CONCEPT REPORT

Castlecrag Shopping Centre with Apartments

Building Services

Project Reference # 122058

Revision B
June 2020

Prepared For:

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REV	DATE	WRITTEN BY	REVIEWED BY	APPROVED BY
A	05/06/20	AM	SH	AS
B	15/06/20	AM, DR, BP	SH	AS

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1 General

1.1 Project Overview

We understand the project to comprise the following:

Castlecrag Shopping centre and residential living

- Basement carpark and plant space
- Lower ground, Supermarket, storage and residential living
- Ground floor supermarket, retail, commercial space and residential living
- Podium floor, residential living, Gym and storage
- Level 2 Residential living
- Level 3 Residential living and plant space
- Roof, residential plant space and retail plant space

1.2 Project Description

FJMT architecture has designed an affordable living arrangement on top of various retail outlets in the shopping centre, ample parking and space will be paramount in this design, plant space in the basement and on the rooftop will house all plant equipment and several risers throughout the building will house all pipework running up and down the building.

This report presents the Buildings Services Discipline for the Proposal.

2 Mechanical Services

2.1 Scope

General Objectives

- The mechanical services capital cost is to achieve value for money
- The mechanical services need to be energy efficient

Air Conditioning (Comfort Cooling)

- Accommodation
- Common areas
- Retail and commercial spaces

Ventilation

- Outdoor air throughout
- Toilet exhaust in all amenities
- Car Park Exhaust and Make Up Air systems
- Dedicated roof space for the plant
- Garbage exhaust systems
- Fire Pump Room Exhaust
- Storeroom exhaust
- Electrical for the mechanical
- Building management and control systems
- BASIX and ESD Report requirements if required

No allowance has been made for the following:

- Specialist refrigeration, including cold rooms
- Precision controlled environmental rooms
- Compressed air and suction systems

2.2 Performance Standards

2.2.1 Code Compliance

New mechanical works shall be in accordance with the following current Australian Building Code and Standards.

- Comply to client's requirements including industry best practice
- Comply to the current Australia Standards
- Building Code of Australia (BCA) or otherwise known as the National Construction Code (NCC) Series
- Fire Engineering Reports
- AS/NZS 1668.1 The Use of Mechanical Ventilation and Air Conditioning in Buildings Part 1
- AS/NZS 1668.2 The Use of Mechanical Ventilation and Air Conditioning in Buildings Part 2
- AS 1324 – Air Filters for use in air conditioning and general ventilation (Parts 1 & 2)
- AS 1682 – Fire Dampers
- AS 1674 – Cutting and Welding
- AS1530 – Fire Hazard Tests
- AS 3666 – Microbial Control in Air-conditioning
- AS 4254 – Ductwork for Air-handling Systems in Buildings
- AS 1851 - Maintenance of Fire Protection Systems
- AS 3000 - SAA Wiring Rules
- AS 3013 - Electrical installations, wiring systems for specific applications.
- AS 3666 Series
- AS 4254 Series - Ductwork and Solid Ductwork – Fire resistance & Sealing.

- AS 2107 - Acoustics
- NSW Fire Brigade
- Safe Work requirements

2.2.2 Outdoor temperature

- Summer 32o C dry bulb, 23 o C wet bulb, Full Solar Load
- Winter 5.4o C

2.2.3 Room Temperature

Summer

- All Areas, except reticulation space 23 o C +- 1.0K, no humidity control
- Reticulation space 23 o C +- 2.0K, no humidity control

Winter

- All Areas, except reticulation space 21 o C +- 1.0K, no humidity control
- Reticulation space 21 o C +- 2.0K, no humidity control

Although called up in the Green Star report we do not recommend to Humidity controls not required.

We also suggest that Camel is used to calculate the building heat loads.

2.2.4 Glazing and Building Fabric:

Heating and cooling load calculations will be based in the information provided by ESD in the BASIX report which requires inputs from the Building Services, Architectural Features and Building Fabric

The below will be used for preliminary calculations these values are confirmed.

Glazing U-value (whole system) [K. m²/W]	**Glazing SHGC (whole system)**	**Wall Total R-value** [K. m²/W]	**Roof Total R-value** [K. m²/W]
4.8	0.51 or 0.59 (Slider)	TBA	TBA

These figures above are assumed and are subject to change.

2.2.5 Outside Air Content

Generally, as per AS1668.2

2.2.6 Exhaust air flow rates

Substation	To meet energy supplier requirements if it is required.
Switchroom	to meet Electrical Consultants requirements.
Carpark	To meet AS1668.1-2015, AS1668.2-2012 requirements
Occupancy units	to meet AS 1668.2-2012 requirements
Other areas	to meet AS1668.2-2012 requirements
Gas meter room	to meet AS1668.2-2012 & AS 5601.1.2013 requirements
Garbage / waste rooms	to meet AS1668.2-2012 requirements

2.2.7 Accommodation

Toilet Exhaust	10 l/s/m2 in common area, 35 - 40 l/s for private toilets which allows for a maintenance factor.
Kitchen Exhaust	120l/s (Recommended) dependent on final range hood selection.

2.3 General - Air conditioning and ventilation

Each sole occupancy unit shall be provided with VRV DX air conditioning which is fed by roof top package plant. This air cooled plant will service the entire building. Heating will be provided by virtue of the fact that the equipment is heat recovery reverse cycle.

Outdoor air will be ducted in via the face of the building to serve the units and also the roof top if required. This will allow the residents to bring in outdoor air from time to time without the need to run the air conditioning system. This will also allow the windows to remain closed in the event external winds, noise or other factors are unsuitable. The filters will be installed in a convenient location to allow for maintenance to be carried out safely.

The range hood exhaust will also be directed towards the façade via small openings. An in-duct fan will be used to assist with the discharge. Motorised dampers shall be installed to prevent air coming back into the building through the weatherproof louvres.

The exhaust system is installed to facilitate exhaust of the bathroom odours to the external weatherproof louvre, typically provided in the façade of the building as approved by the architect. The exhaust ductwork can be shallow to allow to work with the ceiling space allowance.

A GPO will be supplied c/w run on timer, current sensor and controls above the ceiling for toilet/laundry exhaust fan. Residential toilet exhaust systems are to be interlocked with lighting.

This kitchen exhaust will consist of a domestic style range hoods with filters that recirculate the exhaust air by removing grease particles and ducted to discharge louvre via facade.

2.3.1 Indoor Air Conditioning Units

Low profile DX fan coil units are proposed for the accommodation spaces as per the picture below.

Typical Fan Coil unit

Each indoor unit will be equipped with a wired remote-control panel for individual control. The control panel will provide control for on/off switch, temperature display, temperature reset, mode selector, fan speed selector, time clock as minimum. The control panel will be similar to the unit presented below.

Typical Local Control Panel

2.4 Ventilation and Air Conditioning Systems

Each apartment shall be naturally ventilated via operable doors and windows to outside. Typically, this requires an opening free area of 5% of the floor area of the zone to be ventilated.

Mechanical exhaust will be provided to all bathrooms, ensuites, WC's etc within each unit in accordance with AS 1668.2. Each unit will have a dedicated mechanical exhaust system that can be operated by turning on a dedicated switch. Exhaust systems will be designed in excess of that stipulated in the standards to ensure that over the lifetime of the plant minimum air flow rates are achieved.

All fans will be powered from local distribution board.

Corridors and apartments will be provided with natural ventilation via operable windows

Retail – provision of 350 W per square metre for cooling, and 120 W per square metre for heating allowances.

An economy cycle will be provided in the corridors and general circulation spaces where possible and will also have provision to heat and cool as required.

2.4.1 Range Hood Exhaust

The range hoods will have booster fans depending on the length of ductwork runs. The system is complete with discharge ductwork connection to range hoods via flexible ductwork and discharge louvre from façade. The range hoods will be by others.

Typical Fan

2.4.2 Carpark Ventilation

A mechanical ventilation system will be provided in accordance with AS 1668.2 to the carpark.

The system will include make-up (supply) to the basement through intakes at the entrance/exit of the carpark and or the roof as required. The carpark exhaust will be ducted to the roof level.

The exhaust system will be controlled via a carbon monoxide (CO) monitoring system which will ensure that operation of the fans will occur in accordance with AS1668.2. The fans will also be controllable from the Fire Fan Controls (located in the Fire Indication Panel) in accordance with AS 1668.1.

Fans will be powered from the Mechanical Services Switchboard.

The car park basement levels will be ventilated in compliance with AS 1668.2.2012 or a fire engineered solution based on CO Modelling

Dedicated fans room will be provided for supply and exhaust systems. The car park exhaust system will be discharged at roof level via a discharge louvre

CFD modelling may be beneficial to reduce the extent ductwork required and reduce the air flow requirements for the supply and exhaust air systems.

Car park supply, and exhaust reticulation path will be via inbuilt plenums at each car park level

2.4.3 Retail tenancies Kitchen Exhaust

The fresh air intake for the retail tenancies will be provided via a continuous louvre band in the overhang at high level on the ground level. The future retail tenants may be required to provide their own duct connection to the outside air plenum above the retail ceiling level.

- Retail Typical Exhaust rates are as follows 3000 L/s
- Exhaust air rates will be subject to change depending on cooking process

2.4.4 Garbage/ Waste Rooms

Garbage / waste rooms will be mechanically exhausted via exhaust risers and discharge on the roof levels. The system is complete with roof mounted fans and cowls.

2.4.5 Bicycle storeroom (Where provided):

Bicycle storerooms will be provided with mechanical supply air system in compliance with AS 1668.2.2012. The system is complete with fan, supply air ductwork, intake louvre and filter.

2.4.6 Switch room:

The room will be provided with mechanical fresh air system in compliance with AS 1668.2.2012 and the room heat load requirements. The system is complete with fan, supply air ductwork, intake louvre and filter.

2.4.7 Gas meter room:

The space will be provided with mechanical exhaust system in compliance with AS 1668.2.2012 and AS 5601.1

2.4.8 Power supply:

Essential and non-essential mechanical switchboard will be provided for the building.

2.5 Control/ BMCS:

Automatic control of the mechanical plant shall be provided by a Direct Digital Control (DDC) system. The DDC shall be an integral component of the Building Automation System. A distributed processing arrangement shall be utilised that will allow plant components to continue to operate in the event of a failure of the system head end or failure of the control system serving a specific plant component.

The BMS will only control the mechanical plant at this point in time. It may be expanded to suit the client requirements.

2.6 Noise and vibration:

All mechanical equipment and /or plant areas will be required to be assessed by an Acoustician to ensure noise levels do not exceed the requirements of AS2107, and Local Council requirements.

2.7 Energy Meters

Electrical Energy meters are to be provided within the mechanical switchboards to measure the energy usage from the major plant. The meters are to be connected to the BMS.

2.8 WORK BY OTHERS

The following equipment and work will be supplied and/or carried out by other Trades/Authorities as follows:

Work by Mechanical Installer....	Work By ....
In Connection with Electrical Services	**Electrical Services Installer**
• Supply and installation of mechanical services switchboard (MSSB) and advise whether boards are non-essential or fire essential. • Power and control wiring from MSSB to mechanical plant. • Connection of power from local isolators adjacent to mechanical plant. • Power and control wiring from Apartment distribution board to exhaust fans.	• Provision and termination of power supplies to mechanical services switchboards and FFCP. • Provision of power and local isolators to Unit exhaust fans. • Provision of power and local isolators to Unit Outdoor air fans.
In Connection with Hydraulic Services	**Hydraulic Services Installer**
• Condensate drainage to tundishes.	▪ Provision of tundishes
In Connection with Fire Services	**Fire Services Installer**
• Final termination of fire alarm signal cable at equipment fire trip interface where required. • Provision of fire fan control panel (FFCP) OR Coordination with Fire Services Installer for integration of FFCP into the FDCIE. • Access panels, drilling and sealing of ductwork for mounting of detectors • Installation of Fire dampers	• Provision of fire alarm signal cable to equipment fire trip interface where required. • Provision and installation of smoke detector on the supply ventilation systems required to run during Fire Mode.

In Connection with Building Works	Builder's Works
Fire Rated Building Elements Seal all penetrations using a system to AS4072.1.	Fire Rated Building Elements Undertake all coring, cutting and making good.
Non-Fire Rated Building Elements ▪ Seal penetrations around conduits, ducts and sleeves. Seal around cables within sleeves. If the building element is acoustic rated, maintain the rating.	**Non-Fire Rated Building Elements** ▪ Undertake all coring, cutting and making good.
Ceilings ▪ Co-ordination of penetrations. ▪ Locate all ceiling penetrations. ▪ Set out all required penetrations in ceilings for access and maintenance of Mechanical Services. ▪ Installation of access panels in ductwork	**Ceilings** ▪ Cut outs and trimming of openings for diffusers and grilles provided as part of Mechanical Services Works. ▪ Removal and replacement of ceiling panels ▪ Openings in plasterboard ceilings and ceiling tiles. Access panels in plasterboard ceilings for the maintenance and servicing of new and existing mechanical services. Locations to be confirmed on site by mechanical contractor and agreed with the Architect prior to installation of services.

3 Electrical Services

3.1 Scope

- Main switchboard, consumers' mains and metering as required.
- Submains to electrical DB's and other services.
- General lighting, interior and exterior.
- Exit & emergency lighting to NCC and AS2293.
- General purpose & special purpose power.
- Electrical supply for A/C to apartment units.
- Power supply to equipment & plants by other trades.
- Communication cabling and reticulation.
- NBN conduit provisions
- Retail/Commercial Electrical services (base build)
- Smoke Alarms
- MATV
- Access Control and Intruder Detection
- CCTV

No allowance has been made for the following:

- Level 3 design
- Standby and Emergency Power Generator systems
- Fit-out and retail design
- Lightning Protection
- Council street lighting

3.2 Incoming supply

3.2.1 Existing power supply

The existing building is serviced by a three-phase supply from Ausgrid on-site kiosk substation (5062) located at the west side of the building, on Eastern Valley Way via an underground feed into the adjacent Main Switch Board.

Further investigation is required to understand the current rating of the incoming supply from the on-site kiosk substation and the available spare capacity of the existing system. The current maximum demand of the existing building is also required to work out the spare capacity of the existing substation.

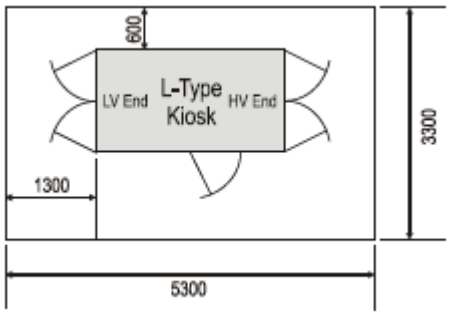
The kiosk substation that positioned within 10m from the fire boosters and fire hydrant pumps do not comply with current Code and Regulations.

3.2.2 Proposed power supply

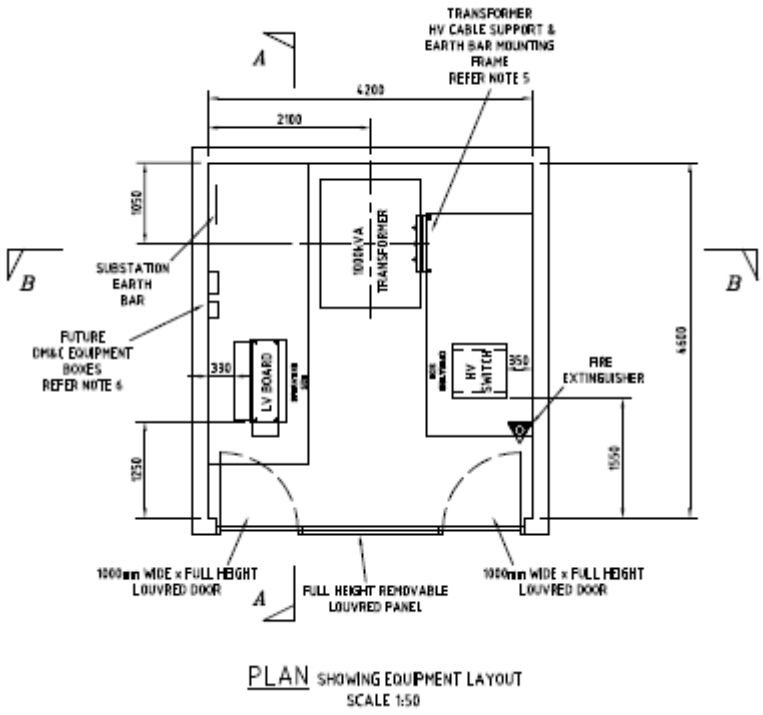
An initial maximum demand calculation was done to work out required power infrastructure of the development. Taking 67 units, lower ground and ground floor supermarkets, retail and carpark into account the maximum demand of the proposed development will be 930A including 10% future growth. The exact capacity and location of required substation will be defined in Level 3 design and is subject to Ausgrid approval however based on calculated maximum demand probably an 800 KVA kiosk substation will be proposed by Ausgrid.

Generally, kiosk substations are located at street levels. In our spatial drawing the substation has been indicated at lower ground floor to follow architect's layout. To locate the kiosk at lower ground floor, specific approval needs to be obtained from Ausgrid prior to proceeding with the design. The level at the top of the kiosk base must be not more than two metres above or below the access roadway level or street footpath level adjacent to the kiosk site.

The minimum site requirements for the kiosk would be 5.3m x 3.3m as per the layout below:



Another option is to install a surface chamber substation. This substation will be located within the property with 24/7 access for utilities.



PLAN SHOWING EQUIPMENT LAYOUT
SCALE 1:50

To enable us to determine if a new kiosk can cater for the load requirements of the proposed development as well as supply the load of the existing kiosk, the following information needs to be reviewed:

1) MD of the existing site. (needs to be investigated from site. MDI reading or electricity bills)
2) MD of the proposed development. (calculated at 930A)
3) Load on the existing kiosk (needs to be investigated from Ausgrid)

An application for connection alteration will be submitted to Ausgrid for proposed development power requirements. After submitting the application Ausgrid will provide a letter of offer normally within two weeks notifying how the proposed site will be supplied.

3.3 Performance Standards

3.3.1 Code Compliance

The electricity supply Authority Ausgrid, is the utility provider for the site. All works involving Ausgrid will be in accordance with their standards and specifications.

New electrical works will be in accordance with the following current Australian Building Code and Standards and Client Briefs.

- AS 1158 Lighting for Roads and Public Spaces
- AS 1428 General requirements for access – New building works
- AS 1680 Interior lighting and the visual environment
- AS 1768 Lightning Protection
- AS 2201 Intruder Alarm Systems
- AS/NZS 2293.1 Emergency evacuation lighting in buildings, system design, installation and operation
- AS/NZS 3000 Australian/New Zealand Wiring Rules
- AS/NZS 3008 Electrical Installations – Selection of Cables
- AS/NZS 3080 Integrated telecommunications cabling systems for commercial premises
- AS 4282 Control of the obtrusive effects of outdoor lighting
- TS 009 Installation Requirements for Customer Cabling (Wiring Rules)
- National Construction Code, including Section J6 and J8
- Local Supply Authority Services and Installation Rules
- Relevant Australian Standards
- The requirements of other relevant regulatory authorities

3.3.2 Electrical Main Switchboard & Metering

The Main Switchboard will to be located within a 2 hours fire rated Main Switch Room complete with 2 outward opening egress doors.

The Main Switch Room shall be located close to the substation.

The main switchboard will be front or back connected, floor mounted, bottom and top cable entry, Form 3B construction, minimum to IP42 rate, and with fault level of 35kA for 1 sec.

The fire rated consumer mains will be reticulated from the substation to the main switchboard supported on ladder tray or underground rigid conduits.

Submain protection will be by circuit breakers with suitable fault rating capacity to withstand the expected fault current. Circuit breakers will be selected for full discriminations.

The main switchboard will consist of 3 sections:

- Essential section (safety services) – for safety equipment identified by NCC
- Metered section – serve public area and house services
- Un-metered section – apartments and retail/commercial tenancies

Each section of the MSB will have minimum 20% spare modules for future circuit breakers.

3.3.3 Authorities Metering

Authority Metering will be provided in accordance with Ausgrid requirements.

We understand that each of the tenancies and each of the accommodation apartments will require a separate Authority meter.

Authority meter will be located on selected floors of the building within the electrical riser as well as in the Main Switchboard room.

Private energy metering will also be provided to comply with NCC Section J requirements, covering

- Vertical transportation,
- Mechanical services,
- Fire services,
- hydraulic services,
- House lighting
- House power.

These meters will be located within the Main Switch Room and within the House Distribution Boards.

3.3.4 Distribution Boards/ Load Centre

House electrical distribution boards serving general lighting and power will be of 3-phase supply complete with split chassis – for lighting and power. They will be of Form 1 construction and IP42 rated. The House Distribution Board will have 20% spare space.

Single phase load centres will be provided to each apartment for electricity distribution within the apartment. The location of the apartment load centres will be coordinated with the Architect at detail design stage.

It is proposed that each retail tenancy will be provided with

- General Retail/Café: Single phase 63 Amp supply to a 36-pole distribution board.
- Specialist Food Tenancy. Three phase 80 Amp supply to a 60-pole distribution board.
- Commercial Tenancy. Three phase 80 Amp supply to a 60-pole distribution board.

3.3.5 Submains

Submains will originate from the Main Switchboard and will be reticulated to:

- The Meter Panels serving the apartments, retail and commercial spaces.
- House light and power switchboard.
- Mechanical Services Switchboards.
- Hydraulic control panels.
- Fire services control panels.
- Lifts.
- Fire Panel.

Submains cabling will be reticulated throughout the building from the main switch board to the respective electrical distribution boards and load centres.

Submains cabling will be run on a system of ladder trays.

Submains cabling for fire and life safety related services will be of fire rated cables with copper conductors. Submains cabling for other services will be by XLPE/PVC stranded copper cables.

The cable type and size will be selected to comply with AS3008 and AS/NZS 3000 requirements.

3.3.6 General Power

General Power Outlets (GPOs) will be provided to each apartment.

GPOs and cleaner outlets will be provided to public area.

Dedicated power supply will be provided to mechanical services, hydraulic services, vertical transportation and fire services.

Dedicated GPO will be provided at selected parking bay for electric car charging if required.

The location of power outlets to each of the apartments will be determined in conjunction with the Architect and the Client

3.3.7 Lighting and Lighting Control System

Design of interior and exterior lighting is generally carried out based on the recommendations AS/NZS 1680, 1158 and the mandatory requirements of NCC Section J. All luminaires will be of LED type light fittings and will be controlled as follows:

- Basement carpark light fittings will be provided with motion detectors. At main car park entry – luminaires setting to be controlled by timer and PE cell controls.
- Exterior lighting will be controlled by photo electric (PE) cell and timer.
- Corridor lighting will be controlled by motion detector and timer.

24-hour security lights will be provided throughout the building at selected strategic locations.

Apartment lighting will be controlled by a local light switch.

Lighting will be provided to all areas within the building that are part of this project.

Lighting will be designed in accordance with the BCA, the project BASIX report and AS 1680.

The exact details of fitting locations and types will be determined in conjunction with the Architect and Client.

3.3.8 Exit and Emergency Lights

Emergency lighting and exit signs will be provided in accordance with mandatory requirements to AS/NZS 2293.

Exit and emergency lighting will be self-contained single point units. Emergency and Exit lights will be of LED type.

3.3.9 Digital Master Antenna Television (MATV)

A digital free-to-air Master Antenna Television will be provided, the system will comprise of the following:

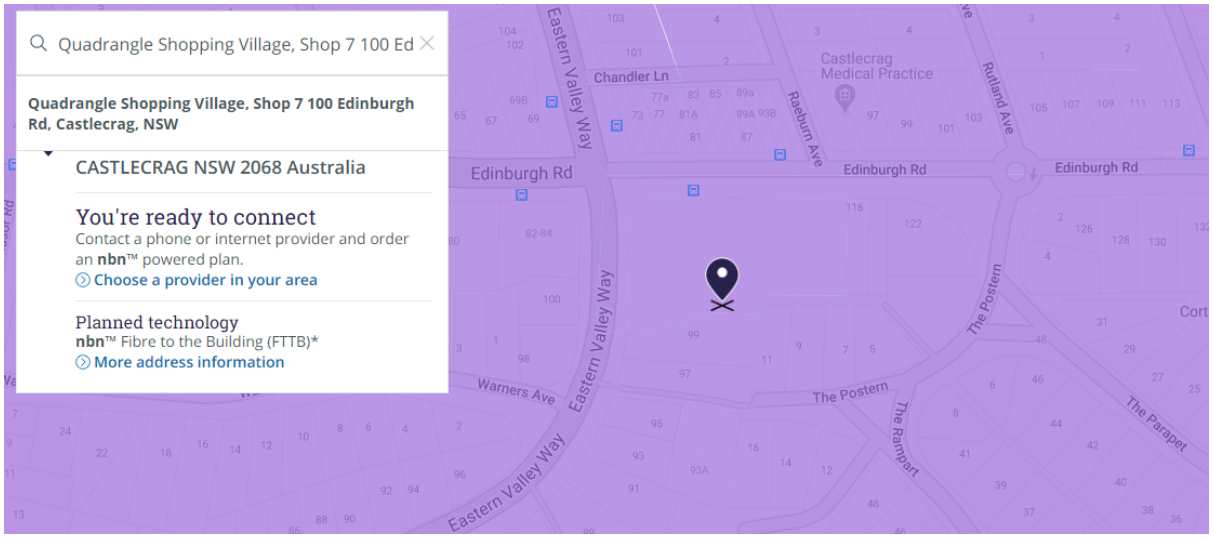
- VHF/UHF high-gain antenna, suitable for digital TV.
- Individual channel amplifiers.
- Tap and Splitter for horizontal cabling.
- Horizontal cabling and MATV outlets as required.

MATV outlets will be provide to each Apartment

3.3.10 COMMUNICATIONS

The exiting Centre MDF is located next to G/F electrical riser, outside of the Centre Management Office. Copper telephone cabling are installed.

NBN rollout map shows the NBN is available at the site and the property is ready to connect:



A dedicated communication room is required in the new development to accommodate NBN/MDF equipment.

A connection application will be submitted to NBN to allow for site future communications requirements.

The NBN works will comprise:

- Inground white communications lead-in conduits from property boundary to the Main Communications Room.
- Main Communication Room to accommodate Premises Distribution Hub and Network Termination Device.
- Communication riser cupboard on all floors for NBN backbone cables.
- Provision of communication cable trays and conduits reticulation throughout the facilities starting from Main Communications room to Communications riser cupboard to apartment Network Terminal Device (NTD).
- Provision of access along the public corridors.
- Provision of NTD enclosure in each apartment.
- Provision of 240V power supply as required.

RJ 45 outlets for both telecommunication and broadband network will be provided to each apartment. The outlet will be located next to the Apartment Network Terminal Device, unless instructed otherwise.

Each retail/commercial will be provided with 1no NBN Network Device (NTD) to cater for telecommunication network.

3.3.11 Smoke Alarms

Stand-alone smoke alarms will be provided in accordance with AS3786 within each apartment, powered from the resident's distribution board.

3.3.12 WORK BY OTHERS

The following equipment and work will be supplied and/or carried out by other Trades/Authorities as follows:

Work by Electrical Installer....	Work By ....
in Connection with the Supply Authority	**Supply Authority/Energy Retailer**
▪ Application for connection ▪ Application for meters	▪ Provision of Supply Authority/Energy Retailer meter.
in Connection with the NBN Co	**NBN Co**
▪ All drawings required by NBN Co. ▪ Cable supports/conduits as required by NBN Co	▪ Incoming cabling and backbone cabling ▪ Apartment NBN equipment ▪ Building NBN equipment

in Connection with Mechanical Services	Mechanical Services Installer
▪ Supply and installation of sub-mains to the Mechanical Services Switchboards	▪ Supply and installation of Mechanical Services Switchboards, complete with suitable lugs, gland plates, connectors, isolators.
▪ Supply and installation of sub-mains to air conditioning plant for the business, retail and apartment areas, including provision of isolator and final connection	▪ Supply and installation of air conditioning equipment.
▪ All cables to be dressed, prepared and terminated.	
in Connection with Lift Services	**Lit Services Installer**
▪ Provide supply to the lift services switchboards.	▪ Supply and installation of lift switchboards and panels complete with suitable lugs, gland plates, connectors, isolators etc.
▪ Dress and prepare all cables for termination and terminated as indicated on the drawings.	▪ Final connection of power supplies to the lift switchboards.
▪ Provide telephone cabling to Local Distributor box adjacent to the Lift Motor panels and terminate the cables at each end.	▪ Connection to telephone Local Distributor panel from the lift machine control panels.
in Connection with Hydraulic Services	**Hydraulic Services Installer**
▪ Provide supply to hydraulic services equipment.	▪ Supply and installation of hydraulic services equipment complete with suitable lugs, gland plates, connectors, isolators etc.
▪ All cables to be dressed, prepared and terminated.	
in Connection with Civil Engineering	**Civil Engineering Installer**
▪ Provide supply to civil engineering panel.	▪ Supply and installation of civil engineering equipment complete with suitable lugs, gland plates, connectors, isolators etc.
▪ All cables to be dressed, prepared and terminated.	
in Connection with the Ceilings	**Ceiling Installer**
▪ Set out all required penetrations in ceilings for Electrical Services (lights, exit and emergency lights etc.).	▪ Cutouts and trimming of openings for light fittings. ▪ Removal and replacement of ceiling tiles. ▪ Openings in plasterboard ceilings and ceiling tiles. ▪ Co-ordination of penetrations.
in Connection with Building Works	**Builders Works**
▪ Seal all fire rated penetrations using a system to AS4072.1. ▪ Seal all non-fire rated penetrations around conduits and sleeves. Seal around cables within sleeves. If the building element is acoustic rated, maintain the rating. ▪ Undertake all coring, cutting and making good, subject to approval from the Structural Engineer. ▪ Undertake all placing, casting in and protection of conduct sleeves and conduits.	▪ Services trenches; excavation and backfilling. ▪ All chasing, coring, cutting and making good. ▪ Access doors and hatches for maintenance. ▪ Bases and plinths for equipment.

4 Hydraulic Services

4.1 Scope

The scope of the hydraulic services will comprise the following:

- Cold Water Service
- Hot Water Flow and return Service
- Rainwater harvest
- Natural Gas Services
- Sanitary Plumbing and Drainage Systems
- Fire Hose reel Service
- Rainwater Drainage (Gutters & Downpipes Only)
- Trade waste drainage

No allowance has been made for the following:

- LP gas services or other
- Stormwater drainage (including Civil and Ground drainage)
- Water / Sewerage Treatment services (Filtration / Black Water / Grey Water)
- Roof design
- Irrigation systems
- Authority Infrastructure upgrades

4.2 Performance Standards

The hydraulic services will be designed to comply with.

- Australian Standard AS3500 parts 1, 2, 3, &4
- Australian Standard AS2419
- Australian Standard AS2441
- Australian Standard AS5061
- Water and Gas Supply Authorities
- Council Regulations
- Nation Construction Code – Plumbing Code of Australia

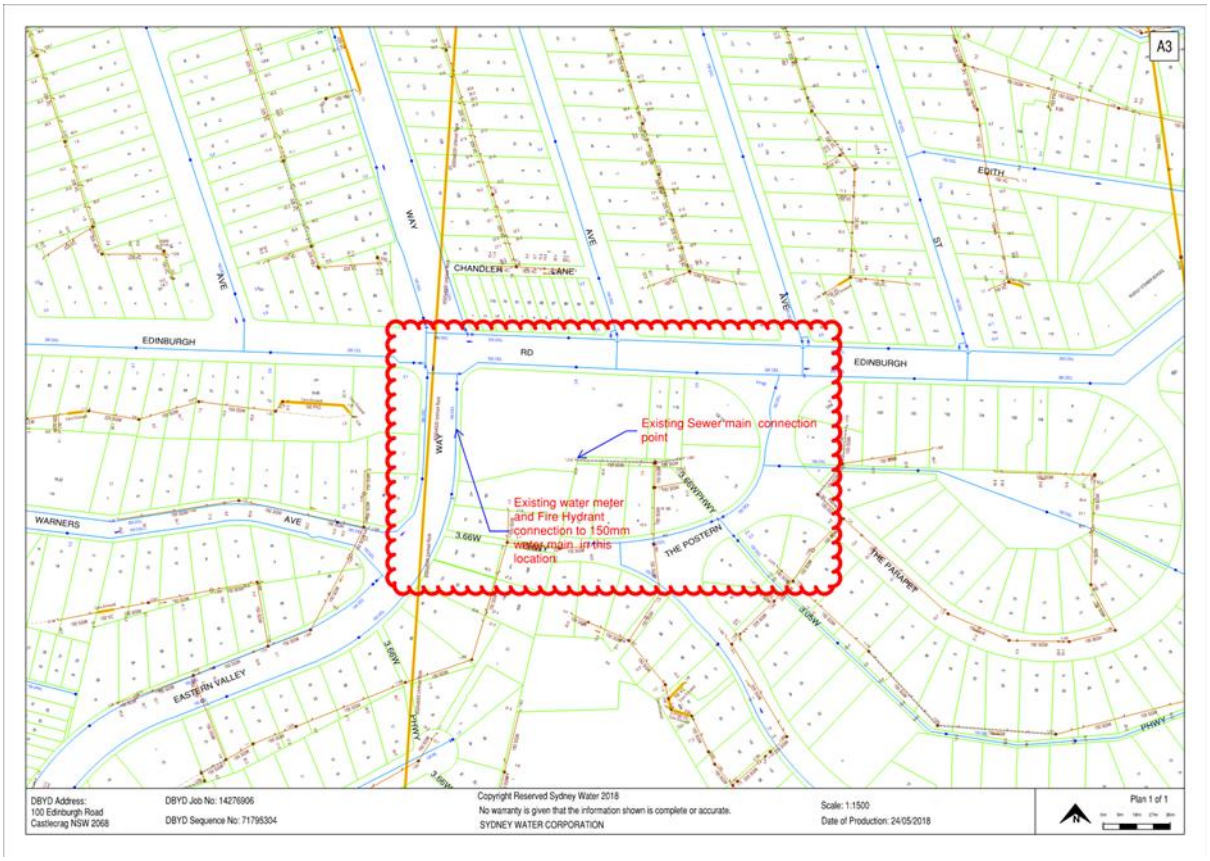
4.3 Incoming Services

Incoming services will be designed to suit site-specific requirements and existing services conditions will be confirmed onsite.

4.4 Domestic Water Supply

The existing cold water is provided by 50mm diameter water supply, from the 150mm Sydney Water main in Eastern Valley Way,

For the new retail / residential building with estimated total probable simultaneous demand (PSD) (67 dwellings 5.73 L/s + retails 4.5L/s + Fire hose reel and irrigation 3.2 L/= **13.43L/s**). It is proposed that a new Domestic water services supply connected to 150mm Sydney Water's water main located in east side of Eastern Valley Way be incorporated. (Subject to Sydney Water notice of requirements and Section 73 Sydney Water approval, Sydney Water will determine the connection point and amplifying of existing water main pipe to 200mm).



Master Water meter sets for the building will be located in the site boundary, including testable RPZD to each meter (Backflow prevention Device and pressure limiting Valves). The Water meter will be at a maximum distance of 3 meters from building boundary.

Domestic potable pump in basement:
A domestic potable water pump will be required in the basement to supply water to the roof of the building, estimated 9 l/s is required, the supermarket is to advise us on their water usage requirements.

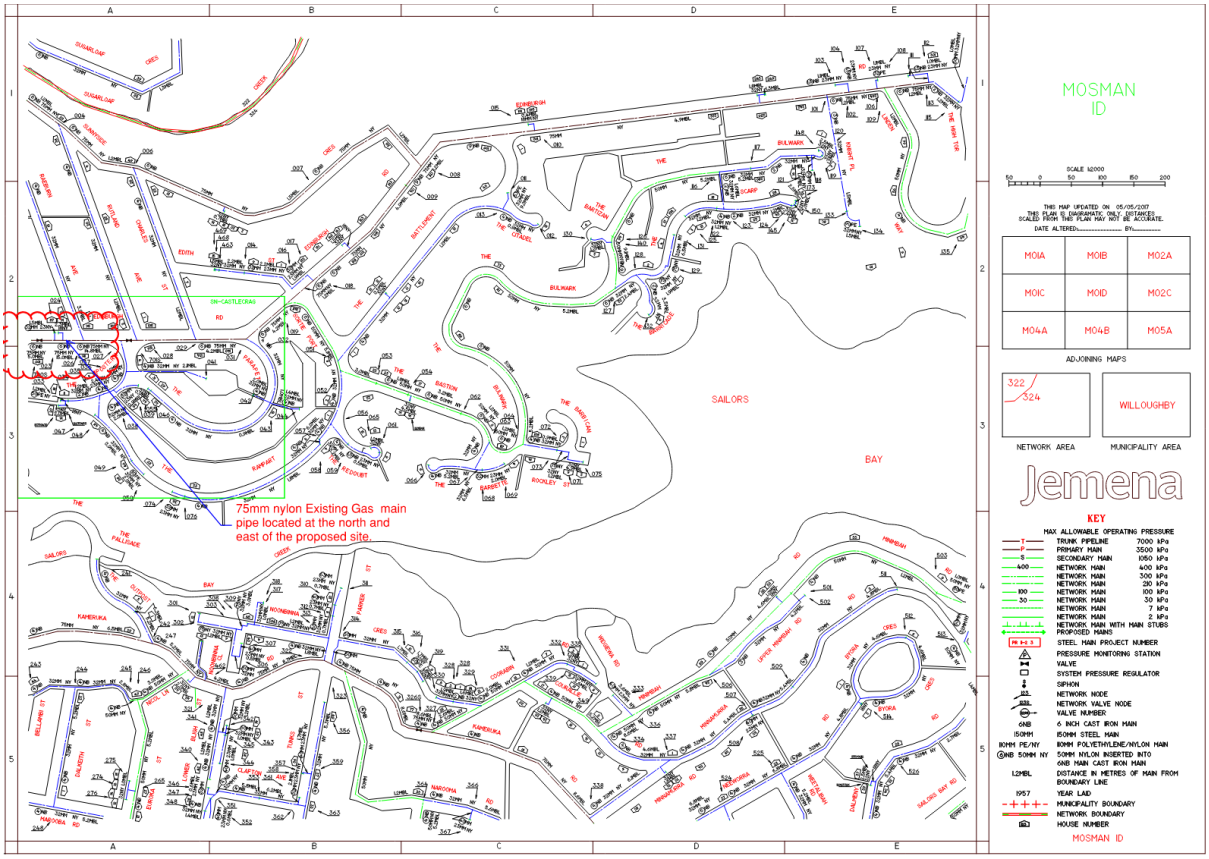
New branch lines from the water supply main, to groups of fixtures or other user groups, including take-offs for WC flushing system, will all be provided with stop valves for easy shut off and maintenance.

Rainwater downpipes will be connected to stormwater system, and rainwater from roof downpipes with be used rainwater harvesting system including filtration system.

4.5 Natural Gas Service

Existing 75mm Natural Gas main having working pressure of 210Kpa, is located in Edinburgh in accordance with the authorities. The gas main will be extended to the proposed site building with new regulator to reduce the pressure to 2.75Kpa.

For the new retail / residential building with estimated gas load (Retail 3,500Mj/hr + Residential 1,910Mj/hr=**5,410Mj/hr** total Gas consumption). The Existing main have the capacity to provide the new proposed development with natural gas



Application to be submitted to the Gas authority for approval for the required load.

Natural gas services will be provided with Safety shut off valve (System III) and connected to Fire indicator panel.

Gas will be reticulated throughout the building to serve central hot water main kitchen within new proposed building.

All flues and safety measures to be provided as per the Gas Company's requirements and relevant standards.

4.6 Sewer Drainage and Connection to Sydney Water Mains

There is a 150mm sewer Sydney Water main on south boundary of the site, the main sewer has been repaired by Sydney water as the Sydney water map above indicate that the existing sewer main SGW (Salt Glazed Ware) has been rehabilitation(lining) . Application / advice from Sydney Water coordinator regarding the requirements to connect and protect Sydney Water assets will be required.

Subject to Sydney Water's Section 73, the sewer connection will be from the existing 150mm sewer main.

Sanitary drainage will be provided from sewer drainage and connecting all the stack work together and discharging thereafter to 'Sydney Water's sewer system via a boundary trap.

4.7 Sanitary Plumbing

Sanitary plumbing will be provided with a fully vented modified system of stacks and relief vents for all wet areas. Vents which will be terminate above the roof to atmosphere.

4.8 Sanitary ware and Tapware

Sanitary ware will generally be vitreous china in accordance with Architect Specification. Tapware will generally be chrome plated brass with loose jumper valves. Sanitary ware and tap ware will be scheduled by the Architect and to comply with regulations, Basix, and star rating.

4.9 Sanitary Drainage

Sanitary drainage is provided from the underside of the ground floor, connecting all the stack work together, and discharging to the street sewer system.

4.10 Hot and Cold Water Services

A hot and cold-water reticulation is provided with the cold-water system having a connection to the street water mains, via a water meter assembly and RPZD to supply water to the building. Subject to Sydney Water Section 73,

Hot water system for the building will be provided via two new flow and return central hot water systems (one for each side of the building) The retail stores will have a separate hot water system separate to the residential hot water system complete with a gas booster which will be provide warm water. The hot water system will be designed complete with circulation for each unit including valve control.

Isolation valves will be provided to each dwelling for easy shut off and maintenance.

4.11 Water Heating Plant

The following water heating plant is proposed:

1. Water Heating Plant

The proposed residential hot water plants are separated into 2 sides, the east side which has 3 storeys and the west side which has 4 storeys;
Zone 1 (east side) will consist of 26 apartments

1 x Rheem Tankpak series 2 model TPI02N*D/1340 (internal) inclusive of:

- 2 x Rheem 6.1 Star 205MJ commercial continuous flow internal water heaters factory manifolded inline on galvanised frame
- 1 x 610340 commercial storage cylinder with high flow 50mm fittings.
- 1 x Grundfos CM 3-2 primary circulator factory mounted on frame.
- 1 x digital controller with temperature display factory mounted on frame.
- 1 x circulating pump will be required

Providing up to 3,615 litres of hot water raised 50°C over the 2 hour peak period

Weight and plant space required

Weight in operation: 519kg

3500mm x 2000mm is the required space in the plant room.

1000mm x 1000mm space will be required for the circulation pump

Gas and electrical consumption

- Gas consumption is 410 MJ/H
- Maximum running current 4.0 Amps

Flue requirements

- This internal Tankpak model will require 2 x Rheem co-axial room sealed flue terminations to suit the project.
- A 160mm flue will be required for the hot water unit, it will penetrate through the roof vertically and terminate.

Zone 2 (West side) will consist of 41 apartments

1 x Rheem Tankpak series 2 model TPI04N*D/1340 (internal) inclusive of:

- 4 x Rheem 6.1 Star 205MJ commercial continuous flow internal water heaters factory manifolded inline on galvanised frame
- 1 x 610340 commercial storage cylinder with high flow 50mm fittings.
- 1 x Grundfos CM 3-2 primary circulator factory mounted on frame.
- 1 x digital controller with temperature display factory mounted on frame.
- 1 x circulating pump will be required

Providing up to 3,615 litres of hot water raised 50°C over the 1 hour peak period

Top down heating for faster hot water delivery and better redundancy

Weight and plant space required

Weight in operation: 677kg

4000mm x 2000mm is the required space in the plant room.

1000mm x 1000mm space will be required for the circulation pump

Gas and electrical consumption

- Gas consumption is 820 MJ/H
- Maximum running current 5.5 Amps

Flue requirements

- This internal Tankpak model will require 4 x Rheem co-axial room sealed flue terminations to suit the project.
- A 160mm flue will be required for the hot water unit, it will penetrate through the roof vertically and terminate.

Circulation hot water Pumps to be provided to each hot water plant to provide continues flow and return to all levels

This will Include with by-pass, include mounting brackets and pump control panel. Panel to incorporate relays, contractors, etc and BMS labelled terminal strip for remote monitoring of pump status.
All as supplied by Kelair Pumps Australia
all necessary pipework, valves, supports, safe tray, circulating pumps etc to form a complete working installation.
Reticulate pipework to all wet areas via a recirculation loop system s

4.12 Fire Hose Reel

A fire hose reel system will be installed to provide enough coverage to all parts of the development for initial response by the building occupants in the event of a fire.

Fire hose reels will be installed within four meters of designated exits; or fire stairs and in other areas to provide supplementary coverage. (Non-class 2 areas only)

The fire hose reel system will be fed from the domestic service and is to be installed in accordance with AS2441.

4.13 WORK BY OTHERS

The following equipment and work will be supplied and/or carried out by other Trades/Authorities as follows:

Work by Hydraulic Installer....	Work By ....
in Connection with the Mechanical Services	**Mechanical Services Installer**
▪ Provide AC tundish drains for AC condensate drainage	▪ Connect condensate pipework to tundishes
in Connection with the Electrical Services	**Electrical Services Installer**
▪ Provide access to electrical components from manufacturer products.	▪ Supply and install electrical services to the required hydraulic items
in Connection with the Supply Authority	**Supply Authority/Energy Retailer**
▪ Application for all connections ▪ Application for meters	▪ Provision of supply from Authority.

in Connection with Civil Engineering	Civil Engineering Installer
▪ Discharge above ground stormwater system to inground civil system.	▪ Allow discharge points for hydraulic services to discharge to civil inground system

5 Fire Protection Services

5.1 Scope of Design

ITEM #	Essential Fire Safety Measures	Standard of Performance NCC 2019 (DtS) (including all amendments) & EP&A Regs 2000 Clauses:
1	Alternative/Performance Solutions	BCA CL. A0.3
2	Automatic door fail-safe devices	D2.21, D2.22, AS1670.1:2018
3	Automatic Fire Sprinkler Systems	E1.5, Spec E1.5, AS 2118.1:2017 and AS 2118.6:2012.
4	Automatic Fire Detection and Alarm Systems	Spec E2.2A(Cl.5), AS 1670.1:2018, AS 1668.1:2015, AS 3786:2014.
5	Brigade connection (system monitoring)	AS 1670.3-2018, Spec E2.2A (CL. 8).
6	Emergency warning and intercommunication systems	E4.9, AS 1670.4:2018, AS 7240.24:2018, AS 7240.23:2014, G3.8, Spec G3.8 (CL.5)
7	Fire extinguishers & blankets	E1.6, AS 2444: 2001
8	Fire hydrants and sprinkler mains	E1.3, AS 2419.1:2005, AS 2118.6:2012.
9	Fire Pumps and Pump Rooms	C2.12, C2.13, F5.7, G3.8(6), AS 2941:2013 AS2118.1:2017, AS2419.1:2017
10	Kitchen hood fire suppression system (Range Guard)	AS 3772:2008, Range Guard Design Guidelines, UL300, NFPA 17A, NFPA 96
11	Static water storage (hydrants &/or sprinklers)	E1.3, AS 2419.1:2017, AS 2304:2019. E1.5, Spec E1.5 (CL. 7), AS 2118.1:2017, AS 1657:2018, AS 3500.1:2018
12	Fire sprinkler risk – back of house storage areas	OH3 – K_M :8.00 – DD:5.0 mm/min – 18 off heads
13	Fire sprinkler risk – carpark	OH2 – K_M :8.00 – DD:5.0 mm/min – 12 off heads
14	Fire sprinkler risk – ceiling space	LH Skeleton – K_M :8.00 – DD:1.59 mm/min – 6 off heads
15	Fire sprinkler risk – lift motor room	OH1 – K_M :8.00 – DD:5.0 mm/min – 6 off heads
16	Fire sprinkler risk – offices below ceiling	LH – K_M :8.00 – DD:3.19 mm/min – 6 off heads
17	Fire sprinkler risk – plant room	OH1 – K_M :8.00 – DD:5.0 mm/min – 6 off heads
18	Fire sprinkler risk – residential	LH – K_M :8.35 – DD:4.1 mm/min – 4 off heads
19	Fire sprinkler risk – restaurants & cafes	OH2 – K_M :8.00 – DD:5.0 mm/min – 12 off heads
20	Fire sprinkler risk – retail areas	OH3 – K_M :8.00 – DD:5.0 mm/min – 18 off heads
21	Fire sprinkler risk – switch room	Nil Sprinklers. All walls and doors are required to maintain an FRL of 120/120/120.

5.2 WORK BY OTHERS

The following equipment and work will be supplied and/or carried out by other Trades/Authorities as follows:

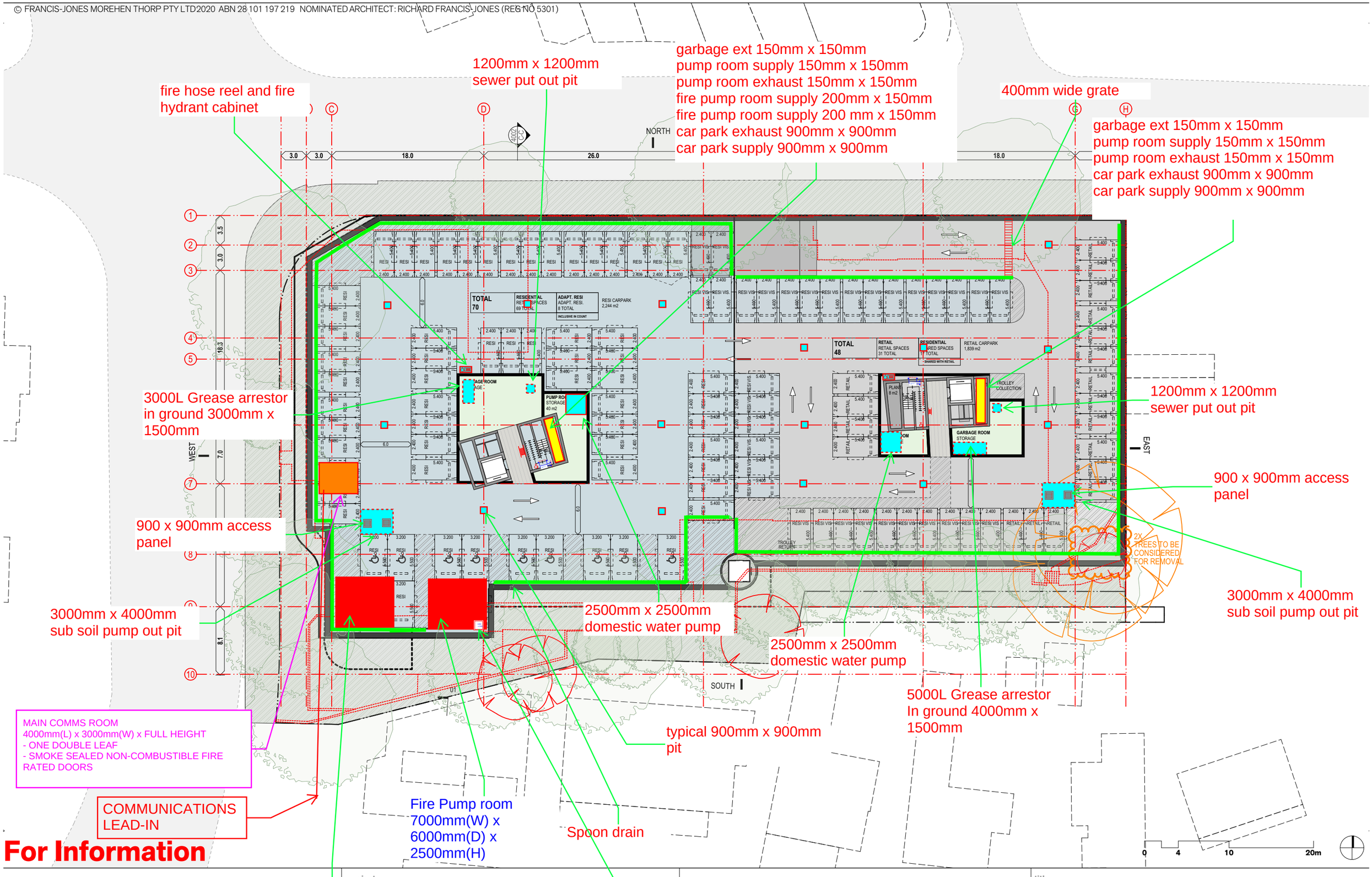
Work by Fire Installer....	Work By ....
in Connection with Mechanical Services	**Mechanical Services Installer**
▪ Supply and installation of cabling between the FIP and other input output to mechanical switchboard.	▪ Supply and installation of Mechanical Services Switchboards, complete with suitable interface relays suitable for connection to FIP. ▪ Connection, testing and commissioning of smoke hazard management. ▪ Providing access and installation for supply duct air detectors.
in Connection with Electrical Services	**Electrical Services Installer**
	▪ Provision of power supply to FIPs and other remote part of the Control and Indication Equipment (CIE).
in Connection with Hydraulic Services	
Provision of stop valves and double check valves for sprinkler system	▪ Provision of domestic water riser and branch for sprinkler connection. ▪ Provision of domestic pump capable to supply domestic and sprinkler system.

6 Building Services Spatial Requirements

Electrical System	Location	Preferred Aspect and Size Etc.	System Requirements and Considerations
Chamber Substation	Ground Level	Refer to Level 3 designer	Refer to Level 3 ASP designer
Alternative: Pad mounted substation	N/A	Refer to Level 3 designer	Refer to Level 3 ASP designer
Main Switchboard and Meter Panel Room	Basement	5800mm x 2800mm x 2600mm	In close proximity to substation. Two doors on opposite side of room. Doors must open outwards. Column free. Meter panel located in MSB for House services and commercial tenancies.
Electrical Riser	Typical floors - Vertically aligned	3200 mm wide x 400 mm deep	Meter panels located in riser cupboards for apartments.
Main Communications Rooms	Basement	2400 mm wide x 1700 mm deep	Room to also contain security head end panel and intercom head end panel, and data loggers for gas supplies.
Communications Riser	Typical floors	1200 wide x 400 mm deep	Vertically aligned
NBN Riser	Typical floors	900 wide x 400 mm deep	Vertically aligned
Mechanical System	**Location**	**Preferred Aspect and Size Etc.**	**System Requirements and Considerations**
Stair Pressurisation	Adjacent Fire Stairs	3200mm x 600mm or as shown on the drawings	1200mm dia fan located on the roof top, pressure sensors, VSD
Car Park Exhaust and Supply	Carpark	900mm x 1100mm each system	Duct work opposite walls at high level
Storeroom Exhausts	Throughout	125mm x 150mm	Small Exhaust Fan
Toilet Exhausts	Throughout	400mm x 500mm	Roof top exhaust fan
Garbage Rooms	Ground floor	150mm x 150mm	Roof top exhaust fan
Lobby Ventilation	2 opposite sides	800mm x 700mm	Fan and grilles
Kitchen Exhaust	Ground Level	800mm x 900mm	Roof top exhaust fan
Kitchen Supply	Ground Level	800mm x 800mm	Grilles and fan at Ground Level
Potable Cold-Water Pump Room	Basement	100mm x 200mm	Grilles and fan
Laundry Room	Basement	125mm x 125mm	Grilles and Fan
Fire Pump Room exhaust and supply	Basement	250mm x 200mm	Fan and grilles
Basement Showers	Basement	125mm x 125mm	Fan and grilles
Outside Air Ducts	apartments and retail spaces	150mm x 150mm	Fan and grilles
Floor and Return Chilled Water	Risers	800mm x 300mm	Chilled Water Pipework
Lobby Ventilation	Lobbies	200mm x 125mm	Ducts and grilles
Hydraulic System	**Location**	**Preferred Aspect and Size Etc.**	**System Requirements and Considerations**
Roof Down Pipes	Internal	250mm x 250mm	Location and numbers to be confirmed
Hydraulic risers	1 or 2 per Apartment	600mm x 300mm Internal Clear	Caters for 100mm Sewer Stack and 100mm Relief Vent as well as water and gas risers.
Master Gas Meter and Regulator	Ground Floor at boundary	1500mm X 1000mm	If in room will need to be 3m x 2m and accessed straight from the street. Mains extension required.
Subsoil pump pit	Basement carpark	4000mmx 5000mm	To be located in ground.

Grease arrestor	Basement carpark	4500mm x 4500mm	To be located in ground.
Sewers pump out pit	Basement carpark	1200mm x 1200mm	Any sewer that cannot be gravity fed to the main is to go in this pit.
Drain Sump	Fire Pump Room	1200mm x 1200mm x 900mm	Be able to withstand the testing of the fire pump
Master Water Meter and RPZD	External at Front Boundary	2200mm x 1000mm	Must be located within 1m of front boundary unless special approval given by Municipal Water Authority with backflow device.
Roof pump room	Roof	2000mm x 2000mm	Adequate ventilation required.
Hot Water Plant 1 (gas system)	Open Roof Plant	6000mm X 2500mm	Adequate ventilation required.
Hot Water Plant 2 (gas system)	Open Roof Plant	6500mm x 2500mm	Adequate ventilation required.
Cold Water Pump Room	Internal (Basement Level)	3500mm x 4500mm	Potable cold-water pump room.
Fire System	**Location**	**Preferred Aspect and Size Etc.**	**System Requirements and Considerations**
Combined Fire Hydrant and Sprinkler System Booster	Adjacent to Main Site Entry and Dominant Towns Mains - External	5250mm (W) x 1500mm (D) x 2975mm (H)	Located within building facade. Fire rating of 90/90/90 for 2m each side and 3m above cupboard. To be located within sight of the main entry to the building and within 8m of a hardstand that can cater a fire brigade pumping appliance (truck).
Combined Fire Hydrant and Sprinkler Tank	Basement - Internal	Tank Volume = 153m^3 (Effective Capacity = 113kL)	At least 1000mm vertical clearance above the access hatch.
Fire Control Room	Street Level - Internal	4000mm (W) x 3000mm (D) x 2500mm (H)	Door must open into the room. Two paths of egress (One directly to the road or open space & the other via the front entry of the building) Fire rating of 120/120/120 Minimum width 2.5m as per NCC Containing the following as per NCC requirements; - master emergency control panel - Fire Indicator Panel - White board - Pin board - Racked plan table
Fire Pump Room	Basement - Internal	7000mm (W) x 6000mm (D) x 2500mm (H)	Opening directly onto a public road or open space or fire isolated egress. (basement fire stairs) - Fire Rating; 120/120/120 - 2 x Diesel Fire pumps - 1 x Diesel Fire relay pump - Sprinkler control valve assemblies - Testing drainage sump (1200 x 1200 x 900) raised of slab. Draining to stormwater pumpout tank.
2 x Dry Fire Riser	Typical floors - Vertically aligned in separate cupboards	1200mm (W) x 400mm (D)	Vertically aligned.
2 x Wet Fire Risers	Typical floors - Vertically aligned in each fire stair	990mm (W) x 270mm (D)	Vertically aligned.

7 Building Services Spatial Drawings



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rev	date	reason	by	chk
3	20/05/2020	For Information	DN	
2	14/05/2020	For Information	DN	RFJ
01	13/05/2020	For Information	DN	RFJ

title
PLANS
Basement 1 Floor Plan

scale	code	sheet no.	rev
1:400 @ A3	GQC	3000	03

garbage ext 150mm x 150mm
pump room supply 150mm x 150mm
pump room exhaust 150mm x 150mm
fire pump room supply 200mm x 150mm
fire pump room supply 200 mm x 150mm
car park exhaust 900mm x 900mm
car park supply 900mm x 900mm
switchboard room exhaust 125mm x 125mm

gas and water meter
for supermarket
1000mm x 600mm x 2

garbage ext 150mm x 150mm
pump room supply 150mm x 150mm
pump room exhaust 150mm x 150mm
car park exhaust 900mm x 900mm
car park supply 900mm x 900mm
Outside air duct 200mm x 200mm

400mm wide grate

2x cabinet 1000mm x 600mm for gas and water sub meter for units

Typical every unit needs an individual hydraulic riser 600mm x 300mm to house all drainage pipes, water pipe, gas pipes and any internal storm water pipework

MAIN SWITCHROOM
7000mm(L) x 5000mm(W) x FULL HEIGHT
- TWO DOORS ONE SINGLE LEAF AND ONE DOUBLE LEAF
- SMOKE SEALED NON-COMBUSTIBLE FIRE RATED DOORS

Gas and Water sub meter cupboard 1000mm x 350mm for units

crust hump to be provided in front of truck turning circle

INDICATIVE LOCATION OF KIOSK SUBSTATION. TO BE VERIFIED BY LEVEL 3 DESIGNER SUBJECT TO AUSGRID APPROVAL.

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03	20/05/2020	For Information	DN	
02	14/05/2020	For Information	DN	RFJ
01	13/05/2020	For Information	DN	RFJ

title
PLANS
Lower Ground

scale 1:400 @ A3 | code **GQC** | sheet no. **3001** | rev **03**

garbage ext 150mm x 150mm
pump room supply 150mm x 150mm
pump room exhaust 150mm x 150mm
fire pump room supply 200mm x 150mm
fire pump room supply 200 mm x 150mm
car park exhaust 900mm x 900mm
car park supply 900mm x 900mm
switchboard room exhaust 125mm x 125mm
restaurant exhaust 200mm x 200mm
cafe exhaust 200mm x 200mm
cafe exhaust 200mm x 200mm
pharmacy shop 200mm x 200mm

Fire Booster Assembly
- Internal Dimensions
5250(L) x 1500(D) x
2975(H)

water and gas master meter rooms
3200mm(D) x
1000mm(D) x
1500mm(H) each

restaurant and cafe future gas meter

garbage ext 150mm x 150mm
pump room supply 150mm x 150mm
pump room exhaust 150mm x 150mm
car park exhaust 900mm x 900mm
car park supply 900mm x 900mm
Outside air duct 200mm x 200mm
outside air duct 200mm x 200mm

2x cabinet 1000mm x 600mm for gas and water sub meter for units

ELECTRICAL RISER CUPBOARD
(W)1600 x (D)600mm
- ALIGNED WITH THE RISER CUPBOARD ABOVE AND BELOW
- SMOKE SEALED NON-COMBUSTIBLE DOUBLE DOORS

COMMS RISER CUPBOARD
(W)1200 x (D)600mm
- ALIGNED WITH THE RISER CUPBOARD ABOVE AND BELOW
- SMOKE SEALED NON-COMBUSTIBLE DOORS

COMMS RISER CUPBOARD
(W)1200 x (D)600mm
- ALIGNED WITH THE RISER CUPBOARD ABOVE AND BELOW
- SMOKE SEALED NON-COMBUSTIBLE DOORS

ELECTRICAL RISER CUPBOARD
(W)1600 x (D)600mm
- ALIGNED WITH THE RISER CUPBOARD ABOVE AND BELOW
- SMOKE SEALED NON-COMBUSTIBLE DOUBLE DOORS

1500mm x 350mm cabinets
1x for retail water sub meter
1x for residential gas sub meter
1x hot/cold residential water sub meter

Fire control room
10m^2

Every unit needs an individual hydraulic riser 600mm x 300mm to house all drainage pipes, water pipe, gas pipes and any internal storm water pipework

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02	14/05/2020	For Information	DN	RFJ
01	13/05/2020	For Information	DN	RFJ

title
PLANS
Ground Floor Plan

scale	code	sheet no.	rev
1:400 @ A3	GQC	3002	03

garbage ext 150mm x 150mm
pump room supply 150mm x 150mm
pump room exhaust 150mm x 150mm
fire pump room supply 200mm x 150mm
fire pump room supply 200 mm x 150mm
car park exhaust 900mm x 900mm
car park supply 900mm x 900mm
switchboard room exhaust 125mm x 125mm
restaurant exhaust 200mm x 200mm
cafe exhaust 200mm x 200mm
cafe exhaust 200mm x 200mm
pharmacy shop 200mm x 200mm

garbage ext 150mm x 150mm
pump room supply 150mm x 150mm
pump room exhaust 150mm x 150mm
car park exhaust 900mm x 900mm
car park supply 900mm x 900mm
Outside air duct 200mm x 200mm
outside air duct 200mm x 200mm

COMMS RISER CUPBOARD
(W)1200 x (D)600mm
- ALIGNED WITH THE RISER CUPBOARD ABOVE AND BELOW
- SMOKE SEALED NON-COMBUSTIBLE DOORS

ELECTRICAL RISER CUPBOARD
(W)1600 x (D)600mm
- ALIGNED WITH THE RISER CUPBOARD ABOVE AND BELOW
- SMOKE SEALED NON-COMBUSTIBLE DOUBLE DOORS

2x cabinet 1000mm x 600mm for gas and water sub meter for units

Every unit needs an individual hydraulic riser 600mm x 300mm to house all drainage pipes, water pipe, gas pipes and any internal storm water pipework

1500mm x 350mm cabinets
1x for residential gas sub meter
1x hot/cold residential water sub meter

ELECTRICAL RISER CUPBOARD
(W)1600 x (D)600mm
- ALIGNED WITH THE RISER CUPBOARD ABOVE AND BELOW
- SMOKE SEALED NON-COMBUSTIBLE DOUBLE DOORS

Every unit needs an individual hydraulic riser 600mm x 300mm to house all drainage pipes, water pipe, gas pipes and any internal storm water pipework

COMMS RISER CUPBOARD
(W)1200 x (D)600mm
- ALIGNED WITH THE RISER CUPBOARD ABOVE AND BELOW
- SMOKE SEALED NON-COMBUSTIBLE DOORS

2X TREES TO BE CONSIDERED FOR REMOVAL

WEST

EAST

SOUTH

0 4 10 20m

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rev	date	reason	by	chk
03	20/05/2020	For Information	DN	
02	14/05/2020	For Information	DN	RFJ
01	13/05/2020	For Information	DN	RFJ

title
PLANS
Podium Floor Plan

scale 1:400 @ A3
code **GQC**
sheet no. **3003**
rev **03**

garbage ext 150mm x 150mm
pump room supply 150mm x 150mm
pump room exhaust 150mm x 150mm
fire pump room supply 200mm x 150mm
fire pump room supply 200 mm x 150mm
car park exhaust 900mm x 900mm
car park supply 900mm x 900mm
switchboard room exhaust 125mm x 125mm
restaurant exhaust 200mm x 200mm
cafe exhaust 200mm x 200mm
cafe exhaust 200mm x 200mm
pharmacy shop 200mm x 200mm

garbage ext 150mm x 150mm
pump room supply 150mm x 150mm
pump room exhaust 150mm x 150mm
car park exhaust 900mm x 900mm
car park supply 900mm x 900mm
Outside air duct 200mm x 200mm
outside air duct 200mm x 200mm

COMMS RISER CUPBOARD
(W)1200 x (D)600mm
- ALIGNED WITH THE RISER CUPBOARD ABOVE AND BELOW
- SMOKE SEALED NON-COMBUSTIBLE DOORS

ELECTRICAL RISER CUPBOARD
(W)1600 x (D)600mm
- ALIGNED WITH THE RISER CUPBOARD ABOVE AND BELOW
- SMOKE SEALED NON-COMBUSTIBLE DOUBLE DOORS

1500mm x 350mm cabinets
1x for residential gas sub meter
1x hot/cold residential water sub meter

Every unit needs an individual hydraulic riser 600mm x 300mm to house all drainage pipes, water pipe, gas pipes and any internal storm water pipework

Every unit needs an individual hydraulic riser 600mm x 300mm to house all drainage pipes, water pipe, gas pipes and any internal storm water pipework

2X TREES TO BE CONSIDERED FOR REMOVAL

COMMS RISER CUPBOARD
(W)1200 x (D)600mm
- ALIGNED WITH THE RISER CUPBOARD ABOVE AND BELOW
- SMOKE SEALED NON-COMBUSTIBLE DOORS

ELECTRICAL RISER CUPBOARD
(W)1600 x (D)600mm
- ALIGNED WITH THE RISER CUPBOARD ABOVE AND BELOW
- SMOKE SEALED NON-COMBUSTIBLE DOUBLE DOORS

WEST

EAST

0 4 10 20m

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03	20/05/2020	For Information	DN	
02	14/05/2020	For Information	DN	RFJ
01	13/05/2020	For Information	DN	RFJ

title
PLANS
Level 2 Floor Plan

scale	code	sheet no.	rev
1:400 @ A3	GQC	3004	03

garbage ext 150mm x 150mm
pump room supply 150mm x 150mm
pump room exhaust 150mm x 150mm
fire pump room supply 200mm x 150mm
fire pump room supply 200 mm x 150mm
car park exhaust 900mm x 900mm
car park supply 900mm x 900mm
switchboard room exhaust 125mm x 125mm
restaurant exhaust 200mm x 200mm
cafe exhaust 200mm x 200mm
cafe exhaust 200mm x 200mm
pharmacy shop 200mm x 200mm

COMMS RISER CUPBOARD
(W)1200 x (D)600mm
- ALIGNED WITH THE RISER CUPBOARD ABOVE AND BELOW
- SMOKE SEALED NON-COMBUSTIBLE DOORS

ELECTRICAL RISER CUPBOARD
(W)1600 x (D)600mm
- ALIGNED WITH THE RISER CUPBOARD ABOVE AND BELOW
- SMOKE SEALED NON-COMBUSTIBLE DOUBLE DOORS

East side hot water plant 4500mm x 2000mm including circulation pump

garbage ext 150mm x 150mm
pump room supply 150mm x 150mm
pump room exhaust 150mm x 150mm
car park exhaust 900mm x 900mm
car park supply 900mm x 900mm
Outside air duct 200mm x 200mm
outside air duct 200mm x 200mm

discharging to roof

residential central hot water plant 5000mm x 2000mm including circulation pump

1500mm x 350mm cabinets
1x for residential gas sub meter
1x hot/cold residential water sub meter

Every unit needs an individual hydraulic riser 600mm x 300mm to house all drainage pipes, water pipe, gas pipes and any internal storm water pipework

2X TREES TO BE CONSIDERED FOR REMOVAL

WEST
EAST
SOUTH

0 4 10 20m

For Information

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project
The Quadrangle - Castlecrag
100 Edinburgh Road
Castlecrag NSW 2068

rev	date	reason	by	chk
03	20/05/2020	For Information	DN	
02	14/05/2020	For Information	DN	RFJ
01	13/05/2020	For Information	DN	RFJ

title
PLANS
Level 3 Floor Plan

scale	code	sheet no.	rev
1:400 @ A3	GQC	3005	03

garbage ext 150mm x 150mm
pump room supply 150mm x 150mm
pump room exhaust 150mm x 150mm
fire pump room supply 200mm x 150mm
fire pump room supply 200 mm x 150mm
car park exhaust 900mm x 900mm
car park supply 900mm x 900mm
switchboard room exhaust 125mm x 125mm
restaurant exhaust 200mm x 200mm
cafe exhaust 200mm x 200mm
cafe exhaust 200mm x 200mm
pharmacy shop 200mm x 200mm

residential central hot water plant 5000mm x 2000mm including circulation pump

discharging to the roof

2000mm x 1000mm for common area hot water system

PV PANELS
PV PANELS
RESIDENTIAL PLANT
RESIDENTIAL PLANT
RETAIL PLANT
RESIDENTIAL PLANT
RESIDENTIAL PLANT
RETAIL PLANT

2X TREES TO BE CONSIDERED FOR REMOVAL

WEST
EAST
SOUTH

4002 C-C
4000 C-A
01
01

0 4 10 20m

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title
PLANS
Roof Plan

scale 1:400 @ A3
code **GQC**
sheet no. **3006**
rev **03**

FJMT Scheme -Friday 22nd May 2020

DEVELOPMENT AREAS

AREAS	RESIDENTIAL	RETAIL

	GFA	NSA	NLA	
BASEMENT 2				
BASEMENT 1				
LOWER GROUND	1551	770	647	0.3 :1
GROUND	2720	904	1440	1.7 :1
PODIUM	2585	2236		
LEVEL 2	2383	2150		
LEVEL 3	1173	1062		
TOTAL	**10412**	**7122**	**2087**	

EFFICIENCY	GFA / NLA+NSA	88%

3 STOREYS (EAST) & 4 STOREYS (WEST)
FSR 2.0 :1

Targets	m²	
Site area	5166	
Target GFA	10332	m2
Target FSR	2.0	:1

APARTMENT MIX

1BED	2 BED	3 BED	4BED
3	8	1	0
2	5	0	0
4	4	9	1
6	6	8	0
1	5	4	0
16	**28**	**22**	**1**
24%	42%	33%	1%
Total			**67**

CARPARKING REQUIREMENTS

RESIDENTIAL			
Studio Apartments	0.5 per 1 apartment	0.5	N/A
Apartments	1 per / 1 dwelling	1	67
Visitor Spaces	1 per 4 apartments	0.25	17
Accessible Resi	Refer WDCP 6.2.2.2	50% Apartments Adapt	8 (Inclusive)
		TOTAL	**84**
RETAIL			
Retail (Shop)	1 per 25m2 (@85%)	25	70.958
Accessible Shop	3% of parking spaces	3%	2.1
		TOTAL	**73**

BICYCLE PARKING

BICYCLE LOCKERS			
Apartments	1 per 10apartments	0.1	6.7
Retail / Restaurant	1 per 450m2	450	5
		TOTAL	**11**
RAILS/RACKS			
Apartments	1 per 10 units	10	6.7
Retail / Restaurant	1 per 150m2	150	13.9
		TOTAL	**21**

** Note: In the case of shop development proposals, where the shop selling areas are not precisely defined on the plans submitted to Council for development approval, determination of parking requirements will be based on a figure equivalent to 85 percent of the net lettable area .*

WDCP C4.2 - Table: Schedule of Car parking Requirements
Carparking numbers are neither maximum nor minimum rates

SEPP65 / ADG COMPLIANCE

SOLAR >2 HOURS	CROSS VENT	NO SOLAR ACCESS	COMMUNAL SPACE	DEEP SOIL
3	6	9	100	638
4	3	3	1200	602
13	11	5		
18	14	2		
9	10	1	800	
47	**44**	**20**		
70%	**66%**	**30%**	**2100**	**1240**
Min 70%	Min 60%	Max 15%	25% Site = 1,292m²	7% Site = 362m²

PROVIDED CARPARK

BASEMENT 2		
Residential Carpark		70
Resi Visitor		17
Residential Accessible (inclusive)		8
	Total Resi	**87**
Retail Carpark		30
Retail Accessible (Included in above count)		0
	Total	**30**
	Complies?	

BASEMENT 1		
Retail Carpark		39
Retail Accessible (Included in above count)		2 (inclusive)
	Total	**39**

Residential Visitor Bike Rack		TBC
Bicyle / Store Lockers		*TBC*
	Total Bicycles	**0**

Totals			
		Residential	**87**
		Retail	**69**

17 visitors to be shared with Retail

FOR CO-ORDINATION ONLY

For Information

0 4 10 20m

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DEVELOPMENT
Development Summary

scale 1:400 @ A3 | code **GQC** | sheet no. **9000** | rev **02**