Report

Building Services Summary

270 PACIFIC HIGHWAY, CROWS NEST
Fitzpatrick & Partners

CONFIDENTIAL

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1 EXECUTIVE SUMMARY

Norman Disney and Young have been engaged to provide a high level design brief for the proposed development at 270 Pacific Highway, Crows Nest. The proposed site is intended to be a development consisting of:

- Basement level car parks;
- Lower ground office space;
- Ground floor retail and commercial space; and
- Commercial Tower.

The purpose of this report is to provide a high level design brief for the building engineering services. This information is presented to enable the architect to review the services design criteria in accordance with Australian standards & codes and relevant building design standards and does not preclude alternative design strategies.

Allowance of sufficient space for all services to be incorporated into all floor plans including basements and plantrooms. The building services will need to have the ability to be run on separate systems and separately metered. Significant service requirements, such as electrical substations, alternative power generation plants, wastewater recycling, stormwater systems, can be common to the whole development.

Consideration should be given to services that require direct street frontage for maintenance or emergency access. If the building design proposes the use of podium roof top areas for tenants, visitors, outdoor dining, etc, any services plant or exhaust must be designed to protect and prioritise the amenity of such uses.

This indicative building services brief provides preliminary assumptions for the purposes of the planning process only, does not preclude alternative design strategies and will need to be further developed as part of the DA process. Inclusion of this brief is intended only to provide high-level assumptions to cover off any significant spatial requirements.

This brief shall not be relied upon as providing any warranty or guarantee of the building, its services or equipment.

2 COMMERCIAL TOWER

2.1 Mechanical Services

Mechanical services consist of the following:

2.1.1 Basement Car Park Ventilation

Enclosed car parks shall be provided with mechanical ventilation in accordance with AS1668.2 - 2012.

Car park exhaust and make-up air shall be via either masonry plenums or ducts located in dedicated zones around the perimeter of the car park and elsewhere as required to achieve compliant coverage.

Spatial allowance shall be made in the car parks for exhaust and supply air fan rooms with connectivity to respective plenums or ducts.

Car park exhaust air shall be discharged above street level with discharge point/s a minimum of 3.0 m above pedestrian thoroughfares and a minimum of 6.0 m away from the property boundary to an adjacent allotment or any ventilation opening (outside air intake or operable openings to the building). Nominal sizes and locations of exhaust point/s shall be nominated along with vertical exhaust air riser spatials with direct connectivity to fan rooms.

Car park make-up air shall be via intake point/s located above street level. Nominal sizes and locations of intake point/s shall be nominated along with vertical make-up air riser spatials with direct connectivity to fan rooms.

All miscellaneous plant rooms (i.e. Hydraulic service rooms, Main Switch Room, Sub Station, Main Communication Room, Garbage Room, Fire Pump Room, Grease Arrestor etc) and end of trip facilities shall be provided with the required ventilation systems as per AS1668.2 - 2012. Nominal sizes and location of exhaust and supply air intake point/s shall be nominated for ventilation of these rooms along with vertical air riser spatials.

Plant room and end of trip facility exhaust air shall be discharged above street level with discharge point/s a minimum of 3.0 m above pedestrian thoroughfares and a minimum of 6.0 m away from the property boundary to an adjacent allotment or any ventilation opening (outside air intake or operable openings to the building).

2.1.2 Retail Spaces

Retail spaces shall be provided as shell and core space for fit out by retail tenants.

Make-up and outside air shall be via louvres located in the façade frontage of retail spaces at high level.

Allowance shall be made for provision of commercial kitchen exhaust to nominated food and beverage tenancies (nominal allowance of 2 x 2,000 l/s). Spatial provisions to be nominated for kitchen exhaust fan room/s and interconnecting vertical exhaust air risers.

Preference is for exhaust vertical discharge of kitchen exhaust in accordance with AS1668.2 requirements. Should a horizontal discharge configuration be proposed, additional spatial provisions should be made for the required filtration and treatment systems.

Kitchen exhaust shall be discharged above street level with discharge point/s a minimum of 3.0 m above pedestrian thoroughfares and a minimum of 6.0 m away from the property boundary to an adjacent allotment or any ventilation opening (outside air intake or operable openings to the building).

Cooling and heating to retail tenancies shall be done via tenant installed above ceiling units connected to the central thermal plant with capped pipework connections provided within the envelope of each tenancy. The retail tenancies shall include sufficient height to accommodate installation of these units.

2.1.3 Central thermal plant and air conditioning system type

The central thermal plant for the building shall comprise of chilled water refrigeration machines, cooling towers, heating hot water generation units and ancillary equipment such as pumps and heat exchangers.

The configuration of the central thermal plant shall satisfy the requirements of a PCA A-Grade building.

The heating hot water generation equipment shall not be via gas fired equipment. A fully electric solution is to be allowed for in the spatial planning.

The central thermal plant equipment and configuration proposed in conjunction with the air conditioning system type shall be capable of achieving the project ESD target ratings (noted under Section 4).

The sizing of the plant and plant rooms shall take into consideration whole of building life plant maintenance, plant replacement and future flexibility considerations.

The cooling towers shall be located within the roof level plant room open to above and with sufficient clearance or louvered façade around the plant space to provide the necessary air intake provisions to the towers.

The air conditioning system type is currently based on a hybrid chilled beam and VAV type system solution.

The mechanical plant and equipment shall be housed within dedicated plant floors. The air handling units and ventilation system areas shall have direct access to louvres on the façade of the plant room floors. Louvers shall be provided for both air intake and air discharge with minimum required separation distances maintained between each. Nominal intake and discharge louver locations and sizes shall be nominated for each plant level.

2.1.4 Tower Ventilation

Smoke hazard management and stair pressurisation systems shall be incorporated to comply with NCC and AS1668.1:2015 requirements. Each pressurised stair will be provided with a vertical masonry shaft located directly adjacent the stair.

The stair pressurisation will be achieved using one or more fans per stair located within a fire rated enclosure adjacent to the stair within each plant room floor with direct access to an air intake louvre located within the facade.

Spatial allowances shall be made for stair pressurisation systems including nominal sizes and locations for intake louvres.

Relief air for the stair pressurisation systems in the basement shall be via the car park exhaust system.

Miscellaneous ventilation systems are to be provided in accordance with the requirements of AS1668. 2 and for provision of tenant supplementary services.

2.1.5 Tower Risers

The core of the office tower shall incorporate spatial provisioning for the required mechanical services risers associated with the air conditioning and ventilation system types proposed for the building.

The layout of the riser space must take into consideration horizontal connectivity to the floor NLA where serving the office spaces as well as connectively to the air handling systems and fans located within the plant floors.

2.2 Electrical Services

Electrical services consist of the following:

2.2.1 Incoming Network Electrical Supply

The incoming electrical supply to the building is envisioned to originate from the Ausgrid high voltage underground reticulation network. Ausgrid compliant chamber substation(s) are to be provided to power the building. Further substation requirements and details are to be confirmed with Ausgrid.

Substations are to be integrated into the fabric of the building. The location and design of substations should ensure chambers and enclosures are recessed within the building envelope and positively contribute to the architecture, landscape and public domain design quality. If required, screening is to be of high material quality equal in standard to the facade treatment applied to principle buildings and should not compromise activation of street frontages nor the public domain. The substations are to have two dedicated egress points (for basement style substations) and a three-hour fire-rated construction. Substation ventilation inlet and outlets surrounds are to be 3 hour fire rated Ausgrid compliant and integrated into the façade.

Provision should be made for substations to service the upper and lower portions of the building and should not be collocated to avoid services coordination and congestion and planning.

2.2.2 Upper level Plant (Access and Removal)

Lifting facilities are to be provided for all upper level plant areas including substations. Lifting access set down areas are to be provided external to substations for equipment (transformers, etc.) replacement.

2.2.3 Main Switch Room(s)

The main switchroom is envisioned to be as close as possible to the associated substation and incorporate the main switchboards for each component of the development including separate switchboards for the retail, house and tenant components.

2.2.4 Power Distribution

Riser cupboards are to be provided per floor for tenant and house distribution boards as indicated on the attached matrix. A separate car park distribution board is to be considered for separate operation and metering of the car park.

2.2.5 Standby Power Generation

Standby power generation is to be provided to comply with PCA A-Grade requirements including generator diesel bulk fuel tanks and pump room. The bulk fuel tanks have capacity to supply the generator for a minimum of 24 hours. A fuel riser will be required to transport fuel to the generator plant room location.

2.2.6 Lighting and Lighting Control

All lighting including emergency and exit lighting for the basements is to be LED technology. All lighting control systems are to be electronic centralised and separate for each component of the development.

Provision of power to illuminated sky signage is to be allowed for.

2.3 Technology

2.3.1 Communications Distribution

The communications distribution for the development is to be managed within two separate Main Distribution Frame (MDF) rooms. The two rooms are to be located close to and on separate site boundaries and different floors to allow for redundancy. MDF rooms to be located in close proximity to the primary ELV/ICN riser and secondary ICN riser respectively, to avoid long horizontal route lengths.

A Distributed Antennae System (DAS) will be used to allow for distribution of mobile telephone coverage throughout the building. The system head-end equipment is to be housed within a room located in the basement and require double door access for equipment delivery.

The DAS and other Extra Low Voltage (ELV) equipment and cabling, including security and MATV, shall be reticulated throughout the building in a dedicated ELV riser /room. The riser / room shall be large enough to contain an accessible communications rack as well as communication risers. This riser is envisioned to run vertically stacked and continuous within the building core to the roof level and be in an accessible common area location.

2.4 Hydraulic Services

2.4.1 Cold Water Service

A dedicated cold water booster pump to supply cold water has been allowed.

2.4.2 Trade Waste

A grease arrestor has been allowed for in line with PCA requirements.

2.4.3 Sewer

Sewer spatial requirements should be allowed for within the development.

2.4.4 Hot Water Service

Dedicated hot water plant should be allowed for. Careful consideration should be given to the volume of heated water required.

2.5 Fire Services

The scope of works included in the fire services is briefly summarised as:

- Automatic Fire Detection System
- Sound System and Intercom System for Emergency Purposes
- Combined Fire Sprinkler and Hydrant System
- Fire Hose Reels
- Fire extinguishers

2.5.1 Design Standards and Criteria

The design criteria for the Fire Services is as follows:

ITEM	STANDARDS
Fire Detection System	NCC, AS 1670.1
Sound System and Intercom System for Emergency Purposes	NCC and AS 1670.4
Combined Fire Sprinkler and Hydrant System	NCC, AS 2419, AS2118.1 and AS2118.6
Fire Hose Reels	NCC and AS 2441
Fire Extinguishers	NCC and AS 2444

2.5.2 Fire Detection System

The installation of automatic fire detection system in accordance with the requirements of the NCC and AS 1670.1 shall include:

- A fully addressable fire detection system shall be provided throughout all areas.
- System monitoring in accordance with AS1670.3
- Direct Brigade Alarm connected to an approved monitoring service for all fire and fault signals.

2.5.3 Sound System and Intercom System for Emergency Purposes

Sound System and Intercom System for Emergency Purposes shall be provided in the form of speakers powered from the Main Emergency Control Panel (MECP) located in the Fire Control Room.

The speakers shall be spaced at standard industry spacing to meet the minimum requirements of AS 1670.4.

Warden Intercom Points (WIPs) shall be located at the main building entry and in common areas on each floor. Where the floor is divided into more than one emergency zone, each emergency zone shall have one WIP. Each designated emergency lift shall have a WIP. All WIPs shall be connected to the MECP.

Emergency Call Points (Break Glass Alarms) shall be located adjacent each WIP.

2.5.4 Fire Hydrant System

Fire hydrant protection shall be provided throughout the retail spaces in line with the requirements of the NCC and relevant Australian Standards and Authorities. All fire hydrants are to be located within the fire stairs.

2.5.5 Fire Hose Reels

Fire hose reels shall be installed throughout the carpark and retail spaces of the building in accordance with AS2441 requirements and shall be extended from the domestic water supply.

2.5.6 Fire Sprinkler System

An automatic fire sprinkler system shall be installed throughout the building. The fire sprinkler system shall share water supply infrastructure with the hydrant system. Fire sprinkler control valve assemblies will be located on each floor within the fire stairs in order to allow isolation of each floor without isolating the entire system. A flow switch shall be installed on each floor in order to allow indication of sprinkler operation at each floor level.

2.5.7 Fire Extinguishers

Fire extinguishers shall be installed throughout the building in accordance with NCC requirements for the provision of first attack firefighting equipment.

3 VERTICAL TRANSPORTATION SERVICES

3.1 Codes and Regulations

Design of the Vertical Transportation Services shall be in accordance with, but not limited to the relevant sections of the following statutory requirements:

- NCC - National Construction Code (B.C.A.)
- A.S.1735 Australian Standards - Lift Code - Lifts, escalators and moving walks
- A.S.3000 Australian Standards - Wiring Rules
- The requirements of the relevant Work Health & Safety Act.

3.2 General Description

Vertical Transportation Services within the proposed development works are classified as base building services and shall be arranged to provide efficient circulation throughout the building.

Final detail, location and dimensions are to be determined within the design development process. Where applicable, due regard shall be given to the documented requirements of the end user groups.

3.2.1 System Inclusions:

1. **Energy Efficiency**

   All lifts will be provided with variable voltage, variable frequency AC drive systems, incorporating a regenerative drive feature, and lift car lighting and ventilation shall incorporate 'auto – off' controls.

2. **Destination Control System**

   All tower passenger lifts to be provided with Destination Control System.

3. **Restricted Access Facilities**

   All lifts will be capable of interfacing with the base building access control system. Provision for installation of a CCTV camera in each lift car will also be included.

4. **On Site Lift Monitoring**

   A stand-alone PC based monitor / management system will be provided.

5. **Finishes**

   High quality lift car interior finishes will be in accordance with Architectural detail.

6. **Disabled Persons Facilities**

   All lifts will be provided with disabled persons facilities.

7. **Escalators**

   Escalators, if required, shall be variable voltage, variable frequency AC drive systems, 30 degree maximum incline and 1,000mm step width.

3.3 General Design Scope

Lift Services shall be designed to satisfy the agreed Performance Benchmark Requirements of the Property Council of Australia Guidelines Revision 3 (PCA – 2019) for a new A-Grade office building.

3.4 Lift Design & Performance Details

A summary of PCA Revision 3 Guidelines for Lift Services is provided below for information:

Clause	Parameter	A-Grade
E1	Car Capacity	≥ 16 passengers
E2	Lateral Vibration	≤ 20 mg
E3	Waiting Time	Up peak ≤ 30 sec DCS Lunch Peak ≤ 40 sec
E4	Handling Capacity	Up Peak ≥ 13% DCS Lunch Peak ≥ 11%
E5	Goods Lift	≥ 1
E6	Goods Lift	≥ 1,400 kg min

Notes:

- Up Peak Waiting Time and Handling Capacity are based on based on a 5 minute peak interval, and 100% of the building population.
- DCS lunch peak Waiting Time and Handling Capacity are based on a 5 minute two-way traffic interval and 100% of the building population.
- Population density is calculated based on one (1) person per 12m^2 of the building NLA.
- Carpark / Shuttle Lift performance is not included in the PCA guidelines.

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4 SUSTAINABILITY SERVICES

4.1 General Requirements

The design shall demonstrate appropriate consideration of the following policy, legislation and industry guidance:

- A Carbon Positive Roadmap for the Built Environment: Stage 1: Commercial, *institutional, and government buildings and fitouts* [2019]. Green Building Council of Australia (GBCA)
- Property Council of Australia Guidelines Revision 3 (PCA – 2019)
- Bringing embodied Carbon upfront: *Coordinated action for the building and construction sector to tackle embodied carbon* [2019]. World Green Building Council (WGBC)

4.2 Project Targets

The design must incorporate the following elements as a minimum:

- The building will comply with the provisions of BCA 2019 Section J1.
- The building is being designed in line PCA (Property Council of Australia) Guide to Office Building Quality, 2019 Grade A:
  - Green Star (GS) Design & As Built equivalency performance of 5 Star,
  - NABERS Office Energy 5.5. Star,
  - NABERS Office Water 4 Stars,
  - Percentage of Indoor Environment Quality points under GS, minimum 60%, and
  - Preparation of a project specific Climate Change Adaptation and Resilience Plan.
- Optimisation of building orientation and shading to minimise air conditioning energy consumption.
- LED lighting will be used throughout.
- Minimum 4-star dual-flush toilets and taps and 3-star urinals will be used.
- A rainwater tank is proposed to capture rainwater for irrigation and toilet flushing reuse.
- Photovoltaic Panels will provide on-site renewable energy
- An all-electric services strategy will be considered.
- Recognition of IPCC climate change scenarios RCP4.5 and RCP8.5 and simulation of greenhouse gas emissions impacts using appropriate future climate data sets.

Spatial Requirements	Item	System	Location	Qty	Weight (kg) (Each)	Spatial Requirements (m²) (Each)	Comments
Mechanical Services						(LxWXH)	
M001	Chilled Water System					17m x 10m x 4.5m	Chilled water system would ideally be located in a podium or low-level plantroom to enable removal and replacement of chillers
M002	Cooling Towers		Roof			20m x 6.5m x 5.5m	Cooling towers to be open to above with louvered walls for air flow into the area
M003	Heating hot water system (Non-gas fired)		Roof			12m x 15m x 4m	Heat pumps to be open to above with louvered walls for air flow into the area
M006	Air Handling and Ventilation Plantroom/s	- Air Handling Units - Ventilation fans incl. tenant supplementary services	Plantroom			~880sqm x 5.5m	Louvers around the perimeter of AHU plant room for intake and relief air
M007	Supply Air Risers - (combined area)	Centre Zone and North, East & South Perimeter Zone Risers	Core			21.0m²	Final riser arrangement in the core will need to consider configuration of take-offs and access to floor plate
M008	Return / Smoke Exhaust Riser	Return / Smoke Exhaust Riser	Core			2x9.0m² (this does not include any use of the atrium as potential for return/smoke exhaust)	Must be vertically aligned through the building to the roof level
M009	Toilet Exhaust	Toilet exhaust riser shaft	Core			3.2m² (including supp. T.Ex for A Grade, circa 2.0m2 without supp T.Ex)	Includes provision for A grade tenant supplementary toilet exhaust.
M010	Supplementary General Exhaust	General exhaust riser shaft	Core			1.6m²	Includes provision for A grade tenant supplementary general exhaust.
M011	Supplementary Outside Air	Outside air riser shaft	Core			3.0m²	Includes provision for A grade tenant supplementary outside air.
M012	Kitchen Exhaust (Commercial Office)	Kitchen exhaust riser and fan, kitchen exhaust make up air riser	Core/Plantroom			Exhaust: 1.2m² Make-Up: 1.2m²	The PCA Premium Grade guideline calls for 1 kitchen exhaust and make-up air riser per rise.
M013	Kitchen Exhaust (Retail)	Kitchen exhaust riser and fan	Core/Plantroom			Exhaust: 1.2m²	One of these risers required for each retail F&B tenant. Make-up air to retail tenancies to be via louvers above the tenancy facade
M014	Stair Pressurisation	Riser shaft and fans	Core/Plantroom			1.5m²	Shafts must be directly adjacent stairs and have connectivity to Air Handling Plantroom. Fans incorporated on roof / in air handling plant rooms
M016	Mech Pipework Riser	Pipework Shaft	Core/Plantroom			~2.5m²	Vertically aligned through building.

Spatial Requirements	Item	System	Location	Qty	Weight (kg) (Each)	Spatial Requirements (m²) (Each)	Comments
Electrical Services							
E001	HV Electrical Street Feeder	11kV Cable Route	From street to substation				Easement only to zone substation.
E002	Substation	As per Ron G's separate advice					
E003	Main Switchroom						
E004	Generator Bulk Fuel Tanks	2 x 10,000 L Diesel Fuel Tanks	Basement/below ground	1 off		8000mm (W) x 7000mm (D) x 3000mm H (min)	Space (can be below basement slab)
E005	Pump Room		Basement - in proximity to bulk fuel tanks.	1 off		4000mm (W) x 3000mm (L)	
E006	Load Bank Space	1000kW Load Banks	Roof or well ventilated location	1 off		4000mm (L) x 3000mm (W) x 3500mm (H) min.	
E007	Fuel Riser		Between fuel tanks, generator and refueling point	2 off		300mm (W) x 300mm (D)	Dedicated riser is required to be vertical and contiguous through the building.
E08	Generator Room	1 x 1500kVA Generators	Roof or Mid plant room.	1 off		10000mm (L) x 12000mm (W) x 4500mm (H) min.	Includes space for generators, one 1500kVA allowance as spatial provision for future tenants. Room requires ventilation louvres on two sides. One large equipment access door / personnel egress and additional personnel egress door. 2 hours fire rated room.
E09	House Electrical Riser Room	House LV power and lighting	Core (all levels)	1 off		3000mm W x 3000mm D (min) - to fit house board and electrical cable risers	Dedicated risers is required to be vertical and contiguous through the building.
E010	House Electrical Riser Cupboards (can be conslidated within E09)	House LV lifts and mechanical, etc.	Core (all levels)	1 off		3000mm W x 700mm D (min) - electrical cable risers to plant mid and roof plant rooms	Dedicated risers is required to be vertical and contiguous through the building.

E011	Commercial Electrical Cupboards	Tenant Electrical Services	Core (all levels)	1 off		3000mm W x 700mm D (min) - to fit in metering and tenant boards (2)	Dedicated risers is required to be vertical and contiguous through the building where possible.

Spatial Requirements	Item	System	Location	Qty	Weight (kg) (Each)	Spatial Requirements (m^2) (Each)	Comments
Communication and Security Services							
C001	Security Room	House & Tenant security services	Ground Floor	1 off		4000mm (L) x 3000mm (W)	Line of sight to lobby.
C002	DAS/Mobile room	Mobile phone equipment	Ground Floor or Basement	1 off		32m^2 area	Mobile room to house building Distributed Antenna System (DAS) racks.
C003	Satellite Room	Pay & Free to air TV	Roof Level / Upper plant room	1 off		3000mm (L) x 4000mm (W) x 2700mm (H)	Satellites and terrestrial antennae for MATV system will be located on roof of building. Dedicated cable pathway from satellite / antennae location to satellite room will be required. Allow 12sqm on the roof for satellite dishes etc.
C004	Main Distribution Frame (MDF) No. 1	Incoming voice / fibre cabling	Ground or Basement	1 off		5000mm (W) x 4000mm (W) x 2700mm (H) each	Allowance for fibre connection cabinets rooms located adjacent to risers. MDF rooms are ideally positioned such that there is direct access to the street, and are separated on either side of building and on separate floors. 2 hours fire rated rooms.
C005	Main Distribution Frame (MDF) No. 2 (Optional as only 1 is needed for A Grade)	Incoming voice / fibre cabling	Ground or Basement	1 off		5000mm (W) x 4000mm (W) x 2700mm (H) each	Allowance for fibre connection cabinets rooms located adjacent to risers. MDF rooms are ideally positioned such that there is direct access to the street, and are separated on either side of building and on separate floors. 2 hours fire rated rooms.
C006	House ELV Riser / Room (Primary)	Riser cables and IDF Voice cable terminations.	Core Area (All levels)	1 off		3000mm (W) x 3000mm (D) x 3000mm (H) min.	An ELV room is preferred due to ELV contractors wanting to work within a designated ELV room in lieu of an LV room. An ELV room has been included due to the potential requiremetn of an ICN. Should ICN not be preferred, an ELV cupboard may be suitable. Dedicated house riser / room is required to be vertical and contiguous through the building. Includes BMCS, DAS, MATV
C007	House ELV Risers (Secondary)	Riser cables and IDF Voice cable terminations.	Core Area (All levels)	1 off		1500mm (W) x 600mm (D).	Dedicated house riser is required to be vertical and contiguous through the building.
C008	Tenant Communications Riser No.1	Riser cables and IDF Voice cable terminations.	Core Area (All levels)	1 off		900mm W x 600mm D x 2400mm H (min)	Dedicated tenant risers to be provided, each of minimum dimensions as noted adjacent. Tenant risers are required to be vertical and contiguous through the building. Tenant risers are to be physically separated. One tenant riser per 30,000sqm of NLA area as per PCA A grade requirements.
C009	Tenant Communications Riser No. 2 (optional as the building is less than 30,000m2 NLA)	Riser cables and IDF Voice cable terminations.	Core Area (All levels)	1 off		900mm W x 600mm D x 2400mm H (min)	Dedicated tenant risers to be provided, each of minimum dimensions as noted adjacent. Tenant risers are required to be vertical and contiguous through the building. Tenant risers are to be physically separated. One tenant riser per 30,000sqm of NLA area as per PCA A grade requirements.
C012	Security Riser		Core Area (All levels)	1 off		900mm W x 600mm D x 2400mm H (min)	Dedicated security riser to be vertical and contiguous through the building. Includes space for security field panels.

Spatial Requirements	Item	System	Location		Weight (kg) (Each)	Spatial Requirements (m^2) (Each)	Comments
Hydraulics Services							
H001	Water Meter Assembly		Property Boundary - access from outside	1		2m x 3.0m	To be located in common area to allow unrestricted 24-hour access to Sydney Water
H002	Gas Meter Assembly		Property Boundary - access from outside	1		3m x 3m	To be located in common area to allow unrestricted 24-hour access to Jemena. Gas room will require ventilation.
H003	Water Storage Tank	25000L	Basement	1		4m x 3m (2.5 height)	Depending on final height cold water riser may need to be adjusted as maximum riser height is limited by pressure at bottom.
H004	Cold Water Pumps	2 Duty / 1 Stand-by	Basement beside water storage tanks	3		4m x 3m	
H005	Hot Water Plant (High Level)	Gas Fired System	Rooftop / mid level plant room	1		4m x 3m	Hot Water for 1 hour peak period. This include water heaters, storage tanks and recirculation pumps.
H007	Hot Water Plant (EOTFl)	Heat Pump System	Basement plant room	1		5m x 4m	Hot Water for 1 hour peak period. This include water heaters, storage tanks and recirculation pumps. Will consist of heat pumps.

H008	Recycled Water Tank	40000L	Basement	1		4m x 4m (2.5 height)	There will be a DA condition to conenct and provide recycled water to toilets, laundries and irrigation
H009	Recycled Water Pumps	1 Duty / 1 Stand-by	Adjacent to rainwater tank	1		4m x 3m	
H010	Recycled Water Treatment Plant	Bag filters, Backwash and UV	Adjacent to rainwater pumpset	1		In the pump room	
H011	Grease Arrestor Room	2 x 5,000L	Basement	2		5m x 4m	2 Grease arrestor rooms required.
H012	Sewer Pump-out	10000L	Basement	1		Inground	To be installed in-ground. Adjacent to the EOTF and grease arrestors
H013	Stormwater Pump-out	3000L	Basement	1		Inground	
H014	Drainage stacks in amenities	Hydraulic drainage services risers	Core Amenities	2		1.2m x 0.6m	Drainage stacks to be within the male and female amenities. Including grease waste for tenancy fitout
H015	Water and gas risers	Hydraulic pressure services risers	Corridor	1		1.5m x 0.6m	Metering to be for each tenancy within the cupboard. To be accessible from the corridor
H016	Drainage stacks in the floor space	Hydraulic drainage services risers	Floor plate	4		0.75m x 0.6m	Including grease waste for tenancy fitout for PCA grade and future flexibility.
Spatial Requirements	**Item**	**System**	**Location**	**Qty**	**Weight (kg) (Each)**	**Spatial Requirements (m^2) (Each)**	**Comments**
Fire Protection Services							
F001	Fire Alarm System / Sound System Intercom System for Emergency Purposes	Fire Control Room	Ground Floor	1		$15m^2$ (no internal dimension less than 2.5m)	Must be accessible via two paths of travel: from the front entrance of the building and directly from a public/open space (or connect via a fire isolated passageway to an open space). Egress from floor of FCR to opening of open space not to exceed change in level of 300mm.
F002	Fire Alarm System / Sound System Intercom System for Emergency Purposes	Risers – Dry Fire	Two per floor	1		1200mm x 800mm (located in service core)	1 riser required Required to be accessible on levels with sub panels (estimated at 3 locations throughout levels).
F003	Fire Alarm System / Sound System Intercom System for Emergency Purposes	Mimic Panels	Within Building Entry Lobbies (and/or Security management rooms)	1		200mm (H) x 300mm (W) recessed into wall	
F004	Combined Hydrant Sprinkler System	Fire Pump Room	Preferably located on Level 0 with direct external access however maybe located elsewhere in building provided it is directly accessible from a fire isolated passageway/fire stair. Can also be on Level -1 (Basement)	1		6000mm x 8000mm x 2400mm (high)	Note: If pumps are located on Level 0, the fire tanks will also need to be located adjacent or higher. As the building is greater than 50 metres in height relay pump will be required.
F005	Combined Hydrant Sprinkler System	Brigade Booster Cupboard	Must be located within sight of main entry to the building, parallel with street alignment. If less than 10m from the building additional fire rating is to be provided to building external wall, as fire engineered solution.	1		4000mm (W) x 1000mm (D) x 1700mm (H)	May be located remote from the building at property street boundary provided this is in excess of 10m from the building. Install parallel to street at main entry to the building.
F006	Combined Hydrant Sprinkler System	Fire Water Storage Tank	Level -1 (basement) preferred	1		Depending on configuration and pressure/flow results, likely to be 1 x 80Kl tanks; $40m^2$ x 3600mm high in total	These dimensions are the size required for storage in a panel tank. Allow an additional 2m to each dimension for access to construct the tank. Alternatively provide in-situ tank to dimensions noted. Note tank will have an internal dividing partition. Tank to be located immediately adjacent or above Fire Pump Room. Tanks sized based on combined hydrant sprinkler system and provide full test recirculation capability thereby allowing full Green Star point claim. Alternative tank construction could be reinforced concrete with one wall connecting pump room.
F007	Combined Hydrant Sprinkler System	Risers – Wet Fire	Within fire isolated stairs	1		900mm x 300mm in each fire stair	On landing that serves the floor. Extend stair landing width to accommodate.
F008	Combined Hydrant Sprinkler System	Risers – Fire Stairs - Hydrant Landing Valves & Combined hydrant sprinkler control valves	On stair landings at floor level	1		1000mm x 300mm in each fire stair	The combined hydrant sprinkler system including sprinkler system control valves (combined system style) will be located in the stair wells. The dimensions are clears space requirements that must be added to the 1000mm egress passage width that in turn must be measured from the Stair handrail.

F009	Combined Hydrant Sprinkler System	Riser – Diesel Exhaust		1		300mm x 300mm	Required through all floors from the location of the Fire Pump Room to discharge at a suitable point external to the building
F010	Combined Hydrant Sprinkler System	Risers – Town main and Brigade Booster Pipes		1		600mm x 300mm	Required through all floors that separate the Brigade Booster Cupboard from the Fire Pump Room.
F011	Combined Hydrant Sprinkler System	Concealed space above ceilings		1		300mm min clear height	Required to transfer pipes from fire stairs to distribute fire sprinkler mains pipes.
F012	Combined Hydrant Sprinkler System	Fire Pipework - Test return and Drain	Core	1		300mm x 300mm in service core	1 off pipe extends through full building height
F013	Fire Hose Reels (not on commercial office floors)	Fire hose reels	Within 4m of exits	1		900mm x 500mm	50mm lettering on the doors; extinguishers located internal. Fire hose reels are not required throughout class 5.
F014	Fire Sprinklers	Sprinkler heads	In ceilings	1		200mm minimum clear height	Semi recessed pendants or flush concealed.
F015	Pressure Reduction Valve Station	Pressure Reduction	Within stair core (situated at two to four levels depending on building height.	1		800mm x 500mm x 400mm	Dual pressure reduction valves. Can be located within stair. Depending on final building arrangement may be located within fire pump room.

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NDY QA SYSTEM

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