SERVICES INFRASTRUCTURE REPORT

UNITING EDINGLASSIE STAGE 2 ILU REDEVELOPMENT

ELECTRICAL, FIRE & HYDRAULIC SERVICES

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Title	Services Infrastructure Report
Project	Uniting Edinglassie Stage 2 ILU Redevelopment
Description	Hydraulic, Fire and Electrical Services
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1. EXISTING INFRASTRUCTURE

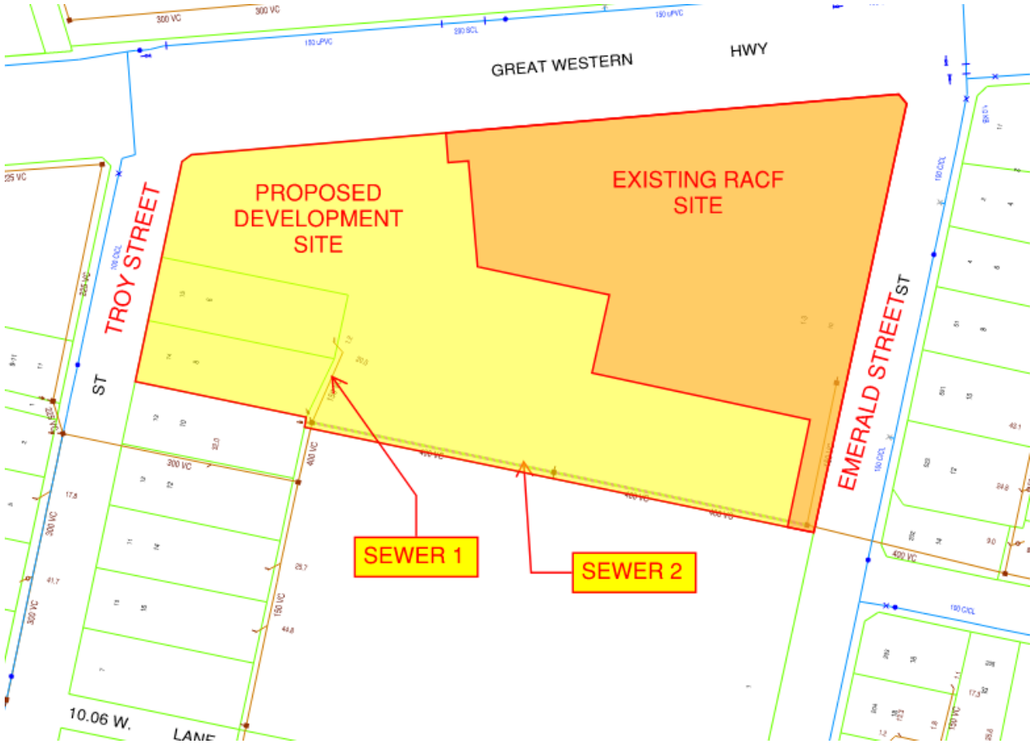
1.1 HYDRAULIC INFRASTRUCTURE

1.1.1 SEWER DRAINAGE

The site is serviced by the following authority sewer mains which extend through the site, as per the following:

- Ø150mm authority sewer main extending through the southern portion of the site (Sewer 1);
- Ø450mm authority sewer main extending through site adjacent to the southern boundary (Sewer 2)

The diagram below illustrates the surrounding authority sewer mains:



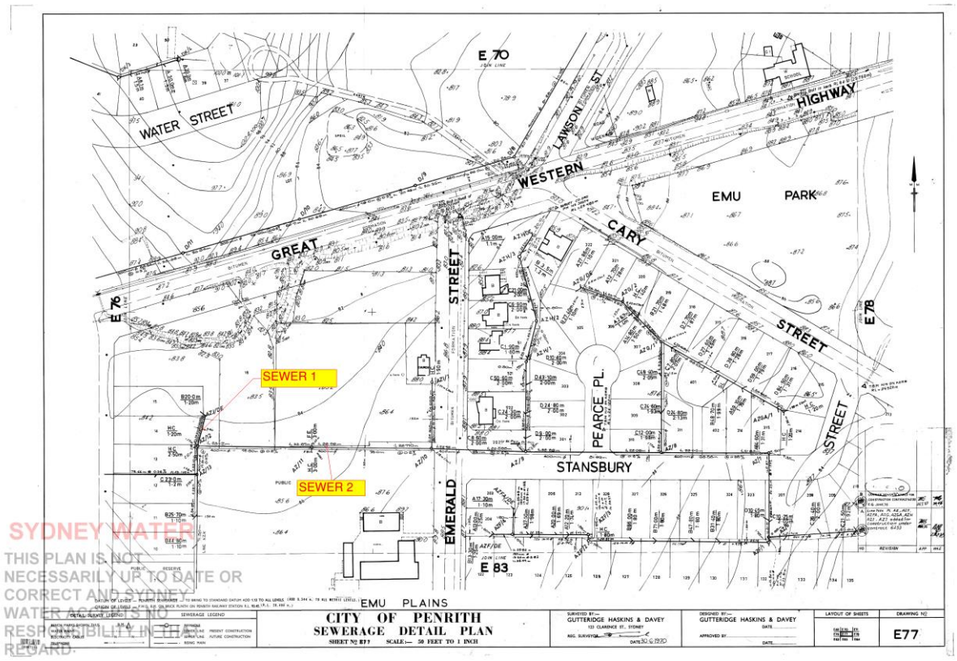
DBYD – Sydney Water hydromap (sewer infrastructure)

The existing RACF has an independent sewer connection to the sewer main within the site confines and will not be affected by the development.

Sewer 1 will need to be deleted from the two lots that t is currently serving.

Sewer 2 has been concrete encased and any adjacent structures will require the structural loads for the buildings to be transferred to below the zone of influence of the sewer main in accordance with standard Sydney Water requirements.

We note that these sewer mains were installed circa 1970 and were not originally under the ownership of Sydney Water but The City of Penrith Council. We are not aware of when the transfer to Sydney Water responsibility occurred. A copy of the original design/Work as Executed plan is included below.



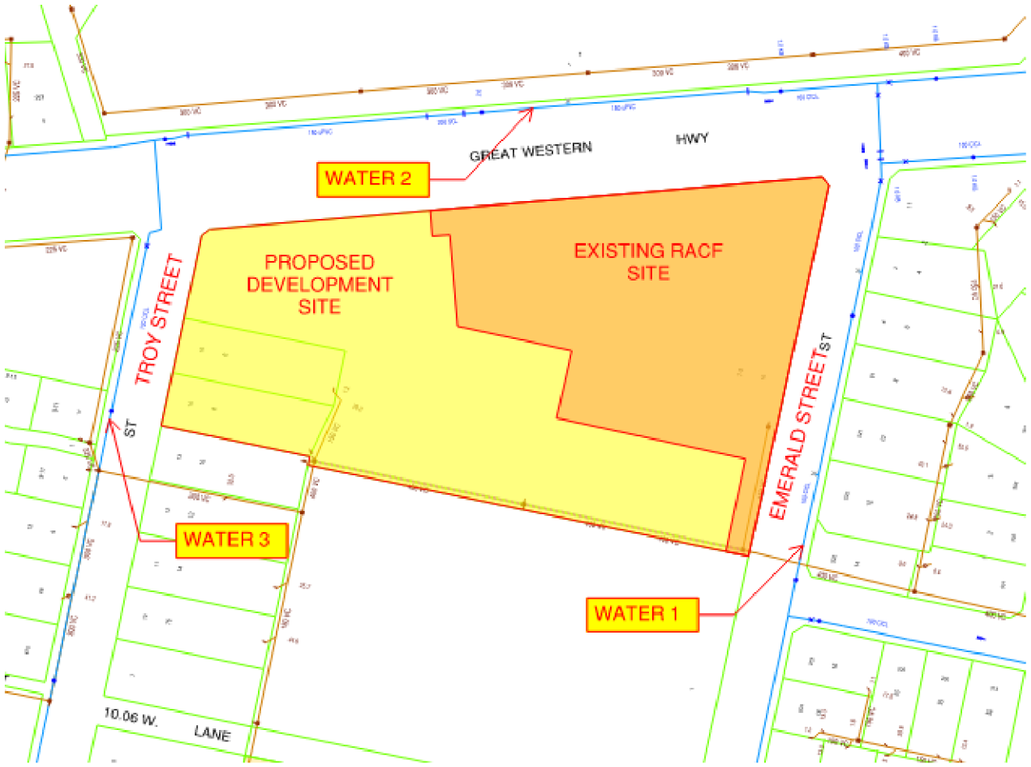
Existing Sewer Infrastructure-City of Penrith Sewer Details.

1.1.2 POTABLE WATER

The existing site has frontage to the following authority water mains:

- Ø100mm CICL main in Emerald Street (Water 1);
- CICL main in Great Western Highway (Water 2 of varying sizes – 100, 150 & 200); and
- Ø100mm CICL main in Troy Street (Water 3)

The diagram below illustrates the surrounding authority water mains:



DBYD – Sydney Water hydramap (water infrastructure)

The available Sydney Water Pressure and Flow Statement for Emerald Street is attached, and a new updated certificate will be obtained.

Available pressure and flow certificate for Emerald Street

The existing RACF development is serviced from the water main in Emerald Street. This services the RACF and is fitted with a booster pump to achieve required minimum pressure within the development.

The cold water service for the new ILU development will be extended from the Emerald Street connection on the boundary, to supply the fixtures and fittings as required.

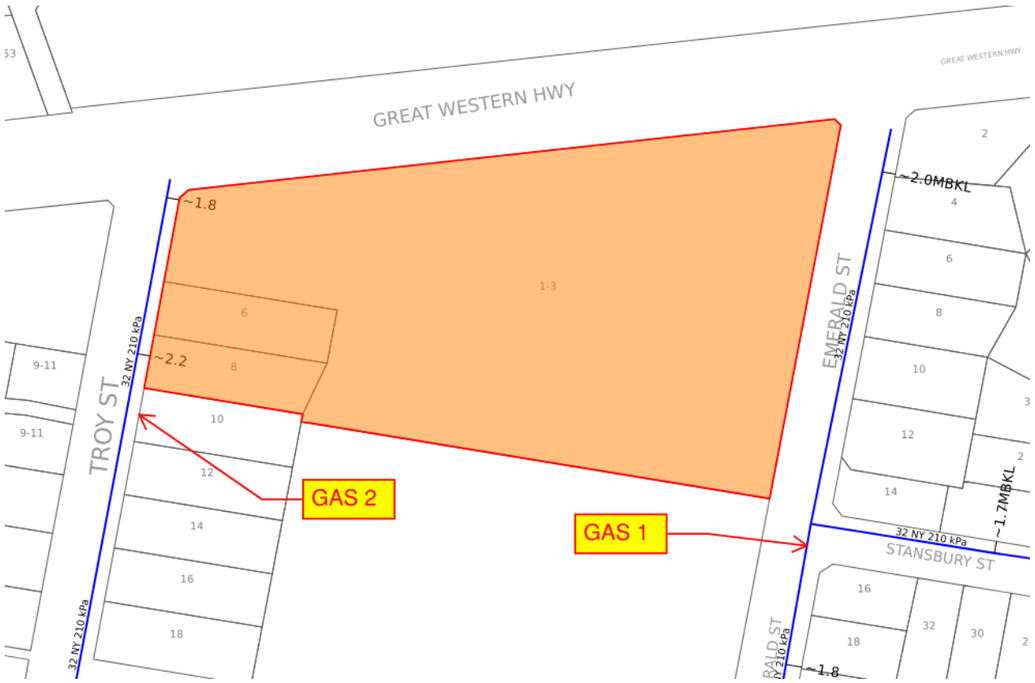
The RACF and surrounding area is serviced from the fire hydrant booster valve and pump assembly located in the southeast corner on the Emerald Street frontage. There was an extension from this service installed for extension to the ILU development terminated adjacent to the southwestern corner of the RACF building.

1.1.3 GAS SERVICES

The existing site has frontage to the following authority natural gas mains:

- Ø32mm NY, 210kPa main in Emerald Street (Gas 1); and
- Ø32mm NY, 210kPa main in Troy Street (Gas 2).

The diagram below illustrates the location of the authority gas mains:



DBYD – Jemena natural gas plan

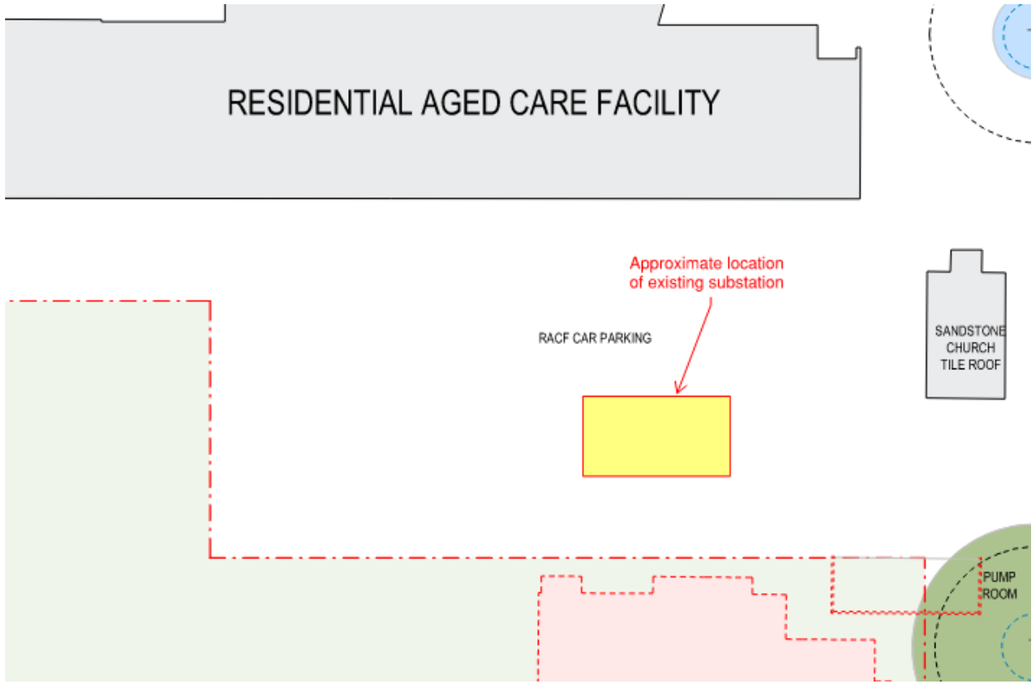
There is an existing gas service connection and associated pressure regulator and meter assembly located in the southeastern corner of the site on the Emerald Street frontage. This service feeds the existing RACF.

No gas is required for the new ILU development.

1.2 ELECTRICAL AND COMMUNICATIONS INFRASTRUCTURE

1.2.1 EXISTING SUBSTATION

The site is currently supplied from an existing substation located on the southern side of the residential aged care facility (RACF). The figure below indicates the location of this existing substation.

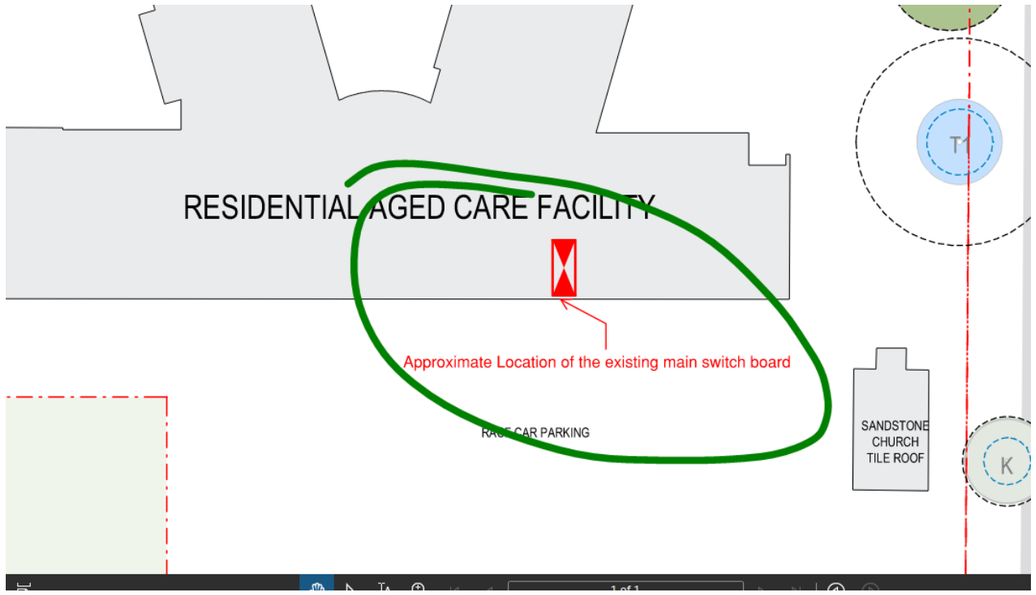


Existing Substation Location Sketch

This existing substation will be retained to feed the existing facilities including Residential Aged Care Facility and chapel.

1.2.2 EXISTING MAIN SWITCHBOARD

The existing main switchboard located in the Residential Aged Care Facility (RACF) is currently feeding the entire site. The below figure indicates the location of this existing site main switchboard.



Existing Main Switchboard Location Sketch

Existing Main Switch Board

This main switchboard is located outside the stage 2 zone. The main switchboard has to be retained during the work. Existing buildings under demolition in stage 2 are currently fed from this existing main switchboard in the Residential Aged Care Facility (RACF) building. Contractor to ensure the disconnection, removal and isolation of redundant services and make good for this existing main switchboard.

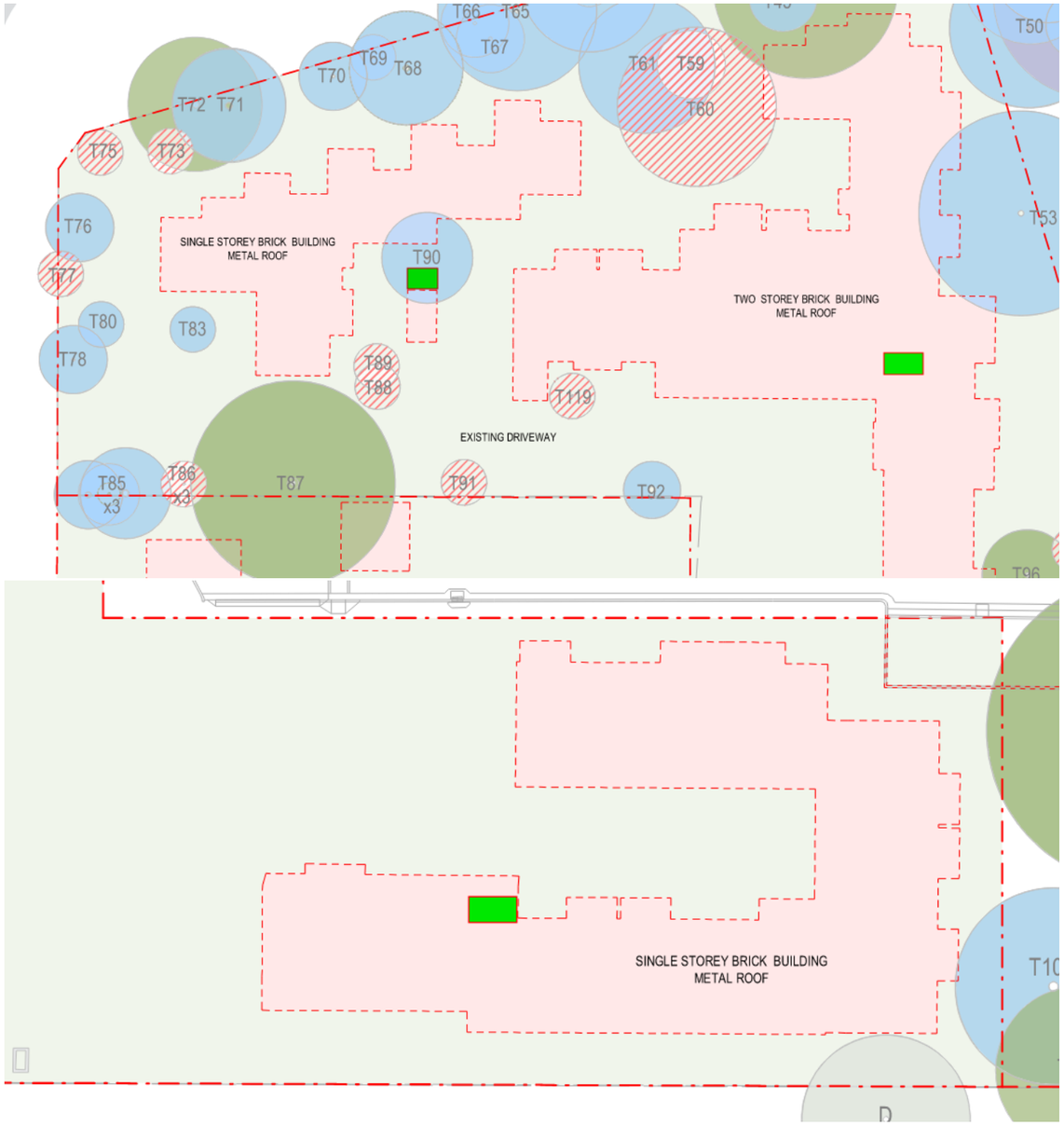
All new stage 2 buildings will be fed from a new substation and a new main switchboard.

1.2.3 METERING

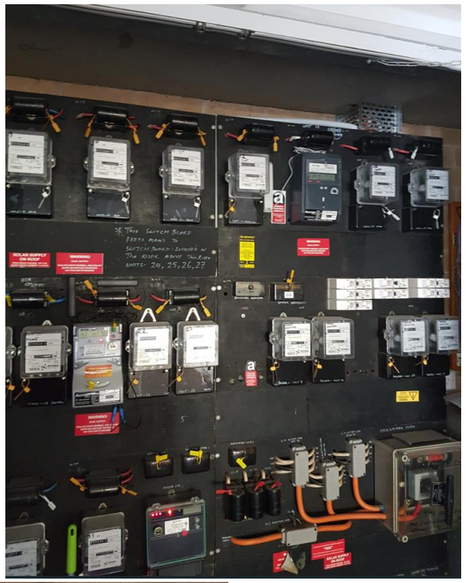
The site electricity network is within Endeavour Energy's jurisdiction and the existing site NMI (National Meter Identifier) number is 4311371547. This authority meter is in the current main switch room within the Residential Aged Care Facility (RACF) building. This meter will be retained.

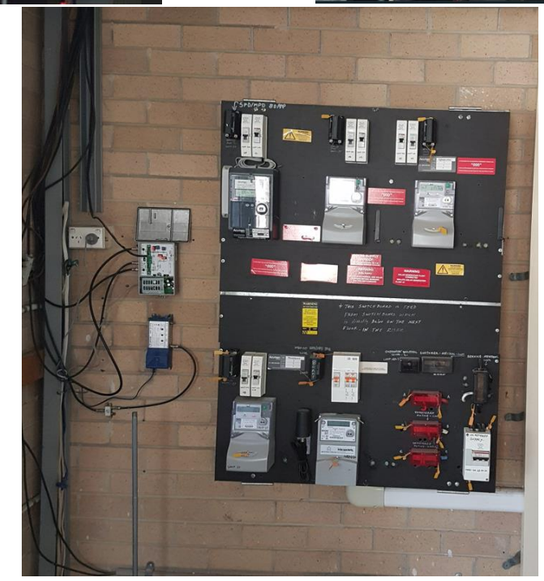
Authority Metering

The existing meters for buildings under demolition in stage 2 work are located within demolition area. Below figure indicates the approximate location of these existing meters.



Existing Meters locations





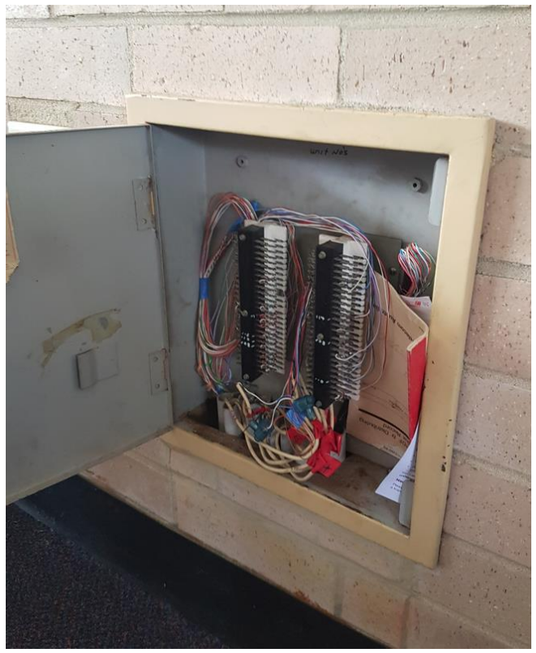
Existing Meters

These meters will be demolished under stage 2 work. Contract to ensure the removal, disconnection and isolation of the equipment and make good.

1.2.4 EXISTING MAIN DISTRIBUTION FRAME (MDF) AND SINGLE DISTRIBUTION FRAME (SDF)

The existing main distribution frame (MDF) is in Block B foyer area. Each block inside the stage 2 demolition zone has its own dedicated single distribution frame (SDF) connecting back to the Main distribution frame (MDF) in the centre like a star style.

Main Distribution Frame (MDF)



Example of Single Distribution Frame (SDF)

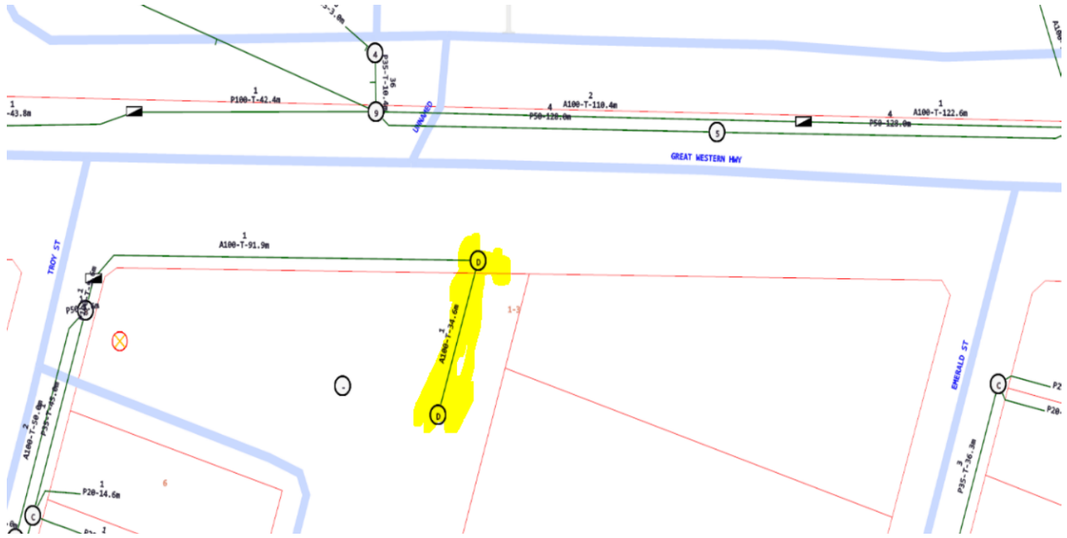
The existing main distribution frame (MDF) shall be relocated as indicated by the Uniting IT department. The exact proposed location of the existing main distribution frame (MDF) requires further confirmation with the Uniting IT department.

1.2.5 EXISTING NBN SERVICE

The existing NBN termination box is currently located in Block B upper level.

NBN Termination Box

Please see below from Dial Before You Dig (DBYD) regarding the existing lead-in NBN service. As shown, there is an existing NBN services lead-in from Great Western Highway.



NBN lead-in indicated by Dial Before You Dig (DBYD)

As above, the existing NBN service is fed from Great Western Highway. As part of the stage 2 work, new NBN services for new work will be still fed from Great Western Highway.

2. PROPOSED INFRASTRUCTURE

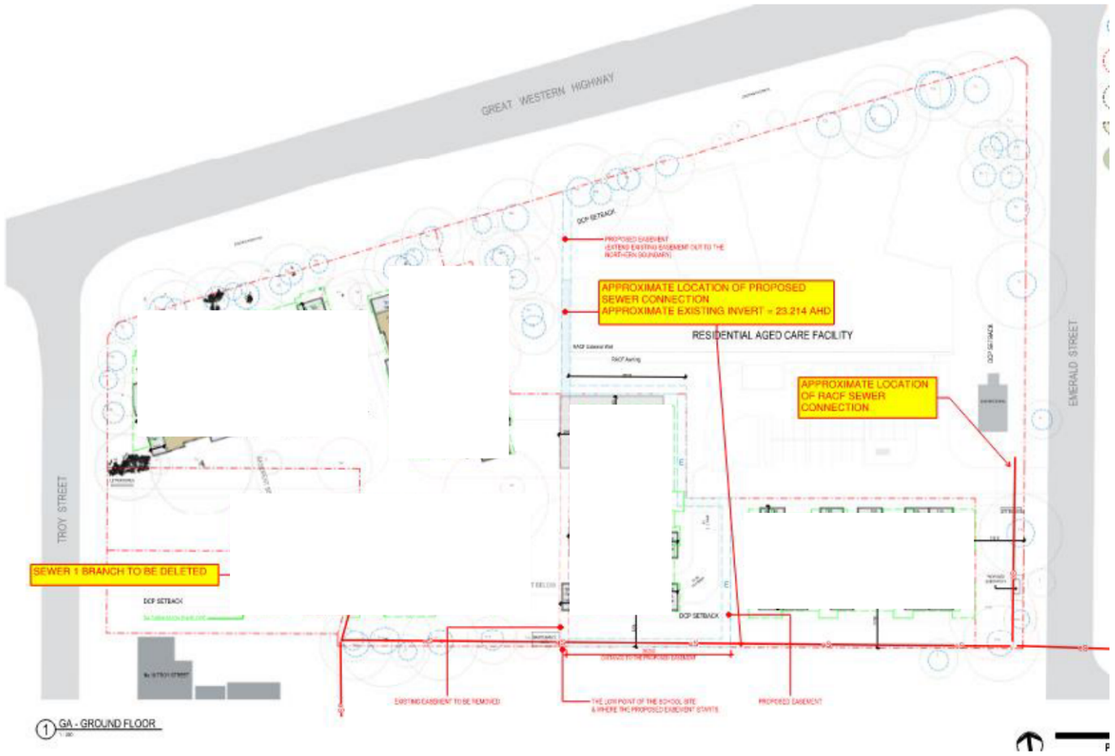
2.1 HYDRAULIC INFRASTRUCTURE

2.1.1 SEWER DRAINAGE

The existing sewer branch, SEWER 1, in the southwestern corner will be deleted.

A new sewer connection will be made to the existing sewer, SEWER 2, that is located within the site boundary running parallel to the southern boundary.

This sewer has been concrete encased and the structure of the adjacent basement and buildings will have to be constructed to eliminate any loads imposed on the sewer in accordance with standard Sydney Water requirements for building adjacent to their infrastructure.



Proposed Sewer Drainage connection

2.1.2 COLD WATER AND HYDRANT SUPPLY

The RACF has a connection to the Emerald Street water main and is served via a pressure pump assembly within the development.

The currently existing ILUs are served from the water main in Troy Street.

The cold water service for the new ILU development will be extended from the Emerald Street connection on the boundary, to supply the fixtures and fittings as required.

The existing RACF development has a fire hydrant booster valve assembly and pressure pump located on the Emerald Street frontage. A capped off service for extension to the ILUs was included in the RACF design and should be located adjacent to the southwestern corner of the RACF building. The fire hydrant service will be connected to this location and extended to serve the ILUs as required.

2.1.3 ADEQUACY OF POTABLE COLD WATER AND SEWER AUTHORITIES' INFRASTRUCTURE

A Section 73 Certificate Application will be required to be made for the development from Sydney Water.

Sewer

Due to the positioning of the existing sewer main, Sewer 2, this application will have to be made through a Water services Coordinator to obtain the Notice of Requirements, which will nominate/confirm the proposed the water and sewer connection details.

We do not foresee any issues with our proposed connection locations nor the capacity of the proposed sewer main to which connection is proposed.

Cold Water

The expected water probable simultaneous demand for the 147 ILUs is 9.88 l/s. The water main in Emerald Street will be extended to supply the cold water requirements for the new ILU development.

We do not foresee any issues with our proposed connection locations nor the capacity of the proposed water main to which connection is proposed.

Gas supply

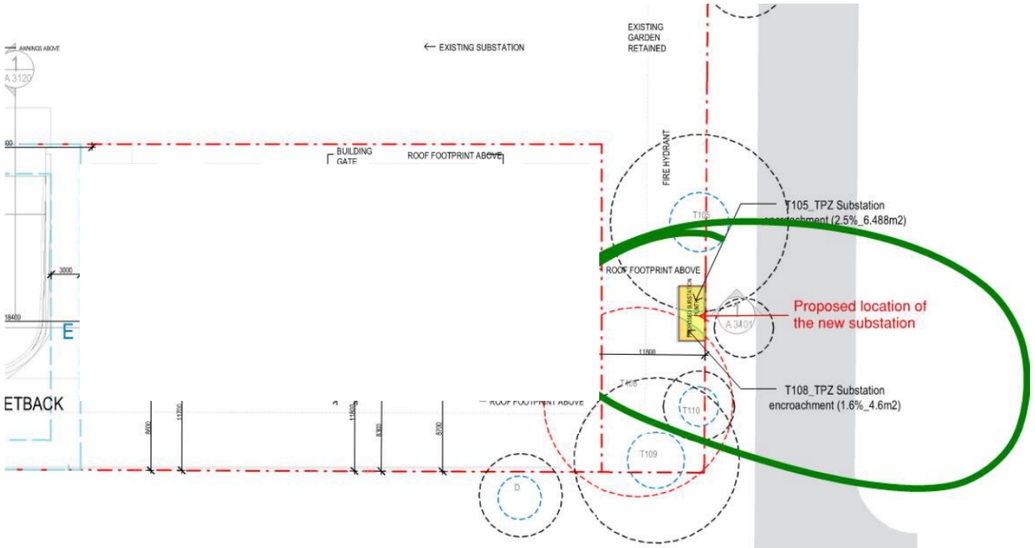
The RACF is served with gas fed from a pressure regulator and meter assembly located on the Emerald Street frontage in the southeastern corner.

It is not proposed to utilise any gas service within the ILU development with electrical heat pumps being utilised for the hot water generation.

2.2 ELECTRICAL AND COMMUNICATION INFRASTRUCTURE

2.2.1 NEW SUBSTATION

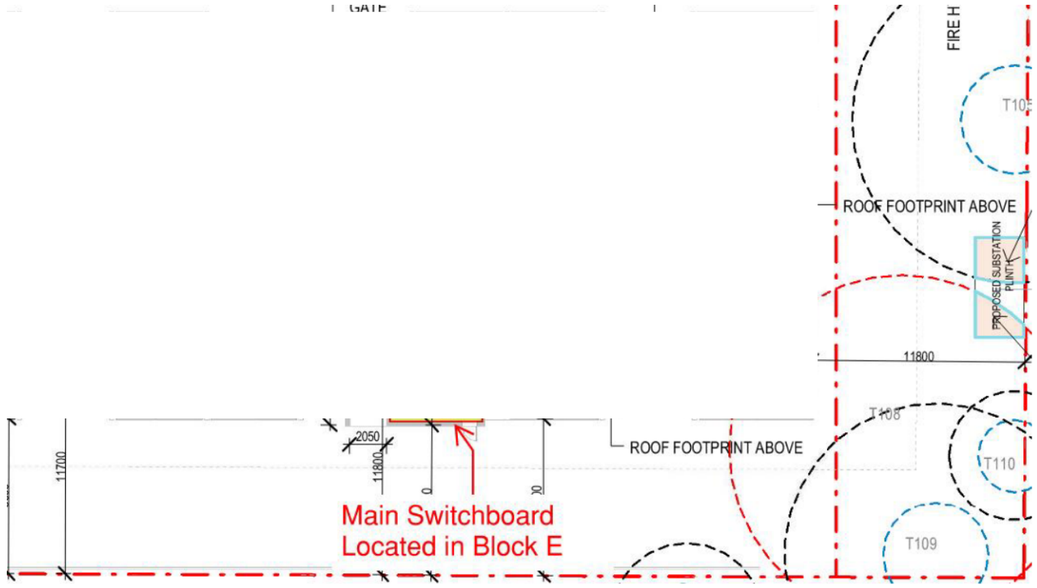
A new substation is proposed outside east south corner of new Block E nearby Emerald Street. This new substation will be feeding all new blocks in stage 2 work. The figure below indicates the proposed location of this new substation.



New Substation Location

2.2.2 NEW MAIN SWITCHBOARD

A new main switchboard proposed for stage 2 work will be in new block E. This new main switchboard will be fed from the new substation via underground conduits and will feed all new works in Stage 2. The figure below indicates the approximate location of the new main switchboard.



New Main Switch Board Location

Other blocks will be fed from this main switchboard via underground conduits externally and cable tray internally.

A few new electrical distribution boards will be proposed to supply the common area. Each apartment will have its own electrical distribution board. These apartment distribution boards will be housed in each apartment.

2.2.3 NEW MERTERING

The new authority meter will be proposed for stage 2 work and located on the incoming supply. Uniting have confirmed that the site will be metered by an embedded energy provider. This authority meter will be known as the embedded gate meter for the site.

Separate NMI complaint meters will be including in the development for the following:

- Each apartment
- House services

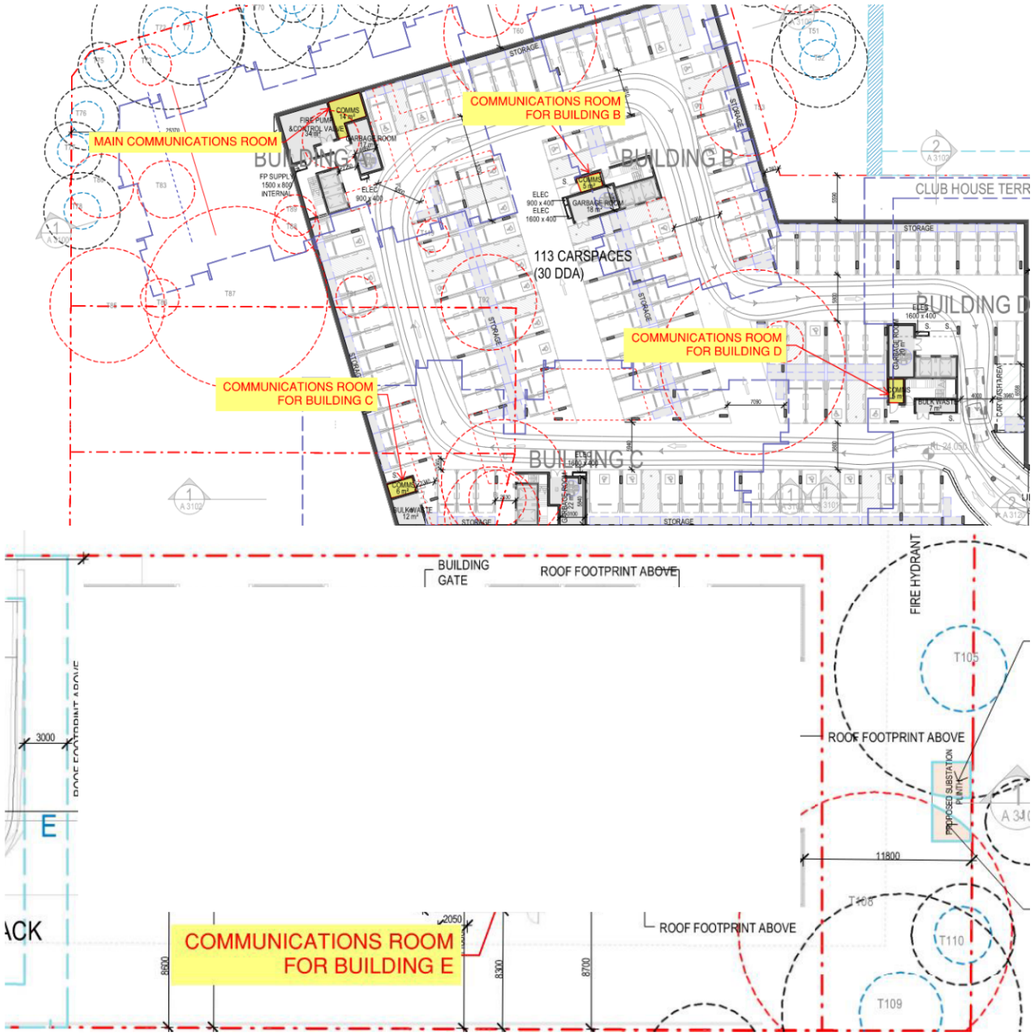
The apartment NMI metres will be in meter enclosures/ cupboards on each floor of each building. Please refer to the electrical service spatial mark-up attached at the end of this report for locations.

2.2.4 RELOCATION OF EXISTING MAIN DISTRIBUTION FRAME (MDF)

The existing main distribution frame (MDF) will be relocated. The exact location requires further confirmation with the Uniting IT department.

2.2.5 NEW COMMUNICATION ROOM

A new main communication room is proposed in the basement under new building A. This communication room will contain NBN equipment, security equipment and a communication rack. Additional 3 communication rooms in the basement area and 1 communication room on the ground floor of building E are proposed. In this case, each block will have its own communication room. The below figures indicate the proposed locations of these communication rooms.



Communication Rooms Locations

Communication cables will be reticulated via cable trays internally. Underground conduits are to be used externally to connect each building. Please note that the new communication rack in the new communication room also requires to be connected back to the existing Residential Aged Care Facility (RACF). Cables are to be reticulated via cable tray where possible and underground conduit externally. This will require further coordination with Uniting during the design stage.

Each apartment will contain its own NBN modem. The tenant distribution board will be housed together with NBN equipment in the same enclosure in each apartment.

2.3 PROPSOED FIRE SERVICES

2.3.1 GENERAL

The fire services detail design report outlines the design intention across aspects of the dry fire design and summarises the key components that make-up these systems.
The proposed new fire systems will include, but not limited to;

- Smoke/Fire Detection
- Automatic Fire Sprinkler System
- Building Occupant Warning System
- Portable Fire Extinguishers and Blankets

2.3.2 STANDARDS AND REGULATIONS

A number of design standards, guidelines and codes of practice are applicable to the fire protection service design for this project. The fire protection services design includes the requirements of the following key design standards, guidelines and codes of practice.
In addition to complying with the brief, the design solution will be in strict accordance with the following relevant Codes and Standards (note, some of these Standards may be overridden by specific State Government guidelines):

National Construction Code (NCC) – 2022	
AS 2118.1-2017 (incorporating amendments 1 and 2)	Automatic Fire Sprinklers Systems – General systems
AS 2444-2001	Portable Fire Extinguishers and Fire Blankets – Selection and location
AS 1670.1-2018 Incorporating Amendment 1	Smoke Detection, Warning, Control and Intercom Systems
NSW Service and Installation Rules	
Work Cover Authority requirements;	
Requirements of the NSW Fire Brigade	

2.3.2.1 DESIGN CRITERIA

The project will be designed to satisfy the above-mentioned Australian Standards and the National Construction Code (NCC).
Fire Services system requirements have been established on the premise that the building is classified as Class 2 (Residential), Class 9b (community room), Class 7a (Carpark), Class 5 (office) as per the NCC Part A6. Final building classifications to be confirmed by the BCA Consultant and to be outlined in the BCA Report.

2.3.3 AUTOMATIC FIRE SPRINKLER SYSTEM

An Automatic Fire Sprinkler System will be provided throughout the development, in accordance with the AS 2118.1-2017 requirements. The hazard classification will be Light Hazard for the majority of the residential areas with Ordinary Hazard 1 for plant rooms and Ordinary Hazard 2 for carpark areas.
A new sprinkler system fire brigade booster assembly is proposed to be installed at the site boundary adjacent to the main pedestrian entry at Troy Street, parallel to the street. The booster will be positioned such that it is readily accessible to the fire brigade to meet their operational requirements; and will be located no further than 10m from a truck hardstand.
The fire services pump room is proposed to be within the Basement/Carpark. This room shall be provided with double door access to allow for installation and maintenance/future replacement of the pumps. This pump room will house the 2-off pumps and the pump test pit. Three sprinkler control valve sets shall be located within the pump room, one to serve the Carpark and two for Upper residential areas.
The following constrains and requirements are to be implemented:
A clearance of not less than 1.0m shall be provided around the pump assembly, and a clearance of not less than 600mm between two pumps shall be provided.
The clearance around the panel shall be 1.0m at the front and 0.6m on both sides of the controller.
The sprinkler system will have a demand of 12L/s (considering the worst case OH2 system) and the water supply for this is from Troy Street water main.
The sprinkler system will be designed such that the activation of any one sprinkler head will automatically start the fire pump set (where installed) and activate the alarm initiating device.
The hazard classification will be as follows.

DESIGN CRITERIA

Occupancy	Hazard Class	Assumed Area of Operation
Residential	Light Hazard	4 *Residential* Heads
Car park	Ordinary Hazard 2	12 heads
Plant Spaces	Ordinary Hazard 1	6 heads

Sprinkler heads will be selected to take advantage of the latest fast/quick response and extended coverage technology.

2.3.4 FIRE DETECTION AND BUILDING OCCUPANT WARNING SYSTEM (BOWS)

A smoke detection System & alarm system will be provided in accordance with BCA, AS 1670.1-2018 and AS/NZS 1668.1-2015. The system shall be an automatic fully addressable fire detection and alarm system that is controlled and monitored by Fire Indicator Panels (FIPs) located at the each designated entry point of Building A,B,C,D and E.

A fully addressable fire detection system and building occupant warning system (BOWS), designed in compliance with AS1670.1-2018, is proposed to be provided throughout Building A,B,C,D and E.

The BOWS will instigate an audible and visual warning system throughout the buildings in compliance with AS1670.1-2018. All BOWS speakers will be provided throughout the building in accordance with AS 1670.1-2018 to provide sound pressure levels and speech intelligibility in accordance with code requirements. In areas where speech intelligibility performance cannot be achieved due to the layout constraints of the occupancy, these areas will then be provided with visual indicators.

The smoke detection system will interface with mechanical, electrical and security systems to provide signals that initiate operation of the respective hazard management systems e.g. equipment shutdown, BMS, door security. The Fire Fan Control Panel (FFCP) interface will be incorporated within the Main Fire Indicator Panel. The FFCP will all necessary interfaces with the smoke hazard management systems in accordance with AS 1668.1.

The Fire Indicator Panels will be provided with a minimum of 20% spare capacity.

2.3.5 PORTABLE FIRE EXTINGUISHERS

Portable fire extinguishers and fire blankets to satisfy the requirements of the Building Code of Australia, Fire & Rescue NSW and the local authorities shall throughout the development in accordance with the requirements of the AS 2444-2001 standard and NCC Clause E1.6

Portable fire extinguishers can be located recessed cupboards on the residential levels. These cupboards may be shared with other services such as water meters etc. Cupboards if used are to be provided with lettering indicating the presence of a fire extinguisher as outlined in AS 2444 – 2001. Portable fire extinguishers will be provided within 10m from any single occupant unit entry door.

SELECTION AND LOCATION

Risk	Equipment Type and Rating	Preferred Location
Essential Service Switchboards	4.5 kg Dry Chemical Powder (4A 60B:(E)) or Carbon Dioxide 5 kg (5B(E))	Between 2m and 20m from essential service switchboards.
Electrical Switch Rooms	4.5 kg Dry Chemical Powder (4A 60B:(E)) or Carbon Dioxide 5 kg (5B(E))	Adjacent to and internal side of entry door between 2m and 5m maximum.
Plant Rooms	4.5 kg Dry Chemical Powder (4A 60B:(E)) or Carbon Dioxide 5 kg (5B(E))	Adjacent to and internal side of entry door between 2m and 5m maximum.
Residential levels	2.5kg Dry Chemical Powder	Within 10m of all residential entry points
Throughout the entire site	4.5kg Dry Chemical Powder (4A 60B:(E))	Within 2m of each Fire Hose Reel.

2.3.6 INTERFACE WITH OTHER SERVICES

Operation of the building services in fire mode requires interfaces with other services. Interfaces will be provided between the fire detection system and the following building services:

- Mechanical ventilation used for smoke hazard management
- General air conditioning systems
- Security and access control devices
- Automatic door operators