St Ignatius' College Redevelopment – Ignis Stage 2

Tambourine Bay Road, Lane Cove NSW 2066

PREPARED FOR
St Ignatius' College Riverview Limited
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Ref: SY192718-MDR01
Rev: 4
Date: 15.10.2020

Infrastructure Management Plan

Revision Schedule

Date	Revision	Issue
25.06.2020	1	Draft Infrastructure Management Plan
08.07.2020	2	Draft Infrastructure Management Plan
11.08.2020	3	Infrastructure Management Plan
15.10.2020	4	Infrastructure Management Plan

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Infrastructure Management Plan report contents by:

Executive Summary

This Infrastructure Management Plan (IMP) report for has been prepared on behalf of EPM Projects Pty Ltd (EPM) for the St Ignatius' College Redevelopment – Ignis Stage 2 project (the Project). The Consulting Engineers responsible for each relevant service is as follows:

- Power Systems – Northrop Consulting Engineers Pty Ltd (Northrop)
- Communications Systems – Northrop Consulting Engineers Pty Ltd (Northrop)
- Water Infrastructure – JHA Consulting Engineers Pty Ltd (JHA)
- Sewer Infrastructure – JHA Consulting Engineers Pty Ltd (JHA)
- Stormwater Infrastructure – Taylor Thomson Whitting Pty Ltd (TTW)
- Natural Gas Infrastructure – JHA Consulting Engineers Pty Ltd (JHA)

This IMP outlines the existing infrastructure, detailing information on the existing capacity and any augmentation to the aforementioned services required for the proposed development. The report also details records of consultation with relevant agencies. The details within this report are preliminary and based on currently available information and correspondence undertaken at the time of writing.

This report is provided in response to the Secretary's Environmental Assessment Requirements (SEARs) issued for the project and has been prepared for lodgement to the State Significant Development (SSD) application for St Ignatius' College Redevelopment – Ignis Stage 2. This IMP addresses the Infrastructure Management Plan requirements held within Item 14 of the SEARs.

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1. Development Description

Client: **St Ignatius' College, Riverview**

Client Acronym: **SICR**

State Significant Development Number: **SSD 7140**

Project Name: **Senior School Redevelopment**

Project Address: **Tambourine Bay Road, Lane Cove NSW 2066**

The St Ignatius' College Redevelopment – Ignis Stage 2 project proposes a significant expansion of the current facilities on site (Refer to Site Concept in Figure 1). The proposed works are as follows:

- Construction of new five (5) storey building with a maximum RL52.00 at the heart of the Campus to accommodate modern, flexible teaching and learning spaces;
- Provide improved learning opportunities for Science, Technology, Engineering, Mathematics and PDHPE as a STEMP facility, along with six (6) Pastoral Care House areas, and staff rooms;
- The ground floor will accommodate a C.O.L.A, multi-purpose Hall and Canteen (Food and Beverage) with servicing by a loading area on basement level;
- Refurbishment of existing O'Neil Building to allow integration of New Ignis Stage 2 STEMP Building to connect to existing fabric;
- New North Landscaped Area;
- New Landscaped Area between the existing Wallace Building and the New Ignis Stage 2 STEMP Building; and
- Upgrade courtyard to improve the integration of the learning space and create a sense of place.

Figure 1: Site Concept Plan

2. SEARS Issues Addressed

This report addresses how the proposed project addresses Item 14 of the SEARs and outlines strategies relating to Utilities. These requirements are outlined below alongside where the response to each can be found within this report;

Item	Action to Address the Requirement	Report Location
Prepare an Infrastructure Management Plan in consultation with relevant agencies, detailing information on the existing capacity and any augmentation requirements of the development for the provision of utilities including staging of infrastructure.	This IMP report details the existing hydraulic and electrical services infrastructure available to service the proposed St Ignatius' College Redevelopment – Ignis Stage 2. This report also includes details regarding any augmentation / amplifications required to service the proposed school development.	Section 4 & 5.
Prepare an Integrated Water Management Plan detailing any proposed alternative water supplies, proposed end uses of potable and non-potable water, and water sensitive urban design.	Section 6 of this report describes the water sensitive urban design strategy proposed to be used within the proposed school to offset the use of potable water services. Sections 4 & 5 of this report describe proposed alternative water supplies and potable/non-potable end use.	Section 4, 5 & 6

3. Site Description

3.1 The Site

The proposed site of works is located on the northern half of the current school site bounded by Riverview Street and Tambourine Bay Road. The campus encompasses a loop road, Loyola Drive, upon which the development site is situated (Refer to hatched area in Figure 2 below).

Figure 2: Proposed Site of Works

The site is approximately 0.5 ha in size and is situated on a minor gradient that slopes in an easterly direction. The Surface levels vary between RL 31.15m AHD along the southern periphery to 25.30m AHD on the northern side with an average slope of approximately 7%.

The current site consists of significant impervious areas including paved roads, bitumen driveways, paved footpaths and buildings. Pervious areas include the grassed oval and garden beds.

4. Existing Services

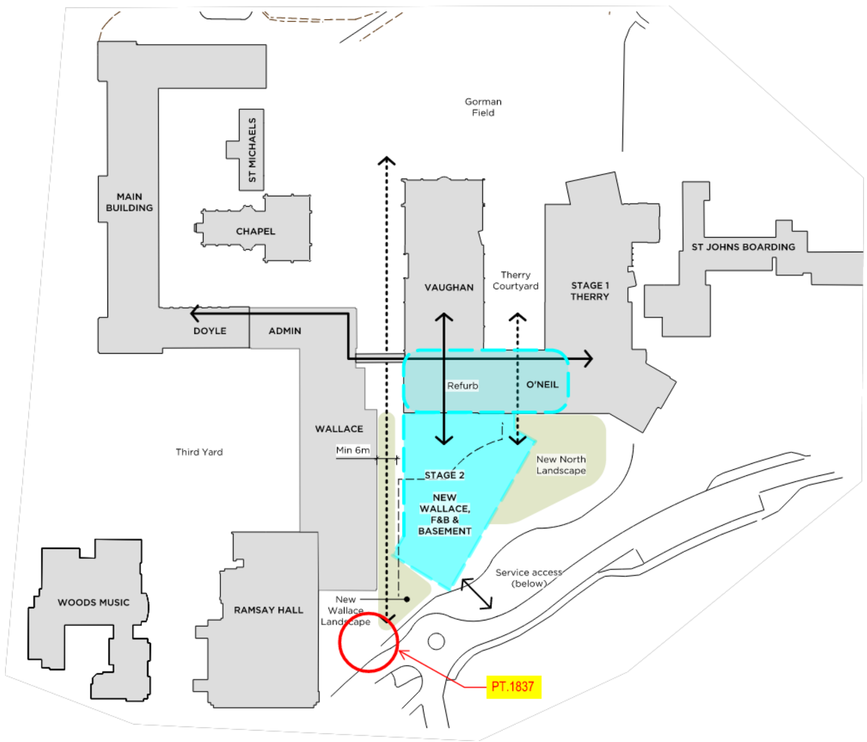
4.1 Power

Northrop has performed non-invasive investigations with regards to the existing power infrastructure, considering the context of the proposed St Ignatius' College Redevelopment - Ignis Stage 2. Note that the entire campus is large, and our scope is limited to the immediate area surrounding the Ignis Stage 2 Redevelopment.

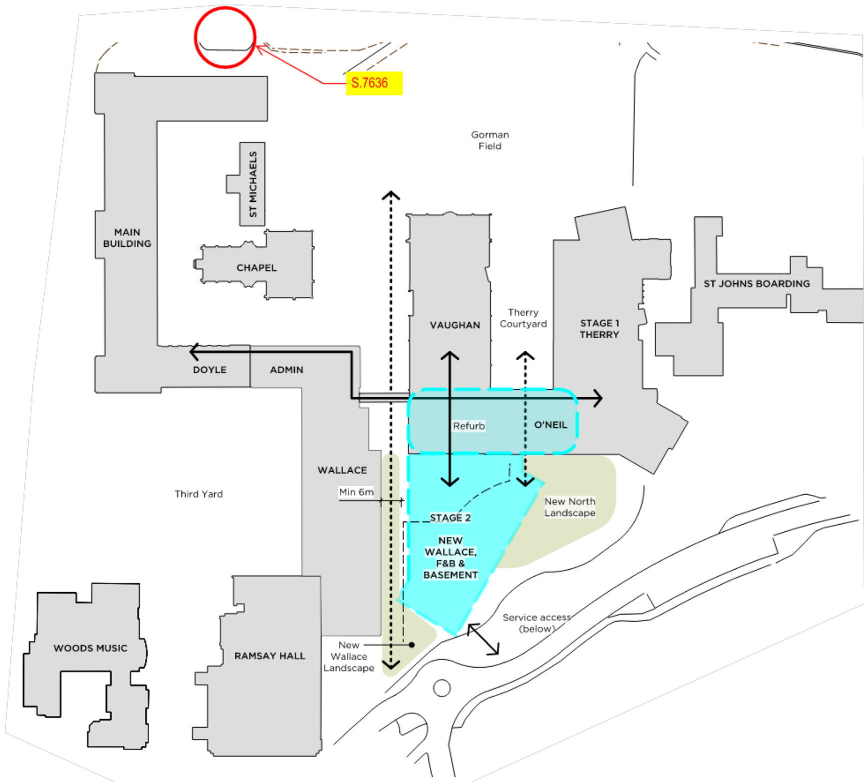
The existing site is bounded by Ausgrid high-voltage infrastructure (11 kV cabling) traversing, approximately, parallel to Loyola Drive. This feeder cable carries an easement which encompasses the proposed St Ignatius' College Redevelopment - Ignis Stage 2 development site.

Ausgrid-owned public lighting services also exist on the boundary roads.

The existing site is supplied by electrical utility infrastructure from Ausgrid, as per the following:

Asset Number	PT.1837
Type of Asset	Pole-Top Substation/Transformer
HV Operating Voltage	11 kV
Location on Site	
Incoming Consumer Mains	4 x 1c x 300mm^2 Cu
Capacity	400A
Impacts on Infrastructure	Pole-top Substation servicing 'Old Wallace' building and nearby freestanding buildings including Ramsay Hall, O'Kelly Theatre, The Woods Auditorium, Gartlan Sports Centre and Cottages near Gartlan Sports Centre. This substation is relevant to the project considering that the new Kiosk Substation and MSB will be required to replace this

	infrastructure in full, allowing for the eventual decommissioning of PT.1837.

<table>
<tr><td>Asset Number</td><td>S.7636</td></tr>
<tr><td>Type of Asset</td><td>Kiosk Substation/Transformer</td></tr>
<tr><td>HV Operating Voltage</td><td>11 kV</td></tr>
<tr><td>Location on Site</td><td>
</td></tr>
<tr><td>Incoming Consumer Mains</td><td>Unknown</td></tr>
<tr><td>Capacity</td><td>630A</td></tr>
<tr><td>Impacts on Infrastructure</td><td>This kiosk substation supplies the majority of the Senior campus, including the O'Neil, Vaughan and Therry buildings. These buildings are required to be refurbished and linked to the new Wallace building. It is intended that the loading on this kiosk substation will be reduced, as the refurbished parts of the O'Neil building are intended to be serviced by the new substation servicing the 'New Wallace' building.</td></tr>
</table>

There is also a third substation, S.7289, servicing the Junior School portion to the north of the campus, however, due to the distance to the proposed Project, it is not relevant to this report. The Senior campus main switchboard (serviced by substation S.7636) currently comprises one tariff meter, and the Old Wallace MSB (serviced by substation PT.1837) currently comprises an additional tariff meter. On the Junior School side (not relevant to this Project) there are a further two tariff meters currently in service.

4.2 Telecommunications

Following the review of the Dial Before You Dig (DBYD) plans and a site inspection conducted by Northrop on 21st January 2020, existing utility telecommunications services have been identified in the immediate vicinity of the Project. Utility telecommunications cabling is installed in underground conduits on street verges, with regular access points through pits along Tambourine Bay Road and Riverview Street.

For Utility communications, the College maintains a Telstra fibre optic connection which traverses the internal road, Loyola Drive, to the site's west. This fibre optic connection terminates in the College's private datacentre located in the O'Neil building. The College provides private fibre connectivity to all buildings on campus from this centralised datacentre. No other buildings on campus than O'Neil should contain a Utility communications service.

The College maintains an existing private pit and conduit network containing the College's private fibre optic cable. This currently traverses the site and encroaches on the proposed development site.

According to the information provided by LTS Surveyors, two Telstra conduits containing optical fibre traverse the excavation site and must be diverted.

- One conduit is a 120.5 metre P100 conduit exending from a Type 6 pit at the northern end of the St John's Boarding House through to a Type 6 pit at the foot of the Vaughan building. It contains a 120.5 metre length of multi core single mode optical fibre.
- The second conduit traverses under the existing Wallace building through to the Caretakers building to the north of Gartlan Sports Centre. The length in question is a 70.9 metre P35 conduit that may contain unused copper phone line services.

These conduits are under the jurisdiction of Telstra and the detailed design shall incorporate diversion of these conduits via Telstra Network Integrity.

Extract from Telstra survey plan showing conduits traversing site (highlighted in red)

4.3 Water

The site is served with two incoming water services.

There is an incoming 100mm service from the Sydney Water Cast Iron Concrete Lined (CICL) street main located in Riverview St.

The water meter is 80mm with 2 off RPZD assemblies.

This connection is not currently proposed to be utilised to serve the Ignis Stage 2 redevelopment.

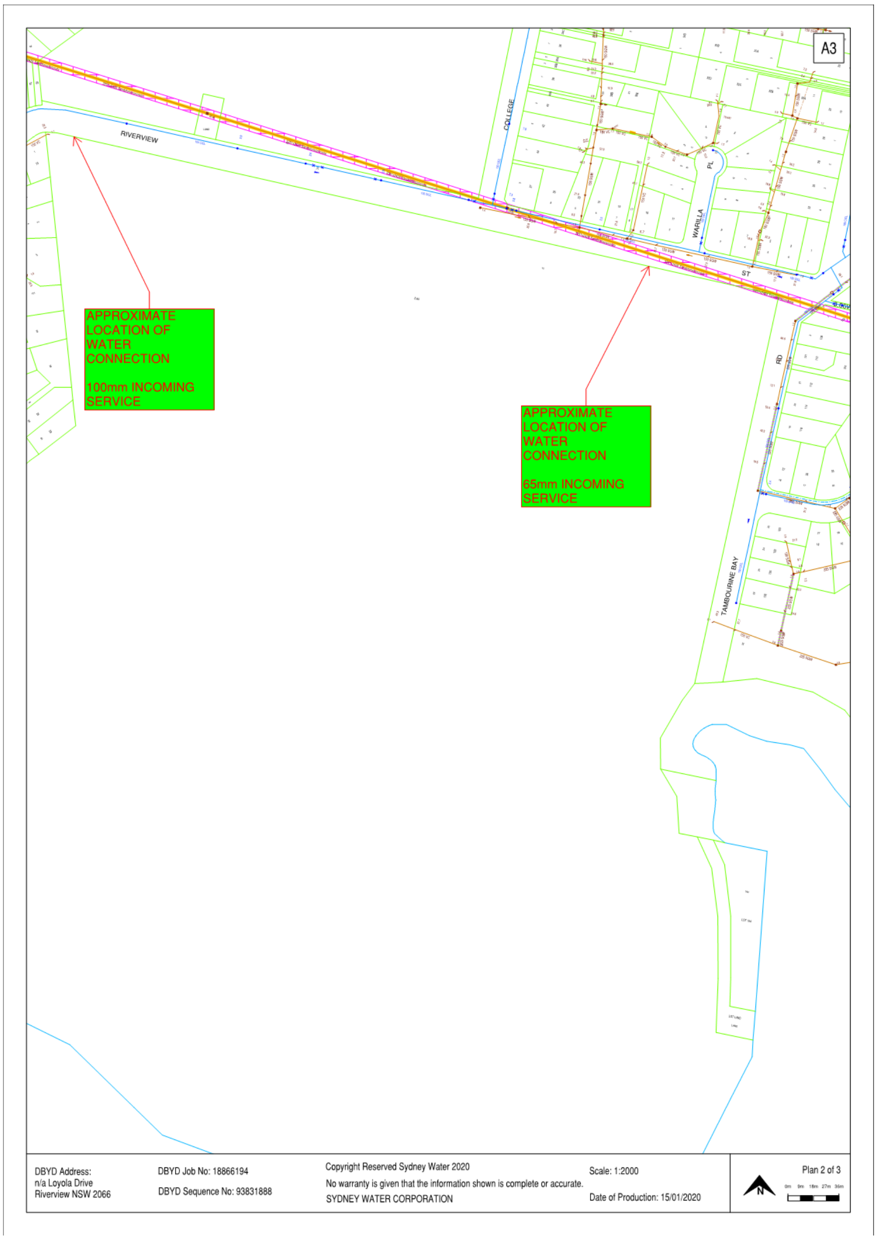
	
80mm METER AND RPZD ASSEMBLIES	**65mm METER AND RPZD ASSEMBLIES**

There is an incoming 65mm supply from the Sydney Water Cast Iron Concrete Lined (CICL) street main located in Riverview St.

The water meter assembly is located on the boundary between College Road South and Warilla Place.

The water meter is 50mm, with 2 X 65mm RPZD's with an 80mm service to the site.

This is the proposed water service to be utilised for the Ignis Stage 2 redevelopment.



The Sydney Water 100mm main in Riverview Street has sufficient capacity to serve the redevelopment.

4.3.1 Fire Hydrants

The Riverview campus is provided with an existing fire hydrant service via a site main arrangement which is reticulated around the site. The hydrant system serving the site includes a brigade booster adjacent to the main site entry from Riverview Street, which incorporates a 4-point boost connection capable of providing 40L/s into the system, a 150mm tank suction connection, and a 2-point brigade suction connection.

Fire Hydrant Tank Suction and Booster Pump Assembly

The hydrant system is supplied via two diesel hydrant booster pumps served from a storage tank, which is located in a dedicated fire services plant room below ground level adjacent to the main site entry from Riverview Street.

It is expected that the capacity of the existing booster pump and associated water storage is sufficient to provide the required pressure, flows and water storage required for the proposed redevelopment. This will have to be confirmed at an early stage to ensure that it is adequate for the proposed redevelopment.

The existing signage at the booster location is currently non-compliant.

Further investigation will be required to locate the existing fire hydrant piping system, both below and above ground, water storage tank and the like, to enable a new and complying Fire Hydrant Block Plan to be prepared and installed at the booster location.

Existing Fire Services Block Plan

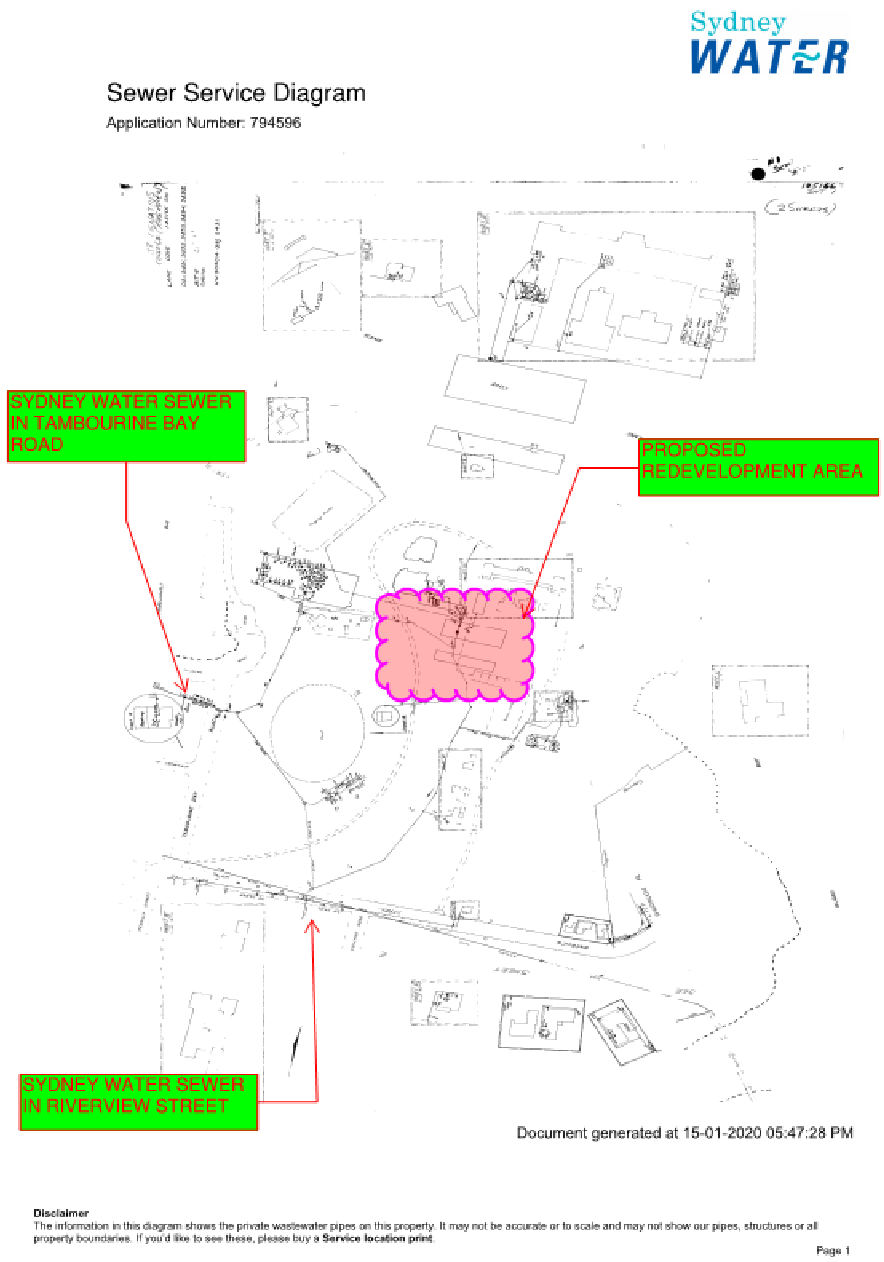
4.4 Sewer

Sydney Water records indicate the site discharges to the Sydney Water sewer in Riverview Street and the 225mm Sydney Water sewer in Tambourine Bay Road.

The diagrams below indicate the location of the Sydney Water sewer mains.

The new development will drain to the existing 225mm Sydney Water sewer main in Tambourine Bay Road.

The Sydney Water 225mm sewer in Tambourine Bay Road has sufficient capacity to serve the development.



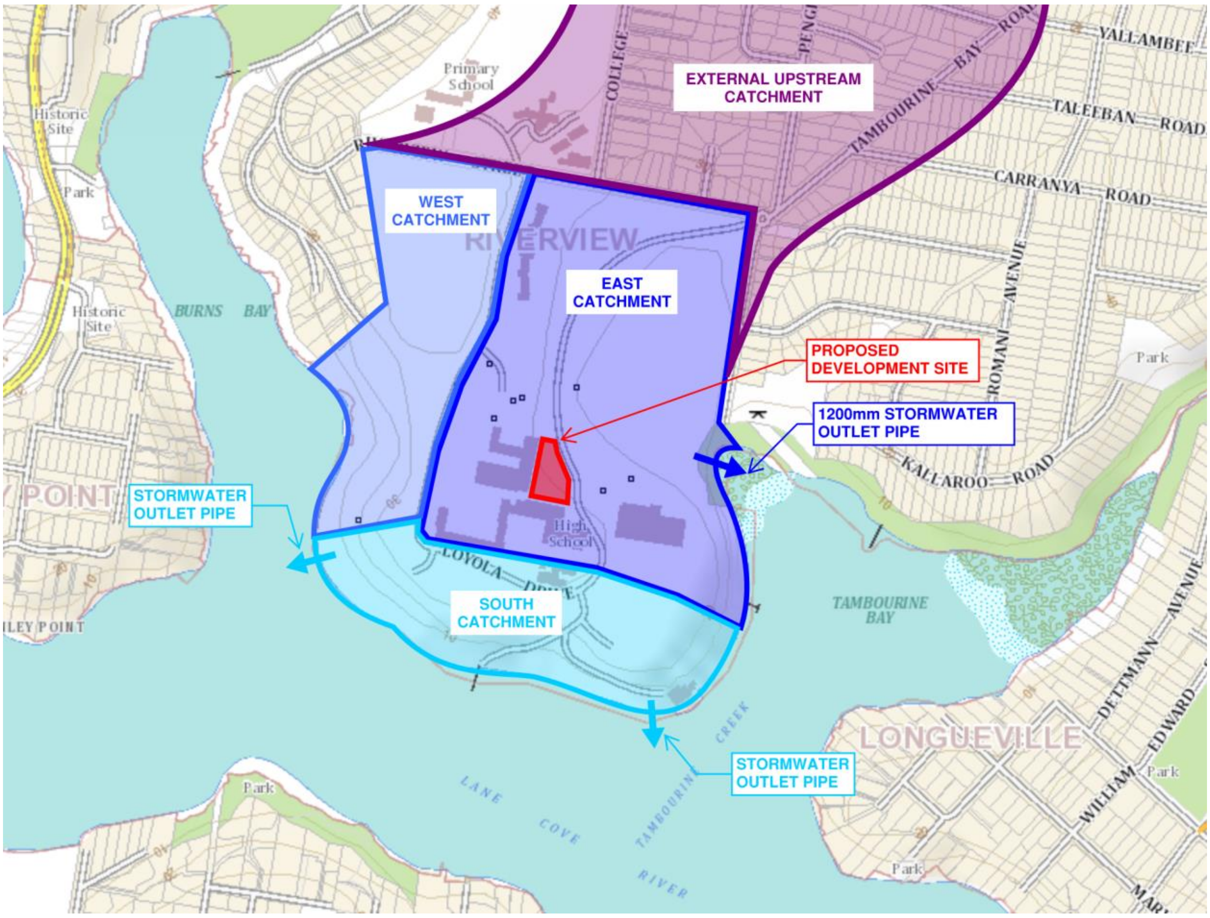
4.5 Stormwater

4.5.1 Flooding Context

The is no risk of flooding due to the high elevation above the Lane Cove River. Design considerations should be made for any existing overland flow paths to ensure there is no significant water ingress or erosion damage through the development site.

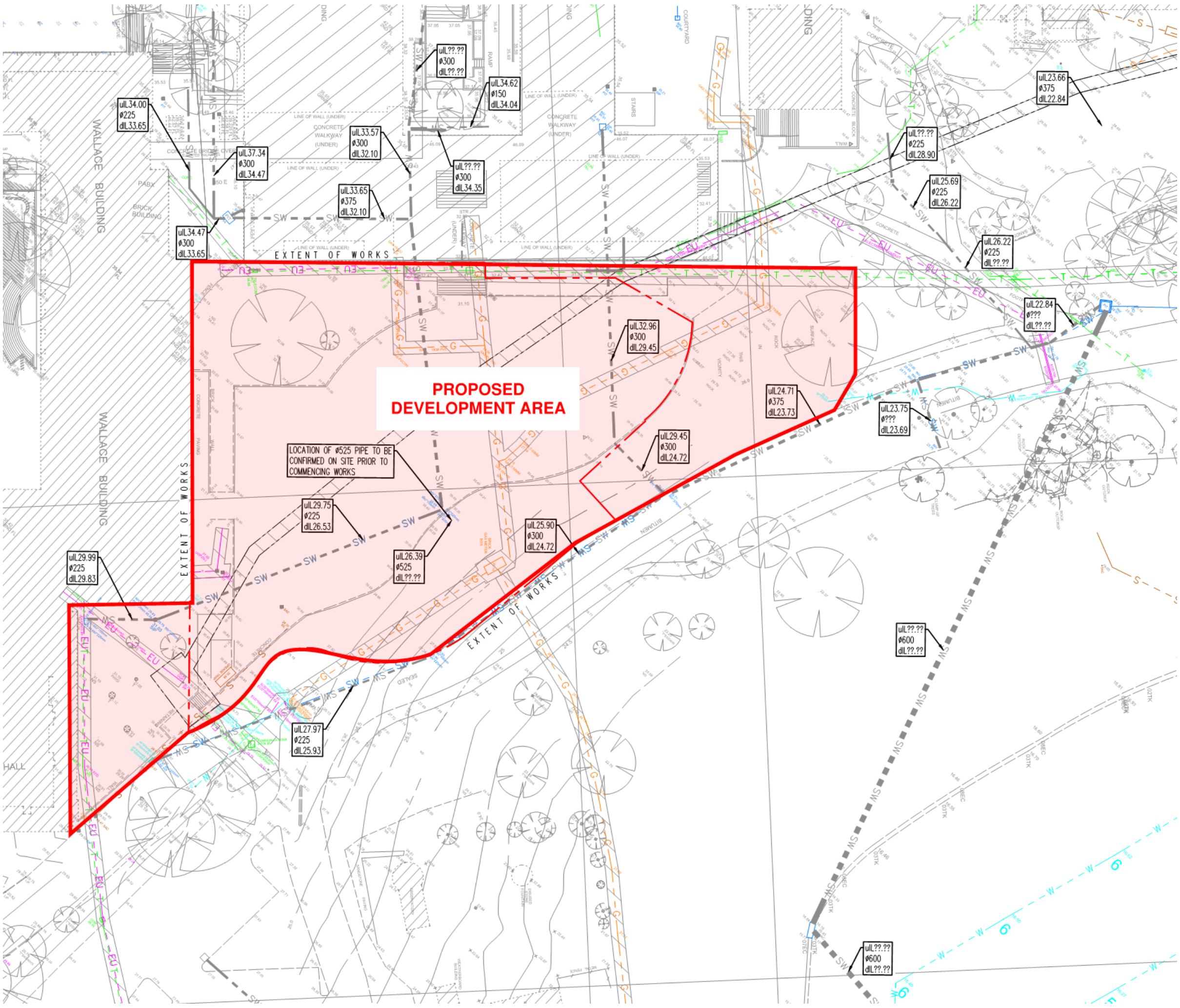
4.5.2 Existing Sub-Catchments

The natural topography divides the campus site into three catchments. The western and southern catchments outside the proposed development area drains via surface flow or localised piped networks into Burns Bay and the Lane Cover River. Roof and surface runoff in the eastern catchment is collected via a network of grated pits, swales and channels into a trunk drain which discharges into Tambourine Bay.



4.5.3 Pre-Development Stormwater Management Approach

Much of the proposed development area is covered by existing hardstand playing courts and surrounded by grassed or landscaped areas. Surveying works carried out in 2014 and 2016 reveals an extensive network of stormwater pits and pipes servicing the area around the proposed development. Surface drainage from the playing courts is collected via a grated inlet pits and drains into a 375mm diameter pipe running along the western edge of Loyola Drive. Roof and surface drainage from the Wallace, Vaughan and Therry buildings is collected via pits and pipes and passes underneath the existing playing courts and makes a direct connection into the trunk drain.



4.6 Natural Gas

There are two existing gas meter connections serving the existing appliances installed on the site.

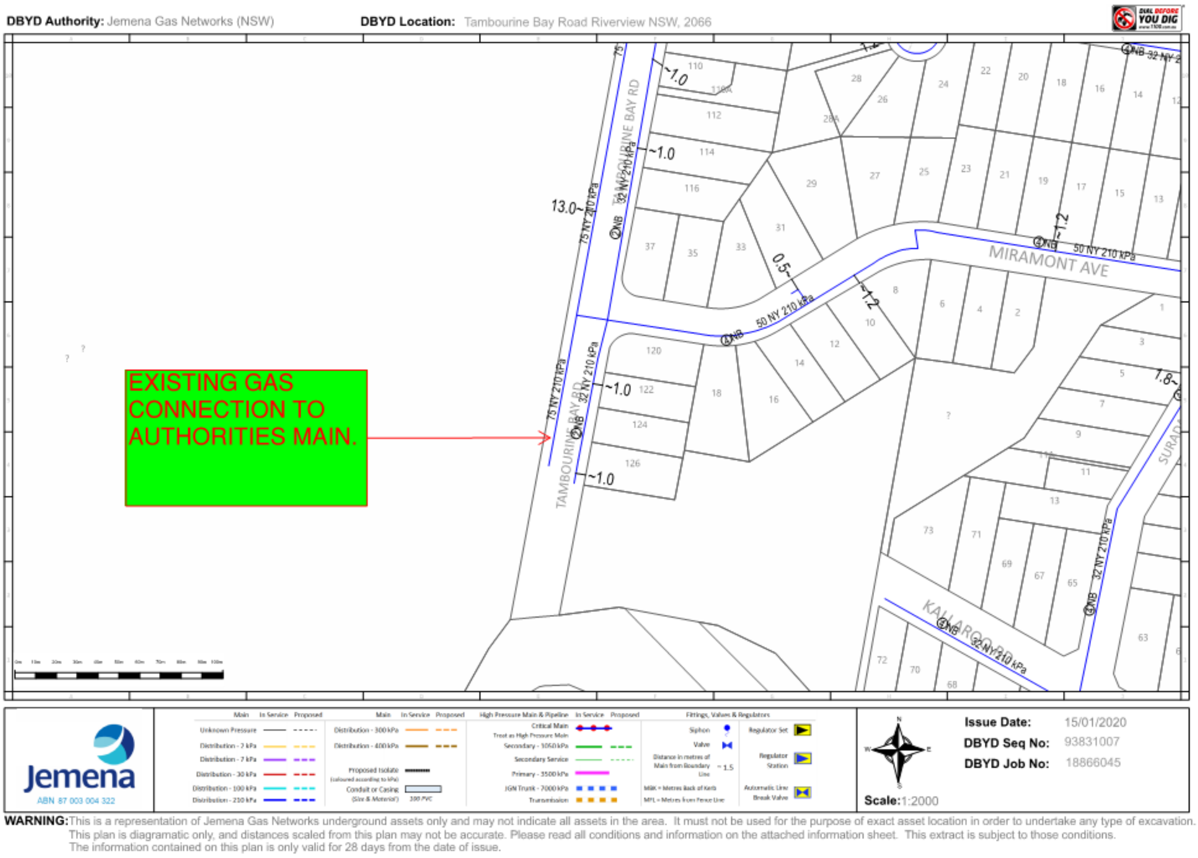
The existing gas meter and regulator assembly number 1 is located adjacent to the site entry on Riverview Street and is fed from the Authorities main located in the street. This service will not be utilised to serve the redevelopment.

Gas meter and regulator assembly number 2 is located on the internal roadway nominated as Loyola Drive in the vicinity of the oval.

It is understood that this service is connected to the Authorities 75mm, 210 kPa gas main in Tambourine Bay Road and crosses the adjacent playing field to the meter and regulator assembly.

It is expected that the regulator at the meter assembly reduces the pressure from 210 kPa to approximately 3.0 kPa.

The 75mm Jemena gas main has sufficient capacity to serve the redevelopment



Location of Gas Mains in Tambourine Bay Road

5. Proposed Infrastructure & Augmentation

5.1 Power

5.1.1 Power Supply Demand Calculations

During the Concept Design phases of the project, Northrop completed ongoing maximum demand calculations based on the Architectural plans to determine the required augmentation to utility power services to service the Project.

Northrop has undertaken a preliminary assessment of the load requirements for the proposed development, according to AS/NZS 3000:2018 Table C3.

Assumptions used in the calculation are as follows:

- We have assumed the Food and Beverage precinct contains commercial electric cooking equipment, not gas.
- We have assumed 25 VA/m2 of air conditioning as per AS/NZS 3000:2018 Table C3 – this is the estimated contribution for air conditioning for the Project scope alone, with consideration made to being supported by a Central Thermal Plant (CTP) system.
- We have assumed 35 VA/m2 of lighting and power in classroom and office areas, below the AS/NZS 3000:2018 Table C3 recommended figure of 50 VA/m2. This is because we will only be considering high efficiency LED lighting, sensor-based lighting controls, and a sparse number of fixed desktop computers (as we identify that the majority of computing in the College is performed on less power-hungry portable computers, with LED external monitors sporadically).
- We have assumed 40 VA/m2 of lighting and power in the STEMP maker space to allow for additional equipment, including power tools, a number of 3D printers, etc.
- We have assumed a 10% spare capacity figure.

Group	Description	Area	VA/m2	Load (kVA)	Load (A / Phase)
Level -1	Basement	404.9	7.5	3.04	4.38
	Delivery Storage	35	10	0.35	0.51
	Central Plant	299	30	8.97	12.95
	Thermal Labyrinth	135.9	10	1.36	1.96
Level 0	STEMP Maker Space	261.6	65	17.00	24.54
	Store Room	36.7	10	0.37	0.53
	WC	30	15	0.45	0.65
	Circulation	119	30	3.57	5.15
	COLA	1198.6	7.5	8.99	12.98
	Canteen	95.7	175	16.75	24.17
	Canteen (Pickup and Store)	103.5	10	1.04	1.49
	Freezer	8	600	4.80	6.93
	Cool Room	10.4	600	6.24	9.01
	Dry Store	5	10	0.05	0.07
	Service	10.2	65	0.66	0.96
	Stationery	22.8	40	0.91	1.32
	Reception	25.7	65	1.67	2.41
	Machine Room	60.7	65	3.95	5.69
	Paper Store	40.9	10	0.41	0.59

Group	Description	Area	VA/m2	Load (kVA)	Load (A / Phase)
Landscape	North Lawn	503.1	5	2.52	3.63
	South Lawn	688.5	5	3.44	4.97
Level 1	Overall - Learning	1363.4	65	88.62	127.91
Level 2	Overall - Learning	1290.3	65	83.87	121.06
	Refurbished - Learning	908.68	65	59.06	85.25
Level 3	Overall - Learning	1230.8	65	80.00	115.47
	Refurbished - Learning	908.68	65	59.06	85.25
Level 4	Staff Commons	240.7	65	15.65	22.58
	WC	90	15	1.35	1.95
	Meeting	15	65	0.98	1.41
	Plant	121.4	10	1.21	1.75
	Terrace	176.8	10	1.77	2.55

Total Maximum Demand (Including Air-Conditioning) for the New Wallace Building: **523 kVA / 759 A/phase**

5.1.2 Power Supply Provisions

The existing School site contains three existing substations accessible around the site's perimeter (refer to Section 4.1 for details). These substations do not have sufficient capacity to support the Project's proposed loads; therefore, there is a requirement for new power infrastructure from the local supply authority, Ausgrid.

The Level 3 ASP, Osborne & Smith Consulting, has undertaken discussion with Ausgrid, and applied for a single 1,500 kVA padmount kiosk type substation to be installed on site to service the development, encompassing the loads of:

- New Wallace Building
- Existing Buildings previously supplied by PT.1837
- Central Thermal Plant

Spatial allowance shall be made for an additional 1,000 kVA substation for future Central Thermal Plant expansion as required.

This allowance for a new substation is proposed to be located inside the campus, at the roundabout where Loyola Drive meets the observatory, pending Ausgrid approval (refer to Figure 3).

This modification to the electrical utility authority asset carries the Ausgrid project ID AN-21280.

An additional project AN-21099 has been registered with Ausgrid to redirect the existing 11kV feeder cable beneath the proposed Stage 2 Ignis building footprint. This will result in the creation of a new easement over the new cable path, enabling the existing easement to be extinguished so that the Stage 2 Ignis Building permanent structure can be built above.

Figure 3: Location of proposed new substation in relation to the proposed site

The new substation is proposed to be an Ausgrid 'K' type kiosk. The kiosk carries an easement size of 6.65 metres by 4.5 metres. For all Ausgrid high-voltage cables, an additional two-metre easement is required around the path the cable is laid.

The project has been registered with Ausgrid by way of application for connection; detailed design of the infrastructure will be directed by a Design Information Package pertaining to project AN-21280, expected to be issued by Ausgrid in the coming weeks.

The existing pole top substation servicing the immediate existing site, PT.1837, is to be decommissioned and replaced in full by the new substation.

The two existing padmount substations surrounding the School (S.7636 and S.7289) are located outside the redevelopment site and shall continue to operate as normal during and after project completion.

5.1.3 Power Supply Connection Points

The new substation is intended to connect to a new main switchboard to service the Proposed New STEMP Building, carry the proposed Central Thermal Plant (CTP) and carry all existing loads formerly supplied by the existing pole top substation, including the Ramsay Hall, O'Kelly Theatre, The Woods Auditorium, Gartlan Sports Centre and Cottages near Gartlan Sports Centre.

This new main switchboard is intended to be located within the immediate development site, in an internal location not more than 50 metres from the proposed new substation. The final location is currently under design development.

5.2 Telecommunications

During the Concept Design phase of the project, Northrop has determined how the proposed Project is to receive utility communications services, including internet and telephony.

The proposed Project shall be directly connected to the College's private fibre optic network. The College's private network is supplied by an existing Telstra lead-in fibre optic service which we have determined is suitable for continued use by the New STEMP Building.

No new Utility telecommunications service will be required to service the site.

5.3 Water

In order to assess the capabilities of the surrounding hydraulic services infrastructure, JHA has undertaken a preliminary load assessment for the precinct. JHA's estimates of the additional demands imposed on Sydney Water water infrastructure and the existing site service proposed for connection for the St Ignatius' College Redevelopment – Ignis Stage 2 will not adversely affect the current capacity of the water main or service.

The existing incoming 65 mm water service and associated water meter and RPZD assemblies will not be required to be upgraded to accommodate the additional requirements of the Ignis Stage 2 redevelopment.

The new fixtures will be serviced from a connection to the existing 80mm water service, in the vicinity of the proposed Ignis Stage 2 redevelopment.

It is not expected that a pressure pump set will be required to provide adequate pressure to the fixtures and the Fire Hose Reels.

The cold water and fire hose reel water services will be constructed in compliance with AS/ NZS 3500.1.

Cold water only will be provided to the fixtures in learning and other student areas.

5.3.1 Fire Hose Reels

It is not necessary to provide Fire Hose Reel (FHR) coverage to classrooms or associated corridors of schools.

However, for any other classification/use within the school, FHR coverage is required if the fire compartment is over 500 m^2 in area.

Fire hose reels will be required to be installed within 4m of fire exits and additional, located in the path of travel, to provide compliant coverage to non-classroom/corridor areas.

The fire hose reel system will connect to the cold water service and be of copper piping.

5.3.2 Fire Hydrants

It is intended to connect to the existing fire hydrant piping system and extend to serve both external and internal fire hydrants to provide compliant coverage for the Ignis Stage 2 redevelopment.

The fire hydrants will be located externally, within fire stairs and additional internal fire hydrant along the path of travel to provide compliant coverage.

The piping underground will be MDPE and will be galvanised mild steel internally aboveground.

It is expected that the capacity of the existing booster pump and associated water storage is sufficient to provide the required pressure, flows and water storage required for the proposed redevelopment. This is yet to be confirmed to ensure that it is adequate for the proposed redevelopment.

The fire hydrant system will comply with NCC 2019, AS 2419 and AS 2941 requirements.

The existing signage at the booster location is currently non-compliant and will require revision and replacement as per AS 2419.

Further investigation will be required to locate the existing fire hydrant piping system, both below and above ground, water storage tank and the like, to enable a new and complying Fire Hydrant Block

Plan to be prepared and installed at the booster location. Also, a current building location site plan will be required to align with the block plan requirements.

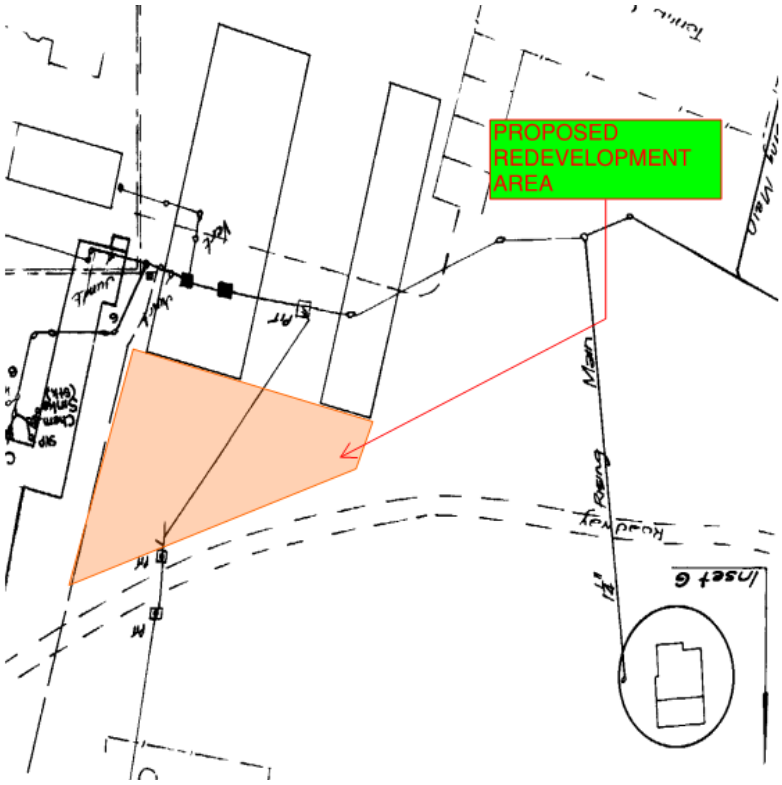
5.4 Sewer Drainage

The new fittings and fixtures will be connected to a system of gravity sewer drainage and sanitary plumbing stacks which will drain to the existing internal sewer drainage system.

The sanitary plumbing will generally be a single stack system designed as an AS3500.2 Sanitary Plumbing and Drainage modified vented system and will generally be of uPVC material connecting to the sewer drainage in the ground

The sewer drainage will comply with AS3500.2 –Sanitary Plumbing and Drainage and connect to the existing internal sewer drainage system.

There is existing sewer drainage piping within the Ignis Stage 2 redevelopment area which will require relocation. This may have to be undertaken as part of an early works package to maintain the operation of the upstream fixtures.



Excerpt of Site Sewer Service Diagram indicating existing sewer drainage within Ignis Stage 2 Redevelopment Area

5.5 Trade Waste Drainage and Trade Waste Plumbing

The new fittings and fixtures within the science laboratories will be connected to a system of gravity trade waste drainage and trade waste plumbing stacks which will drain to a new treatment pit consisting of a 1000 litre dilution pit.

The trade waste plumbing will generally be a single stack system designed as an AS3500.2 Sanitary Plumbing and Drainage modified vented system. The piping and associated fittings will generally be of HDPE material connecting to the trade waste drainage in the ground. The trade waste drainage will also be of HDPE connecting to the treatment pit.

The trade waste drainage will comply with AS3500.2 –Sanitary Plumbing and Drainage and the discharge from the dilution pit will connect to the existing internal sewer drainage system.

The fixtures within the Food and Beverage area will all drain to a grease arrestor. The grease arrestor will be of 2000 litre capacity and installed below ground.

The drainage piping system will be HDPE from the Food and Beverage B fixtures to the grease arrestor. Traps and wastes within the Food and Beverage area connecting the fixtures to the drainage system will be chrome plated copper.

The trade waste drainage will comply with AS3500.2 –Sanitary Plumbing and Drainage and the discharge from the grease arrestor will connect to the existing internal sewer drainage system.

5.6 Stormwater

5.6.1 Proposed Stormwater Management Approach

Lane Cove Council DCP Part O requires the proposed piped flow conveyance for up to a 50 year Annual Recurrence Interval (ARI), equivalent to a 2% Annual Exceedance Probability (AEP) under Australian Rainfall Runoff 2016. Overland flowpaths are to be design for the 100 year ARI, equivalent to 1% AEP. Roof water is collected in roof gutters and downpipes and conveyed via a separate pipe system into the 10kL rainwater tank located in the basement for re-use. Surface stormwater runoff will be collected through site grading, overland flowpaths and inlet pits and conveyed by in-ground pipe system into the trunk main discharging to Tamborine Bay. The proposed development does not pose any obstruction to existing overland flow paths.

5.6.2 On-Site Detention

Appendix 12 of the Lane Cove Council DCP Part O identifies the site of the proposed development as exempt from on-site detention requirements due to proximity to the Lane Cove River foreshore. This has also been confirmed directly with Lane Cove Council's stormwater development engineer.

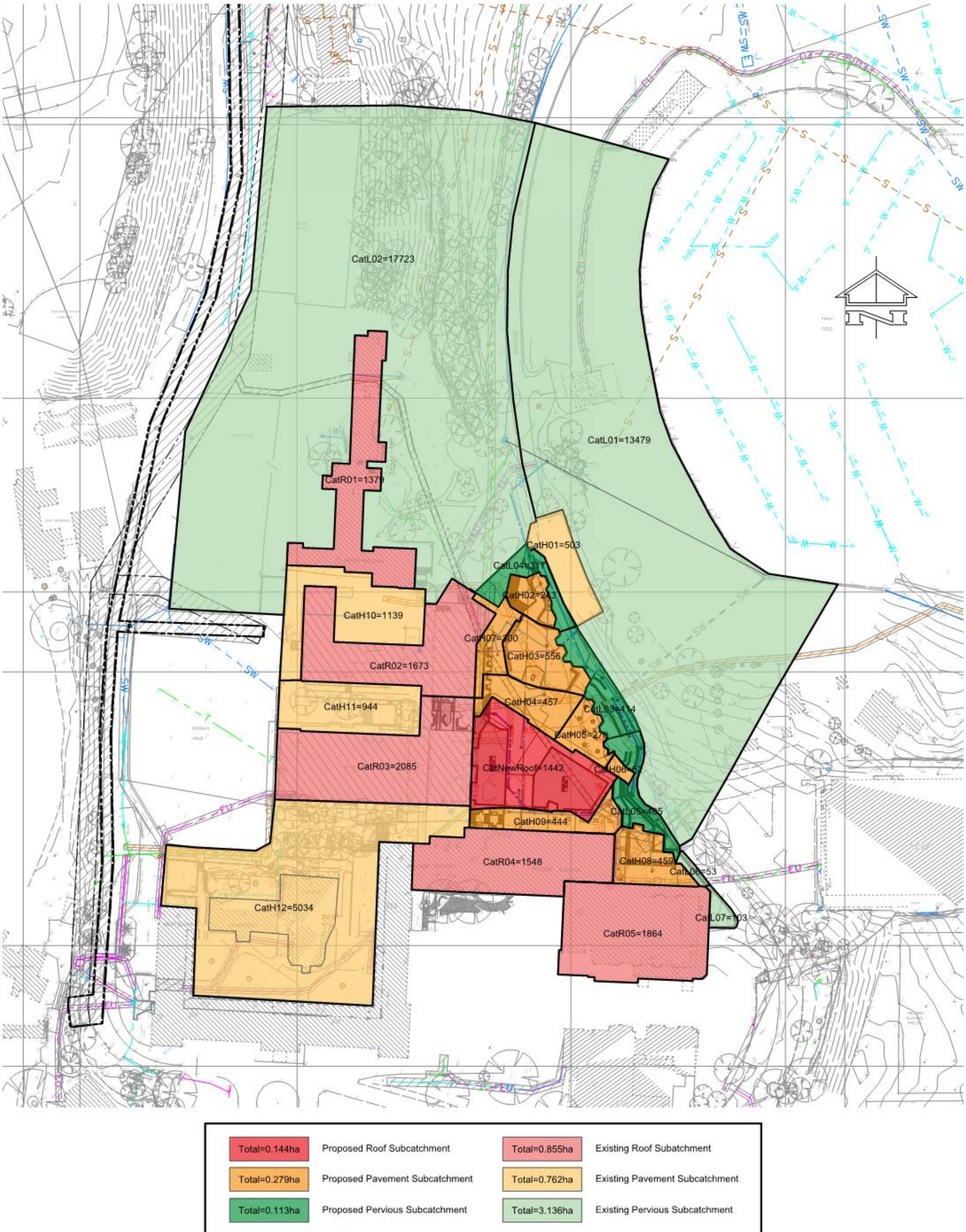
5.6.3 Proposed Infrastructure

Surface run-off has been modelled using DRAINS modelling software and pits and pipes selected in accordance with AS/NZS 3500.3-2018. Overflow from the rainwater tank and run off collected in the basement car park travels via a gravity pipe to the surface drainage system. All roof and surface run then passes through a downstream Gross Pollutant Trap as detailed in Section 6. Due to the increased impervious area as part of the proposed development, the existing 375mm pipe running in Loyola Drive has insufficient capacity to convey the 50 year ARI flows. It is instead proposed to provide a new connection into the trunk main with a 375mm pipe and surcharge pit. This method avoids a significant hydraulic loss occurring at the existing junction pit connecting into the trunk main, has no adverse effects on the downstream hydraulic performance of the trunk main while allowing run off to safely surcharge via overland flow path during major storm events or blockages.

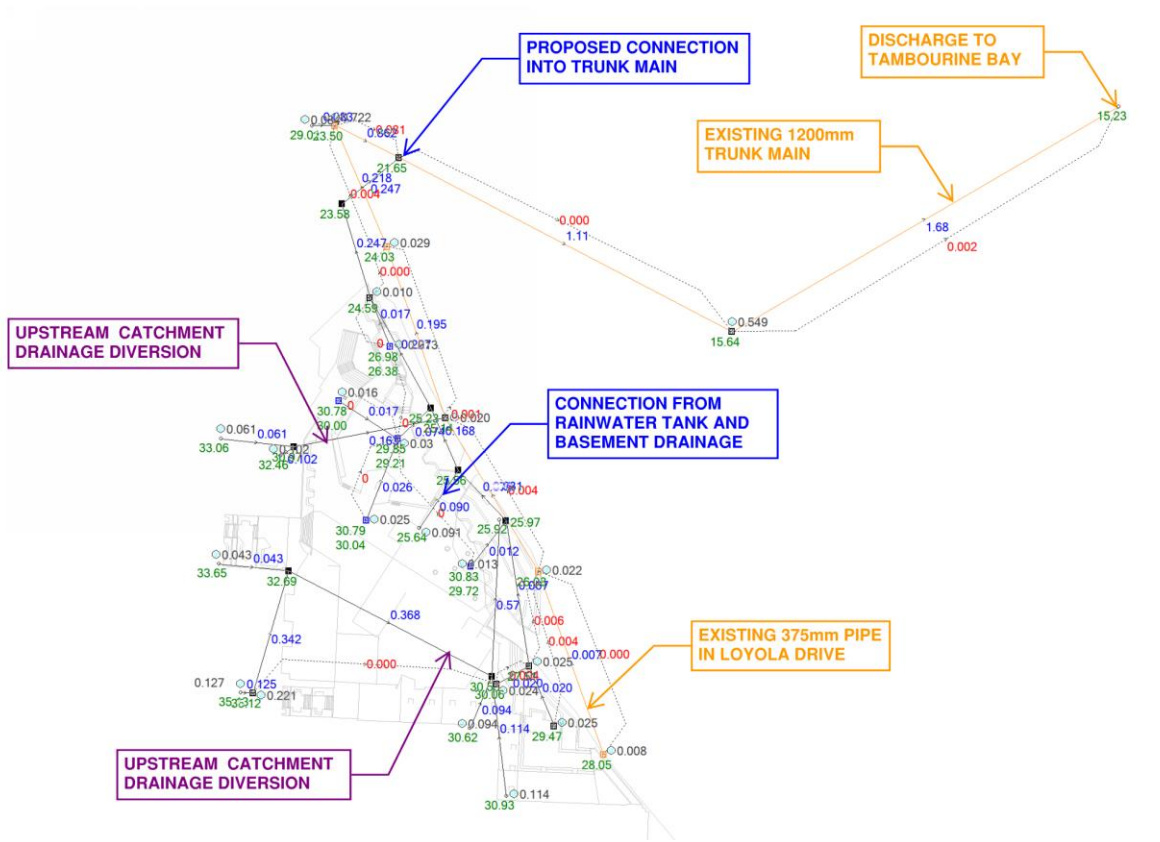
There are two existing stormwater services that traverse the site from upstream catchments that will need to be diverted as part of the proposed works; this is due to modified surface levels or the arrangement of the proposed building and other structures which interfere with the current alignments. The existing 375mm pipe from the Vaughan Building and 225mm pipe from the Wallace Building will be diverted along the southern edge of the proposed building and reconnect into the downstream 525mm pipe; existing pipe invert and alignment information will be required during the developed design phase to confirm no adverse effects to hydraulic performance. Another 300mm pipe travelling from the Therry Building to a kerb inlet pit on Loyola Drive may need to be adjusted to suit finished surface levels and retaining structures.

5.6.4 DRAINS Modelling

The below plan is a breakdown of subcatchments where are contributing stormwater runoff upstream of the desired point of connection into the trunk main.

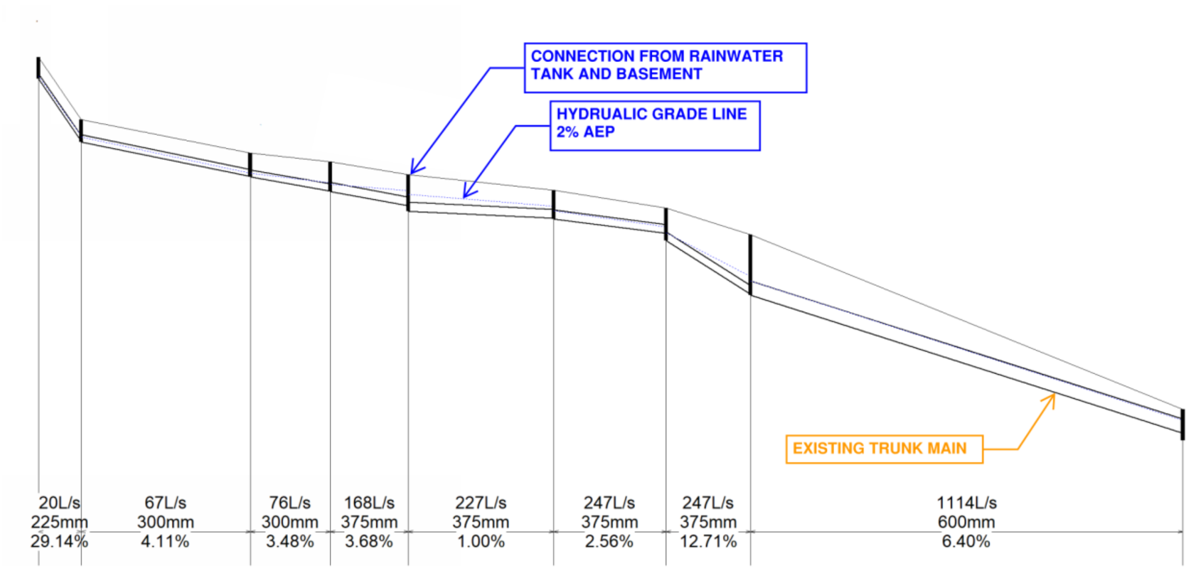


Results for the 50 year ARI storm are shown in the below figure extracted from DRAINS modelling program.



5.6.5 Post-Development Stormwater Performance

Assumptions used for proposed stormwater design makes allowance for 20% blockage for all on-grade pits and 50% blockage for all sag pits. DRAINS results for the minor 2% AEP storm demonstrates that stormwater is fully conveyed by the in-ground system. Results for the major 1% AEP storm show that any upwelling from grated inlet pits is safely conveyed via overland flow path towards Tamborine Bay. The in-ground stormwater network has been designed to reduce hydraulic losses by eliminating sharp changes in direction and large vertical drops. The below longitudinal sections along the primary drainage line demonstrates that the hydraulic grade line for the 2% AEP storm remains under the finished surface and no upwelling occurs.



5.7 Natural Gas

Gas meter and regulator assembly number 2 is located on the internal roadway nominated as Loyola Drive in the vicinity of the oval.

It is understood that this service is connected to the Authorities75mm, 210 kPa gas main in Tambourine Bay Road and crosses the adjacent playing field to the meter and regulator assembly. This will be required to be confirmed together with the piping route and mains connection location.

It is expected that the regulator at the meter assembly reduces the pressure from 210 kPa to approximately 3.0 kPa.

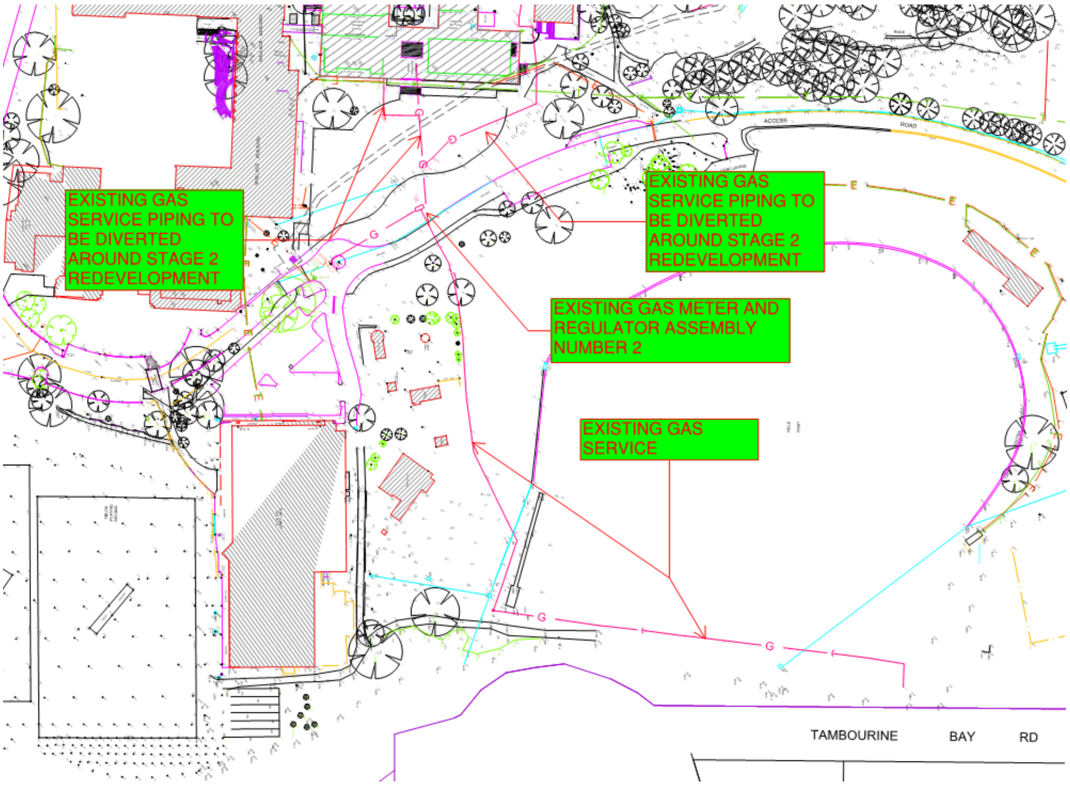
The pressures of the incoming and outgoing pressures at the meter assembly should be tested and confirmed prior to final design and pipe sizing are undertaken.

There is existing gas service piping within the area of the Ignis Stage 2 redevelopment area and will have to be relocated away from the building footprint. This may have to be undertaken as part of an early works package to maintain the operation of the existing appliances.

There is minimal increase in the gas load expected for the new development and it is expected that there will be no necessity to upgrade the existing gas service within the site.

The existing gas load on the existing system will need to be confirmed to ensure that the piping and gas meter & regulator are adequate to supply gas to both the existing and additional gas loads. If the meter, regulator or piping is not adequate, then there will have to be upgrade of the deficient aspect.

The gas piping will be installed in accordance with AS 5601 and will be of copper. Isolation valves will be installed to allow isolation of each separate branch to allow for maintenance with minimal disruption to other appliances.



Site Plan Indicating Incoming Gas Service, Gas Meter & Regulator Number 2 And Existing Gas Piping Within Ignis Stage 2 Redevelopment Area

6. Water Sensitive Urban Design

The stormwater quality management approach will involve incorporation of Water Sensitive Urban Design (WSUD) techniques in the proposed stormwater drainage system.

The WSUD measures described below ensure water quality targets are met, considering stormwater runoff from roads, parks, vegetated areas and the remaining site.

6.1 WSUD Implementation

6.1.1 Grassed Swales

Surface runoff along the landscaped Loyola Drive frontage will be diverted via swales into grated inlet pits. This method increases infiltration, reduces runoff entering the roadway and assists in filtering sediment. Runoff collected from swales enters the in-ground pipe system and is conveyed to the downstream water quality devices for further treatment.

6.1.2 Gross Pollutant Trap

As a requirement stated in Lane Cove Council DCP Part O, a gross pollutant trap (GPT) is to be installed downstream on the development site. The selected GPT unit will be able to capture all litter, debris and sediment particles greater than 5mm in size. A submerged outlet also allows for grease and to oil remain trapped in the GPT. The GPT will be positioned alongside Loyola Drive, downstream from the development to allow for ease of access and maintenance before discharging to the trunk main to Tambourine Bay. All roof catchment and 97% of all hardstand and landscaping runoff will pass through the gross pollutant trap during low and frequent rainfall events.

7. Conclusion

This Infrastructure Management Report (IMP) outlining the proposed Utility Infrastructure servicing the proposed development addresses the Secretary's Environmental Assessment Requirements (SEARs) issues identified in this report.

The project, St Ignatius' College Redevelopment – Ignis Stage 2, including the construction of the Proposed New STEMP Building, can be sufficiently serviced by power, telecommunications, water, sewer, gas and stormwater services.

It has been identified that there is currently insufficient electrical infrastructure to support the proposed buildings, requiring one or more additional kiosk substations (subject to Ausgrid requirements), requiring further investigation of the current capacity of the local HV network to support the proposed utility works.

It has been identified that the existing water, sewer and gas infrastructure is generally sufficient to support the proposed buildings with minor augmentation.

The stormwater management approach for the Redevelopment confirms that stormwater can be managed in accordance with SSD and Council requirements.

This IMP has addressed all aspects of the SEARs items identified in Section 2 of this report.