



CONSULTING CIVIL & TRAFFIC ENGINEERS, RISK MANAGERS.



Project:	Transport Assessment for the development of 40 Masonmill Road, Carmel, Kalamunda
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Consulting Civil and Traffic Engineers, Risk Managers

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1 Summary

Shawmac Pty Ltd was commissioned by Landinsights to undertake an assessment of the transportation impacts associated with the development of 40 Masonmill Road, Carmel in the Shire of Kalamunda. The site has operated as the Mason Mill Rose Garden and Nursery for many years.

Key transport issues focus on the following:

- The capacity of the local road network to accommodate the additional traffic generated by the proposal;
- The extent to which the additional traffic generated can be safely managed on the adjacent current road network;
- The provision of safe access to the proposed development from the adjacent road network; and
- The extent that the site is able to safely and efficiently accommodate alternative and sustainable transport modes including pedestrians and cyclists.

Analysis shows that Masonmill Road and Canning Road will be the major traffic carrying routes adjacent to the development. An assessment of the traffic to be generated by the new development was carried out and the two intersections of Masonmill Road with Canning Road analysed to determine the impact on their operation. Both intersections are predicted to operate with high levels of service, minimum delays and negligible queuing. The additional traffic generated by the development will also not adversely affect the operation of the surrounding road network.

However a site inspection did identify sight distance issues at the northern intersection of Masonmill Road and Canning Road and at the cross over to the site (40 Masonmill Road) and consideration should be given to restricting access to Masonmill Road to the southern intersection with Canning Road.

2 Introduction and Background

The intent of this transport assessment is to clearly demonstrate to the approving authority that the development would:

- provide safe and efficient access for patrons of the site;
- be well integrated with the surrounding land uses;
- not adversely impact on the surrounding area; and
- not adversely impact on the surrounding transport networks and the users of those networks.

The assessment is prepared for the proponent, Holmes Management Group Pty Ltd and has been prepared by Shawmac Pty Ltd.

2.1 Proposed development

The proposed development site, as shown on Figure 1, is located at 40 Masonmill Road, Carmel, Kalamunda, approximately 6.5km south of Kalamunda Town Centre.

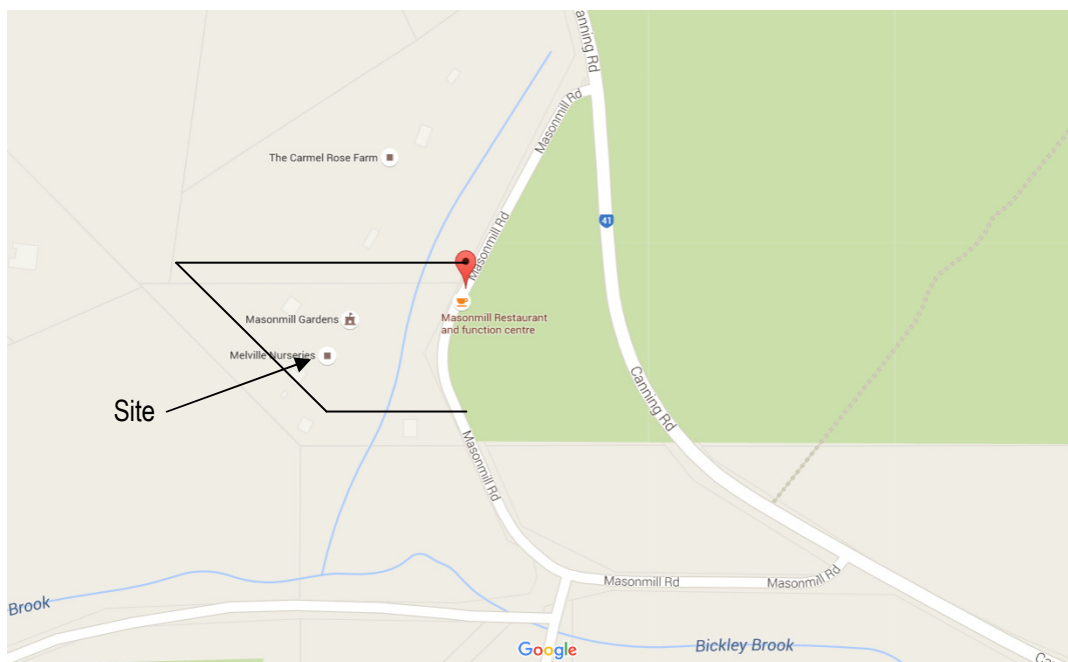


Figure 1. Location.

The proposed development will consist of a mix of café/restaurant, function centre and associated tourist uses.

Existing uses include:

- Café/Restaurant and Function Centre
- Nursery

The development's relationship with the surrounding land uses is shown on Figure 2.

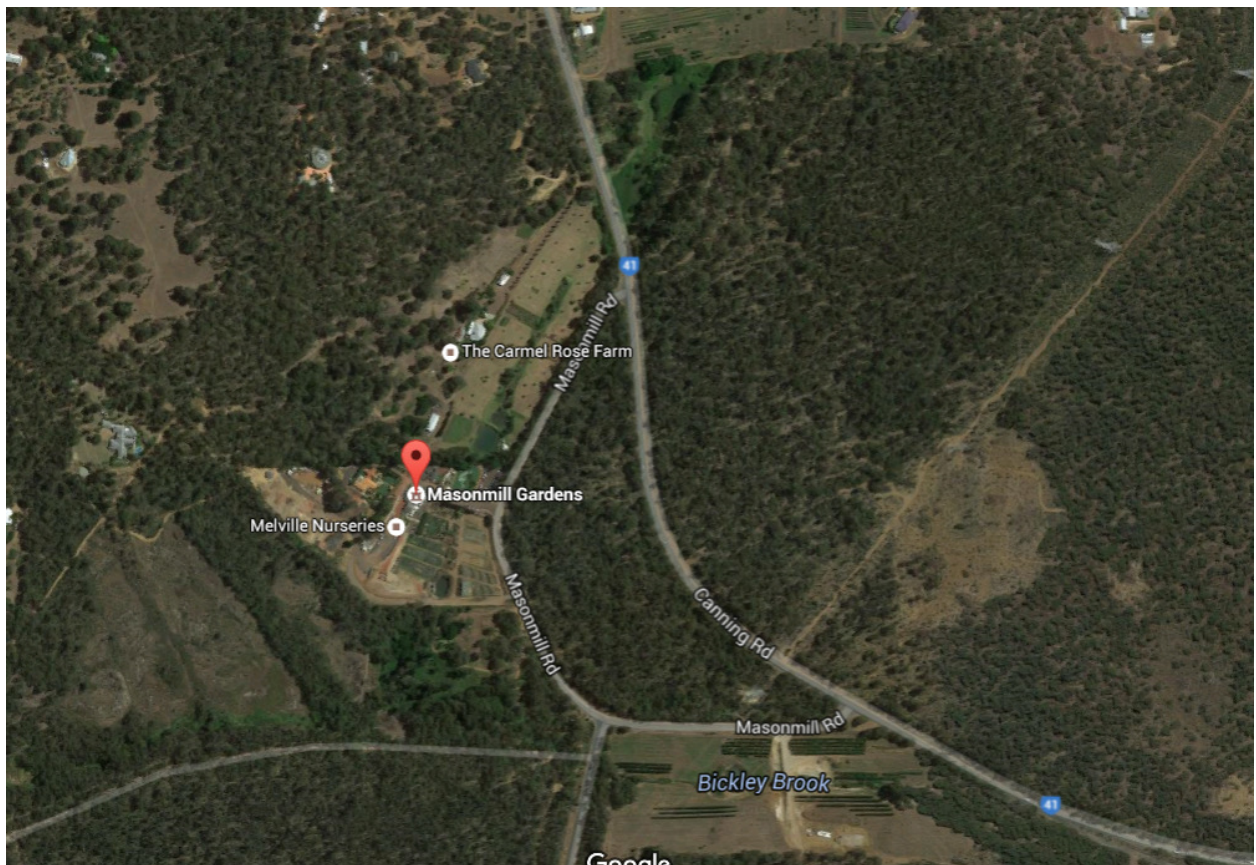


Figure 2. Adjacent land uses.

To the north of the site is another nursery and undeveloped bush land. To the west are large acreage properties and hobby farms. South and east of the site is undeveloped natural bush land.

2.2 Issues.

No Issues were identified.

3 Existing situation

3.1 Land Use

Existing land uses surrounding the development are shown on Figure 3.

Land use of the adjacent area is consistent with the site zoning which is shown on Figure 3.

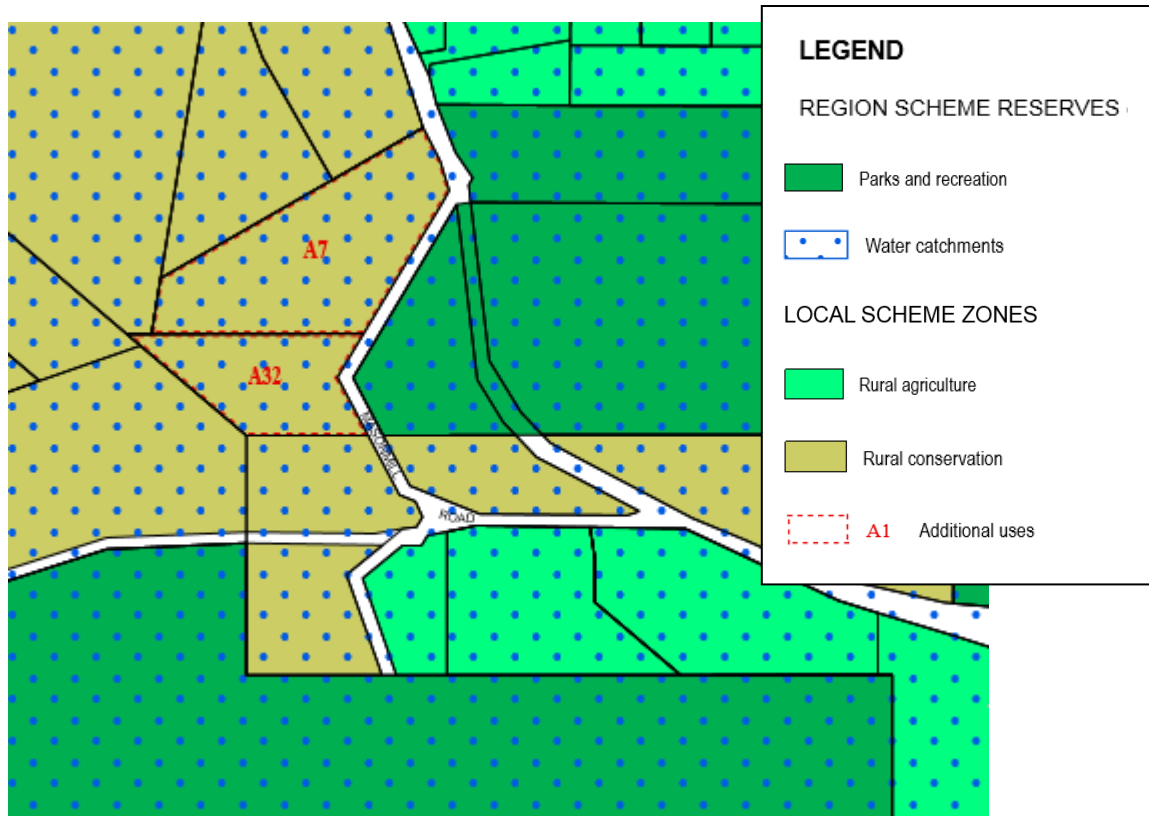


Figure 3. Site Zoning

3.2 Road Network

Figures 4 and 5 show the traffic count data sourced from MRWA for Canning Road. There is no traffic count data available for Masonmill Road. The majority of the traffic on Masonmill Road will be related to the existing Mason Mill site as the only side road off Masonmill Road is a Water Corporation road to Victoria reservoir.



Weekly Volume by Hour									
Traffic Flow:	Both Directions			Road Name:	Canning Rd (1020003)				
Site No:	0648			Location Description:	South of Welshpool Rd East (SLK 6.17)				
Date Range:	09 Apr 2014 to 13 Apr 2014			Count Type:	Classification Counts				
Average Vehicle Volume									
Hour	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon - Fri	Mon - Sun
0000			9	17	15	43	108	14	38
0100			7	2	11	21	83	7	25
0200			3	8	7	12	21	6	10
0300			6	2	5	7	13	4	7
0400			4	9	7	12	6	7	8
0500			22	11	13	9	5	15	12
0600			72	74	68	24	21	71	52
0700			165	164	172	85	42	167	126
0800			260	271	252	127	121	261	206
0900			365	375	317	216	154	352	285
1000			212	198	237	244	292	216	237
1100			193	211	237	309	267	214	243
1200			224	236	261	286	364	240	274
1300			181	231	238	313	318	217	256
1400			184	251	255	243	286	230	244
1500			244	273	293	290	313	270	283
1600			341	374	366	277	293	360	330
1700			363	338	392	239	248	364	316
1800			306	316	377	261	190	333	290
1900			171	209	249	230	176	210	207
2000			96	96	123	168	98	105	116
2100			78	78	73	76	68	76	75
2200			39	67	99	88	46	68	68
2300			27	32	73	86	26	44	49
Total			3572	3843	4140	3666	3559	3851	3757
Peak Statistics									
	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon - Fri	Mon - Sun
AM	1/4 Hour		0915	0915	0945	1145	1145	0930	0915
	1/4 Hr Vol		110	106	95	108	84	97	76
	1/2 Hour		0915	0915	0930	1130	1145	0915	0915
	1/2 Hr Vol		213	209	180	184	168	194	152
	1 Hour		0915	0900	0900	1130	1145	0900	0900
	1 Hr Vol		367	375	317	324	389	352	285
	1 Hr Fact		.8341	.8844	.8342	.75	.8761	.9072	.935
	2 Hour		0815	0800	0800	1145	1145	0800	1145
	2 Hr Vol		649	646	569	655	693	613	549
PM	1/4 Hour		1615	1630	1715	1300	1215	1615	1615
	1/4 Hr Vol		105	100	110	90	111	102	93
	1/2 Hour		1715	1615	1715	1300	1215	1615	1600
	1/2 Hr Vol		184	193	209	176	221	190	173
	1 Hour		1645	1545	1715	1245	1215	1615	1615
	1 Hr Vol		365	378	400	344	365	368	332
	1 Hr Fact		.9605	.945	.9091	.9556	.8221	.902	.8963
	2 Hour		1600	1530	1615	1200	1200	1600	1545
	2 Hr Vol		704	725	774	599	682	725	648
Peak	12 Hour		0745	0730	0730	0845	0830	0730	0745
	12 Hr Vol		3068	3309	3493	3091	3047	3290	3172

Figure 4. MRWA Count Data – Canning Road

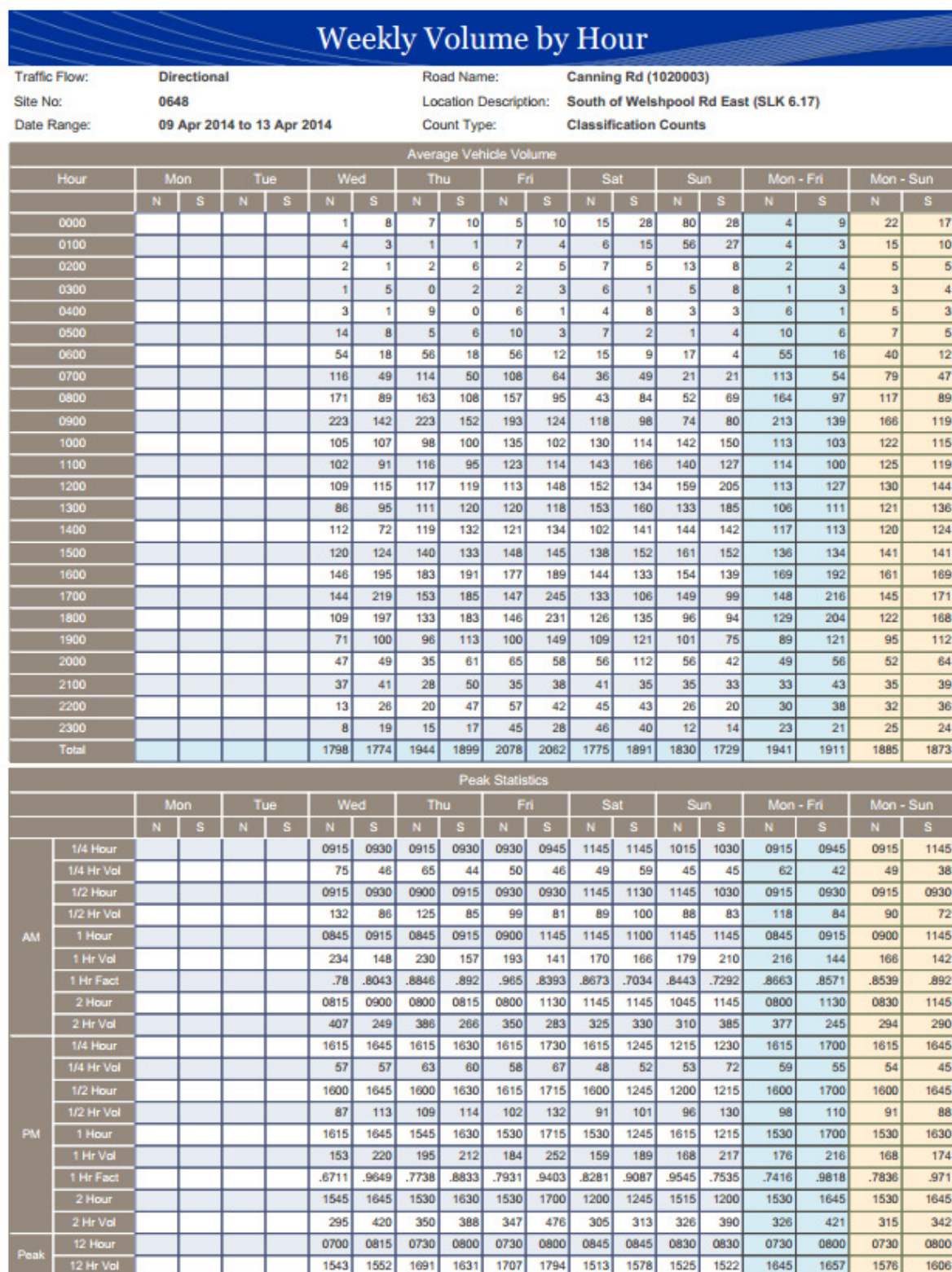


Figure 5. MRWA Count Data – Canning Road

3.3 Pedestrian and Cycle Links, Public Transport;

There are no designated bus routes, pedestrian pathways or cycle ways along either Canning Road or Masonmill Road in the vicinity of the proposed development.

3.4 Traffic management on the frontage streets

Road infrastructure adjoining the site is shown below on Table 1.

Road	Carriageways	Paths	Parking	Zoned speed limit	Intersection details
Masonmill Road	Unkerbed single carriageway Approx 5.8 – 6.0m wide	None	None. Road has narrow gravel shoulders	Derestricted	Unchannelised T-intersection with Canning Road. Give Way road marking. No signs.
Canning Road	Unkerbed single carriageway Approx. 6.8 – 7.0m wide	None	Gravel shoulders – restricted width in some locations	80 km/h	

Table 1. Existing Network.

4 Changes to external transport networks

No planned changes to the external transport networks have been identified. There is no planned extension to the existing public transport route

5 Integration with surrounding area

5.1 Major attractors and generators

Major attractors and generators are shown on Figure 6.

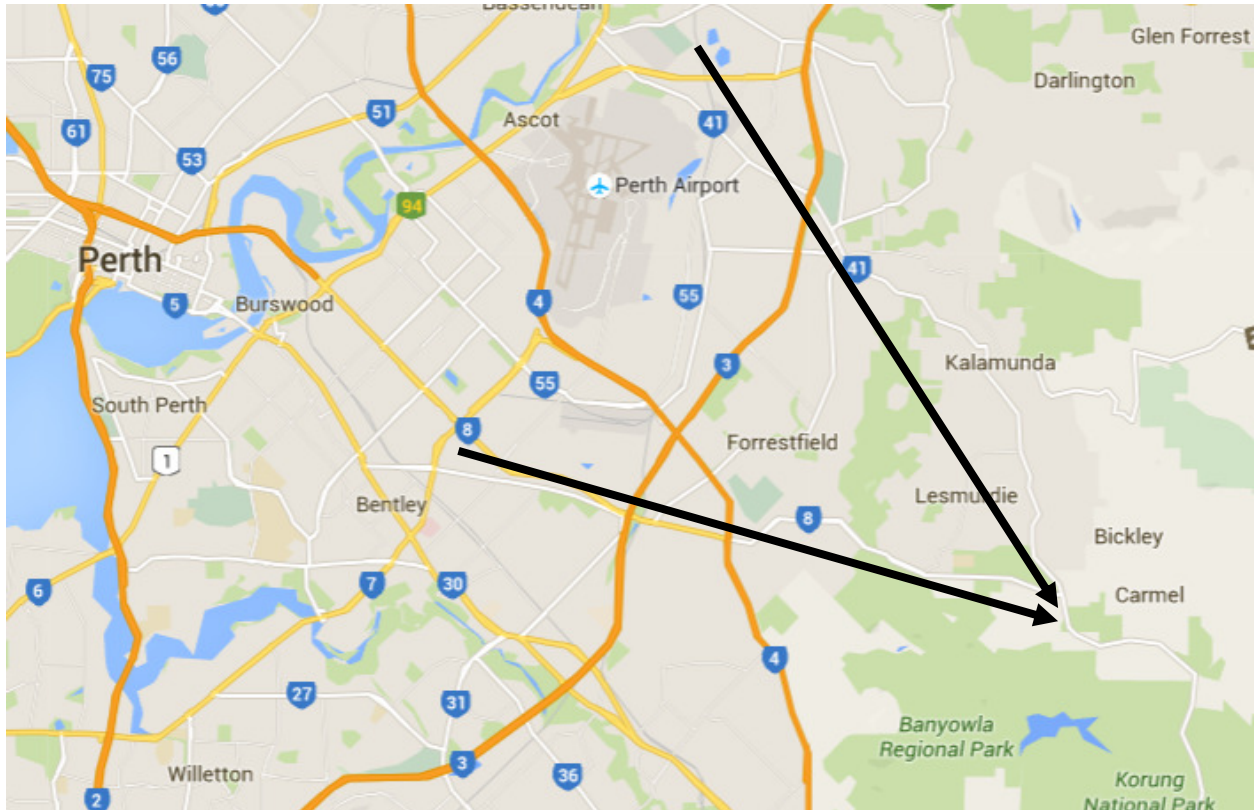


Figure 6. Attractors and Generators

Key attractors are likely to be visitors from Perth metropolitan area, accessing the site via Welshpool Road East and Kalamunda Road / Canning Road.

5.2 Major changes to land uses

No major changes to land use external to the site have been identified.

6 Traffic Generation

Traffic generation is typically estimated by application of published generation rates applied to a measured quantum of proposed land uses. In order to predict the impact of the proposed rezoning of the Masonmills Complex, the possible future land use was estimated from initial concept information provided by Landinsights and industry rates applied to give an estimated daily traffic flow as shown in the table below. A variety of land uses were used in order to give a broad assessment of possible future development.



Land use	Approximate / Assumed size		Current generation potential (vpd)	Future generation potential (vpd)
	Existing	Possible future		
Reception Centre	300 m ² GFA	300 m ² GFA	150	150
Function Centre	60 person capacity	400 m ² GFA	0	200
Café	350 m ² GFA	350 m ² GFA	210	210
Tavern – Beer Garden	300 m ² GFA	300 m ² GFA	210	210
Shop		300 m ² GFA	15	15
Caretakers Dwelling	1	1	9	9
Garden Centre		1400 m ² GFA	0	530
Tourist Development (Accommodation)		Allow 10 units	0	40
Mini Golf	-	3500 m ²	0	200
Pro shop		300 m ² GFA	0	15
			594	1579 say 2,000

It should be noted that the traffic generation shown assumes that each specific landuse will generate the traffic flows shown and if operating concurrently, flows from various uses will be cumulative. In reality this is likely to overstate the generation potential, as a number of trips are expected to be multi-purpose trips; for example, patrons from the mini golf facility may also use the tavern or café. Nonetheless, the intent is to endeavour to predict the order of traffic that may be generated from a fully developed site in order to comment on potential impacts, and as such a conservative approach is considered to be appropriate. Also for the purpose of assessing road network performance, an assumed peak hour traffic flow of 10% of daily traffic has been adopted. Similarly, this is likely to overstate the actual traffic generated in the peak hours as the various land uses will generate at different peak times. For example, it is expected that the Mini Golf facility would generate peak traffic on weekends after the morning peak hour on the adjacent road network and before the afternoon peak hour on the adjacent road network. Similarly, the reception centre is expected to generate peak traffic flows after the peak hour on the adjacent road network and at markedly different times to some of the other land uses. Nonetheless, 10 % of the cumulative traffic generation has been assumed to contribute to the morning and afternoon peak hour traffic on the adjacent road network. On that basis a potential daily traffic generation of 2,000 vehicles per day (vpd) and a typical peak hour generation of 200 vehicles per hour (vph) has been adopted.

7 Distribution and Impacts

It is assumed that 75% of traffic will be distributed to Masonmills Road north of the site with 25% to Masonmills

Road south of the site. Desire lines from the intersections of Masonmills Road and Canning Road (north) and Masonmills Road and Canning Road (south) are assumed to be to the north and to the south respectively. Given that there are negligible traffic generators off Masonmills Road other than the subject site, baseline traffic is likely to be insignificant and largely associated with the operation of the current site. For the purpose of assessment, an allowance of 200 vpd other than that currently generated by the site has been allowed for. Based on the estimated traffic flows and the recorded flows on Canning Road, typical peak hour movements through the Masonmills Road intersections were established and are shown on Figure 7.

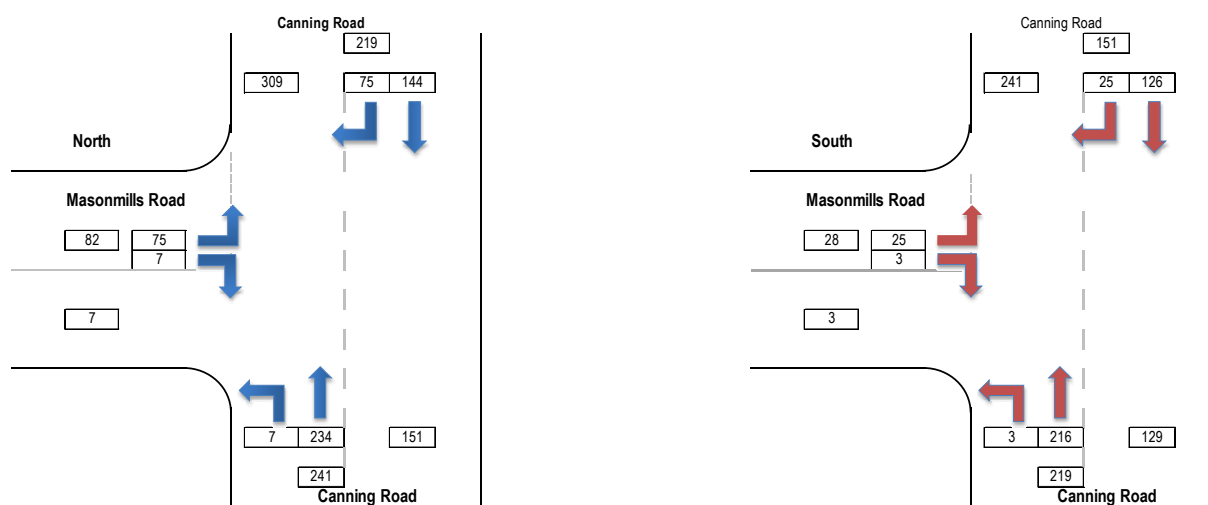


Figure 7. Typical Peak flows

The performance of the intersections was modelled using Sidra Intersection 6.0 and the results of that modelling are shown on Figures 8 and 9 below.

Movement Performance - Vehicles											
Mov ID	ODMo v	Demand Flows Total	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Prop. Queued	Effective Stop Rate	Average Speed	
		veh/h	%	v/c	sec		veh	m	per veh	km/h	
South: Canning Road											
1	L2	7	5.0	0.133	5.6	LOS A	0.0	0.0	0.00	0.02	57.9
2	T1	246	5.0	0.133	0.0	LOS A	0.0	0.0	0.00	0.02	59.8
Approach		254	5.0	0.133	0.2	NA	0.0	0.0	0.00	0.02	59.8
North: Canning Road											
8	T1	152	5.0	0.138	1.0	LOS A	0.8	5.9	0.39	0.21	56.7
9	R2	79	5.0	0.138	6.5	LOS A	0.8	5.9	0.39	0.21	54.5
Approach		231	5.0	0.138	2.9	NA	0.8	5.9	0.39	0.21	56.0
West: Masonmills Road											
10	L2	79	0.0	0.069	6.5	LOS A	0.3	1.9	0.33	0.59	52.6
12	R2	7	0.0	0.069	6.4	LOS A	0.3	1.9	0.33	0.59	52.1
Approach		86	0.0	0.069	6.5	LOS A	0.3	1.9	0.33	0.59	52.5
All Vehicles		571	4.2	0.138	2.2	NA	0.8	5.9	0.21	0.18	57.0

Figure 8. Peak Hour Performance – Northern Intersection.

Movement Performance - Vehicles											
Mov ID	ODMo v	Demand Total	Flows HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Canning Road											
1	L2	3	5.0	0.121	5.6	LOS A	0.0	0.0	0.00	0.01	58.0
2	T1	227	5.0	0.121	0.0	LOS A	0.0	0.0	0.00	0.01	59.9
Approach		231	5.0	0.121	0.1	NA	0.0	0.0	0.00	0.01	59.9
North: Canning Road											
8	T1	133	5.0	0.089	0.8	LOS A	0.5	3.8	0.35	0.10	57.7
9	R2	26	5.0	0.089	6.4	LOS A	0.5	3.8	0.35	0.10	55.4
Approach		159	5.0	0.089	1.8	NA	0.5	3.8	0.35	0.10	57.3
West: Masonmills Road											
10	L2	26	0.0	0.023	6.3	LOS A	0.1	0.6	0.31	0.57	52.7
12	R2	3	0.0	0.023	6.3	LOS A	0.1	0.6	0.31	0.57	52.2
Approach		29	0.0	0.023	6.3	LOS A	0.1	0.6	0.31	0.57	52.6
All Vehicles		419	4.6	0.121	1.2	NA	0.5	3.8	0.16	0.08	58.3

Figure 9. Peak Hour Performance – Southern Intersection.

Both intersections are predicted to operate with high levels of service, minimum delays and negligible queuing. Should the northern intersection be closed on account of poor sight distance and all traffic diverted through the southern intersection, that intersection is predicted to perform generally as shown in Figure 10.

Movement Performance - Vehicles											
Mov ID	ODMo v	Demand Total	Flows HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Canning Road											
1	L2	11	5.0	0.125	5.6	LOS A	0.0	0.0	0.00	0.03	57.9
2	T1	227	5.0	0.125	0.0	LOS A	0.0	0.0	0.00	0.03	59.7
Approach		238	5.0	0.125	0.3	NA	0.0	0.0	0.00	0.03	59.6
North: Canning Road											
8	T1	152	5.0	0.156	1.0	LOS A	0.9	6.6	0.38	0.25	56.5
9	R2	105	5.0	0.156	6.5	LOS A	0.9	6.6	0.38	0.25	54.3
Approach		257	5.0	0.156	3.2	NA	0.9	6.6	0.38	0.25	55.5
West: Masonmills Road											
10	L2	105	0.0	0.092	6.4	LOS A	0.4	2.5	0.32	0.59	52.6
12	R2	11	0.0	0.092	6.4	LOS A	0.4	2.5	0.32	0.59	52.2
Approach		116	0.0	0.092	6.4	LOS A	0.4	2.5	0.32	0.59	52.6
All Vehicles		611	4.1	0.156	2.7	NA	0.9	6.6	0.22	0.23	56.5

Figure 10. Peak Hour Performance – Southern Intersection all Traffic.

Given the uncertainty of traffic generated by the site, a sensitivity analysis was undertaken and all flows were increased by 100%. The results of this analysis indicated that even with a doubling of flows, the degree of saturation only increases from 0.16 to 0.36 and the delay on the worst movement from 6.5 seconds to 8.8 seconds.

8 Analysis of external transport networks

8.1 Design traffic flows on external road network

Design traffic flows on the external network as affected by the proposal are covered in section 7.

8.2 Impact on external roads

The impacts of design traffic flows on the external network as affected by the proposal are covered in section 7.

8.3 Impact on external intersections

The impacts of design traffic flows on external intersections as affected by the proposal are covered in section 7.

9 Safety issues

9.1 Canning Road – Masonmill Road Intersections

An assessment of the two intersections of Masonmill Road with Canning Road, referred to as the northern and southern intersections, identified safety issues with the northern intersection.

The northern intersection is located in a dip in Canning Road which limits the reaction time and stopping distance for people turning into Masonmill Road from Canning Road, approaching the intersection from either direction. This is also a safety issue for vehicles travelling behind the turning vehicle due to the short reaction time from when the front vehicle sees the intersection and starts rapidly reducing speed in preparation for the turning movement off Canning Road.

The sight distance at the intersection for vehicles exiting Masonmill Road onto Canning Road is also restricted. It could be improved towards the north with some vegetation clearing, however a blind rise to the south obscures the view of vehicles approaching the intersection from the south.

The geometry of Masonmill Road at the northern intersection is also problematic as it has a sharp bend and incline on the approach to Canning Road.

The southern intersection is a much safer layout. There is still a bend in Masonmill Road just prior to the intersection, however sight distances are much better, travelling along Canning Road as well as from Masonmill Road, looking both north and south along Canning Road.



9.2 Cross over 40 Masonmill Road

The existing crossover providing access to the proposed development is located on the outside of a bend in Masonmill Road. This provides good sight distance for vehicles leaving the site, however the sight distance is restricted for vehicles turning into the site when approaching from north. This cannot be rectified as there is a large Water Corporation main above ground within the sight distance zone. Sight distance is not a problem for vehicles approaching from the south as it is a left turn movement.

9.3 Comment

To address the intersection sight distance issues, consideration could be given to restricting access to Masonmill Road from Canning Road via the southern intersection and through closure of the northern intersection. This would also improve the safety at the cross over to 40 Masonmill Road. Currently Masonmill Road is only used for access to the development site and the Victoria Reservoir. Restricting access to Masonmill Road to the southern intersection on Canning Road would slightly increase the travel distance to the site but would have negligible impact on access to the reservoir as the Water Corporation road is near the southern end of Masonmill Road, close to the intersection with Canning Road. No other properties would be affected.

10 Conclusions

There is no public transport access to the site and no pedestrian or cycle paths. Access to the proposed new development will therefore be by vehicle.

An estimate of the expected increase in traffic was determined based on the land use of the proposed development. The analysis showed that the surrounding road network and intersections can accommodate the increase in traffic flow and will still operate at an acceptable level of service. However sight distance issues were identified at the northern intersection of Masonmill Road and Canning Road and at the cross over to the site (40 Masonmill Road) and consideration should be given to restricting access to Masonmill Road to the southern intersection with Canning Road.



11 Appendix A Checklist

Item	Section	Comments/Proposals
Summary	1	
Introduction/Background	2	
name of applicant and consultant	2.1	
subdivision / development location and context	2.1	
brief description of subdivision / development	2.1	
key issues	2.2	
background information	2	
Subdivision / development proposal	2.1	
regional context	n/a	
proposed land uses	2.1	
table of land uses and quantities	n/a	
major attractors/generators	5.1	
any specific issues		
Existing situation	3	
existing land uses within structure plan	n/a	
existing land uses surrounding the subdivision	3.1	
existing road network within subdivision	n/a	
existing road network surrounding the subdivision	3.4	
traffic flows on roads within subdivision (AM and PM peak hours)	n/a	
traffic flows on roads surrounding the subdivision (AM and PM peak hours)	3.2	
existing pedestrian/cycle networks within the subdivision	3.2	
existing pedestrian/cycle networks surrounding the subdivision	3.3	
existing public transport services within the subdivision	3.3	
existing public transport services surrounding the subdivision	3.3	
Proposed internal transport networks	n/a	
changes/additions to existing road network	4	
road reservation widths		
road cross-sections & speed limits		



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Item	Section	Comments/Proposals
intersection controls	7	
pedestrian/cycle networks and crossing facilities	3.3	
public transport routes	3.3	
Changes to external transport networks	4	
road network	5	
intersection controls	5	
pedestrian/cycle networks and crossing facilities	5	
public transport services	5	
Integration with surrounding area	6	
surrounding attractors/generators		
proposed changes to surrounding land uses		
travel desire lines from subdivision to these attractors/generators		
adequacy of existing transport networks	7	
deficiencies in existing transport networks	7	
remedial measures to address deficiencies	7	
Analysis of internal transport networks	7	
assessment years and time periods	7	
subdivision generated traffic	6	
extraneous (through) traffic		
design traffic flows	6	
road cross-sections		
intersection sight distances		
intersection operation and method of control	7	
frontage access strategy		
pedestrian / cycle networks		
safe walk/cycle to school assessment (residential subdivisions only)		
pedestrian permeability & efficiency		
access to public transport		
Analysis of external transport networks	8	
base flows for assessment years		
total traffic flows	8	
road cross-sections	-	
intersection operation	-	
pedestrian/cycle networks	-	
Safety issues	9	
identify issues	-	



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Item	Section	Comments/Proposals
remedial measures	9	
Conclusions	10	

Proponent's name;

Signature

Date

Transport assessor's name; Ed Wilks

Company; Shawmac

Signature

A handwritten signature in black ink, appearing to read "Ed Wilks", written over a light blue horizontal line.

Date 24/3/2016