Ref: 19/134

2nd September 2019

CorVal Partners Pty Ltd
C/- Vivacity Property
Level 54, Governor Phillip Tower
1 Farrer Place
SYDNEY NSW 2000

Attention:- Tom Copping

Dear Tom,

RE: Traffic Advice – Proposed Manufactured Home Estate – Lot 5 DP 1228880 – 45 Mulloway Road, Chain Valley Bay.

Reference is made to your request for traffic advice regarding the cumulative impacts of all known proposed developments within the Chain Valley Bay area as requested by NSW Roads and Maritime Services (NSW RMS) as part of the assessment of your development.

The following advice is provided as an addendum report to the Traffic Impact Assessment prepared by BJ Bradley & Associates for the development dated 24 June 2019. Data used in this advice has been sourced from this report as well as reports by Intersect Traffic for the three other known developments in the area.

Introduction

Intersect Traffic has been engaged by Vivacity Property Pty Ltd to prepare an addendum report for a 190 site Manufactured Home Estate on Lot 5 DP 1228880 – 45 Mulloway Road, Chain Valley Bay. This addendum report is to specifically address the cumulative impacts of other known developments in the area on the local road network. Intersect Traffic having undertaken the traffic assessments for all the other known developments in the area recently is well placed to undertake this assessment.

The cumulative impact assessment has been requested by NSW RMS as part of its assessment of the proposed development which is the subject of a development application to Central Coast Council as the consent authority. This advice is required to support the development application and will allow Council and NSW RMS officers to consider the cumulative impacts of development in the area in their assessments of this development.

Background

The proposed development is one of four major developments proposed in the Chain Valley Bay area that will likely have an impact on the local and state road network in the area. The issues that need to be assessed when considering the cumulative impact of these developments are;

1. Two-way mid-block capacity of the Pacific Highway, Chain Valley Bay Road and Mulloway Road; and
2. Intersection capacity of the Pacific Highway / Chain Valley Bay Road stop sign controlled rural seagull intersection and the Chain Valley Bay Road / Mulloway Road give way controlled T-intersection.

The other known developments considered in this assessment are;

- Low density residential at 405 – 425 Pacific Highway, Lake Munmorah and 2 Kanangra Drive, Crangan Bay for Darkinjung LALC – 545 lots (Intersect Traffic – April 2018).
- Low Density residential at 15 Mulloway Road for Optima Developments – 110 lots (Intersect Traffic – February 2019); and
- Low density residential (72 lots) and extension to existing Manufactured Home Estate (Teraglin Lakeshore Home Village – 138 sites) at 2 & 10 Mulloway Road, Chain Valley Bay for ADW Johnson Pty Ltd (Intersect Traffic – August 2019).

Traffic Generation

In undertaking this assessment the following peak hour traffic generation from each development has been used all sourced from the relevant traffic reports for each development;

1. MHE – 45 Mulloway Road, Chain Valley Bay – 37 vtph in the AM peak and 27 vtph in the PM peak;
2. Residential Subdivision – 15 Mulloway Road, Chain Valley Bay – 94 vtph in the AM peak and 99 vtph in the PM peak;
3. Residential Subdivision – 405 – 425 Pacific Highway Lake Munmorah and 2 Kanangra Drive, Crangan Bay – 390 vtph in the AM peak and 428 vtph in the PM peak; and
4. Residential subdivision (72 lots) plus extension of MHE (138 sites) – 2 and 10 Mulloway Road, Chain Valley Bay – 79 vtph in the AM peak and 77 vtph in the PM peak.

It is noted that development 1 and 3 have access directly to Chain Valley Bay Road south of Mulloway Road and thus do not have a major impact on the traffic flows on Mulloway Road and through the Chain Valley Bay Road / Mulloway Road intersection.

Adopting the trip distributions within the traffic reports the following cumulative traffic generation on the road network occurs with all developments (***Table 1***).

Table 1 – Cumulative AM and PM peak traffic generation

Road	Development AM (vtph)	Development PM (vtph)
Pacific Hwy west of Chain Valley Bay Rd	450	477
Pacific Hwy east of Chain Valley Bay Rd	88	90
Chain Valley Bay Rd north of Pacific Hwy	538	567
Mulloway Rd west of Chain Valley Bay Rd	165	172
Chain Valley Bay Rd north of Mulloway Rd	13	15
Chain Valley Bay Rd south of Mulloway Rd	152	157

Two-way mid-block road capacity

From the Intersect Traffic report (August 2019) for 2 and 10 Mulloway Road, Chain Valley Bay Road the local and state road network has the following two-way mid-block capacities based on *Table 4.3 of RTA's Guide to Traffic Generating Developments (2002)* noting these roads have been assessed as urban roads as speed limits are less than or equal to 80 km/h.

- Pacific Highway – 3,800 vtph;
- Chain Valley Bay Road – 1,800 vtph; and
- Mulloway Road – 1,800 vtph.

Therefore the likely traffic volumes post development in 2029, which is considered the earliest that full development of the area would occur, compared to these road capacities is shown in ***Table 2*** below;

Table 2 – Mid-block road capacity assessment 2029 – all developments

				Post Development - all developments			
Road	Capacity (vtph)	Development AM (vtph)	Development PM (vtph)	2019 AM peak (vtph)	2019 PM peak (vtph)	2029 AM peak (vtph)	2029 PM peak (vtph)
Pacific Hwy west of Chain Valley Bay Rd	3800	450	477	2910	2817	3305	3193
Pacific Hwy west of Chain Valley Bay Rd	3800	450	477	2643	2972	2995	3373
Pacific Hwy east of Chain Valley Bay Rd	3800	88	90	2351	2254	2714	2601
Chain Valley Bay Rd north of Pacific Hwy	1800	538	567	761	800	797	838
Chain Valley Bay Rd north of Pacific Hwy	1800	538	567	804	846	847	891
Mulloway Rd west of Chain Valley Bay Rd	1800	165	172	359	369	390	401
Chain Valley Bay Rd north of Mulloway Rd	1800	13	15	82	85	93	96
Chain Valley Bay Rd south of Mulloway Rd	1800	152	157	377	388	413	425

This assessment shows that with all developments considered the two-way mid-block road capacity of the local and state road network is not reached by 2029 therefore it is reasonable to conclude the cumulative traffic from the developments in Chain Valley Bay do not adversely impact on the local and state road network.

Intersection Capacity

In assessing intersection performance the main intersection of concern will be the Pacific Highway / Chain Valley Bay Road roundabout.

The impacts of the development are best assessed using the SIDRA intersection modelling software. This software package predicts likely delays, queue lengths and thus levels of service that will occur at intersections. Assessment is then based on the level of service requirements of the RMS shown below;

Table 4.2
Level of service criteria for intersections

Level of Service	Average Delay per Vehicle (secs/veh)	Traffic Signals, Roundabout	Give Way & Stop Signs
A	< 14	Good operation	Good operation
B	15 to 28	Good with acceptable delays & spare capacity	Acceptable delays & spare capacity
C	29 to 42	Satisfactory	Satisfactory, but accident study required
D	43 to 56	Operating near capacity	Near capacity & accident study required
E	57 to 70	At capacity; at signals, incidents will cause excessive delays Roundabouts require other control mode	At capacity, requires other control mode

Source: - RTA's Guide to Traffic Generating Developments (2002).

Assumptions made in this modelling were;

- The intersection layout will remain as per current conditions which operates as a seagull. A two stage network model is used to model the intersection.
- Traffic volumes used in the modelling were collected by NTPE in December 2016 provided within the Intersect Traffic reports.
- A 1.5 % per annum background traffic growth rate has been adopted on the local and state road network.
- Cumulative development traffic from all known developments have been included in the 2029 modelling based on the trip distribution diagrams contained in each of the traffic reports for these developments.

The results of the modelling are summarised in ***Table 3*** below showing the 'all vehicles' summary results except for the LoS which is the worst result for any movement. The Sidra Movement Summary Tables are provided in ***Attachment 1***.

Table 3 – The Pacific Highway / Chain Valley Bay Road T Intersection – Sidra Modelling – Results Summary

Model Scenario	Degree of Saturation (v/c)	Average Delay (s)	Right turn out LoS	Network LoS	95% back of Queue Length (cars)
2019 AM	1.178	29.1	F	C	8.1
2029 AM + cumulative development	8.965	1711.8	F	F	120.1
2019 PM	0.747	5.8	F	A	1.3
2029 PM + cumulative development	9.406	995.3	F	F	73.7

This modelling shows that the Pacific Highway / Chain Valley Bay Road intersection does not currently operate satisfactorily during both the AM and PM peak periods and obviously would continue to do so post development through to 2029 with all known developments considered. Whilst average delays, LoS and 95 % back of queue lengths for the majority of movements at the intersection remain at acceptable levels based on the NSW RMS assessment criteria listed above the right turn movement from Chain Valley Bay Road has unacceptable average delays, LoS and 95 % back of queue lengths. The intersection would therefore require upgrading with a higher level of intersection control required most likely signalisation.

As the intersection is currently 'failing' the upgrading of the intersection would also provide benefit to existing road users and future developments in the area. It would therefore be unreasonable to expect the developer to fully fund the development and the upgrading of the intersection should be contained within a Section 94 developer contributions plan or a voluntary planning agreement providing a mechanism for a fair and reasonable contribution to the intersection upgrade from all developers who would gain benefit from the intersection upgrade as well as the road authority for existing traffic. It is noted that post development 2029 traffic generated from the MHE at 45 Mulloway Road would make up approximately 1.1 % of PM traffic and 0.7 % of AM traffic through the intersection during the peak hour periods.

In assessing the performance of the Chain Valley Bay Road / Mulloway Road intersection it is noted that by observation this intersection is currently operating with uninterrupted flow conditions. However with the cumulative impacts of all the proposed developments this may not be guaranteed in the future. Therefore this intersection has also been modelled using the SIDRA INTERSECTION 8 program.

Assumptions made in this modelling were;

- The intersection layout will remain as per current conditions.
- Traffic volumes used in the modelling were collected by Intersect Traffic in September 2016.
- A 1.5 % per annum background traffic growth rate has been adopted on the local road network; and
- Cumulative development traffic from other known developments have been included in the 2029 modelling based on the trip distribution diagrams contained in each of the traffic reports for these developments.

The results of the modelling are summarised in ***Table 4*** below showing the 'all vehicles' summary results except for the LoS which is the worst result for any movement. The Sidra Movement Summary Tables are provided in ***Attachment 1***.

Table 4 –Chain Valley Bay Road / Mulloway Road T Intersection – Sidra Modelling – Results Summary

Model Scenario	Degree of Saturation (v/c)	Average Delay (s)	Worst LoS	95% back of Queue Length (cars)
2019 AM	0.104	4.6	A	0.4
2029 AM + cumulative development	0.208	5.2	A	0.8
2019 PM	0.081	4.6	A	0.2
2029 PM + cumulative development	0.149	5.2	A	0.5

On this basis it is concluded that the cumulative traffic from all known developments in the area will not adversely impact on the operation of the Chain Valley Bay Road / Mulloway Road intersection with average delays, LoS and 95 % back of queue lengths for all movements at the intersection remaining at acceptable levels based on the NSW RMS assessment criteria through to 2029 and beyond.

Conclusion

This assessment has determined that the cumulative traffic generated by all the known developments in the Chain Valley Bay area including the proposed Manufactured Home Estate at 45 Mulloway Road, Chain Valley Bay will not adversely impact on the local and state road network subject to the Pacific Highway / Chain Valley Bay Road being upgraded to traffic signals prior to the first development occurring as the intersection is already failing in the both the AM and PM peak periods. Funding of the intersection should be via a S94 developer contributions plan or a voluntary planning agreement involving all developments as this provides a fair and reasonable mechanism for all developments to contribute to the intersection upgrade based on the proportion of development traffic to total traffic on the road network.

For further information or clarification please do not hesitate to contact me on 0423 324 188 or 02 4936 6200.

Yours sincerely

Jeff Garry

Director
Intersect Traffic

M: 0423 324 188 **E: jeff@intersecttraffic.com.au**
PO BOX 268 EAST MAITLAND NSW 2323

Attachment 1 – Sidra Summary Tables

MOVEMENT SUMMARY

Site: 101 [2019AM]

Network: N101 [2019AM]

Pacific Highway / Chain Valley Bay intersection
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Pacific Highway														
6	R2	9	22.2	9	22.2	0.056	24.6	LOS B	0.1	0.6	0.82	0.93	0.82	41.4
Approach		9	22.2	9	22.2	0.056	24.6	NA	0.1	0.6	0.82	0.93	0.82	41.4
North: Chain Valley Bay Road														
7	L2	18	0.0	18	0.0	0.028	11.3	LOS A	0.0	0.3	0.50	0.91	0.50	50.2
8	T1	141	2.2	141	2.2	1.178	249.6	LOS F	8.1	58.0	1.00	2.28	6.19	6.6
Approach		159	2.0	159	2.0	1.178	222.7	LOS F	8.1	58.0	0.94	2.12	5.55	8.0
West: Pacific Highway														
10	L2	53	12.0	53	12.0	0.031	5.7	LOS A	0.0	0.0	0.00	0.57	0.00	53.1
11	T1	1005	6.0	1005	6.0	0.268	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
12u	U	12	0.0	12	0.0	0.008	6.7	LOS A	0.0	0.0	0.00	0.67	0.00	52.3
Approach		1069	6.2	1069	6.2	0.268	0.4	NA	0.0	0.0	0.00	0.04	0.00	59.5
All Vehicles		1238	5.8	1238	5.8	1.178	29.1	NA	8.1	58.0	0.13	0.31	0.72	39.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: 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.

MOVEMENT SUMMARY

Site: 101 [2019PM] — **Network: N101 [2019PM]**

Pacific Highway / Chain Valley Bay intersection
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
East: Pacific Highway														
6	R2	23	4.5	23	4.5	0.136	25.1	LOS B	0.2	1.2	0.85	0.94	0.85	41.6
Approach		23	4.5	23	4.5	0.136	25.1	NA	0.2	1.2	0.85	0.94	0.85	41.6
North: Chain Valley Bay Road														
7	L2	15	0.0	15	0.0	0.024	11.6	LOS A	0.0	0.2	0.52	0.91	0.52	50.0
8	T1	71	1.5	71	1.5	0.747	87.3	LOS F	1.3	9.4	0.97	1.18	1.74	16.1
Approach		85	1.2	85	1.2	0.747	74.2	LOS F	1.3	9.4	0.89	1.14	1.53	20.1
West: Pacific Highway														
10	L2	122	5.2	122	5.2	0.068	5.6	LOS A	0.0	0.0	0.00	0.58	0.00	53.4
11	T1	1084	2.0	1084	2.0	0.282	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
12u	U	12	0.0	12	0.0	0.008	6.7	LOS A	0.0	0.0	0.00	0.67	0.00	52.3
Approach		1218	2.3	1218	2.3	0.282	0.7	NA	0.0	0.0	0.00	0.06	0.00	59.1
All Vehicles		1326	2.3	1326	2.3	0.747	5.8	NA	1.3	9.4	0.07	0.15	0.11	54.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: 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.

MOVEMENT SUMMARY

Site: 101 [2029AM + cumulative development]

Network: N101 [2029AM+ cumulative development]

Pacific Highway / Chain Valley Bay intersection
includes 2 Mulloway Rd , 15 Mulloway Rd, 45 Mulloway Rd &
405 - 425 Pacific Highway developments
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
East: Pacific Highway														
6	R2	42	5.0	42	5.0	0.400	46.7	LOS D	0.5	3.7	0.93	1.02	1.13	33.4
Approach		42	5.0	42	5.0	0.400	46.7	NA	0.5	3.7	0.93	1.02	1.13	33.4
North: Chain Valley Bay Road														
7	L2	84	0.0	84	0.0	0.156	13.0	LOS A	0.2	1.5	0.59	1.00	0.59	49.1
8	T1	492	0.6	492	0.6	8.965	7197.5	LOS F	120.1	845.5	1.00	3.79	13.29	0.3
Approach		576	0.5	576	0.5	8.965	6146.8	LOS F	120.1	845.5	0.94	3.39	11.43	0.3
West: Pacific Highway														
10	L2	218	2.9	218	2.9	0.120	5.6	LOS A	0.0	0.0	0.00	0.58	0.00	53.5
11	T1	1220	4.9	1220	4.9	0.323	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
12u	U	14	0.0	14	0.0	0.010	6.7	LOS A	0.0	0.0	0.00	0.67	0.00	52.3
Approach		1452	4.6	1452	4.6	0.323	0.9	NA	0.0	0.0	0.00	0.09	0.00	58.8
All Vehicles		2069	3.5	2069	3.5	8.965	1711.8	NA	120.1	845.5	0.28	1.03	3.20	1.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: 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.

MOVEMENT SUMMARY

Site: 101 [2029PM + cumulative development]

Network: N101 [2029PM + cumulative development]

Pacific Highway / Chain Valley Bay intersection
Includes 2 Mulloway Road development only
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
East: Pacific Highway														
6	R2	86	1.2	86	1.2	1.361	429.1	LOS F	7.6	54.0	1.00	2.12	6.04	7.2
Approach		86	1.2	86	1.2	1.361	429.1	NA	7.6	54.0	1.00	2.12	6.04	7.2
North: Chain Valley Bay Road														
7	L2	55	0.0	55	0.0	0.108	13.4	LOS A	0.1	1.0	0.61	1.00	0.61	48.9
8	T1	283	0.4	283	0.4	9.406	7612.4	LOS F	73.7	517.9	1.00	2.62	8.41	0.2
Approach		338	0.3	338	0.3	9.406	6381.4	LOS F	73.7	517.9	0.94	2.36	7.15	0.3
West: Pacific Highway														
10	L2	453	1.4	453	1.4	0.246	5.6	LOS A	0.0	0.0	0.00	0.58	0.00	53.5
11	T1	1316	1.7	1316	1.7	0.341	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
12u	U	14	0.0	14	0.0	0.010	6.7	LOS A	0.0	0.0	0.00	0.67	0.00	52.3
Approach		1782	1.6	1782	1.6	0.341	1.5	NA	0.0	0.0	0.00	0.15	0.00	58.1
All Vehicles		2206	1.4	2206	1.4	9.406	995.3	NA	73.7	517.9	0.18	0.57	1.33	3.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: 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.

MOVEMENT SUMMARY

▽ Site: 101 [2019AM]

Chain Valley Bay Road / Mulloway Road
Site Category: (None)
Giveway / Yield (Two-Way)
Design Life Analysis (Final Year): Results for 3 years

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Chain Valley Bay Road												
1	L2	62	5.0	0.040	5.6	LOS A	0.0	0.0	0.00	0.49	0.00	54.1
2	T1	11	5.0	0.040	0.0	LOS A	0.0	0.0	0.00	0.49	0.00	55.7
Approach		73	5.0	0.040	4.8	NA	0.0	0.0	0.00	0.49	0.00	54.3
North: Chain Valley Bay Road												
8	T1	41	5.0	0.028	0.1	LOS A	0.1	0.5	0.08	0.12	0.08	58.5
9	R2	11	5.0	0.028	5.8	LOS A	0.1	0.5	0.08	0.12	0.08	56.5
Approach		52	5.0	0.028	1.3	NA	0.1	0.5	0.08	0.12	0.08	58.1
West: Mulloway Road												
10	L2	9	5.0	0.006	5.6	LOS A	0.0	0.2	0.05	0.55	0.05	53.3
12	R2	120	5.0	0.104	5.9	LOS A	0.4	2.6	0.18	0.58	0.18	52.4
Approach		129	5.0	0.104	5.9	LOS A	0.4	2.6	0.17	0.58	0.17	52.5
All Vehicles		253	5.0	0.104	4.6	NA	0.4	2.6	0.10	0.46	0.10	54.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
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.

MOVEMENT SUMMARY

▽ Site: 101 [2019PM]

Chain Valley Bay Road / Mulloway Road
Site Category: (None)
Giveway / Yield (Two-Way)
Design Life Analysis (Final Year): Results for 3 years

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Chain Valley Bay Road												
1	L2	111	5.0	0.081	5.6	LOS A	0.0	0.0	0.00	0.44	0.00	54.5
2	T1	36	5.0	0.081	0.0	LOS A	0.0	0.0	0.00	0.44	0.00	56.1
Approach		147	5.0	0.081	4.2	NA	0.0	0.0	0.00	0.44	0.00	54.9
North: Chain Valley Bay Road												
8	T1	18	5.0	0.017	0.3	LOS A	0.1	0.4	0.19	0.22	0.19	57.2
9	R2	11	5.0	0.017	6.0	LOS A	0.1	0.4	0.19	0.22	0.19	55.3
Approach		29	5.0	0.017	2.5	NA	0.1	0.4	0.19	0.22	0.19	56.5
West: Mulloway Road												
10	L2	8	5.0	0.005	5.7	LOS A	0.0	0.1	0.10	0.54	0.10	53.1
12	R2	75	5.0	0.066	6.0	LOS A	0.2	1.6	0.20	0.58	0.20	52.4
Approach		83	5.0	0.066	5.9	LOS A	0.2	1.6	0.19	0.58	0.19	52.4
All Vehicles		259	5.0	0.081	4.6	NA	0.2	1.6	0.08	0.46	0.08	54.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
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.

MOVEMENT SUMMARY

▽ Site: 101 [2029AM + cumulative development]

Chain Valley Bay Road / Mulloway Road
Includes 2 Mulloway Rd, 15 Mulloway Road, 45 Mulloway Road and 405 - 420 Pacific Highway development traffic
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Chain Valley Bay Road												
1	L2	142	5.0	0.086	5.6	LOS A	0.0	0.0	0.00	0.53	0.00	53.8
2	T1	13	5.0	0.086	0.0	LOS A	0.0	0.0	0.00	0.53	0.00	55.4
Approach		155	5.0	0.086	5.1	NA	0.0	0.0	0.00	0.53	0.00	53.9
North: Chain Valley Bay Road												
8	T1	47	5.0	0.039	0.2	LOS A	0.1	0.9	0.17	0.17	0.17	57.8
9	R2	20	5.0	0.039	6.1	LOS A	0.1	0.9	0.17	0.17	0.17	55.7
Approach		67	5.0	0.039	2.0	NA	0.1	0.9	0.17	0.17	0.17	57.2
West: Mulloway Road												
10	L2	19	5.0	0.012	5.6	LOS A	0.0	0.3	0.06	0.55	0.06	53.2
12	R2	228	5.0	0.208	6.2	LOS A	0.8	5.7	0.26	0.60	0.26	52.2
Approach		247	5.0	0.208	6.1	LOS A	0.8	5.7	0.25	0.60	0.25	52.3
All Vehicles		469	5.0	0.208	5.2	NA	0.8	5.7	0.15	0.52	0.15	53.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
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.

MOVEMENT SUMMARY

▽ Site: 101 [2029PM + cumulative development]

Chain Valley Bay Road / Mulloway Road
Includes 2 Mulloway Rd, 15 Mulloway Rd, 45 Mulloway Road and 405 - 420 Pacific Highway Lake Munmorah development traffic
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Chain Valley Bay Road												
1	L2	212	5.0	0.140	5.6	LOS A	0.0	0.0	0.00	0.48	0.00	54.1
2	T1	42	5.0	0.140	0.0	LOS A	0.0	0.0	0.00	0.48	0.00	55.7
Approach		254	5.0	0.140	4.7	NA	0.0	0.0	0.00	0.48	0.00	54.4
North: Chain Valley Bay Road												
8	T1	20	5.0	0.027	0.7	LOS A	0.1	0.9	0.32	0.30	0.32	56.1
9	R2	22	5.0	0.027	6.4	LOS A	0.1	0.9	0.32	0.30	0.32	54.2
Approach		42	5.0	0.027	3.7	NA	0.1	0.9	0.32	0.30	0.32	55.1
West: Mulloway Road												
10	L2	15	5.0	0.010	5.7	LOS A	0.0	0.3	0.11	0.54	0.11	53.1
12	R2	158	5.0	0.149	6.3	LOS A	0.5	3.8	0.28	0.61	0.28	52.1
Approach		173	5.0	0.149	6.3	LOS A	0.5	3.8	0.27	0.61	0.27	52.2
All Vehicles		468	5.0	0.149	5.2	NA	0.5	3.8	0.13	0.51	0.13	53.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
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.