



Forest High School, for SINSW Schematic Design Report

Revision	Date	Description	Author/s
0	09.05.2022	Preliminary	MS
1	10.05.2022	Master Planning report issue	MS
2	08.06.2022	Master Planning Options (revised)	MS / SF
3	09.09.2022	Schematic Design Report (1 st issue)	MS
4	28/09/2022	Schematic Design Report	MS
5	29/09/2022	Schematic Design Report	MS

The reader's attention is drawn to the following important information:

Exclusive Use

This Report should be read in its entirety and must not be copied, distributed, or referred to in part only. The Report must not be reproduced without the written approval of the author. This Report (or sections of the Report) should not be used as part of a specification for a project or for incorporation into any other document without the prior agreement of erbas™.

Data displayed and any calculation herein are based solely on information made available to erbas™ at the time of preparing the Report.

The passage of time; unexpected variations in ground conditions; manifestations of latent conditions; or the impact of future events (including & without limitation) changes in policy, legislation, guidelines, scientific knowledge; and changes in interpretation of policy by statutory authorities; may require further investigation or subsequent re-evaluation of the content and determinations made herein.

This Report can only be relied upon for the intended purpose. The Report does not purport to recommend or induce a decision to make (or not make) any purchase, disposal, investment, divestment, financial commitment or otherwise.

It is the responsibility of the Client to accept (if the Client so chooses) any Conclusions contained within the Report and implement them in an appropriate, suitable, and timely manner.

In the absence of written consent of erbas™, no responsibility is accepted for the use of the Report in whole or in part by any party other than the Client for any purpose whatsoever. Further, any use which a third party makes of this Report or any reliance on (or decisions to be made) based on this Report is at the sole risk of those third parties without recourse to erbas™.

Copyright

erbas™ retains all rights to written and graphic materials used in the report. No part may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the prior written permission of erbas™.

Contents

1 Revision 3, summary of updates4

2 Scope & objective4

3 Project site.....5

4 Limitations5

5 Applicable documents5

6 Sources of information.....6

7 Scope of Services.....6

8 Cold Water services.....6

9 Hot water services.....7

10 Gas services.....9

11 Sewer, drainage & vents.....10

12 Rainwater, catchment and reuse.11

13 Fire hydrant system11

14 Fire hose reel services12

15 Fire sprinkler protection13

16 Portable fire extinguishers and fire blankets13

17 Fire Detection and Occupant Warning13

1 Revision 3, summary of updates

The report required some minor explanatory notations and expanded design commentaries as listed below and updated within the report body herein,

- The hydrant and sprinkler protection approach. With the resolution of the design alterations for the options of the Equitable Access outcome.

This report outlines the extent of building engineering services proposed for the Project within our agreed scope. The objective of this report is to define the overarching design parameters and intent of our approach for the design of the following building services:

2 Scope & objective

This report outlines the extent of building engineering services proposed for the Project within our agreed scope. The objective of this report is to define the overarching design parameters and intent of our approach for the design of the following building services:

- Hydraulic and Fire Services (sanitary plumbing, sewerage, domestic hot and cold water, natural gas, rainwater harvesting, fire hydrants, fire hose reel, fire sprinkler systems and fire and smoke detection systems).

The project development includes the design of a new high school located on the corner of Allambie Road & Aquatic Drive Frenches Forest.

The project consists of,

- library,
- science building,
- TAS building,
- SSU building,
- admin and staff building,
- performance and fitness building,
- gymnasium, and
- sports facilities.

For the purposes of this report it has been asserted the BCA 2019 is relevant for the project. The building has multiple BCA classifications storeys / part storeys including,

- Class 5 offices,
- Class 6 café areas,
- Class 7a car parking,
- Class 7b storage and
- Class 9b school and assembly buildings.

The project is seeking compliance with BCA 2019 and its associated referenced Standards alongside the Education and Facilities Guidelines as is required for the project.

DfMA elements will also contribute to the services designs and necessary inground reticulations of the services for the site.

The information within this report has assumed optimal use of available site information whilst also considering the regulatory requirements, client driven design guidance, best practice industry guidelines and other SINSW projects by comparison.

The main considerations we have applied at this early stage are,

- Creating a non-intrusive services strategy that does not negatively affect circulation or amenity,
- Developing a service strategy that explores options of sustainable outcomes and compliments the Environmentally Sustainable practices that will be integrated into the site through the design and construction process.
- Providing a services strategy that is adaptable and provides options for future expansion and site flexibility.

The information contained within this report has been prepared by erbas™ engineers to detail the services and infrastructure strategy for the proposed works. The overall intent of this report is to provide an overview of the services strategy, and to create an agreeable infrastructure methodology for the project.

3 Project site

The proposed Forest High School is in the suburb of Allambie Heights on Sydney's Northern Beaches and is accessed by Allambie Road from the North & South (also Aquatic Drive from the West). The school has multiple existing buildings on the site which in turn will be demolished and is surrounded on its northern & eastern boundaries by private residences. The sites Southern Boundary consists of commercial offices each accessed from Allambie Road.

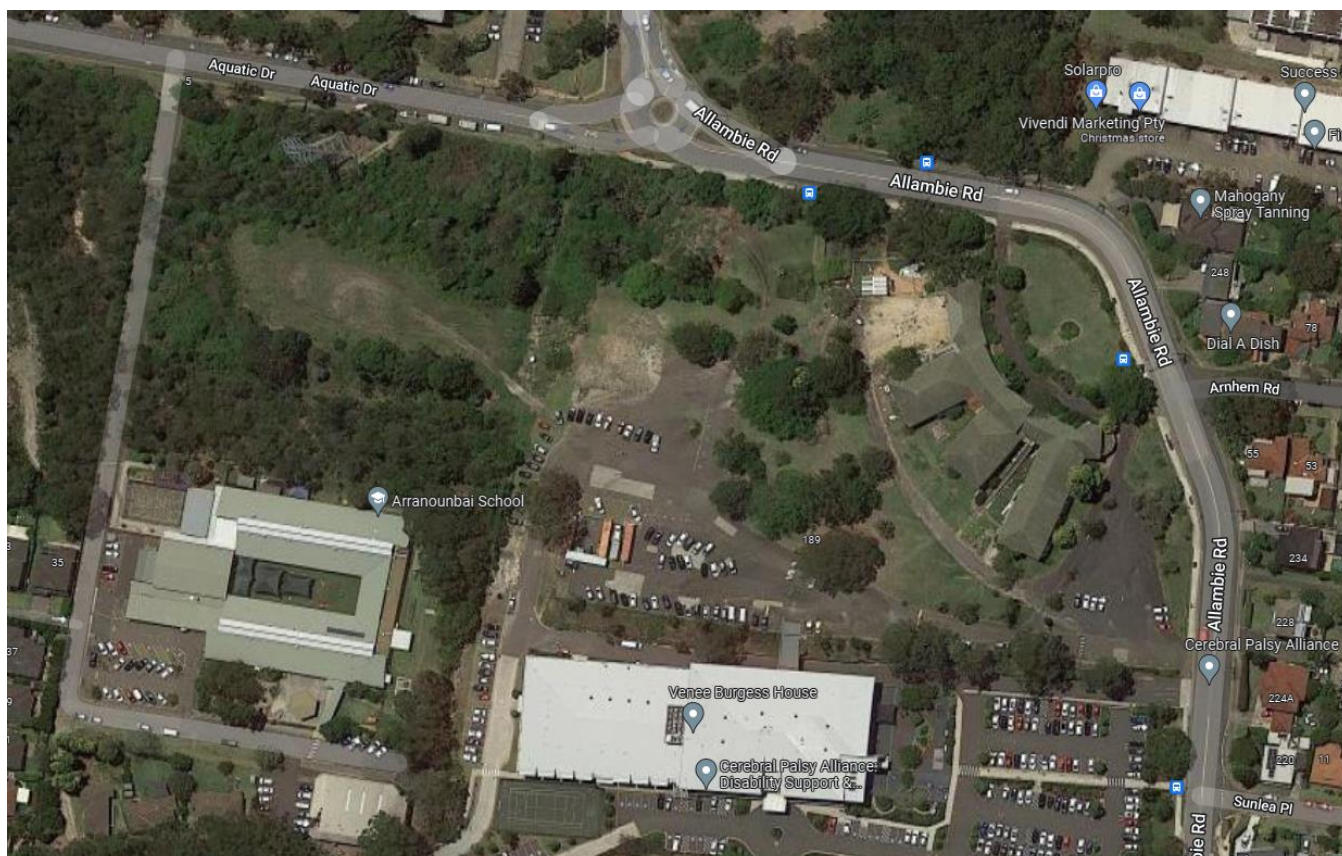


Image 1, Satellite image of the site

4 Limitations

The design approach for each of the building services disciplines is based upon preliminary planning solutions and master plan layouts.

This report does not currently incorporate the project specific requirements of fire engineering constraints which may be required for this project unless explicitly stated.

This report does not incorporate any requirements of the project that may be imposed as part of the planning conditions unless explicitly stated.

5 Applicable documents

It is assumed that the following standards will be applicable throughout the project:

- National Construction Code Building Code of Australia 2016;
- New South Wales Statutory Regulations;
- Educational Facilities Standards and Guidelines (EFSG);
- Relevant Australian Standards including but not limited to AS 2419.1, AS2441, AS2444, AS 3666, AS1432, AS3500, AS 5601 etc.;

6 Sources of information

This report is based upon the information available from the project brief and subsequent correspondence, meetings and available existing information/drawings ascertained from the Client and non-intrusive site inspections.

This report shall be read in conjunction with the architectural drawing package issued as current at the date of this report.

7 Scope of Services

Hydraulic services for these works shall be provided in accordance with the National Construction Code, relevant Australian Standards, and any fire safety engineered solution.

Services will include:

- Fire hydrant system
- Fire hose reel services
- Fire and smoke detection systems
- Cold water services
- Rainwater Re-use service
- Hot water services to serve areas of admin, staff, canteen, and ambulant amenities
- Sewer, drainage & vents
- Grease trade waste and vent
- Rainwater gutters and downpipes

8 Cold Water services

The site has access to two water mains of differing sizes and pressure profiles. Each are available to the site with one being more advantageous than the other.

The first water main option is by connection to the main that runs north south along Allambie Road as illustrated in image A below. This main offers a better hydraulic performance than option 2 due to its elevation and recorded performance shown on the Sydney Water Pressure and Flow Statement.

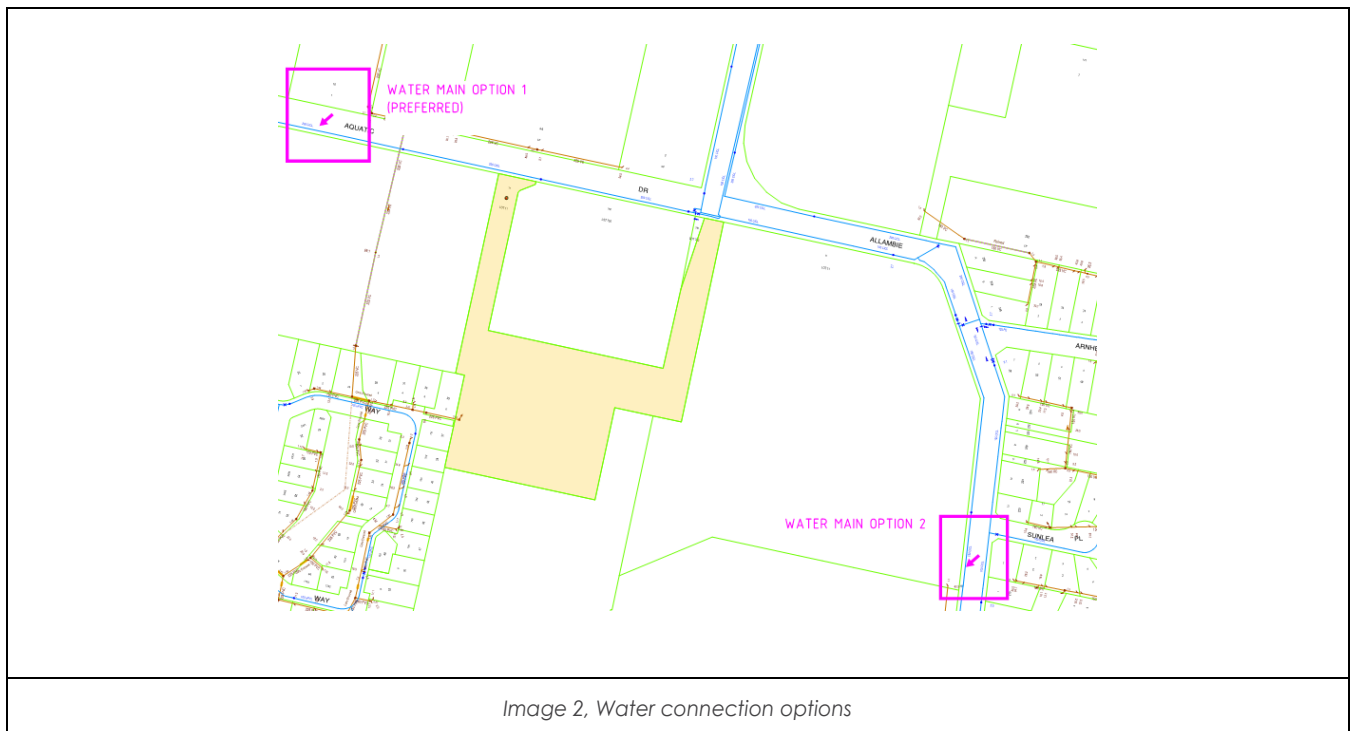


Image 2, Water connection options

To attain a consistent pressure from the supplying main of 350kPa at the most disadvantaged fixtures for the site a pressure pump is recommended. A triplex style pump would allow the pressure to be modulated efficiently and smoothly by utilising variable speed drives. This pump configuration allows each pump to interchange the duty as supply demands it and extend the life of each driver by allowing each to maintain a lower pump efficiency as it is assisted by the others.

This style of pump set also allows redundancy for maintenance as one pump can be serviced independent of the others allowing the remaining two to stay in service during maintenance.

This pump set would likely be located within the carpark storage areas underneath the proposed playing fields and requires a space of not less than 1500mm length, 600mm in width and standing 1200mm in height.



Image 3, Triplex potable water pump set

Water metering will be required on both potable and non-potable water supplies to ensure adherence to any sustainability initiatives and regulatory requirements. Meters will be installed in line and upstream of any main pressure raising devices. Volumetric water meters will be preferred as they offer a simplistic and robust technology that complies with the regulatory requirements. Meters come complete with the ability to provide data outputs and can be easily integrated into the Sustainability requirements for metering and monitoring.



Image 4, Data output water meter

9 Hot water services

Hot & warm water services will be provided to all ablutionary fixtures, staff sinks, and other commercial plant areas as required by the scope. In staff areas point of use boiling water units will be provided and each will be equipped with appropriate child safety lock out devices and thermostatic controlling devices as appropriate and required by regulation.

Preference will be given to single system flow and return reticulation to serve multiple areas. In the first instance Heat Pump will be assessed for efficiency and to provide an effective solution where two buildings or larger use hot water requirements are stipulated for the project. These can be supplied with a primary heat source of electric or gas. This can be further resolved with input from the engineering and sustainability teams.

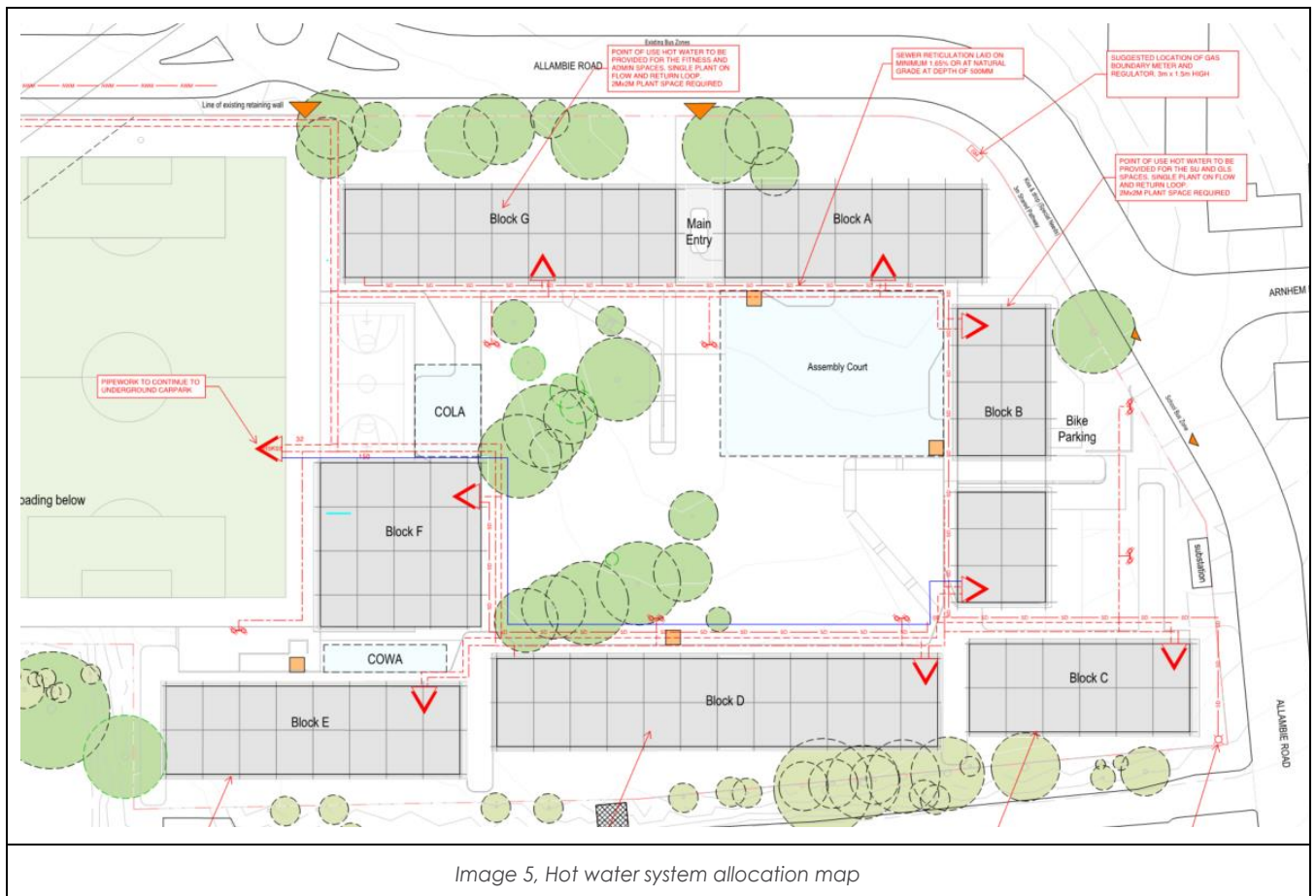
Single fixture point of use hot water provides challenges for sustainability should it be required on the project. For example, a staff sink or cleaners room isolated from other main amenities on the floor plate may require 50C hot water and not be within an economical distance to reticulate a flow and return

system. In this instance single fixture continuous flow electrical hot water units, or isolated small capacity electric hot water cylinders could be utilised.

The site has natural gas available and currently there is good economy to providing continuous flow units to larger hot water areas of demand like the Food Tech Hub and the adjacent amenities block at the south of the site. The table below corresponds with the site image and provides an indicative approach to the hot water strategy.

Each of these approaches need to be tested and discussed and remain provisional until further interrogation of the room layouts and potential demands become known.

Area (as marked on Image below)	Hot water approach
G & A	Common water service served by Heat pump and circulating flow and return system
B	Point of use approach, providing individual source hot water via small electric hot water units locally mounted.
C	Point of use approach, providing individual source hot water via small electric hot water units locally mounted.
D	Common water service served by Heat pump and circulating flow and return system
E	Potentially the largest demand requiring common water service served by Heat pump and circulating flow and return system, or continuous flow gas may need to be assessed if space allocation is problematic at this location.
F	Common water service served by Heat pump and circulating flow and return system



10 Gas services

Natural gas is available to the site via a 40mm medium pressure main located on the northern boundary. This being located on the southern side (Project side) of Allambie Road is beneficial for the project in terms of cost and convenience.

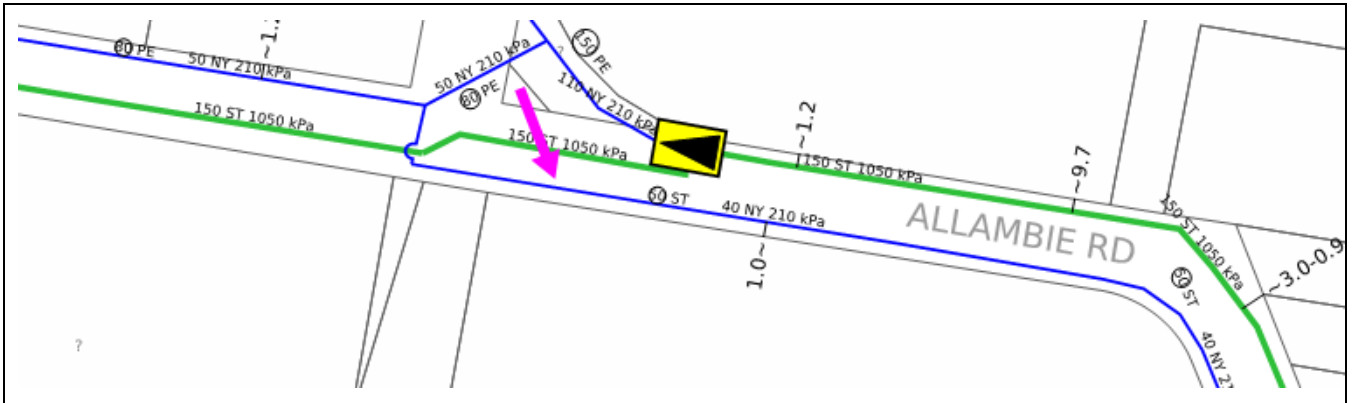


Image 6, Natural Gas network diagram

Immediately downstream of the connection point will require a gas meter and boundary regulator to drop the supply pressure and enable the inground reticulation to be made within the site and requires a space of not less than 1200mm length, 1200mm in width and standing 1500mm in height.



Image 7, Natural Gas boundary meter, regulator & enclosure

11 Sewer, drainage & vents

The existing sewer connection is anticipated to be retained in place. All other existing new sewer drainage will reticulate to serve the proposed buildings. The new sewer drainage will connect to new waste fixtures and reticulate to the existing sewer connection on the south eastern corner at the boundary of the site.

A new sewer overflow relief gully will be provided, and the sewer system shall include connections to all plumbing fixtures and equipment including associated traps, vents and fittings.

Drainage vents will extend to roof and terminate through roof to atmosphere within each building.

Condensate drainage will be provided to collect condensate from the designed mechanical units.

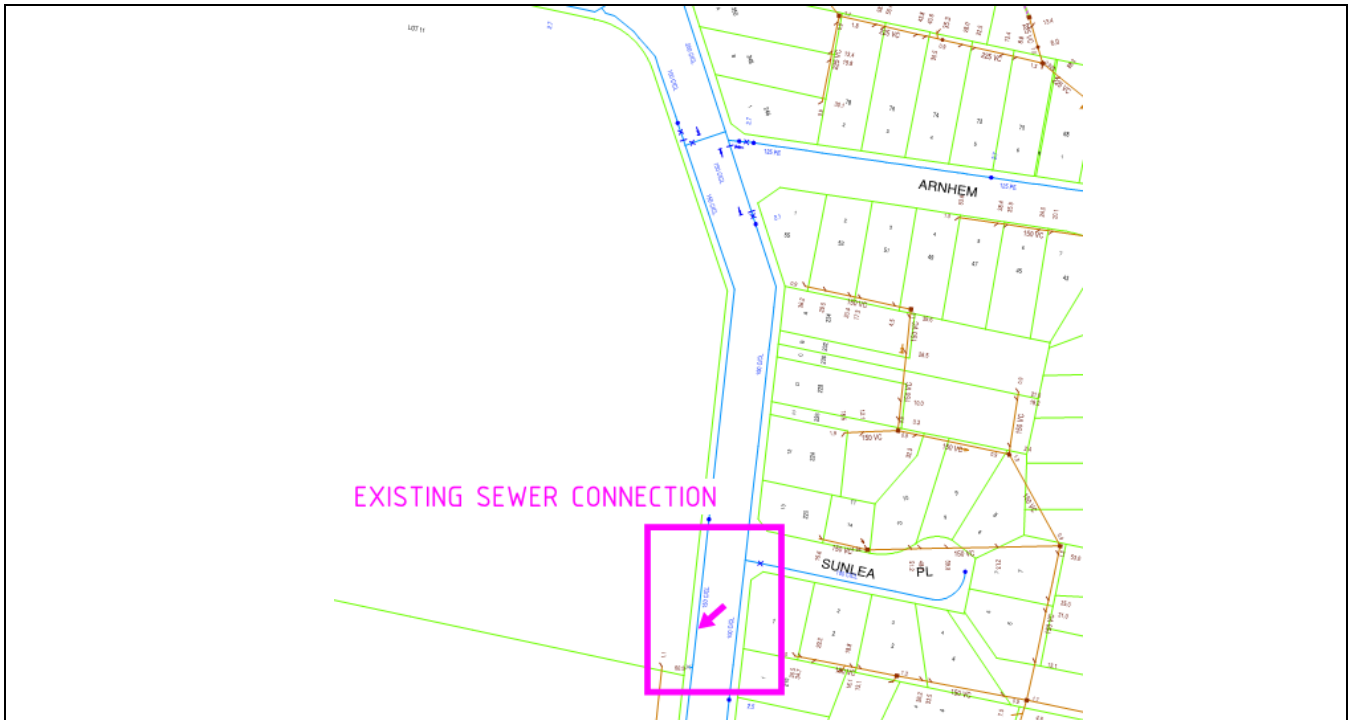


Image 8, location of existing sewer connection

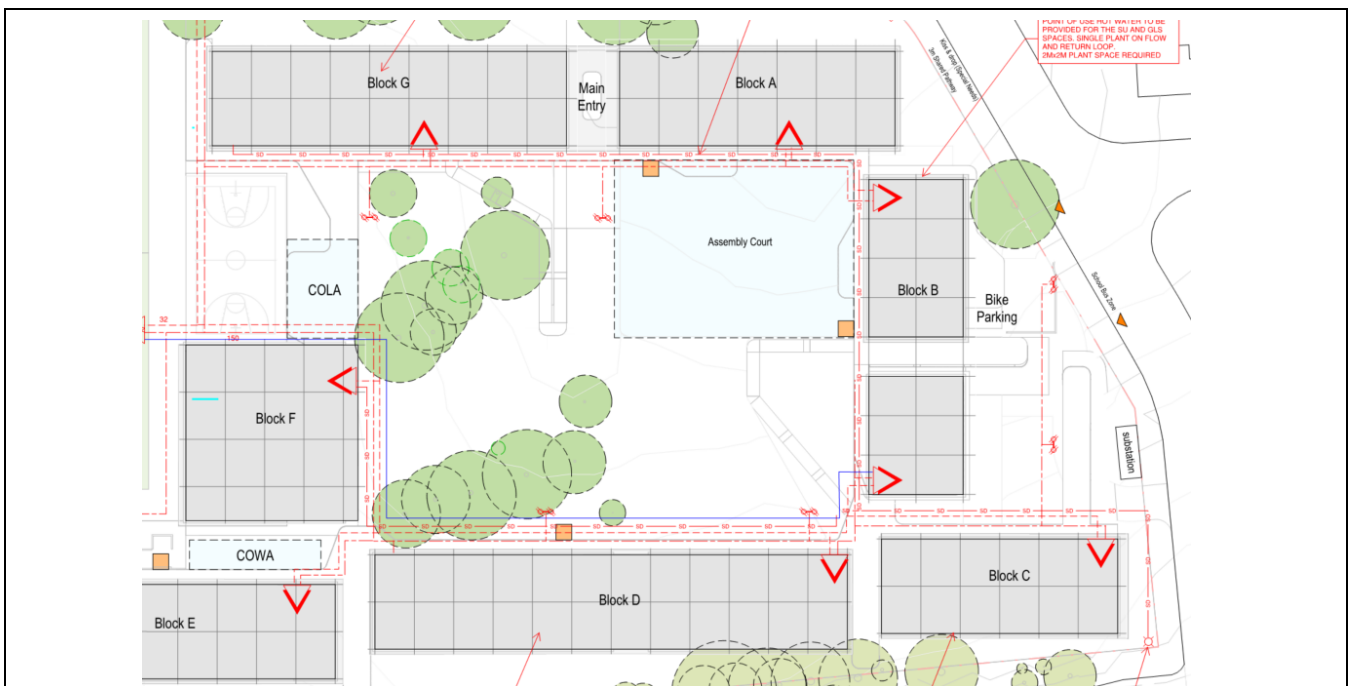


Image 9, current drainage concept showing consolidated trenching

Any area generating what is classified by Sydney Water as contaminated waste under their operating guidelines will require a pre-treatment device to be installed immediately downstream of the equipment discharging waste to the sewer system. Pre-treatment essentially filters grease and other foreign matter from the wastewater via an interceptor or arrestor.

Detailed process information will be needed during the detailed design to confirm the exact type and style of pre-treatment required. We understand at this stage it can be safely assumed that an inground grease arrestor of 1500L will be required and be positioned on the southern external perimeter of the Food Tech hub and Canteen.



Image 10, Example of an Above ground Grease Arrestor displayed for fitting example. Below ground grease arrestors are preferred.

12 Rainwater, catchment and reuse.

Rainwater falling on open and non-trafficable roof catchments will be directed to rainwater storage tanks around the site to be targeted for reuse in line with the sustainability initiatives for the site.

Opportunities exist at the site to utilise the lands grade to consolidate the number of rainwater tanks around the site by providing a single underground tank. This may be combined with the Civil detention tank (if required).

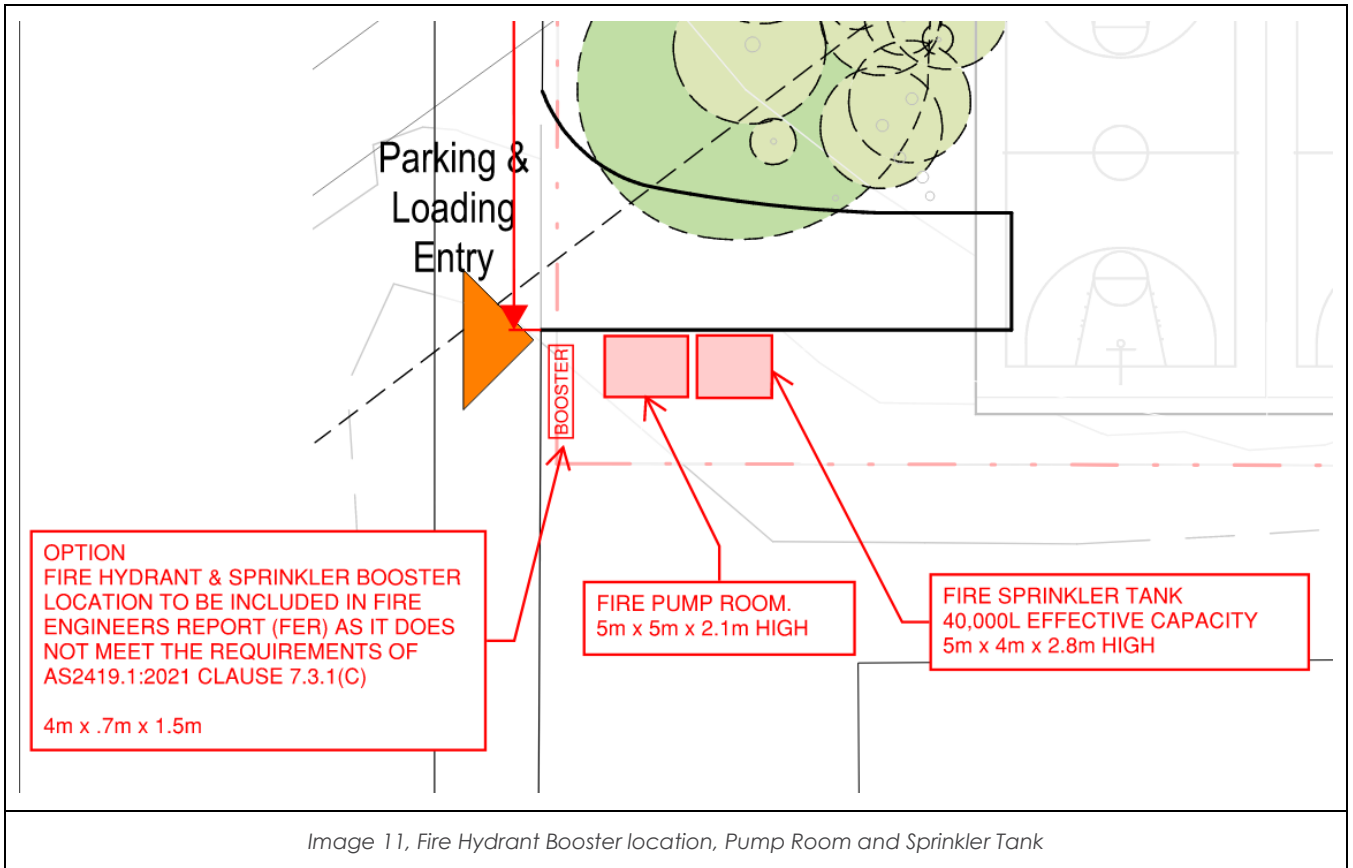
Once captured this water will require sediment control and filtration to enable it to be suitable for its intended use around the site. The water supply will require pressure pumping and inground site reticulation to ensure the extents of landscape and any other uses identified as preferred by the sustainability Team and/or Council have been accounted for.

Further information and input will be required from the Sustainability Team and the Landscape designers to establish a water balance calculator to ensure a logical and efficient balance between water capture and potential reuse is achieved.

13 Fire hydrant system

A new fire hydrant booster assembly, fire hydrant pump and reticulated pipework to be installed as required to serve the proposed buildings. The system is currently concept developed to achieve adequate hydrant coverage utilising a network of external hydrants around the site.

The current documented location of the Booster assembly is located adjacent to the principal vehicular entry as required by the performance standard. This is illustrated in the below image. Deviation from this location will require further technical input from the project Fire Engineer via an engineered solution.



The combined hydraulic and fire performance of the water main requires water to supply @ 32l/s whilst retaining a minimum pressure of 250kPa to the fire hydrant system. The water main at the Aquatic Drive entry cannot supply this performance unassisted and the site will require a hydrant pump to assist the required pressure to be achieved. A fire hydrant and fire sprinkler pump room requires 5m x 5m x 2.1m high (clear internal space) at a location that satisfies the following regulatory requirements.

- local to brigade booster valve,
- direct egress (2hour fire rated) to road or open space via fire isolated passage as per AS2419.1-2005, clause 6.4.2(a),
- double outward opening doors,
- airlock or smoke lobby that leads to a fire isolated passageway, entry from a common space

Supplementary water supply storage is not required for the site as the main has ample flow to facilitate the required water quantity for the systems on the site.

The location of the Fire Hydrant Booster to be incorporated into the Fire Engineering Report (FER)

14 Fire hose reel services

Under BCA classifications, 9b classrooms do not need hose reel coverage. Fire hose reels are to be provided in other areas as required in accordance with the NCC

Fire hose reel coverage can be achieved by ensuring all areas of the floor on which it serves can be adequately reached by hydrants with a 36m hose length and four (4) meters nozzle spray, where the hose extends at least one (1) meter into the room it is covering.

15 Fire sprinkler protection

As defined by the requirements of the National Construction Code, and the supporting technical standard AS2118 the vehicle space allocation within the proposed carpark exceeds 40 therefore, an OH2 hazard class system will be required for the extents of the carpark located beneath the playing fields.

A separate sprinkler booster will be required adjacent to the hydrant booster (currently located adjacent to the principal vehicular entry).

A separately located main sprinkler control valve will be sited within the project's sprinkler protected area. This shall be located with ground floor access in a location accessible from open space (i.e. not behind locked doors).

16 Portable fire extinguishers and fire blankets

Portable fire extinguishers and fire blankets shall be provided throughout in accordance with AS2444-2001 and NCC 2019 E1.6. Classrooms are required to have extinguishers and fire blankets in to AS2444 and Education Facilities Standards and Guidelines (EFSG – 573)

17 Fire Detection and Occupant Warning

The design has incorporated the specific advice of the PCA and the determinations of lass and height as applicable to the project.

Further analysis of the class and usage is being undertaken to ensure the correct performance provision is incorporated into the project mechanical intake systems will be needed to ensure adequate localized all detection and occupant warning systems will be supplied to meet with compliance of AS1670.1.

Sydney

Level 1,
15 Atchison Street
St Leonard's NSW 2065
+612 9437 1022

Melbourne

Level 3,
116 Hardware Street
Melbourne VIC 3000
+613 9111 2290

Manila

Suite 2403, Union Bank Plaza
Meralco Avenue Ortigas Centre
Pasig City Philippines 1605

general@erbas.com.au | erbas.com.au | erbasSUSTAIN.com.au



green building council australia
MEMBER 2019-2020

