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1 December 2022

Ross Closter
Urban Land Developments
Level 1, 237 Ryrie Street
GEELONG VIC 3220

Dear Ross

RE: ADDENDUM TO TRAFFIC ENGINEERING REPORT
C103 – HOPETOUN PARK NORTH REZONING

SALT has reviewed the consolidated Request for Further Information document prepared by Moorabool Shire Council and sent via e-mail to Debra Butcher Consulting on 29th July, 2022.

In particular, SALT has reviewed the comments pertaining to the previously submitted traffic report at Section H of the RFI document.

Subsequent to the above, SALT has commissioned updated traffic surveys and undertaken further intersection analysis at the Western Freeway / Hopetoun Park Road half diamond interchange and the intersection of Hopetoun Park Road with Old Western Highway.

The following sub-sections summarise the additional analysis and provide direct responses to the traffic related items raised in the RFI Document.

It is intended that the analysis provided within this addendum can be substituted into the abovementioned traffic engineering assessment once approved by Council.

1 UPDATED TRAFFIC SURVEYS

1.1 TURNING MOVEMENT SURVEYS

SALT commissioned Nationwide Traffic Surveys to undertake turning movement surveys at the following intersections:

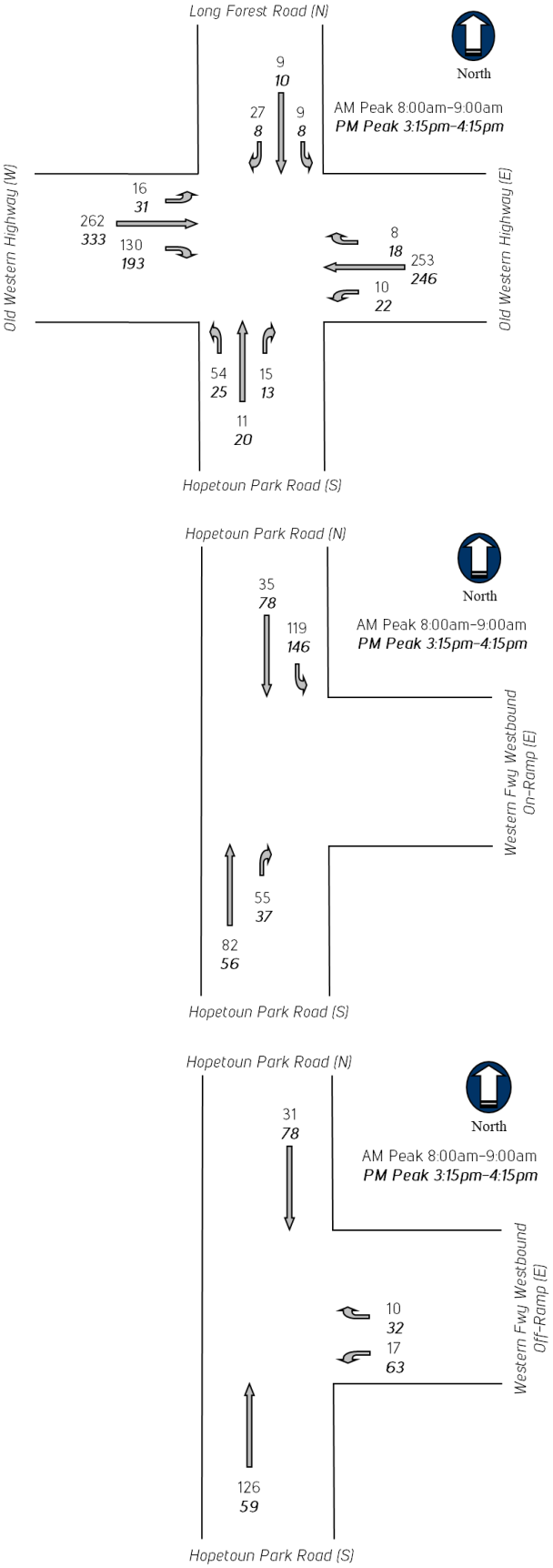
- Hopetoun Park Road Half Diamond Interchange at Western Freeway; and
- Hopetoun Park Road / Long Forest Road / Old Western Highway Intersection.

The turning movement counts were undertaken on Thursday 13th October, 2022 between 6:00am and 10:00am in the morning and between 2:00pm and 7:00pm in the afternoon / evening.

The peak 1-hour periods of traffic activity at both intersections occurred from 8:00am to 9:00am in the morning and 3:15pm to 4:15pm in the afternoon.

The turning volumes at each intersection are summarised at Figure 1.

Figure 1 Surveyed Peak Hour Traffic Volumes – Thursday 13th October, 2022

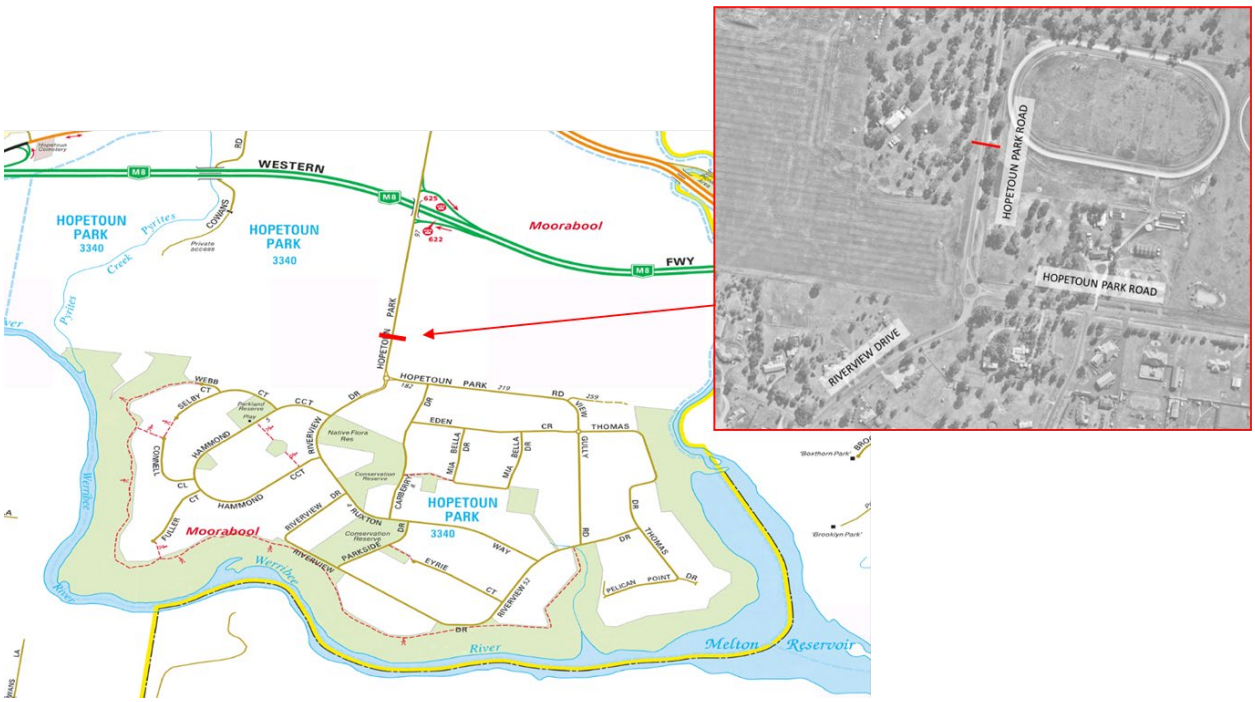


1.2 TUBE COUNTER SURVEY

In addition to the turning movement surveys, SALT commissioned Nationwide Traffic Surveys to install a 7-day counting tube on Hopetoun Park Road approximately 200 metres north of the roundabout intersection at Hopetoun Park Road and Riverview Drive.

The Location of the tube counter is illustrated at Figure 2, below.

Figure 2 Tube Counter Location



The existing Hopetoun Park residential development is effectively a closed network of streets that is accessed via a single road (Hopetoun Park Road).

The location of the tube counter on Hopetoun Park Road was chosen as it would capture every vehicle that entered and exited the existing Hopetoun Park residential development over the survey period.

The tube counter captured the following data:

- An Average Weekday Daily Traffic Volume (two-way) of 2,142 vehicles per day;
- An Average AM Peak Hour Traffic Volume (two-way) of 206 vehicles per hour (8:00am-9:00am); and
- An Average AM Peak Hour Traffic Volume (two-way) of 197 vehicles per hour (3:00pm-4:00pm).

The existing Hopetoun Park residential development south of the tube counter location comprises 260 dwellings.

Based on the above, the surveyed average weekday trip generation rates are as follows:

- *Daily* *8.24 vpd per dwelling*
- *AM Peak Hour* *0.79 vph per dwelling*
- *PM Peak Hour* *0.76 vph per dwelling*

Further to the above, the following directional biases were recorded across the peak periods:

- AM Peak Hour
  - 74% outbound
  - 26% inbound
- PM Peak Hour
  - 67% inbound
  - 33% outbound

2 UPDATED TRAFFIC ANALYSIS

2.1 SIDRA INTERSECTION PARAMETERS

The SIDRA9 Intersection software is a computer package that measures the performance of an intersection using a range of parameters, as described below:

Degree of Saturation (D.O.S.) is the ratio of the volume of traffic observed making a particular movement compared to the maximum capacity for that movement. Where an intersection is oversaturated, this indicates that not all traffic can pass through the control mechanism. Under such conditions, the degree of saturation would be greater than 1.0 (100%).

AustRoads *"Guide to Traffic Management Part 3: Transport Study and Analysis Methods* (AGTM3)" states that

> *"In practice the target degrees of saturation of 0.90 for signals, 0.85 for roundabouts and 0.80 for unsignalised intersections are generally agreed to.*
>
> *These are usually called 'practical degrees of saturation."*

The *95th Percentile (95%ile) Queue* represents the maximum queue length, in metres, that could be expected to be observed on 95% of occasions during the analysis period. (i.e. it is the queue length that only has a 5% chance of being exceeded during the analysis time period).

Average Delay is the delay time (in seconds) which can be expected over all vehicles making a particular movement or over all vehicles on an approach, in the peak hour.

Level of Service (L.O.S.) is a qualitative measure which can be based on various traffic factors such as speed, volume of traffic, degree of saturation, delays and freedom to manoeuvre.

2.2 CHANGES TO MODELLING PROCESS

2.2.1 OLD WESTERN HIGHWAY / HOPETOUN ROAD INTERSECTION SETUP

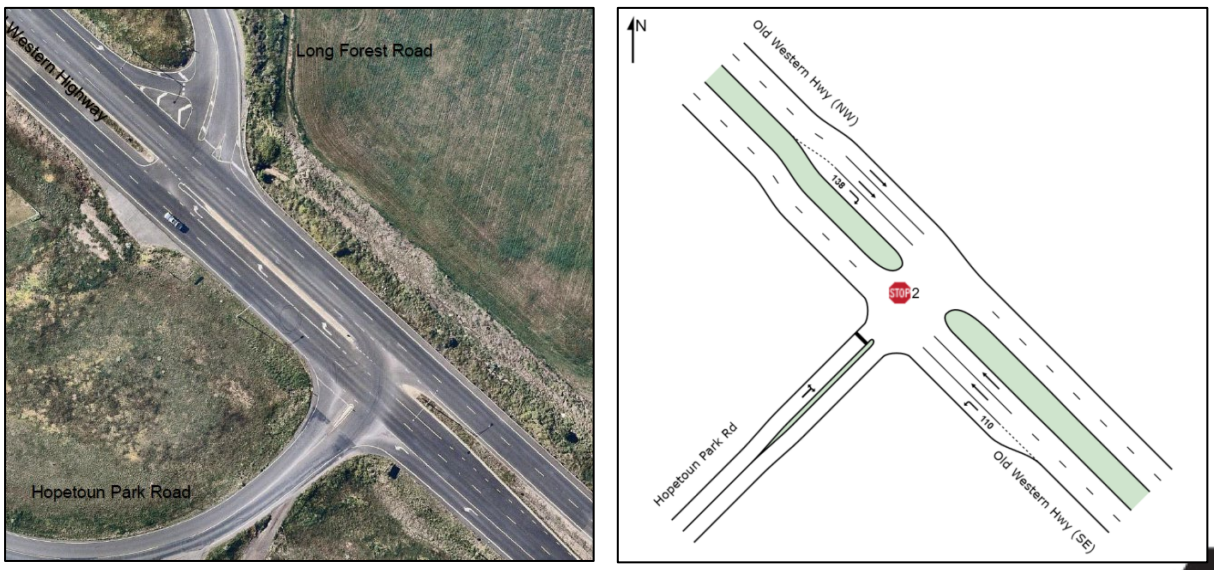
The analysis within the initial Cardno Traffic and Transport Assessment was prepared in mid-2019 and based on traffic survey data from May 2019.

At the time of the analysis, the right-turn lane from Old Western Highway into Long Forest Road (southeast to northeast) extended beyond the break in the central median on Old Western Highway. This required right-turning vehicles from Hopetoun Park Road to Old Western Highway (southwest to southeast) to cross the westbound carriageway and merge into the eastbound carriageway in a single manoeuvre, or risk blocking the right-turn lane into Long Forest Road.

Accordingly, the Cardno Assessment (and all analyses thereafter) have modelled the Old Western Highway and Hopetoun Park Road intersection as an at-grade intersection which does not allow staging.

The aerial photograph and SIDRA layout modelled in the Cardno Assessment is presented at Figure 3.

Figure 3 Previous Existing Conditions Aerial (L) and Modelling Layout (R)



A review of NearMap images indicates that works took place at the intersection sometime in late-2019, which reduced the length of the right-turn lane into Long Forest Road and established a wider median either side of the opening.

These works allowed the right-turn movement from Hopetoun Park Road to Old Western Highway to be staged, such that vehicles undertaking this manoeuvre initially cross the westbound carriageway and store in the central median prior to turning right and entering the eastbound carriageway.

This arrangement is shown at Figure 4 (left).

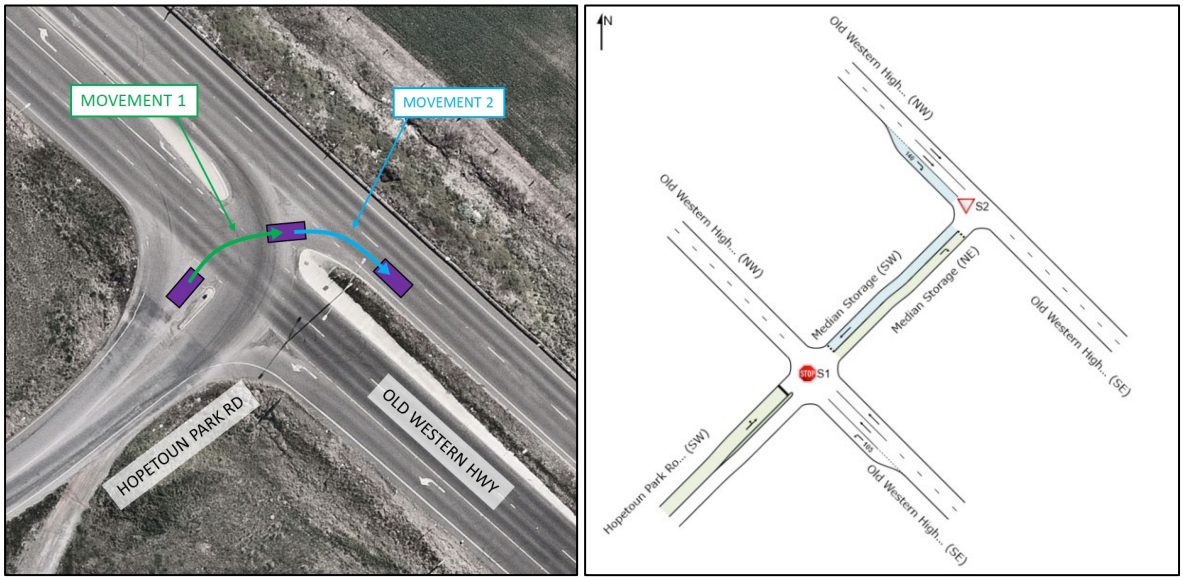
SALT has since liaised with *SIDRA Solutions* (the developer of the software program used to model intersections) in order to confirm the preferred intersection setup for analysis.

SIDRA Solutions provided SALT with a template for a 'Type B Staged Crossing', which it advised was the preferred model to use to analyse the intersection. The template comprises two intersection site models which are then modelled in a network:

- Stage 1 is a four leg intersection that comprises the westbound carriageway of Old Western Highway as the priority route, and both Hopetoun Park Road and a 7 metre long median storage as minor road approaches.
- Stage 2 is a three leg intersection that comprises the eastbound carriageway of Old Western Highway as the priority route and a 7 metre long median storage as the minor road approach.

The two intersections are illustrated in a network formation at Figure 4 (right).

Figure 4 2022 Old Western Highway / Hopetoun Park Road Intersection Aerial (L) and Modelling Layout (R)



The priorities have been set so that the through movement from Hopetoun Park Road to the median is initially opposed by the through movement from the median storage to Hopetoun Park Road.

This reflects the requirement for a right-turning vehicle from Hopetoun Park Road to Old Western Freeway (eastbound) to yield to a vehicle turning right from Old Western Freeway to Hopetoun Park Road.

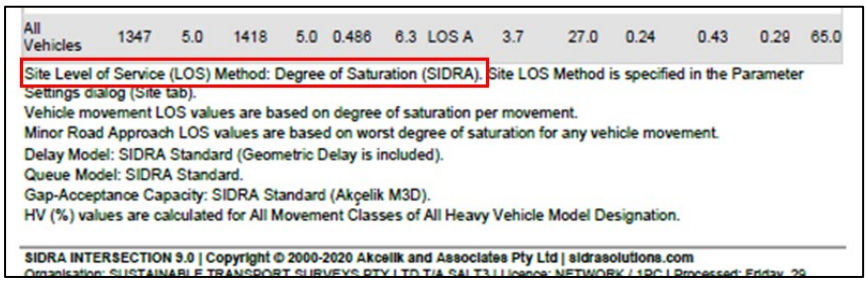
SIDRA has further recommended that:

- The default gap acceptance parameters in the model be retained; and
- The potential blockage effect caused by vehicles stored in the median on vehicles turning right from Old Western Highway into Hopetoun Park Road be disregarded in this instance. This is discussed at Section 2.5.

2.2.2 LEVEL OF SERVICE

SALT notes from the SIDRA output tables at Appendix 7 of the previous Traffic Engineering Report (SALT Ref# 20338REP01F03, dated 19th April, 2022) that "degree of saturation" was selected as the performance measure for Level of Service, as shown in the excerpt at Figure 5.

Figure 5 Previous Level of Service (LOS) Parameter (from previous Traffic Engineering Assessment)



This resulted in Level of Service ratings from A to F being assigned based on the Degree of Saturation output.

AustRoads *"Guide to Traffic Management Part 3: Transport Study and Analysis Methods* (AGTM3)" states that the performance measure for defining LOS at two-way stop intersections is the delay output.

SIDRA9 assigns the Levels of Service at Table 1 to two-way stop controlled intersections based on degree of saturation or delay being used as the defining parameter.

Table 1 Level of Service Ratings (Degree of Saturation vs Delay)

LOS	*Degree of Saturation (x)*	*Average Delay per Vehicle (secs/veh)*
A	*$x \leq 0.60$*	*$d \leq 10$*
B	*$0.60 < x \leq 0.70$*	*$10 < d \leq 15$*
C	*$0.70 < x \leq 0.80$*	*$15 < d \leq 25$*
D	*$0.80 < x \leq 0.90$*	*$25 < d \leq 35$*
E	*$0.90 < x \leq 1.00$*	*$35 < d \leq 50$*
F	*$1.00 < x$*	*$50 < d$*

The ensuing analysis outputs now provide Level of Service ratings using the delay parameter as per the AustRoads and VicRoads guidelines.

The Department of Transport (DoT) *"Transport Modelling Guidelines Volume 5: Intersection Modelling"* states that:

> *"A total of six measures are defined in a qualitative manner to explain the condition experienced. In simple terms, a performance of an Intersection at a Level of Service A or B suggests that the intersection over provides for the existing demand (an excess of infrastructure provision) while the Level of Service F implies that demand has exceeded the available capacity of the site."*

It is generally agreed that a target Level of Service 'D' or better is acceptable.

2.3 EXISTING INTERSECTION OPERATION

The three (3) surveyed intersections have been assessed using SIDRA9 software. The key outputs for each intersection are summarised in the table below.

Full SIDRA outputs are appended to this addendum.

Table 2 Key SIDRA Outputs (Existing Conditions)

Approach	AM Peak				PM Peak			
	DOS	95th Q (m)	Avg Delay (s)	LOS	DOS	95th Q (m)	Avg Delay (s)	LOS
Old Western Highway / Hopetoun Park Road – Stage 1								
Old Western Highway (SE)	0.070	0.0	0.3	-	0.071	0.0	0.5	-
Median Storage (NE)	0.156	5.4	1.8	A	0.227	8.1	2.0	A
Hopetoun Park Road (SW)	0.083	2.4	9.4	A	0.063	1.8	9.8	A
Intersection	***0.156***	***5.4***	***2.2***	***-***	***0.227***	***8.1***	***2.0***	***-***
Old Western Highway / Hopetoun Park Road – Stage 2								
Old Western Highway (NW)	0.085	-	2.4	-	0.134	0.0	2.6	-
Median Storage (SW)	0.014	A	1.6	A	0.013	0.3	1.7	A
Intersection	***0.085***	***-***	***2.4***	***-***	***0.134***	***0.3***	***2.6***	***-***
Hopetoun Park Road / Western Freeway ON RAMP								
Hopetoun Park Road (S)	0.045	1.1	2.3	-	0.032	0.8	2.3	-
Hopetoun park Road (N)	0.084	2.7	4.6	A	0.102	3.3	3.8	A
Intersection	***0.084***	***2.7***	***3.5***	***-***	***0.102***	***3.3***	***3.4***	***-***
Hopetoun Park Road / Western Freeway OFF RAMP								
Hopetoun Park Road (S)	0.068	0.0	0.0	-	0.033	0.0	0.0	-
Western Freeway Off Ramp (E)	0.013	0.4	6.2	A	0.045	1.3	6.0	A
Hopetoun Park Road (N)	0.018	0.0	0.0	-	0.042	0.0	0.0	-
Intersection	***0.068***	***0.4***	***0.9***	***-***	***0.045***	***1.3***	***2.5***	***-***

The above table indicates that the intersections all operate below capacity with minimal queue lengths and delays.

2.4 TRAFFIC GENERATION ESTIMATE

2.4.1 TRAFFIC VOLUME

The subject proposal seeks to rezone the subject land to allow the development of 850 residential lots.

The surveyed traffic generation rates from the tube counter survey at Section 1.2 have been adopted to estimate the volume of traffic generated by the sought rezoning and eventual subdivision of land.

Based on the above, the traffic generation estimate is presented at Table 3, below.

Table 3 Traffic Generation Estimate

Yield	Daily		AM Peak		PM Peak	
	Rate	Estimate	Rate	Estimate	Rate	Estimate
850 Lots	8.24 trips / dwelling	7,004 vpd	0.79 trips / dwelling	673 vph	0.76 trips / dwelling	644 vph

Based on the above, the subject proposal is forecast to generate in the order of 7,004 vehicle movements per day, inclusive of around 673 movements during the AM peak period and 644 movements during the PM peak period.

Notwithstanding the above, in the interests of conservatism a peak hour trip generation rate of 0.8 vehicle movements per dwelling will be adopted. This equates to a peak hour traffic volume of 680 vehicle movements per hour during both peak periods, which is consistent with the previous assessments undertaken by both Cardno and SALT.

2.4.2 TRAFFIC DISTRIBUTION

The surveyed traffic volumes at Figure 1 have been used to estimate the distribution of site-generated traffic movements to and from the site.

The percentage splits of site-generated turning movements are derived as follows:

Outbound Distribution

- All outbound traffic passes through (south to north) the HP Road / W'Fwy Exit Ramp intersection;
- At the HP Road / W'Fwy Entry Ramp intersection, all right-turn (south to east) movements are generated by Hopetoun Park.

  The only other vehicles this movement could serve are those using the interchange to u-turn (east to east) on Western Freeway. This volume is considered negligible.

  The remaining traffic will continue to Old Western Highway;
- At the HP Road / Old Western Highway intersection, vehicle movements have been split to the west (towards Bacchus Marsh and Long Forest Road) and east (towards Melton West) in accordance with the observed turning volumes.

Inbound Distribution

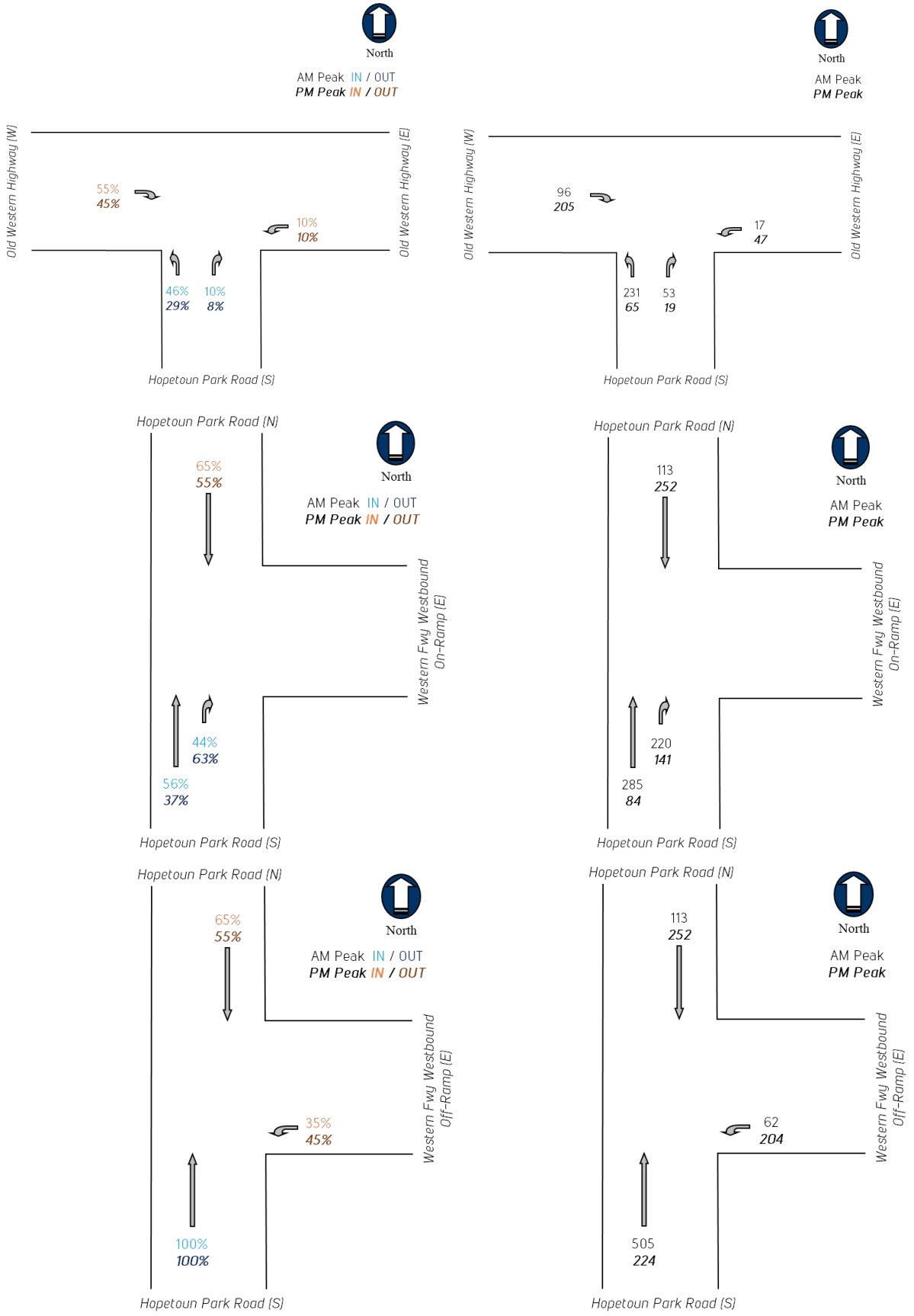
- All traffic turning left (east to south) from Western Freeway to HP Road is generated by Hopetoun Park,

  The remaining traffic arrives from Old Western Freeway.
- At the HP Road / Old Western Highway intersection, vehicle movements have been split generally in accordance with the arrival flows from both directions. A small redistribution of vehicle movements arriving from the west (from Bacchus Marsh) has been made to the east (from Melton West) to account for freeway bound traffic arriving to the intersection from Bacchus Marsh Road.

Based on the preceding, the adopted distributions for peak hour generated traffic are presented at Figure 6 (left).

The surveyed inbound and outbound traffic splits from the tube counter survey at Section 1.2 have been adopted to estimate the site-generated traffic volume at each intersection at Figure 6 (right).

Figure 6 Estimated Site Generated Traffic Splits and Volumes



2.5 FUTURE INTERSECTION OPERATIONS

The estimated traffic volumes presented at Figure 6 have been combined with the surveyed traffic volumes at Figure 1 for assessment with the SIDRA9 software.

Given the residential nature of the proposed rezoning, the additional vehicle movements have assumed a 98% light vehicle / 2% heavy vehicle split.

The following models have been assessed:

1. Old Western Highway / Hopetoun Park Road (with additional HP Road approach lane)
2. Hopetoun Park Road / Western Freeway ON RAMP (roundabout)
3. Hopetoun Park Road / Western Freeway OFF RAMP (existing layout)

Models 1 and 2 have been assessed as these intersection arrangements have been previously negotiated with Regional Roads Victoria.

The key outputs for each intersection are summarised in the table below. Full SIDRA outputs are appended to this addendum.

Table 4 Key SIDRA Outputs – Post Development

Approach	AM Peak				PM Peak			
	DOS	95th Q (m)	Avg Delay (s)	LOS	DOS	95th Q (m)	Avg Delay (s)	LOS
Old Western Highway / Hopetoun Park Road – Stage 1 (with additional HP Road lane)								
Old Western Highway (SE)	0.070	0.0	0.6	-	0.071	0.0	1.5	-
Median Storage (NE)	0.262	9.6	2.1	A	0.474	26.9	3.9	A
Hopetoun Park Road (SW)	0.249	8.4	9.8	A	0.104	2.9	11.1	B
Intersection	***0.262***	***9.6***	***4.8***	***-***	***0.474***	***26.9***	***4.1***	***-***
Old Western Highway / Hopetoun Park Road – Stage 2								
Old Western Highway (NW)	0.165	0.0	3.3	-	0.239	0.0	3.8	-
Median Storage (SW)	0.062	1.4	1.6	A	0.030	0.7	1.8	A
Intersection	***0.165***	***1.4***	***3.1***	***-***	***0.239***	***0.7***	***3.7***	***-***
Hopetoun Park Road / Western Freeway ON RAMP (Roundabout)								
Hopetoun Park Road (S)	0.387	0.0	5.8	A	0.193	0.0	6.6	A
Hopetoun park Road (N)	0.254	10.4	5.1	A	0.400	18.7	4.7	A
Intersection	***0.387***	***10.4***	***5.6***	***A***	***0.400***	***18.7***	***5.4***	***A***
Hopetoun Park Road / Western Freeway OFF RAMP (Roundabout)								
Hopetoun Park Road (S)	0.341	0.0	0.1	-	0.154	0.0	0.0	-
Western Freeway Off Ramp (E)	0.060	1.8	6.8	A	0.242	7.6	7.3	A
Hopetoun Park Road (N)	0.079	0.0	0.0	-	0.179	0.0	0.0	-
Intersection	***0.341***	***1.8***	***0.8***	***-***	***0.242***	***7.6***	***2.4***	***-***

The key SIDRA outputs indicate that the intersection would operate below capacity, with minimal queue lengths and delays.

With regard to the operation of the Old Western Highway / Hopetoun Park Road intersection, the *SIDRA Intersection 9 User Guide* states the following with regard to the outputs of staged crossing intersections:

> The degree of saturation, average delay level of service values for the two stages need to be considered in assessing the overall conditions of the staged crossing movement:
>
> - The degree of saturation is the higher of the values for the two stages.
> - The overall average delay is the sum of the average delay values for the two stages.
> - The level of service for the staged crossing could be assessed using the average delay calculated as the sum of the delays at the two stages of crossing.

A review of the detailed SIDRA outputs with regard to the staged movements at the intersection is provided as follows:

Table 5 Review of Staged Turn Movements

Approach	AM Peak			PM Peak		
	DOS	Avg Delay (s)		DOS	Avg Delay (s)	
Right-turn from Old Western Highway to Hopetoun Park Road (NW to SW)						
Stage 2	0.165	7.0		0.239	7.0	
Stage 1	0.262	2.1		0.474	3.9	
Total	***0.262***	***9.1***	***(LOS A)***	***0.474***	***10.9***	***(LOS B)***
Right-turn from Old Hopetoun Park Road to Old Western Highway (SW to SE)						
Stage 1	0.151	14.6		0.104	18.9	
Stage 2	0.062	1.6		0.030	1.8	
Total	***0.151***	***16.2***	***(LOS C)***	***0.104***	***20.7***	***(LOS C)***

Based on the above:

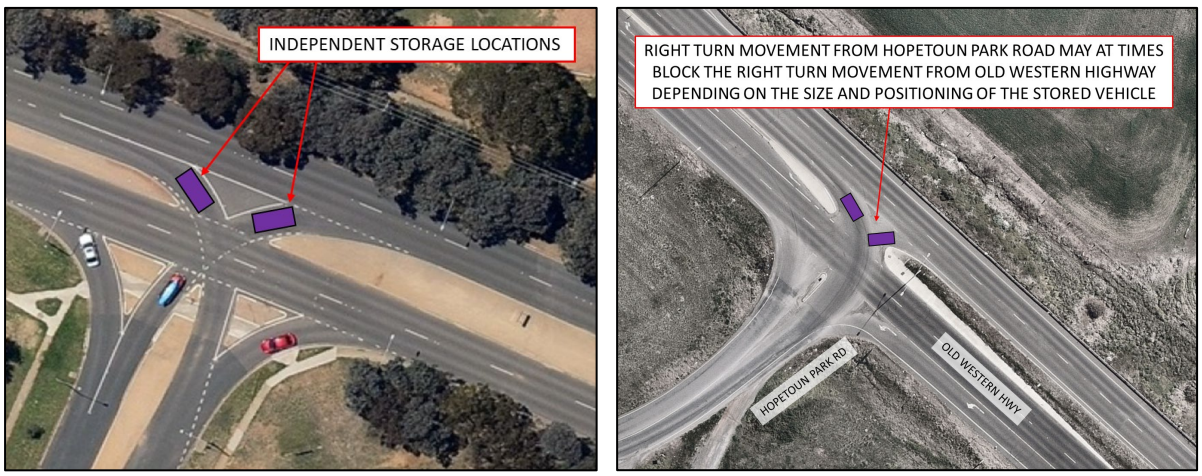
- The right-turn movement from Old Western Highway to Hopetoun Park Road would operate well below capacity during both peak periods with a Level of Service 'A' during the AM peak period and Level of Service 'B' during the PM peak period;
- The right-turn movement from Hopetoun Park Road to Old Western Highway would operate well below capacity during both peak periods with a Level of Service 'C' during both peak periods;
- It is noted that both movements would operate with a Level of Service A if Degree of Saturation were used as the defining parameter for LOS, as per the previous assessment.

With regard to the potential blockage effect on right-turn movements from Old Western Highway to Hopetoun Park Road, this is due to the narrow width of the opening in the central median and the potential for a motorist turning right from Hopetoun Park Road to Old Western Highway to block the other movement.

This may occur at times depending on the size of the vehicle and how the driver positions the vehicle in the median,

This is illustrated at Figure 7, below.

Figure 7 Opposing Right Turn Movements



A review of Table 5 indicates that vehicles turning right from Hopetoun Park Road to Old Western Highway store in the central median for an average 1.6 seconds during the AM peak period and 1.8 seconds during the PM peak period.

These average delays are very short due to the low traffic volumes on the Old Western Highway eastbound carriageway into which the stored vehicle is required to merge.

Based on the projected number of vehicles expected to make this movement during the respective AM and PM peak periods, the right-turn movement from Old Western Highway into Hopetoun Park Road would be blocked for

- (67 vehicles x 1.6 seconds) = 107 of 3600 seconds during the AM peak 1-hour period; and
- (31 vehicles x 1.8) seconds = 56 of 3600 seconds during the PM peak 1-hour period.

This blockage effect will have no significant impacts on the right-turn movement from Old Western Highway to Hopetoun Park Road, which is projected to have a 95th percentile queue length of less than 2 vehicles during the AM peak period and 3 vehicles during the PM peak period

3 RESPONSE TO RFI

The following responses are made to the traffic related items in the RFI:

H) Traffic Report

Council reviewed the provided documents with the intention that resolution of the more detailed aspects of the transport infrastructure will be undertaken in subsequent planning process (development plan, planning permit/detail design stage).

The following changes should be made:

I. The report should note that Council requires all road design and construction to be consistent with the Infrastructure Design Manual, Austroads and other relevant standards

A note will be included in the report when revised.

II. The Impact Assessment be amended to be consistent with the Infrastructure Design Manual, using a measurement of 10 vehicle movements per day. This measurement is used shire wide for all developments. This change is not anticipated to trigger any further or earlier upgrades and the road classifications are anticipated to remain the same.

The traffic assessment provided in this addendum is based on a peak hour trip generation rate of 0.8 vehicle movements per dwelling.

Whilst this is less than the abovementioned rate (which equates to a peak hour trip generation rate of 1.0 vehicle movement per dwelling) it is greater than the surveyed peak hour traffic generation rate of the existing Hopetoun Park residential development and is consistent with the Cardno Traffic Engineering Assessment.

The use of applicable case study data in traffic engineering assessments is common practice, as it accounts for the locational attributes of an area that are not captured in overarching trip generation rates.

III. The existing Hopetoun Park Road pavement has not been designed for an additional 850 lots. Rather than the re-sheeting, contributions will be required toward the reconstruction requirements. This information isn't required for the re-zoning application, but the re-sheeting as stated within the report is not required. Therefore this section (pp.3) is to be re-worded.

The Applicant is currently engaging a Geotechnical Engineer to review the condition of the existing pavement to determine if any works are required.

IV. The Neighbourhood Character document be amended to be consistent with the Traffic Impact Assessment.

To be done by others.

V. Text be amended to be consistent with the cross sections.

The text will be edited in the report when revised.

The following further information is requested:

VI. Information to be provided behind the logic of the allocation of movement in the following statement "For traffic distribution, the report contended that approximately 44% of generated traffic would be eastbound, towards Melton. Of the 44% eastbound traffic, 34% would travel via the Western Freeway and the remaining 10% would travel via the Old Western Highway. The remaining 56% of generated traffic would be westbound, to Bacchus Marsh.".

The above volumes are from the Cardno Traffic & Transport Assessment (March 2020)

The distribution of traffic to/from the site for the updated analysis provided in this addendum has been described at Section 2.4.2 and is based on surveyed traffic volumes at the Western Freeway and Old Western Highway intersections.

- In the AM peak period:
  - Outbound traffic is 46% westbound (towards BM) and 54% eastbound (towards Melton/Melbourne);
  - Inbound traffic is 55% eastbound (from BM) and 45% westbound (from Melton Melbourne).
- In the PM peak period:
  - Outbound traffic is 29% westbound (towards BM) and 71% eastbound (towards Melton/Melbourne);
  - Inbound traffic is 45% eastbound (from BM) and 55% westbound (from Melton Melbourne).

The distribution of approximately 10% to / from Melton via Old Western Highway is relatively consistent throughout both peak periods.

VII. 4.11, 4.12 & 4.13 detail the lot requirement for the intersection upgrade. Within the appendices documentation of in-principal support from RRV via email has been provided but not the formal approval, please provide evidence of approval VIII. Please provide additional information on the discussions and information provided to DoT in order to receive in-principal support

The report includes correspondence between the Applicant and VicRoads outlining the latter's 'in-principle approval' to the roadworks.

IX. The Degree of Saturation are to be reviewed to determine if it is appropriate for the area. For example on page 8, a post development Degree of saturation of 0.388 has been determined for the right lane on Hopetoun Park North that is within the Excellent range (that being 0.6). However, an average delay of 66.5 seconds is anticipated to achieve this 'Excellent' outcome which Council consider excessive for the location and would not satisfy the expectations of future residents.

The 'Level of Service parameter' has been updated to reflect 'delay' rather than degree of saturation as described at Section 2.2 of this addendum.

As noted in the previous section, the right-turn movement from Hopetoun Park Road to Old Western Highway will operate with a degree of saturation of 0.262 and 0.151 during the respective AM and PM peak periods. This is well below capacity.

The average delay for the movement would be 16.2 seconds during the AM peak period and 20.7 seconds during the PM peak period, which is classified as a LOS 'C'.

This is within the generally accepted target of LOS 'D' or better (i.e. an average delay of 35 seconds or less).

MOVEMENT SUMMARY

Site: 101 [HP Road / WF Off Ramp AM Ex (Site Folder: Existing Conditions)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Hopetoun Park Road (S)														
2	T1	126	1	133	0.8	0.068	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
Approach		126	1	133	0.8	0.068	0.0	NA	0.0	0.0	0.00	0.00	0.00	60.0
East: Western Freeway Off Ramp (E)														
4	L2	17	4	18	23.5	0.013	5.9	LOS A	0.0	0.4	0.10	0.54	0.10	52.3
6	R2	10	2	11	20.0	0.011	6.6	LOS A	0.0	0.3	0.24	0.59	0.24	51.3
Approach		27	6	28	22.2	0.013	6.2	LOS A	0.0	0.4	0.16	0.56	0.16	51.9
North: Hopetoun Park Road (N)														
8	T1	31	3	33	9.7	0.018	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
Approach		31	3	33	9.7	0.018	0.0	NA	0.0	0.0	0.00	0.00	0.00	60.0
All Vehicles		184	10	194	5.4	0.068	0.9	NA	0.0	0.4	0.02	0.08	0.02	58.6

Site Level of Service (LOS) Method: Delay (SIDRA). 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.

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

Queue Model: SIDRA Standard.

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 [HP Road / WF On Ramp AM Ex (Site Folder: Existing Conditions)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Hopetoun Park Road (S)														
2	T1	82	2	86	2.4	0.045	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
3	R2	55	2	58	3.6	0.034	5.7	LOS A	0.2	1.1	0.12	0.57	0.12	52.5
Approach		137	4	144	2.9	0.045	2.3	NA	0.2	1.1	0.05	0.23	0.05	56.7
North: Hopetoun Park Road (N)														
7	L2	119	11	125	9.2	0.084	5.9	LOS A	0.4	2.7	0.15	0.52	0.15	53.4
8	T1	35	3	37	8.6	0.020	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
Approach		154	14	162	9.1	0.084	4.6	LOS A	0.4	2.7	0.11	0.40	0.11	54.8
All Vehicles		291	18	306	6.2	0.084	3.5	NA	0.4	2.7	0.08	0.32	0.08	55.7

Site Level of Service (LOS) Method: Delay (SIDRA). 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.

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

Queue Model: SIDRA Standard.

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

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

MOVEMENT SUMMARY

Site: S1 [OWH-HPR Stage 1 AM Ex (Site Folder: Existing Conditions)]

Network: TSTIC [OWH-HPR AM Ex (Network Folder: Existing)]

Type B Two-Stage T-Intersection Crossing
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Old Western Highway (SE)														
3	L2	11	0.0	11	0.0	0.006	6.9	LOS A	0.0	0.0	0.00	0.63	0.00	65.4
4	T1	275	3.1	275	3.1	0.070	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
Approach		285	3.0	285	3.0	0.070	0.3	NA	0.0	0.0	0.00	0.02	0.00	79.3
NorthEast: Median Storage (NE)														
5	T1	146	10.8	146	10.8	0.156	1.8	LOS A	0.7	5.4	0.44	0.32	0.44	49.3
Approach		146	10.8	146	10.8	0.156	1.8	LOS A	0.7	5.4	0.44	0.32	0.44	49.3
SouthWest: Hopetoun Park Road (SW)														
1	L2	68	0.0	68	0.0	0.083	8.6	LOS A	0.3	2.4	0.29	0.88	0.29	55.9
2	T1	16	6.7	16	6.7	0.083	13.1	LOS B	0.3	2.4	0.29	0.88	0.29	46.8
Approach		84	1.3	84	1.3	0.083	9.4	LOS A	0.3	2.4	0.29	0.88	0.29	54.7
All Vehicles		516	4.9	516	4.9	0.156	2.2	NA	0.7	5.4	0.17	0.25	0.17	67.0

Site Level of Service (LOS) Method: Delay (SIDRA). 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.

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

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

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

MOVEMENT SUMMARY

Site: S2 [OWH-HPR Stage 2 AM Ex (Site Folder: Existing Conditions)]

Network: TSTIC [OWH-HPR AM Ex (Network Folder: Existing)]

Type B Two-Stage T-Intersection Crossing
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
NorthWest: Old Western Highway (NW)														
2	T1	285	1.5	285	1.5	0.074	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
3	R2	146	10.8	146	10.8	0.085	7.1	LOS A	0.0	0.0	0.00	0.67	0.00	61.7
Approach		432	4.6	432	4.6	0.085	2.4	NA	0.0	0.0	0.00	0.23	0.00	75.4
SouthWest: Median Storage (SW)														
1	R2	16	6.7	16	6.7	0.014	1.6	LOS A	0.0	0.3	0.29	0.32	0.29	56.4
Approach		16	6.7	16	6.7	0.014	1.6	LOS A	0.0	0.3	0.29	0.32	0.29	56.4
All Vehicles		447	4.7	447	4.7	0.085	2.4	NA	0.0	0.3	0.01	0.23	0.01	74.8

Site Level of Service (LOS) Method: Delay (SIDRA). 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.

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

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 [HP Road / WF Off Ramp PM Ex (Site Folder: Existing Conditions)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Hopetoun Park Road (S)														
2	T1	59	3	62	5.1	0.033	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
Approach		59	3	62	5.1	0.033	0.0	NA	0.0	0.0	0.00	0.00	0.00	60.0
East: Western Freeway Off Ramp (E)														
4	L2	63	3	66	4.8	0.045	5.8	LOS A	0.2	1.3	0.17	0.54	0.17	52.9
6	R2	32	2	34	6.3	0.031	6.3	LOS A	0.1	0.7	0.22	0.60	0.22	52.0
Approach		95	5	100	5.3	0.045	6.0	LOS A	0.2	1.3	0.19	0.56	0.19	52.6
North: Hopetoun Park Road (N)														
8	T1	78	2	82	2.6	0.042	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
Approach		78	2	82	2.6	0.042	0.0	NA	0.0	0.0	0.00	0.00	0.00	60.0
All Vehicles		232	10	244	4.3	0.045	2.5	NA	0.2	1.3	0.08	0.23	0.08	56.7

Site Level of Service (LOS) Method: Delay (SIDRA). 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.

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

Queue Model: SIDRA Standard.

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 [HP Road / WF On Ramp PM Ex (Site Folder: Existing Conditions)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Hopetoun Park Road (S)														
2	T1	56	4	59	7.1	0.032	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
3	R2	37	1	39	2.7	0.024	5.8	LOS A	0.1	0.8	0.18	0.56	0.18	52.4
Approach		93	5	98	5.4	0.032	2.3	NA	0.1	0.8	0.07	0.22	0.07	56.7
North: Hopetoun Park Road (N)														
7	L2	146	14	154	9.6	0.102	5.8	LOS A	0.4	3.3	0.12	0.52	0.12	53.5
8	T1	78	2	82	2.6	0.042	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
Approach		224	16	236	7.1	0.102	3.8	LOS A	0.4	3.3	0.08	0.34	0.08	55.6
All Vehicles		317	21	334	6.6	0.102	3.4	NA	0.4	3.3	0.08	0.30	0.08	55.9

Site Level of Service (LOS) Method: Delay (SIDRA). 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.

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

Queue Model: SIDRA Standard.

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

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

MOVEMENT SUMMARY

Site: S1 [OWH-HPR Stage 1 PM Ex (Site Folder: Existing Conditions)]

Network: TSTIC [OWH-HPR PM Ex (Network Folder: Existing)]

Type B Two-Stage T-Intersection Crossing
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Old Western Highway (SE)														
3	L2	23	0.0	23	0.0	0.012	6.9	LOS A	0.0	0.0	0.00	0.63	0.00	65.4
4	T1	278	2.7	278	2.7	0.071	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
Approach		301	2.4	301	2.4	0.071	0.5	NA	0.0	0.0	0.00	0.05	0.00	78.6
NorthEast: Median Storage (NE)														
5	T1	214	7.9	214	7.9	0.227	2.0	LOS A	1.1	8.1	0.47	0.36	0.47	49.2
Approach		214	7.9	214	7.9	0.227	2.0	LOS A	1.1	8.1	0.47	0.36	0.47	49.2
SouthWest: Hopetoun Park Road (SW)														
1	L2	44	2.4	44	2.4	0.063	8.7	LOS A	0.3	1.8	0.30	0.88	0.30	55.0
2	T1	14	0.0	14	0.0	0.063	13.6	LOS B	0.3	1.8	0.30	0.88	0.30	46.3
Approach		58	1.8	58	1.8	0.063	9.8	LOS A	0.3	1.8	0.30	0.88	0.30	53.6
All Vehicles		573	4.4	573	4.4	0.227	2.0	NA	1.1	8.1	0.21	0.25	0.21	65.9

Site Level of Service (LOS) Method: Delay (SIDRA). 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.

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

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

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

MOVEMENT SUMMARY

Site: S2 [OWH-HPR Stage 2 PM Ex (Site Folder: Existing Conditions)]

Network: TSTIC [OWH-HPR PM Ex (Network Folder: Existing)]

Type B Two-Stage T-Intersection Crossing
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
NorthWest: Old Western Highway (NW)														
2	T1	359	2.6	359	2.6	0.094	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
3	R2	214	7.9	214	7.9	0.134	7.0	LOS A	0.0	0.0	0.00	0.67	0.00	61.6
Approach		573	4.6	573	4.6	0.134	2.6	NA	0.0	0.0	0.00	0.25	0.00	74.8
SouthWest: Median Storage (SW)														
1	R2	14	0.0	14	0.0	0.013	1.7	LOS A	0.0	0.3	0.33	0.35	0.33	59.9
Approach		14	0.0	14	0.0	0.013	1.7	LOS A	0.0	0.3	0.33	0.35	0.33	59.9
All Vehicles		586	4.5	586	4.5	0.134	2.6	NA	0.0	0.3	0.01	0.25	0.01	74.5

Site Level of Service (LOS) Method: Delay (SIDRA). 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.

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

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 [HP Road / WF Off Ramp AM Fu (Site Folder: Future Scenarios)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Hopetoun Park Road (S)														
2	T1	631	11	664	1.7	0.341	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.8
Approach		631	11	664	1.7	0.341	0.1	NA	0.0	0.0	0.00	0.00	0.00	59.8
East: Western Freeway Off Ramp (E)														
4	L2	79	5	83	6.3	0.060	6.1	LOS A	0.2	1.8	0.25	0.55	0.25	52.6
6	R2	10	2	11	20.0	0.025	11.9	LOS B	0.1	0.6	0.64	0.83	0.64	47.8
Approach		89	7	94	7.9	0.060	6.8	LOS A	0.2	1.8	0.30	0.59	0.30	52.0
North: Hopetoun Park Road (N)														
8	T1	144	5	152	3.5	0.079	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
Approach		144	5	152	3.5	0.079	0.0	NA	0.0	0.0	0.00	0.00	0.00	60.0
All Vehicles		864	23	909	2.7	0.341	0.8	NA	0.2	1.8	0.03	0.06	0.03	58.9

Site Level of Service (LOS) Method: Delay (SIDRA). 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.

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

Queue Model: SIDRA Standard.

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 [HP Road / WF On Ramp AM Fu ROUNDABOUT (Site Folder: Future Scenarios)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Hopetoun Park Road (S)														
2	T1	367	8	386	2.2	0.387	3.4	LOS A	0.0	0.0	0.00	0.52	0.00	56.1
3	R2	275	6	289	2.2	0.387	9.0	LOS A	0.0	0.0	0.00	0.52	0.00	56.2
Approach		642	14	676	2.2	0.387	5.8	LOS A	0.0	0.0	0.00	0.52	0.00	56.1
North: Hopetoun Park Road (N)														
7	L2	119	11	125	9.2	0.254	5.3	LOS A	1.4	10.4	0.47	0.55	0.47	54.1
8	T1	148	5	156	3.4	0.254	5.0	LOS A	1.4	10.4	0.47	0.55	0.47	55.8
Approach		267	16	281	6.0	0.254	5.1	LOS A	1.4	10.4	0.47	0.55	0.47	55.0
All Vehicles		909	30	957	3.3	0.387	5.6	LOS A	1.4	10.4	0.14	0.53	0.14	55.8

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

MOVEMENT SUMMARY

Site: S1 [OWH-HPR Stage 1 AM Fu TURN LANE (Site Folder: Future Scenarios)]

Network: TSTIC [OWH-HPR AM Fu TURN LANE (Network Folder: Future)]

Type B Two-Stage T-Intersection Crossing
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Old Western Highway (SE)														
3	L2	27	0.0	27	0.0	0.014	6.9	LOS A	0.0	0.0	0.00	0.63	0.00	65.4
4	T1	275	3.1	275	3.1	0.070	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
Approach		302	2.8	302	2.8	0.070	0.6	NA	0.0	0.0	0.00	0.06	0.00	78.4
NorthEast: Median Storage (NE)														
5	T1	247	7.2	247	7.2	0.262	2.1	LOS A	1.3	9.6	0.49	0.38	0.49	49.2
Approach		247	7.2	247	7.2	0.262	2.1	LOS A	1.3	9.6	0.49	0.38	0.49	49.2
SouthWest: Hopetoun Park Road (SW)														
1	L2	312	1.7	312	1.7	0.249	8.8	LOS A	1.2	8.4	0.29	0.87	0.29	56.0
2	T1	71	1.5	71	1.5	0.151	14.6	LOS B	0.6	4.5	0.63	0.99	0.63	42.0
Approach		382	1.7	382	1.7	0.249	9.8	LOS A	1.2	8.4	0.36	0.90	0.36	54.1
All Vehicles		932	3.5	932	3.5	0.262	4.8	NA	1.3	9.6	0.28	0.49	0.28	60.4

Site Level of Service (LOS) Method: Delay (SIDRA). 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.

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

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

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

MOVEMENT SUMMARY

Site: S2 [OWH-HPR Stage 2 AM Fu TURN LANE (Site Folder: Future Scenarios)]

Network: TSTIC [OWH-HPR AM Fu TURN LANE (Network Folder: Future)]

Type B Two-Stage T-Intersection Crossing
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
NorthWest: Old Western Highway (NW)														
2	T1	285	1.5	285	1.5	0.074	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
3	R2	247	7.2	247	7.2	0.165	7.0	LOS A	0.0	0.0	0.00	0.67	0.00	61.6
Approach		533	4.2	533	4.2	0.165	3.3	NA	0.0	0.0	0.00	0.31	0.00	73.3
SouthWest: Median Storage (SW)														
1	R2	71	1.5	71	1.5	0.062	1.6	LOS A	0.2	1.4	0.30	0.35	0.30	59.3
Approach		71	1.5	71	1.5	0.062	1.6	LOS A	0.2	1.4	0.30	0.35	0.30	59.3
All Vehicles		603	3.8	603	3.8	0.165	3.1	NA	0.2	1.4	0.04	0.32	0.04	71.9

Site Level of Service (LOS) Method: Delay (SIDRA). 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.

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

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 [HP Road / WF Off Ramp PM Fu (Site Folder: Future Scenarios)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Hopetoun Park Road (S)														
2	T1	283	7	298	2.5	0.154	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach		283	7	298	2.5	0.154	0.0	NA	0.0	0.0	0.00	0.00	0.00	59.9
East: Western Freeway Off Ramp (E)														
4	L2	267	7	281	2.6	0.242	7.1	LOS A	1.1	7.6	0.45	0.67	0.45	52.1
6	R2	32	2	34	6.3	0.052	9.1	LOS A	0.2	1.2	0.50	0.77	0.50	50.1
Approach		299	9	315	3.0	0.242	7.3	LOS A	1.1	7.6	0.45	0.68	0.45	51.9
North: Hopetoun Park Road (N)														
8	T1	330	7	347	2.1	0.179	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach		330	7	347	2.1	0.179	0.0	NA	0.0	0.0	0.00	0.00	0.00	59.9
All Vehicles		912	23	960	2.5	0.242	2.4	NA	1.1	7.6	0.15	0.22	0.15	57.0

Site Level of Service (LOS) Method: Delay (SIDRA). 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.

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

Queue Model: SIDRA Standard.

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 [HP Road / WF On Ramp PM Fu ROUNDABOUT (Site Folder: Future Scenarios)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Hopetoun Park Road (S)														
2	T1	140	6	147	4.3	0.193	3.4	LOS A	0.0	0.0	0.00	0.56	0.00	55.4
3	R2	178	4	187	2.2	0.193	9.0	LOS A	0.0	0.0	0.00	0.56	0.00	55.6
Approach		318	10	335	3.1	0.193	6.6	LOS A	0.0	0.0	0.00	0.56	0.00	55.5
North: Hopetoun Park Road (N)														
7	L2	146	14	154	9.6	0.400	4.8	LOS A	2.6	18.7	0.43	0.50	0.43	54.2
8	T1	330	7	347	2.1	0.400	4.6	LOS A	2.6	18.7	0.43	0.50	0.43	55.9
Approach		476	21	501	4.4	0.400	4.7	LOS A	2.6	18.7	0.43	0.50	0.43	55.4
All Vehicles		794	31	836	3.9	0.400	5.4	LOS A	2.6	18.7	0.26	0.52	0.26	55.4

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

MOVEMENT SUMMARY

Site: S1 [OWH-HPR Stage 1 PM Fu TURN LANE (Site Folder: Future Scenarios)]

Network: TSTIC [OWH-HPR PM Fu TURN LANE (Network Folder: Future)]

Type B Two-Stage T-Intersection Crossing
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Old Western Highway (SE)														
3	L2	73	1.4	73	1.4	0.039	7.0	LOS A	0.0	0.0	0.00	0.63	0.00	64.9
4	T1	278	2.7	278	2.7	0.071	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
Approach		351	2.4	351	2.4	0.071	1.5	NA	0.0	0.0	0.00	0.13	0.00	76.3
NorthEast: Median Storage (NE)														
5	T1	429	4.9	429	4.9	0.474	3.9	LOS A	2.4	17.4	0.61	0.71	0.79	47.1
Approach		429	4.9	429	4.9	0.474	3.9	LOS A	2.4	17.4	0.61	0.71	0.79	47.1
SouthWest: Hopetoun Park Road (SW)														
1	L2	116	5.5	116	5.5	0.095	8.8	LOS A	0.4	2.9	0.26	0.88	0.26	55.1
2	T1	33	0.0	33	0.0	0.104	18.9	LOS C	0.4	2.7	0.73	1.00	0.73	38.4
Approach		148	4.3	148	4.3	0.104	11.1	LOS B	0.4	2.9	0.36	0.91	0.36	52.2
All Vehicles		928	3.9	928	3.9	0.474	4.1	NA	2.4	17.4	0.34	0.52	0.43	59.5

Site Level of Service (LOS) Method: Delay (SIDRA). 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.

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

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

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

MOVEMENT SUMMARY

Site: S2 [OWH-HPR Stage 2 PM Fu TURN LANE (Site Folder: Future Scenarios)]

Network: TSTIC [OWH-HPR PM Fu TURN LANE (Network Folder: Future)]

Type B Two-Stage T-Intersection Crossing
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
NorthWest: Old Western Highway (NW)														
2	T1	359	2.6	359	2.6	0.094	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
3	R2	429	4.9	429	4.9	0.239	7.0	LOS A	1.3	9.5	0.00	0.67	0.00	61.6
Approach		788	3.9	788	3.9	0.239	3.8	NA	1.3	9.5	0.00	0.37	0.00	71.9
SouthWest: Median Storage (SW)														
1	R2	33	0.0	33	0.0	0.030	1.8	LOS A	0.1	0.7	0.33	0.36	0.33	59.8
Approach		33	0.0	33	0.0	0.030	1.8	LOS A	0.1	0.7	0.33	0.36	0.33	59.8
All Vehicles		821	3.7	821	3.7	0.239	3.7	NA	1.3	9.5	0.01	0.37	0.01	71.5

Site Level of Service (LOS) Method: Delay (SIDRA). 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.

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

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

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