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Julius Avenue Data Centre

Infrastructure Delivery, Management & Staging Plan

ISPT

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FINAL ISSUE

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1. EXECUTIVE SUMMARY

1.1 General

This report has been prepared as part of the State Significant Development Application (SSDA) submission for the proposed Julius Avenue Data Centre, being developed by ISPT. It responds to the Planning Secretary's Environmental Assessment Requirements (SEARs) Item 22 - Infrastructure Requirements and Utilities. The content of this report is intended to explain the services infrastructure and utility impacts of the project.

The SEARs requirement for this report is noted below:

In consultation with relevant service providers:

- a) *Assess the impacts of the development on existing utility infrastructure and service provider assets surrounding the site.*
- b) *Identify any infrastructure required on-site and off-site to facilitate the development and any arrangements to ensure that the upgrades will be implemented on time and be maintained.*
- c) *Provide an infrastructure delivery and staging plan, including a description of how infrastructure requirements would be co-ordinated, funded and delivered to facilitate the development.*

The site is located at 6-8 Julius Avenue North Ryde, within the Riverside Corporate Park on Delhi Road. The site is approximately 9km North West of the Sydney CBD, in Sydney's northern suburbs.

From our review of publicly available information and from our own investigations, we believe that the site in question provides a good opportunity for a data centre development with manageable risk for all considered factors, noting the need for new Ausgrid power infrastructure to service the development.

There is a lack of power available in the short term, and a possibility of <15MVA power available in the medium term (2-3 years) or power at 33kV from Ausgrid's planned capacity upgrade is not possible. As the site is quite large, there is also a potential that a 132kV feed could be taken directly from nearby 132kV overhead powerlines, with a formal proposal and offer expected from Ausgrid in April 2025.

The general site risks considered are summarised in the risk table below:

Risk Event	High	Med	Low	Comment
Flood Risk			✓	Not affected by 1 in 100-year flood.
Railway Line			✓	No nearby above ground railway lines
EMI & RFI			✓	132kV overhead powerlines more than 200m away
Airspace			✓	Distant from airport, however under a flight path

Road Network			✓	Good link with major highway. Potential for future highway to have negative implications
Proximity to Coast			✓	Far from coastal or navigable inland waterways
Noise & Acoustic – sensitive neighbours		✓		Nearest residential properties are approximately 170m away.
Adjacent Industrial Facilities			✓	We have no identified undesirable neighbours within a distance that would pose a risk
Planning			✓	Zoned as E2 and E3 which is suitable for data centre use with 30m minimum max building height and 1:1 minimum FSR. Site planning will be required to align to strategic masterplan objectives and planning policies which current focus is on employment growth, high quality urban design and fostering an innovation precinct.
Site Contamination			✓	Geotech investigations have indicated no site contamination issues that preclude the proposed development.
Bush Fire & Natural Disaster Risk		✓		Site is within bush fire zone, but adjacent to vegetation buffer zone. This can be managed.
Mine Subsidence			✓	Not within mine subsidence zoning
Other risk factors				Refer to 'Other location risk factors' detailed assessment within Section 4.16 of this report.
Utilities	✓			Adequate telecommunications, potable water, sewerage, and stormwater utilities. No power availability at time of enquiry, with potential for <15MVA to be available in 2-3 years. Application has been submitted with Ausgrid to confirm power availability in coordination with their network planning to see if connection can be obtained via overhead 132kV transmission lines in proximity to the site.

2. INTRODUCTION

The report is based on desktop studies, publicly available information and the initial schematic design work undertaken on the project. This report presents findings from the review of site location risk factors such as flood risk, as well as provisioning availability for site access to major road networks and the like.

2.1 Report Limitations

The report specifically excludes consideration of the following items which are out of scope for the assignment, and generally covered in other SSDA/SEARs reports or otherwise part of subsequent design stages:

- Detailed Town planning review including zoning and usage
- Commercial benchmarking (rental levels, construction cost benchmarking etc)
- Development risks such as marketability, size of market, etc
- EMF measurements
- Air borne pollution survey (important for direct free cooling)
- Photographic dilapidation survey
- Operational cost forecasts
- Testing or destructive analysis
- Detailed assessment of existing plant and equipment

2.2 Disclaimer

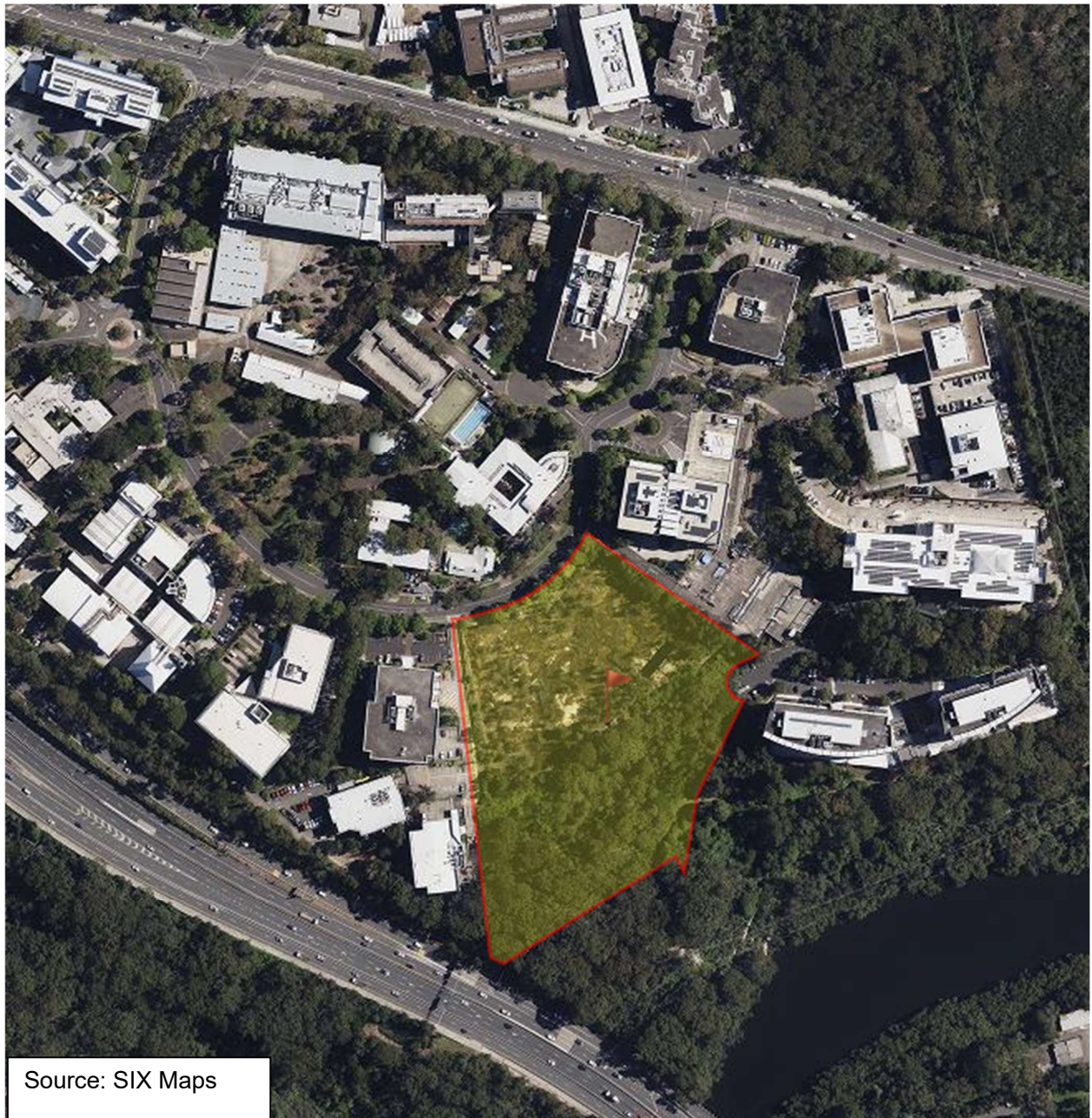
IGS believes the information contained in this document is accurate as of its publication date. IGS makes no warranty of any kind with regards to any existing site conditions or its services, including, but not limited to, the implied warranties of merchantability and fitness for any particular purpose. IGS shall not be held liable for errors contained herein and/or direct, indirect, special, incidental or consequential damages in connection with furnishing, performance, and/or use of this material.

Whilst this report references the requirements of the Uptime Institute Tier Standard and the TIA-942 Tier Standard and reviews the site against the requirements of those standards this report doesn't provide certification of any tier rating.

3. SITE DESCRIPTION AND DESKTOP ASSESSMENT

3.1 Location

The Julius Avenue Data Centre site (shown in Figure 1) is located in the City of Ryde local council catchment, within an area which is predominantly business park with office space and commercial properties. According to the NSW Spatial Information Exchange (SIX Maps) the address of the single lot (DP 1082131) is 6 – 8 Julius Avenue. The site is located approximately 60m above sea level measured at Julius Avenue.



Source: SIX Maps

Figure 1: Aerial Site View

3.2 Site Layout

The site is bordered by Julius Avenue to the North, Epping Road to the South West and other commercial properties on the other boundaries.

The site is currently vacant and unoccupied with any buildings however the site is within a corporate park which is comprised of multiple buildings including office space, laboratories, carparks, some other smaller buildings and adjoining driveways.

An existing approved DA is held by ISPT for four commercial office towers. An original site cut and some detail excavation was undertaken for that DA in the early 2000s however the office tower construction did not proceed.

The Deposited Plan and existing inground services overlay plan indicates applicable easements that are associated with the site. These are included in the appendix.

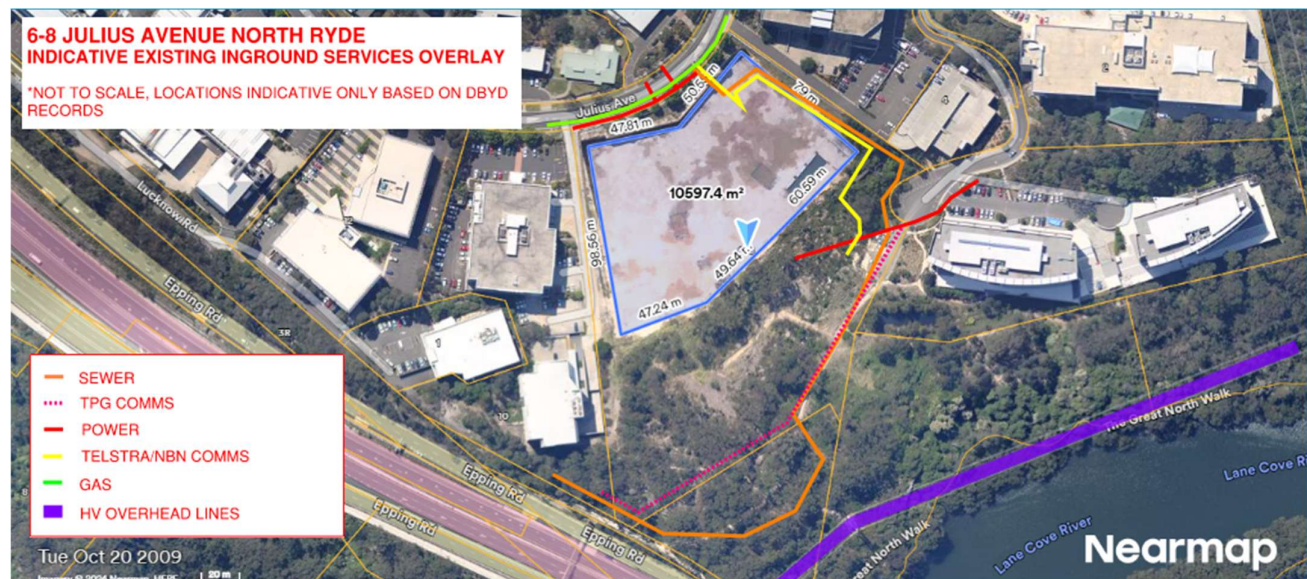


Figure 2: Indicative Simplified BYDA Existing Inground Services Overlay

3.3 Railway Lines

The nearest railway line to the site is the Metro Northwest Line, however as this line is underground it poses minimal risk with regards to above ground derailment. The nearest above ground railway line is more than 3km away and as such poses no risk.



Figure 3: Railway Lines

3.4 EMF & RFI

Electromagnetic interference (EMI) and radio-frequency interference (RFI) is often generated from nearby high voltage powerlines and telecommunications towers. As shown in Figure 6, there are 132kV overhead power lines running east and south of the site. As the closest these lines come to site is 50m from property boundary and approximately 150m from our main buildings, it is anticipated that the EMI & RFI impact will not be a risk. At distances of 50 meters or more, EMF levels are typically close to background levels, well below safety limits.



Figure 4: EMI from Nearby Structures

3.5 Controlled Airspace and Flightpaths

Shown in Figure 7 are nearby airports and helipads. The nearest airport is the Sydney International Airport, which is about 15km away. The closest Helipad is located at Royal North Shore Hospital and is 5km away.

TIA-942¹ stipulates a distance of greater than 1.6km from major airports for a tier 3 site, and a distance of greater than 8km for Tier 4 sites which this site would comply with. Our brief is to aim for a Tier 3 design,

Shown in Figure 8 are the average jet flight paths for the Sydney International Airport. Figure 8. This shows that there are flight paths for this airport that are overhead of the site. The impact posed is considered a manageable residual risk. As an example, there are other significant data centre developments nearby in this same flight path.

¹ TIA-942 Data Centre Standards Overview is an American standard published by the Telecommunications Industry Association (TIA) which provides several requirements and recommendations for designing, building, and maintaining data centre infrastructure.

² The ANSI/TIA-942 standard describes four (4) rating levels in which data centres can be classified regarding infrastructure redundancy. Tier 3 is regarded as "Concurrently Maintainable".

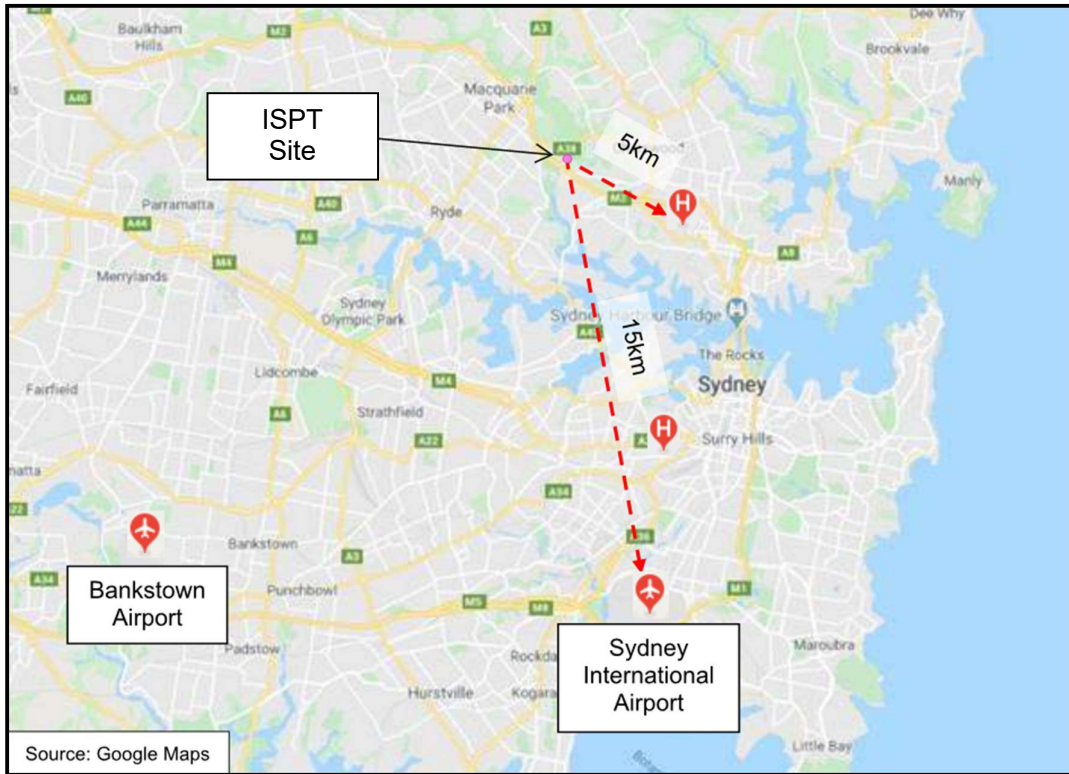


Figure 5: Nearby Airports & Helipads

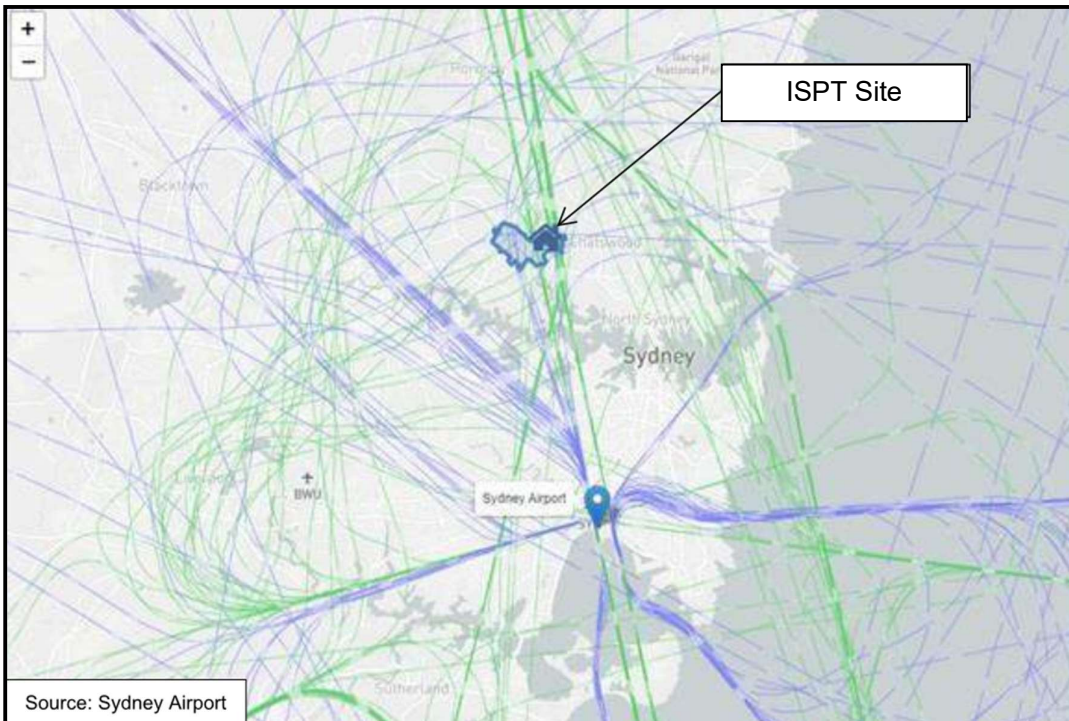


Figure 6: Sydney Airport Average Jet Movements

3.6 Proximity to Major Roads & Highways

The site is located on Julius Avenue, which is a two-lane street in a commercial area of North Ryde. The site frontage of 6 - 8 Julius Avenue faces onto Julius Avenue, which in turn connects to Delhi Rd which is a five (5) lane road at west end, feeding onto the major arterial road M2 motorway and Epping Rd. The M2 motorway is 50msouth-west of the site at the closest. These roads can be seen on Figure 9.

The proximity to the M2 allows excellent road access for goods deliveries and staff. As well as this the existing site would have sufficient car parking spaces for a data centre facility and existing access to site for deliveries is good. Large cloud customers typically look for sites with the ability to bring trucks with 20 or 40ft shipping containers for the purpose of delivery of racks. The provision of parking would be considered in conjunction with the development application for the building and use.

TIA-942 stipulates a distance from major highway traffic arteries of greater than 91m for a tier 3 site and greater than 0.8km for tier 4 sites, which this site would not comply with. Historically tier 4 sites (particularly those claiming compliance with TIA-942 tier 4) have rarely been constructed in Australia. More recently customers constructing sites of tier ratings greater than tier 3 are often choosing to construct to Uptime Institute Tier IV rather than TIA 942 tier. The Uptime Institute tier standard does not place a restriction on the distance from major highway traffic arteries.

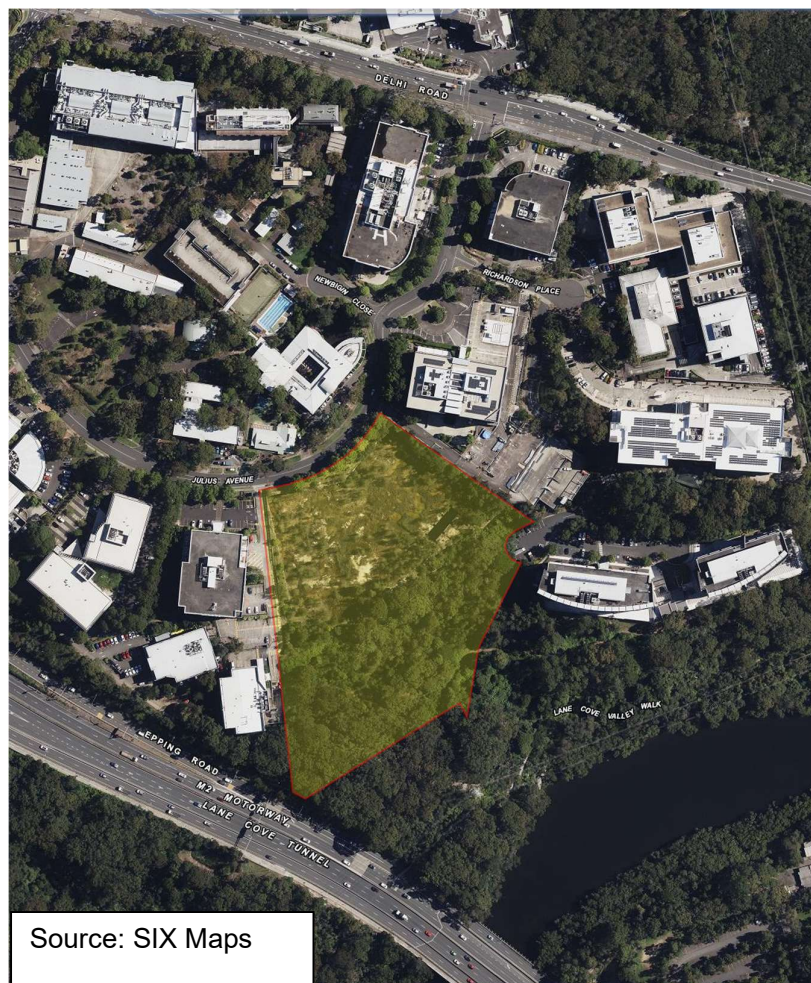


Figure 7: Nearby Roadways

3.7 Proximity to Coastal or Navigable Inland Waterways

As shown in Figure 10, the site boundary is 70m south-east of the Lane Cove River, which is 30 – 40m lower than the site and has an average depth of 4m and is about 50m wide near the site. The electrical STSS is 91m with the nearest building approximately 110m away from the river. TIA-942 stipulates a distance of greater than 91m from coastal or navigable inland waterways for a tier 3 site which this site complies with.

TIA-942 stipulates a distance of greater than 0.8km from coastal or navigable inland waterways for tier 4 sites, which this site would not comply with. More recently customers constructing sites of tier ratings greater than tier 3 are often choosing to construct to Uptime Institute Tier IV rather than TIA-942 tier 4. The Uptime Institute tier standard does not place a restriction on the distance to coastal or navigable inland waterways.

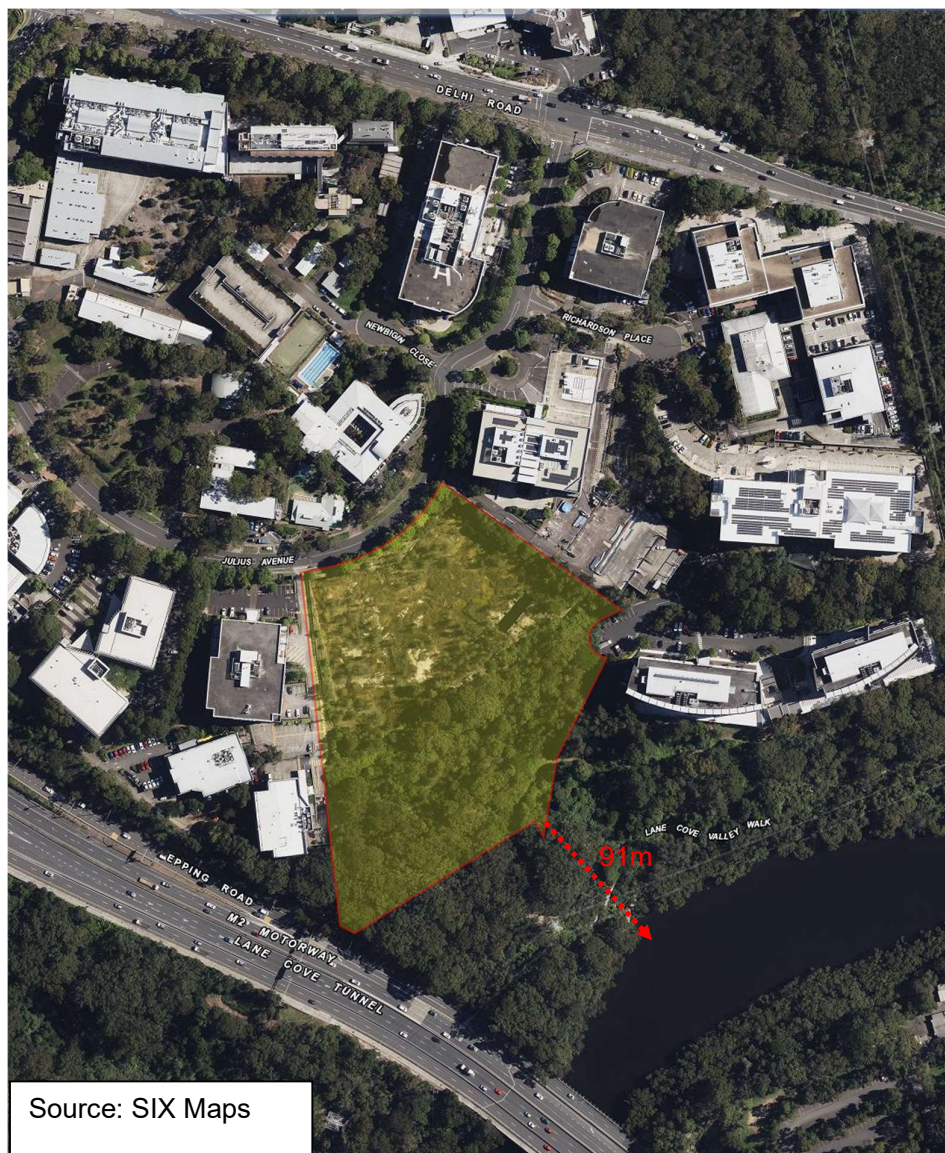


Figure 8: Nearby Waterways

3.8 Noise & Acoustic Risk – Proximity to Sensitive Receivers

The sites / buildings in the immediate surrounding area are mostly commercial developments, with the nearest residential properties 150 - 200m to the west, at the North Ryde station precinct, and south over Epping Road as shown in Figure 11.

Due to the large quantities of cooling and power generator plant required by data centres, near proximity to residential premises and other sensitive receivers can significantly increase the cost of major equipment due to additional attenuation required. For this site the distance from these sensitive receivers appears to be such that the noise criteria would be manageable and not pose a risk to the use of the site as a data centre. We have accounted for the potential future Aqualand site zoning for residential across the road (approximately 150m to the NW) and have also selected rooftop mechanical equipment that is the lowest possible noise rating.

A detailed acoustic assessment has been undertaken confirming that the development can meet the required noise criteria. This report is included within the SSDA/SEARs submission under separate cover.

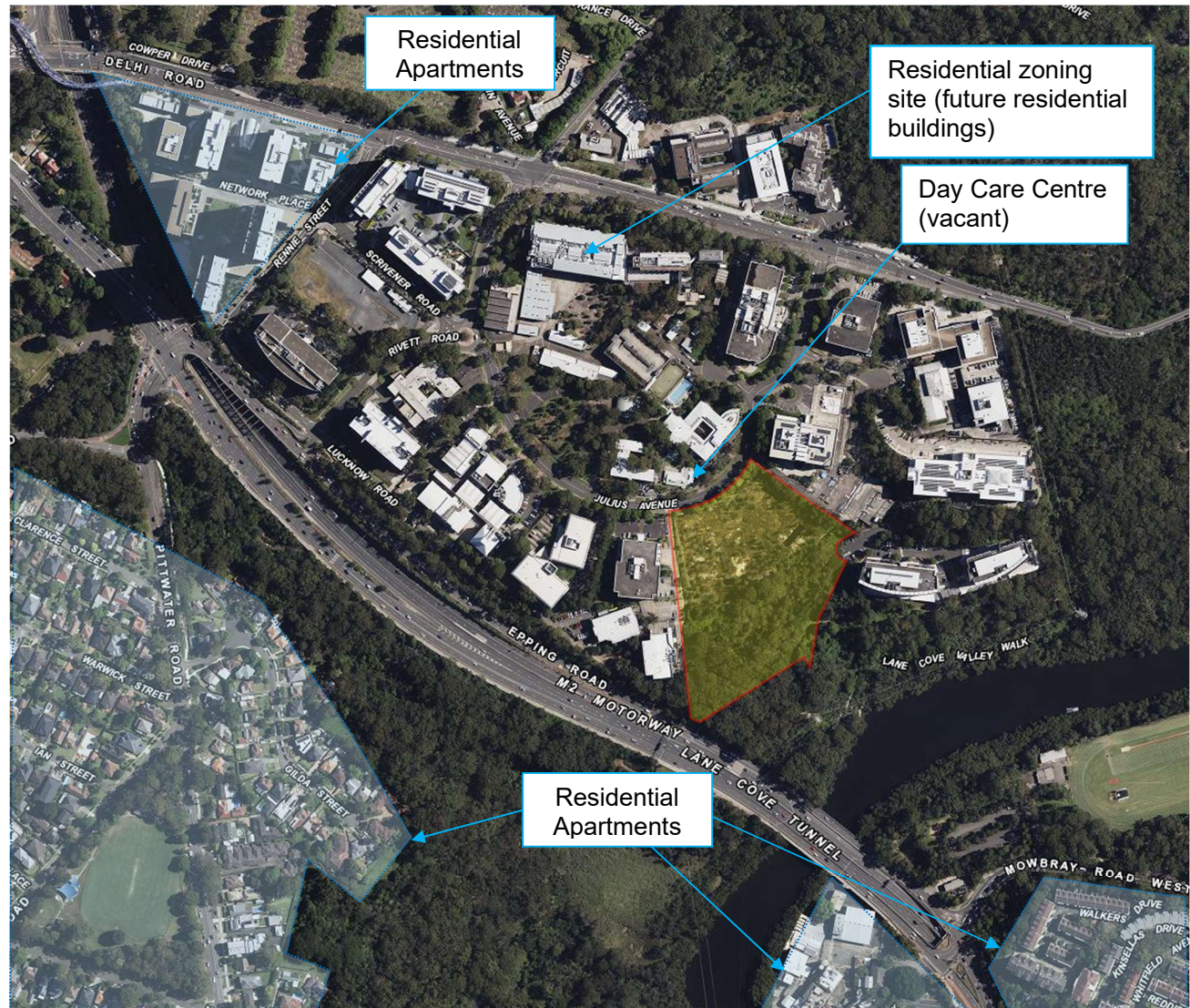


Figure 9: Adjacent Neighbours

3.9 Adjacent Industrial Facilities

Surrounding the site are mostly commercial facilities. From the information available none of these facilities appear to be of cause for concern. Industrial facilities that are undesirable neighbours include fuel storage and refilling stations, chemical plants, fireworks factories etc.

3.10 Site Contamination

Contamination investigations have been completed confirming no issues precluding the proposed development. This report is included within the SSDA/SEARs submission under separate cover.

3.11 Bushfire Risk, Flooding Risk & Other Natural Disasters

The site has been assessed for its risk due to bush fire from information produced by the NSW Rural Fire Service. As shown below in Figures 10 and 11, the site is within a designated bushfire prone area. A bushfire consultant has assessed the site, and all risks are deemed manageable. This report is included within the SSDA/SEARs submission under separate cover.

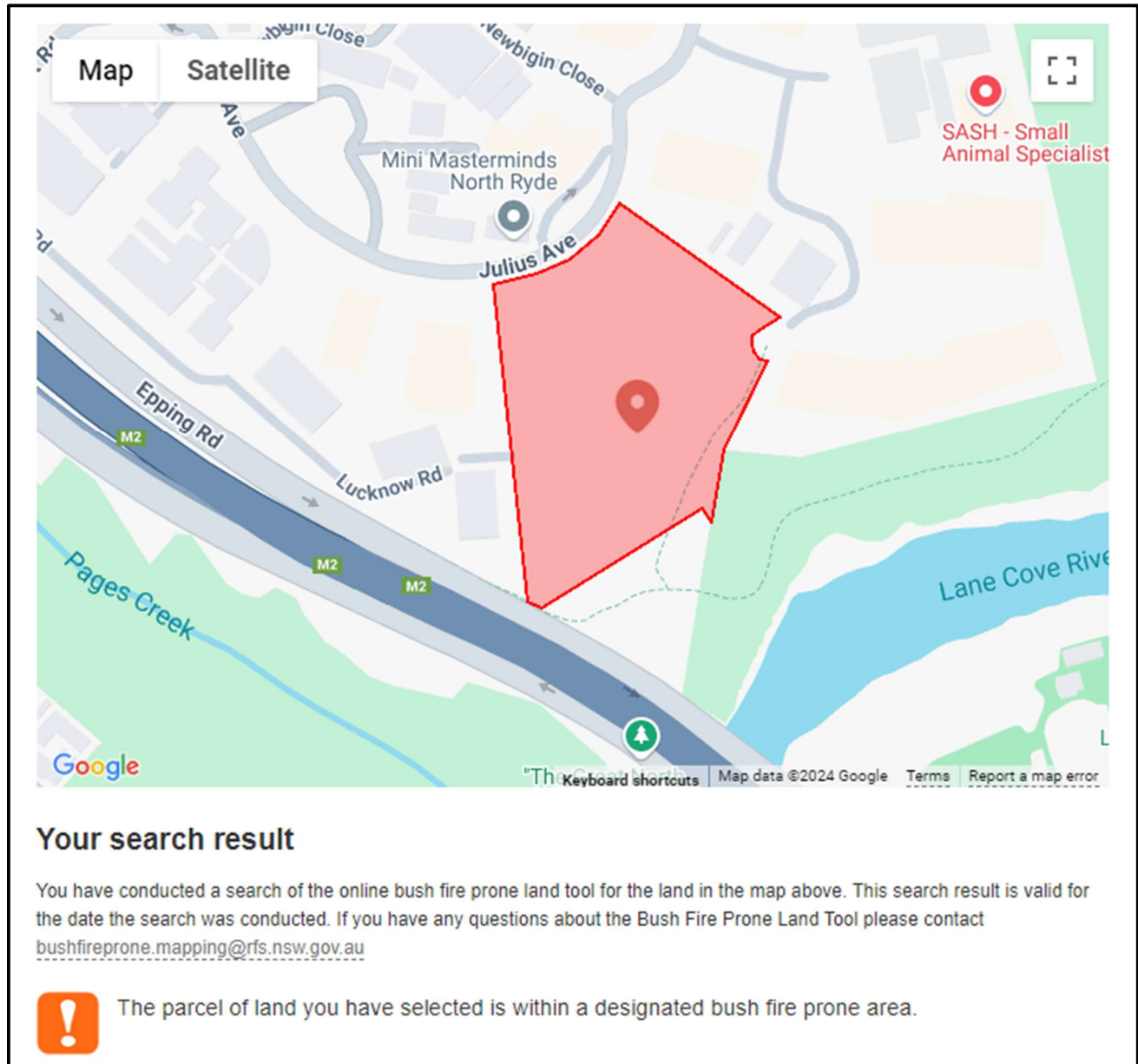


Figure 10: Bushfire, Flooding & Other Natural Disaster Risk Map

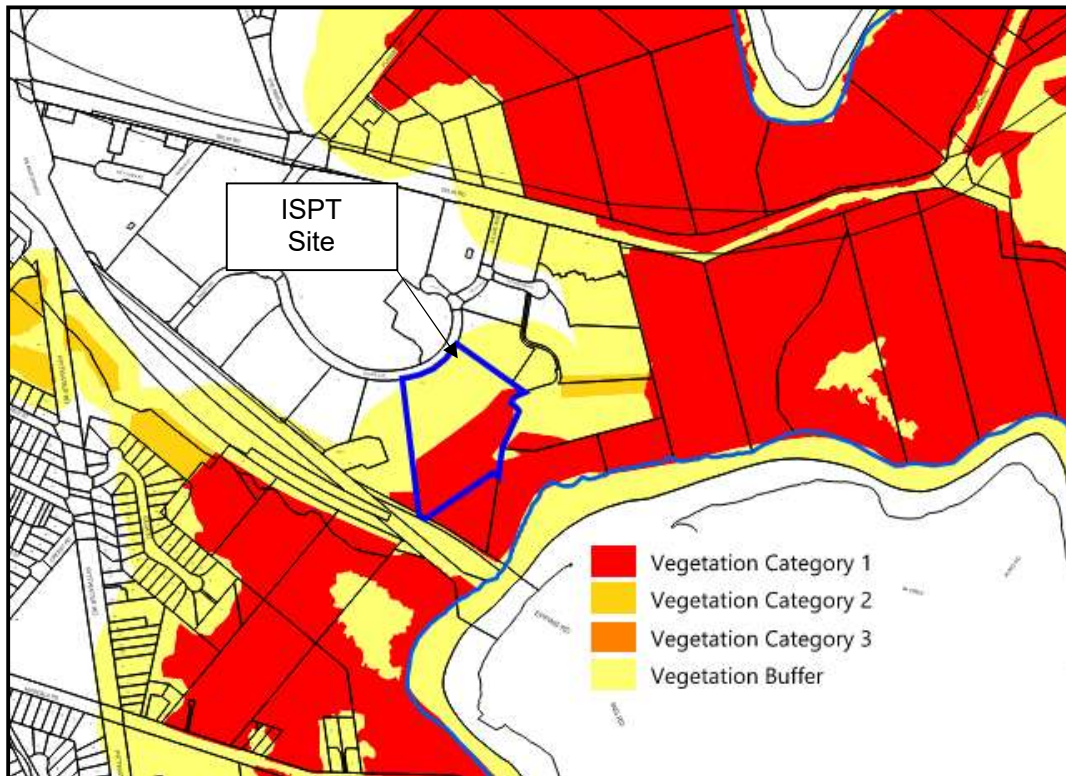


Figure 11: Bush Fire Prone Map

The proposed site is not affected by the 1 in 100-year flood, as determined by the City of Ryde Council as shown in 12 below. A detailed Flood Study has been undertaken as part of the SSDA/SEARs submission, indicating no major risks to the development. This report is included within the SSDA/SEARs submission under separate cover.



Figure 12: Flood Map

SGS Economics & Planning have mapped the natural peril risk levels of various natural disasters with data provided by the Insurance Council of Australia and IAG. This data has been used to determine the risk of natural disasters for the site including earthquake and storm.

The risk due to earthquake in the LGA of Ryde as shown in Figure 13 is high. This will need to be considered during the detailed design, however compliance to the NCC and BCA should provide sufficient requirements for this.

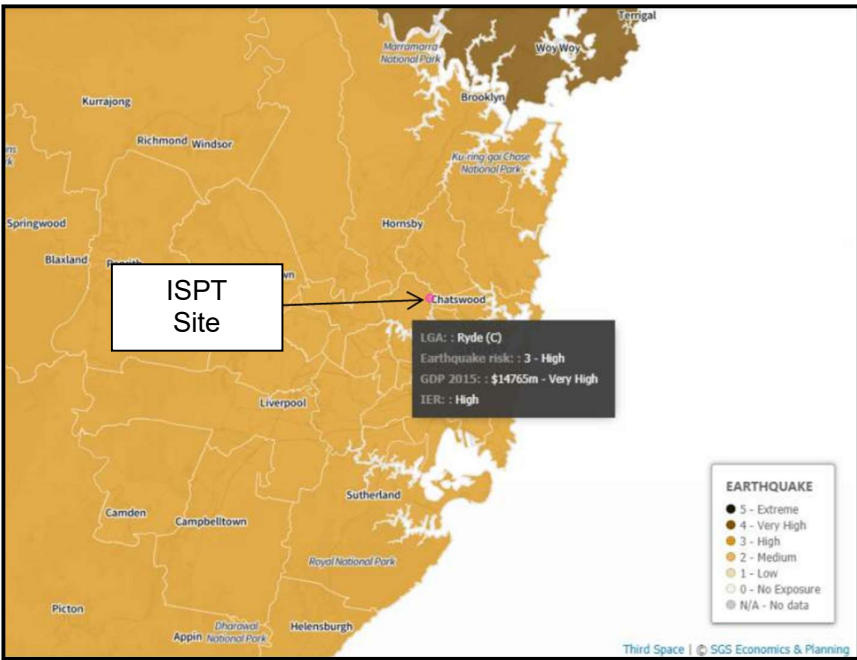


Figure 13: Risk Due Earthquake

The risk due to storm in the LGA of Ryde as shown in Figure 14 is low, and as such is not a notable risk to the use of this site as a data centre.

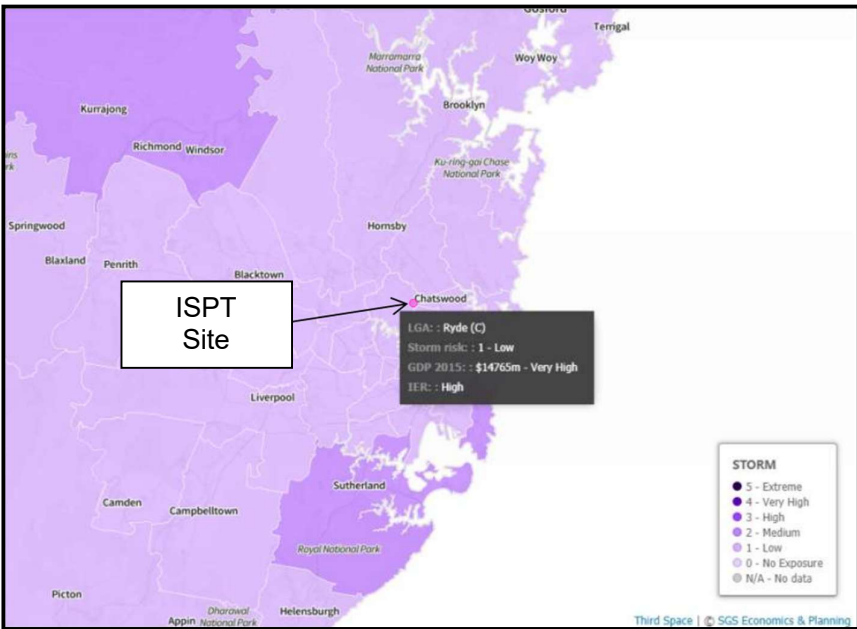


Figure 14: Risk Due Storm

3.12 Mine Subsidence Zoning

The NSW Government records do not classify the site as within mine subsidence zoning, as demonstrated by the lack of mention in the NSW Government Property Report contained in Appendix C.

3.13 Acid Sulfate Soils

The NSW Government records do not classify the site as having acid sulfate soils. Figure 15 shown below is the council supplied map which shows the site as partially being within Class 5 zoning which is defined as follows: “Acid sulfate soils are not typically found in Class 5 areas. Areas classified as Class 5 are located within 500 metres on adjacent class 1,2,3 or 4 land”.

Geotechnical investigations have been undertaken confirming that no Acid Sulphate Soils are present on site. This report is included within the SSDA/SEARs submission under separate cover.

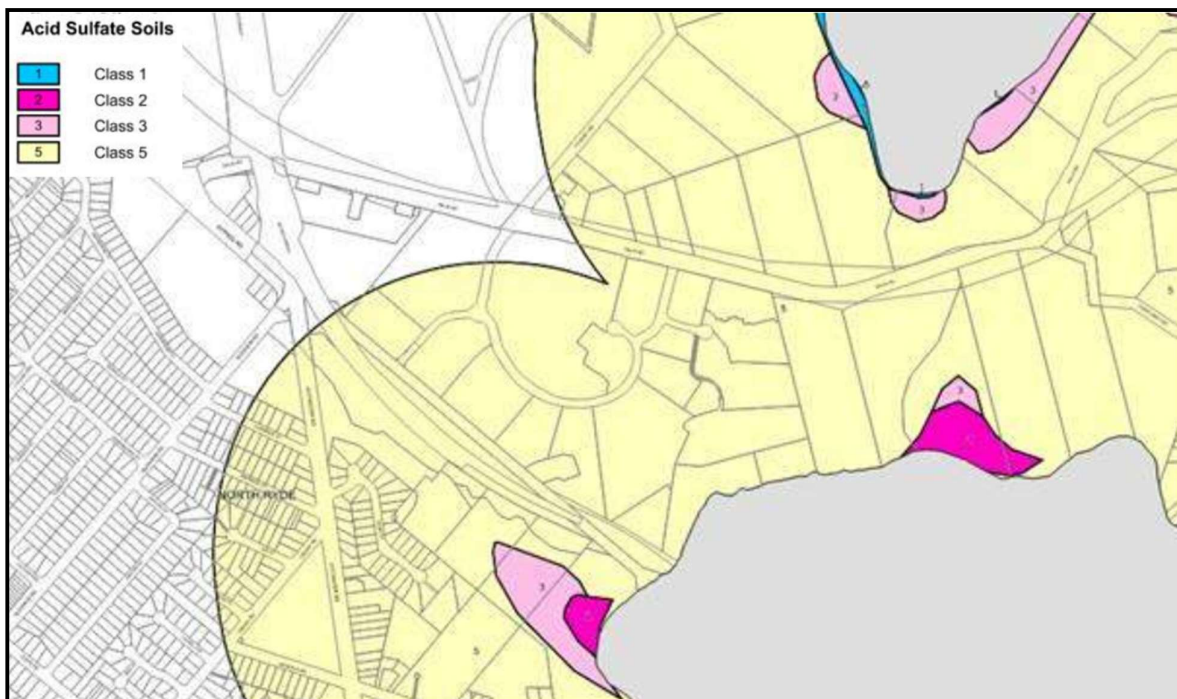


Figure 15: Acid Sulfate Soils

3.14 Perimeter Fencing & Security

As the site is comprised of no buildings and / or dedicated driveways, there is continuous chain wire perimeter fencing with barb wire on top. Modern data centres typically install palisade fencing around most of the building elements as part of the inherent security requirements related to its sensitive use, along with electronic monitoring and CCTV coverage. This can be adequately addressed in the detailed design of the data centre project. Softening the appearance of these elements along the main road frontage is intended.

The lower half of site is not currently fenced and includes several access and walking track easements, and no impact to this access is envisaged.

3.15 Other Location Risk Factors

The following risk considerations are not listed in TIA-942 but are considered by some large cloud vendors in their assessments of data centre site suitability.

Risk Factor	Compliance	Commentary
The data center is not within 0.25 miles of high-voltage power lines	X	There are 132kV overhead transmission lines about 50m away from the site's eastern boundary. At this distance it is considered a low risk.
The data center is not within 1 mile proximity to a wastewater treatment plant	✓	Comply
The data center is not within 0.5 miles to a freight line/rail line that carries chemicals and/or petroleum products and/or other hazardous cargos and/or within a half mile of a curve or crossing	✓	Comply
The data center is not within 0.25 miles of School/Daycare facilities	X	Whilst the site is closer than 0.25 miles to a daycare facility, we believe that the noise restrictions associated with this could be dealt with as part of the design. It is not uncommon in Australia for data centres to be nearby to daycare facilities. We confirm that this daycare facility is vacant.
The data center is not within 0.25 miles of a Residential area	X	Whilst the site is closer than 0.25 miles to a residential area, we believe that the noise restrictions associated with this could be dealt with as part of the design. It is not uncommon in Australia for data centres to be nearby to residential areas.
The data center is not within 5 miles of a grain handling facility (or other facility that would produce small particle emission)	✓	Comply
The data center is not within 0.5 miles of a Chemical Plant, Pharmaceutical or Bio Plant	Partial Risk	The site is closer than 0.5 miles to an ingredient manufacturing plant – Ingredion at 170 Epping Rd. It is understood that this facility is now decommissioned.
The data center is not within 10 miles of a Nuclear Reactor/ Power Plant	✓	Comply
The data center is not within 0.25 miles of a Metal Smelter	✓	Comply

There is not a Petroleum Pipeline within 1,000 feet of the datacenter	✓	Comply
The data center is not within 0.25 miles of a Petroleum Refinery/Gas Storage Facility	✓	Comply
The data center is not within 0.25 miles of a Military Base/Military installation	✓	Comply

4. INCOMING SERVICES

IGS has provided a review of the public information available and the Before You Dig Australia (BYDA) information to assess at high level the existing provisions to the site. BYDA plans are publicly available and show all registered inground assets to minimise unintentional damage by excavation. As well as a BYDA review, a high-level investigation into power availability has been conducted

4.1 Electricity

To size the electricity supply requirements, first the scale of development must be determined.

A good metric of the scale of development that data centres tend to use is the total IT load that the site can support. To calculate this, first the total amount of data hall white space (where the IT racks are situated) needs to be calculated. To simplify the space planning the council stipulated max FSR allowable will be the limiting factor. For data centres, plant space accounts for about 50% of the total floor area, 20% is office/admin/circulation and 30% is data hall white space. As plant space does not contribute towards GFA (as discussed in Section 3.11), the data hall white space accounts for 60% of the GFA. For 6 - 8 Julius Avenue, the average max incentive FSR is 1.5:1.

See below calculations.

- Racks per Data Hall - 648
- Load per rack – 14.8kW
- Total load per Data Hall – 9.6MW
- For twelve (12) Data Halls this equates to an IT load of – $12 \times 9.6\text{MW} = 115.2\text{MW}$

To size the incoming power supply required, the below calculation is used for a max electrical demand.

- Peak power usage effectiveness (PUE) of 1.436
- Power Factor of 0.98
- Total Data Hall power required = $115.2\text{MW} \times 1.436 \div 0.98 = 168.8\text{MVA}$
- Total ancillary area load = 599kVA
- Total development a load = $168.8 + 0.6 \text{ MVA} = 169.4 \text{ MVA}$

Please note that these calculations have excluded any required utility owned site located substations or switchgear, which would need to be considered (this is highly likely based on the loads projected).

4.2 Proposed New Connection

The HV electricity supplies in the street nearby are 11kV which are typically capable of carrying 7MVA per feeder. These would not be suitable for the development proposed above as the demand is much greater than 7MVA. As well as this, data centre developments prefer dedicated feeders from a nearby substation. As shown in Figure 19, the nearest substations are in Macquarie Park – about 1.2km away.

The existing Macquarie Park Zone Substation (ZS) takes incoming power supplied at 132kV and transforms it down to 11kV. As well as the ZS, there is a new Macquarie Sub Transmission Station (STS) which has been recently commissioned and takes incoming power supplied at 132kV and transforms it down to 33kV. These can be seen in Figure 19. 11kV feeders are typically capable of supplying 7MVA per feeder, while 33kV feeders can supply significantly more.

Preliminary conversations with Ausgrid's John Duck of the Major Customer Connections department has indicated that there is currently no spare capacity at either the ZS or the newly constructed STS. Ausgrid have indicated that they are in the early network planning stages of an STS expansion to add more capacity to the area. However, it should be noted that as Ausgrid have a "first in best dressed" policy there is a risk that data centres further progressed in the planning would take this capacity prior to the STS construction being completed.

Mr Duck mentioned that after 2-3 years additional 11kV capacity may become available from the ZS as load transfers to the STS. However, Mr Duck mentioned that for a proposed load in excess of 15MVA a permanent connection at 11kV is unlikely to be offered by Ausgrid.

The second closest substation is the Lane Cove Sub-Transmission Switching Station (which takes in power at 132kV). Ausgrid confirmed that the capacity previously committed to the Microsoft Lane Cove data centre development that is no longer proceeding has been allocated to another data centre developer within this area (Airtrunk).

The Julius Avenue Data Centre SSDA submission makes provision for a new power connection for the project, noting that Ausgrid are the Authority responsible for electricity supply infrastructure. ISPT will be responsible and have made allowance for the Dedicated Connection Asset component of the works, per our obligation under the Ausgrid System Planning Advice letter. Our submission has included this key infrastructure component to ensure impacts of the incoming substation component on the site are fully assessed and to ensure a coordinated and considered design.

It is proposed the new electrical supply connection will be coordinated by Ausgrid for all Shared Asset components, with assistance and in coordination with ISPT and its ASP/3 designer. Ausgrid has provided confirmation that it will progress approvals and funding for the connection in line with their existing process for doing so. Maintenance of the Ausgrid assets will be the responsibility of Ausgrid. Maintenance of the private substation component and downstream infrastructure will be the responsibility of ISPT. ISPT is continuing to progress the connection arrangements and meeting regularly with Ausgrid to do so.

Ausgrid have advised that supply from the existing overhead tower transmission cables which are adjacent the site is not possible as the necessary capacity is not available. As such, they have provided a System Planning Advice with the following options:

Option 1 - Establish 2 x new 132kV feeders from new 132kV sub-transmission switching substation (STSS) at existing North Ryde Zone Substation (ZS) site.

This option involves the installation of a new 132kV STSS supplied by teeing off from existing feeders from Sydney North BSP to Mason Park STSS. The new STSS provides a hosting load capacity of 250MVA. Ausgrid has retained their existing North Ryde Zone Substation site at 22a Goulding Rd North Ryde and are exploring the feasibility of building a new STSS on it.

Option 2 - Establish 2 x new 132kV feeders from new 132kV sub-transmission switching substation (STSS) in the Julius Av North Ryde area.

This option involves the installation of a new 132kV STSS supplied by teeing off from existing feeders from Sydney North BSP to Mason Park STSS. Ausgrid is exploring the feasibility of building a new STSS close to the data centre load near Julius Av North Ryde. As they have received multiple connection applications in the area, having a STSS close to the load centre will reduce the infrastructure costs, offer improved reliability and faster connection times. Ausgrid have offered to work constructively with ISPT in exploring a mutually beneficial solution regarding the use of their property for a new 132/33kV STSS.

Both options would require new 132kV feeders to come into a new 132kV sub-transmission station (STS) which will be located on the subject site. These two (2) feeders will be both fully rated to the entire site load and therefore would be considered 'dual redundant'. The feasibility studies for the new STSS discussed above have not yet been conducted and will need to be initiated.

The size of the STS on the subject site has been reduced to only cater for our development load and not to cater for any future Ausgrid customers. This will be subject to further Ausgrid negotiations.

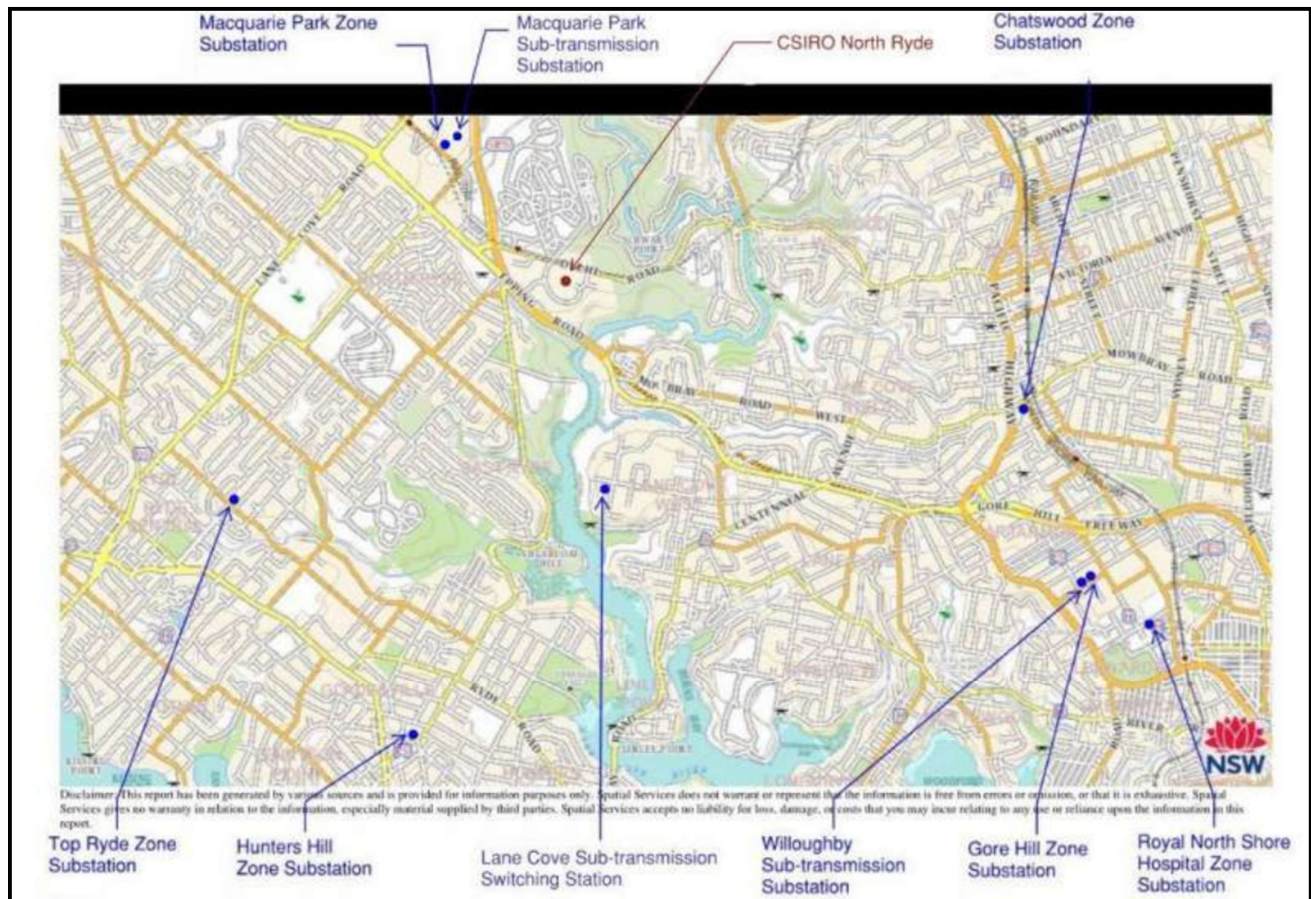


Figure 16: Map of Surrounding Zone Substations

The below map in Figure 17 shows the proposed route of the 132kV feeders to the site from the existing 22a Goulding Road Ausgrid asset (which is being proposed to be repurposed for the STSS) as per Option 1 proposed by Ausgrid.

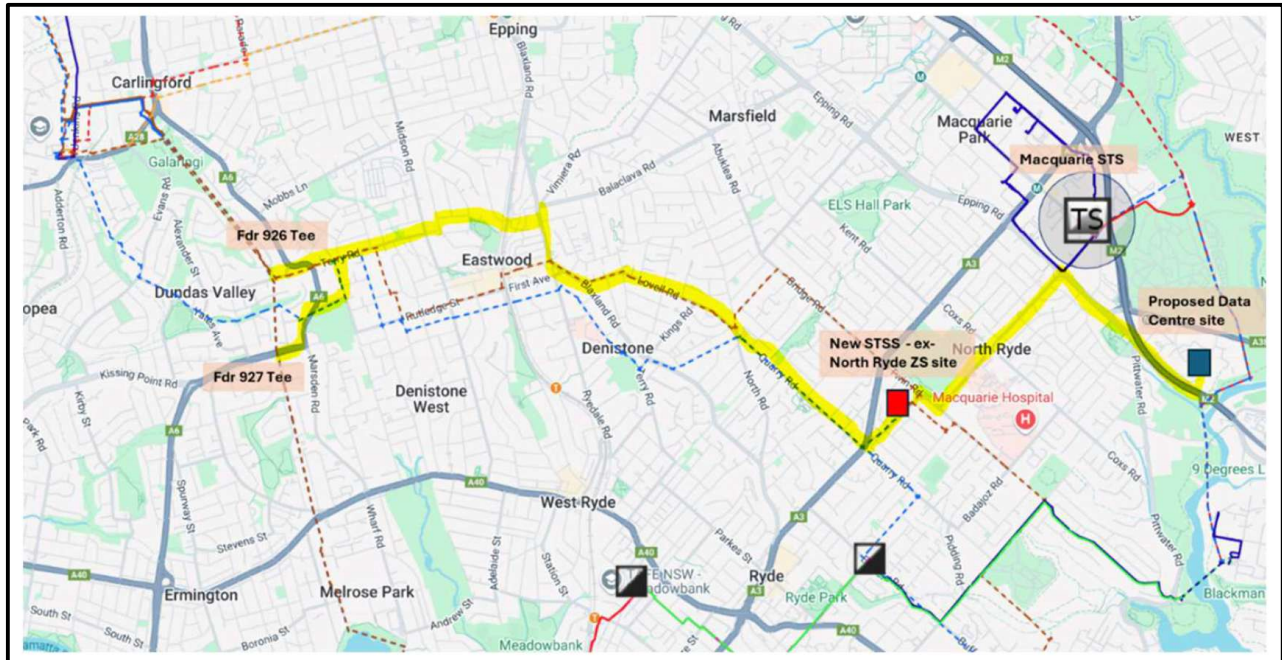


Figure 17: Map of Proposed New STSS at 22a Goulding Road, North Ryde

4.3 Existing Connection

The site does not have any substations on the site and does not appear to have any permanent electrical connections. Any connection to the site appears to be minimal capacity low voltage connections.

This can be seen below in Figure 18.

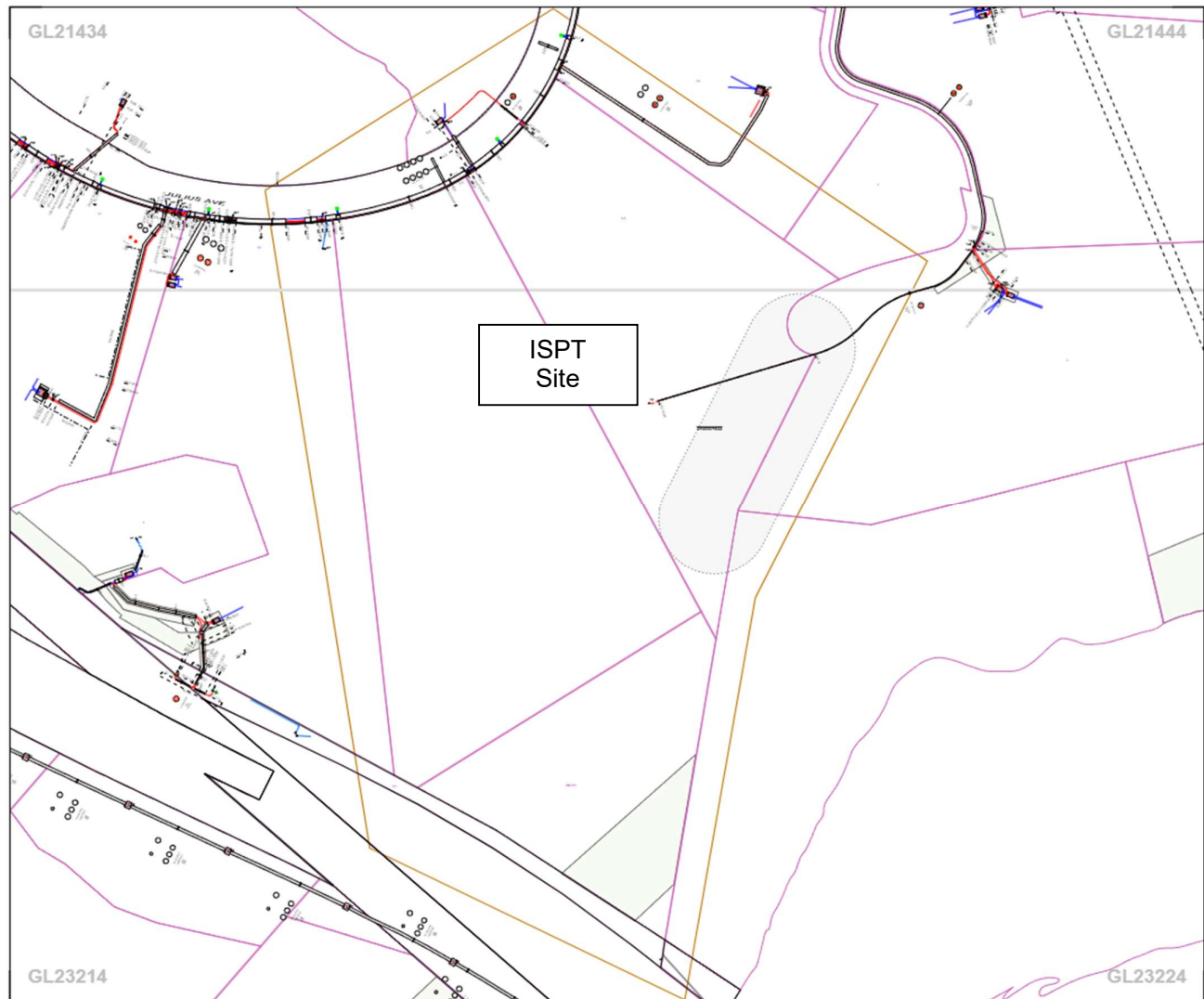


Figure 18: Ausgrid BYDA Map

4.4 Telecommunications

Data centres require communications assets in the public footpath/road/nature reserve to connect to other data centres, customer sites, submarine cables, and other networks. It is desirable to have multiple carrier assets in the footpath/road/nature reserve adjacent to the site. Incoming services are less impactful as they are not overly challenging to relocate and often need to be relocated to accommodate for final site planning. The BYDA plans indicate that the site appears to have sufficient telco services in the nearby vicinity.

4.5 NBN

As shown in Figure 19 there are NBN assets on Delhi Rd and Julius Ave, and multiple incoming services. There are also services at run adjacent to the 6 – 8 Julius Ave site. These appear to be adequate for a data centre

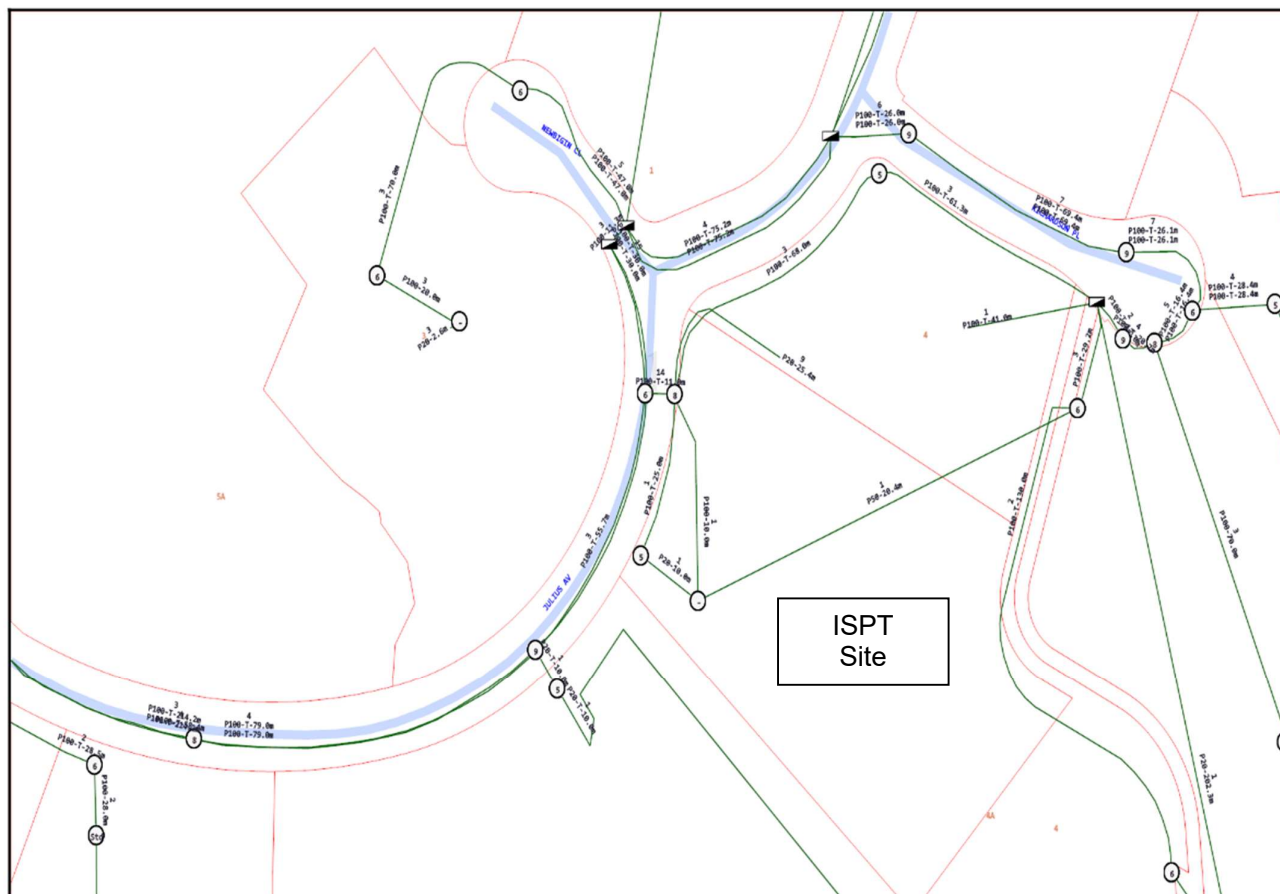


Figure 19: NBN BYDA Map

4.6 Optus

As shown in Figure 20 there are Optus assets adjacent to the site and existing incoming services.

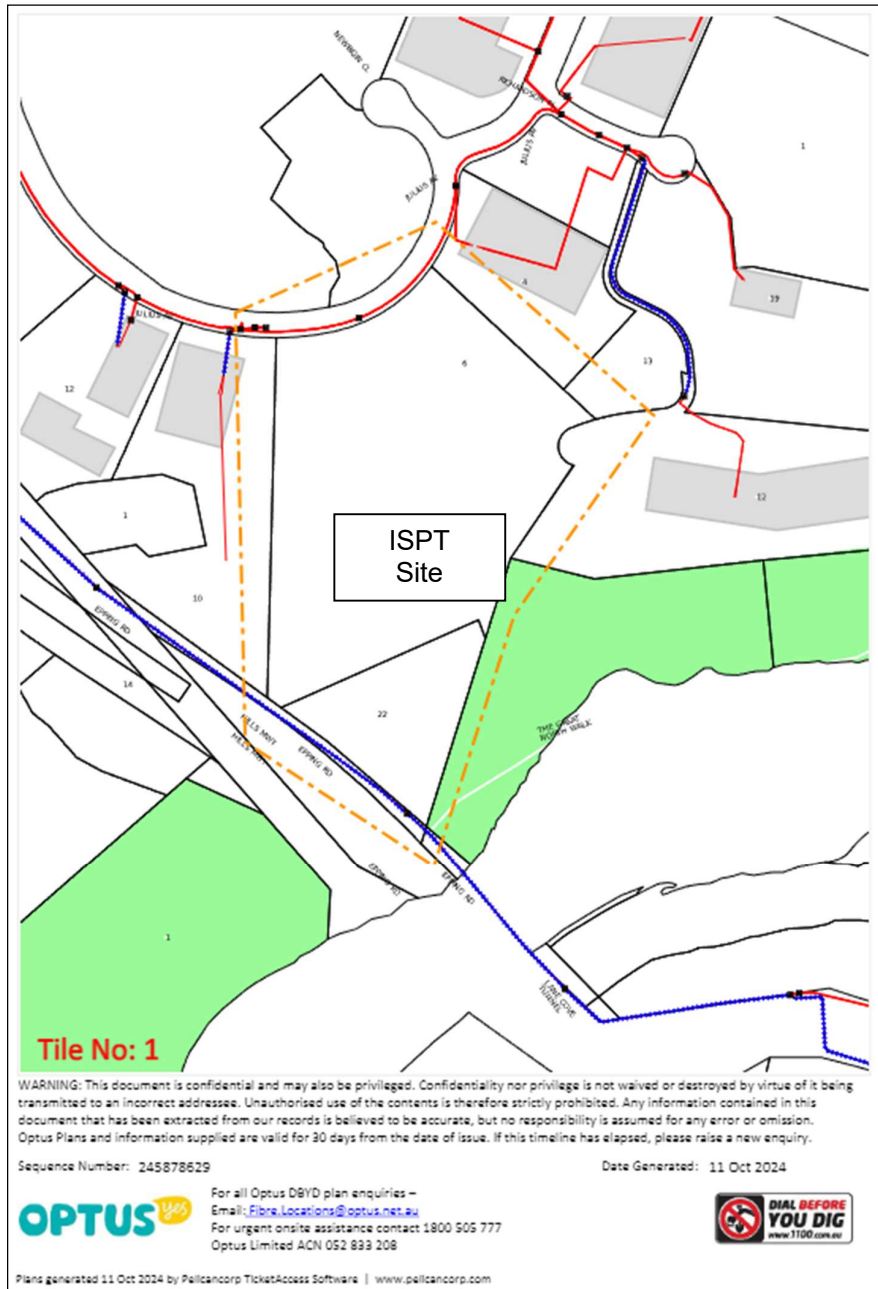


Figure 20: Optus BYDA Map

4.7 Telstra

As shown in Figure 21 there are Telstra assets adjacent to the site and multiple incoming services.

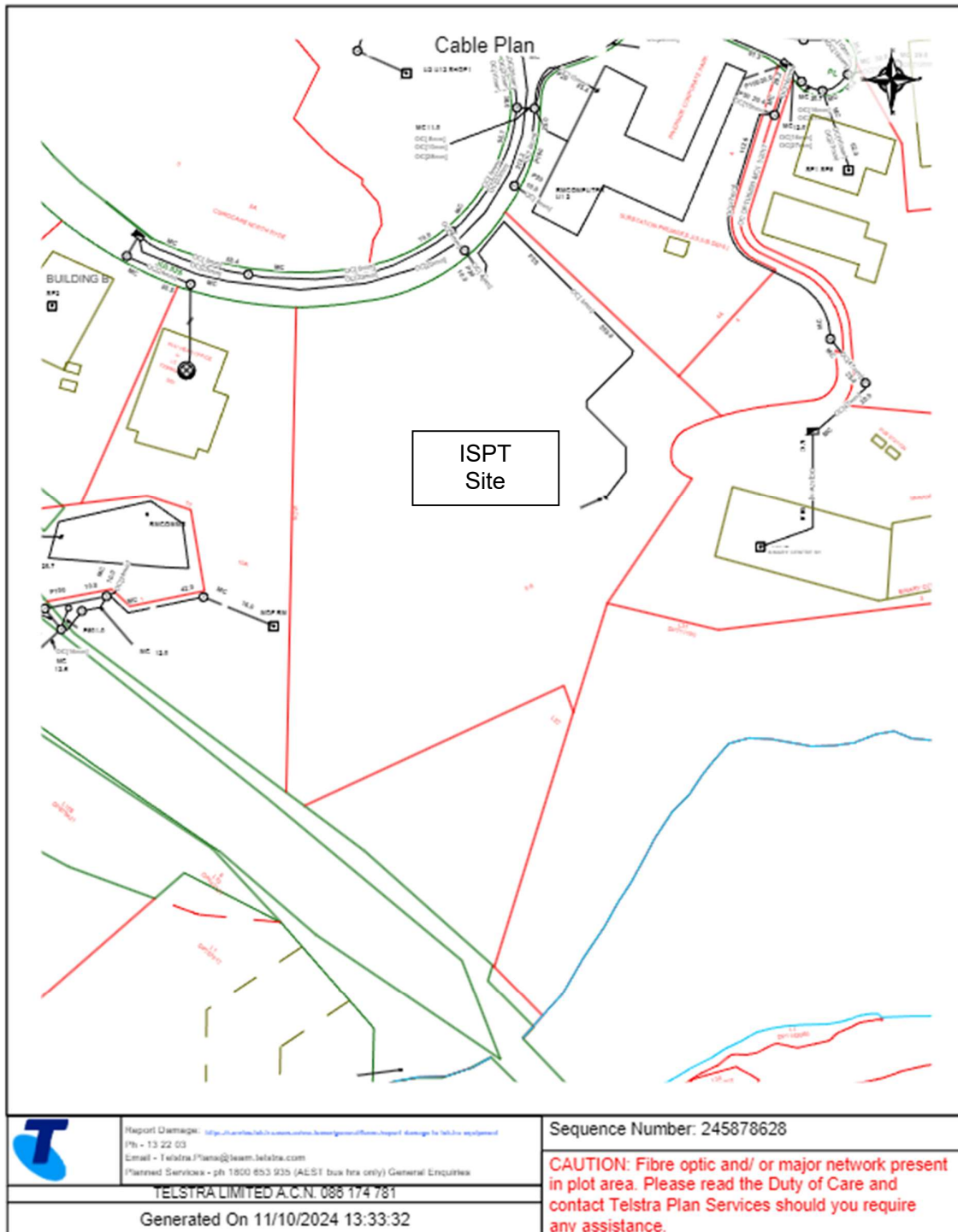


Figure 10: Telstra BYDA Map

4.8 Aarnet

As shown in Figure 22 there are Aarnet assets adjacent to the site.

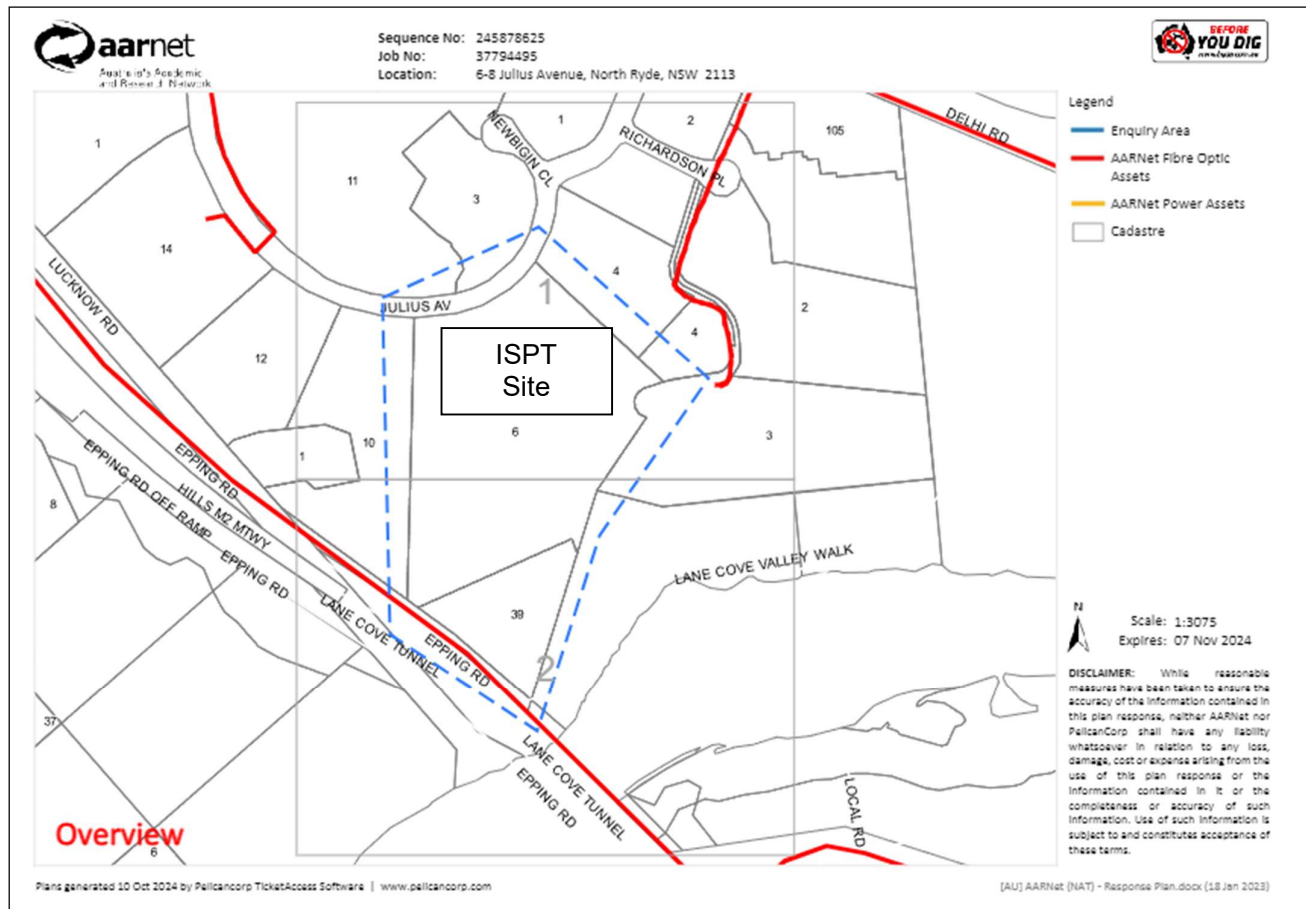


Figure 22: Aarnet BYDA Map

4.9 Uecomm

As shown in Figure 23 there are Uecomm assets adjacent to the site.

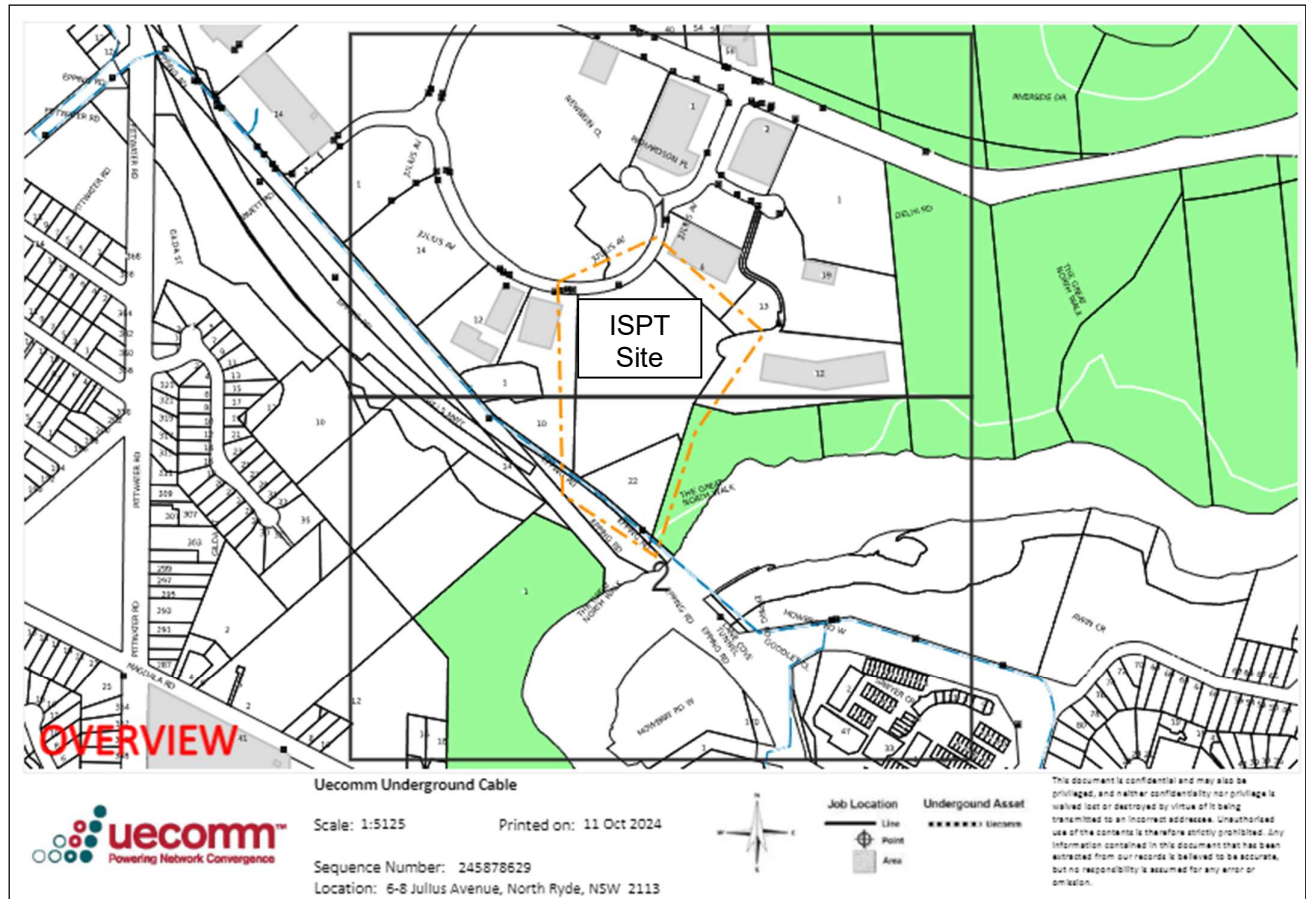


Figure 23: Uecomm BYDA Map

4.10 TPG

There are several TPG assets that run through Julius Ave, and around Julius Avenue as shown below in Figure 24.

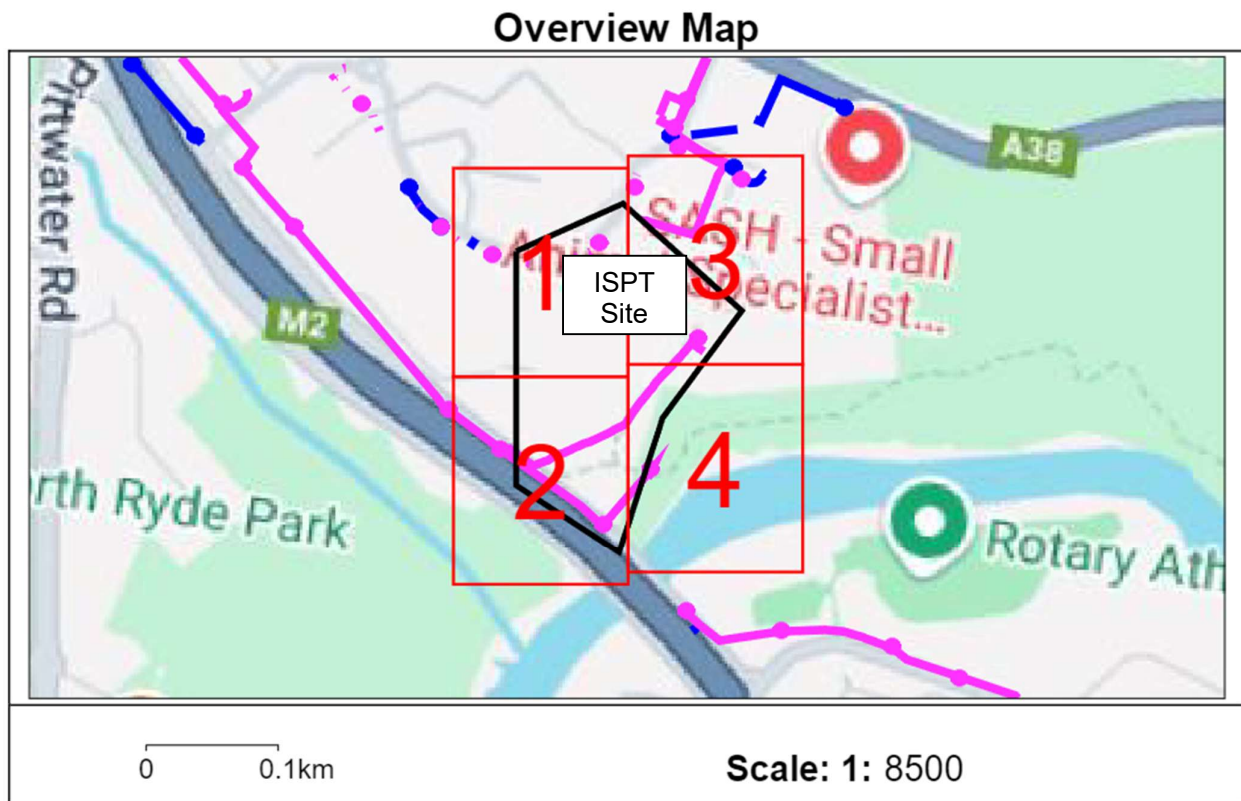


Figure 24: TPG BYDA Map

4.11 Vocus

There are Vocus assets that run through Julius Ave out the front of the site as shown below in Figure 25.

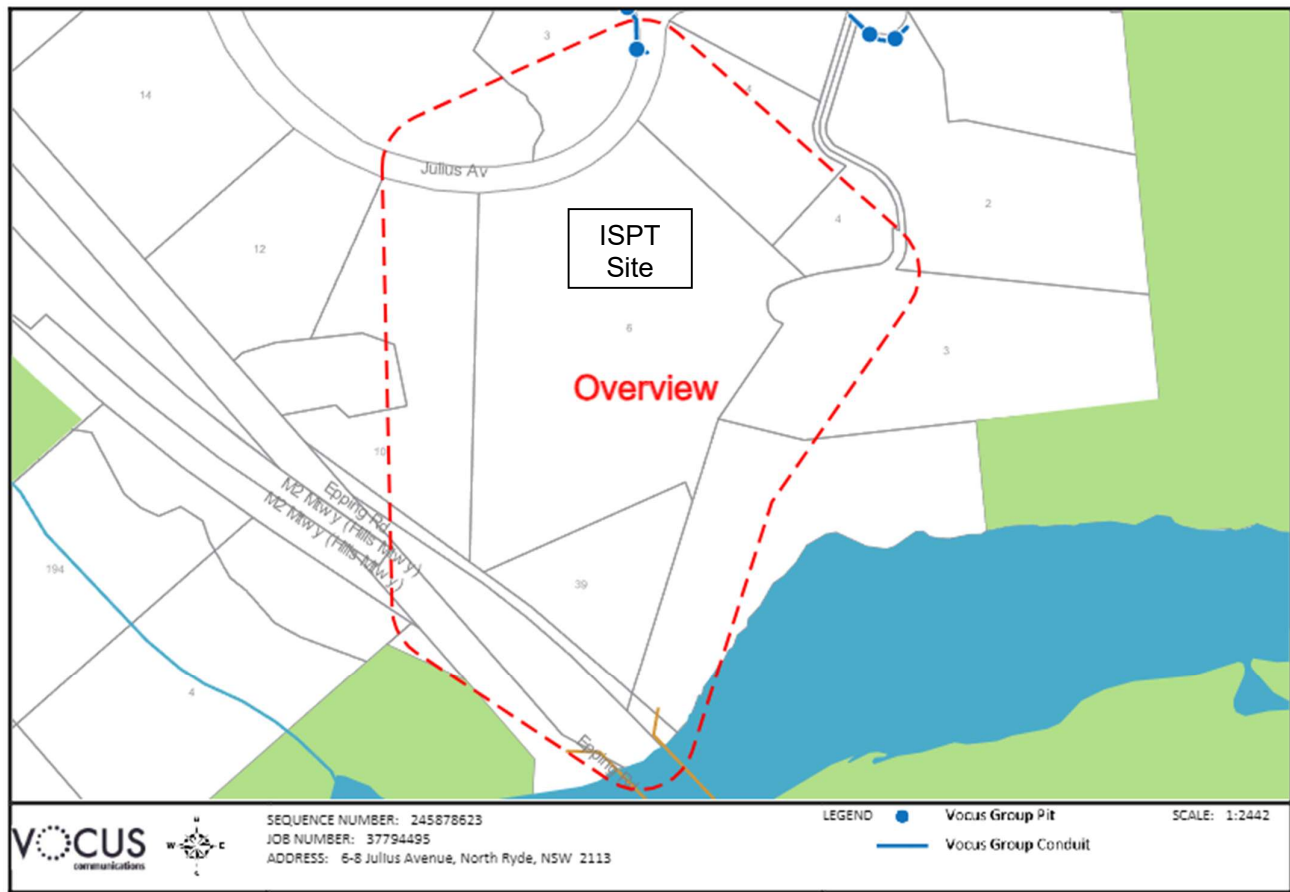


Figure 25: Vocus BYDA Map

4.12 Potable Water

The 6 – 8 Julius Avenue site has a frontage to a Sydney Water 200mm Ductile Iron Cement Lined (DICL) main located within the nature strip on the near side of Julius Avenue. The existing site is unencumbered of utility water mains and requires no diversions.

This site requires a high flow rate demand for an industrial/commercial site, the mechanical typology has been driven primarily by neighbouring sensitive noise receivers which has precluded waterless water to air heat rejection technologies.

Refer to **Appendix D** for Sydney Water Pressure and Flow enquiry for 6 - 8 Julius Avenue – site flow rates can be met by existing mains but are subject to a Sydney Water Feasibility Study (12-13 week lead time) and final Section 73 Certificate Sign Off.

The site is unencumbered of utility water mains and the site appears to be able to be suitably serviced in its existing form subject to Sydney Waters requested network modelling activities. The existing Sydney Water' water mains infrastructure consists of a ring main water network around the Julius Avenue estate, as illustrated in **Figure 28 - Sydney Water BYDA Map** and includes 200mm DICL main along Julius Avenue accessible to the entire frontage of the property located in the nature strip on near side of Julius Avenue.

According to Sydney Water Advice Letter (dated 24 March 2025) the development sits in the Chatswood WSZ. If the total supply of water is to be sourced from this potable water main then amplifications will be required due to the development causing significant strain to the existing system. A water options assessment is required to be developed with a hydraulic engineer in consultation with Sydney Water.

The existing Sydney Water infrastructure indicates the potential to support the proposed new development. Supply of potable water demand based on the estimated demands is subject to Sydney Water's feasibility report requesting the proponent undertake water mains / network modelling which is being managed by the projects Water Servicing Coordinator (WSC) Vinculum.



Figure 26: Sydney Water BYDA Map

4.13 Sewerage

The development is located in the NSOOS 3 Catchment sub-system in the North Head wastewater system.

As shown in, **Figure 28 - Sydney Water BYDA Map**, the site shall be drained via the existing Sydney Water 225mm Sewer Main – which traverses from the north, hugging the north-eastern, eastern and southern boundaries of the site with an existing industrial connection stub at access chamber asset 1395061.

The future planning of new substation assets on the site requires the Section 73 feasibility nominated connection point to be moved one access chamber upstream of asset 1395061 which has been coordinated with Sydney Water via the WSC. This interface requires the proponent to construct a new manhole / access chamber over the existing location, these works are required to be designed and construction managed by the WSC.

Construction of the new development shall consider the alignment of the existing 225mm sewer main. The proposed building requires a Water Serving Coordinator to engage with Sydney Water for capacity and any additional works – final building structural design and footprint given proximity to sewer is subject to a Building Plan Approval (BPA) or Building Over Asset (BOA) applications and zone of influence structural protection measures requirements to ensure the works do not impose any load on the sewer.

Sydney Water have nominated a connection to the existing 225mm sewer service based on the wastewater volume estimates provided to inform the Section 73 Notice of Anticipated Requirements (NoAR) outcome, with a specific capacity limitation that will be further developed in the Section 73 NoAR.

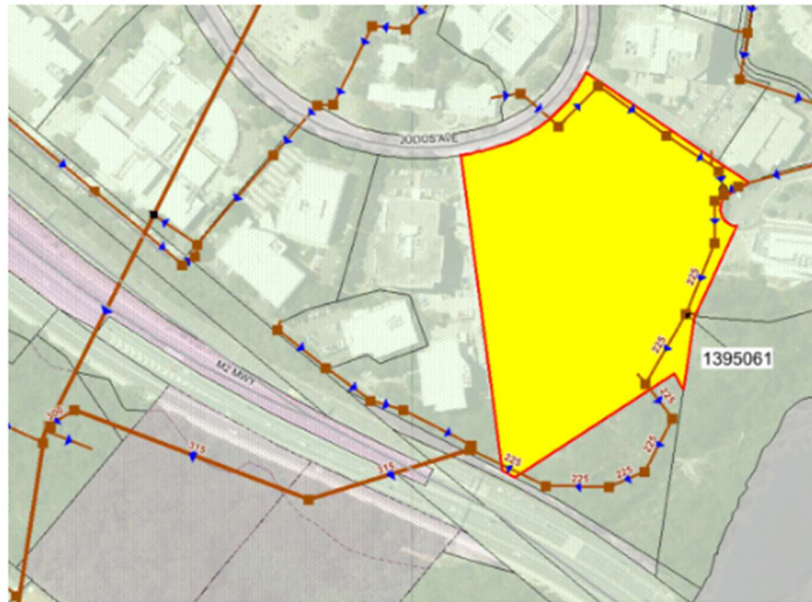


Figure WW1 – Proposed development with surrounding sewers

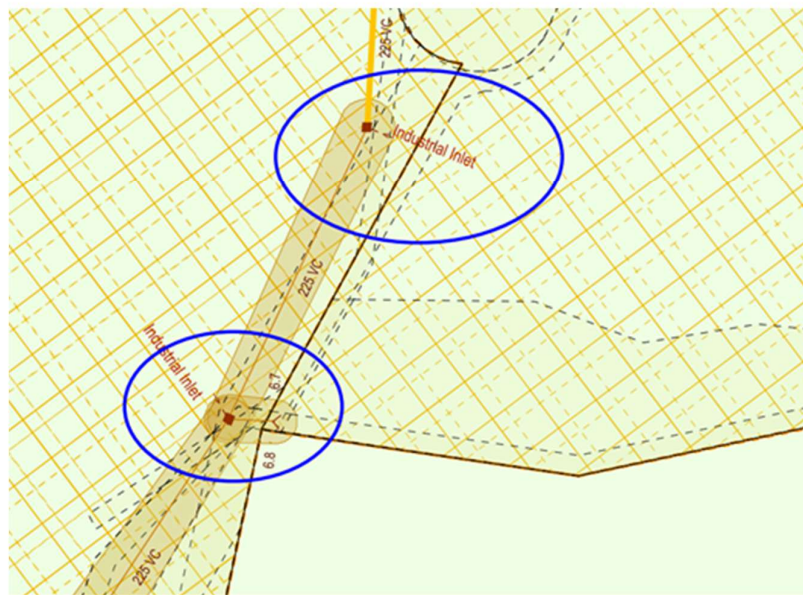


Figure 27: Sewer Hydra Plot and BYD Plans

4.14 Stormwater

There is an existing stormwater system, owned by Ryde Council, serving the site with mains located on Julius Avenue, as shown in Figure 28. The system highlighted below is not proposed to be utilised by the development works. An alternative overland flow path discharge methodology is intended to be utilised.

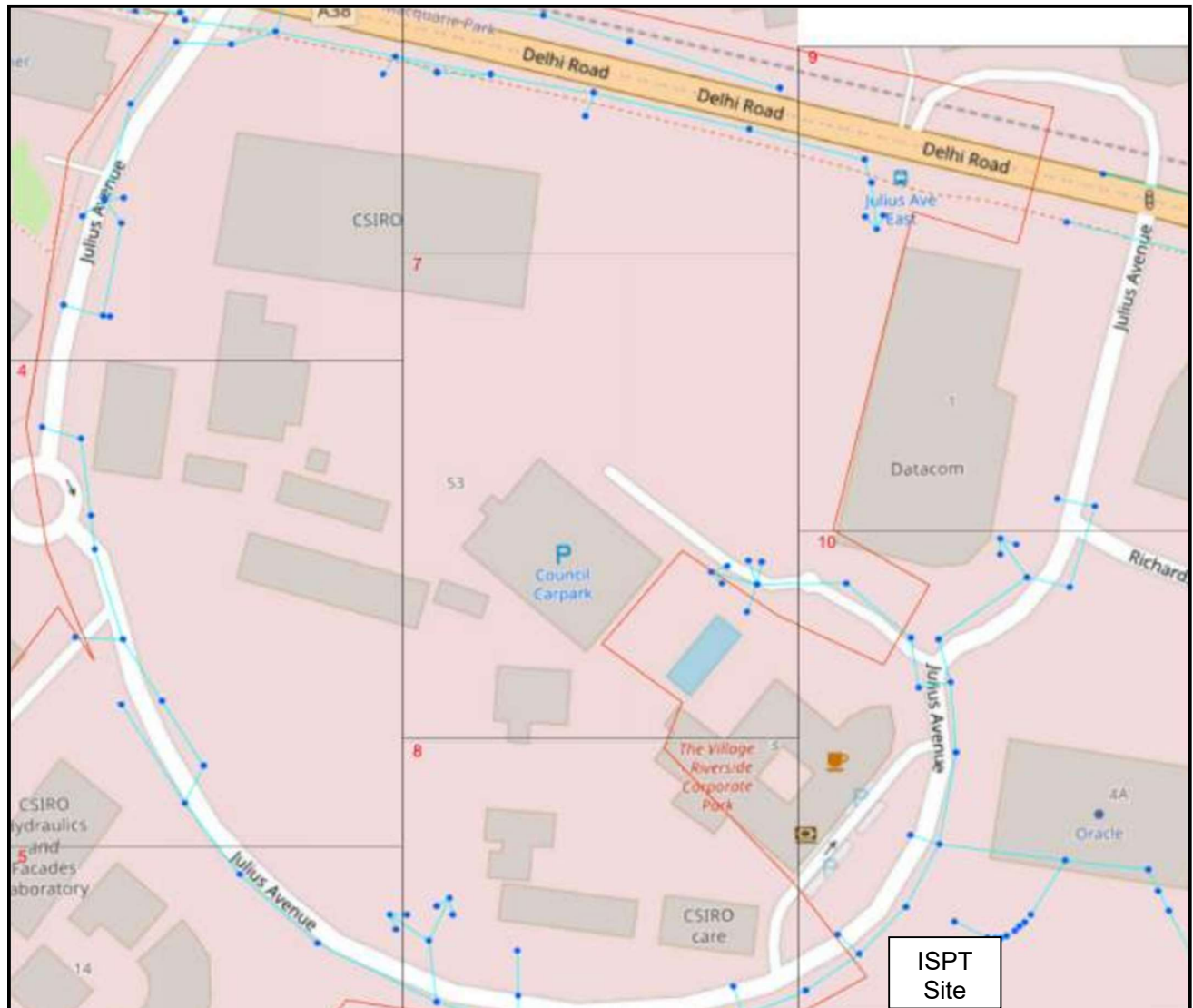


Figure 28: Ryde City Council BYDA Map

4.15 Gas

The BYDA maps seem to indicate there is an existing Jemena gas main located in Julius Ave which fronts the site as shown on Figure 29. Gas services are not typically required for a data centre and not likely required.

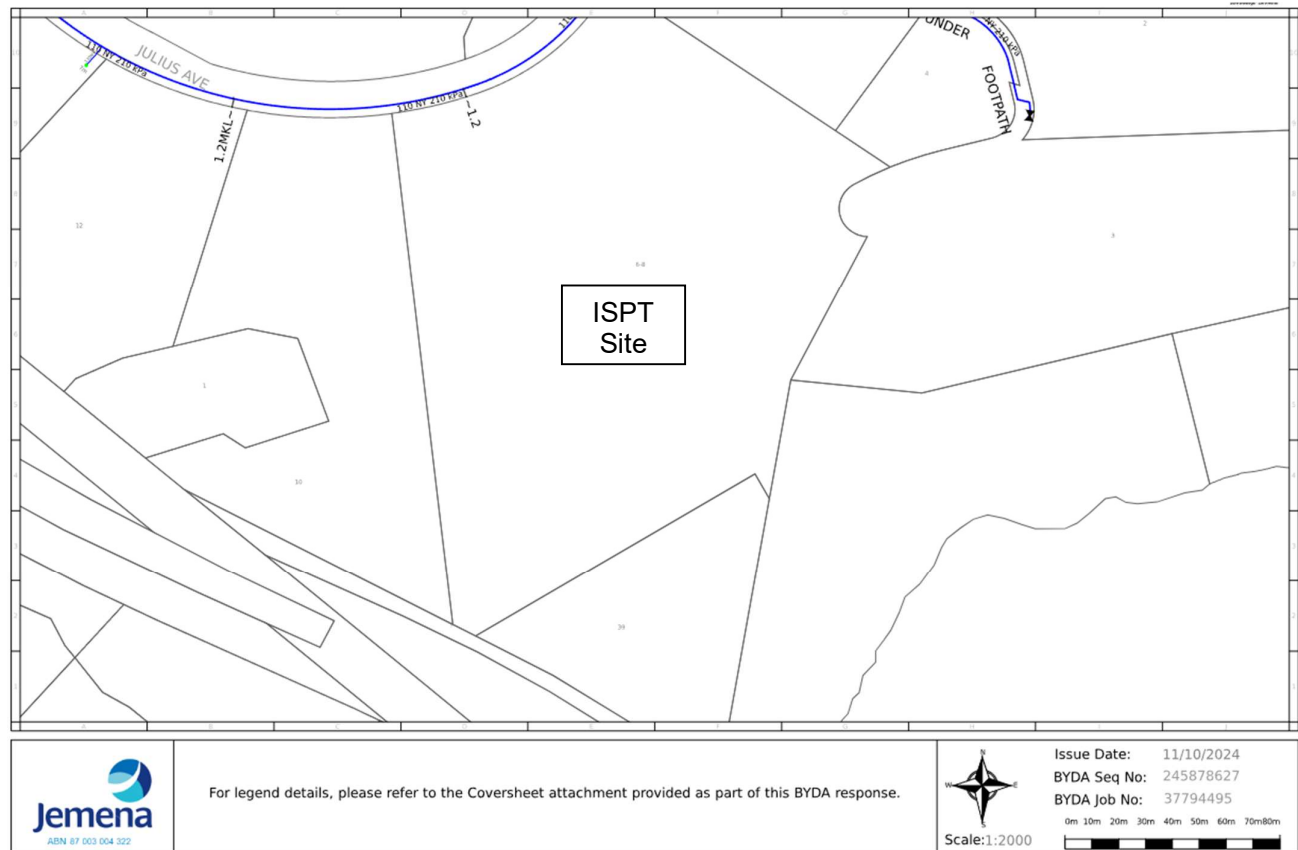


Figure 29: Jemena BYDA Map

5. INFRASTRUCTURE REQUIRED

This section provides details of the proposed infrastructure required onsite and offsite to facilitate the development and any arrangements to ensure that the upgrades will be implemented on time and be maintained.

5.1 Electricity

Demands

The preliminary maximum demand calculated for the Julius Avenue Data Centre is approximately 169MVA based on a 9.6MW IT load for 12 off Data Halls. The final maximum demand may vary slightly due to mechanical plant selection.

Electrical Maximum Demand Calculation ISPT Data Centre: 6-8 Julius Avenue, North Ryde Data Centre with FOH Offices & Carpark 18/03/2025 Revision: 3.2 Job No: EN-N24_386					
					
Carpark	Area (m2)/Units	Amps	VA/m2	VA	kVA
Carpark	2,454		15	36,810	37
EV Charger (230V 7kW)	6		7,000	42,000	42
Lift	2	50		69,200	69
Plant Areas	5,115		20	102,300	102
Sub-Total					250
FOH	Area (m2)/Units	Amps	VA/m2	VA	kVA
Commercial Office (Fully Electric)	2,620		120	314,400	314
Lift	1	50		34,600	35
Sub-Total					349
Data Centre	Load per DH (kW)	Amps	No. of DH	kW	kVA
Data Hall	13,788		12	165,453	168,830
Sub-Total					168,830
Others		Amps	VA/m2	Diversified VA	kVA
Total (kVA)					169,429
Total (MVA)					169.4

Notes:

1. Subject to final area of data halls/rack numbers. Currently based on an IT load of 9.6MW per data hall
2. Refer to "DH Calc" spreadsheet for calculated PUE based on mechanical loads provided by Arup on 5th Mar 2025. Current PUE is 1.436.
2. Based on cloud densities. If AI densities are to be applied then MD will need to be revisited
3. Based on power factor of 0.98

Mains Supply

The new onsite Sub Transmission Switching Station (STSS) of 132kV/33kV at N redundant arrangement with capacity of 180MVA serving the campus is sufficient to meet the electrical demand for the Julius Avenue Data Centre.

Site 33kV MV cable reticulation from the new 132kV/33kV substation to the data centre building will be by means of underground cabling conduits and internal risers up to the transformer rooms.

We were considering two (2) options for HV design and reticulation for the Julius Avenue Data Centre. Deciding on which option suits best depends on a number of factors as follows:

- System Planning Advice from Ausgrid (received mid-April 2025)
- Final spatial planning / availability
- Cost advice

Option 1 system is designed for primary private reticulation at 11kV with 2 off 120MVA 132kV/33kV power transformers (Dry Type) installed to power the Julius Avenue Data Centre fed by 2 off 132kV Ausgrid feeders. A 132kV switchroom would be established with 2 off 132kV switchboards. These power transformers have been sized to cater for the entire development of Julius Avenue Data Centre with no redundancy. The power transformers would then feed into a number of 33kV/11kV 50MVA transformers to allow reticulation to the electrical rooms adjacent the Data Halls.

The 11kV system is then reticulated in a ring main arrangement from each Ring Main Unit (RMU) serving each Data Hall. Two (2) 11kV switchboards serve each Data Hall. Each RMU then supplies a 33kV/400V power transformer which goes onto supply a 400V Automatic Transfer Switch (ATS) and the associated LV main switchboard. The second leg of the ATS is fed from an 400V generator to provide the backup facility.

Option 2 system is designed for primary private reticulation at 33kV with 3 off 60MVA 132kV/33kV power transformers (Dry Type) installed to power the Julius Avenue Data Centre fed by 2 off 132kV Ausgrid feeders. A 132kV switchroom would be established with 3 off 132kV switchboards. These power transformers have been sized to cater for the entire development of Julius Avenue Data Centre with no redundancy. The power transformers would then feed directly into the electrical rooms adjacent the Data Halls with a much reduced private substation area.

The 33kV system is then reticulated in a ring main arrangement from each Ring Main Unit (RMU) serving each Data Hall. Each RMU then supplies a 33kV/400V power transformer which goes onto supply a 400kV Automatic Transfer Switch (ATS) and the associated LV main switchboard. The second leg of the ATS is fed from an 400V generator to provide the backup facility.

These are private switchrooms, with the switchgear supplied and maintained by ISPT, with easements, metering and protection provided to Ausgrid requirements.

It has been decided that Option 2 will be employed due to the fact it is more space efficient (substantial reduction in private substation area) as well as slightly less costly.

Ausgrid system planning advice was received in mid-April 2025 and is currently being reviewed.

Backup Generation

The data centre is a mission critical facility¹ and therefore requires back-up power generation. The site is designed for a total of 72 no. low voltage 3MW Data Centre Data Centre Continuous rated 400V LV generators to supply the data centre critical loads. An additional 1000kVA (1MVA) low voltage generator will be provided to supply the admin and life safety loads (not shared with the Data Hall infrastructure).

All data centre generators will be inside an acoustic treated enclosed plantroom with 1000 litre day tank fed from bulk fuel tanks on basement floor. The office generator will be in an acoustically rated enclosure on the roof of the FOH building with its bulk tank in the basement.

Diesel generators shall be provided to support the entire Julius Avenue Data Centre load for when

utility supply is not available, or when required for operational reasons.

¹ A mission-critical facility is a building or infrastructure that is essential for critical operations, services, or systems to function. Failure or disruption of a mission-critical facility can have significant negative impacts, ranging from financial losses to endangering human lives.

The configuration and rating of the generators shall be subject to detailed design, subject to a minimum of six (6) generators per data hall (6 Makes 5)¹ to satisfy the distributed redundant system described above.

The diesel generator system shall be designed for ambient conditions of up to 47°C and installed within a plantroom as an open set arrangement. This was found to be more spatially compact than an enclosed generator arrangement.

Diesel generators will be located in a multi-level concrete framed structure separate to the data hall buildings to ensure sufficient air intake/exhaust paths and will include:

- Diesel engine
- Inlet and outlet attenuators
- Radiator cooling system – including mechanically or electrically driven fans
- 1000 litre daily service fuel tank
- Switchgear
- Alternator
- Generator control panel
- Lighting
- Socket outlets for maintenance
- Oil supplementary tanks where extra capacity oil sumps are not available
- Diesel generators shall meet the following requirements:
- Data centre continuous power rating certified for Uptime Tier III
- Dual electric starters and batteries
- Alternator sized to accommodate mechanical loads e.g. EC fans and unfiltered VSDs, with high harmonic content
- Capable of accepting Renewable Diesel or Hydrotreated Vegetable Oils (HVO) (when commercially available in Australia)

Based on advice from the air quality consultant, all exhaust flues cannot discharge horizontally but instead shall discharge vertically either adjacent each generator creating a vertical stack of multiple flues for each stack of six (6) generators or otherwise taking the exhausts to the sides of the gantry to avoid blocking of the air discharge for the generators above. Taking the flues alongside each generator would be the preferred option as it allows easy maintenance access. Ducting all flues to the roof and discharging in a vertical direction will provide vertical momentum to the discharge and assist in the dispersion and dilution of emissions, plus the wake of the building has less chance of interfering with that emission.

For the generators to achieve compliance with relevant noise criteria the acoustic criteria within the development is as follows for each generator:

Item	Sound Power Level (SWL)	Sound Pressure Level (SPL) @ 1m	Sound Pressure Level (SPL) @ 7m
Generator Discharge (assuming 6m x 5m louvre)	91 dB(A)	75 dB(A) @ 1m	66 dB(A) @ 7m
Generator Intake (assuming 6m x 5m louvre)	95 dB(A)	79 dB(A) @ 1m	70 dB(A) @ 7m
Generator Exhaust (flue)	91 dB(A)	83 dB(A) @ 1m	66 dB(A) @ 7m

¹ A distributed redundant system in a "6 makes 5" (6M5) system means five (5) off systems will support 100% of the load with the 6th unit/system being redundant. Therefore, one (1) unit/system can fail without loss of the load.

Note that generators are only assessed during maintenance/testing and not the emergency scenario with the following assumptions:

- Two (2) generators will be tested at any one time in order to minimise the testing time to <200 hours per annum;
- Generator maintenance/testing undertaken during daytime only (between 7am and 6pm)

Attenuators will be sized to the above criteria but will be subject to change as the criteria develop.

Transfers between utility supplies and the diesel generator shall be a 'break-before-make'¹ transfer. Transfer of load back from generators to utility as 'closed transition' or make-before-break² can be considered as a client request but not offered as a base case.

¹ A "break before make" transfer switch, also known as an "open transition" transfer switch, breaks the connection with one power source before connecting to another. This means there's a brief interruption in power during the transfer, preventing back feeding from the emergency generator to the utility line, for example.

² A "make before break" transfer switch, also known as a "closed transition" switch, makes a connection to a new power source before breaking the connection to the old one. This ensures a continuous power supply to the load during the transfer process.

The following alternative commercially available technologies have been considered for standby generators:

Technology	Consideration	Technology Availability	Feasibility	Comment
Gas Turbine Diesel Generators	Reduce footprint compared to traditional diesel generator.	Yes	Gas turbine takes much longer to start and more suitable at medium voltage network.	Not feasible for this project due to slow start to pick-up the critical load.
Hydrogen Cell	Not considered due to lack of real estate space.	Yes	Very large real estate space required for Data Centre load requirement.	Not feasible for this project due to lack of real estate space in urban areas.
Solar Panels with large scale battery storage	Not considered due to lack of real estate space.	Yes	Very large real estate space required for Data Centre load requirement.	Not feasible for this project due to lack of real estate space in urban areas.
HVO (2nd gen biofuel)	Shelf-life comparable to diesel No special storage required.	Yes	Lack of HVO availability in Australia.	Not feasible due to lack of readily HVO availability in Australia but selected generators will be 'HVO ready'

Backup generators will operate as a standby power supply in the event of mains failure. The onsite 132kV/33kV substation is expected to be provided with two (2) feeders with both fully rated to the entire site load and therefore would be considered 'dual redundant'. Failure rates for a N-1 supply in this arrangement are extremely low with the feeders coming from a new STSS located either on the existing North Ryde ZS site or on land in the Julius Avenue area near/adjacent to the site. This feeders can fully support the entire building load.

Although it is not possible to determine exactly the duration of power outage/damage over a year which would require the standby generators to be in operation, based on the electricity supplier Ausgrid Distribution and Transmission Annual Planning Report Summary (DTAPR, December 2024), it has been determined that the average unplanned actual system average interruption duration index (SAIDI) of power outage incident over the past 10 years is 74.0 minutes (total cumulative events) of unplanned

outages per year per customer – based on year 2013/14 to 2023/24 of SAIDI data. This equates to just over 0.01% likelihood of occurrence in a year. Ausgrid network and operations cover Sydney, the Central Coast and Hunter regions of New South Wales.

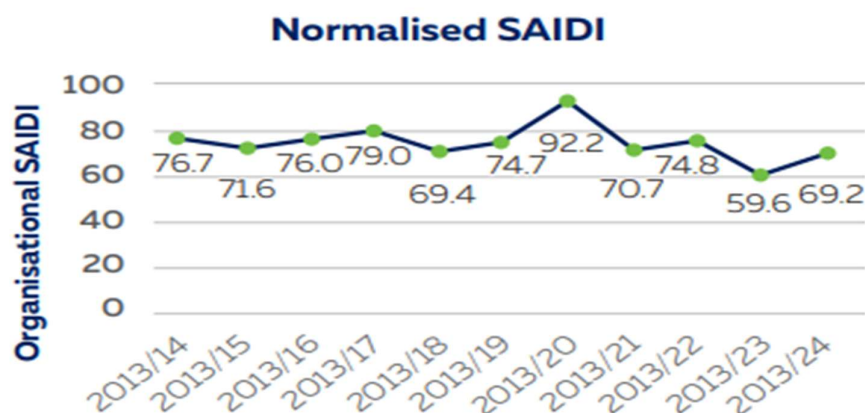


Figure 30: Ausgrid graph of normalised SAIDI data in the past 11 years (Source: Ausgrid, 2024)

The new building will be provided with new bulk fuel storage tanks located within the bottom level of the generator gantry. The central diesel tank farm will provide up to 48 hours of fuel storage.

Diesel fuel will be pumped from bulk fuel storage tanks to 1000L generator day tanks by diesel fuel transfer pumps. The proponent has estimated that the total site fuel storage will be approximately 1,272kL when including bulk storage and day tanks.

Maintenance

In addition to the potential operation as a secondary back-up during a power outage event that also affects the dual redundant power supply, the generators will be required to be run during short-term routine maintenance testing.

The Applicant has detailed the maintenance testing schedule, specifying that two generators will be operated simultaneously for periodic testing, with one on the eastern gantry and one on the western gantry, both at the same level. The anticipated testing schedule, based on the provided framework, is outlined in the table below:

Parameter	Detail
Total number of generators to be tested	73 (72 x 'IT', 1 x 'house')
Testing frequency	Monthly (12 testing periods)
Operational testing hours	Daytime hours (7:00 am to 6:00 pm (Monday to Sunday))
Generators tested simultaneously	Two (one in eastern side, one in western side)
Tests per period	36.5
Duration per test	27 minutes total (22 minutes runtime, 5 mins cooldown)
Total testing time per period	985.5 minutes
Total testing time per year	11,826 minutes
Total testing hours per year	197.1 hours

Note: → Testing involves two generators running simultaneously for 27 minutes per test, with 36 or 37 tests conducted per period.

This assumes that each generator will be tested individually for a duration of 27 minutes. Additional information provided by the Applicant indicates that testing will take place during daylight hours which are assumed to be between 7:00 am and 6:00 pm.

For the purposes of the dispersion modelling assessment, it has been assumed that two generators will undergo maintenance testing simultaneously at any given time within this period, every day. In practice, the total annual generator testing is expected to be no more than 200 hours, making this a highly conservative approach to assessing operational phase activities.

The generator testing schedule is anticipated to have a cumulative total of not more than the 200-hour exemption limit outlined in Schedule 1 Clause 17 of the NSW Protection of the Environment Operations Act 1997 (refer Section 3.1), in addition to Part 5, Division 6, Clause 73 of the POEO (Clean Air) Regulation 2022 (refer Section 3.2).

It is noted that should SSDA approval be granted, a condition is likely to require periodic emissions testing of the standby generators.

5.2 Telecommunications

Incoming telco services to service base building requirements shall be arranged directly by ISPT. All other telco cabling requirements will be arranged directly by each Data Hall client.

External Pathways to Street

The site is proposed to have two (2) sets of dual diversely routed underground pathways (4 off in total) for telecommunications cabling from street pits in Julius Avenue and Richardson Place to the two (2) Point of Entry (POE) telco rooms to serve the Julius Avenue data centre.

Quantity of additional conduits required for this phase of works is estimated to be 48.

Two (2) of each bank of non-dedicated conduits will be subducted on each pathway into site. These allow a single conduit to be split for different customers.

Comms Pathway	Number of Conduits	Dedicated Tenant Conduits
Eastern Side of Julius Ave (ZD pathway)	12	6
Western Side of Julius Ave (North) (ZC pathway)	12	6
Western Side of Julius Ave (South) (ZA pathway)	12	
Southern Boundary Provisions – Richardson PI (ZB pathway)	12	

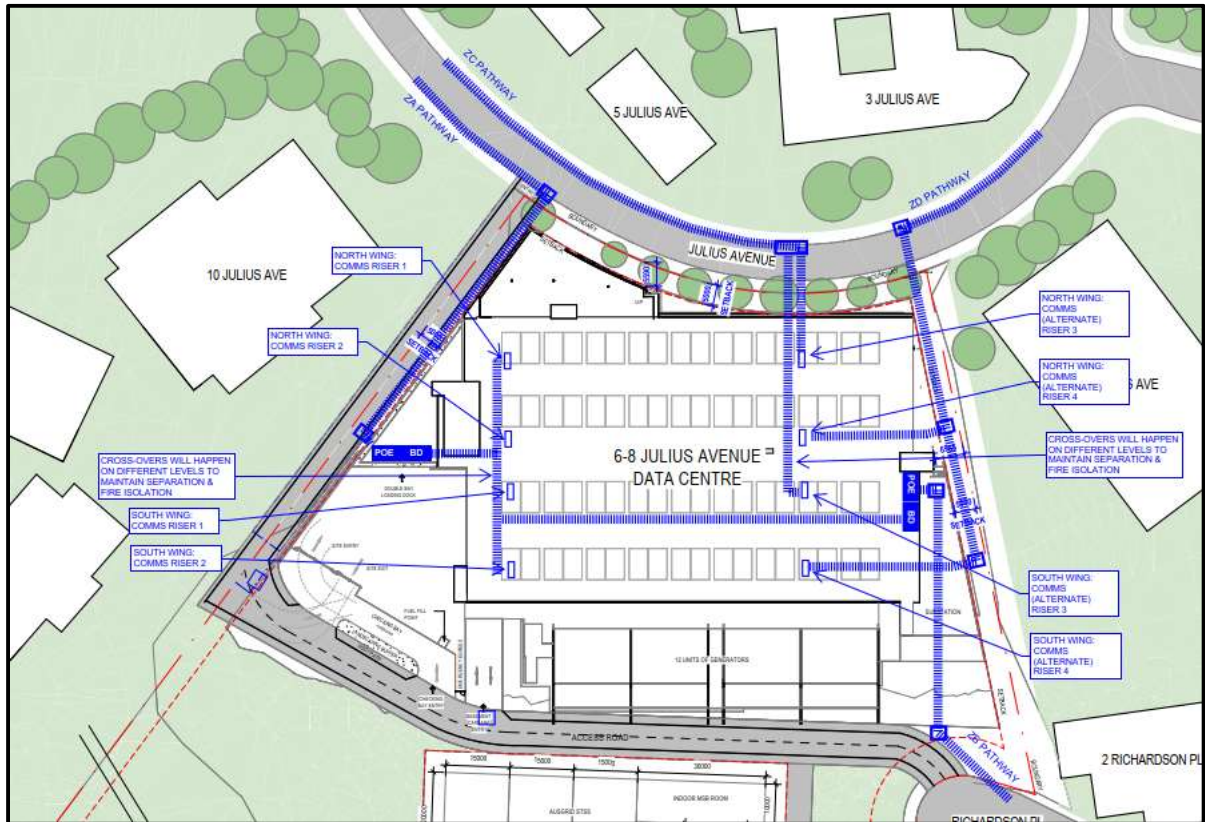


Figure 31: Conceptual Telecommunications Servicing Strategy

Diverse conduit paths shall be required with 20m separation between each pathway maintained at all times. If 20m separation cannot be maintained anywhere outside the building, conduits shall be concrete encased. Where 20m separation cannot be maintained inside the building, pathways shall be reticulated on different building levels, separated by fire rated floor slabs as a minimum.

Entrance Rooms

The Julius Avenue Data Centre will be provided with two (2) diverse Point of Entry (PoE) Rooms with at least 20m separation.

Customer Direct Entry Rooms

The Julius Avenue Data Centre will be provided with two (2) diversely routed conduit and containment pathways in secure risers suitable for steel duct lines to serve individual customer needs direct from street to Data Halls.

5.3 Potable Water

General

The proposed building wholly within the site will be supplied with potable water supply for internal domestic and industrial water supplied from Sydney Waters 200mm potable network.

Potable water will be supplied to the mechanical services industrial water tanks as a means of cross connection separation of potable and non-potable sources to feed all non-potable requirements to separate domestic potable water supplies.

Potable mains water is the primary water source of the mechanical evaporative cooling systems serving the data halls heat rejection requirements. In addition, the potable water supply feeds water into the mechanical industrial water storage tanks prior to serving the mechanical systems. The mechanical industrial water system consists of 24hr stored water volume should Sydney Water's water supply be under maintenance or failure for short periods.

All tanks, mechanical systems and pipework within the subject site will be owned, operated and maintained by the Proponent.

The fire services connection will serve the aggregate fire hydrant and fire sprinkler demand simultaneously. Due to the effective building height and available pressure and flow data from Sydney Water, fire pumps and dedicated fire services storage tanks will be required to serve the development. Design of an efficient system will be subject to input and coordination with Fire & Rescue New South Wales (FRNSW) and Fire Engineering to provide data centre specific protection requirements performance solutions.

Points of connection

It is proposed to utilise two (2) potable water connections to limit draw from a single point on the main and provide to provide resilient dual water supply to the domestic, industrial water and fire services. These connections shall be made from 200mm mains on Julius Avenue.

These two (2) connections shall be reticulated primarily through the authority meters located at the frontage and fire booster assemblies located to the north-west and south-west corners of the site. Locations shall be as per Australian standards, design guidelines, site architectural master planning options and utility requirements.

The building shall be supplied with potable which feeds industrial water supplies. Potable water shall be supplied to the industrial water tanks, administration and amenities areas as well as hose taps surrounding the site. Industrial water will supply the evaporative cooling system serving the data halls. In addition, the potable water supply backs up the industrial water tank fed supplies.

All tanks and pipework within the subject site will be owned and operated by the Proponent.

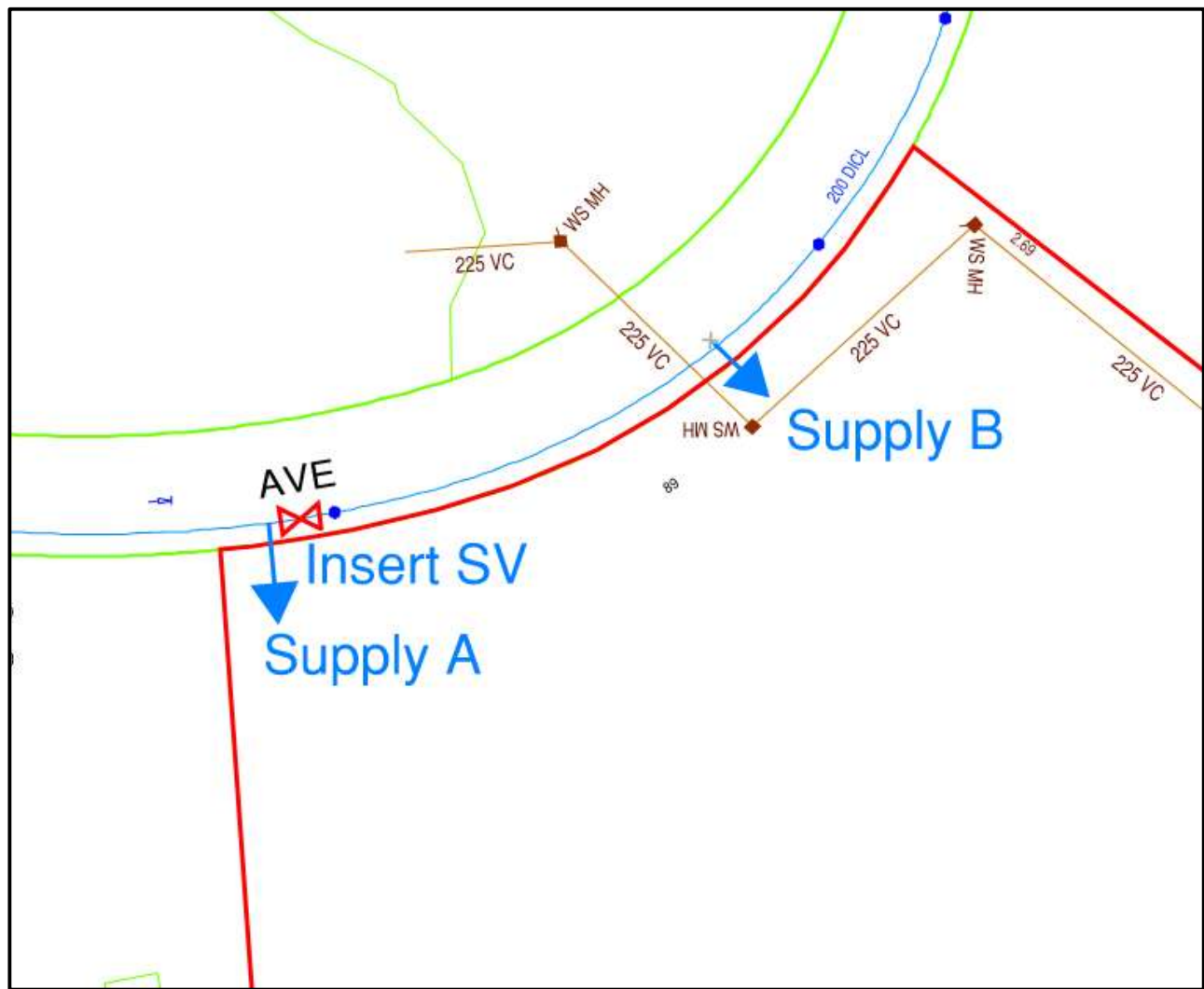


Figure 32: Conceptual Water Supply Servicing Strategy

Fire Water Supply

The fire services connection has the capacity to serve the aggregate fire hydrant and sprinkler demand simultaneously with the required flow and pressures, however due to the effective building height and extent of the site, fire pumps and storage tanks are required to serve the development under the DtS requirements of the NCC. Design of an efficient fire system will be subject to input and coordination with Fire & Rescue New South Wales (FRNSW) and Fire Engineering to provide performance based solutions.

System	Site Requirement
Fire Hydrant Flow	Fire Hydrant Flow rate per hydrant = 10 L/s at 700kPa assisted or 30 L/s unassisted Number of hydrants operating simultaneously = 3 Total flow rate required 30L/s
Fire Sprinkler Flow	NFPA / FMDS_5-33 protection for battery energy storage systems (BESS) 12.2mm design density / 230m ² area of operation / 90 min duration Total flow rate required 46.8 L/s + 20% = 56.1 L/s
Combined Fire Flow	Total flow rate required 86.1 L/s

Potable Water Demand Estimate

Initial calculations indicate that an ultimate **6,183,000 L/day** total water demand at peak **71.57 L/s** flow will be required to service the Data Centre development. Refer to table below for demand values at proposed stages of work.

Staging	Phasing	Maximum Demand (kL/Day)	Peak Flow Demand l/s	Number of Storage Tanks (No.)	Tank Storage Volume (kL)
Stage 1	Q3 2030	1,031	11.93	2	1,440
Stage 2	Q1 2031	2,061	22.86	4	2,880
Stage 3	Q3 2031	3,092	35.78	6	4,320
Stage 4	Q1 2032	4,122	47.71	6	4,320
Stage 5	Q3 2032	5,153	59.64	8	5,760
Stage 6	Q1 2033	6,183	71.57	10	6,880

*Potable water staging refers to the sequential fitout of each internal data hall space which progressively increase flow demand.

Industrial Water Supply

The industrial water system will supply the mechanical evaporative cooling system. The cooling system typically recirculates water 8 cycles prior to discharge reducing the net water demand.

The mechanical services industrial water system will be supplied from industrial water tanks located in the ground level of the site. An industrial water reticulation network will be installed, serving the mechanical plant via diverse A & B pathways.

The private water reticulation network within the building will be designed in a ring main configuration to provide supply resilience to the system.

The industrial water system will be supplied from the following sources;

- Potable water from the authority's water mains

- Rainwater Captured from the roof catchments

The industrial water system will draw its water source in sequence;

- Bulk water storage tanks
- Rainwater make-up
- Potable water supply

The industrial water supply will be filtered with automatic back wash filters and automatically chemically dosed to prevent legionella growth prior to being supplied to the evaporative cooling units.

Water supplied to the evaporative heat rejection system will be retained within the cooling towers sump. Water within the sump will be pumped up and be partially evaporated to cool the supply air stream.

To minimise water usage, the non-evaporated water is recirculated up to 8 times from the sump to be evaporated. This recirculation process will occur until adequate evaporation process has taken place such that the concentration of dissolved solids (TDS) within the sump water reaches six times the incoming water – achieving 8 cycles of concentration.

Offsetting Potable Water

The potable water demand will be reduced by utilising the rainwater stored in on site rainwater tank of total 150,000 litre effective capacity. The rainwater tank capacity has been sized based on average highest daily rainfall received each month over the past 50 years, and a roof catchment area of ~8,500m².

Based on the estimated annual average recycled water consumption by the cooling systems the rainwater harvesting system could further reduce the water consumption in the ultimate configuration and at higher percentages in early stages of the ramping profile whilst discharging minimal collected roof water off-site thus improving the existing zone tailwater flows in conjunction with the civil OSD.

Consultation with Authority

A Section 73 feasibility application has been made to Sydney Water under case number **216608**. A site-specific calculation for anticipated maximum water and sewer demands, based on the peak operating day for the fully developed data centre has been undertaken including phased ramp up demands throughout the build and fit-out phases for the facility.

The Proponent has appointed Vinculum as the projects Water Services Co-ordinator (WSC) and will continue to liaise with Sydney Water during the SSDA and ongoing design process.

5.4 Sewerage Services

General

The site will be serviced by a private sanitary drainage system in accordance with AS.3500 that is proposed to gravity drain to an existing industrial sewer connection as nominated by the Section 73 feasibility. The sanitary drainage will be separated into soil waste from front of house areas and wastewater drainage systems from the mechanical plant and the data halls to facilitate metering of mechanical drainage flows and flow restriction during peak times.

Soil waste

The soil waste drainage will collect all sanitary fixtures within the office spaces and other associated zones. This drainage system will run separately to the wastewater system throughout the data halls.

Industrial Wastewater

The wastewater system will collect all the cooling system wastewater as well as all floor waste and tundishes within the data halls. The wastewater drainage systems shall run separately to any soil waste systems draining to a retention / holding tank with a flow control orifice and will merge to the site's sanitary drainage system prior to site discharge via the boundary trap sewer connection located at the south boundary of the site.

Demand Estimate

Most of the site's discharge is from the wastewater generated by the evaporated cooling system. The soil waste discharge will be minimal due to relatively low staff number in relation to the size of the facility. The ultimate wastewater discharge forecast is detailed in table below.

Initial calculations indicate that a **730,000 L/day** sewer discharge demand and **8.5L/s** peak day flow will be required to service the final data centre development. In accordance with Sydney Water approvals, peak flow shall be limited to **7.6L/s** with additional flows detained on-site for out of hours release.

Staging	Phasing	Maximum Flows (kL/Day)	Peak Drainage Flows (L/s)
Stage 1	Q3 2030	122	1.403
Stage 2	Q1 2031	243	2.806
Stage 3	Q3 2031	365	4.209
Stage 4	Q1 2032	487	5.612
Stage 5	Q3 2032	608	7.015
Stage 6	Q3 2032	730	8.45

*Sewer staging refers to the sequential fitout of each internal data hall space which progressively increase discharge flow.

Based on standard soil and waste generated from the Front of House office side and Cooling system discharge from the back of house zones, the requirement of Trade waste agreements for the facility are likely not required. Trade waste requirements confirmation will be stipulated within Sydney Water Notice of Anticipated Requirements (NoAR) in due course as the design and statutory approvals progress.

Sewer demands are significantly lower than peak water demands as industrial water is recirculated 8 times prior to bleed off discharge from the cooling equipment to the wastewater system. In the initial earlier years of operation, the sewer demands will be significantly lower in stage 1 whilst the project ramps.

A Sydney Water **Section 73 feasibility** review has been received the Water Services Coordinator (WSC) under **Case number 219852**.

The overall capacity of the water network must be assessed by Sydney Water via a **Section 73** Notice of Anticipated Requirements (NoAR) application submitted by the Water Services coordinator following receipt of the SSDA requirements.

Consultation

A **Section 73** feasibility application has been made to Sydney Water under **Case number 219852**. The design team have provided a site-specific utility demands to the project WSC for anticipated maximum water and sewer demands, based on the peak operating final day for the fully developed data centre.

The Proponent has appointed Vinculum Advisory as the projects Water Services Co-ordinator (WSC) and will continue to liaise with Sydney Water during the SSDA and ongoing post SSDA design process through construction to receipt of a section 73 certificate to enable an occupancy certificate to be granted in due course.

Initial advice provided by Sydney Water has demonstrated a sewerage discharge limit of **7.6L/s** if the existing system is to be used without amplification. As such, one option to account for the excess discharge is to allow for on-site storage of sewer in a tank for out of hours discharge, which has been incorporated into the hydraulic design.

Confirmation of acceptance of this proposal was received from Sydney Water on the proposed sewer discharge arrangement via email on 17/6/25:

Planning supports an on-site storage tank for the development to capture the difference in wastewater flow rate on-site over an 18 hour period from 6 am to 12 am, and then from the on-site storage tank discharge at 14 L/s into the DN225 sewer at MH asset 1395061 during the 6 hour period from 12 am to 6 am.

Permanent Configuration

In the permanent configuration, sewer flows will drain from the site via a flow control / detention tank to Sydney Water sewer system to a newly constructed sewer junction to a sewer access chamber that exists within the site boundary already subject to Section 73 NoAR advice for the subject site and any Minor/Major works requirements to be confirmed by the WSC as the design progresses.

On-Site Reticulation

The soil waste drainage and waste drainage systems for the data centre will reticulate to the south boundary on the Site and discharge into a newly constructed manhole / access chamber over the 225mm sewer mains operated by Sydney Water.

5.5 Stormwater

The proposed data centre's stormwater design will be serviced by a series of drainage elements which will discharge the site's catchment.

The main building concrete roof is raked to allow capture of all rainwater via guttering to the north and south elevation. The generator structure concrete roof is raked to allow capture of all rainwater via guttering to the north elevation. All water will be captured via downpipes routed internally to an On Site Detention (OSD) tank in the basement via a proposed rainwater tank. If the rainwater tank is already at capacity, the runoff will discharge directly into the OSD.

The external pedestrian and vehicular pavement catchments will be accumulated via surface inlet pits or kerb inlet pits and routed to one of the two OSD tanks on site.

Both OSD tanks will contain water quality treatment units and will discharge into the lower-level bushland via the utilisation of level spreaders. The overland discharge to lower-level bushland was the preferred proposed discharge methodology as suggested by Council and agreed with NSW Parks and Wildlife Service in initial consultation sessions.

5.6 Gas

No gas supply is proposed to serve the data centre facility, and the site remains unencumbered by gas mains. There is a low-pressure gas main within Julius Avenue that does not trigger an encroachment to be referred to Jemena for an encroachment application (high pressure) through the Jemena online Portal and standard utility protections measures for utilities shall be adhered to during construction.

All heating generation will be via electric powered plant, with an auxiliary back-up supply from on-site diesel generators. As such no formal consultation with Jemena has been undertaken as part of the SSDA.

All existing site supplies will be capped off (if required) during site demolition phase via standard application to disconnect by licenced gas fitters as required by Jemena and any meters returned to Jemena by the licenced plumber in accordance with Jemena's online portal processes.

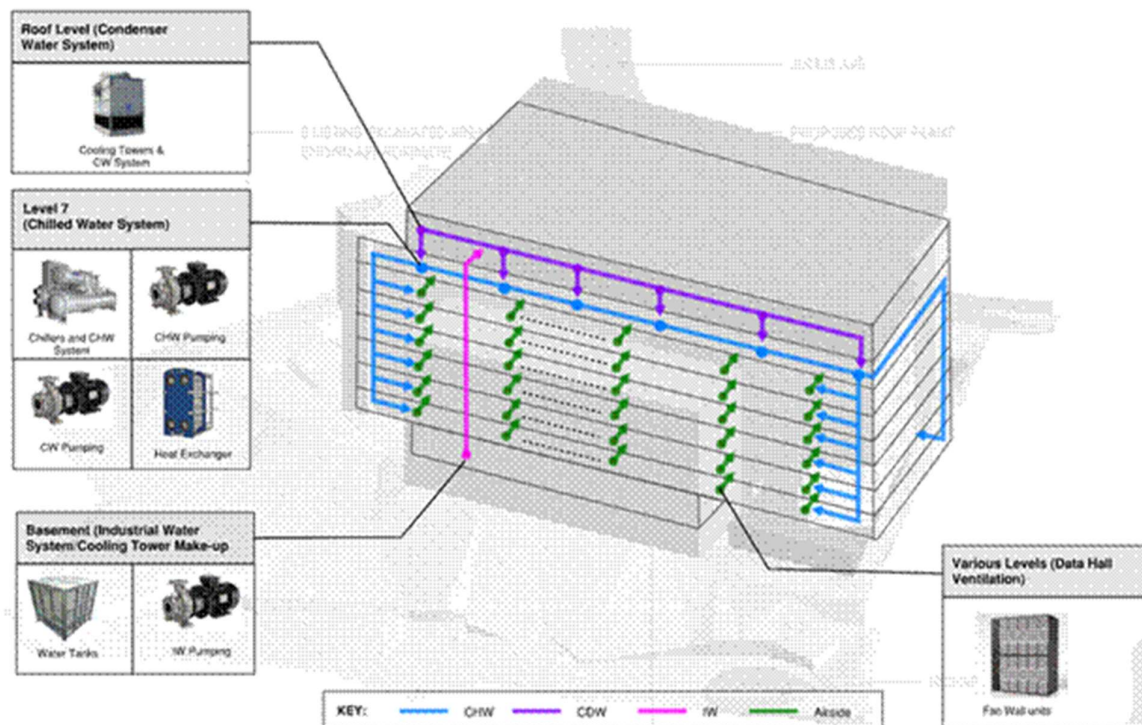
5.7 Mechanical

Mechanical System Overview

Below outlines the estimated system loads for a water-cooled chiller system based on six-storey development with twelve 9.6MW data halls in total.

Typical Data Hall Mechanical Configuration					Comments
	Per Data Hall		Total (6 Levels)		
IT Heat Dissipation	9.6	MW	115.2	MW	
Electrical Room Per Data Hall (including transformer, switchroom, UPS and battery room)	0.96	MW	11.52	MW	
Total Data Hall Heat Dissipation	10.56	MW	126.7	MW	12 Data Halls Total
Chillers Capacity	2.12	MW Each			5 Duty + 1 Standby Per Data Hall. (72 Total)
Total Cooling Capacity	10.6	MW	127	MW	
Cooling Tower Capacity	2.4	MW Each			5 Duty + 1 Standby Per Data Hall (72 Total)
Total Heat Rejection Capacity	12	MW	144	MW	
Fan Wall Units	0.37	MW Each			26 Duty + 2 Standby Per Data Hall (14 units per FWU gallery)

Total FWU Cooling Capacity	9.62	MW	N/A		Per Data Hall
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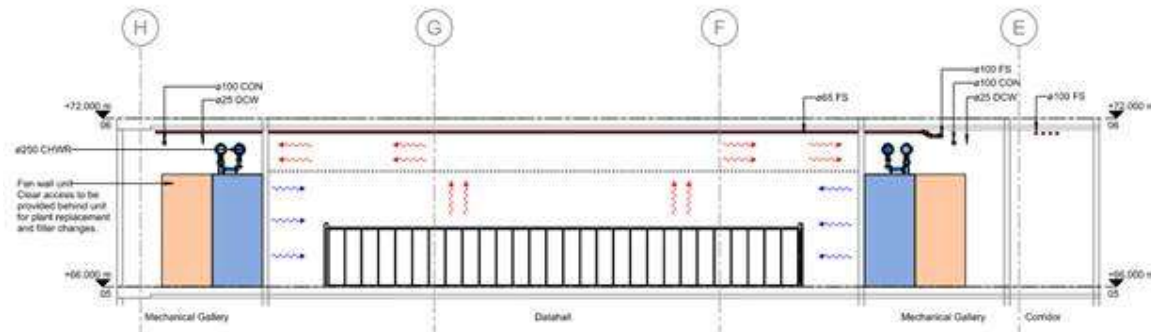
The systems and equipment associated with the mechanical services supporting the IT load includes:

- Water cooled chillers, open circuit cooling towers, plate heat exchangers, make up water tanks and associated chilled/condenser water pumps
- Associated pipework and system ancillaries
- Data hall pressurisation units (PAHUs)
- Chilled Water Fan wall units (FWUs)
- Chilled water CRAH units for electrical rooms
- Air cooled DX FCUs for HV Incomer and main comms rooms

Chilled water will be produced by a series of high efficiency, water cooled, electric vapour compression HFO chillers. Chilled water is then supplied to Fan Wall Units within each data hall providing cooling to the Data Hall IT load. Chillers will be specified to operate using refrigerant with zero ozone depletion potential. Heat produced by the chillers will be rejected to atmosphere by a condenser water system, a number of dedicated open loop cooling towers. Cooling towers will be selected to ensure high performance operation in low load conditions to enhance energy and water efficiency.

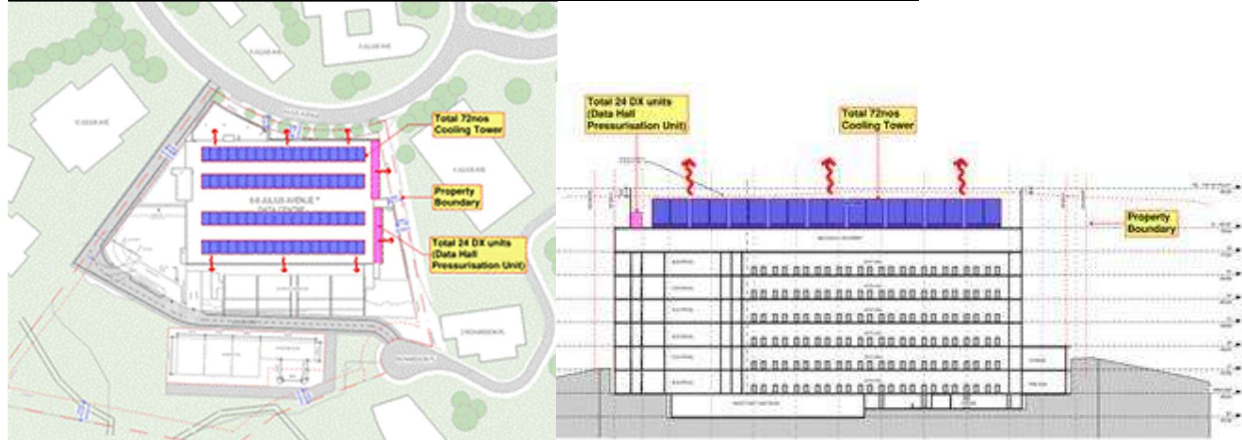
The design includes for water side economiser (heat exchangers) whereby condenser water can either precool the chilled water return before entering the chiller or fully by-pass the chiller and solely depend on low condenser water temperature to meet the data hall cooling requirement during periods when ambient conditions permits condenser water supply temperature to be below required chilled water temperature (free cooling mode).

If the chilled water supply temperature can be increased to a point that it is warmer than the condenser water flow temperature including a provision for plate heat exchanger inefficiency, then free cooling can be relied upon through the whole year and no chiller is required.



Cooling to the Data Hall IT load will utilise full air recirculation Fan Wall Units (FWU) connected to the dedicated chilled water circuit serving the associated data hall. FWU will provide cooling to the cold aisle and return air via hot aisle and overhead return plenum.

Urban Heat Island Effect Assessment (heat rejection from equipment)



As a data centre, it is inherent that there is more heat to reject from the building compared to a typical commercial or residential building. However, it is important to note that the primary method of heat rejection is via cooling towers which work adiabatically. This means that the heat is used to vaporise water rather than heat the air. Additionally, all the “hot” equipment associated with the ventilation and cooling of the data centre is located on the roof which is well ventilate and avoid impacting habitable rooms and communal open spaces. In addition, the equipment complies with AS1668.2 minimum separation to property boundary minimising impacts to neighbouring properties.

Alternative Cooling Options

This section summarises the evaluation of cooling solution options reviewed for this proposed data centre development.

The following technical requirements were considered when conducting the analysis:

- A data hall supply air temperature of 23°C
- A low Power Usage Effectiveness (PUE)
- Ability to be adapted to suit various tenants
- Flexibility for design to be modified to suit customer needs
- Noise emitted

The current design trends faced by the data centre industry is the adoption of direct-to-chip cooling. Liquid to chip cooling has gradually been deployed in some data centres in Australia. Another noticeable trend in data centre technology is the rise in temperature within cold aisles which allows the chilled water temperature to be raised and potentially the removal of chillers if water cooled solutions are used. The cooling solution chosen must be flexible in taking on these trends

The following cooling options have been reviewed during the concept design:

- Option 1: Air-cooled chillers + Fan Wall Units (FWUs)
- Option 2: Open circuit cooling towers (CTs) + water cooled chillers + FWUs
- Option 3: Hybrid towers + water cooled chillers + FWUs
- Option 4: Open circuit CTs + direct expansion (DX) FWU/Computer Room Air Conditioning (CRAC) units

These systems represent the most common cooling solutions used in Australia for data centre applications. Each listed option includes a description of its operational functionality.

Option 1: Air-cooled chillers + FWUs

Air cooled chillers produce chilled water and reject heat to ambient air. The chilled water produced is pumped to serve fan wall units which supply cool air into data halls and remove heat from the data halls. This option does not require water for heat rejection, but all chillers need be placed in an external plant space as enclosed areas restrict the airflow intake into the chillers.

Option 2: Open circuit CTs + water cooled chillers + FWUs

Chilled water is produced by water-cooled chillers and heat is rejected via open circuit cooling towers to the atmosphere. The chilled water produced is pumped to serve fan wall units which supply cool air into the data halls and remove heat from the data halls. Water side free cooling is possible using plate heat exchangers and this will reduce the operation hours of the chiller resulting in improved annualised PUE. Water is required for the cooling tower operation.

Option 3: Hybrid towers + water cooled chillers + FWUs

The option is the same as Option 2 with cooling towers replaced by hybrid coolers. When ambient temperature drops, hybrid coolers will switch from wet mode to dry mode. This reduces the annual water consumption of the site.

Option 4: Open circuit CTs + DX FWU/CRAC units

Open Circuit Cooling Towers reject heat to the atmosphere and condenser water is pumped to serve direct expansion (DX) FWU/CRAC units, which have local condensers and evaporators. Water side free cooling is possible when the outdoor wet bulb temperatures drop below the condenser water supply temperature. No central chillers are required, and the local compressors are smaller but also less efficient.

Cooling Option	Expected Peak PUE	Expected Annualised PUE	Water usage	Typical Acoustic Performance	Plant space	Future proofing
Option 1. Air-cooled chillers + FWUs	1.43-1.48	1.37-1.40	No water is required	85-92 dBA Significantly louder fans than water options.	Utilise more external plant space (only roof space)	Can adopted for high supply air temperatures and liquid to chip. Diminishing return (system efficiency) should higher cooling water temperature be acceptable to customer.

Option 2. Open circuit CTs + water cooled chillers + FWUs	1.32- 1.37	1.27-1.32	High peak water usage. High annual water usage	72-78 dBA	Can utilise both external and internal plantroom s	If higher cooling water temperature is acceptable to customers, direct condenser water supply can be implemented providing increased efficiency (omitting chiller) Can adopt higher supply air temperatures and a range liquid to chip solution.
Option 3. Hybrid towers + water cooled chillers + FWUs	1.35- 1.40	1.29-1.34	High peak water usage. Lower annual water usage	83-90 dBA	Can utilise both external and internal plantroom s	Same as option 2
Option 4. Open circuit CTs + DX FWU/CR AC units	1.42- 1.47	1.35-1.40	High peak water usage. Higher annual water usage	72-78 dBA	Can utilise both external and internal plantroom s	Can be adopted for higher supply air temperatures Cannot accommodate low temperature Direct liquid to chip solution.

Discussion

The air cooled chiller option has the highest peak and annualised PUEs. It also takes up more external plant space and does not fit within the available roof area.

In terms of water usage, Option 2 and 3 have a higher annual consumption compared to the other options. However, both options have greater efficiency during peak design conditions and lower annual energy consumptions. Rainwater is also captured from the large roof area to assist in reducing portable water consumption to the site.

Due to the proximity of residential development to the site, noise criteria is crucial in evaluating which cooling option is better suited for this data centre development. The air cooled chiller option produce the loudest noise emission of all options. Option 2 and 4 emit the lowest noise of all equipment, hence are considered the most suitable solution for this site.

Due to the height restriction of the site, equipment height is also a consideration. Based on supplier selections, option 3 would greatly exceed the height limit due additional coils need to allow dry/wet modes as compared to a conventional open circuit cooling tower.

The lowest PUEs of all options analysed is Option 2 with open circuit CTs and water cooled chillers, and this cooling solution is used in the design. This cooling solution also has the potential of removing water-cooled chillers if customers can utilise higher cooling water temperatures due to the adoption of liquid to chip cooling technology and/or raised supply air temperatures. This will further improve the energy efficiency of the system and provide even lower PUEs.

Conclusion

In conclusion, Option 2 with its used of open circuit cooling towers and water cooled chillers to provide cooling to the data centre is shown to be the most efficient solution. The option is flexible in its design, it can also be adapted to liquid to chip cooling which will make the cooling solution even more efficient. It has lowest noise emission which is important for site close to residential towers.

6. INFRASTRUCTURE DELIVERY AND STAGING PLAN

This section provides details of the proposed infrastructure delivery and staging plan, including a description of how infrastructure requirements would be coordinated, funded and delivered to facilitate the development.

6.1 Electricity

The STSS is proposed to be delivered in a single stage to reflect the construction of the development. As such, there is no staging to be considered for the power delivery to the project.

Interim power will be required for the Temporary Builder's Services (TBS) which will be subject to a separate application to Ausgrid once the construction phase loads are ascertained.

6.2 Telecommunications

New works for telecommunications pit and duct will be required but will be delivered in a single stage to reflect the construction of the development. The cable reticulation pathways will be co-ordinated with the various telecommunications carriers.

6.3 Potable Water

New works for potable water will be required but will be delivered in a single stage to reflect the construction of the development. The tapping points and metering will be co-ordinated with Sydney Water through their TAP-IN applications portal as required.

The industrial water tanks and associated pumps within the site will be expanded as shown in section 5.3.4 as the facilities mechanical demands grow over the operational lifecycle of the building.

6.4 Sewerage

New works for sewer drainage will be required and will be delivered in a single stage to reflect the construction of the base building development. The sewer connection point will be co-ordinated with Sydney Water through the WSC and Sydney Water's online TAP-IN applications portal as required.

The on-site industrial wastewater flow retention tank will be integrated within the initial construction phase with the flows generally being a pass through up to stage 6 (refer Section 5.4 for extra detail) once the outflow is estimated to exceed the maximum receiving flow rate which will be retained via a fixed flow control orifice as the facilities mechanical demands grow over the operational lifecycle of the building.

6.5 Stormwater

New works for the stormwater drainage will be required and delivered in a single stage to reflect the construction of the site layout.

The interim condition of stormwater catchment capture will incorporate a comprehensive Erosion & Sediment control plan that will utilise pump out pits at excavated low points. The water in these pits will then be routed to a sediment retention pond.

6.6 Gas

No new works for gas services will be required, the existing gas network shall be protected throughout construction phase to the satisfaction of Jemena.

7. POTENTIAL IMPACTS

This section provides details of potential impacts of the development on existing utility infrastructure identified in the vicinity of the site.

7.1 Electricity

There seem to be only minimal capacity existing electrical conduits to the site. These assets will require decommissioning prior to construction to ensure no adverse impacts which appear simple to achieve.

The proposed STS will be a new asset located on our site to supply power to our development. We are currently in negotiations with Ausgrid to cater for this on-site Sub-Transmission Substation (STS). This mitigates the impact to the existing electrical infrastructure in and around the area.

The STS will bring in power from a new Sub-Transmission Switching (STSS) either in North Ryde or local to the site to provide electrical supply to the entire development and will mitigate the need for HV cabling to come from existing electrical infrastructure in and around the area.

New Ausgrid HV cabling will need to be reticulated in nearby streets to bring in the new 132kV feeders to the site, which may cause minor disruption to the local area. Typically these works be via underground boring rather than open trenching to minimise disturbance. The proposed route for these feeders is yet to be confirmed with Ausgrid, and this work would be undertaken by Ausgrid and subject to their separate approvals and coordination process.

7.2 Telecommunications

There are several minor telecommunications conduits running into the site. These assets will require decommissioning prior to construction to ensure no adverse impacts which appear simple to achieve.

We will be proposing additional communications incoming pits and lead-in conduits into the facility. The proposed routes will be subject to negotiation with the telecommunications carriers. Additional pit and pipe infrastructure is envisaged to be required to connect into existing and/or new carrier infrastructure.

7.3 Potable Water

The site is unencumbered by water infrastructure. Construction works within the subject site will cause no impacts to the utilities water infrastructure. There are existing mains isolation valves to each side of the site, facilitating the ability to isolate mains to cut in new supplies without affecting the landholders connected to the wider Sydney Water ring mains network around Julius Avenue.

Any required upgrades to water assets outside the property boundary yet to be defined by the water network modelling will require approval from Sydney Water and from the relevant roads' authority. There are unlikely to be impacts on traffic along Julius Avenue given the location of the site and available water main size.

During later construction stages which are predominantly internal fit-outs, measures will be implemented to avoid damage to water services constructed during initial stages of work including dedicated craneage locations within the site boundary.

7.4 Sewerage

Any required upgrades to sewer assets outside the property boundary will require approval from the relevant roads authority as well as Sydney Water. However, as previously stated, works to upgrade the sewer will not be required as per the Section 73 Feasibility report.

In the baseline condition the site building footprint is within proximity to an existing mains sewer the northern, eastern and southern boundaries that is to be maintained operational throughout the construction and operational phases of the development. The work will require Sydney Water to approve building plans and structural protection measures via a Building Plan Approval (BPA) application which is to be completed in accordance with Sydney Water's process or as otherwise prescribed within the Section 73 notice of anticipated requirements as this information becomes available.

7.5 Stormwater

The proposed stormwater drainage infrastructure will be designed to City of Ryde's design standard with respect to site permissible discharge rates. This discharge rate will be regulated by way of an On Site Detention tank and a specified outlet orifice.

As discussed with Council, as well as NSW Parks and Wildlife, the overriding objective of the stormwater discharge methodology is to maintain the state-of-nature overland flow path conditions wherever possible. The use of level spreader dispersal units will ensure that the natural downstream irrigation flow paths are preserved.

7.6 Gas

All existing gas utilities are outside the subject site boundaries and no gas connections are Proposed for the new development. Any potential modifications to telecommunications, water, and sewer outside the boundary will need to ensure no adverse effects to the existing gas line on Julius Ave.

No gas supply is proposed to serve the data centre facility. All Heating generation will be from electrical sources with auxiliary supply from on-site back-up diesel generators. There are also no existing gas network mains within the subject site boundary and therefore the development causes no impact to existing gas networks.

During later construction stages which are predominantly internal fit-outs, measures will be implemented to avoid damage to utility gas services including dedicated craneage locations within the site boundary to not impose loads on utility services.

APPENDIX A

Ausgrid Response



Address all relevant correspondence to:
Customer Connections
PO Box 4009
Sydney NSW 2001

E: majorconnections@ausgrid.com.au

11 April 2025

Mr William Walker
Chief Investment and Development Officer
ISPT
Email: wwalker@ispt.com.au

c/. Mr Braj Dubey
Technical Director & Level 3 ASP Team
Integrated Group Services
Email: braj.dubey@igs.com.au

Dear Braj,

AN-30170 ISPT Data Centre – 6-8 Julius Ave North Ryde NSW 2113 System Planning Advice

Further to your original connection application on 5th November 2024 and subsequent engagement with Ausgrid to explore connection options for this development, our Planning group has now completed a planning study to investigate power supply options for this data centre development.

Ausgrid has investigated permanent N-1 supply options to cater for an ultimate maximum demand of 240MVA at 6-8 Julius Ave North Ryde. A supply voltage of 132kV has been identified as suitable for this magnitude of load.

As per IGS's email dated 13/12/2024, it is anticipated the data centre load will require an initial load of 120MVA and then an additional 120MVA totalling 240MVA within 2 years of energisation.

The key considerations and outcomes from this study are described below and will provide important information to assist with project planning and future connection of bulk power supplies.

The proposed data centre site is located approximately 2.0km away from Ausgrid's Macquarie 132/33kV STS. Macquarie STS is currently equipped with two 120MVA 132/33kV transformers. The STS currently supplies three data centres and has committed supply connections in progress. A project is underway to install a third 120MVA transformer at Macquarie STS, with commissioning scheduled by December 2025. After the committed data centre connections, there will be no spare 33kV feeder bays at Macquarie STS for additional data centre supply connections. Hence, the supply connection at 33kV from Macquarie STS has been discounted.

Macquarie Park ZS is located approximately 2km from the proposed data centre site. The zone substation has limited spare capacity and 11kV feeder bays, making it unable to support the ultimate data centre load of 240MVA. Considering the size of the load, 11kV as a supply option is not being offered.

132kV feeders 92A & 92B from Sydney North BSP to Lane Cove STSS is in close proximity to the proposed data centre site but do not have adequate capacity to supply the proposed data centre load including other proposed loads in the Julius Av precinct.

2 Supply Options & Technical Requirements

Ausgrid is currently evaluating uncommitted customer connection projects in the Julius Ave area. The options listed below adopt a comprehensive planning strategy to supply all these loads, optimizing network utilization by addressing them collectively rather than individually. As such, the same options below may be offered to other interested parties until specific augmentation requirements have been developed and implemented as part of Transgrid-Ausgrid joint planning.

The specific augmentation requirements in the Transgrid and Ausgrid networks to strengthen the upstream network have been under general discussion at quarterly Transgrid-Ausgrid joint planning meetings, and discussions are ongoing.

As outlined in Section 1.0, Macquarie STS is the nearest supply connection; however, it lacks the spare capacity and feeder bays needed to connect the load.

Based on the network hosting load capacity, load size and other developments in the area, the following options have been identified for supply of the proposed loads:

- Option 1 – Establish 2 x 132kV feeders from new 132kV subtransmission switching substation (STSS) at Ausgrid's ex-North Ryde ZS site
- Option 2 – Establish 2 x 132kV feeders from new 132kV subtransmission switching substation (STSS) in the Julius Ave North Ryde area

High level investigation on feasible feeder routes has been completed at this stage. The proponent or consultant should conduct detailed investigations as part of their own feasibility review.

2.1 Option 1 – Establish 2 x new 132kV feeders from new 132kV subtransmission switching substation (STSS) at Ex-North Ryde ZS site

2.1.1 Project Details

This option involves the installation of a new 132kV STSS supplied by teeing off from the existing feeders 926 and 927 from Sydney North BSP to Mason Park STSS. The new STSS provides a hosting load capacity of 250MVA. Given the typical Ausgrid project timelines, completing this type of option generally takes at least 4 to 5 years.

Ausgrid has retained ex-North Ryde ZS site at 22a Goulding Rd North Ryde and are exploring the feasibility of building a new STSS on it. The feasibility study for the new STSS has not yet been conducted and will need to be initiated.

This option requires:

- Removal of existing tee from 132kV feeder 926 and 927 to Endeavour Energy (EE) owned Carlingford transmission substation. This has already been discussed in the joint planning and the initial advice from the EE planning team indicates that the tee is not required. EE are conducting detailed planning analysis regarding this requirement.
- Relocation of all the in-service equipment, if any, from the ex-North Ryde ZS site to prepare for the new STSS.
- Installation and commissioning of the new 132kV STSS at 22a Goulding Rd North Ryde (ex-North Ryde ZS).
- Installation of two new 132kV feeders between this new 132kV STSS and the proposed ISPT site on 6-8 Julius Av North Ryde to supply the data centre load of 240MVA. These feeders would be considered dedicated network assets to be funded by ISPT.
- Funding for the new STSS is not accounted for within our current regulatory period 2025-29, as approved by the Australian Energy Regulator (AER). This would need to be approved as a contingent project by the AER.

As the proposed load increases in the future along with underlying network load, the following network augmentation is also required in the medium to long term (7-10 years) to support this option and the wider Carlingford area:

- New Carlingford 330/132kV BSP and associated 330kV feeders (Transgrid to initiate the project)
- Rearrangement of the new STSS to Carlingford BSP and network rearrangement in the Macquarie Park/Lane Cove area.

Figure 2 below depicts a high-level single line diagram which describes the connectivity between the new 132kV STSS and the proposed data centre site.

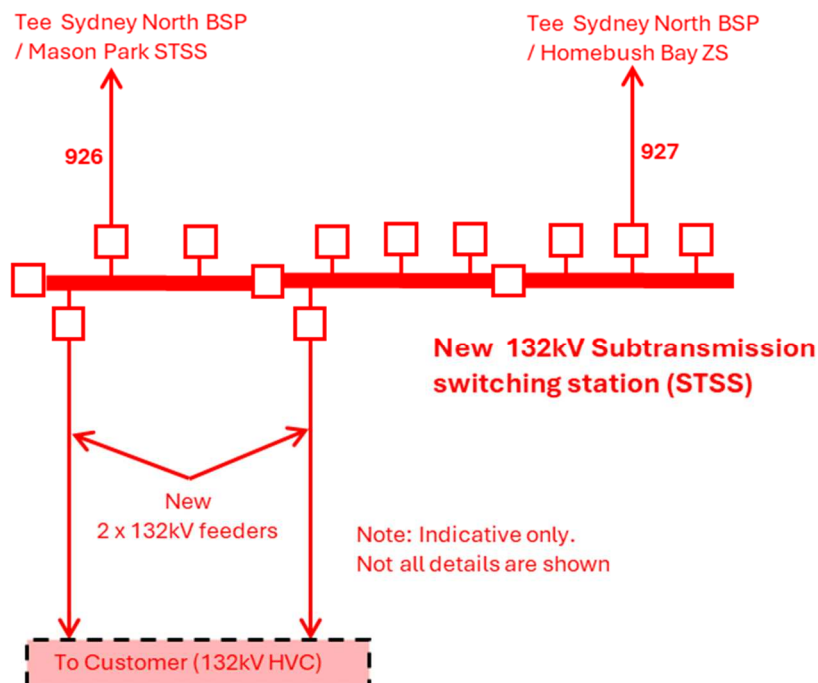


Figure 2: Indicative single line diagram for Option 1

A potential high level desktop feeder route (highlighted in Yellow) to the proposed ISPT site is shown in Figure 3 below.

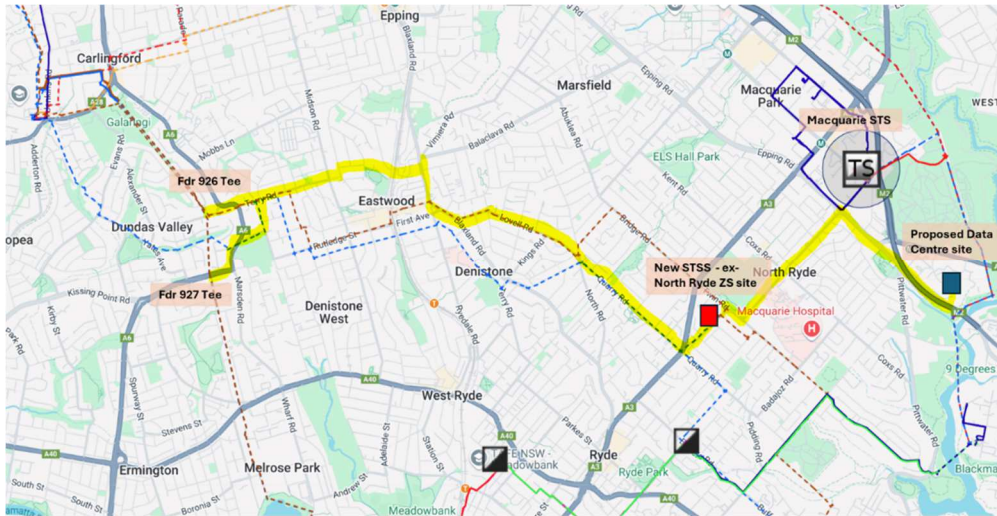


Figure 3: Indicative feeder route from feeder 926/927 tee to new STSS to Customer site

2.1.2 Fault Levels

Estimated fault levels (voltage factor – 1.1) are as follows:

Substation	Scenario	C-Factor	Fault Level (kA)			
			3PH	LLG		LG
				Phase	Earth	
New STSS – 132kV	Max	1.1	21.9	20.6	11.6	15.2
New STSS – 132kV ¹	Min	1.0	15.4	14.4	6.7	9.3

Note: Maximum fault level is calculated based on system NORMAL network configuration. Minimum fault level is based on the lowest fault level when either Fdr 926 tee or 927 tee to STSS is out of service.

All 132kV equipment installed as part of this project should have a fault duty of at least 40kA for 1.0 sec to align with Ausgrid's current standard contract specification. The earth fault levels at the Customer installation should be designed for future network fault levels to cater for any future developments at the Ausgrid network.

¹ Minimum fault based on either Fdr 926 tee or Fdr 927 tee to STSS out of service

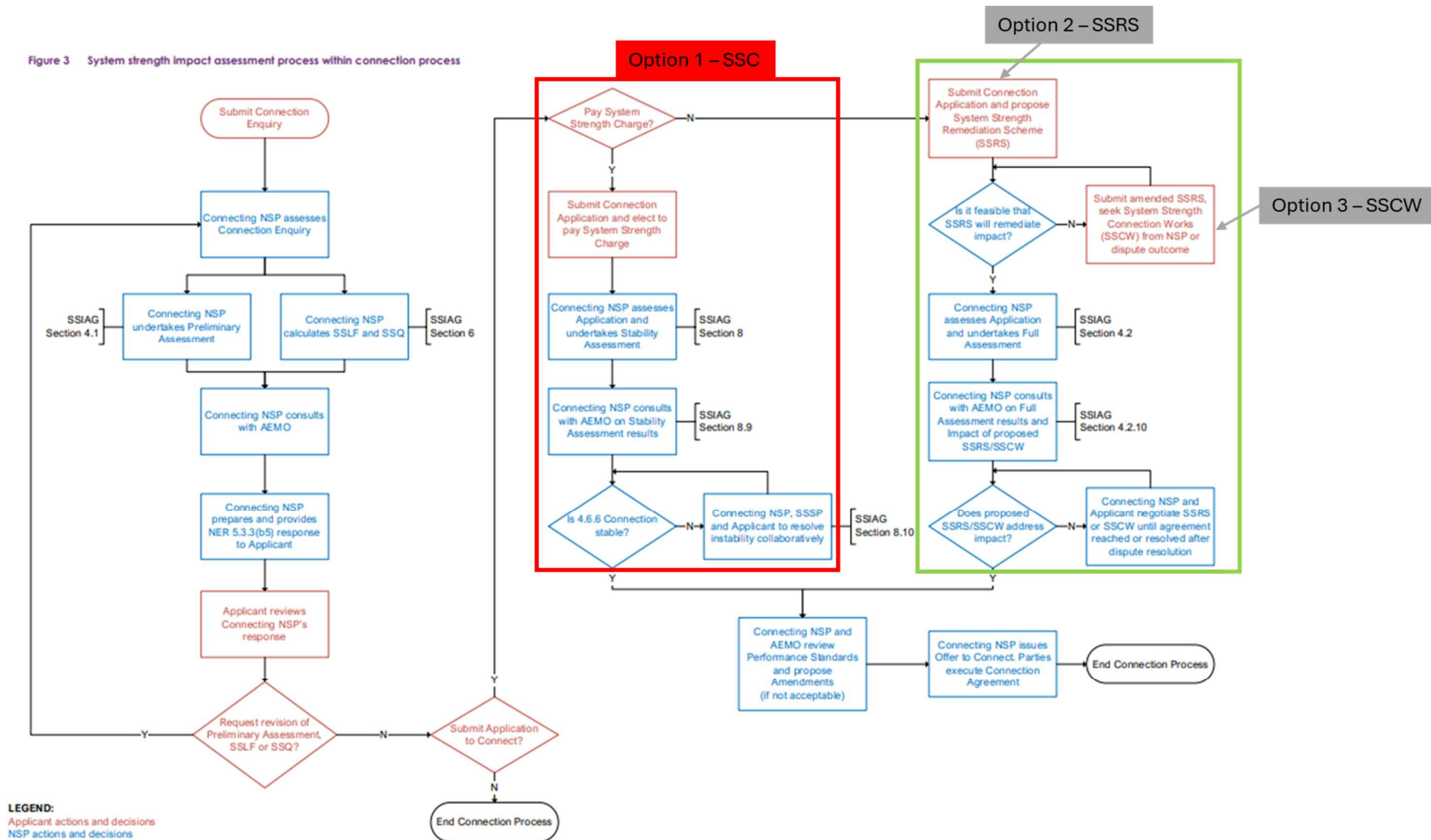
2.1.3 System Strength Impact Assessment Guidelines

As a new connection, the installation is expected to need to comply with, as a minimum, the final determination of the National Electricity Amendment (Efficient management of system strength on the power system) Rule 2021 and associated system strength impact assessment guidelines (SSIAG). As per Figure 3 from section 2.5 of the SSIAG (reproduced and marked up overleaf), it is up to the customer to choose one of the three options below:

1. Pay system strength charge (SSC)
2. Propose and implement acceptable system strength remediation scheme (SSRS)
3. Propose and implement acceptable system strength connection works (SSCW)

Once the customer has selected an option, Ausgrid will assist the customer to move forward. If the customer decides to pay the SSC, a short circuit ratio (SCR) withstand assessment will be required. If Withstand SCR has an impact of less than 5% on the available fault level, then the customer will be exempt from paying the SSC. The SCR withstand assessment also has the potential to reduce the SSC.

Figure 3 System strength impact assessment process within connection process



2.1.4 Operational Details

All supplies to the proposed data centre site will be run normally closed at Ausgrid's substation. It is Ausgrid's preference that the 132kV feeders should not be paralleled at the customer's premises as it imposes limitations on Ausgrid's ability to operate the upstream network.

2.1.5 Communications

Appropriate fibre-optic communication is to be installed between Ausgrid's substation(s) and the proposed data centre site as required for control, protection and communications. Additional communication pits may be required along the proposed route. Allowance should be made for any installation/upgrades to SCADA equipment at both the Ausgrid substation and customer installation.

2.1.6 Metering

An appropriate Rules compliant metering installation should be installed at the customer's site as per Ausgrid Electrical Supply standards ES3 Part A. The installation must also comply with the current version of NS195, the National Electricity Rules and AEMO Metrology procedures.

2.1.7 Protection

The requirement for the protection system will be installed as per relevant Ausgrid Standards. New optical fibre may need to be installed as required. The design of the customers installation should not allow interconnection with any other source of supply (whether from Ausgrid or elsewhere) without prior agreement.

2.1.8 SCADA

Allowance shall be made for indication of the feeder circuit breakers (CBs) at the proposed customer installation.

Ausgrid's obligations under its License Conditions relating to cybersecurity shall be considered when implementing this scheme. Minor modifications to the SCADA system may be required.

2.1.9 Load Shedding Capability

Ausgrid has obligations to provide both automatic under-frequency and remote load shedding facilities throughout the network. Load shedding capability is to be confirmed during the design phase.

2.1.10 Additional Technical Requirements and Ride Through Capability

AEMO has undertaken a recent review of technical requirements for large load connections and intends to develop load rule change proposals in the future as part of a Load Technical Requirements Review. Ausgrid will work with proponents to ensure that future technical requirements are appropriate for the specific connection point as well as the large load connection.

2.1.11 Land Requirements (Easements, Acquisitions, Disposals)

It is assumed that underground cable installation between the STSS and customer site will be contestable. It is expected that the preferred route will be in public roadways and potentially through other sites. Any easement requirements are to be determined by further route investigations and negotiated/secured as part of the projects development in coordination with Ausgrid.

Ausgrid has retained ex-North Ryde ZS site at 22a Goulding Rd North Ryde and are exploring the feasibility of building a new STSS on it. However, the feasibility study for the new STSS has not yet been conducted and will need to be initiated.

2.1.12 Planning Estimate

The planning estimates are based on approximate Ausgrid standard costs (in Real 2024/25 dollars) for an assumed final arrangement and required works. They are only preliminary planning estimates and do not include any costs for easements or property acquisitions. The planning estimates have assumed that the most direct feeder routes are obtained, and where it is not possible these planning estimates will not be valid.

The below planning estimates do not include the medium to long term augmentation works as mentioned in section 2.1.1.

OPTION 1 – Establish 2 x new 132kV feeders from new 132kV STSS at Ex-North Ryde ZS site	
Dedicated Connection Assets ²	Estimated Cost Range (FY24/25 \$M)
Install two 132kV feeders from a new STSS to a private HVC substation within the customer premises (2 x 3.5km of route length is assumed)	
Terminate two 132kV feeders at the customer's end (Includes associated control and protection works)	
Shared Assets ³	
New 132kV STSS (21 x 132kV CB)	
2 x 132kV feeder tee off Feeder 926 and 927 (2 x 7km of route length is assumed)	
Terminate two 132kV feeders at New 132kV STSS (Includes associated control and protection works)	

Table 1: Planning estimate for permanent 132kV supply Option 1

² The high-level planning estimate does not include privately owned substation related costs.

³ Refer to Section 3 for further details.

2.1.13 Project Timing and Other Considerations

This option involves establishing a new 132kV STSS to supply the proposed ISPT data centre at 6-8 Julius Av North Ryde. Typically, constructing a new STSS takes 4-5 years. Given the customer's request to connect the load by late 2028, the new STSS may not be ready in time.

Several proposed data centre loads are in various stages of the connection process, with supply options at 33kV from the proposed Wallumatta STS. The Wallumatta STS is a contingent project awaiting funding approval from AER and is scheduled for completion in 2028/2029. If any proposed data centres in the area do not proceed, there might be an opportunity, though not guaranteed, to temporarily connect the ISPT data centre load at 33kV until the new STSS is commissioned.

The establishment of new 132kV feeders between new STSS and the proposed ISPT site is expected to be contestable. As such, the customer is expected to be responsible for the feeder rating, timing, and delivery of these works.

A coordinated and detailed investigation on the feasibility of establishing feeders in the vicinity of new STSS and surrounding areas should be conducted to avoid impacts on the thermal ratings of existing and future feeders in the area.

Further, detailed investigation should be completed to determine potential routes to the proposed ISPT data centre site.

A detailed investigation should be conducted to determine the practicality and/or feasibility of this option.

2.2 Option 2 – Establish 2 x new 132kV feeders from new 132kV subtransmission switching substation (STSS) in the Julius Av North Ryde area

2.2.1 Project Details

This option involves the installation of a new 132kV STSS supplied by teeing off from the existing feeders 926 and 927 from Sydney North BSP to Mason Park STSS. Given the typical Ausgrid project timelines, completing this type of option generally takes at least 4 to 5 years.

Ausgrid is exploring the feasibility of building a new STSS close to the data centre load near Julius Av North Ryde. Ausgrid have received multiple connection applications in the area and having a STSS close to the load centre will reduce the infrastructure costs, offer improved reliability and faster connection times. Ausgrid would be like to work constructively with ISPT in exploring a mutually beneficial solution regarding the use of their property for a new 132/33kV STSS.

A feasibility study for the new STSS has not yet been conducted and needs to be initiated.

This option requires:

- Removal of existing tee from 132kV feeder 926 and 927 to Endeavour Energy (EE) owned Carlingford transmission substation. This has been already discussed in the joint planning and the initial advice from the EE planning team indicates that the tee is not required. EE are conducting detailed planning analysis regarding this requirement.
- Identification of a suitable site for the new STSS.
- Installation and commissioning of the new 132kV STSS in the suitable site.
- Installation of two new 132kV feeders between this new 132kV STSS and the proposed ISPT site on 6-8 Julius Av North Ryde to supply the data centre load of 240MVA. These feeders would be considered dedicated network assets to be funded by ISPT.
- Funding for the new STSS is not accounted within our current regulatory period 2025-29, as approved by the Australian Energy Regulator (AER). This would need to be approved as a contingent project by the AER.

As the proposed load increases in the future along with underlying network load, the following network augmentation is also required in the medium to long term (7-10 years) to support this option and the wider Carlingford area:

- New Carlingford 330/132kV BSP and associated 330kV feeders (Transgrid to initiate the project)
- Rearrangement of the new STSS to Carlingford BSP and rearrangement of network in the Macquarie Park/ Lane Cove area.

Figure 4 below depicts a high-level single line diagram which describes the connectivity between the new 132kV STSS and the proposed data centre site.

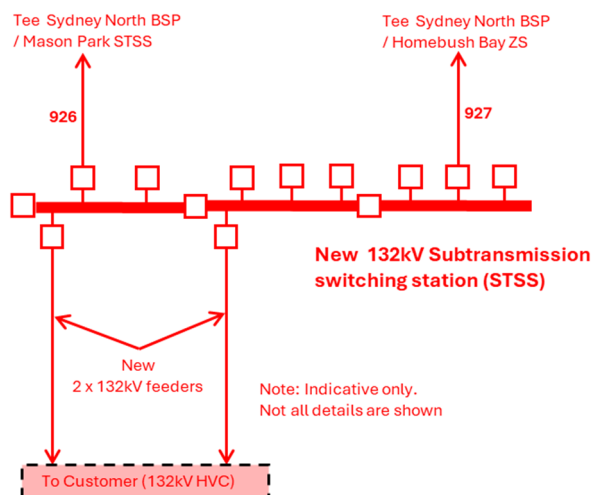


Figure 4: Indicative single line diagram for Option 1

A potential high level desktop feeder route (highlighted in Yellow) to the proposed ISPT site is shown in Figure 5 below.

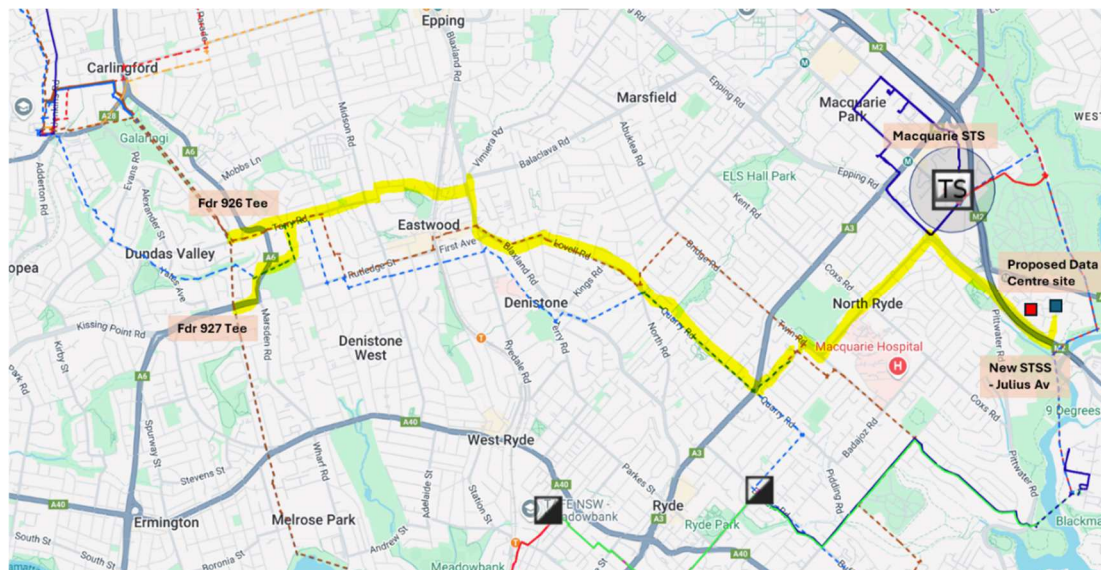


Figure 5: Indicative feeder route from feeder 926/927 tee to new STSS to Customer site

2.2.2 Fault Levels

Estimated fault levels (voltage factor – 1.1) are as follows:

Substation	Scenario	C-Factor	Fault Level (kA)			
			3PH	LLG		LG
				Phase	Earth	
New STSS – 132kV	Max	1.1	20.6	19.3	10.6	14.1
New STSS – 132kV ⁴	Min	1.0	18.7	17.5	9.6	12.8

Note: Maximum fault level is calculated based on system NORMAL network configuration.
Minimum fault level is based on the lowest fault level when either Feeder 926 tee or 927 tee to STSS is out of service.

All 132kV equipment installed as part of this project should have a fault duty of at least 40kA for 1.0 sec to align with Ausgrid's current standard contract specification. The earth fault levels at the Customer installation should be designed for future network fault levels to cater for any future developments at the Ausgrid network.

2.2.3 System Strength Impact Assessment Guidelines

Refer to Section 2.1.3.

2.2.4 Operational Details

Refer to Section 2.1.4.

2.2.5 Communications

Refer to Section 2.1.5.

⁴ Minimum fault based on either Fdr 926 tee or Fdr 927 tee to STSS out of service

2.2.6 Metering

Refer to Section 2.1.6.

2.2.7 Protection

Refer to Section 2.1.7.

2.2.8 SCADA

Refer to Section 2.1.8.

2.2.9 Load Shedding Capability

Refer to Section 2.1.9.

2.2.10 Additional Technical Requirements and Ride Through Capability

Refer to Section 2.1.10.

2.2.11 Land Requirements (Easements, Acquisitions, Disposals)

It is assumed that underground cable installation will be contestable. It is expected that the preferred route will be in public roadways and potentially through other sites. Any easement requirements are to be determined by further route investigations and negotiated/secured as part of project development in coordination with Ausgrid.

Ausgrid does not own land in Julius Av North Ryde area for the STSS and would be interested in working with ISPT to establish a suitable parcel of land for the STS.

A feasibility study for the new STSS has not yet been conducted and needs to be initiated.

2.2.12 Planning Estimate

The planning estimates are based on approximate Ausgrid standard costs (in Real 2024/25 dollars) for an assumed final arrangement and required works. They are only preliminary planning estimates and do not include any costs for easements or property acquisitions. The planning estimates have assumed that the most direct feeder routes are obtained, and where it is not possible these planning estimates will not be valid.

The below planning estimates do not include the medium to long term augmentation works as mentioned in section 2.2.1.

OPTION 2 – Establish 2 x new 132kV feeders from new 132kV STSS In the Julius Av North Ryde area	
Dedicated Connection Assets ⁵	Estimated Cost Range (FY24/25 \$M)
Install two 132kV feeders from new STSS to a private HVC substation within the customer premises (2 x 0.5km of route length is assumed)	
Terminate two 132kV feeders at the customer's end (Includes associated control and protection works)	
Shared Assets ⁶	
New 132kV STSS (21 x 132kV CB) + property	
2 x 132kV feeder tee off Feeder 926 and 927 (2 x 10.5km of route length is assumed)	
Terminate two 132kV feeders at New 132kV STSS (Includes associated control and protection works)	

Table 2: Planning estimate for permanent 132kV supply Option 2

⁵ The high-level planning estimate does not include privately owned substation related costs.

⁶ Refer to Section 3 for further details.

2.2.13 Project Timing and Other Considerations

This option involves establishing a new 132kV STSS on a site in the Julius Av North Ryde area to supply the proposed ISPT data centre at 6-8 Julius Av North Ryde. Ausgrid do not own a site in the area for the STSS and would be interested in working with ISPT to establish a suitable parcel of land. Typically, constructing a new STSS takes 4-5 years. Given the customer's request to connect the load by late 2028, the new STSS may not be ready in time.

Several proposed data centre loads are in various stages of the connection process, with supply options at 33kV from the proposed Wallumatta STS. The Wallumatta STS is a contingent project awaiting funding approval from AER and is scheduled for completion in 2028/2029. If any proposed data centres in the area do not proceed, there might be an opportunity, though not guaranteed, to temporarily connect the ISPT data centre load at 33kV until the new STSS is commissioned.

Further, detailed investigation should be completed to determine potential routes to the proposed ISPT data centre site.

The establishment of new 132kV feeders between new STSS and the proposed ISPT site is expected to be contestable. As such, the customer is expected to be responsible for the feeder rating, timing, and delivery of these works.

A detailed investigation should be conducted to determine the practicality and/or feasibility of this option.

3 Funding Arrangements

Under Ausgrid's current connections policy, the connection applicant is required to fund all dedicated connection and customer premises works. Ausgrid will fund non-contestable or shared network assets provided appropriate tariff and revenue security arrangements are in place to ensure that a reasonable return is earned on this investment.

4 Responsibility for Costs and Contestability - General

Under current legislative arrangements in NSW, applicants are required to contribute to the cost of developing and establishing a connection. This may include costs for Ausgrid design related services and costs for Ausgrid connection related ancillary services, as well as responsibility for arranging and funding dedicated contestable connection works. For large load connections, this may also include costs for augmentation of upstream shared distribution network assets.

Design and construction of dedicated extensions to the distribution network, or alterations to an existing connection are arranged and funded by applicants who are also permitted their choice of Accredited Service Providers (ASPs) following the normal contestability processes.

The Ausgrid related costs will be dependent on the complexity and timing of the connection and are estimated in accordance with Ausgrid's Connection Policy in accordance with the Australian Energy Regulator (AER) determined rates.

Further background and detailed information in relation to connecting to the network, contestability and related topics as can be found on the Ausgrid website www.ausgrid.com.au under "Connections".

5 Next Steps

In accordance with the Contract for Design Related Services the services have been carried out at an hourly rate with the recovery of these costs being determined via regulated rates set by the Australian Energy Regulator (AER).

It should be noted that the applicability of the information contained in this response may diminish over time.

Future technical requirements for the connections will need to be ascertained through a range of technical assessments, which will need to be undertaken by the Customer as part of developing a detailed design and by Ausgrid in preparing Design Information and subsequent Connection Offers.

After reviewing this information, it may be advisable to arrange a meeting with Ausgrid to discuss this response and to help address any immediate concerns. Accordingly, please do not hesitate to contact the undersigned should you wish to discuss any aspect of this information.

Yours sincerely,

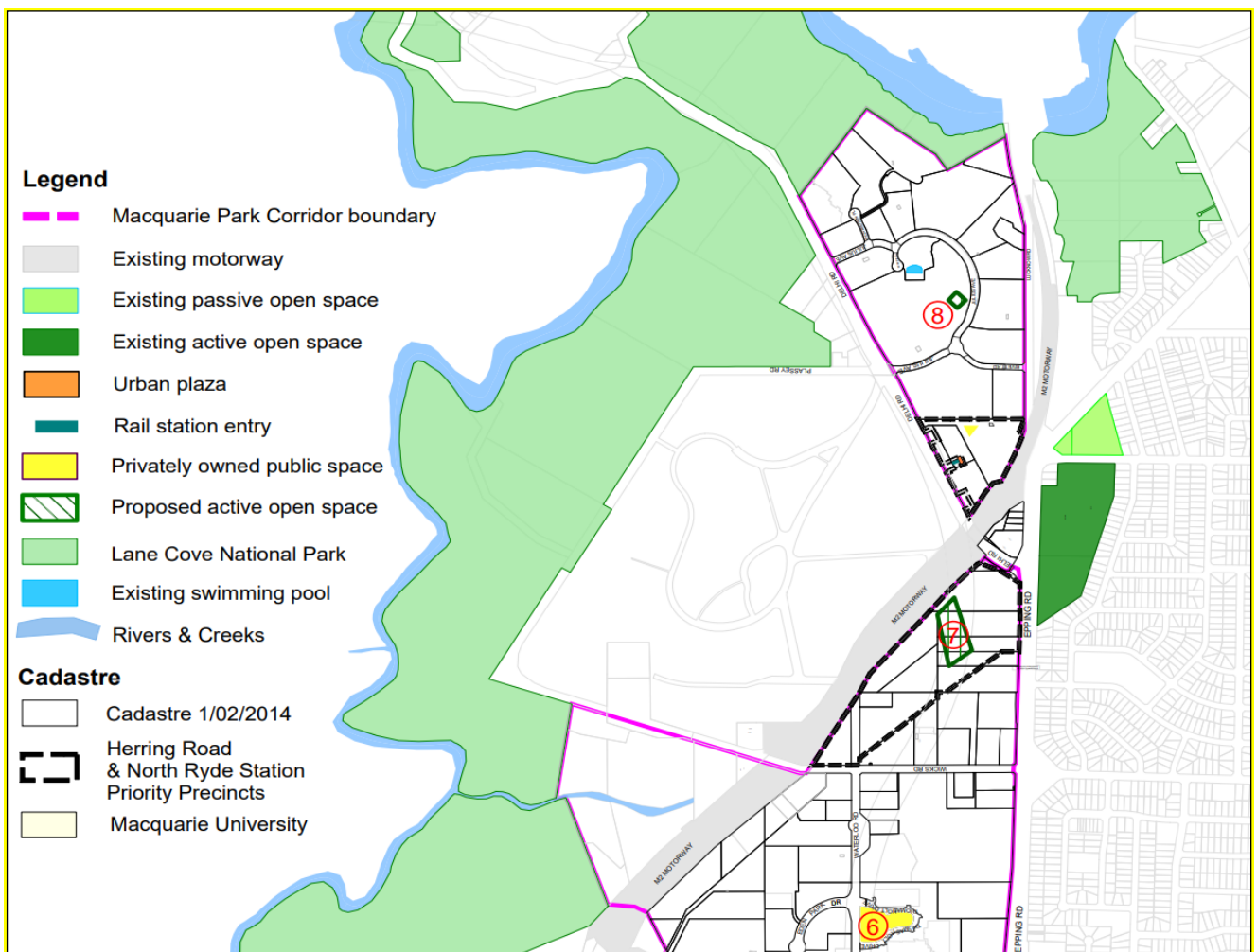


Sam Christodoulides

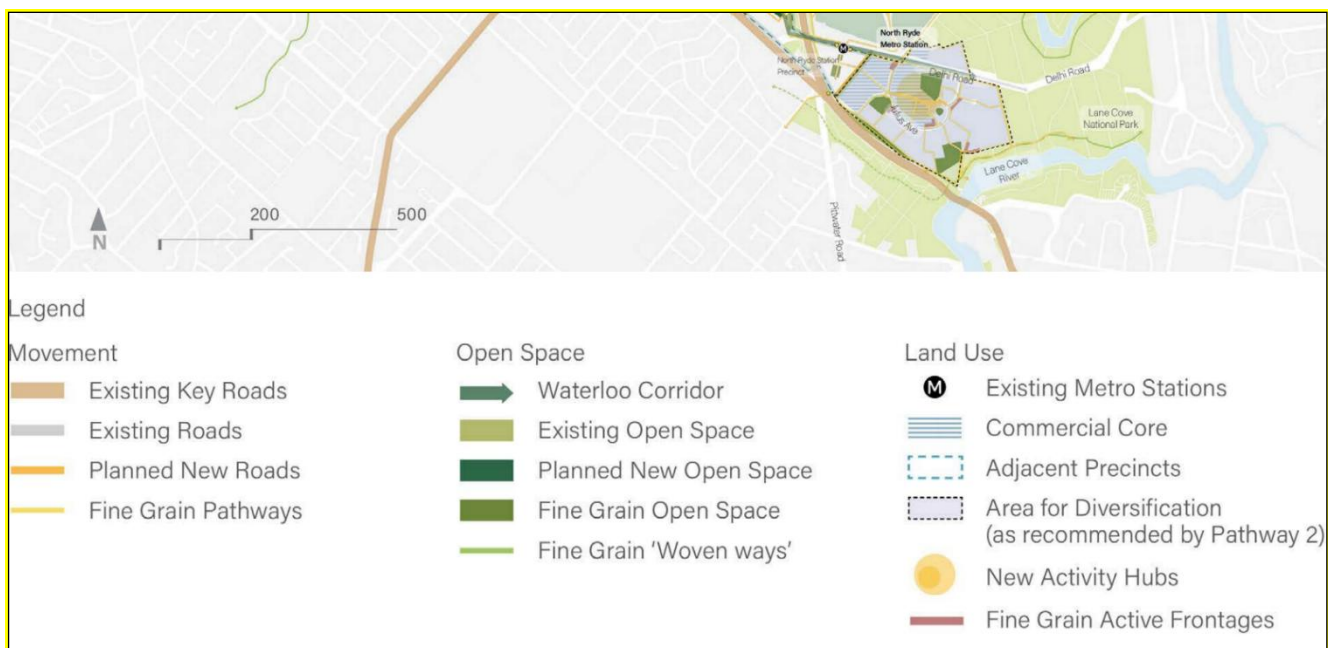
Engineer – Large Industry & Commercial
Connections Solutions
Customer Connections

APPENDIX B

City of Ryde Council Maps



Extract from City of Ryde DCP 2014



Extract from Macquarie Park Innovation Precinct and Place Strategy Master Plan 2022

APPENDIX C

Sydney Water Pressure and Flow Response

Statement of Available Pressure and Flow



Abeer Syed
Barrack PI 151 Clarence Street
Sydney, 2000

Attention: Abeer Syed

Date: 31/01/2025

Pressure & Flow Application Number: 2056087
Your Pressure Inquiry Dated: 2025-01-23
Property Address: Julius Avenue, North Ryde 2113

The expected maximum and minimum pressures available in the water main given below relate to modelled existing demand conditions, either with or without extra flows for emergency fire fighting, and are not to be construed as availability for normal domestic supply for any proposed development.

ASSUMED CONNECTION DETAILS

Street Name: Julius Avenue	Side of Street: South
Distance & Direction from Nearest Cross Street	100 metres South from Newbiggin Close
Approximate Ground Level (AHD):	48 metres
Nominal Size of Water Main (DN):	200 mm

EXPECTED WATER MAIN PRESSURES AT CONNECTION POINT

Normal Supply Conditions	
Maximum Pressure	80 metre head
Minimum Pressure	52 metre head

WITH PROPERTY FIRE PREVENTION SYSTEM DEMANDS	Flow l/s	Pressure head m
Fire Hose Reel Installations (Two hose reels simultaneously)	0.66	52
Fire Hydrant / Sprinkler Installations (Pressure expected to be maintained for 95% of the time)	10	55
	15	55
	20	54
	25	53
	30	52
	40	50
	50	48
	60	46
Fire Installations based on peak demand (Pressure expected to be maintained with flows combined with peak demand in the water main)	10	51
	15	50
	20	50
	25	49
	30	48
	40	46
	50	43
	60	41
Maximum Permissible Flow	118	19

(Please refer to reverse side for Notes)

For any further inquiries regarding this application please email :

hydraulicassessment@sydneywater.com.au

APPENDIX D

Deposited Plan

Signatures, Seals and Statements

of intention to dedicate public roads, to create public reserves, drainage reserves, easements, restrictions on the use of land or positive covenants.

Signed, sealed and delivered by
DARYL BROWNING and PAMELA
MITCHELL as attorneys for ISPT Pty Ltd
ACN 064 041 283 under power of
attorney dated 17 February 2005
Book 4450 No. 550

X Signature of Attorney

X *Pamela Mitchell*
Signature of Attorney

in the presence of

Leith Hubbard
Legal Practitioner

Department of Lands Approval

I, in approving this plan certify
(Authorised Officer)
that all necessary approvals in regard to the allocation of the land
shown hereon has been given.

Signature:

Date:

File Number:

Office:

Subdivision Certificate

I certify that the provisions of s.109J of the Environmental Planning
and Assessment Act 1979 have been satisfied in relation to the
proposed

..... set out herein
* (insert 'subdivision' or 'new road')

* Authorised Person/General Manager/Accredited Certifier

Consent Authority:

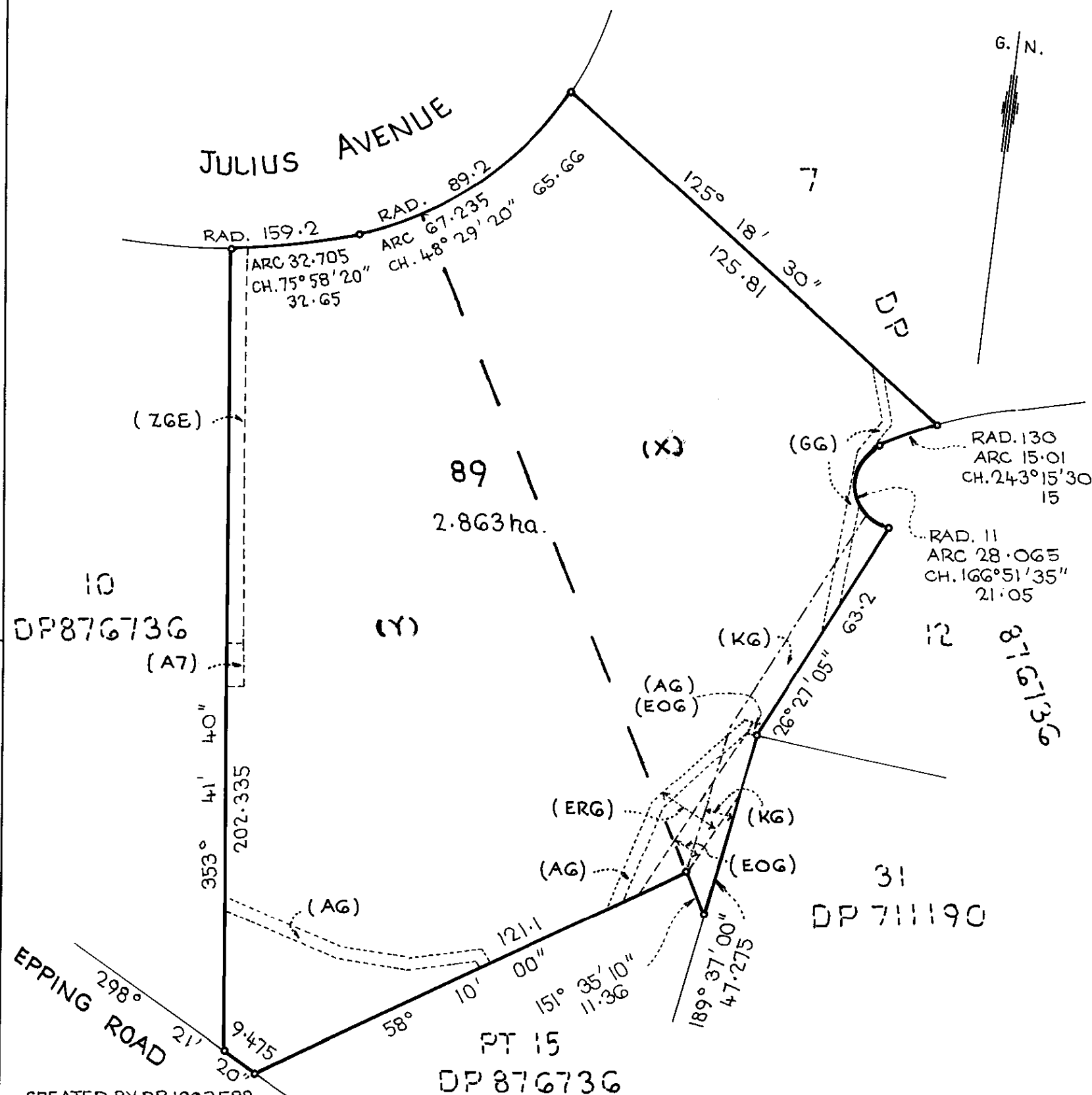
Date of Endorsement:

Accreditation no:

Subdivision Certificate no:

File no:

* Delete whichever is inapplicable



DP1082131

Registered:  18.05.2005

Title System: TORRENS

Purpose: CONSOLIDATION

Ref. Map: U0952-21
U0952-23

Last Plan: DP 876736

PLAN OF CONSOLIDATION OF
LOTS 8 AND 9 IN DP 876736

Lengths are in metres. Reduction Ratio 1:1250

L.G.A.: RYDE

Locality: NORTH RYDE

Parish: HUNTERS HILL

County: CUMBERLAND

Plans used in preparation of Survey/Compilation
DP'S 876736
1003588
1067548

Surveying Regulation, 2001

JAMES P THORPE

of DUNLOP THORPE & CO, 447 KENT ST, SYDNEY
a surveyor registered under the Surveying Act, 2002, hereby certify
that the survey represented in this plan is accurate, has been made in
accordance with the Surveying Regulation, 2001 and was completed
on 18 MARCH 2005

The survey relates to

(here specify the land actually surveyed or specify any land shown in
the plan that is not the subject of the survey)

(Signature) *James P. Thorpe* Dated 4.4.2005

Surveyor registered under the Surveying Act, 2002

Datum Line:

Type: Urban / Rural

APPENDIX E

Combined Inground Services Plan

This drawing is copyright and is the property of TTW and must not be used without authorisation. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT NOTES AND LEGENDS

UTILITIES LEGEND

dS	dS	EXISTING SEWER
dSW	dSW	EXISTING STORMWATER
dW	dW	EXISTING POTABLE WATER
dG	dG	EXISTING GAS
cCOMM	cCOMM	EXISTING TELECOMMUNICATION
dNBN	dNBN	EXISTING NBN
dE	dE	EXISTING ELECTRICITY

CLASSIFICATION OF EXISTING UTILITY INFORMATION

A	-	SIGHTED, MUST BE LOCATED, THEN POTHOLED. UTILITY MUST BE PHYSICALLY SIGHTED AND MEASURED.
B	-	ELECTRONICALLY DETECTED AND LOCATED ON SITE USING VARIOUS TRACING METHODS.
C	-	ALIGNED FROM SURFACE FEATURES AND DIGITISED DATA.
D	-	DIGITISED DATA (BEFORE YOU DIG AUSTRALIA).

NOTE

1. BELOW GROUND SERVICES CAN BE REPRESENTED AS GREY FOR EXISTING AND BLACK FOR PROPOSED DEPENDING ON THE PLAN.
2. EXISTING SERVICES PITS, STRUCTURES AND COLUMNS ARE ILLUSTRATED AS PER THE ORIGINAL SURVEY.
3. TTW ACCEPTS NO RESPONSIBILITY FOR THE ACCURACY OF THE REPRESENTATION OF THE SERVICE RECORDS AND EASEMENT RECORDS AS SHOWN.

NOT FOR CONSTRUCTION

0.0 10.0 20.0 30.0 40.0m
1:500 A1 1:1000 A3

A 30% DESIGN ISSUE					AM COY 16.04.2025										
Rev	Description				Eng	Draft	Date	Rev	Description				Eng	Draft	Date



Engineer: **TTW**
www.ttweengineers.com

Project:
JULIUS AVE DATA CENTRE
6-8 JULIUS AVENUE,
NORTH RYDE NSW, 2113

Drawing Title:
**EXISTING UTILITIES
LAYOUT PLAN**

NOT FOR CONSTRUCTION

Scale at A1	Drawn	Designed	Approved
1:500	COY	AM	AM

241920-TTW-00-DR-CI-05101-A
17.04.2025 4:22 PM

APPENDIX F

Section 73 Feasibility Report

Case Number: 219852

March 24, 2025

ISPT Pty Ltd
c/- RMA INFRASTRUCTURE PTY LTD.

Feasibility Letter

Developer: ISPT Pty Ltd
Your WSC's reference: W-13415
Development: Lot 89 DP1082131 JULIUS AVE, North Ryde
Development Description: Data Centre
Your application date: December 12, 2024

Dear Applicant

This Feasibility Letter (Letter) is a guide only. It provides general information about what our requirements could be if you applied to us for a Section 73 Certificate (Certificate) for your proposed development. **The information is accurate at today's date only.**

We have not allocated any system capacity to your proposal from the investigation into this Feasibility advice. This advice is only an indication of our systems and possible requirements as of today. Where there is system capacity, it may have been fully utilised by the time you obtain a Consent. The requirements applied to any approved Development proposal may differ significantly in the future since the original advice was issued.

If you obtain development consent for that development from your consent authority (this is usually your local Council) they will require you to apply to us for a Section 73 Certificate. You will need to submit a new application (and pay another application fee) to us for that Certificate by using your current or another Water Servicing Coordinator (WSC).

We'll then send you either a:

- Notice of Requirements (Notice) and Developer Works Deed (Deed)
or
- Certificate.

These documents will be the definitive statement of our requirements.

There may be changes in our requirements between the issue dates of this Letter and the Notice or Certificate. The changes may be:

- if you change your proposed development eg the development description or the plan/site layout, after today, the requirements in this Letter could change when you submit your new application
- if you decide to do your development in stages then you must submit a new application (and pay another application fee) for each stage.

What You Must Do To Get A Section 73 Certificate In The Future.

To get a Section 73 Certificate you must do the following things. You can also find out about this process by visiting [Plumbing, building & developing](#) page on our website.

1. **Obtain Development Consent from the consent authority for your development proposal.**
2. **Engage a Water Servicing Coordinator (WSC).**

You must engage your current or another authorised WSC to manage the design and construction of works that you must provide, at your cost, to service your development. If you wish to engage another WSC (at any point in this process) you must write and tell us.

You'll find a list of WSC's at [Listed providers](#) on our website.

The WSC will be your point of contact with us. They can answer most questions that you might have about the process and developer charges and can give you a quote or information about costs for services/works (including our costs).

As of the date of this advice, it is anticipated that no Sydney Water Construction works are required. Your WSC can advise you about this.

4. Water and Sewer Works

4.1 Water

Your development must have a frontage to a water main that is the right size and can be used for connection.

We've assessed your application and found that:

The development sits in the Chatswood WSZ

The peak water consumption, which is the only value provided is 6.16MLD.

Whilst pressures in the zone are above Operating License criteria, amplifications will be required to service the development due to the development causing significant strain to the existing system. Pressures with the data center can drop by up to 30m around the development.

Currently SW are undertaking a strategy that will address the impact of Data Centers on the Potable Water system. This study should be completed by end of 2025, with options to provide recycled water to large users in some areas.

If the developer wishes to pursue a potable water option only, then the developer needs to engage a hydraulic consultant to carry out a water options assessment in consultation with Sydney Water.

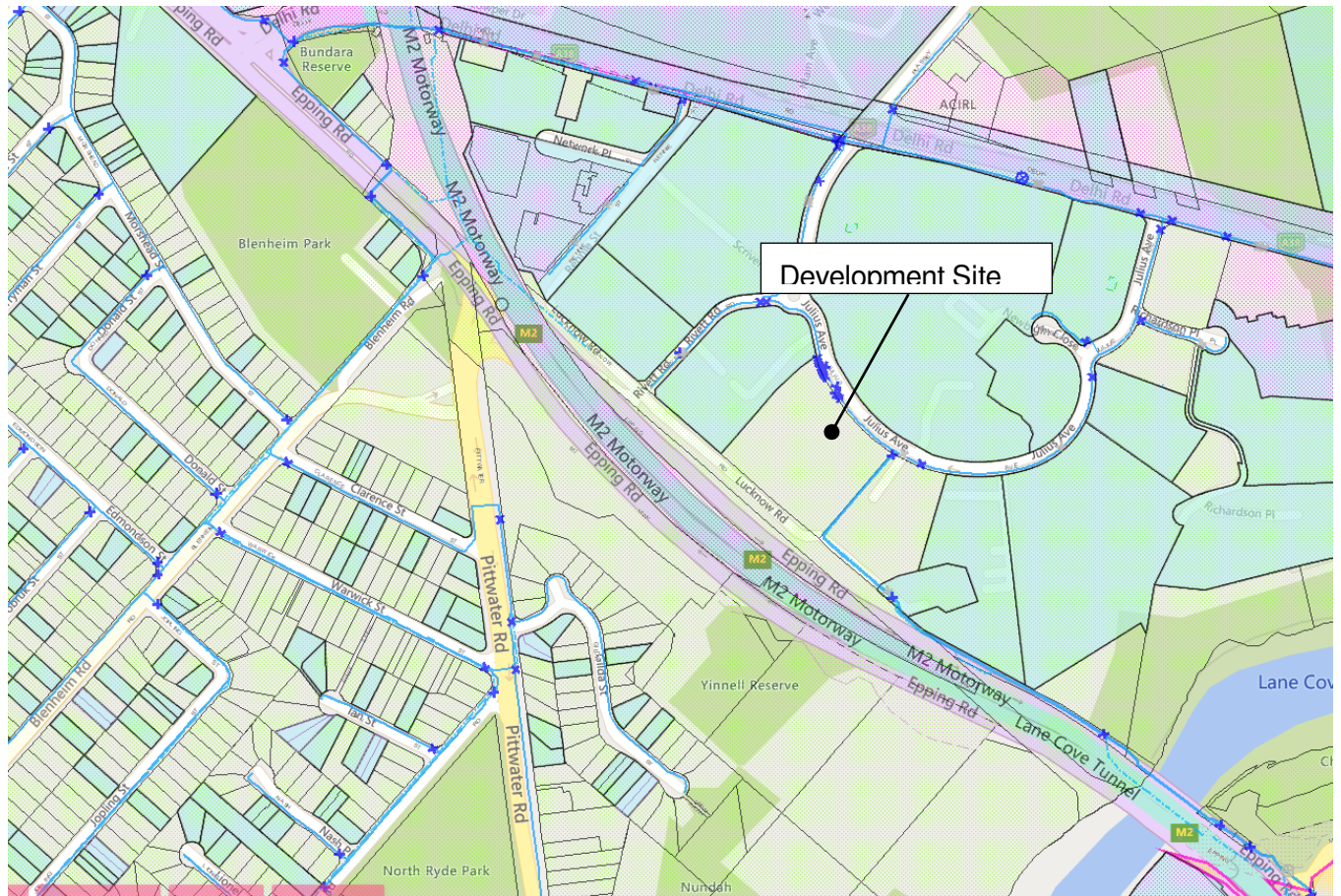


Figure 2 – Drinking Water Location Map

4.2 Sewer

Your development must have a sewer main that is the right size and can be used for connection. That sewer must also have a connection point within your development's boundaries.

We've assessed your application and found that:

The development is located in the NSOOS 3 Catchment sub-system in the North Head wastewater system.

The development will need to connect into the existing drain point at MH asset 1395061. This will drain into a DN225 line that runs along the eastern edge of the development lot boundary, which then drains into the DN315 line downstream and then ultimately into the West Lane Cove Submain. (See Figure WW1 below)

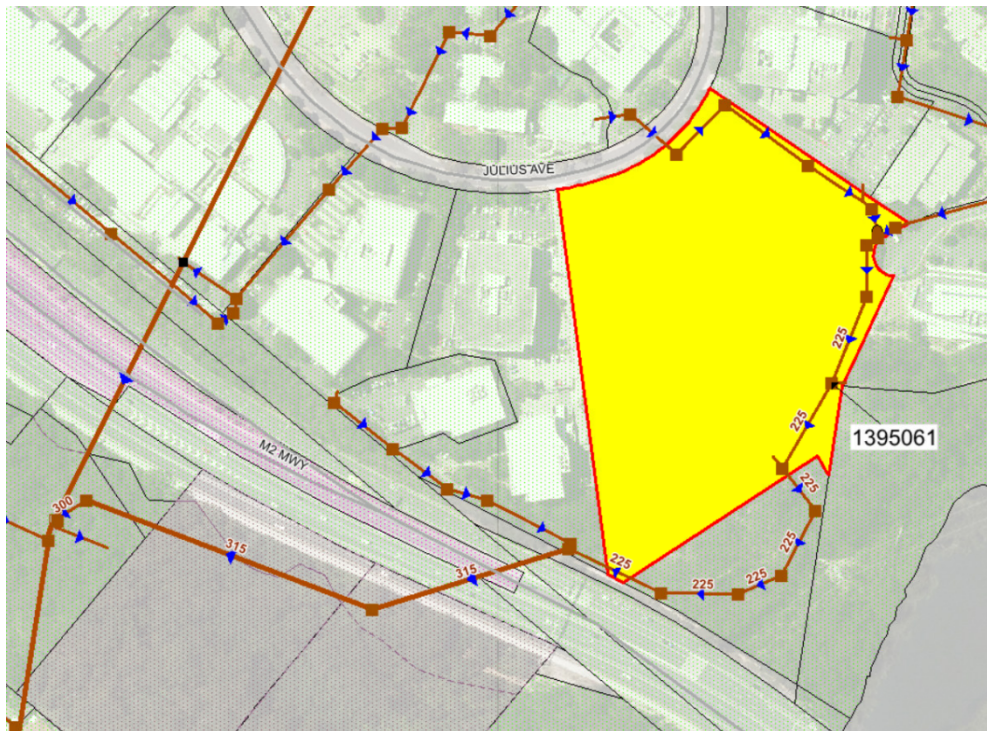


Figure WW1 – Proposed development with surrounding sewers

SWC supports the proposed connection into the DN225 sewer at MH 1395061 provided that the developer further reduces their sewage discharge from 8.486 L/s to 7.6 L/s due to capacity reasons.

5. Ancillary Matters

5.1 Asset adjustments

After we issue this Notice (and more detailed designs are available), we may require that the water main/sewer main/stormwater located in the footway/your property needs to be adjusted/deviated. If this happens, you'll need to do this work as well as the extension we have detailed above at your cost. The work must meet the conditions of this Notice and you will need to complete it **before we can issue the Certificate**. We'll need to see the completed designs for the work, and we'll require you to lodge a security. The security will be refunded once the work is completed and all charges paid.

5.2 Entry onto neighbouring property

If you need to enter a neighbouring property, you must have the written permission of the relevant property owners and tenants. You must use our **Permission to Enter** form(s) for this. You can get copies of these forms from your WSC or on our website. Your WSC can also negotiate on your behalf. Please make sure that you address all the items on the form(s) including payment of compensation and whether there are other ways of designing and constructing that could avoid or reduce their impacts. You will be responsible for all costs of mediation involved in resolving any disputes. Please allow enough time for entry issues to be resolved.

6. Infrastructure contributions

You will need to pay an infrastructure contribution towards the cost of each Sydney Water system that will serve your development.

The infrastructure contributions are calculated in accordance with the Development Servicing Plans registered with the Independent Pricing and Regulatory Tribunal (IPART) under the *Independent Pricing and Regulatory Tribunal Act*.

An estimate of your infrastructure contributions is shown in the table below. These amounts have the NSW Government-directed cap applied for the current financial year. **These amounts are subject to the NSW Government transition pathway and other factors and will change** – see Section 6.1 Price Changes for full details.

No payments can be accepted for these estimates. Should you obtain Development Approval for this proposal and apply for a Section 73 Certificate in the future, then we'll advise you of the applicable charges to your Development.

Development Servicing Plan (DSP)	Basis of Calculation	Charge (\$) for Applicable Period (2/19/25-6/30/25)
Greater Sydney Drinking Water	Commercial Flow 2571.860 @ \$850 per ET = \$2186081.4 based on Flow rates in paragraph below less Credit of \$0.0 for previous payment/use	\$2,186,081.40
North Head Wastewater	Commercial Flow 480.000 @ \$152.24 per ET = \$73075.2 based on Flow rates in paragraph below less Credit of \$0.0 for previous payment/use	\$73,075.20
DEVELOPER CHARGES TOTAL:		\$2,259,156.60

- The charges in the table are based on your development needing an average day water demand of 1106 kl and an average day sewer discharge of 182 kl.
- **If the development generates a greater demand, you may have to pay more in charges. If you are going to sell the development, you have to explain the situation to prospective buyers as part of the requirements of Vendor Disclosure.**

6.1 Price changes

The infrastructure contribution you must pay may also change due to:

1. Changes to the Consumer Price Index (CPI). Our prices increase by CPI each financial year. CPI is the weighted average of the capital cities CPI for the 12 months to the end of the previous March.

2. The NSW Government-directed transition pathway for infrastructure contributions for drinking water and wastewater infrastructure:

Financial Year payment is made	Percentage of infrastructure contribution payable
1 July 2023 to 30 June 2024	Infrastructure contribution capped at 0% of the full price
1 July 2024 to 30 June 2025	Infrastructure contribution capped at 25% of the full price
1 July 2025 to 30 June 2026	Infrastructure contribution capped at 50% of the full price
1 July 2026 onwards	Full price payable

3. Any updates to our Development Servicing Plans (including prices). Our Development Servicing Plans must be updated every five years. The next updates will be introduced by 31 December 2028.

Your infrastructure contributions become payable once your WSC has submitted all Project Completion Packages under each Developer Works Deed to us confirming that the works required under the Notice are complete.

OTHER THINGS YOU MAY NEED TO DO

Shown below are other things you need to do that are NOT a requirement for the Certificate. They may well be a requirement from us in the future because of the impact of your development on our assets.

You must read them before you go any further.

Approval of your building plans

Please note that the building plans must be approved when each lot is developed. This can be done at in our Tap in™ system [Sydney Water Tap in](#)™.

This is not a requirement for the Certificate, but the approval is needed because the construction/building works may affect our assets (e.g. water, sewer, and stormwater mains).

If our stormwater channel, pipe, or culvert is located within ten (10) metres of your development site it must be referred to us for a detailed review.

Your Coordinator can tell you about the approval process including:

- Possible requirements
- Their costs

- Timeframes.

If your building plans need to be referred to us for detailed review you will be required to pay us for the costs associated with the detailed review.

This is not a requirement of the Certificate, but the approval is needed because construction/building works may impact on our existing assets (e.g. water and sewer mains). In any case, these works **MUST NOT** commence until we have granted approval.

Your WSC can tell you about the approval process including:

- Possible requirements
- Their costs
- Timeframes.

We recommend that you apply for Building Plan Approval early as in some instances your WSC may need to refer your building plans to us for detailed review. You'll be required to pay us for the costs associated with the detailed review.

Note: You must obtain our written approval before you do any work on our systems. We'll take action to have work stopped on the site if you do not have that approval. We will apply Section 44 of the *Sydney Water Act 1994*.

Disused Sewerage Service Sealing

Please do not forget that you must pay to disconnect all disused private sewerage services and seal them at the point of connection to our sewer main. This work must meet our standards in the Plumbing Code of Australia (the Code) and be done by a licensed drainer. The licensed drainer must arrange for an inspection of the work by a NSW Fair Trading Plumbing Inspection Assurance Services (PIAS) officer. After that officer has looked at the work, the drainer can issue the Certificate of Compliance. The Code requires this.

Soffit Requirements

Please be aware that floor levels must be able to meet our soffit requirements for property connection and drainage.

Requirements for Business Customers for Commercial and Industrial Property Developments

If this property is to be developed for Industrial or Commercial operations, it may need to meet the following requirements:

Trade Wastewater Requirements

If this development is going to generate trade wastewater, the property owner must submit an application requesting permission to discharge trade wastewater to Sydney Water's sewerage system. You must wait for approval of this permit before any business activities can commence.

The permit application should be emailed to Sydney Water's Business Customer Services at businesscustomers@sydneywater.com.au

It is illegal to discharge Trade Wastewater into the Sydney Water sewerage system without permission.

A **Boundary Trap** is required for all developments that discharge trade wastewater where arrestors and special units are installed for trade wastewater pre-treatment.

If the property development is for Industrial operations, the wastewater may discharge into a sewerage area that is subject to wastewater reuse. Find out from Business Customer Services if this is applicable to your development.

Backflow Prevention Requirements

Backflow is when there is unintentional flow of water in the wrong direction from a potentially polluted source into the drinking water supply.

All properties connected to Sydney Water's supply must install a testable **Backflow Prevention Containment Device** appropriate to the property's hazard rating. Property with a high or medium hazard rating must have the backflow prevention containment device tested annually. Properties identified as having a low hazard rating must install a non-testable device, as a minimum.

Separate hydrant and sprinkler fire services on non-residential properties, require the installation of a testable double check detector assembly. The device is to be located at the boundary of the property.

Before you install a backflow prevention device:

1. Get your hydraulic consultant or plumber to check the available water pressure versus the property's required pressure and flow requirements.
2. Conduct a site assessment to confirm the hazard rating of the property and its services.
Contact PIAS at NSW Fair Trading on **1300 889 099**.

For installation you will need to engage a licensed plumber with backflow accreditation. Visit www.sydneywater.com.au > [Plumbing, building & developing](#) > Plumbing > Backflow prevention to find a plumber.

Water Efficiency Recommendations

Water is our most precious resource and every customer can play a role in its conservation. By working together with Sydney Water, business customers are able to reduce their water consumption. This will help your business save money, improve productivity and protect the environment.

Some water efficiency measures that can be easily implemented in your business are:

- Install water efficiency fixtures to help increase your water efficiency. Visit www.waterrating.gov.au/ to take you to the WELS (Water Efficiency Labelling and Standards (WELS) Scheme
- Consider installing rainwater tanks to capture rainwater runoff, and reusing it, where cost effective. Visit www.sydneywater.com.au > [Plumbing, building & developing](#) > Plumbing > Rainwater *tanks*
- Install water-monitoring devices on your meter to identify water usage patterns and leaks.
- Develop a water efficiency plan for your business.

It is cheaper to install water efficiency appliances while you are developing than retrofitting them later.

Fire Fighting

Definition of fire fighting systems is the responsibility of the developer and is not part of the Section 73 process. It is recommended that a consultant should advise the developer regarding the fire fighting flow of the development and the ability of our system to provide that flow in an emergency. Sydney Water's Operating Licence directs that our mains are only required to provide domestic supply at a minimum pressure of 15 m head.

A report supplying modelled pressures called the Statement of Available pressure can be purchased through [Sydney Water Tap in](#)™ and may be of some assistance when defining the fire fighting system. The Statement of Available pressure may advise flow limits that relate to system capacity or diameter of the main and pressure limits according to pressure management initiatives. If mains are required for fire fighting purposes, the mains shall be arranged through the water main extension process and not the Section 73 process.

Large Water Service Connection

A water main are available to provide your development with a domestic supply. The size of your development means that you will need a connection larger than the standard domestic 20 mm size.

To get approval for your connection, you will need to lodge an application with [Sydney Water Tap in](#)™. You, or your hydraulic consultant, may need to supply the following:

- a plan of the hydraulic layout
- a list of all the fixtures/fittings within the property
- a copy of the fireflow pressure inquiry issued by us
- a pump application form (if a pump is required)
- all pump details (if a pump is required).

You'll have to pay an application fee.

We don't consider whether a water main is adequate for fire fighting purposes for your development. We can't guarantee that this water supply will meet your Council's fire fighting requirements. The Council and your hydraulic consultant can help.

Disused Water Service Sealing

You must pay to disconnect all disused private water services and seal them at the point of connection to our water main. This work must meet our standards in the Plumbing Code of Australia (the Code) and be done by a licensed plumber. The licensed plumber must arrange for an inspection of the work by a NSW Fair Trading Plumbing Inspection Assurance Services (PIAS) officer. After that officer has looked at the work, the drainer can issue the Certificate of Compliance. The Code requires this.

Other fees and requirements

The requirements in this Advice Letter relate to your future Certificate application only. We may be involved with other aspects of your development and there may be other fees or requirements. These include:

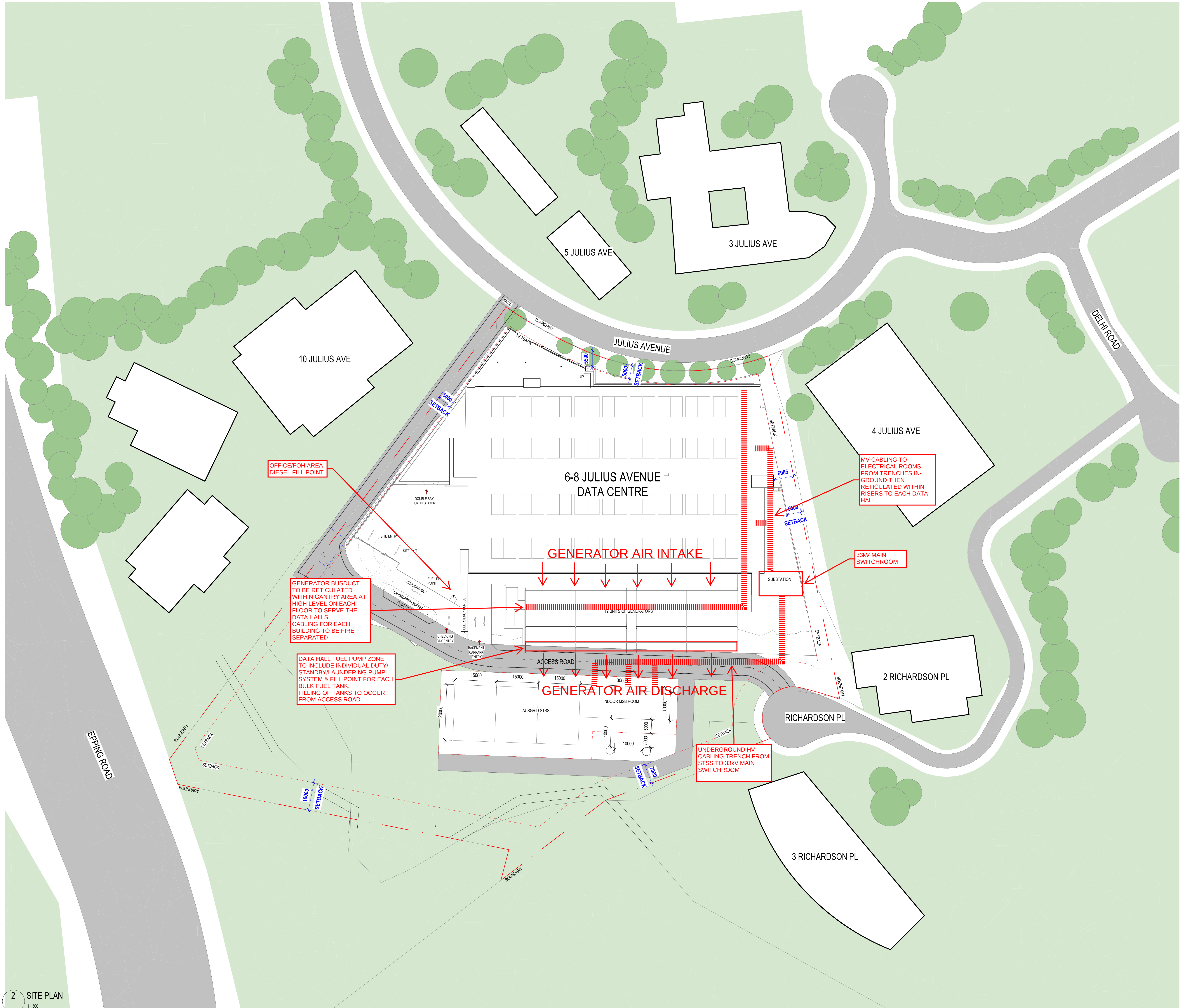
- construction/building plan approval fees
- plumbing and drainage inspection costs
- the installation of backflow prevention devices
- trade waste requirements
- large water connections and
-
- council firefighting requirements. (It will help you to know what the firefighting requirements are for your development as soon as possible. Your hydraulic consultant can help you here)

No warranties or assurances can be given about the suitability of this document or any of its provisions for any specific transaction. It does not constitute an approval from us and to the extent that it is able, we limit its liability to the reissue of this Letter or the return of your application fee. You should rely on your own independent professional advice.

END OF ADVICE

APPENDIX G

Concept Electrical Site Plan



WIP

GBA per Level	
Level	Area
Not Placed	0 m ²
B2	8729 m ²
B1	7384 m ²
00	10382 m ²
01	9354 m ²
02	8965 m ²
03	8645 m ²
04	7106 m ²
05	14 m ²
06	7883 m ²
07	145 m ²
GFA per Level	
Level	Area
Not Placed	0 m ²
B1	4 m ²
00	6 m ²
01	3 m ²
02	13 m ²
03	15 m ²
04	6 m ²
05	3 m ²
06	6 m ²
07	0 m ²
OVERALL OFFICE	
Level	Area
02	198 m ²
03	267 m ²
04	280 m ²
05	280 m ²
06	280 m ²

OFFICE NLA per Level	
Level	Area
02	24 m ²
03	218 m ²
04	225 m ²
05	225 m ²
06	225 m ²

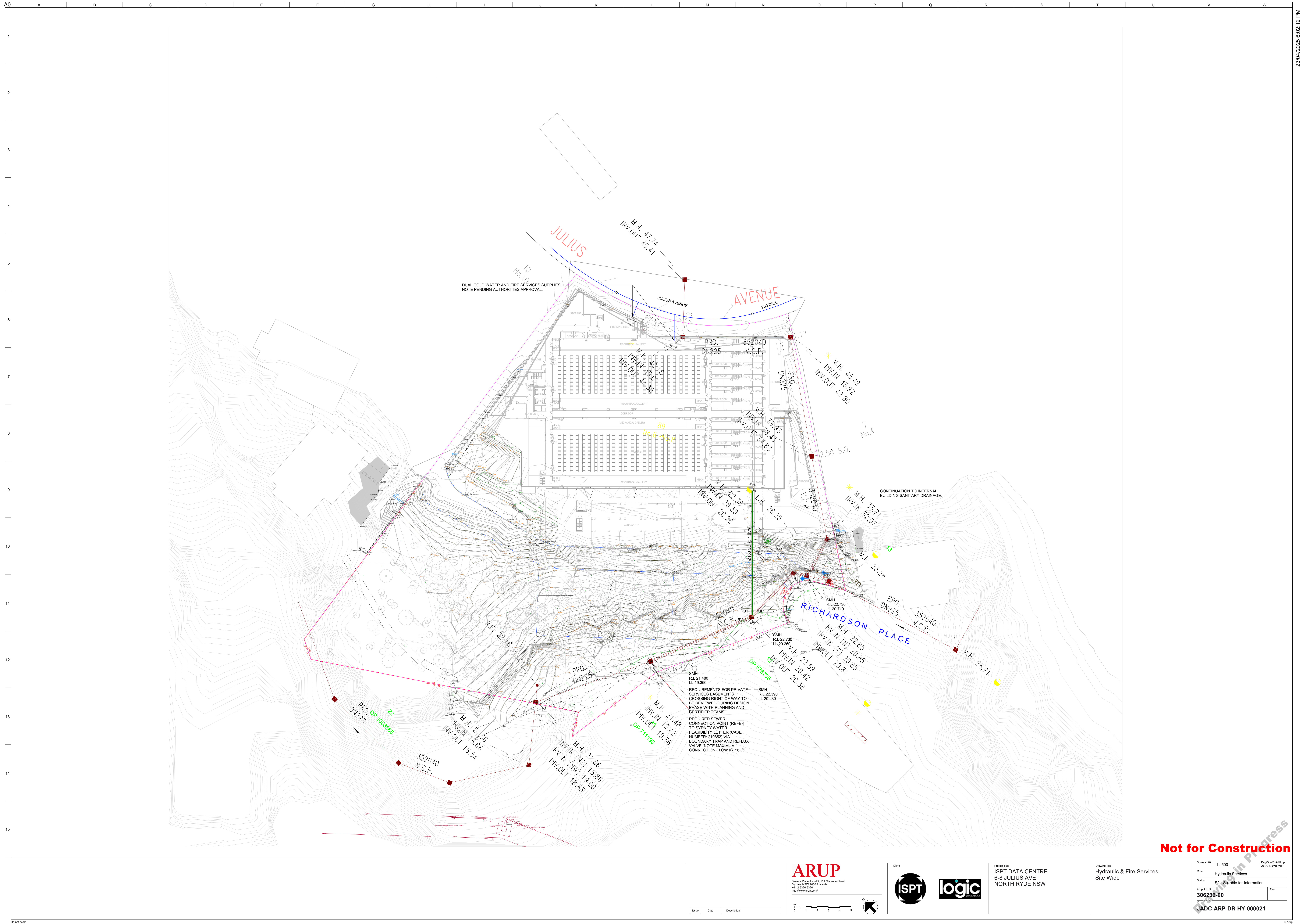
SITE INFORMATION		REQUIRED	PROPOSED
SITE AREA	26,539 m ²		
LAND ZONING	E3		
FOR	1.5:1 = 42,945 m ²		26,788 m ²
BUILDING HEIGHT LIMIT	45m		
GBA			72,897 m ²
			50 + 2 ACCESSIBLE CAR PARK
			992 m ²
			1292 m ²

DATA HALL INFORMATION	
AREA (DATA HALL WORLD)	1,428 m ²
TOTAL DATA HALL AREA	17,113 m ²
TOTAL RACKS / DATA HALL	672
RACK IT CAPACITY	16MW
NO. OF RACKS / POD	60
NO. OF PODS / DATA HALL	12
TOTAL IT LOAD / HALL	9.6 MW
TOTAL IT LOAD / FLOOR	19.2 MW
TOTAL IT LOAD	118 MW
ASSUMED PUE	TBC
TOTAL SITE LOAD	TBC
SLAB TO SLAB HEIGHT	6M

ELECTRICAL SITE PLAN
SK-001
REV 02

APPENDIX H

Concept Sewer Plan



APPENDIX I

Concept Stormwater Layout Plan

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NOT FOR CONSTRUCTION

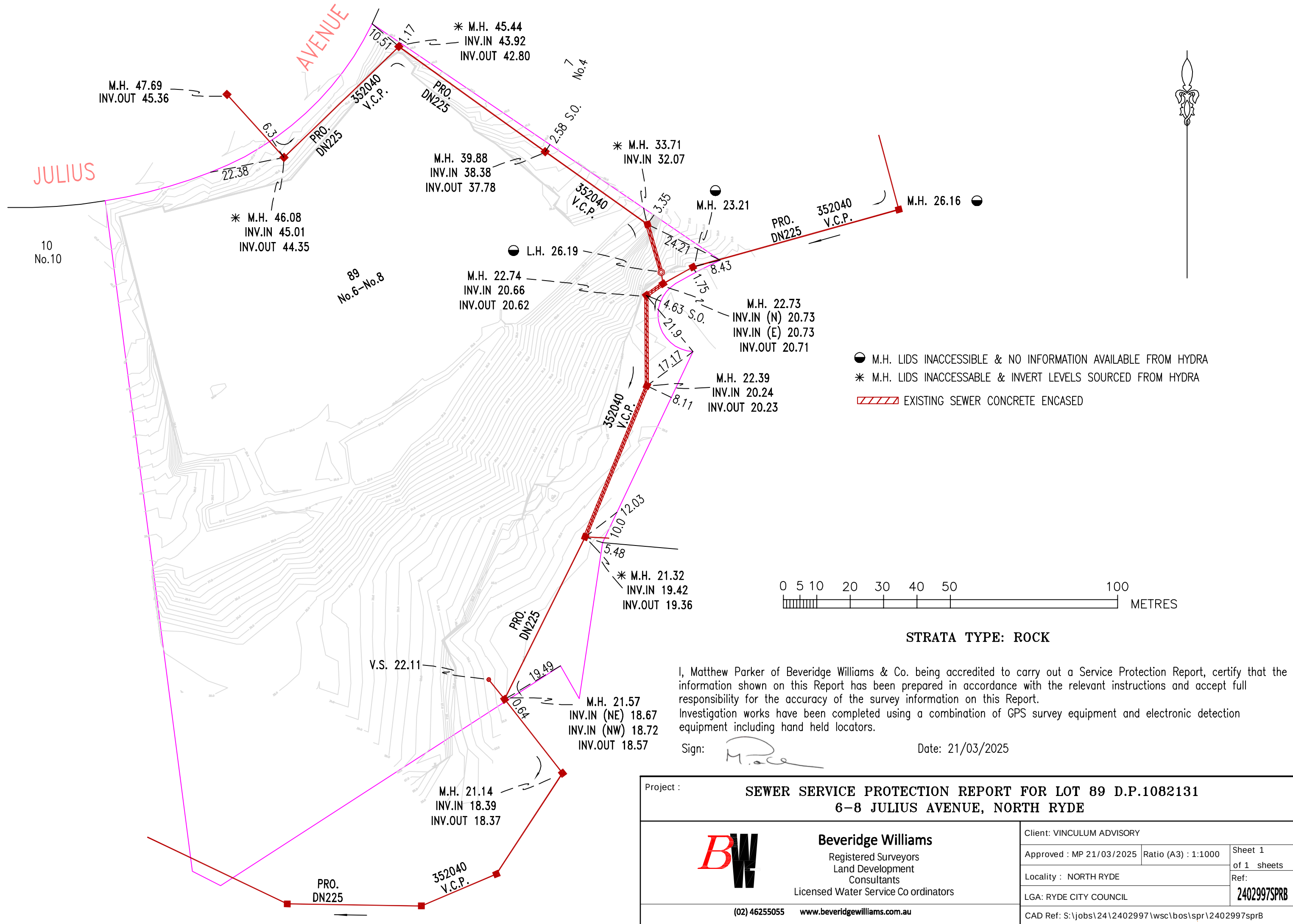
Client:			Engineer:			Project:			Drawing Title:			Scale at A1:			Drawn:			Designed:			Approved:		
ISPT						JULIUS AVE DATA CENTRE			STORMWATER			1:500			COY			AM			AM		
241920-TTW-00-DR-CI-04101-A						6-8 JULIUS AVENUE,			LAYOUT PLAN			Project No			Originator			Zone			Type		
A 30% DESIGN ISSUE			AM COY 16.04.2025			241920-TTW-00-DR-CI-04101-A			17.04.2025 10:54 AM			Rev			Description			Eng Draft			Date		
Rev			Description			Eng Draft			Date			Rev			Description			Eng Draft			Date		

APPENDIX J

Concept Telecommunications Site Plan

APPENDIX K

Sewer Protection Report



I, Matthew Parker of Beveridge Williams & Co. being accredited to carry out a Service Protection Report, certify that the information shown on this Report has been prepared in accordance with the relevant instructions and accept full responsibility for the accuracy of the survey information on this Report.
Investigation works have been completed using a combination of GPS survey equipment and electronic detection equipment including hand held locators.

Sign: *M. Parker*

Date: 21/03/2025

Project : SEWER SERVICE PROTECTION REPORT FOR LOT 89 D.P.1082131 6-8 JULIUS AVENUE, NORTH RYDE			
 Beveridge Williams Registered Surveyors Land Development Consultants Licensed Water Service Co ordinators	Client: VINCULUM ADVISORY		
	Approved : MP 21/03/2025	Ratio (A3) : 1:1000	Sheet 1 of 1 sheets
	Locality : NORTH RYDE		Ref:
	LGA: RYDE CITY COUNCIL		2402997SPRB
	CAD Ref: S:\jobs\24\2402997\wsc\bos\spr\2402997sprB		
(02) 46255055 www.beveridgewilliams.com.au			

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