

APPENDIX 24

Services Infrastructure Assessment (JWP, August 2017)



Services Infrastructure Assessment

ESQ 1818
Mixed Use Development
Panthers North Precinct
Ransley Street, Penrith

ESQ 1818 PANTHERS PTY LTD

08 August, 2017

Document Control

Issue	Amendment	Author	Reviewer	Approved
A	First Issue	LG	SP	DJ
		18/02/2016	24/02/2016	02/03/2016
B	Second Issue	LG	SP	DC
		18/02/2016	11/03/2016	11/03/2016
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		18/02/2016	06/04/2016	06/04/2016
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		08/08/2017	08/08/2017	08/08/2017
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1 EXECUTIVE SUMMARY

J Wyndham Prince has been engaged by ESQ1818 Panthers Pty Ltd to undertake a high-level utilities capacity assessment for a proposed mixed used development within Panthers North Precinct. The investigation covers existing trunk infrastructure and potential servicing strategies to be delivered to the site.

ESQ1818 Panthers North Precinct is proposed to be developed into a mixed used development consisting of:

- 850 total apartments
- 3,304m² (GFA) retail floor
- 1,209 car spaces

The proposed site is a 6.6 Ha area of land being Lot 2, 3A & 3B located within Penrith City Council LGA as shown in Plate 1.1.

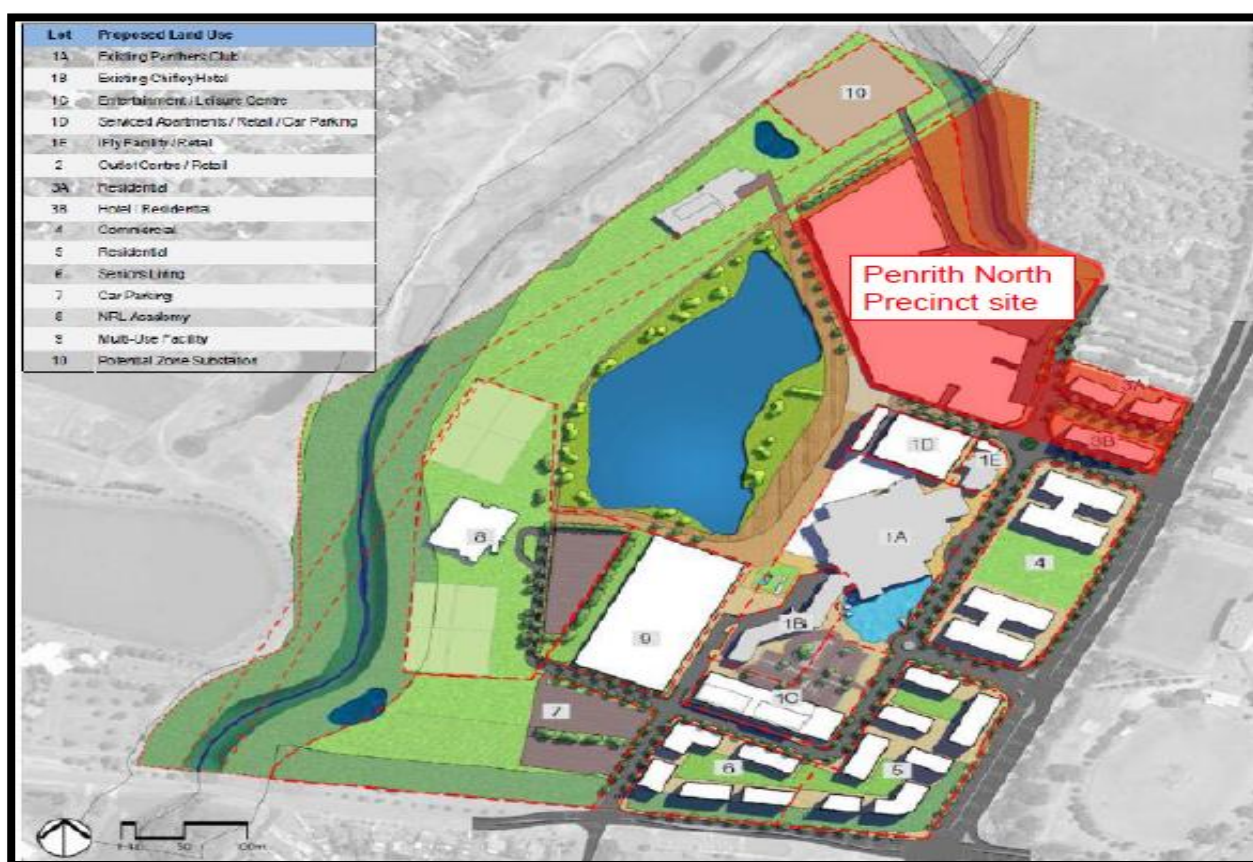


Plate 1.1 -Panthers Precinct Masterplan

J. Wyndham Prince have undertaken a general servicing location enquiry for all relevant services via Dial Before You Dig. Copies of services plans as a result of this investigation are attached in Appendix C of this report.

We also made contact with all relevant servicing authorities and submitted a feasibility application to obtain detail assessment on existing infrastructure and any new or augmentation works require in supplying the proposed development.

Available service capacity, infrastructure strategies and high-level costing advice received from the authorities have been gathered and detailed in the following sections.

2 DISCUSSION

2.1 Electrical

Dial Before You Dig information indicates existing HV underground electricity mains along Mulgoa Road. Attached in Appendix C.

There are also existing twin 132kV overhead feeders on steel towers, being feeders 222 and 238, within 100 feet wide easement. These feeders are located on the western side of the site. Refer Plate 2.1

There are restrictions relating to what activities can occur and what can be located within the easement. There is an Endeavour Energy document *Guideline for the Management of Activities within Electricity Easements and Close to Electricity Infrastructure* that can be referred to during planning and design stage to ensure that the developments comply with these restrictions and the safety of public and the reliability of electrical network are not compromised.



Plate 2.1 - Existing Twin 132kV Overhead Cables

We have lodged a feasibility assessment request with Endeavour Energy for ESQ1818 Panthers North Precinct Development, their letter of advice has been received on 17 February 2015, a copy is attached in Appendix B of this report and summarised below:

- The supply for this development will be sourced from Penrith ZS, via the existing 2 x 11kV feeders within Mulgoa Road, namely feeders PH1234 & PH1201. Refer Plate 2.2 for feeders' locations below.

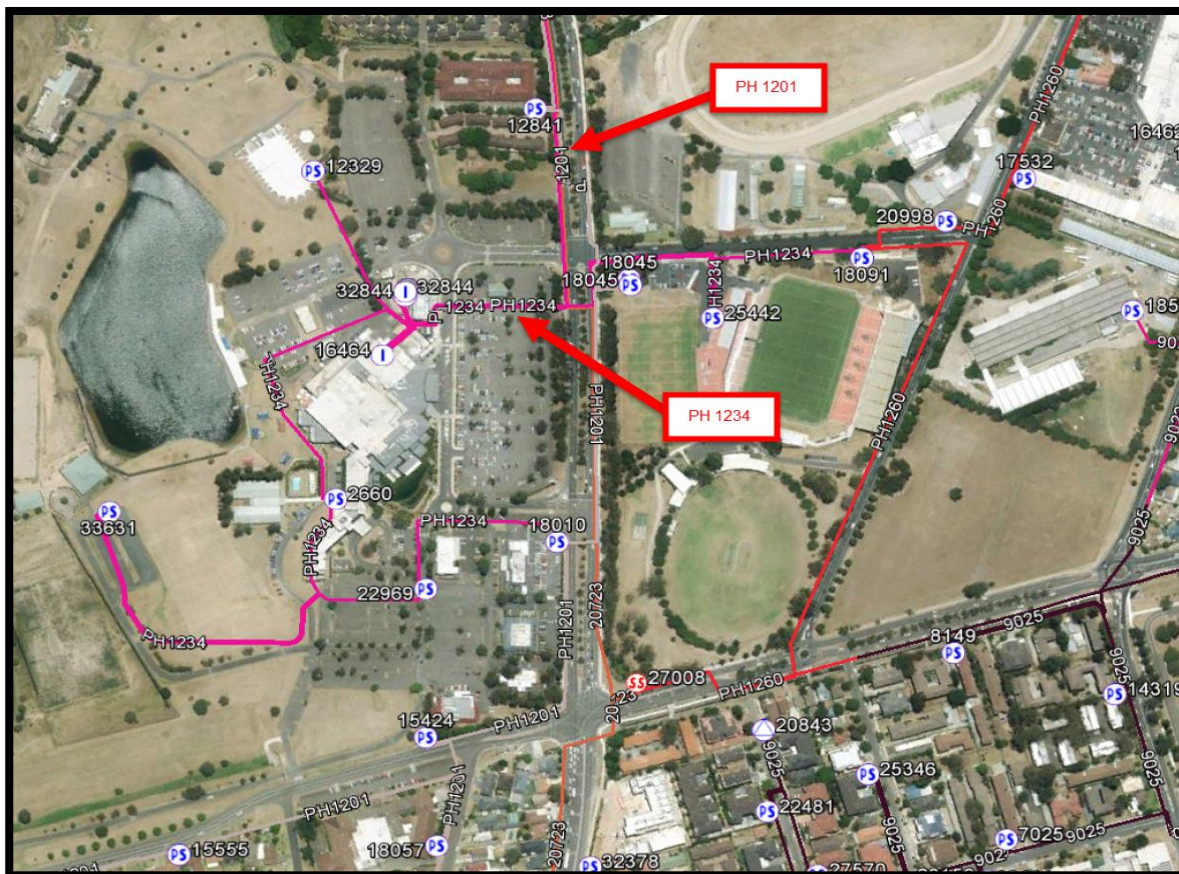


Plate 2.2 - Feeders Location

These feeders will need to be extended from Mulgoa Road to the development approximately 500m.

- The total required load of the development have been calculated to be in a range of 3-3.5 MVA
- The load will be supplied via multiple pad/indoor substations. These pad substations shall allow 24 hours access for Endeavour Energy for maintenance and servicing purposes.
- General advice from Endeavour Energy on the number of pad stations indicates that for the two smaller building blocks adjacent to Mulgoa Road might only need one shared pad substation with the remaining blocks of building requiring one pad substation each. Please note that this is a preliminary advice and needs to be confirmed by a Level 3 ASP during detail electrical design.
- The work is a developers' funded contestable work.

The cost estimate for extending 500 m electrical lead-in to the site is approximately \$250,000. For pad substations, assuming 8 will be needed, the costs is approximately \$400,000-\$500,000.

The information provided by Endeavour Energy and our high level costs were of general nature and will only be fully determined after an application is made to Endeavour Energy.

Recently, Council raised a question regarding establishing a new Zone Substation (ZS) possibly located within ESQ 1818 Panthers site from previous Endeavour Energy advice. Refer Jason Lu's email on 6/12/13 attached in Appendix B.

We seek further clarification from David Ho on this matter whether a ZS is still required within Panthers Site. Response has been received on 09/03/16 and summarised below:

- David Hos' advice on 17 February 2016 still stands. ESQ 1818 Panthers North Precinct electricity supply will be sourced from Penrith ZS, via the existing 2 x 11kV feeders within Mulgoa Road, namely feeders PH1234 & PH1201
- Endeavour Energy identified a need for new ZS that will be required by 2023 to supply the ultimate load to Riverlink, Panthers Penrith Precincts and surrounding developments. The acquisition of site for this new ZS will be 5 years prior to the need for ZS.
- Endeavour Energy would not acquire a site that is prone to flooding, the current reserved site for ZS on the Masterplan is subject to flooding therefore Endeavour would not agree to acquisition of this particular site.

2.2 Gas

Currently there is an existing high pressure (HP) 1050kPa and medium pressure 210 kPa network extending along Mulgoa Rd.

Discussions with Jemena suggest that a High Pressure main extension could be required from Mulgoa Rd through Ransley Street to supply a proposed 6m x 3m Regulatory Station, which in turn will supply the proposed site with Medium Pressure 210kpa delivery. The Regulatory Station is to be located within Ransley Street adjacent to the proposed development; the exact location is to be confirmed during detail design stage.

Jemena confirm that they will not provide infrastructure to private road therefore the developer will need to provide the medium pressure gas reticulation to private road network within the proposed development. Refer Plate 2.5 for private road network location.

Jemena advice to anticipate a financial contribution towards capital costs of approximately \$150,000- \$200,000 for the proposed development.

2.3 Telecommunications

NBN rollout map indicate that the Precinct and the surrounding areas are being serviced by NBN as coloured purple shown in Plate 2.3.

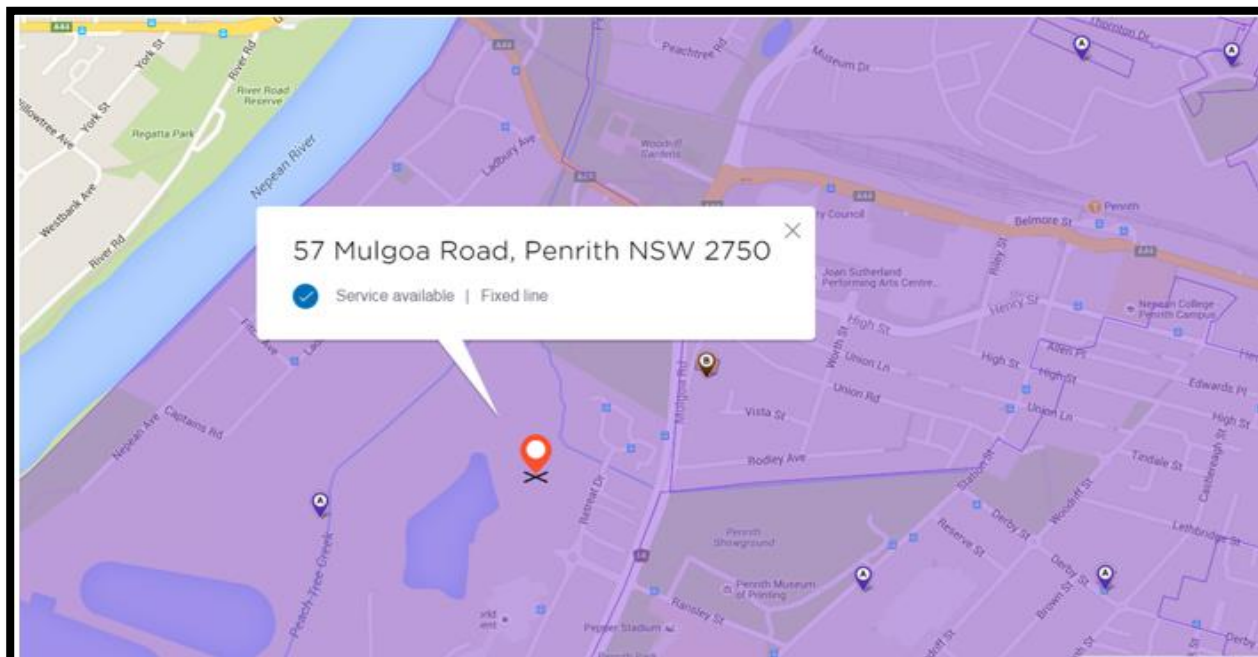


Plate 2.3- NBN Rollout Map

We lodged a feasibility assessment with NBN to expand on telecommunication requirements and associated costs to be paid by the developer. NBN provided an offer to service the proposed development and outlined the contribution to be paid and payment terms as shown in Table 1.

Table 1- Developers Contribution

Contribution Table		
Estate Name	Cost Contribution Item	Pricing
Panthers North Precinct	Backhaul cost at this stage	\$0
	Deployment charge per premise – Voice & Data	\$400.00
	Number of Premises (Approx. 800 Units)	800
	Panthers North Precinct	\$ 320,000.00

Payment Terms	
Please note the Deployment per premise charge will be invoiced on a Stage by Stage basis. Two invoices will be generated as follows:	
•	Invoice 1: When the pit & pipe design status changes to 'Design Accepted' an invoice will be issued for a 50% payment which is required before commencement of works for each Stage
•	Invoice 2: When the pit & pipe is confirmed as 'Practical Completion Certified' an invoice will be issued the remaining 50% payment of the deployment charge for each Stage.

2.4 Recycled Water

There are no recycled water network within the vicinity of the proposed development. As such, Sydney Water are not likely to provide recycled water.

2.5 Potable Water

Dial Before Your Dig Information indicate an existing 300mm potable watermain located along Mulgoa Road and a possible connection point to service the development. Refer Plate 2.4.

A formal feasibility application has been lodge with Sydney Water regarding their likely water servicing requirements. However, Sydney Water (SW) feasibility assessment takes 60 days and we have not received the letter of advice from SW at the time of this report. This information will be forwarded to ESQ 1818 Panthers Pty Ltd once available.

However, from previous assessment undertaken by Qalchek during 2013 for Panthers Precinct Development, at that time there was sufficient capacity in the existing 300mm watermain in Mulgoa Road to service the Panthers Precinct development and assume there are no lead in water main services required. To confirm this, a detail planning and modelling works are necessary to be undertaken.

2.6 Sewer

Based on Dial Before You Dig information shows several existing sewer systems internal to the site including a 450mm diameter trunk sewer crosses Mulgoa Road from ESQ1818 Panthers site that could possibly a point of connection for the proposed development. Refer to Hydra plan from DBYD information as shown in Plate 2.4.

A formal feasibility application has been lodged to Sydney Water regarding their likely sewer servicing requirements. However, Sydney Water (SW) feasibility assessment takes 60 days and we have not received the letter of advice from SW at the time of this report.

Based on comments provided by Qalchek, the proposed development could be serviced from existing infrastructure it will only depend on what amplifications are required. Previous Qalcheks' assessment undertaken in 2013 against the Panthers Precinct development, there is sufficient capacity in SPS 896 located on the opposite side of Mulgoa Rd from the Panthers club to service the proposed development via the existing 450mm diameter sewer trunk. However, the site was assessed at the time to be commercial and has now been changed to retail and residential development, therefore a detail planning and modelling works are necessary to confirmed the sewer pipe sizing are sufficient.

The existing internal Sewer networks if need be can be disused, relocate or build over depending on the development requirements. This can only be determined at detail design stage.

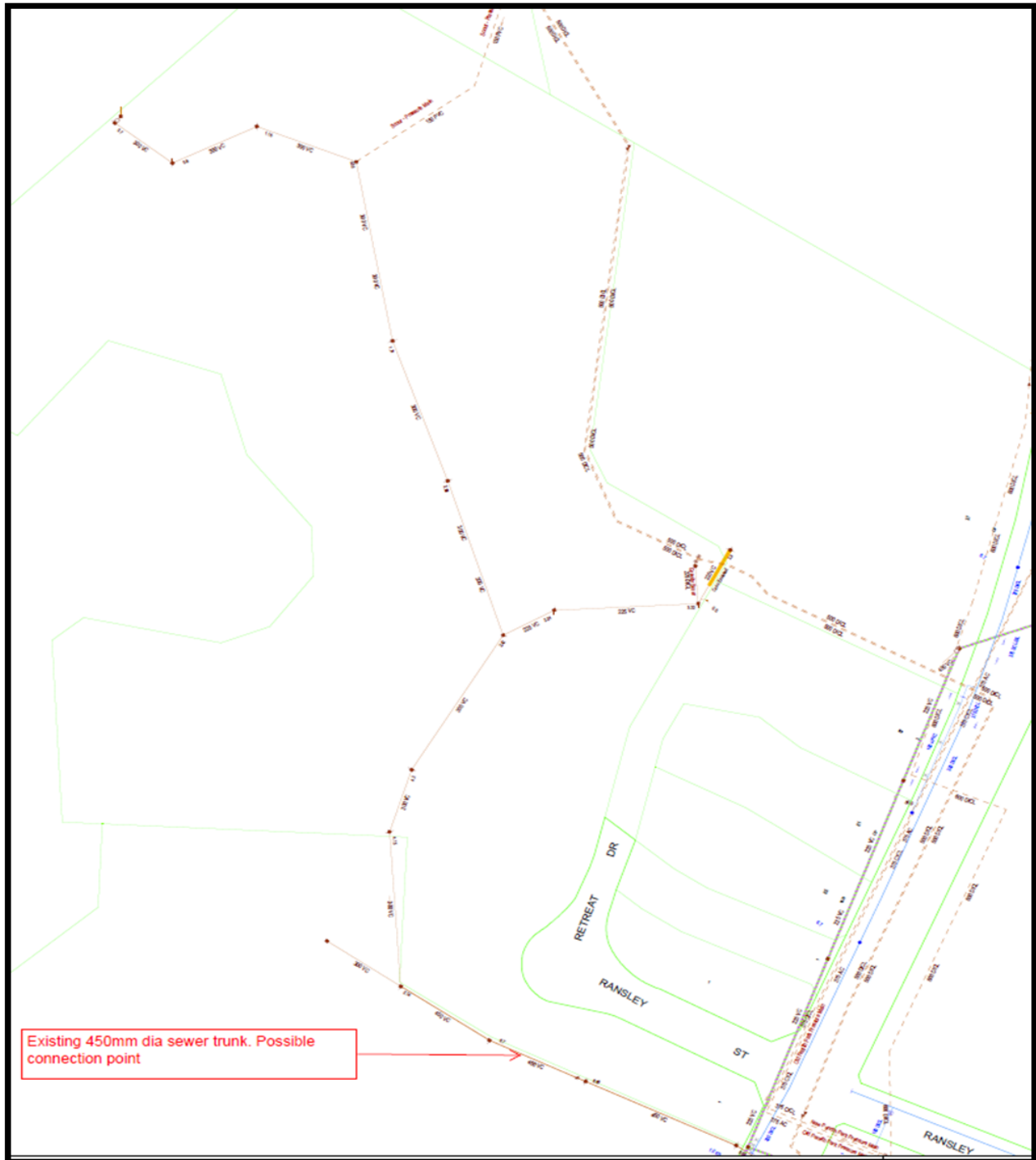


Plate 2.4- DBYD Sydney Water

2.7 Road and Drainage

Information from Penrith Development Control Plan 2014, E13 Riverlink Part B Panthers Penrith Precinct has been reviewed, the required road and road dimensions for the proposed site are summarised below:

- Ransley Street is a 21m wide road to be extended from existing Panthers Link roundabout to Lake Promenade approximately 135m. Preliminary cost for road and drainage is \$3,000 per meter approximately \$405,000.

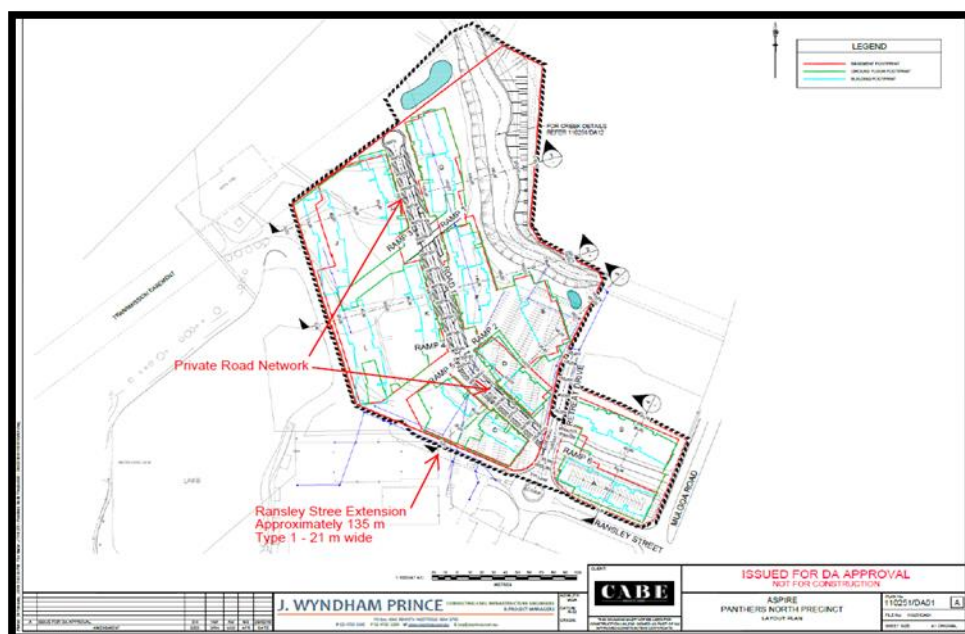


Plate 2.5 -Ransley Street Extension

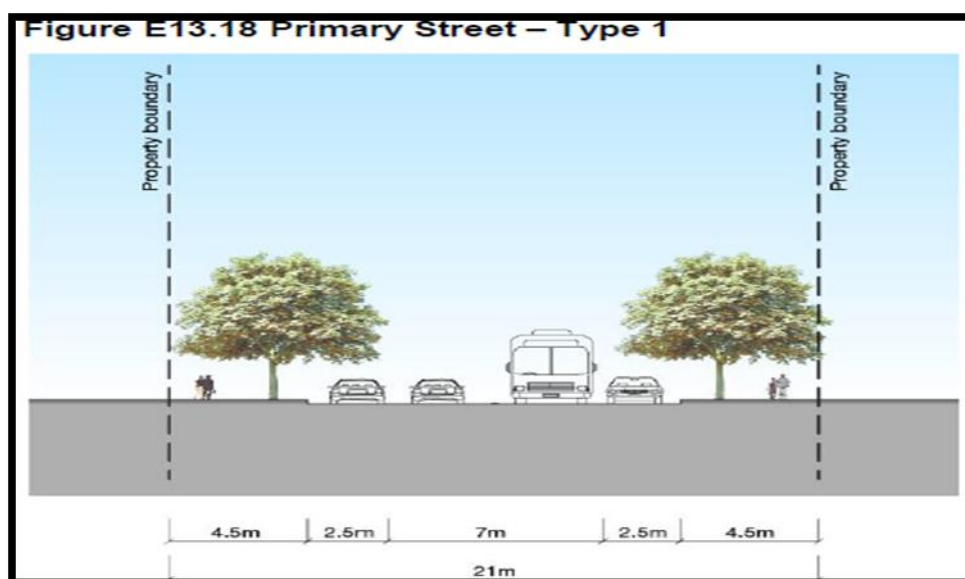


Plate 2.6 - Street Type and Dimension

- The Lake Promenade is strictly a pedestrian zone only. No cost provided as this assumed to be part of building or landscape works.

The above costs are for works in public road only. The costs of the private road, footpaths, retaining walls and landscape works are assumed part of building works.

Refer Plate 2.6 for Street Hierarchy and Street Dimensions.

The main road upgrade works that will be required to facilitate this development as identified in the *Planning Agreement Road Works, 28 November 2012*, are outlined below:

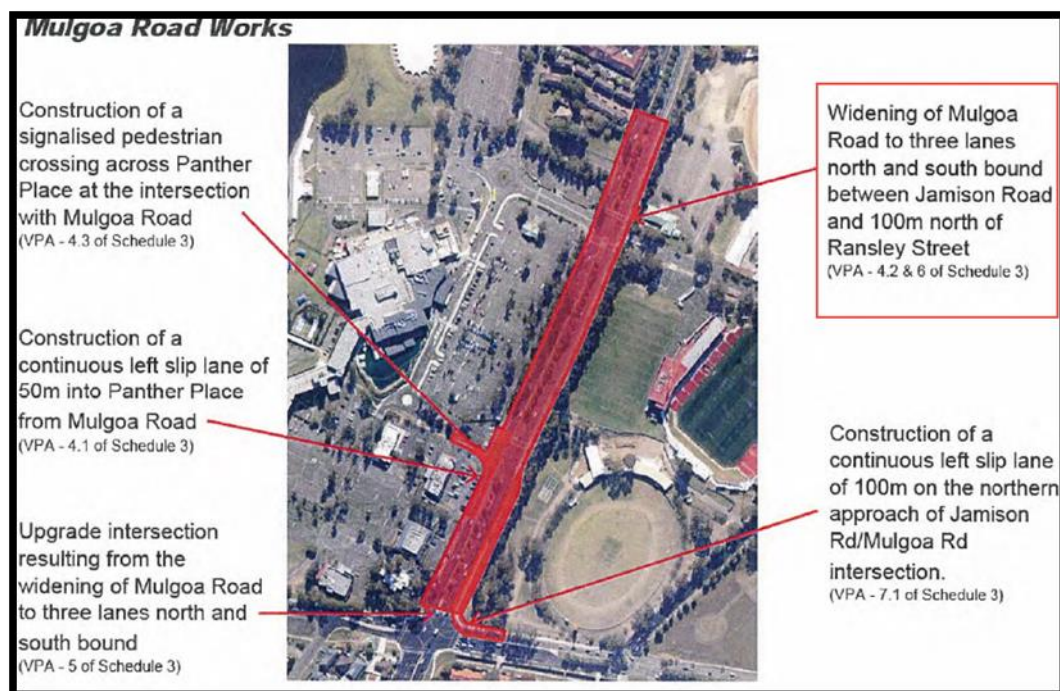
Scope of works for the west side of Mulgoa Rd:

- New left in slip lane into Panthers Place.
- Median realignment and line marking Mulgoa Rd from Jamison Rd to lot 3A.
- Minor intersection adjustments at Ransley St.

Developers' apportionment of this road upgrade based on *Report for Panthers Penrith Planning Proposal, Traffic management Works and Apportionment Plan, GHD, 7 February 2012*, apportionment is \$1,071, 601.



Plate 2.7 - Road Works for Panthers North Precinct



2.8 Stormwater

The proposed Flooding and Stormwater Management Strategy consisting of on lot treatment, street level treatment and development treatment measures. The structural elements proposed for the development consist of:

- Two bio-retention raingarden located within Showground Creek with a total area of approximately 890m² to service the proposed development. Preliminary cost is \$156,000(890m² x \$175/m²).
- Council approved GPT units at each stormwater discharge point and just prior to each bio-retention raingarden. Preliminary cost for Two x GPT approximately \$120,000(2 x \$60,000/GPT).
- A 2 x 2100mm x 600mm culverts system to control upstream flooding approximate 190m from under Retreat Drive to Showground Creek. Refer Plate 1.1 for approximate culverts location. Preliminary cost for 2 x 2100mm x 600mm culverts from under retreat Drive to Showground Creek, approximately \$1.8 million (190m x \$9,500/m).

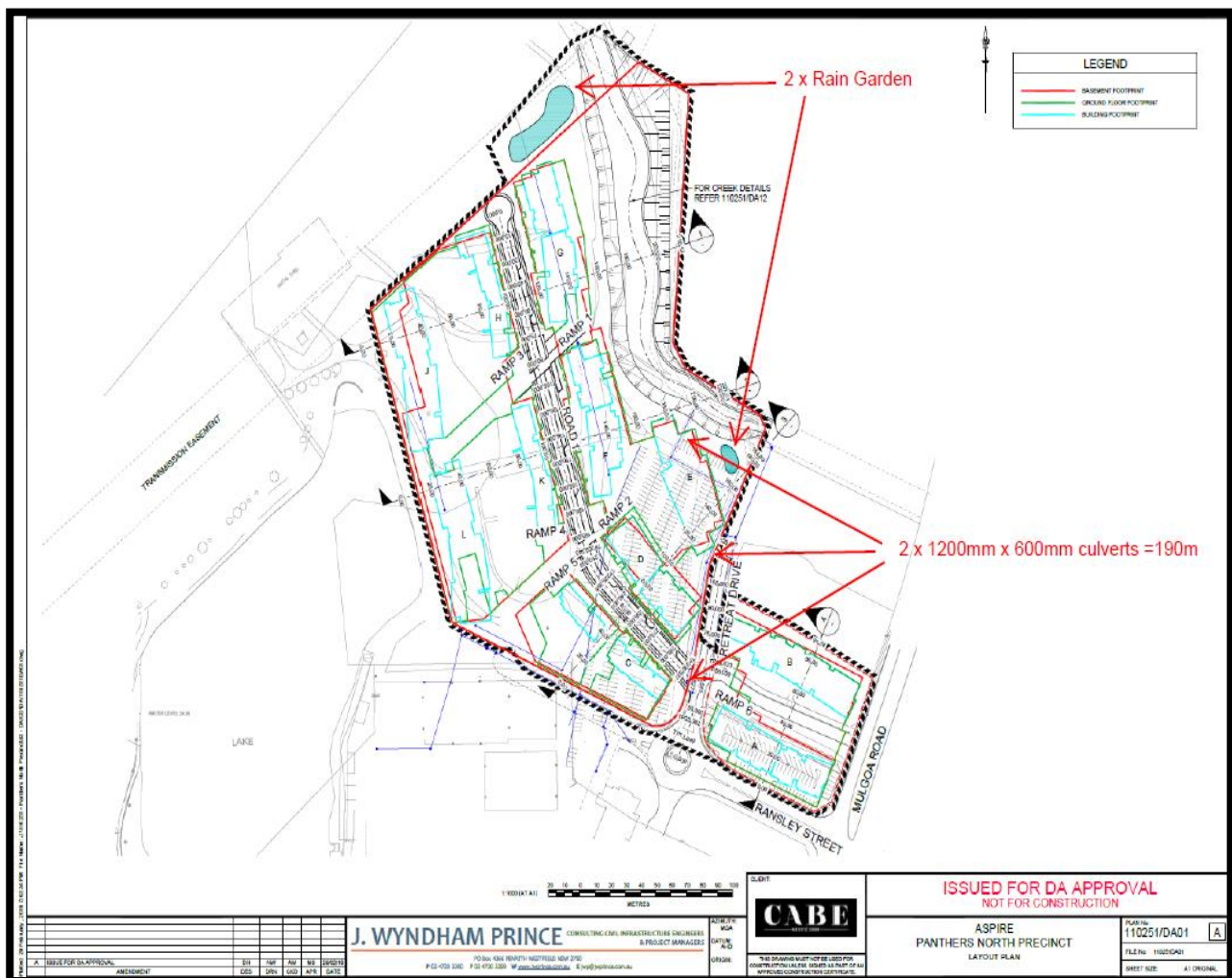


Plate 2.8 - Culverts Location

3 CONCLUSION

Conclusions drawn in this report for the overall status of the infrastructure are summarised in the table below:

Table 2 - Conclusion Summary

ID	Infrastructure	Conclusion
1.	Electricity	Has capacity to supply the development via the existing 11kV Feeders within Mulgoa Rd.
2.	Gas	Existing system has capacity to public roads only.
3.	Telecommunications-NBN	NBN Co will supply the telecommunication service to the proposed development.
4.	Recycled Water	There is no recycled water network in the immediate vicinity of the site. Therefore, SW is not likely to provide recycled water.
5.	Water	Likely to have capacity for the proposed development but need to be confirmed by SW. Letter of advice from SW is still on progress at the time of this report
6.	Sewer	Likely to have capacity for the proposed development but may require amplifications with the existing networks. Letter of advice from SW is still on progress at the time of this report
7.	Roads	Existing roads and intersections have capacity but will need some modifications to facilitate the development
8.	Stormwater Drainage – Showground Creek	Detail can be found in JWP Stormwater report that is being proposed separately for this development.

APPENDIX A – AUTHORITIES SERVICING ADVICE

- Endeavour Energy Letter of Advice
- NBN Offer of Supply
- Jemena servicing strategy advice

17 February 2016

Endeavour Energy Ref: ENL2601 – 2016/00495/001
Customer Ref:

J.WYNDHAM PRINCE
580 High Street
Penrith
NSW 2750

Attention: Lydia De Guzman

ENL2601 – Lot 1 DP 1043008, Lot 1 DP 1064526 and Lot 1021 DP 812335, Mulgoa Road, PENRITH

Dear Lydia,

Thank you for your enquiry regarding the proposed complex development at the above address. This enquiry has been registered under our reference numbers – ENL2601. Please quote this number for all future correspondence.



Need to update

859

3304

Endeavour Energy acknowledges that proposed development will establish 9 Blocks with totally 795 residential units, approximately 3000mm² commercial/retail floor areas and 1167 car spaces.

1209



Preliminary analysis indicates that total required load of the development have been calculated to be in a range of 3.0 to 3.5 MVA and the load will be supplied via multiple pad/indoor substations, ring- interconnected to existing 11kV network.

It is anticipated that presently there are two 11kV feeders, namely PH1234 and PH1201, which are sourced from Penrith ZS, within Mulgoa Road can be used to supply this development. These feeders will need to be extended from Mulgoa Road to the development (approx. 500m) and some load transfers will need to be done to free up required capacity on the feeders.

Lydia DeGuzman

From: Jason Lu <Jason.Lu@endeavourenergy.com.au>
Sent: Friday, 6 December 2013 10:02 AM
To: Ben Bacon
Cc: Harshul Dalal
Subject: RE: Panthers ZS site visit

Hi Ben

Harshul is looking at more detail into the distribution works required for your Enquiry application. He mentioned that he had requested via our Network Connections group some more clarification on timing of development and was waiting for a response. Are you aware of this?

With respect to the zone substation site on Panthers, I have perhaps been too hasty in my dismissal of the requirement. The complication has been evolving information on the rating of our 11kV transformer cables which restrict the output of our transformers at Penrith ZS. The most recent advice from our ratings engineer a few days ago suggests a problem at the existing Penrith ZS due to recent site works.

This means that we will have to make a decision on whether we invest in upgrading the existing Penrith ZS site to remove the constraint or establish a new zone substation. Consideration will be given as to how the 11kV distribution feeders can be developed to service growth.

Our formal NIO (Network Investment Option) process including board approvals can take up to 12 months. As such, if you agree, I would like to keep the option of substation at Panthers open for 12 months to enable Endeavour to make a considered decision. I don't think we require any further due diligence work on this site until a direction becomes clearer on the preferred option.

This should not affect your ability to obtain supply for initial stages of development.

The response to the Enquiry will reiterate the issues around the existing zone substation capacity and the option of a zone substation.

Thanks
Jason

Jason Lu
Strategic Network Planning Manager
Endeavour Energy

D: (02) 9853 5003
M: 0403 604 607
T: 131 081
E: jason.lu@endeavourenergy.com.au

51 Huntingwood Drive, Huntingwood NSW 2148
www.endeavourenergy.com.au

Lydia DeGuzman

From: Andrew Worboys <Andrew.Worboys@endeavourenergy.com.au>
Sent: Wednesday, 9 March 2016 11:17 AM
To: Lydia DeGuzman
Cc: Jason Lu; David Ho; Dragana Hele
Subject: RE: Zone sub station

Hi Lydia,

With respect to the zone substation site on Panthers, Endeavour Energy has identified a new zone substation will be required in approximately 2023. The zone substation will supply the ultimate load to Riverlink, Panthers Penrith Precincts and surrounding developments. The interim supply to the Riverlink precinct will be from Penrith ZS. A zone substation site acquisition will be dependent on the pace of development in the area. Endeavour Energy is not currently in a position to acquire a site for a zone substation within the Panthers precinct or surrounding area, we will be actively seeking acquisition of a site 5 years prior to the need for a substation and will discuss with Panthers at the appropriate time. Site acquisition will depend on site suitability. Endeavour Energy would not acquire a site that is subject to flooding. If the current reserved site on the Masterplan is subject to flooding, Endeavour would not agree to acquisition of this particular site.

Regards

Andy Worboys

Acting Capacity Planning Manager
Asset Strategy and Planning

D: 61 2 9853 5309

F: 61 2 9853 6099

T: 131 081

E: andrew.worboys@endeavourenergy.com.au

51 Huntingwood Drive, Huntingwood NSW 2148

www.endeavourenergy.com.au



From: David Ho
Sent: Thursday, 3 March 2016 2:09 PM
To: Jason Lu
Cc: Lydia De Guzman
Subject: FW: Zone sub station

Hi Jason,

Could you advise Lydia if a new ZS is required or not.

Regards,
David

From: Lydia DeGuzman [<mailto:ldeguzman@jwprince.com.au>]
Sent: Thursday, 3 March 2016 1:57 PM



Lydia DeGuzman
Project Manager - J. WYNDHAM PRINCE
580 High Street,
Penrith, NSW
PO Box 4366 PENRITH WESTFIELD 2750

8th February 2016

RE: NBN Telecommunications Solution for the Panthers North Precinct.

Dear Lydia,

Thank you for the opportunity to quote the **nbn** telecommunications solution for the above project.

This objective is very much aligned with **nbn's** primary goal, which is to deliver much more than a long term vision for Australian telecommunications. It is a vision for the future of Australian lifestyles and homes. At our core is the desire to create connected healthy and brighter communities, where people can live, work and play.

Nbn would like some key points to be considered when choosing the telecommunications solutions that is right for you, these include:

- **nbn's powerful brand recognition** - **nbn** enjoys a 90% brand awareness rate and a recent survey conducted by Real Estate Australia has shown that 1 in 4 homebuyers would only search areas where **nbn** is available.
- Joint **marketing campaigns** – support and materials available to promote the benefits of purchasing an '**nbn**TM ready' home from MOGUL STUD PTY LTD.
- Simplified **nbn** Pit & Pipe technical guidelines - updated to reflect reduction in pit & pipe requirements (**additional savings**) released on the 23rd of October.
- **Deem to Accept process** – issue of Practical Completion Certification upon notification of pit and pipe completion
- Over **80 Retail service providers** - currently available to the residents of The Hill of Carmel with service options that include expected download speeds of up to 100Mbps – for each premise.
- Proven **On-time Delivery Capability** – 90% on time performance record with dedicated Account Management Teams for your projects.
- **Extensive Deployment Experience**- **nbn** has, including commercial, residential, greenfields and infill developments nationally, more than 3,940 developments / 600,310 premises under contract.
- Solutions include full end to end delivery of equipment to the end users residents, focusing **on Pre-installation** with builders to ensure homes are fully-equipped before residents move-in.

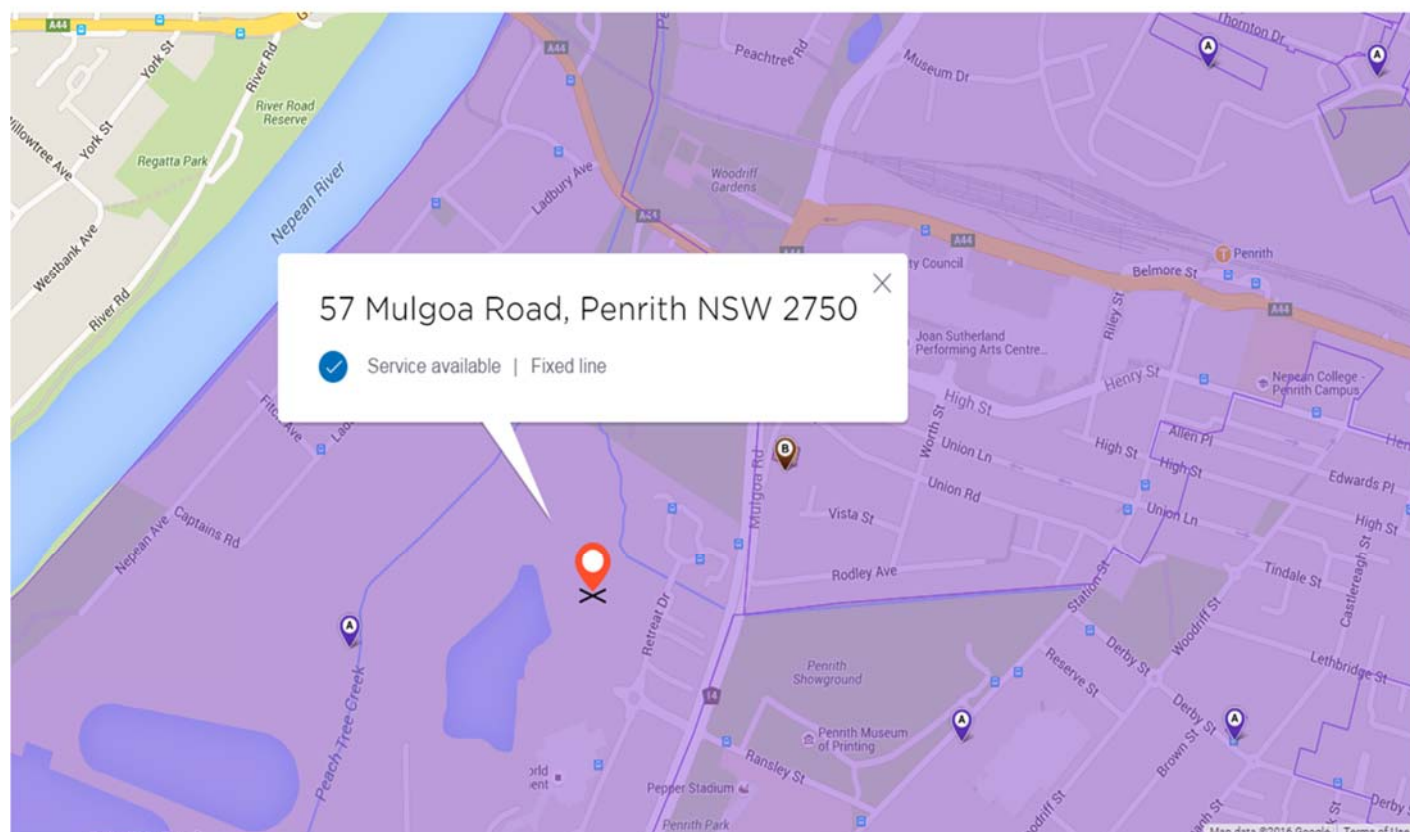
Outlined in this proposal we have included:

- A map location for the Panthers North Precinct.
- Contribution Table for the Panthers North Precinct
- Fibre TV Solution (Optional)

Summary of Panthers North Precinct

The table (below) highlights the number of premises confirmed by the Panthers North Precinct.

This offer is conditional upon the inclusion of all remaining lots per Development in new agreements as per the TIND Policy from 1 March 2015.



Contribution Table

Estate Name	Cost Contribution Item	Pricing
Panthers North Precinct	Backhaul cost at this stage	\$0
	Deployment charge per premise – Voice & Data	\$400.00
	Number of Premises (Approx. 800 Units)	800
	Panthers North Precinct	\$ 320,000.00

Payment Terms

Please note the Deployment per premise charge will be invoiced on a Stage by Stage basis. Two invoices will be generated as follows:

- **Invoice 1:** When the pit & pipe design status changes to 'Design Accepted' an invoice will be issued for a 50% payment which is required before commencement of works for each Stage
- **Invoice 2:** When the pit & pipe is confirmed as 'Practical Completion Certified' an invoice will be issued the remaining 50% payment of the deployment charge for each Stage.

Fibre TV Solution (Optional)

nbn™ plans to introduce a new solution to property developers and Content Service Providers (**CSP's**) known as **Fibre TV**.

The **Fibre TV** solution enables television signals to be provided quickly and cost-effectively to premises in large new developments using the same **nbn™** fibre-to-the-premises (**FTTP**) broadband infrastructure used to carry **nbn's™** broadband services, thereby avoiding the need for television rooftop antenna infrastructure or MATV cabling.

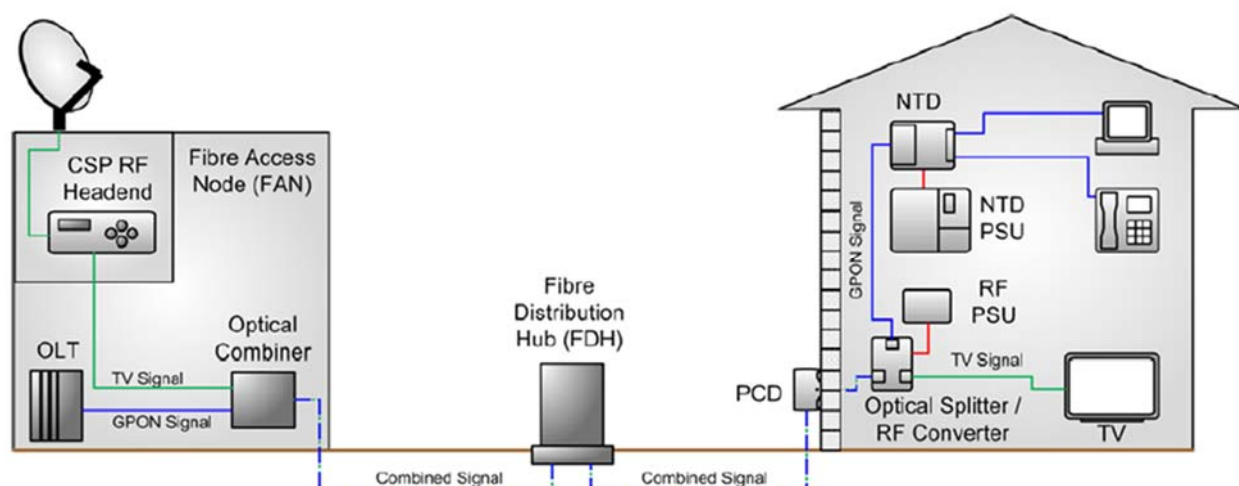


Figure 1. Fibre TV Architecture Overview



Co-branding and marketing opportunities

Co-branding with **nbn** provides a number of opportunities to promote your development and the lifestyle benefits it offers by being connected to Australia's fastest Internet. **nbn's** strong and recognisable brand provides a powerful tool for partners who participate in joint marketing efforts.

As a partner, you will have access to the new '**nbn**TM ready' logo which has been developed to provide a recognisable symbol and a stamp of added value.

Being '**nbn**TM ready' means a home's full potential is unlocked and residents have the opportunity to be more productive, creative, efficient, and connected for decades to come. This is the lifestyle that Australians are increasingly embracing – a lifestyle that's fuelled by the benefits of fast broadband.

Nbn can provide **Panthers North Precinct** a tailored campaign support, working with your existing marketing strategy to showcase your '**nbn**TM ready' community.

Lydia DeGuzman

From: Neale Hilton <Neale.Hilton@jemena.com.au>
Sent: Wednesday, 24 February 2016 1:11 PM
To: Lydia DeGuzman
Subject: FW: Panthers North Precinct-gas servicing assessment
Attachments: Penrith Master Plan 2-Marked Plan.pdf; Penrith Development Yield.pdf

Lydia

Apologies for the delay. Jemena suggests that a High Pressure main extension could be required from Mulgoa Rd through Ransley St to supply a proposed Regulator Station which in turn will supply this proposal with Medium Pressure 210kpa delivery.

Jemena will not enter the internal road network as shown on your masterplan. I suggest you anticipate a financial contribution towards to capital costs of approx. \$150k.

Neale Hilton

Network Development Manager

Jemena

Level 14, 99 Walker Street, North Sydney, NSW 2060
M 0402 060 151

neale.hilton@jemena.com.au | www.jemena.com.au
www.gonaturalgas.com.au



From: Neale Hilton
Sent: Tuesday, 16 February 2016 12:53 PM
To: Thomas Lukito
Subject: FW: Panthers North Precinct-gas servicing assessment

Thomas
Any news on this simulation

Neale Hilton

Network Development Manager

Jemena

Level 14, 99 Walker Street, North Sydney, NSW 2060
M 0402 060 151

neale.hilton@jemena.com.au | www.jemena.com.au
www.gonaturalgas.com.au



From: Neale Hilton
Sent: Friday, 5 February 2016 3:49 PM
To: Thomas Lukito
Subject: FW: Panthers North Precinct-gas servicing assessment

Thomas

Can you do a quick simulation on the proposed 800 units x .4m³/hr = 320m³/hr plus Commercial 200m³/hr. Total 520m³/hr

Will the 50mm in Retreat St be able to supply or will the Secondary supply across Mulgoa Rd be the point of connection. Is this 1050kpa road crossing 100mm ?

APPENDIX B – OTHER DOCUMENTS

- Report for Panthers Penrith Planning Proposal, Traffic management Works and Apportionment Plan, GHD, 7 February 2012
- Penrith Development Control Plan 2014, E13 Riverlink Part B Panthers Penrith Precinct
- Planning Agreement Road Works, 28 November 2012

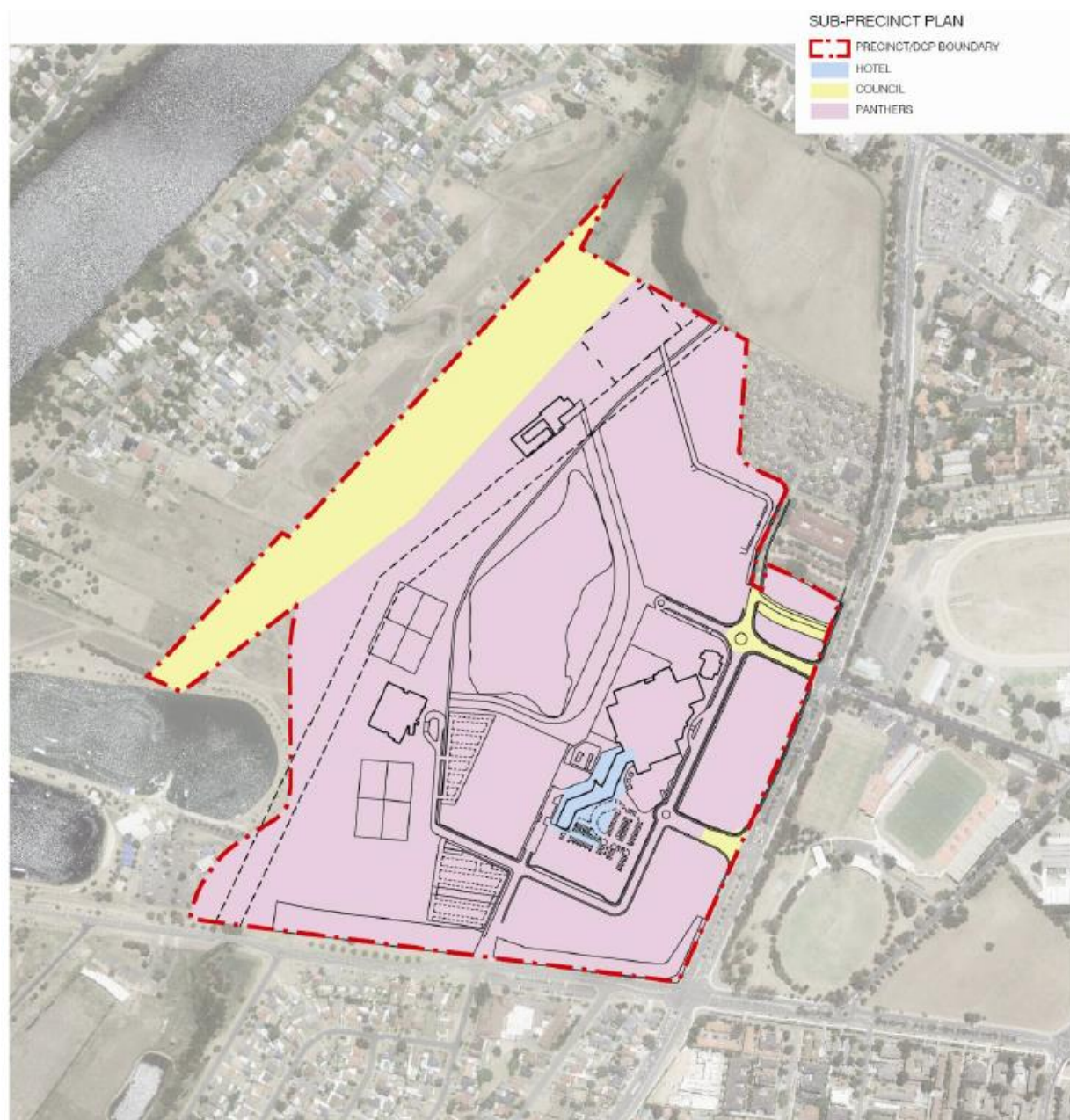
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Part B – PANTHERS PENRITH PRECINCT

13.5. Panthers Penrith Site

Figure E13.9: Ownership - Panthers Penrith Precinct Area



background

This section applies to development on land known as Panthers Penrith Precinct as identified in Figures E13.9 and E13.10. This section provides specific controls for Panthers Penrith in addition to the general controls elsewhere in this DCP. Where there is an inconsistency between this section and the rest of this DCP, the requirements of this section prevail.

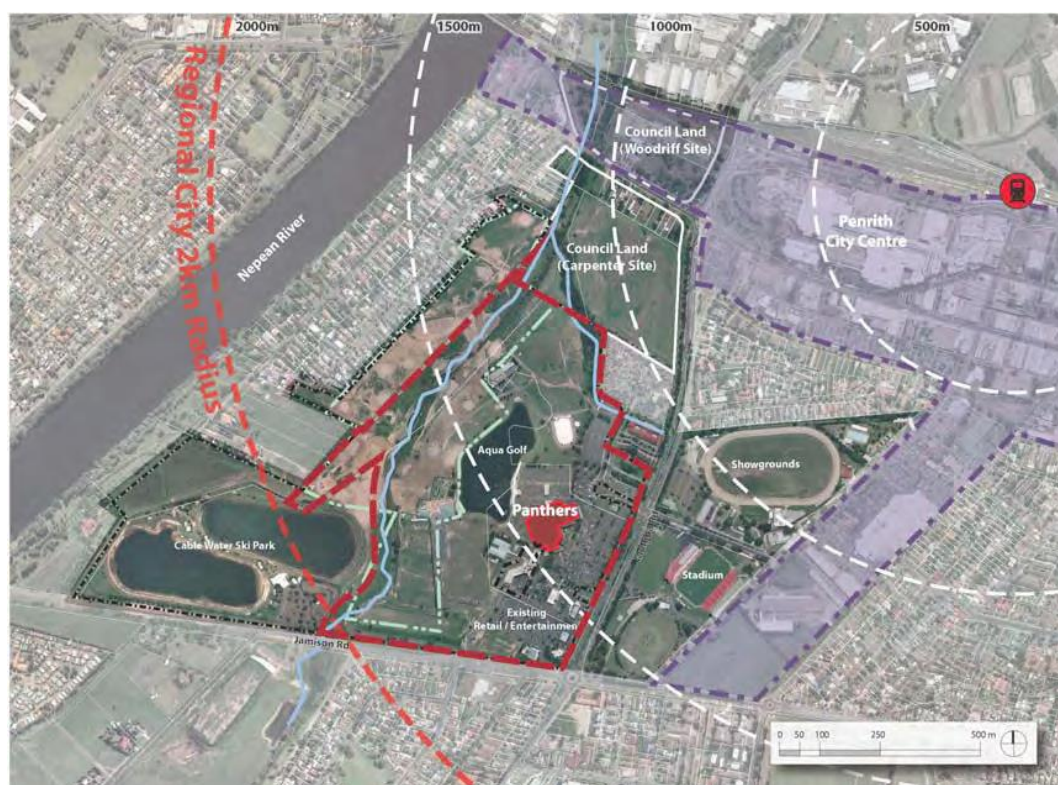
The Panthers Penrith Precinct is located within a 2km radius of the City Centre and is approximately 68.1ha in area. It is bounded by Mulgoa Road to the east, the Nepean River, Nepean and Ladbury Avenue residences to the west, Council's 'Carpenter's site' to the north and Jamison Road to the south. It includes the Panthers Club and associated lands and facilities.

The agglomeration of land uses, within an entertainment core east of Peachtree Creek that incorporates the existing Panthers Club will be revitalised, as an entertainment, leisure, lifestyle and sporting precinct. Possible uses include cinemas, bowling, restaurants, cafes, limited retail, health, wellness and aquatic facilities, sporting facilities, accommodation and a multi-use events/exhibition centre. It will be surrounded by a mix of residential offerings and campus style business park accommodation. Recreational opportunities will be enhanced with green parks and open spaces, as well as walking and cycling tracks. The part of the precinct that has been identified for entertainment, retail, business and residential use in the Panthers Penrith Planning Proposal is 51.11ha in area.

The aim of the controls in this section of the DCP is to provide more detailed provisions for development in the Panthers Penrith Precinct that will:

- a) Contribute to the growth and character of Panthers Penrith Precinct as a cohesive and active entertainment, leisure, lifestyle (including sporting) precinct that will contribute to Penrith as a regional city;
- b) Deliver a balanced social, economic and environmental outcome; and
- c) Protect and enhance the public domain.

E13.10: The Panthers Penrith Precinct relationship to Penrith City Centre



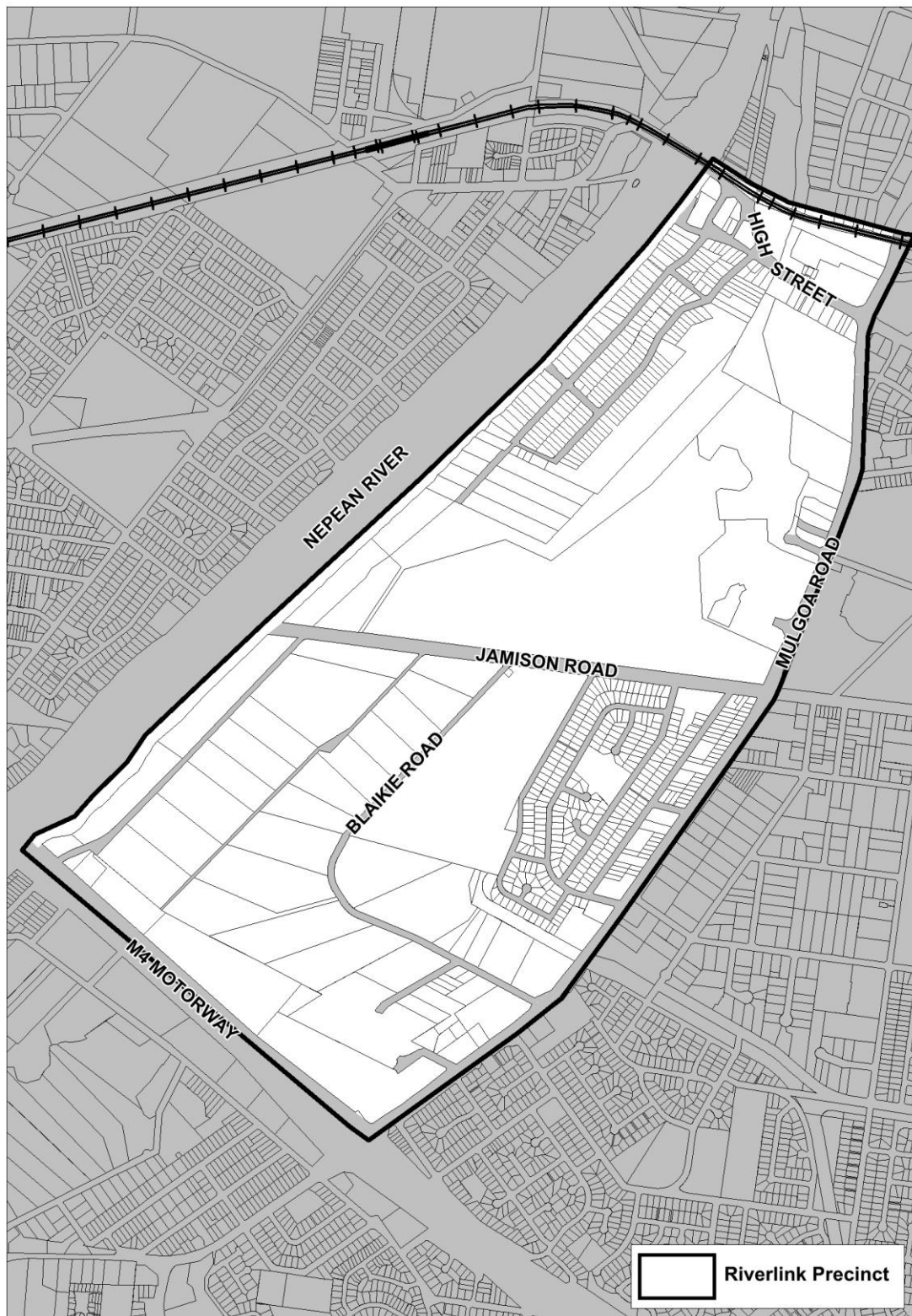
2 Riverlink Precinct Plan

The Panthers Precinct lies within the area considered in the Penrith Riverlink Precinct Plan (adopted by Council 5 May 2008) – a vision plan for the area on the eastern bank of the Nepean River between the Main Western Railway Line and the M4 Motorway (Figure E13.11). It includes the area known as Blaikie Road and Tench Avenue, south of Jamison Road and identifies locations and types of future activity nodes, view corridors, key gateway locations and connections for the precinct including the Concept Plan area.

The Riverlink Precinct Plan has the broad goal of creating a living, entertainment and working hub to link the City Centre to the Nepean River. It seeks to create a cohesive and well-connected precinct by:

- Enhancing and activating Mulgoa Road as a significant approach to Penrith City Centre
- Reinforcing key intersections as gateways to the Precinct and the Penrith City Centre
- Creating a clear and legible public domain framework of streets and open space
- Creating an exciting core of entertainment, leisure and lifestyle uses around the existing club
- Incorporating sustainability best practice
- Connecting Riverlink pathways with the Great River Walk
- Encouraging views of the Blue Mountains from the public domain
- Encouraging design excellence
- Improving connectivity through the Precinct
- Enhancing Peachtree Creek with the planting of indigenous riparian vegetation.

Figure E13.11: The Riverlink Precinct



13.6 PANTHERS PENRITH PRECINCT VISION

Panthers Penrith Precinct Vision

Figure E13.12: Panthers Penrith Illustrative Concept Plan showing indicative land uses





1. Entertainment Uses



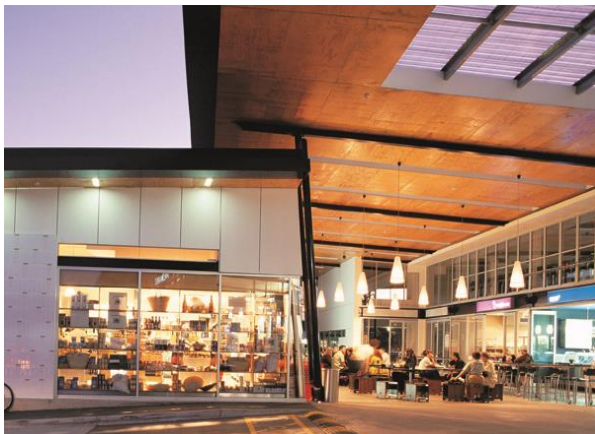
2. Outlet Retail



3. Multi Use Facility



4. Commercial Uses



5. Cafes and Restaurants



6. Medium density housing

The Panthers Penrith vision is to create a vibrant entertainment, leisure, lifestyle and sporting precinct that offers a range of activities to attract a diverse mix of locals and intrastate, interstate and international visitors.

Panthers Penrith Precinct will be a dynamic and sustainable place, providing a new workplace, day and night-time entertainment, a new and different shopping experience, food and beverage opportunities, conferencing and accommodation. It will be linked to the Penrith City Centre by public transport, pedestrian and cycle pathways.

In addition to building on the Panthers Penrith Precinct as a core entertainment, leisure and lifestyle offer for the region, the plan aims to provide open space and access that will benefit the wider community and to contribute to Penrith's role as a regional city. The illustrative plan developed for the precinct (Figure E13.12) shows the proposed concept with the anticipated building footprint.

The Panthers Penrith Precinct will enable better integration with and connection to neighbouring lands and will facilitate improved management of precinct-wide issues such as flooding. The regionally important Riverlink will be incorporated into the structure, providing a key missing pedestrian and cycle connection between the Nepean River and the city centre. In addition, the needs of adjoining sites have been taken into account.

The Panthers Penrith Precinct is to be a pedestrian oriented, quality-landscaped and urban public domain with equitable access throughout the precinct for pedestrians, public transport, cyclists and cars. The new landscaped public domain is to improve amenity for workers and residents of the nearby areas in addition to providing convenient and logical internal linkages.

2 Precinct Objectives

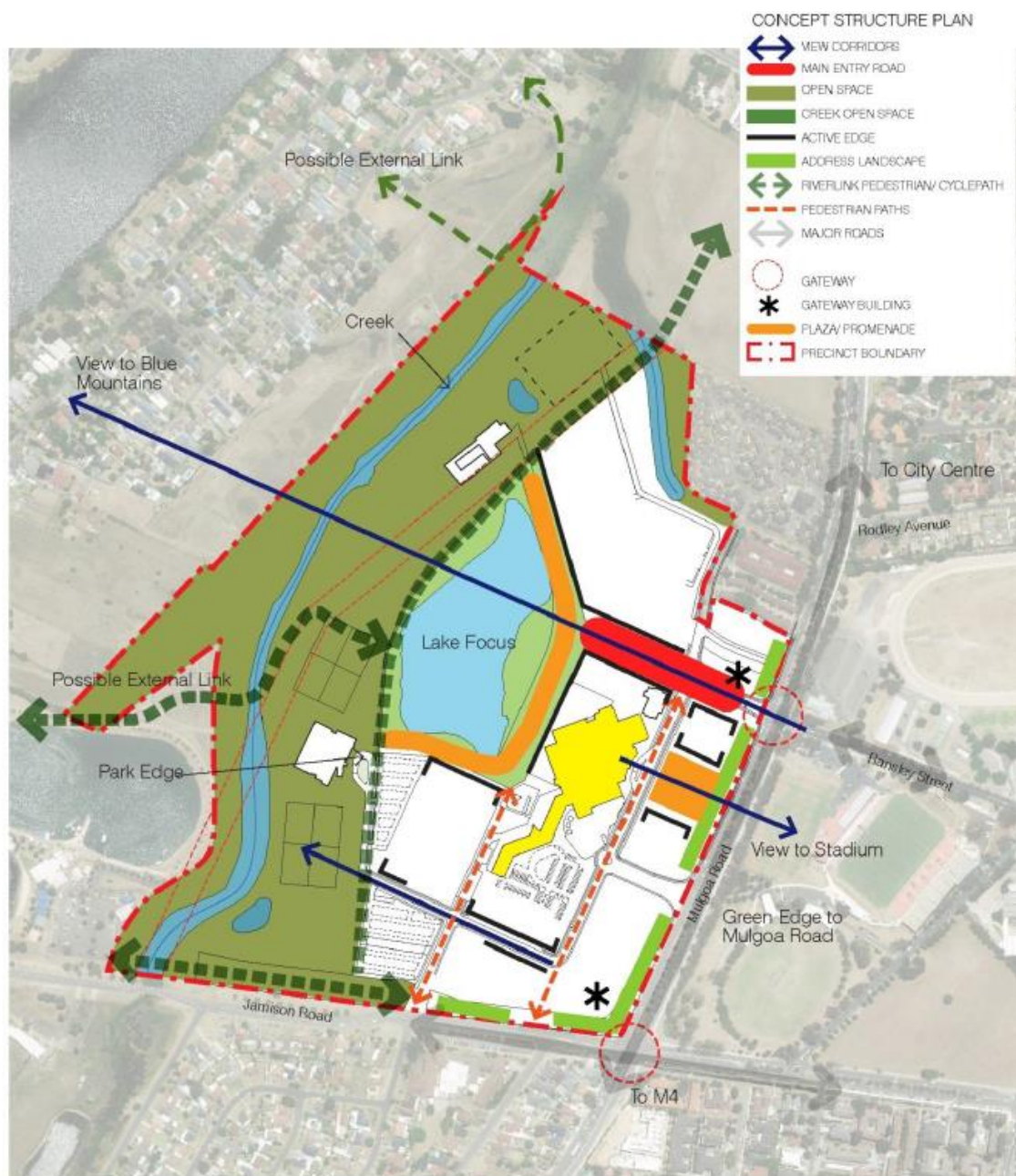
- a) To facilitate the development of the place by promoting redevelopment and urban sustainability;
- b) To promote quality urban design, architectural excellence and environmental sustainability in the planning, development and management of the place;
- c) To create a high quality public domain and ensure development integrates and relates to the public domain;
- d) To provide for mixed use development (entertainment, limited retail, hotel, campus style office development, residential, seniors living, multi-use events /exhibition) which provide high levels of amenity for occupants and visitors;
- e) To provide high levels of accessibility within Panthers Penrith, connecting significant activity nodes, public open space and surrounding residential and mixed use areas;
- f) To encourage development within Panthers Penrith that gives primacy to the public domain and creates an attractive and vibrant centre;
- g) To encourage integration of the existing Panthers Club with residential and non-residential land uses and improved access to transport facilities;
- h) To ensure that development at Panthers Penrith is consistent with the desired future character of the precinct and sub-precincts as described in the following section;
- i) To provide clear connectivity through the site and to the surrounding neighbourhood;
- j) To ensure that view corridors are maintained to the lake and Blue Mountains escarpment;
- k) To provide the framework to facilitate and encourage the use of public transport, safe pedestrian and cycle movement and vehicular movement;

- l) To create a sensitive buffer between the development within the precinct and neighbouring properties, where required; and
- m) To maximise opportunities for pedestrian activities around the lake at the centre of the precinct to create an active promenade and waterside edge and allow for lakeside circulation.

13.7 URBAN FRAMEWORK

Structure Plan

Figure E13.13: Panthers Penrith Structure Plan



Background

A new public domain defined by streets and blocks and interface between buildings and the lakeside will create new site connectivity, links to existing surrounding areas and safe and legible access for pedestrians, cyclists, public transport, cars, trucks and service vehicles.

The Structure Plan is based around the creation of a new integrated street network that will be designed to Penrith Council standards. Cycle paths will be provided in appropriate

locations in the open space network. The creek open space corridor will be activated by the construction of a new road along the western edge of the site known as the Riverlink.

The plan has been developed to accommodate a range of flexible uses within a new framework of roads and open space opportunities. It allows for a variety of complementary uses to be developed on the site over the next 20 years.

The landscaped public domain will improve amenity for workers, visitors, patrons and residents of the nearby areas in addition to providing convenient and clear internal linkages. Key links through the site will acknowledge views to the Blue Mountains and connections to the River.

- **Objectives**

- a) To create a new entertainment, leisure, lifestyle (including sporting) precinct that contributes to Penrith's role as a regional city;
- b) To create a well defined and accessible public domain that is connected to the CBD, river and recreation system;
- c) To achieve active street frontages with good physical and visual connections between buildings and the street;
- d) To provide for pedestrian comfort, amenity and protection from weather conditions;
- e) To provide for quality landscape to contribute to user amenity and a sustainable urban environment;
- f) To maintain and enhance important views to surrounding natural landscape features, including the lake and the Blue Mountains;
- g) To establish the scale, dimensions, form and separation of buildings appropriate for the setting;
- h) To develop a built form and density that reflects the location and proximity to the city centre;
- i) To protect and enhance the amenity of residents in the vicinity of the development; and
- j) To create an active and well defined lake's edge that is accessible and provides a central focal point for the site.

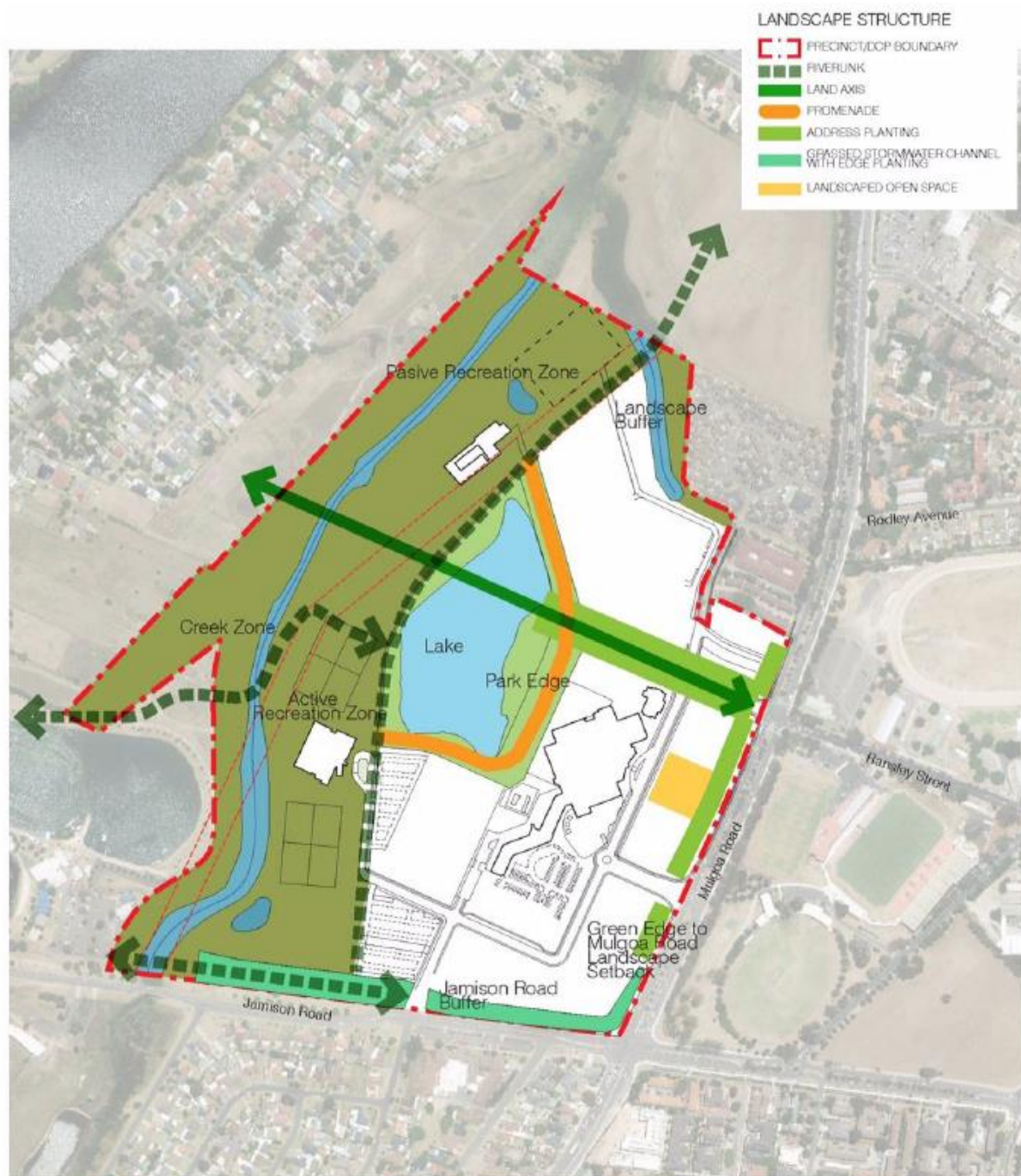
Controls

Future development is to be consistent with Figure E13.13 and is to:

- 1) Develop a public domain based on the lake's edge, new streets and blocks.
- 2) Extend key streets from the existing network.
- 3) Facilitate access to the Peachtree Creek corridor.
- 4) Create view corridors that open views to the Blue Mountains.
- 5) Focus activity around the lake's edge and Ransley Street.
- 6) Create a high quality address to Mulgoa Road.
- 7) Develop high quality buildings that in particular respond to gateway locations.
- 8) Create new pedestrian and cyclist links along the Riverlink corridor.

2 Landscape Structure

Figure E13.14: Landscape Structure



Background

The plan seeks to create a vibrant new destination with integrated public domain, streetscapes, built form and sophisticated coordinated range of finishes, furniture, lighting, street trees and landscaping. Water Sensitive Urban Design (WSUD) features, signage systems, canopies and other public domain elements will add to the detailed resolution of the public domain.

The Landscape Structure seeks to integrate the natural and civic areas of the site through strong landscape links from the riparian areas back along the tree lined roadways to the Mulgoa Road frontage. Proposed landscape components and strategies that underpin the Landscape Structure include:

- a) Enhancement of the linear north-south open space and riparian corridor that links Penrith and the Riverlink Precinct Plan structure of pedestrian and cycleway connectivity, and strong integration of the surrounding area with the Panthers precinct.
- b) Reinforcing the central lake as a focal landscape element, and creating an active lakeside that provides a high level of amenity within the precinct.
- c) Create a civic identity through a parkland and playing fields area that extends west of the lake to integrate and transition between the developed eastern portion of the site, and the open space and riparian zone to the west of the site.
- d) Acknowledgement of and a response to the site flooding events through landscape, environmental, engineering, built form and site management elements.
- e) Framing western views to the mountains.
- f) Creation of shade in summer and solar access in winter to key public spaces.
- g) Provision of a landscaped interface with Mulgoa Road.
- h) The creation of defined site entries that integrate with new public domain areas and open spaces to the north, south and west.
- i) Development of an interesting and culturally engaging component to connect to the Great River Walk along the Nepean River.
- j) Create a landscaped precinct that integrates with the precinct's surrounds.
- k) The detail design response of all landscape areas is to be the subject of on-going consultation with Council in order to develop a specific Panthers precinct identity and landscape character, while also referencing the existing open space and urban design palette of Penrith.

☐ **Objectives**

- a) To ensure landscaping is integrated into the design of the precinct and development sites;
- b) To ensure landscape design is flood compatible so that works proposed improve safety and do not adversely flood impact others;
- c) To reinforce and enhance the entries and gateways to the precinct from Mulgoa and Jamison Roads;
- d) To create well designed active and passive recreation areas, open spaces, and lakeside promenade;
- e) To create a well defined high amenity and active lakefront;
- f) To ensure that landscape contributes to the amenity of streets, including shade, particularly to the active streets;
- g) To maintain select view corridors to the mountains and the lake;
- h) To reinforce the city's ecology and biodiversity by using appropriate species for the area;
- i) To improve urban air quality;
- j) To ensure that the use of potable water for landscaping irrigation is minimised;
- k) To incorporate WSUD principles and contribute to the reduction of stormwater runoff; and

- l) To improve the microclimate within the development.

C Controls

1. General

- a) A detailed landscape/public domain design is to be submitted with a development application. In addition to this section refer to Section C6 of this DCP.
- b) The landscape treatment of precincts within the site is to be developed based on the following controls for open space uses, landscape character and the Landscape Principles for the precinct. Remnant vegetation and riparian areas in the precinct are to be protected and enhanced where possible.
- c) Any significant stands of mature trees are to be assessed and where possible, are to be retained.
- d) The vegetation within the area identified as “Landscape Buffer” on Figure E13.14 is to be retained.
- e) Water management principles are to be incorporated as per the Water Management Section of this DCP.

2. Street Design

- a) Verge planting is to be provided in local streets and full width paving in pedestrian areas with high activity.
- b) New streets in the precinct are to have a strong landscape character with planting of trees consistent with Council policy. East-west street trees are to be predominantly native and north-south streets deciduous.
- c) The street detailing, furniture, lighting and finishes are to be developed to respond to the specific character of the Panthers precinct and its sub-precincts and are to complement the design palette in draft Penrith Public Domain Technical Manual.

3. Lake Edge

- a) The lake edge is to be developed as a pedestrian promenade that links that retail outlet centre to the north, club and club expansion to the east, and multi-purpose facility to the south. The promenade will become a key focus for activity in the precinct and will allow for adjacent land uses to ‘spill out’ to the lake frontages.
- b) The lake edge treatments will appropriately include trees, shade structures, seating and other amenity elements that will encourage gathering and active uses at the water edge. The design is to vary to respond to the adjoining conditions including roadways, the promenade, passive and active recreational areas, development zones and the parkland interfaces:
 - Western edge - predominantly a soft landscape interface with easy transition of slopes back to the adjoining Riverlink pathway and open space areas. The edge provides a future north-south link through the precinct.
 - Eastern and northern edge – a formalised promenade edge to the lakeside that will be the primary focal point of the site, drawing activity from the various uses across the eastern portion of the site.
 - Southern edge – An edge defined by the multi-use facility that allows interaction with the waterfront.
- c) Views of mountains and access to the water are to be key elements in the landscape/public domain design.

- d) The promenade and lake edge is to provide sufficient area to accommodate a range of uses such as festivals, markets, passive and active recreation and interaction with the lake.
- e) The lakefront open space and promenade will accommodate spill over from any multi use facility to the south and is to integrate food, beverage and outdoor dining and recreational opportunities provided by the club expansion and retail outlet centre at the eastern and northern edges of the lake.
- f) Provide pedestrian connectivity from the active eastern part of the precinct to the western edge of the lake.

4. Ransley Street

- a) The Ransley Street character is to be designed as the main entry to the precinct. It is to be lined with active land uses, and lead to the active promenade at the lake frontage.
- b) Wide pavements are to be provided to allow for active adjacent land uses. In particular the southern side is to allow for generous pedestrian circulation and outdoor eating areas. These pavement areas will connect to a lakefront promenade and to parkland to the west and are to be suitable for active uses.
- c) The view corridor is to be maintained along the street to the mountains.
- d) Provide a focal point at the end of Ransley Street to draw visitors to the lake edge and to activate the precinct.
- e) A well designed urban space at the end of the Ransley Street activity zone is to be provided.
- f) The street should be characterised by active uses at ground floor level.

5. Recreational Open Space

- a) Detailed design is to allow parkland areas to transition from high amenity and useable trees-in-grass style parkland, to more densely vegetated areas with strong riparian character and content.
- b) The central visual axis along Ransley Street is to be extended to a visual element across the lake and the parkland.
- c) Areas for services and associated uses should not impact on the functionality or amenity of the recreational precinct.
- d) Parking areas serving the active recreation areas are to be suitably located and are to incorporate suitable landscaping and tree planting.
- e) A plan for the landscape treatment of Peachtree Creek is to be developed by the owners of the creek - Penrith City Council and Panthers Penrith.
- f) Any development application in the Recreational Precinct in regards to Peachtree Creek rehabilitation must take into consideration conditions of previous approval for a golf course on the site.

6. Mulgoa Road Frontage

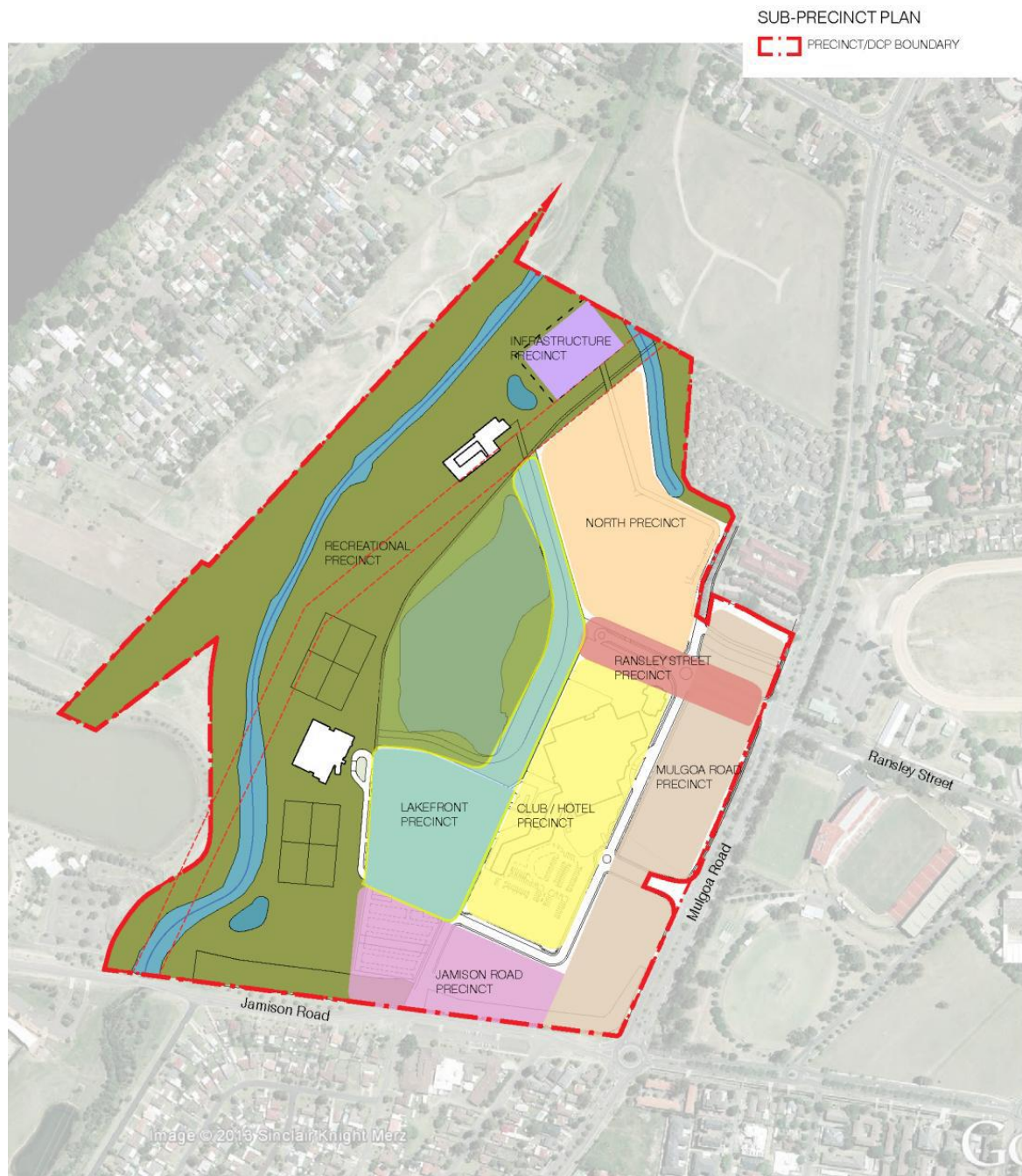
- a) Acknowledging the importance of this major regional roadway, the landscape treatment along Mulgoa Road is to be high quality design and is to be well maintained in the future.
- b) A 5m landscape setback along this frontage is to continue the nearby character of lawns, grasses and low native planting and retain the existing native canopy trees.
- c) Planting is to provide framed and filtered views and exposure to the new buildings along this frontage.

7. Jamison Road Frontage

- a) Jamison Road is to provide a transitional landscape character, continuing the Mulgoa Road landscape character with scattered canopy trees east of the new Harris Street intersection, and a more open parkland landscape character to its west.
- b) A landscape setback is to accommodate overland flow from land to the east.
- c) Landscape east of the overflow at-grade car park along the Jamison Road frontage is to successfully interface with adjoining playing fields and Peachtree Creek open space.

Sub Precincts

Figure E13.15: Sub Precincts



A background

The Panthers Precinct comprises a series of integrated sub precincts, each with a distinctive character and role. The sub precincts are defined by varying uses and built form, which are interconnected through the key focal points, being the lake's edge, Ransley Street and the site's street network.

Within each sub precinct there are a wide range of uses possible. These uses are not necessarily limited to a particular sub precinct however development must address the

envisaged character of each sub-precinct. It is the mix of these uses that provide a net community benefit to Penrith in delivering an entertainment, leisure and lifestyle precinct.

The following is the envisaged character and range of indicative uses for each sub precinct:

1. Ransley Street sub precinct

Ransley Street links the main entry from Mulgoa Road west to the Lakefront and Recreation precinct. This sub precinct, centred on Ransley Street will be a pedestrian oriented place, is linked by a range of active uses on both sides at street level.

The Ransley Street alignment and the alignment of buildings on either side provide a vista to the mountains, visible on entry to the Panthers Precinct as well as from Ransley Street to the east of Mulgoa Road. It will be an active street that will become a destination and strong entry to the precinct.

Indicative land uses within this sub precinct include a mix of uses comprising staged retail (limited to 12,500m² GFA), entertainment and possibly residential uses above. These sites are seen as having active edges that encourage both a vibrant street life and a rich public domain. Cafes, restaurants and ground level retail will generate activity through the day and into the evening as the Precinct becomes a unique urban environment.

2. Mulgoa Road sub precinct

Mulgoa Road is one of the major entries to Penrith City and therefore the sub precinct fronting it is an important 'front door' and gateway to the city itself.

This frontage is currently characterised by a 'green' landscaped edge to both sides of Mulgoa Road. It is proposed to strengthen this frontage with a well defined built form that reinforces the landscape setback.

While buildings within the Mulgoa Road precinct will not have direct vehicle access off Mulgoa Road, the buildings are to address this frontage, not 'turn their backs' on Mulgoa Road.

Open space between the Club and Mulgoa Road is to enhance the clubs address to the street. This open space is to be defined by a strong built edge to the north and south and will open up the site to its surrounds.

The north-west corner of the Jamison and Mulgoa Road intersection will be highly visible and will require high quality architectural and landscape design.

Indicative land uses include:

- a) Campus-style office development that is differentiated from, but complements, office space in the Penrith City Centre.
- b) A mix of uses that attract and sustain a vibrant and active day and night time economy.
- c) Sporting and recreation uses.

3. Club/Hotel sub precinct

There are existing buildings and facilities associated with the Club and Hotel within this sub precinct.

A key objective of the Panthers Precinct, and reinforced in this sub precinct, is to create a series of connections between this core and its surroundings including east to Mulgoa Road, west to the open space and recreation facilities as well as to the north towards the city.

Future development and/or expansion of the existing Club and existing Hotel should take advantage of views over the lake and towards the Blue Mountains.

It is proposed that new buildings will improve the activation of the public street edges of this precinct including the relationship with new Ransley Street area and the western edge.

Indicative land uses may include:

- a) Extension to the existing Club.
- b) Indoor/outdoor dining will be a vibrant and exciting new destination for Penrith.
- c) Food and beverage outlets and live entertainment venues.
- d) Hotel uses with synergies with conference and meeting events.
- e) A mix of uses that attract and sustain a vibrant and active day and night time economy.
- f) An aquatic centre.

4. Lakefront sub precinct

This sub precinct sits between the existing club core and recreation and open space area to the west. It is therefore an important linking sub precinct as well as the primary focus for pedestrian activity and active uses that 'spill out' to the lake, and the precinct's open space corridor. The Lakefront should also provide good pedestrian amenity.

The sub precinct will activate both the open space generally and the Lakefront in particular providing an excellent outlook to open space and the mountains.

Indicative uses may include:

- a) A Multi use events/ exhibition centre which would be a significant asset for Penrith and the region. The facility would host conferences, exhibitions, sporting events and concerts. Associated uses may include a gymnasium, sports medicine facility, café, community services and supporting facilities.
- b) Serviced apartments/ hotel uses with synergies with conference and meeting events.
- c) Café/restaurants to activate the Lake edge.

5. Jamison Road sub precinct

This Precinct is the southern edge of the Panthers site and is immediately north of Jamison Road and the largely residential areas to the south.

The precinct also addresses the open space recreational area to the west and a range of precincts to the north and east.

Indicative land uses may include:

- a) Residential development to provide additional activity and year round activation of the Precinct. A range of options exists on the site for medium and higher density residential and aged housing. Planning will take advantage of water and open space views with residents enjoying the range of uses and facilities within the precinct.
- b) Car park to support adjoining development.

6. North sub precinct

This sub precinct sits immediately north of Ransley Street and is located adjacent to the open space recreational area and lake.

The sub precinct creates a transition from the Panthers site to the Council owned 'Carpenter's site' that sits to the north which then connects to the Penrith City.

Retail uses within the zone will contribute to the activation of the Ransley Street precinct and the lakefront.

Indicative land uses may include:

- a) A retail outlet centre (limited to 25,000m² net usable floor area) which focuses on discounted and discontinued retail lines has been proposed in concept planning for the

precinct. The scale of the centre and its parking requirement will be subject to feasibility studies and traffic assessment. Rather than an internalised mall, there is an opportunity for the centre to explore the provision of outdoor dining and lakefront retail and take advantage of views over the lake and to the Blue Mountains.

- b) A mix of uses such as cafes, restaurants and ground level retail will generate activity through the day and into the evening as the Precinct becomes a unique urban environment.

7. Recreational sub precinct

The recreational sub precinct is the largest precinct on the Panthers site, occupying almost half the entire area. The precinct includes Peachtree Creek and the Riverlink which connects green space from Jamison Road northwards to Penrith City Centre via Council's 'Carpenter's site'.

This sub precinct will be characterised by landscaping, creek, lake and outdoor playing fields. The fields will be integrated into the landscape design to create distinctive linear parkland with a water focus at the termination of Ransley Street.

Indicative land uses may include:

- a) Sports facilities available to the wider Greater Western Sydney community as well as to elite training to allow promotion of excellence and participation.
- b) A range of active and passive recreation uses are to be accommodated including playing fields for a range of sporting codes.
- c) Temporary markets and community events.

8. Infrastructure sub precinct

Major services on the site will be located on land in the north of the precinct. High tension lines run through the site and it will be the location for substations and other service uses. Landscape buffers to the road, creek and adjoining site will be provided as necessary. This sub precinct can accommodate site maintenance facilities as required.

□□Objectives

- a) To create distinctive places activated by a mix of uses compatible with each sub precinct;
- b) To create a framework that is flexible enough to accommodate a changing range of uses over time and respond to market opportunities;
- c) To facilitate the orderly development of the precinct;
- d) To encourage high quality urban design, architectural excellence and environmental sustainability;
- e) To minimise potential conflicts and achieve compatibility between different uses;
- f) To guide development of sub-precincts across the site;
- g) To ensure that development contributes to the overall creation of a destination within Penrith;
- h) To plan uses in the most appropriate locations; and
- i) To preserve views to surrounding places where identified.

C□Controls

1. General

- a) A development application within each sub precinct is to consider the desired character of that sub precinct and the Panthers Precinct.

2. Mulgoa Road sub precinct

- a) Any proposed residential uses are to be located at the southern end towards Jamison Road and north of Ransley Street within this sub precinct.
- b) Development is to take advantage and respond to the high visibility of the Mulgoa Road frontage. A high quality architectural response is required for development along the Mulgoa Road frontage and is to address this road.
- c) Campus style office development is to complement office space within the City Centre through features such as low rise, large floor plate development.

3. Club/Hotel sub precinct

- a) Future expansion of the existing club is to take advantage of views to the lake and Blue Mountains and allow for associated outdoor areas for club use.
- b) Pedestrian linkages through the sub precinct are to be provided.

4. Ransley Street sub precinct

- a) Ransley Street is to be developed as the main street to the Precinct with a range of active street level uses including restaurants and cafes. The sub precinct is to support uses to the immediate north and south of Ransley Street.
- b) A focal point is to be provided at the lakefront end of the street to create a sense of arrival.
- c) Development is to facilitate connectivity between Ransley Street and the Stadium to connect patrons between the two sites and generate activity by providing an attractive pedestrian environment.
- d) Development in Ransley Street is to take into consideration views towards the lake and the Blue Mountains.

5. Mixed Use Controls (not limited to Ransley Street sub precinct)

- a) Developments with a mix of uses must have flexible building layouts which allow greater adaptability of the floor area of, or tenancies on, the first floor of a building above the ground floor.
- b) Development with a mix of uses is to have a minimum floor to floor height of 3.6m in order to provide for flexibility of future use.
- c) The commercial and residential activities of the building are to have separate service provision, such as loading docks and residential access and servicing needs.
- d) Residential pedestrian and vehicular entries shall be clearly marked and provide direct access to the street. Pedestrian entrances are to address the main streets.
- e) Commercial and residential uses should have clearly separate pedestrian and vehicular entries and internal vertical circulation.
- f) Security access controls must be provided to all entrances into private areas, including car parks and internal courtyards.
- g) Buildings are to front onto major streets with active uses.
- h) Blank building walls with frontage to streets or open space are to be avoided.

6. Lakefront sub precinct

- a) A landmark building (up to 32m) is to be located on the lake adjacent to the Ransley Street termination.
- b) Develop an accessible frontage to the lakefront. Ensure shade through the provision of trees and shade structures.
- c) A well designed landscaped promenade is to be developed on the lakefront, connecting the retail outlet centre, the Club and the multi-use facility.

7. North sub precinct

- a) Large scale retail outlet centre use in the sub precinct is to explore the possibility of open air shopping and must develop a strong relationship to the lake and Ransley Street activity zone.
- b) Any uses within this sub precinct are to consider the privacy and amenity of adjoining residences.
- c) A landscape buffer is required at the interface with existing adjoining residential development.

8. Recreational sub precinct

- a) On-grade parking areas are to be located adjacent to sports fields with suitable landscaping so as to minimise visual impact and to provide shade.
- b) Development within the Recreational sub precinct will be required to demonstrate compatibility and flood conveyance and must not adversely affect the existing flood conditions.

9. Jamison Road sub precinct

Residential (not limited to Jamison Road sub precinct)

- a) In addition to other controls in this DCP, State Environmental Planning Policy No.65 – Design Quality of Residential Flat Development (SEPP 65) and the accompanying Residential Flat Design Code apply to residential development in the Panthers Penrith Precinct including flats, multi dwelling housing, any residential component of a mixed use development, and serviced apartments that are strata titled.
- b) In particular, Parts 2 and 3 of the Residential Flat Design Code will apply to the precinct and include provisions for the following:
 - Site configuration including deep soil zones, fences and walls, landscape design, open space, orientation, planting on structures, and stormwater management
 - Site amenity including safety and visual privacy
 - Site access including building entries, parking, pedestrian and vehicle access
 - Building configuration including apartment layout, balconies, ceiling heights, flexibility, ground floor apartments, internal circulation, mixed use and storage
 - Building amenity including acoustic privacy, daylight access and natural ventilation
 - Building form including awnings, facades and roof design
 - Building performance including energy efficiency, maintenance, waste management and water conservation.
- c) In addition to controls for apartment mix in Part 3 of the Residential Flat Design Code, the following controls apply:

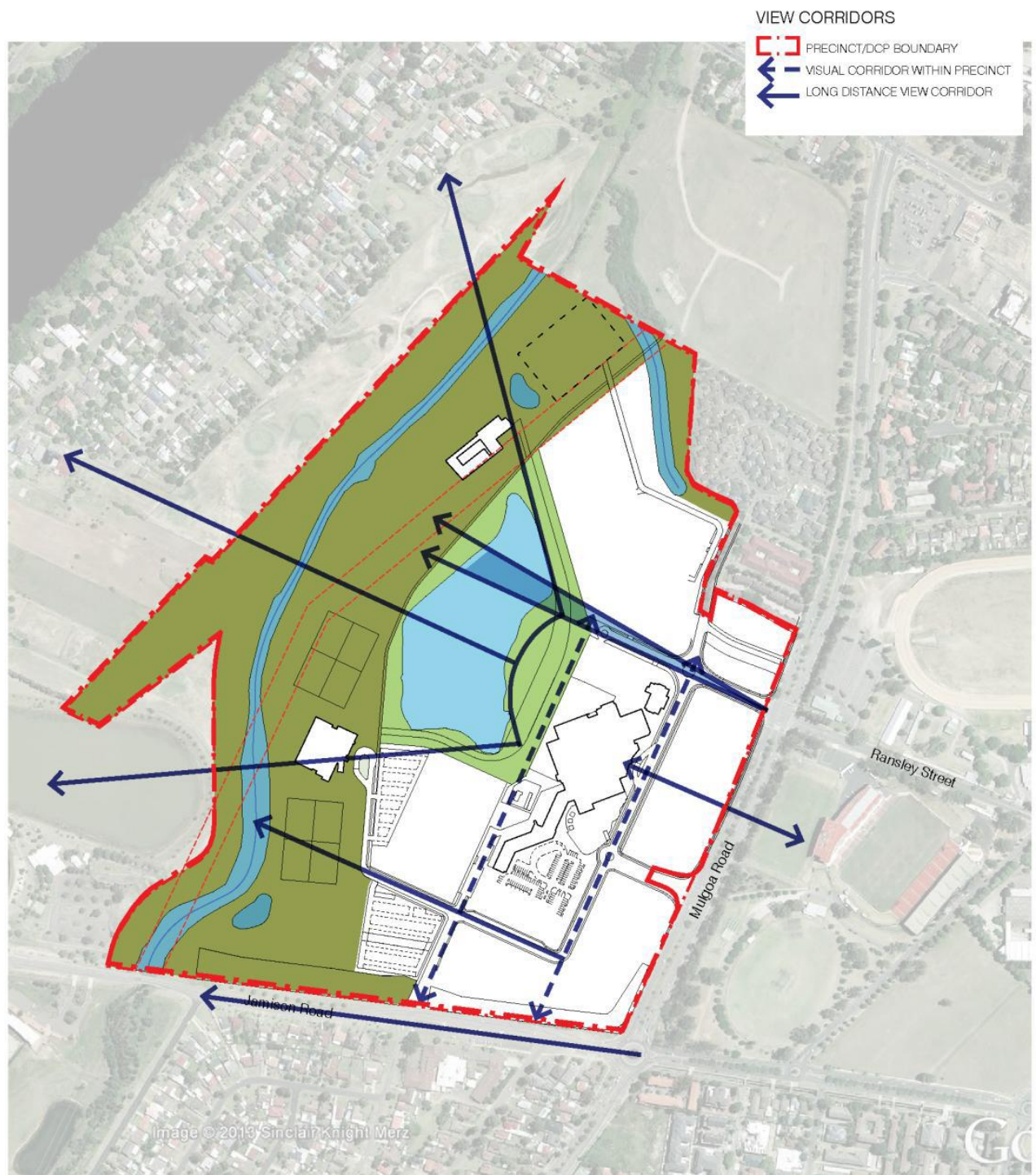
- i) Where residential units are proposed at ground level in a zone nominated as an Active Frontage, a report must be provided with the development application demonstrating how future non-residential uses can be accommodated within the ground level design. The report must address:
- Access requirements including access for people with a disability;
 - Any upgrading works necessary for compliance with the Building Code of Australia; and
 - Appropriate floor to ceiling heights.
- ii) 10% of all dwellings or a minimum one dwelling, whichever is the greater, must be designed in accordance with the Australian Adaptable Housing Standard (AS 4299-1995), to be capable of adaptation for people with a disability or elderly residents.
- iii) Where possible, the mandatory adaptable dwellings shall be located on the ground floor. Adaptable dwellings located above the ground level of a building may only be counted towards the minimum required where lift access from the basement is available within the building.
- iv) The development application must be accompanied by certification from an accredited Access Consultant confirming that the adaptable dwellings are capable of being modified, when required by the occupant, to comply with the Australian Adaptable Housing Standard (AS 4299-1995).
- v) Car parking and garages allocated to adaptable dwellings must comply with the requirements of the relevant Australian Standard regarding parking for people with a disability.

10. Infrastructure sub precinct

- a) Development must preserve amenity of existing adjoining residences and a landscape buffer must be maintained.
- b) Landscaped setbacks shall be provided from the river walk edge to screen and minimise visual impacts from any utilities locating within this sub precinct.
- c) Development application for infrastructure is to consider any visual impacts.

Views

Figure E13.16: Views



A□□background

There are a number of existing distant views, especially from the eastern edges, looking west across the site. These views are important to the identity of the region and characterise this area of Penrith.

The Blue Mountains can be seen from various points along Mulgoa Road and along the Ransley Street alignment at the Panthers site. There are important views between the Panthers Club and the Penrith Football Stadium across Mulgoa Road. Figure E13.16 shows the views corridors on the Site to the mountains and between the Panthers Club and the Penrith Football Stadium.

□□Objectives

- a) To maintain identified views and vistas;
- b) To reinforce the visual connection between Mulgoa Road and the mountains;
- c) To protect and provide visual connectivity between sub precincts and towards the site recreational areas;
- d) To improve legibility and sense of place from within the site;
- e) To visually connect the Precinct to the wider area; and
- f) To create new view corridors where possible, to maximize views over the lake and towards the Blue Mountains.

C□Controls

- 1) Development is to preserve major views /vistas as identified on Figure E13.16.
 - a) Extension of Ransley Street view corridor to the Blue Mountains
 - b) The view from the Club entry to the Stadium
 - c) Views from the eastern edge of the lake to the Blue Mountains.

□□□□□Public Art Strategy

A□□background

Panthers Penrith is an entertainment, leisure, lifestyle and sporting precinct with a unique sense of place. It is a key destination for the Penrith Community and the Western Sydney region that will be further realised by the vision of the master plan. The provision of public art within open space is an important step in contributing to this sense of place in the precinct and the creation of an enlivened public domain.

Public art should be developed with the engagement of professional artists, and reflect and interpret matters of local significance.

An art strategy for the precinct is to be developed that responds to the architectural character and environment of the Panthers Penrith precinct through the staged integration of public art with public spaces as the precinct is delivered.

□□Objectives

- a) To integrate urban art within the public domain and property development;
- b) To position Penrith as an internationally renowned arts destination;
- c) To encourage excellence in the development of urban art initiatives;
- d) To create opportunities for landmark statements in the Penrith landscape; and

- e) To enrich the public domain through the installation of artworks in the open space network, particularly around the lakeside promenade.

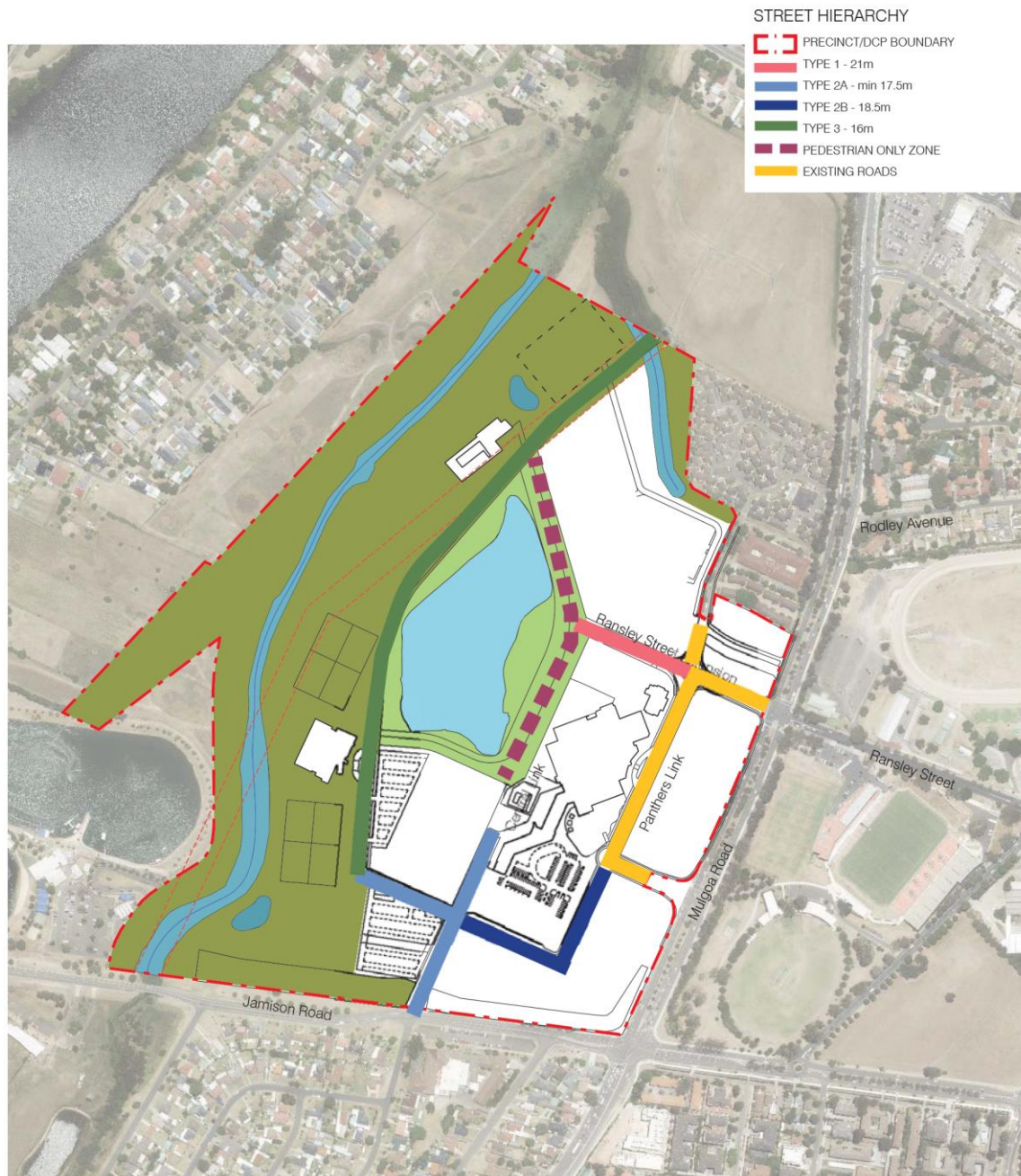
C▯Controls

- 1) A Public Art Strategy is to be prepared by a specialist art consultant for the whole Precinct prior to approval of the first major building development application \$5 million in value.
- 2) The Public Art Strategy is to be relevant and site specific for the precinct and is to address:
 - a) Context of precinct within Penrith and the Penrith Community
 - b) Community / public artist engagement
 - c) Location of installations/art work
 - d) Themes and narrative
 - e) Procurement strategies
 - f) Maintenance strategies
 - g) Decommissioning strategies.

13.8 CONNECTIVITY

8 Street Design and Character

Figure E13.17: Street Hierarchy



A□□background

The Panthers Penrith Precinct currently has three existing streets: Ransley Street, Panther Place and the road between Ransley Street and Panther Place in front of the Club. The expanded street network encourages pedestrian permeability, public transport, cycle and local vehicle and service access and movement across the Site and to adjoining places.

A clear hierarchy of street types is proposed throughout the site.

The street character is local in nature with street tree planting used to reinforce the character of the street. Generous footpaths and setbacks allow for cafes and outdoor seating opportunities. Consistently spaced street tree planting will create a generous landscape treatment framing the street, providing shade to the street and complementing the green corridors of Mulgoa Road and the north-south open space green corridor.

It is anticipated that Panthers Penrith will have a variety of new streets:

Ransley Street extension (Type 1 - Primary Street)

The Ransley Street extension provides the primary point of address to the Site, linking Mulgoa Road physically and visually to the Site and to the mountains beyond. The opening up of this link will also create a memorable sense of arrival. The interface and intersections of this link create the most important address points to the Site. Its character will be active with some outdoor seating, and with buildings built to the boundary. It will provide an appropriate prelude to the vibrancy of the lake promenade and adjacent uses.

Panthers Link (Existing Road to remain)

The Panthers Link is currently the primary north-south vehicular link within the Site. This road will be maintained with public domain improvements. The public bus will use this street with the front entry to Panthers the main stop within the Site.

Central Link (Type 2 Secondary Street)

The Central Link roads will provide vehicular access within the Site, from Jamison Road at the south to Panthers Link. They will be designed to accommodate events and exhibition traffic and service vehicles.

Peachtree Creek Edge & Riverlink (Type 3 - Park Edge Street)

The Peachtree Creek edge will be defined by a low volume north-south vehicular link through the Site from Jamison Road at the south, past the western edge of the existing lake to the northern boundary of the site. A footpath and cycleway will be developed the full length of the north-south corridor providing an essential part of the link from the CBD leading to the Nepean River. The street will be strongly pedestrian focussed but it will accommodate slower vehicular traffic with the ability to close the street if required for events or at other times.

□□Objectives

- a) To create a quality public domain that provides legible, safe and comfortable street environments, in terms of daylight, scale, sense of enclosure and wind mitigation;
- b) To ensure good circulation within the site;
- c) To encourage sunlight access to new public spaces; and
- d) To facilitate view corridors to the Blue Mountains.

C□Controls

- 1) All streets will be constructed in accordance with Council's standards.

2) The dimensions of each road as noted in Figure E13.17 will be:

Road Type	1	2	2a	3
	Primary Street	Secondary Street (without parking)	Secondary Street (with parking)	Park Edge Street
Total width	21.0 m	17.5m	18.5m	16m
Road width	7.0 m	10.5m	6.5m	6.5m
Parking	2 x 2.5 m	NA	2 x 2.5 m	1 x 3.0m
Footpath & verge	2 x 4.5m	2 x 3.5m	2 x 3.5m	1 x 6m

3) Street sections are illustrated in Figures E13.18-21.

Figure E13.18 Primary Street – Type 1

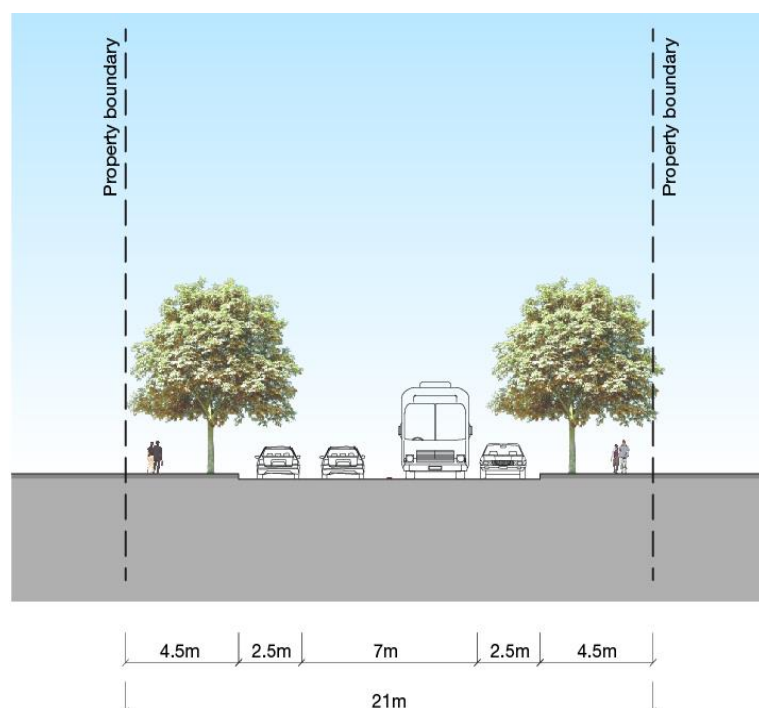


Figure E13.19 Secondary Street (without parking) – Type 2

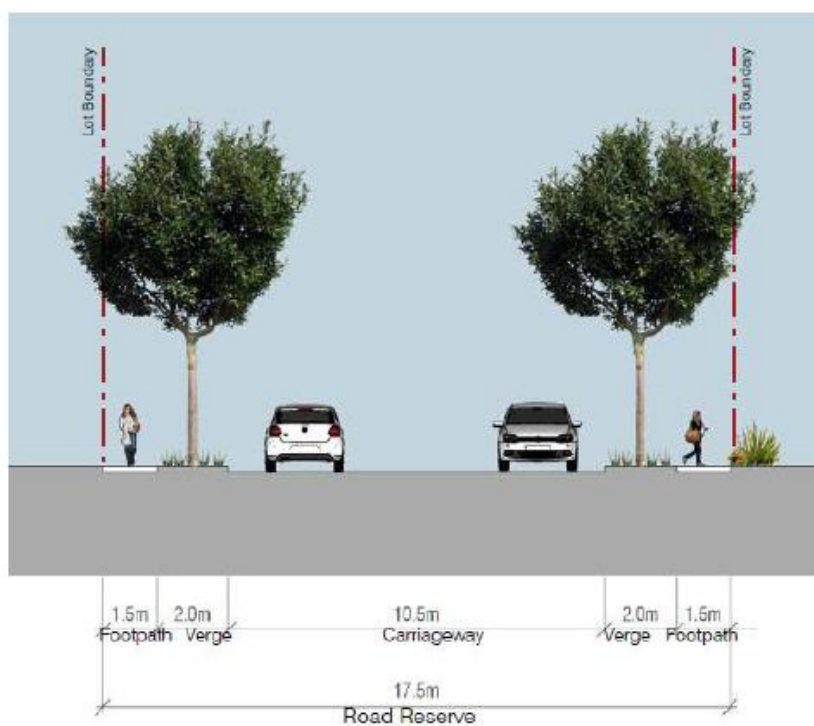


Figure E13.20 Secondary Street (with parking) – Type 2a

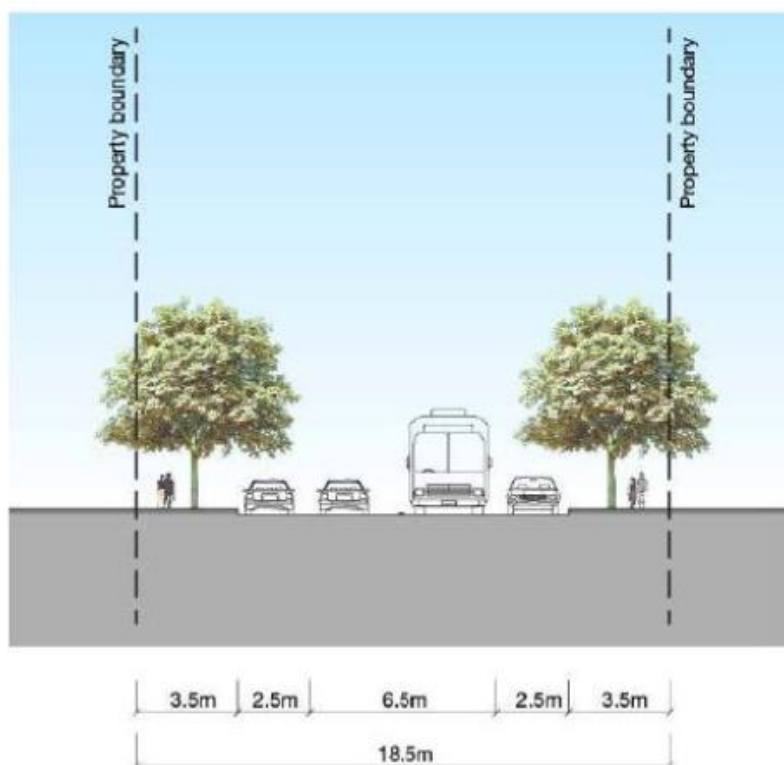
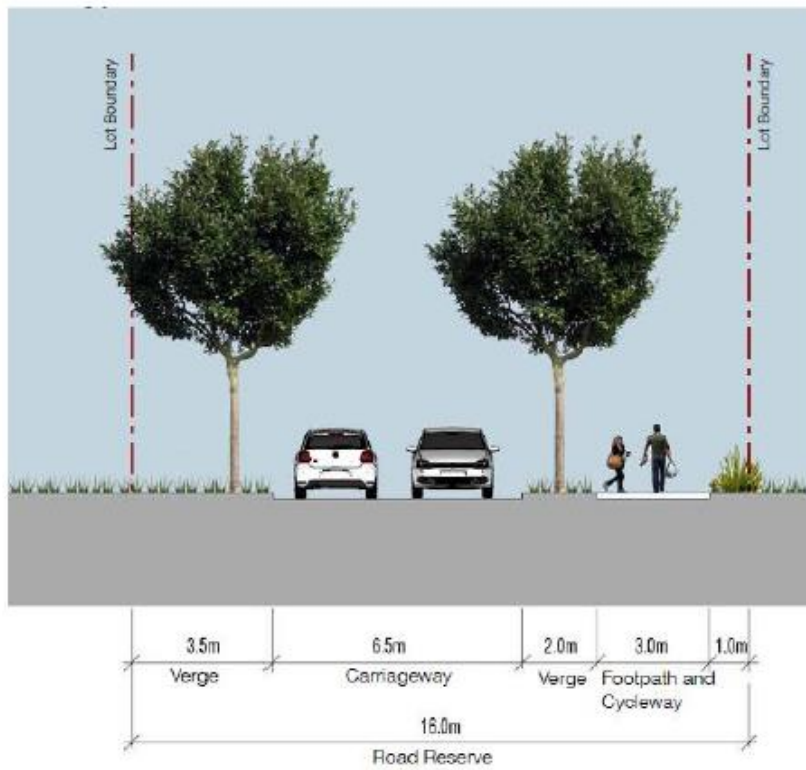
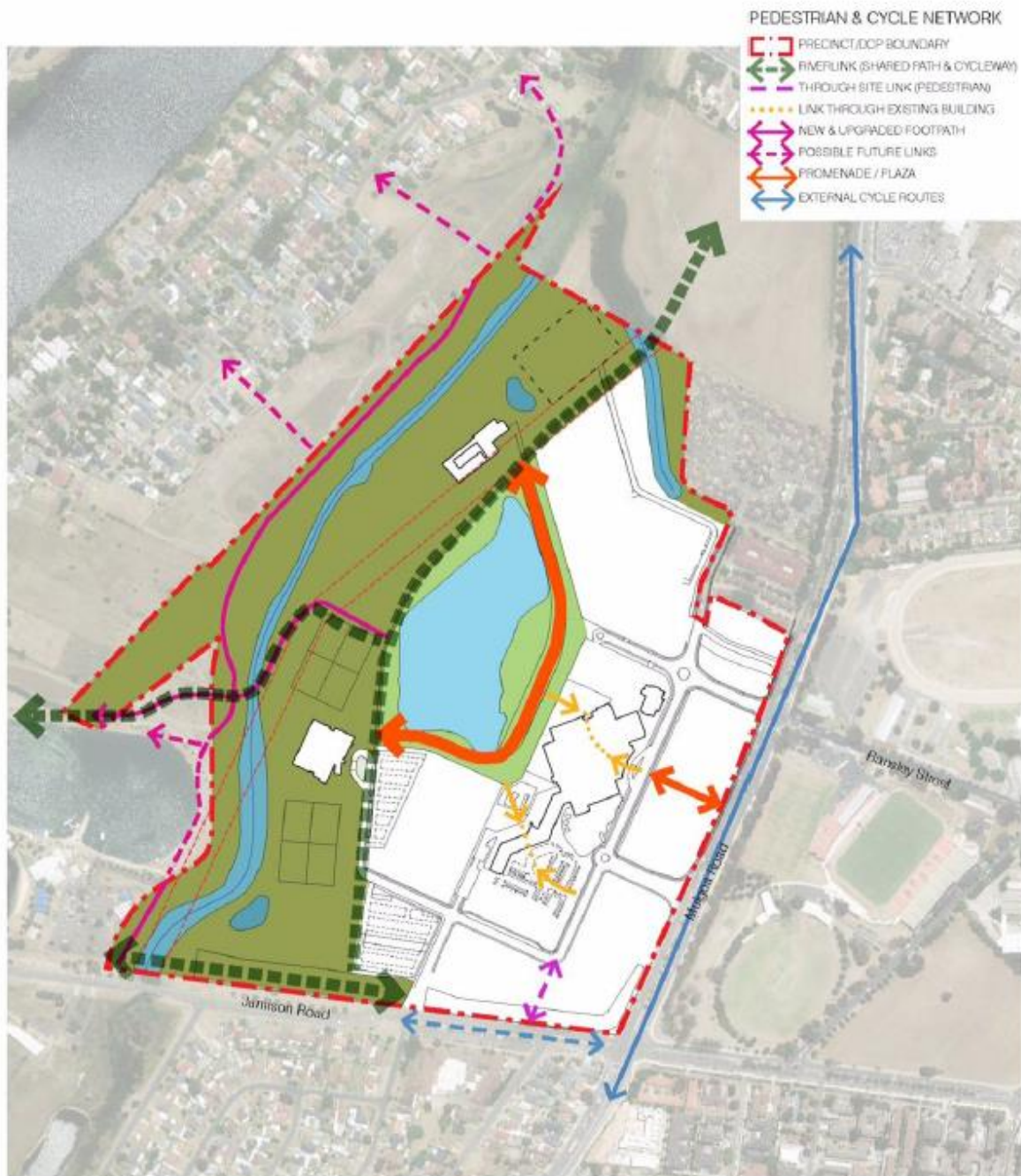


Figure E13.21: Park Edge Street – Type 3



8.2 Pedestrian and Cycle Network

Figure E13.22: Pedestrian and Cycle Network



A Background

The new road network forms the basis of both pedestrian and cycle access within the site. Generous footpaths accommodate pedestrian movement and wide lanes and in some areas dedicated cycleways facilitate bicycle movement around the precinct.

B Objectives

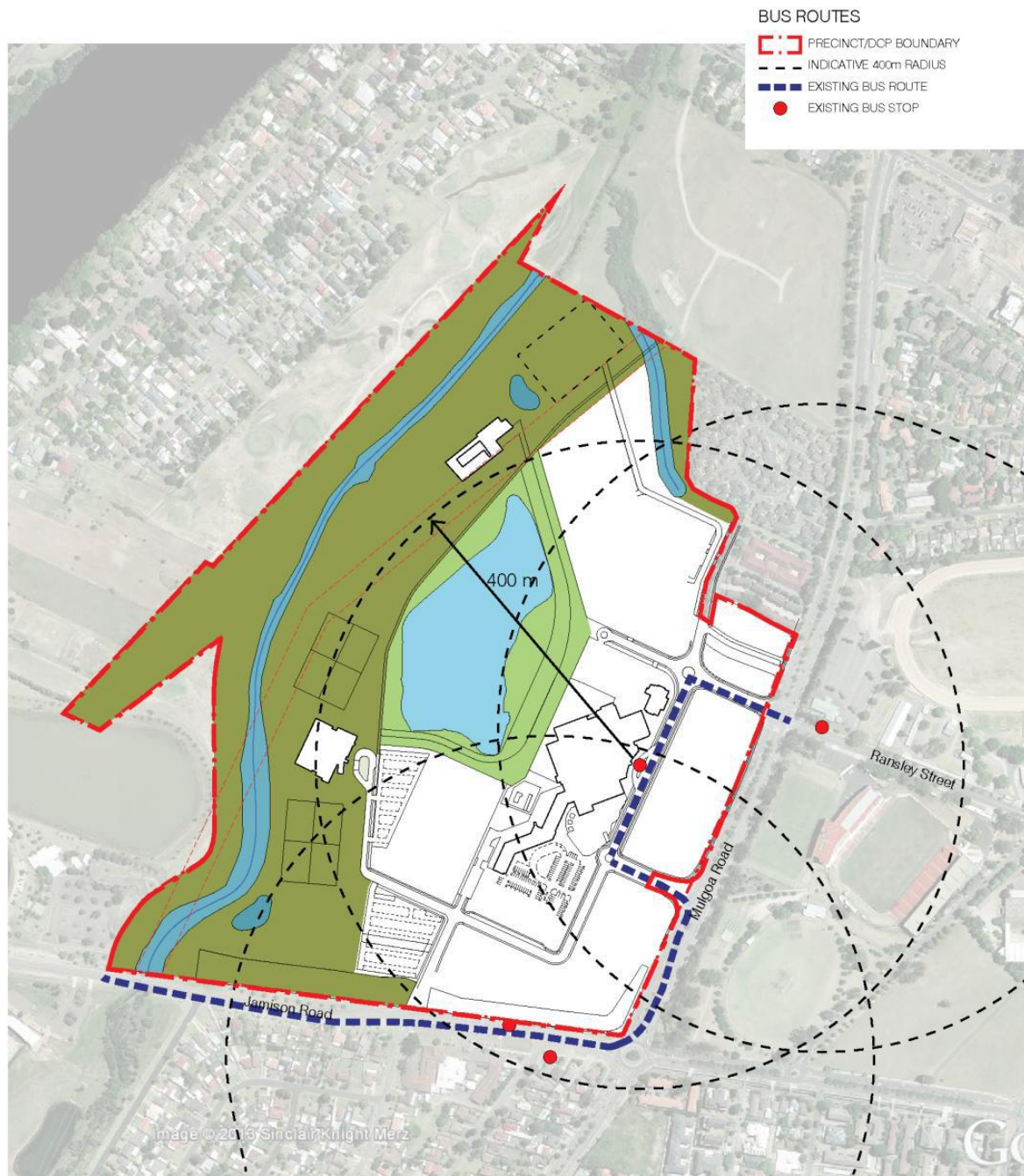
- a) To improve access in the Panthers Penrith by providing through site links as development occurs;
- b) To retain and enhance existing through site links as redevelopment occurs;
- c) To encourage active street fronts along the length of through site links where possible;
- d) To provide for pedestrian amenity and safety;
- e) To improve the permeability of large sites when they are redeveloped for more intensive uses; and
- f) To provide a lakefront promenade that provides a central pedestrian connection to the various lakeside sub precincts.

C Controls

- 1) Pedestrian and cycle access within the site is to be provided as indicated in Figure E13.22.
- 2) A dedicated cycle lane is to be provided to the park edge.
- 3) Pedestrian links are to make use of existing crossings within the Peachtree Creek zone.
- 4) Pedestrian links are to facilitate future connections from outside the site.
- 5) Through site links are to be provided as shown in Figure E13.24 with accessible paths of travel that are:
 - a) A minimum width of 4m for its full length and clear of all obstructions including columns, stairs, etc.
 - b) Direct and publicly accessible thoroughfares for pedestrians.
- 6) Signage is to be located at street entries indicating public access through the site as well as the street to which the link connects.

8 Public Transport

Figure E13.23: Public Transport Nodes



A Background

The Site benefits from its relatively close proximity to Penrith railway station – the station is within 20 minutes casual walking distance to the north of the precinct.

A number of bus routes travel north-south along Mulgoa Road, providing access to the railway station and Penrith city centre. Jamison Road has a weekday bus service. Panthers has a bus stop for public buses serving Penrith and the Blue Mountains.

B Objectives

- a) To locate higher density development near public transport opportunities;
- b) To explore extension of bus services into the site; and
- c) To ensure adequate infrastructure for pedestrian amenity and safety.

C Controls

- 1) The public transport route is shown as per Figure E13.23.
- 2) New development is to respond to public transport opportunities within and adjacent to the site.
- 3) Ensure adequate infrastructure for bus users such as seating and shelters are provided at bus stops within the site.

8 Traffic Parking and Site Access

Figure E13.24: Restricted Vehicular Access



A. Background

The Panthers Penrith Precinct will accommodate a range of uses and traffic generation and parking needs will differ from traditional single use sites.

Panthers have entered into a Voluntary Planning Agreement with the roads and Maritime Services and Council to deliver local and State road infrastructure as result of traffic generated by the development within the Precinct.

B. Objectives

- a) To ensure that traffic generation of development on the Panthers Penrith Precinct does not exceed agreed limits;
- a) To integrate adequate car parking and servicing access without compromising street character, landscape or pedestrian amenity and safety;
- b) To ensure that adequate parking to serve development is provided on site;
- c) To encourage shared use of parking;
- d) To allow flexibility in parking rates to reflect shared use or best practice;
- e) To ensure that parking structures do not dominate the public domain; and
- f) To control site entry points to encourage the active use of street frontages.

C. Controls

Traffic and Access

- 1) Development applications for major development proposals should be accompanied by an appropriate Traffic Report that details the assessed impact of projected vehicular traffic associated with the proposal. Traffic on the site is not to exceed limits identified in the Voluntary Planning Agreement supporting Traffic Management Report.
- 2) Any Traffic Report or Traffic Impact Statement is required to address the following issues:
 - a) The objectives of this section relating to transport and land use;
 - b) The objectives of this section relating to traffic management and safety; and
 - c) The objectives and controls of this section relating to traffic generating developments.
- 3) A Traffic Plan that addresses Special Event traffic conditions is to be submitted with any DA for event or major sporting facilities on the site.
- 4) Vehicular access is not permitted in zones nominated in Figure E13.24 and where practicable, vehicle access is to be from secondary streets.
- 5) A new median in Jamison Road is to be provided.
- 6) Potential pedestrian/vehicle conflict is to be minimised by:
 - a) Limiting the width and number of vehicle access points;
 - b) Ensuring clear site lines at pedestrian and vehicle crossings;
 - c) Utilising traffic calming devices; and
 - d) Separating and clearly distinguishing between pedestrian and vehicular accessways.

Parking

- 1) The appearance of car parking and service vehicle entries is to be improved by locating or screening parking, garbage collection, loading and servicing areas visually away from the street.
- 2) Structured parking that extends above ground where viewed from the public domain is to be architecturally treated or where possible sleeved with development.
- 3) Any development application within the Mulgoa Road sub precinct is to submit a car parking strategy that details the location and provision of the displaced existing parking as a result of any development within this sub precinct.

13.9 BUILT FORM

☐☐☒☐☐☐☐ Street Alignment ☐ Wall ☐ Height and Setbacks

Figure E13.25: Setbacks

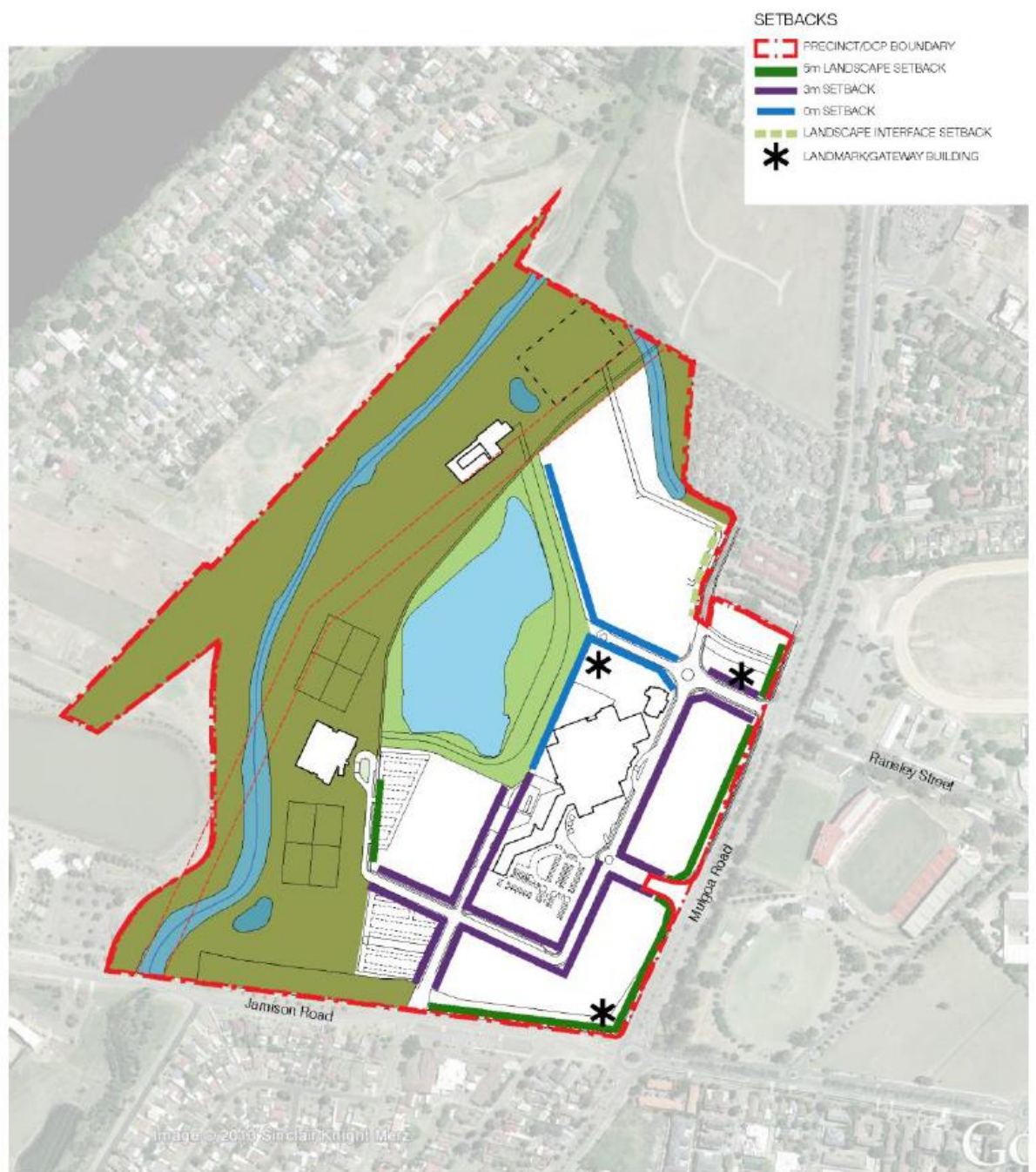
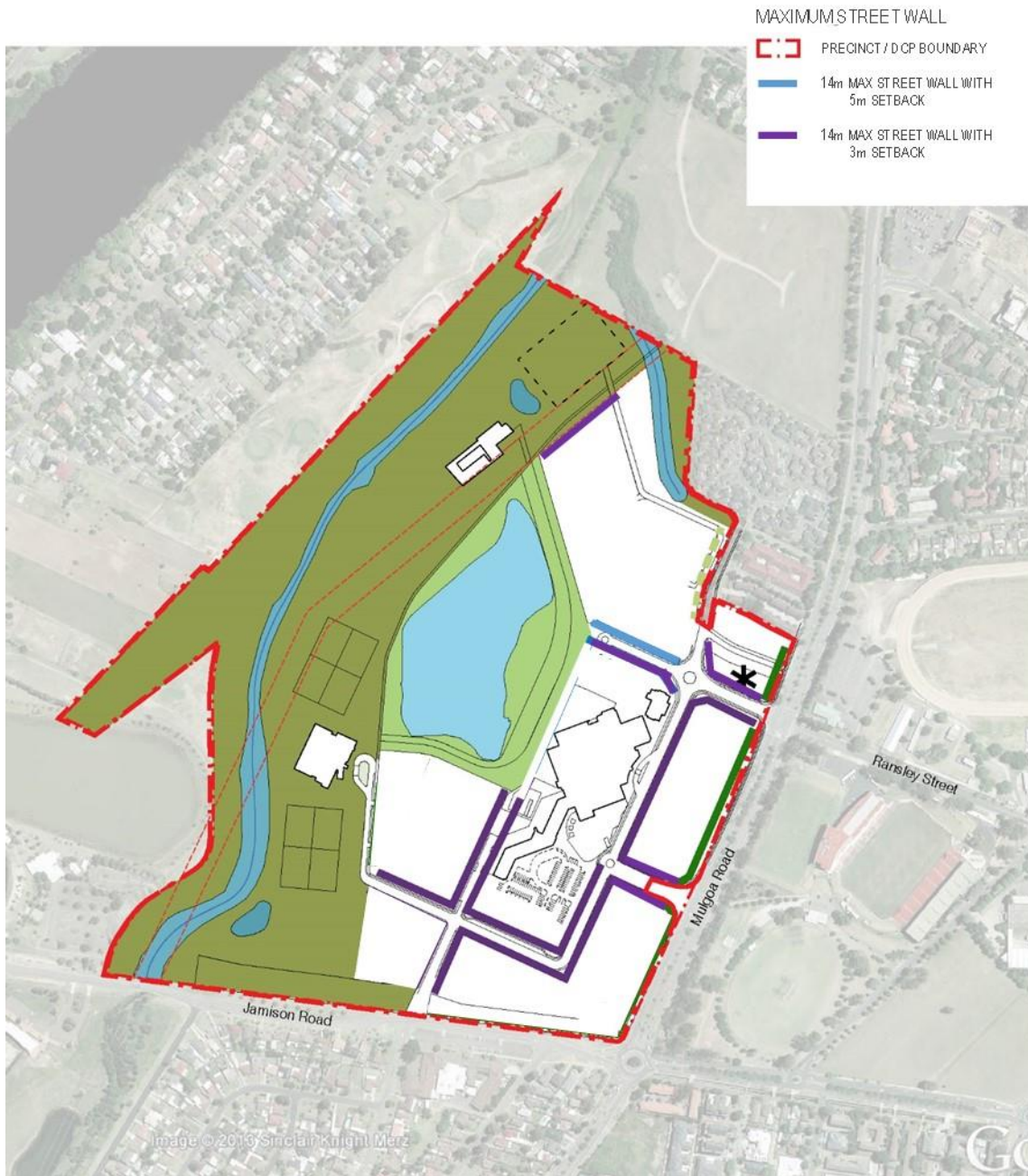


Figure E-2 Street Wall Height



A□□background

Zoning of the site allows for heights up to 24m with a landmark building site of 32m. The establishment of a clear and cohesive built form framework allows for flexibility of building use.

Street setbacks and building alignments establish the front building line. They help to create the proportions of the street and can contribute to the public domain by enhancing streetscape character and continuity of street facades.

Street setbacks can also be used to enhance the setting and address for the building. They provide for landscape areas, entries to ground floor apartments and deep soil zones. Setbacks allow ventilation, daylight access and view sharing and increase privacy.

Buildings should be built up to the street alignment to reinforce the urban character and improve pedestrian accessibility amenity and activity at street level. Above street frontage height, buildings are to be set back to provide sunlight access to streets, pedestrian areas and lower levels of other buildings. These setbacks allow view corridors, an appropriate building scale for pedestrians, and good growing conditions for street trees.

□□Objectives

- a) To establish consistent building alignments to the street;
- b) To provide street setbacks appropriate to building function and character;
- c) To establish the desired spatial proportions of the street and define the street edge;
- d) To create a transition between public and private space;
- e) To locate active uses closer to pedestrian activity areas;
- f) To maintain sun access to the public domain;
- g) To protect important views to the Blue Mountains escarpment;
- h) To ensure an appropriate level of amenity for building occupants in terms of daylight access, outlook, view sharing, ventilation, wind mitigation, and privacy;
- i) To achieve usable and pleasant streets and public domain areas in terms of wind mitigation and daylight access;
- j) To provide building separation for visual and acoustic privacy; and
- k) To provide deep soil zones within sites, and maintain mature/significant vegetation where possible.

C□Controls

General

- 1) Street building alignment and street setbacks are specified in Figure E13.25 and Figure E13.26.
- 2) Balconies may project up to 600 mm into front building setbacks, provided the cumulative width of all balconies at that particular level totals no more than 50% of the horizontal width of the building façade, measured at that level.
- 3) Minor projections into front building lines and setbacks for sun shading devices, entry awnings and cornices are permissible.
- 4) The minimum height of development built to the side boundary should comply with the maximum street frontage height requirement as shown in Figures E13.27-31. Exceptions

to this control can occur for parts of a building's frontage provided it is not more than 40% of that buildings frontage and such exemption is justified on architectural merit.

- 5) Where 0m side and rear boundary setbacks are permissible, it must be demonstrated that 0m setbacks provide amenity in terms of day light access and ventilation.

Gateway Buildings

- 1) Gateway sites have been nominated at the corner of Jamison and Mulgoa Roads and at the site entry off Mulgoa Road at Ransley Street. Special emphasis through architectural quality and detailing is required.
- 2) These buildings are to be iconic in form and will denote and provide emphasis to the main Blue Mountain view corridors from Mulgoa Road.
- 3) Buildings are to address the corner condition with an emphasis on the approach along Mulgoa Road.

Figure E13:27 Setbacks on existing North/South Street

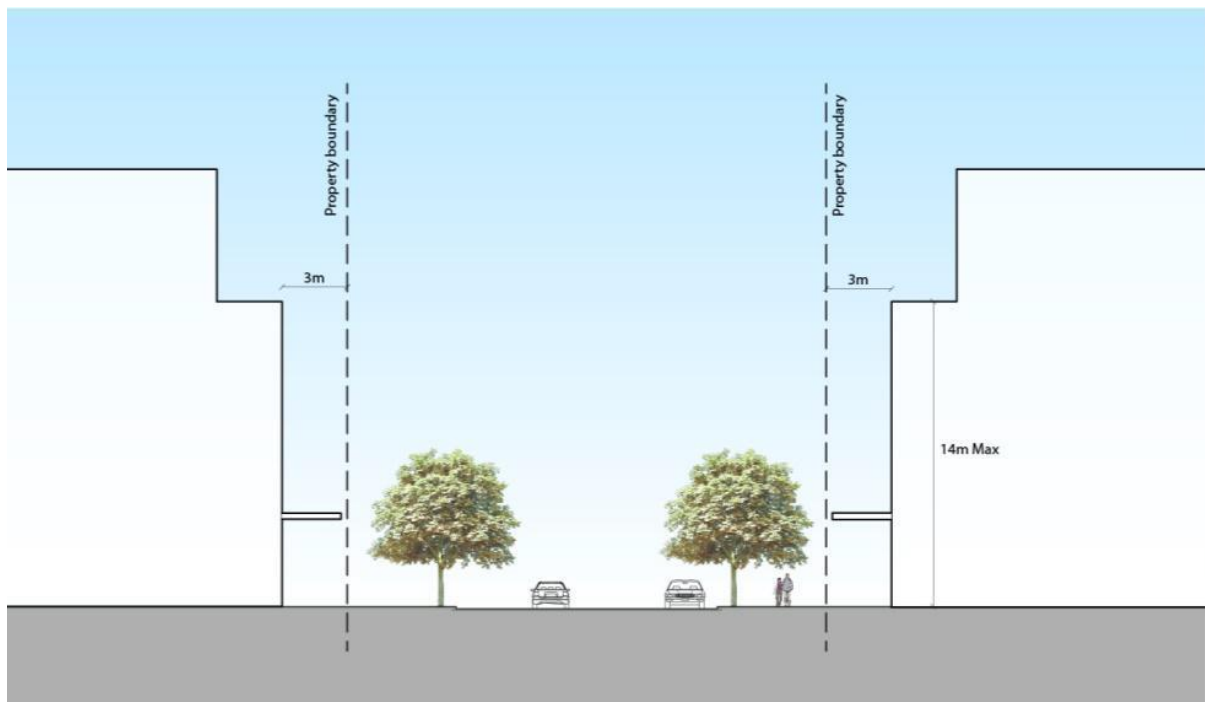


Figure E13:28 Setbacks West of Existing Hotel

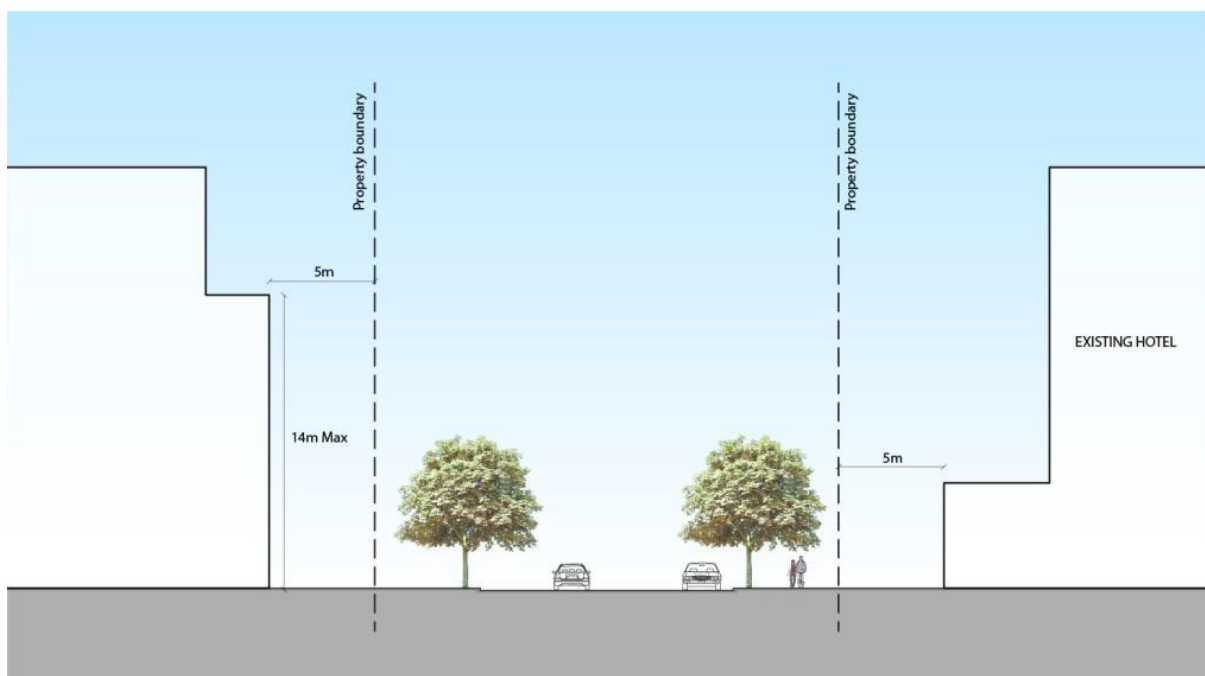


Figure E13:29 Setbacks on Ransley Street

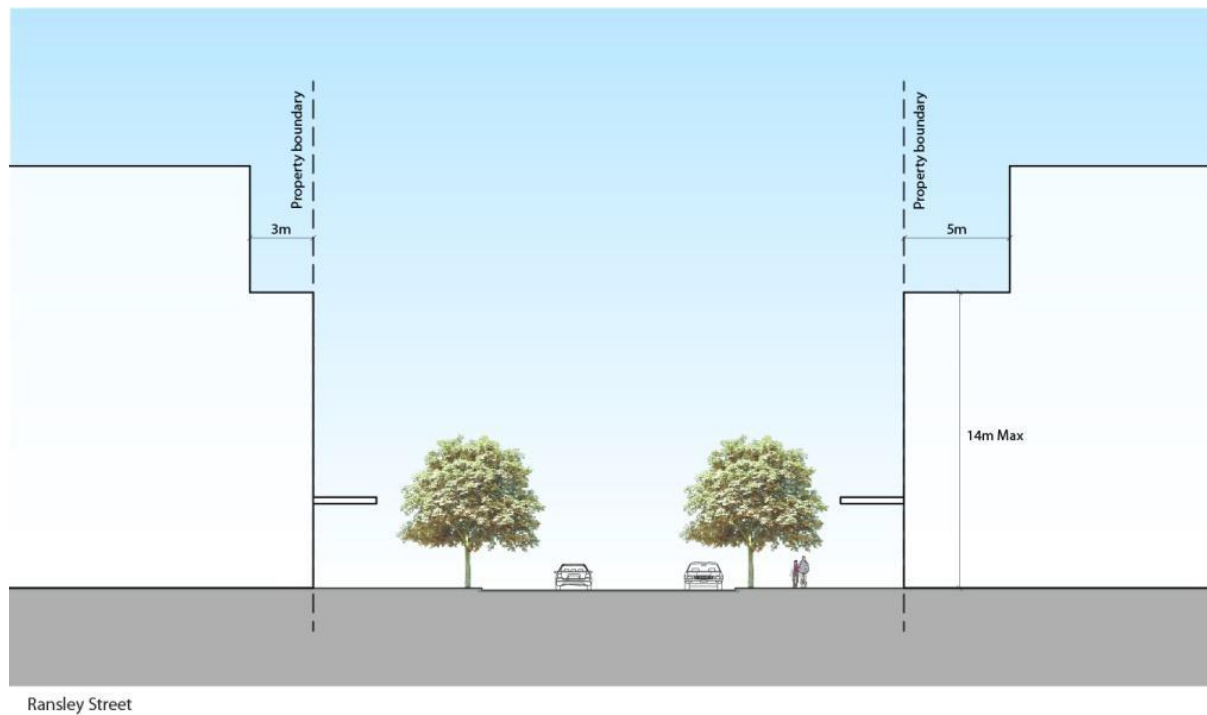


Figure E13:30 Setbacks Park Edge Street

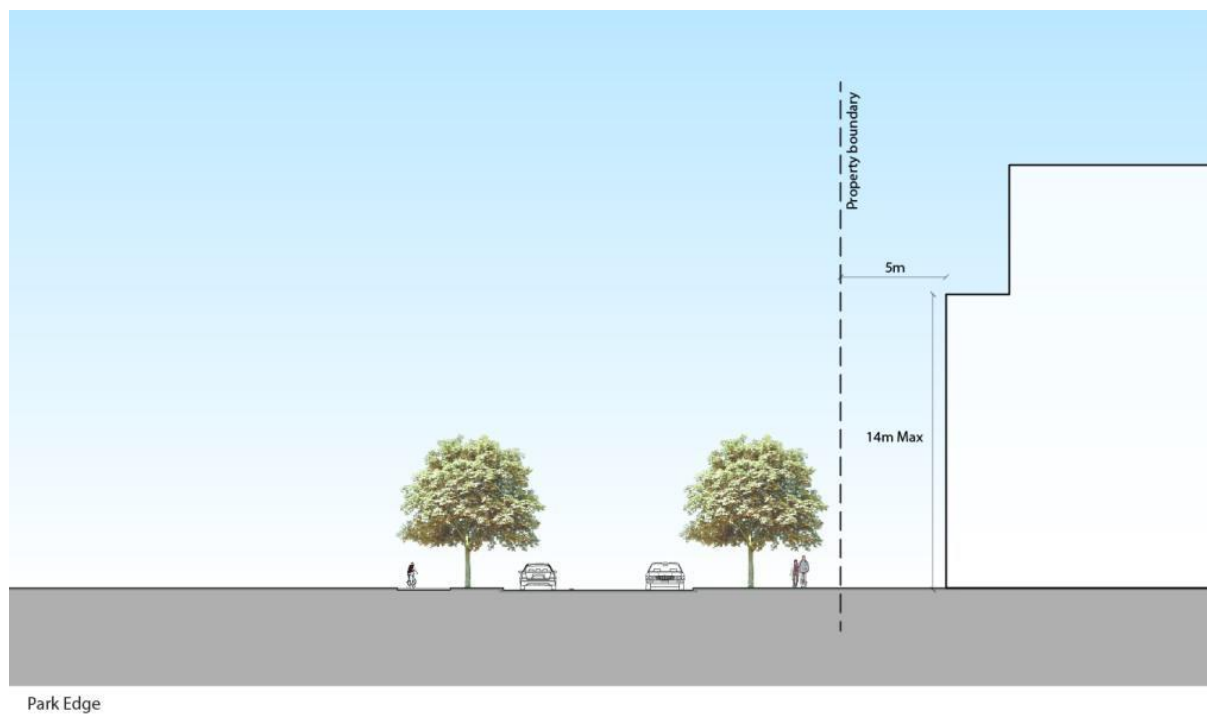
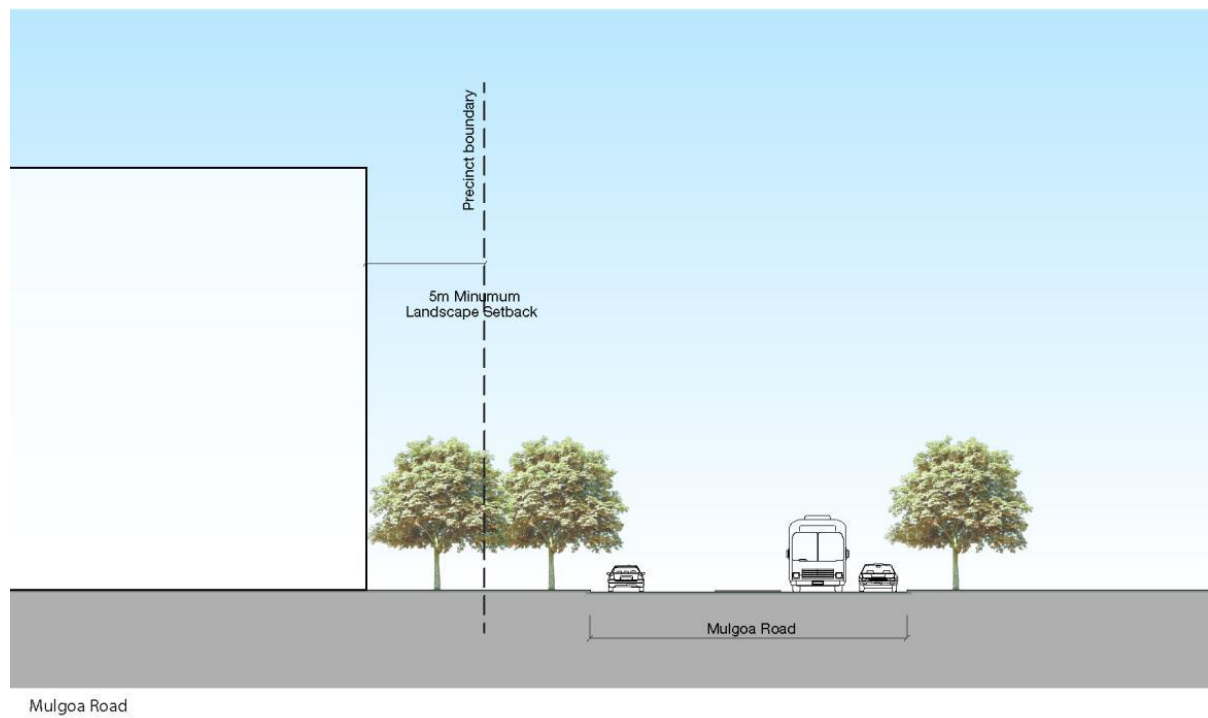


Figure E13:31 Mulgoa Road Frontage



2 Active Street Frontages

Figure E13.32: Active Frontages



A□□ackground

Active frontages promote an interesting and safe pedestrian environment. Due to the size of the area, it is recognised that not all streets will develop as active pedestrian areas. Active frontages have been identified where active ground level uses are to be consolidated, creating vibrant streetscapes in areas with high pedestrian traffic and possibly located close to public transport and public open space.

Active uses include:

- a) Shop fronts
- b) Retail/service facilities with a street entrance
- c) Cafe or restaurants with street entrance
- d) Community and civic uses with a street entrance
- e) Recreation and leisure facilities with a street entrance.

□□Objectives

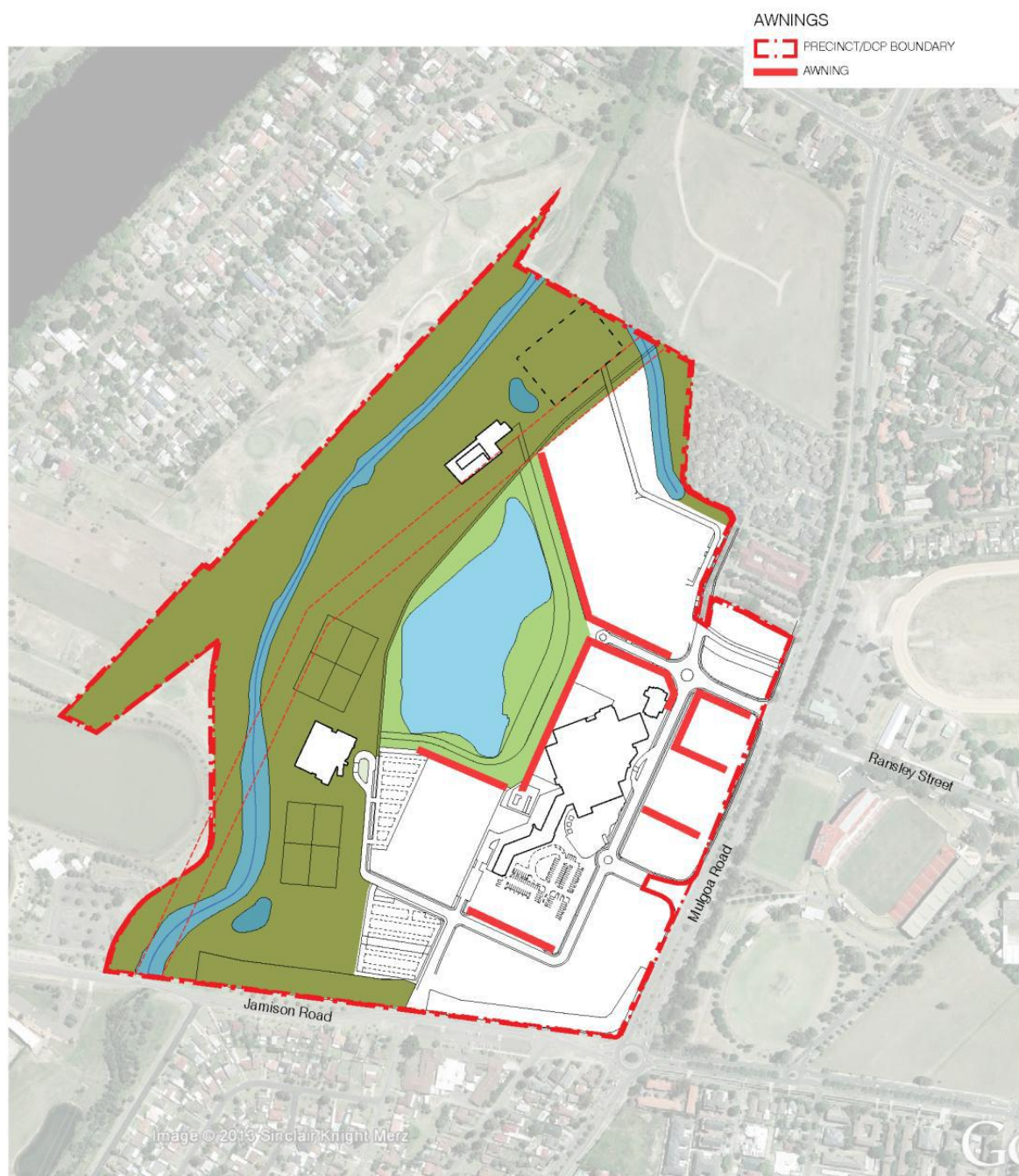
- a) To promote pedestrian activity and safety in the public domain;
- b) To create vibrant streetscapes around areas of high pedestrian traffic;
- c) To encourage activity within the Site outside commercial business hour;
- d) To provide a mix of uses to support an increasing employment and visitor population over time; and
- e) To enhance pedestrian safety, security and amenity within Precinct.

C□Controls

- 1) Active ground level uses are to be located as shown Figure E13.32.
- 2) Active street fronts are to be maximised along Ransley Street, to the lakeside promenade, and in front of hotels and the multi-use facility.
- 3) Entries to active frontage tenancies are to be accessible.
- 4) Vehicular access points should not, if possible, be located at primary active frontages.
- 5) Ground level uses at active frontage zones are to be located at or close to street level.
- 6) Transparency and openings to the street are to be maximised and blank walls, fire exits and building services elements are to be minimised.

Awnings

Figure E13.33: Awning Locations



A **Background**

Awnings increase pedestrian amenity by providing shelter and enclosure at a pedestrian scale. They encourage pedestrian activity along streets and, in conjunction with active edges, support and enhance the vitality of the local area. Awnings and entry canopies provide a public presence and interface within the public domain, contributing to the identity of a development.

Objectives

- a) To provide weather protection, safety and security for pedestrians;
- b) To unify the streetscape; and
- c) To demarcate building entries and contribute to the image and identity of development.

C **Controls**

Awnings

- 1) Continuous awnings must be provided as shown in Figure E13.33.
- 2) Awning width is to be a minimum of 3m.
- 3) Provide awnings with a soffit height of 3.6m above the finished ground floor level. On sloping sites, awning soffit height may vary from 3.6m – 4.2m.
- 4) Where the topography slopes along the street, awnings are to step to provide a regular height over the footpath. Steps in awnings should not exceed 600mm.
- 5) Stepped awnings must be detailed to provide continuous weather protection.
- 6) Glazing is not permitted in continuous awnings.
- 7) Under awning lighting is to be provided to achieve appropriate luminance levels for pedestrians (Refer to relevant Australian Standards). This should be recessed into the soffit of the awning.

Entry Canopies

- 1) Entry canopies and discontinuous awnings may be provided to building entries not located along Active Frontages.
- 2) Entry canopies may be glazed or solid, and are to be coordinated with the overall facade design.
- 3) Provide canopies with a soffit height of 3.6m – 4.2m.

Building Depth and Bulk

A **Background**

The final use of sites remains flexible and subject to market demand and opportunities. Without a clear program of land uses across the precinct, controlling the size of floor plates of buildings and site coverage helps to create good internal amenity, access to natural light and ventilation and reduces potential adverse effects that tall and bulky buildings may have on the public domain, including visual impacts and overshadowing.

Building depth is related to building use.

Objectives

- a) To promote the design and development of sustainable buildings;

- b) To achieve the development of living and working environments with good internal amenity and minimise the need for artificial heating, cooling and lighting;
- c) To provide viable and useable commercial floor space;
- d) To achieve usable and pleasant streets and public domain at street level;
- e) To achieve a skyline sympathetic to the topography and context;
- f) To allow for view sharing and view corridors; and
- g) To reduce the apparent bulk and scale of buildings by breaking up expanses of building wall with modulation of form.

C□Controls

- 1) Commercial floor plate sizes are governed by the Panthers Penrith provisions within the LEP.
- 2) All points of an office floor should be no more than 10m from a source of daylight (e.g. window, atria, or light wells) in buildings less than 24m in height, and no more than 12.5m from a window in buildings over 24m in height.
- 3) Use atria, light wells and courtyards to improve internal building amenity and achieve cross ventilation and/or stack effect ventilation.

□□□□□□□□Building Articulation

A□□background

Building articulation refers to the three dimensional external modelling of a building façade. Building articulation establishes the relationship of the building with its street. The composition and detailing of the building façade has an impact on its apparent scale as well as its appearance. The pattern or rhythm established by the proportions of the façade, the modulation of the external walls, the design of façade elements, their materials and detailing are all important considerations.

□□Objectives

- a) To create buildings with articulated façade that address the public domain;
- b) To ensure that new developments have facades which define and enhance the public domain; and
- c) To ensure that building elements such as awnings, sun screens, shading devices, roof structures and service elements are integrated into the overall building form and façade design.

C□Controls

- 1) Facades are to be composed with an appropriate scale, rhythm and proportion, that respond to building use and the desired character by:
 - a) Defining a base, middle and top related to the overall proportion of the building;
 - b) Expressing key datum lines in the context using cornices, a change in materials or building setback;
 - c) Expressing the internal layout of the building, for example, vertical bays or its structure, such as party wall divisions;
 - d) Expressing the variation in floor to floor height, particularly at the lower levels;

- e) Articulating building entries with awnings, porticos, recesses and blade walls; and
 - f) Incorporating architectural features which give human scale to the design of the building at street level. These can include entrance porches, awnings, pergolas and fences using recessed balconies and deep windows to create articulation and define shadows thereby adding visual depth to the façade.
- 2) Facade design is to reflect and respond to the orientation of the site using elements such as sun shading and environmental controls where appropriate.
 - 3) The maximum unbroken facade length is to be 70 metres and it must provide articulation and interest.
 - 4) Important corners are to be expressed by giving visual prominence to parts of the façade (e.g. a change in building articulation, material or colour).
 - 5) Building services such as roof plant and parking ventilation are to be coordinated and integrated with the overall façade and building design, and screened from view.
 - 6) Ventilation louvres and car park entry doors are to be coordinated with the overall façade design.

□□□□□□ **Architectural Excellence**

A□□background

This Part seeks to encourage urban design and architectural excellence as well as environmental sustainability in both the public and private domain.

Architectural excellence is particularly important where the building is highly visible from the public domain outside the precinct.

Good building design should positively contribute to the overall architectural quality of the city and provide buildings appropriate to their context. In some circumstances, this contribution may be as an iconic or landmark building, but more typically it is as a well-mannered building that fits sensitively into the streetscape.

Architectural excellence should be achieved through careful consideration of:

- a) Built form – how it relates to its context
- b) Quality of materials
- c) Integrity of the design concept
- d) Its contribution to the public domain.

□□ **Objectives**

- a) To encourage a high level of design consideration;
- b) To ensure that significant buildings achieve design excellence;
- c) To ensure that buildings contribute positively to the precinct character; and
- d) To encourage the development of sustainable design.

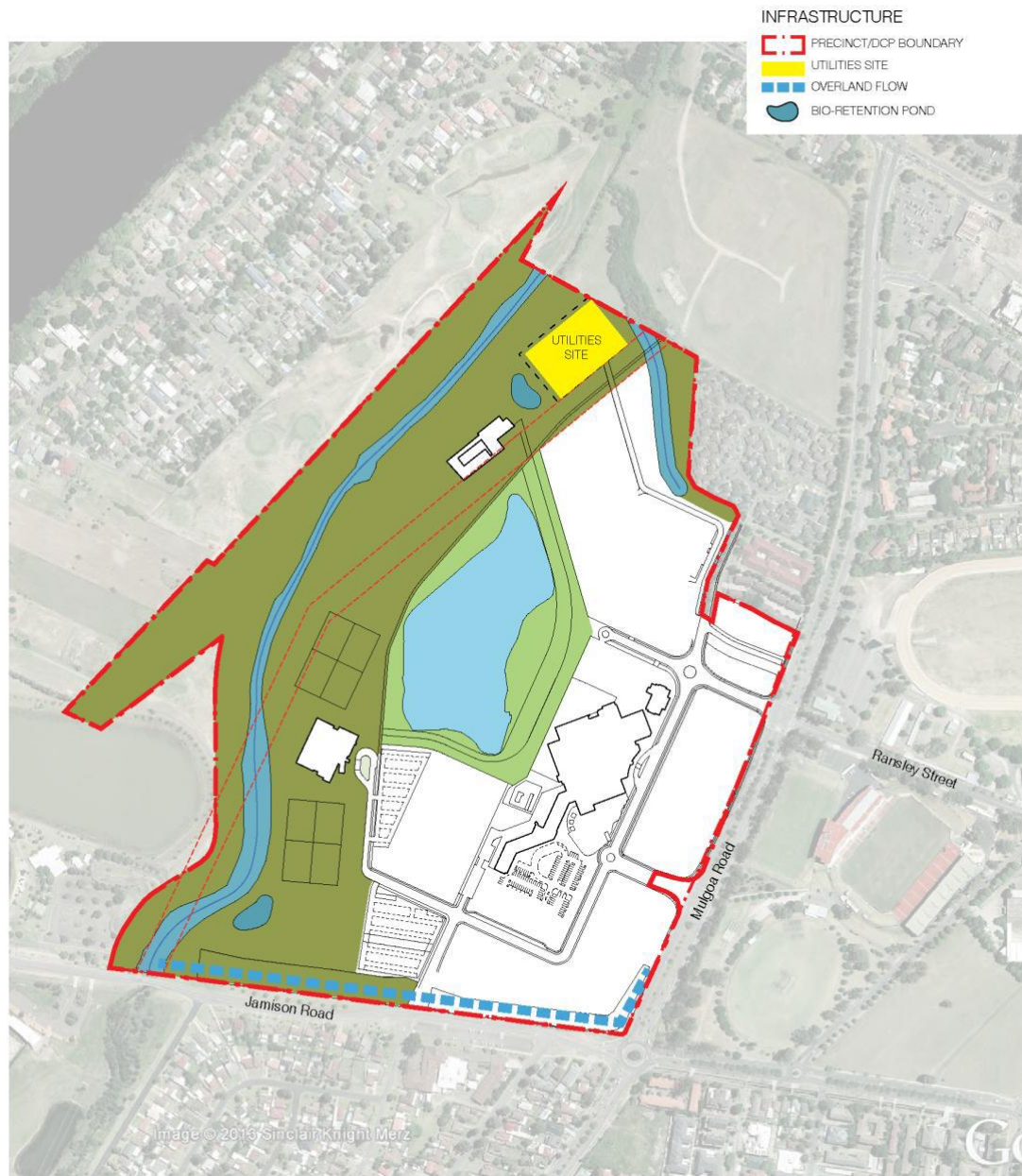
C□Controls

- 1) All applications are to explain the design concept including built form, context response and materials selection.
- 2) Gateway buildings are to demonstrate architectural excellence in the following areas:
 - a) How the building reinforces and enhances significant vistas and view corridors

- b) How the building will enliven the public domain it adjoins.
- 3) Materials are to be selected for durability and quality. In general painted surfaces are not appropriate especially at street 'level'.
- 4) Particular attention is to be paid to detailing of materials.
- 5) Buildings are to be simple, elegant and well proportioned.
- 6) Environmental sustainable initiatives are to be incorporated into new buildings.

13.10 DELIVERY

Figure E13.34: Infrastructure Plan



□□□□□□□□ Flooding and Drainage

A□□□□□□□ background

Flooding and stormwater are major considerations on the Penrith Panthers Precinct site. A precinct Stormwater Management Strategy (SMS) will minimise the impact on water quality, identify opportunities to maximise the reuse of stormwater runoff, reduce the demand on potable water supplies, reduce pollutants and enhance the landscaping opportunities within the development.

The SMS will be based upon the principles of Water Sensitive Urban Design (WSUD) and will be underpinned by a stormwater harvesting strategy aimed at maximizing the reuse of runoff for non-potable purposes, maintaining the ecological integrity of Peachtree Creek, and complying with Penrith City Council's water management requirements as set out in Section C3 of this DCP.

Any development that is flood affected will require an appropriate level of flood assessment and may include the need to undertake modelling and prepare flood reports. The assessment will need to include consideration of flood behaviour and hazard, and any mitigation measures required to ameliorate any impacts identified.

Maintaining the regional flood runner function of Peachtree Creek through the site and ensuring no adverse impact upon flood levels and flood conveyance on surrounding properties and in Peachtree Creek is of prime importance. In this regard the adopted flood conveyance principles of Panthers Planning Proposal Appendix H Scenario 4 Flood Model apply to the site (i.e. conveyance of 200 year regional flood).

The flood levels detailed in Panthers Planning Proposal Appendix H table H1.1 have been prepared for strategic planning purposes only. Applicable flood levels for each development shall be determined in conjunction with Penrith City Council at the time of each application.

**Figure E13.35: Development Layout as modelled from Panthers /
Adopted Scenario 4 development footprint**



Objectives

- a) To manage development of the Panthers site with respect to its unique flooding characteristics;
- b) To develop the site in accordance with sound flood management principles;
- c) To achieve high quality outcomes for water quality and quantity; and
- d) To provide opportunities for WSUD initiatives.

C□Controls

- 1) All applications are to address the relevant sub-sections of the Water Management section of this DCP.
- 2) A Stormwater Management Strategy (SMS) is to be prepared for the whole Precinct and be submitted with the first major development application and should identify and address:
 - a) Impacts of stormwater generated both on and off the site;
 - b) Stormwater easements and overland flow paths;
 - c) Opportunities to maximise the reuse of stormwater runoff;
 - d) Means to reduce the demand on potable water supplies; and
 - e) Reductions in pollutants entering the water system.
- 3) Any development west of the Club and within the flood flow conveyance corridor is to develop a strategy to ensure that the 200-year regional flood runner is maintained without causing adverse impact to adjoining lands in accordance with the principles of Scenario 4 modelling under Panthers Planning Proposal – Appendix H. The strategy will identify the timing, staging and detailing of necessary works to be undertaken.
- 4) Development of a comprehensive flood evacuation and emergency response plan as part of the Infrastructure Master Plan.

□□□□2 □ilities

A□□background

The Panthers Penrith Precinct will connect to the local utilities network, with upgrades occurring where required to support the future development. As part of the overall development strategy, alternative services and energy sources will be investigated.

An integral part of determining development suitability for a site involves assessing whether the appropriate utilities and services are available on the site to service the proposed development, and whether they have sufficient capacity to meet the demand of the proposal.

This section aims to ensure that development consent is only granted where a proposal can be appropriately serviced, either through the existing system having sufficient capacity or being upgraded, or an alternative system being provided. In most cases, the developer will be required to fund necessary system upgrades or alternatives.

□□Objectives

- a) To ensure that development will not place unreasonable pressure on servicing authorities in terms of timing and extent of supply;
- b) To ensure that development will take place only where satisfactory arrangements are made with the servicing authorities; and
- c) To ensure that adequate consultation is carried out with the relevant servicing authorities during the formulation of development proposals.

C□Controls

- 1) All development applications are to address the existing and proposed provision of services/utilities to a site and whether there is satisfactory capacity to address the required demand of the proposal.

- 2) Satisfactory arrangements are to be made with the servicing authorities for the provision of services to the property.
- 3) Where possible, services (including easements) should not be located in areas where vegetation will be removed or damaged.
- 4) Existing easements are to be reviewed and rationalised.
- 5) A site utilities zone with adequate landscape screening is to be located in the north of the site as indicated in Figure E13.34.

□□□□□ Staging

A□□background

The Panthers Penrith Precinct Structure Plan represents indicative super lots on the site and the order and timing in which elements are to be delivered will be in response to market opportunities.

The delivery of individual developments must be considered in the context of:

- a) Available and future infrastructure
- b) Site access
- c) Flood control
- d) Public domain delivery
- e) Traffic and parking limits
- f) As each development is delivered, the supporting infrastructure must be provided. All relevant supporting studies must be completed with each major development application.

□□Objectives

- a) To facilitate orderly development of the site;
- b) To ensure that adequate services are provided at each stage of development;
- c) To ensure that infrastructure anticipates future development; and
- d) To ensure that development does not exceed floor space or traffic and parking limits identified for the Precinct.

C□Controls

- 1) Each development application for new buildings in excess of 1,000m² GFA is to identify the infrastructure provision necessary to service this development. This includes, but is not limited to:
 - a) Power
 - b) Water and gas supply
 - c) Drainage works
 - d) Flood control works
 - e) Roadworks.
- 2) Infrastructure provision is to anticipate future development adjacent and linked to the site. The provision is to ensure that any disruption to new roads and services is minimised as future projects are brought on line.

- 3) Consideration of any flood studies undertaken to determine in particular the timing and delivery of any flood mitigation works (e.g. if required, reducing the ski lake)
- 4) Major new development in excess of 1,000m² GFA will require evaluation of parking and traffic generation based on the findings and limits identified in Supplementary Transport Assessment for the Panthers Penrith Planning Proposal GHD May 2011 and the Panthers Roadworks Planning Agreement.
- 5) A register of all floor area, use and parking provision in the precinct is to be maintained through the life of precinct development.



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Panthers Group

Report for Panthers Penrith Planning Proposal

Traffic Management Works and Apportionment Plan

7 February 2012

COMMERCIAL IN CONFIDENCE

COMMERCIAL IN CONFIDENCE

This Traffic Management Works and Apportionment Plan Report ("Report"):

- ▶ *has been prepared by GHD Pty Ltd for Penrith Panthers;*
- ▶ *may only be used and relied on by Penrith Panthers;*
- ▶ *must not be copied to, used by, or relied on by any person other than Panthers Penrith without the prior written consent of GHD;*
- ▶ *may only be used for the purpose of infrastructure works apportionment (and must not be used for any other purpose).*

GHD and its servants, employees and officers otherwise expressly disclaim responsibility to any person other than Panthers Penrith arising from or in connection with this Report.

To the maximum extent permitted by law, all implied warranties and conditions in relation to the services provided by GHD and the Report are excluded unless they are expressly stated to apply in this Report.

The services undertaken by GHD in connection with preparing this Report:

- ▶ *were limited to those specifically detailed in section 3.3.2 of this Report;*
- ▶ *did not include GHD undertaking a detailed survey of the road corridor including three dimensional surveys or roadway elevations .*

The opinions, conclusions and any recommendations in this Report are based on assumptions made by GHD when undertaking services and preparing the Report ("Assumptions"), including (but not limited to):

- ▶ *-All concept designs undertaken on the basis of aerial photography and do not into account elevations or other three-dimensional limitations that may arise following a complete survey*
- ▶ *- Background traffic growth assumptions are based on traffic growth data provided by NSW Roads and Maritime Services from their strategic traffic model.*

GHD expressly disclaims responsibility for any error in, or omission from, this Report arising from or in connection with any of the Assumptions being incorrect.

Subject to the paragraphs in this section of the Report, the opinions, conclusions and any recommendations in this Report are based on conditions encountered and information reviewed at the time of preparation and may be relied on until [insert a "sunset" timeframe, eg 3 or 6 months], after which time, GHD expressly disclaims responsibility for any error in, or omission from, this Report arising from or in connection with those opinions, conclusions and any recommendations.

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1. Introduction

1.1 Overview

Panthers Investment Corporation Pty Ltd (the *Proponent*) commissioned GHD Pty Ltd to develop an Apportionment Plan (the *Plan*) for traffic management and road improvement measures needed to accommodate future development within the Panthers Penrith Precinct. The Panthers Penrith Precinct will be zoned to allow mixed-use retail, entertainment, hotel accommodation, recreation facilities, commercial and exhibition space. The site's future development will generate traffic levels higher than existing levels. The additional traffic will have an impact on the level of service surrounding the higher order road network in the Panthers Penrith area if traffic management and road improvement measures are not introduced.

The *Plan* describes the impact of the likely development in the Panthers Penrith Precinct and in particular the nexus between the proposed planning proposal and the need for traffic management and road improvement measures. This *Plan* addresses the traffic management and road improvement measures which will be required to meet the future development needs for the Panthers Penrith Precinct as agreed with Roads and Maritime Services (RMS), Transport for New South Wales (TfNSW) and Penrith City Council (PCC).

As part of the development of a road improvement works schedule, the RMS EMME/2 strategic traffic model was used to assess background traffic along the higher order road network. A spreadsheet model was used to assess the changes in traffic volumes at surrounding intersections 'with' and 'without' the expected development. The spreadsheet model was also used as a basis for allocating the proportion of traffic at each intersection. Detailed intersection analysis was performed using SIDRA, LinSig and Paramics for the critical PM peak hour profile as agreed with RMS.

Horizon Year 2031 has been identified as the forecast year for traffic modelling which assumes full development of the Panthers Penrith Precinct. In this context, traffic growth will depend on the rate of at which development actually occurs and will necessitate the need to stage traffic management and road infrastructure works progressively.

For the purposes of allocating appropriate contribution at each intersection from various developments, three major categories including Penrith Panthers Precinct, Riverlink Precinct and 'other' traffic were used in the traffic modelling. The 'other' traffic represents growth in background traffic that can be expected in the study area (i.e. without an origin or destination in the designated study area), and traffic generated by all other likely future developments.

1.2 Purpose of the Apportionment Plan

The primary purpose of this *Plan* is to enable RMS, TfNSW and PCC to agree to the Proponent's contribution towards the provision of additional traffic management and road improvement measures that will be required as a consequence of development in the Panthers Penrith Precinct.

It is the intent of this *Plan* to ensure that adequate facilities are available to serve the proposed Planning

Proposal and study area. To this extent, this plan is intended to assist the drafting of a Planning Agreement or similar arrangement to secure the provision of any necessary road works.

1.3 Anticipated Development

The Panthers Penrith site already includes a range of entertainment and tourist facilities, including:

- ▶ Licensed Club with restaurants, bars, lounges etc.;
- ▶ Restaurants
- ▶ Events and function space;
- ▶ Hotel accommodation; and
- ▶ Sports and leisure facilities such as Golf, Aqua Golf, and Cables Water Park.

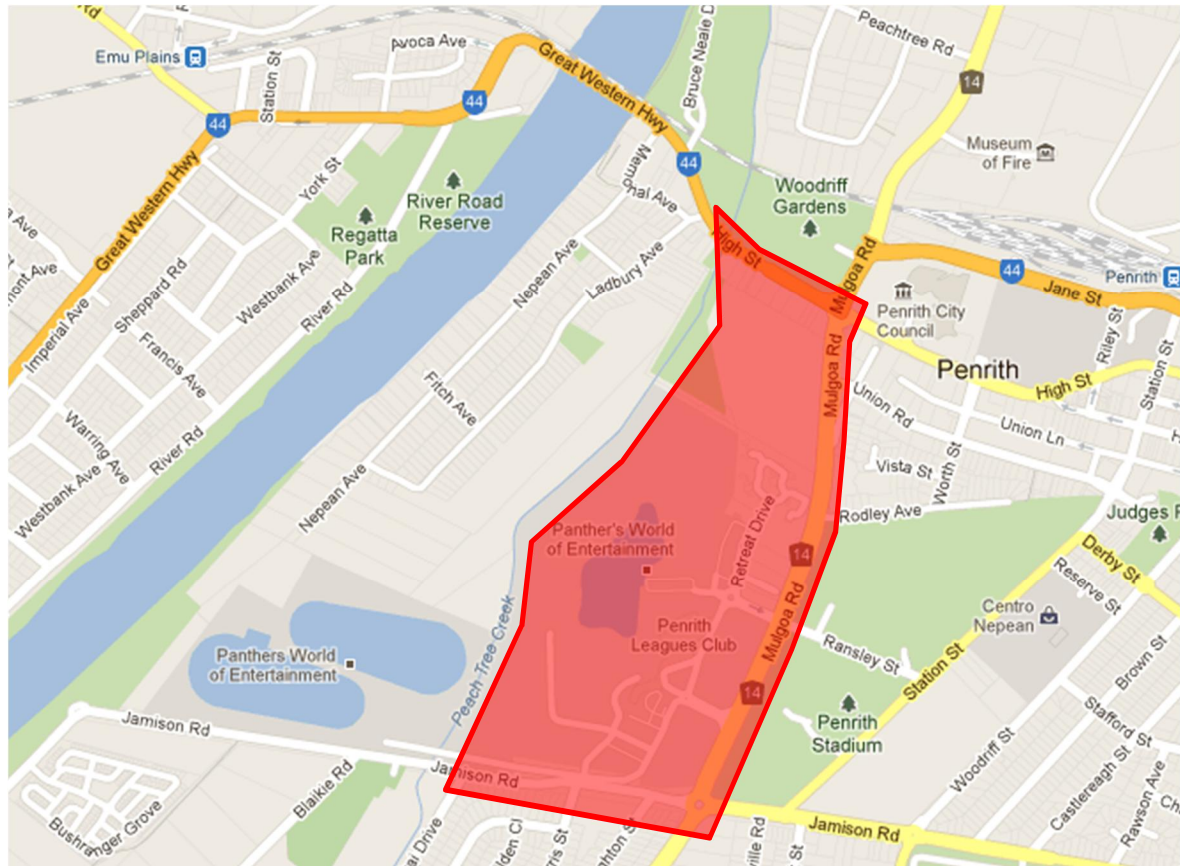
In addition to these facilities, the Panthers Penrith development will also include the following proposed development:

- ▶ Restaurants and cafes;
- ▶ A mix of retail offerings including general retail and an outlet retail centre;
- ▶ Entertainment facilities including cinemas and bowling;
- ▶ Hotel and services apartment accommodation;
- ▶ A multi-use events and exhibition centre;
- ▶ Residential and seniors living; and
- ▶ Business Park comprised of campus-style business developments.

1.4 Apportionment Plan Study Area

The size of the study area as agreed with RMS has taken into consideration both the nature of the development and the current and expected conditions in the surrounding area. The study area includes all development access points and major adjacent intersections located on the higher order road network. The *Plan* applies to the area known as Panthers Penrith Precinct, as shown in Figure 1 and captures all agreed significantly influenced facilities.

Figure 1 - Panthers Penrith Study Area



Source: Google Maps

1.5 Methodology

The apportionment plan has been synthesised using the outputs from the traffic impact assessment and traffic modelling undertaken for the development, as detailed in the GHD Supplementary Transport Assessment for Panthers Penrith Planning Proposal (Final Report) issued to RMS and PCC in July 2011. In order to arrive at the apportionment plan, the following tasks have been undertaken:

- ▶ Traffic generation from the precinct (under the ultimate 2031 development scenario) has been determined;
- ▶ Traffic generated by the precinct has been broken down into Panthers and non-Panthers traffic and then distributed and assigned to the road network;
- ▶ Background traffic growth on the road network has been estimated for the 2031 horizon year;
- ▶ Intersection modelling has been undertaken to determine the works that will be necessary to support background traffic and traffic associated with the development;
- ▶ Traffic management and road improvement measures have been identified in consultation with

RMS, PCC and TfNSW;

- ▶ Strategic cost estimates have been developed for the required works including construction, land acquisition, movement of utilities and the installation of traffic controls; and
- ▶ An apportionment of these costs has been determined based on the share of Panthers and non-Panthers traffic using each of the intersections.

1.6 Structure of the Plan

This document outlines the methodology used by GHD to determine the cost apportionment for the additional works required to accommodate the proposed Panthers development, and is outlined in the following sections:

- ▶ Existing Conditions – Outlines the traffic conditions on the network today, identifying key pinch-points in the network and existing traffic problems (Section 2).
- ▶ Future Conditions – Outlines the forecast traffic conditions resulting from the Panthers Penrith development, other Riverlink Precinct development and background traffic growth and outlines the traffic modelling methodology used to determine future traffic (Section 3).
- ▶ Strategic Concept Layouts – Outlines the strategic road design plans developed by GHD to address the projected traffic demand from the development (Section 4).
- ▶ Strategic Cost Estimates – Outlines strategic estimates of the cost of road works, land acquisition, relocation of utilities and traffic management infrastructure (Section 5).
- ▶ Apportionment Plan – Details the principles and methodology for apportioning the costs of the required road infrastructure among the relevant contributing parties (Section 6).

2. Existing Conditions

This section presents a summary of the existing traffic conditions around Panthers Penrith, including traffic conditions on Mulgoa Road, High Street and Jamison Road. This includes the profile of the development, the existing accessibility conditions and the existing road network performance.

2.1 Development Profile

Panthers Penrith forms part of the Riverlink Precinct, a 370 ha development precinct bounded by the eastern bank of the Nepean River to the west, the M4 Motorway to the south, Mulgoa Road to the east and the Western Railway line to the north. For the purposes of this study, the study area has been agreed as the area bounded by High Street, Jamison Road and Mulgoa Road. The current land uses within this area include the following:

- ▶ Licensed Club with restaurants, bars, lounges etc.;
- ▶ Events and function space;
- ▶ Hotel accommodation;
- ▶ Sports and leisure facilities such as Golf, Aqua Golf, and Cables Water Park; and
- ▶ Council's vacant site known as the Carpenter Land.

A summary of the floor areas and number of rooms for the primary traffic generating land uses in the existing Panthers Penrith development is presented below in Table 1.

Table 1 Existing Land Uses within Panthers Penrith Precinct

Building	Area (sqm)
Club – Existing	27,200
Club – Conference	6,000
Hotel – Existing (216 rooms)	11,500

Source: ING (2008, MacroPlan Australia (2008)

2.2 Accessibility Conditions

This section outlines the accessibility conditions for the main modes of travel to Panthers Penrith and highlights any current accessibility issues.

2.2.1 Vehicular Access

Data from the 2006 Census indicates that in 2006, 53% of the 59,000 households in the Penrith LGA owned two or more cars. This is significantly higher than the average figure for the entire Sydney statistical subdivision, at 42%. The majority of access to the Panthers site takes place by car, and

vehicular access to Panthers is provided from Mulgoa Road, either at Panther Place or Ransley Street.

Panthers and the Penrith City generally are serviced by two state classified roads, namely Great Western Highway and Mulgoa Road. Further to the south, Mulgoa Road also provides access to the M4 Motorway.

Mulgoa Road is a classified road linking the Penrith City Centre and Mulgoa Village. It is generally a four-lane divided road north of Glenmore Park, and to the south of Glenmore Park is a two-lane undivided Road. Mulgoa Road is signposted at 60 km/hr through the study area and currently carries an average annual daily traffic volume of 38,000 vehicles per day in the section south of Preston Street, Jamisontown. Mulgoa Road is a main traffic route into and out of Penrith and has a number of signalised intersections along its length. Due to its location, Mulgoa Road is the key thoroughfare affected by the traffic generated by the Penrith Panthers development proposal.

The Great Western Highway is one of the key east west routes between the Sydney CBD and Sydney's western suburbs and beyond. It is a classified state road and is signposted at 60 km/hr through the study area, carrying an average annual daily traffic volume of over 30,000 vehicles. Great Western Highway intersects Mulgoa Road (and its northern extension, Castlereagh Street) at a signalised intersection.

Jamison Road is an east west local road providing access to the Nepean River from The Northern Road. It is a four-lane divided road to the east of Mulgoa Road and a two-lane undivided road to the west of Mulgoa Road. Jamison Road is signposted at 60 km/hr to the east of Mulgoa Road and 50 km/hr to the west of Mulgoa Road and currently carries an average annual daily traffic of over 16,000 vehicles per day and significantly less to the west of Mulgoa Road where it is a local collector road. Jamison Road intersects Mulgoa Road at a recently upgraded signalised intersection adjacent to the study area.

The key intersections in the study area are as follows:

- ▶ Great Western Highway and Mulgoa Road;
- ▶ Ransley Street and Mulgo Road;
- ▶ Panther Place and Mulgoa Road; and
- ▶ Jamison Road and Mulgoa Road.

2.2.2 Bus Access

Mulgoa Road is the main north-south bus corridor through Penrith and some 16 separate bus routes pass by Panthers Penrith. Bus service 794 operates directly to Panthers Penrith with an alternate off-peak service to the Riverlink Precinct. The 794 bus service has an average headway of 30 minutes in the peak periods and 60 minutes in the off peak periods and does not run during weekends.

The Transport Research Board's *Transit Capacity and Quality of Service Manual (2003)* outlines a means of determining Level of Service for bus routes based on an assessment of service frequency. This is presented in Table 2 below.

Table 2 Level of Service Criteria for Bus Route Frequency

Level of Service	Average Headway (minutes)	Buses Per Hour	Comments
A	<10	>6	Passengers do not need schedules
B	10-14	5-6	Frequent service, passengers consult schedules
C	15-20	3-4	Maximum desirable time to wait if bus/train missed
D	21-30	2	Service unattractive to choice riders
E	31-60	1	Service available during the hour
F	>60	<1	Service unattractive to all riders

Based on the frequencies provided for the 794 service direct to Panthers, the existing bus service directly to Panthers is below the desirable Level of Service C.

2.2.3 Rail Access

The closest railway station to Panthers Penrith is Penrith Station on the western line, which is located approximately 1 km from Panthers. Penrith Station is located to the north east of Panthers, near the intersection of Jane Street and Station Street. Most CityRail services terminate at Penrith Station, with most Blue Mountains intercity services also stopping at Penrith Station. These services connect Penrith to the Sydney CBD and the North Shore line.

In 2007, Penrith Station ranked as the 38th busiest station in the CityRail network, with an average of more than 7,000 weekday station entries and exits. More than 3,000 rail passengers, (2,870 entering and 1,290 exiting) use Penrith Station during the 3.5-hour weekday morning peak between 6:00 and 9:30. In the evening peak and an average of 1,890 entering and 3,050 exiting passengers have been recorded for Penrith Station between 15:00 and 18:30.

Household Travel Survey data indicate that in 2004, rail passengers accessed Penrith Station during the morning hour mostly by private car (68%), 23% walked to Penrith Station while 5% arrived by bus.

2.2.4 Pedestrian Access

Footpaths are located along the major roads in the study area, such as Mulgoa Road and Great Western Highway/High Street, few other footpaths and pedestrian facilities are present. This level of footpath provision is typical of areas with car-dominated areas where priority has been assigned to longer distance movements of private vehicles. Other locations such as Jamison Road have short sections of pavement implemented, but these are fragmented in their distribution and do not connect to a wider network. Consequently, there is a lack of suitable footpaths in the study area.

Similarly, the quality of the pedestrian environment varies, with some streets being tree-lined and quiet, while others such as Mulgoa Road are noisy and provide little shade or amenity for pedestrians. Pedestrian crossing across Mulgoa Road, Jamison Road and Great Western Highway are provided at

signalised intersections and there are no mid-block pedestrian crossing facilities in the study area.

2.2.5 Cycle Access

There are two off-road shared cycle paths in the study area; one provided along the northern side of Jamison Road and one on the southern side of Great Western Highway. The cycle path on Jamison Road is unmarked and relatively narrow. There is limited directional signage for cyclists and limited line marking present at the major intersections. Analysis of the Bureau of Transport Statistics (BTS) journey-to-work data and household travel data shows that cycling trips account for less than 1% of trips made in the Penrith Statistical Division, which reinforces cars as the preferred mode of travel within the Penrith LGA.

2.3 Existing Road Network Performance

The performance of the road network around Panthers Penrith is primarily a function of intersection operation. To this end, an appraisal of the existing traffic conditions in the study area has been undertaken on the basis of intersection modelling using the SIDRA intersection modelling package.

The intersection “Level of Service” is the standard used to measure the performance of intersection operation. This is defined as the qualitative assessment of the quantitative effect of factors such as speed, traffic volume, geometric features, delays and freedom of movement. The Level of Service concept as applied to intersections through measures of effectiveness is summarised below in Table 3.

Table 3 Level of Service Description for Intersections

Intersection Control	Measure of Effectiveness
Sign or merge control	Average Delay (sec/vehicle) Delay to critical movements Queue length for critical movements
Traffic Signals	Average Delay (sec/vehicle) Delay to critical movements Degree of Saturation Cycle Length Queue length for critical movements
Roundabout	Average Delay (sec/vehicle) Delay to critical movements Degree of Saturation Queue length for critical movements

The assessment of intersection operation is based on the criteria outlined in Table 4 as defined in the *Guide to Traffic Generating Developments*, published by NSW Roads and Maritime Services (RMS) in 2002.

Table 4 Intersection Levels of Service

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

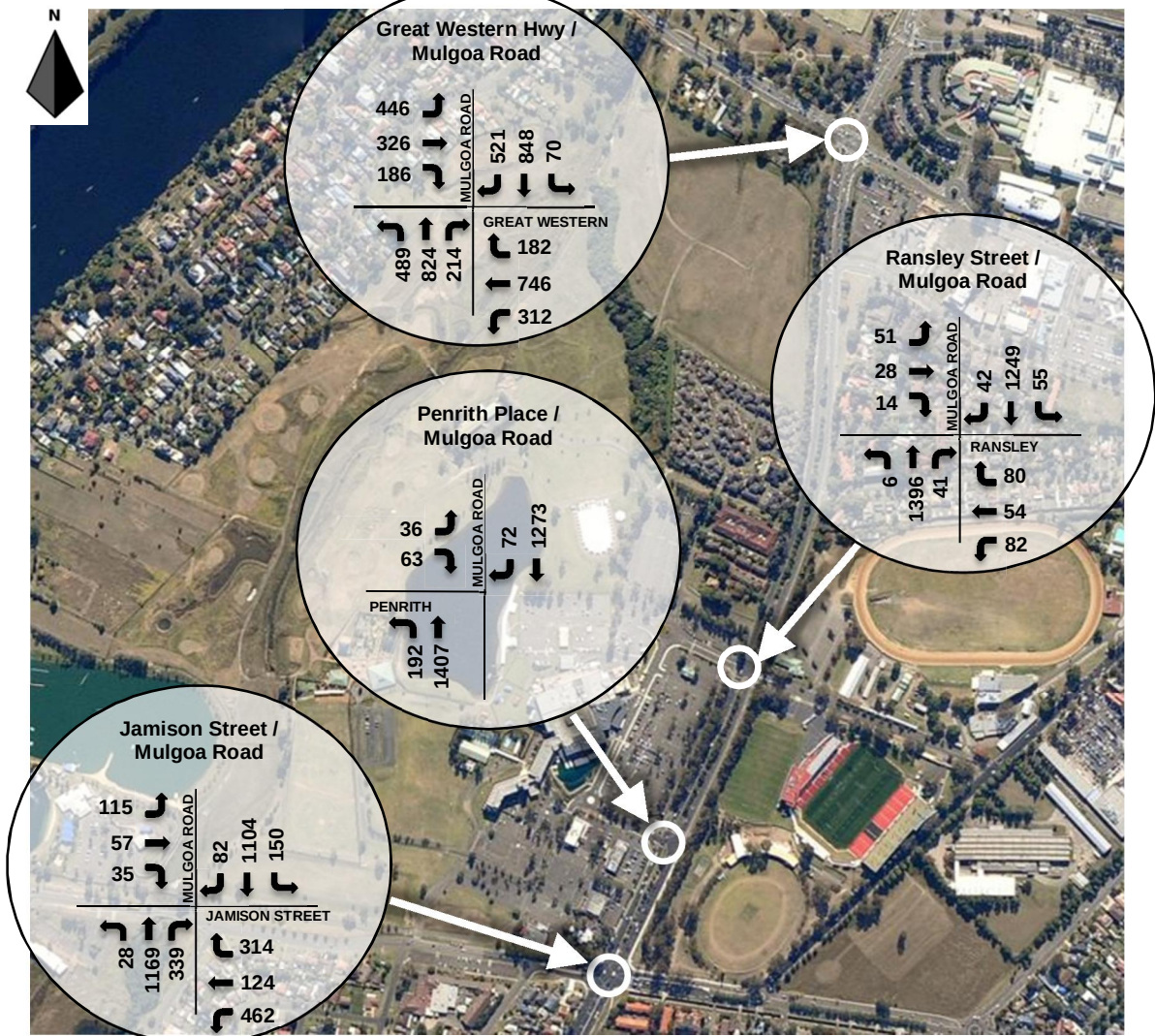
Source: Guide to Traffic Generating Developments, NSW RMS (2002)

Traffic counts were undertaken for the Thursday evening peak period in 2011 at the following intersections within the study area:

- ▶ Jamison Road and Mulgoa Road;
- ▶ Mulgoa Road and Panther Place;
- ▶ Mulgoa Road and Ransley Street; and
- ▶ Mulgoa Road and Great Western Highway.

A summary of the observed traffic flows at these intersections is shown below in Figure 2.

Figure 2 - Panthers Penrith Thursday Evening Peak 2011 Base Traffic Flows



Source: Google Maps

Based on these surveyed traffic flows, SIDRA modelling of each of the above intersections was undertaken, using traffic signal data (including phase splits and cycle times) provided by RMS and intersection layouts determined from aerial photography and site visits. Based on traffic surveys along Mulgoa Road, a heavy vehicle percentage of 7% at each intersection was assumed. A summary of the average delay and Levels of Service for each of these intersections is presented below in Table 5.

Table 5 2011 Intersection Levels of Service

Intersection	Average Delay (s)	Degree of Saturation	Level of Service
Jamison Road and Mulgoa Road	35	0.77	C
Mulgoa Road and Panther Place	5	0.70	A
Mulgoa Road and Ransley Street	7	0.59	A
Mulgoa Road and Great Western Highway	77	1.04	F

Based on the intersection Levels of Service presented in Table 5, the intersections of Mulgoa Road with Ransley Street, Panther Place (the two primary points of access to Panthers Penrith) and Jamison Road all operate at a satisfactory Level of Service. The intersection of Mulgoa Road and High Street is currently operating over-capacity with a Level of Service F, indicating the requirement for capacity enhancement measures under the existing traffic demand.

3. Future Conditions

This section outlines the proposed development on the Panthers Site and summarises the traffic impact analysis of the development and the level of works that will be required in the study area to accommodate additional traffic generated by the development.

3.1 Proposed Land Use and Vision for Panthers Penrith

The Panthers Penrith redevelopment masterplan builds upon the existing entertainment and tourist facilities already present on the site, and presents a development vision that is aligned with the greater Riverlink precinct plan. The vision for the Panthers site is primarily that of an entertainment precinct surrounding the existing club, with restaurants, cafes and other entertainment facilities including bowling and cinemas. Additional general retail and an outlet retail centre is planned for the site, with the outer areas accommodating a commercial business park, seniors living and additional hotel and serviced apartment accommodation. Finally, a multi-use events and exhibition centre is also planned for the site.

This development will also take place alongside further development in the Riverlink precinct on lands not owned by Panthers, and this additional development in the area has been taken into account in this assessment.

A proposed Transport Hierarchy and access strategy has been developed by GHD in response to the original concept masterplan undertaken by Cox Richardson Architects, and is documented in the Supplementary Transport Assessment for Panthers Penrith Planning Proposal Prepared by GHD in July 2011. Since the production of this document, some minor changes have been made to vehicular access to the site as a result of consultation with RMS and PCC. These include:

- ▶ Realignment of the Southern Riverlink Access to coincide with the existing Harris Street and Jamison Road intersection as a fourth leg on the existing intersection; and
- ▶ Extension of the existing median on Jamison Road between Harris Street and Mulgoa Road.

Other accessibility considerations remain the same. The primary access to the site will be via Panther Place and Ransley Street to the east of the site while secondary vehicular accesses will also be provided at the proposed northern and southern Riverlink accesses on Great Western Highway and Jamison Road.

A plot of the proposed transport hierarchy and access strategy is shown below in Figure 3. Based on the access strategy shown in Figure 3, the two primary access points are Panther Place and Ransley Street, with the northern and southern Riverlink accesses providing secondary access, mainly for traffic exiting the site.

Figure 3 - Panthers Penrith Proposed Transport Hierarchy and Access Strategy



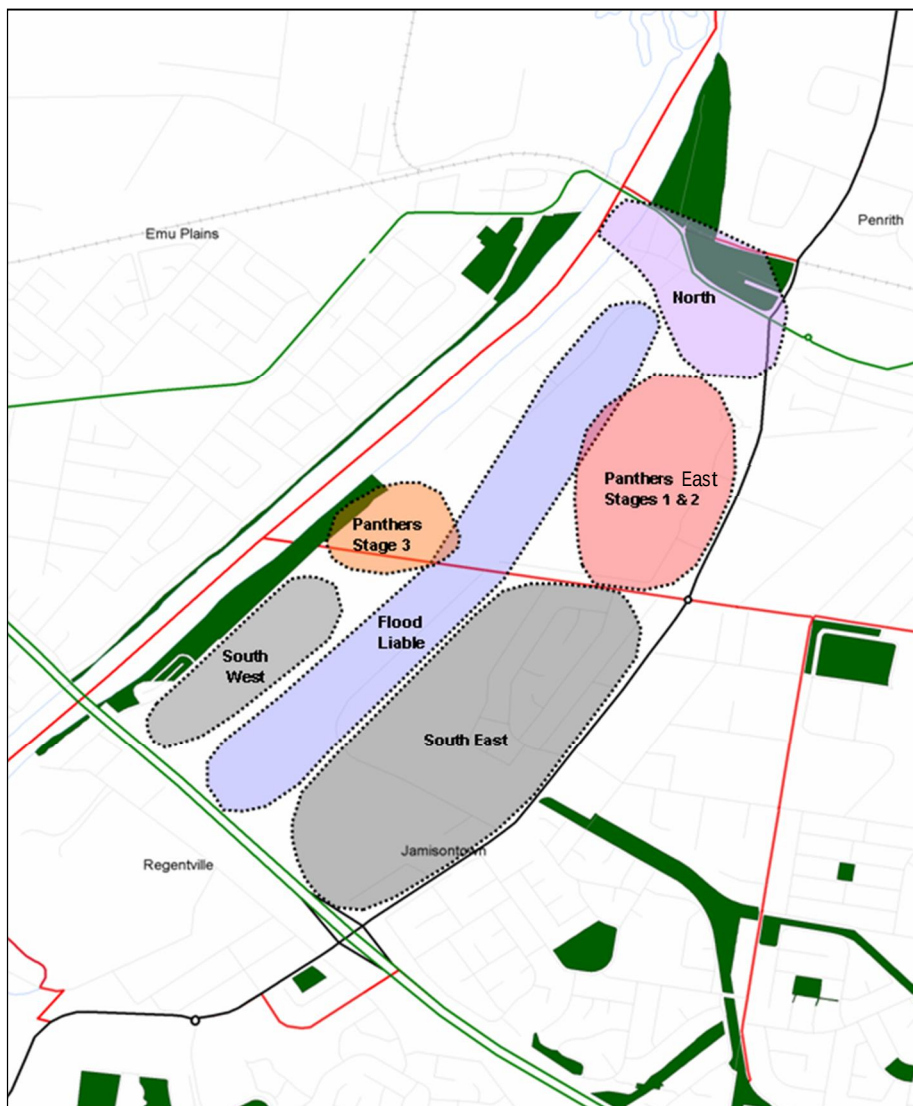
Source: Google Maps

3.2 Anticipated Development

As noted above, future development in the study area will be from both Panthers Penrith and other development in the Riverlink Precinct. Based on the Riverlink Precinct Economic Impact and Land Use Assessment Study undertaken by Hill PDA, a number of sub precincts have been identified for development in the Riverlink Precinct. The traffic generating potential of these precincts has been documented in the *Penrith Riverlink Precinct Traffic, Transport and Access Impact Assessment* (GHD, for Penrith Council, 2009). A plan of these sub-precincts is shown below in Figure 4, and based on this layout, Panthers East Stage 1, 2 and 3, as well as the north sub-precinct all fall within the study area. An indicative development plan for Penrith Panthers East Stage 1,2 and 3 as well as the North Sub-Precinct

has been proposed, with the traffic impact assessment focussing on the ultimate development in the precinct by 2031. This section details the proposed development in Panthers stages 1 and 2 (“Panthers East”) and estimates the likely traffic generation of the adjacent Riverlink precincts, based on proposed land use documented in the *Penrith Riverlink Precinct Traffic, Transport and Access Impact Assessment* (GHD, for Penrith Council, 2009).

Figure 4 - Proposed Riverlink Sub-Precincts



Source: Hill PDA

3.2.1 Panthers Penrith

A summary of the proposed land uses and floor areas for each of the proposed land uses in the Panthers East development is shown below in Table 6. Figure 5 shows the locations of each of the proposed land

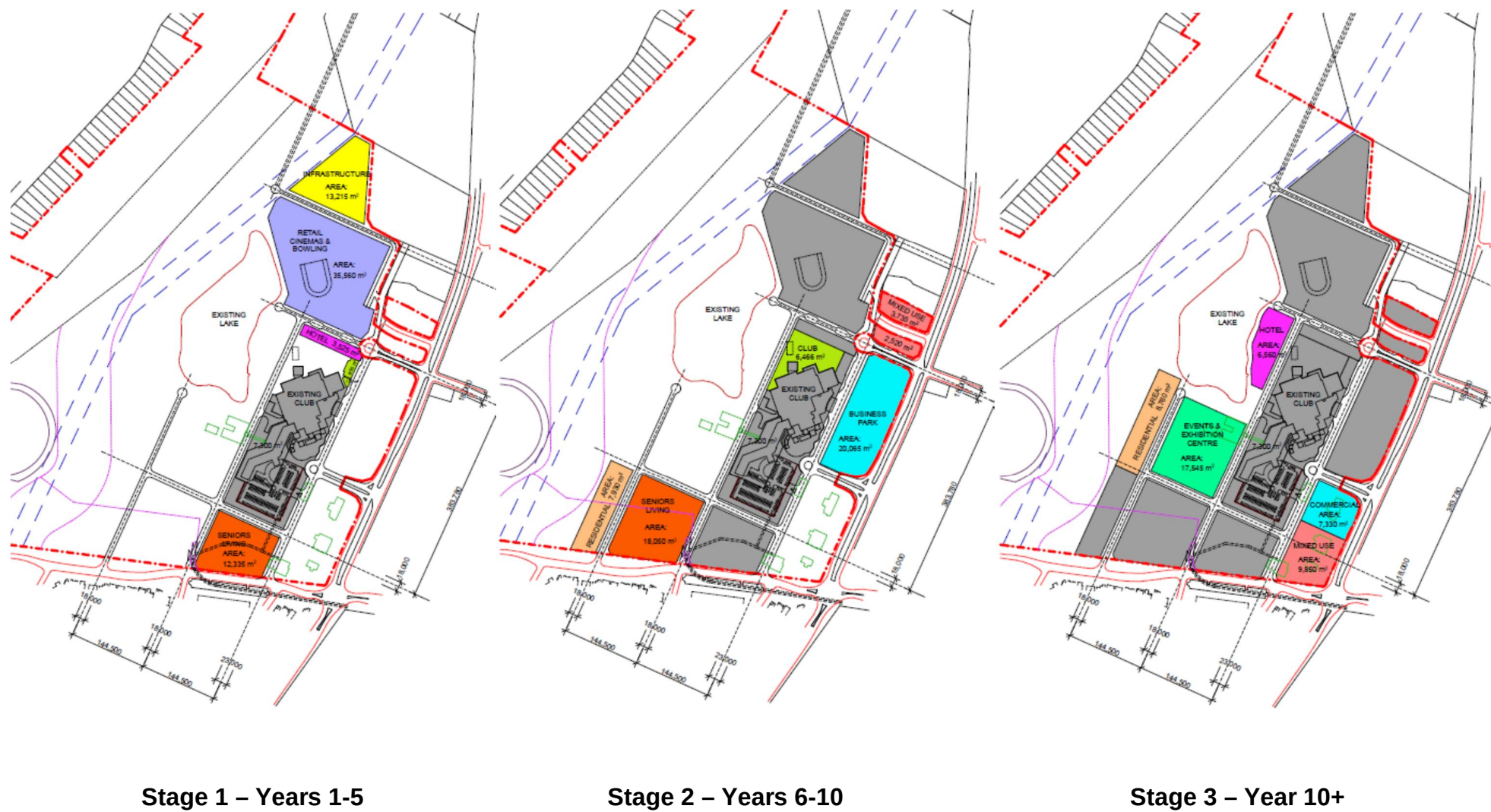
use types within the Panthers precinct at each of the three stages of development.

Table 6 Panthers Penrith Planning Proposal Proposed Land Use by Stage

Stage	Land Use	Floor Area (m ²)
Existing	Existing Club (Panthers)	48,200
	Existing Hotel (Chifley)	11,500
Stage 1 – Panthers East (Year 1 to Year 5)	New Hotel	19,800
	Cinemas and bowling	8,500
	General Retail	5,000
	Outlet Retail	25,000
	Restaurants	3,000
	Commercial Suites	6,000
	Seniors living	25,000 (125 units)
Stage 2 – Panthers East (Year 6 to Year 10)	Commercial suites	6,000
	Seniors living	25,000 (125 units)
	Business Park	20,000
	Residential	15,000 (90 units)
	Aquatic, health and well-being	4,000
	General Retail	4,500
Stage 3 – Panthers East (Year 10 and beyond)	Residential	70,000 (410 units)
	New Hotel	10,400 (130 rooms)
	Business Park	5,000
	Mixed use/Service apartments	9,000 (60 units)
	Events and exhibition	30,000
	General Retail	3,000

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Figure 5 - Penrith Panthers Indicative Land Use by Stage



Plans are indicative of land use only and do not reflect proposed road network, see Figure 3 for access arrangements

3.2.2 Riverlink Precinct

A summary of land use and floor areas for the Riverlink Precincts is shown below in Table 7 to Table 9. These indicative land uses and floor areas are derived from the Riverlink Precinct Economic Impact and Land Use Assessment Study undertaken by Hill PDA and represent the possible development profile in this precinct by 2031.

Table 7 Proposed Riverlink North Precinct Developments

Land Use	Site Area (ha)	Existing GFA	Proposed GFA
Sports Stadium	2.0	-	2,000
Indoor/Outdoor Sports Centre	1.5	-	5,000
Integrated Visitor Centre/Museum/Gallery	2.0	-	2,000
Sports Academy/Management School			4,000
Art/Cultural/Business Incubator			3,000
Retail ground floor			2,000
GPS School	6.0	-	10,000
North Precinct Total	11.5	-	28,000

Table 8 Proposed Riverlink South East Precinct Developments

Land Use	Site Area (ha)	Existing GFA	Proposed GFA
Bulky Goods	3.0	-	12,500
Industrial	10.0	-	6,000
Convenience retail	1.0	-	3,000
South East Precinct Total	14.0	-	21,500

Table 9 Proposed Riverlink Flood Liable Lands Developments

Land Use	Site Area (ha)	Existing GFA	Proposed GFA
Water Theme Park	7.5	-	20,000
Golf course	20.0	-	3,000
Camping grounds			
Eco tourism resort	4.0	-	(150 huts)
South East Precinct Total	31.5	-	23,000

3.3 Traffic Modelling

This section outlines the approach taken for modelling the traffic generation from the development sites in the study area and the impacts that this traffic will have on the surrounding road network. It also details the process undertaken to determine the intersection and road improvements that will be required to accommodate the traffic generated by the proposed developments. GHD have used a three-tiered modelling approach to examine the road network performance including intersection Level of Service, delay and queuing as follows:

1. Modelling key intersections in isolation using SIDRA intersection modelling;
2. Modelling of key corridors for coordinated intersections using LinSig modelling; and
3. Modelling key aspects of the network to examine impacts of queuing in the network using Paramics micro simulation modelling.

The details of this traffic assessment are presented below.

3.3.1 SIDRA Modelling

GHD have undertaken initial traffic analysis of the Panthers Penrith proposal using SIDRA intersection modelling of the key intersections in the study area. The existing intersections in the study area that were included in the analysis were:

- ▶ Jamison Road and Mulgoa Road;
- ▶ Mulgoa Road and Panther Place;
- ▶ Mulgoa Road and Ransley Street; and
- ▶ Mulgoa Road and Great Western Highway.

In addition to these intersections, the following new intersections have been proposed as part of the Panthers Penrith access strategy:

- ▶ A new intersection on Jamison Road connecting the southern end of the proposed north-south Riverlink Access; and
- ▶ A new intersection on Great Western Highway connecting the northern end of the proposed north-south Riverlink Access.

Base SIDRA models of the existing intersections have been developed based on traffic data collected in 2011 for the Thursday evening peak, which is the typical analysis period for retail developments that tend to have their highest impact on the road network when coinciding with the commuter peak. In order to determine the future traffic demand on the road network in the study area, future traffic has been estimated for each of the following components of growth:

- ▶ Background traffic growth, independent of the Panthers or Riverlink North developments;
- ▶ Traffic growth associated with the proposed Panthers Penrith Planning Proposal; and

- ▶ Traffic growth associated with the Riverlink North Precinct.

Traffic growth associated with Panthers and Riverlink has been derived from traffic generation calculated from the proposed land use, while background traffic growth has been estimated based on strategic traffic modelling undertaken by NSW Roads and Maritime Services (RMS).

Each of these components of traffic growth have been assigned to the road network based on assumptions around geographic pattern of demand to the site, resulting in revised 2031 traffic flows at each of the six intersections above, for the 2031 Thursday Evening Peak.

3.3.2 LinSig Modelling

LinSig modelling was undertaken to supplement the SIDRA modelling as SIDRA is not able to model signalised intersections in coordinated operation. LinSig is capable of modelling and optimising coordinated sets of signals, and report signal settings and resulting queues and delay for intersections operating in a corridor, rather than each intersection in isolation.

The LinSig modelling was used to further assess the interaction of the following intersections as agreed with RMS and PCC:

- ▶ Mulgoa Road and Ransley Street;
- ▶ Mulgoa Road and Panther Place;
- ▶ Mulgoa Road and Jamison Road;
- ▶ Jamison Road, Harris Street and Southern Riverlink Access.

The traffic growth, traffic distribution and assignment assumptions used in LinSig modelling are the same as those used for SIDRA modelling.

3.3.3 Paramics Modelling

Following the LinSig modelling, further modelling using Paramics was used to demonstrate the build-up and discharge of queues through the peak period and demonstrate any net accumulation of traffic in the system over the peak hour. The traffic growth, traffic distribution and assignment assumptions used in the Paramics modelling are the same as those used for the SIDRA and LinSig modelling.

3.3.4 Assumptions

A number of key assumptions have been made in the assessment and analysis of the traffic impacts of the Panthers Penrith Planning Proposal as agreed with RMS and PCC. These are detailed below.

- ▶ Analysis and design considerations for intersections have been made on the basis of Thursday evening traffic demands.
- ▶ Background traffic flows in 2031 have been derived from the RMS Strategic EMME/2 highway model (shown in Appendix A). Based on flows along Mulgoa Road forecast in the RMS strategic model, the following background traffic growth rates have been adopted:
 - o 1.5% per annum (cumulative) on Mulgoa Road, north and south;

- o 1.87% per annum (cumulative) on Great Western Highway (west);
 - o 1.31% per annum (cumulative) on Great Western Highway (east);
 - o 2.2% per annum (cumulative) on Jamison Road (west) as advised by RMS based on the *Penrith Riverlink Precinct Traffic, Transport and Access Impact Assessment* (GHD for Penrith Council, 2009); and
 - o 0.51% per annum (cumulative) on Jamison Road (east).
- ▀ No additional works in the study area have been considered in this assessment, other than those directly related to the development of the Panthers Penrith site. In particular, the extension of Jane Street to Great Western Highway, which has been included in previous traffic impact assessments, has been excluded from this study, presenting a worst case scenario for traffic flows in the study area.
 - ▀ An estimate of the traffic demand for Harris Street was made on the basis of the number of observed dwellings in the block adjacent to Harris Street down to a point halfway to Willoring Crescent. As trip generation rate of 0.8 trips per dwelling, with a directional split of 20% out and 80% in was used.
 - ▀ Signal phasing has been modelled to be consistent with existing arrangements at all intersections, with the exception of Mulgoa Road and Ransley Street, which has an additional phase added for the eastbound movement out of Panthers Penrith to account for the additional traffic generated by the development.
 - ▀ Full pedestrian demand has been assumed at all intersections, as requested by RMS. This is a conservative assumption as there is likely to be less than full pedestrian demand every cycle at each of these intersections.
 - ▀ The assumption of full pedestrian demand also necessitates modelling higher cycle times than are observed in the field. All intersections along Mulgoa Road have been modelled operating at 160 second cycle times rather than the observed 120 second cycle times. This is a conservative assumption and will tend to result in higher modelled queues overall.
 - ▀ Lane widths in the 2031 development case scenario have been assumed to be 3.2m wide along Mulgoa Road, as distinct from the existing 3.5m wide lanes currently on Mulgoa Road.
 - ▀ A Passenger Car Unit (PCU) equivalence of 2 PCUs per heavy has been assumed. On the basis of this assumption, a conversion factor of 1.07 from vehicles to PCUs has been adopted.
 - ▀ An average cruise speed between intersections of 35 km/hr has been assumed.

3.3.5 Traffic Generation

Traffic generation for the Panthers Penrith Planning Proposal, as well as the North Riverlink Precinct has been from the *RMS Guide to Traffic Generating Developments, 2002*, where possible. In the case where a particular land use is not specified in the *Guide*, an estimate was made based on comparison with similar sites. The split of inbound and outbound traffic has also been determined based on individual land uses as recommended by the *Guide*. This approach has been reviewed and agreed by RMS.

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A summary of the land uses and trip generation for the 2031 ultimate development in Panthers East is shown below in Table 10.

Table 10 2031 Panthers Penrith Traffic Generation Potential (Evening Peak)

Stage	Land Use	GFA (m ²)	Traffic Generation Rate	2031 PM Peak Hour Trips	
				Outbound	Inbound
Stage 1 - East	New hotel	19,800 (250 rooms)	0.5/room	100	25
	Cinemas and bowling	8,500	0.6/100m ²	40	10
	General retail	5,000	2/100m ²	72	18
	Outlet retail	25,000	500	400	100
	Restaurants	3,000	100	80	20
	Commercial suites	6,000	90	72	18
	Seniors living	25,000 (125 units)	45	36	9
Stage 2 - East	Commercial suites	6,000	1/100m ²	48	12
	Seniors living	25,000 (125 units)	2.8 / lot	36	9
	Business park	20,000	15 / ha	24	6
	Residential	15,000 (90 units)	0.4 / lot	7	29
	Aquatic, health and well-being	4,000	0.25 / 100m ²	60	15
	General Retail	4,500	2/100m ²	65	16
Stage 3 - East	Residential	70,000 (410 units)	0.4 / unit	34	134
	New hotel	10,400	0.5 / room	10	42
	Business park	5,000	15 / ha	2	6
	Mixed use/serviced apartments	9,000 (60 units)	0.55 / lot	6	24
	Events and exhibition	30,000	0.5 / 100m ²	30	120
	General Retail	3,000	2/100m ²	43	11
Total				1324	664

In addition to the traffic generation from the Panthers East Site, some traffic from the adjacent Riverlink Precincts is also expected to pass through the study area. The expected traffic generation for the Riverlink Precincts is detailed below in Table 11.

Table 11 2031 Riverlink Traffic Generation (Evening Peak)

Precinct	Trips In	Trips Out
North	71	18
South East	295	74
Flood Liable Lands	36	9
Total	402	101

3.3.6 Traffic Distribution

The trip generation outlined in section 3.3.3 was distributed to destinations at the edge of the study area in accordance with traffic distribution observed in NETANAL strategic model used by Penrith Council. Traffic travelling to and from Panthers Penrith and adjacent Riverlink Precinct is assumed to come from and go to the following points at the edge of the study area:

- ▶ Emu Plains and Blaxland Road;
- ▶ Castlereagh Road and Mulgoa Road North;
- ▶ Jane Street and High Street east;
- ▶ Ransley Street east;
- ▶ Jamison Road east;
- ▶ Mulgoa Road south;
- ▶ Harris Street;
- ▶ Jamison Road west/Tench Avenue

A summary of the distribution of Panthers and Riverlink traffic to each of the destinations identified above is shown below in Table 12.

Table 12 2031 Panthers Penrith Traffic Distribution (Thursday Evening Peak).

Origin/Destination	From	To
Emu Plains/Blaxland	9%	13%
Castlereagh Rd/Mulgoa Rd N	25%	21%
Jane St/High St E	23%	21%
Ransley St E	5%	7%
Jamison Rd E	11%	20%
Mulgoa Rd S	10%	13%
Harris St	16%	7%
Jamison Rd W/Tench Ave	9%	13%

Based on the traffic distribution shown in Table 12, the majority of traffic coming to and from Panthers is expected to do so from the north and the east, which is in line with the major traffic flows in the study area.

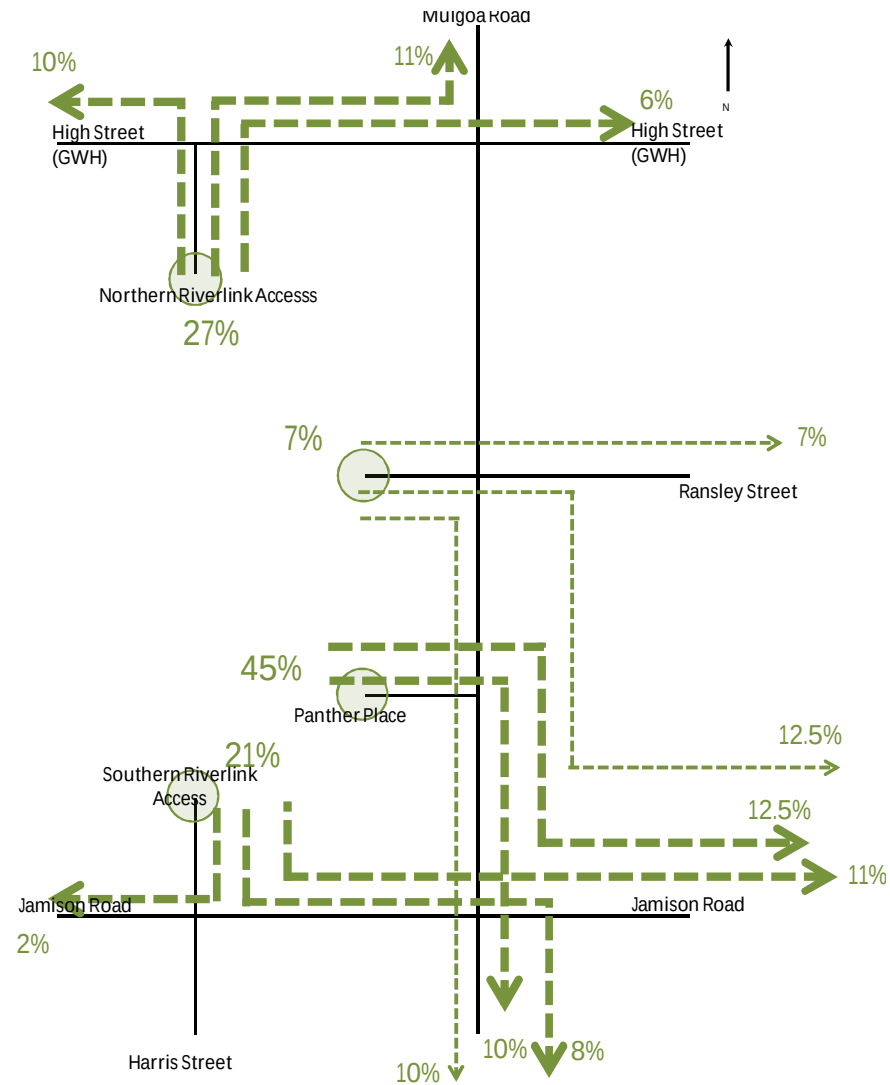
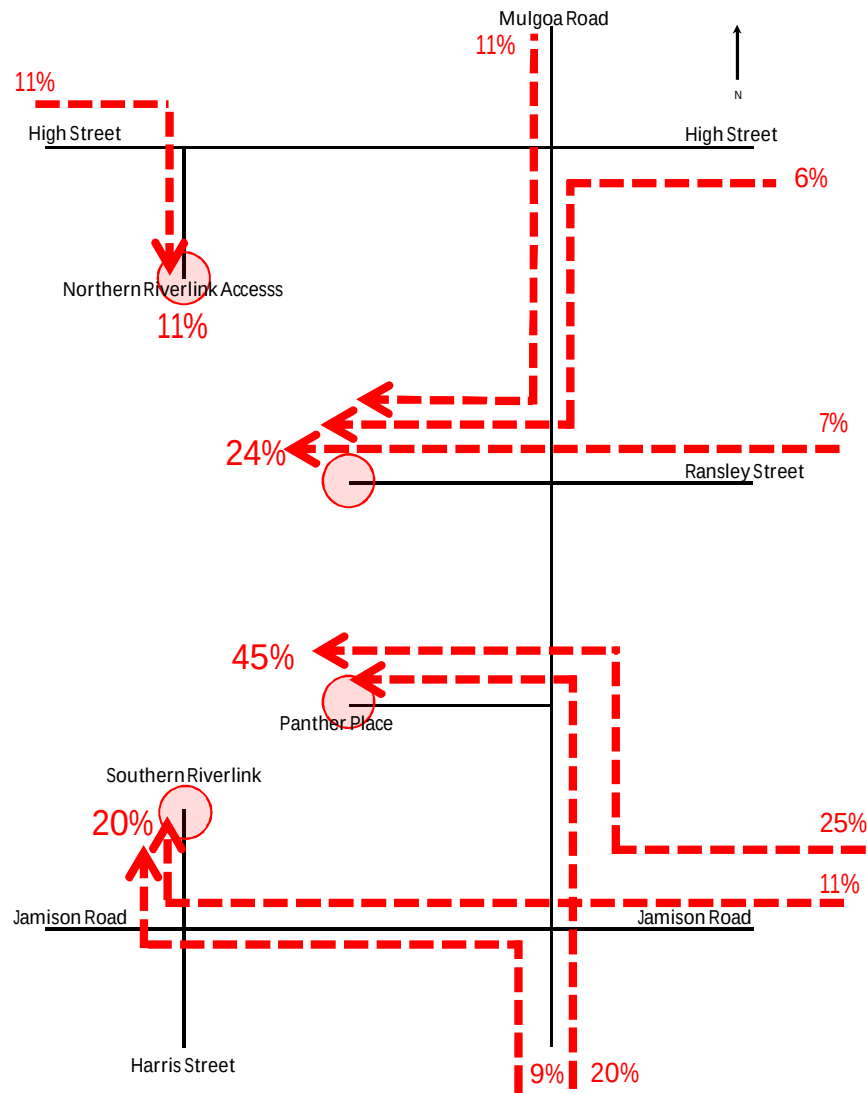
3.3.7 Traffic Assignment

Based on the generation and distribution of traffic outlined in sections 3.3.3 and 3.3.4, traffic was assigned on the road network in the study area according to the following principles:

- ▶ Traffic travelling to Panthers would enter Panthers via the closest and first available entry;
- ▶ Traffic travelling from Panthers would exit via the closest available exit to their destination. In the case of traffic exiting to Jamison Road east and Mulgoa Road south, trips were assumed to be split evenly between Ransley Street and Panther Place.
- ▶ Traffic was assumed to be able to enter and exit Panthers via Ransley Street, Panther Place, Jamison Road and Riverlink Access North.
- ▶ During “special events” an Event Traffic Management Plan would be in place to manage traffic around Panthers Penrith. It is noted that such a traffic plan is outside the scope of this apportionment plan, and event traffic should not influence good urban traffic planning and design.

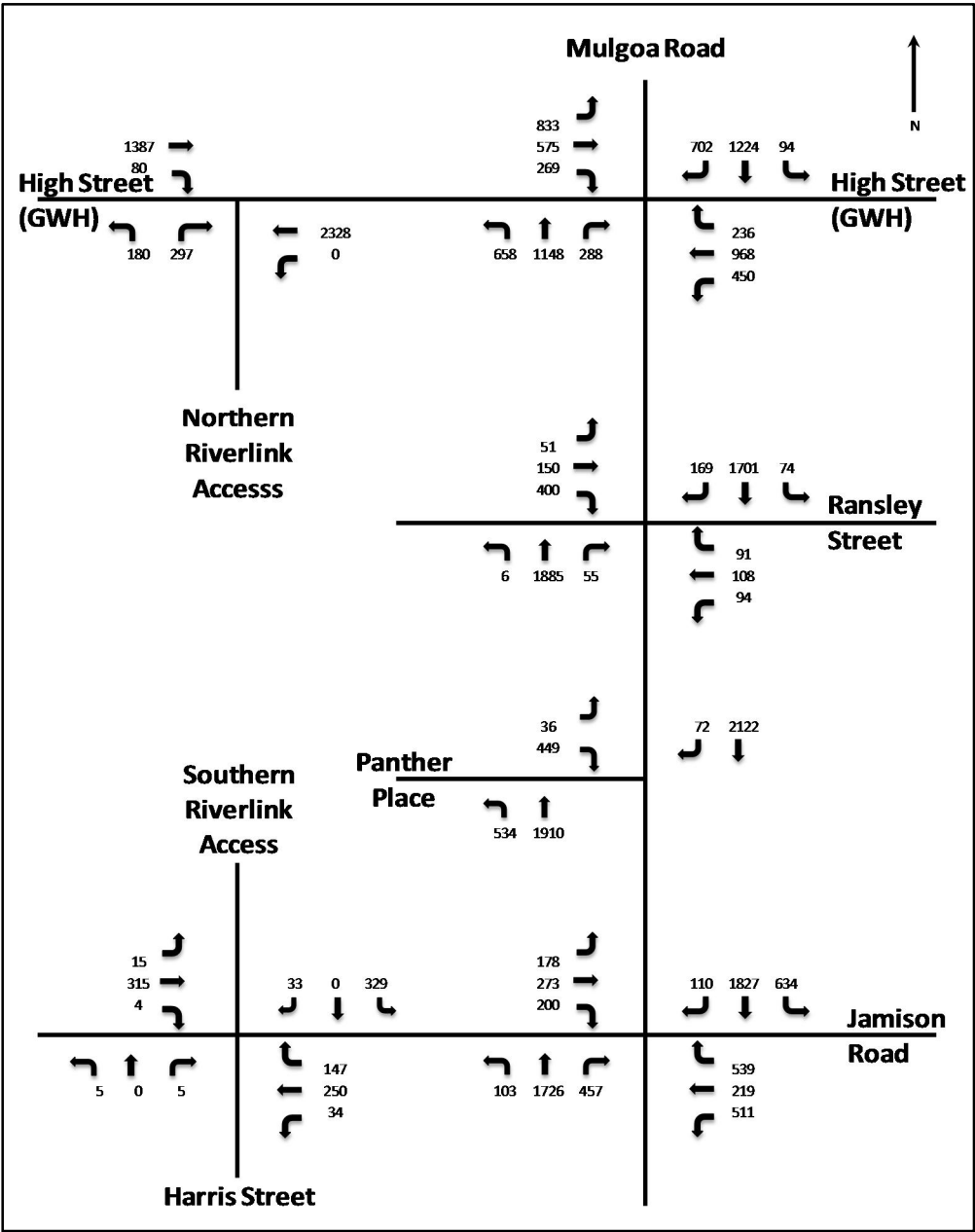
Figure 6 shows the traffic assignment assumed for the Thursday evening peak period for incoming and outgoing trips respectively.

Figure 6 – Penrith Panthers 2031 Traffic Assignment (Thursday Evening Peak)



Background traffic growth, Panthers traffic and Riverlink traffic was combined for each of the six intersections to give forecast traffic flows for the 2031 Thursday evening peak period. These traffic volumes were then used as inputs to the 2031 Thursday evening peak SIDRA models. A plot of the assumed traffic flows for each of the key intersections in the model is shown in Figure 7. A more detailed breakdown of the 2031 traffic volumes, showing the contributions to traffic growth from background growth, Panthers growth and other Riverlink Precinct growth is presented in Appendix B.

Figure 7 – Panthers Penrith Thursday Evening Peak Assumed Traffic Flows for 2031



3.4 Future Road Network Performance (Year 2031) SIDRA Modelling

The forecast 2031 traffic flows for the study area were modelled using the SIDRA intersection modelling package for each of the intersection identified in section 3.3.1 to determine the future road network performance under the full Penrith Panthers development scenario. Modelling of these intersections in their existing configurations showed that some additional works would be required to accommodate the existing flows.

These additional works are further documented in section 3.5.

Table 13 below shows a comparison between the average delay and Levels of Service for each of the six intersections in the study area under the base 2011 and forecast 2031 Thursday evening traffic flows. More detailed output summaries from SIDRA are shown in Appendix C.

Table 13 SIDRA Intersection Performance

Intersection	Base 2011		Forecast 2031 (with improvements)	
	Average Delay (s)	Level of Service	Average Delay (s)	Level of Service
Northern Riverlink Access/Great Western Highway	N/A	N/A	52	D
Mulgoa Road/Great Western Highway/High Street	77	F	82	F
Mulgoa Road/Ransley Street	7	A	38	C
Mulgoa Road/Panther Place	5	A	11	A
Mulgoa Road/Jamison Road	35	C	49	D
Southern Riverlink Access/Jamison Road/Harris Street	N/A	N/A	23	B

Analysis of the modelled SIDRA outputs shows that the two critical intersections in the network are:

- Jamison Road and Mulgoa Road; and
- Great Western Highway and Mulgoa Road.

3.4.1 Great Western Highway/Northern Riverlink Intersection

SIDRA analysis of the intersection of Great Western Highway and the Northern Riverlink Access shows that the intersection will operate under an acceptable Level of Service.

3.4.2 Mulgoa Road/Ransley Street Intersection

SIDRA analysis of the intersection of Mulgoa Road and Ransley Street shows that the intersection will operate under satisfactory Level of Service.

3.4.3 Mulgoa Road/Panther Place Intersection

SIDRA analysis of the intersection of Mulgoa Road and Ransley Street shows that the intersection will operate under a good Level of Service.

3.4.4 Jamison Road/Harris Street/Southern Riverlink Access Intersection

SIDRA analysis of the intersection of Jamison Road, Harris Street and The Southern Riverlink Access shows that the intersection will operate under a good Level of Service.

3.4.5 Mulgoa Road/Jamison Road Intersection

The intersection analysis shows that the intersection of Mulgoa Road and Jamison Road is sensitive to pedestrian clearance times, noting that the modelled intersection Levels of Service are based on the assumption of pedestrian facilities being called every cycle. Under these conditions, the SIDRA modelling shows that this intersection would need to run at a higher cycle time than currently observed on site (160 seconds as opposed to 120 seconds) to remain operating at an acceptable Level of Service. Site observations have shown that the pedestrian facilities are not called each cycle and that average delays at this intersection are thus expected to be lower than those presented above. It is expected that the above intersections can run at a lower cycle time than 160 seconds. Analysis of the intersection operation using SIDRA also shows that reducing cycle times at this intersection will also decrease queue lengths below those reported in this document.

Analysis of queue lengths at this intersection (as shown in Table 14 and Appendix C) also showed that queue lengths at this intersection were likely to affect adjacent intersections. As discussed previously, the effects of closely spaced intersections, optimisation of traffic signals and optimisation of traffic corridors cannot be accurately modelled in SIDRA. To account for this, GHD have undertaken additional LinSig modelling of a coordinated set of intersections to optimise the entire corridor to provide accurate signal timings and signal offsets between intersections within a coordinated progression. This is detailed below in Section 3.5.

3.4.6 Mulgoa Road/Great Western Highway Intersection

The intersection of Mulgoa Road and High Street is currently congested and it is expected that an extension of Jane Street through to the Great Western Highway to the west of Mulgoa Road will be required in the future. At the request of Transport for NSW and Roads and Maritime Services, it has been assumed that this Jane Street intersection upgrade will not be included in this assessment. It should be noted that this intersection currently fails under existing conditions, and that the level of average delay is expected to increase by 5 seconds with the inclusion of forecast 2031 flows. The majority of this additional demand is a result of additional background traffic growth rather than traffic associated with the Panthers Penrith development, as reflected in the intersection's current unsatisfactory Level of Service.

3.5 Future Road Network Performance (Year 2031) LinSig Modelling

As detailed in Section 3.4 above, modelling of isolated intersections using SIDRA showed that the intersection of Jamison Road and Mulgoa Road is likely to affect the operation of adjacent intersections. In reality, signalised intersections along Mulgoa Road would be coordinated to improve operation along the corridor. LinSig modelling was undertaken to account for this difference in signal operation. Table 14 below shows a comparison between queues modelled in SIDRA and queues modelled in LinSig.

Table 14 Comparison of 2031 Modelled Queues (SIDRA versus LinSig)

Intersection	Approach	SIDRA Queue (m)	LinSig Queue (m)
Harris St/Jamison Rd	N (within development)	87	47
	E	36	15
	S	4	1
	W	92	52
Mulgoa Rd/Jamison Rd	N	445	174
	E	257	129
	S	215	160
	W	122	63
Mulgoa Rd/Panther Pl	N	42	145
	S	40	37
	W (within development)	125	67
Mulgoa Rd/Ransley St	N	236	171
	E	101	93
	S	620	163
	W (within development)	173	41

Comparison of the queuing from SIDRA analysis and LinSig analysis show significant differences in the expected queue length expected in the study area around Mulgoa Road and Jamison Road. LinSig modelling shows that the mean-maximum queue lengths under coordinated operation are likely to be shorter than those reported by SIDRA. This indicates that queuing on the approaches to the intersection of Mulgoa Road and Jamison will not impact on the operation of adjacent intersections when under coordinated signal operation.

In particular, queues on Jamison Road west of Mulgoa Road and Mulgoa Road north of Jamison Road are lower than those reported by SIDRA, and well within the storage lengths for those approaches.

Table 15 below shows a comparison of intersection Levels of Service modelled in SIDRA and LinSig. More detailed LinSig model outputs are presented in Appendix D.

Table 15 Comparison of 2031 Modelled Intersection Delays (SIDRA vs LinSig)

Intersection	SIDRA		LinSig	
	Av Delay (s)	LoS	Av Delay (s)	LoS
Harris St and Jamison Rd	21	B	20	B
Mulgoa Rd and Jamison Rd	49	D	54	D
Mulgoa Rd and Panther Pl	11	A	13	A
Mulgoa Rd and Ransley St	37	C	40	C

Comparison of the average delays and intersection Levels of Service for both SIDRA and LinSig analysis shows good agreement between the two models, indicating that under co-ordinated operation, intersections in the study area are expected to operate comparably and that queuing between intersections is not expected to impede their operation.

3.6 Future Road Network Performance (Year 2031) Paramics Modelling

In order to provide further appreciation of expected queuing behaviour at the intersection of Mulgoa Road and Jamison Road, Paramics micro simulation modelling of was also conducted for the following intersections:

- ▶ Mulgoa Road and Ransley Street;
- ▶ Mulgoa Road and Panther Place;
- ▶ Mulgoa Road and Jamison Road; and
- ▶ Jamison Road, Harris Street and Southern Riverlink Access.

The Paramics models were coded using the same phasing and cycle time used in both SIDRA and LinSig modelling, with some adjustments made to phase splits and signal offset modelling of the 2031 evening peak hour using Paramics.

Figure 8 below shows a plot of the Paramics model operation at the end of the peak period (18:00). Operation of the model under a number of starting conditions shows that there is no net accumulation of traffic in the network over the peak period.

A summary and comparison of peak queues from SIDRA, LinSig and Paramics is shown in

Figure 8. Comparison of the queuing statistics from both LinSig and Paramics supplementary traffic modelling show that under coordinated signal operation, the queues expected under the 2031 development scenarios are manageable not expected to impede the operation traffic along Mulgoa Road or Jamison Road.

Figure 8 - Paramics Model Operation (18:00)

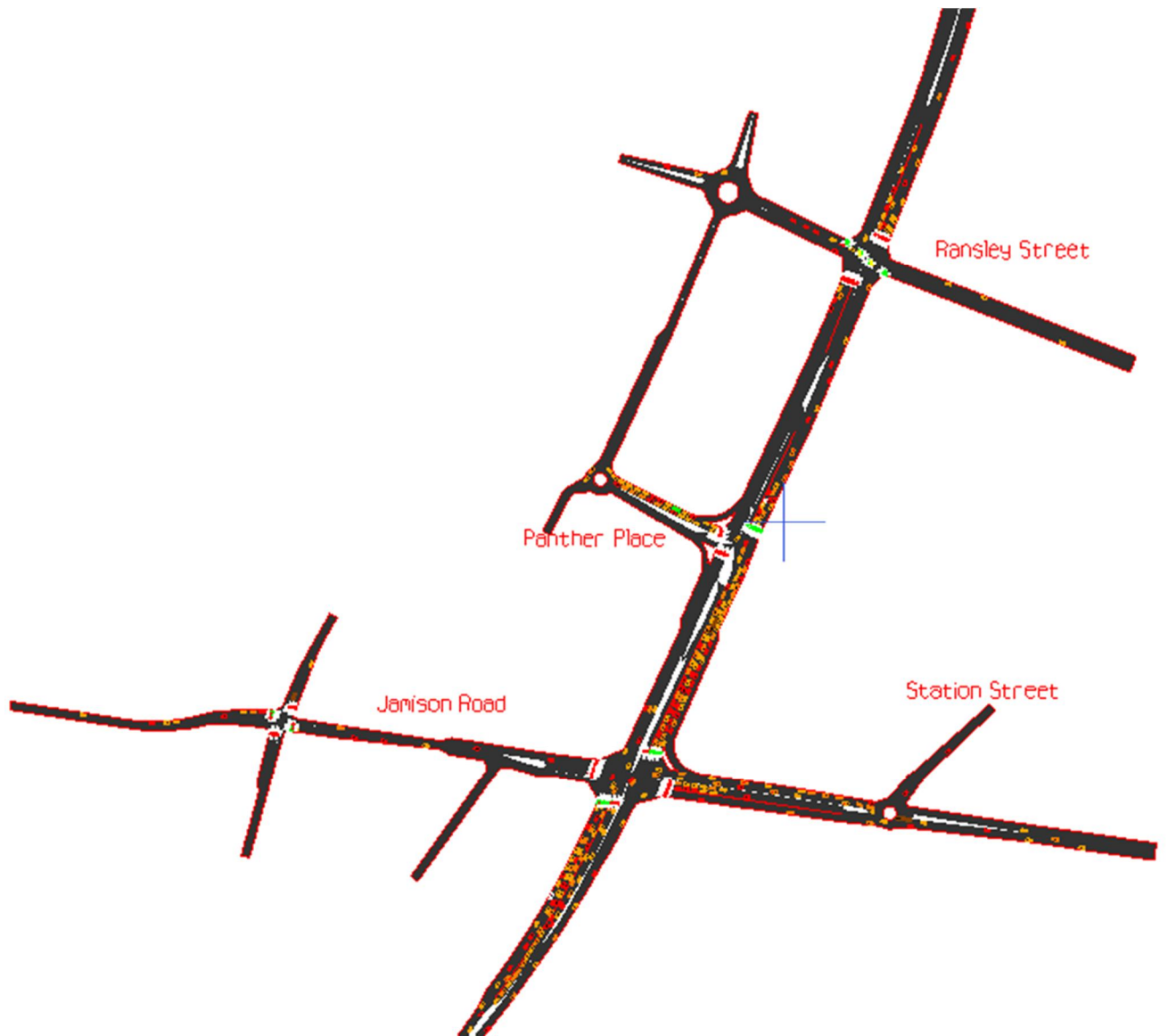
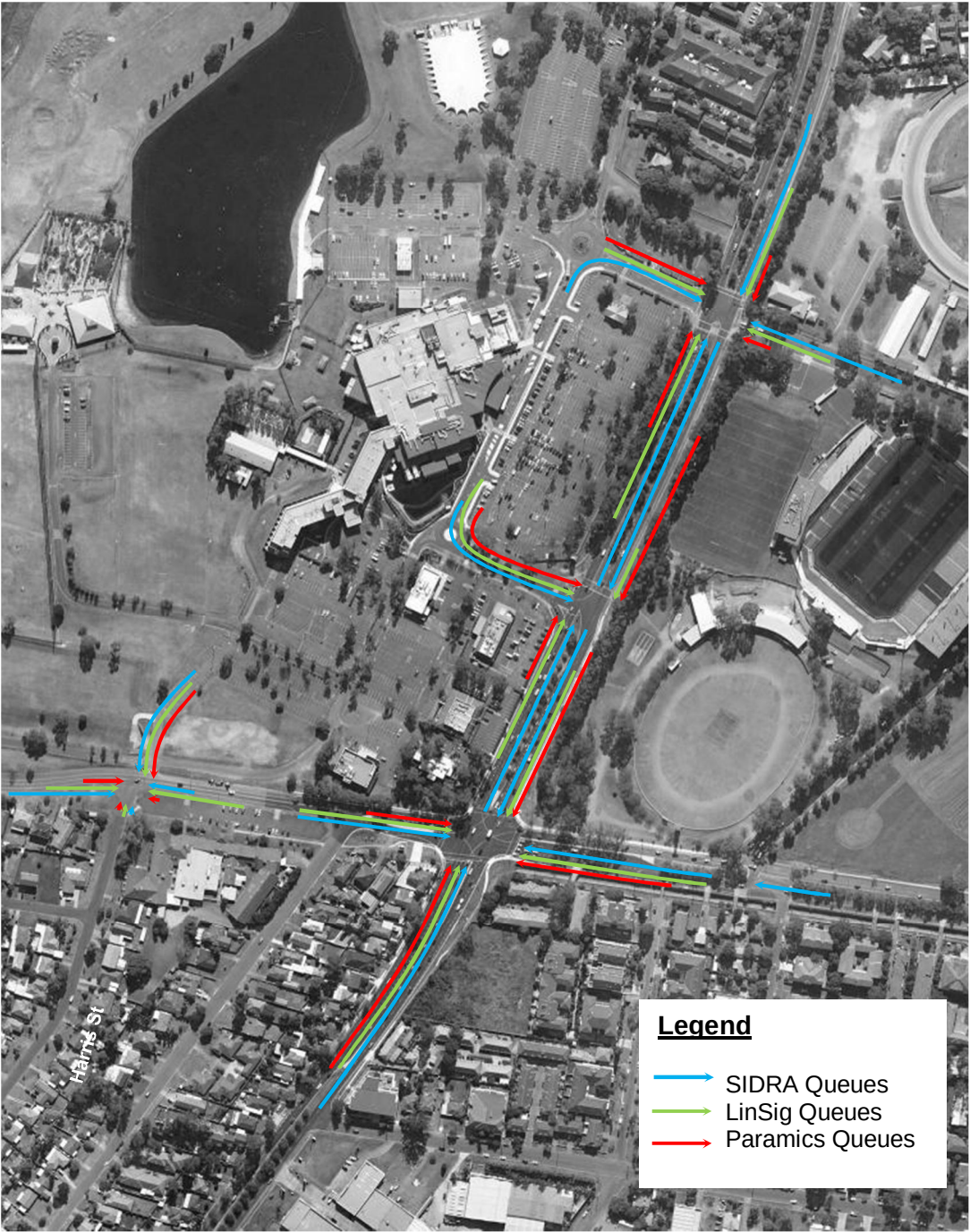


Figure 9 – Comparison of Evening Peak Hour Queues (SIDRA, LinSig and Paramics)



Source: Google Maps

3.7 Future Road Infrastructure (Year 2031)

The required works and the assumptions surrounding these works have been developed through traffic engineering and modelling followed a process of stakeholder consultation through a series of negotiations with the following parties:

- ▶ Transport for NSW (TfNSW);
- ▶ NSW Roads and Maritime Services (RMS);
- ▶ Penrith City Council; and
- ▶ Panthers Penrith.

The following negotiation meetings were held to guide the development of the proposed network:

- ▶ Wednesday, 26 October, 2011;
- ▶ Friday, 4 November, 2011;
- ▶ Thursday, 8 December, 2011;
- ▶ Monday, 23 January, 2012; and
- ▶ Friday 10 February, 2012.

The proposed network changes outlined below represent the culmination of design work, consideration of feedback and instruction on policy and practice from the relevant stakeholders in the approval process.

Based on the intersection modelling undertaken for the ultimate 2031 scenario, a number of improvements to the road network around Panthers have been identified. These include:

- ▶ New signalised intersection connecting the proposed Riverlink Access Road with Great Western Highway in the north and Jamison Road in the south;
- ▶ Widening of Mulgoa Road to three lanes in each direction between Jamison Road and Great Western Highway/High Street. The Panthers Penrith Planning Proposal considers only a subsection of this widening between Jamison Road and 100 north of Ransley Street, as agreed with RMS during the consultation stage;
- ▶ Changes to the configuration of the intersection of Mulgoa Road and Great Western Highway;
- ▶ Changes to the configuration of the intersection of Mulgoa Road and Panther Place;
- ▶ Changes to the configuration of the intersection of Mulgoa Road and Jamison Road; and
- ▶ Changes to the configuration of Jamison Street between Harris Street and Mulgoa Road, including traffic signals.

The following elements of the proposed works have been agreed by RMS and PCC to be necessary to the development and should be funded in full by the proponent:

- ▶ Left turn continuous slip lane from Mulgoa Road northbound into Panther Place

- ▶ Right turn bay from Jamison Road into the Southern Riverlink Access; and
- ▶ Northern approach of the intersection of Harris Street, Jamison Road and the Southern Riverlink Access.

These individual works elements are documented in Appendix G. Identified road network improvements are documented in further detail below.

3.7.1 New Intersections with Proposed Riverlink Access

In order to aid in the distribution of traffic onto the road network from both the Panthers East site and Riverlink North Site, a north-south link, connecting to Panthers and linking in to Great Western Highway in the north and Jamison Road in the south will be required. This link allows for a more diffuse release of traffic to the network, reducing pressure on the intersections of Mulgoa Road and Great Western Highway and Mulgoa Road and Jamison Road.

The northern Riverlink Access on Great Western Highway will be located on the existing Council lands to the east of the bridge over Peach Tree Creek. As widening of this bridge is unlikely to be feasible, it has been assumed that this intersection will be located as close as possible to the bridge while still allowing for a southbound right turn lane into the Riverlink Access. PCC have advised during the consultation stage that it will be possible for this intersection to be located on the existing Council lands; however it may need to be relocated from the position shown in the concept design during the detailed design stage.

On advice from RMS, the southern Riverlink Access has been located at the existing intersection of Harris Street and Jamison Road, effectively forming the fourth leg of this intersection. RMS have requested that this intersection will need to be signalised by the time the full Panthers Stage 3 development is complete (2031). As part of the staging of the Panthers Penrith Planning Proposal, this intersection could be initially constructed as a priority controlled intersection and then upgraded as necessitated by traffic demand as development progresses.

3.7.2 Widening of Mulgoa Road

Based on the forecast traffic growth along Mulgoa Road by 2031, it is expected that Mulgoa Road will need to be widened to three continuous through lanes in each direction between High Street/Great Western Highway and Jamison Road. It is expected that this widening can be achieved within the existing road reserve through a combination of narrowing the existing median and reducing the width of lanes from 3.5m to 3.2m. It has been agreed with RMS that Panthers Penrith will contribute to a subsection of this widening, between Jamison Road and a point 100m north of Ransley Street.

3.7.3 Mulgoa Road and Great Western Highway

In order to minimise delay at the intersection of Mulgoa Road and Great Western Highway without the inclusion of the Jane Street Extension, some changes will be required to the intersection layout, as agreed by RMS. The changes are as follows:

- ▶ Addition of a through lane on the western approach;

- ▶ Addition of a dedicated left turn lane on the northern;
- ▶ Addition of a dedicated left slip lane, feeding a continuous free left turn on the eastern approach into Mulgoa Road; and
- ▶ Addition of a through lane on the southern approach and extension of the northbound left turn by an additional 70m.

3.7.4 Mulgoa Road and Panther Place

In addition to the proposed widening of Mulgoa Road, and additional northbound left slip lane of 50m into Panther Place will be required, feeding into its own lane. Provision will also be made for a pedestrian crossing across Panther Place on the approach to Mulgoa Road.

3.7.5 Mulgoa Road and Ransley Street

Other than the widening of Mulgoa Road to three lanes in each direction, no further works will be required at the intersection of Mulgoa Road and Ransley Street. It is expected that widening through this section can be achieved within the existing road reserve without any need to modify the existing intersection.

3.7.6 Mulgoa Road and Jamison Road

In order to minimise intersection delay at the intersection of Jamison Road and Mulgoa Road, some changes will be required to the existing intersection layout. The changes are as follows:

- ▶ Addition of an exclusive left lane (100m) to the northern approach. The left turn lane will be configured as a give-way left-slip lane;
- ▶ Extension of the existing right turn lanes on the eastern to 160m (lane 3) and 130m (lane 4);
- ▶ Extension of the existing through and left lane on the western approach to Harris Street and the construction of an additional 30m right turn bay. This can be achieved through line marking and modification of the existing wide median;
- ▶ Remarking of turning discipline in lane 2 of Jamison Road on the approach to Mulgoa Road to a left and through lane (currently a through lane); and
- ▶ As advised by RMS, the existing median on Jamison Road will be extended through the intersection of McNaughton Street to Harris Street to restrict turning movements at McNaughton Street to left-in, left-out to reduce conflicts and improve safety on Jamison Road.

3.8 Infrastructure Staging

The road infrastructure changes identified in section 3.7 are assumed to be required in full by 2031. Previous modelling undertaken by GHD (documented in the Supplementary Transport Assessment for Panthers Penrith Planning Proposal, July 2011) identified the horizons for the following works:

- ▶ Widening of Mulgoa Road to three lanes in each direction would be required by 2026 (based

largely on background traffic growth);

- ▶ Similarly, intersection upgrades at the intersections of Mulgoa Road and Great Western Highway and Mulgoa Road and Jamison Street should be undertaken at the same time as the widening of Mulgoa Road;
- ▶ Construction of the Northern Riverlink Access and its intersections with Jamison Road and Great Western Highway is likely to coincide with Panthers East Stage 2 and Riverlink North development. These accesses assist to reduce traffic volumes at Panther Place and Ransley Street;
- ▶ The intersection of Harris Street, Jamison Road and the Southern Riverlink Access can be initially built as a priority intersection, with a give-way sign control on the northern and southern approaches and traffic signals to be included by the completion of Panthers East Stage 3 development.

As identified in the traffic modelling, however, a substantial proportion of the need for these identified works is generated by background growth (both existing and future traffic) and overall development within the Riverlink Precinct other than that proposed by Panthers.

4. Strategic Concept Layouts

4.1 Overview

The preliminary concept road layout is based on the Cox Richardson Architects Masterplan and traffic and transportation coordination with GHD Pty Ltd. Refer to Figure 3 for the road layout plan for the Panthers Penrith Precinct for horizon year 2031.

The overall approach is to provide an economic design solution, which would tie-in into the existing road network, to provide a safe, reliable and economically maintainable external road network for all road users, pedestrians, visitors and occupants for the Panthers Penrith East Precinct. The concept road layouts have been based on utilising existing aerial overlays in the absence of topographical survey, geotechnical or detailed design information.

The concept road layouts have been used to produce strategic cost estimates for the road and traffic related infrastructure (refer to Section 5.0).

4.2 Road Design Standards

The strategic concepts developed for roads surrounding the Panthers Penrith Precinct have been designed in accordance with:

- Roads and Maritime Services Road Design Guide
- Penrith City Council Design Guidelines

4.3 Design Criteria

The road hierarchy, speed environments and intersection layouts are in accordance with the concept layouts developed as part of the Supplementary Transport Assessment for Panthers Penrith Planning Proposal (July, 2011) undertaken by GHD Pty Ltd. This provided confirmation of the detailed traffic analysis with respect to traffic circulation, intersection design and configuration and overall road network planning for the Panthers Penrith Precinct.

4.4 Road Network Design

4.4.1 Road Infrastructure - Limits of Work

The traffic and road related infrastructure limits of work as agreed between the Proponent, RMS, TfNSW and PCC includes:

- Jamison Road and Harris Street (new traffic signal installation)
- Mulgoa Road and Jamison Road (reconfiguration of intersection to increase capacity)
- Mulgoa Road and Panthers Place (reconfiguration of intersection to increase capacity)
- Mulgoa Road and Ransley Street (reconfiguration of intersection to increase capacity)

- ▶ Mulgoa Road and Great Western Highway (reconfiguration of intersection to increase capacity)
- ▶ Great Western Highway and Northern Riverlink Access (new traffic installation)
- ▶ Widening of Mulgoa Road to six lanes (between Jamison Road to 100m north of Ransley Street)

4.4.2 Design Speeds

In accordance with the nature of the site, the design and posted speeds are shown in **Table 16** below.

Table 16 Road Design Speeds

Roads	Design Speed (km/h)	Posted Speed (km/h)
Jamison Road (between Mulgoa Road and Harris Street)	50	50
Mulgoa Road (between Jamison Road and Great Western Hwy)	60	60
Great Western Highway (between Mulgoa Road and River Road)	60	60

4.4.3 Typical Cross Sections

Typical cross sections for the roads have been developed in accordance with the RMS Road Design Guide and in conjunction with the on-going traffic and transport planning work conducted by GHD Pty Ltd as part of the Panthers Penrith Planning Proposal. Refer to Drawing No. 21-20942-C0001 to C0005 for the typical cross sections for Jamison Road, Mulgoa Road and Great Western Highway.

Typical cross sections adopted in the design are characterised as follows:

- ▶ Through traffic lanes generally 3.2m wide;
- ▶ Turning traffic lanes generally 3.2m to 3.5m wide;
- ▶ Road shoulder: 2.0m wide to the face of kerb;
- ▶ A minimum footpath reserve of 4.5m (to accommodate 3.0m shared pedestrian/bicycle path on Jamison Road between Mulgoa Road and Harris Street as advised by RMS);
- ▶ A divided carriageway along Mulgoa Road with three through traffic lanes in each direction separated by a median of varying width (to a minimum of 1.2m) within a 40m road reserve; and
- ▶ A median of 0.9m wide has been used along the length of Great Western Highway between the Northern Riverlink Access and Mulgoa Road.

It is noted that this design is for the purposes of strategic cost estimation only, and as such, confirmation of property acquisition will require detailed survey and further design development. Furthermore, as this design is only two-dimension at this stage, further work will be required to determine the requirements for earthwork batters, retaining structures and relocation of utilities.

4.5 Strategic Concept Layout Drawings

The strategic road layout drawings for the ultimate design year (2031) for the proposed traffic and road related infrastructure are attached in Appendix E (refer to Drawing No 21-20942-C0001 to 21-20942-C0005).

5. Strategic Cost Estimates

This section outlines strategic cost estimates for all of the works identified in sections 4 and 5 of this report. The methodology and assumptions underlying these cost estimates is presented in the following sections. Cost estimates detailed in this section have been prepared by **M. Raven Consulting Pty Ltd** based on a strategic concept layout prepared by GHD (as detailed in Section 4 of this report). Full detailed calculations of strategic cost estimates for each of the identified works can be found in Appendix E.

5.1 Basis for Strategic Cost Estimate

The strategic cost estimates for the proposed works associated with Panthers Penrith are based on the *RMS Estimating Manual for Strategic Estimates*. The following drawings have been used to determine the scope of works cost estimation:

- ▶ 21-20942-C0001
- ▶ 21-20942-C0002
- ▶ 21-20942-C0003
- ▶ 21-20942-C004
- ▶ 21-20942-C0005-1
- ▶ 21-20942-C0005-2

First Principles estimates have been prepared using the Empirical Contingency method. No probabilistic method has been used.

5.2 Assumptions

This section details the assumptions that have been used in the development of the strategic cost estimates.

5.2.1 Generalh

The strategic cost estimates include allowances for the following:

- ▶ Primary Testing;
- ▶ Accommodation;
- ▶ Traffic Management;
- ▶ Environmental; and
- ▶ Clearing and Demolition works.

Where nominated, allowances have also been made for the relocation of bus stops and any adjustment to property boundaries required.

5.2.2 Civil Works

This section outlines the assumptions made specific to civil works.

Earthworks

The following earthworks assumptions have been made:

- ▶ Topsoil has been based on 150mm average thickness;
- ▶ Earthworks quantities have been produced by GHD from MX model. This is based on boxing out for new pavement areas;
- ▶ We have allowed 300mm Select Material to all new pavement areas;
- ▶ Allowance for unsuitable of 15% of the area by 300mm thickness;
- ▶ No allowance for contaminated, Acid Sulphate materials;
- ▶ Allowance has been made to dispose of excess material to the development site adjacent; and
- ▶ Allowed Type E1 and C1 foundation treatments.

Drainage and Kerbing

Where new pavement widening is required we have allowed for the demolition of existing kerbs and the construction and installation of new pipelines (ave 450mm RCP), pits, subsoil and kerbs.

The extension of the existing transverse drain at Mulgoa/Jamison has been allowed for in the Jamison/Link intersection cost estimate.

Pavements

Based on the existing pavement design shown on RMS drawings for the Mulgoa/Jamison intersection we have allowed the following pavements along the length of Mulgoa Road:

- ▶ 310mm Intermediate AC
- ▶ 45mm AC Wearing Course

Similarly, for Jamison Road and the Riverlink Access Road, the following pavement assumptions were made:

- ▶ 320mm HB Base
- ▶ 75mm Intermediate AC
- ▶ 45mm Wearing AC

Where existing pavement exists and linemarkings have changed, the cost estimate allows for 50mm milling and re-sheeting of the pavement.

No allowance has been made for heavy patching of the existing pavements.

Road Furniture

The following road furniture has been included in the cost estimate:

- Linemarking;
- Signage;
- Footpaths;
- Streetlighting;
- Barriers;
- Vegetation and Landscaping;
- Fencing;
- Adjustment to Properties; and
- Traffic Lights.

5.2.3 Structures

The strategic cost estimate has allowed for the extension of a large culvert at the outlet in the vicinity of the new Southern Riverlink Access Road intersection with Jamison Road. No allowances have been made for overpass structures.

5.2.4 Utilities

The strategic cost estimate includes all services identified by “Dial Before You Dig”. This information from “Dial Before You Dig” identifies the service types, but not the size of services. Where services in pathways are affected by widening, then relocation of services has been allowed. In areas where services cross roadways we have allowed either protection or encasement of the service, in lieu of relocation.

5.2.5 Property Acquisition

Property Acquisition areas are nominated on the concept drawings included in Appendix E (shown in Pink) with areas noted. Basic real estate rates have then been applied with a 40% contingency allowance.

5.2.6 Escalation

The estimates are based on today (2012) rates with no allowance for escalation, when the project may be delivered.

5.2.7 Contingency

RMS require a contingency of 35% to 70% for Strategic Estimates. On average, we have allowed a contingency of 42% to 47%. The following contingencies have been applied:

- Project Development 30%;
- Investigation and Design 30%;

- ▶ Property Acquisition 40%;
- ▶ Construction costs –varied with averages 42% to 50%; and
- ▶ Handover 30%.

5.2.8 Exclusions

The following items have been excluded from the strategic cost estimates:

- ▶ GST;
- ▶ Carbon Tax;
- ▶ Escalation;
- ▶ Out Turn Dollars; and
- ▶ Programs.

5.3 Summary of Costs

The estimated project costs including contingency for the works outlined in section 3 and 4 are shown below in Table 17. A full breakdown of these cost estimates is provided in Appendix F.

Table 17 Panthers Penrith Strategic Cost Estimates by Item

Item	Description	Cost
1	Jamison Road, Harris Street and Southern Riverlink Intersection	\$5.03M
2	Jamison Road and Mulgoa Road Intersection	\$5.37M
3	Mulgoa Road and Panther Place Intersection	\$4.03M
4	Mulgoa Road and Ransley Street Intersection	\$3.35M
5	Mulgoa Road, High Street and Great Western Highway Intersection	\$7.90M
6	Great Western Highway and Northern Riverlink Access Intersection	\$4.62M
	Total	\$30.3M

6. Apportionment Plan

6.1 Nexus between Panthers Penrith Planning Proposal and Demand

The existing road network currently has limited spare capacity with all major arterial intersections along Mulgoa Road and Great Western Highway are currently operating at level of service 'E' to 'F' during the critical peak periods.

The Panthers Penrith Planning Proposal comprising of mixed use, entertainment (with outlet retail), commercial and residential development will result in increased traffic on the surrounding road network. New traffic generated by the Planning Proposal currently relies on key intersections for access. In the future, the surrounding road network will need to cater for traffic from surrounding developments including Panthers Penrith (up to 2,000 vehicles per hour), and Riverlink (up to 500 vehicle per hour) by 2031. It will also need to cater for growth in cross-regional traffic on the higher road network and from developments outside the study area.

It has been assessed that the surrounding road network will required improvement works to intersections to cater for traffic increases imposed by the Panthers Penrith Planning Proposal and growth in cross-regional traffic by 2031.

Assuming surrounding precincts are developed to their potential, it has been estimated that the surrounding road network, as augmented by the road improvements identified in this report, can absorb an additional 1,300 vehicles per hour exiting the Panthers Penrith Precinct.

6.2 Apportionment Philosophy

In order to inform the development of a planning agreement (or similar) between Panthers Penrith and the relevant approval authority, a philosophy for determining the contribution to required road works in the study area has been developed. The key elements of this philosophy are as follows:

- ▶ Where necessary road works can be directly and solely attributable to the Panthers Development (i.e. the need for these works is generated only by the introduction of traffic from the Panthers Penrith development), it has been assumed that that Panthers will contribute 100% of the cost required for these individual works.
- ▶ Where road works are required to accommodate background traffic growth, other Riverlink development and additional traffic from the Panthers Penrith development, it has been assumed that Panthers Penrith will contribute to these works in proportion to the amount additional traffic attributable to the Panthers Penrith development.
- ▶ An inventory of the works required has been compiled on a per-intersection basis with costing associated with these works prepared on the basis of concept designs.
- ▶ Based on the proportions of traffic and estimated costs of works for each intersection, the contribution required by Panthers to account for the Panthers share of traffic at each intersection is calculated as a lump sum.

- ▶ Summing the contributions required by the Panthers for all intersections gives the total contribution required by Panthers for their impact on the road network as a whole. This amount will then be used to determine an appropriate discrete package of road works to be delivered by Panthers to be of a value commensurate with that calculated as a part of this process.

It should be noted that an agreement has been reached with RMS that the Panthers contribution to the widening of Mulgoa Road between Great Western Highway/High Street and Jamison Road shall only be from Jamison Road to a point 100m north of the intersection of Mulgoa Road and Ransley Street. It is assumed that widening within this section is accounted for in the domain of works for the intersections themselves.

6.3 Summary of Road Infrastructure Works

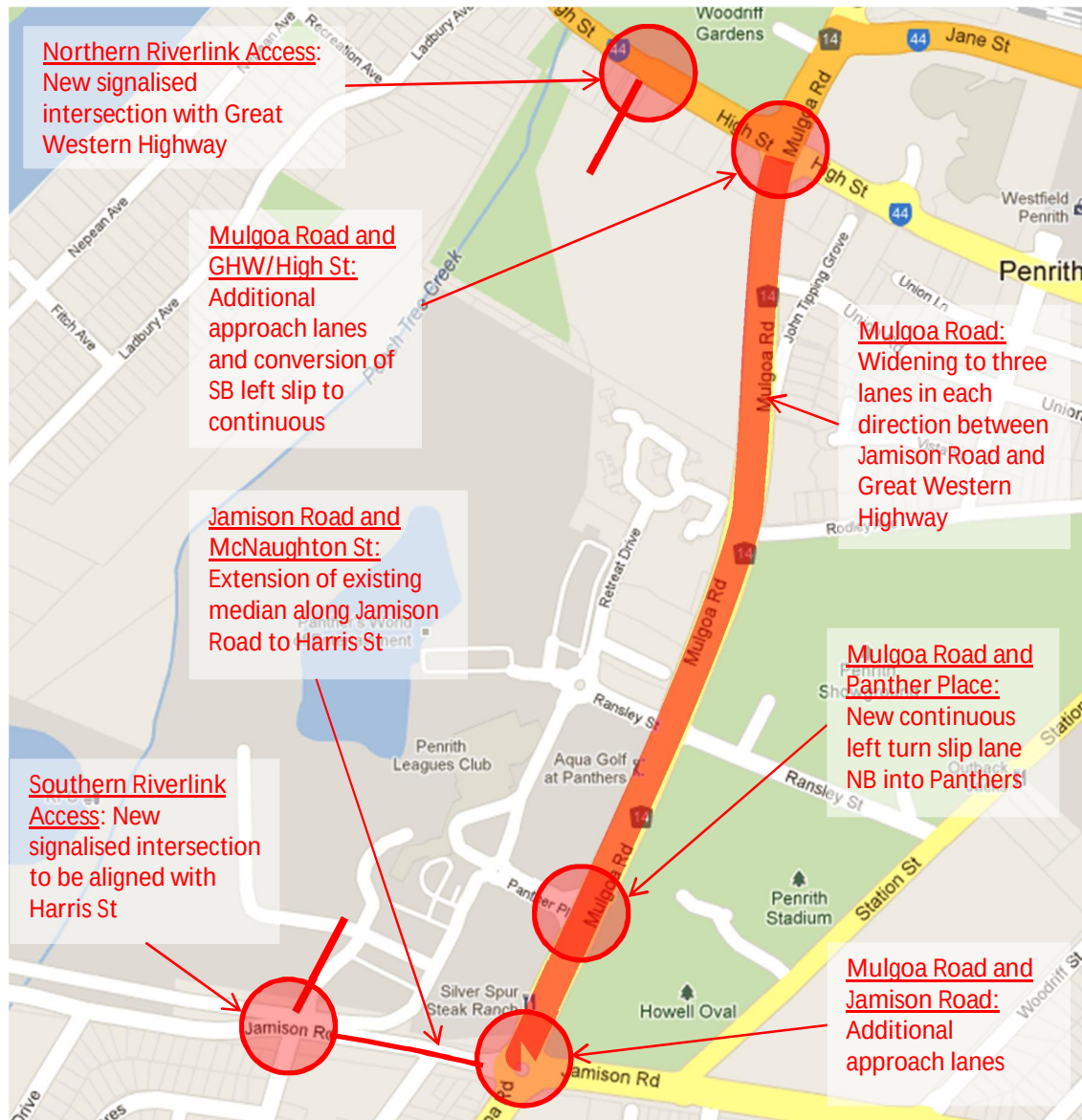
The Panthers Penrith Planning Proposal has been taken into account in the derivation of results for current and future intersection performance, including planned development at the Riverlink Precinct. Most of the road improvements works will be provided surrounding the Panthers Penrith Precinct as agreed with RMS, TfNSW and Penrith Council.

The proposed road infrastructure works to be provided to meet the demands generated by the Penrith Panthers Planning Proposal are listed in Section 3.5 of this report and their respective locations are shown in Figure 10. Further detailed concepts for each of the intersection layouts in the study area are also shown in Appendices B and C.

6.4 Summary of Apportionment for Year 2031

Based on the traffic generations and assignment model, the traffic expected to be derived from the Panthers Penrith Planning Proposal will contribute to the overall new traffic load at the various intersections identified for improvement. The cost of road improvement measures should be apportioned based on an assessment of the equitable and fair system where all parties (including the proponent) who contribute to the need for road network improvements contribute to its construction based on their relative share of new traffic demand. The traffic impacts have been used to derive an appropriate and reasonable apportionment of costs for the proposed road infrastructure works which are applicable to future development in the Penrith Panthers Precinct. Table 18 shows the respective apportionments.

Figure 10 - Panthers Penrith Summary of Road Works Required by 2031



Source: Google Maps

COMMERCIAL IN CONFIDENCE

Table 18 Apportionment Summary (Year 2031)

ID	Description	Proportion of Additional Traffic (%)				Proportion of Costs (\$)			
		Panthers Penrith	Riverlink Precinct	Others*	Total	Panthers Penrith	Riverlink Precinct	Others*	Total Cost (\$)
1	Jamison Road/Harris Street ^(see 7)	7% ¹	1% ¹	92% ¹	100%	\$300,517	\$42,931	\$3,949,657	\$4,293,106
2	Jamison Road/Mulgoa Road	46%	11%	43%	100%	\$2,470,125	\$590,682	\$2,309,030	\$5,369,837
3	Mulgoa Road/Panther Place ^(see 8)	32% ²	10% ²	56% ²	100%	\$714,198	\$223,187	\$1,249,847	\$2,231,869
4	Mulgoa Road/Ransley Street	32%	8%	60%	100%	\$1,071,601	\$267,900	\$2,009,251	\$3,348,752
5	Great Western Highway/Mulgoa Road	15%	4%	81%	100%	\$1,185,342	\$316,091	\$6,400,847	\$7,902,280
6	Great Western Highway/Northern Riverlink Access	28%	8%	64%	100%	\$1,292,570	\$369,306	\$2,954,445	\$4,616,321
Subtotal A						\$7,034,353	\$1,810,097	\$18,873,078	\$27,762,165
7	Jamison Road/Harris Street (Northern approach and eastern right turn lane)†	100%	0%	0%	100%	\$738,097	\$0	\$0	\$738,097
8	Mulgoa Road / Panther Place (Left Slip Lane into Panther Place)†	100%	0%	0%	100%	\$1,800,208	\$0	\$0	\$1,800,208
Subtotal B						\$2,538,305	\$0	\$0	\$2,538,305
TOTAL (A+B)						\$9,572,658	\$1,810,097	\$18,873,078	\$30,300,470

†Denotes elements that have been agreed by RMS and PCC to be fully funded by the proponent.

*Other traffic corresponds to background traffic growth as identified in RMS's Strategic Traffic Model.

¹Panthers Penrith contribution for this intersection would be 55% if the northern leg was included, which has been accounted for in item 7 above. Reported figure is adjusted for removal of these volumes in apportionment. Refer to Appendix B and Appendix G for comparisons. *Total cost of Jamison Road and Harris Street intersection upgrade is \$738,097 + \$4,293,106 = \$5,031,203.*

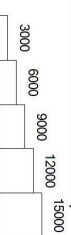
²Panthers Penrith contribution for this intersection would be 45% if the southern left turn slip lane was included, which has been accounted for in item 8 above. Reported figure is adjusted for removal of these volumes in apportionment. Refer to Appendix B and Appendix G for comparisons. *Total cost of Mulgoa Road and Panther Place intersection upgrade is \$1,800,208 + 2,231,869 = \$4,032,077.*

Appendix A – RMS 2031 Strategic Model Forecasts

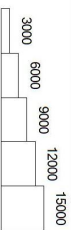
Traffic Volumes_Lanes



2006/17Z SYDNEY GMA STRATEGIC TRAFFIC FORECASTING MODEL
Scenario 1114: 2010/11 SYDNEY ROAD NETWORK (INTDELA)-4-6PM(m16)
2011-07-07 12:31 (guox)



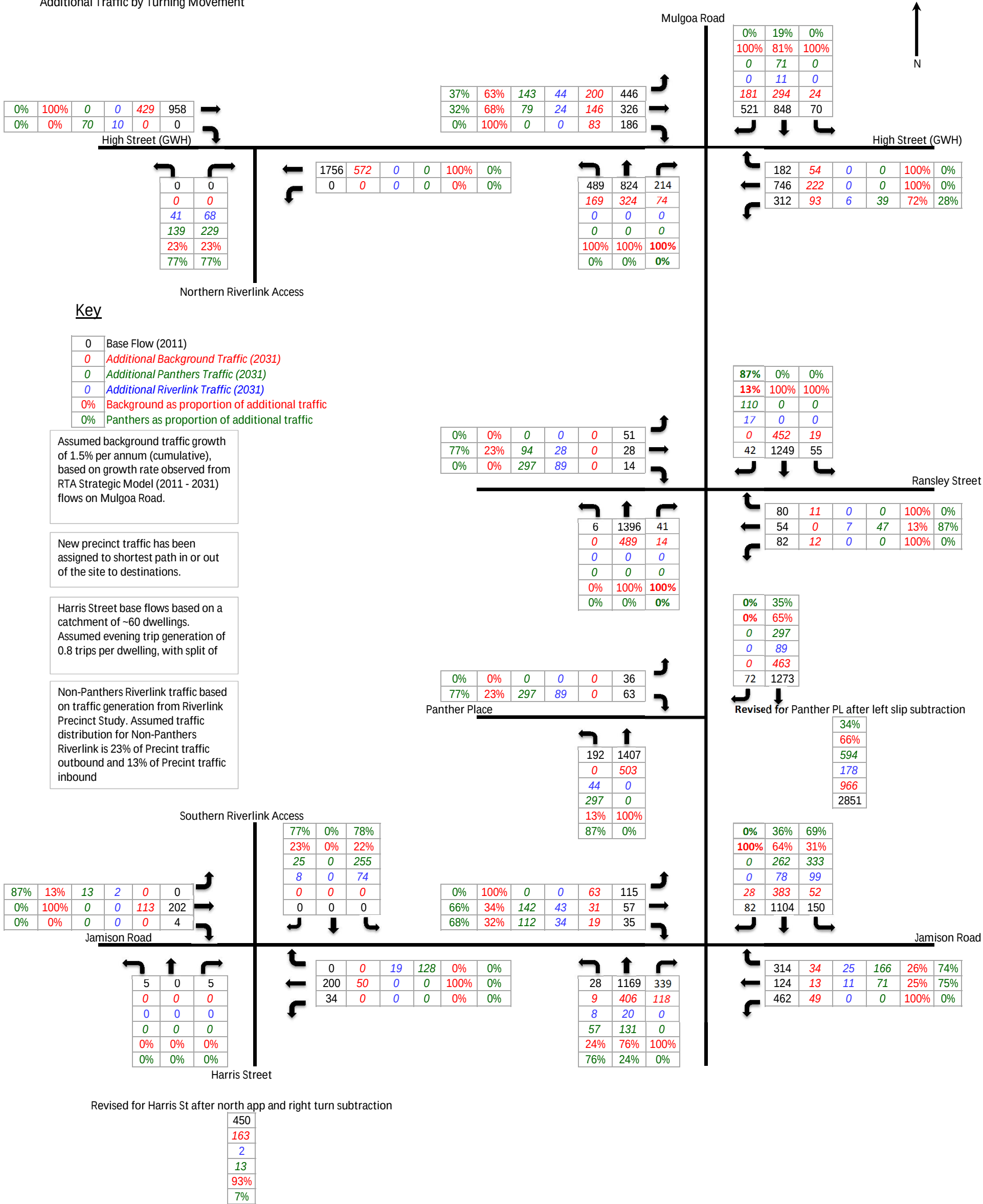
Lanes:
1
2
3
4
5



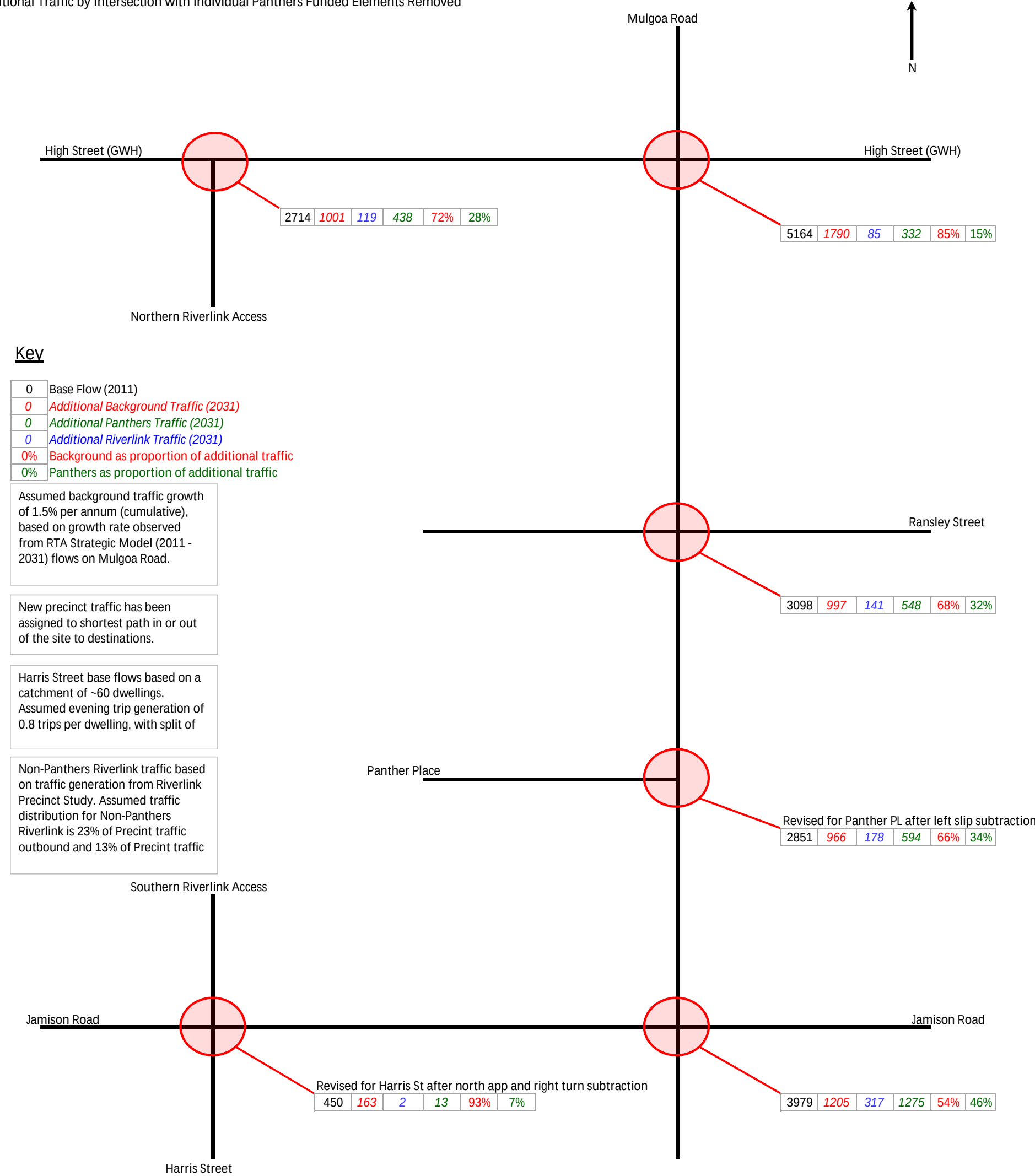
2006ITZ SYDNEY GMA STRATEGIC TRAFFIC FORECASTING MODEL
Scenario 1177: 2031 SYDNEY ROAD NETWORK (INTDELAY)-4.6PM(mf19)
2011-07-07 12:31 (guox)

Appendix B – Forecast 2031 Traffic Apportionment

2031 Assumed Traffic Volumes (No Jane Street Extension) - Thursday Evening Peak
Additional Traffic by Turning Movement

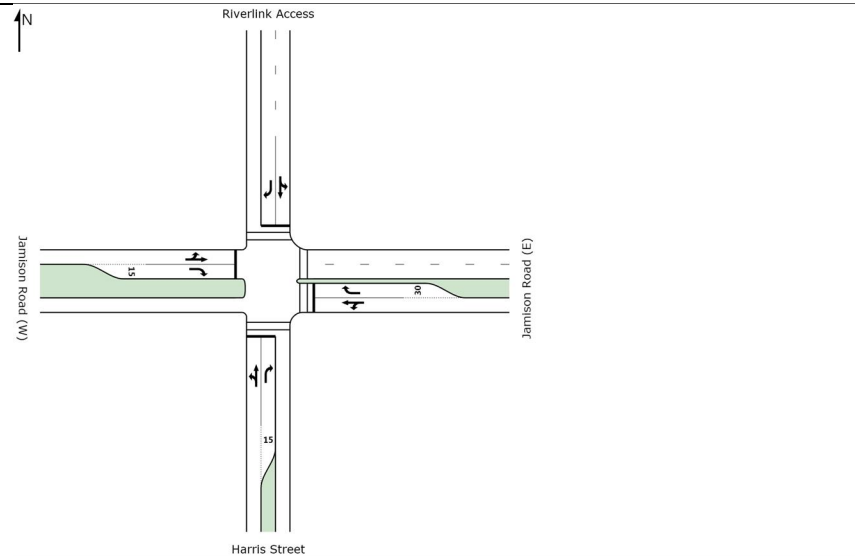


2031 Assumed Traffic Volumes (No Jane Street Extension) - Thursday Evening Peak
Additional Traffic by Intersection with Individual Panthers Funded Elements Removed



Appendix C – SIDRA Intersection Layouts and Model Outputs

2031 Jamison-Riverlink Intersection



PHASING SUMMARY

Jamison Road - Riverlink Access intersection
Signals - Fixed Time Cycle Time = 120 seconds (User Given Cycle Time)

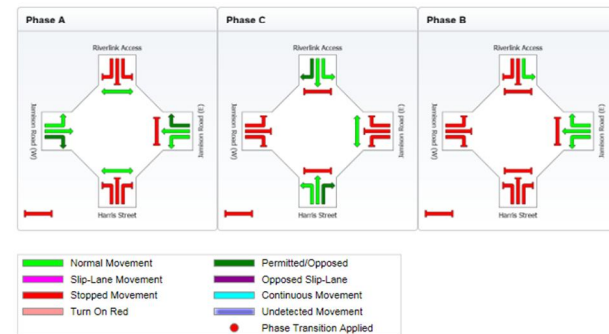
Phase times determined by the program

Sequence: SCATS RTA

Input Sequence: A, C, B

Output Sequence: A, C, B

Phase Timing Results			
Phase	A	C	B
Green Time (sec)	51	21	30
Yellow Time (sec)	4	4	4
All-Red Time (sec)	2	2	2
Phase Time (sec)	57	27	36
Phase Split	48 %	23 %	30 %



LANE SUMMARY

Site: Jamison - Riverlink_2031
Redistribution of traffic

Jamison Road - Riverlink Access intersection

Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Lane Use and Performance

	Demand Flows				HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Lane Length m	SL Type	Cap. Adj. %	Prob. Block. %
	L veh/h	T veh/h	R veh/h	Total veh/h												
South: Harris Street																
Lane 1	5	5	0	11	0.0	333	0.032	100	48.1	LOS D	0.5	3.6	500	-	0.0	0.0
Lane 2	0	0	5	5	0.0	58 ¹	0.090	100	68.6	LOS E	0.3	2.1	15 Turn Bay		0.0	0.0
Approach	5	5	5	16	0.0		0.090		54.9	LOS D	0.5	3.6				
East: Jamison Road (E)																
Lane 1	36	250	0	286	6.1	1351	0.211	100	6.6	LOS A	5.3	39.0	500	-	0.0	0.0
Lane 2	0	0	147	147	0.0	351 ¹	0.418	100	15.6	LOS B	2.6	18.0	30 Turn Bay		0.0	0.0
Approach	36	250	147	433	4.0		0.418		9.7	LOS A	5.3	39.0				
North: Riverlink Access																
Lane 1	329	5	0	334	0.0	804	0.416	100	33.1	LOS C	13.4	93.7	500	-	0.0	0.0
Lane 2	0	0	33	33	0.0	265	0.124	100	53.8	LOS D	1.7	11.6	500	-	0.0	0.0
Approach	329	5	33	367	0.0		0.416		34.9	LOS C	13.4	93.7				
West: Jamison Road (W)																
Lane 1	15	315	0	330	6.7	793	0.416	100	26.1	LOS B	13.4	98.9	170	-	0.0	0.0
Lane 2	0	0	5	5	0.0	97 ¹	0.054	100	29.3	LOS C	0.2	1.2	15 Turn Bay		0.0	0.0
Approach	15	315	5	335	6.6		0.416		26.1	LOS B	13.4	98.9				
Intersection				1151	3.4		0.418		23.1	LOS B	13.4	98.9				

Level of Service (LOS) Method: Delay (RTA NSW).

Lane LOS values are based on average delay per lane.

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

SIDRA Standard Delay Model used.

1 Reduced capacity due to a short lane effect

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SIDRA INTERSECTION 5.1.2.1053

Project: G:\21\20942\Tech\Revised Thursday SIDRA\2012_01_24 Redistribution of traffic\Jamison -

Riverlink_2031 Redistribution of traffic.sip

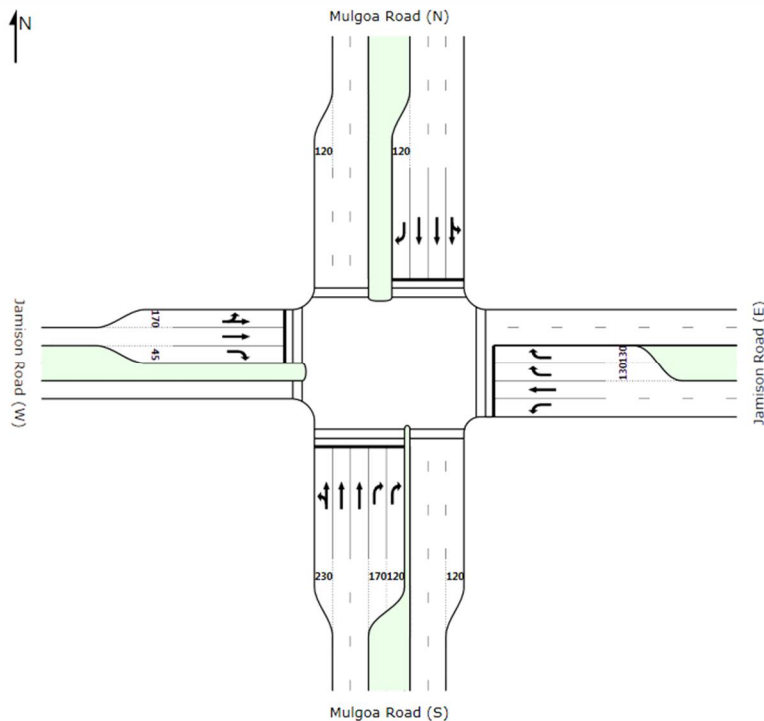
8000065, GHD SERVICES PTY LTD, ENTERPRISE

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SIDRA
INTERSECTION

2011 Base Jamison Road – Mulgoa Road Intersection

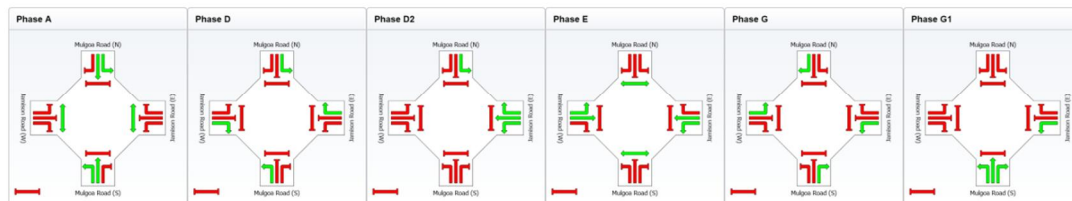


PHASING SUMMARY

Jamison Road - Mulgoa Road
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Phase times determined by the program
Sequence: SCATS
Input Sequences: A, D, D2, E, G, G1
Output Sequences: A, D, D2, E, G, G1

Phase	A	D	D2	E	G	G1
Green Time (sec)	39	10	0	28	9	0
Yellow Time (sec)	4	4	4	4	4	4
All-Red Time (sec)	2	2	2	2	2	2
Phase Time (sec)	45	16	4	34	15	6
Phase Split	38 %	13 %	3 %	28 %	13 %	5 %



Normal Movement	Permitted/Opposed
Slip-Lane Movement	Opposed Slip-Lane
Stopped Movement	Continuous Movement
Turn On Red	Undetected Movement
	Phase Transition Applied

Processed: Wednesday, 19 January 2012 10:44:43 AM
SIDRA INTERSECTION 5.1.2.1853
Project: G:\21020532\Tech\SIDRA Model\2011 SIDRA\Mulgoa - Jamison 2011.sip
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LANE SUMMARY

Site: Jamison - Mulgoa_PM_2031-
Redistribution of traffic

Jamison Road - Mulgoa Road

Signals - Fixed Time Cycle Time = 160 seconds (Optimum Cycle Time - Minimum Delay)

Lane Use and Performance															
	Demand Flows														
	L	T	R	Total	HV	Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue Vehicles	Distance	Lane Length	SL Type	Cap. Prob. Adj. Block.
	veh/h	veh/h	veh/h	veh/h	%	veh/h	v/c	%	sec		veh	m	m		%
South: Mulgoa Road (S)															
Lane 1	103	505	0	608	7.0	802	0.759	100	20.9	LOS B	28.3	210.3	230 Turn Bay	0.0	0.0
Lane 2	0	610	0	610	7.0	804	0.759	100	20.1	LOS B	29.0	215.3	500 -	0.0	0.0
Lane 3	0	610	0	610	7.0	804	0.759	100	20.1	LOS B	29.0	215.3	750 -	0.0	0.0
Lane 4	0	0	229	229	7.0	243	0.940	100	101.6	LOS F	20.5	152.2	170 Turn Bay	0.0	0.0
Lane 5	0	0	229	229	7.0	243	0.940	100	101.6	LOS F	20.5	152.2	120 Turn Bay	0.0	26.6
Approach	103	1726	457	2286	7.0		0.940		36.6	LOS C	29.0	215.3			
East: Jamison Road (E)															
Lane 1	464	0	0	464	7.0	674	0.689	100	53.5	LOS D	30.1	223.1	500 -	0.0	0.0
Lane 2	47	219	0	266	7.0	386	0.689	100	64.4	LOS E	19.2	142.4	500 -	0.0	0.0
Lane 3	0	0	270	270	7.0	287	0.938	100	103.5	LOS F	25.0	185.3	500 -	0.0	0.0
Lane 4	0	0	270	270	7.0	287	0.938	100	103.5	LOS F	25.0	185.3	130 Turn Bay	0.0	37.4
Approach	511	219	539	1269	7.0		0.938		77.0	LOS F	30.1	223.1			
North: Mulgoa Road (N)															
Lane 1	634	0	0	634	7.0	783 ¹	0.810	100	11.5	LOS A	5.0	37.0	100 Turn Bay	0.0	0.0
Lane 2	0	469	0	469	7.0	699	0.670	69 ⁸	26.6	LOS B	23.3	173.0	500 -	0.0	0.0
Lane 3	0	679	0	679	7.0	699	0.971	100	53.5	LOS D	59.9	444.6	500 -	0.0	0.0
Lane 4	0	679	0	679	7.0	699	0.971	100	53.5	LOS D	59.9	444.6	500 -	0.0	0.0
Lane 5	0	0	110	110	7.0	144	0.765	100	91.7	LOS F	8.9	65.8	120 Turn Bay	0.0	0.0
Approach	634	1827	110	2571	7.0		0.971		39.9	LOS C	59.9	444.6			
West: Jamison Road (W)															
Lane 1	178	63	0	241	7.0	374	0.644	100	69.0	LOS E	17.2	127.7	500 -	0.0	0.0
Lane 2	0	210	0	210	7.0	326	0.644	100	66.5	LOS E	15.4	114.1	500 -	0.0	0.0
Lane 3	0	0	119	119	7.0	133 ¹	0.894	100	94.8 ⁸	LOS F ⁸	9.9 ⁸	73.4 ⁸	45 Turn Bay	0.0	50.0
Lane 4	0	0	81	81	7.0	91 ¹	0.894	100	93.0 ⁸	LOS F ⁸	6.6 ⁸	49.0 ⁸	30 Turn Bay	0.0	50.0
Approach	178	273	200	651	7.0		0.894		75.9	LOS F	17.2	127.7			
Intersection				6777	7.0		0.971		49.2	LOS D	59.9	444.6			

Level of Service (LOS) Method: Delay (RTA NSW).

Lane LOS values are based on average delay per lane.

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

SIDRA Standard Delay Model used.

- 1 Reduced capacity due to a short lane effect
- 6 Lane underutilisation due to downstream effects
- 8 Delay, queue length and stops for the short lane have been cut down to fit in the queuing space. You may wish to change the short lane to a full lane to investigate the effect on the adjacent lane performance.

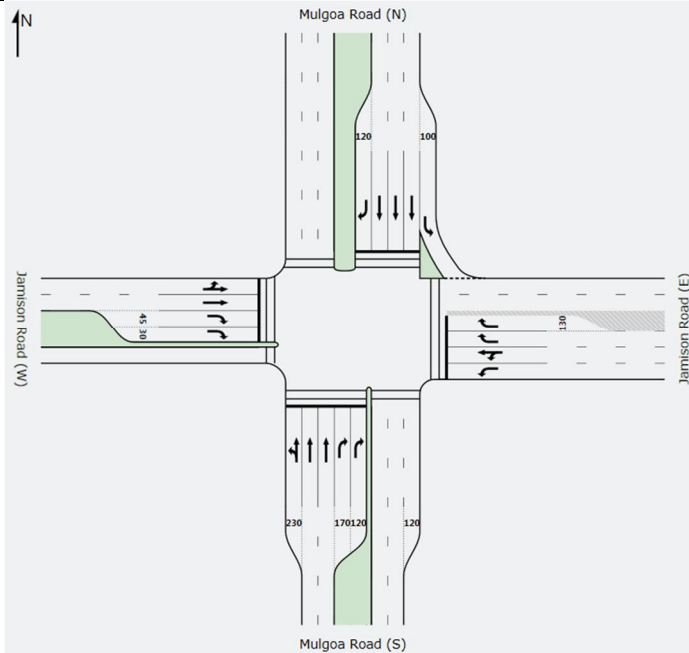
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2031 Jamison Road – Mulgoa Road Intersection

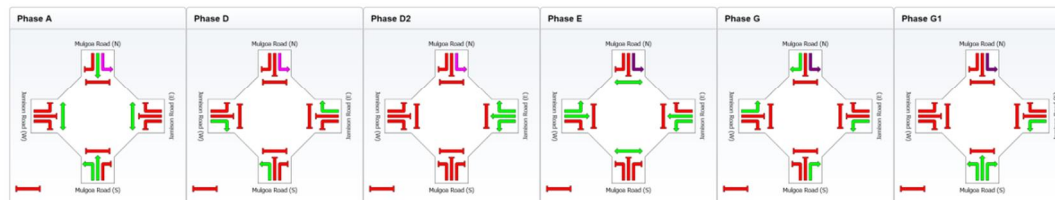


PHASING SUMMARY

Jamison Road - Mulgoa Road
Signals - Fixed Time Cycle Time = 160 seconds (Optimum Cycle Time - Minimum Delay)

Phase times determined by the program
Sequence: SCATS - 1
Input Sequence: A, D, D2, E, G, G1
Output Sequence: A, D, D2, E, G, G1

Phase Timing Results	A	D	D2	E	G	G1
Phase	60	21	0	28	13	3
Green Time (sec)	4	4	4	4	4	4
Yellow Time (sec)	2	2	2	2	2	2
All-Red Time (sec)	66	27	5	34	19	9
Phase Split	41 %	17 %	3 %	21 %	12 %	6 %



Normal Movement	Permitted/Opposed
Slip-Lane Movement	Opposed Slip-Lane
Stopped Movement	Continuous Movement
Turn On Red	Undetected Movement
	Phase Transition Applied

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LANE SUMMARY

Site: Jamison - Mulgoa_PM_2031-
Redistribution of traffic

Jamison Road - Mulgoa Road
Signals - Fixed Time Cycle Time = 160 seconds (Optimum Cycle Time - Minimum Delay)

Lane Use and Performance

	Demand Flows			Total	HV	Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue	Distance	Lane Length	SL Type	Cap. Adj.	Prob. Block.
	veh/h	veh/h	veh/h	veh/h	%	veh/h	v/c	%	sec		veh	m	m		%	%
South: Mulgoa Road (S)																
Lane 1	103	505	0	608	7.0	802	0.759	100	20.9	LOS B	28.3	210.3	230 Turn Bay	0.0	0.0	
Lane 2	0	610	0	610	7.0	804	0.759	100	20.1	LOS B	29.0	215.3	500 -	0.0	0.0	
Lane 3	0	610	0	610	7.0	804	0.759	100	20.1	LOS B	29.0	215.3	750 -	0.0	0.0	
Lane 4	0	0	229	229	7.0	243	0.940	100	101.6	LOS F	20.5	152.2	170 Turn Bay	0.0	0.0	
Lane 5	0	0	229	229	7.0	243	0.940	100	101.6	LOS F	20.5	152.2	120 Turn Bay	0.0	26.6	
Approach	103	1726	457	2286	7.0		0.940		36.6	LOS C	29.0	215.3				
East: Jamison Road (E)																
Lane 1	511	0	0	511	7.0	652	0.783	100	57.1	LOS E	35.1	260.2	500 -	0.0	0.0	
Lane 2	0	219	0	219	7.0	361	0.606	100	63.7	LOS E	15.7	116.3	500 -	0.0	0.0	
Lane 3	0	0	270	270	7.0	287	0.938	100	103.5	LOS F	25.0	185.3	500 -	0.0	0.0	
Lane 4	0	0	270	270	7.0	287	0.938	100	103.5	LOS F	25.0	185.3	130 Turn Bay	0.0	37.4	
Approach	511	219	539	1269	7.0		0.938		77.9	LOS F	35.1	260.2				
North: Mulgoa Road (N)																
Lane 1	634	0	0	634	7.0	783 ¹	0.810	100	11.5	LOS A	5.0	37.0	100 Turn Bay	0.0	0.0	
Lane 2	0	469	0	469	7.0	699	0.670	69 ⁵	26.6	LOS B	23.3	173.0	500 -	0.0	0.0	
Lane 3	0	679	0	679	7.0	699	0.971	100	53.5	LOS D	59.9	444.6	500 -	0.0	0.0	
Lane 4	0	679	0	679	7.0	699	0.971	100	53.5	LOS D	59.9	444.6	500 -	0.0	0.0	
Lane 5	0	0	110	110	7.0	144	0.765	100	91.7	LOS F	8.9	65.8	120 Turn Bay	0.0	0.0	
Approach	634	1827	110	2571	7.0		0.971		39.9	LOS C	59.9	444.6				
West: Jamison Road (W)																
Lane 1	178	63	0	241	7.0	374	0.644	100	69.0	LOS E	17.2	127.7	500 -	0.0	0.0	
Lane 2	0	210	0	210	7.0	326	0.644	100	66.5	LOS E	15.4	114.1	500 -	0.0	0.0	
Lane 3	0	0	119	119	7.0	135 ¹	0.879	100	93.3	LOS F	9.8	73.0	45 Turn Bay	0.0	49.4	
Lane 4	0	0	81	81	7.0	93 ¹	0.879	100	92.5 ⁸	LOS F ⁸	6.6 ⁸	49.0 ⁸	30 Turn Bay	0.0	50.0	
Approach	178	273	200	651	7.0		0.879		75.6	LOS F	17.2	127.7				
Intersection				6777	7.0		0.971		49.3	LOS D	59.9	444.6				

Level of Service (LOS) Method: Delay (RTA NSW).

Lane LOS values are based on average delay per lane.

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

SIDRA Standard Delay Model used.

1 Reduced capacity due to a short lane effect

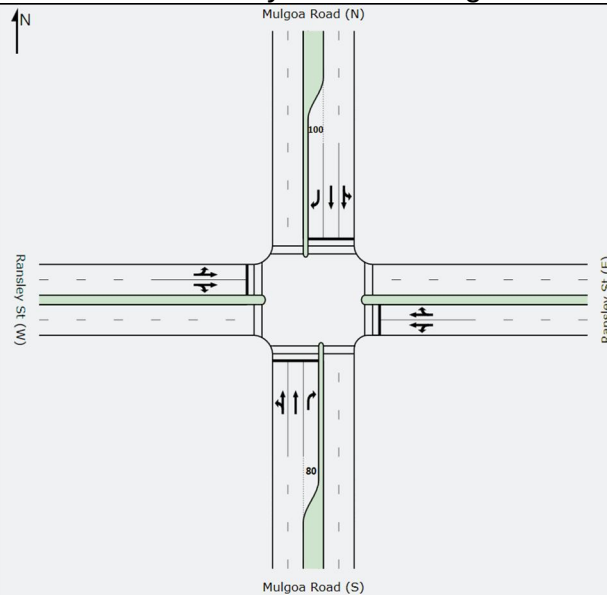
6 Lane underutilisation due to downstream effects

8 Delay, queue length and stops for the short lane have been cut down to fit in the queuing space. You may wish to change the short lane to a full lane to investigate the effect on the adjacent lane performance.

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2011 Base Ransley Street – Mulgoa Road Intersection



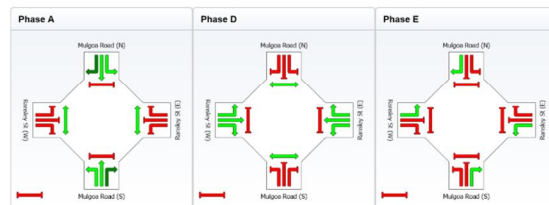
Site: Ransley St - Mulgoa_PM_2011

PHASING SUMMARY

Ransley St - Mulgoa Road
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Phase times determined by the program
Sequence: SCATS
Input Sequence: A, D, E
Output Sequence: A, D, E

Phase Timing Results	A	D	E
Phase			
Green Time (sec)	76	20	6
Yellow Time (sec)	4	4	4
All-Red Time (sec)	2	2	2
Phase Time (sec)	82	26	12
Phase Split	68 %	22 %	10 %



Normal Movement	Permitted/Opposed
Slip-Lane Movement	Opposed Slip-Lane
Stopped Movement	Continuous Movement
Turn On Red	Undetected Movement
	Phase Transition Applied

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INTERSECTION

LANE SUMMARY

Site: Ransley St -
Mulgoa_PM_2011

Ransley St - Mulgoa Road
Signals - Fixed Time Cycle Time = 120 seconds (User-Given Cycle Time)

Lane Use and Performance

	Demand Flows			Total	HV	Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue	Vehicles Distance	Lane Length	SL Type	Cap. Adj.	Prob. Block.
	L	T	R													
South: Mulgoa Road (S)																
Lane 1	6	695	0	701	7.0	1181	0.594	100	1.9	LOS A	4.6	34.3	500	–	0.0	0.0
Lane 2	0	701	0	701	7.0	1181	0.594	100	1.9	LOS A	4.6	34.3	500	–	0.0	0.0
Lane 3	0	0	41	41	7.0	186	0.220	100	13.7	LOS A	0.4	2.9	80 Turn Bay		0.0	0.0
Approach	6	1396	41	1443	7.0		0.594		2.2	LOS A	4.6	34.3				
East: Ransley St (E)																
Lane 1	82	36	0	118	0.0	375	0.314	100	50.8	LOS D	5.9	41.6	500	–	0.0	0.0
Lane 2	0	18	80	98	0.0	312	0.314	100	55.3	LOS D	5.1	35.9	500	–	0.0	0.0
Approach	82	54	80	216	0.0		0.314		52.8	LOS D	5.9	41.6				
North: Mulgoa Road (N)																
Lane 1	55	596	0	651	7.0	1176	0.553	100	3.0	LOS A	4.5	33.7	500	–	0.0	0.0
Lane 2	0	653	0	653	7.0	1181	0.553	100	1.8	LOS A	4.0	29.4	500	–	0.0	0.0
Lane 3	0	0	42	42	7.0	186	0.226	100	12.0	LOS A	0.3	2.3	100 Turn Bay		0.0	0.0
Approach	55	1249	42	1346	7.0		0.553		2.7	LOS A	4.5	33.7				
West: Ransley St (W)																
Lane 1	51	4	0	55	0.0	456	0.120	100	45.8	LOS D	2.5	17.3	500	–	0.0	0.0
Lane 2	0	24	14	38	0.0	319	0.120	100	49.3	LOS D	1.9	13.4	500	–	0.0	0.0
Approach	51	28	14	93	0.0		0.120		47.2	LOS D	2.5	17.3				
Intersection				3098	6.3		0.594		7.3	LOS A	5.9	41.6				

Level of Service (LOS) Method: Delay (RTA NSW).

Lane LOS values are based on average delay per lane.

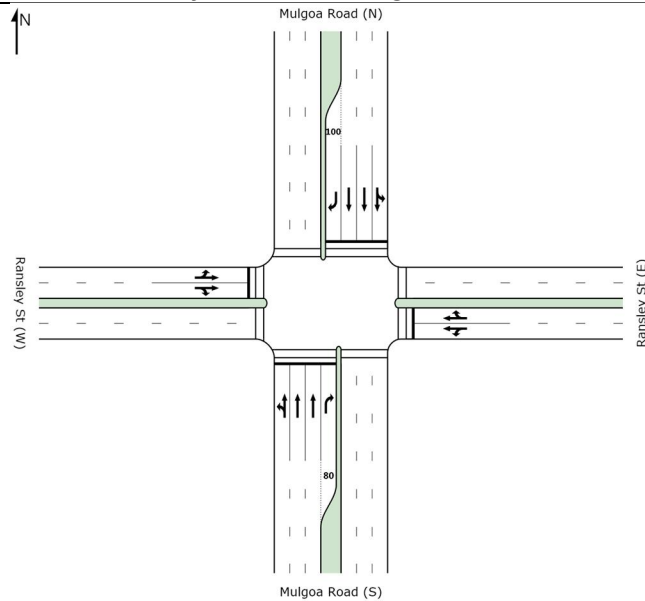
Intersection and Approach LOS values are based on average delay for all lanes.

SIDRA Standard Delay Model used.

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INTERSECTION

2031 Ransley Street – Mulgoa Road Intersection



LANE SUMMARY

Site: Ransley St -
Mulgoa_PM_2031 Dev

Ransley St - Mulgoa Road
Signals - Fixed Time Cycle Time = 160 seconds (User-Given Cycle Time)

Lane Use and Performance

	Demand Flows			Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Lane Length m	SL Type	Cap. Adj. %	Prob. Block. %
	L veh/h	T veh/h	R veh/h													
South: Mulgoa Road (S)																
Lane 1	6	624	0	630	7.0	758	0.832	100	53.1	LOS D	84.8	629.0	500	-	0.0	25.9
Lane 2	0	630	0	630	7.0	758	0.832	100	25.5	LOS B	36.4	270.1	500	-	0.0	0.0
Lane 3	0	630	0	630	7.0	758	0.832	100	25.5	LOS B	36.4	270.1	500	-	0.0	0.0
Lane 4	0	0	55	55	7.0	195	0.282	100	46.2	LOS D	2.7	20.3	80 Turn Bay		0.0	0.0
Approach	6	1885	55	1946	7.0		0.832		35.0	LOS C	84.8	629.0				
East: Ransley St (E)																
Lane 1	94	104	0	198	0.0	318	0.623	100	71.3	LOS F	14.5	101.3	500	-	0.0	0.0
Lane 2	0	4	91	95	0.0	153	0.623	100	85.2	LOS F	7.4	51.8	500	-	0.0	0.0
Approach	94	108	91	293	0.0		0.623		75.8	LOS F	14.5	101.3				
North: Mulgoa Road (N)																
Lane 1	74	515	0	589	7.0	753	0.783	100	26.9	LOS B	31.8	235.7	500	-	0.0	0.0
Lane 2	0	593	0	593	7.0	758	0.783	100	23.9	LOS B	31.4	232.7	500	-	0.0	0.0
Lane 3	0	593	0	593	7.0	758	0.783	100	23.9	LOS B	31.4	232.7	500	-	0.0	0.0
Lane 4	0	0	169	169	7.0	211	0.801	100	70.5	LOS F	10.7	79.2	100 Turn Bay		0.0	0.0
Approach	74	1701	169	1944	7.0		0.801		28.9	LOS C	31.8	235.7				
West: Ransley St (W)																
Lane 1	51	150	0	201	7.0	686	0.293	35 ^E	27.1	LOS B	8.6	63.7	500	-	0.0	0.0
Lane 2	0	0	400	400	7.0	479	0.835	100	69.7	LOS E	23.3	173.2	500	-	0.0	0.0
Approach	51	150	400	601	7.0		0.835		55.4	LOS D	23.3	173.2				
Intersection																
				4784	6.6		0.835		37.6	LOS C	84.8	629.0				

Level of Service (LOS) Method: Delay (RTA NSW).

Lane LOS values are based on average delay per lane.

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

SIDRA Standard Delay Model used.

5 Lane underutilisation determined by program

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SIDRA INTERSECTION 5.1.2.1953
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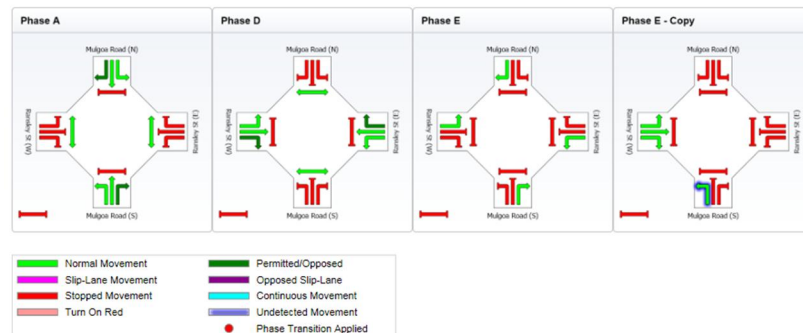
SIDRA
INTERSECTION

PHASING SUMMARY

Ransley St - Mulgoa Road
Signals - Fixed Time Cycle Time = 160 seconds (User-Given Cycle Time)

Sequence: SCATS - Copy
Input Sequence: A, D, E, E - Copy
Output Sequence: A, D, E, E - Copy

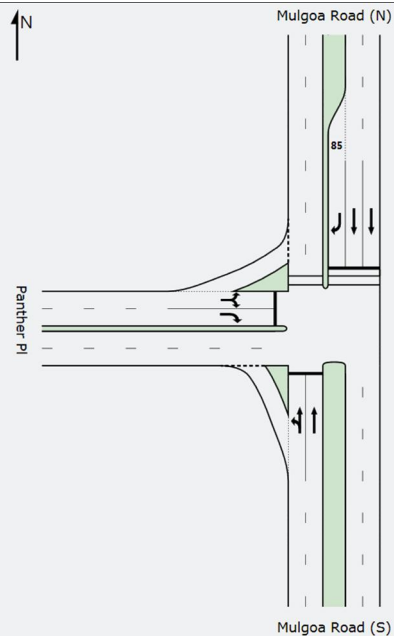
Phase Timing Results				
Phase	A	D	E	E - Copy
Green Time (sec)	65	25	12	34
Yellow Time (sec)	4	4	4	4
All-Red Time (sec)	2	2	2	2
Phase Time (sec)	71	31	18	40
Phase Split	44 %	19 %	11 %	25 %



Processed: Friday, 3 February 2012 12:30:40 PM
SIDRA INTERSECTION 5.1.2.1953
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2011 Base Panther Place – Mulgoa Road Intersection

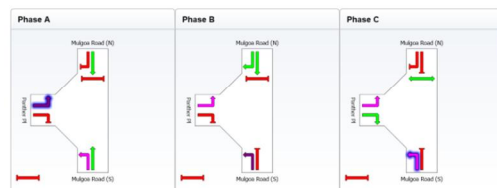


PHASING SUMMARY

Panther PI - Mulgoa Road
Signals - Fixed Time - Cycle Time = 120 seconds (User-Given Cycle Time)

Phase times determined by the program
Sequence: SCATS RTA
Input Sequence: A, B, C
Output Sequence: A, B, C

Phase	A	B	C
Green Time (sec)	75	7	20
Yellow Time (sec)	4	4	4
All-Red Time (sec)	2	2	2
Phase Time (sec)	81	13	26
Phase Split	66 %	11 %	22 %



Normal Movement	Permitted/Opposed
Slip-Lane Movement	Opposed Slip-Lane
Stopped Movement	Continuous Movement
Turn On Red	Undetected Movement
	Phase Transition Applied

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Project: G:\21\20532\Tech\SIDRA Model\2011 SIDRA\Mulgoa - Panther PI 2011.sip
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SIDRA
INTERSECTION

LANE SUMMARY

Site: Panther PI -
Mulgoa_PM_2011

Panther PI - Mulgoa Road
Signals - Fixed Time - Cycle Time = 120 seconds (User-Given Cycle Time)

Lane Use and Performance																
	Demand Flows			Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Vehicles veh	Queue Distance m	Lane Length m	SL Type	Cap. Adj. %	Prob. Block. %
	L veh/h	T veh/h	R veh/h													
South: Mulgoa Road (S)																
Lane 1	192	606	0	798	7.0	1160	0.687	100	4.3	LOS A	6.5	48.5	200	-	0.0	0.0
Lane 2	0	801	0	801	7.0	1166	0.687	100	2.1	LOS A	6.7	49.4	200	-	0.0	0.0
Approach	192	1407	0	1599	7.0		0.687		3.2	LOS A	6.7	49.4				
North: Mulgoa Road (N)																
Lane 1	0	637	0	637	7.0	1368	0.465	100	1.3	LOS A	3.3	24.2	500	-	0.0	0.0
Lane 2	0	637	0	637	7.0	1368	0.465	100	1.3	LOS A	3.3	24.2	500	-	0.0	0.0
Lane 3	0	0	72	72	7.0	103	0.698	100	74.4	LOS F	4.5	33.2	85 Turn Bay		0.0	0.0
Approach	0	1273	72	1345	7.0		0.698		5.2	LOS A	4.5	33.2				
West: Panther PI																
Lane 1	36	0	19	55	7.0	364	0.150	100	30.6	LOS C	1.8	13.7	500	-	0.0	0.0
Lane 2	0	0	44	44	7.0	295	0.150	100	55.8	LOS D	2.2	16.6	500	-	0.0	0.0
Approach	36	0	63	99	7.0		0.150		41.9	LOS C	2.2	16.6				
Intersection				3043	7.0		0.698		5.3	LOS A	6.7	49.4				

Level of Service (LOS) Method: Delay (RTA NSW).

Lane LOS values are based on average delay per lane.

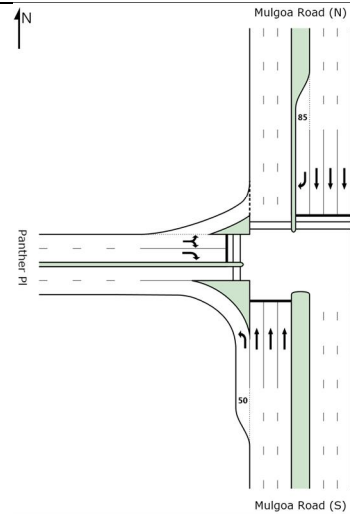
Intersection and Approach LOS values are based on average delay for all lanes.

SIDRA Standard Delay Model used.

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Project: G:\21\20532\Tech\SIDRA Model\2011 SIDRA\Mulgoa - Panther PI 2011.sip
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SIDRA
INTERSECTION

2031 Panther Place – Mulgoa Road Intersection



PHASING SUMMARY

Panther PI - Mulgoa Road
Signals - Fixed Time Cycle Time = 160 seconds (User-Given Cycle Time)

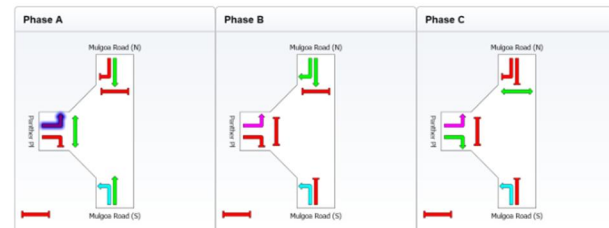
Phase times determined by the program

Sequence: SCATS RTA

Input Sequence: A, B, C

Output Sequence: A, B, C

Phase Timing Results			
Phase	A	B	C
Green Time (sec)	93	12	37
Yellow Time (sec)	4	4	4
All-Red Time (sec)	2	2	2
Phase Time (sec)	99	18	43
Phase Split	62 %	11 %	27 %



Normal Movement	Permitted/Opposed
Slip-Lane Movement	Opposed Slip-Lane
Stopped Movement	Continuous Movement
Turn On Red	Undetected Movement
	Phase Transition Applied

Processed: Friday, 3 February 2012 12:35:09 PM
SIDRA INTERSECTION 5.1.2.1953
Project: G:\21\20942\Tech\Revised Thursday SIDRA\2012_01_24 Redistribution of traffic\Mulgoa - Panther
PI_2031 Redistribution of traffic.sip
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LANE SUMMARY

Panther PI - Mulgoa Road
Signals - Fixed Time Cycle Time = 160 seconds (User-Given Cycle Time)

Site: Panther PI -
Mulgoa_PM_2031 Dev - Final

Lane Use and Performance

	Demand Flows			Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Length m	SL Type	Cap. Adj. %	Prob. Block. %
	L veh/h	T veh/h	R veh/h								Vehicles veh	Distance m				
South: Mulgoa Road (S)																
Lane 1	534	0	0	534	7.0	1769	0.302	100	9.7	X	X	X	50	Turn Bay	0.0	X
Lane 2	0	637	0	637	7.0	1084	0.587	100	2.7	LOS A	5.5	40.8	500	-	0.0	0.0
Lane 3	0	637	0	637	7.0	1084	0.587	100	2.7	LOS A	5.5	40.8	500	-	0.0	0.0
Lane 4	0	637	0	637	7.0	1084	0.587	100	2.7	LOS A	5.5	40.8	500	-	0.0	0.0
Approach	534	1910	0	2444	7.0		0.587		4.2	LOS A	5.5	40.8				
North: Mulgoa Road (N)																
Lane 1	0	707	0	707	7.0	1294	0.547	100	2.1	LOS A	5.6	41.5	500	-	0.0	0.0
Lane 2	0	707	0	707	7.0	1294	0.547	100	2.1	LOS A	5.6	41.5	500	-	0.0	0.0
Lane 3	0	707	0	707	7.0	1294	0.547	100	2.1	LOS A	5.6	41.5	500	-	0.0	0.0
Lane 4	0	0	72	72	7.0	133	0.543	100	89.1	LOS F	5.6	41.3	85	Turn Bay	0.0	0.0
Approach	0	2122	72	2194	7.0		0.547		4.9	LOS A	5.6	41.5				
West: Panther PI																
Lane 1	36	0	208	244	7.0	413	0.590	100	66.4	LOS E	16.6	123.3	500	-	0.0	0.0
Lane 2	0	0	241	241	7.0	409	0.590	100	68.0	LOS E	16.8	124.5	500	-	0.0	0.0
Approach	36	0	449	485	7.0		0.590		67.2	LOS E	16.8	124.5				
Intersection				5123	7.0		0.590		10.5	LOS A	16.8	124.5				

X: Not applicable for Continuous lane.

Level of Service (LOS) Method: Delay (RTA NSW).

Lane LOS values are based on average delay per lane.

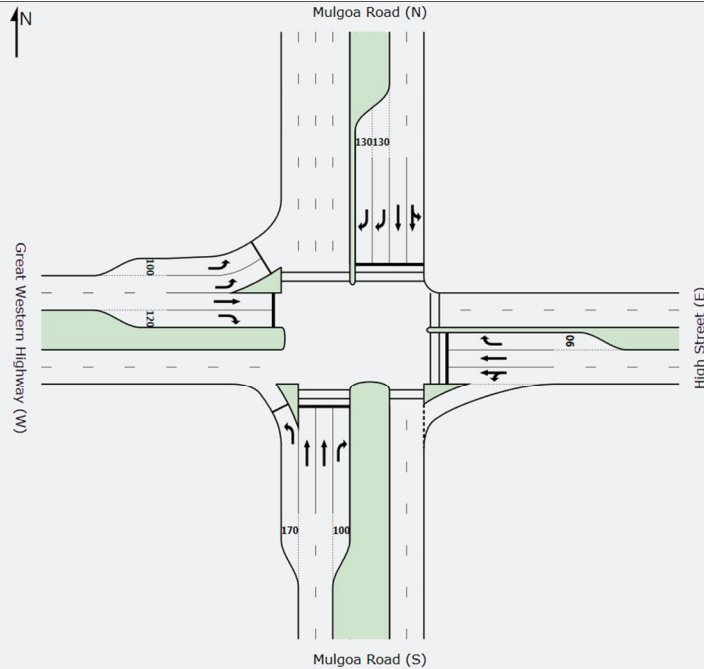
Intersection and Approach LOS values are based on average delay for all lanes.

SIDRA Standard Delay Model used.

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SIDRA INTERSECTION 5.1.2.1953
Project: G:\21\20942\Tech\Revised Thursday SIDRA\2012_01_24 Redistribution of traffic\Mulgoa - Panther
PI_2031 Redistribution of traffic.sip
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SIDRA
INTERSECTION

2011 Base Great Western High-Mulgoa Road-High Street Intersection



LANE SUMMARY

Site: Mulgoa - High_Base 2011

Mulgoa Road - High Street - Great Western Highway
Signals - Fixed Time Cycle Time = 120 seconds (Optimum Cycle Time - Minimum Delay)

Lane Use and Performance

	Demand Flows				HV %	Cap. veh/h	Deg. Satn %	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue		Lane Length m	SL Type	Cap. Adj. %	Prob. Block. %
	L veh/h	T veh/h	R veh/h	Total veh/h							Vehicles veh	Distance m				
South: Mulgoa Road (S)																
Lane 1	489	0	0	489	7.0	663	0.737	100	40.8	LOS C	22.6	168.0	170 Turn Bay	0.0	3.9	
Lane 2	0	412	0	412	7.0	404	1.020	100	86.3	LOS F	34.0	251.9	750 -	0.0	0.0	0.0
Lane 3	0	412	0	412	7.0	404	1.020	100	86.3	LOS F	34.0	251.9	750 -	0.0	0.0	0.0
Lane 4	0	0	214	214	7.0	206	1.037	100	133.1	LOS F	19.7	146.2	100 Turn Bay	0.0	39.7	
Approach	489	824	214	1527	7.0		1.037		78.3	LOS F	34.0	251.9				
East: High Street (E)																
Lane 1	312	128	0	440	7.0	442	0.994	100	105.2	LOS F	38.4	284.7	300 -	0.0	0.3	0.3
Lane 2	0	618	0	618	7.0	622	0.994	100	81.2	LOS F	50.4	374.2	300 -	0.0	25.1	
Lane 3	0	0	182	182	7.0	280	0.650	100	37.6	LOS C	6.4	47.2	90 Turn Bay	0.0	0.0	0.0
Approach	312	746	182	1240	7.0		0.994		83.4	LOS F	50.4	374.2				
North: Mulgoa Road (N)																
Lane 1	70	393	0	463	7.0	458	1.010	100	58.3	LOS E	30.4	225.3	500 -	0.0	0.0	0.0
Lane 2	0	455	0	455	7.0	451	1.010	100	78.6	LOS F	36.6	271.9	500 -	0.0	0.0	0.0
Lane 3	0	0	261	261	7.0	251	1.040	100	128.5	LOS F	23.6	175.0	130 Turn Bay	0.0	32.1	32.1
Lane 4	0	0	261	261	7.0	251	1.040	100	128.5	LOS F	23.6	175.0	130 Turn Bay	0.0	32.1	32.1
Approach	70	848	521	1439	7.0		1.040		90.1	LOS F	36.6	271.9				
West: Great Western Highway (W)																
Lane 1	201	0	0	201	7.0	543 ¹	0.370	100	27.1	LOS B	6.4	47.2	100 Turn Bay	0.0	0.0	0.0
Lane 2	245	0	0	245	7.0	663	0.370	100	27.6	LOS B	8.0	59.4	170 -	0.0	0.0	0.0
Lane 3	0	326	0	326	7.0	435	0.749	100	48.1	LOS D	18.4	136.4	500 -	0.0	0.0	0.0
Lane 4	0	0	186	186	7.0	192	0.971	100	97.3	LOS F	14.3	106.0	120 Turn Bay	0.0	0.0	0.0
Approach	446	326	186	958	7.0		0.971		48.0	LOS D	18.4	136.4				
Intersection				5164	7.0		1.040		77.2	LOS F	50.4	374.2				

Level of Service (LOS) Method: Delay (RTA NSW).

Lane LOS values are based on average delay per lane.

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

SIDRA Standard Delay Model used.

1 Reduced capacity due to a short lane effect

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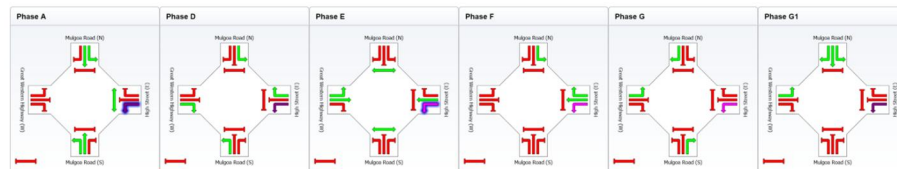
SIDRA
INTERSECTION

PHASING SUMMARY

Mulgoa Road - High Street - Great Western Highway
Signals - Fixed Time Cycle Time = 120 seconds (Optimum Cycle Time - Minimum Delay)

Phase times determined by the program
Sequence: SCAT 9 R/A
Input Sequence: A, D, E, F, G, G1
Output Sequence: A, D, E, F, G, G1

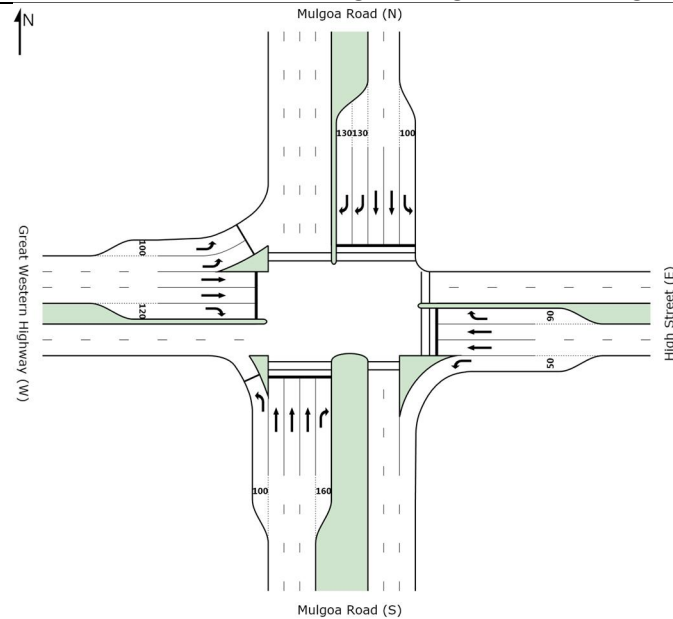
Phase	A	D	E	F	G	G1
Green Time (sec)	26	13	28	6	14	0
Yellow Time (sec)	4	4	4	4	4	4
All-Red Time (sec)	2	2	2	2	2	2
Phase Time (sec)	32	19	34	12	20	6
Phase Split	27 %	16 %	28 %	10 %	17 %	3 %



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INTERSECTION

2031 Great Western High-Mulgoa Road-High Street Intersection

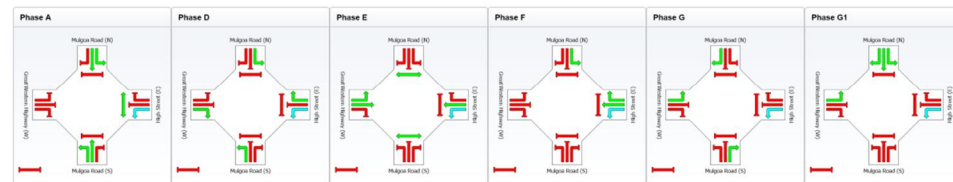


PHASING SUMMARY

Mulgoa Road - High Street - Great Western Highway
Signals - Fixed Time Cycle Time = 160 seconds (Practical Cycle Time)

Phase times determined by the program
Sequence: SCATS RTA
Input Sequence: A, D, E, F, G, G1
Output Sequence: A, D, E, F, G, G1

Phase	A	D	E	F	G	G1
Green Time (sec)	41	20	31	6	24	2
Yellow Time (sec)	4	4	4	4	4	4
All-Red Time (sec)	2	2	2	2	2	2
Phase Time (sec)	47	26	37	12	30	8
Phase Split	24 %	16 %	23 %	8 %	19 %	5 %



Normal Movement	Permitted/Opposed
Slip-Lane Movement	Opposed Slip-Lane
Stopped Movement	Continuous Movement
Turn On Red	Undetected Movement
	Phase Transition Applied

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INTERSECTION

LANE SUMMARY

Site: Mulgoa - High_2031 Dev -
GHD Pref 20111212

Mulgoa Road - High Street - Great Western Highway
Signals - Fixed Time Cycle Time = 160 seconds (Practical Cycle Time)

Lane Use and Performance

	Demand Flows			Total	HV	Cap.	Deg.	Lane	Average	Level of	95% Back	Queue	Lane	SL	Cap.	Prob.
	L	T	R	veh/h	%	veh/h	Satn	Util.	Delay	Service	Vehicles	Distance	Length	Type	Adj.	Block.
	veh/h	veh/h	veh/h				v/c	%	sec		veh	m	m		%	%
South: Mulgoa Road (S)																
Lane 1	435	0	0	435	7.0	435 ¹	1.000 ³	100	56.4 ⁵	LOS D ⁵	22.0 ⁵	163.2 ⁵	100	Turn Bay	0.0	50.0
Lane 2	223 ²	227	0	450	7.0	465	0.968	100	81.1	LOS F	41.6	308.9	750	-	0.0	0.0
Lane 3	0	463	0	463	7.0	478	0.968	100	69.9	LOS E	41.5	308.1	750	-	0.0	0.0
Lane 4	0	459	4 ²	462	7.0	478	0.968	100	70.1	LOS E	41.5	308.2	750	-	0.0	0.0
Lane 5	0	0	284	284	7.0	265	1.072	100	178.6	LOS F	35.2	261.1	160	Turn Bay	0.0	50.0
Approach	658	1149	288	2095	7.0		1.072		84.3	LOS F	41.6	308.9				
East: High Street (E)																
Lane 1	450	0	0	450	7.0	1769	0.254	100	9.7	X	X	X	50	Turn Bay	0.0	X
Lane 2	0	484	0	484	7.0	501	0.966	100	89.1	LOS F	45.4	336.7	300	-	0.0	15.4
Lane 3	0	484	0	484	7.0	501	0.966	100	89.1	LOS F	45.4	336.7	300	-	0.0	15.4
Lane 4	0	0	245	245	7.0	287	0.852	100	62.0	LOS E	15.2	112.8	90	Turn Bay	0.0	25.6
Approach	450	968	245	1663	7.0		0.966		63.6	LOS E	45.4	336.7				
North: Mulgoa Road (N)																
Lane 1	94	0	0	94	7.0	512 ¹	0.184	100	21.0	LOS B	2.3	16.9	100	Turn Bay	0.0	0.0
Lane 2	0	612	0	612	7.0	571	1.071	100	127.1	LOS F	72.1	534.7	500	-	0.0	11.1
Lane 3	0	612	0	612	7.0	571	1.071	100	127.1	LOS F	72.1	534.7	500	-	0.0	11.1
Lane 4	0	0	351	351	7.0	354	0.992	100	83.3 ⁵	LOS F ⁵	28.6 ⁵	212.2 ⁵	130	Turn Bay	0.0	50.0
Lane 5	0	0	351	351	7.0	354	0.992	100	83.3 ⁵	LOS F ⁵	28.6 ⁵	212.2 ⁵	130	Turn Bay	0.0	50.0
Approach	94	1224	702	2020	7.0		1.071		106.9	LOS F	72.1	534.7				
West: Great Western Highway (W)																
Lane 1	317	0	0	317	7.0	429 ¹	0.740	100	36.8	LOS C	15.3	113.7	100	Turn Bay	0.0	16.6
Lane 2	516	0	0	516	7.0	696	0.740	100	41.0	LOS C	28.0	208.1	500	-	0.0	0.0
Lane 3	0	308	0	308	7.0	361	0.853	100	74.7	LOS F	25.1	186.5	500	-	0.0	0.0
Lane 4	0	267	39 ²	306	7.0	359	0.853	100	74.8	LOS F	25.0	185.4	500	-	0.0	0.0
Lane 5	0	0	230	230	7.0	221	1.040	100	156.3	LOS F	26.3	195.2	120	Turn Bay	0.0	49.7
Approach	833	575	269	1677	7.0		1.040		68.4	LOS E	28.0	208.1				
Intersection				7455	7.0		1.072		82.2	LOS F	72.1	534.7				

X: Not applicable for Continuous lane.

Level of Service (LOS) Method: Delay (RTA NSW).

Lane LOS values are based on average delay per lane.

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

SIDRA Standard Delay Model used.

0 Excess flow from back of an adjacent short lane

1 Reduced capacity due to a short lane effect

3 x = 1.00 due to short lane.

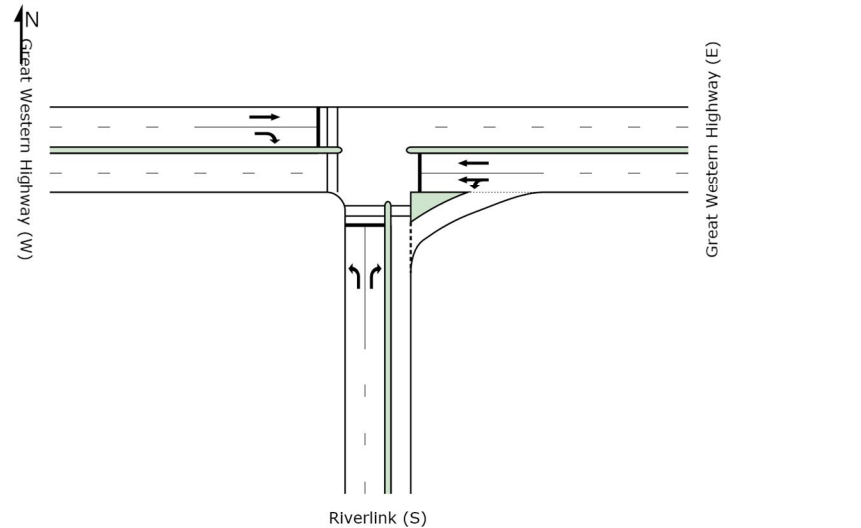
5 Delay, queue length and stops for the short lane have been cut down to fit in the queuing space. You may wish to change the short lane to a full lane to investigate the effect on the adjacent lane performance.

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SIDRA
INTERSECTION

2031 Great Western High-Riverlink Intersection



LANE SUMMARY

Site: GWH - Riverlink_2031 RTA
Pref - Opt Bay

Great Western Highway - Riverlink intersection
Signals - Fixed Time Cycle Time = 140 seconds (User-Given Cycle Time)

Lane Use and Performance																
	Demand Flows				HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Vehicles	Distance m	Lane Length m	SL Type	Cap. Adj. %	Prob. Block. %
	L veh/h	T veh/h	R veh/h	Total veh/h												
South: Riverlink (S)																
Lane 1	180	0	0	180	0.0	464	0.388	100	45.5	LOS D	8.5	59.8	500	-	0.0	0.0
Lane 2	0	0	298	298	0.0	305	0.977	100	101.9	LOS F	25.6	179.5	500	-	0.0	0.0
Approach	180	0	298	478	0.0		0.977		80.6	LOS F	25.6	179.5				
East: Great Western Highway (E)																
Lane 1	10	1159	0	1169	6.9	1239	0.944	100	41.7	LOS C	86.4	640.4	500	-	0.0	27.5
Lane 2	0	1169	0	1169	7.0	1239	0.944	100	40.4	LOS C	86.3	640.1	500	-	0.0	27.5
Approach	10	2328	0	2338	7.0		0.944		41.0	LOS C	86.4	640.4				
West: Great Western Highway (W)																
Lane 1	0	1387	0	1387	7.0	1399	0.992	100	58.3	LOS E	125.7	932.4	170	-	0.0	100.0
Lane 2	0	0	80	80	0.0	150	0.533	100	71.5	LOS F	5.5	38.8	500	-	0.0	0.0
Approach	0	1387	80	1467	6.6		0.992		59.0	LOS E	125.7	932.4				
Intersection				4283	6.1		0.992		51.6	LOS D	125.7	932.4				

Level of Service (LOS) Method: Delay (RTA NSW).

Lane LOS values are based on average delay per lane.

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

SIDRA Standard Delay Model used.

Processed: Friday, 3 February 2012 2:17:27 PM
SIDRA INTERSECTION 5.1.2.1953
Project: G:\21\20942\Tech\Revised Thursday SIDRA\2012_01_24 Redistribution of traffic\GWH - Riverlink_2031.sip
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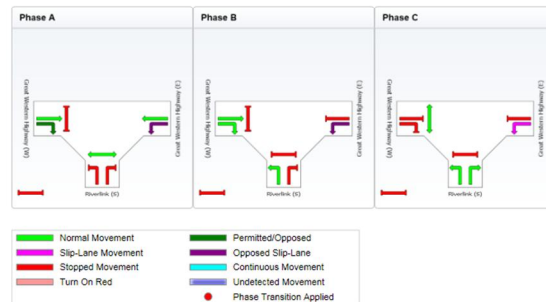
SIDRA
INTERSECTION

PHASING SUMMARY

Great Western Highway - Riverlink intersection
Signals - Fixed Time Cycle Time = 140 seconds (User-Given Cycle Time)

Phase times determined by the program
Sequence: SCATS RTA
Input Sequence: A, B, C
Output Sequence: A, B, C

Phase Timing Results			
Phase	A	B	C
Green Time (sec)	93	6	23
Yellow Time (sec)	4	4	4
All-Red Time (sec)	2	2	2
Phase Time (sec)	99	12	29
Phase Split	71 %	9 %	21 %



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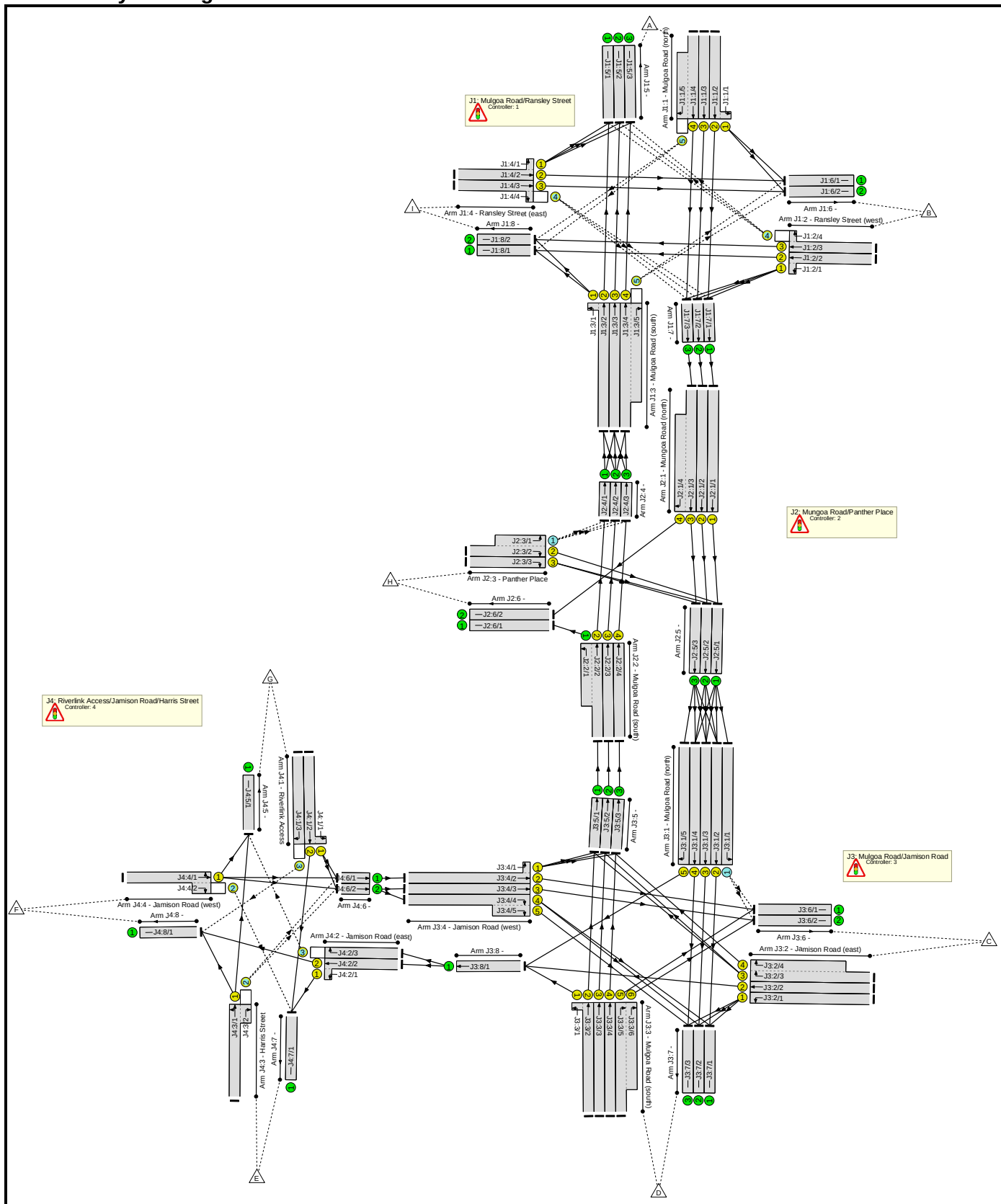
Appendix D – LinSig Model Outputs

Full Input Data And Results

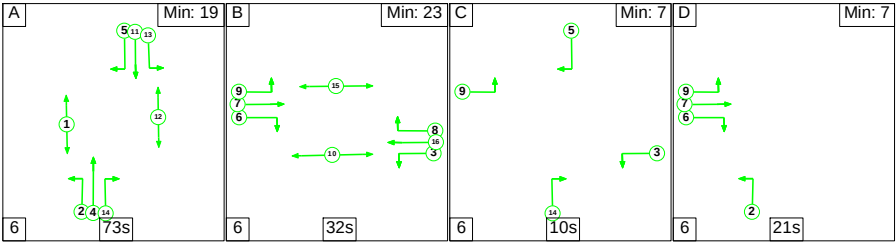
User and Project Details

Project:	Penrith Panthers
Title:	2031 With Development
Location:	
File name:	2031 With Development V9.lsg3x
Author:	OP
Company:	GHD
Address:	Level 16 133 Castlereagh St Sydney NSW 2000 Australia
Notes:	

Network Layout Diagram



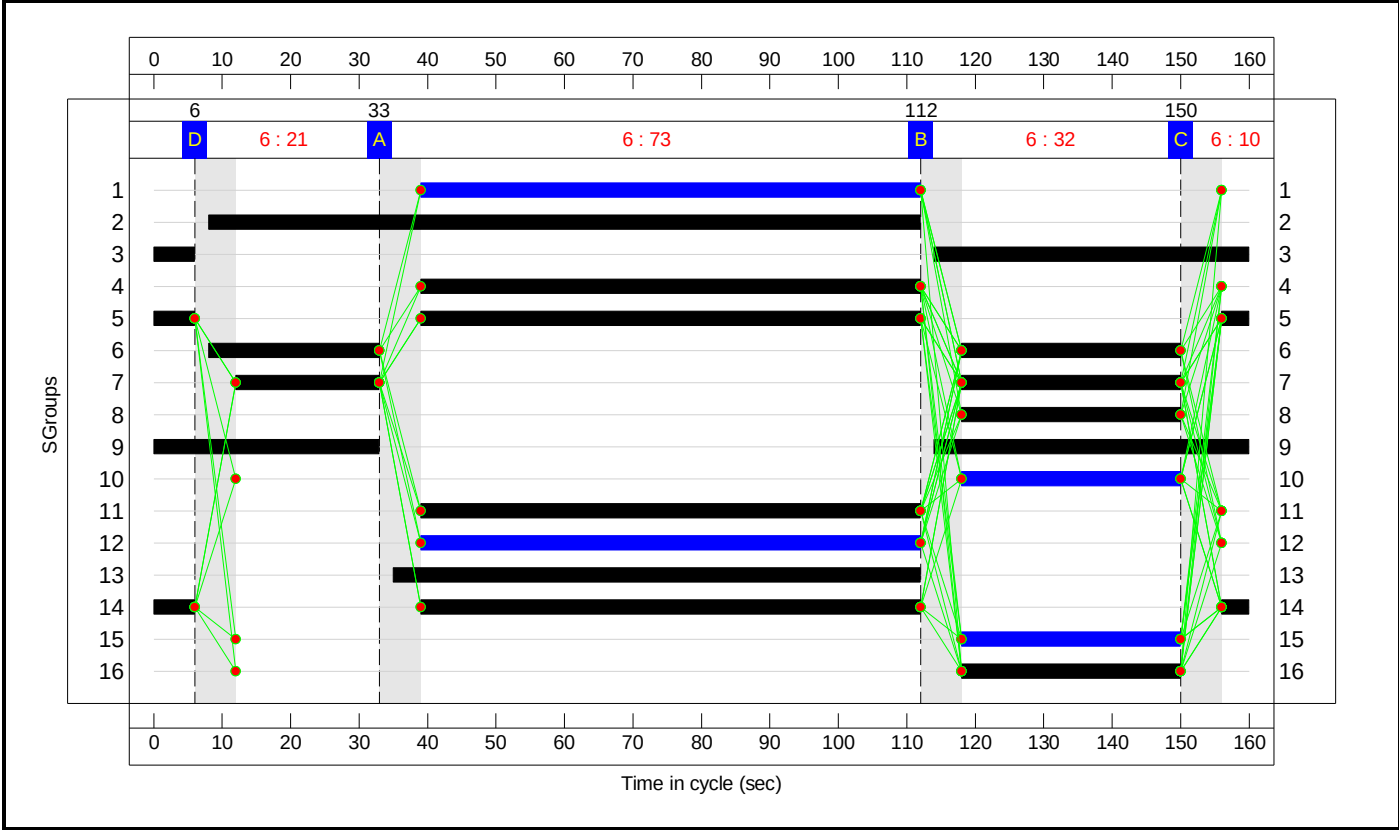
Scenario 1: 'Scenario 1' (FG1: '2031 With Development Traffic Flows - PM Peak ', Plan 1: 'Network Control Plan 1')
C1 - Ransley Street/Mulgoa Rd
Phase Sequence Diagram
Phase Stream: 1



Phase Timings
Phase Stream: 1

Phase	A	B	C	D
Duration	73	32	10	21
Change Point	33	112	150	6

Signal Timings Diagram

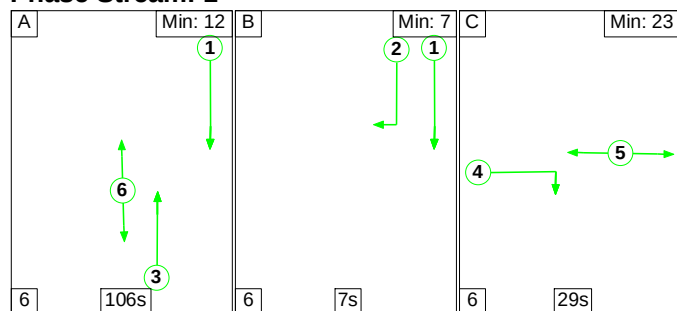


Full Input Data And Results

C2 - Panther Place/Mulgoa Rd

Phase Sequence Diagram

Phase Stream: 1

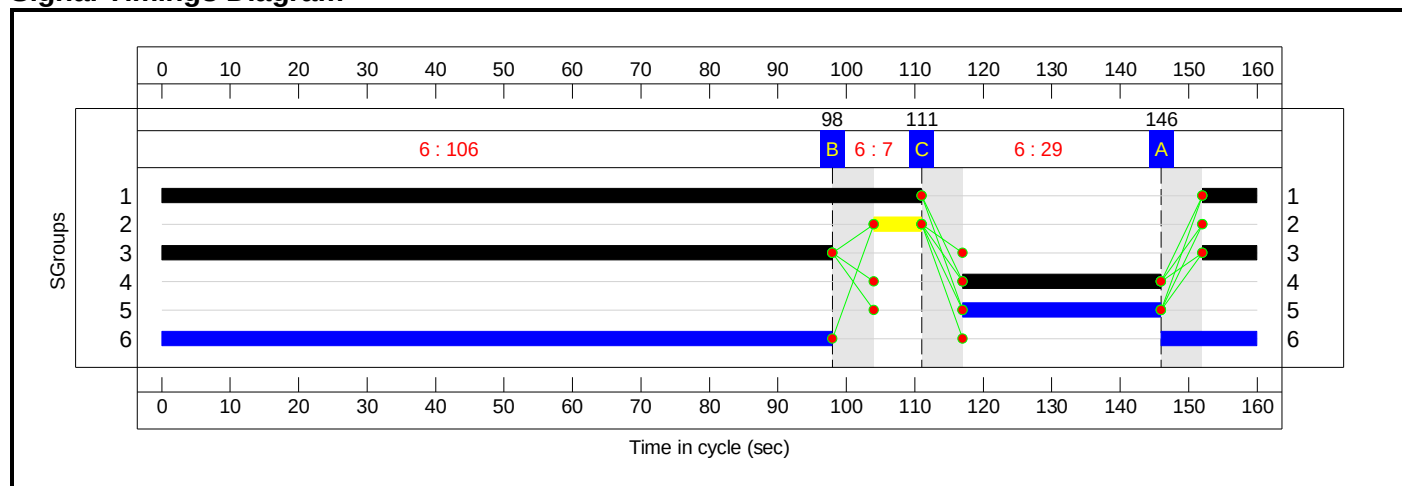


Phase Timings

Phase Stream: 1

Phase	A	B	C
Duration	106	7	29
Change Point	146	98	111

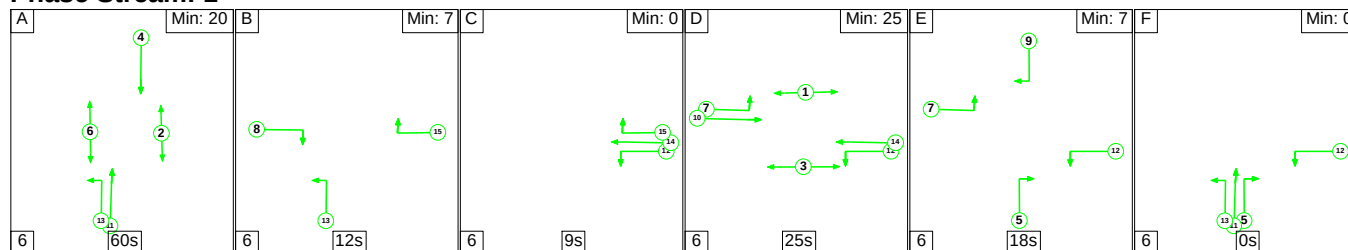
Signal Timings Diagram



C3 - Jamison Road/Mulgoa Road

Phase Sequence Diagram

Phase Stream: 1

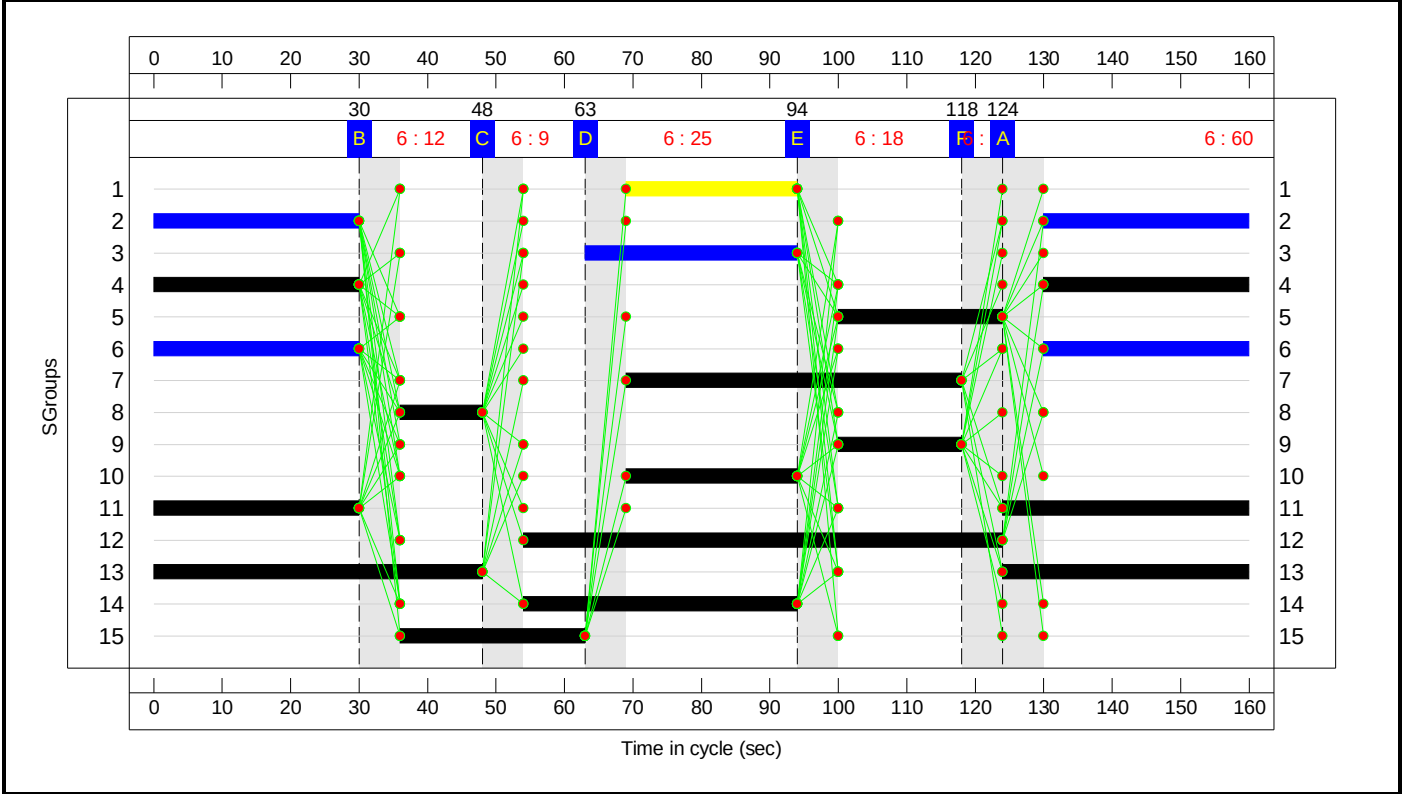


Phase Timings

Phase Stream: 1

Phase	A	B	C	D	E	F
Duration	60	12	9	25	18	0
Change Point	124	30	48	63	94	118

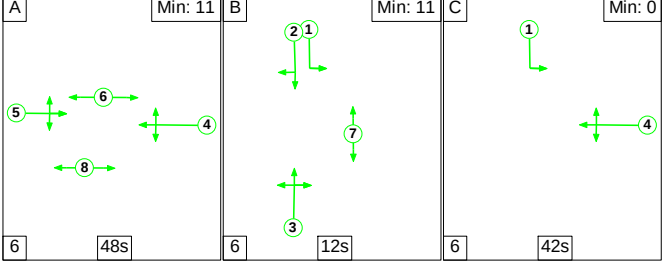
Signal Timings Diagram



C4 - Riverside Access/Jamison Road/Harris Street

Phase Sequence Diagram

Phase Stream: 1

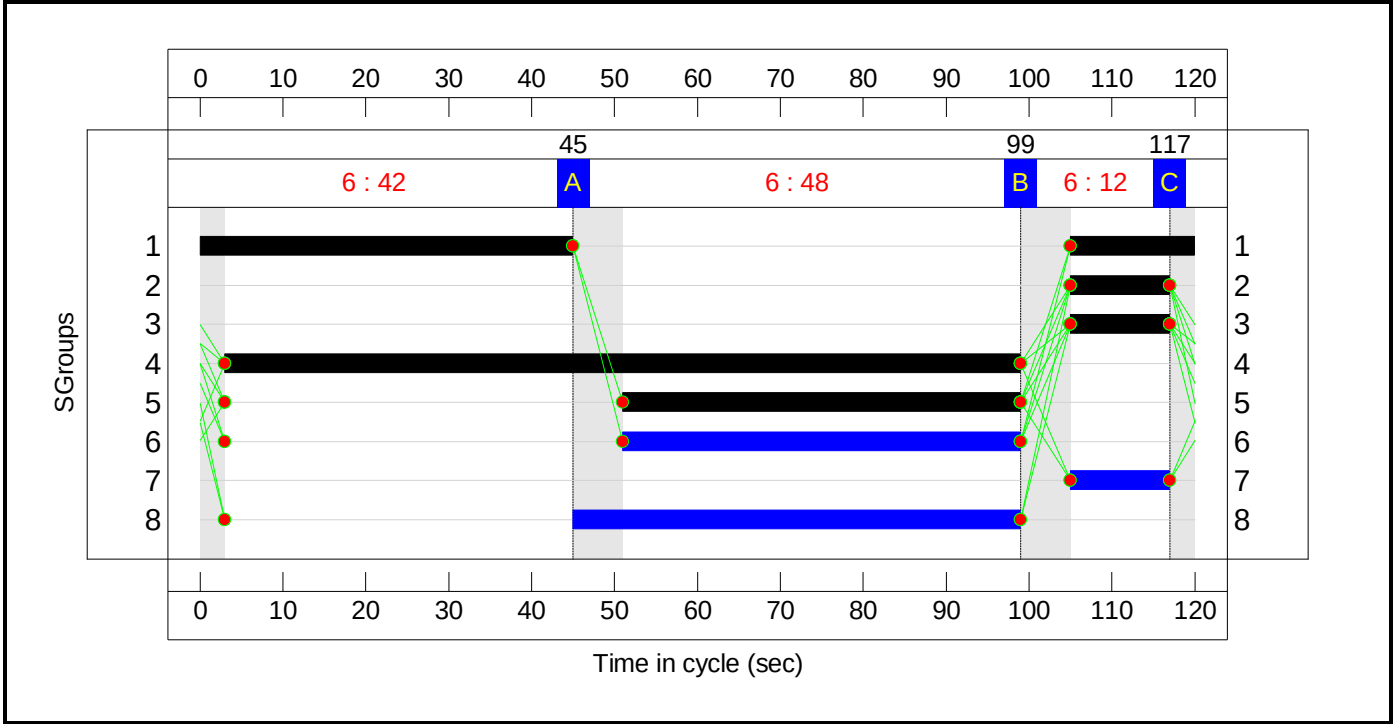


Phase Timings

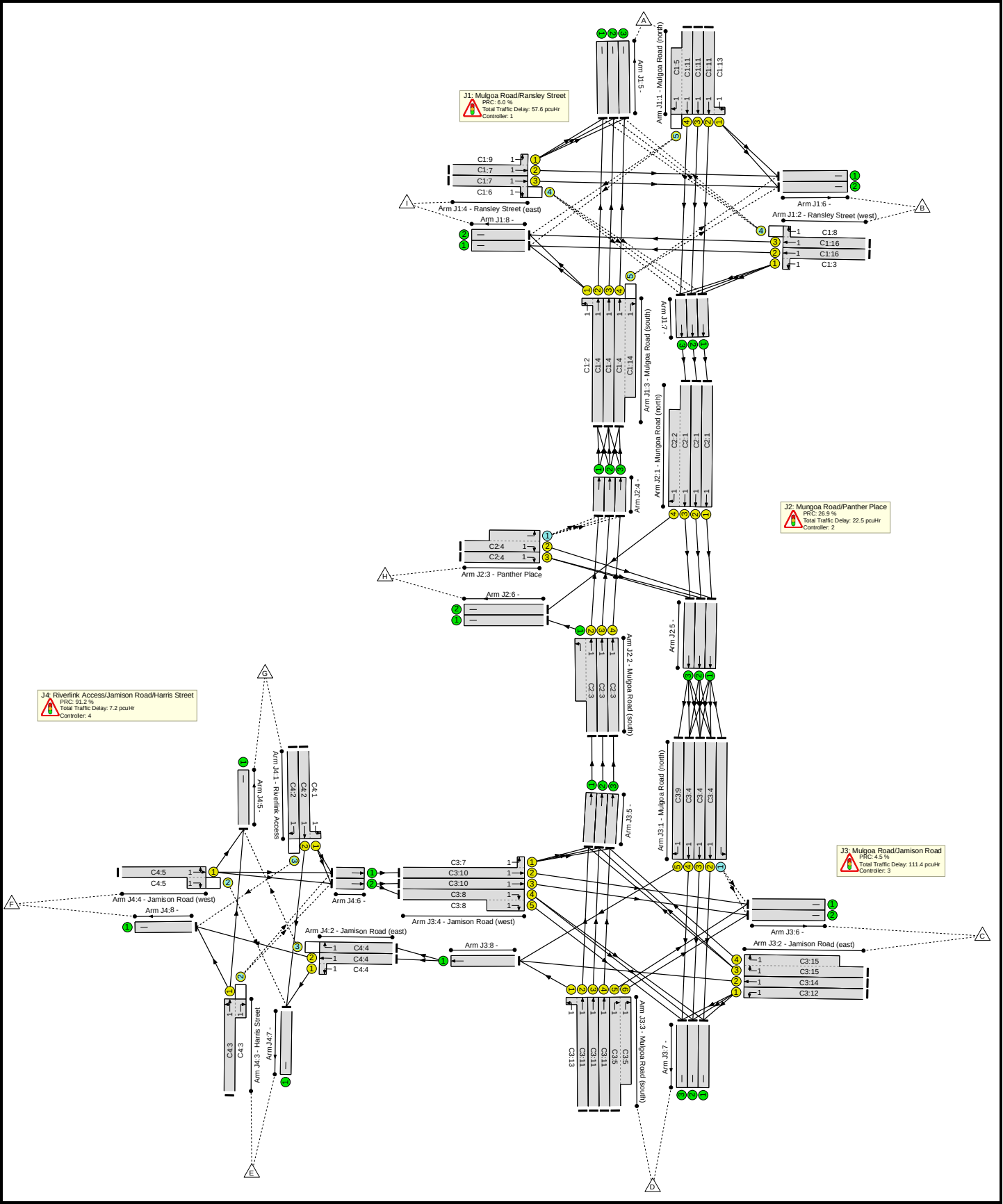
Phase Stream: 1

Phase	A	B	C
Duration	48	12	42
Change Point	45	99	117

Signal Timings Diagram



Network Layout Diagram



Full Input Data And Results

Network Results

Item	Lane Description	Lane Type	Controller Stream	Position In Filtered Route	Full SGroup	Arrow SGroup	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)
Network	-	-	N/A	-	-		-	-	-	-	-	-	86.1%
J1: Mulgoa Road/Ransley Street	-	-	N/A	-	-		-	-	-	-	-	-	84.9%
1/2+1/1	Mulgoa Road (north) Left Ahead	U	1:1	N/A	C1:11 C1:13		1	73:77	-	584	1935:1759	890	65.6%
1/3	Mulgoa Road (north) Ahead	U	1:1	N/A	C1:11		1	73	-	642	2075	960	66.9%
1/4+1/5	Mulgoa Road (north) Ahead Right	U+O	1:1	N/A	C1:11 C1:5		1:2	73:83	-	861	2075:1886	1014	84.9%
2/2+2/1	Ransley Street (west) Left Ahead	U	1:1	N/A	C1:16 C1:3		1	32:52	-	192	1965:1965	426	45.1%
2/3+2/4	Ransley Street (west) Right Ahead	U+O	1:1	N/A	C1:16 C1:8		1	32	-	127	2105:1914	268	47.3%
3/2+3/1	Mulgoa Road (south) Ahead Left	U	1:1	N/A	C1:4 C1:2		1	73:104	-	649	1935:1671	899	72.2%
3/3	Mulgoa Road (south) Ahead	U	1:1	N/A	C1:4		1	73	-	701	2075	960	73.0%
3/4+3/5	Mulgoa Road (south) Ahead Right	U+O	1:1	N/A	C1:4 C1:14		1:2	73:83	-	730	2075:1886	985	74.1%
4/2+4/1	Ransley Street (east) Left Ahead	U	1:1	N/A	C1:7 C1:9		2:1	53:79	-	215	1786:1786	634	33.9%
4/3+4/4	Ransley Street (east) Ahead Right	U+O	1:1	N/A	C1:7 C1:6		2	53:57	-	428	2105:2105	520	82.3%
5/1		U	N/A	N/A	-		-	-	-	662	Inf	Inf	0.0%
5/2		U	N/A	N/A	-		-	-	-	719	Inf	Inf	0.0%
5/3		U	N/A	N/A	-		-	-	-	787	Inf	Inf	0.0%
6/1		U	N/A	N/A	-		-	-	-	231	Inf	Inf	0.0%
6/2		U	N/A	N/A	-		-	-	-	68	Inf	Inf	0.0%

Full Input Data And Results

7/1	Ahead	U	N/A	N/A	-		-	-	-	748	1935	1935	38.7%
7/2	Ahead	U	N/A	N/A	-		-	-	-	645	2075	2075	31.1%
7/3	Ahead	U	N/A	N/A	-		-	-	-	966	2075	2075	46.6%
8/1		U	N/A	N/A	-		-	-	-	181	Inf	Inf	0.0%
8/2		U	N/A	N/A	-		-	-	-	122	Inf	Inf	0.0%
J2: Mungoa Road/Panther Place	-	-	N/A	-	-		-	-	-	-	-	-	70.9%
1/1	Mungoa Road (north) Ahead	U	2:1	N/A	C2:1		1	119	-	748	1935	1451	51.5%
1/2	Mungoa Road (north) Ahead	U	2:1	N/A	C2:1		1	119	-	645	1935	1451	44.4%
1/3+1/4	Mungoa Road (north) Ahead Right	U	2:1	N/A	C2:1 C2:2		1	119:7	-	966	2075:1886	1555	62.1%
2/2+2/1	Mulgoa Road (south) Ahead Left	U	2:1	N/A	C2:3 -		1	106	-	893	1935:1786	1594	56.0%
2/3	Mulgoa Road (south) Ahead	U	2:1	N/A	C2:3		1	106	-	786	2075	1388	56.6%
2/4	Mulgoa Road (south) Ahead	U	2:1	N/A	C2:3		1	106	-	933	2075	1388	67.2%
3/2+3/1	Panther Place Left Right	U+O	2:1	N/A	C2:4 -		1	29	-	278	1965:1965	392	70.9%
3/3	Panther Place Right	U	2:1	N/A	C2:4		1	29	-	246	2105	395	62.3%
4/1	Ahead	U	N/A	N/A	-		-	-	-	327	1935	1935	16.9%
4/2	Ahead	U	N/A	N/A	-		-	-	-	798	2075	2075	38.5%
4/3	Ahead	U	N/A	N/A	-		-	-	-	955	2075	2075	46.0%
5/1	Ahead	U	N/A	N/A	-		-	-	-	987	1935	1935	51.0%
5/2	Ahead	U	N/A	N/A	-		-	-	-	662	2075	2075	31.9%
5/3	Ahead	U	N/A	N/A	-		-	-	-	1118	2075	2075	53.9%
6/1		U	N/A	N/A	-		-	-	-	571	Inf	Inf	0.0%
6/2		U	N/A	N/A	-		-	-	-	77	Inf	Inf	0.0%
J3: Mulgoa Road/Jamison Road	-	-	N/A	-	-		-	-	-	-	-	-	86.1%

Full Input Data And Results

1/1	Mulgoa Road (north) Left	O	N/A	N/A	-		-	-	-	679	1759	1087	62.4%
1/2	Mulgoa Road (north) Ahead	U	3:1	N/A	C3:4		1	60	-	627	1935	738	85.0%
1/3	Mulgoa Road (north) Ahead	U	3:1	N/A	C3:4		1	60	-	663	2075	791	83.8%
1/4	Mulgoa Road (north) Ahead	U	3:1	N/A	C3:4		1	60	-	664	2075	791	83.9%
1/5	Mulgoa Road (north) Right	U	3:1	N/A	C3:9		1	18	-	134	2075	246	54.4%
2/1	Jamison Road (east) Left	U	3:1	N/A	C3:12		1	70	-	547	1572	698	78.4%
2/2	Jamison Road (east) Ahead	U	3:1	N/A	C3:14		1	40	-	242	2105	539	44.9%
2/3+2/4	Jamison Road (east) Right	U	3:1	N/A	C3:15		1	27	-	577	1914:1914	670	86.1%
3/2+3/1	Mulgoa Road (south) Ahead Left	U	3:1	N/A	C3:11 C3:13		1	66:84	-	643	1935:1935	819	78.5%
3/3	Mulgoa Road (south) Ahead	U	3:1	N/A	C3:11		1	66	-	680	2075	869	78.3%
3/4	Mulgoa Road (south) Ahead	U	3:1	N/A	C3:11		1	66	-	635	2075	869	73.1%
3/5+3/6	Mulgoa Road (south) Right	U	3:1	N/A	C3:5		1	24	-	489	1886:1886	589	83.0%
4/2+4/1	Jamison Road (west) Left Ahead	U	3:1	N/A	C3:10 C3:7		1	25:49	-	248	1965:1786	346	71.7%
4/3	Jamison Road (west) Ahead	U	3:1	N/A	C3:10		1	25	-	236	2105	342	69.0%
4/4+4/5	Jamison Road (west) Right	U	3:1	N/A	C3:8		1	12	-	214	1914:1914	278	76.9%
5/1	Ahead	U	N/A	N/A	-		-	-	-	893	1935	1935	46.1%
5/2	Ahead	U	N/A	N/A	-		-	-	-	786	2075	2075	37.9%
5/3	Ahead	U	N/A	N/A	-		-	-	-	933	2075	2075	45.0%
6/1		U	N/A	N/A	-		-	-	-	636	Inf	Inf	0.0%
6/2		U	N/A	N/A	-		-	-	-	822	Inf	Inf	0.0%

Full Input Data And Results

7/1		U	N/A	N/A	-		-	-	-	863	Inf	Inf	0.0%
7/2		U	N/A	N/A	-		-	-	-	898	Inf	Inf	0.0%
7/3		U	N/A	N/A	-		-	-	-	954	Inf	Inf	0.0%
8/1	Ahead	U	N/A	N/A	-		-	-	-	493	1965	1965	25.1%
J4: Riverlink Access/Jamison Road/Harris Street	-	-	N/A	-	-		-	-	-	-	-	-	47.1%
1/2+1/1	Riverlink Access Left Ahead	U	4:1	N/A	C4:2 C4:1		1	12:60	-	352	1965:1786	833	42.2%
1/3	Riverlink Access Right	O	4:1	N/A	C4:2		1	12	-	35	1914	187	18.8%
2/2+2/1	Jamison Road (east) Left Ahead	U	4:1	N/A	C4:4		1	96	-	335	1965:1786	1583	21.2%
2/3	Jamison Road (east) Right	O	4:1	N/A	C4:4		1	96	-	158	1914	642	24.6%
3/1+3/2	Harris Street Ahead Right Left	U+O	4:1	N/A	C4:3		1	12	-	12	1786:1914	185	6.5%
4/1+4/2	Jamison Road (west) Left Ahead Right	U+O	4:1	N/A	C4:5		1	48	-	359	1847:1914	763	47.1%
5/1		U	N/A	N/A	-		-	-	-	174	Inf	Inf	0.0%
6/1	Ahead	U	N/A	N/A	-		-	-	-	248	1965	1965	12.6%
6/2	Ahead	U	N/A	N/A	-		-	-	-	450	2105	2105	21.4%
7/1		U	N/A	N/A	-		-	-	-	34	Inf	Inf	0.0%
8/1		U	N/A	N/A	-		-	-	-	345	Inf	Inf	0.0%

Full Input Data And Results

Item	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In SGroup Intergreen (pcu)	Uniform Delay (pcuHr)	Rand + Oversat Delay (pcuHr)	Storage Area Uniform Delay (pcuHr)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Max. Back of Uniform Queue (pcu)	Rand + Oversat Queue (pcu)	Mean Max Queue (pcu)
Network	-	-	628	945	109	147.0	49.4	2.4	198.7	-	-	-	-
J1: Mulgoa Road/Ransley Street	-	-	300	352	109	42.3	13.0	2.3	57.6	-	-	-	-
1/2+1/1	584	584	-	-	-	5.3	0.9	-	6.3	38.7	19.7	0.9	20.7
1/3	642	642	-	-	-	6.0	1.0	-	7.0	39.1	22.1	1.0	23.1
1/4+1/5	861	855	24	106	45	9.1	2.7	0.9	12.7	53.2	26.9	2.7	29.7
2/2+2/1	192	192	-	-	-	2.6	0.4	-	3.0	55.8	6.8	0.4	7.2
2/3+2/4	127	127	98	0	0	2.0	0.4	0.2	2.6	74.8	4.9	0.4	5.3
3/2+3/1	649	649	-	-	-	3.5	1.3	-	4.8	26.6	27.0	1.3	28.3
3/3	701	701	-	-	-	3.6	1.3	-	4.9	25.2	26.1	1.3	27.5
3/4+3/5	730	730	0	14	45	3.2	1.4	0.8	5.4	26.8	23.0	1.4	24.4
4/2+4/1	215	215	-	-	-	1.5	0.3	-	1.8	30.2	5.4	0.3	5.7
4/3+4/4	428	428	178	232	19	5.5	2.2	0.3	8.1	68.0	13.9	2.2	16.1
5/1	662	662	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/2	719	719	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
5/3	787	787	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	231	231	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/2	68	68	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	748	748	-	-	-	0.0	0.3	-	0.3	1.5	0.0	0.3	0.3
7/2	645	645	-	-	-	0.0	0.2	-	0.2	1.3	0.0	0.2	0.2
7/3	966	966	-	-	-	0.0	0.4	-	0.4	1.6	0.0	0.4	0.4
8/1	178	178	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/2	119	119	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
J2: Mungoa Road/Panther Place	-	-	24	15	0	14.2	8.2	0.0	22.5	-	-	-	-
1/1	748	748	-	-	-	0.8	0.5	-	1.3	6.2	5.0	0.5	5.5
1/2	645	645	-	-	-	1.0	0.4	-	1.4	7.9	14.0	0.4	14.4

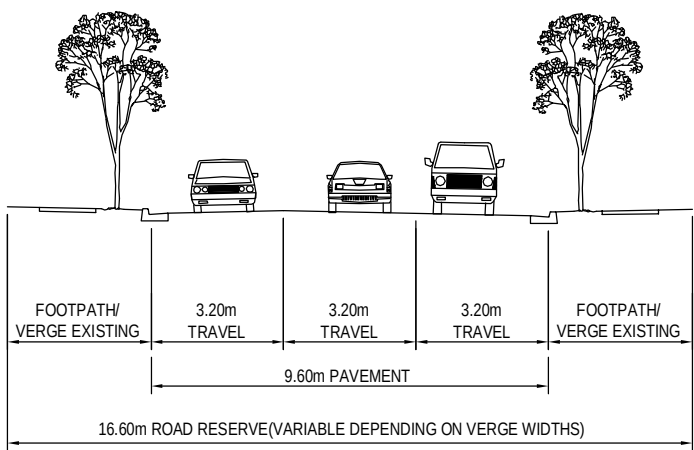
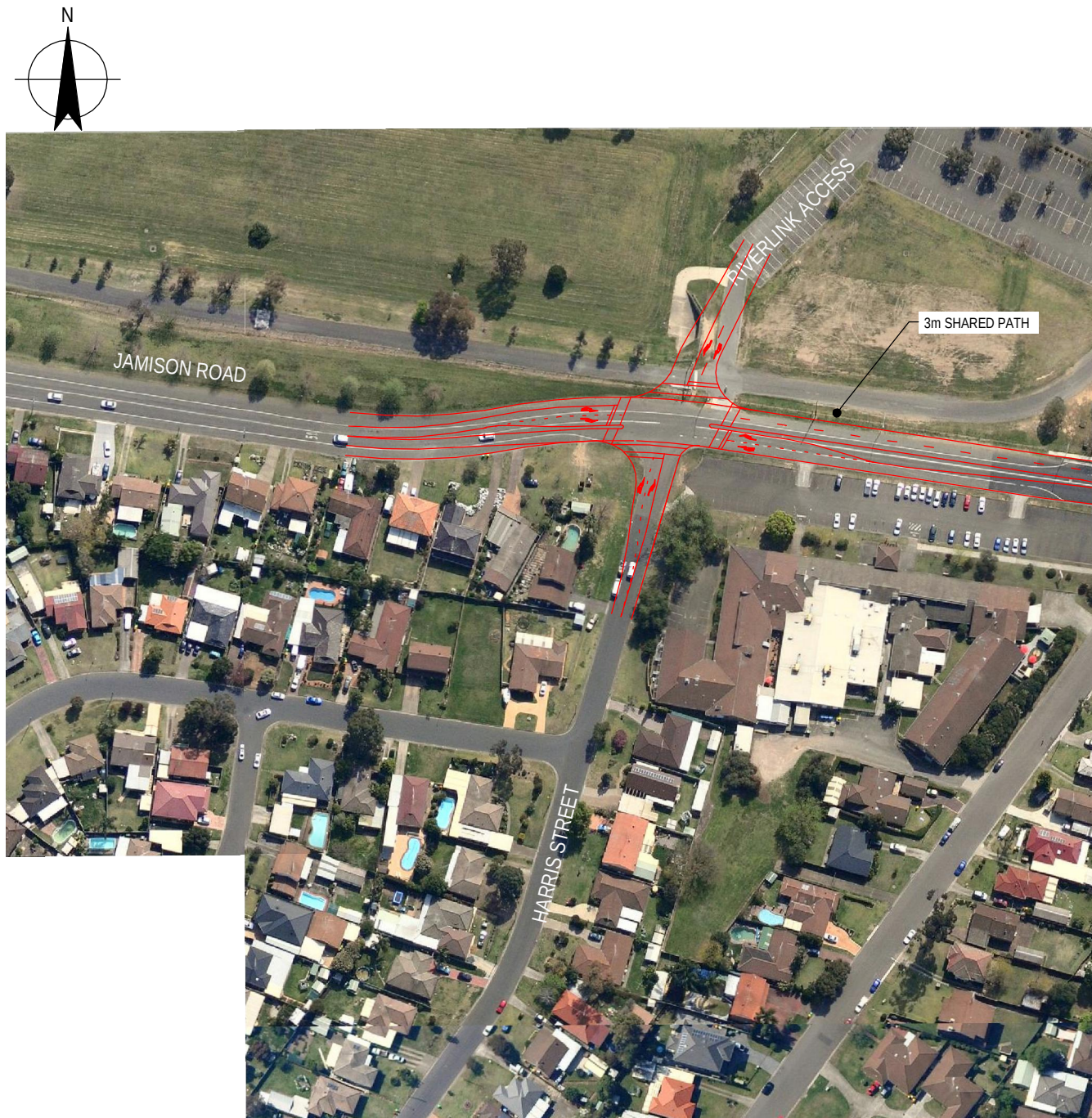
Full Input Data And Results

1/3+1/4	966	966	-	-	-	2.1	0.8	-	2.9	10.9	24.5	0.8	25.3
2/2+2/1	893	893	-	-	-	1.0	0.6	-	1.6	6.6	4.8	0.6	5.5
2/3	786	786	-	-	-	0.7	0.7	-	1.3	6.0	5.8	0.7	6.5
2/4	933	933	-	-	-	0.4	1.0	-	1.4	5.5	2.6	1.0	3.6
3/2+3/1	278	278	24	15	0	4.2	1.2	-	5.4	69.5	10.4	1.2	11.6
3/3	246	246	-	-	-	4.1	0.8	-	4.9	71.8	10.0	0.8	10.9
4/1	327	327	-	-	-	0.0	0.1	-	0.1	1.1	0.0	0.1	0.1
4/2	798	798	-	-	-	0.0	0.3	-	0.3	1.4	0.0	0.3	0.3
4/3	955	955	-	-	-	0.0	0.4	-	0.4	1.6	0.0	0.4	0.4
5/1	987	987	-	-	-	0.0	0.5	-	0.5	2.0	8.1	0.5	8.6
5/2	662	662	-	-	-	0.0	0.2	-	0.2	1.3	0.0	0.2	0.2
5/3	1118	1118	-	-	-	0.0	0.6	-	0.6	1.9	0.0	0.6	0.6
6/1	571	571	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/2	77	77	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
J3: Mulgoa Road/Jamison Road	-	-	107	572	0	84.8	26.7	0.0	111.4	-	-	-	-
1/1	679	679	107	572	0	0.9	0.8	-	1.8	9.4	14.3	0.8	15.1
1/2	627	627	-	-	-	6.5	2.7	-	9.2	52.8	26.5	2.7	29.2
1/3	663	663	-	-	-	7.1	2.5	-	9.6	52.0	27.8	2.5	30.3
1/4	664	664	-	-	-	7.1	2.5	-	9.6	52.0	27.8	2.5	30.3
1/5	134	134	-	-	-	1.7	0.6	-	2.3	61.0	5.1	0.6	5.6
2/1	547	547	-	-	-	5.8	1.8	-	7.5	49.6	20.7	1.8	22.4
2/2	242	242	-	-	-	3.4	0.4	-	3.8	56.0	9.0	0.4	9.4
2/3+2/4	577	577	-	-	-	10.3	2.9	-	13.2	82.4	13.2	2.9	16.1
3/2+3/1	643	643	-	-	-	7.1	1.8	-	8.9	49.6	24.5	1.8	26.3
3/3	680	680	-	-	-	7.6	1.8	-	9.4	49.6	26.1	1.8	27.8
3/4	635	635	-	-	-	6.9	1.3	-	8.2	46.6	23.6	1.3	25.0
3/5+3/6	489	489	-	-	-	8.9	2.3	-	11.2	82.6	10.5	2.3	12.9
4/2+4/1	248	248	-	-	-	3.3	1.2	-	4.5	65.2	8.5	1.2	9.8
4/3	236	236	-	-	-	4.1	1.1	-	5.2	79.8	9.8	1.1	10.9

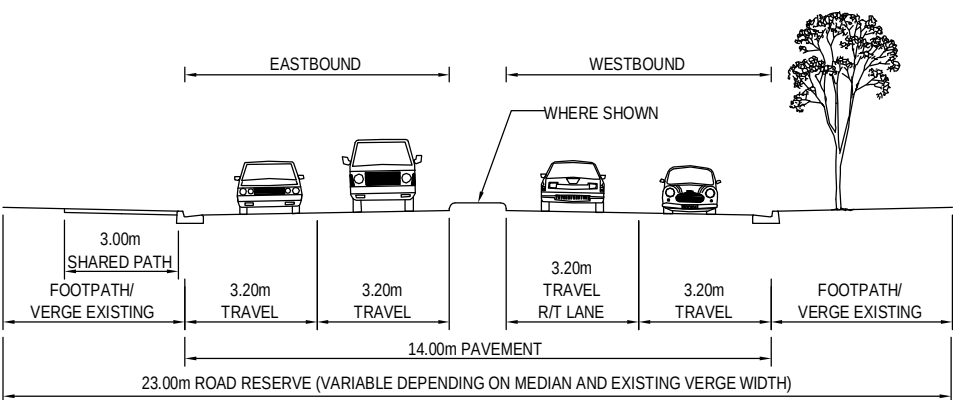
Full Input Data And Results

4/4+4/5	214	214	-	-	-	4.3	1.6	-	5.8	98.2	4.7	1.6	6.2
5/1	893	893	-	-	-	0.0	0.4	-	0.4	1.7	0.0	0.4	0.4
5/2	786	786	-	-	-	0.0	0.3	-	0.3	1.4	0.0	0.3	0.3
5/3	933	933	-	-	-	0.0	0.4	-	0.4	1.6	0.0	0.4	0.4
6/1	636	636	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/2	822	822	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/1	863	863	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/2	898	898	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
7/3	954	954	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/1	493	493	-	-	-	0.0	0.2	-	0.2	1.2	0.0	0.2	0.2
J4: Riverlink Access/Jamison Road/Harris Street	-	-	198	6	0	5.7	1.5	0.1	7.2	-	-	-	-
1/2+1/1	352	352	-	-	-	2.1	0.4	-	2.4	25.0	7.7	0.4	8.1
1/3	35	35	35	0	0	0.5	0.1	0.0	0.6	61.1	1.0	0.1	1.2
2/2+2/1	335	335	-	-	-	0.2	0.1	-	0.4	4.1	2.5	0.1	2.6
2/3	158	158	158	0	0	0.1	0.2	0.1	0.4	8.9	1.1	0.2	1.3
3/1+3/2	12	12	1	6	0	0.2	0.0	0.0	0.2	59.2	0.2	0.0	0.2
4/1+4/2	359	359	4	0	0	2.6	0.4	0.0	3.0	30.4	8.6	0.4	9.1
5/1	174	174	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
6/1	248	248	-	-	-	0.0	0.1	-	0.1	1.0	0.0	0.1	0.1
6/2	450	450	-	-	-	0.0	0.1	-	0.1	1.1	0.0	0.1	0.1
7/1	34	34	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
8/1	345	345	-	-	-	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
C1 - Ransley Street/Mulgoa Rd C2 - Panther Place/Mulgoa Rd C3 - Jamison Road/Mulgoa Road C4 - Riverside Access/Jamison Road/Harris Street Stream: 1 PRC for Signalled Lanes (%) Stream: 1 PRC for Signalled Lanes (%) Stream: 1 PRC for Signalled Lanes (%) Stream: 1 PRC for Signalled Lanes (%) PRC Over All Lanes (%) 6.0 26.9 4.5 91.2 4.5 Total Delay for Signalled Lanes (pcuHr) Total Delay for Signalled Lanes (pcuHr) Total Delay for Signalled Lanes (pcuHr) Total Delay for Signalled Lanes (pcuHr) Total Delay Over All Lanes(pcuHr): 56.61 20.29 108.35 7.04 198.75 Cycle Time (s): 160 Cycle Time (s): 160 Cycle Time (s): 160 Cycle Time (s): 120													

Appendix E – Strategic Concept Designs



RIVERLINK ACCESS & HARRIS STREET
ATTG

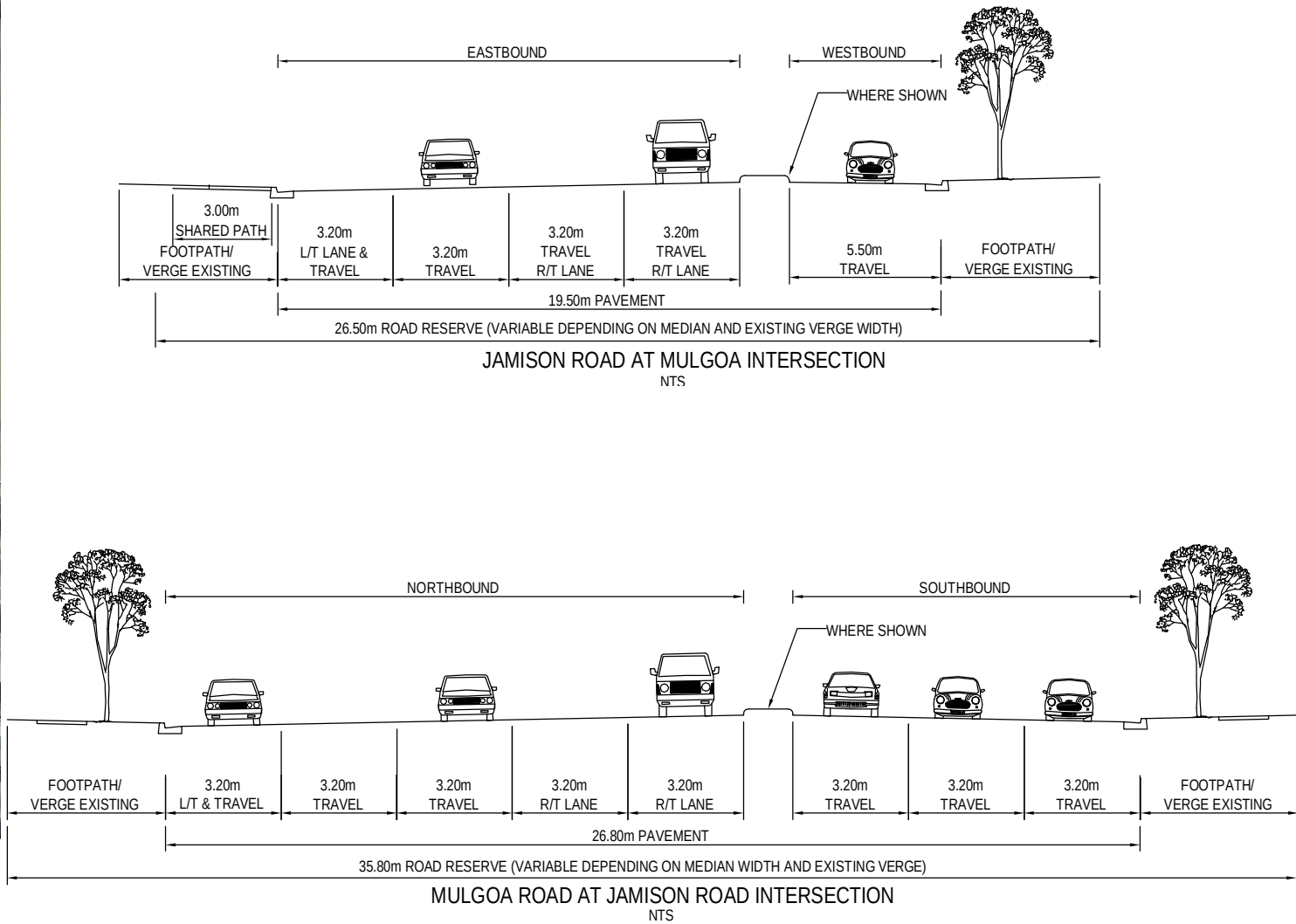


JAMISON ROAD
NTS

- NOTES
1. THIS DESIGN IS STRATEGIC ONLY. CONFIRMATION OF PROPERTY ACQUISITION WILL REQUIRE DETAILED SURVEY AND FURTHER DESIGN DEVELOPMENT.

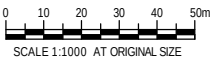
PRELIMINARY

								 SCALE 1:1000 AT ORIGINAL SIZE		 		 CLIENTS PEOPLE PERFORMANCE		DO NOT SCALE		Drawn M.PERKS	Designer M.PERKS	Client	ING PANTHERS GROUP	
D	FURTHER DESIGN DEVELOPMENT			MP	IS									Conditions of Use. This document may only be used by GHD's client (and any other person who GHD has agreed can use this document) for the purpose for which it was prepared and must not be used by any other person or for any other purpose.		Drafting Check	Design Check	Project	PENRITH PANTHERS ONGOING ADDITIONAL SERVICES	
C	DESIGN DEVELOPMENT			MP	IS											Approved (Project Director)		Title	JAMISON ROAD INTERSECTION WITH RIVERLINK ACCESS	
B	INTERSECTIONS REVISED AFTER FURTHER TRAFFIC INVESTIGATIONS			MP	IS											Date			STRATEGIC DESIGN	
A	FOR INFORMATION ONLY			MP	IS											Scale AS SHOWN	This Drawing must not be used for Construction unless signed as Approved	Original Size	Drawing No: 21-20942-C0001	
No	Revision	Note: * indicates signatures on original issue of drawing or last revision of drawing			Drawn	Job Manager	Project Director	Date				Level 6, 20 Smith Street Parramatta NSW 2150 Australia PO Box 788 Parramatta NSW 2124 T 61 2 8898 8800 F 61 2 8898 8810 E sydmaa@ghd.com.au W www.ghd.com.au						Rev: D		



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C	DESIGN DEVELOPMENT	MP	IS		13.01.12	
B	INTERSECTIONS REVISED AFTER FURTHER TRAFFIC INVESTIGATIONS	MP	IS		23.11.11	
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Project

Title

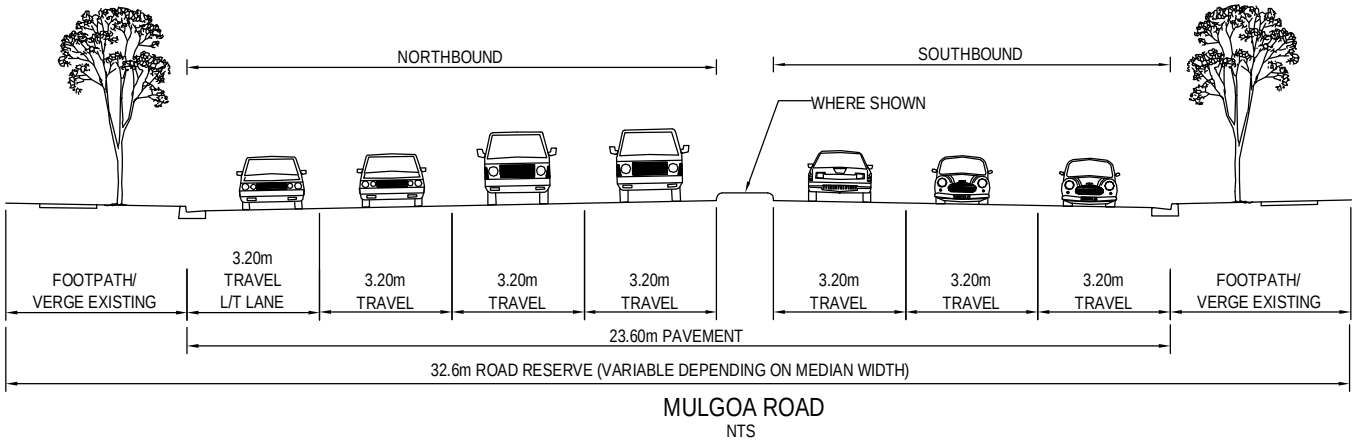
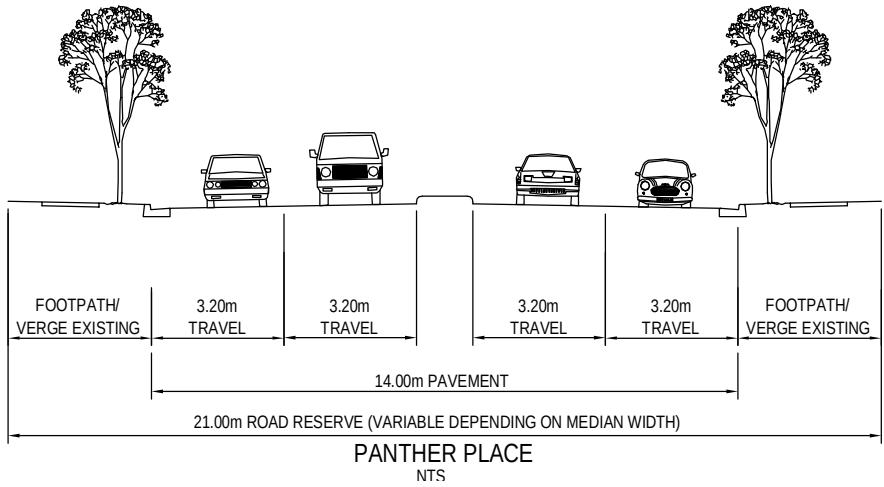
Original Size

A1

ING PANTHERS GROUP
PENRITH PANTHERS ONGOING ADDITIONAL SERVICES
JAMISON ROAD INTERSECTION WITH MULGOA ROAD
STRATEGIC DESIGN

Drawing No: 21-20942-C0002

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A	FOR INFORMATION ONLY	MP	SK		26.09.11	
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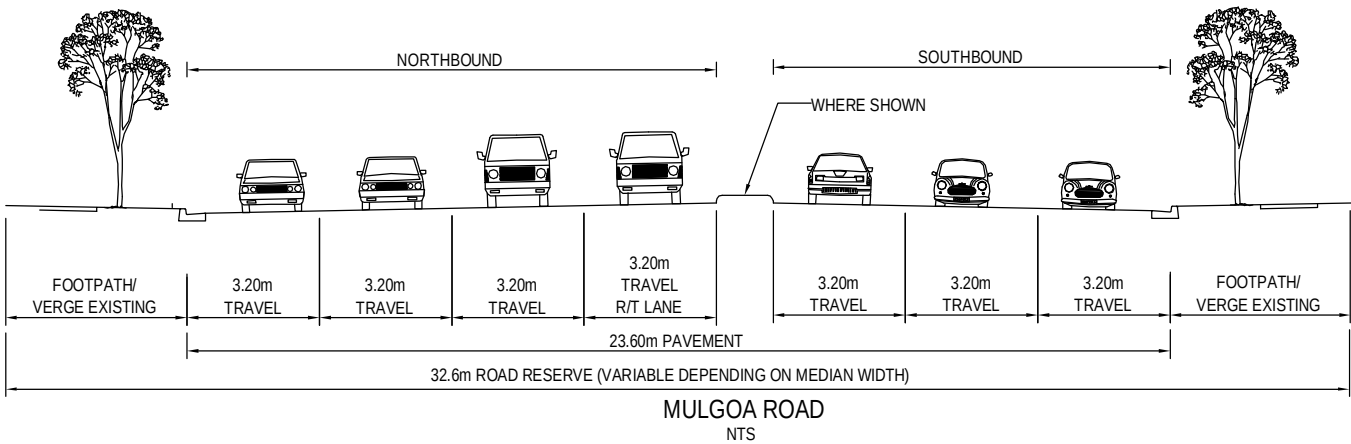
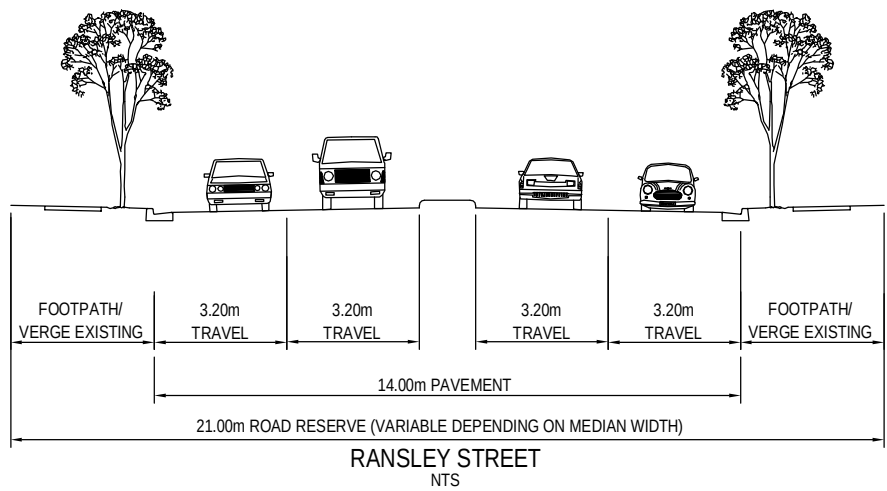
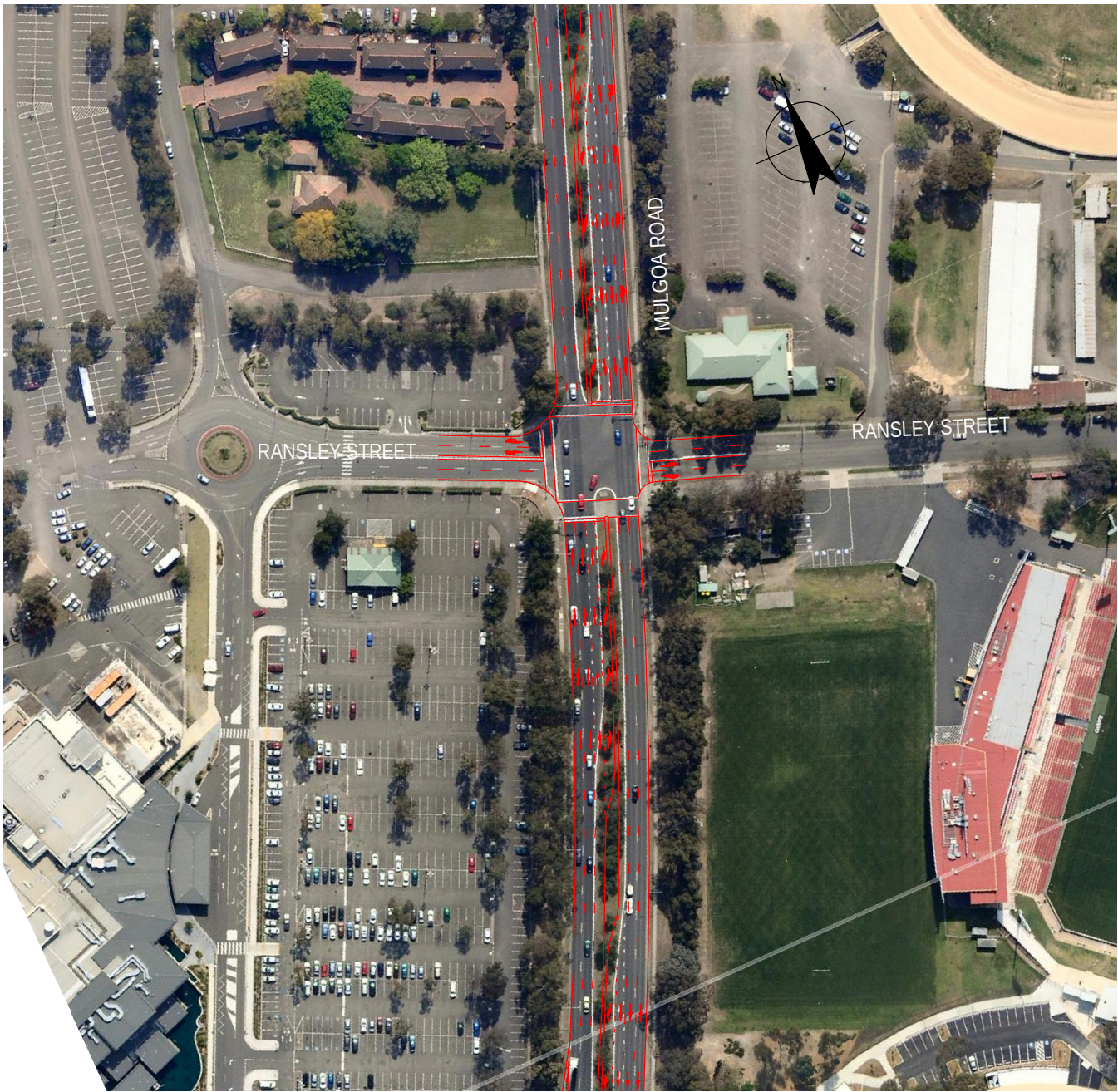
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Client **ING PANTHERS GROUP**
Project **PENRITH PANTHERS ONGOING ADDITIONAL SERVICES**
Title **PANTHER PLACE INTERSECTION WITH MULGOA ROAD STRATEGIC DESIGN**

Original Size **A1** Drawing No: **21-20942-C0003**

Rev: C

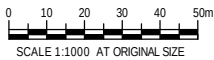


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B	DESIGN DEVELOPMENT	MP	IS		13.01.12	
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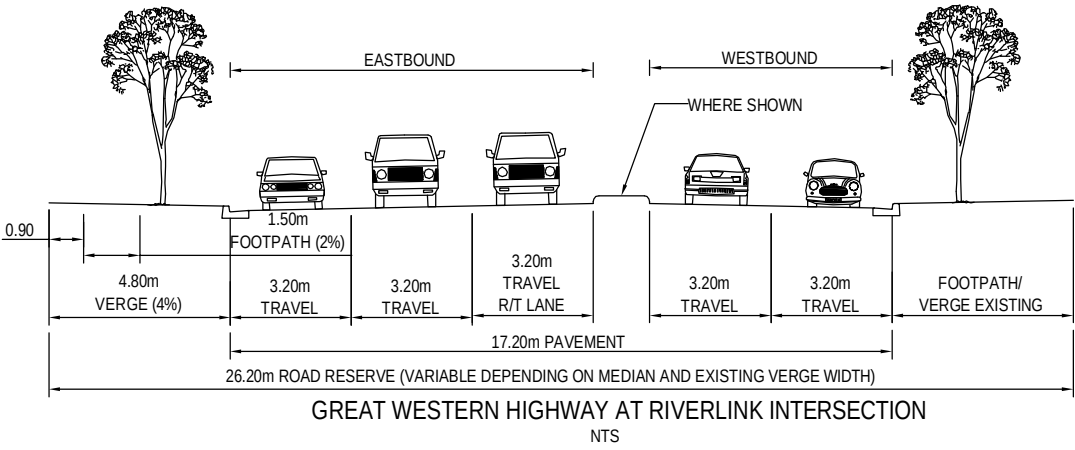
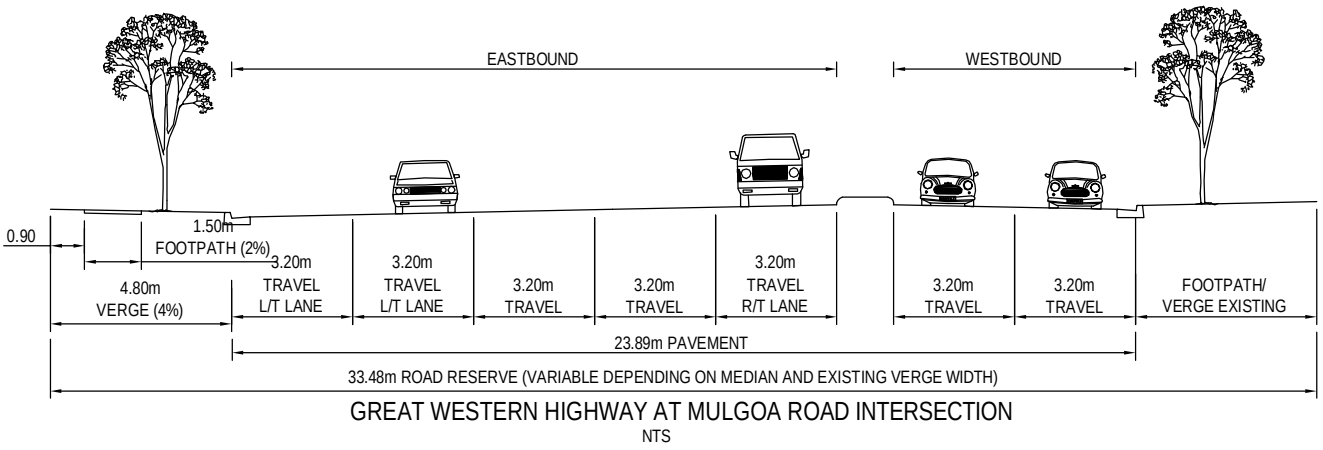
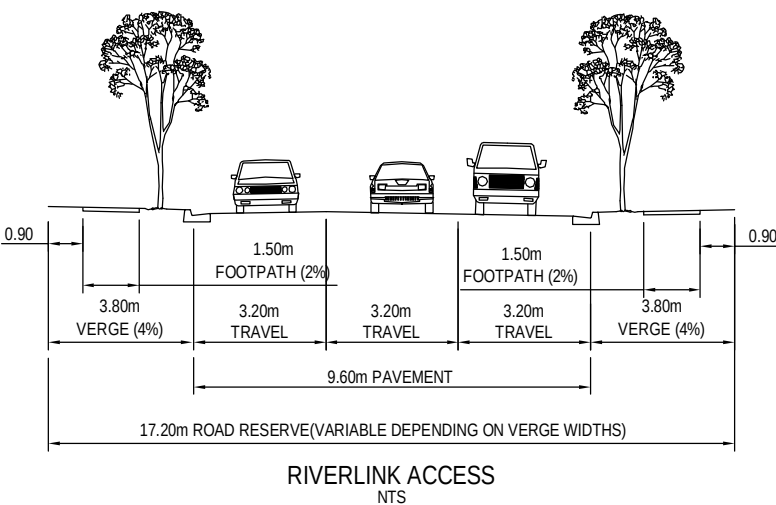
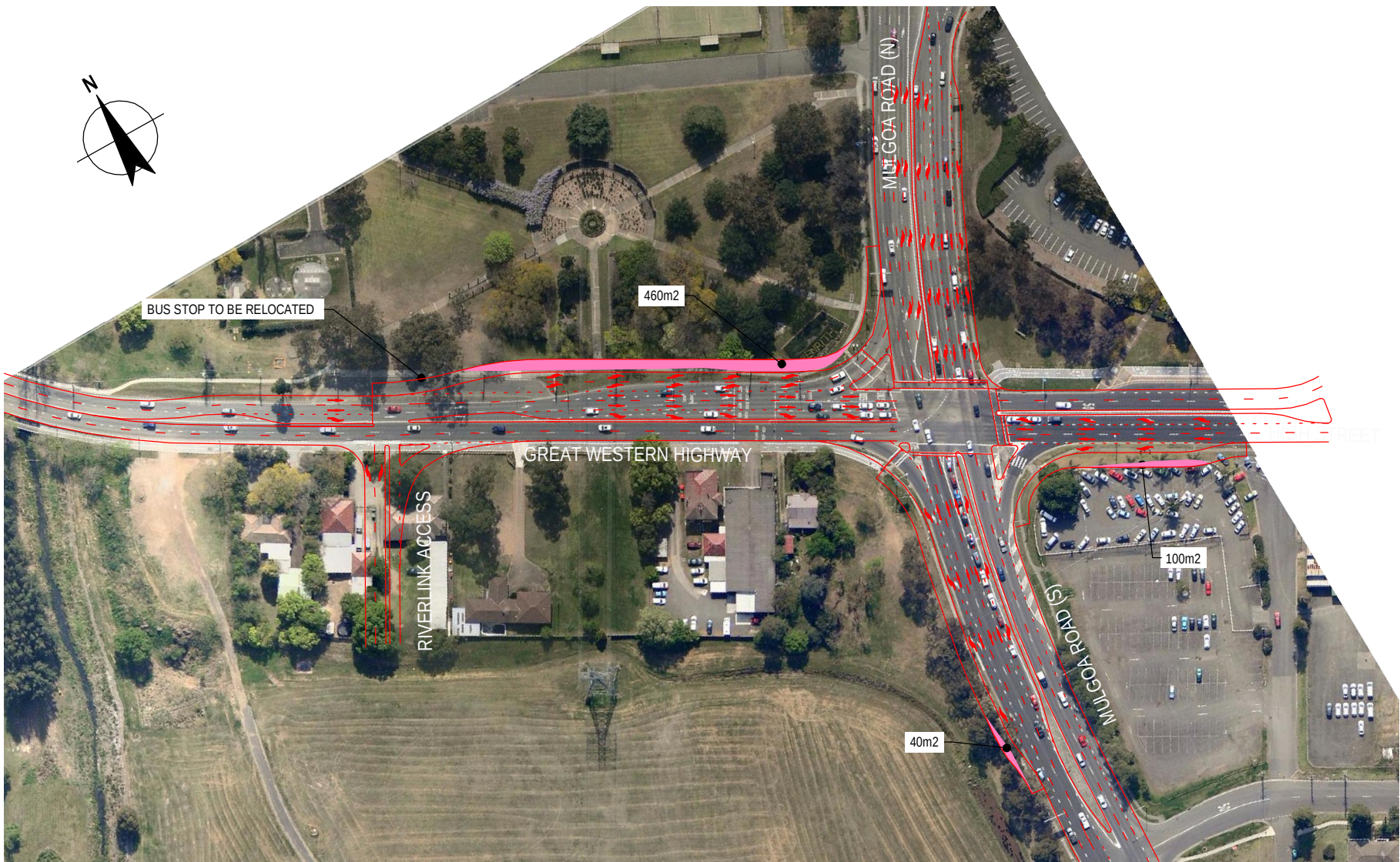
Title

Original Size

ING PANTHERS GROUP
PENRITH PANTHERS ONGOING ADDITIONAL SERVICES
RANSLEY STREET INTERSECTION WITH MULGOA ROAD
STRATEGIC DESIGN

A1 Drawing No: 21-20942-C0004

Rev: C



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SCALE 1:2500 AT ORIGINAL SIZE

Appendix F – Detailed Cost Estimates

PROJECT: Penrith Panthers Ongoing Additional Services

New Signalised Intersection on Great Western Highway and Northern Riverlink

Client: ING Panthers Group

Project SummaryPrepared by: *M. Raven*

Project No:		DATE: December 2012		Estimate Stage: Strategic Rev.B		
Item	Estimate (excluding contingency)	Contingency		Estimate (including contingency)	% of Total Estimate	Comments/Assumptions
		%	Amount			
1. Project Development						
1 (a) Route/Concept/EIS/REF	\$72,143	30%	\$21,643	\$93,786		
1 (b) Project Management Services	\$7,214	30%	\$2,164	\$9,379		
1 (c) Client Representation	\$721	30%	\$216	\$938		
1 (d) Community Liaison	\$25,000	30%	\$7,500	\$32,500		
Sub total	\$105,079	30%	\$31,524	\$136,602	3.0%	
2. Investigation and Design						
2 (a) Investigation and Design	\$144,286	30%	\$43,286	\$187,572		
2 (b) Project Management Services	\$14,429	30%	\$4,329	\$18,757		
2 (c) Client Representation	\$1,443	30%	\$433	\$1,876		
Sub total	\$160,157	30%	\$48,047	\$208,205	4.5%	
3. Property Acquisitions						
3 (a) Acquire Property	\$803,200	40%	\$321,280	\$1,124,480		To be confirmed by RTA/ING
3 (b) Professional Services for Property	\$56,224	40%	\$22,490	\$78,714		
3 (c) Project Management Services	\$80,320	40%	\$32,128	\$112,448		
3 (d) Client Representation	\$8,032	40%	\$3,213	\$11,245		
Sub total	\$947,776	40%	\$379,110	\$1,326,886	28.7%	
4. Public Utility Adjustments						
4 (a) Adjustment to Utilities	\$0	45%	\$0	\$0		Included in Construction Costs
4 (c) Project Management Services	\$0	45%	\$0	\$0		
4 (d) Client Representation	\$0	45%	\$0	\$0		
Sub total	\$0		\$0	\$0	0.0%	
5. Construction						
5 (a) - 5 (c) Infrastructure	\$1,803,575	45%	\$812,833	\$2,616,407		
5 (d) Project Management Services	\$180,357	45%	\$81,283	\$261,641		
5 (e) Client Representation	\$18,036	45%	\$8,128	\$26,164		
5 (f) Insurance	\$9,920	45%	\$4,471	\$14,390		
Sub total	\$2,011,887	45%	\$906,715	\$2,918,602	63.2%	
6. Handover						
6 (a) Handover and Finalisation	\$0	30%	\$0	\$0		
6 (b) Project data and performance	\$18,036	30%	\$5,411	\$23,446		
6 (c) Project Management Services	\$1,804	30%	\$541	\$2,345		
6 (d) Client Representation	\$180	30%	\$54	\$234		
Sub total	\$20,020	30%	\$6,006	\$26,026	0.6%	
TOTAL	\$3,244,919	42%	\$1,371,402	\$4,616,321	100%	35% -70% required by RMS

Project Management

\$284,124

\$404,569

8.8%

Client Representation

\$28,412

\$40,457

0.9%

Document No:

Issue 1.9

Page 1 of 1

No allowance for GST, Escalation, Carbon Tax

PROJECT: Penrith Panthers Ongoing Additional Services

New Signalised Intersection at Jamison Rd and Mulgoa Rd

Client: ING Panthers Group

Project Summary

Prepared by: M. Raven

Project No:		DATE: February 2012		Estimate Stage: Strategic Rev.E		
Item	Estimate (excluding contingency)	Contingency		Estimate (including contingency)	% of Total Estimate	Comments/Assumptions
		%	Amount			
1. Project Development						
1 (a) Route/Concept/EIS/REF	\$111,751	30%	\$33,525	\$145,277		
1 (b) Project Management Services	\$11,175	30%	\$3,353	\$14,528		
1 (c) Client Representation	\$1,118	30%	\$335	\$1,453		
1 (d) Community Liaison	\$25,000	30%	\$7,500	\$32,500		
Sub total	\$149,044	30%	\$44,713	\$193,757	3.6%	
2. Investigation and Design						
2 (a) Investigation and Design	\$223,503	30%	\$67,051	\$290,554		
2 (b) Project Management Services	\$22,350	30%	\$6,705	\$29,055		
2 (c) Client Representation	\$2,235	30%	\$671	\$2,906		
Sub total	\$248,088	30%	\$74,426	\$322,514	6.0%	
3. Property Acquisitions						
3 (a) Acquire Property	\$141,100	40%	\$56,440	\$197,540		To be confirmed by RTA/ING
3 (b) Professional Services for Property	\$9,877	40%	\$3,951	\$13,828		
3 (c) Project Management Services	\$14,110	40%	\$5,644	\$19,754		
3 (d) Client Representation	\$1,411	40%	\$564	\$1,975		
Sub total	\$166,498	40%	\$66,599	\$233,097	4.3%	
4. Public Utility Adjustments						
4 (a) Adjustment to Utilities	\$0	45%	\$0	\$0		Included in Construction Costs
4 (c) Project Management Services	\$0	45%	\$0	\$0		
4 (d) Client Representation	\$0	45%	\$0	\$0		
Sub total	\$0		\$0	\$0	0.0%	
5. Construction						
5 (a) - 5 (c) Infrastructure	\$2,793,784	47%	\$1,312,136	\$4,105,920		
5 (d) Project Management Services	\$279,378	47%	\$131,214	\$410,592		
5 (e) Client Representation	\$27,938	47%	\$13,121	\$41,059		
5 (f) Insurance	\$15,366	47%	\$7,217	\$22,583		
Sub total	\$3,116,466	47%	\$1,463,687	\$4,580,154	85.3%	
6. Handover						
6 (a) Handover and Finalisation	\$0	30%	\$0	\$0		
6 (b) Project data and performance	\$27,938	30%	\$8,381	\$36,319		
6 (c) Project Management Services	\$2,794	30%	\$838	\$3,632		
6 (d) Client Representation	\$279	30%	\$84	\$363		
Sub total	\$31,011	30%	\$9,303	\$40,314	0.8%	
TOTAL	\$3,711,107	45%	\$1,658,729	\$5,369,837	100%	35% -70% required by RTA

Project Management

\$329,808

\$477,561

8.9%

Client Representation

\$32,981

\$47,756

0.9%

Document No:

Issue 1.9

Page 1 of 1

No allowance for GST, Escalation, Carbon Tax

Rev C -New Layout

Rev D - Split Between Panthers and RMS

PROJECT: Penrith Panthers Ongoing Additional Services						
New Signalised Intersection on Jamison Rd at Harris St and Southern Riverlink Access						
Client: ING Panthers Group						
Project Summary				Prepared by: M. Raven		
Project No:		DATE: February 2012		Estimate Stage: Strategic Rev.G		
Item	Estimate (excluding contingency)	Contingency		Estimate (including contingency)	% of Total Estimate	Comments/Assumptions
		%	Amount			
1. Project Development						
1 (a) Route/Concept/EIS/REF	\$108,353	30%	\$32,506	\$140,859		
1 (b) Project Management Services	\$10,835	30%	\$3,251	\$14,086		
1 (c) Client Representation	\$1,084	30%	\$325	\$1,409		
1 (d) Community Liaison	\$25,000	30%	\$7,500	\$32,500		
Sub total	\$145,272	30%	\$43,581	\$188,853	3.8%	
2. Investigation and Design						
2 (a) Investigation and Design	\$216,705	30%	\$65,012	\$281,717		
2 (b) Project Management Services	\$21,671	30%	\$6,501	\$28,172		
2 (c) Client Representation	\$2,167	30%	\$650	\$2,817		
Sub total	\$240,543	30%	\$72,163	\$312,706	6.2%	
3. Property Acquisitions						
3 (a) Acquire Property	\$0	40%	\$0	\$0		To be confirmed by RTA/ING
3 (b) Professional Services for Property	\$0	40%	\$0	\$0		
3 (c) Project Management Services	\$0	40%	\$0	\$0		
3 (d) Client Representation	\$0	40%	\$0	\$0		
Sub total	\$0	#DIV/0!	\$0	\$0	0.0%	
4. Public Utility Adjustments						
4 (a) Adjustment to Utilities	\$0	45%	\$0	\$0		Included in Construction Costs
4 (c) Project Management Services	\$0	45%	\$0	\$0		
4 (d) Client Representation	\$0	45%	\$0	\$0		
Sub total	\$0		\$0	\$0	0.0%	
5. Construction						
5 (a) - 5 (c) Infrastructure	\$2,708,819	49%	\$1,316,780	\$4,025,599		
5 (d) Project Management Services	\$270,882	49%	\$131,678	\$402,560		
5 (e) Client Representation	\$27,088	49%	\$13,168	\$40,256		
5 (f) Insurance	\$14,899	49%	\$7,242	\$22,141		
Sub total	\$3,021,687	49%	\$1,468,868	\$4,490,555	89.3%	
6. Handover						
6 (a) Handover and Finalisation	\$0	30%	\$0	\$0		
6 (b) Project data and performance	\$27,088	30%	\$8,126	\$35,215		
6 (c) Project Management Services	\$2,709	30%	\$813	\$3,521		
6 (d) Client Representation	\$271	30%	\$81	\$352		
Sub total	\$30,068	30%	\$9,020	\$39,088	0.8%	
TOTAL	\$3,437,570	46%	\$1,593,633	\$5,031,203	100%	35% -70% required by RMS
Project Management	\$306,096			\$448,339	8.9%	
Client Representation	\$30,610			\$44,834	0.9%	
Document No:		Issue 1.9		Page 1 of 1		

No allowance for GST,Escalation,Carbon Tax
Rev B - Existing Culvert drawing
Rev C - Revised Drawing Layout
Rev D - Revised Traffic Control
Rev E - Revised Layout
Rev F - Split Between Panthers and RMS

PROJECT: Penrith Panthers Ongoing Additional Services						
New Signalised Intersection on Jamison Rd at Harris St and Southern Riverlink Access						
Client: ING Panthers Group						
Project Summary - PANTHERS COST				Prepared by: M. Raven		
Project No:		DATE: December 2012		Estimate Stage: Strategic Rev.F		
Item	Estimate (excluding contingency)	Contingency		Estimate (including contingency)	% of Total Estimate	Comments/Assumptions
		%	Amount			
1. Project Development						
1 (a) Route/Concept/EIS/REF	\$15,717	30%	\$4,715	\$20,433		
1 (b) Project Management Services	\$1,572	30%	\$472	\$2,043		
1 (c) Client Representation	\$157	30%	\$47	\$204		
1 (d) Community Liaison	\$10,000	30%	\$3,000	\$13,000		
Sub total	\$27,446	30%	\$8,234	\$35,680	4.8%	
2. Investigation and Design						
2 (a) Investigation and Design	\$31,435	30%	\$9,430	\$40,865		
2 (b) Project Management Services	\$3,143	30%	\$943	\$4,087		
2 (c) Client Representation	\$314	30%	\$94	\$409		
Sub total	\$34,892	30%	\$10,468	\$45,360	6.1%	
3. Property Acquisitions						
3 (a) Acquire Property	\$0	40%	\$0	\$0		To be confirmed by RTA/ING
3 (b) Professional Services for Property	\$0	40%	\$0	\$0		
3 (c) Project Management Services	\$0	40%	\$0	\$0		
3 (d) Client Representation	\$0	40%	\$0	\$0		
Sub total	\$0	#DIV/0!	\$0	\$0	0.0%	
4. Public Utility Adjustments						
4 (a) Adjustment to Utilities	\$0	45%	\$0	\$0		Included in Construction Costs
4 (c) Project Management Services	\$0	45%	\$0	\$0		
4 (d) Client Representation	\$0	45%	\$0	\$0		
Sub total	\$0		\$0	\$0	0.0%	
5. Construction						
5 (a) - 5 (c) Infrastructure	\$392,933	49%	\$191,008	\$583,941		
5 (d) Project Management Services	\$39,293	49%	\$19,101	\$58,394		
5 (e) Client Representation	\$3,929	49%	\$1,910	\$5,839		
5 (f) Insurance	\$2,161	49%	\$1,051	\$3,212		
Sub total	\$438,317	49%	\$213,070	\$651,386	88.3%	
6. Handover						
6 (a) Handover and Finalisation	\$0	30%	\$0	\$0		
6 (b) Project data and performance	\$3,929	30%	\$1,179	\$5,108		
6 (c) Project Management Services	\$393	30%	\$118	\$511		
6 (d) Client Representation	\$39	30%	\$12	\$51		
Sub total	\$4,362	30%	\$1,308	\$5,670	0.8%	
TOTAL	\$505,017	46%	\$233,080	\$738,097	100%	35% -70% required by RMS
Project Management	\$44,401			\$65,035	8.8%	
Client Representation	\$4,440			\$6,503	0.9%	
Document No:		Issue 1.9		Page 1 of 1		

No allowance for GST,Escalation,Carbon Tax
Rev B - Existing Culvert drawing
Rev C - Revised Drawing Layout
Rev D - Revised Traffic Control
Rev E - Revised Layout
Rev F - Split Between Panthers and RMS

PROJECT: Penrith Panthers Ongoing Additional Services						
New Signalised Intersection on Jamison Rd at Harris St and Southern Riverlink Access						
Client: ING Panthers Group						
Project Summary - OTHER				Prepared by: M. Raven		
Project No:		DATE: December 2012		Estimate Stage: Strategic Rev.F		
Item	Estimate (excluding contingency)	Contingency		Estimate (including contingency)	% of Total Estimate	Comments/Assumptions
		%	Amount			
1. Project Development						
1 (a) Route/Concept/EIS/REF	\$92,635	30%	\$27,791	\$120,426		
1 (b) Project Management Services	\$9,264	30%	\$2,779	\$12,043		
1 (c) Client Representation	\$926	30%	\$278	\$1,204		
1 (d) Community Liaison	\$15,000	30%	\$4,500	\$19,500		
Sub total	\$117,825	30%	\$35,348	\$153,173	3.6%	
2. Investigation and Design						
2 (a) Investigation and Design	\$185,271	30%	\$55,581	\$240,852		
2 (b) Project Management Services	\$18,527	30%	\$5,558	\$24,085		
2 (c) Client Representation	\$1,853	30%	\$556	\$2,409		
Sub total	\$205,651	30%	\$61,695	\$267,346	6.2%	
3. Property Acquisitions						
3 (a) Acquire Property	\$0	40%	\$0	\$0		To be confirmed by RTA/ING
3 (b) Professional Services for Property	\$0	40%	\$0	\$0		
3 (c) Project Management Services	\$0	40%	\$0	\$0		
3 (d) Client Representation	\$0	40%	\$0	\$0		
Sub total	\$0	#DIV/0!	\$0	\$0	0.0%	
4. Public Utility Adjustments						
4 (a) Adjustment to Utilities	\$0	45%	\$0	\$0		Included in Construction Costs
4 (c) Project Management Services	\$0	45%	\$0	\$0		
4 (d) Client Representation	\$0	45%	\$0	\$0		
Sub total	\$0		\$0	\$0	0.0%	
5. Construction						
5 (a) - 5 (c) Infrastructure	\$2,315,885	49%	\$1,125,772	\$3,441,657		
5 (d) Project Management Services	\$231,589	49%	\$112,577	\$344,166		
5 (e) Client Representation	\$23,159	49%	\$11,258	\$34,417		
5 (f) Insurance	\$12,737	49%	\$6,192	\$18,929		
Sub total	\$2,583,370	49%	\$1,255,799	\$3,839,169	89.4%	
6. Handover						
6 (a) Handover and Finalisation	\$0	30%	\$0	\$0		
6 (b) Project data and performance	\$23,159	30%	\$6,948	\$30,107		
6 (c) Project Management Services	\$2,316	30%	\$695	\$3,011		
6 (d) Client Representation	\$232	30%	\$69	\$301		
Sub total	\$25,706	30%	\$7,712	\$33,418	0.8%	
TOTAL	\$2,932,553	46%	\$1,360,553	\$4,293,106	100%	35% -70% required by RMS
Project Management	\$261,695			\$383,304	8.9%	
Client Representation	\$26,170			\$38,330	0.9%	
Document No:		Issue 1.9		Page 1 of 1		

No allowance for GST,Escalation,Carbon Tax
Rev B - Existing Culvert drawing
Rev C - Revised Drawing Layout
Rev D - Revised Traffic Control
Rev E - Revised Layout
Rev F - Split Between Panthers and RMS

\$0

PROJECT: Penrith Panthers Ongoing Additional Services

Adjusted Signalised Intersection on Mulgoa Rd, Great Western Highway and High St

Client: ING Panthers Group

Project SummaryPrepared by: *M. Raven*

Project No:		DATE: December 2012		Estimate Stage: Strategic Rev.B		
Item	Estimate (excluding contingency)	Contingency		Estimate (including contingency)	% of Total Estimate	Comments/Assumptions
		%	Amount			
1. Project Development						
1 (a) Route/Concept/EIS/REF	\$163,952	30%	\$49,186	\$213,137		
1 (b) Project Management Services	\$16,395	30%	\$4,919	\$21,314		
1 (c) Client Representation	\$1,640	30%	\$492	\$2,131		
1 (d) Community Liaison	\$25,000	30%	\$7,500	\$32,500		
Sub total	\$206,986	30%	\$62,096	\$269,082	3.4%	
2. Investigation and Design						
2 (a) Investigation and Design	\$327,904	30%	\$98,371	\$426,275		
2 (b) Project Management Services	\$32,790	30%	\$9,837	\$42,627		
2 (c) Client Representation	\$3,279	30%	\$984	\$4,263		
Sub total	\$363,973	30%	\$109,192	\$473,165	6.0%	
3. Property Acquisitions						
3 (a) Acquire Property	\$191,800	40%	\$76,720	\$268,520		To be confirmed by RTA/ING
3 (b) Professional Services for Property	\$13,426	40%	\$5,370	\$18,796		
3 (c) Project Management Services	\$19,180	40%	\$7,672	\$26,852		
3 (d) Client Representation	\$1,918	40%	\$767	\$2,685		
Sub total	\$226,324	40%	\$90,530	\$316,854	4.0%	
4. Public Utility Adjustments						
4 (a) Adjustment to Utilities	\$0	45%	\$0	\$0		Included in Construction Costs
4 (c) Project Management Services	\$0	45%	\$0	\$0		
4 (d) Client Representation	\$0	45%	\$0	\$0		
Sub total	\$0		\$0	\$0	0.0%	
5. Construction						
5 (a) - 5 (c) Infrastructure	\$4,098,794	48%	\$1,982,813	\$6,081,608		
5 (d) Project Management Services	\$409,879	48%	\$198,281	\$608,161		
5 (e) Client Representation	\$40,988	48%	\$19,828	\$60,816		
5 (f) Insurance	\$22,543	48%	\$10,905	\$33,449		
Sub total	\$4,572,205	48%	\$2,211,828	\$6,784,033	85.8%	
6. Handover						
6 (a) Handover and Finalisation	\$0	30%	\$0	\$0		
6 (b) Project data and performance	\$40,988	30%	\$12,296	\$53,284		
6 (c) Project Management Services	\$4,099	30%	\$1,230	\$5,328		
6 (d) Client Representation	\$410	30%	\$123	\$533		
Sub total	\$45,497	30%	\$13,649	\$59,146	0.7%	
TOTAL	\$5,414,985	46%	\$2,487,295	\$7,902,280	100%	35% -70% required by RTA

Project Management

\$482,344

\$704,282

8.9%

Client Representation

\$48,234

\$70,428

0.9%

Document No:

Issue 1.9

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No allowance for GST, Escalation, Carbon Tax

PROJECT: Penrith Panthers Ongoing Additional Services

Mulgoa Rd Widening Between High St and Ransley St

Client: ING Panthers Group

Project SummaryPrepared by: *M. Raven*

Project No:		DATE: December 2012		Estimate Stage: Strategic Rev.A		
Item	Estimate (excluding contingency)	Contingency		Estimate (including contingency)	% of Total Estimate	Comments/Assumptions
		%	Amount			
1. Project Development						
1 (a) Route/Concept/EIS/REF	\$74,236	30%	\$22,271	\$96,506		
1 (b) Project Management Services	\$7,424	30%	\$2,227	\$9,651		
1 (c) Client Representation	\$742	30%	\$223	\$965		
1 (d) Community Liaison	\$25,000	30%	\$7,500	\$32,500		
Sub total	\$107,402	30%	\$32,220	\$139,622	4.1%	
2. Investigation and Design						
2 (a) Investigation and Design	\$148,471	30%	\$44,541	\$193,013		
2 (b) Project Management Services	\$14,847	30%	\$4,454	\$19,301		
2 (c) Client Representation	\$1,485	30%	\$445	\$1,930		
Sub total	\$164,803	30%	\$49,441	\$214,244	6.3%	
3. Property Acquisitions						
3 (a) Acquire Property	\$0	40%	\$0	\$0		To be confirmed by RTA/ING
3 (b) Professional Services for Property	\$0	40%	\$0	\$0		
3 (c) Project Management Services	\$0	40%	\$0	\$0		
3 (d) Client Representation	\$0	40%	\$0	\$0		
Sub total	\$0		\$0	\$0	0.0%	
4. Public Utility Adjustments						
4 (a) Adjustment to Utilities	\$0	45%	\$0	\$0		Included in Construction Costs
4 (c) Project Management Services	\$0	45%	\$0	\$0		
4 (d) Client Representation	\$0	45%	\$0	\$0		
Sub total	\$0		\$0	\$0	0.0%	
5. Construction						
5 (a) - 5 (c) Infrastructure	\$1,855,892	46%	\$846,432	\$2,702,324		
5 (d) Project Management Services	\$185,589	46%	\$84,643	\$270,232		
5 (e) Client Representation	\$18,559	46%	\$8,464	\$27,023		
5 (f) Insurance	\$10,207	46%	\$4,655	\$14,863		
Sub total	\$2,070,248	46%	\$944,194	\$3,014,442	88.8%	
6. Handover						
6 (a) Handover and Finalisation	\$0	30%	\$0	\$0		
6 (b) Project data and performance	\$18,559	30%	\$5,568	\$24,127		
6 (c) Project Management Services	\$1,856	30%	\$557	\$2,413		
6 (d) Client Representation	\$186	30%	\$56	\$241		
Sub total	\$20,600	30%	\$6,180	\$26,781	0.8%	
TOTAL	\$2,363,053	44%	\$1,032,036	\$3,395,089	100%	35% -70% required by RTA

Project Management	\$209,716	\$301,597	8.9%
Client Representation	\$20,972	\$30,160	0.9%

No allowance for GST, Escalation, Carbon Tax

PROJECT: Penrith Panthers Ongoing Additional Services						
Adjusted Signalised Intersection at Panther Place and Mulgoa Rd						
Client: ING Panthers Group						
Project Summary				Prepared by: M. Raven		
Project No:		DATE: February 2012		Estimate Stage: Strategic Rev.D		
Item	Estimate (excluding contingency)	Contingency		Estimate (including contingency)	% of Total Estimate	Comments/Assumptions
		%	Amount			
1. Project Development						
1 (a) Route/Concept/EIS/REF	\$75,695	30%	\$22,709	\$98,404		
1 (b) Project Management Services	\$7,570	30%	\$2,271	\$9,840		
1 (c) Client Representation	\$757	30%	\$227	\$984		
1 (d) Community Liaison	\$25,000	30%	\$7,500	\$32,500		
Sub total	\$109,022	30%	\$32,707	\$141,728	3.5%	
2. Investigation and Design						
2 (a) Investigation and Design	\$151,391	30%	\$45,417	\$196,808		
2 (b) Project Management Services	\$15,139	30%	\$4,542	\$19,681		
2 (c) Client Representation	\$1,514	30%	\$454	\$1,968		
Sub total	\$168,044	30%	\$50,413	\$218,457	5.4%	
3. Property Acquisitions						To be confirmed by RTA/ING
3 (a) Acquire Property	\$326,400	40%	\$130,560	\$456,960		
3 (b) Professional Services for Property	\$22,848	40%	\$9,139	\$31,987		
3 (c) Project Management Services	\$32,640	40%	\$13,056	\$45,696		
3 (d) Client Representation	\$3,264	40%	\$1,306	\$4,570		
Sub total	\$385,152	40%	\$154,061	\$539,213	13.4%	
4. Public Utility Adjustments						Included in Construction Costs
4 (a) Adjustment to Utilities	\$0	45%	\$0	\$0		
4 (c) Project Management Services	\$0	45%	\$0	\$0		
4 (d) Client Representation	\$0	45%	\$0	\$0		
Sub total	\$0		\$0	\$0	0.0%	
5. Construction						
5 (a) - 5 (c) Infrastructure	\$1,892,384	47%	\$891,455	\$2,783,839		
5 (d) Project Management Services	\$189,238	47%	\$89,146	\$278,384		
5 (e) Client Representation	\$18,924	47%	\$8,915	\$27,838		
5 (f) Insurance	\$10,408	47%	\$4,903	\$15,311		
Sub total	\$2,110,954	47%	\$994,419	\$3,105,372	77.0%	
6. Handover						
6 (a) Handover and Finalisation	\$0	30%	\$0	\$0		
6 (b) Project data and performance	\$18,924	30%	\$5,677	\$24,601		
6 (c) Project Management Services	\$1,892	30%	\$568	\$2,460		
6 (d) Client Representation	\$189	30%	\$57	\$246		
Sub total	\$21,005	30%	\$6,302	\$27,307	0.7%	
TOTAL	\$2,794,177	44%	\$1,237,901	\$4,032,077	100%	35% -70% required by RTA
Project Management	\$246,479			\$356,061	8.8%	
Client Representation	\$24,648			\$35,606	0.9%	
Document No: Issue 1.9 Page 1 of 1						
No allowance for GST,Escalation,Carbon Tax ING to confirm acquisition costs						
Rev B Revised Layout Rev C Split Between Panthers and RMS						

PROJECT: Penrith Panthers Ongoing Additional Services						
Adjusted Signalised Intersection at Panther Place and Mulgoa Rd						
Client: ING Panthers Group						
Project Summary - PANTHERS COST				Prepared by: M. Raven		
Project No:		DATE: December 2012		Estimate Stage: Strategic Rev.C		
Item	Estimate (excluding contingency)	Contingency		Estimate (including contingency)	% of Total Estimate	Comments/Assumptions
		%	Amount			
1. Project Development						
1 (a) Route/Concept/EIS/REF	\$27,442	30%	\$8,233	\$35,675		
1 (b) Project Management Services	\$2,744	30%	\$823	\$3,567		
1 (c) Client Representation	\$274	30%	\$82	\$357		
1 (d) Community Liaison	\$5,000	30%	\$1,500	\$6,500		
Sub total	\$35,461	30%	\$10,638	\$46,099	2.6%	
2. Investigation and Design						
2 (a) Investigation and Design	\$54,884	30%	\$16,465	\$71,349		
2 (b) Project Management Services	\$5,488	30%	\$1,647	\$7,135		
2 (c) Client Representation	\$549	30%	\$165	\$713		
Sub total	\$60,921	30%	\$18,276	\$79,198	4.4%	
3. Property Acquisitions						To be confirmed by RTA/ING
3 (a) Acquire Property	\$326,400	40%	\$130,560	\$456,960		
3 (b) Professional Services for Property	\$22,848	40%	\$9,139	\$31,987		
3 (c) Project Management Services	\$32,640	40%	\$13,056	\$45,696		
3 (d) Client Representation	\$3,264	40%	\$1,306	\$4,570		
Sub total	\$385,152	40%	\$154,061	\$539,213	30.0%	
4. Public Utility Adjustments						Included in Construction Costs
4 (a) Adjustment to Utilities	\$0	45%	\$0	\$0		
4 (c) Project Management Services	\$0	45%	\$0	\$0		
4 (d) Client Representation	\$0	45%	\$0	\$0		
Sub total	\$0		\$0	\$0	0.0%	
5. Construction						
5 (a) - 5 (c) Infrastructure	\$686,051	47%	\$323,182	\$1,009,233		
5 (d) Project Management Services	\$68,605	47%	\$32,318	\$100,923		
5 (e) Client Representation	\$6,861	47%	\$3,232	\$10,092		
5 (f) Insurance	\$3,773	47%	\$1,777	\$5,551		
Sub total	\$765,290	47%	\$360,509	\$1,125,799	62.5%	
6. Handover						
6 (a) Handover and Finalisation	\$0	30%	\$0	\$0		
6 (b) Project data and performance	\$6,861	30%	\$2,058	\$8,919		
6 (c) Project Management Services	\$686	30%	\$206	\$892		
6 (d) Client Representation	\$69	30%	\$21	\$89		
Sub total	\$7,615	30%	\$2,285	\$9,900	0.5%	
TOTAL	\$1,254,439	44%	\$545,769	\$1,800,208	100%	35% -70% required by RTA
Project Management	\$110,164			\$158,214	8.8%	
Client Representation	\$11,016			\$15,821	0.9%	
Document No: Issue 1.9 Page 1 of 1						
No allowance for GST,Escalation,Carbon Tax ING to confirm acquisition costs						
Rev B Revised Layout Rev C Split Between Panthers and RMS						

PROJECT: Penrith Panthers Ongoing Additional Services						
Adjusted Signalised Intersection at Panther Place and Mulgoa Rd						
Client: ING Panthers Group						
Project Summary - OTHER				Prepared by: M. Raven		
Project No:		DATE: December 2012		Estimate Stage: Strategic Rev.C		
Item	Estimate (excluding contingency)	Contingency		Estimate (including contingency)	% of Total Estimate	Comments/Assumptions
		%	Amount			
1. Project Development						
1 (a) Route/Concept/EIS/REF	\$48,253	30%	\$14,476	\$62,729		
1 (b) Project Management Services	\$4,825	30%	\$1,448	\$6,273		
1 (c) Client Representation	\$483	30%	\$145	\$627		
1 (d) Community Liaison	\$20,000	30%	\$6,000	\$26,000		
Sub total	\$73,561	30%	\$22,068	\$95,630	4.3%	
2. Investigation and Design						
2 (a) Investigation and Design	\$96,507	30%	\$28,952	\$125,459		
2 (b) Project Management Services	\$9,651	30%	\$2,895	\$12,546		
2 (c) Client Representation	\$965	30%	\$290	\$1,255		
Sub total	\$107,122	30%	\$32,137	\$139,259	6.2%	
3. Property Acquisitions						To be confirmed by RTA/ING
3 (a) Acquire Property	\$0	40%	\$0	\$0		
3 (b) Professional Services for Property	\$0	40%	\$0	\$0		
3 (c) Project Management Services	\$0	40%	\$0	\$0		
3 (d) Client Representation	\$0	40%	\$0	\$0		
Sub total	\$0	#DIV/0!	\$0	\$0	0.0%	
4. Public Utility Adjustments						Included in Construction Costs
4 (a) Adjustment to Utilities	\$0	45%	\$0	\$0		
4 (c) Project Management Services	\$0	45%	\$0	\$0		
4 (d) Client Representation	\$0	45%	\$0	\$0		
Sub total	\$0		\$0	\$0	0.0%	
5. Construction						
5 (a) - 5 (c) Infrastructure	\$1,206,332	47%	\$568,274	\$1,774,606		
5 (d) Project Management Services	\$120,633	47%	\$56,827	\$177,461		
5 (e) Client Representation	\$12,063	47%	\$5,683	\$17,746		
5 (f) Insurance	\$6,635	47%	\$3,126	\$9,760		
Sub total	\$1,345,664	47%	\$633,909	\$1,979,573	88.7%	
6. Handover						
6 (a) Handover and Finalisation	\$0	30%	\$0	\$0		
6 (b) Project data and performance	\$12,063	30%	\$3,619	\$15,682		
6 (c) Project Management Services	\$1,206	30%	\$362	\$1,568		
6 (d) Client Representation	\$121	30%	\$36	\$157		
Sub total	\$13,390	30%	\$4,017	\$17,407	0.8%	
TOTAL	\$1,539,738	45%	\$692,131	\$2,231,869	100%	35% -70% required by RTA
Project Management	\$136,316			\$197,848	8.9%	
Client Representation	\$13,632			\$19,785	0.9%	
Document No: Issue 1.9 Page 1 of 1						
No allowance for GST,Escalation,Carbon Tax ING to confirm acquisition costs						
Rev B Revised Layout Rev C Split Between Panthers and RMS						

PROJECT: Penrith Panthers Ongoing Additional Services

Adjusted Signalised Intersection at Ransley St and Mulgoa Rd

Client: ING Panthers Group

Project SummaryPrepared by: *M. Raven*

Project No:		DATE: December 2012		Estimate Stage: Strategic Rev.B		
Item	Estimate (excluding contingency)	Contingency		Estimate (including contingency)	% of Total Estimate	Comments/Assumptions
		%	Amount			
1. Project Development						
1 (a) Route/Concept/EIS/REF	\$73,836	30%	\$22,151	\$95,987		
1 (b) Project Management Services	\$7,384	30%	\$2,215	\$9,599		
1 (c) Client Representation	\$738	30%	\$222	\$960		
1 (d) Community Liaison	\$25,000	30%	\$7,500	\$32,500		
Sub total	\$106,958	30%	\$32,087	\$139,045	4.2%	
2. Investigation and Design						
2 (a) Investigation and Design	\$147,672	30%	\$44,302	\$191,974		
2 (b) Project Management Services	\$14,767	30%	\$4,430	\$19,197		
2 (c) Client Representation	\$1,477	30%	\$443	\$1,920		
Sub total	\$163,916	30%	\$49,175	\$213,091	6.4%	
3. Property Acquisitions						
3 (a) Acquire Property	\$0	40%	\$0	\$0		To be confirmed by RTA/ING
3 (b) Professional Services for Property	\$0	40%	\$0	\$0		
3 (c) Project Management Services	\$0	40%	\$0	\$0		
3 (d) Client Representation	\$0	40%	\$0	\$0		
Sub total	\$0	#DIV/0!	\$0	\$0	0.0%	
4. Public Utility Adjustments						
4 (a) Adjustment to Utilities	\$0	45%	\$0	\$0		Included in Construction Costs
4 (c) Project Management Services	\$0	45%	\$0	\$0		
4 (d) Client Representation	\$0	45%	\$0	\$0		
Sub total	\$0		\$0	\$0	0.0%	
5. Construction						
5 (a) - 5 (c) Infrastructure	\$1,845,901	44%	\$816,564	\$2,662,465		
5 (d) Project Management Services	\$184,590	44%	\$81,656	\$266,247		
5 (e) Client Representation	\$18,459	44%	\$8,166	\$26,625		
5 (f) Insurance	\$10,152	44%	\$4,491	\$14,644		
Sub total	\$2,059,103	44%	\$910,877	\$2,969,980	88.7%	
6. Handover						
6 (a) Handover and Finalisation	\$0	30%	\$0	\$0		
6 (b) Project data and performance	\$18,459	30%	\$5,538	\$23,997		
6 (c) Project Management Services	\$1,846	30%	\$554	\$2,400		
6 (d) Client Representation	\$185	30%	\$55	\$240		
Sub total	\$20,490	30%	\$6,147	\$26,636	0.8%	
TOTAL	\$2,350,466	42%	\$998,286	\$3,348,752	100%	35% -70% required by RTA

Project Management \$208,587

\$297,442 8.9%

Client Representation \$20,859

\$29,744 0.9%

Document No:

Issue 1.9

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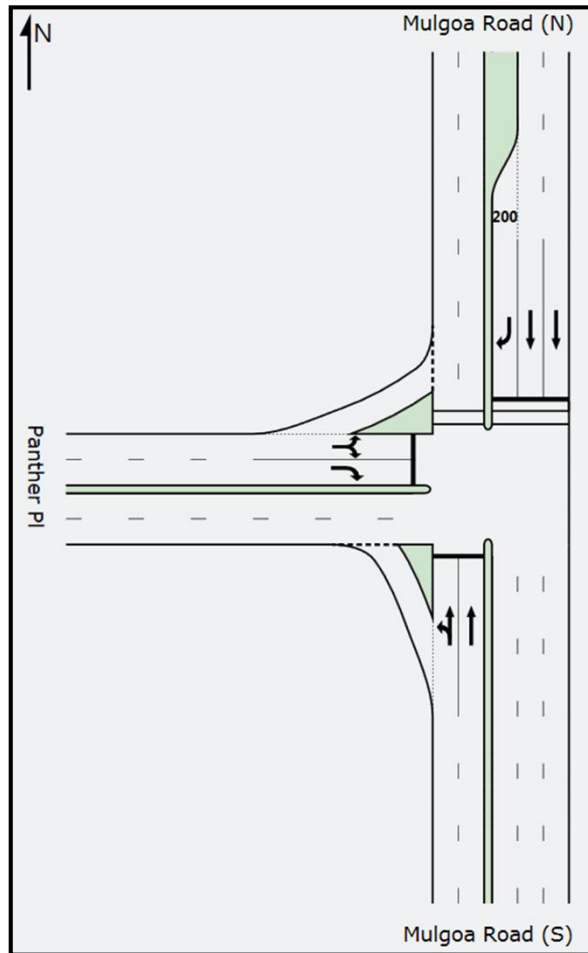
No allowance for GST, Escalation, Carbon Tax

Appendix G – Summary of Individual Works Elements

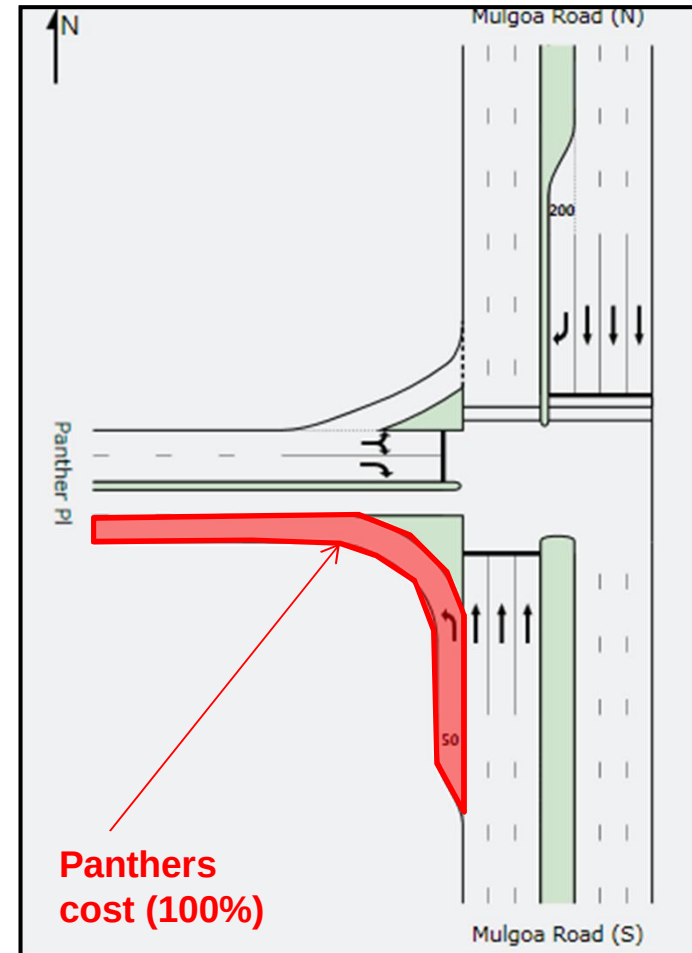
Panther PI/Mulgoa Rd

Proposed Layout (2031) – PM Peak

Current Layout



Proposed Layout



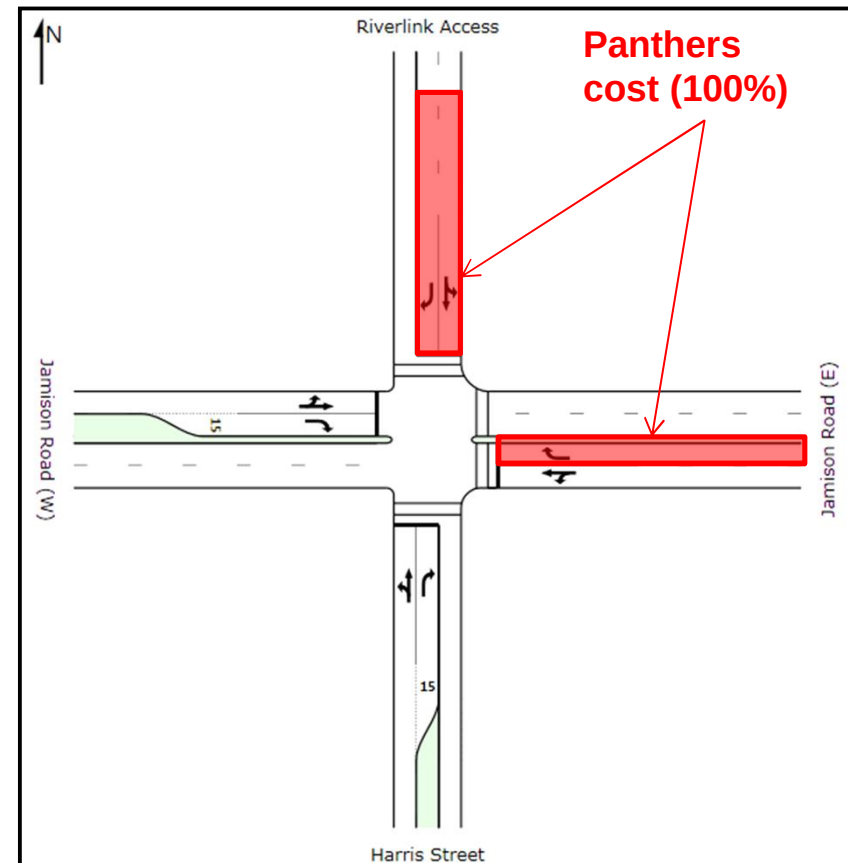
Jamison Rd/Harris St/Southern Riverlink Access

Revised Layout (2031) – PM Peak

Current Layout



Preferred Layout



COMMERCIAL IN CONFIDENCE

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Document Status

Rev No.	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
1	I. Smith	S. Konstas		S. Konstas		13/01/2012
2	I. Smith	S. Konstas		S. Konstas		17/01/2012
3	I. Smith	S. Konstas		S. Konstas		9/02/2012

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Penrith Rugby League Club Limited

Penrith City Council

Roads and Maritime Services

Planning Agreement Road Works

Section 93F of the Environmental Planning
and Assessment Act, 1979 (NSW)

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Agreement made at **PENRITH** on **28 NOVEMBER 2012**

Parties

Penrith City Council ABN 43 794 422 563 of 601 High Street, Penrith, New South Wales (**Planning Authority**)

Roads and Maritime Services ABN 76 236 371 088 a NSW Government Agency and corporation incorporated under section 46 of the *Transport Administration Act 1988* (NSW) of Level 9, 101 Miller Street, North Sydney, New South Wales, 2060 (**RMS**)

Penrith Rugby League Club Limited ABN 57 000 578 398 of Mulgoa Road, Penrith, New South Wales (**Developer**)

Background

- A On 10 December 2009 the Developer submitted the Planning Proposal to the Planning Authority for the Amending LEP and to facilitate the Development on the Land.
 - B The Planning Proposal was lodged by the Planning Authority with DP&I on 2 June 2010 and received Gateway determination on 13 August 2010.
 - C In connection with the Planning Proposal, the Developer submitted an offer dated 26 March 2012 to enter into this Agreement to make the Development Contributions towards the Public Facilities if the Amending LEP is made.
-

Operative provisions

1 Planning Agreement under the Act

The Parties agree that this Agreement is a planning agreement governed by Subdivision 2 of Division 6 of Part 4 of the Act.

2 Application of this Agreement

This Agreement applies to the:

- (a) Land; and
- (b) Development.

3 Operation of this Agreement

This Agreement operates on and from the date that:

- (a) the Amending LEP is published on the NSW Legislation website; and
- (b) the Agreement is entered into as required by Clause 25C(1) of the Regulation.

4 Definitions and interpretation

4.1 Definitions

In this Agreement the following definitions apply:

Act means the *Environmental Planning and Assessment Act 1979* (NSW).

Agreement means this planning agreement including any schedules that come into operation upon satisfaction of the requirements set out in **clause 3**.

Alternative Trigger Event means the date on which the event described in **column 4 of schedule 3** occurs for the Road Works identified in **columns 1 and 2 of schedule 3**.

Amending LEP means the Local Environmental Plan proposed under the Planning Proposal to amend the *Penrith Local Environmental Plan 2010*.

Authority means, in respect of a particular context or circumstance, each Federal, State or Local Government, semi-Government, quasi-Government or other body or authority, statutory or otherwise, including but not limited to any court or tribunal, having jurisdiction and responsibility in respect of that context or circumstance.

Business Day means a day which is not a Saturday, Sunday or bank or public holiday in Sydney.

Campus Style Office Development means the campus style office development forming part of the Development as defined in the Amending LEP.

Commencement Date means the date upon which the Agreement is taken to operate under **clause 3**.

Completion means that date upon which the relevant Roads Authority notifies the Developer (and if necessary the Planning Authority and RMS) in writing that the Road Works or parts of the Road Works have been completed in accordance with:

- (a) the relevant conditions of consent for the Road Works; and
- (b) if applicable, any relevant Works Authorisation Deed.

Construction Certificate has meaning given to it in the Act.

Dealing means subdividing, mortgaging, charging, encumbering or otherwise dealing with the Land.

Defects Liability Period means the period of 12 months which commences on the date of Completion of the Road Works or parts of the Road Works.

Development means the 'Panthers Penrith Precinct' development as described in the Planning Proposal being a mixed use development inclusive of 25,000m² NUFA of Outlet Centre, 12,500m² GFA of retail, 25,000m² GFA of campus style offices and entertainment facilities, hotel accommodation, seniors living, residential, recreation facilities and exhibition space, which is to be carried out in stages generally in the form described in **schedule 5**.

Development Contribution means:

- (a) the carrying out and delivery of the Road Works; and
- (b) the dedication of the Road Works Land.

Development Stage means each stage of the Development that is approved under a Planning Approval and that is generally in accordance with those stages identified in **schedule 5**.

DP&I means the NSW Department of Planning and Infrastructure or any other Authority replacing it.

Explanatory Note means the Explanatory Note attached at **schedule 4**.

Force Majeure Event means any of the following:

- (a) the declaration by a Court that the Amending LEP is invalid and where a modified LEP is not remade in similar form within 12 calendar months of the date of the declaration; or
- (b) any of the following:
 - (i) act of God;
 - (ii) law, rule, regulation, order or policy of any government or governmental authority;
 - (iii) act of war declared or undeclared;
 - (iv) accident, fire, explosion, epidemic
 - (v) public disorder;
 - (vi) riot, civil disturbance, insurrection, rebellion, sabotage or act of terrorists;
 - (vii) flood, earthquake, hail, lightning, severe weather conditions or other natural calamity;
 - (viii) strike, boycott, lockout or other labour disturbance,which:
 - (ix) prevents the Developer from carrying out or completing the Road Works or the Development;
 - (x) is beyond the control of the Developer; and

- (xi) was not directly or indirectly caused or contributed to by the Developer.

GFA has the meaning given to it in the *Standard Instrument (Local Environmental Plans) Order 2006*.

GST Law has the meaning given to that term in *A New Tax System (Goods and Services Tax) Act 1999* (Cth) and any other Act or regulation relating to the imposition or administration of the GST.

Interim Occupation Certificate has the meaning given to it in section 109H of the Act.

Land means the land described in **schedule 2**.

Land Owners mean Mulgoa Road (No. 1) Pty. Limited and Panthers Property Management Pty Ltd.

Local Environmental Plan has the meaning given to it in the Act.

LPI means the Land and Property Information of New South Wales or any other Authority replacing it.

Milestone Event means the earlier of:

- (a) the date on which an Occupation Certificate or Interim Occupation Certificate is granted for any part of the Development identified in the applicable Trigger Event in **column 3 of schedule 3** for the relevant component of the Road Works identified in **columns 1 and 2 of schedule 3**; or
- (b) the date on which an Occupation Certificate or Interim Occupation Certificate is granted for any part of the Development identified in the Alternative Trigger Event in **column 4 of schedule 3** for the relevant component of the Road Works identified in **column 1 and 2 of schedule 3**.

Multi Use Arena and Exhibition Centre means the multi-use arena and exhibition centre forming part of the Development that is capable of accommodating major events, sports, school programs, conferences, tradeshows and exhibitions.

Novation Deed means a deed substantially in the same form as that attached at **annexure A**.

NUFA (net useable floor area) has the meaning given to the expression, "net useable floor area" in the Amending LEP.

Occupation Certificate has the meaning given to it in the Act.

Outlet Centre means the proposed outlet centre of up to 25,000m² NUFA forming part of the Development.

Party means a party to this Agreement, including their successors and assigns.

Planning Application means a development application made under the Act for the Development or a stage of the Development.

Planning Approval means the determination by approval of the Planning Application for the Development or a stage of the Development.

Planning Proposal means the planning proposal submitted under Part 3, Division 4 of the Act for the Amending LEP, DP&I reference PP_2010_PENRI_001_00, or its amended form, as has been endorsed by the Planning Authority.

Public Facility means a public amenity, a public service, a public facility, public land, public infrastructure, a public road, a public work, or any other act matter or thing that meets a Public Purpose.

Public Purpose means any purpose that benefits the public or a section of the public, specified in section 93F(2) of the Act.

Regulation means the *Environmental Planning and Assessment Regulation 2000* (NSW).

Residential Lot means a lot created under plan of subdivision, including a strata plan of subdivision, which forms part of the Development and which is created solely for residential purposes.

Road Works means those road works identified in **schedule 3** and in **schedules 5 and 6**.

Road Works Land means such parts of the Land upon which the Roads Works are required to be constructed which is not owned by the Planning Authority or RMS.

Roads Authority has the meaning given to it in the *Roads Act 1993* (NSW).

Stage 1 Development means that part of the Development identified in **schedule 5** and that is intended to commence on or around 2016.

Stage 2 Development means that part of the Development identified in **schedule 5** and that is intended to commence on or around 2021.

Stage 3 Development means that part of the Development identified in **schedule 5** and that is intended to commence on or around 2026.

Stage 4 Development means that part of the Development identified in **schedule 5** and that is intended to commence on or around 2031.

Subdivision has the meaning given to it in the Act.

Subdivision Certificate has the meaning given to it in the Act.

Transfer Dealings means selling or transferring the Land.

Trigger Event means the date on which the event occurs in **column 3 of schedule 3** corresponding with the Road Works identified in **columns 1 and 2 of schedule 3**.

Works Authorisation Deed means any deed(s) entered into between RMS and the Developer to complete any relevant part of the Road Works for which RMS is the Roads Authority.

4.2 Interpretation

In the interpretation of this Agreement, the following provisions apply unless the context otherwise requires:

- (a) Headings are inserted for convenience only and do not affect the interpretation of this Agreement.
- (b) If the day on which any act, matter or thing is to be done under this Agreement is not a Business Day, the act, matter or thing must be done on the next Business Day.
- (c) A reference in this Agreement to dollars or \$ means Australian dollars and all amounts payable under this Agreement are payable in Australian dollars.
- (d) A reference in this Agreement to any law, legislation or legislative provision includes any statutory modification, amendment, replacement or re-enactment, and any subordinate legislation or regulations issued under that legislation or legislative provision.
- (e) A reference in this Agreement to any agreement, deed or document is to that agreement, deed or document as amended, novated, supplemented or replaced.
- (f) A reference to a clause, part, schedule or attachment is a reference to a clause, part, schedule or attachment of or to this Agreement.
- (g) An expression importing a natural person includes any company, trust, partnership, joint venture, association, body corporate or governmental agency.
- (h) Where a word or phrase is given a defined meaning, another part of speech or other grammatical form in respect of that word or phrase has a corresponding meaning.
- (i) A word which denotes the singular denotes the plural, a word which denotes the plural denotes the singular, and a reference to any gender denotes the other genders.
- (j) References to the word 'include' or 'including' are to be construed without limitation.
- (k) A reference to this Agreement includes the agreement recorded in this Agreement.
- (l) A reference to a Party to this Agreement includes a reference to the servants, agents and contractors of the Party, and the Party's successors and assigns.
- (m) Any schedules and attachments form part of this Agreement.

5 Development Contributions to be made under this Agreement

- (a) Subject to this Agreement, the Developer is to make a Development Contribution comprising:
 - (i) the carrying out and the delivery of the Road Works in accordance with this Agreement and any applicable Works Authorisation Deed; and
 - (ii) the dedication of the Road Works Land in accordance with **clause 7**, which is required for the Road Works.
- (b) The Parties agree that the Trigger Event and Alternative Trigger Event for the Road Works set out in **columns 3 and 4 of schedule 3** and the nature, timing and delivery and staging described in the Development Stages are subject to review by the Parties and the Parties agree to:
 - (i) meet within 30 Business Days of each anniversary date of the Commencement Date, and at any other time as may be agreed between the Parties in writing, to review, in good faith:
 - (A) the timing, scope of works and land required for the delivery of the Road Works; and
 - (B) the Development Stages;the Parties may each nominate two representatives to attend that meeting, unless otherwise agreed; and
 - (ii) any variation to **schedule 3** or the Development Stages is to be agreed in writing by the Parties.
- (c) In the event that no written agreement can be reached between the Parties in respect of any requested variance to **schedule 3** or the Development Stages, the Parties agree that the Works will be delivered in accordance with the requirements in **schedule 3**, as if the request for the variance had not been made.
- (d) The Developer acknowledges and agrees that in respect of the Road Works for which RMS is the Roads Authority:
 - (i) the carrying out of the Road Works will be subject to one or more Works Authorisation Deeds between the Developer and RMS and this Agreement in no way fetters or restricts the terms of any such Works Authorisation Deed; and
 - (ii) the Road Works will be required to meet the then current Austroads standards and RMS supplements to the applicable Austroads standards which may be different from those standards which apply as at the date of this Agreement.
- (e) The Parties agree that the legal costs of any modification to this Agreement arising from a review in accordance with **clause 5(b)** will be borne by the party that requests the modification. Where more than one

party requests the modification, the legal costs associated with modification to this Agreement will be split between the Parties equally, unless otherwise agreed in writing.

- (f) The Parties agree that the specifications for that part of the Road Works for which RMS is the Roads Authority will be set out in the relevant Works Authorisation Deed and, for all other components of the Road Works, in the relevant Planning Application and Planning Approval for the Road Works.

6 Road Works

6.1 Carrying out the Road Works

- (a) The Developer must enter into a Works Authorisation Deed with RMS for those components of the Road Works identified in **columns 1 and 2 of schedule 3** for which RMS is the Roads Authority prior to any Trigger Event or Alternative Trigger Event, whichever occurs first.
- (b) The Developer must Complete the Road Works in **columns 1 and 2 of schedule 3** prior to the relevant Milestone Event.
- (c) For the purpose of calculating the Alternative Trigger Event identified in **column 4 of schedule 3**, the Developer must provide an estimate of the GFA and NUFA for the specific Planning Application and the cumulative GFA and NUFA for each of the Development Stages with each Planning Application submitted for the Development.
- (d) The Developer must promptly notify RMS of the lodgement of a Planning Application relevant to this Agreement and the Planning Authority must promptly notify RMS of the GFA and NUFA for which Planning Approval is sought in the Planning Application, along with the cumulative GFA and NUFA identified for the Alternative Trigger Event.

6.2 Pre-Conditions for Road Works

The Developer must obtain at the Developer's cost:

- (a) all necessary approvals (including Planning Approvals), consents, certifications and authorisations required to carry out the Road Works or any component of the Road Works and to subdivide and dedicate the Road Works Land and any components of the Road Works Land; and
- (b) Land Owners' consent from all relevant Land Owners to enable the Road Works or any component of the Road Works to be carried out and to subdivide and dedicate the Road Works Land and any components of the Road Works Land.

6.3 Road Works - Standard of Work

- (a) The Developer must carry out the Road Works in a good and workmanlike manner, in compliance with applicable laws, regulations and currently applicable road design standards (including any relevant

Australian Standards, Austroads standards, RMS Supplements to Austroads standards or other standards), the provisions of any applicable Works Authorisation Deed, the conditions of any Planning Approval and conditions of any approval under section 138 of the *Roads Act 1993* (NSW).

- (b) The Developer must permit duly authorised representatives of the Planning Authority and RMS, as the case may be, to inspect the Road Works as they are constructed in accordance with any applicable Works Authorisation Deed.
- (c) The Planning Authority and RMS (as appropriate) may nominate the stages at which it requires formal notification that the Road Works (or any part of the Road Works) are available for inspection, and the Developer must use all reasonable endeavours to ensure that those inspection opportunities are provided to the Planning Authority and RMS, as appropriate.

6.4 Access to Planning Authority's and RMS' Land

If requested, the Planning Authority and RMS must promptly grant, at no cost to the Developer, such licences or other rights (as are reasonably necessary) over the Planning Authority's and RMS' land and roads (subject to the provisions of the *Roads Act 1993*) to enable the Developer, its contractors, employees and servants to carry out the Road Works in accordance with a licence to be agreed between the Parties.

6.5 Failure to deliver Road Works

- (a) If the Developer fails to Complete any component of the Road Works by the applicable Milestone Event then the Developer acknowledges and agrees that, unless otherwise agreed in writing by both the Planning Authority and RMS, it will ensure that:
 - (i) no further Planning Applications are lodged with the Planning Authority for the Development or any other development on the Land; and
 - (ii) no application for any Occupation Certificate or Interim Occupation Certificate is lodged for any aspect of the Development or any other development on the Land that generates additional GFA or NUFA until such time as the relevant Road Works are Completed.
- (b) Where the Developer fails to Complete the Road Works as required by this Agreement by the applicable Milestone Event for that item of Road Work, RMS may complete that item or such part or parts as are outstanding as at the time of the Milestone Event or otherwise as agreed, or appoint a contractor to carry out these Works on RMS' behalf.
- (c) If RMS elects to Complete an item or such part or parts of the Road Works under **clause 6.5(b)**, any reasonable costs and expenses of carrying out those Road Works will become a debt due and payable to RMS by the Developer.

6.6 Failure to enter into Works Authorisation Deed

If the Developer fails to enter into a Works Authorisation Deed in breach of **clause 6.1(a)**, then, unless otherwise agreed in writing by RMS, the Developer acknowledges and agrees that it will ensure that:

- (a) no further Planning Applications will be lodged with the Planning Authority for the Development; and
- (b) no further applications for any Construction Certificate or Occupation Certificate or Interim Occupation Certificate will be lodged for any aspect of the Development or any other development on the Land that generates additional GFA or NUFA,

until such time as the relevant Works Authorisation Deed has been agreed and executed by the Developer.

6.7 Roads Authority

The parties acknowledge and agree that RMS will exercise the functions of the Roads Authority for all of the Road Works other than the provision of a shared pathway on the northern side of Jamison Road, between Harris Street and Mulgoa Road.

7 Road Works Land Dedication

- (a) When requested to do so by RMS following Completion of the Road Works or a component of the Road Works, the Developer must ensure the registered proprietors of the Road Works Land dedicate the Road Works Land or the relevant part of the Road Works Land as a public road to the Planning Authority within the timeframe required by RMS, acting reasonably, at no cost to RMS or the Planning Authority.
- (b) For the purpose of **paragraph (a)**, the timeframe nominated by RMS for the lodgement of the plan with LPI requesting registration of the dedication of the Road Works Land or relevant part of the Road Works Land, must not be less than 10 Business Days of the date of the Completion of the Road Works or relevant component of the Road Works.
- (c) The Developer must do all things necessary to effect dedication of the Road Works Land including ensuring that the registered proprietors of the Road Works Land provide to the Planning Authority an instrument in registrable form under the *Real Property Act 1900* that is effective to transfer title to the land to the Planning Authority when registered.
- (d) To allow for the registration of an instrument of transfer referred to in **paragraph (c)**, the Developer is to:
 - (i) cause to be produced to the LPI the certificate of title to that part of the Road Works Land to be dedicated under this Agreement or a direction allowing the certificate of title to be used for that purpose, and

- (ii) give to the Planning Authority an irrevocable undertaking to deliver to the Planning Authority the certificate of title if that certificate is released to the Developer by the LPI.

8 Application of sections 94, 94A and 94EF of the Act to the Development

This Agreement does not exclude the application of sections 94, 94A and 94EF of the Act to the Development.

9 Registration of this Agreement

- (a) The Developer must, at its expense, procure the registration of the Agreement on the relevant folios of the register held by the LPI pertaining to the Land as soon as reasonably practicable after the Commencement Date and, in any event, no later than 120 Business Days after that date.
- (b) The Parties agree that Lot 1021 DP812335 is excluded from the registration requirements in this **clause 9**.
- (c) Until such time as this Agreement is registered on the relevant folios of the register held by the LPI pertaining to the Land, the Developer agrees that the Planning Authority and RMS may each lodge a caveat on the relevant folios of the Register held by the LPI pertaining to the Land.
- (d) If the Planning Authority or RMS lodges a caveat in accordance with **clause 9(c)**, then the Planning Authority or RMS must during such time as the caveat remains lodged on the title of the Land:
 - (i) provide written consent within 5 Business Days to any proposed Dealing in respect of the Land other than a Transfer Dealing;
 - (ii) provide written consent within 5 Business Days to a proposed Transfer Dealing in circumstances where the proposed assignee, transferee, purchaser or other party (the "**Incoming Party**") of the Land or part of the Land has executed a Novation Deed in substantially the same form as contained in Annexure A;
 - (iii) ensure that the caveat does not prevent or delay the registration of this Agreement; and
 - (iv) remove the caveat from the title to the Land promptly, following registration of this Agreement in accordance with **clause 9(a)**.
- (e) If after 120 Business Days, the Developer has failed or has been unable to register this Agreement on any of the Land in accordance with **clause 9(a)**, the Developer must pay the Planning Authority's and RMS' reasonable costs and expenses, including legal costs, of exercising their rights under **clause 9(c)** of this Agreement.

10 Review of this Agreement

- (a) This Agreement may be reviewed or modified and any review or modification of this Agreement will be conducted in the circumstances and in the manner determined by the Parties.
- (b) No modification or review of this Agreement will be of any force or effect unless it is in writing and signed by the Parties to this Agreement.

11 Dispute Resolution

11.1 Reference to Dispute

If a dispute arises between the Parties in relation to this Agreement, then either Party must resolve that dispute in accordance with this clause.

11.2 Notice of Dispute

The Party wishing to commence the dispute resolution processes must notify the other in writing of:

- (a) the intent to invoke this clause;
- (b) the nature or subject matter of the dispute, including a summary of any efforts made to resolve the dispute other than by way of this clause; and
- (c) the outcomes which the notifying Party wishes to achieve (if practicable).

11.3 Representatives of Parties to Meet

- (a) The representatives of the Parties must promptly (and in any event within 14 Business Days of the written notice provided in accordance with **clause 11.2**) meet in good faith to attempt to resolve the notified dispute.
- (b) The Parties may, without limitation:
 - (i) resolve the dispute during the course of that meeting;
 - (ii) agree that further material, expert opinion or consideration is needed to effectively resolve the dispute (in which event the Parties will, in good faith, agree to a timetable for resolution);
 - (iii) agree that the Parties are unlikely to resolve the dispute and, in good faith, agree to a form of alternative dispute resolution (including expert determination, arbitration or mediation) which is appropriate for the resolution of the relevant dispute.

11.4 Neither party may constrain

If:

- (a) at least one meeting has been held in accordance with **clause 11.3**; and
- (b) the Parties have been unable to reach an outcome identified in **clause 11.3(b)(i) to (iii)**; and

- (c) either of the Parties, acting in good faith, forms the view that the dispute is reasonably unlikely to be resolved in accordance with a process agreed under **clause 11.3**,

then, that Party may, by 14 Business Days written notice to the other Party, terminate the dispute resolution process in respect of that dispute. The termination of the process set out in this clause does not of itself amount to a breach of this Agreement and either Party may proceed to enforce this Agreement in a Court of competent jurisdiction.

12 Security and Enforcement

12.1 Security

The Parties agree that:

- (a) registration of this Agreement and the Planning Authority's and RMS' rights under **clause 9**; and
- (b) the requirement for the Developer to enter into a Works Authorisation Deed with RMS for the Road Works for which RMS is the Roads Authority pursuant to which the Developer will be required to lodge a bank guarantee or other similar security with RMS,

constitute suitable means of enforcement for the purpose of section 93F(3)(g) of the Act.

12.2 Enforcement

- (a) Without limiting any other remedies available to the Parties, this Agreement may be enforced by any Party in any court of competent jurisdiction.
- (b) Nothing in this Agreement prevents:
 - (i) a Party from bringing proceedings in the Land and Environment Court or any other Court of competent jurisdiction to enforce any aspect of this Agreement or any matter to which this Agreement relates; and
 - (ii) the Planning Authority or RMS from exercising any function under the Act or any other Act or law relating to the enforcement of any aspect of this Agreement or any matter to which this Agreement relates.

13 Notices

13.1 Delivery

Any notice, consent, information, application or request that must or may be given or made to a Party under this Agreement is only given or made if it is in writing and sent in one of the following ways:

- (a) Delivered or posted to that Party at its address set out below.
- (b) Faxed to that Party at its fax number set out below.
- (c) Emailed to that Party at its email address set out below.

Penrith City Council

Attention: General Manager
Address: 601 High St, Penrith NSW 2750
Fax Number: 02 4732 7958
Email: pgrimson@penrithcity.nsw.gov.au;
pencit@penrithcity.nsw.gov.au

RMS

Attention: Michael Veysey- Director Network
Management
Address: 101 Miller Street North Sydney NSW 2060
Fax Number: 02 8588 4160
Email: michael.veysey@rms.nsw.gov.au

Penrith Rugby League Club Limited

Attention: General Manager - Corporate Real Estate
Address: 123 Mulgoa Road Penrith NSW 2750
Fax Number: 02 4731 2665
Email: stacey.fishwick@panthers.com.au;
realestate@panthers.com.au

13.2 Change of Details

If a Party gives the other Party three Business Days' notice of a change of its address, email address or fax number, any notice, consent, information, application or request is only given or made by that other Party if it is delivered, electronically sent, posted or faxed to the latest address, email address or fax number.

13.3 Giving of Notice

Subject to **clause 13.4**, any notice, consent, invoice, information, application or request is to be treated as given or made at the following time:

- (a) if it is delivered by process server, when it is served at the relevant address;
- (b) if it is sent by registered post, two Business Days after it is posted; and
- (c) if it is sent by email, when a delivery confirmation report is received by the sender, unless subsequently the sender receives a delivery failure notification, indicating that the electronic mail has not been delivered.

13.4 Delivery outside of business hours

If any notice, consent, information, application or request is delivered on a day that is not a Business Day, or if on a Business Day, after 5.00 pm on that day in the place of the Party to whom it is sent, it is to be treated as having been given or made at the beginning of the next Business Day.

14 Approvals and consent

Except as otherwise set out in this Agreement, and subject to any statutory obligations, a Party may give or withhold an approval or consent to be given under this Agreement in that Party's absolute discretion and subject to any conditions determined by the Party. A Party is not obliged to give its reasons for giving or withholding consent or for giving consent subject to conditions.

15 Coordination of Road Works

In the event that any part of the Land is assigned or novated in accordance with **clause 16**, wherever Panthers Rugby League Club Limited is the Developer of the Development in whole or part, it acknowledges and agrees that it is responsible for coordinating the delivery of all of the Works in **schedule 3**, including those responsibilities assigned or novated to another party under **clause 16**.

16 Assignment and Novation

16.1 Assignment

- (a) The Developer must not assign, encumber or deal with any right, obligation or interest under this Agreement without the prior written consent of the Planning Authority and RMS, such consent not to be unreasonably withheld.
- (b) Approval is reasonably withheld if the proposed assignee, or person is not solvent and reputable and the assignment or encumbrance with materially adversely affect the obligations of the Developer and the rights of the Planning Authority and RMS.
- (c) Any purported dealing in breach of this clause is of no effect.

16.2 Transfer Dealings

- (a) The Developer must not have any Transfer Dealings with the Land unless the proposed assignee, transferee, purchaser or other party (the "**Incoming Party**") enters into the Novation Deed.
- (b) As and from the date of execution of the Novation Deed by the Planning Authority, RMS, the Developer and the Incoming Party, and other than as set out in the Novation Deed, the Developer is released from the obligations contained in this Agreement to the extent that they:

- (i) are novated to the Incoming Party, and
- (ii) remain to be performed.

17 Release and discharge

- (a) Upon satisfaction of the Developer's obligations under this Agreement, the Planning Authority and RMS must provide a release and discharge of this Agreement with respect to the Land, including any strata lot, within 20 Business Days of receiving a written request from the Developer and do all things reasonably necessary, including executing any necessary document to enable the Developer to remove the notation of this Agreement on the relevant folios of the Torrens title register held by the LPI pertaining to the Land.
- (b) If there is a disagreement about whether the Developer has satisfied its obligations under this Agreement, the Planning Authority and RMS must provide a release and discharge of the Agreement where alternative security is provided by the Developer to the reasonable satisfaction of the Planning Authority and the RMS to secure any obligations the Planning Authority or RMS considers are still outstanding in respect of the Land.
- (c) From time to time, the Developer may request RMS and the Planning Authority provide a partial release and discharge of the Agreement. The Planning Authority and RMS must provide a partial release and discharge of this Agreement to the extent that the Agreement affects any Residential Lot for which a Subdivision Certificate has been issued or a strata Subdivision Certificate has been issued and where:
 - (i) the Developer has satisfied its obligations under this Agreement in respect of that part of the Land; or
 - (ii) provided alternative security to the reasonable satisfaction of the Planning Authority and RMS to secure the performance of any outstanding obligations under this Agreement in respect of that part of the Land.
- (d) The Planning Authority and RMS must provide the release and discharge or partial release and discharge referred to in **paragraphs (a) and (c)**, within 20 business days of receiving a written request from the Developer and do all things reasonably necessary, including execute any necessary document to enable the Developer to remove the notation of this Agreement on the relevant folios of the Torrens title register held by the LPI pertaining to the Land.

18 Force Majeure

- (a) If a Party is unable by reason of a Force Majeure Event to carry out wholly or in part its obligations under this Agreement, it must:
 - (i) give to the other Parties prompt notice of the force majeure with reasonably full particulars; and
 - (ii) suggest an alternative method, if any, of satisfying its obligations under this Agreement.
- (b) If a Party is unable to satisfy its obligations under this Agreement by an alternative method, the obligations of the Parties, and any time periods, so far as they are affected by the Force Majeure Event are then suspended during continuance of the force majeure and any further period as may be reasonable in the circumstances.
- (c) The Party giving such notice under this clause must use all reasonable efforts and diligence to remove the Force Majeure Event or ameliorate its effects as quickly as practicable.
- (d) If the Parties are unable to agree on the existence of a Force Majeure Event or the period during which the obligations of the Parties, and any time periods, are suspended during the continuance of the Force Majeure Event, that dispute must be referred for determination under **clause 11**.
- (e) If a Force Majeure Event cannot be rectified to the mutual satisfaction of the Parties and the Developer, in its sole discretion, determines that it is unable to undertake or continue with the Development, then upon the surrender of any existing Planning Approvals that relate to works that have not yet been physically commenced (as defined in the Act), the Developer may terminate this agreement by written notice to the Planning Authority and RMS in which event neither Party will have any claim against the other under this Agreement.
- (f) If **paragraph (e)** applies, the Planning Authority and RMS shall do all things reasonably necessary including executing any necessary documents to enable the Developer to remove the notation of this Agreement on the relevant folios of the Torrens title register held by LPI relating to the land within 20 Business Days of receiving written request from the Developer.
- (g) If **paragraph (e)** applies, RMS or Council may give notice to the Developer that it requires:
 - (i) works to be done to ensure that there is no immediate risk of harm to human safety arising from any incomplete Road Works or any part of the Development; and
 - (ii) works to be done of a permanent nature to ensure the ongoing functionality of the road network and use of the pedestrian

footpath, notwithstanding the non-completion of either of the whole or part of the Road Works or the Development.

- (h) The Developer must be given a reasonable period of time, and not less than 10 Business Days, to carry out any works the subject of a notice under this clause and the Council and RMS must reasonably consider any variation sought by the Developer to any works requested under this clause.

19 Costs

- (a) The Parties agree to bear their own costs of preparing, negotiating, executing and stamping this Agreement and any document related to this Agreement.
- (b) The legal costs of preparing, negotiating, executing and stamping any modifications to this Agreement are to be dealt with in the manner contemplated in **clause 5(e)** of this Agreement.

20 Entire Agreement

- (a) This Agreement, any applicable Works Authorisation Deed and any documents required or contemplated by any Works Authorisation Deed contain everything to which the Parties have agreed in relation to the matters those documents deal with. No Party can rely on an earlier document, or anything said or done by another Party, or by a director, officer, agent or employee of that Party, before this Agreement was executed, except as permitted by law.
- (b) Pursuant to clause 25E(7) of the Regulation, the Parties agree that the Explanatory Note is not to be used to assist in construing this Agreement.

21 Further acts

Each Party must promptly execute all documents and do all things that another Party from time to time reasonably requests to affect, perfect or complete this Agreement and all transactions incidental to it.

22 Governing law and jurisdiction

This Agreement is governed by the law of New South Wales. The Parties submit to the non-exclusive jurisdiction of its Courts and Courts of appeal from them. The Parties will not object to the exercise of jurisdiction by those Courts on any basis.

23 No fetter

Nothing in this Agreement shall be construed as requiring the Planning Authority or RMS to do anything that would cause it to be in breach of any of its obligations at law, and without limitation, nothing shall be construed as limiting or fettering in any way the exercise of any statutory discretion or duty.

24 Representations and warranties

- (a) The Developer represents and warrants that on the date of this Planning Agreement:
 - (i) The Land Owners are the legal and beneficial owners of the Land.
 - (ii) The Land Owners have provided written consent to:
 - (A) the Developer entering into and performing its obligations under this Planning Agreement;
 - (B) the registration of the Planning Agreement in the relevant folio of the Land titles;
 - (C) the lodgement by RMS and the Planning Authority of caveats notifying their interest in the Planning Agreement in the relevant folio of the Land titles, up until such time as the Agreement is registered in the relevant folios of the register held by the LPI pertaining to the Land.
- (b) The Land Owners have agreed, promptly upon request, to lodge at the LPI the relevant certificates of title to enable the registration of the Planning Agreement in the relevant folios of the Land titles.
- (c) The Parties represent and warrant that they have power to enter into this Agreement and comply with their obligations under this Agreement and that entry into this Agreement will not result in the breach of any law.

25 Severability

If a clause or part of a clause of this Agreement can be read in a way that makes it illegal, unenforceable or invalid, but can also be read in a way that makes it legal, enforceable and valid, it must be read in the latter way. If any clause or part of a clause is illegal, unenforceable or invalid, that clause or part is to be treated as removed from this Agreement, but the rest of this Agreement is not affected.

26 Waiver

The fact that a Party fails to do, or delays in doing, something the Party is entitled to do under this Agreement, does not amount to a waiver of any obligation of, or breach of obligation by, another Party. A waiver by a Party is only effective if it is in writing. A written waiver by a Party is only effective in relation to the particular obligation or breach in respect of which it is given. It is not to be taken as an implied waiver of any other obligation or breach or as an implied waiver of that obligation or breach in relation to any other occasion.

27 GST

27.1 Construction

In this **clause 27**:

- (a) words and expressions which are not defined in this Agreement but which have a defined meaning in the GST Law have the same meaning as in the GST Law; and
- (b) **GST Law** has the same meaning given to that expression in the GST Act.

27.2 Intention of the Parties

Without limiting the operation of this **clause 27**, as at the date of this Agreement, the Parties intend that:

- (a) Divisions 81 and 82 of the GST Act apply to the supplies made under and in connection with this Agreement;
- (b) no tax invoices will be exchanged between the Parties; and
- (c) no additional amount will be payable to a Supplier (as defined in **clause 27.4** below) on account of GST.

27.3 Consideration GST exclusive

All prices or other sums payable or consideration to be provided under this Agreement are exclusive of GST.

27.4 Payment of GST – additional payment required

- (a) If an entity (**Supplier**) makes a taxable supply under or in connection with this Agreement (**Relevant Supply**), then, subject to **clause 27.4(d)**, the Party required under the other provisions of this Agreement to provide the consideration for that Relevant Supply (**Recipient**) must pay an additional amount to the Supplier (**GST Amount**), as calculated under **clause 27.4(b)**, **27.4(c)** and **27.4(e)** (as appropriate).
- (b) To the extent that the consideration to be provided by the Recipient for the Relevant Supply under the other provisions of this Agreement is a payment of money (including, for the avoidance of doubt, any payment under **clauses 27.4(c)** and **27.4(e)**), the Recipient must pay to the

Supplier an additional amount equal to the amount of the payment multiplied by the rate or rates of GST applicable to that Relevant Supply.

- (c) To the extent that the consideration to be provided by the Recipient for that Relevant Supply is neither:

- (i) a payment of money; nor
- (ii) a taxable supply,

(Non-taxable non monetary consideration),

the Recipient must pay to the Supplier an additional amount equal to 1/11th of the GST-inclusive market value of the Non-taxable non-monetary consideration.

- (d) To the extent that the consideration payable by the Recipient is a taxable supply made to the Supplier by the Recipient, then, notwithstanding **clause 27.4(a)** and subject to **clause 27.4(e)**, no additional amount is payable by the Recipient to the Supplier on account of the GST payable on that taxable supply.
- (e) Notwithstanding **clause 27.4(d)** if the GST-inclusive market value of the non-monetary consideration of the Relevant Supply (**Supplier's taxable supply**) is less than the GST-inclusive market value of the non-monetary consideration comprising the taxable supply made by the Recipient to the Supplier for the Supplier's taxable supply (**Recipient's taxable supply**) then, the Recipient must pay to the Supplier an additional amount equal to 1/11th of the difference between the GST-inclusive market value of the Recipient's taxable supply and the GST-inclusive market value of the Supplier's taxable supply.
- (f) The recipient will pay the GST Amount referred to in this **clause 27.4** in addition to and at the same time as the first part of the consideration is provided for the Relevant Supply.

27.5 Valuation of non-monetary consideration

The Parties will seek to agree upon the market value of any non-monetary consideration which the Recipient is required to provide under **clause 27.4**. If agreement cannot be reached prior to the time that a Party becomes liable for GST, the matter in dispute is to be determined by an independent expert nominated by the President for the time being of the Institute of Chartered Accountants in Australia. The Parties will each pay one half of the costs of referral and determination by the independent expert.

27.6 Tax invoice

The Supplier must deliver a tax invoice to the Recipient before the Supplier is entitled to payment of the GST Amount under **clause 27.4**. The Recipient can withhold payment of the GST Amount until the Supplier provides a tax invoice.

27.7 Adjustment event

If an adjustment event arises in respect of a taxable supply made by a Supplier under this Agreement, the GST Amount payable by the Recipient under **clause**

27.4 will be recalculated taking into account any previous adjustment under this clause to reflect the adjustment event and a payment will be made by the Recipient to the Supplier or by the Supplier to the Recipient as the case requires.

27.8 Reimbursements

Where a party is required under this Agreement to pay, indemnify or reimburse an expense, loss or outgoing of another party, the amount to be paid, indemnified or reimbursed by the first party will be the sum of:

- (a) the amount of the expense, loss or outgoing less any input tax credits in respect of the expense, loss or outgoing to which the other party, or to which the representative member of a GST group of which the other party is a member, is entitled; and
- (b) any additional amount payable under **clause 27.4** in respect of that reimbursement.

27.9 No Merger

This **clause 27** does not merge in the completion, discharge, rescission or termination of this document or on the transfer of any property supplied or to be supplied under this document.

28 Effect of Schedules

The Parties agree to comply with any terms contained in Schedules to this Agreement as if those terms were included in the operative part of the Agreement.

29 Relationship of Parties

This Agreement is not intended to create a partnership, joint venture or agency relationship between the Parties.

30 Further steps

Each party must promptly do whatever any other party reasonably requires of it to give effect to this document and to perform its obligations under it.

31 Counterparts

This document may consist of a number of counterparts and, if so, the counterparts taken together constitute one document.

32 Rights cumulative

Except as expressly stated otherwise in this Agreement, the rights of a Party under this Agreement are cumulative and are in addition to any other rights of that Party.

Schedule 1

Section 93F Requirement

Provision of the Act	This Agreement
Under section 93F(1), the Developer has:	
(a) sought a change to an environmental planning instrument.	(a) Yes
(b) made, or proposes to make, a development application.	(b) Yes (to be made at a later date)
(c) entered into an agreement with, or is otherwise associated with, a person, to whom paragraph (a) or (b) applies.	(c) No
Description of the land to which this Agreement applies- (Section 93F(3)(a))	See schedule 2
Description of the development to which this Agreement applies- (Section 93F(3)(b)(ii))	The Development comprises the 'Panthers Penrith Precinct', being a mixed use development inclusive of 25,000m ² NUFA of Outlet Centre, 12,500m ² GFA of retail, 25,000m ² GFA of campus style offices and entertainment facilities, hotel accommodation, seniors living, residential, recreation facilities and exhibition space.
The scope, timing and manner of delivery of Development Contributions required by this Agreement - (Section 93F(3)(c))	See clause 7 and schedule 3
Applicability of Section 94 of the Act - (Section 93F(3)(d))	Section 94 is not excluded as it applies to the Development.
Applicability of Section 94A of the Act - (Section 93F(3)(d))	Section 94A is not excluded as it applies to the Development.
Applicability of Section 94EF of the Act - (Section 93F(3)(d))	Section 94EF is not excluded as it applies to the Development.
Applicability of Section 93F(3)(e) of the Act	Not Applicable.
Mechanism for Dispute resolution - (Section 93F(3)(f))	See clause 11.
Enforcement of this Agreement - (Section 93F(3)(g))	See clause 12.

Provision of the Act	This Agreement
Registration of this Agreement (Section 93H)	See clause 9.
No obligation to grant consent or exercise functions - (Section 93F(9))	See clause 14 and 23.

Schedule 2

Land Description

Title Description	Address
Lot 1021 DP812335	63 Mulgoa Road, Penrith
Lot 1 DP1043008	73 Mulgoa Road, Penrith
Lot 151 DP863625	83 Mulgoa Road, Penrith
Lot 13 DP710086 (part)	123 – 135 Mulgoa Road, Penrith

Schedule 3

Development Contributions - Road Works

1	Jamison/Harris Street Construction of new intersection at Jamison Road, Harris Street and new access road from Panthers development	Construction of intersection at Harris Street and Jamison Road, with provision for a 15 metre long sheltered right turn bay from Jamison Road into Harris Street and a 30 metre long sheltered right turn bay from Jamison Road into the new Southern Riverlink Access and provision of appropriate traffic signals at the Jamison and Harris Street intersection.	Stage 2 Development The grant of a Construction Certificate in respect of the Multi Use Arena and Exhibition Centre.	Stage 2 Development On the earlier of: (a) the grant of a Construction Certificate in respect of the Stage 2 Development which has the effect that Construction Certificates have been granted for more than 69,300m² of GFA for the Stage 2 Development on the Land calculated on a cumulative basis; or (b) the grant of a Construction Certificate in respect of any part of the Development which has the effect that Construction Certificates have been granted for more than 153,200m² of the GFA for the Development on the Land calculated on a
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				cumulative basis.
2	Jamison Road between Harris Street and Mulgoa Road	2.1 Widening of Jamison Road between Harris Street and Mulgoa Road to include two continuous eastbound lanes within the existing road reserve.	Stage 2 Development The grant of a Construction Certificate in respect of the Multi Use Arena and Exhibition Centre.	Stage 2 Development On the earlier of: (a) the grant of a Construction Certificate in respect of the Stage 2 Development which has the effect that Construction Certificates have been granted for more than 69,300m² of GFA for the Stage 2 Development calculated on a cumulative basis; or (b) the grant of a Construction Certificate in respect of any part of the Development which has the effect that Construction Certificates have been granted for more than 153,200m² of GFA for the Development on the Land calculated on a cumulative basis.
		2.2 Retention and, if necessary reconstruction, of a 3m wide shared path along the northern side of Jamison Road between	Stage 2 Development The grant of a Construction Certificate in respect of the Multi Use Arena and Exhibition Centre.	Stage 2 Development On the earlier of: (a) the grant of a Construction Certificate in respect

	Harris Street and Mulgoa Road.		of the Stage 2 Development which has the effect that Construction Certificates have been granted for more than 69,300m ² of GFA for the Stage 2 Development calculated on a cumulative basis; or (b) the grant of a Construction Certificate in respect of any part of the Development which has the effect that Construction Certificates have been granted for more than 153,200m ² of GFA for the Development on the Land calculated on a cumulative basis.
		2.3 Extension of the existing median along Jamison Road between Mulgoa Road and Harris Street.	Stage 2 Development On the earlier of: (a) the grant of a Construction Certificate in respect of the Stage 2 Development which has the effect that Construction Certificates have been granted for more than 69,300m² of GFA for the Stage 2 Development calculated on a cumulative basis; or (b) the grant of a Construction Certificate in respect of any part of the Development which has the effect that Construction Certificates have been granted for

				more than 153,200m ² of GFA for the Development on the Land calculated on a cumulative basis.
3	Jamison Road /Mulgoa Road	Construction of a second right turn bay from Jamison Road eastbound into Mulgoa Road (30m). Existing right turn bay (45m) to be retained.	Stage 2 Development The grant of a Construction Certificate in respect of the Multi Use Arena and Exhibition Centre.	Stage 2 Development On the earlier of: (a) the grant of a Construction Certificate in respect of the Stage 2 Development which has the effect that Construction Certificates have been granted for more than 69,300m² of GFA for the Stage 2 Development calculated on a cumulative basis; or (b) the grant of a Construction Certificate in respect of any part of the Development which has the effect that Construction Certificates have been granted for more than 153,200m² of GFA for the Development on the Land calculated on a cumulative basis.

Table 4			
4 Mulgoa Road/Panther Place An additional northbound left slip lane off Mulgoa Road into Panther Place	4.1 Construction of a continuous left slip lane of 50m into Panther Place from Mulgoa Road. 4.2 Construction of a signalised pedestrian crossing across Panther Place at the intersection with Mulgoa Road.	Stage 1 Development The grant of a Construction Certificate in respect of the Outlet Centre. Stage 1 Development The grant of a Construction Certificate in respect of the Outlet Centre.	Stage 1 Development The grant of a Construction Certificate in respect of the Stage 1 Development which has the effect that Construction Certificates have been granted for more than 58,730m² of GFA for the Stage 1 Development on the Land calculated on a cumulative basis. Stage 1 Development The grant of a Construction Certificate in respect of the Stage 1 Development which has the effect that Construction Certificates have been granted for more than 58,730m² of GFA for the Stage 1 Development on the Land calculated on a cumulative basis.

				
5	Mulgoa Road/Ransley Street intersection	5.1 Upgrade north bound component of intersection of Mulgoa Road and Ransley Street resulting from the widening of Mulgoa Road to three lanes north bound including associated right hand turn bays.	Stage 1 Development The grant of a Construction Certificate in respect of the Outlet Centre.	Stage 1 Development The grant of a Construction Certificate in respect of the Stage 1 Development which has the effect that Construction Certificates have been granted for more than 58,730m² of GFA for the Stage 1 Development on the Land calculated on a cumulative basis.

		5.2 Upgrade south bound component of intersection of Mulgoa Road and Ransley Street resulting from the widening of Mulgoa Road to three lanes south bound.	Stages 3 and 4 Development The grant of a Construction Certificate in respect of the Campus Style Office Development.	Stages 3 and 4 Development On the earlier of: (a) the grant of Construction Certificate for the Stage 3 and Stage 4 Development which has the effect that Construction Certificates have been granted for more than 46,325m² GFA for the Stage 3 Development and Stage 4 Development on the Land calculated on a cumulative basis; or (b) the grant of a Construction Certificate in respect of the Development which has the effect that Construction Certificates have been granted for more than 229,225m² GFA for the Development on the Land calculated on a cumulative basis.
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6	Widening of Mulgoa Road to provide for three lane carriageway north and south bound	6.1 Widening of Mulgoa Road north bound Widen to three carriageways north bound between Jamison Road to 100m north of Ransley St within the existing kerb-to-kerb alignment through reclamation of median and narrowing of lanes from 3.5m to 3.2m	Stage 1 Development The grant of a Construction Certificate in respect of the Outlet Centre.	Stage 1 Development The grant of a Construction Certificate in respect of the Stage 1 Development which has the effect that Construction Certificates have been granted for more than 58,730m² of GFA for the Stage 1 Development on the Land calculated on a cumulative basis.
	6.2 Widening of Mulgoa Road south bound Widen to three carriageways south bound between Jamison Road to 100m north of Ransley St within the existing kerb-to-kerb alignment through reclamation of median and narrowing of lanes from 3.5m to 3.2m	Stages 3 and 4 Development The grant of a Construction Certificate in respect of the Campus Style Office Development.	Stages 3 and 4 Development On the earlier of: (a) the grant of Construction Certificate for the Stage 3 and Stage 4 Development which has the effect that Construction Certificates have been granted for more than 46,325m² GFA for the Stage 3 Development and Stage 4 Development on the Land calculated on a cumulative basis; or (b) the grant of a Construction Certificate in respect of the Development which has the effect that Construction Certificates have been granted for	

		Rd/Mulgoa Rd intersection to show left, left-through, right, right arrangement.	The grant of a Construction Certificate in respect of the Outlet Centre.	The grant of a Construction Certificate in respect of the Stage 1 Development which has the effect that Construction Certificates have been granted for more than 58,730m ² of GFA for the Stage 1 Development on the Land calculated on a cumulative basis.
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Schedule 4

Explanatory Note

Environmental Planning and Assessment Regulations 2000

(Clause 25E)

Explanatory Note

1 Planning Agreement

Under section 93F of the *Environmental Planning and Assessment Act 1979* (NSW) and Clause 25E of the *Environmental Planning and Assessment Regulations 2000*

2 Parties

Penrith City Council ABN 43 794 422 563 of 601 High Street, Penrith New South Wales (**Planning Authority**)

Roads and Maritime Services ABN 76 236 371 088 a NSW Government Agency and corporation incorporated under section 46 of the *Transport Administration Act 1988* (NSW) of Level 9, 101 Miller Street, North Sydney, New South Wales, 2060 (**RMS**).

Penrith Rugby League Club Limited ABN 57 000 578 398 of Mulgoa Road, Penrith New South Wales (**Developer**)

3 Description of Subject Land

The land located at the address 63, 73, 83, 123 – 135 Mulgoa Road, Penrith, New South Wales and contained in folio identifiers Lot 1021, DP812335, Lot 1 DP1043008, Lot 151 DP863625 and Lot 13 DP710086 (part).

4 Description of Proposed Change to Environmental Planning Instrument

The Developer has submitted a Planning Proposal to the Planning Authority to rezone the Land.

An Amending LEP will facilitate additional development of the 'Panthers Penrith Precinct' on the Land being a mixed use development inclusive of 12,500m² GFA of retail, 25,000m² NUFA of Outlet Centre, 25,000m² GFA of campus style offices, entertainment facilities, hotel accommodation, seniors living, residential, recreation facilities, and exhibition space.

5 Summary of Objectives, Nature and Effect of the Draft Planning Agreement

The objective of the draft Planning Agreement is to facilitate the delivery of Development Contributions in relation to required Road Works on local and State roads associated with the 'Panthers Penrith Precinct'.

The nature of the draft Planning Agreement is a contractual relationship between Penrith City Council, the Developer and Roads and Maritime Services (RMS) for the provision of Road Works to support the Development and how they will be provided.

The effect of the draft Planning Agreement is that the Developer must provide Development Contributions that include:

Element	Detail of Works
1 Jamison/Harris Street Construction of new intersection at Jamison Road, Harris Street and new access road from Panthers development	1.1 Construction of intersection at Harris Street and Jamison Road, with provision for a 15 metre long sheltered right turn bay from Jamison Road into Harris Street and a 30 metre long sheltered right turn bay from Jamison Road into the new Southern Riverlink Access and provision of appropriate traffic signals at the Jamison and Harris Street intersection
2 Jamison Road between Harris Street and Mulgoa Road	2.1 Widening of Jamison Road between Harris Street and Mulgoa Road to include two continuous eastbound lanes within the existing road reserve. This includes any required adjustments to access arrangements and utility services fronting this section of Jamison Road. 2.2 Retention and, if necessary reconstruction, of a 3m wide shared path along the northern side of Jamison Road between Harris Street and Mulgoa Road. 2.3 Extension of the existing median along Jamison Road between Mulgoa Road and Harris Street
3 Jamison Road /Mulgoa Road	3.1 Construction of a second right turn bay from Jamison Road eastbound into Mulgoa Road (30m). Existing

- right turn bay (45m) to be retained. .
- | | |
|---|---|
| <p>4 Mulgoa Road/Panther Place</p> <p>An additional northbound left slip lane off Mulgoa Road into Panther Place.</p> | <p>4.1 Construction of a continuous left slip lane of 50m into Panther Place from Mulgoa Road.</p> <p>4.2 Construction of a signalised pedestrian crossing across Panther Place at the intersection with Mulgoa Road.</p> |
| <p>5 Mulgoa Road/Ransley Street</p> | <p>5.1 Upgrade north bound component of intersection of Mulgoa Road and Ransley Street resulting from the widening of Mulgoa Road to three lanes north bound including associated right hand turn bays.</p> <p>5.2 Upgrade south bound component of intersection of Mulgoa Road and Ransley Street resulting from the widening of Mulgoa Road to three lanes south bound</p> |
| <p>6 Mulgoa Road</p> <p>Three lanes north & south from Jamison Road to 100m north of Ransley St</p> | <p>6.1 Widening of Mulgoa Road north bound</p> <p>Widen to three carriageways north bound between Jamison Road to 100m north of Ransley St within the existing kerb-to-kerb alignment through reclamation of median and narrowing of lanes from 3.5m to 3.2m</p> <p>6.2 Widening of Mulgoa Road south bound</p> <p>Widen to three carriageways south bound between Jamison Road to 100m north of Ransley St within the existing kerb-to-kerb alignment through reclamation of median and narrowing of lanes from 3.5m to 3.2m</p> |
| <p>7 Mulgoa Road (North of Jamison Road) and Jamison Road (East of Mulgoa Road)</p> | <p>7.1 Construction of a continuous left slip lane of 100m on the northern approach of Jamison Rd/Mulgoa Rd intersection.</p> <p>7.2 Lengthening of existing right turn bays on Jamison Road between Station Street and Mulgoa Road to continuous and 130m respectively.</p> <p>7.3 Change line marking on the eastern leg of Jamison Rd/Mulgoa Rd intersection to show left, left-through, right, right arrangement.</p> |

The draft Planning Agreement:

- (a) Contains a schedule for the Road Works required in relation to the above Development Contribution including the triggers and milestones of the delivery of these Road Works.
- (b) Includes the dedication of Road Works Land.
- (c) Does not exclude the application of s94, s94A and s94EF of the Act to the Development.
- (d) Is required to be registered on the Land, with the exception of Lot 1021 in DP 812335.

- (e) Requires the Developer to provide security against any breach of the agreement.
- (f) Notes that the bulk of the Road Works will be subject to separate Works Authorisation Deeds between the Developer and RMS.

6 Assessment of the Merits of the Draft Planning Agreement, including the impact on the public or any relevant section of the public

The draft Planning Agreement satisfies the objectives through the Developer making Development Contributions for Road Works to meet the road infrastructure and traffic impacts created by the Development and to ensure that existing communities which may be affected do not bear the cost of these Road Works.

The positive impact on the public is that the public will gain benefit from the Development Contributions.

The negative impact on the public is that Penrith City Council and the RMS will need to maintain the infrastructure provided by the Development Contributions.

7 Other Matters

7.1 How the draft Planning Agreement promotes public interest and one or more of the objects of the Act

The draft Planning Agreement promotes the public interest by:

- providing Development Contributions comprising road upgrades to local and State infrastructure including the dedication of those Road Works Land;
- providing for the carrying out of those required Development Contributions in a timely manner in connection with the Development; and
- promoting the sharing of responsibility between the different levels of government in the State

And therefore promotes the objects of the *Environmental Planning and Assessment Act 1979* as set out in s5(a)(ii) and s5(b),

7.2 How the draft Planning Agreement promotes one or more of the elements of the council's charter under Section 8 of the Local Government Act 1993

The draft Planning Agreement is consistent with Council's charter under Section 8 of the Local Government Act 1993:

- (a) to have regard to the long term and cumulative effects of its decisions

- (b) to bear in mind that it is the custodian and trustee of public assets and to effectively plan for, account for and manage the assets for which it is responsible;
- (c) to engage in the long term strategic planning on behalf of the local community; and
- (d) to keep the local community and the State government (and through it, the wider community) informed about its activities.

7.3 The planning purpose/s served by the draft Planning Agreement

The draft Planning Agreement will provide for a reasonable means of achieving the planning purpose by the co-ordinated provision of local and State infrastructure and associated land dedication to enable Development to occur.

7.4 Whether the draft Planning Agreement conforms with Council's capital works program

The draft Planning Agreement conforms with Council's capital works program as it provides infrastructure to support the Development which would otherwise would be required to be provided under a contributions plan under Division 6 of Part 4 of the *Environmental Planning and Assessment Act 1979*.

Road Works for Stage 2 Development



Road Works for Stages 3 and 4 Development



Schedule 5

Development Stages

Road Works for Stage 1 Development

2031 Panthers – Gross Floor Area & Traffic Generation Trips (Evening Peak) – March 2012									
Stage years	Land use	GFA (floorspace is calculated as GFA, except for the Outlet Centre, which is calculated as NUFA)		Traffic Generation Rate	2031 PM Peak Hour Trips				
					Outbound	Inbound	Total	Total %	
		m2	%						
Stage 1 – 2016	Cinemas and bowling	8,500 GFA		0.6/100m ²	40	10	50		
	General retail	5,000 GFA		2/100m ²	72	18	90		
	Outlet Centre	25,000 NUFA		500	400	100	500		
	Seniors living (125 units)	25,000 GFA		45	36	9	45		
	Residential (60 units)	10,000 GFA		0.4/lot	5	20	25		
	New hotel	10,400 GFA		0.5 / room	10	42	52		
	Sub Total	83,900 GFA	29.2%		563	199	762	44.1%	
Stage 2 – 2021	Seniors living (125 units)	25,000 GFA		2.8 / lot	36	9	45		
	Business park	6,500 GFA		15 / ha	8	2	10		
	Residential (140 units)	24,000 GFA		0.4 / lot	11	46	57		
	General retail	4,500 GFA		2/100m ²	65	16	81		
	Mixed use/serviced apartments (60 units)	9,000 GFA		0.55 / lot	6	24	30		
	Events and exhibition	30,000 GFA		0.5 / 100m ²	30	120	150		
	Sub Total	99,000 GFA	34.5%		156	217	373	21.6%	

Stage 3 – 2026	Aquatic, health and well-being	4,000 GFA		0.25/100m ²	60	15	75	
	Business Park Stg 2	6,500 GFA			2	8	10	
	Business Park Stg 3	12,000 GFA			4	14	18	
	Residential (200 units)	33,200 GFA		0.4/unit	16	65	81	
	General retail	3,000 GFA		2/100m ²	43	11	54	
	Sub Total	58,700 GFA	20.5%		125	113	238	13.8%
Stage 4 – 2031	New hotel (250 rooms)	19,800 GFA		0.5/room	100	25	125	
	Restaurants	3,000 GFA		100	80	20	100	
	Commercial suites (ancillary)*	6,000 GFA		90	72	18	90	
	<i>Deleted commercial suites 6,000m²</i>						0	
	Residential (100 units)	16,600 GFA		0.4/Lot	8	33	41	
	Sub Total	45,400 GFA	15.8%	190	260	96	356	20.6%
	Total	287,000 GFA	100.0%		1,104	625	1,729	
66* this floorspace needs to be distributed across all stages								

Traffic Management Works

Extent Overview

1. Mulgoa Rd Upgrade:
Three lanes from
Jamison Rd to 100m past
Ransley St inclusive of
Ransley St & Panther PI
intersection works; plus
2. Jamison Road Upgrade:
Works from Harris St
intersection through to
west side of Station St.



Overview
of works

Traffic Management Works

Mulgoa Road Works

Construction of a
signalised pedestrian
crossing across Panther
Place at the intersection
with Mulgoa Road
(VPA - 4.3 of Schedule 3)

Construction of a
continuous left slip lane of
50m into Panther Place
from Mulgoa Road
(VPA - 4.1 of Schedule 3)

Upgrade intersection
resulting from the
widening of Mulgoa Road
to three lanes north and
south bound
(VPA - 5 of Schedule 3)



Widening of Mulgoa
Road to three lanes
north and south bound
between Jamison Road
and 100m north of
Ransley Street
(VPA - 4.2 & 6 of Schedule 3)

Construction of a
continuous left slip lane
of 100m on the northern
approach of Jamison
Rd/Mulgoa Rd
intersection.
(VPA - 7.1 of Schedule 3)

Traffic Management Works

Jamison Road Works

Construction of new intersection at Jamison Road, Harris Street and new access road from Panthers development
(VPA - 1 of Schedule 3)

Retention of a 3m wide shared path along the northern side of Jamison Road between Harris Street and Mulgoa Road.
(VPA - 2.2 of Schedule 3)

Extension of the existing median along Jamison Road between Mulgoa Road and Harris Street.
(VPA - 2.3 of Schedule 3)

Widening of Jamison Road between Harris Street and Mulgoa Road to include two continuous eastbound lanes within the existing road reserve.
(VPA - 2.1 of Schedule 3)

Construction of a second right turn bay from Jamison Road eastbound into Mulgoa Road
(VPA - 3 of Schedule 3)

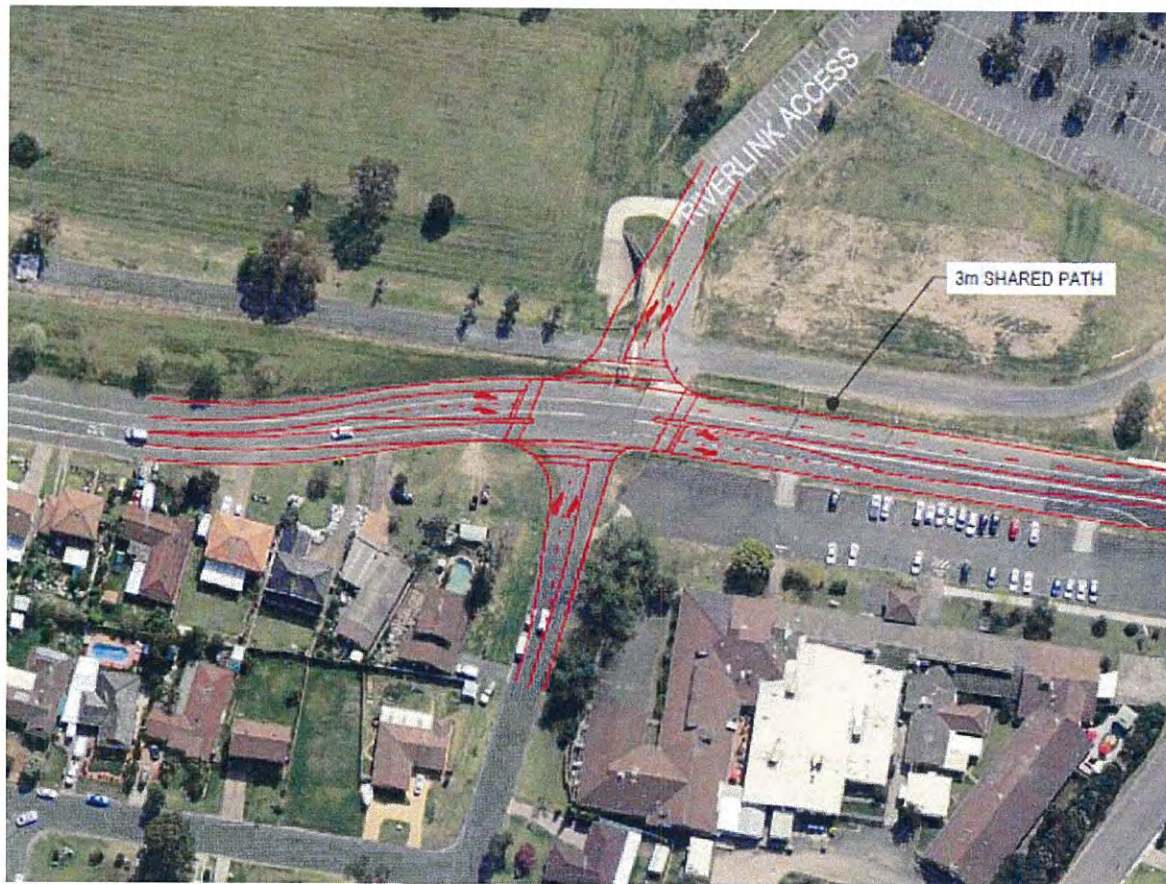
Change line marking on the eastern leg of Jamison Road
(VPA - 7.3 of Schedule 3)

Lengthening of existing right turn bays on Jamison Road between Station Street and Mulgoa Road
(VPA - 7.2 of Schedule 3)



Strategic Concept Design

Jamison Road, Harris Street and Southern Riverlink Access



Strategic Concept Design

Jamison Road and Mulgoa Road



Strategic Concept Design

Panther Place and Mulgoa Road



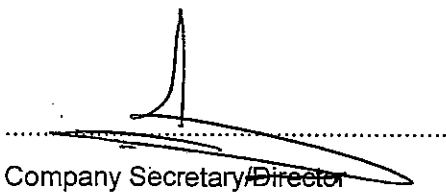
Strategic Concept Design

Ransley Street and Mulgoa Road



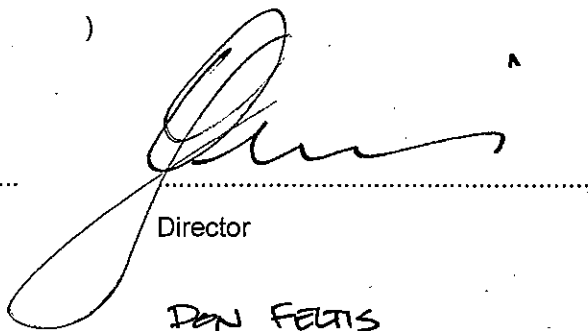
Executed as a deed

Executed by **Penrith Rugby League**)
Club Limited ABN 43 794 422 563)


.....
Company Secretary/Director

WARREN WILSON

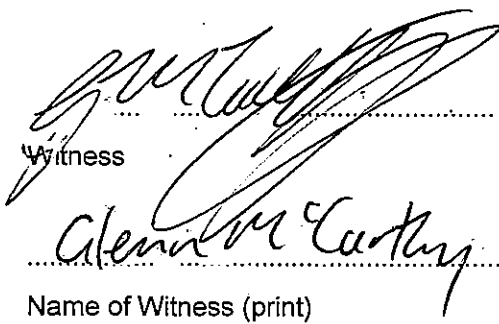
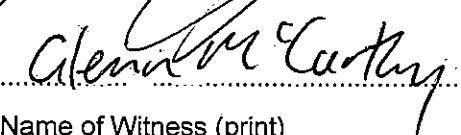
Name of Company Secretary/Director
(print)

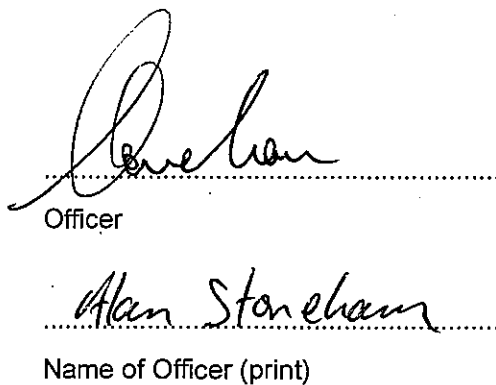
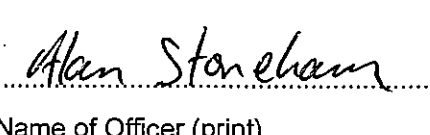

.....
Director

DON FELTS

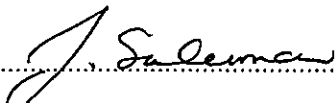
Name of Director (print)

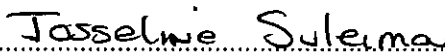
Executed by **Penrith City Council**)
ABN 43 794 422 563 by its duly)
appointed officer in the presence of:)


.....
Witness

.....
Name of Witness (print)

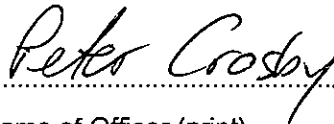

.....
Officer

.....
Name of Officer (print)

Executed by Roads and Maritime)
Services ABN 76 236 371 088 by its)
duly appointed officer in the presence)
of:


.....
Witness


.....
Name of Witness (print)


.....
Officer


.....
Name of Officer (print)

Annexure A

Novation Deed

Penrith City Council

Penrith Rugby League Club Limited

Roads and Maritime Services

[Insert Name of New Developer]

Deed of Novation for Planning Agreement

Contents

1	Interpretation	1
1.1	Definitions	1
1.2	Construction	2
1.3	Headings	2
2	Novation	2
2.1	Original Agreement	2
2.2	Reference in Original Agreement	3
2.3	Address for notices	3
2.4	Coordination of Road Works	3
3	Affirmation of the Original Agreement	3
4	Indemnities	3
5	Warranties and representations	4
5.1	Warranties	4
5.2	Survival of warranties	4
6	GST	4
7	Stamp duty and costs	4
8	Further acts	4
9	Amendment	5
10	Governing law	5
11	Counterparts	5

Date

Parties

Penrith City Council ABN 43 794 422 563 of 601 High Street, Penrith New South Wales (**Planning Authority**)

Roads and Maritime Services ABN 76 236 371 088 a NSW Government Agency and corporation incorporated under section 46 of the *Transport Administration Act 1988* (NSW) of Level 9, 101 Miller Street, North Sydney, New South Wales, 2060 (**RMS**).

Penrith Rugby League Club Limited ABN 57 000 578 398 of Mulgoa Road, Penrith New South Wales (**Original Developer**)

[Insert Name] ACN **[Insert ABN]** of **[Insert Address]** New South Wales (**New Developer**)

Background

- A The Planning Authority, RMS and the Original Developer are parties to the Original Agreement.
 - B The Original Agreement relates to the whole of the Land **[or part of the Land (provide description of the relevant part of the Land)]**.
 - C The Original Developer wishes to novate all of its rights and obligations to the New Developer.
-

Agreed terms

1 Interpretation

1.1 Definitions

In this document:

Effective Date means **[Insert Date]**

Land has the meaning given to that term in the Original Agreement.

Original Agreement means the planning agreement dated **[Insert Date]** and made between the Planning Authority, RMS and the Original Developer.

1.2 Construction

Unless expressed to the contrary, in this document:

- (a) words in the singular include the plural and vice versa;
- (b) any gender includes the other genders;
- (c) if a word or phrase is defined its other grammatical forms have corresponding meanings;
- (d) "includes" means includes without limitation;
- (e) no rule of construction will apply to a clause to the disadvantage of a party merely because that party put forward the clause or would otherwise benefit from it;
- (f) a reference to:
 - (i) a person includes a partnership, joint venture, unincorporated association, corporation and a government or statutory body or authority;
 - (ii) a person includes the person's legal personal representatives, successors, assigns and persons substituted by novation;
 - (iii) any legislation includes subordinate legislation under it and includes that legislation and subordinate legislation as modified or replaced;
 - (iv) an obligation includes a warranty or representation and a reference to a failure to comply with an obligation includes a breach of warranty or representation;

1.3 Headings

Headings do not affect the interpretation of this document.

2 Novation

2.1 Original Agreement

With effect from the Effective Date:

- (a) the New Developer is substituted for the Original Developer as a party to the Original Agreement;
- (b) the New Developer will be bound by the Original Agreement, and will be subject to the rights and obligations contained in the Original Agreement, as if the New Developer was a party to the Original Agreement instead of the Original Developer; and
- (c) other than in respect:
 - (i) ***[Parties to set out any responsibilities that the Original Developer is not discharged from, for example, any part of the Land and Road Works for which the Developer is not novating its rights and***

obligations or matters arising from or occurring prior to the date of execution of this Novation Deed],

the Original Developer is released and discharged from all obligations and liabilities to the extent they are novated to the New Developer and remain to be performed, and from all claims (whether for costs, damages, fees, expenses or otherwise), arising under the Original Agreement.

2.2 Reference in Original Agreement

All references to the Original Developer in the Original Agreement are to be construed as references to the New Developer.

2.3 Address for notices

The Planning Authority and RMS must address all notices and communications to be given or made by it to the New Developer under the Original Agreement to the following address:

New Developer:

Address: ***[Insert]***

Fax: ***[Insert]***

Contact Person: ***[Insert]***

Email: ***[Insert]***

2.4 Coordination of Road Works

[Parties to insert a clause setting out the implications of the novation on the coordination of the delivery of the Road Works]

3 Affirmation of the Original Agreement

The Original Agreement will be read and construed subject to this deed, and in all other respects the provisions of the Original Agreement are ratified and confirmed, and, subject to the variation and novation contained in this deed, the Original Agreement will continue in full force and effect.

4 Indemnities

The New Developer indemnifies the Original Developer on demand against all liabilities, claims, damages and loss which the Original Developer suffers or incurs in relation to the Original Agreement including those which arise or relate to acts or omissions occurring on or after the Effective Date.

5 Warranties and representations

5.1 Warranties

Each party represents and warrants that, at the time of execution, and at the Effective Date:

- (a) it has capacity unconditionally to execute, deliver and comply with its obligations under this document;
- (b) it has taken all necessary action to authorise the unconditional execution and delivery of, and the compliance with, its obligations under this document;
- (c) this document is a valid and legally binding obligation and is enforceable against it by each other party in accordance with its terms; and
- (d) its unconditional execution and delivery of, and compliance with its obligations under, this document do not contravene:
 - (i) any law or directive from a government entity;
 - (ii) its constituent documents;
 - (iii) any agreement or instrument to which it is a party; or
 - (iv) any obligation of it to any other person.

5.2 Survival of warranties

The warranties and representations in **clause 5.1** survive the execution of this document and the novation of the Original Agreement.

6 GST

Where a supply made under this deed gives rise to a liability for GST, the consideration to be provided for that supply (other than under this clause) shall be increased by an additional amount equal to the GST payable on the supply. The additional amount must be paid, and the supplier must provide a tax invoice, at the same time as the other consideration for that supply is to be provided under this deed. Terms used in this clause have the meanings in the *A New Tax System (Goods and Services Tax) Act 1999*.

7 Stamp duty and costs

The New Developer will pay all stamp duty arising directly or indirectly from this deed.

8 Further acts

- (a) Each party will take all steps, execute all deeds and do everything reasonably required by any other party to give effect to any of the actions

contemplated by this deed.

- (b) This deed binds each Party which signs it even if other Parties do not, or if the execution by other Parties is defective, void or voidable.

9 Amendment

This document may only be varied or replaced by a document executed by the Parties

10 Governing law

This deed is governed by the law in force in the place specified in the New South Wales and the Parties submit to the non-exclusive jurisdiction of the courts of that place.

11 Counterparts

This deed may consist of a number of counterparts and the counterparts taken together constitute one and the same instrument.

Executed as a deed

Executed by **Penrith Rugby League**)
Club Limited ABN 43 794 422 563)

.....
Company Secretary/Director

.....
Director

.....
Name of Company Secretary/Director
(print)

.....
Name of Director (print)

Executed by Penrith City Council)
ABN 43 794 422 563 by its duly)
appointed officer in the presence of:)

.....
Witness

.....
Officer

.....
Name of Witness (print)

.....
Name of Officer (print)

Executed by Roads and Maritime)
Services ABN 76 236 371 088 by its)
duly appointed officer in the presence)
of:)

.....
Witness

.....
Officer

.....
Name of Witness (print)

.....
Name of Officer (print)

Executed by [Insert Incoming Party)
Name] [Insert ABN] by its duly)
appointed officer in the presence of:)
)

.....
Witness

.....
Officer

.....
Name of Witness (print)

.....
Name of Officer (print)

APPENDIX C – DIAL BEFORE YOU DIG INFORMATION

- Electricity-Endeavour Energy
- Gas-Jemena
- Sewer & Water- Sydney Water Plans
- Telecommunications-Telstra Plans

SCALE 1:1500

NOTES

- DESIGN CERTIFICATION SHALL LAPSE WHERE :-
 - NOTICE OF INTENT HAS NOT BEEN RECEIVED WITHIN SIX (6) MONTHS OF THIS CERTIFICATION, OR
 - CONSTRUCTION HAS BEEN INTERRUPTED FOR MORE THAN SIX (6) MONTHS.
- WHERE DESIGN CERTIFICATION HAS LAPSED THE DESIGN MUST BE RESUBMITTED FOR CERTIFICATION BY THE ACCREDITED DESIGNER.
- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH INTEGRAL ENERGY'S MDI 0020 DOCUMENT.
- CLOSE HV SWITCH 12306 IN PM SUB 1555 IN JAMISON RD.
- OPEN USL 10993 IN BLAIKIE RD
- OPEN HV SWITCH T535 IN PM SUBSTATION 16458 IN ANAKAI DR

LEGEND

- NEW HV U/G MAINS
- EXISTING OH MAINS
- EXISTING U/G MAINS
- HV TRENCHING
- EXISTING DUCT
- EXISTING SUBSTATION SITE
- EXISTING POLE
- NEW TRENCH & DUCT CONFIGURATION
- EXISTING DUCT CONFIGURATION

PLEASE NOTE :-REFER TO NOTES 3, 4 & 5 FOR THE SWITCHING ARRANGEMENTS FOR THIS PROJECT.

WORKS COMPLETED	
CONSTRUCTED BY	
WORKS COMPLETED	NAME
SIGNED	DATE
INSPECTED BY	NAME
SIGNED	DATE
FORWARDED TO CONTESTABLE WORKS ADMINISTRATOR (CWA)	
LOCATION	
SIGNED	DATE

Authorisation of Integral Energy Funding.....
Print Name.....
Service Number.....
Date.....

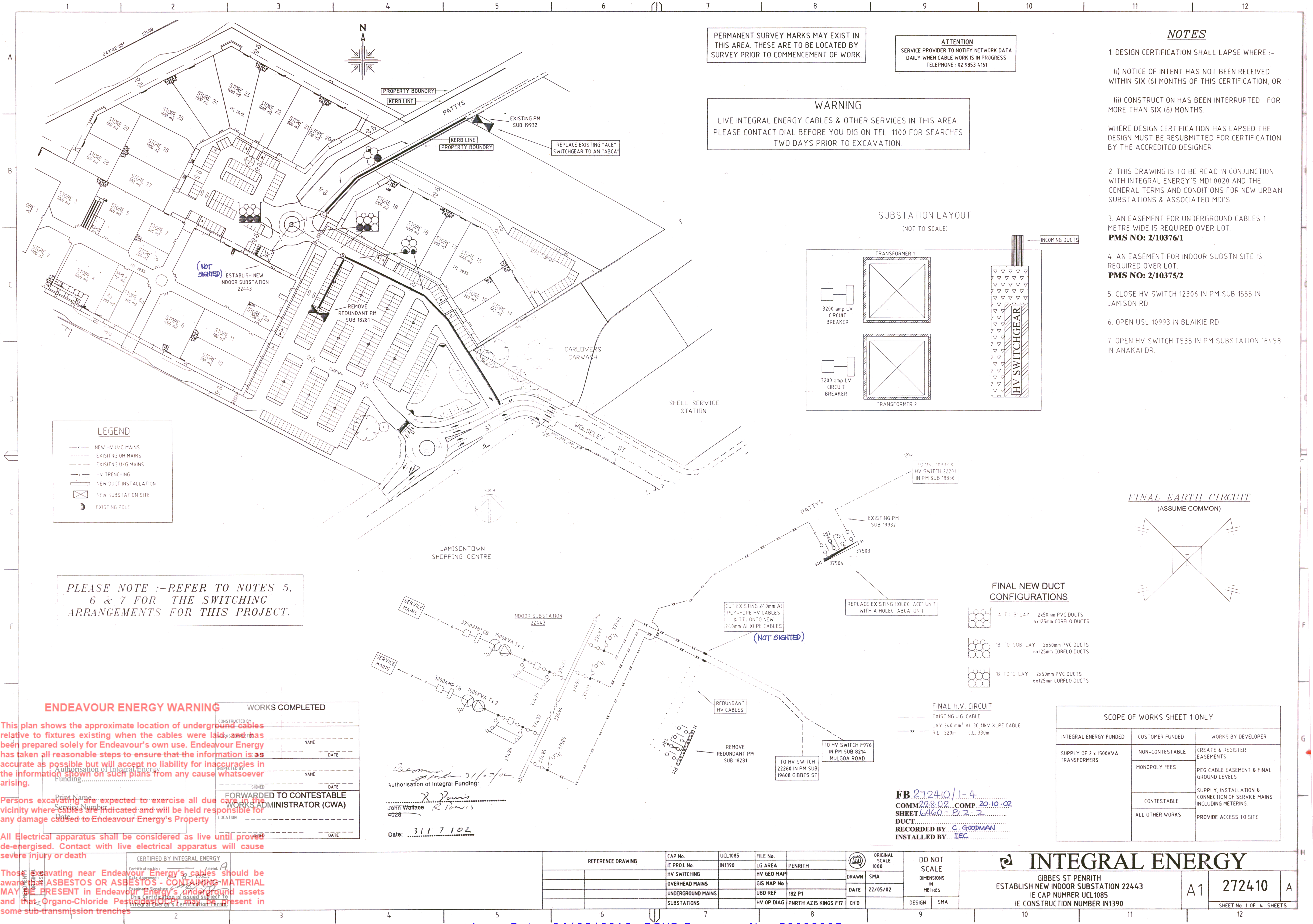
Authorisation of Integral Funding

John Wallace
4028

Date: 31/07/10

FB 272410/4 of 4
COMM 22.8.02 COMP 20.10.02
SHEET 4 of 4
DUCT
RECORDED BY: C. GOODMAN
INSTALLED BY: TEC

CERTIFIED BY INTEGRAL ENERGY		REFERENCE DRAWING		CAP No.	UCL1085	FILE No.			ORIGINAL SCALE	DO NOT SCALE		 INTEGRAL ENERGY INSTALL A NEW 11KV 240mmsq Cu CABLE FROM PENRITH ZONE TO PANTHERS LAEAGUES CLUB GIBBES ST, PENRITH CAP NUMBER : UCL1085				A1	272410	A
Certification No.	Amend A			IE PROJ. No.	INT1390	LG AREA	PENRITH		1:1500	DIMENSIONS IN METRES	DATE							
Date Approved	1-8-02			HV SWITCHING		HV GEO MAP	6460-61	DRAWN	BRM									
Examiner's Signature				OVERHEAD MAINS		GIS MAP No	6460-61											
This Certification is issued subject to Integral Energy's Certification Terms.				UNDERGROUND MAINS		UBD REF	163 F-7											
				SUBSTATIONS		HV OP DIAG	PENRITH 3&4	CHD										
SHEET No 4 OF 4 SHEETS																		



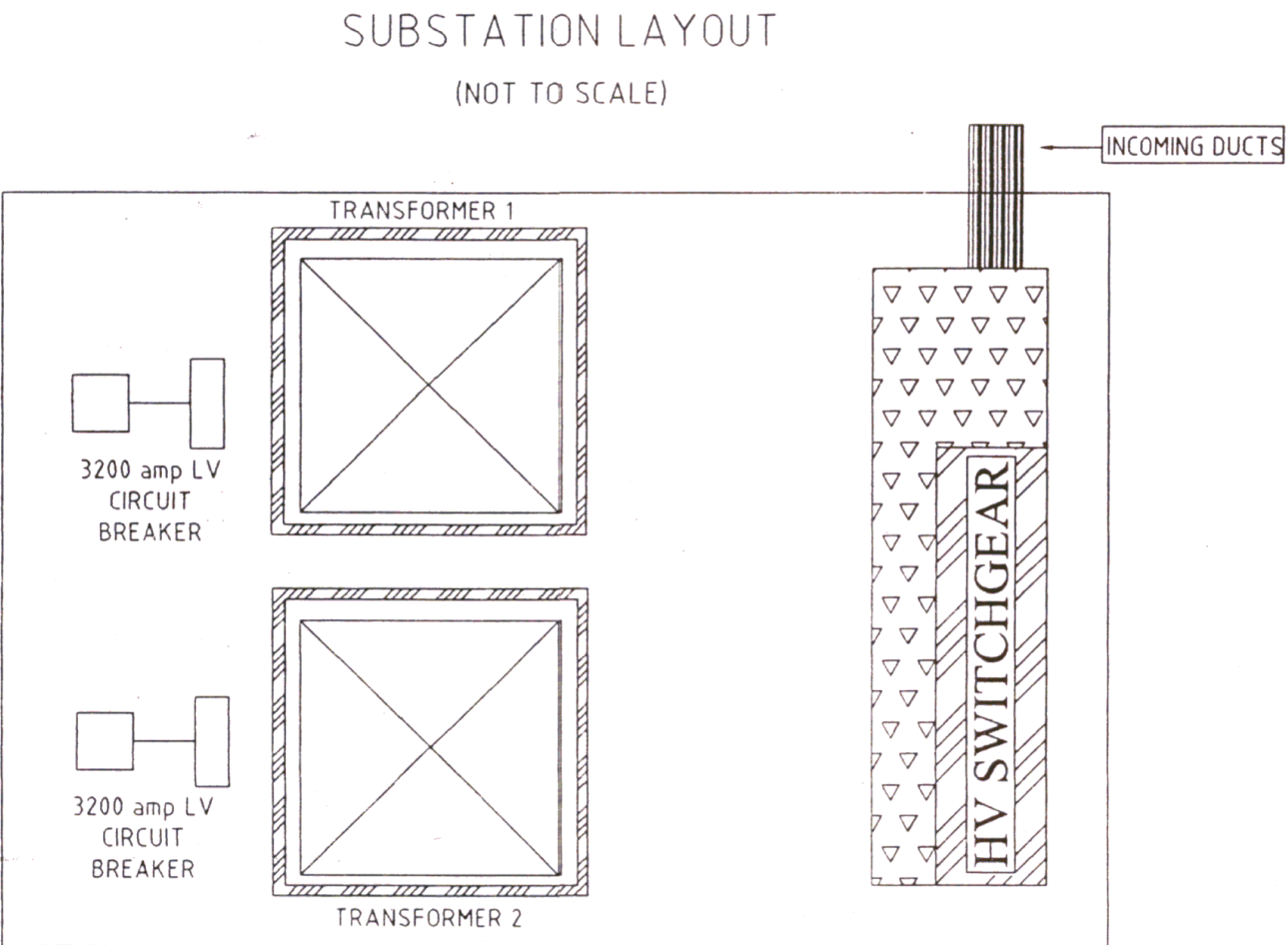
PERMANENT SURVEY MARKS MAY EXIST IN THIS AREA. THESE ARE TO BE LOCATED BY SURVEY PRIOR TO COMMENCEMENT OF WORK.

ATTENTION
SERVICE PROVIDER TO NOTIFY NETWORK DATA DAILY WHEN CABLE WORK IS IN PROGRESS
TELEPHONE : 02 9553 4161

WARNING
LIVE INTEGRAL ENERGY CABLES & OTHER SERVICES IN THIS AREA.
PLEASE CONTACT DIAL BEFORE YOU DIG ON TEL: 1100 FOR SEARCHES
TWO DAYS PRIOR TO EXCAVATION.

- NOTES**
- 1. DESIGN CERTIFICATION SHALL LAPSE WHERE :-
 - (i) NOTICE OF INTENT HAS NOT BEEN RECEIVED WITHIN SIX (6) MONTHS OF THIS CERTIFICATION, OR
 - (ii) CONSTRUCTION HAS BEEN INTERRUPTED FOR MORE THAN SIX (6) MONTHS.
 - WHERE DESIGN CERTIFICATION HAS LAPSED THE DESIGN MUST BE RESUBMITTED FOR CERTIFICATION BY THE ACCREDITED DESIGNER.

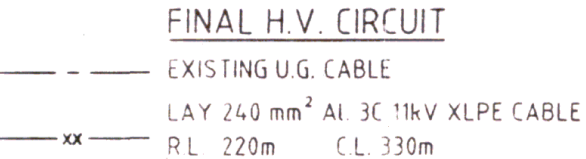
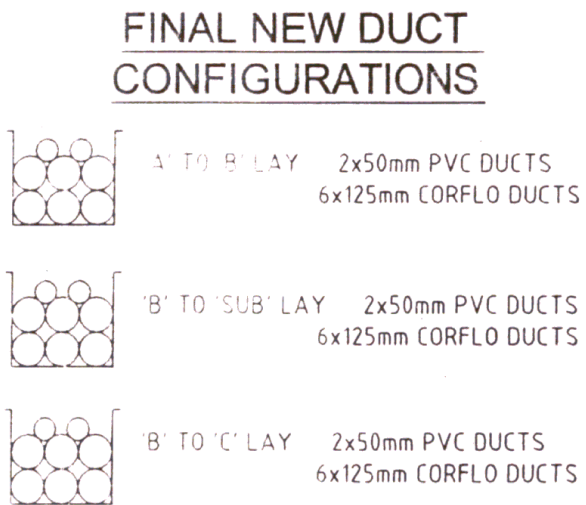
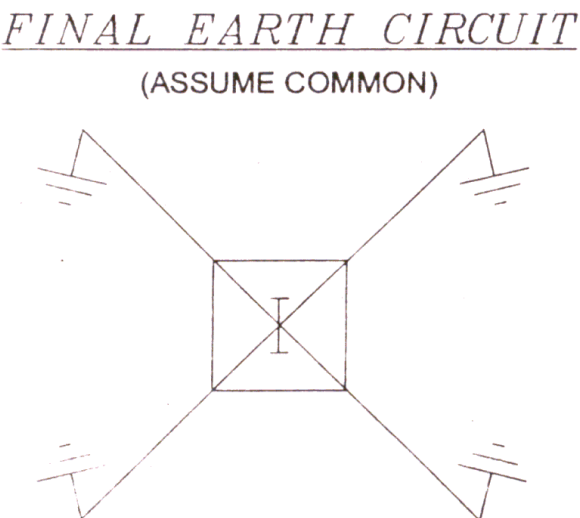
- 2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH INTEGRAL ENERGY'S MDI 0020 AND THE GENERAL TERMS AND CONDITIONS FOR NEW URBAN SUBSTATIONS & ASSOCIATED MDI'S.
- 3. AN EASEMENT FOR UNDERGROUND CABLES 1 METRE WIDE IS REQUIRED OVER LOT.
PMS NO: 2/10376/1
- 4. AN EASEMENT FOR INDOOR SUBSTN SITE IS REQUIRED OVER LOT.
PMS NO: 2/10375/2
- 5. CLOSE HV SWITCH 12306 IN PM SUB 1555 IN JAMISON RD.
- 6. OPEN USL 10993 IN BLAIKIE RD.
- 7. OPEN HV SWITCH T535 IN PM SUBSTATION 16458 IN ANAKAI RD.



LEGEND

- NEW HV U/G MAINS
- EXISTING OH MAINS
- EXISTING U/G MAINS
- HV TRENCHING
- NEW DUCT INSTALLATION
- NEW SUBSTATION SITE
- EXISTING POLE

PLEASE NOTE :-REFER TO NOTES 5, 6 & 7 FOR THE SWITCHING ARRANGEMENTS FOR THIS PROJECT.



ENDEAVOUR ENERGY WARNING

This plan shows the approximate location of underground cables relative to fixtures existing when the cables were laid and has been prepared solely for Endeavour's own use. Endeavour Energy has taken all reasonable steps to ensure that the information is as accurate as possible but will accept no liability for inaccuracies in the information shown on such plans from any cause whatsoever arising.

Persons excavating are expected to exercise all due care in the vicinity where cables are indicated and will be held responsible for any damage caused to Endeavour Energy's Property

All Electrical apparatus shall be considered as live until proved de-energised. Contact with live electrical apparatus will cause severe injury or death

Those excavating near Endeavour Energy's cables should be aware that ASBESTOS OR ASBESTOS - CONTAINING MATERIAL MAY BE PRESENT IN Endeavour Energy's underground assets and that Organo-Chloride Pesticides may be present in some sub-transmission trenches

WORKS COMPLETED

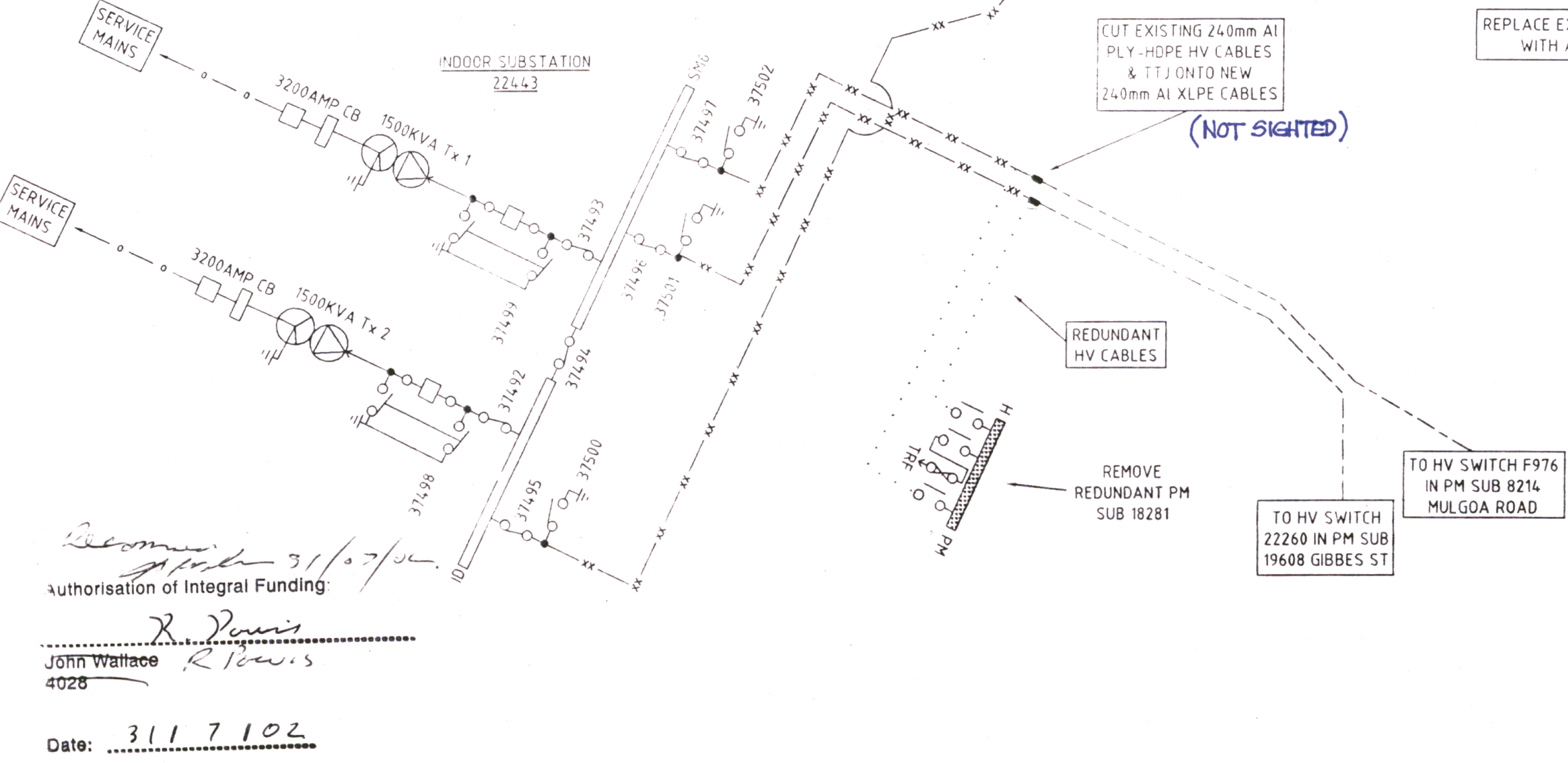
CONSTRUCTED BY	NAME	DATE

FORWARDED TO CONTESTABLE WORKS ADMINISTRATOR (CWA)

SIGNED	LOCATION	DATE

CERTIFIED BY INTEGRAL ENERGY

CERTIFICATION No.	DATE APPROVED



FB 2724/10/1-4
COMM 22.8.02 COMP. 20.10.02
SHEET 6460-8.2-2
DUCT
RECORDED BY C. GOODMAN
INSTALLED BY TEC

SCOPE OF WORKS SHEET 1 ONLY		
INTEGRAL ENERGY FUNDED	CUSTOMER FUNDED	WORKS BY DEVELOPER
SUPPLY OF 2 x 1500KVA TRANSFORMERS	NON-CONTESTABLE	CREATE & REGISTER EASEMENTS
	MONOPOLY FEES	PEG CABLE EASEMENT & FINAL GROUND LEVELS
	CONTESTABLE	SUPPLY, INSTALLATION & CONNECTION OF SERVICE MAINS INCLUDING METERING.
	ALL OTHER WORKS	PROVIDE ACCESS TO SITE

REFERENCE DRAWING		CAP No.	UCL1085	FILE No.	PENRITH	ORIGINAL SCALE 1000	DO NOT SCALE DIMENSIONS IN METRES	INTEGRAL ENERGY		GIBBS ST PENRITH ESTABLISH NEW INDOOR SUBSTATION 22443 IE CAP NUMBER UCL1085 IE CONSTRUCTION NUMBER IN1390		A1	272410	A
IE PROJ. No.		IN1390	LG AREA	PNRTH	DATE	22/05/02	DESIGN	SMA	SHEET No 1 OF 4 SHEETS					
HV SWITCHING			HV GEO MAP	GIS MAP No	DATE									
OVERHEAD MAINS			UBD REF	182 P1	CH'D									
UNDERGROUND MAINS			HV OP DIAG	PNRTH AZ15 KINGS FT7										
SUBSTATIONS														

SCALE 1:1000

NOTES

- DESIGN CERTIFICATION SHALL LAPSE WHERE :-
(i) NOTICE OF INTENT HAS NOT BEEN RECEIVED WITHIN SIX (6) MONTHS OF THIS CERTIFICATION, OR
(ii) CONSTRUCTION HAS BEEN INTERRUPTED FOR MORE THAN SIX (6) MONTHS.
WHERE DESIGN CERTIFICATION HAS LAPSED THE DESIGN MUST BE RESUBMITTED FOR CERTIFICATION BY THE ACCREDITED DESIGNER.
- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH INTEGRAL ENERGY'S MDI 0020 DOCUMENT.
- CLOSE HV SWITCH 12306 IN PM SUB 1555 IN JAMISON RD.
- OPEN USL 10993 IN BLAIKIE RD.
- OPEN HV SWITCH T535 IN PM SUBSTATION 16458 IN ANAKAI DR.

ATTENTION
ALL SERVICES SEARCHES MUST BE CHECKED BEFORE CONSTRUCTION.

WARNING
LIVE INTEGRAL ENERGY CABLES & OTHER SERVICES IN THIS AREA.
PLEASE CONTACT DIAL BEFORE YOU DIG ON TEL: 1100 FOR SEARCHES
TWO DAYS PRIOR TO EXCAVATION.

DUCT DETAIL

- TRENCH & LAY A TO B
6 X 125mm PVC CORFLO DUCTS
2 X 50mm PVC DUCTS
EXISTING: Street Light Duct
- TRENCH & LAY B TO C
6 X 125mm PVC CORFLO DUCTS
2 X 50mm PVC DUCTS
- TRENCH & LAY C TO D
6 X 125mm PVC CORFLO DUCTS
2 X 50mm PVC DUCTS
- TRENCH & LAY D TO E
6 X 125mm PVC CORFLO DUCTS
2 X 50mm PVC DUCTS
EXISTING: Street Light Duct

DUCT LEGEND

- DUCT WITHOUT CABLE
- ◐ DUCT WITH EXISTING CABLE
- DUCT WITH NEW CABLE

Authorisation of Integral Funding
John Wallace
4028
Date: 3/1/02

UBD REF : 163,F-7

PLEASE NOTE :-REFER TO NOTES 3, 4 & 5 FOR THE SWITCHING ARRANGEMENTS FOR THIS PROJECT.

Authorisation of Integral Energy Funding.....
Print Name.....
Service Number.....
Date.....

FB 272410/1-4
COMM 22.8.02 COMP 20.10.02
SHEET 6460-6-1/2/6-1/4/632
RECORDED BY: C. GOODMAN
INSTALLED BY: TEC

SCOPE OF WORKS (SHEET 2 TO 4)

INTEGRAL ENERGY FUNDED
(NON-CONTESTABLE)

ALL WORKS

LEGEND

- NEW HV U/G MAINS
- EXISTING OH MAINS
- EXISTING U/G MAINS
- HV TRENCHING
- EXISTING DUCT
- EXISTING SUBSTATION SITE
- EXISTING POLE
- NEW TRENCH & DUCT CONFIGURATION
- EXISTING DUCT CONFIGURATION

WORKS COMPLETED

CONSTRUCTED BY

WORKS COMPLETED

SIGNED

DATE

INSPECTED BY

SIGNED

DATE

FORWARDED TO CONTESTABLE WORKS ADMINISTRATOR (CWA)

LOCATION

SIGNED

DATE

ENDEAVOUR ENERGY WARNING

This plan shows the approximate location of underground cables relative to fixtures existing when the cables were laid, and has been prepared solely for Endeavour's own use. Endeavour Energy has taken all reasonable steps to ensure that the information is as accurate as possible but will accept no liability for inaccuracies in the information shown on such plans from any cause whatsoever arising.

Persons excavating are expected to exercise all due care in the vicinity where cables are indicated and will be held responsible for any damage caused to Endeavour Energy's Property

All Electrical apparatus shall be considered as live until proved de-energised. Contact with live electrical apparatus will cause severe injury or death

Persons excavating near Endeavour Energy's cables should be aware that ASBESTOS OR ASBESTOS - CONTAINING MATERIAL MAY BE PRESENT in Endeavour Energy's underground assets and that Organo-Chloride Pesticides(OCp) may be present in some sub-transmission trenches

CERTIFIED BY INTEGRAL ENERGY

Amend A

Certification No. 1-8-02

Date Approved: 1-8-02

Examiner's Signature: [Signature]

This Certification is issued subject to Integral Energy's Certification Terms.

REFERENCE DRAWING

CAP No.	UCL1085	FILE No.	
IE PROJ. No.	IN1390	LG AREA	PENRITH
HV GEO MAP	6460-61	GIS MAP No.	6460-61
OVERHEAD MAINS		UBD REF	167.F7
UNDERGROUND MAINS		HV OP DIAG	PENRITH384
SUBSTATIONS			

ORIGINAL SCALE 1:1000

DRAWN BRM

DATE 8/7/02

CHD

DESIGN SS

DO NOT SCALE DIMENSIONS IN METRES

INSTALL A NEW 11KV 240mmsq Cu CABLE FROM PENRITH ZONE TO PANTHERS LEAGUES CLUB GIBBES ST, PENRITH CAP NUMBER : UCL1085

A1 272410 A

SHEET No 2 OF 4 SHEETS

WARNING

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- In accordance with the *Electricity Supply Act 1995*, you are obliged to report any damage to Endeavour Energy Assets immediately by calling **131 003**.
- The customer must obtain a new set of plans from Endeavour Energy if work has not been started or completed within twenty **(20)** working days of the original plan issue date.
- The customer must contact Endeavour Energy if any of the plans provided have blank pages, as some underground asset information may be incomplete.
- Endeavour Energy underground earth grids may exist and their location **may not** be shown on plans. Persons excavating are expected to exercise all due care, especially in the vicinity of padmount substations, pole mounted substations, pole mounted switches, transmission poles and towers.
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DISCLAIMER

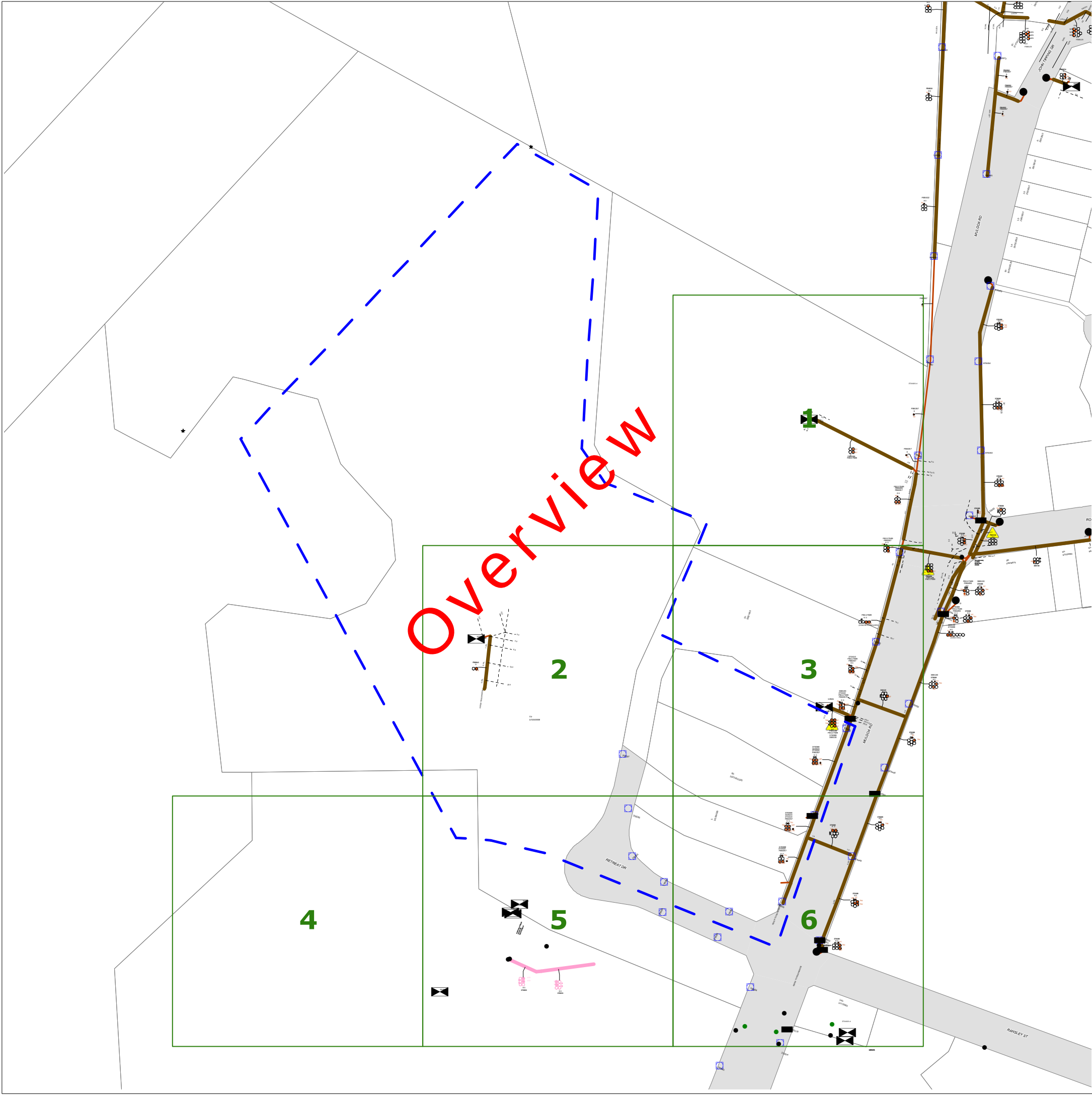
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LEGEND

- or ■ Street light column
- ▤ Padmount substation
- or ■ Overground pillar (O.G.Box)
- ▤ Underground pit
- ▬ Duct run
- ▬ Cable run
- ⊙ Typical duct section
- ▲ Asbestos warning

**NOT TO SCALE**

DBYD Sequence No.:	50623995
Issued Date:	04/02/2016



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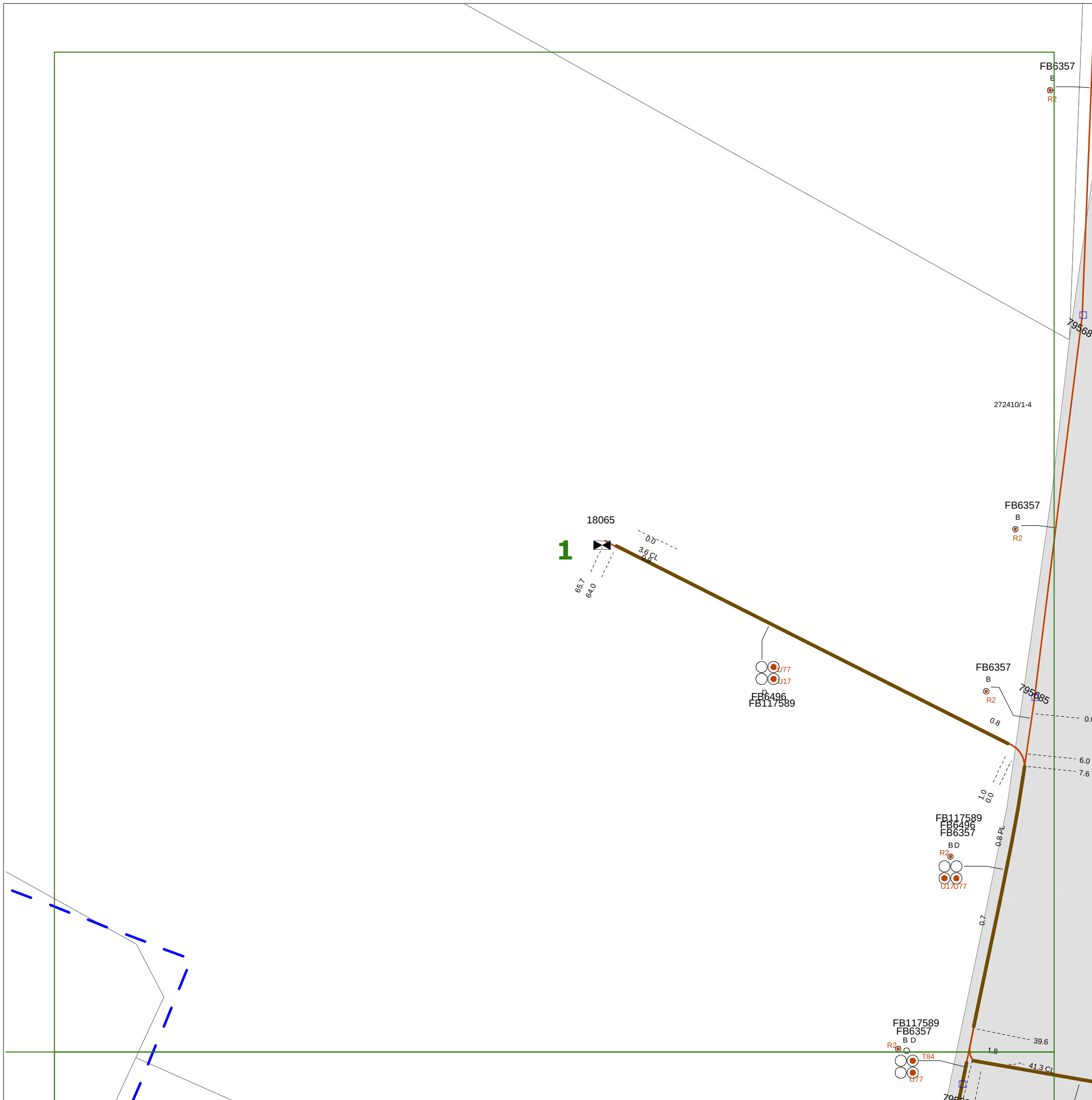
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LEGEND

- or

Street light column

Padmount substation

or

Overground pillar (O.G.Box)

Underground pit

Duct run

Cable run

Typical duct section

Asbestos warning

2

73-
1//1043008

256187

NOT TO SCALE

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Issued Date:	04/02/2016

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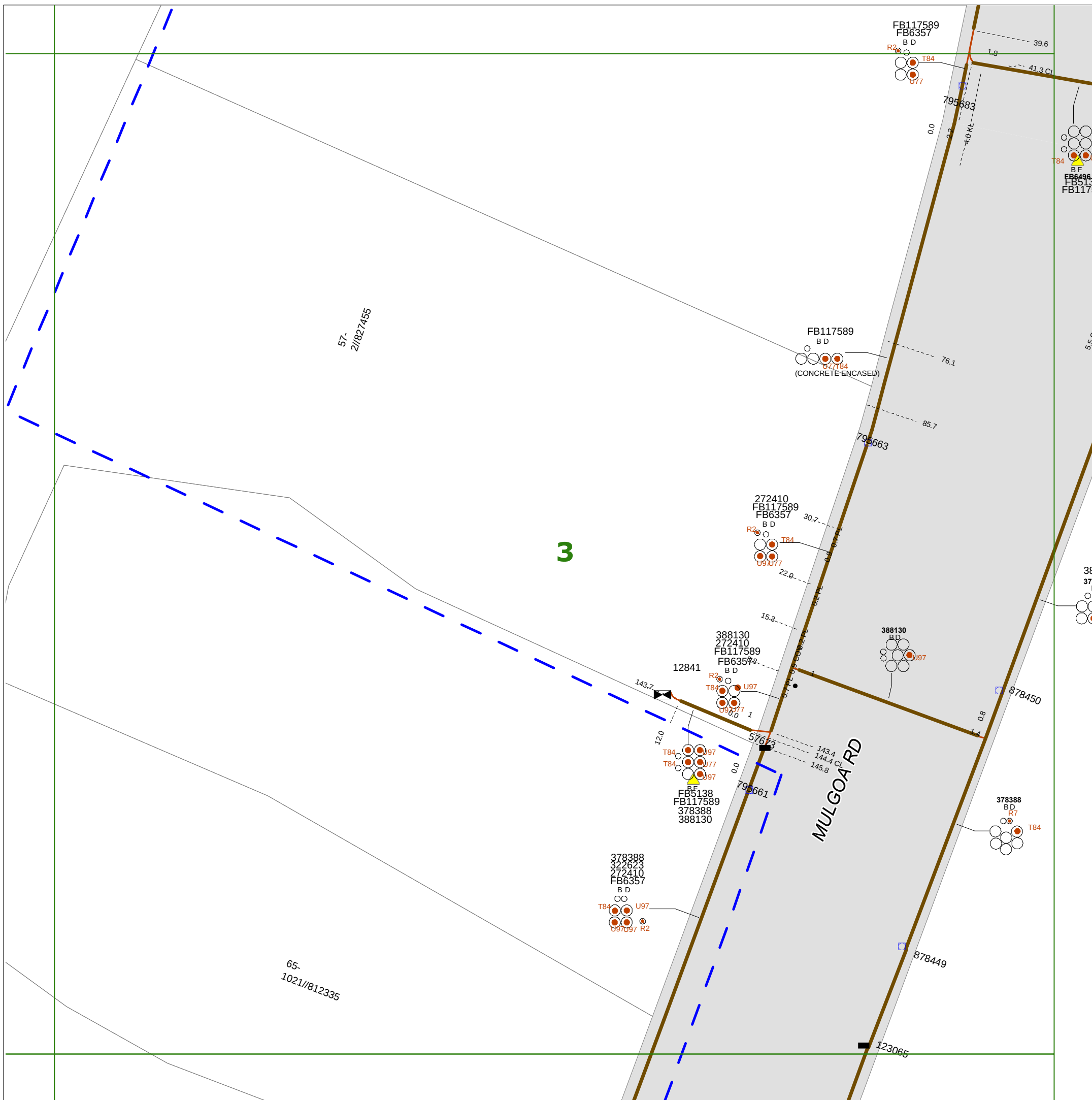
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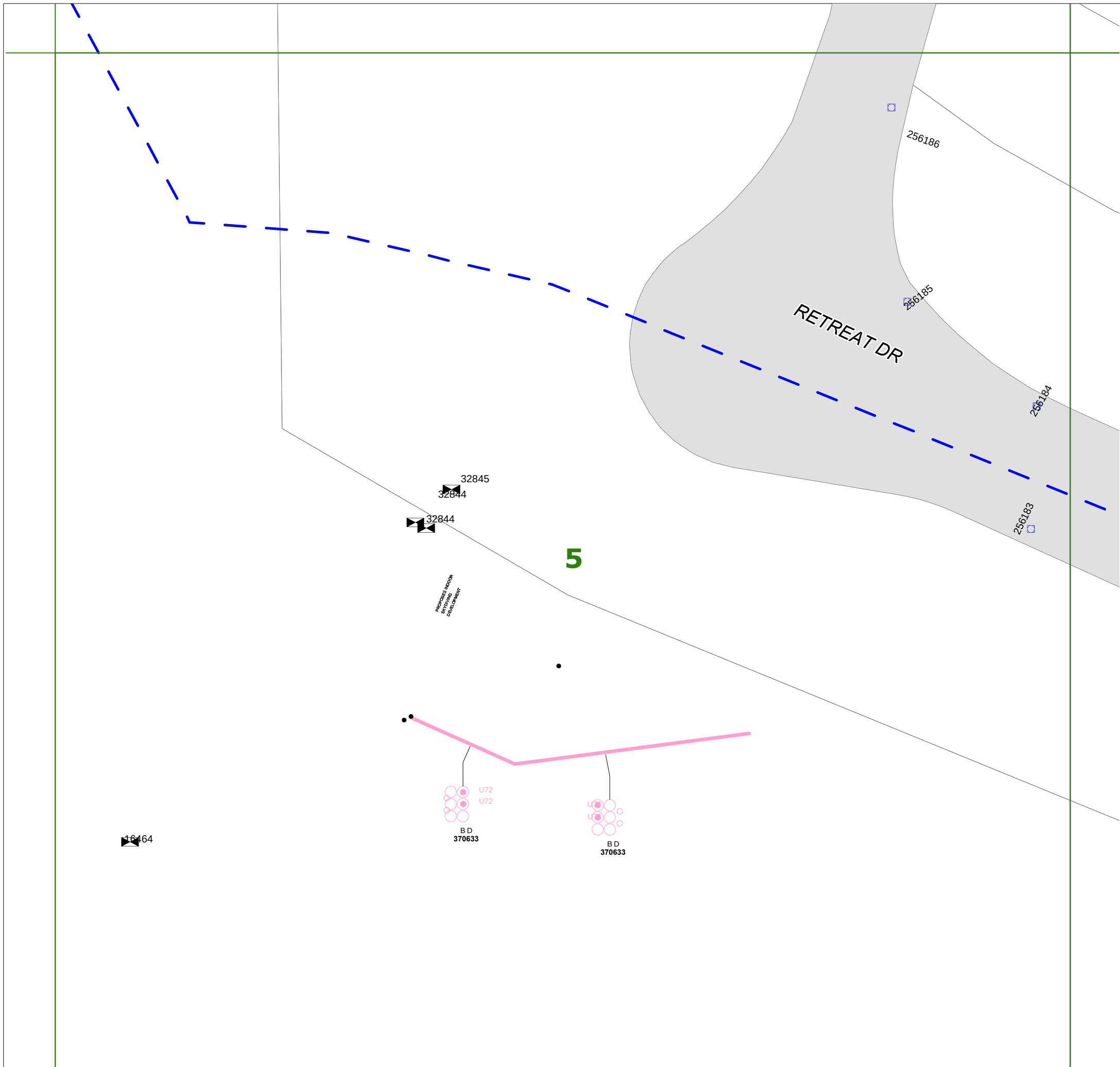
LEGEND

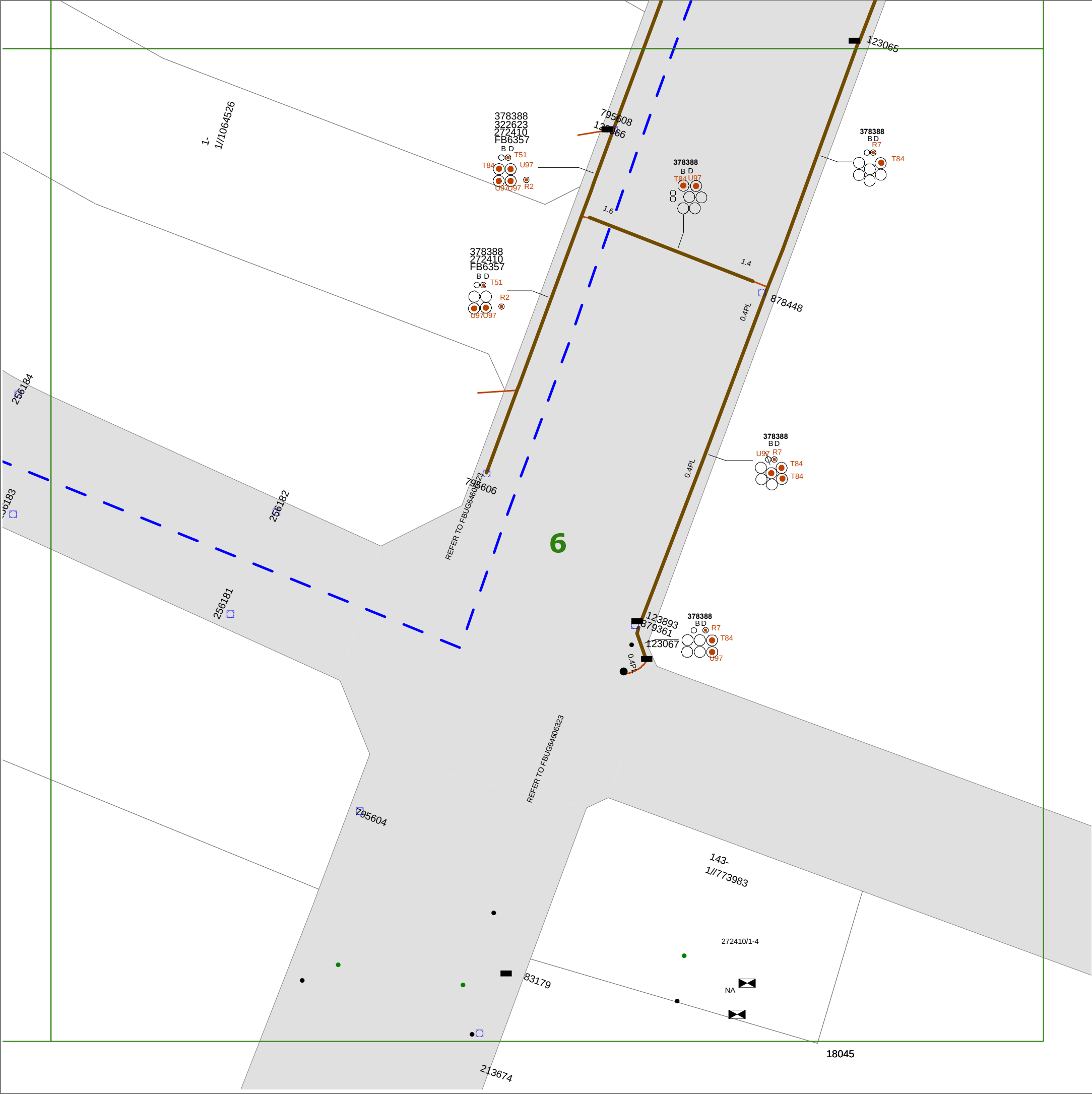
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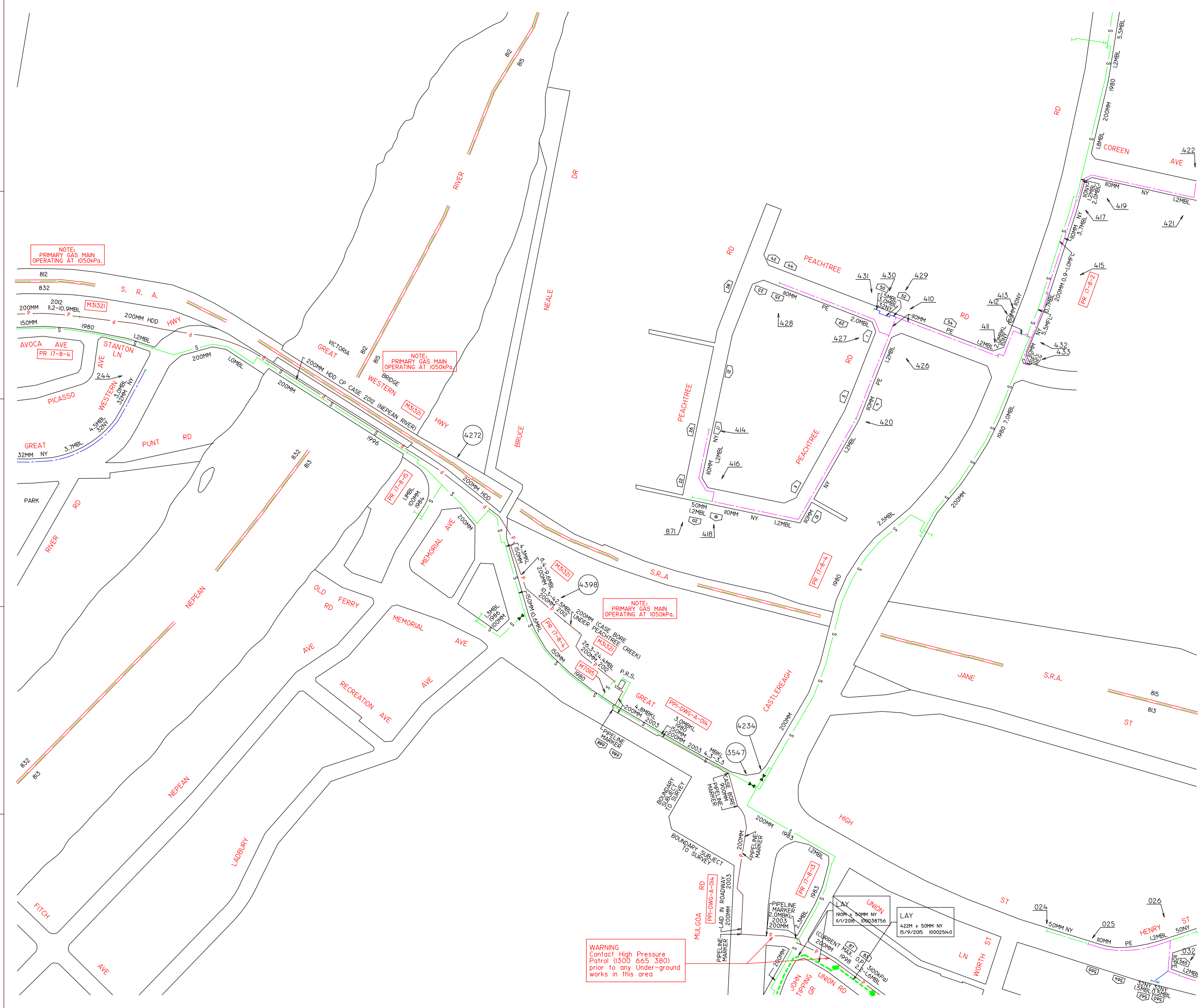
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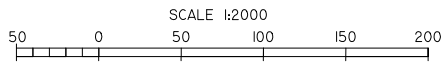


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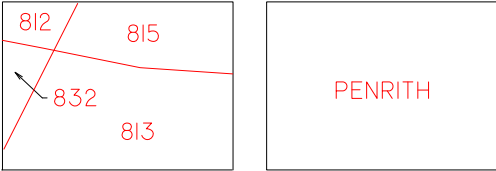
PENRITH
6A



THIS MAP UPDATED ON 11/1/16
THIS PLAN IS DIAGRAMATIC ONLY. DISTANCES
SCALED FROM THIS PLAN MAY NOT BE ACCURATE.

PE2D	PE3C	PE3D
PE5B	PE6A	PE6B
PE5D	PE6C	PE6D

ADJOINING MAPS



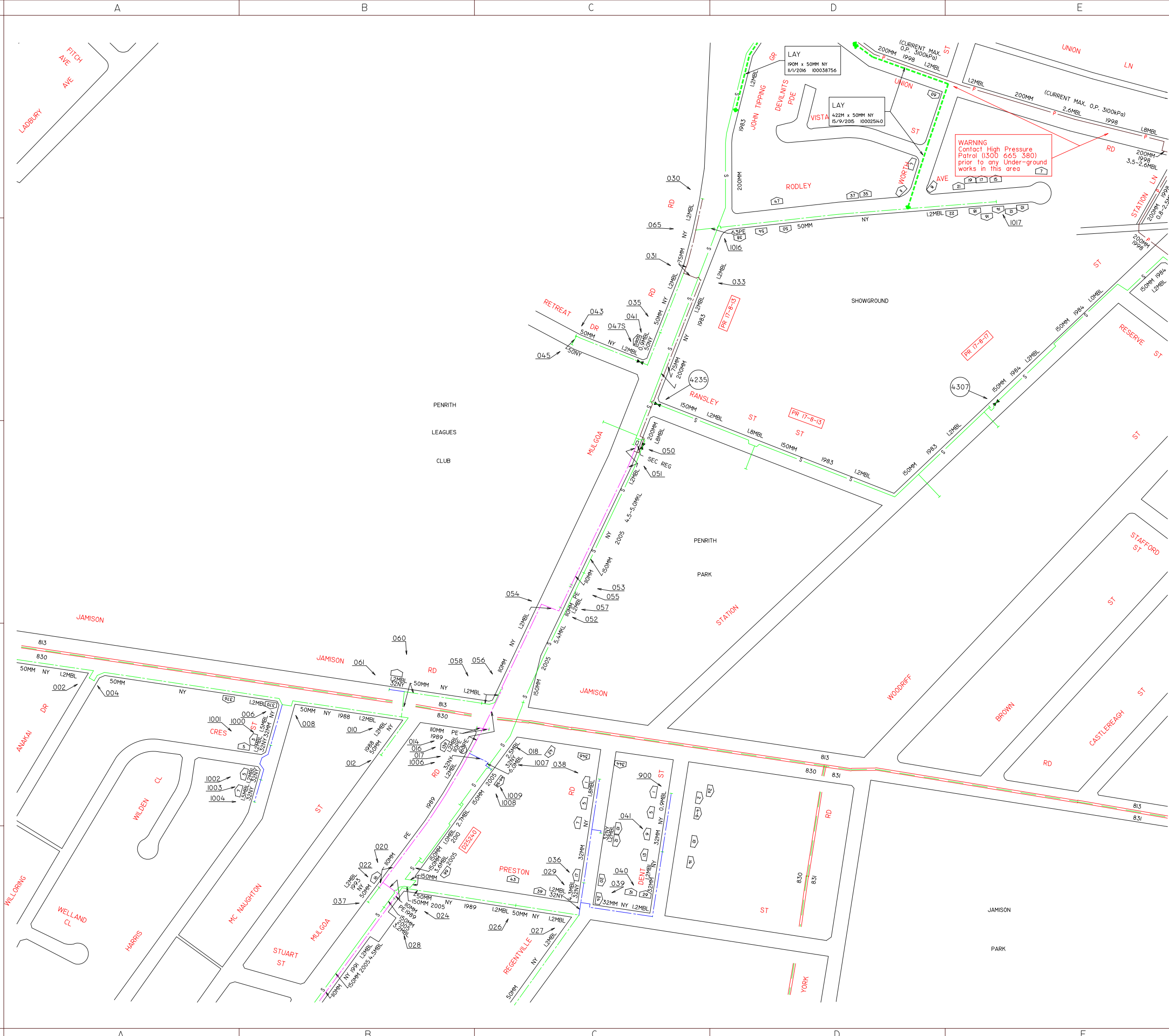
NETWORK AREA MUNICIPALITY AREA

Jemena

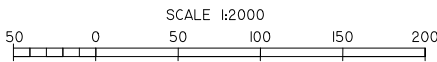
KEY

	MAX ALLOWABLE OPERATING PRESSURE
T	TRUNK PIPELINE 7000 kPa
P	PRIMARY MAIN 3500 kPa
S	SECONDARY MAIN 1050 kPa
400	NETWORK MAIN 400 kPa
300	NETWORK MAIN 300 kPa
210	NETWORK MAIN 210 kPa
100	NETWORK MAIN 100 kPa
30	NETWORK MAIN 30 kPa
7	NETWORK MAIN 7 kPa
2	NETWORK MAIN 2 kPa
PR II-2 3	STEEL MAIN PROJECT NUMBER
P	PRESSURE MONITORING STATION
V	VALVE
SR	SYSTEM PRESSURE REGULATOR
S	SIPHON
123	NETWORK NODE
123S	NETWORK VALVE NODE
123	VALVE NUMBER
6NB	6 INCH CAST IRON MAIN
150MM	150MM STEEL MAIN
110MM PE/NY	110MM POLYETHYLENE/NYLON MAIN
6NB 50MM NY	50MM NYLON INSERTED INTO 6NB MAIN CAST IRON MAIN
1.2MBL	DISTANCE IN METRES OF MAIN FROM BOUNDARY LINE
1957	YEAR LAID
++ ++	MUNICIPALITY BOUNDARY
== ==	NETWORK BOUNDARY
123	HOUSE NUMBER

PENRITH 6A



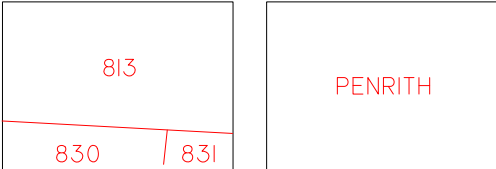
PENRITH
6C



THIS MAP UPDATED ON 11/1/16
THIS PLAN IS DIAGRAMATIC ONLY. DISTANCES
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DATE ALTERED:..... BY:.....

PE5B	PE6A	PE6B
PE5D	PE6C	PE6D
PE8B	PE9A	PE9B

ADJOINING MAPS



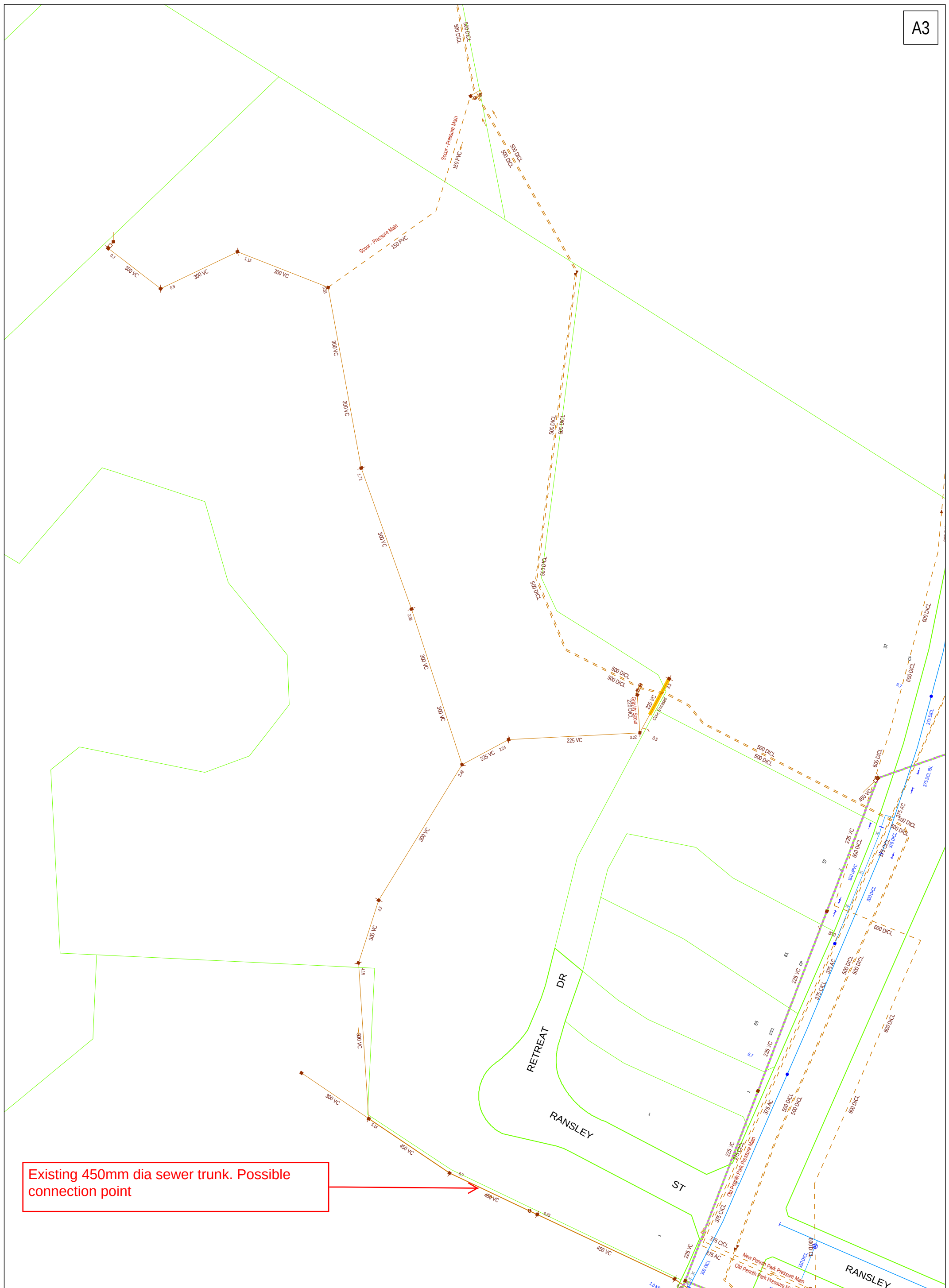
NETWORK AREA MUNICIPALITY AREA

Jemena

KEY		
MAX ALLOWABLE OPERATING PRESSURE		
T	TRUNK PIPELINE	7000 kPa
P	PRIMARY MAIN	3500 kPa
S	SECONDARY MAIN	1050 kPa
400	NETWORK MAIN	400 kPa
300	NETWORK MAIN	300 kPa
210	NETWORK MAIN	210 kPa
100	NETWORK MAIN	100 kPa
30	NETWORK MAIN	30 kPa
7	NETWORK MAIN	7 kPa
2	NETWORK MAIN	2 kPa
PR II-2 3	PROPOSED MAINS	

PR II-2 3	STEEL MAIN PROJECT NUMBER
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V	VALVE
R	SYSTEM PRESSURE REGULATOR
S	SIPHON
N	NETWORK NODE
NV	NETWORK VALVE NODE
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1957	YEAR LAID
++ ++ ++	MUNICIPALITY BOUNDARY
---	NETWORK BOUNDARY
123	HOUSE NUMBER

PENRITH 6C



DBYD Address:
n/a Mulgoa Road
Penrith NSW 2750

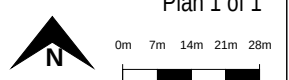
DBYD Job No: 10237834

DBYD Sequence No: 50623999

Copyright Reserved Sydney Water 2016
No warranty is given that the information shown is complete or accurate.
SYDNEY WATER CORPORATION

Scale: 1:1500

Date of Production: 04/02/2016





To: Ms Lydia De Guzman
Phone: 02 47203300
Fax: Not Supplied
Email: ldeguzman@jwprince.com.au

Dial before you dig Job #:	10237834	 DIAL BEFORE YOU DIG www.1100.com.au Some impact. No onsite action required.
Sequence #	50624000	
Issue Date:	02/04/2016	
Location:	Mulgoa Road, Penrith, NSW-2750	

Location of Underground Telecommunications Facilities and Power Facilities

We thank you for your enquiry. In relation to your enquiry at the above address:

- **nbn's** records indicate that there **ARE** underground fibre optic, telecommunications and/or power facility/facilities (owned or controlled by **nbn**) in the vicinity of the location identified above ("Location").
- **nbn** indicative plan/s are attached with this notice ("Indicative Plans").
- The Indicative Plan/s show general depth and alignment information only and are not an exact, scale or accurate depiction of the location, depth and alignment of the fibre optic, telecommunications and/or power facilities shown on the plan/s.
- In particular, the fact that the Indicative Plan/s show that a facility is installed in a straight line, or at uniform depth along its length cannot be relied upon as evidence that the facility is, in fact, installed in a straight line or at uniform depth.
- You should read the Indicative Plans in conjunction with this notice and in particular, the notes below.
- You should note that, at the present time, the Indicative Plans are likely to be more accurate in showing location of fibre optics and telecommunications cables than power cables. There may be a variation between the line depicted on the Indicative Plans and the location of any power cables. As such, consistent with the notes below, particular care must be taken by you to make your own enquiries and investigations to precisely locate any power cables and manage the risk arising from such cables accordingly.
- The information contained in the Indicative Plans is valid for 28 days from the date of issue set out above. You are expected to make your own inquiries and perform your own investigations (including engaging appropriately qualified plant locators at your



expense to locate **nbn** telecommunications and/or power facilities during any activities you carry out on site).

We thank you for your enquiry and appreciate your continued use of the Dial Before You Dig Service. If you are planning to excavate or require further information, please contact **nbn** on 1800 626 762. For any enquiries related to moving assets or Planning and Design activities, please email the **nbn** at relocationWorks@nbnc.com.au.

Notes:

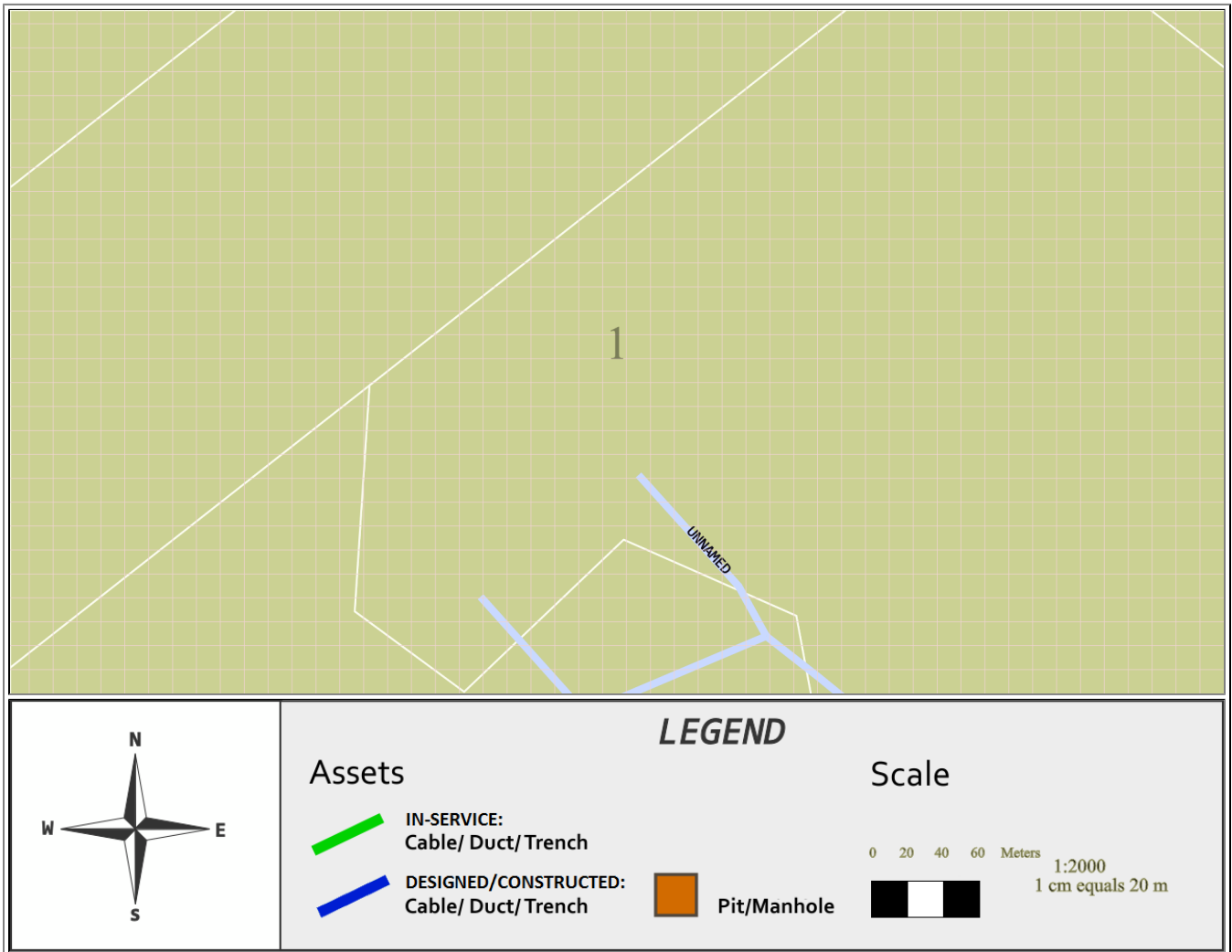
1. You are now aware that there are items of telecommunications and/or power facilities in the vicinity of the above property that could be damaged as a result activities carried out (or proposed to be carried out) by you in the vicinity of the Location.
2. You should have regard to section 474.6 and 474.7 of the *Criminal Code Act 1995* (CoA) which deals with the consequences of interfering or tampering with a telecommunications facility. Only persons authorised by **nbn** can interact with **nbn's** network facilities.
3. Any information provided is valid only for **28 days** from the date of issue set out above.

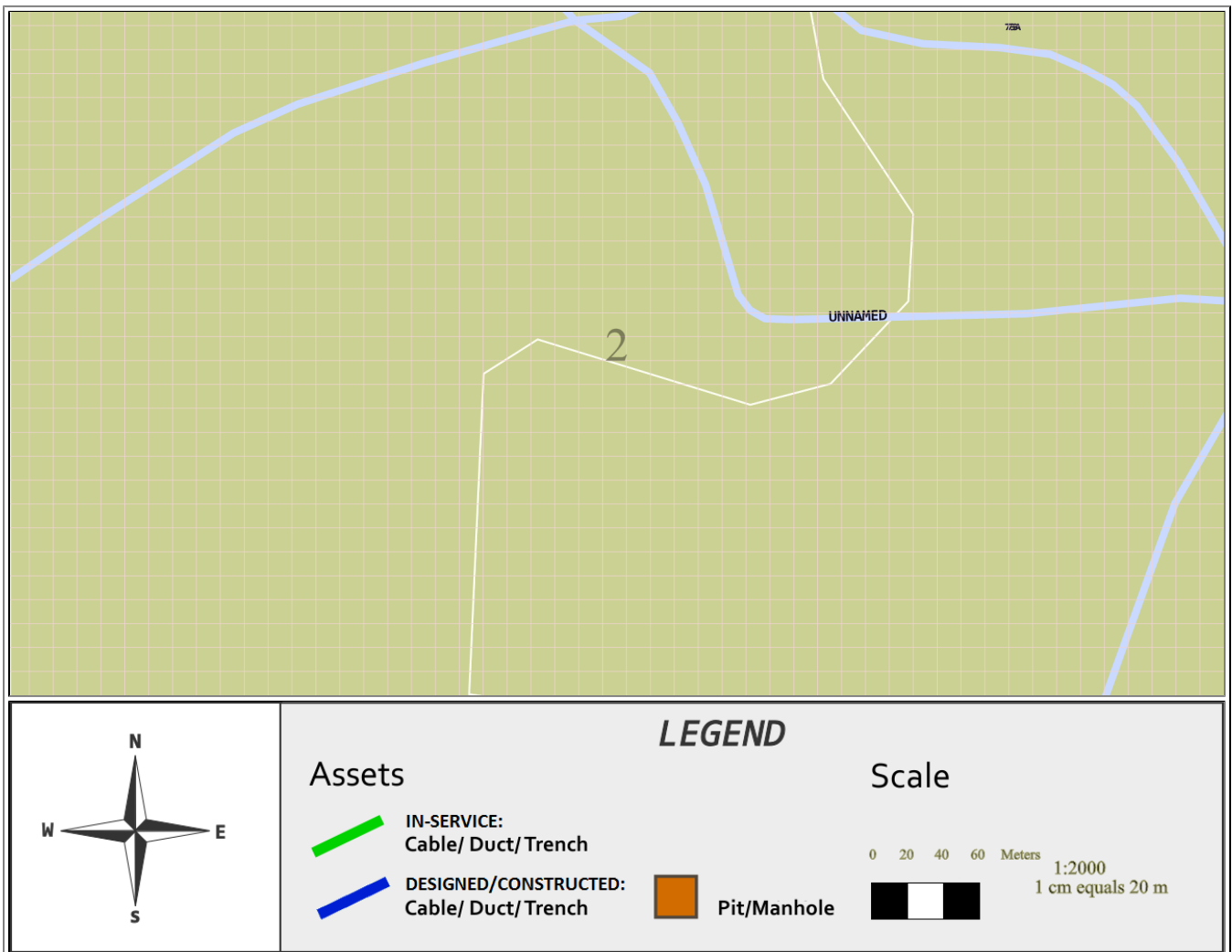
Indicative Plans

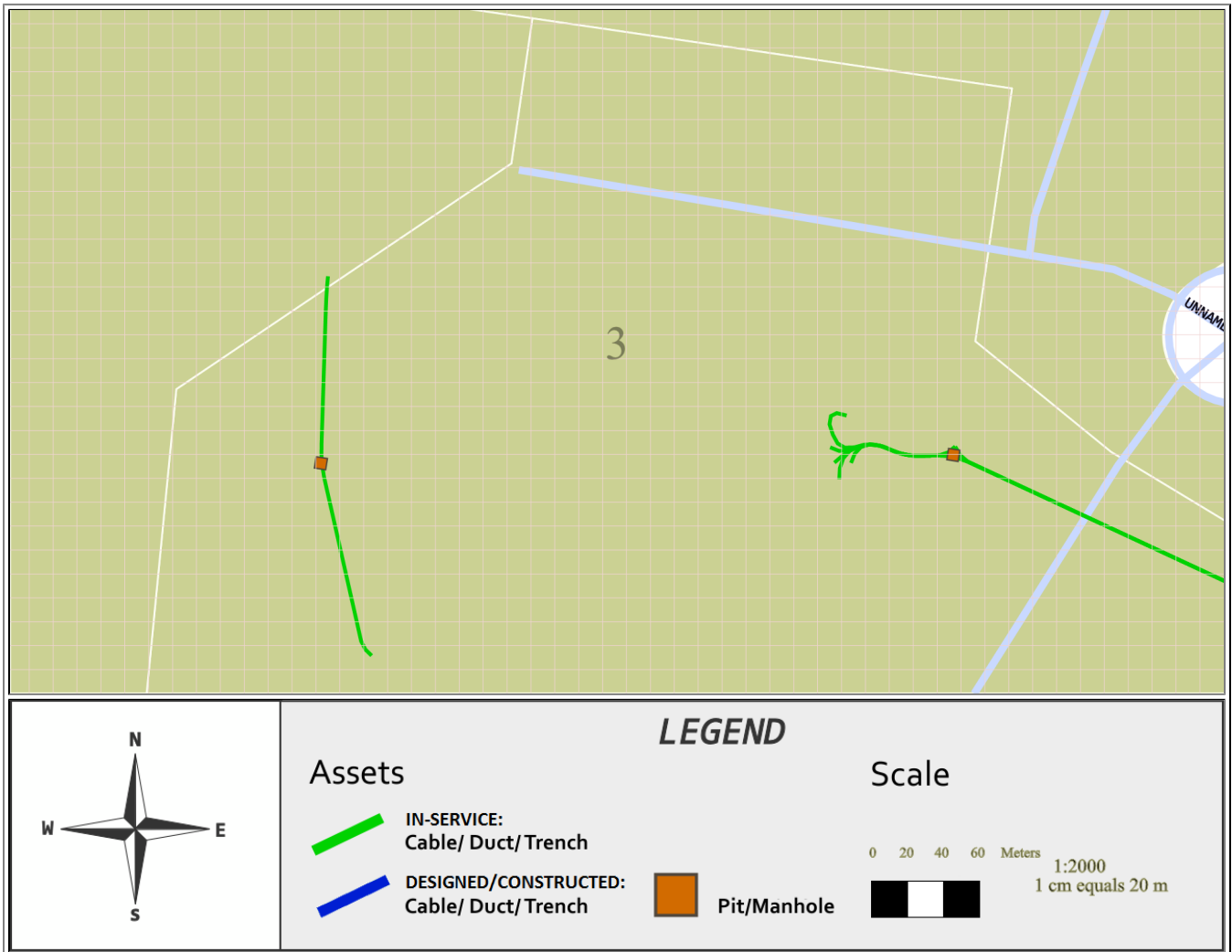
1	4
2	5
3	6

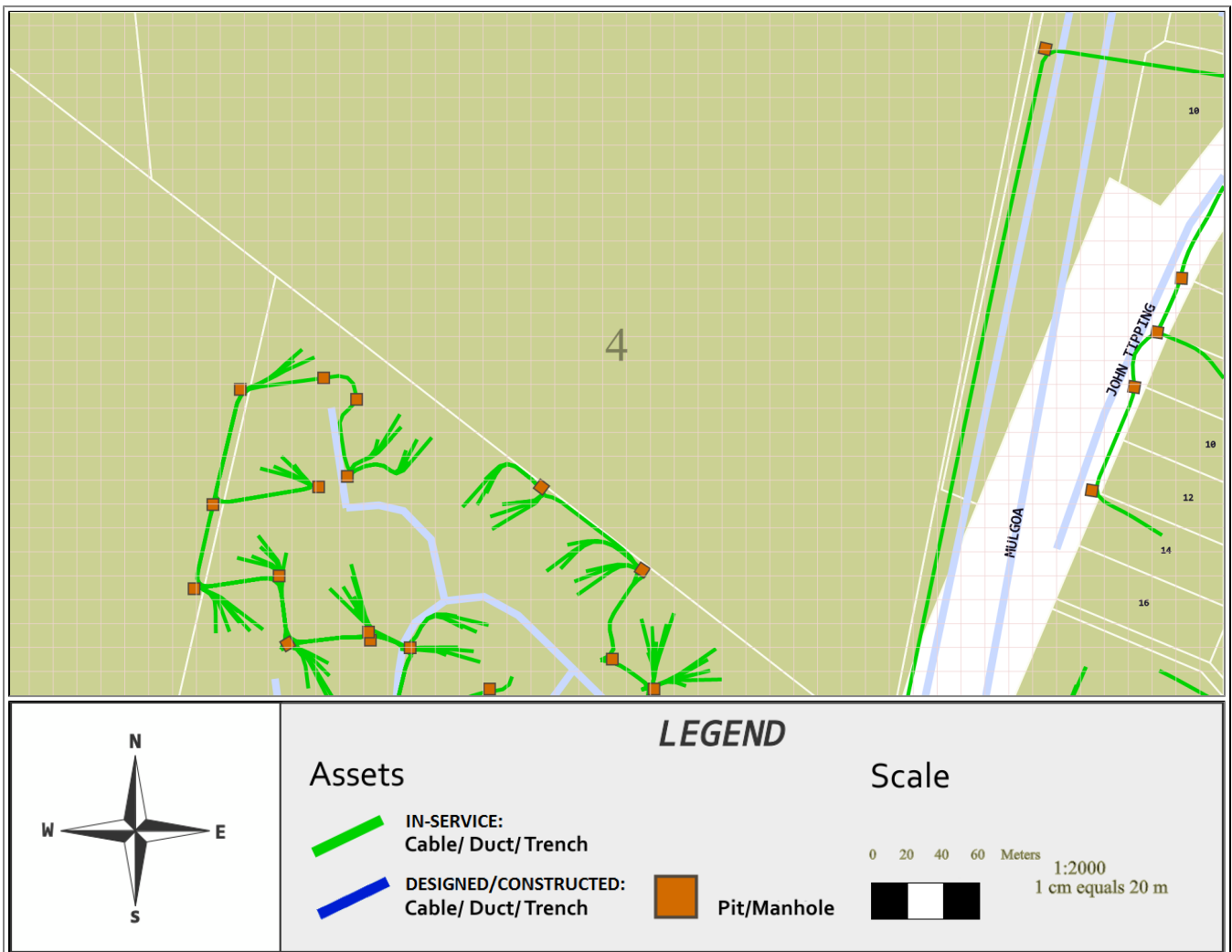
LEGEND

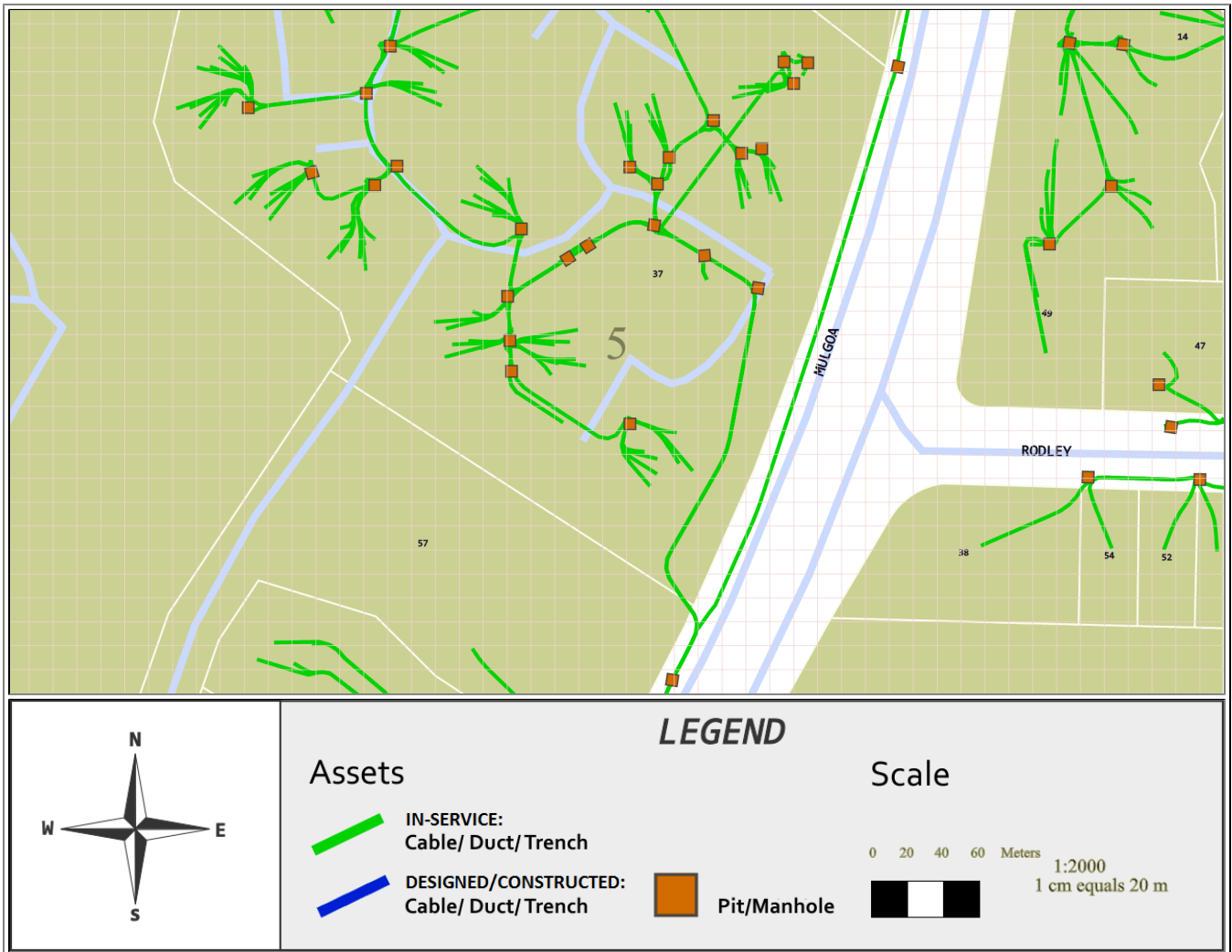
Assets	Scale
IN-SERVICE: Cable/ Duct/ Trench	0 20 40 60 Meters 1:2000 1 cm equals 20 m
DESIGNED/CONSTRUCTED: Cable/ Duct/ Trench	
Pit/Manhole	

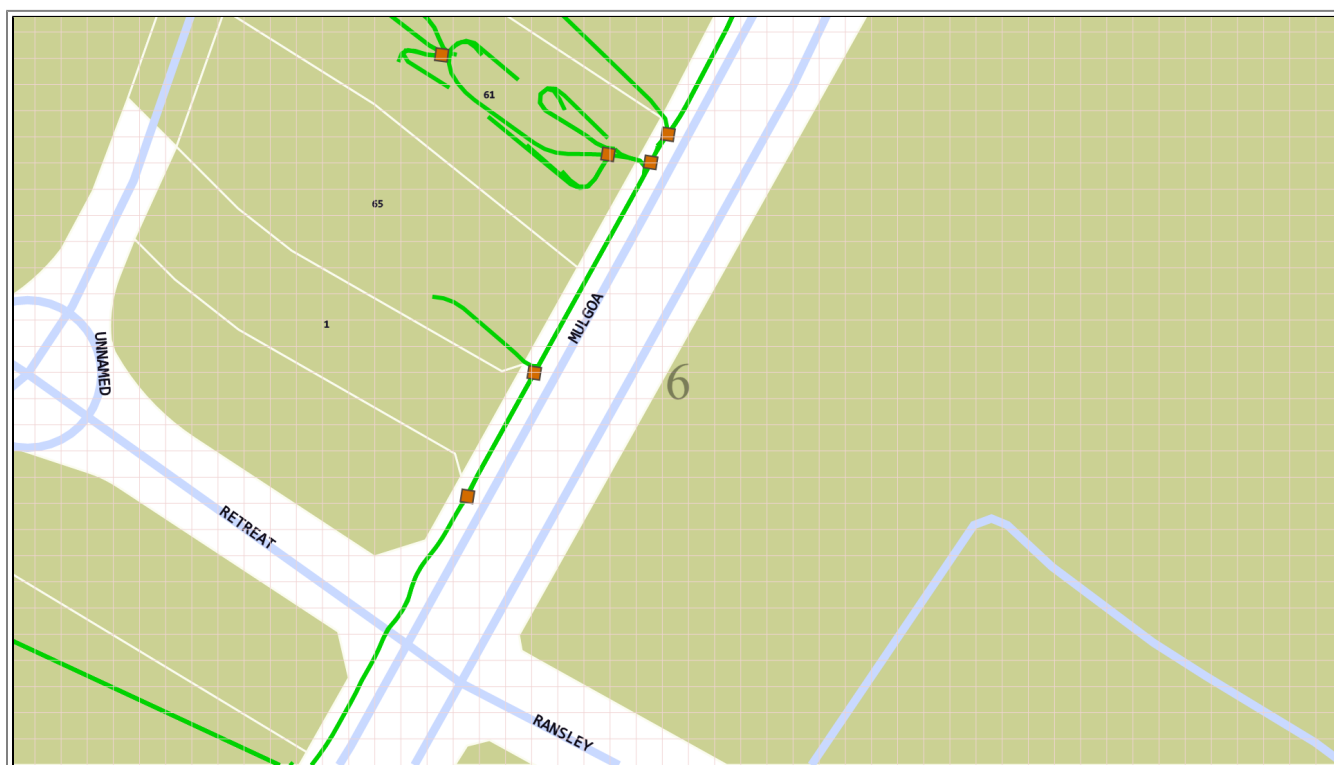












Referral Conditions

The following are conditions on which **nbn** provides you with the Indicative Plans. By accepting the plans, you are agreeing to these conditions. These conditions are in addition, and not in replacement of, any duties and obligations you have under applicable law.

1. **nbn** does not accept any responsibility for any inaccuracies of its plans. You are expected to make your own enquiries and perform your own investigations (including engaging appropriately qualified plant locators at your expense to locate **nbn** telecommunications and/or power facilities during any activities you carry out on site).
2. You acknowledge that **nbn** has specifically notified you above that the Indicative Plans are likely to be more accurate in showing location of fibre optics and telecommunications cables than power cables. There may be a variation between the line depicted on the Indicative Plans and the location of any power cables.
3. You should not assume that **nbn** cables and assets follow straight lines or are installed at uniform depths along their lengths, even if they are indicated on plans provided to you. Careful onsite investigations are essential to locate the exact position of cables.
4. In carrying out any works in the vicinity of **nbn** facilities, you must maintain the following minimum clearances:
 - 300mm when laying assets inline, horizontally or vertically
 - 500mm when operating vibrating equipment, for example: jackhammers or vibrating plates; and
 - 1000mm when operating mechanical excavators.



- Adherence to clearances as directed by other asset owner's instructions and take into account any uncertainty for power cables.
5. You are aware that there are inherent risks and dangers associated with carrying out work in the vicinity of underground facilities (such as **nbn** fibre optic, copper and coaxial cables, and power cable feed to **nbn** assets). Damage to underground electric cables may result in:
- Injury from electric shock or severe burns, with the possibility of death.
 - Interruption of the electricity supply to wide areas of the city.
 - Damage to your excavating plant.
 - Responsibility for the cost of repairs.
6. You must take all reasonable precautions to avoid damaging **nbn** facilities. These precautions may include, but not limited to, the following:
- All excavation sites should be examined for underground cables by careful hand excavation. Cable cover slabs if present must not be disturbed. Hand excavation needs to be undertaken with extreme care to minimise the likelihood of damage to the cable, for example, the blades of hand equipment should be aligned parallel to the line of the cable rather than digging across the cable.
 - If any undisclosed underground cables are located, notify **nbn** immediately.
 - All personnel must be properly briefed, particularly those associated with the use of earth-moving equipment, trenching, boring and pneumatic equipment.
 - The safety of the public and other workers must be ensured.
 - All excavations must be undertaken in accordance with all relevant legislation and regulations.
7. You will be responsible for all damage to **nbn** facilities that are connected whether directly, or indirectly with work you carry out (or work that is carried out for you or on your behalf) at the Location. This will include, without limitation, all losses expenses incurred by **nbn** as a result of any such damage.
8. You must immediately report any damage to **nbn**TM network that you are/become aware of. Notification may be by telephone - 1800 626 762.
9. Except to the extent that liability may not be capable of lawful exclusion, **nbn** and its servants and agents and the related bodies corporate of **nbn** and their servants and agents shall be under no liability whatsoever to any person for any loss or damage (including indirect or consequential loss or damage) however caused (including, without limitation, breach of contract negligence and/or breach of statute) which may be suffered or incurred from or in connection with this information sheet or any Plans attached hereto. Except as expressly provided to the contrary in this information sheet or the attached Indicative Plans, all terms, conditions, warranties, undertakings or representations (whether expressed or implied) are excluded to the fullest extent permitted by law.

All works undertaken shall be in accordance with all relevant legislations, acts and regulations applicable to the particular state or territory of the Location. The following table lists all relevant documents that shall be considered and adhered to.

State/Territory	Documents
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National	Work Health and Safety Act 2011
	Work Health and Safety Regulations 2011
	Safe Work Australia - Working in the Vicinity of Overhead and Underground Electric Lines (Draft)
	Occupational Health and Safety Act 1991
NSW	Electricity Supply Act 1995
	Work Cover NSW - Work Near Underground Assets Guide
	Work Cover NSW - Excavation Work: Code of Practice
VIC	Electricity Safety Act 1998
	Electricity Safety (Network Asset) Regulations 1999
QLD	Electrical Safety Act 2002
	Code of Practice for Working Near Exposed Live Parts
SA	Electricity Act 1996
TAS	Tasmanian Electricity Supply Industry Act 1995
WA	Electricity Act 1945
	Electricity Regulations 1947
NT	Electricity Reform Act 2005
	Electricity Reform (Safety and Technical) Regulations 2005
ACT	Electricity Act 1971

Thank You,

Network Operations Centre - Assurance

Date: 02/04/2016

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