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30 September 2014

P0242 JWP Moonee Beach TIA Ver02

J W Planning
13/478 The Esplanade,
Warners Bay NSW 2282

Attn: Trevor Allen

Dear Trevor,

Re: Traffic Impact Statement for the proposed residential development at Moonee Beach, NSW

We have now completed our study work for the above project, undertaken site work and collected traffic data. The traffic impact assessment in Table 1 has been completed in accordance with the requirements of the RTA Guide to Traffic Generating Developments and the Austroads Guidelines.

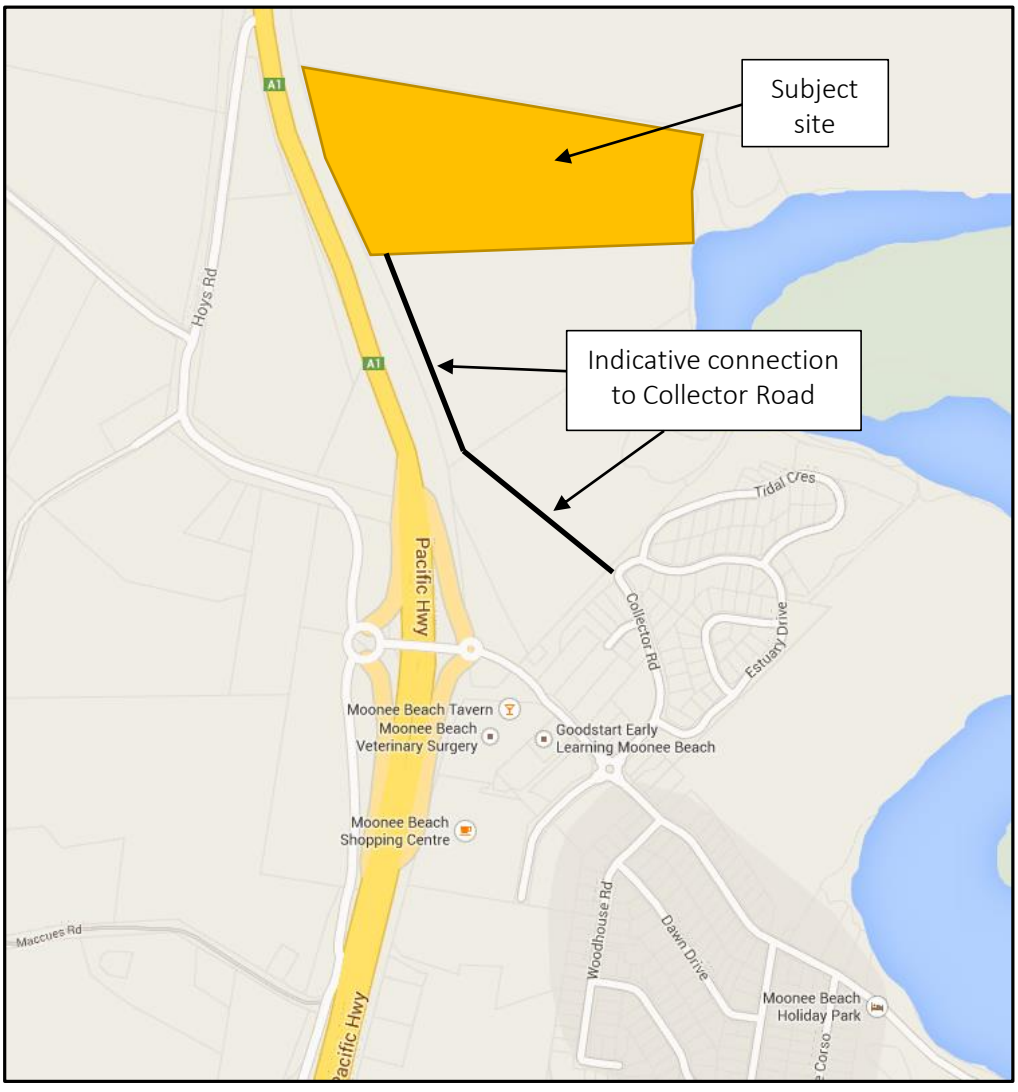


Figure 1 – Site location

Table 1 – Traffic Impact Assessment

Item	Comment
2.1.1 Site Location and Access	The site is located to the north of Moonee Beach and has frontage to the Pacific Highway. No access will be provide direct to the Pacific Highway, with all vehicle access to be provide via an approved access road connecting to Estuary Drive / Collector Road.
2.2.1 Road Hierarchy	The main road through the locality is the Pacific Highway (A1) along the western boundary of the site. This forms part of the national road network running along the east coast of Australia providing an important local, regional and national route for freight movements and all other traffic. It provides access to a number of towns and major centres throughout the locality including Coffs Harbour to the south through to Grafton and then on to Queensland to the north. It carries a reasonably high volume of traffic with significant seasonal demands, reflecting its role and function within the road network. The highway has been upgraded in this locality to provide 2 lanes of travel in both directions with access provided via grade separated interchanges to maintain capacity and road safety. Access to the town of Moonee Beach is provided via **Moonee Beach Road** to the south of the subject site. Moonee Beach Road connects with the Pacific Highway via a grade separated intersection allowing for all turning movements. Moonee Beach Road provides a single lane of travel in both directions with additional lanes provided at the key intersections to maintain capacity and reduce delays. As a residential area it operates under the posted speed limit of 50 km/h. Moonee Beach Road connects with **Estuary Drive** via a 4-way roundabout. Estuary Drive provides a connection to the local residential development in this location providing a single lane of travel in both directions and an overall pavement width of 10.0 metres. There is a footpath along one side only adjacent to the residential development with no footway or driveways on the opposite side of the road. Estuary Drive runs into **Collector Road** which allows for connection to the subject site.
2.2.2 Roadworks	None noted in the vicinity of the site. It is understood that there are no road works in the general locality except for Council maintenance work as required. The RMS have upgraded the Pacific Highway in this location, with the road upgraded to dual carriageway standard with controlled access points and grade separated intersections. There is a grade separated intersection with Moonee Beach Road which allows for access to the subject site and the general locality of Moonee Beach. This road upgrade allows for a high quality road network and a significant capacity upgrade over the previous at grade connection between the Pacific Highway and Moonee Beach.
2.2.3 Traffic Management Works	None noted.
2.2.4 Pedestrian and Cycling Facilities	The recent development within Moonee Beach has allowed for the provision of footpaths, but they do not provide a consistent route. However, the traffic flows in the locality are relatively low and as such pedestrians can walk along the verges or on the side of the roads if required. There are limited local cycling facilities within the general locality of the subject site. It is noted that there is a sealed shoulder in both directions

<table>
<tr><th>Item</th><th>Comment</th></tr>
<tr><td></td><td>on the Pacific Highway and during the site work a number of regular cyclists were observed riding along these shoulders.</td></tr>
<tr><td>2.2.5 Public Transport</td><td>Ryans Bus Service provide a twice daily service between Graton to the north and Coffs Harbour to the south and connect with Moonee Beach. The main services are Monday to Friday and provide a service for school children to access schools in the Coffs Harbour area.</td></tr>
<tr><td>2.3 Traffic Flows</td><td></td></tr>
<tr><td>2.3.1 Daily Traffic Flows</td><td>Traffic data for the locality has been collected by Seca Solution during the morning and afternoon peak hours, as part of the study work. Traffic flows were collected at the intersection of Moonee Beach Road and Estuary Drive and a summary of the traffic flows is given below:

<table>
<tr><th>Street</th><th>Direction</th><th>Direction</th><th>2-way</th></tr>
<tr><td>Moonee Beach Road</td><td>160 AM west
305 PM east</td><td>124 AM west
125 PM east</td><td>284 AM
430 PM</td></tr>
<tr><td>Estuary Drive</td><td>11 AM north
43 PM north</td><td>35 AM south
30 PM south</td><td>46 AM
73 PM</td></tr>
</table>

Based on peak hour flows typically representing some 10% of the daily flows, this would indicate that the daily 2-way traffic movement on Moonee Beach Road between the highway and the roundabout could be in the order of 3,570 whilst on Estuary Drive could be in the order of 595 vehicles per day 2-way in this location.</td></tr>
<tr><td>2.3.2 Daily Traffic Flow Distribution</td><td>Daily traffic movements are reasonably balanced in both directions along the local road network. It was noted during site work that there were a significant number of vehicles turning off the highway and completing a U-turn at the roundabout, due to the raised central median which stops right turn movements to access the Moonee Beach Tavern area and adjacent retail outlets. This was particularly noticeable during the afternoon surveys.</td></tr>
<tr><td>2.3.3 Vehicle Speeds</td><td>No speed surveys were completed as part of the study work. However it is considered that traffic does not speed in this location due to interaction with the various intersections and the short distance between the highway and the roundabout. Drivers also drive at appropriate speeds along Estuary Drive / Collector Road.</td></tr>
<tr><td>2.3.4 Existing Site Flows</td><td>The site is currently vacant so generates no traffic movements.</td></tr>
<tr><td>2.3.5 Heavy Vehicle Flows</td><td>There are high heavy vehicle movements along the Pacific Highway, associated with local and interstate transport needs. Heavy vehicle movements on Moonee Beach Road are very low, generally associated with deliveries to the various commercial outlets within the shopping centre of Moonee Beach.</td></tr>
<tr><td>2.3.6 Current Road Network Operation</td><td>Observations on site during the morning and afternoon peak periods show that the intersection of Moonee Beach Road and Estuary Drive works well with minimal delays. There are no delays for traffic entering or exiting the Pacific Highway, due to the grade separated intersection design.</td></tr>
<tr><td>2.4 Traffic Safety and Accident History</td><td>Previous information provided by the RMS indicates that there has been a single recorded accident within the general locality of the site. It is noted that since this accident the road network has been upgraded as</td></tr>
</table>

Item	Comment
	part of the Pacific Highway upgrade and the upgrade provides a safe and high standard of road. The local residential roads providing access to the subject site provide a wide and reasonably straight alignment and as such will not create any safety concerns.
2.5 Parking Supply and Demand	
2.5.1 On-street Parking Provision	Parking is permitted along both sides of the local residential roads within Moonee Beach. No parking is permitted along Moonee Beach Road between the Pacific Highway and the roundabout at Estuary Drive.
2.5.3 Parking Demand and Utilisation	During the site work, it was noted that the kerb side parking along both sides of Estuary Drive and Collector Road is very low, with the majority of local residents parking within the individual lots.
2.5.4 Set down or pick up areas	There are no designated set down areas in the immediate locality of the subject site.
2.6 Public Transport	
2.6.1 Rail Station Locations	The area is not served by trains.
2.6.2 Bus Stops and Associated Facilities	There are informal bus stops provided within Moonee Beach which allow for school bus pick up and drop off.
2.6.3 Pedestrians	There are limited footpaths within the locality. There is typically a single footpath provided along the major road routes, allowing for local connections. The minor roads have no footpaths, but the low traffic flows allow pedestrians to walk on the road pavement as required or the verges.
2.7 Other Proposed Developments	No other significant developments noted.
3. The Development	
3.1 The Development	The project involves the development of a new residential subdivision with some 104 residential lots to be provide. All vehicle access will be provide via a road link that will connect to the northern end of Collector Road which currently ends in a stub. An internal road network will be provided on site to allow for access to each individual lot.
3.1.1 Nature of Development	Residential subdivision.
3.1.2 Access and Circulation Requirements	All vehicle access is provided via Collector Road and all vehicles will be able to enter and exit the site in a forward direction.
3.2 Access	Access will be provided via an extension of Collector Road. The main access road is 9 metres wide with the side roads varying in width from 8 metres down to a minimum of 6 metres, reflective of the lower traffic demands on the side roads.
3.2.1 Driveway Location	The driveway locations to the individual lots will be subject to a separate DA for each site and will comply with Council requirements.
3.2.2 Sight Distances	Posted speed limit of 50 km/h on the local roads. Based upon Austroads requirements the sight distance requirements at intersections is 80 metres. The internal roads connect at right angles to maximise visibility and as such the 80 metres visibility requirement will be met. For the intersection of Estuary Drive and Moonee Beach Road, the roundabout is well laid out and provides good visibility on the approaches. Once on the immediate approach to the roundabout, visibility for 80 metres is available on all legs.
3.2.3 Service Vehicle Access	No dedicated service vehicle access is required. Access for Council refuse collection vehicles is required and the internal road network has been designed in accordance with Council requirements which caters for these vehicles.

Item	Comment
3.2.4 Queuing at entrance to site	No vehicle queues expected at site entry / exit point. The traffic flows in the general locality of the subject site are low which allows for ease of access for the traffic associated with the development.
3.2.5 Comparison with existing site access	The site currently has a simple gated access to the Pacific Highway which is not suitable for use with the residential subdivision. There will be no access between the new residential development and the Pacific Highway.
3.2.6 Access to Public Transport	The existing public transport primarily allows for connection to the schools in Coffs Harbour for children. Discussion with the bus provider indicates that bus patronage is monitored and additional routes / buses are provided as needed, to ensure all school children can be transported to school as required.
3.3 Circulation	
3.3.1 Pattern of circulation	All vehicles will be able to enter and exit the site in a forward direction. The internal roads have been designed in accordance with Council requirements and allow for vehicles to circulate around the site.
3.3.2 Road width	The internal road widths have been determined in accordance with the Council DCP and reflective of the road hierarchy and associated traffic demands.
3.3.3 Internal Bus Movements	As part of the development, a bus stop has been provided on the corner of Road 1 (the primary access road) and Road 2 to allow for a future expansion of the bus route that provides access for school children. The layout of the site allows for a bus to circulate around the site.
3.3.4 Service Area Layout	No service area is required for a residential development. Any parking requirements for servicing can be accommodated on street.
3.4 Parking	
3.4.1 Proposed Supply	In accordance with Council requirements, with the parking provided for each lot. The garage and driveway design will allow for parking in accordance with Council requirements.
3.4.2 Authority Parking	Minimum requirement for one parking if less than 100 m^2 GFA or two spaces if greater than 100 m^2 GFA.
3.4.3 Parking Layout	Determined as part of separate development application for each lot.
3.4.4 Parking Demand	Normal parking demands can be accommodated on site in accordance with Council requirements. Additional parking for peak events e.g. parties can be accommodated on street as required.
3.4.5 Service Vehicle Parking	No dedicate service vehicle parking required. Service vehicles can park on street as required.
3.4.6 Pedestrian and Bicycle Facilities	Pedestrian paths will be provided in accordance with the Council DCP and detailed as part of the detailed design process for the project. The new roads being provided as part of the development are in accordance with the DCP and allow for a verge / footpath to be provided as required. No dedicated cyclist facilities will be provided within the subdivision. Given the relatively low traffic flows within the subdivision cyclists will be able to ride on road in a safe environment. It is noted however that the Coffs Harbour City Council Moonee Release Area Developer Contributions Plan 2013 (s94 Plan) does provide for the provision of cycling and pedestrian facilities in the area including a district cycleway and the Coastal Walk (Map 5 of the s94 Plan).
4. Traffic Analysis	
4.1 Traffic Generation	Standard traffic generation rates provide by the RTA Guide to Traffic Generating Development have been used as a basis for determining the future traffic flows associated with the development. This guide provides

Item	Comment
	a morning rate of 0.71 per dwelling and an afternoon rate of 0.78 per dwelling. The daily rate is given at 7.4 trips per dwelling. For the 104 lot development, this gives additional flows of 74 in the AM peak, 81 in the PM peak and 770 per day.
4.1.1 Daily and Seasonal Factors	Limited annual variation expected.
4.1.2 Pedestrian Movements	Pedestrian movements are considered to be relatively low, given the location of the development, with the majority of attractions being located in Coffs Harbour to the south requiring vehicle travel. Local attractions would include the shops within Moonee Beach and the beach front. These are leisure orientated facilities and will not be major pedestrian generators. Pedestrians facilities associated with the Coastal Walk are provided in the s94 Plan and an access track is proposed as part of this development.
4.2 Traffic Distribution and Assignments	All traffic will access the site via the roundabout controlled intersection of Moonee Beach Road and Estuary Drive. The majority of traffic will then head towards the Pacific Highway to access the numerous facilities within Coffs Harbour.
4.2.1 Origin / destinations assignment	Assumed all traffic will travel via the above roundabout and that 90% of traffic will then use the Pacific Highway to access Coffs Harbour.
4.3 Impact on Road Safety	It is considered that the proposed development will have a minimal impact upon road safety. The RMS have indicated that there has been very few accidents within the general locality of the site over a 5 year timeframe, reflective of the combination of low traffic flows and well-designed roads. The upgrade to the Pacific Highway and the associated works on the side road allow for the safe movement of vehicles. The major impact could be at the roundabout controlled intersection of Moonee Beach Road and Estuary Drive and this roundabout currently operates very well with minimal delays. The intersection is well laid out and provides good visibility to allow for safe traffic control.
4.4 Impact of Generated Traffic	
4.4.1 Impact on Daily Traffic Flows	The overall impact upon daily traffic flows in the locality will be relatively low and within the capacity of the local roads. The RTA Guide to Traffic Generating Development indicates that the development could generate 74 to 81 vehicle movements during the critical peak hours. The current 2-way traffic flow on the southern end of Estuary Drive are 46 in the AM peak and 73 in the PM peak, and these could increase to 120 and 154 respectively. The RMS's Guide to Traffic Generating Developments provides advice on environmental limits for residential roads for peak hours, and it is considered that if the peak hour impacts are acceptable then the daily impacts are also acceptable. The RMS guide states that for a local street, the maximum environmental limit is 300 vehicles per hour. It can be seen that the above maximum flow of 154 vehicles is well within this limit and therefore acceptable.
4.4.2 Peak Hour Impacts on Intersections	The major impact of the redevelopment of the subject site would be at the roundabout controlled intersection of Moonee Beach Road and Estuary Drive. Observations on site show that this roundabout currently operates very well with minimal delays and congestion. As part of the project work, Seca Solution collected traffic data at this roundabout during both the AM and PM peaks and have completed a

Item	Comment
	Sidra modelling assessment of the roundabout. The results of this modelling are presented below.
4.4.3 Impact of Construction Traffic	Majority of construction work contained within site so minimal impact upon external road network. There will be a requirement for construction machinery to access the site and traffic associated with workers. A Traffic Management Plan may be required for work on site and access controls. This will be completed as part of the design process by the contractor on site. All contractor vehicles will be able to park within the site, with no impact upon the external road network.
4.4.4 Other Developments	A number of other residential subdivisions are proposed within the general locality of the subject site. These include residential subdivisions to the north and south of the subject site which will also gain access via Collector Road / Estuary Drive to Moonee Beach Road. These development are currently in planning stages and have not commenced construction. Additional residential development is also occurring to the south of Moonee Beach which will also gain access to the Pacific Highway via Moonee Beach Road. The traffic associated with this additional residential development has been taken into account with the Sidra modelling below.
4.5 Public Transport	
4.5.1 Options for improving services	As outlined in the s94 Plan there are limited options available. The subject site is not a major generator / attractor for public transport. The current bus services in the vicinity of the site are reasonably good and provide access to Coffs Harbour for school children. The capacity of the current buses will be monitored by the bus company as part of their operations and the bus service expanded as required to meet these demands.
4.5.2 Pedestrian Access to Bus Stops	Pedestrians can access the existing bus stops on Moonee Beach Road via the existing path along Collector Road. The development site has also allowed for a bus stop to be provided within the site that could be used for the buses which ensures all future residents are within a 400 metre walk of the bus stop. The s94 Plan identifies and funds 18 bus shelters including seating and layovers, throughout the area. Two of these are adjacent to the site.
4.6 Recommended Works	
4.6.1 Improvements to Access and Circulation	None required. Ensure future driveway crossings are designed and constructed in accordance with Council requirements.
4.6.2 Improvements to External Road Network	None required as the future traffic flows associated with the development are within the capacity of the existing road network. The key intersection of Moonee Beach Road and Estuary Drive has been assessed with Sidra and shows that the roundabout will continue to operate well with minimal delay and congestion. The connection of Moonee Beach Road to the Pacific Highway is a grade separated intersection providing a high quality connection with considerable capacity. The network modelling completed as part of the upgrade of the Pacific Highway in this location allowed for the continual development along the Pacific Highway corridor and caters for the additional traffic associated with the development of the subject site.
4.6.3 Improvements to Pedestrian Facilities	No upgrades required. Pedestrian facilities within the development will be provided in accordance with the Council DCP and will connect to the existing path along the side of Collector Road / Estuary Drive to allow

Item	Comment
	for ease of connection between the subject site and the external attractions.
4.6.4 Effect of Recommended Works on Adjacent Developments	No impact as no external works recommended.
4.6.5 Effect of Recommended Works on Public Transport Services	Nil
4.6.6 Provision of LATM Measures	None required
4.6.7 Funding	No external road upgrades required. Site access and internal roads will be funded by the developer.

Sidra modelling – intersection of Moonee Beach Road and Estuary Drive

The current traffic flows surveyed by Seca Solution were used to assess the current operation of the roundabout at the intersection of Moonee Beach Road and Estuary Drive. The results of this current operation are presented below.

Table 2 - Current operation of roundabout at Moonee Beach Drive / Estuary Drive

Approach	Level of service	Delay (seconds)	Queue (metres)
Access to shopping centre	A / A	5.4 / 5.4	1.2 / 3.0
Moonee Beach Road east	A / A	5.1 / 5.8	2.1 / 1.9
Estuary Drive	A / A	8.8 / 8.8	1.0 / 1.0
Moonee Beach Road west	A / A	7.3 / 7.3	4.0 / 8.9

Note: results for AM / PM peak

The above results confirm the on-site observations with minimal delays and congestion for road users.

Table 3 - Current operation of roundabout at Moonee Beach Drive / Estuary Drive plus development traffic

Approach	Level of service	Delay (seconds)	Queue (metres)
Access to shopping centre	A / A	5.6 / 5.4	1.3 / 3.2
Moonee Beach Road east	A / A	5.3 / 5.9	2.2 / 1.9
Estuary Drive	A / A	8.8 / 8.8	2.3 / 1.3
Moonee Beach Road west	A / A	7.3 / 6.8	4.2 / 11.2

Note: results for AM / PM peak

The above results demonstrate that the roundabout will continue to operate to a very high standard with minimal delays and congestion.

The roundabout was then assessed with the following additional traffic allowances:

- Traffic movements right in and left out of the access to the shopping centre were increased by 25% per annum, giving a 250% increase over current demands inclusive of the development traffic.
- Traffic movements turning left in and right out of Estuary Drive were increased by 25% per annum, giving a 250% increase in current demands inclusive of the development traffic.

The results of this Sidra analysis are presented below.

Table 4 - Roundabout operation at Moonee Beach Drive / Estuary Drive plus development traffic and 25% growth per annum on side roads

Approach	Level of service	Delay (seconds)	Queue (metres)
Access to shopping centre	A / A	7.5 / 5.4	3.1 / 13.2
Moonee Beach Road east	A / A	8.6 / 10.9	4.8 / 6.1
Estuary Drive	A / A	11.4 / 14.0	13.0 / 11.7
Moonee Beach Road west	A / A	7.9 / 8.4	18.2 / 96.5

Note: results for AM / PM peak

The above results demonstrate that the roundabout will continue to have adequate capacity over the 10 year design horizon, allowing for significant increases in traffic flows associated with ongoing development within Moonee Beach. This level of growth assessed would allow, for example, for another 250 residential lots to be developed off Estuary Drive and demonstrates that the current roundabout will continue to provide a good level of operation for road users.

Overall it is concluded that on traffic and access grounds the proposed residential subdivision on the site should be approved. The additional traffic demands associated with the 104 lot residential subdivision will have an acceptable impact upon the local road network.

Please feel free to contact me on 4925 7795 should you have any further queries.

Yours sincerely

Sean Morgan

Director

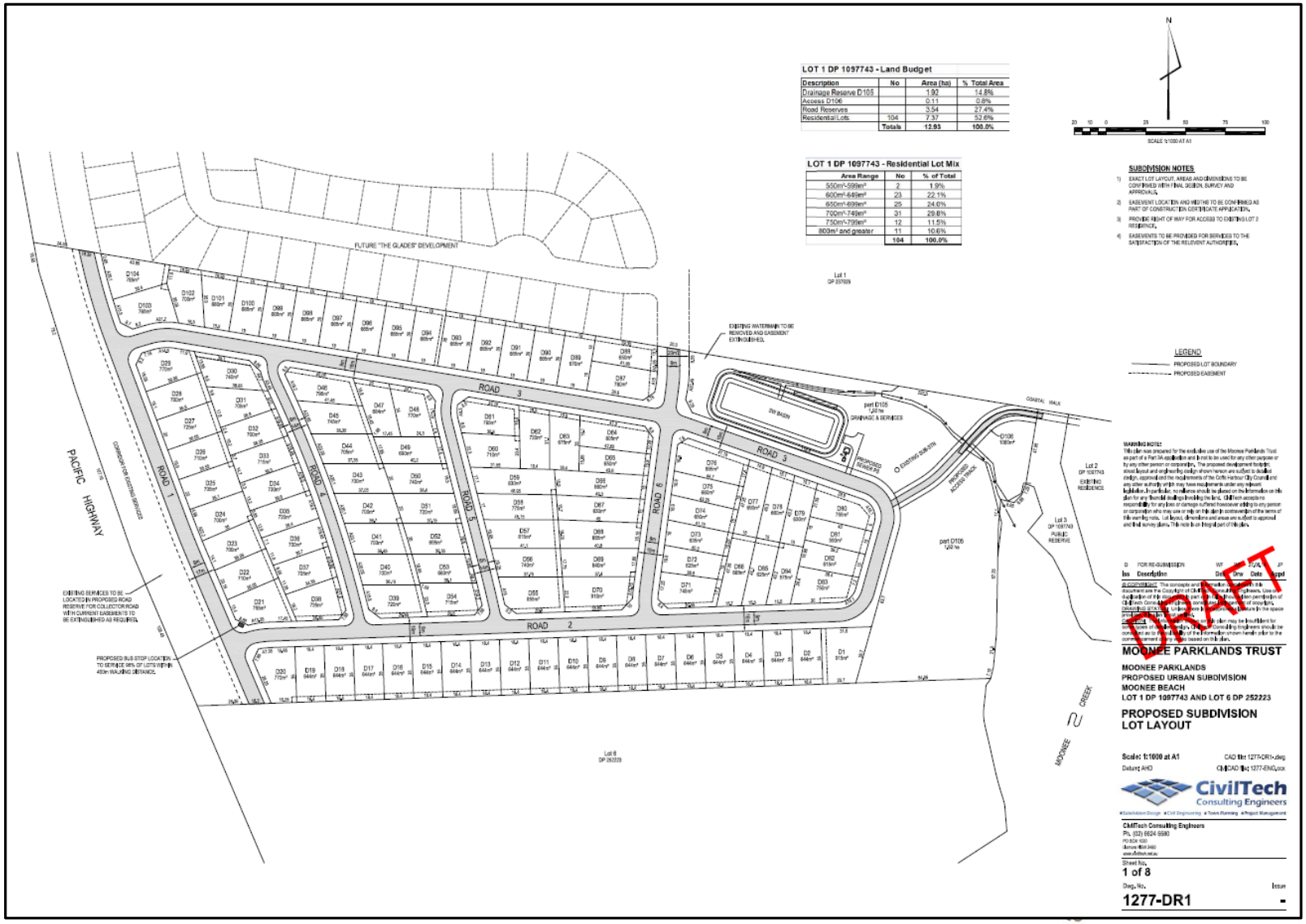
Attachment A – Site plan

Attachment B – Traffic data

Attachment C – Sidra output

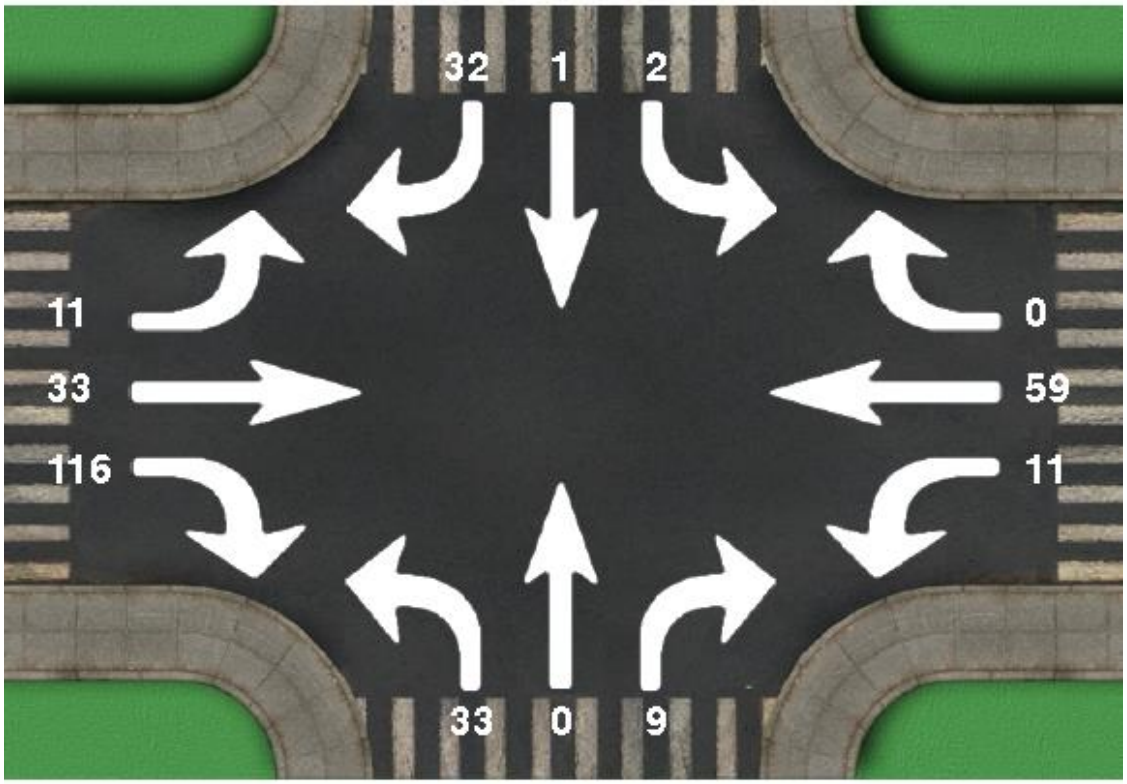
Attachment C – Site Photos

Attachment A –Site Plan



Attachment B – Traffic Data

Location:	**Collector Road at Moonee Beach Road,**
GPS Coordinates:	**N = -30.204985, W= 153.152248**
Date:	**05/08/2014**
Day of week:	**Tuesday**
Weather:	
Analyst:	**sm**

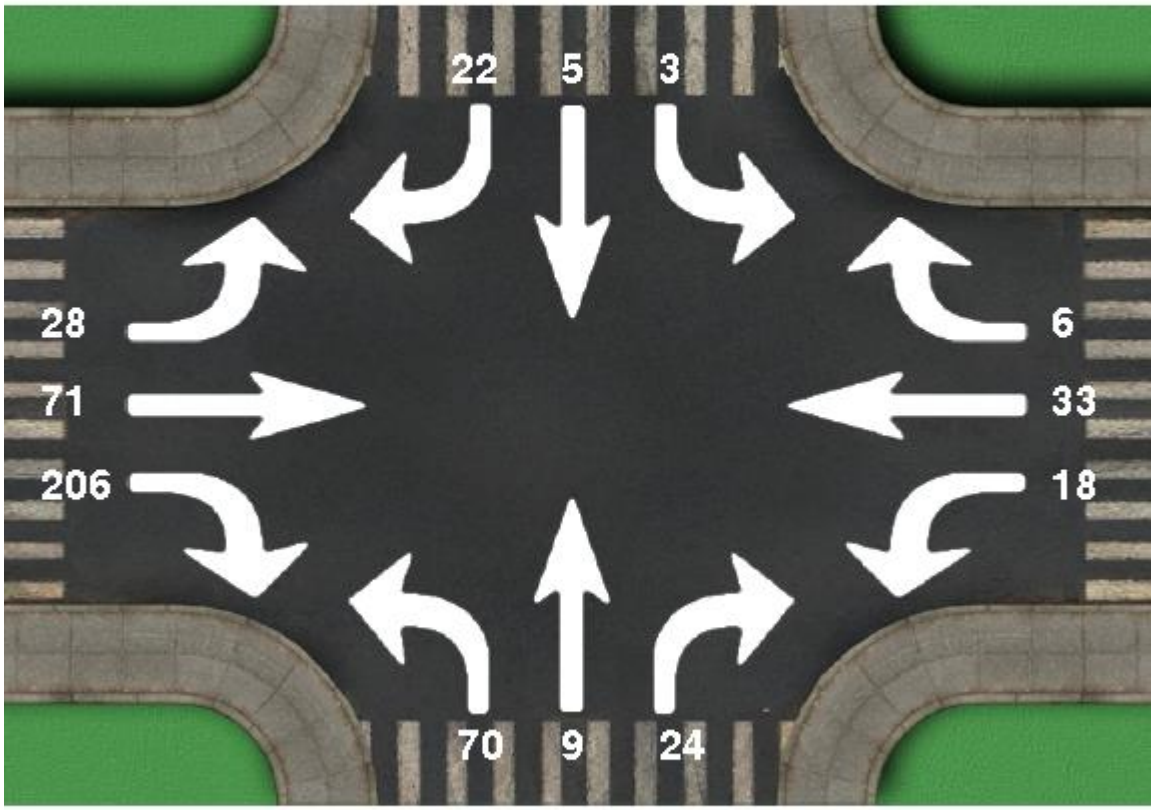


Intersection Peak Hour

08:15 - 09:15

Intersection Peak Hour

Location:	Collector Road at Moonee Beach Road, Moonee Beach
GPS Coordinates:	N = -30.205641, W= 153.151297
Date:	2014-08-05
Day of week:	Tuesday
Weather:	
Analyst:	sm



Intersection Peak Hour

16:30 - 17:30

Attachment C – Sidra output

INTERSECTION SUMMARY

Site: Moonee Beach / Estuary 2014 AM base

Moonee Beach Road and Estuary Drive
2014 AM existing traffic flows
Roundabout

Intersection Performance - Hourly Values				
Performance Measure	Vehicles		Persons	
Travel Speed (Average)	52.4	km/h	52.4	km/h
Travel Distance (Total)	276.0	veh-km/h	331.2	pers-km/h
Travel Time (Total)	5.3	veh-h/h	6.3	pers-h/h
Demand Flows (Total)	325	veh/h	390	pers/h
Percent Heavy Vehicles (Demand)	0.0	%		
Degree of Saturation	0.109			
Practical Spare Capacity	680.0	%		
Effective Intersection Capacity	2985	veh/h		
Control Delay (Total)	0.61	veh-h/h	0.73	pers-h/h
Control Delay (Average)	6.7	sec	6.7	sec
Control Delay (Worst Lane)	8.8	sec		
Control Delay (Worst Movement)	9.2	sec	9.2	sec
Geometric Delay (Average)	6.4	sec		
Stop-Line Delay (Average)	0.3	sec		
Idling Time (Average)	0.0	sec		
Intersection Level of Service (LOS)	LOS A			
95% Back of Queue - Vehicles (Worst Lane)	0.6	veh		
95% Back of Queue - Distance (Worst Lane)	4.0	m		
Queue Storage Ratio (Worst Lane)	0.01			
Total Effective Stops	182	veh/h	219	pers/h
Effective Stop Rate	0.56	per veh	0.56	per pers
Proportion Queued	0.18		0.18	
Performance Index	7.7		7.7	
Cost (Total)	142.73	$/h	142.73	$/h
Fuel Consumption (Total)	23.3	L/h		
Carbon Dioxide (Total)	54.8	kg/h		
Hydrocarbons (Total)	0.005	kg/h		
Carbon Monoxide (Total)	0.064	kg/h		
NOx (Total)	0.017	kg/h		

Level of Service (LOS) Method: Delay (RTA NSW).
Intersection LOS value for Vehicles is based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

MOVEMENT SUMMARY

Site: Moonee Beach / Estuary 2014 AM base

Moonee Beach Road and Estuary Drive
2014 AM existing traffic flows
Roundabout

Movement Performance - Vehicles

Mov ID	ODMov	Demand Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Access to shopping centre											
1	L2	35	0.0	0.037	4.5	LOS A	0.2	1.2	0.24	0.52	52.4
2	T1	1	0.0	0.037	4.8	LOS A	0.2	1.2	0.24	0.52	54.9
3	R2	9	0.0	0.037	8.9	LOS A	0.2	1.2	0.24	0.52	54.7
Approach		45	0.0	0.037	5.4	LOS A	0.2	1.2	0.24	0.52	53.0
East: Moonee Beach Road											
4	L2	12	0.0	0.063	4.8	LOS A	0.3	2.1	0.31	0.47	53.7
5	T1	62	0.0	0.063	5.1	LOS A	0.3	2.1	0.31	0.47	53.7
6	R2	1	0.0	0.063	9.2	LOS A	0.3	2.1	0.31	0.47	54.7
Approach		75	0.0	0.063	5.1	LOS A	0.3	2.1	0.31	0.47	53.7
North: Estuary Drive											
7	L2	2	0.0	0.031	4.8	LOS A	0.1	1.0	0.31	0.61	51.3
8	T1	1	0.0	0.031	5.1	LOS A	0.1	1.0	0.31	0.61	52.3
9	R2	34	0.0	0.031	9.2	LOS A	0.1	1.0	0.31	0.61	50.6
Approach		37	0.0	0.031	8.8	LOS A	0.1	1.0	0.31	0.61	50.7
West: Moonee Beach Road											
10	L2	12	0.0	0.109	4.1	LOS A	0.6	4.0	0.07	0.60	51.0
11	T1	35	0.0	0.109	4.4	LOS A	0.6	4.0	0.07	0.60	52.3
12	R2	122	0.0	0.109	8.5	LOS A	0.6	4.0	0.07	0.60	52.1
Approach		168	0.0	0.109	7.3	LOS A	0.6	4.0	0.07	0.60	52.1
All Vehicles		325	0.0	0.109	6.7	LOS A	0.6	4.0	0.18	0.56	52.4

Level of Service (LOS) Method: Delay (RTA NSW).
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.
Roundabout Capacity Model: SIDRA Standard.
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.

SIDRA INTERSECTION 6

Project: Not Saved
8002653, 6019222, SECA SOLUTION, NETWORK / 1PC

INTERSECTION SUMMARY

Site: Moonee Beach / Estuary 2014 PM base

Moonee Beach Road and Estuary Drive
2014 PM existing traffic flows
Roundabout

Intersection Performance - Hourly Values				
Performance Measure	Vehicles		Persons	
Travel Speed (Average)	52.3	km/h	52.3	km/h
Travel Distance (Total)	447.0	veh-km/h	536.4	pers-km/h
Travel Time (Total)	8.5	veh-h/h	10.3	pers-h/h
Demand Flows (Total)	521	veh/h	625	pers/h
Percent Heavy Vehicles (Demand)	0.0	%		
Degree of Saturation	0.221			
Practical Spare Capacity	284.5	%		
Effective Intersection Capacity	2357	veh/h		
Control Delay (Total)	0.99	veh-h/h	1.18	pers-h/h
Control Delay (Average)	6.8	sec	6.8	sec
Control Delay (Worst Lane)	8.8	sec		
Control Delay (Worst Movement)	9.9	sec	9.9	sec
Geometric Delay (Average)	6.4	sec		
Stop-Line Delay (Average)	0.4	sec		
Idling Time (Average)	0.0	sec		
Intersection Level of Service (LOS)	LOS A			
95% Back of Queue - Vehicles (Worst Lane)	1.3	veh		
95% Back of Queue - Distance (Worst Lane)	8.9	m		
Queue Storage Ratio (Worst Lane)	0.01			
Total Effective Stops	293	veh/h	352	pers/h
Effective Stop Rate	0.56	per veh	0.56	per pers
Proportion Queued	0.22		0.22	
Performance Index	12.6		12.6	
Cost (Total)	226.11	$/h	226.11	$/h
Fuel Consumption (Total)	38.0	L/h		
Carbon Dioxide (Total)	89.2	kg/h		
Hydrocarbons (Total)	0.008	kg/h		
Carbon Monoxide (Total)	0.104	kg/h		
NOx (Total)	0.029	kg/h		

Level of Service (LOS) Method: Delay (RTA NSW).
Intersection LOS value for Vehicles is based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

MOVEMENT SUMMARY

Site: Moonee Beach / Estuary 2014 PM base

Moonee Beach Road and Estuary Drive
2014 PM existing traffic flows
Roundabout

Movement Performance - Vehicles

Mov ID	ODMov	Demand Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Access to shopping centre											
1	L2	74	0.0	0.083	4.4	LOS A	0.4	3.0	0.20	0.52	52.4
2	T1	9	0.0	0.083	4.6	LOS A	0.4	3.0	0.20	0.52	54.9
3	R2	25	0.0	0.083	8.7	LOS A	0.4	3.0	0.20	0.52	54.7
Approach		108	0.0	0.083	5.4	LOS A	0.4	3.0	0.20	0.52	53.2
East: Moonee Beach Road											
4	L2	19	0.0	0.055	5.2	LOS A	0.3	1.9	0.39	0.53	53.2
5	T1	35	0.0	0.055	5.5	LOS A	0.3	1.9	0.39	0.53	53.2
6	R2	6	0.0	0.055	9.6	LOS A	0.3	1.9	0.39	0.53	54.2
Approach		60	0.0	0.055	5.8	LOS A	0.3	1.9	0.39	0.53	53.3
North: Estuary Drive											
7	L2	3	0.0	0.030	5.5	LOS A	0.1	1.0	0.44	0.62	51.5
8	T1	5	0.0	0.030	5.8	LOS A	0.1	1.0	0.44	0.62	52.5
9	R2	23	0.0	0.030	9.9	LOS A	0.1	1.0	0.44	0.62	50.8
Approach		32	0.0	0.030	8.8	LOS A	0.1	1.0	0.44	0.62	51.2
West: Moonee Beach Road											
10	L2	29	0.0	0.221	4.3	LOS A	1.3	8.9	0.17	0.58	50.9
11	T1	75	0.0	0.221	4.5	LOS A	1.3	8.9	0.17	0.58	52.1
12	R2	217	0.0	0.221	8.6	LOS A	1.3	8.9	0.17	0.58	51.9
Approach		321	0.0	0.221	7.3	LOS A	1.3	8.9	0.17	0.58	51.9
All Vehicles		521	0.0	0.221	6.8	LOS A	1.3	8.9	0.22	0.56	52.3

Level of Service (LOS) Method: Delay (RTA NSW).
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.
Roundabout Capacity Model: SIDRA Standard.
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.

SIDRA INTERSECTION 6

Project: Not Saved
8002653, 6019222, SECA SOLUTION, NETWORK / 1PC

INTERSECTION SUMMARY

Site: Moonee Beach / Estuary 2014 AM base+dev

Moonee Beach Road and Estuary Drive
2014 AM existing traffic flows plus development traffic
Roundabout

Intersection Performance - Hourly Values				
Performance Measure	Vehicles		Persons	
Travel Speed (Average)	52.2	km/h	52.2	km/h
Travel Distance (Total)	317.6	veh-km/h	381.2	pers-km/h
Travel Time (Total)	6.1	veh-h/h	7.3	pers-h/h
Demand Flows (Total)	374	veh/h	448	pers/h
Percent Heavy Vehicles (Demand)	0.0	%		
Degree of Saturation	0.112			
Practical Spare Capacity	657.5	%		
Effective Intersection Capacity	3330	veh/h		
Control Delay (Total)	0.73	veh-h/h	0.87	pers-h/h
Control Delay (Average)	7.0	sec	7.0	sec
Control Delay (Worst Lane)	8.8	sec		
Control Delay (Worst Movement)	9.4	sec	9.4	sec
Geometric Delay (Average)	6.5	sec		
Stop-Line Delay (Average)	0.5	sec		
Idling Time (Average)	0.0	sec		
Intersection Level of Service (LOS)	LOS A			
95% Back of Queue - Vehicles (Worst Lane)	0.6	veh		
95% Back of Queue - Distance (Worst Lane)	4.2	m		
Queue Storage Ratio (Worst Lane)	0.01			
Total Effective Stops	213	veh/h	256	pers/h
Effective Stop Rate	0.57	per veh	0.57	per pers
Proportion Queued	0.21		0.21	
Performance Index	8.9		8.9	
Cost (Total)	168.60	$/h	168.60	$/h
Fuel Consumption (Total)	27.1	L/h		
Carbon Dioxide (Total)	63.6	kg/h		
Hydrocarbons (Total)	0.005	kg/h		
Carbon Monoxide (Total)	0.074	kg/h		
NOx (Total)	0.020	kg/h		

Level of Service (LOS) Method: Delay (RTA NSW).
Intersection LOS value for Vehicles is based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

MOVEMENT SUMMARY

Site: Moonee Beach / Estuary 2014 AM base+dev

Moonee Beach Road and Estuary Drive
2014 AM existing traffic flows plus development traffic
Roundabout

Movement Performance - Vehicles

Mov ID	ODMov	Demand Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Access to shopping centre											
1	L2	35	0.0	0.039	4.7	LOS A	0.2	1.3	0.29	0.53	52.2
2	T1	2	0.0	0.039	4.9	LOS A	0.2	1.3	0.29	0.53	54.7
3	R2	9	0.0	0.039	9.1	LOS A	0.2	1.3	0.29	0.53	54.5
Approach		46	0.0	0.039	5.6	LOS A	0.2	1.3	0.29	0.53	52.9
East: Moonee Beach Road											
4	L2	12	0.0	0.066	5.0	LOS A	0.3	2.2	0.35	0.49	53.5
5	T1	62	0.0	0.066	5.3	LOS A	0.3	2.2	0.35	0.49	53.5
6	R2	1	0.0	0.066	9.4	LOS A	0.3	2.2	0.35	0.49	54.5
Approach		75	0.0	0.066	5.3	LOS A	0.3	2.2	0.35	0.49	53.5
North: Estuary Drive											
7	L2	2	0.0	0.068	4.9	LOS A	0.3	2.3	0.32	0.62	51.3
8	T1	5	0.0	0.068	5.1	LOS A	0.3	2.3	0.32	0.62	52.3
9	R2	73	0.0	0.068	9.2	LOS A	0.3	2.3	0.32	0.62	50.6
Approach		80	0.0	0.068	8.8	LOS A	0.3	2.3	0.32	0.62	50.7
West: Moonee Beach Road											
10	L2	16	0.0	0.112	4.1	LOS A	0.6	4.2	0.08	0.60	51.1
11	T1	35	0.0	0.112	4.4	LOS A	0.6	4.2	0.08	0.60	52.4
12	R2	122	0.0	0.112	8.5	LOS A	0.6	4.2	0.08	0.60	52.2
Approach		173	0.0	0.112	7.3	LOS A	0.6	4.2	0.08	0.60	52.1
All Vehicles		374	0.0	0.112	7.0	LOS A	0.6	4.2	0.21	0.57	52.2

Level of Service (LOS) Method: Delay (RTA NSW).
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.
Roundabout Capacity Model: SIDRA Standard.
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.

SIDRA INTERSECTION 6

Project: Not Saved
8002653, 6019222, SECA SOLUTION, NETWORK / 1PC

INTERSECTION SUMMARY

Site: Moonee Beach / Estuary 2014 PM base+dev

Moonee Beach Road and Estuary Drive
2014 PM existing traffic flows plus development traffic
Roundabout

Intersection Performance - Hourly Values				
Performance Measure	Vehicles		Persons	
Travel Speed (Average)	52.4	km/h	52.4	km/h
Travel Distance (Total)	511.6	veh-km/h	613.9	pers-km/h
Travel Time (Total)	9.8	veh-h/h	11.7	pers-h/h
Demand Flows (Total)	598	veh/h	717	pers/h
Percent Heavy Vehicles (Demand)	0.0	%		
Degree of Saturation	0.265			
Practical Spare Capacity	220.2	%		
Effective Intersection Capacity	2252	veh/h		
Control Delay (Total)	1.09	veh-h/h	1.31	pers-h/h
Control Delay (Average)	6.6	sec	6.6	sec
Control Delay (Worst Lane)	8.8	sec		
Control Delay (Worst Movement)	9.9	sec	9.9	sec
Geometric Delay (Average)	6.2	sec		
Stop-Line Delay (Average)	0.4	sec		
Idling Time (Average)	0.0	sec		
Intersection Level of Service (LOS)	LOS A			
95% Back of Queue - Vehicles (Worst Lane)	1.6	veh		
95% Back of Queue - Distance (Worst Lane)	11.2	m		
Queue Storage Ratio (Worst Lane)	0.02			
Total Effective Stops	332	veh/h	398	pers/h
Effective Stop Rate	0.55	per veh	0.55	per pers
Proportion Queued	0.23		0.23	
Performance Index	14.5		14.5	
Cost (Total)	256.09	$/h	256.09	$/h
Fuel Consumption (Total)	43.4	L/h		
Carbon Dioxide (Total)	102.1	kg/h		
Hydrocarbons (Total)	0.009	kg/h		
Carbon Monoxide (Total)	0.119	kg/h		
NOx (Total)	0.033	kg/h		

Level of Service (LOS) Method: Delay (RTA NSW).
Intersection LOS value for Vehicles is based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

MOVEMENT SUMMARY

Site: Moonee Beach / Estuary 2014 PM base+dev

Moonee Beach Road and Estuary Drive
2014 PM existing traffic flows plus development traffic
Roundabout

Movement Performance - Vehicles

Mov ID	ODMov	Demand Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Access to shopping centre											
1	L2	74	0.0	0.090	4.4	LOS A	0.5	3.2	0.21	0.52	52.4
2	T1	17	0.0	0.090	4.6	LOS A	0.5	3.2	0.21	0.52	54.9
3	R2	25	0.0	0.090	8.8	LOS A	0.5	3.2	0.21	0.52	54.7
Approach		116	0.0	0.090	5.4	LOS A	0.5	3.2	0.21	0.52	53.3
East: Moonee Beach Road											
4	L2	19	0.0	0.055	5.3	LOS A	0.3	1.9	0.40	0.53	53.2
5	T1	35	0.0	0.055	5.5	LOS A	0.3	1.9	0.40	0.53	53.1
6	R2	6	0.0	0.055	9.6	LOS A	0.3	1.9	0.40	0.53	54.2
Approach		60	0.0	0.055	5.9	LOS A	0.3	1.9	0.40	0.53	53.3
North: Estuary Drive											
7	L2	3	0.0	0.038	5.6	LOS A	0.2	1.3	0.44	0.62	51.4
8	T1	7	0.0	0.038	5.8	LOS A	0.2	1.3	0.44	0.62	52.5
9	R2	28	0.0	0.038	9.9	LOS A	0.2	1.3	0.44	0.62	50.8
Approach		39	0.0	0.038	8.8	LOS A	0.2	1.3	0.44	0.62	51.2
West: Moonee Beach Road											
10	L2	92	0.0	0.265	4.3	LOS A	1.6	11.2	0.19	0.56	51.2
11	T1	75	0.0	0.265	4.6	LOS A	1.6	11.2	0.19	0.56	52.5
12	R2	217	0.0	0.265	8.7	LOS A	1.6	11.2	0.19	0.56	52.3
Approach		383	0.0	0.265	6.8	LOS A	1.6	11.2	0.19	0.56	52.0
All Vehicles		598	0.0	0.265	6.6	LOS A	1.6	11.2	0.23	0.55	52.4

Level of Service (LOS) Method: Delay (RTA NSW).
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.
Roundabout Capacity Model: SIDRA Standard.
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.

SIDRA INTERSECTION 6

Project: Not Saved
8002653, 6019222, SECA SOLUTION, NETWORK / 1PC

INTERSECTION SUMMARY

Site: Moonee Beach / Estuary 2014 AM base+dev+10 years

Moonee Beach Road and Estuary Drive
2014 AM existing traffic flows plus development traffic
Allowance for 10 years growth
Roundabout
Design Life Analysis (Practical Capacity): Results for 10 years

Intersection Performance - Hourly Values				
Performance Measure	Vehicles		Persons	
Travel Speed (Average)	50.7	km/h	50.7	km/h
Travel Distance (Total)	828.1	veh-km/h	993.7	pers-km/h
Travel Time (Total)	16.3	veh-h/h	19.6	pers-h/h
Demand Flows (Total)	971	veh/h	1166	pers/h
Percent Heavy Vehicles (Demand)	0.0	%		
Degree of Saturation	0.353			
Practical Spare Capacity	140.7	%		
Effective Intersection Capacity	2751	veh/h		
Control Delay (Total)	2.40	veh-h/h	2.88	pers-h/h
Control Delay (Average)	8.9	sec	8.9	sec
Control Delay (Worst Lane)	11.4	sec		
Control Delay (Worst Movement)	12.7	sec	12.7	sec
Geometric Delay (Average)	7.3	sec		
Stop-Line Delay (Average)	1.6	sec		
Idling Time (Average)	0.2	sec		
Intersection Level of Service (LOS)	LOS A			
95% Back of Queue - Vehicles (Worst Lane)	2.6	veh		
95% Back of Queue - Distance (Worst Lane)	18.2	m		
Queue Storage Ratio (Worst Lane)	0.02			
Total Effective Stops	638	veh/h	766	pers/h
Effective Stop Rate	0.66	per veh	0.66	per pers
Proportion Queued	0.40		0.40	
Performance Index	26.5		26.5	
Cost (Total)	468.11	$/h	468.11	$/h
Fuel Consumption (Total)	73.8	L/h		
Carbon Dioxide (Total)	173.5	kg/h		
Hydrocarbons (Total)	0.015	kg/h		
Carbon Monoxide (Total)	0.199	kg/h		
NOx (Total)	0.057	kg/h		

Level of Service (LOS) Method: Delay (RTA NSW).
Intersection LOS value for Vehicles is based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

MOVEMENT SUMMARY

Site: Moonee Beach / Estuary 2014 AM base+dev+10 years

Moonee Beach Road and Estuary Drive
2014 AM existing traffic flows plus development traffic
Allowance for 10 years growth
Roundabout
Design Life Analysis (Practical Capacity): Results for 10 years

Movement Performance - Vehicles

Mov ID	ODMov	Demand Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Access to shopping centre											
1	L2	42	0.0	0.082	5.7	LOS A	0.4	3.1	0.49	0.63	50.8
2	T1	7	0.0	0.082	6.0	LOS A	0.4	3.1	0.49	0.63	53.4
3	R2	33	0.0	0.082	10.1	LOS A	0.4	3.1	0.49	0.63	53.3
Approach		82	0.0	0.082	7.5	LOS A	0.4	3.1	0.49	0.63	52.1
East: Moonee Beach Road											
4	L2	14	0.0	0.119	8.3	LOS A	0.7	4.8	0.69	0.71	51.7
5	T1	75	0.0	0.119	8.6	LOS A	0.7	4.8	0.69	0.71	51.3
6	R2	1	0.0	0.119	12.7	LOS A	0.7	4.8	0.69	0.71	52.6
Approach		90	0.0	0.119	8.6	LOS A	0.7	4.8	0.69	0.71	51.4
North: Estuary Drive											
7	L2	3	0.0	0.307	7.3	LOS A	1.9	13.0	0.65	0.78	49.9
8	T1	18	0.0	0.307	7.6	LOS A	1.9	13.0	0.65	0.78	50.9
9	R2	254	0.0	0.307	11.7	LOS A	1.9	13.0	0.65	0.78	48.9
Approach		275	0.0	0.307	11.4	LOS A	1.9	13.0	0.65	0.78	49.1
West: Moonee Beach Road											
10	L2	55	0.0	0.353	4.3	LOS A	2.6	18.2	0.21	0.59	50.2
11	T1	42	0.0	0.353	4.5	LOS A	2.6	18.2	0.21	0.59	51.5
12	R2	427	0.0	0.353	8.7	LOS A	2.6	18.2	0.21	0.59	51.3
Approach		524	0.0	0.353	7.9	LOS A	2.6	18.2	0.21	0.59	51.2
All Vehicles		971	0.0	0.353	8.9	LOS A	2.6	18.2	0.40	0.66	50.7

Level of Service (LOS) Method: Delay (RTA NSW).
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.
Roundabout Capacity Model: SIDRA Standard.
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.

SIDRA INTERSECTION 6

Project: Not Saved
8002653, 6019222, SECA SOLUTION, NETWORK / 1PC

INTERSECTION SUMMARY

Site: Moonee Beach / Estuary 2014 PM base+dev+10 years

Moonee Beach Road and Estuary Drive
2014 PM existing traffic flows plus development traffic
Roundabout
Design Life Analysis (Practical Capacity): Results for 10 years

Intersection Performance - Hourly Values				
Performance Measure	Vehicles		Persons	
Travel Speed (Average)	50.3	km/h	50.3	km/h
Travel Distance (Total)	1454.8	veh-km/h	1745.8	pers-km/h
Travel Time (Total)	28.9	veh-h/h	34.7	pers-h/h
Demand Flows (Total)	1717	veh/h	2061	pers/h
Percent Heavy Vehicles (Demand)	0.0	%		
Degree of Saturation	0.829			
Practical Spare Capacity	2.5	%		
Effective Intersection Capacity	2070	veh/h		
Control Delay (Total)	3.97	veh-h/h	4.76	pers-h/h
Control Delay (Average)	8.3	sec	8.3	sec
Control Delay (Worst Lane)	14.0	sec		
Control Delay (Worst Movement)	15.0	sec	15.0	sec
Geometric Delay (Average)	6.4	sec		
Stop-Line Delay (Average)	1.9	sec		
Idling Time (Average)	0.3	sec		
Intersection Level of Service (LOS)	LOS A			
95% Back of Queue - Vehicles (Worst Lane)	13.8	veh		
95% Back of Queue - Distance (Worst Lane)	96.5	m		
Queue Storage Ratio (Worst Lane)	0.13			
Total Effective Stops	1018	veh/h	1221	pers/h
Effective Stop Rate	0.59	per veh	0.59	per pers
Proportion Queued	0.68		0.68	
Performance Index	55.9		55.9	
Cost (Total)	813.92	$/h	813.92	$/h
Fuel Consumption (Total)	132.4	L/h		
Carbon Dioxide (Total)	311.2	kg/h		
Hydrocarbons (Total)	0.028	kg/h		
Carbon Monoxide (Total)	0.358	kg/h		
NOx (Total)	0.103	kg/h		

Level of Service (LOS) Method: Delay (RTA NSW).
Intersection LOS value for Vehicles is based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

MOVEMENT SUMMARY

Site: Moonee Beach / Estuary 2014 PM base+dev+10 years

Moonee Beach Road and Estuary Drive
2014 PM existing traffic flows plus development traffic
Roundabout
Design Life Analysis (Practical Capacity): Results for 10 years

Movement Performance - Vehicles

Mov ID	ODMov	Demand Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Access to shopping centre											
1	L2	258	0.0	0.286	4.9	LOS A	1.9	13.2	0.40	0.54	52.1
2	T1	59	0.0	0.286	5.2	LOS A	1.9	13.2	0.40	0.54	54.7
3	R2	30	0.0	0.286	9.3	LOS A	1.9	13.2	0.40	0.54	54.5
Approach		347	0.0	0.286	5.4	LOS A	1.9	13.2	0.40	0.54	52.8
East: Moonee Beach Road											
4	L2	23	0.0	0.131	10.3	LOS A	0.9	6.1	0.84	0.81	50.1
5	T1	42	0.0	0.131	10.6	LOS A	0.9	6.1	0.84	0.81	49.3
6	R2	8	0.0	0.131	14.7	LOS B	0.9	6.1	0.84	0.81	50.9
Approach		72	0.0	0.131	10.9	LOS A	0.9	6.1	0.84	0.81	49.8
North: Estuary Drive											
7	L2	4	0.0	0.241	10.6	LOS A	1.7	11.7	0.88	0.89	48.2
8	T1	26	0.0	0.241	10.8	LOS A	1.7	11.7	0.88	0.89	49.1
9	R2	99	0.0	0.241	15.0	LOS B	1.7	11.7	0.88	0.89	46.9
Approach		129	0.0	0.241	14.0	LOS A	1.7	11.7	0.88	0.89	47.5
West: Moonee Beach Road											
10	L2	321	0.0	0.829	5.6	LOS A	13.8	96.5	0.73	0.56	49.2
11	T1	90	0.0	0.829	5.8	LOS A	13.8	96.5	0.73	0.56	50.4
12	R2	759	0.0	0.829	9.9	LOS A	13.8	96.5	0.73	0.56	50.2
Approach		1169	0.0	0.829	8.4	LOS A	13.8	96.5	0.73	0.56	49.9
All Vehicles		1717	0.0	0.829	8.3	LOS A	13.8	96.5	0.68	0.59	50.3

Level of Service (LOS) Method: Delay (RTA NSW).
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.
Roundabout Capacity Model: SIDRA Standard.
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.

SIDRA INTERSECTION 6

Project: Not Saved
8002653, 6019222, SECA SOLUTION, NETWORK / 1PC

Attachment D – Site Photos

Photo 1 – View looking north along Estuary Drive / Collector Road showing typical cross-section. Note footpath along one side of road only.

Photo 2 – View looking west on Moonee Beach Road showing road upgrade