

APPENDIX 12

Traffic response to Penrith City Council's Memorandum (GHD, July 2017)



12th July 2017

Joe Bevacqua
Development Manager
CABE
P.O. Box 6924
Baulkham Hills, NSW, 2153

Dear Joe

ESQ1818 – Mixed Use Development Response to Penrith City Council's Memorandum

GHD Pty Ltd (GHD) has been engaged by ESQ1818 Pty Ltd to undertake transport planning and traffic engineering services for the ESQ1818 at Panthers (ESQ – 1818) development located on Lots 2, 3a and 3b at Penrith Panthers, at 123 Mulgoa Road, Penrith.

The previous reports and statements prepared by GHD for this development include:

- A Masterplan Transport Strategy which comprised a parking and transport strategy for the entire Panthers Precinct, including Lots 2, 3a and 3b (*Panthers Precinct Master Plan – Transport Strategy* referred to henceforth as the *Transport Strategy*) – July 2014.
- A Traffic Impact Statement, (referred to henceforth as the TIA) which provided a comparison of the traffic impacts of the updated land uses associated with the proposed ESQ1818 Development (for Lots 2, 3a and 3b) and the previously approved land uses (as contained in the *Transport Strategy*) – March 2016.
- A Traffic Statement that analysed the changes in traffic impacts associated with the removal of the internal Riverlink Road, which was previously proposed to run in a north-south direction through the ESQ1818 at Panthers Development – July 2016.

In response to the above studies, Penrith City Council issued a memorandum (18th November 2016) requesting additional information/clarification on the traffic/transport impacts of the proposed development. This letter has been prepared to respond to the comments included in the memorandum.

Council's memo is included in Attachment A.

Issue 1 – Trip Generation Comparison

Council has requested that for lots 2, 3a and 3b a comparison of trip generation be undertaken in accordance with the following:

- The latest proposed land uses (as detailed in the TIA)
- The land use in the previously approved master plan
- The and uses detailed in the *Report for Panthers Penrith Planning Proposal Traffic Management Works and Apportionment Plan 7 February 2012 (GHD 2012 - for Road Works VPA) report*.

Table 1 compares the proposed updated land uses/trip generation for Lots 2, 3a and 3b with the previously approved master plan.

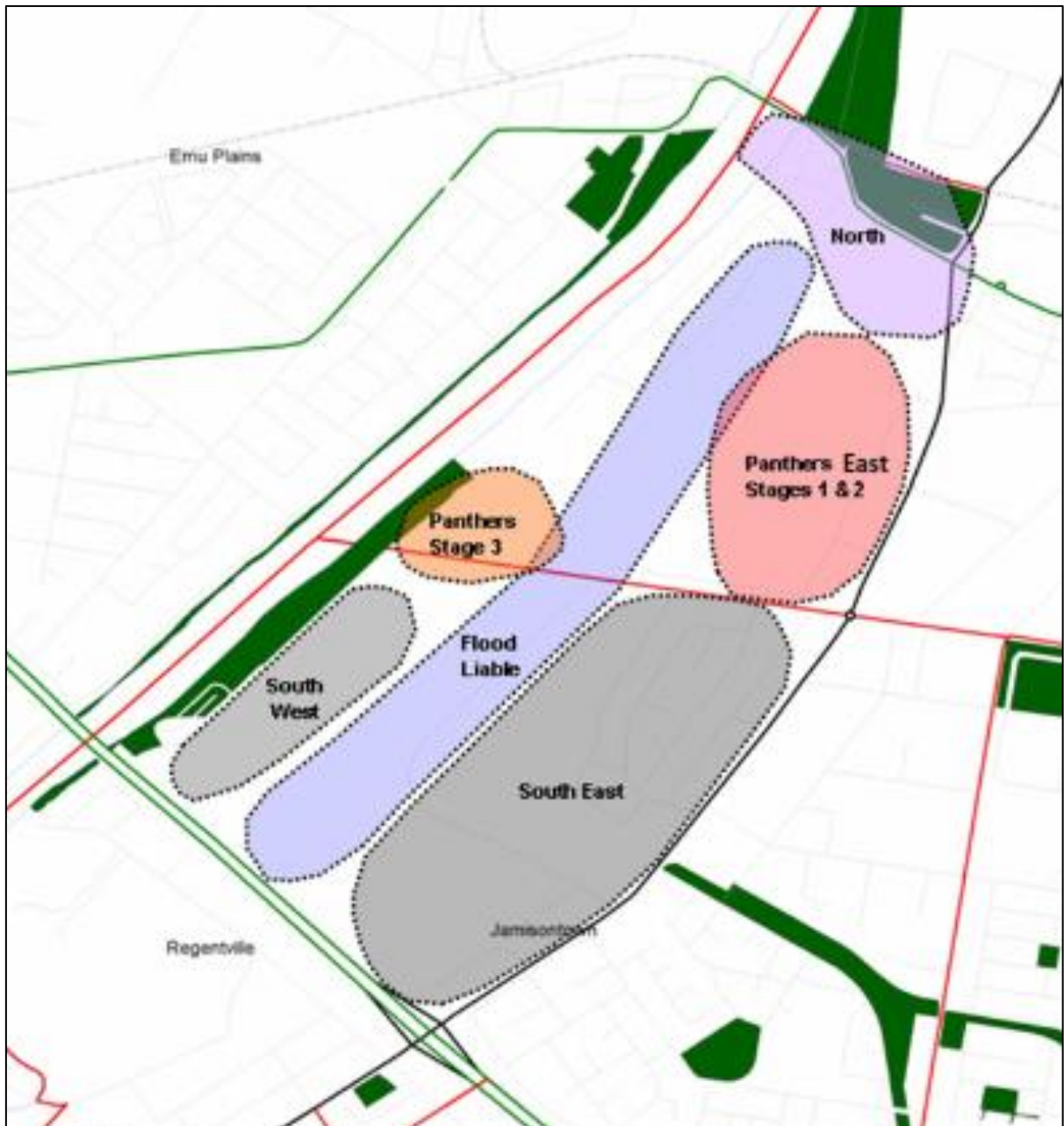
Table 1 –Land Use and Trip Generation Comparison

Lot	Stage	Land use	No. units (GFA (m ²))	Panthers Masterplan Trip Generation Rate	Trip Generation (PM peak hour)	Panthers Masterplan Approval Comparison	Approved Trip Generation (PM peak hour)
3A + 3B	1	Residential (165 units)	165	0.5	82	Residential (89 dwellings) and Hotel (200 rooms)	145
2	2	Residential (70 units)	70	0.5	35	Retail Outlet Centre 25,000 GFA and Retail 2,500 GFA	544
	3	Residential (373 units)	373	0.5	187		
	2	Retail (Speciality shops)	1,251 (939 GLFA)	0.02	19		
	3	Retail (Restaurant)	2,053	0.05 (RMS Guide rate per GFA)	103		
	4	Residential (111 units)	111	0.5	56		
	5	Residential (140 units)	140	0.5	70		
Total					551		689

The amended land uses are expected to generate 138 fewer peak hour trips when compared to the previously approved master plan. This is primarily due to the removal of the retail outlet centre from the master plan.

The proposed “Riverlink Sub-Precinct” as detailed in the Report for *Panthers Penrith Planning Proposal Traffic Management Works and Apportionment Plan 7 February 2012* (referred hence forth as the *Appointment Plan*), is shown in Table 1. Lots 2, 3a and 3b form **part of** the area designated as “Panthers East Stages 1 and 2”.

Figure 1 – Proposed Riverlink Sub Precincts



Source: Penrith Panthers Planning Proposal – Traffic Management Works and Appointment Plan

The land uses and associated (2031) trip generation associated with “Panthers East Stages 1 and 2” are shown in Table 2.

Table 2 – 2031 Land Use and trip Generation (Appointment Plan)

Stage	GFA (m ²)	Outbound Trips	Inbound Trips
Stage 1			
New hotel	19,800 (250 rooms)	100	25
Cinema and bowling	8,500	40	10
General retail	5,000	72	18
Outlet Retail	25,000	400	100
Restaurants	3,000	80	20
Commercial suites	6,000	72	18
Senior Living	25,000 (125 rooms)	36	9
Total		800	200
Stage 2			
Commercial suites	6,000	48	12
Senior Living	25,000 (125 rooms)	36	9
Business park	20,000	24	6
Residential	15,000 (90 units)	7	29
Aquatic health and well-being	4,000	60	15
General retail	4,500	65	16
Total		240	87

Source: Traffic Management Works and Appointment Plan

A comparison of Table 2 and the original Panthers Master Plan for Lots 2, 3a and 3b (Table 1) indicates the following:

- The 25,000 m² retail outlet centre is included in both land use schedules
- The Appointment Plan (Stage 2) specifies 90 residential units and the master plan 89 residential units
- The Appointment Plan (Stage 1) specifies 5,000 m² retail and the master plan 2,500 m² retail
- The Appointment Plan (Stage 1) specifies 250 hotel rooms and the master plan 200 rooms.

The land uses (and associated trip generation) detailed in the Appointment Plan have been scaled to correspond with land uses for the previously approved master plan, as displayed below in Table 3.

Table 3 – Original and Scaled (Appointment Plan) Land Use and Trip Generation (1 hour PM Peak)

Land Use	Original Land Use		Scaled Land Use	
	Unit	Trip Generation	Unit	Trip Generation
Convention Centre	25,000 m2	500	25,000 m2	500
Residential	90 units	36	89 units	36
General Retail	5,000 m2	90	2,500 m2	45
Hotel Rooms	250 rooms	125	200 rooms	100
Total		751		681

Table 3 indicates that for the scaled land use data (based upon the information contained in the Appointment Plan) that by 2031 Lots 2, 3a and 3b are expected to generate 681 trips.

The trip generation for the previous master plan (as displayed in Table 1) indicates that by 2031 Lots 2, 3a and 3b are expected to generate 689 trips.

Thus, the trip generation characteristics of the previously approved master plan and Appointment Plan are consistent with each other.

Issue 2 – Clarification of Background Data

Council has requested clarification if the background traffic used in the 2031 analysis comprises the overall development for the Panthers site, including all planned and approved developments.

It is noted that the 2031 horizon year analysis represents all the approved and planned developments as well as the background growth.

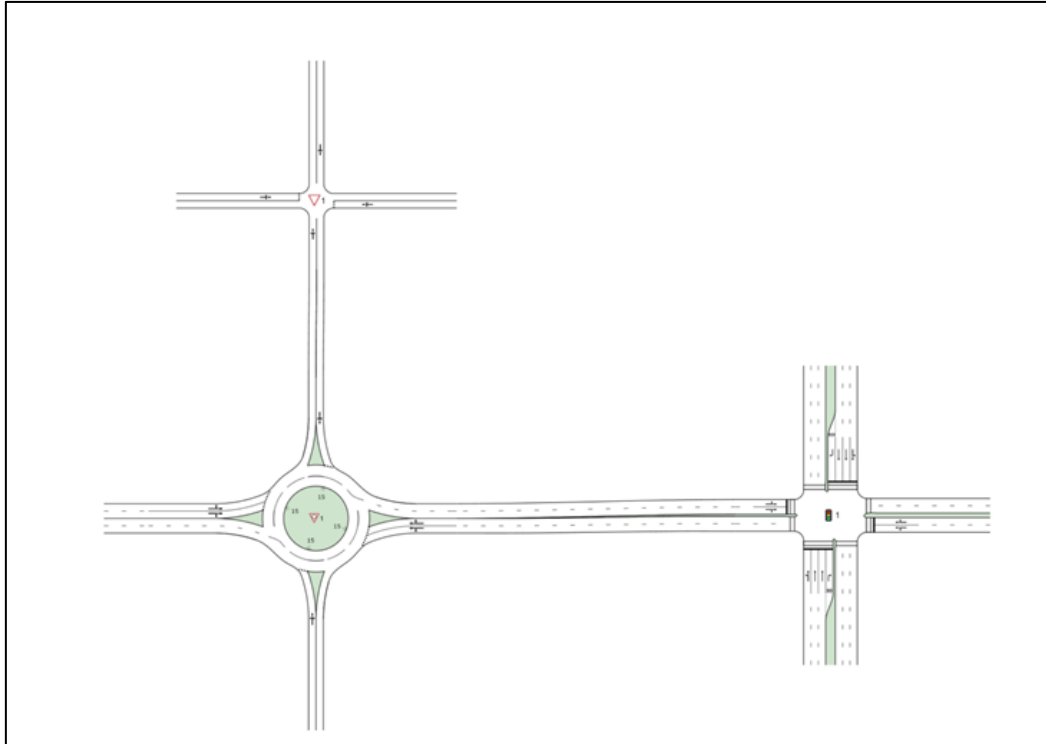
As detailed in the Traffic Statement, in order to identify the expected 2031 horizon year background traffic volumes an annual growth rate of (approximately) 1.5% was applied to the existing traffic volumes. This is considered conservative as survey data on the road network in proximity to the subject site indicate that traffic volumes have typically decreased between 2011 and 2015/2016.

Issue 3 – Network Operation

Council has requested that the intersection of Mulgoa Road, Ransley Street and Retreat Drive be modelled together.

Due to their proximity, the intersections of the Mulgoa Road/Ransley Street/Retreat Drive, the Retreat Drive Roundabout and the intersection formed by Retreat Drive and the Lot 2, 3A and 3B access roads were modelled using SIDRA Network (see Figure 5 of the Traffic Statement) as shown in Figure 2.

Figure 2 – SIDRA Network Intersection Layouts (2031 base)



The intersections were modelled as a network which includes spillback queuing and delays within the analysis. The modelling showed that that the Mulgoa Road/Ransley Street/Retreat Drive intersection and the Retreat Drive Roundabout are expected to operate acceptably in the 2031 horizon year. The modelling also suggested that queues on the northern leg of the roundabout may affect the performance of the Lot 2, 3A and 3B access intersection.

Issue 4 – Additional Intersection Analysis

Council has requested that the following additional scenarios be assessed using SIDRA for the 2031 horizon year of analysis.

- Widening Retreat Drive to provide an additional lane between Mulgoa Road and Retreat Drive Roundabout to provide adequate capacity.
- Road widening, additional lanes and traffic signal improvements at the intersection of Retreat Drive / Mulgoa Road / Ransley Street
- Replacing the Retreat Drive Roundabout with a traffic signalised intersection

Roads and Maritime Guidelines indicate that for safety reasons, traffic signals should be at least 200 m apart. Due to the proximity of the Mulgoa Road/Ransley Street/Retreat Drive intersection and the Retreat Drive Roundabout, traffic signal performance has not been tested for a paired set of traffic signals.

In order to address this query from Council, additional Sidra (network) analysis has been undertaken for the Mulgoa Road/Ransley Street/Retreat Drive intersection, the Retreat Drive Roundabout and the intersection formed by Retreat Drive and the Lot 2, 3A and 3B access roads for the following scenarios:

- Option 1 - Provision of a 40 m left turn slip lane on Retreat Drive at its intersection with Mulgoa Road (Figure 3).
- Option 2 - Provision of a 40 m right turn lane on Retreat Drive at its intersection with Mulgoa Road (Figure 4).
- Option 3 - -Provision of a 40 m left and through lane on Retreat Drive at its intersection with Mulgoa Road (Figure 5).

The proposed layouts are based on the provision of an additional approach and departure lane on Mulgoa Road, which is consistent with the Schedule 3 of the 2012 VPA.

Figure 3 - Option 1 Intersection Layout

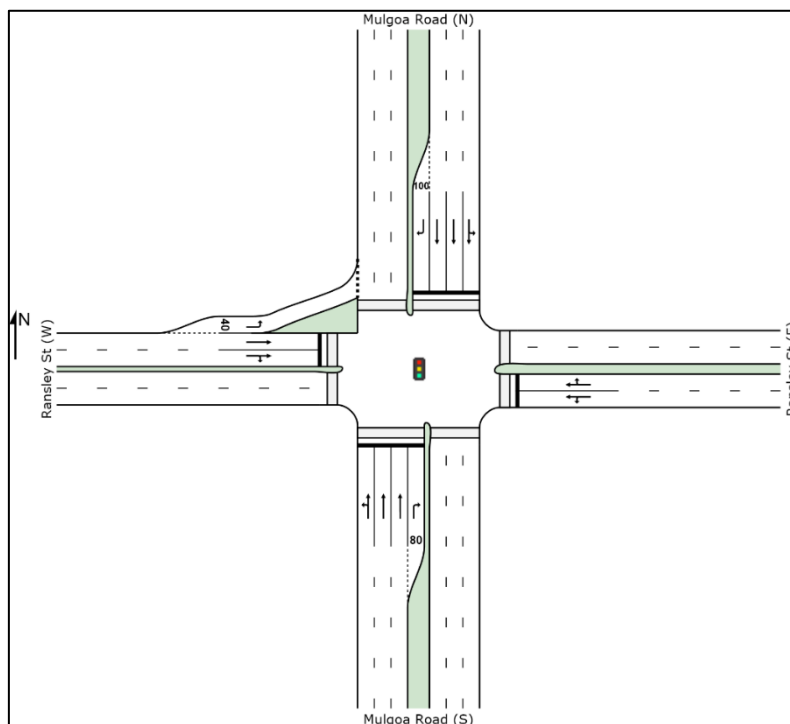


Figure 4 – Option 2 Intersection Layout

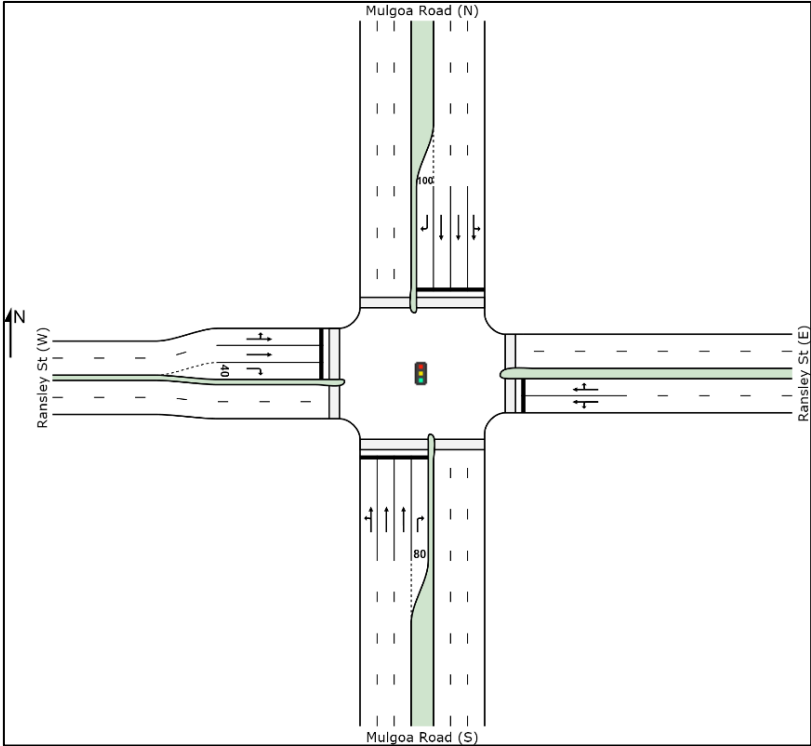
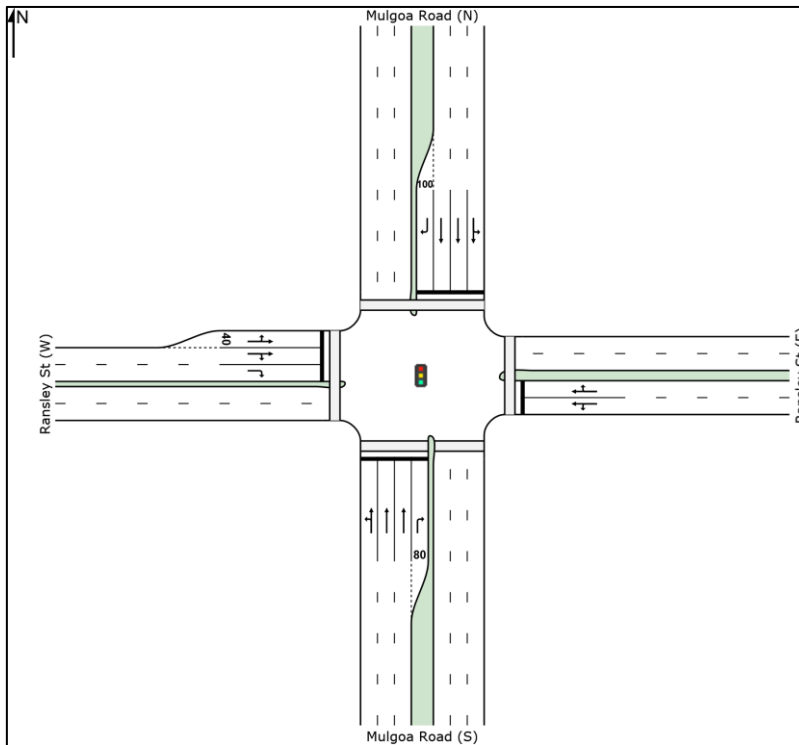


Figure 5 – Option 3 Intersection Layout



The proposed upgrades in Option 3 provides additional lane capacity for the right turn movements from Retreat Drive onto Mulgoa Road (a right turn lane and through/right turn lane) compared to the other options.

The 2031 SIDRA (network) PM peak hour analysis for the road upgrade options was undertaken using with the following assumptions:

- The same phase sequence and phase timings at the Mulgoa Road/Ransley Street/Retreat Drive intersection have been used for all upgrade options.
- In accordance with the typical operation of major roads, it is expected that the Mulgoa Road/Ransley Street/Retreat Drive intersection is coordinated with upstream and downstream signalised intersections.. As, Mulgoa Road is a major road more green time will be allocated to the through movement, than to the intersecting roads. Accordingly, the signal timings / phase timings to provide additional green time to Ransley Street and Retreat Drive have not been changed.
- The analysis year was 2031 without the Riverlink Road.
- The traffic volumes associated with the retail and restaurant components of the proposed development have been distributed to include the provision of a one-way loop road in accordance with the latest master plan.

- The 20 m short left turn lane on the northern leg of Retreat Drive (at the roundabout) previously identified as a mitigation measure (in the Traffic Statement issued in July 2016) was not included in the analysis.

The results if the SIDRA analysis are shown in Table 4.

Table 4 – SIDRA Network Analysis

Option	Intersection	AM Peak		PM Peak	
		Delay (s)	LoS	Delay (s)	LoS
Original Proposed Layout	Lot 2 and Lot 3 Access Intersection	7	A	243	F
	Retreat Drive Roundabout	11	B	30	C
	Mulgoa Road / Ransley St Intersection	19	B	53	D
Option 1	Lot 2 and Lot 3 Access Intersection	7	A	7	A
	Retreat Drive Roundabout	11	B	26	C
	Mulgoa Road / Ransley St Intersection	21	B	52	D
Option 2	Lot 2 and Lot 3 Access Intersection	7	A	7	A
	Retreat Drive Roundabout	11	B	34	C
	Mulgoa Road / Ransley St Intersection	22	B	53	D
Option 3	Lot 2 and Lot 3 Access Intersection	7	A	7	A
	Retreat Drive Roundabout	11	B	11	B
	Mulgoa Road / Ransley St Intersection	24	B	54	D

Table 4 shows that:

- For each option, during the morning and evening peak hours only minor changes are observed in the performance of the Mulgoa Road/Ransley Street/Retreat Drive intersections.
- During the evening peak hour, the performance of Lot 2 and Lot 3 access intersection is improved (Los F to LOS A) under all three intersection options. All three options provide better queue storage capacity on Retreat Drive at its intersection with Mulgoa Road/Ransley Street

meaning queues on the Retreat Drive Roundabout (northern leg) do not extend back to the Lot 2 and Lot 3 Access Intersection.

- The performance of the Mulgoa Road/Ransley Street/Retreat Drive intersection is marginally worse during the morning peak hour (delay increases from 19 seconds to 24 seconds, but the LOS remains the same at B). This is because under Option 3, the kerbside full length on Retreat Drive has been converted to a short 40 m lane, reducing the storage capacity of the through and the left turning vehicles.
- In the evening peak hour, Option 3 provides the best level of service for the Retreat Drive Roundabout (LOS B).

Additional analysis has been undertaken to assess the 95th percentile peak queue lengths on Retreat Drive at its intersection with Mulgoa Road and the potential impact on the Retreat Drive Roundabout as shown in Table 5.

Table 5 – 95th Percentile Queue Lengths on Retreat Drive (from Mulgoa Road)

Option	AM Peak		PM Peak	
	Length (m)	Impact on roundabout	Length (m)	Impact on roundabout
Original Proposed Layout	79	N	132	Y
Option 1	45	N	132	Y
Option 2	48	N	148	Y
Option 3	77	N	103	Y

Table 5 indicates that in the AM Peak:

- All three options provide an improved queue storage capacity as compared to the original proposed layout, reducing queue lengths

While for the PM Peak the following is noted:

- The right turn traffic is higher when compared to the left and the through movements on Retreat Drive.
- In Option 1 the queue length on Retreat Drive are the same as the original layout.
- In Option 2 the queues on the right turn lane on Retreat Drive approach spill into the adjacent lane, reducing the capacity of through movement and resulting in longer queues on Retreat Drive.
- Option 3 has the lowest queue lengths.

- Accordingly, the 2031 SIDRA analysis for all 3 options indicates that in the PM peak that occasionally eastbound queues on Retreat Drive at Mulgoa Road will extend beyond the Retreat Drive Roundabout, however Option 3 facilitates the shortest PM peak hour queues.

Issue 5 – Pedestrian Crossing on Retreat Drive

Council has noted that the marked pedestrian crossing on Retreat Drive between Mulgoa Road and the Retreat Drive Roundabout is not in accordance with RMS Guidelines.

Council's request that the pedestrian crossing on Retreat Drive should be removed is noted.

Issue 6 – VPA Triggers

Council has requested clarification with respect to the “triggers events” for the road works detailed in the Planning Works Agreement (28th November 2012).

The road works associated with the proposed ESQ 1818 Development are as follows:

- Item 4 – Mulgoa Road/Panther Place
- Item 5 – Mulgoa Road/Ransley Street Intersection

For both of these items the main trigger event is:

The grant of a Construction Certificated in respect to the Outlet Centre.

As detailed in Table 1 it is no longer proposed to construct the outlet centre.

The alternative trigger is:

The grant of a Construction Certificate in respect of the Stage 1 Development which has the effect that the Construction Certificates have been granted for more than 58,730 m² of GFA for Stage 1 Development on the land calculated on a cumulative basis”.

The overall GFA for ESQ1818 Development is expected to be 80,400 m² and thus is expected to trigger some of the road upgrades specified in the VPA.

Issue 7 – Trip Distribution

Council has requested clarification with respect to 27% of trips generated by the proposed development that were previously distributed onto the Great Western Highway/High Street via Riverlink Road.

The removal of the Riverlink Road will result in amended internal and external trip distribution patterns. The forecast trip distribution with and without the Riverlink Road are shown in Figure 6 and Figure 7 respectively.

Figure 6 – Trip Distribution with Riverlink Road

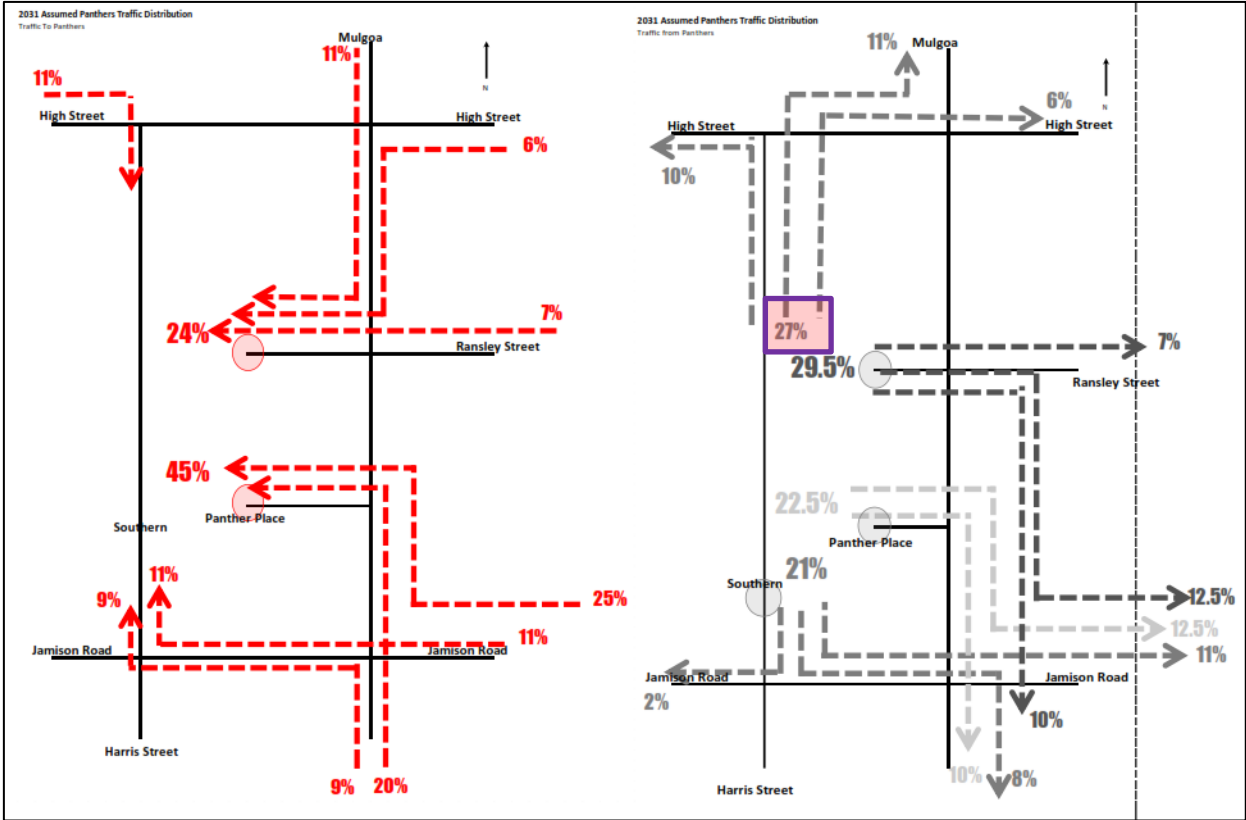
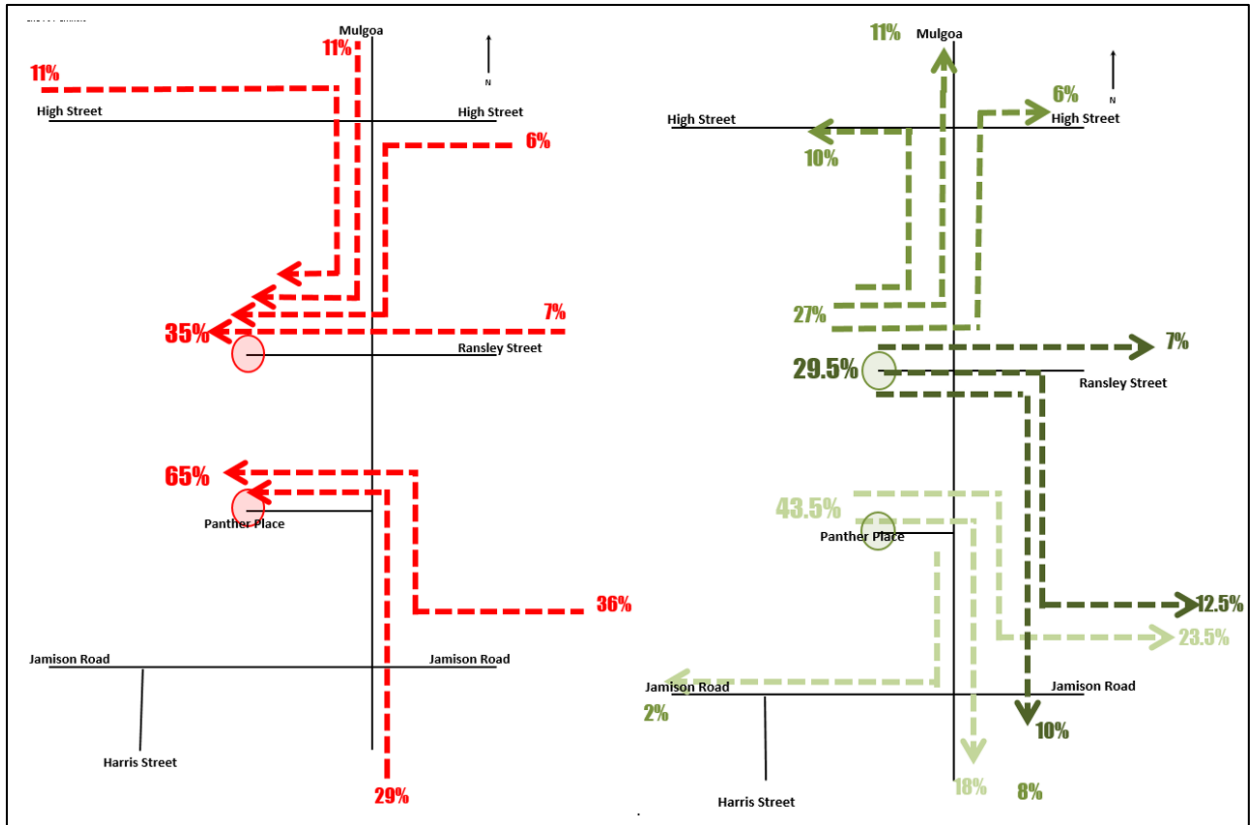


Figure 7 – Trip Distribution without Riverlink Road



The distribution of traffic without the Riverlink Road has been modified so that 27% of trips travel exit the development directly onto Mulgoa Road.

In response to an additional query made by Council, we note that the trip distribution patterns in Figure 7 were applied to all the trips generated by the ESQ1818 Development, not just the trips associated with the updated Lot 2, 3A and 3B land uses.

Issue 8 – Road Widths

Council has requested that road internal widths be provided to enable a parking and traffic lane in either direction.

This not a matter within GHD's scope of works.

I trust this is of assistance, please call if you have any comments or questions.

Regards,

Mark Lucas

Principal Transport Planner

Attachment A



MEMORANDUM

FILE: ESQ 1818 – Mixed Use Development

TO: Joel Carson

FROM: Mark Cremona

DATE: 18 November 2016

SUBJECT: Engineering Services Advice – GHD Traffic Impact Assessment

Engineering advice provided in this memorandum has been compiled by Transportation Planning section, Traffic Engineering and Development Engineering.

Preface

The purpose of this exercise, as we understand, was to update the Panthers Traffic Modelling that was previously prepared, namely Report for Panthers Penrith Planning Proposal Traffic Management Works and Apportionment Plan 7 February 2012 (GHD 2012 - for Road Works VPA)" report, which was the underpinning of the Panthers/RMS/Council VPA. Importantly this was to account for the changes between DFO and ESQ 1818 Mixed Use Development, removal of the north/south link and other changes.

Comments

Transportation Planning Section and Traffic Engineering Section have reviewed the Traffic Impact Statement (TIS) dated 19 July 2016 from GHD consultant in regards to ESQ 1818 Mixed Use Development by Panthers Pty Ltd and provide the following comments:

The TIS Table 4 shows the predicted landuse and trips generated by Lots 2, 3a and 3b. Council request that the TIS Table 4 include a comparison with the previous landuse and trips generation for this site from the "Report for Panthers Penrith Planning Proposal Traffic Management Works and Apportionment Plan 7 February 2012 (GHD 2012 - for Road Works VPA)"report. This would provide Council certainty with regard to the range of different trips generated between the different land-uses.

Council request that the TIS report include a summary of the proposed land uses and evening peak trips for ultimate development of the Panthers site with the current Master Plan. In addition to this, a summary table to be included from the previous Panthers Precinct development traffic generation potential based upon GHD 2012 -for Road Works VPA report. This comparison would provide certainty for Council with respect to land-use trips for the ultimate, overall development of the Panthers site including all planned and approved developments.

TIS report states on Section 4, "Additional analysis has been undertaken for the 2031 horizon year for the expected background traffic and the trips generated by Lots 2, 3a and 3b". Council request clarification as to whether the background traffic includes the ultimate, overall development of the Panthers site including all planned and approved developments.

TIS report 3rd bullet point below the Table 7 makes reference that "the Lot 2 and Lot 3 access intersection is expected to operate with a poor LOS during peak PM periods. Analysis of the SIDRA Network outputs indicates that the poor performance of the access intersection is due to eastbound queues on Retreat Drive spilling back from Mulgoa Road across the Retreat Drive Roundabout causing queues on the northern leg, which consequently inhibits the operation of the nearby priority controlled access intersection". This statement raises concern as it appears to conflict with the detail in Table 7 for the two intersections where it indicates LOS of D and C respectively. Council request that these two intersections be reassessed together, rather than as separate intersections. Also further assessment is requested to address Retreat Drive (north leg) PM queues extending across the proposed Retreat Drive / Lot 2 and Lot 3 intersection. The assessments show the impact of reassigning the traffic trips from the 2012 VPA based Panthers / Carpenter Site / Great Western Highway link road to Retreat Drive / Mulgoa Road which requires improvements. Improvement options requested to be assessed include:
Widening Retreat Drive to provide an additional lane between Mulgoa Road and Retreat Drive Roundabout to provide adequate capacity.
Road widening, additional lanes and traffic signal improvements at the intersection of Retreat Drive / Mulgoa Road / Ransley Street
Replacing the Retreat Drive Roundabout with a traffic signalised intersection

The existing marked pedestrian crossing across multiple traffic lanes in Retreat Drive between the roundabout and Mulgoa Road is not in accordance with current RMS guidelines should be removed from any proposal.

Appendix B, Schedule 3 of the TIS gives the road infrastructure triggers and it is noted that the values of GFA are different to the adopted VPA (Planning Agreement Road Works, 28 November 2012). The 2012 VPA was also based on a proposed link road from Panthers through the Carpenters Site to the Great Western Highway which accounted for 27% of traffic trips. Council request further discussion and clarification regarding the applicability of the proposal with the 2012 VPA. Any adjustments to the VPA will also require RMS involvement and approval prior to any rezoning approval. A review and update of the Panthers Masterplan and DCP may also be considered.

Suitable road widths for two way traffic and parking each side are requested at the proposed road through this development to allow a potential future link to Carpenters Site road to Great Western Highway.

Conclusion

The update of the traffic model is critical to:

Redefining the relevant aspects of the VPA including scope and triggers; and

Ensuring that adequate infrastructure is defined to support a significant development as proposed by the ESQ 1818 Mixed Use Development.

Regards

Mark Cremona

Senior Engineer - Major Developments