Riverside Tea Gardens

Traffic Impact Assessment

March 2016

SECA solution

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Traffic Impact Assessment

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1 Executive Summary

1.1 Background

Seca Solution was commissioned by Tattersall Lander Pty Ltd on behalf of the Sheargold Group to prepare a Traffic Impact Assessment for the approved concept Riverside Residential Subdivision Tea Gardens, NSW. The approved concept provided for a more extensive development than now proposed and as such the previously recommended roadworks are no longer considered appropriate. This assessment therefore reviews the current proposal and the road upgrades suitable to mitigate any associated impacts.

The proposed development provides for the staged development of 725 residential lots with 805 potential dwellings over 16 stages with associated on-site road development and connection to the broader road network. The site is located east of Myall Street and south of Toonang Drive and represents a less intense use of the area than the approved concept that included development on both sides of Myall Road.

The approved concept had been previously assessed by Better Transport Futures (BTF) in 2008 with more recent updates, including surveys, undertaken in October 2012. It is these surveys that are being used to complete the Sidra modelling for this assessment. These surveys are still considered valid due to the limited development that has occurred in this location.

This traffic impact assessment has been prepared in accordance with Austroads Guidelines and the "RTA Guide to Traffic Generating Developments" published by the Roads and Maritime Services (RMS) and uses the most recent traffic generation rates released by the RMS (TD 2013/04a).

1.2 Scope of Report

This traffic impact assessment has been prepared to assess the impacts of the proposed development and the necessary road upgrades required to mitigate the impacts of the development.

As such, the scope of the report is to document the traffic and access impacts associated with the proposed development and to assess the general access arrangements. The report provides advice on road network capacity and access issues as well as documenting the impacts of the staged development on the local road network and relevant intersections.

1.3 Issues and Objectives of the study

The issues relative to the proposal are:

- Determine the future traffic generation for the proposed development applying TD 2013-04a rates;
- Assess impact on the local road network due to the additional flows;
- Review the access arrangements for the proposal;
- Assess any road upgrades required and provide advice on the timing of upgrades.

The objective of the report is to document the impacts of the proposed development and provide advice on any infrastructure work required on the external road network as part of the future development.

1.4 Planning Context

In preparing this document, the following guides and publications were used:

- RTA Guide to Traffic Generating Developments, Version 2.2 Dated October 2002;
- RMS TDT 2013/04 "Update Traffic surveys August 2013".
- Australian / New Zealand Standard – Parking Facilities Part 5 : on-street car parking (AS2890.5:2004);
- Great Lake Council DCP 52 2008
- Great Lakes Council Tea Gardens District Section 94 Development Contributions Plan 2009 (S94 Plan)

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2 Existing Situation

2.1 Site Description and Proposed Activity

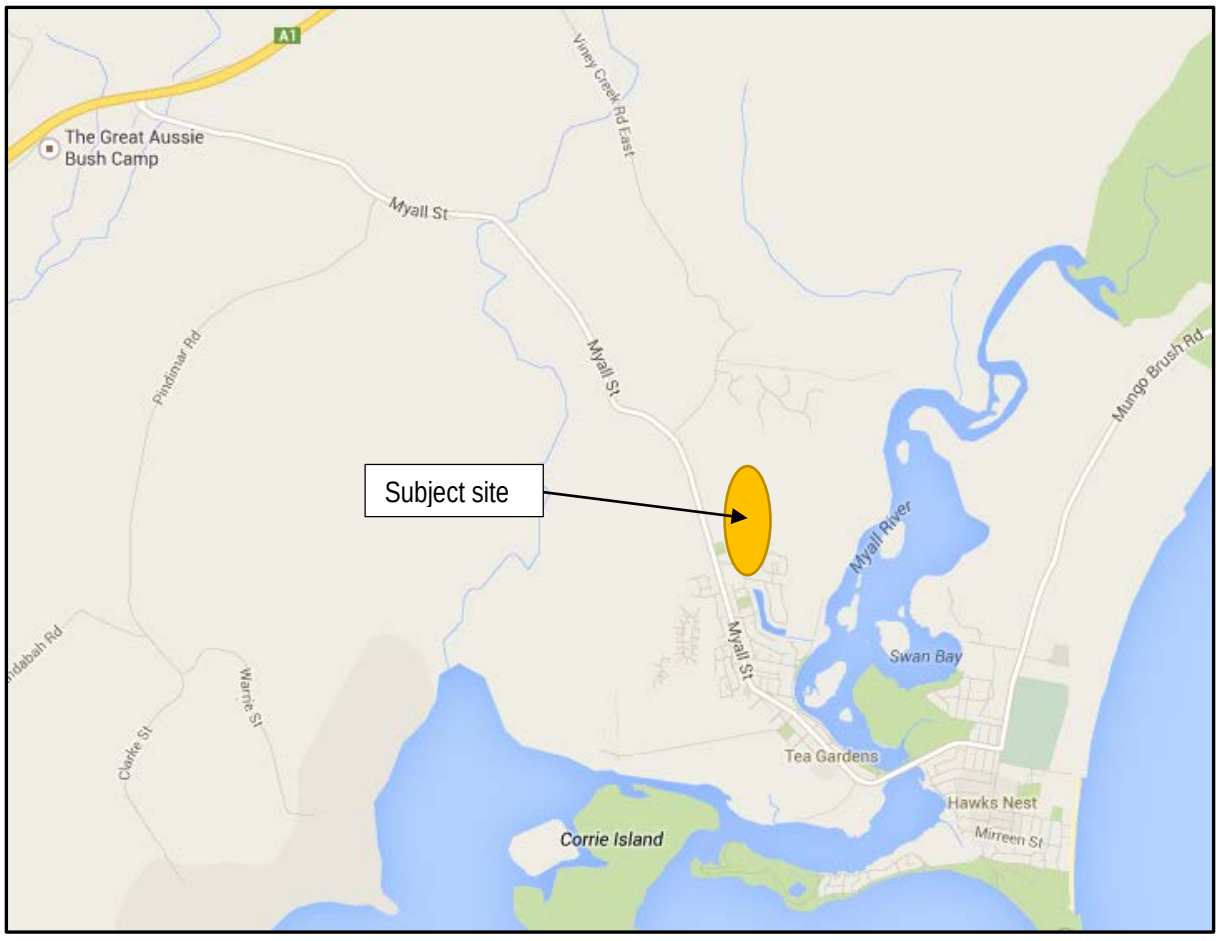
2.1.1 Site Location and Access

The subject site is located on the eastern side of Myall Street (Myall Way) in Tea Gardens, NSW. It is bounded to the south by the existing residential development of Myall Quays and to the north by Toonang Drive whilst Myall Street forms its western boundary. Vehicle access will be provided initially via the existing T-intersection of Myall Quays Boulevard with Myall Street with later stages connecting via Riverside Boulevard onto Myall Street and later onto Toonang Drive.

Myall Street is the main access road to the villages of Tea Gardens and Hawks News to the east of the site as well as connecting to the greater road network (Pacific Highway) west of the site.

The site is currently vacant.

The location of the site is shown below in Figure 2-1.



Source: Google maps

■ *Figure 2-1 - Site Location*

2.1.2 Zoning

The subject site is zoned for residential development.

2.2 Existing Traffic Conditions

2.2.1 Road Hierarchy

The main road through the locality is Myall Street, providing a connection between the Pacific Highway, and the north-west of the site, Hawks Nest to the east. It provides a single lane of travel in both directions and operates under the posted speed limit of 50 km/h through this urban area. It has in-consistent footpaths along its length. It provides the road link between the locality of Hawks Nest / Tea Gardens and the regional road network, the Pacific Highway. The intersections along its length are all priority control, with the main road being Myall Street.

Traffic flows along Myall Street are governed by seasonal demands, with significantly higher traffic movements during the summer months and over the weekends, associated with tourist traffic visiting this popular seaside centre.

Myall Street connects with the Pacific Highway to the west of the locality, with the Pacific Highway forming part of the regional and national road network. The intersection of Myall Street and the Pacific Highway is an at-grade intersection allowing for all turning movements with the Pacific Highway being the priority road. The Pacific Highway carries a significant volume of both regional and national traffic movements, forming the primary route between Sydney and Newcastle to the south and through to Queensland to the north. The Pacific Highway provides two lanes of travel in both directions with sealed shoulders allowing for cyclists and broken down vehicles.

Access to the subject site will be provided in the early stages via Myall Quays Boulevard. Myall Quays Boulevard connects with Myall Street via a T intersection allowing for all turning movements with Myall Street being the priority road. Myall Quays Boulevard provides a single lane of travel in both directions with a kerb side parking lane and marked on-street cycle lane. It provides a pedestrian pathway along one side and has street lighting. It provides access to the Tea Gardens shopping centre as well as access to an existing residential subdivision (approximately 170 lots).

To the north of the subject site is Toonang Drive. Toonang Drive provides a single lane of travel in both directions and connects with Myall Street via a simple give way controlled intersection with Myall Street being the priority road. There are no footpaths provided along the length of Toonang Drive which provides access to a number of residential lots and forms part of a cul de sac.

2.2.2 Roadworks

There are no road works occurring within the general locality of the subject site. Other than road maintenance work, Council have no plans for road works to occur within the general locality of the subject site.

2.2.3 Traffic Management Works

There are no traffic management works planned within the general locality of the subject site. Current traffic flows are typically well within acceptable limits and during the peak summer demands the delay and congestion remain minimal and well within acceptable limits.

2.2.4 Pedestrian and Cycling Facilities

Pedestrian facilities are limited within the general locality of the subject site with pedestrians and cyclists able to use the public roads. Footpaths have been provided in association with the Myall Quays development south of the site however footpaths along Myall Street are limited. Council has updated their bike plan and there are a number of routes identified including a shared path between Myall Quays and Tea Gardens (Appendix D). Construction work for this shared path has commenced along the eastern side of the road south of Myall Quays Boulevard.

Within the new residential development in Tea Gardens, the through roads provide a single footpath along one side of the road. Given the low traffic flows along the local roads within the general locality of the subject site, pedestrians and cyclists are able to walk on the side of the road or the verge as required.

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2.3 Traffic Flows

2.3.1 Peak Hour Flows

As part of the previous traffic work completed by Better Transport Futures (BTF) in November 2012 peak hour traffic surveys were collected at the key intersection of Myall Street and Toonang Drive as well as at Myall Street and Myall Quays Boulevard. These traffic surveys were completed in October 2012 in both the AM and PM peak periods. A summary of the peak hour traffic flows is provided below:

Road	Peak period	Peak flows	Mid-block capacity	Volume / capacity
Myall Street	AM peak	193 towards Hawks Nest	900 one-way	0.214
		270 towards Pacific Highway	900 one-way	0.300
	PM peak	331 towards Hawks Nest	900 one-way	0.338
		203 towards Pacific Highway	900 one-way	0.225
Myall Quays Boulevard	AM peak	159 towards Myall Quay Estate	900 one-way	0.176
		133 from Myall Quay Estate	900 one-way	0.148
	PM peak	175 towards Myall Quay Estate	900 one-way	0.194
		214 from Myall Quay Estate	900 one-way	0.238

The RTA Guide to Traffic Generating Developments provides the following guide for the hourly capacity of an urban road:

Level of Service	One lane (vehicles / hour)	Two lanes (vehicles per hour)
A	200	900
B	380	1400
C	600	1800
D	900	2200
E	1400	2800

Based upon the above table, it can be seen that currently the road network is operating well within acceptable limits. For the peak movement, the afternoon flow is 331 vehicles heading towards Hawks Nest in the afternoon peak. This the level of service is within the boundary of B indicating a good level of service with plenty of spare capacity.

2.3.2 Daily Traffic Flows

Typically peak hour flows represent in the order of 10% of the daily flow and based on this the daily traffic flows in the general vicinity of the site are considered to be:

- Myall Street - 5,000 vehicles per day
- Myall Quay Boulevard to immediate east of Myall Street – 3,400 vehicles per day

The RMS publication "Network and Corridor Planning" provides advice on road attributes and capacity, based upon their function within the road hierarchy. Myall Street is a sub-arterial road and under the RMS publication would be classified as a 3U road. Typically these roads carry an average of 13,000 vehicles per day. It can be seen that Myall Street is currently operating well within the capacity for this type of road.

Myall Quay Boulevard to the immediate east of Myall Street would be classified as 2U road, carrying an average of 5,000 vehicles per day. Myall Quay Boulevard in this location is currently carrying some 3,400 vehicles per day, well below the average of 5,000 per day typical of this road standard. To the east of the shopping centre, Myall Quay Boulevard would decrease in importance in the road hierarchy and would be classified as a 1U road, carrying on average 1,000 vehicles per day.

2.3.3 Daily Traffic Flow Distribution

The daily traffic volumes are reasonably balanced in both directions, with the above data indicating a bias in traffic movements westbound in the morning along Myall Street towards the Pacific Highway, reflective of commuter trips from the locality towards the Pacific Highway for access to the major centres such as Raymond Terrace and Newcastle further south as well as to areas such as Maitland and the Lower Hunter Valley. The reverse traffic movements then occur in the afternoon period with a bias in movement towards Tea Gardens / Hawks Nest.

2.3.4 Vehicle Speeds

No speed surveys were completed as part of the study work. From on-site observations, it is considered that drivers travel at or just above the posted speed limit of 50 km/h, due to the straight road alignment and low traffic volumes. It was noted that traffic tends to travel in platoons, with slower vehicles creating gaps in the traffic streams due to the lack of opportunity for drivers to overtake.

2.3.5 Existing Site Flows

The site is currently vacant and therefore generates no traffic movements.

2.3.6 Heavy Vehicle Flows

There are limited heavy vehicle movements in the general vicinity of the subject site. There are some heavy vehicle movements associated with deliveries within the nearby shopping centre as well as deliveries to retail outlets in the Tea Gardens / Hawks Nest area. These flows are very low with the vast majority of traffic being light vehicles.

2.3.7 Current Road Network Operation

Observations on site during the typical peak periods show that overall the road network operates well, with minimal delays and congestion along the road network. During the peak summer demands, some delays occur for traffic entering and exiting Myall Quay Boulevard but these are within acceptable limits.

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2.4 Traffic Safety and Accident History

Accident data has been provided by the RMS for the locality and shows that in the past five years there has been only two accidents. Given the straight road alignment and the operational speeds limit it is considered that the road network in this location offers a safe environment.

2.5 Parking Supply and Demand

2.5.1 On-street Parking Provision

Parking is generally permitted along the majority of the local roads in the generally vicinity of the subject site, on the verges or shoulders with normal restrictions applying at intersections and driveways.

2.5.2 Off-Street Parking Provision

There is off street parking provided within the Tea Gardens shopping centre which caters for the demands of this centre. The local residential development allows for of street parking within driveways and garages.

2.5.3 Parking Demand and Utilisation

There was very limited on-street parking noted along either Myall Street or Myall Quay Boulevard. It could be seen that the parking demands are catered for within the various lots fronting these roads.

2.5.4 Set down or pick up areas

There are no dedicated drop off zones in the 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

Bus facilities are limited in the vicinity of the site.

2.7 Other Proposed Developments

There are currently no other developments occurring within the general locality of the subject site. There is land on the western side of Myall Street that has been previously identified for residential and light industrial development, but this development is currently on hold and has not been approved or rezoned at present.

3 Proposed Development

3.1 The Development

The plans for the project allow for a staged residential subdivision as shown below (but it is possible that these stages will be further refined as the project rolls out):

Stage	Year	No of lots	Number of dwellings	Road works
Stage 1	2017	44	49	
Stage 2/3/15	2018	143	159	
Stage 4/16a	2019	78	87	
Stage 5/16b	2020	86	95	plus link to North Shearwater Estate
Stage 11a/11b	2021	84	93	Plus second connection to Myall Street
Stage 6/7	2022	67	75	
Stage 8/9/10	2023	103	114	plus connection to Toonang Drive
Stage 12/13	2024	90	100	
Stage 14	2025	30	33	
Total		725	805	

The initial stages will all gain access via Myall Quay Boulevarde. Initial stages will be developed at the central/western side of the site with the stages then progressing to allow for connection through to North Shearwater Estate during Stage 16b. A second connection to Myall Quay Boulevarde will be established during Stage 11b whilst the final stage will have links to Toonang Drive.

3.1.1 Phasing and Timing

The development will be constructed in a number of stages, with the timing of the project development dependent upon market demands. An indicative schedule is shown in 3.1 above.

For the purposes of this assessment, it has been assumed that all development will occur over a 10 year timeframe. Whilst the impact has been assessed over a 10 year period, any reduction in sales activities would see an extension to the above timetable and a lessening of any traffic impacts during the initial ten year period.

3.1.2 Access and Circulation Requirements

All vehicle access during the initial 6 stages of the development will be via Myall Quay Boulevard. Beyond these first 6 stages, a second access will be provided to connect to North Shearwater Estate. Beyond stage 16b a second connection to Myall Street will be provided. For the last six stages a link will also be provided to connect through to Toonang Drive. The design of the internal road layouts allow for all vehicles to enter and exit the site in a forward direction.

3.2 Access

The main access during the initial stage, via Myall Quay Boulevard, currently allows for a simple T intersection with give way sign control. As agreed with Council and as part of the on-going development of the site, this intersection

will be upgraded to provide signal control to allow for all vehicle movements as well as provide control for pedestrian movements. Note that this intersection will be provided as a 3 way control but will allow for a future 4th leg to be provided to allow access to the future potential development land to the west of Myall Street.

Beyond the first eight stages, a second access on Myall Street will be constructed on the new road (Riverside Boulevard) which will be a signal controlled intersection. Again this will be constructed as a 3-way signal control but will allow for a future 4th leg to be provided to allow for access to the future potential development land to the west of Myall Street. These intersections have been documented in the draft Section 94 plan shortly to be presented to Council (September 2014).

A connection to North Shearwater Estate will be provided after the first six stages.

Beyond this stage of the development, a third access will be provided to connect to Toonang Drive.

3.2.1 Driveway Location

The driveway location to the individual lots will be determined and designed during the development application stage for each of the individual lots and will take into account he requirements of the Council design code.

3.2.2 Service Vehicle Access

No dedicated service vehicle bay is required as part of the residential development. Service vehicle demands will be relatively low and can be accommodated on-street as required.

3.2.3 Access to Public Transport

Public transport in Tea Gardens is limited with no rail services and only limited bus services. Busways provides services between Tea Gardens and Newcastle three times a day (6.50am, 12pm and 5.05pm) with return services arriving at 11.25am, 4.15pm and 5.00pm. The first two services then travel north to Taree.

School bus runs also provide connection between Tea Gardens and schools in Medowie, Raymond Terrace and Bulahdelah.

3.3 Circulation

3.3.1 Pattern of circulation

All vehicles will be able to enter and exit the site in a forward direction from the local road network. The internal design of the driveways and car parks will be in accordance with AS2890 and or Council design requirements permitting vehicles to turn around within the site and exit in a forward direction.

3.3.2 Road width

The internal road widths will be in accordance with Council design requirements and reflective of the existing new roads built in the locality as well as reflective of the demands and road hierarchy within the subdivision.

3.3.3 Internal Bus Movements

The current bus services and routes within the general locality of the subject site are limited but it is considered that these routes could be expanded in the future to potentially provide greater access to public transport. The design of the main access roads e.g. Myall Quay Boulevard and Riverside Boulevard both allow for a large vehicle such as a bus which can then connect through to the northern road to Toonang Drive.

Currently there is a school bus run along Myall Street that provides access to schools in Raymond Terrace and a bus stop with associated shelter in the vicinity of Myall Quay Boulevard and / or Riverside Boulevard would allow for a convenient connection to this existing bus service.

The provision of bus services to the locality and the subject site will require discussion with local providers with support from Council and will occur during the detailed design stage of the project.

3.3.4 Service Area Layout

No dedicated service area is required for a residential sub division. The internal design of the roads will be in accordance with Council design requirements which will allow for access for large vehicles such as Council refuse trucks. The swept path movements of these size of vehicles are similar to typical delivery vehicles which may need to access the site on irregular occasions.

3.4 Parking

The parking for the development will be provided in accordance with Council requirements and will be finalised for each lot during the DA stage for each individual lots. Council requirements are for a minimum of one off street space together with a driveway which will cater for a vehicle. This can be provide for each lot based upon the plans provided.

3.5 Pedestrian and Bicycle Facilities

The Council design guide requires a footpath to be provided on one side of future roads to cater for pedestrian movements. This will allow pedestrians to move safely around the subdivision as well as gain access to the wider network. This will allow for connection to the Tea Gardens shopping area on the corner of Myall Street and Myall Quay Boulevard and through to the existing network paths within the adjacent residential development as well as the footway / cycleway that runs along Myall Street.

Within the residential development, cyclist can ride on road due to the low traffic speeds and traffic volumes. There will also be off road paths provided within the development to allow for linkages between the site and the existing off road routes within the adjacent residential development. Details of these connections will be determined in consultation with Council during the detailed design stage of the project.

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4 Transportation Analysis

4.1 Traffic Generation

When determining the potential volume of traffic generated by the development, it is important to review the mix of residents that live within the Hawks Nest / Tea Gardens area. A significant portion of the dwellings are used for holiday and weekend use only. Retired people (60yo+) make up 49.7% of the local residents (source: profile.id.com.au) with older workers and pre-retirees making up a further 12.4%. By comparison workers between the ages of 25 – 50yo only constitute 19% of the local residents. This is consistent with the limited work opportunities within the area although it is noted that the vast majority of people who live in this area also work in the Great Lakes Council area, although not necessarily in Tea Gardens nor Hawks Nest.

The traffic surveys show that the two-way flow on Myall Street to the north-west of Toonang Drive were 288 vehicles in the morning peak, indicating a very low demand for external traffic movements associated with work trips to / from the locality. The afternoon peak shows a similar two way movement of 296 vehicles.

As per the previous assessment completed by BTF, the trip generation rate should be discounted from the standard rate, to allow for retired residents, holiday use and trip containment. It can be seen that there is considerable scope for walking and cycling trips which would also reduce the typical hourly traffic generation rate for the residential subdivision.

The RMS updated guide to residential development provides the following rates:

- Evening peak hour rate of 0.78 per dwelling
- Morning peak hour rate of 0.71 per dwelling
- Housing for seniors rate of 0.4 per dwelling

No rates are provided for holiday lets / weekend use.

Assuming a conservative approach of 33% of the lots being occupied by retired people and the balance being typical residential lots, this would give a composite rate of 0.61 trips per lot in the AM peak and 0.65 trips per lot in the PM peak. For the purposes of this assessment, a conservative approach has been assumed with a standard AM rate of 0.71 per lot and 0.78 per lot in the PM to ensure a robust assessment of the impacts of the development.

Table 1 – Traffic flow by stage and cumulative for the proposed development

Stage number	Number of dwellings	AM peak	Cumulative AM	PM peak	Cumulative PM
One	49	30	30	32	32
Two	48	29	59	31	63
Three	58	35	94	38	101
Four	44	27	121	29	130
Five	45	27	148	29	159
Six	41	25	173	27	186
Seven	33	20	193	21	207
Eight	32	20	213	21	228
Nine	39	24	237	25	253
Ten	43	26	263	28	281
Eleven a	42	26	289	27	308
Eleven b	51	31	320	33	341
Twelve	53	32	352	34	375
Thirteen	47	29	381	31	406
Fourteen	33	20	401	21	427
Fifteen	54	33	434	35	462
Sixteen a	42	26	460	27	489
Sixteen b	51	31	491	33	522

When reviewing the traffic movements, it is noted that the shopping centre in this locality is located on the edge of the residential development on the eastern side of Myall Street. A significant portion of the traffic associated with the development will be shopping trips and trips to the medical centre located at this centre and as such do not need to access the external road network.

4.1.1 Daily and Seasonal Factors

The nature of the development and the location within Tea Gardens will create some weekend / holiday use with reduced movements outside of these periods. For permanent residents living in this location there will be no seasonal variation in traffic flows. This locality (and Hawks Nest) are traditionally busiest overt the summer months and weekends with much lower traffic flows outside of these periods.

4.1.2 Sight Distances

The development falls within the urban limit of Tea Gardens with a blanket speed limit of 50 km/h. Safe Intersection Sight Distance requirements from Austroads for the 50 km/h speed zone is 80 metres. This requirement applies for the internal road network as well as connections to the external road network at Myall Quay Boulevard and Riverside Boulevard.

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Myall Street provides a straight alignment and as such offers maximum visibility for drivers entering and exiting the side roads and various driveways along its length. The visibility at the intersection of Myall Street and Myall Quay Boulevard has been checked on site and exceeds 150 metres in both direction, in excess of the requirement for 80 metres. The visibility splays for 100 metres are shown below in Figure 4-1

Figure 4-1 – 100 m visibility splays for traffic exiting Myall Quay Boulevard

For the future intersection of Riverside Boulevard and Myall Street, the intersection is located on a straight section of road offering similar visibility splays to the existing access at Myall Quay Boulevard. The visibility splays can be confirmed and checked during the detailed design stage for this new access.

For the intersection of Toonang Drive and Myall Street, the intersection is located on a straight section of the road which maximises visibility in both directions. In this location the posted speed limit is 80 km/h and for this speed, the sight distance requirements are 160 metres.

Figure 2 – 160 metres visibility splays for drivers exiting Toonang Drive

The new access proposed on Toonang Drive will be determined during the detailed design stage of the project. It will be located to ensure the required visibility splays are provided in accordance with Council requirements.

For the internal road network, the design is in accordance with Council design requirements which ensures that visibility is available at each of the intersections to ensure safe and appropriate traffic movements.

4.1.3 Queuing at entrance to site

There are no vehicle queues expected at the main site entry / exit points. Given the traffic demands associated with the development and the low base traffic flows on the adjacent road network, the overall traffic delays will be relatively low. A Sidra assessment has been completed below to review the operation of the site access on Myall Street.

4.1.4 Comparison with existing site access

There is no proposed change to the existing site access controls or layout.

4.1.5 Pedestrian Movements

It is considered that there will be a significant volume of pedestrian movement in and around the development, associated with both leisure walks and people accessing the Tea Gardens shopping centre on the corner of Myall

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Street and Myall Quay Boulevard. Pedestrians will be catered for with a footpath provided along one side of the key roads through the development. In other locations, as per Council design standards and reflective of other new roads in the locality, no footpath will be provided. Given the low traffic flows on the internal road and low speed zone pedestrians are able to walk on the road or verge as required.

4.2 Traffic Distribution and Assignments

During the initial stages, all traffic will enter and exit the site via the priority controlled intersection of Myall Street and Myall Quay Boulevard. It is proposed that this single vehicle access point will cater for the initial stages (1, 2, 3, 15, 4 and 16a) and then the second access will be constructed to North Shearwater Estate.

The connection through to Toonang Drive will predominately cater for the traffic wishing to head out of the locality towards the Pacific Highway. It can be seen that for the traffic heading towards Tea Gardens and Hawks Nest the shortest and most appropriate route will be via the second access on Riverside Boulevard.

Having reviewed the existing traffic splits and the various attractions in the locality of Tea Gardens / Hawks Nest, it is considered that 60% of the traffic will have an origin / destination towards Hawks Nest and 40% of the traffic will have an origin destination away from Tea Gardens.

4.3 Impact of Generated Traffic

4.3.1 Impact on daily Traffic Flows

To determine the daily impact of the development, the potential daily traffic flows associated with the development have been determined in accordance with the rates provided by the RMS. The RMS guide indicates a daily rate of 7.4 trips per dwelling for regional centres. Applying this to the total development of 805 dwellings, this provides a daily traffic generation value of 5,957 vehicles per day, which would be equally split between 2,979 inbound and outbound per day.

Again, these traffic volumes are considered to be at the upper end of the scale, considering the existing demographics within the Hawks Nest / Tea Gardens area and the existing traffic flows within the locality. Based on the peak hours typically representing 10% of the daily traffic flows, the existing traffic flows on Myall Street to the immediate north of Myall Quay Boulevard are some 3,500 vehicles per day and to the south of this intersection are 5,000 vehicles per day.

With the split of 40% having an origin / destination to the north of the site towards the Pacific Highway and 60% having an origin / destination towards Hawks Nest, this would indicate that the daily flows on Myall Street would increase to 5,883 north of Myall Quay Boulevard and 8,574 to the south of Myall Quay Boulevard.

Under the Network and Corridor Planning Practice notes published by the RMS, Myall Street would be classified as a Type 3U urban road, serving an inter-regional function between the Tea Gardens / Hawks Nest area and the Pacific Highway. This classification of road average daily traffic volume of 13,000 vehicles. With the projected maximum increase allowing for 8,574 vehicles per day, this is well within the average limit of 13,000 vehicles per day and the impact accordingly is considered acceptable.

4.3.2 Peak Hour Impacts on Intersections

The key intersection that will be impacted by the development will be the intersection of Myall Quay Boulevard and Myall Street. During the initial stages this will provide the only point of access for the development. A Sidra intersection assessment has been completed for this intersection and the results are provided below:

Table 2 – Sidra results, Initial development all access via Myall Street and Myall Quay Boulevard

Approach	Level of Service	Delay (seconds)	Queue (metres)
Myall Street (Hawks Nest)	A / A	3.1 / 4.6	5.9 / 6.0
Myall Quay Boulevard	A / A	6.9 / 6.5	3.9 / 2.5
Myall Street (Pac Hwy)	A / A	1.9 / 2.0	0.0 / 0.0

Notes: results for AM / PM peak

The above results demonstrate that the existing intersection controls and layout are adequate to cater for the projected traffic flows associated with the initial stage of the development with this single point of access for vehicles.

The Sidra model was then re-run with a worst case scenario of all development traffic entering and exiting the site via the existing intersection of Myall Street and Myall Quay Boulevard. The result of this Sidra assessment are shown below.

Table 3 – Sidra results, Full development (805 dwellings) and all access via the intersection of Myall Street and Myall Quay Boulevard

Approach	Level of Service	Delay (seconds)	Queue (metres)
Myall Street (Hawks Nest)	A / A	3.5 / 8.1	6.7 / 24.9
Myall Quay Boulevard	A / A	8.1 / 8.8	17.1 / 7.3
Myall Street (Pac Hwy)	A / A	2.4 / 3.5	0.0 / 0.0

Notes: results for AM / PM peak

The above results demonstrate that the existing intersection (with priority control) of Myall Quay Boulevard and Myall Street has adequate capacity to cater for the full development of 805 dwellings via this single vehicle access point. This is considered a worst case scenario as no allowance has been made to reduce the flows due to retired people living in the development nor use of the dwellings as holiday / weekend units. It is also recognised that at this point there will be two other points of access, at Riverside Boulevard and Toonang Drive which will decrease the impact at any one intersection.

4.3.3 Background traffic and other developments

There are a limited number of additional developments occurring in the locality and based on the projected population increase of some 1.8% per annum over the next 10 years, it can be seen that the subject site will be the major driver for increased traffic flows in this area.

For the purposes of this assessment, a background growth of 1.5% per annum has been assumed on Myall Street to allow for any other development. The results of the Sidra analysis, allowing for a single point of access and 1.5% growth per annum over 10 years on Myall Street is shown below.

Table 4 - Sidra results, Full development (805 dwellings) and all access via the intersection of Myall Street and Myall Quay Boulevard 2025

Approach	Level of Service	Delay (seconds)	Queue (metres)
Myall Street (Hawks Nest)	A / A	3.4 / 8.1	7.3 / 25.9
Myall Quay Boulevard	A / A	8.5 / 9.1	18.5 / 8.0
Myall Street (Pac Hwy)	A / A	2.2 / 6.7	0.0 / 25.9

Notes: results for AM / PM peak

The above results again demonstrate that the existing intersection layout and controls at the intersection of Myall Street and Myall Quay Boulevard provides adequate capacity for the full development and allowing for 10 years background growth on Myall Street.

The operation of this intersection with traffic signals control has also been assessed, based upon the proposal to install traffic signals at this location. The results of this Sidra analysis for this intersection with signal control is provided below:

Table 5 - Sidra results, Full development (805 dwellings) and all access via the intersection of Myall Street and Myall Quay Boulevard 2025 with signal control

Approach	Level of Service	Delay (seconds)	Queue (metres)
Myall Street (Hawks Nest)	B / B	15.7 / 21.3	18.8 / 77.1
Myall Quay Boulevard	A / B	13.1 / 28.4	32.8 / 40.0
Myall Street (Pac Hwy)	A / A	14.1 / 8.5	11.9 / 21.6

Notes: results for AM / PM peak

The above results confirm that the intersection will operate to a satisfactory level of service for the future scenario, even allowing for ALL development via this one intersection. With trips dispersed over three access points the impact at this intersection will be reduced and the intersection will perform better. Whilst the signal control will create some delays over the sign control, it is recognised that the signals will provide benefit for pedestrians as well as improve road safety.

Note that it is proposed to provide a second access via Myall Street as well as a connection to Toonang Drive and North Shearwater Estate reducing the delays and congestion further. The intersection of Myall Street and Riverside Boulevard will provide a similar layout to the intersection at Myall Quay Boulevard, with a sheltered right turn lane and a left turn deceleration lane on Myall Street. This will reduce delays for the through traffic movements whilst also maintaining road safety.

For the intersection of Toonang Drive and Myall Street, the existing layout will be upgraded to allow for a sheltered right turn lane when the connection through to Toonang Drive is provided. The volume of traffic turning right out of here will be low, as the most convenient route would be via the right turn out of either Myall Quay Boulevard or Riverside Boulevard. No right turn lane is required due to the low traffic flows and low delays / queues at this location. This intersection is located at the bottom of the hill on Myall Street which means a right turn acceleration lane cannot be designed due to the presence of the right turn lane into Viney Creek Road which is 350 metres north of Toonang Drive.

4.3.4 Impact of Construction Traffic

The majority of construction work will be contained within the site so there will be minimal impact upon the 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 works on site will be governed by the requirements of Great Lakes Council as stipulated within any development consent granted including hours of work.

An important element for the construction work will be managing the vehicles associated with the construction staff. Construction staff can be directed to park within the site and the overall area of the site will allow for this to happen.

4.4 Impact on Road Safety

The additional traffic flows associated with the development of the subject site will have an acceptable impact upon the overall road safety in this location. The site access is located on a straight section of Myall Street offering good visibility for drivers entering and exiting the subject site. The driveway is located in a 50 km/h speed zone.

The major impact could occur at the intersection of Myall Street and Myall Quay Boulevard. However, the modelling shows that there will be minimal increases in delays and congestion at this intersection due to the increased traffic flows. Safety will be improved once the traffic signals are provided at this location. A review of the accident history at this location shows that there has been only two accidents in the vicinity of this intersection in a 5 year timeframe.

The intersection of Riverside Boulevard and Myall Quay will also allow for safe vehicle movements with future signal control also to be added to increase safety.

The intersection of Viney Creek Road and Myall Street will be upgraded with a sheltered right turn lane which will allow through traffic movements to continue with minimal delays as right turning traffic can prop in the sheltered right turn lane.

4.5 Parking Analysis

The parking for residential development can be accommodated on site in accordance with Council design requirements with no impact upon the external road network. The parking will be determined during the DA stage for each individual lot.

4.6 Public Transport

4.6.1 Options for improving services

It can be seen that the area currently has limited access to public transport. Additional services could be provided to enhance the area and this will be discussed with local bus providers with Council to improve the services where appropriate.

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4.6.2 Pedestrian Access to Bus Stops

Pedestrian paths will be provided within the development to allow for pedestrian access to Myall Street, along which existing bus services run.

5 Improvement Analysis

5.1 Improvements to Accommodate Existing Traffic

The analysis above, for the intersection of Myall Street and Myall Quay Boulevard shows the existing intersection performs well with minimal delays and congestion.

5.2 Improvements to Accommodate Background Traffic

There are no road upgrades required to accommodate the background traffic growth in the locality.

5.3 Additional Improvements to Accommodate Development Traffic

There are no specific road upgrades required as a direct consequence of the proposed development. The Sidra analysis demonstrates that the proposed full development of up to 805 dwellings can be accommodated with the existing intersection layout and controls at Myall Street and Myall Quay Boulevard. The Sidra analysis also demonstrates that the upgrade of the intersections to signal control will continue to allow for the development flows whilst ensuring road safety is improved for all road users.

5.4 Alternative Improvements

None required or proposed.

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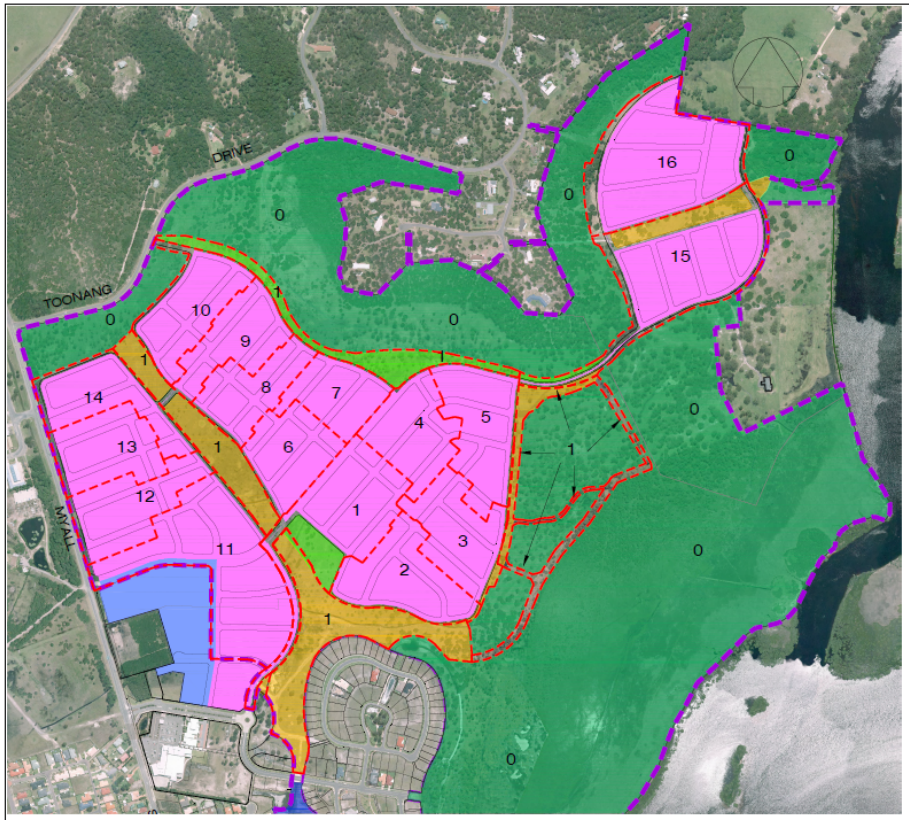
6 Recommendation

From the study work, it is recommended that the proposed residential development be approved on traffic and access grounds. The assessment shows that the full development of 725 lots with potential for 805 dwellings can be accommodated via the existing intersection of Myall Street and Myall Quay Boulevard with no road upgrades required. With the provision of a second access at Riverside Boulevard the impacts at either intersection will be reduced. With the introduction of connection to Toonang Drive the impacts at any one intersection will be reduced further and will allow for efficient movement of vehicles in and out of the development.

It is noted that traffic signals will be installed on Myall Street at Myall Quay Boulevard to improve road safety for all users.

Appendix A Site and Staging Plan



STAGE	LOTS	DESCRIPTION	Approx Registration Date
0	N/A	Establishment of on-site bio-banking site	2017
1	44	Includes establishment & partial embellishment of primary water management and bio-bank areas	2017
2	43		2018
3	52		2018
4	40		2019
5	40		2020
6	37		2022
7	30		2022
8	29		2023
9	35		2023
10	39	Includes second connection to Toonang Dr	2023
11a	38		2021
11b	46	Includes second connection to Myall Street	2021
12	48		2024
13	42		2024
14	30		2025
15	48		2018
16a	38		2019
16b	46	Includes links to North Shearwater Estate	2020
TOTAL	725		

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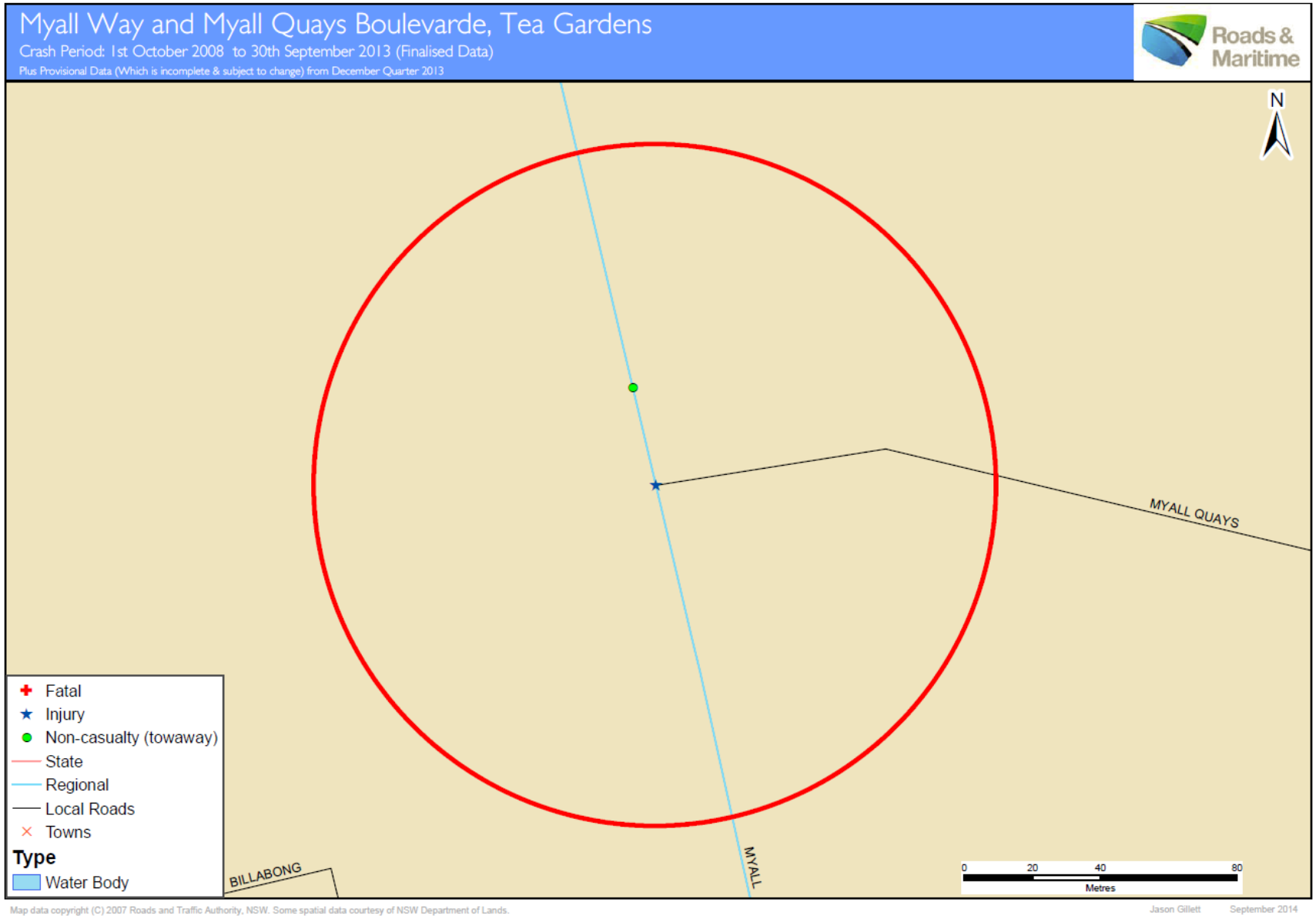
R.C.07 STAGING PLAN

RIVERSIDE TEA GARDENS

Appendix B Accident Data



Detailed Crash Report - sorted

Transport for NSW – Centre for Road Safety

Crash No.	Date	Day of Week	Time	Distance	ID Feature	Loc Type	Alignment	Weather	Surface Condition	Speed Limit	No. of Tus	Tu Type/Obj	Age/Sex	Street Travelling	Speed Travelling	Manoeuvre	Degree of Crash	Killed	Injured	Factors
Natural Lighting																				**S F**
Hunter Region					**Great Lakes LGA**				**Tea Gardens**					**Myall St**						
649570	13/12/2008	Sat	09:45	at	MYALL QUAYA BVD	TJN	STR	Raining	Wet	50	2	CAR	F17	N in MYALL ST	40 Proceeding in lane		I	0	1	
E35951657					Daylight	DCA : 303		Same - Rear right				TRK	M66	N in MYALL ST	5 Turning right					
Hunter Region					**Great Lakes LGA**				**Tea Gardens**					**Tea Gardens Rd**						
813219	05/10/2012	Fri	14:30	30 m N	MYALL QUAYS BVD	2WY	STR	Fine	Dry	50	2	4WD	M76	N in TEA GARDENS RD	20 Perform U-turn		N	0	0	
E49364761					Daylight	DCA : 304		Same - U-turn				UTE	M41	N in TEA GARDENS RD	50 Proceeding in lane					

Report Totals: Total Crashes: 2 Fatal Crashes: 0 Injury Crashes: 1 Killed: 0 Injured: 1

Crashid dataset Myall Way and Myall Quays Boulevarde, Tea Gardens - 1/10/2008 to 2014*

Note: Ordered by: Crash Date. Data for the 9 month period prior to the generated date of this report are incomplete and are subject to change.

Rep ID: DCR02 **Office:** Hunter **User ID:** gillettj Page 1 of 1 Generated: 15/09/2014 14:25

Appendix C Bus Services

150, 151, 152 TAREE - NEWCASTLE via Forster / HAWKS NEST - NEWCASTLE

Depart	152 Mon-Fri except Pub. Hols	151 Daily except Xmas day	150 Daily	150 Mon-Fri
Taree Railway Station	-	7.00am	9.30am	2.50pm
Hallidays Point Opposite Timber Tops Dr	-	7.20am	9.50am	3.10pm
Tuncurry Beach St	-	7.35am	10.05am	3.20pm
Forster Little St - Coach Terminal	-	7.45am	10.15am	3.30pm
Forster Keys Lakes Way turn off	-	7.50am	10.20am	3.35pm
Tiona Tourist Park Lakes Way	-	7.55am	10.25am	3.40pm
Blueys Beach Opposite Shops	-	8.05am	10.35am	3.50pm
Smith Lakes Lakes Way turn off	-	8.10am	10.40am	3.55pm
Bungwahl General Store	-	8.15am	10.50am	4.00pm
Bulahdelah Shell Service Station	-	8.45am	11.20am	4.30pm
The Rock Pacific Highway	-	9.05am	-	-
Hawks Nest Community Centre	6.45am	-	11.55am	5.00pm
Tea Gardens Myall St, bef. Maxwell St	6.50am	-	12.00pm	5.05pm
Karuah Karuah Motor Inn	7.15am	9.15am	12.20pm	5.25pm
Raymond Terrace Opp. Colonial Motor Inn	7.45am	9.40am	12.45pm	5.50pm
Broadmeadow Railway Station	-	10.10am	1.15pm	6.20pm
XPT (Train) to Sydney Broadmeadow Station	-	*10.29am	2.19pm	6.39pm
Newcastle Watt St - Bus Interchange	8.45am	10.25am	1.30pm	6.35pm

Explanations

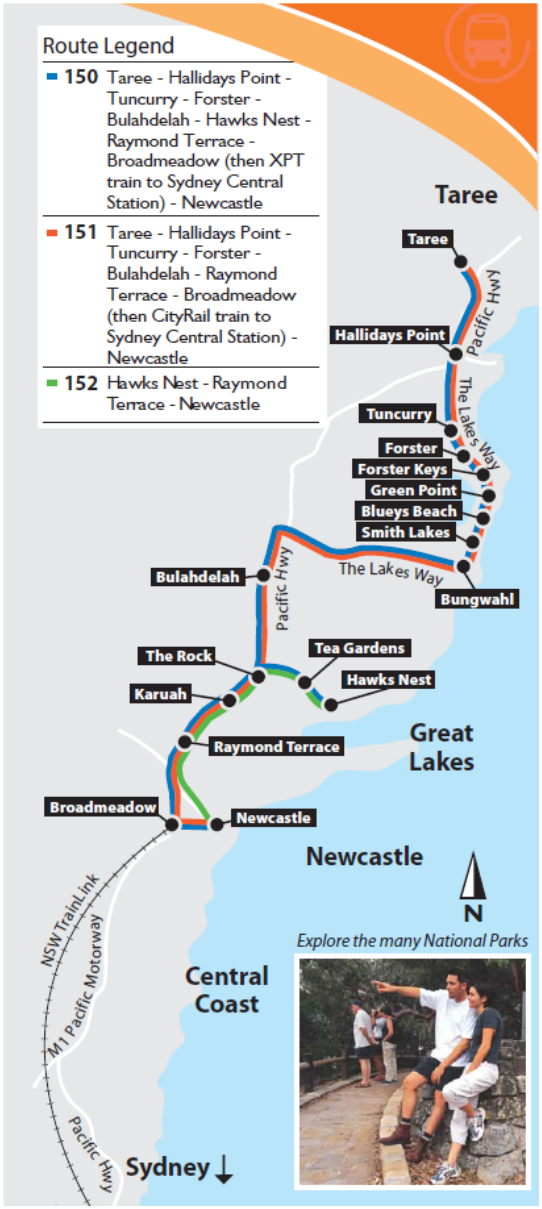
* - NSW TrainLink train departs Broadmeadow Station.
Train departs at 10.43am on Weekends & Public Holidays.

150, 151, 152 NEWCASTLE - TAREE via Forster / NEWCASTLE - HAWKS NEST

Depart	150 Mon-Fri	150 Daily	152 Mon-Fri except Pub. Hols	151 Daily except Xmas day
Newcastle Watt St - Bus Interchange	9.45am	2.35pm	3.30pm	4.45pm
XPT (Train) arrives at Broadmeadow Station	9.36am	2.05pm	-	*4.37pm
Broadmeadow Railway Station	10.05am	2.55pm	-	5.05pm
Raymond Terrace Colonial Motor Inn	10.35am	3.25pm	4.10pm	5.35pm
Karuah Opp. Karuah Motor Inn	10.55am	3.45pm	4.35pm	5.55pm
The Rock Pacific Highway	-	-	-	6.05pm
Hawks Nest Community Centre	11.20am	4.10pm	5.10pm	-
Tea Gardens Myall St, bef. Maxwell St	11.25am	4.15pm	5.00pm	-
Bulahdelah Mobil Service Station	11.55am	4.55pm	-	6.30pm
Bungwahl General store	12.20pm	5.20pm	-	6.55pm
Smith Lakes Lakes Way turn off	12.25pm	5.25pm	-	7.00pm
Blueys Beach Shops	12.35pm	5.35pm	-	7.10pm
Tiona Tourist Park Lakes Way	12.40pm	5.40pm	-	7.15pm
Forster Keys Lakes Way turn off	12.50pm	5.50pm	-	7.25pm
Forster Little St - Coach Terminal	1.00pm	6.00pm	-	7.35pm
Tuncurry Beach St	1.10pm	6.10pm	-	7.45pm
Hallidays Point Lakes Way turn off	1.20pm	6.20pm	-	7.55pm
Taree Railway Station	1.40pm	6.40pm	-	8.15pm

Explanations

* - NSW TrainLink train departs Broadmeadow Station
Train departs at 4.54pm on Weekends & Public Holidays.



Appendix D Bike Routes

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Appendix E Criteria for interpreting results of SIDRA

1-Level of Service (LoS)

LoS	Traffic Signals and Roundabouts	Give Way and Stop Signs
A	Good	Good
B	Good, with acceptable delays and spare capacity	Acceptable delays and spare capacity
C	Satisfactory	Satisfactory, but requires accident study
D	Operating near capacity	Near capacity and requires accident study
E	At capacity, excessive delay: roundabout requires other control method	At capacity, requires other control mode
F	Unsatisfactory, requires other control mode or additional capacity	Unsatisfactory, requires other control mode

2-Average Vehicle Delay (AVD)

The AVD is a measure of operational performance of an intersection relating to its LoS. The average delay should be taken as a guide only for an average intersection. Longer delays may be tolerated at some intersections where delays are expected by motorists (e.g. those in inner city areas or major arterial roads).

LoS	Average Delay / Vehicle (secs)	Traffic Signals and Roundabouts	Give Way and Stop Signs
A	Less than 15	Good operation	Good operation
B	15 to 28	Good with acceptable delays and spare capacity	Acceptable delays and spare capacity
C	28 to 42	Satisfactory	Satisfactory but accident study required
D	42 to 56	Operating near capacity	Near capacity, accident study required
E	56 to 70	At capacity, excessive delays: roundabout requires other control mode	At capacity; requires other control mode
F	Exceeding 70	Unsatisfactory, requires additional capacity	Unsatisfactory, requires other control mode

3-Degree of Saturation (D/S)

The D/S of an intersection is usually taken as the highest ratio of traffic volumes on an approach to an intersection compared with the theoretical capacity, and is a measure of the utilisation of available green time. For intersections controlled by traffic signals, both queues and delays increase rapidly as DS approaches 1.0. An intersection operates satisfactorily when its D/S is kept below 0.75. When D/S exceeds 0.9, queues are expected.

INTERSECTION SUMMARY

Site: Myall Quay AM base 2014+Intial stages One access

Myall Quay Boulevard and Myall Street
AM base 2014
Plus initial stages prior to second access
Giveway / Yield (Two-Way)

Intersection Performance - Hourly Values				
Performance Measure	Vehicles		Persons	
Travel Speed (Average)	55.4	km/h	55.4	km/h
Travel Distance (Total)	723.3	veh-km/h	868.0	pers-km/h
Travel Time (Total)	13.1	veh-h/h	15.7	pers-h/h
Demand Flows (Total)	711	veh/h	853	pers/h
Percent Heavy Vehicles (Demand)	0.0	%		
Degree of Saturation	0.161			
Practical Spare Capacity	460.2	%		
Effective Intersection Capacity	4425	veh/h		
Control Delay (Total)	0.82	veh-h/h	0.98	pers-h/h
Control Delay (Average)	4.1	sec	4.1	sec
Control Delay (Worst Lane)	9.1	sec		
Control Delay (Worst Movement)	9.1	sec	9.1	sec
Geometric Delay (Average)	3.5	sec		
Stop-Line Delay (Average)	0.7	sec		
Idling Time (Average)	0.2	sec		
Intersection Level of Service (LOS)	NA			
95% Back of Queue - Vehicles (Worst Lane)	0.8	veh		
95% Back of Queue - Distance (Worst Lane)	5.9	m		
Queue Storage Ratio (Worst Lane)	0.00			
Total Effective Stops	263	veh/h	315	pers/h
Effective Stop Rate	0.37	per veh	0.37	per pers
Proportion Queued	0.16		0.16	
Performance Index	14.6		14.6	
Cost (Total)	309.95	$/h	309.95	$/h
Fuel Consumption (Total)	52.1	L/h		
Carbon Dioxide (Total)	122.5	kg/h		
Hydrocarbons (Total)	0.010	kg/h		
Carbon Monoxide (Total)	0.150	kg/h		
NOx (Total)	0.034	kg/h		

Level of Service (LOS) Method: Delay (RTA NSW).
NA: Intersection LOS for Vehicles is Not Applicable for two-way sign control since the average intersection delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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MOVEMENT SUMMARY

Site: Myall Quay AM base 2014+Intial stages One access

Myall Quay Boulevard and Myall Street
AM base 2014
Plus initial stages prior to second access
Giveway / Yield (Two-Way)

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: Myall Street (Hawks Nest)											
2	T1	162	0.0	0.161	0.4	LOS A	0.8	5.9	0.18	0.21	57.4
3	R2	134	0.0	0.161	6.3	LOS A	0.8	5.9	0.30	0.33	54.5
Approach		296	0.0	0.161	3.1	NA	0.8	5.9	0.23	0.26	56.1
East: Myall Quay Boulevard											
4	L2	164	0.0	0.088	5.6	LOS A	0.0	0.0	0.00	0.53	54.9
6	R2	89	0.0	0.143	9.1	LOS A	0.6	3.9	0.52	0.75	50.7
Approach		254	0.0	0.143	6.9	LOS A	0.6	3.9	0.18	0.61	53.4
North: Myall Street (Pac Hwy)											
7	L2	54	0.0	0.029	5.5	LOS A	0.0	0.0	0.00	0.58	53.6
8	T1	107	0.0	0.055	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		161	0.0	0.055	1.9	NA	0.0	0.0	0.00	0.19	57.7
All Vehicles		711	0.0	0.161	4.1	NA	0.8	5.9	0.16	0.37	55.4

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road 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.

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INTERSECTION SUMMARY

Site: Myall Quay PM base 2014+Initial stages One access

Myall Quay Boulevard and Myall Street
PM base 2014
Plus initial stages One access
Giveway / Yield (Two-Way)

Intersection Performance - Hourly Values				
Performance Measure	Vehicles		Persons	
Travel Speed (Average)	55.3	km/h	55.3	km/h
Travel Distance (Total)	814.8	veh-km/h	977.7	pers-km/h
Travel Time (Total)	14.7	veh-h/h	17.7	pers-h/h
Demand Flows (Total)	800	veh/h	960	pers/h
Percent Heavy Vehicles (Demand)	0.0	%		
Degree of Saturation	0.184			
Practical Spare Capacity	433.0	%		
Effective Intersection Capacity	4351	veh/h		
Control Delay (Total)	0.96	veh-h/h	1.16	pers-h/h
Control Delay (Average)	4.3	sec	4.3	sec
Control Delay (Worst Lane)	9.8	sec		
Control Delay (Worst Movement)	9.8	sec	9.8	sec
Geometric Delay (Average)	3.7	sec		
Stop-Line Delay (Average)	0.6	sec		
Idling Time (Average)	0.1	sec		
Intersection Level of Service (LOS)	NA			
95% Back of Queue - Vehicles (Worst Lane)	0.9	veh		
95% Back of Queue - Distance (Worst Lane)	6.0	m		
Queue Storage Ratio (Worst Lane)	0.00			
Total Effective Stops	317	veh/h	381	pers/h
Effective Stop Rate	0.40	per veh	0.40	per pers
Proportion Queued	0.14		0.14	
Performance Index	16.5		16.5	
Cost (Total)	350.10	$/h	350.10	$/h
Fuel Consumption (Total)	58.9	L/h		
Carbon Dioxide (Total)	138.4	kg/h		
Hydrocarbons (Total)	0.011	kg/h		
Carbon Monoxide (Total)	0.169	kg/h		
NOx (Total)	0.038	kg/h		

Level of Service (LOS) Method: Delay (RTA NSW).
NA: Intersection LOS for Vehicles is Not Applicable for two-way sign control since the average intersection delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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MOVEMENT SUMMARY

Site: Myall Quay PM base 2014+Initial stages One access

Myall Quay Boulevard and Myall Street
PM base 2014
Plus initial stages One access
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	ODMov	Demand Flows Total	Demand Flows HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Myall Street (Hawks Nest)											
2	T1	99	0.0	0.184	0.4	LOS A	0.9	6.0	0.11	0.15	58.3
3	R2	188	0.0	0.184	6.8	LOS A	0.9	6.0	0.39	0.55	52.9
Approach		287	0.0	0.184	4.6	NA	0.9	6.0	0.29	0.41	54.7
East: Myall Quay Boulevard											
4	L2	193	0.0	0.104	5.6	LOS A	0.0	0.0	0.00	0.53	54.9
6	R2	55	0.0	0.097	9.8	LOS A	0.4	2.5	0.54	0.76	50.3
Approach		247	0.0	0.104	6.5	LOS A	0.4	2.5	0.12	0.58	53.8
North: Myall Street (Pac Hwy)											
7	L2	96	0.0	0.052	5.5	LOS A	0.0	0.0	0.00	0.58	53.6
8	T1	169	0.0	0.087	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		265	0.0	0.087	2.0	NA	0.0	0.0	0.00	0.21	57.5
All Vehicles		800	0.0	0.184	4.3	NA	0.9	6.0	0.14	0.40	55.3

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road 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.

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INTERSECTION SUMMARY

Site: Myall Quay AM base 2014+full flows one access full rates

Myall Quay Boulevard and Myall Street
AM base 2014
One access, full development 805 dwellings full rates
Giveway / Yield (Two-Way)

Intersection Performance - Hourly Values				
Performance Measure	Vehicles		Persons	
Travel Speed (Average)	54.0	km/h	54.0	km/h
Travel Distance (Total)	1190.6	veh-km/h	1428.8	pers-km/h
Travel Time (Total)	22.0	veh-h/h	26.5	pers-h/h
Demand Flows (Total)	1167	veh/h	1401	pers/h
Percent Heavy Vehicles (Demand)	0.5	%		
Degree of Saturation	0.426			
Practical Spare Capacity	87.7	%		
Effective Intersection Capacity	2739	veh/h		
Control Delay (Total)	1.90	veh-h/h	2.28	pers-h/h
Control Delay (Average)	5.9	sec	5.9	sec
Control Delay (Worst Lane)	12.1	sec		
Control Delay (Worst Movement)	12.1	sec	12.1	sec
Geometric Delay (Average)	4.3	sec		
Stop-Line Delay (Average)	1.6	sec		
Idling Time (Average)	0.6	sec		
Intersection Level of Service (LOS)	NA			
95% Back of Queue - Vehicles (Worst Lane)	2.4	veh		
95% Back of Queue - Distance (Worst Lane)	17.1	m		
Queue Storage Ratio (Worst Lane)	0.01			
Total Effective Stops	590	veh/h	708	pers/h
Effective Stop Rate	0.51	per veh	0.51	per pers
Proportion Queued	0.21		0.21	
Performance Index	26.8		26.8	
Cost (Total)	544.19	$/h	544.19	$/h
Fuel Consumption (Total)	91.1	L/h		
Carbon Dioxide (Total)	214.3	kg/h		
Hydrocarbons (Total)	0.018	kg/h		
Carbon Monoxide (Total)	0.257	kg/h		
NOx (Total)	0.089	kg/h		

Level of Service (LOS) Method: Delay (RTA NSW).
NA: Intersection LOS for Vehicles is Not Applicable for two-way sign control since the average intersection delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Quality Traffic Advice

MOVEMENT SUMMARY

Site: Myall Quay AM base 2014+full flows one access full rates

Myall Quay Boulevard and Myall Street
AM base 2014
One access, full development 805 dwellings full rates
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	ODMov	Demand Flows Total	Demand Flows HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Myall Street (Hawks Nest)											
2	T1	162	2.0	0.193	0.4	LOS A	1.0	6.7	0.17	0.22	57.4
3	R2	176	0.0	0.193	6.4	LOS A	1.0	6.7	0.32	0.40	54.0
Approach		338	1.0	0.193	3.5	NA	1.0	6.7	0.25	0.31	55.6
East: Myall Quay Boulevard											
4	L2	397	0.0	0.214	5.6	LOS A	0.0	0.0	0.00	0.53	54.9
6	R2	245	0.0	0.426	12.1	LOS A	2.4	17.1	0.65	0.93	48.7
Approach		642	0.0	0.426	8.1	LOS A	2.4	17.1	0.25	0.68	52.4
North: Myall Street (Pac Hwy)											
7	L2	80	0.0	0.043	5.5	LOS A	0.0	0.0	0.00	0.58	53.6
8	T1	107	2.0	0.056	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		187	1.1	0.056	2.4	NA	0.0	0.0	0.00	0.25	57.1
All Vehicles		1167	0.5	0.426	5.9	NA	2.4	17.1	0.21	0.51	54.0

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road 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.

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INTERSECTION SUMMARY

Site: Myall Quay PM base 2014+full flows one access full rates

Myall Quay Boulevard and Myall Street
PM base 2014
Plus full flows 805 dwellings one access full rates
Giveway / Yield (Two-Way)

Intersection Performance - Hourly Values				
Performance Measure	Vehicles		Persons	
Travel Speed (Average)	53.2	km/h	53.2	km/h
Travel Distance (Total)	1349.9	veh-km/h	1619.9	pers-km/h
Travel Time (Total)	25.4	veh-h/h	30.4	pers-h/h
Demand Flows (Total)	1326	veh/h	1592	pers/h
Percent Heavy Vehicles (Demand)	0.4	%		
Degree of Saturation	0.498			
Practical Spare Capacity	96.9	%		
Effective Intersection Capacity	2664	veh/h		
Control Delay (Total)	2.45	veh-h/h	2.94	pers-h/h
Control Delay (Average)	6.7	sec	6.7	sec
Control Delay (Worst Lane)	17.6	sec		
Control Delay (Worst Movement)	17.6	sec	17.6	sec
Geometric Delay (Average)	4.4	sec		
Stop-Line Delay (Average)	2.2	sec		
Idling Time (Average)	0.6	sec		
Intersection Level of Service (LOS)	NA			
95% Back of Queue - Vehicles (Worst Lane)	3.6	veh		
95% Back of Queue - Distance (Worst Lane)	24.9	m		
Queue Storage Ratio (Worst Lane)	0.02			
Total Effective Stops	780	veh/h	935	pers/h
Effective Stop Rate	0.59	per veh	0.59	per pers
Proportion Queued	0.26		0.26	
Performance Index	31.1		31.1	
Cost (Total)	628.87	$/h	628.87	$/h
Fuel Consumption (Total)	104.3	L/h		
Carbon Dioxide (Total)	245.4	kg/h		
Hydrocarbons (Total)	0.020	kg/h		
Carbon Monoxide (Total)	0.294	kg/h		
NOx (Total)	0.096	kg/h		

Level of Service (LOS) Method: Delay (RTA NSW).
NA: Intersection LOS for Vehicles is Not Applicable for two-way sign control since the average intersection delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Quality Traffic Advice

MOVEMENT SUMMARY

Site: Myall Quay PM base 2014+full flows one access full rates

Myall Quay Boulevard and Myall Street
PM base 2014
Plus full flows 805 dwellings one access full rates
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	ODMov	Demand Flows Total	Demand Flows HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Myall Street (Hawks Nest)											
2	T1	99	2.0	0.051	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
3	R2	445	0.0	0.498	9.8	LOS A	3.6	24.9	0.63	0.92	50.4
Approach		544	0.4	0.498	8.1	NA	3.6	24.9	0.51	0.75	51.9
East: Myall Quay Boulevard											
4	L2	238	0.0	0.128	5.6	LOS A	0.0	0.0	0.00	0.53	54.9
6	R2	84	0.0	0.268	17.6	LOS B	1.0	7.3	0.77	0.94	45.4
Approach		322	0.0	0.268	8.8	LOS A	1.0	7.3	0.20	0.64	52.1
North: Myall Street (Pac Hwy)											
7	L2	291	0.0	0.156	5.6	LOS A	0.0	0.0	0.00	0.58	53.6
8	T1	169	2.0	0.088	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		460	0.7	0.156	3.5	NA	0.0	0.0	0.00	0.36	55.8
All Vehicles		1326	0.4	0.498	6.7	NA	3.6	24.9	0.26	0.59	53.2

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road 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.

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Quality Traffic Advice

INTERSECTION SUMMARY

Site: Myall Quay AM base 2024+full flows one access full rates

Myall Quay Boulevard and Myall Street
AM base 2024
One access, full development 805 lots full rates
Giveway / Yield (Two-Way)

Intersection Performance - Hourly Values				
Performance Measure	Vehicles		Persons	
Travel Speed (Average)	54.0	km/h	54.0	km/h
Travel Distance (Total)	1231.2	veh-km/h	1477.4	pers-km/h
Travel Time (Total)	22.8	veh-h/h	27.4	pers-h/h
Demand Flows (Total)	1207	veh/h	1449	pers/h
Percent Heavy Vehicles (Demand)	0.5	%		
Degree of Saturation	0.453			
Practical Spare Capacity	76.8	%		
Effective Intersection Capacity	2668	veh/h		
Control Delay (Total)	1.98	veh-h/h	2.37	pers-h/h
Control Delay (Average)	5.9	sec	5.9	sec
Control Delay (Worst Lane)	13.1	sec		
Control Delay (Worst Movement)	13.1	sec	13.1	sec
Geometric Delay (Average)	4.1	sec		
Stop-Line Delay (Average)	1.8	sec		
Idling Time (Average)	0.7	sec		
Intersection Level of Service (LOS)	NA			
95% Back of Queue - Vehicles (Worst Lane)	2.6	veh		
95% Back of Queue - Distance (Worst Lane)	18.5	m		
Queue Storage Ratio (Worst Lane)	0.01			
Total Effective Stops	598	veh/h	718	pers/h
Effective Stop Rate	0.50	per veh	0.50	per pers
Proportion Queued	0.21		0.21	
Performance Index	27.8		27.8	
Cost (Total)	561.10	$/h	561.10	$/h
Fuel Consumption (Total)	93.9	L/h		
Carbon Dioxide (Total)	221.0	kg/h		
Hydrocarbons (Total)	0.018	kg/h		
Carbon Monoxide (Total)	0.265	kg/h		
NOx (Total)	0.095	kg/h		

Level of Service (LOS) Method: Delay (RTA NSW).
NA: Intersection LOS for Vehicles is Not Applicable for two-way sign control since the average intersection delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Quality Traffic Advice

MOVEMENT SUMMARY

Site: Myall Quay AM base 2024+full flows one access full rates

Myall Quay Boulevard and Myall Street
AM base 2024
One access, full development 805 lots full rates
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	ODMov	Demand Flows Total	Demand Flows HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Myall Street (Hawks Nest)											
2	T1	186	2.0	0.205	0.5	LOS A	1.0	7.3	0.19	0.22	57.4
3	R2	176	0.0	0.205	6.5	LOS A	1.0	7.3	0.33	0.38	54.2
Approach		362	1.0	0.205	3.4	NA	1.0	7.3	0.26	0.29	55.8
East: Myall Quay Boulevard											
4	L2	397	0.0	0.214	5.6	LOS A	0.0	0.0	0.00	0.53	54.9
6	R2	245	0.0	0.453	13.1	LOS A	2.6	18.5	0.67	0.96	48.1
Approach		642	0.0	0.453	8.5	LOS A	2.6	18.5	0.26	0.69	52.1
North: Myall Street (Pac Hwy)											
7	L2	80	0.0	0.043	5.5	LOS A	0.0	0.0	0.00	0.58	53.6
8	T1	123	2.0	0.064	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		203	1.2	0.064	2.2	NA	0.0	0.0	0.00	0.23	57.3
All Vehicles		1207	0.5	0.453	5.9	NA	2.6	18.5	0.21	0.50	54.0

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road 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.

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INTERSECTION SUMMARY

Site: Myall Quay PM base 2024+full flows one access full rates

Myall Quay Boulevard and Myall Street
PM base 2014
Plus full flows one access full rates 805 lots
Giveway / Yield (Two-Way)

Intersection Performance - Hourly Values				
Performance Measure	Vehicles		Persons	
Travel Speed (Average)	53.3	km/h	53.3	km/h
Travel Distance (Total)	1391.5	veh-km/h	1669.8	pers-km/h
Travel Time (Total)	26.1	veh-h/h	31.4	pers-h/h
Demand Flows (Total)	1367	veh/h	1641	pers/h
Percent Heavy Vehicles (Demand)	0.5	%		
Degree of Saturation	0.512			
Practical Spare Capacity	91.4	%		
Effective Intersection Capacity	2670	veh/h		
Control Delay (Total)	2.53	veh-h/h	3.04	pers-h/h
Control Delay (Average)	6.7	sec	6.7	sec
Control Delay (Worst Lane)	19.0	sec		
Control Delay (Worst Movement)	19.0	sec	19.0	sec
Geometric Delay (Average)	4.3	sec		
Stop-Line Delay (Average)	2.4	sec		
Idling Time (Average)	0.7	sec		
Intersection Level of Service (LOS)	NA			
95% Back of Queue - Vehicles (Worst Lane)	3.7	veh		
95% Back of Queue - Distance (Worst Lane)	25.9	m		
Queue Storage Ratio (Worst Lane)	0.02			
Total Effective Stops	796	veh/h	955	pers/h
Effective Stop Rate	0.58	per veh	0.58	per pers
Proportion Queued	0.26		0.26	
Performance Index	32.1		32.1	
Cost (Total)	645.37	$/h	645.37	$/h
Fuel Consumption (Total)	107.0	L/h		
Carbon Dioxide (Total)	251.8	kg/h		
Hydrocarbons (Total)	0.021	kg/h		
Carbon Monoxide (Total)	0.302	kg/h		
NOx (Total)	0.101	kg/h		

Level of Service (LOS) Method: Delay (RTA NSW).
NA: Intersection LOS for Vehicles is Not Applicable for two-way sign control since the average intersection delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Quality Traffic Advice

MOVEMENT SUMMARY

Site: Myall Quay PM base 2024+full flows one access full rates

Myall Quay Boulevard and Myall Street
PM base 2014
Plus full flows one access full rates 805 lots
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	ODMov	Demand Flows Total	Demand Flows HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Myall Street (Hawks Nest)											
2	T1	114	2.0	0.059	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
3	R2	445	0.0	0.512	10.2	LOS A	3.7	25.9	0.64	0.95	50.2
Approach		559	0.4	0.512	8.1	NA	3.7	25.9	0.51	0.75	51.9
East: Myall Quay Boulevard											
4	L2	238	0.0	0.128	5.6	LOS A	0.0	0.0	0.00	0.53	54.9
6	R2	85	0.0	0.291	19.0	LOS B	1.1	8.0	0.79	0.95	44.6
Approach		323	0.0	0.291	9.1	LOS A	1.1	8.0	0.21	0.64	51.8
North: Myall Street (Pac Hwy)											
7	L2	291	0.0	0.156	5.6	LOS A	0.0	0.0	0.00	0.58	53.6
8	T1	195	2.0	0.101	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		485	0.8	0.156	3.3	NA	0.0	0.0	0.00	0.34	56.0
All Vehicles		1367	0.5	0.512	6.7	NA	3.7	25.9	0.26	0.58	53.3

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road 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.

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INTERSECTION SUMMARY

Site: Myall Quay AM base 2024+full flows one access full rates

Myall Quay Boulevard and Myall Street
AM base 2024
One access, full development 805 dwellings full rates
Signals - Fixed Time Isolated Cycle Time = 30 seconds (Practical Cycle Time)

Intersection Performance - Hourly Values						
Performance Measure	Vehicles		Pedestrians		Persons	
Travel Speed (Average)	48.3	km/h	3.4	km/h	46.9	km/h
Travel Distance (Total)	1231.2	veh-km/h	3.4	ped-km/h	1480.7	pers-km/h
Travel Time (Total)	25.5	veh-h/h	1.0	ped-h/h	31.6	pers-h/h
Demand Flows (Total)	1207	veh/h	105	ped/h	1449	pers/h
Percent Heavy Vehicles (Demand)	0.5	%				
Degree of Saturation	0.534		0.022			
Practical Spare Capacity	68.5	%				
Effective Intersection Capacity	2260	veh/h				
Control Delay (Total)	4.71	veh-h/h	0.28	ped-h/h	5.93	pers-h/h
Control Delay (Average)	14.0	sec	9.6	sec	14.7	sec
Control Delay (Worst Lane)	19.1	sec				
Control Delay (Worst Movement)	19.1	sec	9.6	sec	19.1	sec
Geometric Delay (Average)	4.1	sec				
Stop-Line Delay (Average)	9.9	sec				
Idling Time (Average)	6.1	sec				
Intersection Level of Service (LOS)	LOS A		LOS A			
95% Back of Queue - Vehicles (Worst Lane)	4.7	veh				
95% Back of Queue - Distance (Worst Lane)	32.8	m				
Queue Storage Ratio (Worst Lane)	0.02					
Total Effective Stops	924	veh/h	84	ped/h	1193	pers/h
Effective Stop Rate	0.76	per veh	0.80	per ped	0.82	per pers
Proportion Queued	0.85		0.80		0.90	
Performance Index	42.4		1.5		43.8	
Cost (Total)	693.52	$/h	22.77	$/h	716.29	$/h
Fuel Consumption (Total)	106.9	L/h				
Carbon Dioxide (Total)	251.7	kg/h				
Hydrocarbons (Total)	0.022	kg/h				
Carbon Monoxide (Total)	0.293	kg/h				
NOx (Total)	0.133	kg/h				

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

Quality Traffic Advice

MOVEMENT SUMMARY

Site: Myall Quay AM base 2024+full flows one access full rates

Myall Quay Boulevard and Myall Street
AM base 2024
One access, full development 805 dwellings full rates
Signals - Fixed Time Isolated Cycle Time = 30 seconds (Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	ODMov	Demand Flows Total	Demand Flows HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Myall Street (Hawks Nest)											
2	T1	186	2.0	0.484	12.5	LOS A	2.6	18.8	0.93	0.74	49.8
3	R2	176	0.0	0.521	19.1	LOS B	2.6	18.2	0.96	0.79	44.7
Approach		362	1.0	0.521	15.7	LOS B	2.6	18.8	0.94	0.77	47.2
East: Myall Quay Boulevard											
4	L2	397	0.0	0.534	13.4	LOS A	4.7	32.8	0.81	0.79	49.3
6	R2	245	0.0	0.330	12.5	LOS A	2.6	18.3	0.73	0.76	48.4
Approach		642	0.0	0.534	13.1	LOS A	4.7	32.8	0.78	0.78	48.9
North: Myall Street (Pac Hwy)											
7	L2	80	0.0	0.215	17.2	LOS B	1.1	7.4	0.87	0.74	45.8
8	T1	123	2.0	0.320	12.0	LOS A	1.7	11.9	0.89	0.70	50.1
Approach		203	1.2	0.320	14.1	LOS A	1.7	11.9	0.88	0.71	48.3
All Vehicles		1207	0.5	0.534	14.0	LOS A	4.7	32.8	0.85	0.76	48.3

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.
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	Average Delay	Level of Service	Average Back of Queue Pedestrian	Average Back of Queue Distance	Prop. Queued	Effective Stop Rate
		ped/h	sec		ped	m		per ped
P1	South Full Crossing	53	9.6	LOS A	0.0	0.0	0.80	0.80
P2	East Full Crossing	53	9.6	LOS A	0.0	0.0	0.80	0.80
All Pedestrians		105	9.6	LOS A			0.80	0.80

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.

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INTERSECTION SUMMARY

Site: Myall Quay PM base 2024+full flows one access full rates

Myall Quay Boulevard and Myall Street
PM base 2014
Plus full flows one access full rates 805 dwellings
Signals - Fixed Time Isolated Cycle Time = 40 seconds (Practical Cycle Time)

Intersection Performance - Hourly Values						
Performance Measure	Vehicles		Pedestrians		Persons	
Travel Speed (Average)	45.5	km/h	3.3	km/h	44.4	km/h
Travel Distance (Total)	1390.5	veh-km/h	3.4	ped-km/h	1671.9	pers-km/h
Travel Time (Total)	30.6	veh-h/h	1.0	ped-h/h	37.7	pers-h/h
Demand Flows (Total)	1366	veh/h	105	ped/h	1640	pers/h
Percent Heavy Vehicles (Demand)	0.5	%				
Degree of Saturation	0.854		0.029			
Practical Spare Capacity	5.4	%				
Effective Intersection Capacity	1600	veh/h				
Control Delay (Total)	6.98	veh-h/h	0.31	ped-h/h	8.68	pers-h/h
Control Delay (Average)	18.4	sec	10.6	sec	19.1	sec
Control Delay (Worst Lane)	30.2	sec				
Control Delay (Worst Movement)	30.2	sec	14.5	sec	30.2	sec
Geometric Delay (Average)	4.3	sec				
Stop-Line Delay (Average)	14.1	sec				
Idling Time (Average)	9.2	sec				
Intersection Level of Service (LOS)	LOS B		LOS B			
95% Back of Queue - Vehicles (Worst Lane)	11.0	veh				
95% Back of Queue - Distance (Worst Lane)	77.1	m				
Queue Storage Ratio (Worst Lane)	0.02					
Total Effective Stops	1122	veh/h	75	ped/h	1421	pers/h
Effective Stop Rate	0.82	per veh	0.71	per ped	0.87	per pers
Proportion Queued	0.77		0.71		0.82	
Performance Index	53.2		1.4		54.6	
Cost (Total)	821.74	$/h	23.40	$/h	845.14	$/h
Fuel Consumption (Total)	120.0	L/h				
Carbon Dioxide (Total)	282.4	kg/h				
Hydrocarbons (Total)	0.025	kg/h				
Carbon Monoxide (Total)	0.326	kg/h				
NOx (Total)	0.128	kg/h				

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

Quality Traffic Advice

MOVEMENT SUMMARY

Site: Myall Quay PM base 2024+full flows one access full rates

Myall Quay Boulevard and Myall Street
PM base 2014
Plus full flows one access full rates 805 dwellings
Signals - Fixed Time Isolated Cycle Time = 40 seconds (Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	ODMov	Demand Flows Total	Demand Flows HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Myall Street (Hawks Nest)											
2	T1	114	2.0	0.107	4.7	LOS A	1.1	7.6	0.50	0.40	55.7
3	R2	445	0.0	0.844	25.5	LOS B	11.0	77.1	0.94	1.05	41.5
Approach		559	0.4	0.844	21.3	LOS B	11.0	77.1	0.85	0.92	43.7
East: Myall Quay Boulevard											
4	L2	238	0.0	0.854	30.2	LOS C	5.7	40.0	1.00	1.04	40.3
6	R2	84	0.0	0.302	23.2	LOS B	1.6	11.1	0.93	0.75	42.4
Approach		322	0.0	0.854	28.4	LOS B	5.7	40.0	0.98	0.97	40.8
North: Myall Street (Pac Hwy)											
7	L2	291	0.0	0.284	10.8	LOS A	3.1	21.6	0.57	0.73	49.8
8	T1	195	2.0	0.184	4.9	LOS A	1.9	13.8	0.53	0.44	55.5
Approach		485	0.8	0.284	8.5	LOS A	3.1	21.6	0.55	0.61	51.9
All Vehicles		1366	0.5	0.854	18.4	LOS B	11.0	77.1	0.77	0.82	45.5

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.
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	Average Delay	Level of Service	Average Back of Queue Pedestrian	Average Back of Queue Distance	Prop. Queued	Effective Stop Rate
		ped/h	sec		ped	m		per ped
P1	South Full Crossing	53	14.5	LOS B	0.1	0.1	0.85	0.85
P2	East Full Crossing	53	6.6	LOS A	0.0	0.0	0.58	0.58
All Pedestrians		105	10.6	LOS B			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.

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