMP actions to be implemented.
Emergency Controller	• Mark Pizzol - Site Manager • Call service provider (Operations Manager) • Spill Kit manager (Supervisor) • Periodic inspections and update reporting of site and bund (Operations Manager)
Scale of incident	Incident would be localised to the area with no external impact.
Evacuate	• Only if fire or explosion potential exists. Operations Manager and any advice provided by Fire Dept as part of attendance after immediate notification.
Communications	Internal: • Geoff McDonnell - Operations Manager • Peter Scioscia – Environmental Representative External mandatory: • Immediate Reporting Contact Sheet to be used External non-mandatory: N/A

Rescuer / respondent + safety checks	As per Site Emergency Plan or Fire Department as part of Immediate Reporting
Rescue + First Aid	As per Site Emergency Plan or Fire Department as part of Immediate Reporting
Clean up and Waste disposal	Service Provider to dispose of contaminates.
Reporting and re-preparedness	See SOPs: • Incident Notification SOP (BCM NSW-HSEQ-3-02)

APPENDIX 3.

Boral St Peters location map

APPENDIX 4.

Pollution incident notification log

Person undertaking notification (Name/Function):		
Date and time when first become aware of the incident:		
Incident type:		
Comments:		

Initial immediate notification log				
Appropriate Regulatory Authority	**Time of call**	**Respondent's name/function**	**Approximate call duration**	**Comments**
EPA				
Public Health Unit				
Fire and Rescue NSW				
Local Council				
WorkCover				
Other:				
Other:				
Summary of initial communication:				

Person undertaking notification (Name/Function):	
Date and time when additional information become available:	
Comments:	

Immediate notification of further pertinent information (if applicable)				
Appropriate Regulatory Authority	**Time of call**	**Respondent's name/function**	**Approximate call duration**	**Comments**
EPA				
Public Health Unit				
Fire and Rescue NSW				
Local Council				
WorkCover				
Other:				
Other:				
Summary of additional communication				

Appendix D

Site layout plans

Piles under Agg Bin widening
~15m deep, 750mm diam, 3m spacing

Minor surface works

Piles under Silo/Plant
~20m depth 750mm diam 3m spacing

Minor Surface works

Reclaimer conveyor under rear of bins
4m wide x 4m deep full length of back wall

Wall footings
3m wide x 3m deep

Agg bin wall footings
3m deep piers 750mm diam 3m spacing

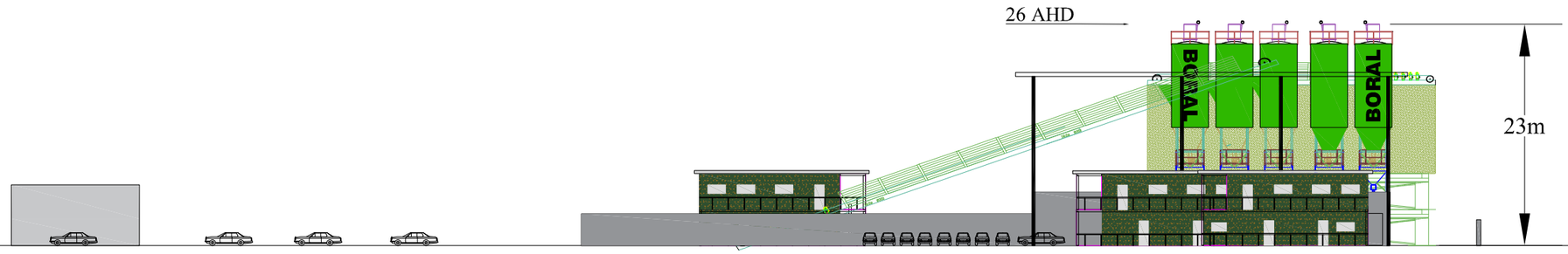
Dump Station
5m depth - mass excavation

0m 10m 20m 30m 40m 50m 60m 70m 80m 90m 100m

Revision	Amendment	Date

BORAL RESOURCES (NSW) PTY LTD
Triniti 2, 39 Delhi Road, North Ryde NSW 2113
www.boral.com.au

Client	BORAL RESOURCES (NSW) PTY. LTD.	Drawn	RF	Scale	1:1000
Project	St Peters Mod 11	Designed	RF	Date	25/05/18
		Checked	PM		
Title	Excavation Details	Size	A3	Drawing No.	STP001
		Sheet	7	Revision	1

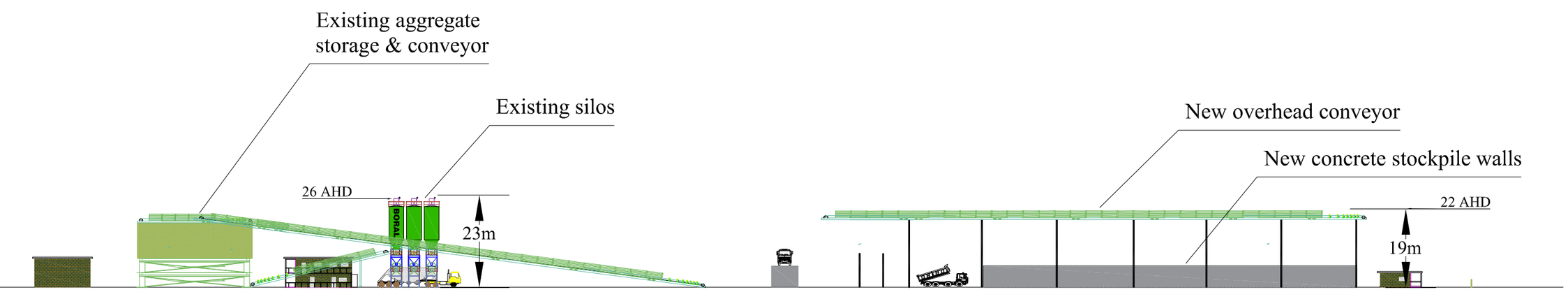


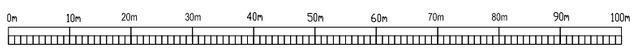
Revision	Amendment	Date

BORAL RESOURCES (NSW) PTY LTD
Triniti 2, 39 Delhi Road, North Ryde NSW 2113
www.boral.com.au

Client	BORAL RESOURCES (NSW) PTY. LTD.
Project	St Peters Concrete Batch Plant Mod 11
Title	North East Elevation

Drawn	RF	Scale	NTS
Designed	RF	Date	11/03/18
Checked	RF		
Size A3	Drawing No. STP002	Sheet 2	Revision 1





Revision	Amendment	Date

BORAL RESOURCES (NSW) PTY LTD

Triniti 2, 39 Delhi Road, North Ryde NSW 2113

www.boral.com.au

Client	BORAL RESOURCES (NSW) PTY. LTD.	Drawn	RF	Scale	NTS
Project	St Peters Concrete Batch Plant Mod 11	Designed	RF	Date	11/03/18
		Checked	RF		
Title	South East Elevation	Size A3	Drawing No. STP002	Sheet 1	Revision 1

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