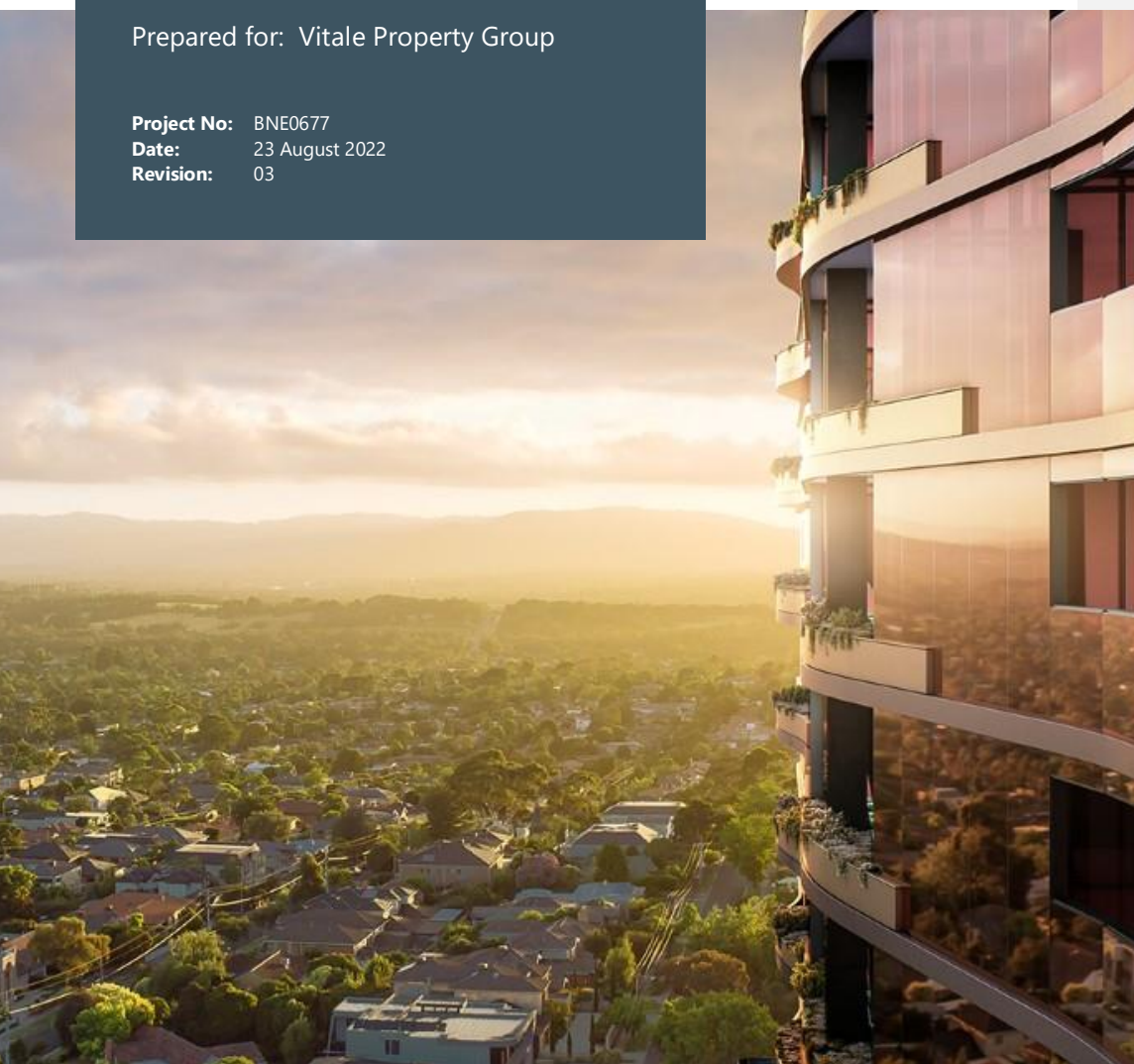


29 Shirley St Byron Bay

Return Services Brief

Prepared for: Vitale Property Group

Project No: BNE0677
Date: 23 August 2022
Revision: 03



Project: 29 Shirley St Byron Bay
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1. Introduction

ADP Consulting has been engaged by Vitale Property Group to complete the building services design for the new Apartment building at 29 Shirley St Byron Bay. The scope includes undertaking the design and documentation of the Hydraulic, Mechanical, Electrical, Fire Protection VT and ESD Services.

This brief, in conjunction with the current architectural plans and current services sketches, is intended to provide an outline of the building services for review by the Client. It is intended that the scope of services defined herein will be developed in further detail during the commencement of the next project phase. The brief will be made available to all stakeholders in the project and all parties are encouraged to review the brief in detail and provide any feedback to ADP Consulting, as appropriate.

2. Mechanical Services

2.1 General

2.1.1 Mechanical Systems

The purpose of this section of the return brief is to provide an outline of the mechanical services solutions and objectives and proposed concepts to serve the development. The mechanical services will comprise but not be limited to the following:

- > Air conditioning to residential apartments, including VRF outdoor condenser units and in ceiling VRF FCUs to serve apartment living areas and bedrooms.
- > Air conditioning to common areas, including main lobby and common room on ground floor.
- > Mechanical ventilation to the basement carpark.
- > Make up air to each apartment via facade mounted intake on each floor.
- > Fire pump room ventilation systems.
- > General exhaust systems – common amenities, PWD room and bike storage.
- > Garbage room air conditioning
- > Communications and MSB rooms air conditioning.
- > Residential exhaust systems including range hood, toilets, and laundry to exhaust out the facade.
- > Energy and water sub-metering as required by BCA/NCC and for billing purposes.
- > Mechanical services, electrical switchboards and electrical work associated with the mechanical services.

2.1.2 General Considerations

- > Builder to provide masonry culvert for car park exhaust.
- > Frames, hangers, suspension, intermediate structures and facilities for support of all mechanical equipment, ductwork systems, pipework, cable trays, and associated components for these systems and equipment.
- > The contractor shall allow for provision and cutting of mesh over penetrations by the builder. Allow for temporary caps to all penetrations and riser so as to weatherproof for safety and cleanout prior to handover.
- > Include all equipment bases and vibration isolation facilities for plant and equipment, fans and the like.
- > Structural members to support mechanical services in accordance with building structural requirements.
- > Lifting, hoisting and scaffolding as required.
- > Penetrations for mechanical services generally, other than through roofing materials.
- > Sealing of all duct and pipe and cable penetrations and packing around services penetration to maintain structural and acoustic and airtight seal. In particular, all penetrations in floors, riser shafts, roof slab, external walls shall be sealed airtight to ensure correct pressurisation of the spaces is achieved.

- > Corrosion protection, painting and labelling of all plant and equipment.
- > Seismic restraints.
- > Removal of rubbish.
- > Materials, cartage, tools, hoisting, labour, handling, fixings, accessories and any other plant and equipment necessary to complete the works in a proper and workmanlike manner.
- > Plinth surrounds to form plinths under mechanical equipment (concrete by builder).
- > Acoustic blankets under fan coil units.

2.2 Design Criteria

2.2.1 General Design Criteria

Item	Design Criteria
Ambient Design Conditions (Brisbane / Gold Coast > Critical Conditions – AIRAH DA09)	Summer: 34.3°C Dry Bulb / 25.5°C Wet Bulb > Winter: 9.1°C Dry Bulb > Air-cooled VRF selected at 35°C Dry Bulb
Internal Design Conditions Thermal Comfort	> Cooling: 24°C Dry Bulb / 50%RH (no active humidity control) > Heating: 21°C Dry Bulb

2.2.2 Room / Area Design Conditions

Space Served	Occupancy m2/ppl	No	Lighting Load (W/m ²)	Equipment Load (W/m ²)	People Sensible / Latent (W/pers)	Noise Level (dB(A))	Outside Air	Infiltration (ACH)
3 Bed Apartments	-	4	6	15	80 / 60	35	Note 4	0.25
2 Bed Apartments	-	3	6	15	80 / 60	35	Note 4	0.25
Main Lobby	3.5	-	20	5	80 / 60	45	1 L/s/m2	0.75
Common room	10	-	10	5	80 / 60	40	7.5	0.5
Bin Room	-	-	-	-	-	50	-	0.5

1. Relative humidity generally in the range 50%-60% but noting that no humidity controls are specified.
2. Default population densities only. Final population to be confirmed by contractor.
3. The acoustic environment within the occupied areas of the building shall meet recommended sound levels of AS/NZS 2107:2000 table 1 and comply with any acoustic consultant noise criteria.
4. Outside air requirements to comply with AS 1668.2-2012 and NCC 2019 Section F4.5-4.7 to be achieved with natural ventilation via openable windows and doors.

5. Apartments lighting loads based on non-concurrent peaks between daylight and artificial lighting with reference to NCC 2019 Section J6.2 and AS 1680.2
6. Occupancy for apartments: Distributed evenly over apartment bedrooms and living area
7. Occupancy for each area to be based off AS 1668.2 Appendix A.

2.2.3 Partition Load for Adjacent Areas

Assuming the adjacent areas are not conditioned, adjacent space temperature is modelled at 50% of the proportional difference between conditioned space and the ambient conditions

2.2.4 Design Safety Factor

A heating and cooling safety factor of 10% is being allowed for in the equipment sizing calculations.

2.2.5 Internal Fan Coil Heat Gain

A heat gain of 2.5% is assumed for the supply air fan within fan coil units.

2.2.6 Ventilation Design Conditions

Room / Space	Ventilation Type	Ventilation Rate
Carpark	Supply / Exhaust	To comply with the requirements of AS 1668.2:2012
Fire pump room	Supply / Exhaust	2700 L/s TBC, to suit pump capacity requirements
Outside air systems	Supply	Main lobby – Naturally Ventilated as per AS1668.2
Lift pressurisation	Supply	To comply with the vertical transport engineer and lift manufacturers requirements (Only if required by Fire Engineering)
Apartment Exhaust	Exhaust	Kitchen Rangehood – 120L/s Toilet Exhaust – 25L/s per bathroom Laundry Exhaust – 40L/s
Common area Ventilation	Exhaust	PWD -10L/s.m ² Bike storage -5L/s.m ² As per AS 1668.2-2012

1. Outside air requirements to comply with AS 1668.2-2012 and NCC 2019 Section F4.5-4.7 to be achieved with natural ventilation via openable windows and doors.

2.2.7 Building Envelope Thermal Performance

The air conditioning units shall be sized based on the thermal performance specified in the House Energy Rating Report (NatHERS Assessment for Class 2 units) This includes:

- Internal partition walls between conditioned and non-conditioned spaces - R-value (m².K/W)

- External roof - R-value (m².K/W)
- External walls common areas - R-value (m².K/W)
- External walls apartments - R-value (m².K/W)
- Glazing apartments - U-Value (W/m²K) and SHGC
- Glazing common areas - U-Value (W/m²K) and SHGC

Note: Shading allowed for in the camel model in the form of overhangs, balconies, and facades.

2.3 System Description

The following provides a description and the requirements for Mechanical Services associated with the various components of the development.

2.3.1 General Ventilation Systems

Serving: Grease trap, bike parking, public amenities, pool pump room etc.

In-line ducted supply/exhaust fan(s) shall be provided to serve general ventilation systems. The systems will consist of hard and flexible ductwork, acoustic insulation (including wavebar), dampers and grilles, controls, wiring, isolators, supports, hangers and fittings to form a complete system. Outside air and clean supply systems shall include filter plenum box and access panel. The systems will be ducted to external façade (with the exception of some systems that are noted on drawing to be within a fire rated riser to roof discharge) and intake/discharge via a weatherproof louvre. Where available relief/make up air shall be via external louvre. Power and controls will be from common mechanical services switchboard

2.3.2 Basement Carpark Ventilation

The basement carpark level requires mechanical ventilation which will comprise of supply and exhaust air systems, these will be controlled by VSDs dependant on the level of CO in order to maximise the efficiency of the system. Carparks will be equipped with CO monitoring system including CO sensors with automatic control. The fan speed will be controlled by VSDs dependant on the level of detected CO in order to maximise efficiency of the system. Carpark fans will operate in fire mode in accordance with AS1668.1 with supply air smoke detectors and manual controls at the Fire Fan Control Panel (FFCP).

- > The in-line axial carpark exhaust fans will be located on carpark level and connect into the fire rated exhaust air riser via underground culvert and grilles. The riser will be continuous to the ground level with discharge through raised masonry plenum with weatherproof louvres 6m from building intakes, natural ventilation openings and neighbouring property boundaries.
- > The make-up air is provided through carpark entry ramp doorway. Doorway to be 80% meshed.
- > Power to the car park fans shall be provided from a non-essential MSSB.

2.3.3 Fire Pump Room Mechanical Ventilation

In-line ducted supply fan shall be provided to serve Fire Pump Room (FPR) located on basement. The system will consist of fire rated rigid ductwork. The supply air fan will be located within the fire pump room.

- > At lower level, relief discharge into adjoining basement.
- > Supply air system from intake louvres in external wall on ground level. Fire rated ductwork from that location to room. Power to the supply fan shall be provided from fire essential MSSB. Fan to be controlled from the FFCP.

2.3.4 Apartment Toilet & Laundry Exhaust Systems

In-line ducted exhaust fan(s) shall be provided to serve the residential wet areas (laundry and bathrooms).

The exhaust systems will be ducted in the ceiling space/bulkheads to the external façade and discharge via a weatherproof louvre in external façade or apartment balconies.

Power from apartment switchboard.

2.3.5 Apartment Range Hood Exhaust

In-line ducted exhaust fan shall be provided to serve the residential range hoods in domestic kitchens which shall be ducted to the external façade via a discharge plenum and fitted with a weatherproof louvre or a mesh grille fitted into a structural block out in the building façade.

Range hoods shall be selected to provide an exhaust air flow rate of 120L/s and the diversified system shall have make up air enough to serve with apartment windows and doors closed.

Access panels in ceiling to provide access to fan. Fans powered from apartment switchboard with three-pin plug within the ceiling. Power from apartment switchboard.

Booster fans to be avoided if possible.

2.3.6 Apartment Corridor Ventilation Systems

The lobby area on Ground level and adjacent fire stairs on each level will be naturally ventilated in accordance with AS 1668.2-2012 and NCC 2019.

There is no apartment common corridor to be ventilated.

2.3.7 Make-up Air to Apartments

Make-up air for each apartment exhaust ventilation system shall be provided from the louvers in façade with non-return damper directly to each apartment. Grille in common area with acoustic treatment.

2.3.8 Lift Shaft Relief/ Ventilation Opening

Allow for installation of a weatherproof louvre to the lift shaft wall on roof level for air relief.

2.3.9 Apartment Air Conditioning Systems

Acceptable manufacturers of air-cooled VRF systems include Daikin, Fujitsu, LG and Mitsubishi Electric or approved equal. The VRF systems shall be selected to achieve the required performance and to suit the refrigerant piping length and lift required to achieve the desired locations for outdoor and indoor units.

- > Ducted concealed medium static air conditioning unit(s) will be provided to each apartment within bulkheads. Living areas and all bedrooms for each apartment will be conditioned via ducted AC units.
- > Ducted system to include insulated sheet metal ductwork, flexible ductwork, grilles, isolators, supports, hangers and fittings etc.
- > System to include insulated refrigerant and condensate pipework, control cabling to all thermostats, controls and sensors.
- > A factory installed proprietary condensate drain pump shall be provided within each indoor unit (if required) and condensate drains shall be piped to the nearest tundish. Accessible tundish to be provided by hydraulic services connected to condensate stack throughout the apartment tower.
- > Each AC unit for a given apartment will be controlled via single control panel with ON/OFF and temperature control.
- > Apartments allow for cable connection for operation control into the apartment central controller and in home display

- > Each apartment will have dedicated outdoor reverse cycle Variable Refrigerant Flow (VRF) allowing for heating or cooling to be located in the roof plant area.
- > Condensers to be mounted and securely fixed with vibration isolation on a plinth or to a structural frame to suit the allocated plant space, arranged with maintenance access and clearance for adequate flow circulation.
- > VRF condensers and hence power will NOT be shared between apartments.
- > Refrigerant riser/s within the apartment core and routed within ceiling voids and walls.

2.3.10 MSB/Communications Room Air Conditioning

Single wall mounted cooling only split system shall be provided to serve the MSB/comms room. The system will consist of a wall mounted indoor unit with local control/temperature panel.

- > Insulated refrigerant and condensate pipework to local condenser mounted on the ground level. Condensate to tundish by hydraulics.
- > System to include all controls, wiring, isolators, supports, hangers and fittings etc.
- > Power and controls from common mechanical services switchboard (MSSB). The AC unit runs 24/7 to keep the temperature below 25°C all the time.

2.3.11 Common Area Air Conditioning Systems

Common area to be conditioned through reverse cycle DX split system with remote condenser. Acceptable manufacturers of air-cooled DX split systems include Daikin, Fujitsu, LG and Mitsubishi Electric or approved equal.

- > Ducted concealed high static air conditioning unit(s) will be provided to main lobby.
- > Ducted system to include insulated sheet metal ductwork, flexible ductwork, grilles, isolators, supports, hangers and fittings etc.
- > System to include insulated refrigerant and condensate pipework, control cabling to all thermostats, controls and sensors.
- > A factory installed proprietary condensate drain pump shall be provided within each indoor unit (if required) and condensate drains shall be piped to the nearest tundish. Accessible tundish to be provided by hydraulic services connected to condensate stack throughout the apartment tower.
- > Each AC unit will be controlled via single control panel with ON/OFF and temperature control.
- > Dedicated outdoor DX split unit allowing for heating or cooling to be located externally on ground floor.
- > Condensers to be mounted and securely fixed with vibration isolation on a plinth or to a structural frame, arranged with maintenance access and clearance for adequate flow circulation.

2.3.12 Waste Room Air Conditioning

Single wall mounted cooling only split system shall be provided to serve the refuse room. The system will consist of a wall mounted indoor unit with local control/temperature panel. Natural ventilation applied.

- > Insulated refrigerant and condensate pipework to local condenser mounted on the ground/basement level. Condensate to tundish by hydraulics.
- > System to include all controls, wiring, isolators, supports, hangers and fittings etc.
- > Power and controls from common mechanical services switchboard (MSSB). The AC unit runs 24/7 to keep the temperature below 25°C all the time.

2.3.13 Heating to Conditioned Spaces

Heating to apartments to be achieved through reverse cycle heat pump VRF units.

2.3.14 Mechanical Services Switchboards and associated work

Provide all fire essential and non-essential mechanical services switchboards including dedicated terminal strip in the fire essential boards for connection for the fire control wiring. Fire essential systems shall be form 4 construction, all other MSSBs shall be form 1 construction. Weather protection to be provided on roof.

- > Power and control wiring from the mechanical services switchboard or tenant/apartment control board to new mechanical equipment in compliance with latest AS 3000.
- > Accessories including conduits, cable trays, switch gear and all associated equipment and local isolator facilities for all new mechanical equipment.
- > All proprietary controllers, control wiring and control accessories.
- > Provide Auto/Off/Manual switches with run and fault lights for each item of equipment.

2.3.15 Mechanical Services Controls

Allow for installation and commissioning of all systems in the control and instrumentation section of this brief including all controls, wiring, sensors, metering, etc.

2.4 Metering

As per NCC 2019 section J (J8.3) the facility will require individual energy monitoring or recording individual energy consumption of air conditioning (where appropriate, cooling plant and air conditioning plants), artificial lighting, appliance power, central hot water supply and internal.

3. Electrical Services

3.1 General

The following provides a description and the requirements for Electrical Services associated with the various components of the development.

- > Low voltage power distribution and switchboards throughout the site.
- > Authority energy metering for house services, mechanical heating/cooling.
- > Building earthing system.
- > Power supply to equipment and control panels e.g. hydraulic pumps, fire control equipment, amenities equipment, access control equipment, mechanical services switchboards etc.
- > Cable supports including trays, catenary cables, ladders, cable ducts and spare conduits for electrical services cabling.
- > General lighting throughout.
- > External lighting.
- > Emergency and exit lighting throughout.
- > Compliance with required Australian Standards and National Construction Code.

3.2 Design Criteria

Item	Design Criteria
All	The entire electrical installation will comply with the relevant standards (in particular AS 3000), NCC, rulings by the regulating electrical authority and relevant state and federal occupational health legislation.
Radio frequency interference	Suppression and shielding as required in accordance with requirements of AS 1044.
Fixed access ways	All electrical work in accordance with requirements of AS 1657
Electromagnetic compatibility	All electrical work in accordance with requirements of AS 4251.1 and AS 4251.2
Degrees of protection	All electrical work in accordance with requirements of AS 1939
Supply Conditions	<ul style="list-style-type: none"> > 230/400V > 50Hz
Reticulation Design	<ul style="list-style-type: none"> > Volt Drop criteria: > Consumer mains < 0.5% > Rising Submains approx. < 2.0% > Final sub-circuits < 2.5 %

Item	Design Criteria
	> Total site allowance 5%
Main Switchboards	<ul style="list-style-type: none"> > Partial type tested assemblies > Ventilated internal switchroom > IP42 Rating > Main busbar to substation rating > Secondary Bars to initial load + 20% > Moulded case breakers > Air circuit breakers 800 A and above > Fault Level – To be co-ordinated with Essential Energy. > Minimum form 2B. > Use metal separation for safety services > Full sized neutral busbars
Distribution Boards	<ul style="list-style-type: none"> > Multiple Meter Panels at various locations alternative levels based on the building layout and final submain cable length. (See preliminary spatial advice). > Communal Lighting and Power Distribution boards > Rating/Capacity based on table C1 of AS3000 for residential portion and table C3 of AS3000 for common areas. > Miniature Circuit Breakers (MCBs) < 100A > Earth leakage protection to lighting and power circuits to AS3000 > Use of current limiters to be absolutely minimised. > Split chassis boards to accommodate NCC metering requirements > Form 1 Construction > Final subcircuit Protection Circuit breakers – Min 10kA fault level
Consumer Mains	<ul style="list-style-type: none"> > Rated to authority supply capacity > Fire rated
Submains	<ul style="list-style-type: none"> > Capacity Max. Demand + 10% > Essential/safety services equipment (where applicable) will have fire rated cabling > 4 core for cables rated less than 125 A.
Final Subcircuit	<ul style="list-style-type: none"> > Power 4mm² min.

Item	Design Criteria
	<ul style="list-style-type: none"> > Lighting 2.5mm2 min. > Max 80% utilisation of AS 3000
Internal Lighting	<ul style="list-style-type: none"> > Design Considerations: > LED technology > Glare > Lamp efficiency > Colour rendering > Aesthetic and architectural empathy
External Lighting (Pathway Lighting)	<ul style="list-style-type: none"> > Design considerations: > LED technology > Lamp efficiency > Colour rendering <p>Aesthetic and architectural/landscape empathy</p>
Emergency Lighting Systems	Self-contained emergency lights with manually tested system.
Lightning Protection	N/A.
Lighting Control	Luminaires shall be motion controlled with override wall switches provided within communal space. Lighting control Strategy is to be further developed
Electrical Metering	Authority metering (proposal of Embedded Network to be confirmed by the client)

3.3 Power Source

3.3.1 Electrical Maximum Demand

The electrical maximum demand is calculated at approximately 204kVA (295 Amps 3-Phase) in alignment with the methods set out within AS3000.

This amount has factored in electric instantaneous hot water delivery systems within apartments and 50% of resident car park spaces to have electric vehicle charging (approximately 1 charger per resident). Should there be a change in hot water solution or further changes to the car charging strategy, the electrical max demand shall be amended accordingly.

Based on our extensive experience working on similar projects, we anticipate that the real measured and operational maximum demand will be in the order of 65-70% that of the theoretical AS3000 derived value. This takes into account consideration for lower usage periods (throughout the middle of the day and night) and focuses the usage during peak morning and evening times.

Whilst we expect a lower maximum demand during "real time", all electrical switch gear and cabling will be rated to the AS3000 derived value.

3.3.2 Essential Energy Application

ADP lodged a connection application with Essential Energy on 05/04/2022 – Reference Number: 57729836.

We have requested a connection for 200 Amps 3-phase factoring in nominal diversification on the electrical maximum demand based on industry trends for peak/off-peak electrical usage times.

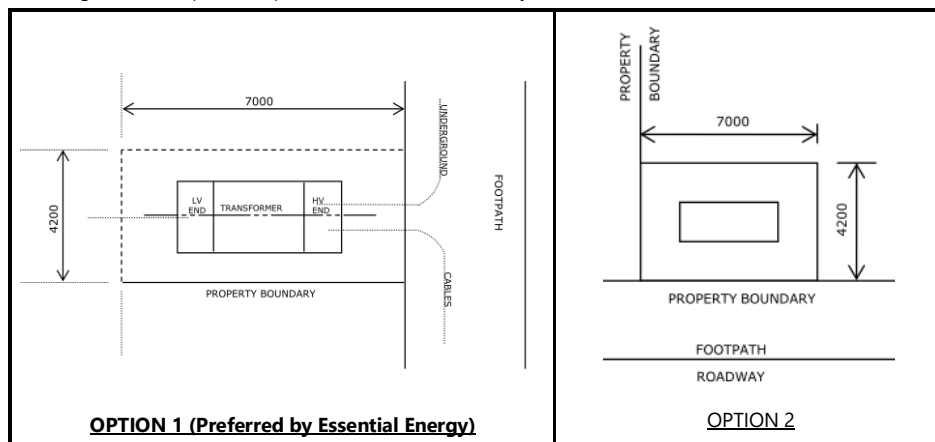
We have requested that Essential Energy provide some input to confirm the appropriate supply size to service this development.

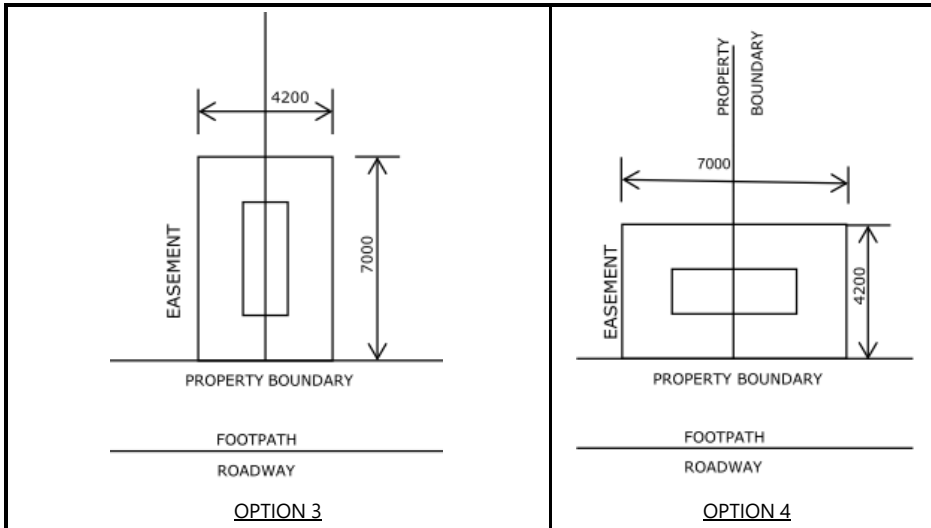
As of 19/04/2022 – Essential Energy have responded noting that the development meets the criteria for a standard model low voltage connection. The client has been informed and is required to countersign this correspondence advising on progress. ADP understand that some augmentation to the existing network will be required to facilitate connection and that all works and liaison are to be undertaken by a Level 3 Accredited Service Provider (ASP) with Essential Energy.

3.3.3 Incoming Supply Point/Transformer(s)

The incoming supply point is likely to be an overhead pole connection or an underground “Green Pillar” connection with Essential Energy. Essential Energy will typically offer these connections for up to 200 Amps 3-phase and hence we do not envision the requirement for a padmount transformer to service this development. However, this is subject to the existing capacity within the surrounding Essential Energy network and their requirements to maintain adequate supply to their street infrastructure e.g. street lights.

If a padmount transformer is required to supply the site (to be determined upon application approval by Essential Energy), the final configuration of the transformer site shall conform to one of the below options. All configurations require complete vertical clearance to sky.





3.4 Main Switchroom (Main Electrical Services Room)

Switchrooms generally contain switchboards for the consolidation and distribution of electrical supplies. Protection devices in the form of circuit breakers or fuses are installed to limit the supply sizes and provide automatic disconnection/protection in the case of a fault.

For this project, ADP proposes using one strategically located main switchroom to house one (1) main switchboard (MSB). The size of the MSB is based on the number of residential apartments and common areas/equipment. The main switchroom is ideally located as close to the substation as possible due to the following reasons:

- > To allow electrical supplies to be broken down as close to the origin as possible (reducing large capacity cables to shorter runs). If this is not done, downstream supply cables will become larger due to the requirement to comply with Australian Standards (AS3000 & AS3008) for fault clearance and voltage drop.
- > To reduce the amount of fire rated cable and cable support required for the consumer mains between point of supply and MSB (in the event fire rated consumer mains is required).

The current proposal is for a new Main Switchboard (MSB) to be provided within a dedicated main electrical services room in the Basement (certifier to confirm if any essential services are required and if so, this room will require 2-hour fire rated construction). **We understand this location to be above the defined flood level however this is to be confirmed in writing by the Architect/Civil Engineer.**

The switchroom shall be of dimensions as nominated on the spatial drawings to accommodate:

- > 1 x Main switchboard
- > Cabling and maintenance clearances.

For compliance with AS3000 section 2.10.2.2:

- > Switchroom doors are required to swing outwards to best enable unimpeded egress.

Commented [MB1]: Suggest bolding the whole line

- > Switchroom doors to be at least 0.9m(W) x 2.2m(H).

3.4.1 Power Distribution / Main Switchboard

The MSB will supply various sub distribution boards, apartment meter panels and other services as necessary. Main Switchboards will be constructed in accordance with AS61439 and will generally comply with the following performance parameters:

- > Switchgear to be sized according to AS3000 Electrical Maximum Demand calculation regardless of prescribed authority diversification factors.
- > Switchboard segregation to be Form 2b minimum (unless essential services are required, then 3b construction is necessary).
- > Full sized neutral and earth bars
- > All escutcheon panels will be hinged
- > Switchgear will be capable of being padlocked in the off position
- > All panels on the switchboard will be via lift off hinges or knurled or crowned nuts, to enable ready removal for inspection
- > Authority kWh energy meters shall be provided for
 - Common/house services (integrated as part of the MSB)
 - Each individual apartment (located within main electrical services riser cupboards).

3.4.2 Metering

Authority meters shall be provided for each apartment to apportion separate billing of electrical energy and allow tenants to choose their electricity retailer.

The meters are proposed to be distributed throughout the tower within 2 separate rises in banks of 6 x 3-phase meters centrally located on every apartment floor and contained within the dedicated electrical services riser. Proposed schedule below:

	<u>Riser #1</u>	<u>Riser #2</u>	<u>Riser #3</u>
Level 3	Meter Panel		Meter Panel
Level 2		Meter Panel	
Level 1	Meter Panel	Meter Panel	Meter Panel
Ground	House Distribution Board	House Distribution Board	House Distribution Board
Basement	Main switchboard and Electric Vehicle Distribution Board		

Submetering of all major loads (as required by NCC Section J8) shall be provided via multifunction meters. These meters shall have the ability to interface with a BMCS (if desired) and provide monitoring of volt, amp, peak current, VAR, MD, PF, V & I harmonic distortions and kWh parameters. The connection of these meters to the BMCS is to be undertaken by the BMCS contractor.

Should an Embedded Network be implemented for this development, a different metering approach will be adopted - an Authority site master meter shall be installed on the main switchboard with an embedded network gateway meter installed downstream. Embedded network meters shall be

provided for each apartment to apportion separate billing of electrical energy and allow tenants to choose their electricity retailer.

3.4.3 Backup Power Generation

A backup generator is not proposed to the development.

3.4.4 Sub Distribution Boards

3.4.4.1 House Distribution Boards

Electrical sub distribution boards to feed house services to be provided on:

- > Basement (integrated as part of the main switchboard, electric vehicle charging)
- > Ground Floor

*Additional sub-distribution boards may be utilised to distribute power to plant equipment and additional electric vehicle charging if desired.

The House distribution boards shall conform to the following:

- > Sized for full number of outlets plus 20% future expansion capacity and 20% future expansion space
- > Distribution boards rated less than 200A will be a Form 1 construction; distribution boards rated greater than 200A and less than 800A will be a Form 2b.
- > Equipped with electric maximum demand metering to meet NCC Section J8 Metering requirements
- > IP42 Degree of protection
- > Busbar rated 160amp
- > MCCBs (miniature circuit breakers) < 63Amps – NHP/Schneider/ABB/GE or approved equal.
- > Separate main switch
- > Busbar chassis to be segregated into lighting and power sections
- > Final sub-circuit Protection Circuit breakers – Min 10kA fault level
- > All protection devices shall be lockable
- > Provided with a lockable door covering all control and protection devices with hinged escutcheon cover
- > Permanently labelled with the incoming sub-main number, rating of the circuit protective devices and the size of the incoming sub-mains

3.4.4.2 Apartment Distribution Boards

As per section 3.4.2, meter panel banks will be located on levels nominated and contained within the dedicated electrical services riser. 3-phase submains will reticulate from the meter panels to each apartment's 3-phase distribution board via the corridor ceiling spaces.

Apartment distribution boards shall typically co-locate with the apartment communications headend in a dedicated corridor utility cupboard. Final location to be coordinated with the architect.

3-phase sub-mains to the apartments is proposed to align with the electric instantaneous hot water solution. If the hot water solution changes away from this, e.g. to a centralised gas system, a 1-phase sub-mains approach may be adopted.

Apartment distribution boards shall conform to the following:

- > Typically, 100Amp chassis 3-phase load centre style
- > Form 1 construction

- > IP42 Degree of protection
- > MCCBs (miniature circuit breakers) < 63Amps – NHP/Schneider/ABB/GE or approved equal.
- > Separate main switch
- > Located within each apartment

3.5 Cables / Cable Trays / Conduits

Submains cabling will originate at the MSB – to the respective electrical DB. Typically, all submains are to be run in conduits cast into the slab or reticulate at high level/in risers on cable tray.

All submains shall be copper and will be sized to ensure the site wide total voltage drop does not exceed 5%.

All submains will be clearly identified at their point of origin, point of connection and any accessible cable risers.

Submains for all safety/essential services shall be fire rated as required by AS3000 & AS3013.

Power sub-circuits shall generally be a minimum 2.5mm² 2C+E and Lighting sub-circuits shall be minimum 2.5mm² 2C+E.

3.6 Power Outlet Provisions

Earth leakage circuit protection (via Residual Current Device (RCD) circuit breakers) will be provided on all outlets rated at 32A or less in accordance with AS3000 requirements.

All common/house area outlets shall be labelled at the outlet identifying the Distribution Board and Circuit Breaker supplying the outlet.

Outlet style to be selected at Architect's discretion to match their preferred interior design. Typical option: Clipsal Classic (to be confirmed).

3.7 Electric Vehicle (EV) Charging

The current proposal (based on initial discussions) is for 26 x electric vehicle chargers allocated 1 per apartment. ADP propose the use of an intelligent load management system with user pay capability. This will ensure the total maximum demand of the charging units does not exceed a specified load. The system can also be set up to manage the power draw based on peak/off-peak energy usage of the building – e.g. the system can be set up to draw power at night when building energy usage is typically low.

In addition, it may be desired to provision for future connectivity/expansion capability for the EV charging system to all or an increased number of car parking spaces. This could consist of additional switchgear provision within the EV charging/house section of the main switchboard, conduit/cable tray provision from the main-switch room to all parking bays and provisional spare capacity within the main switchboard for this future load. This would minimise the works required in the future to retrofit an EV charging system

3.8 General Lighting

3.8.1 Design Efficiency

The lighting design shall be completed to comply with BCA 2019 Section J6.

Lighting shall be LED type used throughout.

3.8.2 Design Criteria

The lighting approach adopted for the development will comprise the following principal components (below) and is in accordance with AS1680 and BCA 2019 Section J6.

Full detail of the proposed design criteria is detailed below.

Note:

- > Average Lux: refers to the maintained average illumination density levels as prescribed by AS1680.
- > Source: All lighting to be LED to meet efficiency standards.
- > CRI: Colour rendering index typically greater than 80. 90+ recommended for premium applications.
- > CCT: Colour Correction Temperature – typically for residential applications, a warmer colour temperature is preferred.

#	Area Description	Avg Lux	Source	CRI	CCT	Remarks / Notes
1	APARTMENTS					
1.1	Bedrooms	80	LED	>80	3000	Recessed LED non-dimmable downlights are proposed to be used throughout. Control via on/off wall switches.
1.2	Bathrooms	240 (at mirror) LED and 100-160 elsewhere in the bathroom	LED	>80	3000	Recessed LED downlight(s) with LED strip lighting above mirror. All fixtures in the bathroom wet areas to be water and vapour proof. Control via on/off wall switches.
1.3	Kitchen	240 lux to benchtop	LED	>80	3000	Recessed LED downlights with LED strip lighting above kitchen benchtop. Feature pendants provided to island benches/dining room tables. Control via on/off wall switches.
1.4	Living Room	160	LED	>80	3000	Recessed LED downlights. Control via on/off wall switches.

#	Area Description	Avg Lux	Source	CRI	CCT	Remarks / Notes
1.5	Balcony Area	40	LED	>80	3000	LED Wall lights. Control via on/off wall switches.

#	Area Description	Avg Lux	CRI	CCT	Remarks / Notes
2	COMMON AREAS				
2.1	Entry Foyers	240	>80	3000	Feature LED downlights/CAN lights. To operate 24/7.
2.2	Fire Stairs and BOH Corridor	80	>80	4000	IP65 LED Battens (option to provide battens with integrated emergency lighting PODS) To operate via motion detection.
2.3	Bin Rooms	160	>80	4000	IP65 LED battens. To operate via motion detection.
2.4	Main Electrical/Communications rooms	320	>80	4000	IP65 LED battens. Control via on/off wall switches.
2.5	Indoor Carpark	80	>80	4000	IP65 LED battens. To operate via motion detection
2.6	Common corridors	80	>80	3000	Recessed LED downlights. To operate via time switch and motion detection for afterhours.
2.8	Ground Floor External Footpath Lighting	External lights to meet Tweed Shire Council requirements.			
2.9	Recreation Areas	Dependant on activities/facilities. Propose 40 lux minimum			

3.9 Control

3.9.1 Apartment Lighting Control & Home Automation

The client has advised that a home automation control system is desired to the apartments. The client's preferred home automation solution is a fully integrated system by "Control4". The system shall provide control over:

- > Access and Security (including CCTV)
- > Air conditioning
- > Audio/Visual services
- > Lighting (optional)*

*If apartment lighting control is not desired under the Control4 home automation package, lighting will be operated via conventional local switches.

3.9.2 Common Area Lighting Control

Lighting will be generally switched via motion sensors, conventional local switches, time clocks and photo-electric (PE) detectors.

3.10 Emergency Lighting

An Emergency and Exit Lighting system will be provided throughout the apartment complex to comply with the AS2293 and the NCC.

Exit lighting will be of self-contained maintained type. LED type units will be utilised.

Emergency luminaires will be LED, self-contained type and non-maintained.

3.11 Lightning Protection

ADP have undertaken preliminary assessment against the AS1768 guidelines and note that a lightning protection system is not required on this project. **Client to advise if a lightning protection system is desired regardless.**

3.12 Building Integrated Solar Photovoltaic (BIPV) System

The client has advised that a BIPV System is desired for the development to offset common area electricity usage and to provide supplementary power for pool heating. We have allowed for the integration of BIPV to the roof deck and balustrade through the use of the Hume Onyx system.

We advise that the decision to implement a Solar BIPV Array System will affect the BASIX certification. Our ADP ESD team has made allowance for a 70kW system in their submission however this may be subject to reduce to fit the operational requirements. Oversizing the PV system beyond the means of the development will result in a surplus of energy production. In this case, there is scope to export back to the energy grid for monetary return – however given the current low tariff rate offerings we do not anticipate a significant return on investment against the initial system installation cost.

4. Communications & Security Services

4.1 General

The following provides a description and the requirements for Communications Services associated with the various components of the development. The scope of works being provided by the Contractor generally includes all infrastructure/backbone and passive equipment, with the client/developer to provide all active equipment.

4.2 Communications Summary

- > NBN communications is to be delivered via dedicated headend located in the main communications room in accordance with NBN standards and working conditions. Incoming NBN fibre services shall reticulate from the main communications room to the street network on Murphys Road.
- > Where required, communications services will utilise Cat 6A UTP cabling.
- > Security Systems (access control, CCTV and intercom) shall be provided by communications connections if Internet Protocol (IP) Power over Ethernet (PoE) based systems are used. Otherwise, standard security cabling will be used.
- > Each apartment is to have its own NBN network terminating device. This is to be located within a dedicated utility cupboard (to be coordinated with Architect). 1x RJ45 outlet per TV location – connected back to this NBN node. Each outlet will be cabled using Cat 6A UTP cabling.
- > Additional NBN nodes will be allowed for house (community) services as required.
- > Lift and FIP services to be on wireless dual SIM dialer.

4.3 Design Criteria

The structured cabling system will be based on the following design criteria:

Item	Criteria
Utility carrier network	Allowance for connection to the NBN Network
Communications room	Single lead-in conduits from the property boundary to NBN headend. Communications rack to house base building equipment/switches/patch panels and base building security control panels.
Master antenna television	Free-to-air and Pay TV backbone and provision of space in riser for Pay TV
Communications risers	The risers will house cabling only. All headend equipment is to be located within the main communications room within the Basement.
Backbone base building systems fibre infrastructure	NBN fibre through communications riser (As per NBN Design)

Item	Criteria
Backbone copper infrastructure	Not applicable
Horizontal field outlet cabling (Base building systems only – WAP, CCTV, Intercom)	Copper – category 6A (Class Ea)
Termination	Modular system and RJ45 Outlets
Termination sequence	T568A configuration
Warranties	Permanent link certified and warranted Installers Minimum 25 years parts and labour

4.4 Main Communications Room

Communications serving the development will operate out of a dedicate main communications room located in the Basement.

The client has confirmed that NBN Communications is to be provided to the building – subject to further offerings that might be proposed with an Embedded Network (if selected).

Incoming fibre will reticulate in P50 conduit from an existing communications pit on Murphys road to an NBN headend within the main communications room within the Basement.

The NBN headend will comprise some form of Premises Distribution Hub (or main cable transition location), Fibre Distribution Terminals (FDTs), Splitter Distribution Terminals (SDTs) and Network Termination Devices (NTDs) for base-building communications services.

The NBN headend will also provide residential internet services reticulating from distribution terminals within the main communications room. Given that NBN is to be supplied to only 4 residential levels we assume that reticulating fibre from the single communications room shall suffice (noting that available riser space within the cores are limited).

In addition to an NBN headend providing resident internet, the room will have space to accommodate 1x communications rack (800x800mm x 42RU high) for:

- > Active Equipment for base building services
- > Electronic Security Systems (access control)
- > CCTV equipment – refer proposed scope below.
- > Any Building Management Systems (BMS)
- > MATV equipment
- > Energy Monitoring - if desired. **Client to advise.**
- > UPS (Uninterruptable Power Supply) – if desired. **Client to advise.**

4.5 Communications Riser Cupboard

Each floor is to be provided with a dedicated communications riser adjacent to the core for reticulating NBN services and base building services. Each riser cupboard accommodates the following:

- > Communications cabling from the Main Communications Room up/down the riser – including fibre cabling to all apartments fed from communications room distribution terminals.
- > MATV cabling
- > Intercom cabling
- > Security services cabling

4.6 Resident Internet

Each apartment will be provided with 1 off NBN Network Termination Device (NTD) for connection to the occupant's choice of communications retailer. NTDs are proposed to be co-located with the apartment distribution boards in a dedicated utility cupboard.

4.7 MATV System

An MATV System will be provided to distribute digital free-to-air TV channels and Pay TV channels to the apartment complex. The system will generally consist of:

- > Roof mounted UHF/VHF digital antenna.
- > Roof mounted satellite dish.
- > Backbone cabling with splitters and amplifiers as required.
- > Head end proposed to be located in the Communications Room.
- > Splitters and active equipment will be located in the on-floor communications cupboards as necessary.

4.8 Security Services

The security services design shall generally consist of the following:

4.8.1 Access Control

- > Fob key access to all building entries/exits, secure areas, recreational areas, car parks and lifts.
- > Access control head-end equipment typically located in respective building communications rack.
- > Manual hardware key for apartments. **Client to advise otherwise.**
- > Radio frequency (RF) remote control resident access to the carpark. **Client to advise otherwise.** Other options are fob reader on the wall or licence plate recognition camera.
- > In-ground vehicle induction loop for exit out of secure carpark areas.

4.8.2 Intercom

Video intercom panels will be provided to each apartment and linked to a master intercom panel next to the lift core on ground floor. Ability to remotely provide lift access to relevant floor, from apartment video intercom panel.

4.8.3 CCTV

CCTV shall be provided to the development by means of an Internet Protocol (IP) based system using PoE (Power over Ethernet) cameras. CCTV head-end equipment shall be located in the base building communications rack.

ADP propose providing coverage to:

- > Common areas (corridors, foyers)

- > Building entry points (carparks & entrance lobbies)
- > Lift carts and lobbies
- > Recreational areas
- > General basement coverage

Client to advise if additional/fewer areas require coverage and to nominate these areas as required.

4.8.4 Intruder Detection System

An intruder detection system is not proposed for this development.

4.9 Distributed Antenna System (DAS)

A distributed antenna system (DAS), which improves the mobile network coverage within a building, is not proposed for this development.

5. Hydraulic Services

5.1 Design Criteria

The Hydraulic Services systems shall be designed to meet the Local Authority requirements and accepted industry standards.

In particular, the systems shall be designed and installed to conform with/to the approval of:

- > NCC 2019 Amendment 1,
- > AS/NZS 3500.1-4:2018,
- > Tweed Shire Council,
- > Any other authorities having jurisdiction.

5.2 Water

Incoming water supply to the development shall be extended from the Authority water main located on Shirley Street and service Fire Protection System (fire hydrants, hose reels, sprinklers) and domestic cold water (DCW), in accordance with the requirements of the Building Code of Australia, AS/NZS 3500 Part 1 and Tweed Shire Council (TSC).

Domestic water supply shall reticulate to all areas of the building, complete with isolation valves and individual residential (sub) water meters and backflow protection, where required.

Sanitary fixtures and fittings to be specified subject to further Architectural briefing and confirmation during the Detailed Design phase.

In addition to providing hot and cold water to each respective apartment, reticulated cold water will serve;

- > Irrigation system,
- > Water points for general cleaning of the roof, basement and street frontages,
- > Mechanical equipment, if required,
- > Cold water provision for pool water top-up.

5.3 Domestic Cold Water

Domestic water supply shall extend from authority meter assembly and reticulate to all areas required. Based on preliminary calculations, we expect a DN50mm domestic cold water meter and a DN100mm fire service water meter to be required.

Authority water meter assemblies shall be located adjacent to street frontage inside property boundary.

Based on pressure and flow modelling by the Tweed shire council, we expect available pressure and flow to be 20L/sec @ 38m/head.

It is expected that cold water booster pumps will not be required.

Residential water meters are required to be installed within a dedicated cupboard in a common area.

5.4 Domestic Hot Water

Domestic hot water shall be generated via a series of independent three Phase Stiebel Eltron electric continuous flow hot water heaters (instantaneous) located within each apartment.

Larger floor plates to be provided multiple units, to cater for higher demands (multiple showers) and reduce hot water wait times.

Temperature control to personal hygiene fixtures will be achieved by using tempering valves located where required in accordance with AS/NZS 3500 Part 4.

The hot water system will be complete with all piping, fittings, hot water units, valves, insulation, etc.

5.5 Sanitary Plumbing & Sewer Drainage

Sanitary drainage shall extend from sewer connection point provided by Civil. Based on the information available and preliminary calculations we expect a minimum DN150mm drainage connection to be required. At this stage we believe all effluent can convey to the local network via gravity and therefore, do not expect a sanitary pump station to be required.

The residential apartment levels sanitary plumbing and drainage system shall consist of a fully vented modified system.]

Vents shall terminate above roof level in discreet locations, where possible.

ADP recommend stacking wet areas (bathrooms, kitchens and laundries), where possible to minimise ceiling impacts. Sanitary plumbing pipework located in the ceiling space of non-typical and transition levels is to be coordinated with architectural details and other services to ensure minimum ceiling heights required are not compromised.

Acoustic insulation/lagging to acoustic consultant requirements and provided as required.

5.6 Stormwater & Roof Drainage

The stormwater system shall collect stormwater from rainwater outlets, balcony drains, planter boxes and convey wastewater to the local network via gravity. Based on previous projects we expect stormwater quality device to be required, this is to be confirmed and documented by the civil consultant.

The conventional stormwater system shall be complete with piping, fittings, rainwater and surface outlets, with provisions for overflow where necessary.

The roof drainage system will be sized to AS/NZS3500 part 3 requirements with provision for 100% overflow.

5.1 Rainwater Collection System

The Rainwater collection system is not required

Commented [J02]: Would you recommend this as a good option or should we just pushfor another solution?

6. Fire Services

6.1 General

The works will comprise of the complete design, documentation, manufacture, supply, delivery, installation, construction, commissioning, testing, placing into service and maintenance of Fire Protection Services and include the following major elements:

- > Combined Fire Sprinkler & Hydrant System
- > Fire Booster Assembly
- > On-Site Fire System Water Storage Tanks
- > Fire System Pumps
- > Fire Hose Reel System
- > Fire Detection System
- > Occupant Warning System
- > Portable Fire Equipment

The fire protection services systems are also to be designed in accordance with the requirements of the Fire Engineering report.

6.2 Design Criteria

Design criteria presented herein form the basis for the design of the works;

Table 1 Design Criteria for Fire Services

Item	Design Criteria
Combined Fire Sprinkler & Hydrant System	AS2118.6 -2012 and NCC 2019 Amendment 1
Fire Sprinkler System	AS2118.1 - 2017 & AS2118.6 - 2012
Residential	Light Hazard Most remote 6 sprinklers operating at a minimum of 48L/min per sprinkler
Plant Rooms (building services)	Ordinary Hazard Group 1 Most remote 6 sprinklers operating at a minimum of 60L/min per sprinkler
Car Park	Ordinary Hazard Group 2 Most remote 12 sprinklers operating at a minimum of 60L/min per sprinkler
Fire Hydrant System	AS2419.1- 2005, NCC 2019 Amendment 1
Fire Water Storage tanks	AS2419.1-2005 and AS3500.1-2018

Item	Design Criteria
Fire pumps	2 x Diesel pump for combined Hydrant & Sprinkler System (Duty/Standby arrangement) Total Flow 25 L/s. - (2 x 5L/sec – Hydrants) - (15 L/sec -Sprinklers)
General	2 x Hydrants operating at 5L/s @ 700kPa each (pumped system) 2 x Hydrants operating at 10L/s @ 700kPa each (boosted) Full floor coverage by the use of 30m long hoses (10m spray)
Fire Hose Reel System	AS2441 - 2005 and NCC2019 Amendment 1 – To be provided to areas not class 2, 3, 4 or 5 portions of the buildings.
Fire Detection System	AS1670.1 – 2018, AS1668.1 - 2015, NCC2019 Amendment 1
Occupant Warning System	AS1670.4 – 2018 and NCC 2019 Amendment 1
Portable Fire Extinguishers	AS2444 - 2005 and NCC 2019 Amendment 1
Maintenance/Verification	AS1851, NCC/BCA as applicable
Water Supply	AS2118.1-2017, AS2118.6-2012, AS2419-2005 AS3500.1-2018, NCC 2019 Amendment 1
Booster Pumps	AS2118.1 – 2017, 2118.6-2012, AS2419-2005, AS2941-2013, NCC2019 Amendment 1
Water Storage Tank	AS2118.1-2017, 2118.6-2012, AS2419-2005, AS2304, AS3500.1 2018, NCC2019 Amendment 1

The fire protection services systems shall be designed in accordance with the requirements of fire safety engineering strategy.

6.3 Design Approach

6.3.1 Combined Fire Sprinkler & Hydrant System

A combined fire sprinkler and hydrant system shall be provided throughout the building in accordance with the requirements of Australian Standards.

The infrastructure will be provided utilising a duty/standby arrangement fire pump set and pressure maintenance pump, to serve the combined fire sprinkler and hydrant system.

The hydrant and sprinkler fire system pump room has been nominated locate at the western corner of basement level. The sprinkler tank has been nominated in the room adjacent to the pump room on the same level.

A fire brigade booster enclosure shall be located adjacent to the vehicular entry, along the western boundary of the allotment facing Murphy Street. A space of 3.0m x 1.0m (with 1.8m height clearance) shall be allowed for the booster assembly, which contains a 4-inlet boost, a 4-outlet mains suction and an attack

hydrant. The booster assembly shall also be located at a minimum of 10m away from onsite transformer, and at least 3.0m away from potential gas meter locations (if any).

Pipework shall reticulate from the pump room into the basement carpark, into fire stairs and reticulate up through the building, as required. A fire test drain shall be provided in each fire system stair well.

Sprinkler control valves shall be located within fire stairs on each respective residential level.

6.3.1.1 Fire Sprinkler System

Fire sprinkler protection and associated pipework shall be provided throughout the building in accordance with the requirements of the Australian Standards, including below ceiling, concealed spaces, plant areas, within and below lift shafts. Sprinkler protection shall be provided to coordinate with mechanical services in accordance with the requirements of AS2118.1 & AS2118.6, including below ductwork. Sprinkler system hazard classification shall be in accordance with the requirements of AS2118.1 – 2017 as listed in the Design Criteria section of this report and the requirements of fire engineering.

Sprinklers shall be supplied by control valves located connected to the system. Major components of the control valves will consist of a stop valve and flow switch which shall be monitored by the fire detection system.

Each sprinkler system to be provided with a drain valve and remote test valve, connected to a dedicated combined sprinkler & hydrant system drain riser. The sprinkler system shall be interfaced with and monitored by the fire detection system.

6.3.1.2 Fire Hydrant System

Generally, fire hydrants will be located within the fire isolated stairs if the stairs have sufficient space for internal hydrants, such that a 1.0m clearance is maintained from handrails to all service equipment. Areas, where compliant coverage is not achieved, shall be provided with additional hydrants. The hydrants shall be supplied by the combined system ring mains. Fire hydrants shall be provided throughout the building so that all parts of the building will be within 40m (30m hose + 10m water spray) of a hydrant.

A hydrant pump room with a dimension of 5m x 6m shall be allowed at basement level. Two diesel fire pumps shall be provided in duty/standby arrangement. The pump room shall be sprinkler protected.

A combined Hydrant and sprinkler(LH system) test drain shall be allowed in the fire isolated stairs with a space of 0.8m x 0.35m.

6.3.2 Fire Tank

A 50kL fire storage tank shall be provided in the basement level. The tank size shall be appropriate to the pressure and flow test of the subject allotment. The tank shall have a minimum height of 1.35m, and 50m³ in capacity.

6.3.3 Fire Hose Reel System

Generally, fire hose reels shall be located within 4m of the fire isolated stairs. Areas, where compliant coverage is not achieved, shall be provided with additional hose reels. The hose reels shall be supplied by the combined hydrant and sprinkler system. Fire hose reels shall be provided to Class 7 and plant areas of the building only and all areas of the floorplate in these spaces will be within 40m (36m hose + 4m water spray) of a hose reel.

6.3.4 Fire Detection System

A fully addressable fire detection system shall be provided throughout the building in accordance with the requirements Australian Standards and fire engineering requirements. The building shall be provided with a Fire Detection Control and Indicating Equipment (FDCIE) panel located within the main lobby. The FDCIE shall contain Alarm Signalling Equipment (ASE) for monitoring of the system by the fire brigade.

The fire detection system shall be interfaced to monitor the combined fire sprinkler & hydrant system and the building occupant warning system for emergency purposes.

Fire cable riser shall be allowed in the fire isolated stairs, with a diameter of 0.15m on the wall.

The fire detection system shall be interfaced with the opening of auto doors and release of electronic access-controlled doors (within community and/or public areas).

Its is proposed an interconnected smoke alarm system is provided within each of the apartments complying to the NCC2019 Amendment 1 and AS3786.

6.3.5 Occupant Warning System

An Occupant Warning System comprising of a FDCIE with compatible loudspeakers shall be provided throughout the building in accordance with the requirements of Australian Standards. The occupant warning system shall be interfaced with & monitored by the fire detection system and shall automatically operate upon activation of an Alarm within the building.

The FDCIE shall be located in the main foyer with a space allowance of 0.8m wide x 0.4m deep, and 0.5m and 1m clearance respectively from either side and in front.

This system shall be zoned to match the fire detection smoke zones. Alert and Evacuation alarm tones shall be produced by the system and shall incorporate a digital voice message facility to warn occupants - to comply with the requirements of AS1670.4 2018.

Occupant warning system shall be provided for all areas in accordance with the NCC2019 Amendment 1 and referenced codes. The objective of this system is to provide sufficient means to alert occupants of a potential hazard and to assist in the evacuation of an area if required.

6.3.6 Fire Extinguishers

Portable Fire Extinguishers shall be selected and located to comply with AS2444 and the NCC. All extinguishers shall be complete with all signage and mounting brackets. Where fire extinguishers are accessible to people outside the building (such as carpark area), or in a location where they may be stolen, they will be installed in tamperproof cabinets or located within fire hose reel cabinets.

6.3.7 Fire Blankets

- > Comply with AS3504.
- > Selected and located to comply with AS2444 and NCC/BCA.
- > Fire blankets will be complete with all signage and mounting brackets.

7. Vertical Transportation

7.1 General

The residential development will be served by two (2 no.) lifts total. The lifts will generally provide apartment occupants with a waiting time of 40 seconds or less from calling a lift, which is in line with ISO8100-32:2020.

7.2 General Scope of Work and Features

It is proposed that each lift will meet the following key requirements:

- > Microprocessor based power and control systems
- > Adequately sized cars to provide the service quality specified
- > Lifts to comply with disabled provisions as required by BCA and AS 1735.12
- > Proximity card key reader connected to the master access control system for the building
- > Allowance for CCTV fitment to each lift car **(Client to advise on CCTV requirement)**
- > Protective blankets and fixings for goods/furniture movements
- > Lifts to be stretcher compliant in accordance with BCA DTS and Building Certifiers requirements
- > Health & Wellbeing features to be incorporated **(Subject to client review and acceptance)**
 - Smartphone / QR Control
 - Antimicrobial Buttons
 - Antimicrobial Covers
 - UV air purification fans inside lift cars.
- > Factory or custom lift car interior finishes to be selected by the architectural design team.

Commented [RH3]: Make bold and underline items that need to be addressed by the client/reader

7.3 Lift Details and Performance

Three Vertical Transportation solutions have been curated for the development, options are outlined below and are summarised

- > Option A – Minimum BCA compliant stretcher lift. It enables the movement of persons with limited mobility, facilitates wheelchair rotation within the lift car, and stretchers for emergency personnel. The lift can move relatively small furniture goods such as a 2-seat couch.
- > Option B – In addition to Option A, the lift provides more space for passenger comfort and can move relatively standard furniture goods such as a 3-seat couch.
- > Option C – in addition to Option B, the lift provides more space for greater passenger comfort and a sense of luxury. It can move relatively larger furniture goods such as a 4-seat couch and provides ease in moving more delicate furniture/ornament items with the extra space.

Commented [RH4]: Elaborate on the options, the service they provide and what changed from the other option

Table 2 Lift Schedule

	Option A	Option B	Option C
Type of lifts	VVVF traction lifts with regenerative drives	VVVF traction lifts with regenerative drives	VVVF traction lifts with regenerative drives
Number of Lifts	2 no.	2 no.	2 no.

	Option A	Option B	Option C
Carrying Capacity	1275kg (17-Passenger)	1350kg (18-Passenger)	1600kg (21-Passenger)
Speed of Lift	1.0 m/s	1.0 m/s	1.0 m/s
No. of Entrances	Two (2)	Two (2)	Two (2)
Lift Door Dimensions (mm)	900W x 2,100H	1,000W x 2,100H	1,100W x 2,200H
Lift Car Dimensions (mm)	1,400W x 2,000D x 2,300H	1,500W x 2,000D x 2,500H	1,600W x 2,100D x 2,700H
Shaft Dimensions, per lift (mm)	2,200W x 2,500D	2,400W x 2,500D	2,500W x 2,600D
Pit Depth (mm)	1,300	1,400	1,400
Overrun (mm)	4,200	4,400	4,600
Machine Room	No machine room permitted – drive and machine at top of shaft		
Electrical Supply	3Ph+E+N sub mains cable to top of lift shaft (per lift)		
Control System	Conventional – controllers located adjacent to landing on the uppermost floor served		
Levels Served	5		
Travel	~13m (Refer to the latest architectural drawing)		
Health & Wellbeing (Optional Extras)	<ul style="list-style-type: none"> - Smartphone / QR Remote Calling - Antimicrobial Buttons - Antimicrobial Handrail - UV Air Purification System 		

7.4 Furniture Goods Movement

The residential lift options have the ability to move the following goods/furniture items.

Category	Typical Items	Width	Depth	Height	Option A	Option B	Option C
Appliances	Fridge (Med)	762	816	1680	Yes	Yes	Yes
Appliances	Fridge (Large)	905	905	1780	Yes	Yes	Yes
Beds	Single	920	200	1870	Yes	Yes	Yes
Beds	King Single	1060	200	2030	Yes	Yes	Yes
Beds	Double	1370	200	1870	Yes	Yes	Yes
Beds	Queen	1530	200	2030	Yes	Yes	Yes
Beds	King	1830	200	2030	Yes	Yes	Yes
Bikes	Road Bicycle	510	1730	1050	Yes	Yes	Yes
Billiard	9ft Table	1372	2743	876	No	No	No
Billiard	8ft Table	1219	2438	876	No	No	Yes
Billiard	7ft Table	1067	2134	876	Yes	Yes	Yes
Bins	240L Bin (SULO)	585	730	1060	Yes	Yes	Yes
Bins	360L Bin (SULO)	680	848	1100	Yes	Yes	Yes
Cleaning	High Capacity Cleaning Cart	552	1264	975	Yes	Yes	Yes
Furniture	Arm Chair	1105	980	480	Yes	Yes	Yes
Furniture	2 Seat Couch	1830	850	670	Yes	Yes	Yes
Furniture	3 Seat Couch	2180	850	670	No	Yes	Yes
Furniture	4 Seat Couch	2440	850	670	No	No	Yes
Furniture	4-Seat Table (Round)	910	910	150	Yes	Yes	Yes
Furniture	6-Seat Table (Round)	1370	1370	150	Yes	Yes	Yes
Furniture	4-Seat Table (Square)	910	910	150	Yes	Yes	Yes
Furniture	6-Seat Table (Square)	1220	1220	150	Yes	Yes	Yes
Furniture	8-Seat Table (Square)	1830	1830	150	Yes	Yes	Yes
Furniture	4-6 Seat Table (Rectangular)	760	1520	150	Yes	Yes	Yes
Furniture	6-8 Seat Table (Rectangular)	910	1830	150	Yes	Yes	Yes
Furniture	8-10 Seat Table (Rectangular)	1070	2440	150	No	No	Yes
Furniture	10-12 Seat Table (Rectangular)	1370	3050	150	No	No	No
Furniture	Ikea KALLAX Shelf Unit (5x5)	1819	391	1819	Yes	Yes	Yes
Furniture	6 Tier Shelf	910	400	2200	Yes	Yes	Yes
Goods	2700mm Plasterboard	1200	2700	10	No	No	No
Pianos	Baby Grand Piano w/o Legs	1470	1550	800	Yes	Yes	Yes
Pianos	Medium Grand Piano w/o Legs	1470	1800	900	Yes	Yes	Yes
Servicing	Housekeeping Trolley	530	1450	1110	Yes	Yes	Yes
Servicing	Linen Trolley	920	600	960	Yes	Yes	Yes
Servicing	Platform Trolley	545	850	980	Yes	Yes	Yes
Sport Equipment	Treadmill	860	2060	250	Yes	Yes	Yes
Sport Equipment	Rower	559	2197	1073	Yes	Yes	Yes
Sport Equipment	Elliptical	749	1486	1880	Yes	Yes	Yes
Strollers / Prams	Single Pram	650	1100	970	Yes	Yes	Yes
Strollers / Prams	Double Pram	800	1100	970	Yes	Yes	Yes

7.5 Redundancy of Service Consideration

Mechanical, or electrical plants are subject to breakdowns and regular maintenance in order to maintain safe and efficient operation; lifts are no exception. It can be expected that the lifts will be out of service during its lifetime (sometimes up to 5 days).

A redundancy of service is not provided as all units are provided with a single lift access. Hence the following are potential scenarios during these times:

- > Many residents, especially those on the upper levels, may be forced to climb up to 5{levels} worth of stairs in order to access their apartments should their lift be out of service
- > Elderly/disabled persons may not be able to access apartment and be placed at a disadvantage
- > Furniture/goods movements would be forced via stairs should the lift be out of service
- > Should the lift be locked out for furniture movements, residents will be forced to use stairs.

During residential moving in/out periods, the waiting times for passengers of the tenancy will be significantly impacted. Hence, it is highly recommended that building management enforce strict lift operational protocols which, at a minimum:

- > Restrict the use of the lift for goods/furniture transfer to off-peak period only
- > Limit the duration of lift usage
- > Ensure protective blankets are used to limit damage to lift interior;

Commented [RH5]: Is its 5 or 6?

Commented [RH6]: Need to note that there will be significant waiting times during this period.



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