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SSD – 10371

Trinity Grammar School, Summer Hill Campus - The Renewal Project

Integrated Water Management Plan

Hydraulic Services

ACOR Project No.: SY180898

Revision No.: 04

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REVISIONS

Revision	Date	Purpose	Prepared By	Approved By
01	30/10/2019	DRAFT Issue for Review	S. McCartney	R. Edwards
02	27/11/2019	For information	S. McCartney	R. Edwards
03	05/12/2019	Final issue	S. McCartney	R. Edwards
04	04/02/2020	SEARS Issue	S. McCartney	R. Edwards

Review Panel	
Division/Office	**Name**
Hydraulic / Sydney	Rhys Edwards

Unless otherwise advised, the parties who have undertaken the Review and Endorsement confirm that the information contained in this document adequately describes the conditions of the site located at corner of Seaview St, Prospect Rd and Victoria St, Summer Hill, NSW.

Table of Contents

Appendices

1 Executive Summary

This report addresses overall the waste water and potable water systems for the proposed renewal project of Trinity Grammar School.

This report is based on item 14 of the Secretary's Environmental Assessment Requirements (SEARs) for application and the associated architectural drawings prepared by PMDL, best industry practise, regulatory requirements and subsequent ancillary information provided.

Scope of services covered within the Integrated Water Management Plan (IWMP) report include:

- Sanitary and trade waste discharge;
- Roof water plumbing and drainage systems connecting to existing civil trunk stormwater; and
- Domestic potable water supply systems.

The hydraulic services of the IWMP can be summarised as follows:

- Consultation with relevant utility supply agencies has been conducted to verify the condition, capacity, compliance reliability and efficiency of the existing sewer and water mains infrastructure and have found them to be acceptable for connection;
- Sewer and trade waste water from the site to discharge to the Sydney Water sewer main via new internal 'house drainage' system in accordance with AS.3500;
- Water pressure/flow result was obtained from Sydney Water in April 2019;
  - Refer to appendix 'A' of this report
- Water supply provided will be in accordance with Australian Drinking Water Guidelines (2011, updated 2016, version 3.4);
- Roof water will drain/discharge through a series of rainwater outlets and eaves gutters systems designed in accordance with AS.3500; and
- Environmentally Sustainable Design (ESD) principles as nominated in this report will be incorporated.

2 Project Overview

2.1 Aims and Objectives

The following objectives have been identified as forming the basis of the proposed development of the existing educational establishment:

- Create an education precinct to create a high-quality teaching and learning environment for staff and students;
- Establish additional floor space to increase availability and efficiency of teaching functions for Trinity Grammar School Summer Hill Campus;
- Improve site access, car parking and surrounding traffic functions in the precinct;
- Strengthen pedestrian linkages throughout the campus;
- Enhance the overall campus aesthetic, upgrade the public domain to create visually interesting transitions through the campus, and promote the heritage elements of the campus;
- Ensure minimal environmental impact;
- Maintain the significant green fields assets and provide opportunities for new outdoor environments;

- Ensure development is compatible with surrounding development and the local context; and
- Create a safe environment to support and nurture the boys growth.

The site and proposed design are considered to meet the objectives of the project as it allows for development on land that has been previously used for educational purposes.

2.2 Description of the Proposal

The proposed development seeks detailed built form approval of new teaching and educational facilities, as detailed below:

- New five (5) storey building at the heart of the Campus to accommodate contemporary, flexible teaching and learning spaces;
- Improve movement and flow for students, with better east-west and north-south links across the school grounds and between levels, including more accessible connections between the Junior School, ovals and car park, and providing strong visual and physical connections;
- Renewal and Refurbishment of existing teaching and learning facilities;
- Reconfiguration and connection of underground car park improve traffic flow for the school drop-off and pick-up zone and improve the safety of boys and visitors who enter the school grounds as pedestrians from Victoria Street;
- New multipurpose pavilion between Ovals 1 and 3 containing a championship size basketball court with practice overlay, spectator seating and amenities;
- Demolition of school-owned residences at 46, 48, 50 and 52 Seaview Street, improving the existing service, maintenance and delivery facilities;
- Improvement and extension to Junior School outdoor teaching, assembly and recreational area.

3 Key Design and Performance Principles

A major element of this report is to outline the minimum building services design criteria to deliver compliance with NSW Schools Infrastructure, NSW Department of Health Engineering guidelines, NSW Department of Health, briefing documents, user groups and all relevant statutory authority requirements, so that the most cost effective and energy efficient, maintainable solutions are achieved for the Project, with safety the main priority.

This report is to be read in conjunction with the Hydraulic Services Strategy Drawings (Refer Appendix ‘B’) which incorporate design principles:

- National Construction Code (NCC) compliance;
- Schools Infrastructure requirements;
- Effective use and waste minimisation of limited water resource;
- Authority infrastructure availability and capacity; and
- ESD principles.

The hydraulic services systems currently documented will:

- Ensure the safety of building occupants, staff and visitors;
- Minimise water wastage;
- Minimise initial capital cost and ongoing maintenance and energy costs; and

- Ensure effective use of energy and resources.

3.1 Standards and Codes

This report has used the following Australian Standards and Codes as references:

- National Construction Code – 2019 (being the current version at the time of writing this report);
- AS 3500 – 2018 Plumbing and Drainage Suite of standards, as ratified by the NCC;
- AS 2419.1 – 2005 Fire Hydrant Installations
- AS 2441 – 2005 Installation of Fire Hose Reels

3.2 Guidelines

- In the absence of guidelines from Trinity Grammar School, NSW Schools Infrastructure suite of guidelines have been used as a reference document

3.3 Relevant Authorities

Key authorities directly relating to the hydraulic and fire services design are (Refer to **Table 1** below):

Table 1 - Utility Authorities

Authority	Asset
Sydney Water	Water Supply / Sewer Drainage / Stormwater Drainage
NSW Fire and Rescue	Regulator for fire protection and hydrant systems
Inner West Council	Stormwater / Civil Drainage
Jemena Gas	Natural Gas

4 Design Standards

All building services will be designed in compliance with the National Construction Code of Australia (prescriptive or performance based requirements), all relevant Australian Standards and local Authority requirements.

Hydraulic services systems will be designed and documented in accordance and fully comply with the requirements of the client engineering briefing documents, guidelines and statutory bodies as listed in Section 3 of this IWMP.

5 Outline of Proposed Water Management Systems

5.1 Potable Water

Potable water systems for human consumption and hygiene purposes for the site will be supplied directly from Sydney Water's water main reticulation and designed and constructed in accordance with AS3500.1:2018, AS3500.4: 2018, Sydney Water's requirements and Australian Drinking Water Guidelines.

The proposed water supply will utilise the existing water supply main, master water meter and dual pressure pumps located on Victoria St, within close proximity to the site boundary.

The estimated daily water usage post redevelopment is 53,760 L. This equates to 2.48 L/sec. (DN100 mm supply).

The above is based on:

- 20 L / student (2100 No. of)
- 35 L / teacher (336 No. of)
- No potable water supply is used for landscape irrigation

The existing DN100 mm reticulated network will remain in-situ during the construction of the new building. During the various stages of the build, branch lines shall be constructed and capped off, to allow connection to at later stages of the school's lifecycle. It is proposed that the entire school's potable supply shall be supplied off a ring main type arrangement, utilising the capped off branches that were installed during earlier stages of the project. The benefit of a ring main is to allow segmented isolation of the network and also bi-directional flow.

The water supply will be distributed to achieve:

- 350 kPa at the most disadvantaged outlet
- 1.5 m/sec (max) velocity through the pipes installed within buildings
- 3.0 m/sec (max) velocity through the pipes installed externally (inground)

Subsidiary meters will be provided to the large water uses such as:

- Hot water plant
- Back up supply to rainwater reticulation (fed from Rainwater storage tanks)

In addition, each floor level will have a hydraulic services riser comprising subsidiary meters (as an optional inclusion) and isolation valves for floor level reticulation.

All subsidiary meters will be connected to the building management system for the monitoring of department and/or area water consumptions as well as to identify areas where non-standard usage occurs i.e. leak detection. The water metering helps to identify water usage so that non-critical areas of the facility can be manually isolated in a staged manner under a disaster scenario or failure of service(s).

5.2 Fire Protection Services

5.2.1 Fire Hydrants

Fire hydrants shall be provided to provide coverage throughout all new areas of the project. Where located externally, they will be a minimum of 10m away from any building. Where located internally, they shall be within the fire escape stairwell. Where coverage is not achieved from a fire stair isolated hydrant, additional internal hydrants shall be provided to cover any shortfalls. These additional hydrants shall be constructed based on 'daisy chain' principles.

The new fire hydrant water supply will extend from existing infrastructure. As a result of reasonably low pressure availability in the authority street water supply mains, the existing fire water pressure pumps are to remain. The flow requirements for the hydrant system from the authority mains is adequate, an no storage tanks are envisaged to be required for the project.

5.2.2 Fire Hose Reels

Fire Hose Reel's shall be provided to provide coverage throughout all new areas of the project. All fire hose reels shall be located a minimum of 4m away from any entry/exit point to the building. Where coverage is not achieved from a fire hose reel adjacent to an exit, additional fire hose reels shall be provided to cover any shortfalls. These fire hose reels shall be constructed based on 'daisy chain' principles. The water supply for the fire hose reels shall be provided from the potable water supply.

5.2.3 Commissioning and ongoing testing

Commissioning of the fire protection services shall be performed in accordance with AS2419.1 2005, AS2118, and the maintenance testing requirements of AS1851.

Estimated water usage for each test is listed in **Table 2** below.

Table 2 – Fire Services Testing Water Consumption

TEST	VOLUME OF WATER PER TEST	TEST FREQUENCY	REFERENCE
Fire Hydrants	150 litres per hydrant	Annually	AS 1851, Table 4.4.3, item 3.2
Fire Hose Reel	5 litres per fire hose reel	Bi - annually	AS 1851, Table 4.4.3, item 10.1
Fire Hydrant Flow and Pressure Testing	9000 litres	Annually	AS 1851, Table 4.4.3, item 3.7
Fire Pump Flow Test	6600 litres 24000 litres	Monthly Annually	AS 1851, Table 3.4.1, item 1.13 AS 1851, Table 3.4.3, item 3.2
Fire Brigade Booster Assembly Flow and Pressure Testing	18000 litres	5 - yearly	AS 1851, Table 4.4.4, item 4.2

All testing and commissioning work to be conducted in accordance with Green Star requirements.

5.3 Sanitary Plumbing and Drainage

New sanitary drains will be constructed to the requirements of AS3500.2:2018 and Sydney Water requirements.

Sydney Water have not been advised of the additional loads expected from the new building. ACOR suggest a Water Services Coordinator (WSC) be engaged to assess the impact of the proposed site building layout against the existing authority sewer drains. No other applications to Sydney Water have been made at this phase of the project.

The estimated daily sewer discharge from the site post redevelopment is 54,696 L. This is based on:

- 17 L / student to sewer (2100 No. of)
- 29.75 L / teacher to sewer (336 No. of)

Vertical and horizontal pipework distribution will be designed to elevated drainage principles. These principles are based on the building having a rise in levels of no more than four, plus the inclusion of the top level, permitting a total of 5 levels compliant under the elevated drainage principles. The main benefit of the elevated drainage system is that there is minimal venting compared to the fully vented modified systems. This approach reduces piping, therefore cost, and also reduces the spatial allocation of the hydraulic services.

The drainage systems will be designed for pipework to be constructed using uPVC.

Any drainage pipework traversing above sound sensitive areas will be acoustically treated.

It is also highly recommended that internal floor areas are laid out architecturally, so that wet areas are not located above sensitive areas such as electrical switchboards, distribution boards and communication hubs.

5.4 Trade Waste Plumbing and Drainage

It is not envisaged that any changes are made to the school's existing trade waste arrangements, and therefore there are no necessary additional trade waste inclusions for the proposed works.

5.5 Wastewater Recycling System

The recycling of wastewater includes the capturing, treatment and redistribution of grey water (waste water from showers and basins). The redistributed water is used only for landscaped irrigation and toilet flushing purposes only.

The process of capturing and treating grey water has several disadvantages, such as:

- Occupational health and safety;
- Capital cost – considerable costs associated with the construction of wastewater plant and additional associated pipework;
- Operational cost – ongoing costs associated with the operation, maintenance and monthly of the system;
- Additional energy consumption.

As the project shall provision the site with an additional rainwater tank, complete with additional rainwater re-use opportunities, it is recommended that a wastewater recycling system not be considered for the project.

5.6 Roof Water Drainage

Roof water plumbing from the new building roof area will be designed to discharge the roof water to surface level, where it will be connected into the main civil stormwater trunk main system. The roof drainage system will be based on an Annual Recurrence Interval (ARI) of 1 in 100 years with a 5 minute duration. All roofed areas will have an independent overflow system which has 100% capacity of the primary downpipe system. This rainfall ARI is compatible for buildings with box gutters or flat roofs.

The roof will be provisioned with multiple rainwater outlets located strategically across the roof level of the building, ensuring adequate drainage is provided for the entire roof. The outlets from the roof level will discharge horizontally within the ceiling space below and continue to discharge externally to the building by way of vertical downpipes.

Pipes within the ceilings will be acoustically insulated where required to minimize noise transmission.

Once the roof water enters the civil stormwater trunk main system, it will reticulate directly to a newly constructed rainwater tank, where it will be stored for landscape irrigation and rainwater re-use purposes for the site.

The catchment from Oval 2 shall continue to discharge into the existing rainwater tank, with all irrigation infrastructure remaining. There will be no additional catchments directed to the existing rainwater tank.

The site is located in the inner-west suburbs of Sydney, where stormwater is directed to local council / authority drainage pipes. The stormwater drainage ends up discharging to three locations, Yeo Park from the southern site sub-catchments, Seaview Street from the northern sub-catchments and residual overland sheet flow from existing Headmaster's garden draining to Prospect Road carriageway. The discharge of the renewal project's roof water will have negligible effect on the local council's stormwater infrastructure. In addition, the project strategy for stormwater management includes flood mitigation and on-site detention prior to discharge to the council system.

5.7 Domestic Potable Hot Water

New centralised hot water plant will be located in a dedicated plant area on the roof level and will consist of a manifolded, gas fired continuous hot water plant, coupled with storage cylinders. The use of storage cylinders will buffer the peak demand and will be able to provide a limited supply of hot water during any un-planned outages.

It is being proposed that the hot water distribution loop be recirculated at 65 degrees Celsius (˚C) with a return velocity of no more than 1.0 m/sec. All hot water will be recirculated through the building on a distribution flow and return loop. All pipework shall be installed with thermal insulation of no less than 25 mm thickness.

Domestic hot water supply will follow the route of the cold water supply within the new building.

Generally, it is expected that 43.5 deg C water will take 20 seconds in a 10 m section of DN20 mm pipe to arrive at the tap outlet. Contrary, it will take approx. 8 seconds in a 10 m section of DN15 mm pipe.

Solar injection is not being proposed for this project.

5.8 Non Potable water

Non potable water within the new building will be fed from the proposed potable water mains via approved backflow prevention devices in accordance with AS3500.1:2015 and Sydney Water requirements.

- High hazard Zone: RPZD (Reduced Pressure Zone Device)

- Medium Hazard Zone: DCV (double check valve)
- Low Hazard Zone: Hose Connection Vacuum Breaker

Generally, the above devices will be supplied to plantrooms for connections to mechanical services plant and hose taps.

Note: Non potable water is not to be confused with rainwater reuse. Non potable water is downstream of a backflow prevention device and is for the purpose of preventing cross contamination

6 Advantages and Disadvantages

6.1 Advantages of current design

1. Traditional/conventional design approach allowing conventional construction methods to be used
2. Mitigated risk of contaminated water affecting building occupants
3. Efficient/economical layout of piping routes
4. Increasing collected rainwater for landscaped irrigation and re-use purposes

6.2 Disadvantages of current design

1. Community expectations to include solar collection integration for integration into the domestic hot water system
2. Limited contribution to overall building's ESD

7 Fixtures, Fittings and Tapware

Sanitary fixtures, fittings and tapware where nominated on architectural plans and room data sheets will be in accordance with whole of life cost, water/energy efficiency, W.E.L.S registration (5 star minimum), availability, ease of maintenance, aesthetic appearance and durability.

Table 3 below details the proposed water efficiencies for the project's fixtures.

FIXTURE	STANDARD RATING	PROPOSED EFFICIENT RATING
Basins	7.2 L/min	4.5 L/min
Sinks	13.2 L/min	6.0 L/min
Showers	12.0 L/min	7.5 L/min
WC (toilets)	6L full flush 3L half flush	Rainwater supply
Hose taps	20 L/min	Rainwater supply
Landscaped irrigation	Varies	Rainwater supply

8 ESD Initiatives

The following ESD measures are to be implemented into the design:

- Metering of water supplies including hot water metering;
- Increased thickness of thermal insulation on all hot water supply pipework; and
- Recyclable materials selection.

Additional measures that may be considered include:

- Solar contribution for water heating (minimum target to be a 50% annual solar gain)
  - Unlikely to be implemented
- Low voltage power generation by converting liquid flow, (either water supply or sewage) at authority points of connection, into energy
  - Unlikely to be implemented
- Grey water treatment and reticulation to building – limited to staff amenities
  - Unlikely to be implemented
- Black water treatment and reticulation
  - Unlikely to be implemented

Appendix A - Sydney Water Pressure and Flow Results

Statement of Available Pressure and Flow

Sydney WATER

Jamie-Lee MacDonald
24 Falcon Street
Crows Nest, 2065

Attention: Jamie-Lee MacDonald Date: 05/04/2019

Pressure & Flow Application Number: 620818
Your Pressure Inquiry Dated: 2019-03-14
Property Address: 119 Prospect Rd, Summer Hill 2130

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: Victoria Street	Side of Street: West
Distance & Direction from Nearest Cross Street	38 metres North from Holwood Avenue
Approximate Ground Level (AHD):	54 metres
Nominal Size of Water Main (DN):	150 mm Nominated Asset Number 2681869 / Test location 1

EXPECTED WATER MAIN PRESSURES AT CONNECTION POINT

Normal Supply Conditions	
Maximum Pressure	26 metre head
Minimum Pressure	17 metre head

WITH PROPERTY FIRE PREVENTION SYSTEM DEMANDS	Flow l/s	Pressure head m
Fire Hose Reel Installations (Two hose reels simultaneously)	0.66	17
Fire Hydrant / Sprinkler Installations (Pressure expected to be maintained for 95% of the time)	5 10 15 20 26 30 40	20 19 18 17 15 13 9
Fire Installations based on peak demand (Pressure expected to be maintained with flows combined with peak demand in the water main)	5 10 15 20 26 30 40	17 16 15 14 12 10 5
Maximum Permissible Flow	43	4

(Please refer to reverse side for Notes)

For any further inquiries regarding this application please email :

swtapin@sydneywater.com.au

Statement of Available Pressure and Flow

Jamie-Lee MacDonald
24 Falcon Street
Crows Nest, 2065

Attention: Jamie-Lee MacDonald Date: 05/04/2019

Pressure & Flow Application Number: 621065
Your Pressure Inquiry Dated: 2019-03-14
Property Address: 119 Prospect Rd, Summer Hill 2130

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: Seaview Street	Side of Street: North
Distance & Direction from Nearest Cross Street	85 metres West from Prospect Road
Approximate Ground Level (AHD):	41 metres
Nominal Size of Water Main (DN):	150 mm Nominated Asset Number – 2681881 / Test location 2

EXPECTED WATER MAIN PRESSURES AT CONNECTION POINT

Normal Supply Conditions	
Maximum Pressure	39 metre head
Minimum Pressure	26 metre head

WITH PROPERTY FIRE PREVENTION SYSTEM DEMANDS	Flow l/s	Pressure head m
Fire Hose Reel Installations (Two hose reels simultaneously)	0.66	26
Fire Hydrant / Sprinkler Installations (Pressure expected to be maintained for 95% of the time)	5 10 15 20 26 30 40 50	30 30 29 29 28 28 27 26
Fire Installations based on peak demand (Pressure expected to be maintained with flows combined with peak demand in the water main) Maximum Permissible Flow	5 10 15 20 26 30 40 50 67	26 25 25 24 23 23 21 20 17

(Please refer to reverse side for Notes)

For any further inquiries regarding this application please email :

swtapin@sydneywater.com.au

Statement of Available Pressure and Flow

Jamie-Lee MacDonald
24 Falcon Street
Crows Nest, 2065

Attention: Jamie-Lee MacDonald Date: 05/04/2019

Pressure & Flow Application Number: 621075
Your Pressure Inquiry Dated: 2019-03-14
Property Address: 119 Prospect Rd, Summer Hill 2130

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: Prospect Road	Side of Street: East
Distance & Direction from Nearest Cross Street	62 metres South from Hurlstone Avenue
Approximate Ground Level (AHD):	49 metres
Nominal Size of Water Main (DN):	100 mm Nominated Asset Number 2682713 / Test location 2

EXPECTED WATER MAIN PRESSURES AT CONNECTION POINT

Normal Supply Conditions	
Maximum Pressure	31 metre head
Minimum Pressure	17 metre head

WITH PROPERTY FIRE PREVENTION SYSTEM DEMANDS	Flow l/s	Pressure head m
Fire Hose Reel Installations (Two hose reels simultaneously)	0.66	17
Fire Hydrant / Sprinkler Installations (Pressure expected to be maintained for 95% of the time)	5 10 15 20	22 20 18 15
Fire Installations based on peak demand (Pressure expected to be maintained with flows combined with peak demand in the water main)	5 10 15 20	16 14 12 8
Maximum Permissible Flow	26	4

(Please refer to reverse side for Notes)

For any further inquiries regarding this application please email :

swtapin@sydneywater.com.au

Appendix B - Hydraulic Services Strategy Drawings

VICTORIA STREET

YEO PARK

OLD CANTERBURY ROAD

SEA VIEW STREET

Renewal project drainage to gravitate
to Prospect Rd authority connection

Sewer Pump Out station to receive discharge from Music building and Pavilion building

Existing property drainage to be upgraded due to age and condition of network. Augmentation is not envisaged

Existing Prospect Rd authority connection to remain

Oval 3
RL 47.675

Oval 2
RL 50.30

Loading

Max ramp 1:8

Driveway Ramp

Delivery

Driveway

Junior School Playground
427.5 sq.m

Agora
RL 50.30

Forecourt

Vehicular access

PROJECT NUMBER:	SY180989
DATE:	03.02.20
MARKUP:	Trinity Grammar School Hydraulic Services - Drainage Strategy H-SK-001

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0 10 20 30 40

PMDL ARCHITECTURE INTERIORS MASTERPLANNING

Plan-Level 0 (Ground)

Trinity Grammar School

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Existing water meter, backflow and booster pump to remain

Construction of pipework shown clouded to be outside renewal project structural zone of influence

Existing DN100 water supply to remain

Existing water supply branch line to be augmented. Construct new DN100 supply as shown

Construct new DN100 supply as shown. Design intent - remove existing DN 50 supply from Prospect Rd and construct new DN100 ring main connecting onto 2 x branch lines. Ring main to reticulate around renewal project area of works

Construct new DN100 branch line to be capped for future connection. Founders building and Admin building to be connected to branch line (ring main)

Existing DN50 water supply to remain during early stages. Buildings to be periodically disconnected from DN50 supply and reconnected to DN100 ringmain

VICTORIA STREET

YEO PARK

OLD CANTERBURY ROAD

SEA VIEW STREET

Victoria Rd axis

Oval 3
RL 47.675

Oval 1
RL 46.00

Loading

Max ramp 1:8

Driveway Ramp

Delivery

Driveway

Junior School Playground
427.5 sq.m

Agora
RL 50.30

Forecourt

Vehicular access

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PROJECT NUMBER:	SY180989
DATE:	01.07.19
MARKUP:	Trinity Grammar School Hydraulic Services - Water Strategy H-SK-002

N

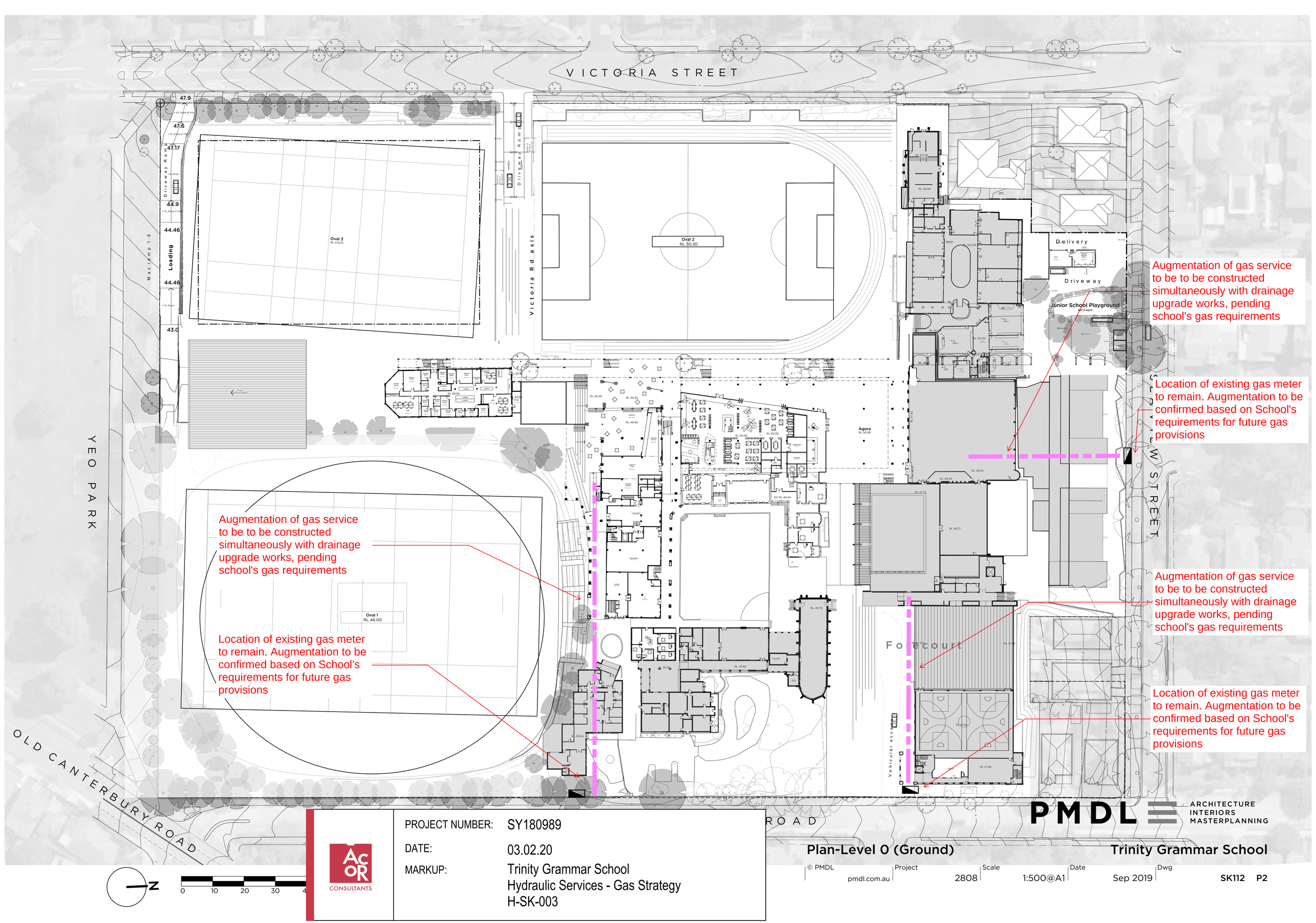
0 10 20

PMDL ARCHITECTURE INTERIORS MASTERPLANNING

Plan-Level 0 (Ground)

Trinity Grammar School

pmdl.com.au | Project 2808 | Scale 1:500@A1 | Date Sep 2019 | Dwg SK112 P2



PROJECT NUMBER: SY180989

DATE: 03.02.20

MARKUP: Trinity Grammar School
Hydraulic Services - Gas Strategy
H-SK-003

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PMDL ARCHITECTURE INTERIORS MASTERPLANNING

Plan-Level 0 (Ground)

Trinity Grammar School

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