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Transport Planning, Traffic Impact Assessments, Road Safety Audits, Expert Witness

24 April 2019

Reference: 190157.03FA

PMDL 17/124 Walker Street, North Sydney, NSW 2060 Australia Attention: Tim Williams

#### SUPPLEMENTARY TRAFFIC AND PARKING ADVICE FOR THE PROPOSED SAINTS PETER AND PAUL ASSYRIAN PRIMARY SCHOOL AT 17 - 19 KOSOVICH PLACE, CECIL PARK, 2178

Dear Tim,

Reference is made to your request to provide Supplementary Traffic and Parking Advice for the proposed Saints Peter and Paul Assyrian Primary School at 17 - 19 Kosovich Place, Cecil Park, 2178 in response to comments on the application from the *Roads and Maritime Services* (RMS). This letter should be read in conjunction with the Traffic and Parking Impact Assessment by *M<sup>c</sup>Laren Traffic Engineering* dated 4 September 2018 (M<sup>c</sup>Laren Report).

The Department of Planning and Environment (DoPE) provided the following comment with regards to the proposed intersection treatment at the intersection of Kosovich Place/Wallgrove Road:

From the submitted SIDRA modelling report it was noted that 47 vehicles will turn right into Kosovich Place from Wallgrove Road during morning peak hour against 1021 opposite direction traffic (including 107 turning left into Kosovich Place from Wallgrove Road), in Stage-1 development. And in ultimate development, 83 vehicles will turn right into Kosovich Place from Wallgrove Road during morning peak hour against 1120 opposite directional traffic.

Considering Wallgrove Road is an 80km/hr speed zone road and right turning traffic has to negotiate with heavy volume of through traffic, RMS does not support proposed right turn bay (CHR) treatment on Wallgrove Road at Kosovich Place intersection. This would be a potential safety hazard for right turn traffic as motorists have to wait for a safe gap which could frustrate the drivers due to the high through traffic volume.

In addition, RMS does not support proposed banning of right turn from Kosovich Place into Wallgrove Road as this would increase unnecessary pressure at the roundabout of Wallgrove Road and Villiers Road.



RMS suggest a roundabout at the intersection of Kosovich Place and Wallgrove Road. It would improve the safety for turning traffic and also would reduce the approach speed at the subject intersection.

The issues raised in the RMS comments have been addressed in the following sections.

## 1 SIDRA Intersection Modelling Outcomes

## 1.1 Kosovich Place/Wallgrove Road Intersection

The SIDRA intersection modelling undertaken to accompany the application indicates that in the AM and PM peak hours the right turn into Kosovich Place from Wallgrove Road will operate with a level of service of "A" or "B", which is indicative of low delays and queue lengths. This analysis takes into consideration 10 years of background traffic growth in addition to the traffic generation of the site. The detailed results of the analysis are presented in **Table 1**. The relevant SIDRA output reports are provided in **Annexure A** for reference.

# TABLE 1: SUMMARY OF SIDRA RESULTSRIGHT TURN FROM WALLGROVE ROAD INTO KOSOVICH PLACE

Scenario	Level of Service	Average Delay	95 <sup>th</sup> Percentile Queue Length
AM Peak Hour + 10Y Growth + Stage 2 School	В	17.5 seconds	6.3m
PM Peak Hour + 10Y Growth + Stage 2 School	А	7.9 seconds	3.2m

As indicated in **Table 1**, the SIDRA analysis indicates that right turning movements into Kosovich Place will experience low delays and limited queues will form. The proposed CHR treatment includes a queue storage length of 26.6m, which is more than sufficient to cater for the 6.3m of queues expected in the AM peak hour.

Considering the SIDRA results, it is unclear on what basis the RMS speculates that a safety hazard could be caused by right turning motorists waiting for a safe gap in traffic. SIDRA Intersection is a widely used and accepted intersection model in NSW and internationally and is relied upon regularly for the analysis of intersections.

## 1.2 Function of Villiers Road/Wallgrove Road Roundabout

The SIDRA intersection modelling undertaken to accompany the application indicates that in the AM and PM peak hours the intersection of Villiers Road/Wallgrove Road will operate with a level of service of "A". This analysis takes into consideration 10 years of background traffic growth in addition to the traffic generation of the site.

The RMS Guide to Traffic Generating Developments Table 4.2 "Level of Service Criteria for Intersections", as reproduced in **Figure 1**, indicates that a level of service of "A" reflects "Good Operation".

It is suggested that the traffic associated with the site would "increase unnecessary pressure" at the roundabout, however, the SIDRA modelling completed reflects that the roundabout will continue to meet the RMS' own criteria for "Good Operation" and considering this, it is not clear why the proposal is not acceptable to RMS.



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							
В	15 to 28	Good with acceptable delays & spare capacity	Acceptable delays & spare capacity							
С	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	At capacity, requires other control mode							
		Roundabouts require other control mode								

## FIGURE 1: RMS LEVEL OF SERVICE CRITERIA

### 2 Traffic Flow Volumes and Characteristics at Kosovich Place/Wallgrove Road Intersection

Traffic counts undertaken during the August 2018 period have been analysed to provide platooning and gap characteristics. AUSTROADS Guide to Road Design Part 4A Table 3.5 suggests that right turns from major roads across one-lane require a critical gap of 4-seconds, with a 2-second follow-up headway; the relevant extract is provided in **Figure 2**.

Using the relevant 4-second critical and 2-second follow up parameters, analysis of the data indicates that on an average weekday between 8:00 am and 9:00 am, a total of 123 gaps occur of at least 4 seconds length in the northbound traffic flow. When a follow-up headway of 2-seconds is considered, the ultimate capacity of a right turn across the northbound traffic flows is 281 vehicles.

As noted in the M<sup>c</sup>Laren Report, a total of 83 vehicles will be required to turn right into the site from the north during the AM peak hour. This represents approximately 29.5% of the capacity of the right turn movement and is therefore acceptable, consistent with the results of the SIDRA intersection modelling.

Movement	Diagram	Description	t <sub>a</sub> <sup>(1)</sup> (sec)	t <sub>f</sub> (2) (sec)
Left turn		<ul> <li>Not interfering with A Requiring A to slow</li> </ul>	14 <u>4</u> 0 5	2–3 2–3
Crossing		Two lane/one way Three lane/one way Four lane/one way Two lane/two way Four lane/two way Six lane/two way	4 6 8 5 8 8	2 3 4 3 5 5 5
Right turn from major road		Across one lane Across two lanes Across three lanes	4 5 6	2 3 4

#### FIGURE 2: GAP ACCEPTANCE PARAMETERS



## 3 Suggested Roundabout Treatment

Pre-DA consultation with RMS and TFNSW was undertaken to better inform the proposed design, with meetings held on 12 April 2018 and 23 July 2018; meeting minutes are provided in **Annexure B** for reference.

Whilst the option of a roundabout was discussed at the meeting, the overriding advice provided was that:

- A new roundabout would be too close to the roundabout of Wallgrove Road/Villiers Road;
- The impacts of an additional roundabout on the operation of Wallgrove Road would be unreasonably great for the purposes of providing access to a single school;
- A roundabout may not be able to be constructed within the RMS land, as the motorway road reserve opposite is privately owned by Transurban.

On the basis of the above and the outcomes of the SIDRA Intersection modelling, a roundabout option is not needed and has not been investigated further.

Please contact the undersigned should you require further information or assistance.

Yours faithfully M°Laren Traffic Engineering

Tom Steal Senior Traffic Engineer BE Civil AMAITPM MIEAust RMS Accredited Level 1 Road Safety Auditor RMS Accredited Work Zone Traffic Management Plan Designer and Inspector



ANNEXURE A: SIDRA OUTPUT REPORTS (4 SHEETS)

## Site: 101 [NRT Existing AM+ 10yr Gr+ S2 - Wallgrove/ Kosovich ]

Site Category: (None) Giveway / Yield (Two-Way)

Move	ement	Perform	ance	- Vehi	cles									
Mov ID	Mov Turn D ID		Flows	Arrival	Flows	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop	Aver. No.	Averag e
		Total veh/h	HV %	Total veh/h	HV %	v/c	sec		Vehicles E veh	)istance m		Rate	Cycles	Speed km/h
South	n: Wallę	grove Road	d (S)											
1	L2	215	0.0	215	0.0	0.598	5.6	LOS A	0.0	0.0	0.00	0.11	0.00	57.1
2	T1	905	6.0	905	6.0	0.598	0.1	LOS A	0.0	0.0	0.00	0.11	0.00	57.7
Appro	bach	1120	4.8	1120	4.8	0.598	1.2	NA	0.0	0.0	0.00	0.11	0.00	57.5
North	: Wallg	rove Road	l (N)											
8	T1	514	12.0	514	12.0	0.286	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
9	R2	83	0.0	83	0.0	0.249	17.5	LOS B	0.9	6.3	0.85	0.97	0.95	38.9
Appro	bach	597	10.3	597	10.3	0.286	2.4	NA	0.9	6.3	0.12	0.13	0.13	55.7
West:	Kosov	vich Place	(E)											
10	L2	273	0.0	273	0.0	0.533	14.4	LOS A	2.7	18.8	0.82	1.07	1.29	36.0
Appro	bach	273	0.0	273	0.0	0.533	14.4	LOS A	2.7	18.8	0.82	1.07	1.29	36.0
All Ve	hicles	1990	5.8	1990	5.8	0.598	3.4	NA	2.7	18.8	0.15	0.25	0.22	53.2

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 (Akcelik M3D).

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

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## Site: 101 [NRT Existing PM+ 10yr Gr+ S2- Wallgrove/ Kosovich]

Site Category: (None) Giveway / Yield (Two-Way)

Move	ement	Performa	ance	- Vehi	cles									
Mov ID	Turn	Turn Demand Flows Arrival Flows		Flows	Deg. Satn	Average Delay	Level of Service	95% Back Queue	of	Prop. Queued	Effective Stop	Aver. No.	Averag e	
		Total veh/h	HV %	Total veh/h	HV %	v/c	sec		Vehicles Dist veh	tance m		Rate	Cycles	Speed km/h
South	n: Wallę	grove Road	l (S)											
1	L2	165	0.0	165	0.0	0.296	5.6	LOS A	0.0	0.0	0.00	0.18	0.00	56.7
2	T1	381	9.0	381	9.0	0.296	0.0	LOS A	0.0	0.0	0.00	0.18	0.00	56.6
Appro	bach	546	6.3	546	6.3	0.296	1.7	NA	0.0	0.0	0.00	0.18	0.00	56.7
North	: Wallg	prove Road	(N)											
8	T1	1180	7.0	1180	7.0	0.638	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.7
9	R2	110	0.0	110	0.0	0.110	7.9	LOS A	0.5	3.2	0.55	0.74	0.55	46.9
Appro	bach	1290	6.4	1290	6.4	0.638	0.7	NA	0.5	3.2	0.05	0.06	0.05	58.3
West	Kosov	vich Place (	(E)											
10	L2	309	0.0	309	0.0	0.275	6.3	LOS A	1.2	8.5	0.48	0.68	0.48	42.5
Appro	bach	309	0.0	309	0.0	0.275	6.3	LOS A	1.2	8.5	0.48	0.68	0.48	42.5
All Ve	hicles	2145	5.4	2145	5.4	0.638	1.8	NA	1.2	8.5	0.10	0.18	0.10	55.4

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.

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Site: 101 [FU AM- Wallgrove/ Villiers - 10Y Growth + S2]

New Site Site Category: (None) Roundabout

Mov	Movement Performance - Vehicles													
Mov ID	Turn	Demand Flows Arrival Flows		Flows	Deg. Satn	Average Delay	Average Level of Delay Service		95% Back of Queue		Prop. Effective Queued Stop		Aver. Averag No. e	
		Total	ΗV	Total	ΗV				Vehicles [	Distance		Rate	Cycles S	Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Wallgrove Road (S)														
2	T1	1015	6.0	1015	6.0	0.673	4.1	LOS A	0.0	0.0	0.00	0.48	0.00	53.4
3u	U	163	0.0	163	0.0	0.673	10.7	LOS A	0.0	0.0	0.00	0.48	0.00	37.0
Appro	bach	1178	5.2	1178	5.2	0.673	5.0	LOS A	0.0	0.0	0.00	0.48	0.00	52.7
North	: Wallg	rove Road	1 (N)											
8	T1	514	12.0	514	12.0	0.419	5.4	LOS A	2.8	21.3	0.42	0.50	0.42	49.7
Appro	bach	514	12.0	514	12.0	0.419	5.4	LOS A	2.8	21.3	0.42	0.50	0.42	49.7
All Ve	hicles	1692	7.2	1692	7.2	0.673	5.1	LOS A	2.8	21.3	0.13	0.48	0.13	51.8

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.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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

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

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Site: 101 [FU PM- Wallgrove/ Villiers - 10Y Growth + S2]

New Site Site Category: (None) Roundabout

Move	Movement Performance - Vehicles													
Mov ID	Turn	Demand Flows Arrival Flows		Flows	Deg. Satn	Average Delay	verage Level of Delay Service		95% Back of Queue		Prop. Effective Queued Stop		Aver. Averag No. e	
		Total	ΗV	Total	ΗV				Vehicles I	Distance		Rate	Cycles S	Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South	South: Wallgrove Road (S)													
2	T1	475	0.0	475	0.0	0.385	4.1	LOS A	0.0	0.0	0.00	0.55	0.00	52.4
3u	U	215	0.0	215	0.0	0.385	10.7	LOS A	0.0	0.0	0.00	0.55	0.00	34.9
Appro	bach	690	0.0	690	0.0	0.385	6.2	LOS A	0.0	0.0	0.00	0.55	0.00	50.1
North	: Wallg	rove Road	(N)											
8	T1	1180	0.0	1180	0.0	0.912	12.9	LOS A	22.9	160.3	1.00	0.88	1.30	42.7
Appro	bach	1180	0.0	1180	0.0	0.912	12.9	LOS A	22.9	160.3	1.00	0.88	1.30	42.7
All Ve	hicles	1870	0.0	1870	0.0	0.912	10.4	LOS A	22.9	160.3	0.63	0.76	0.82	45.0

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.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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

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

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ANNEXURE B: PRE-DA MEETING MINUTES (3 SHEETS)



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#### RMS AND TFNSW CONSULTATION MEETING MINUTES STATE SIGNIFICANT DEVELOPMENT (SSD) 9210 PROPOSED SAINTS PETER AND PAUL CHRISTIAN PRIMARY SCHOOL 17-19 KOSOVICH PLACE, CECIL PARK (LOT 2320 & 2321 DP 1223137)

Meeting Date: 12 April 2018 Meeting Location: Transport for NSW Offices Meeting Attendees:

- PMDL: Tim Williams
- McLaren Traffic: Tom Heal
- RMS: Robert Rutledge
- TfNSW: Ken Ho, Kiavash Seiar

#### **Summary of Meeting Proceedings:**

- The meeting focused on initial considerations based on review of the preliminary Masterplan.
- Bus access is limited; Kosovich Place is a cul-de-sac and the turning head will need to be assessed by swept path analysis to confirm whether it can accommodate a bus completing a u-turn.
- Kosovich Place appears to be narrow; the width will need to be reviewed to confirm if it can accommodate the two-way movement of buses and parked cars (associated with pick-up/set-down). Alternatively, the road should be reviewed to confirm whether it can accommodate bus services and pick-up/set-down operations in another way.
- It was considered that there may potentially be an issue with safety and/or capacity at the intersection of Kosovich Place and Wallgrove Road, particularly associated with the right-turn movement out of Kosovich Place.
- Any scope for an off-street pick-up/drop-off zone should be considered.
- Bus services and routes should be discussed with the operator.
- Traffic generation and parking demand should be based on surveys of the existing St Narsai school.
- The traffic assessment should include modelling of the three (3) intersections of:
  - Kosovich Place/Wallgrove Road;
  - Wallgrove Road/Elizabeth Drive;
  - Wallgrove Road/Horsley Drive.
- RMS will provide details on future traffic growth to assist with modelling.
- RMS will consider intersection upgrade proposals when submitted along with results of modelling.
- Council should provide guidance on Kosovich Place cross-section and parking signage.
- RMS & TfNSW are not concerned with parking/queueing in the street; this is a Council/DPE matter.





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#### RMS AND TFNSW CONSULTATION MEETING MINUTES STATE SIGNIFICANT DEVELOPMENT (SSD) 9210 PROPOSED SAINTS PETER AND PAUL CHRISTIAN PRIMARY SCHOOL 17-19 KOSOVICH PLACE, CECIL PARK (LOT 2320 & 2321 DP 1223137)

Meeting Time and Date: 1pm, 23 July 2018 Meeting Location: Transport for NSW Offices Meeting Attendees:

- PMDL: Tim Williams
- McLaren Traffic: Tom Heal
- Willowtree Planning: Rachel Streeter
- RMS: Robert Rutledge, David Ballm, Mark Carruthers
- TfNSW: Ken Ho

#### Summary of Meeting Proceedings:

- The proposed 25m right-turn lane from Wallgrove Road to Kosovich Place is not supported by RMS, on the following basis:
  - Proximity of the intersection to the existing roundabout (Wallgrove Road and Villers Road), resulting in safety concerns. The proposed 25m length of the right-turn lane does not comply with Australian Standards as applicable to deceleration lanes on a State road with an 80km/h speed limit. These safety concerns persisted despite the following being clarified by the Project Traffic Engineer:
    - SIDRA Modelling demonstrates that the 25m right-turn lane would provide adequate storage for queued cars.
    - Owing to the proximity of the roundabout, traffic would be travelling at speeds much lower than 80km/h.
    - The current volume of traffic carried by Wallgrove Road was clarified to be much lower than the figures initially quoted by RMS. Current volumes are estimated at 838 northbound vehicles in the AM peak hours and 987 southbound vehicles in the PM peak hour.
  - Impact on Wallgrove Road.
- An alternative access option that was considered was a roundabout at the intersection of Wallgrove Road/Kosovich Place. The following matters were discussed:
  - A new roundabout would be in very close proximity/too close to the existing roundabout (Wallgrove Road and Villers Road).
  - This spatial proximity would impact on the operation of Wallgrove Road, with those impacts
    potentially being too great in light of the benefit relating to one (1) school only.
  - Land ownership would also form a key consideration, in light of the motorway road reserve being privately owned by Transurban. The amount of public land available within the road reserve and agreements/costs associated with using private-owned land would need to be considered upfront in association with any proposal involving a roundabout and/or realignment of Walgrove Road. The road reserve also comprises a short embankment/gabion wall and drainage infrastructure.



- If the land ownership issue could be resolved and this option was to be further pursued, RMS
  requested that a Concept Plan be provided for their initial review prior to any significant
  expenditure being made in relation to this option.
- Subject to the outcome of this initial review, RMS would then need to be provided with a Road Safety Audit and SIDRA modelling.
- Other options discussed focused on land to the west of Wallgrove Road:
  - It was noted that there is a wider tract of public land located to the west of Wallgrove Road (the use of which would avoid land ownership issues).
  - The ideal solution would be to build a new road extending from the existing roundabout and connecting at a point further west along Kosovich Place. This option is however generally precluded owing to the creek line.
  - The creation of a new intersection and road further south along Wallgrove Road (generally corresponding with the driveway linking 11-13 Kosovich Place to Wallgrove Road) could offer a solution. With respect to this option, the following was discussed:
    - The further the intersection was from the existing roundabout, the less problems.
    - A sufficiently-long right-turn deceleration lane could be provided.
    - It may be relevant to discuss with Western Sydney Parklands the option of developing such an intersection on part of their land. This could dually provide access to their future 'business use' on the site and resolve land ownership issues related to developing a new intersection. Whilst the creation of a new intersection/roundabout would impact on Wallgrove Road, RMS indicated they would most likely be supportive of such an option (their primary concern is safety, above general impacts on Walllgrove Road).
    - A Condition of Consent would require the new road to be a gazetted road (rather than an access road). This would allow for all 'school zones' to be located along the gazetted road rather than on Wallgrove Road. RMS' preference would be for school zones not to be located on Wallgrove Road given the impact this would cause to the operation of Wallgrove Road.
- For any option pursued, RMS indicated that a Concept Plan may be submitted for their preliminary review and advice, after which stage (and subject to their support), SIDRA modelling and a Road Safety Audit would be required.
- A Voluntary Planning Agreement (VPA) would not be required to be entered into with RMS to carry out the upgrade works. A Works Access Deed would form a condition of DA consent. RMS' preferred model for infrastructure upgrades is now 'third party delivery'.
- In relation to the intersection of Wallgrove Road/Elizabeth Drive, the following was discussed:
  - RMS noted that the proposed appeared to represent 'standard treatment' that would generally be supported.
  - The upgrade works would form a Condition of Consent, to be 'triggered' by a particular stage of the development or student numbers. The Project Team noted that the need for the upgrade works would be triggered when the capacity of the school reached 450-630 students, which would correspond with the final classroom stage of the masterplan.
- Further to the work carried out with the local bus operator (Transit Systems), RMS request that swept paths for buses in the Kosovich Place cul-de-sac are submitted with the DA.
- With respect to planned upgrades potentially affecting the site, RMS identified that a network plan for Wallgrove Road had not yet been developed, provision existed for the motorway to be expanded by one (1) more lane, and, as the M12 had not yet been announced, it would be at least five (5) years prior to it being delivered.
- RMS informed the Project Team that, once lodged, the DA would be assessed by a different team; the Western Precinct team. Prior to the meeting today, RMS had engaged in phone discussions with the West Precinct team.

