REPORT

24-26 Railway Parade, Building Services DA Report

Revision 04

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Revision Information

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Title	DA Building Services Report
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Revision Schedule

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00	31st Mar-2017	For DA Issue	LEP	LEP
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Contents

1. Introduction

This report presents the building services options proposed for the 24-26 Railway Parade development in Westmead for the purposes of supporting the Development Application to Parramatta City Council.

This report provides a list of proposed and potential strategies that will be considered for incorporation into the development.

The following services are described in this report:

- Building Utilities – Site Services
- Mechanical
- Electrical
    - Communications
    - Security
- Hydraulics
- Fire protection
- Vertical transportation

The building services serve a number of different building classifications as follows:

- Residential Apartments - Class 2
- Serviced Hotel/Apartments – Class 3
- Commercial Office / Medical Suites – Class 5
- Retail – Class 6
- Carpark – Class 7a
- Gym – Class 9a

For each of these building classifications, the building services have been designed to meet the specific requirements of the NCC/Building Code of Australia, and relevant Codes and Standards.

2. Reference Design Documentation

This report has been prepared for the 24-26 Railway Parade Parramatta project based on the Sissons Architects design DA Set architectural drawings.

3. Building Utilities – Site Services

3.1. General

The following infrastructure will be provided to the development:

- Electricity supply and reticulation
- Telecommunications
- Sewer services
- Water services
- Gas infrastructure

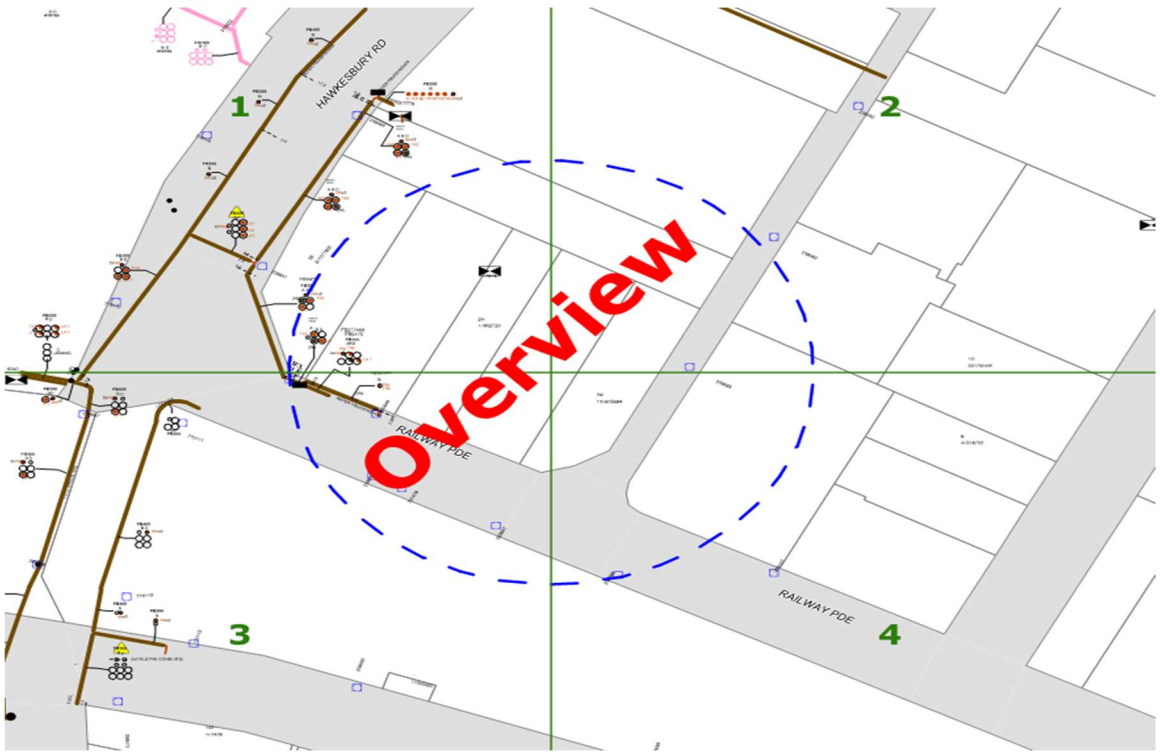
3.2. Electricity supply and reticulation

The following describes the existing and proposed infrastructure arrangement to the development;

A padmount substation of 500kVA rating with High Voltage (HV) cabling serves the existing site. This substation and cabling would be insufficient to the supply the proposed new development. Therefore a replacement/upgrade of infrastructure is required.

Preliminary maximum demand calculations indicate a supply of 1.5MVA (2000A/phase) is required. The proposed location for the new indoor substation will be adjacent the car park entry facing Ashley lane, at street level (subject to Accredited Service Provider Level 3 design and authority approval). The authority will require 24 hours access to the substation. Ashley Lane will need to be able to support the authorities truck requirements in terms of weight and clearances.

The new incoming electricity supply to the substation will be supplied Underground (U/G) from Hainsworth Street HV feeder WM1142 as per the Authorities supply offer dated 11th January 2017 (see appendix 1). Existing Low Voltage circuits supplied from the existing substation shall be maintained. The method for this will need to be considered to manage shutdowns and transferring of existing circuits to the new supply.



Existing electricity network (Endeavour Energy) as provided via Dial before you Dig service Dec'16

3.3. Telecommunications

The development shall be provided with incoming telecommunications U/G infrastructure. The network service could be provided by NBN or Telstra. A preliminary enquire to NBN revealed that rollout of the NBN network is planned in the area between July and December 2018. Suitably rated fibre optic and/or copper cabling shall be provided within the basement to serve the Hotel, apartment, commercial and retail components of the building.

A new building distributor space will be provided for installation of electronic/active equipment, providing cabling and distribution of communications services to the hotel, apartment, commercial and retail and house/common areas.

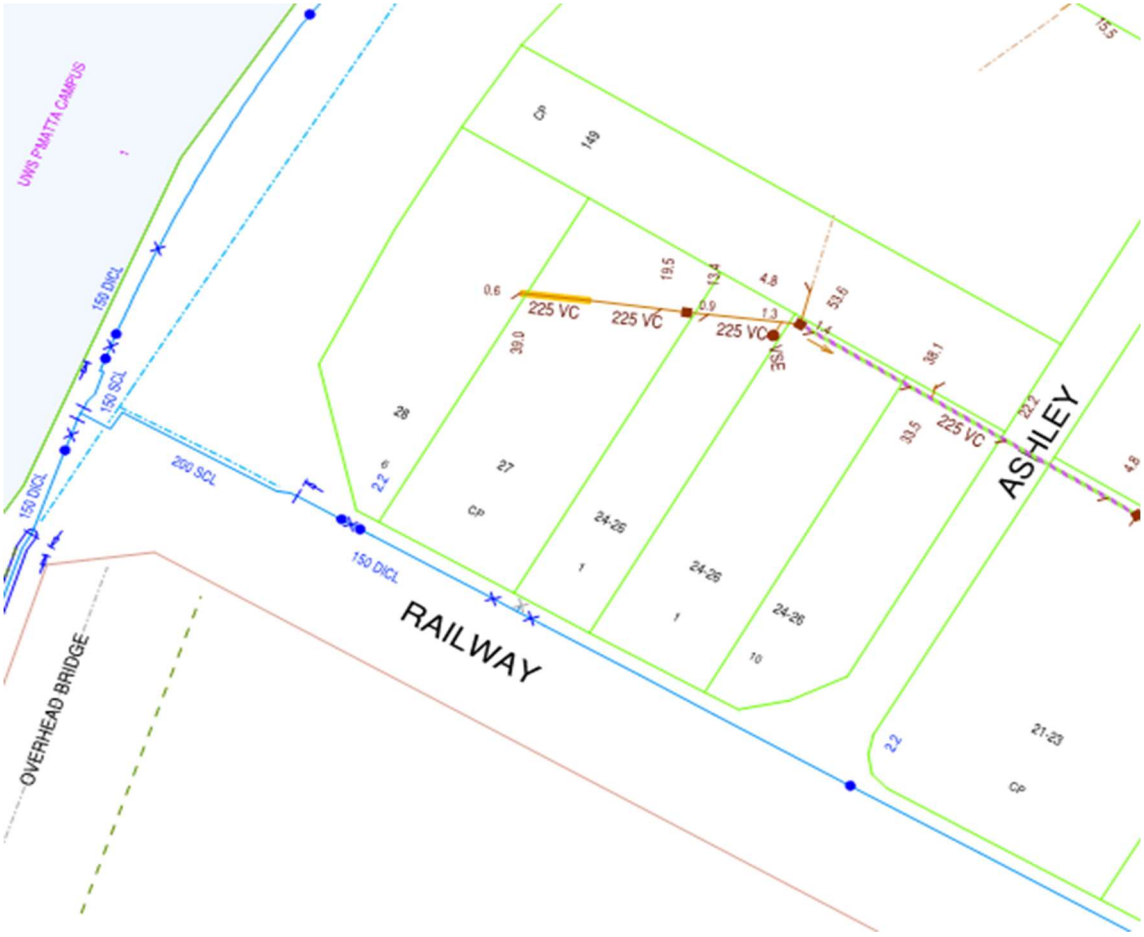
Existing NBN network as provided via Dial before you Dig service Dec'16

3.4. Sewer Services

Sydney Water sewer drawings show there is currently no sewer infrastructure within Railway Parade or Ashley Lane.

An existing 225ø, authority sewer main is currently located as passing through the site along the eastern boundary. The relocation of this main will be undertaken in accordance with Sydney Water's requirements and does not form part of the hydraulic services scope.

The new development will likely require a 225ø sewer connection to the relocated authority main. The location and final design will be subject to the final design of the relocated sewer main.



Existing Sydney Water network as provided via Dial before you Dig service Dec'16

3.5. Water Services

Domestic Water Supply

Sydney Waters water service drawing show an existing 150ømm main on Railway Parade. There is currently no water infrastructure located on Ashley lane.

A new potable and fire services tapping will be required off Ashley Lane to service the new development, which will require an authority branch extension along Ashley Lane to the current water meter room location.

The final water tapping location and size will be subject to both coordination of the building layout as well as the final design and configuration of the branch extension with Sydney Water which is not part of this package and is by others.

Combined Fire Water Supply

A dual fire services water supply will be provided. It will be a dual water supply as defined in AS 2118.6-2012. The water supply will serve both the fire sprinkler system and the fire hydrant system and will consist of:

- Direct connection from the town main complete with double check valve set by the Hydraulic trade. The fire trade will connect from the Back Flow Prevention Device and continue the supply and provide all associated equipment for the Fire Brigade booster arrangement.

- Fixed on-site water storage tank divided into two equal sections so that, in the event that one section is isolated and drained for maintenance, the other section will remain in service.

An electric booster pump (primary) and diesel booster pump (secondary) will be provided to boost water supplies to the peak flow rate and pressure requirements of the fire hydrant and sprinkler system. Pumps will be located in a dedicated fire pump room with direct access to a road or open space via the fire stair, as required by AS 2419.1.

Fire Main Reticulation

Piping to which sprinkler installations and fire hydrants are directly connected to shall be from a 100mm ring main (single pressure zone).

Vertical portions of the ring main pipes shall be located within separate fire isolated stairs.

Fire Tank

The fire service tank volume will be calculated based on simultaneous flow from fire hydrants, sprinklers and a nominal quantity of internal drenchers (where required).

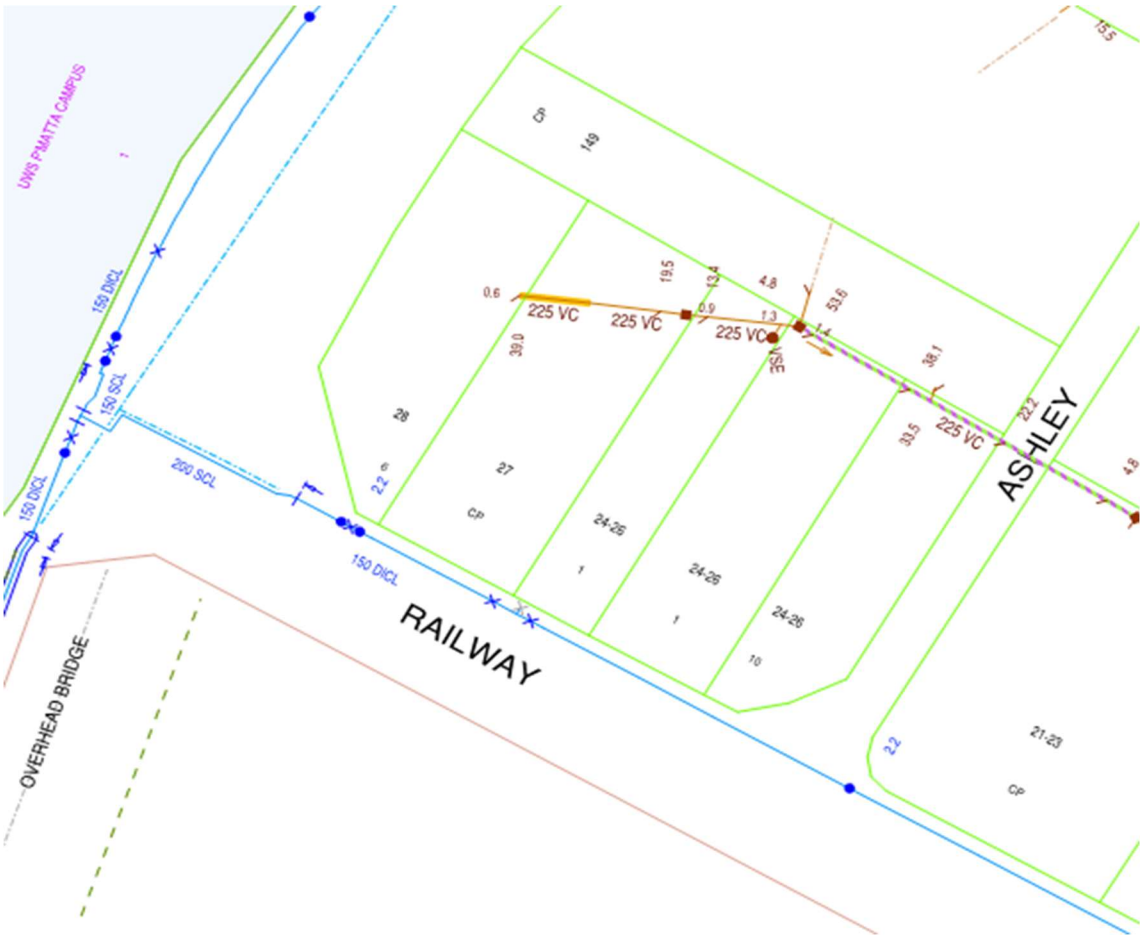
The calculated tank size is 90kL (effective capacity).

Total effective tank volume will be reduced to 2/3rd capacity, in accordance with AS 2118.6-2012, 2.8.5 (c).

Provision for the tank supply shall be provided by the hydraulics trade.

Construction of the water storage tank shall be off concrete and shall be provided by the builder.

The fire services trade shall provide all other associated and required equipment.



Existing Sydney Water network as provided via Dial before you Dig service Dec'16

3.6. Gas infrastructure

Jemena's existing services documentation shows the site is currently bounded by a 75ømm (210kPa) main along Railway Parade and a 32ømm (210kPa) along a small portion of Ashley Lane.

The current proposal is supply gas to the site via the existing main on Ashley Lane, however this will be subject to a capacity review from Jemena which they have advised can be undertaken closer to construction.

Existing Gas network (Jemena) as provided via Dial before you Dig service Dec'16

4. Mechanical Services

4.1. General

The main features including within the mechanical services systems for this building are;

- Air Conditioning Systems
- Ventilation and Exhaust
- Smoke Hazard Management
- Associated Piping System
- Associated Control System; Building Management Control System

4.2. Design Criteria

The building's mechanical services systems will generally be designed to achieve the following requirements.

External Design Conditions

The following ambient design conditions used for the Sydney CBD:

	Summer	Winter
• **Class 2 & 3**	34.6°C DB, 23.9°C WB	4.0°C DB
• **Class 5 & 6**	34.6°C DB, 23.9°C WB	5.8°C DB

Internal Design Conditions

The following values will be applied to the design, with assessment for modification as noted.

	Summer	Winter
• Class 2 Residential Apartments	24.0°C DB	21.0°C DB
• Class 3 Hotel/Serviced Apartments	24.0°C DB	21.0°C DB
• Class 5 Commercial Office	22.5°C DB ± 1.5°C	22.5°C DB ± 1.5°C
• Class 6 Retail and F&B Precinct	22.5°C DB ± 1.5°C	22.5°C DB ± 1.5°C

No humidity control shall be provided however inherent psychrometric processes should limit the maximum humidity to no more than 65%.

4.3. Proposed Air Conditioning Systems

Residential Apartment

The proposed residential apartments will be provided with direct expansion (DX) fan coil units either wall mounted or mounted in ceiling bulkheads. Each apartment will have their air conditioning systems sized to cater for the thermal loads serving the main living space and bedrooms.

On apartment levels, corridors will be provided with conditioned outdoor air from a central fan unit dedicated to the apartments and located in the mid-rise plantroom. Outdoor air shall be ducted to each residential apartment via the corridor ceiling.

Heat rejection from the fan coil units will be through refrigeration pipework to a water-cooled heat exchanger located on every 3rd floor. Cooling water from the heat exchanger shall be piped to a cooling tower located on the roof and dedicated to the residential apartments.

Serviced Apartment Hotel

The proposed serviced apartment hotel will be provided with direct expansion (DX) fan coil units mounted in ceiling bulkheads. Each serviced apartment will have air conditioning systems sized to cater for the thermal loads serving the main room.

The reception area, dining area, meeting rooms, kitchen, and back of house areas will all be served by dedicated DX fan coil units

Outdoor air shall be served to each serviced apartment, reception area, meeting room, and back-of-house area from a central fan unit dedicated to the hotel and located in the mid-rise plantroom. On apartment levels, corridors will be provided with conditioned outdoor air. Outdoor air shall be ducted to each serviced apartment via the corridor ceiling.

Heat rejection from the fan coil units will be through refrigeration pipework to a water-cooled heat exchanger located on every 3rd floor. Cooling water from the heat exchanger shall be piped to a cooling tower located on the roof and dedicated to the serviced apartments hotel.

Commercial Office

The commercial office spaces will be provided with water cooled packaged units located in the mid-rise plantroom. These units will be ducted to the commercial office medical centre space on levels 1 and 2. Heat rejection from the water cooled packaged units will be by cooling tower(s) located on the roof plantroom. The base building condenser water system will be dedicated to serve both the commercial office and retail components of the development.

The commercial office spaces located at the western end of the site will be served by roof top packaged air conditioning units. These units could be either dedicated air cooled units or water cooled packaged units connected to the roof mounted cooling tower.

Retail Tenancies

The retail and Food and Beverage spaces will be provided with condenser water heat rejection facility served by cooling tower(s) located on the roof plantroom. It is proposed that the retail offices be conditioned with water cooled packaged air conditioning systems provided by the prospective tenant(s). The base building condenser water system will be dedicated to serve both the commercial office and retail components of the development.

Outdoor air and exhaust air risers serving the retail facilities will be ducted from the mid-rise plantrooms outdoor air and roof plantroom for exhaust air.

Mechanical Ventilation

Mechanical ventilation will be provided to the following spaces:

• Carpark Supply and Exhaust	AS1668.1 & 2
• WC Areas	To AS1668.2(not less than 10 Air Changes)

- Stair Pressurisation to AS1668.1
- Garbage/Grease Arrestor Room To AS1668.2
- Hotel Kitchen Exhaust 3,000 L/s
- Hotel Kitchen Supply Air makeup 3,000 L/s
- Tavern Exhaust and Supply air 3,000 L/s each
- Level 1 Food and Beverage Exhaust 12,000 L/s to share between all tenancies
- Plantroom Spaces To AS1668.2
- Gas Meter Room To Gas Code

4.4. Smoke Hazard Management

The smoke hazard management systems shall operate in accordance with the requirements of the BCA and the relevant AS1668.1 Standard.

During a detected fire signal the Stair Pressurisation fans will operate to pressurise the Fire escape stairs. Relief air from the Class 2 and 3 parts of the building will be via natural ventilation openings in the side of the building.

4.5. Noise and Vibration

The mechanical systems, including all plant, shall be assessed by the acoustic engineer and treated if required to meet the acoustic performance criteria stated in the Acoustic Report and AS 2107.

4.6. Building Automation System

A computerised Building Management and Control System (BMCS) shall be used to automatically control, monitor and provide alarms for the nominated building services.

5. Electrical Services

5.1. General

The main features including within the electrical services systems for this building are;

- High Voltage Incoming Supply
- Substation
- Standby power generation
- Main switchboards
- Power Factor Correction
- Metering
- Distribution Switchboards
- Power reticulation
- General and special purpose power outlets
- Internal and external artificial lighting and controls
- Emergency and exit lighting
- Backbone communications system
- Free to air (FTA) and provision for pay TV systems
- Security systems;
    - Access Control system and Intercommunications system
    - CCTV Surveillance system
    - Intercom
- Earthing and Lightning Protection system (direct and indirect)

5.2. Standards and Design

The electrical services installation shall be developed in accordance with the following standards;

- NCC/Building Code of Australia
- Service Rules and Regulations of the local Supply Authority (Endeavour Energy)
- AS3000 – Electrical Installations (Wiring Rules)
- AS3008 – Electrical Installations – Selection of Cabling
- AS3010 – Electrical installations – Generating sets
- AS61439 – Low-voltage switchgear and control gear assemblies
- AS1680 – Interior and Work place lighting
- AS2293 – Emergency Escape and Exit Signage
- AS1768 – Lightning Protection

The communications services installation shall be developed in accordance with the following standards;

- CCM – Communications Cabling Manuals
- AS/ACIF 008 – Requirements for customer cabling products
- AS/ACIF 009 – Installation requirements for customer cabling (Wiring Rules)
- AS3084 – Telecommunications installations

The security services installation shall be developed in accordance with the following standards;

- AS2201 – Intruder Alarm Systems set
- AS4806 – CCTV set

5.3. High Voltage Supply and Substation

Local supply authority infrastructure shall have the ability to support the maximum demand of the building. The power supply to the building shall be from underground high voltage cables leading in from the Endeavour Energy network. The High Voltage (HV) feeders shall run underground for the entire route from the Supply Authority power source. The HV cable shall connect to the HV switchgear with the substation.

The buildings chamber substation shall form part of the building structure. An application for a 1.5MVA chamber supply has been made to the Supply Authority (Endeavour Energy). The details of the incoming high supply source are as detailed in their offer letter (see appendix 1 of this document).

Voltage drop at the final point of connection shall not exceed 7% for dedicated on site substation to AS3000 and power supply Authority.

5.4. Standby Power Generation

Due to the type of tenants for this building, it is recommended to provide Standby Power Generators to provide back-up power supply in case of brownouts or blackouts of the normal supply. The Standby Power would be in the form of Diesel Generators complete with supporting Diesel storage tank located in the lowest basement level. A fuel fill point shall be located at street level with pipework reticulating to the tank room.

An automatic PLC based system shall control operation and loading of the generator system. The diesel generator system shall interface with the Building Management Control system (BMCS) for monitoring purposes.

5.5. Consumer Mains

Consumers' mains will be provided from the new chamber substation to the Main Switchboard (MSB) located in an adjacent room.

Consumer main rated to capacity of transformer with fire performance WS52W rating to AS3013.

5.6. Main Switchboard

The main switchboard will be located in close proximity to the substation. Two-hour fire rated protection shall be provided. The main supplies will be divided to supply the following areas;

- Base Building services
- Residential apartments
- Hotel/Services Apartment
- Commercial office tenancy spaces
- Retail and F&B tenancies

The Main Switchboard will be enclosed assembly type of Form 3 construction and minimum IP42 degree of protection. The switchboard will be floor-mounted, free-standing, front/back connected type.

Instrumentation for Volts (V), Amps (A) and Maximum Demand (MD) will be provided on the incoming consumers mains as well as individual loads, in compliance with BCA requirements for buildings with a floor area greater than 2,500m^2. Individual loads would be as follows;

- A/C Plant
- Lighting
- Power
- Vertical Transport
- Any other large ancillary plant

Where required the instrumentation will be interfaced to a BMCS for energy reporting.

5.7. Power Factor Correction

Power factor correction equipment shall be installed to maintain the power factor at a minimum of 0.95 at all times for the commercial tower base building house services. Space shall be provided for tenants to install their own power factor correction units.

5.8. Electricity Metering

Electricity metering equipment comprising of whole current or Current Transformer (CT) metering will be provided generally as follows:

- Base building – Common areas, vertical transport, external lighting etc.
- Hotel/Serviced Apartment – Kitchen Areas, BOH, serviced apartment rooms
- Retail – Separate metering for individual retail and F&B tenancies
- Commercial – Separate metering for commercial tenancies.

The meter panels will be grouped together in locations readily accessible.

5.9. Reticulation and Cable Management

The Hotel and each Apartment, Commercial and Retail tenant shall be provided with a separate authority metered submain.

The electrical risers shall contain cabling and distribution equipment to serve commercial and retail tenants as well as house/common area requirements.

5.10. Power Distribution

Submains will be provided to distribute power to final distribution switchboards and control panels for other services (mechanical, lifts, fire, hydraulic). Submains will be XLPE/PVC copper except when supplying fire essential services loads, which will be the fire rated type.

Submains will be installed on cable trays and arranged in a single path radial format except for typical levels where metered and unmetered rising mains with local tee offs will be used.

5.11. Distribution Boards

House Distribution boards (DB's) shall be readily accessible situated in switchrooms, riser cupboards or plant rooms specifically designed for the purpose. Outgoing circuits shall be protected by circuit breakers.

Retail tenant DBs shall be located to suit the tenants' requirements within the tenancies.

Commercial tenancy DBs shall be located within on-floor fire rated cupboards.

5.12. General Purpose Outlets

Power outlets for general purposes and special purposes will be provided, generally as follows:

- Commercial spaces: as required for use by base building e.g. lobbies, lift lobbies, store rooms, riser cupboards, amenities etc, for equipment, cleaning and general usage.
- Toilets, lockers, store rooms: As required for specific purposes (hand dryers, hot water units, boiling water unit, urinal flushing devices and 10 Amp outlets (GPO) for general purposes. In toilets, double GPO will be provided adjacent to each vanity unit.
- Plant and service areas: As required for specific purposes plus a number of 10 Amp IP rated outlets for general purposes.
- Typical Corridor: Double GPO every 12m.
- Typical Lift core area: Double GPO's for general purposes and vending machines.
- Retail: To be confirmed – shell provision or tenant requirements.
- Apartments: To be confirmed during detailed design stage.
- Serviced Apartments: To be confirmed during detailed design stage.

General purpose outlets will be circuited with a maximum of 8No. per circuit. Residual Current Devices (RCDs) shall be provided in accordance with AS3000 requirements on final circuits for General Power and Lighting.

5.13. Artificial Lighting

Lighting shall be energy efficient, switched lighting and locally controlled. A lighting control strategy shall be implemented appropriate to the application such timers, photocell, dimming etc.

Lighting Emitting Diodes (LEDs) technology shall general be used throughout.

Common/House Areas

Light fittings of type suited to task shall be provided in common/house areas as follows;

- Corridors, stairs and lift lobbies
- Plant rooms;
- Riser cupboards;
- Toilets, cleaners' rooms, and
- Store rooms.

Office tenancies

Light of type suited to task shall be provided in office tenancies. Modifications to this lighting will be the responsibility of the tenant.

Retail Tenants
Lighting requirements within the retail shops shall be the responsibility of the individual tenant.

Hotel Apartment Lighting
Lighting requirements within the hotel apartments shall be the responsibility of the hotel operator.

Apartment Lighting
Generally LED downlights will be provided within individual apartments.

External Lighting
External building feature lighting shall be installed to provide interest and to highlight architectural features.

No light beam shall be directed beyond the site boundaries or upwards without falling directly on a surface to minimise light pollution. Lighting will be controlled by photoelectric cells and/or time switches.

5.14. Exit and Emergency Lighting

Emergency and Exit Lighting shall comply with current requirements of the BCA and shall be LED type.

A central computer monitoring system shall be considered for testing, certification and monitoring fo the emergency and exit lighting system in all areas.

5.15. Lighting Controls

Common/House Areas
An automated lighting controller (based on time switch) is to be provided in each house distribution board. Lighting to common areas shall also utilise motion sensing in parallel with the time switch for control.

Motion sensors shall be provided in the toilets and other low-trafficable areas (fire stairs) to control lighting when movement is detected and ensure efficiency and safety is optimised.

External lighting shall be controlled by use if PE cell and digital timeclock.

5.16. Earthing

Earthing systems shall be in accordance with AS3000 for MEN systems.

5.17. Lightning Protection

Lightning protection provisions shall be provided in accordance with Australian Standards. An assessment will be carried out to determine the extent of the protection required (direct and/or in-direct protection). The system will utilise the building structure and cladding where possible to avoid additional fixtures and fittings where direct lightning protection is provided.

Surge diverters will be provided in the main switchboard and incoming telecommunication services supplying critical equipment.

5.18. Communication Services

Reticulation and Cable Management

Each commercial and retail tenant, the hotel, and residential apartments shall be provided with a dedicated incoming communication service cable (fibre and/or copper).

These risers shall contain cabling and some distribution equipment to serve commercial tenants as well as house/common area requirements.

These communications risers will also accommodate security and MATV distribution cabling and equipment.

MATV

A dedicated clear space will be provided for an MATV antenna located above one of the roof top plant rooms.

A MATV backbone will be provided with antenna and head end equipment. The system will be suitable for digital television signals and Pay TV connections.

5.19. Security Services

The development shall be provided with Intruder detection, Access Control & Intercom, and CCTV surveillance. The systems will interface to a security/building managers room for overall monitoring and management.

The standalone security systems headend will be housed in the Base Build communications room, with any necessary data gathering panels distributed within the building risers. Generally Access Control, Intercom and CCTV will be IP based.

Monitoring and Intruder Detection

All perimeter doors, fire stair doors, plant room doors and access controlled doors will be monitored via reed switches, with monitoring and alarms via the standalone security head end system. An alarm will sound should doors be left in the open position.

Access Control & Intercom

Each commercial and retail tenant will be provided with an access control system, which will control access by proximity card or other approved means to:

- Lifts;
- Main Entries;
- Conduits will be provided in the fire stairs for future installation of proximity card access control to allow re-entry on select levels

An intercom facility shall be provided and will be integrated into the base building access control system. The intercom system shall be answered from within the security control room.

CCTV System

The building will be provided with a CCTV surveillance system. CCTV cameras will provide coverage of:

- Building perimeter;
- All entries and exits;
- Main Lobbies;

- Lift cars subject to further assessment.

The cameras will be of high resolution and connected to a digital recording system; either through Digital Video Recorders (DVR's) or hard drive Local Area Network (LAN) based system, providing 30 hours or archive footage storage.

6. Hydraulic Services

6.1. General

The main features including within the hydraulic services systems for this building are;

- Sewer and Waste Water Drainage
- Sanitary Plumbing
- Trade Waste System
- Potable Cold Water system
- Domestic Cold Water service
- Domestic Hot Water service
- Re-use water (Rainwater) System
- Natural Gas Service
- Roof Drainage

6.2. Codes and Standards

All supplied equipment, methods of installation and standards of workmanship shall comply with the relevant technical specifications, procedures, practices and standards:

- National Construction Code (NCC)
- Plumbing and Drainage Regulations
- Department of Fair Trading requirements
- Sydney Water Authority requirements
- City of Parramatta requirements
- Jemena Gas requirements
- The Project / Client Design Brief
- Tenancy Brief
- Project ESD Brief
- Fire Engineering Report / Fire Engineering Brief
- Building Surveyors Report
- Fire and Rescue NSW
- Geotechnical Report
- Acoustic Report
- All applicable Australian Standards associated with the works
- All requirements of authorities having jurisdiction over the project.

Item	Standards
Sanitary Plumbing & Sewer Drainage	In accordance with AS3500 The National Construction Code Department of Fair Trading Notices Water Authority Requirements
Trade Waste	In accordance with AS3500 Water Authority Requirements
Roof Drainage & Downpipes	In accordance with AS3500 Authority Requirements
Cold Water Services	In accordance with AS3500
Hot Water Services	In accordance with AS3500 Minimum Hot Water temperature 60C
Non Potable Water System	In accordance with AS3500, Water Authority Requirements
Gas Service	AS 5601 Jemena Specific requirements The National Construction Code Department of Fair Trading
Noise criteria	In accordance with acoustic engineer's recommendations.

6.3. Sewer and Waste Water Drainage

The project will be provided with fully vented modified Sanitary plumbing type installation. The sanitary plumbing system shall drain to the sewer drainage system which connects the building to the Sydney Water sewer main that runs through the site from Ashley Lane.

Fixtures unable to gravitate to sewer shall connect to a sewer pumping system located within the basement. Sewer pumping systems shall have dual pumps with 100% standby duty configuration and all associated alarms to ensure adequate notice of failures.

Retail tenancies will be provided with a provisional drainage outlet terminated with capped point for future tenant connection.

6.4. Trade Waste System

Greasy waste shall discharge via a gravity drainage system to the provisional dedicated grease arrestors located in the basement serving the Hotel, Supermarket/Tavern, Medical Facility and Retail spaces. The grease interceptor shall be sized and configured to meet Sydney Water trade waste requirements.

6.5. Potable Cold Water Systems

All areas of the project will be serviced with a potable cold water supply. The cold-water supply shall extend from the authority main in Railway Parade to a new water meter assembly fitted with backflow preventer located within the water meter room off Ashley Lane. Potable water shall be reticulated to

a break tank, pressurised via booster pump and reticulated to the roof plantroom. From the roof plant room piping will extend to all water consuming outlets with pressure reducing valves where appropriate.

Retail tenancies, commercial, hotel and the Apartment strata shall each be provided with a metered provisional potable cold water supply terminated with isolation valve for future tenant connection.

6.6. Domestic cold water variable speed pressure sets

Pump-sets shall consist of dual Multistage centrifugal pressure of the variable speed type. Separate pump-sets will be provided for both the hotel/commercial area and the apartment strata to ensure each service can be maintained and operated separately.

Each pump-set unit shall be complete with variable speed drives, pressure cell, pressure transducers, gauges, and distribution panel all mounted on a mild steel galvanised fabricated base plate frame.

6.7. Domestic Hot Water Systems

A domestic hot water system will be provided to supply domestic hot water to all points of usage throughout the building.

The Hotel, Serviced Apartment strata, and commercial tenancies will be each provided with dedicated Domestic hot water systems. Each system shall comprise of central gas fired plant with pressurised flow and return piping network and dual circulating pumps. Domestic hot water to be a complete flow and return system reticulated at minimum 60 degrees Celsius to avoid legionella issues.

The Retail tenancies will be responsible for installing their own domestic hot water systems

Localised individual electric hot water units will service garbage areas.

Domestic hot water serving showers and basins shall be temperature controlled via thermostatic mixing valves to maintain temperatures at outlets in accordance with AS3500 requirements.

6.8. Rainwater Reuse Systems

Rainwater runoff from the upper main roof area will be collected and stored to reduce the use of potable water. Rainwater shall be treated to an acceptable level prior to reticulating to the usage points. It is expected to re-use rainwater for toilet flushing and washdown water.
Separate pump-sets will be provided for both the hotel/commercial area and the apartment strata to ensure each service can be maintained and operated separately.

6.9. Rainwater Filtration system

A rainwater filtration system shall be installed to pre-treat the rainwater prior to re-use. Each system shall include dual filtration and UV disinfection systems.

6.10. Natural Gas Service System

The project will be serviced by an incoming gas supply from the Authorities main located in Ashley Lane, and extended to the main gas meter room off Ashley lane at Ground level.

Authority gas meters shall be used for billing purposes and the Hotel, Apartment Strata, Commercial Base Building, and Retail tenancies shall be separately metered from the office component.

- All works shall be in compliance with Jemena's access requirements, and shall gain approval from Jemena for the proposed location and access arrangement.

6.11. Roof Drainage System

The project will be provided with a roof drainage system designed for a 1 in 100 year storm event with 100% overflow provision. The roof drainage system shall discharge to the rainwater tank located in the rooftop plant room. The rainwater tank overflow, along with any stormwater drainage at lower levels, will connect into on-site detention tank located in the level 01 plant deck (by others). The on-site detention tank, along with any stormwater drainage not connected to this tank shall discharge to the kerb on Ashley Lane in accordance with Council's requirements.

Any basement level stormwater services below the Authority site connection shall connect to a stormwater pumping system.

Pump-outs shall have dual pumps with 100% standby and all associated alarms to ensure adequate notice of failures

7. Fire Services

7.1. General

The main features including within the fire services systems for this building are;

- A combined fire sprinkler / hydrant system
- Fire Hose Reels system
- Automatic Smoke Detection and Alarm System
- Smoke Hazard management system (See Mechanical services)
- Sound Systems and Intercom Systems for Emergency Purposes (SSISEP)
- Portable Fire Extinguishers

7.2. Codes and Standards

All supplied equipment, methods of installation, and standards of workmanship shall comply with the relevant technical specifications, procedures, practices and standards:

Item	Standards
Fire Detection & Alarms	AS 1670.1 AS 1668.1
SSISEP	AS 1670.4
Fire Sprinkler Systems	AS 2118.1 – Automatic fire sprinkler systems – General requirements AS 2118.6 - Combined sprinkler & hydrant systems in multistorey buildings
Fire Hydrant	AS 2419.1 – Fire hydrant installations – System design, installation and commissioning AS 2419.2 – Fire hydrant installations – Fire hydrant valves AS 2419.3 – Fire hydrant installations – Fire Brigade Booster Connections AS 2118.6 – 2012 Combined sprinkler & hydrant systems in multistorey buildings
Fire Hose reels	AS2441 – Fire Hose Reels
Portable Fire extinguishers	AS 2444 – Portable fire extinguishers and fire blankets – Selection and location
Electrical work	AS/NZS 3000 AS 3013

7.3. Combined Sprinkler and Hydrant System

The combined sprinkler and hydrant system shall include the following;

- Connection to the incoming town main connection for the combined sprinkler and hydrant systems.
- Electric Booster Pump and all associated equipment
- Diesel Booster Pump and all associated equipment
- Fast Response sprinklers throughout
- Wall wetting sprinklers, where required (internal drenchers)
- Sprinkler spares cabinet
- Sprinkler Control Assemblies
- Pressure Reducing Valves
- Flow Switches
- Combined Sprinkler and Hydrant Fire Brigade Booster Arrangement and all associated equipment
- Jockey Pump for pressure maintenance
- Remote test valves
- Internal hydrants
- Pipework and associated valves, equipment, fittings and fixings
- Pressure Switches
- Pressure Gauges
- Fire Brigade Alarm Line
- Monitoring and Controls, including isolation valve monitoring
- Wiring
- Combined Sprinkler and Hydrant Block plan
- Locks and straps
- Water Supply Proving Test Arrangements
- Fire water tank associated equipment, including Flow Control & level Control inlet valves.

Design Criteria

The design criteria for the sprinkler system will be as follows:

Occupancy	Hazard Class	Discharge Density mm/min	Assumed Operation Area
Residential Apartments			
Hotel and Serviced Apartments			
Retail / Restaurants and cafes	OH1 to 3	5	72 to 216m^2
Plant	OH1	5	72m^2
Commercial/Office	LH	2.25	84m^2

For the Hydrants the following design criteria shall apply:

Building classification:	2 & 3
No. of hydrants to operate simultaneously:	1
Minimum flow rate:	10 L/s total at the most hydraulically disadvantaged hydrants (10 L/s each)
Minimum outlet pressure each hydrant outlet non-boosted:	700 kPa @ 10 L/s for each hydrant
Minimum outlet pressure when boosted:	700 kPa

Building classification:	5 & 6
No. of hydrants to operate simultaneously:	1
Minimum flow rate:	10 L/s total at the most hydraulically disadvantaged hydrants (10 L/s each)
Minimum outlet pressure each hydrant outlet non-boosted:	700 kPa @ 10 L/s for each hydrant
Minimum outlet pressure when boosted:	700 kPa

Wet Sprinkler Control Assemblies

Sprinkler control assemblies shall be located at each storey in a common fire rated exit in accordance with AS 2118.6.

Include in the sprinkler control valve assembly and associated components everything necessary for the function of the system in accordance with AS 4118.1.2 and at least the following:

- Main Stop Valve: 0.S & Y type or butterfly valve, with flange or roll grooved connection, hand wheel, right handed

- Check Valve: Flanged or roll grooved connection, installed immediately above each main stop valve. Mount approximately 1400 mm above the floor level
- Connection to fire trip direct Local Fire Brigade alarm and pumps
- Flow switch and solenoid valve arrangement with system test drain
- Installation pressure gauges
- Block plan
- Emergency instructions
- A location plate
- A notice above the mains top valve identifying the installation and the area served by the installation

7.4. Isolation Valve Criteria

The pressure zone shall incorporate isolation valves so that not less than 75% of fire hydrants in that zone and not less than 50% of fire hydrants at each floor level remain operable upon isolation of any section of the fire ring main.

Isolation valves shall also be located such that not more than four storeys of sprinklers can be isolated.

In addition isolation valves shall be located as follows;

- On each arm of the ring main, adjacent to the connection with the supply pipe.
- On branches into buildings, adjacent to the tapping in the ring main, in a position considered to be accessible under fire conditions.
- On branches supplying more than one fire hydrant, adjacent to the tapping in the ring main.
- On branches supplying a sub-ring main, adjacent to the tapping in the ring main.
- On the ring main, remote from the source of supply.
- On any interconnection within the ring main, on the cross-connecting pipe adjacent to the ring main, and on the ring main on each side of the cross connecting pipe.
- On ring mains supplied by separate sources, isolating valves shall be located at the point of connection with each source.

All ring main isolating valves shall be so located as to permit ready access by fire brigade personnel.

7.5. Pressure Reducing Valves

Pressure reducing valves are to be provided in accordance with AS 4118.1.8. and the manufacturer's specific installation requirements. They shall be provided to prevent the total maximum static pressure in the system exceeding 1200 kPa at any sprinkler head or 1300 kPa at any fire hydrant. Isolation valves are to be provided either side of the pressure reducing valve for maintenance purposes.

7.6. Flow Switches

Flow Switch Zoning shall align with fire detection and zone smoke control zones where practical and fitted with flow switch and test facilities drain to the stormwater tank or to a sump / pump out pit provided by the hydraulic trade.

Supply and install on the main sprinkler branches to each floor, downstream of the floor level main stop valve, a flow switch in an accessible location.

Flow switches are to be single pole, magnetic switch or paddle type, low restriction on/off type. Sensitivity to suit minimum flow, with pneumatic retard or time delay.

Each flow switch shall be wired back to the Fire Indicator Panel on separate alarm zone facilities in accordance with AS 1670.1.

A solenoid operated water flow test drain shall be fitted on the system side of each flow switch fitted with a solenoid test valve in an accessible position. Each valve shall be labelled "Flow Switch Test Drain Level ....." and wired back to the fire indicator panel to enable testing to be carried out.

The test drains shall be sized for the water flow necessary to operate the flow switch but less than the flow from a single activated sprinkler.

7.7. Hose Reels

Hose reel system will be supplied from the combined sprinkler and hydrant riser. Hose reels are to be located in a visually unobtrusive, but accessible position and are to be within 4m of the entry door to the fire stairs or fire passageway or non-fire rated required exits. The system will be designed in accordance with AS 2441-2005.

Fire hose reels will be a minimum of 36 metres long.

7.8. Automatic Fire Detection and Alarm System

A smoke detection System & alarm system is required in accordance with BCA, AS 1670.1, AS/NZS 1668.1.

The system shall be an automatic fully addressable fire detection and alarm system that is controlled and monitored by a Fire Indicator Panel (FIP) located in the building entry foyer.

The Automatic Detection and Alarm System will be interconnected with the BMS, combined sprinkler and hydrant system, Sound Systems and Intercom Systems for Emergency Purposes (SSISEP).

The FIP will incorporate a Fire Fan Control Panel (FFCP) that will automatically and manually control the ventilation and air distribution systems throughout the entire site for the control of smoke in accordance with AS 1668. The Fire Fan Controls will be zoned per facility.

The FIP will consist of Alarm Signalling Equipment (ASE) for automatic notification of a fire alarm to the Fire Brigade via a third party monitoring provider.

The fire panels will be provided with a minimum of 20% spare capacity.

Detectors will be selected and positioned to suit the risk and to mitigate the possibility of false alarms.

7.9. Sound System & Intercom System for Emergency Purposes (SSISEP)

A SSISEP shall be provided throughout the entire site in accordance with the latest BCA referenced standards AS 1670.4 and the Fire Engineering Report.

The system shall be controlled and monitored by a Master Evacuation Control Panel (MECP) located in the building entry foyer, directly adjacent to the FIP.

The SSISEP will be automatically initiated by the combined sprinkler and hydrant system and the Automatic Detection and Alarm System. Manual actuation will be achieved via white emergency call points (ECP) located within the fire hose reel cupboards.

Speakers will be selected and located to ensure the required speech intelligibility and sound pressure is delivered to all occupied areas. In areas where speech intelligibility performance cannot be achieved due to the layout constraints of the occupancy an alternative solution will be carried out e.g. plant areas.

The SSISEP will be combined with the front of house public address system. The SSISEP functions will receive higher priority than other sound reinforcement announcements. The public-address functions will allow for zoned distribution of public announcements throughout the facilities. Control consoles for public information announcements will be provided at all reception, fire control room, security control, management control areas.

The SSISEP speakers will achieve the required speech intelligibility and sound pressure levels.

Warden Intercom Points (WIP's) will be provided per alarm zone, at the building's main entry point and designated emergency lifts. The SSISEP will allow controlled evacuation of the facilities during a fire, including zoned and cascading evacuation.

The SSISEP evacuation stored voice message may incorporate mutli-lingual messages in order to improve overall evacuation procedures.

The SSISEP panels will be provided with a minimum of 30% spare capacity.

7.10. Portable Fire Extinguishers

Portable fire extinguishers are to be provided throughout the development to comply with BCA table E1.6 and selected, located and distributed in accordance with sections 1 to 4 of AS 2444.

All extinguishers shall be complete with appropriate mounting boards, mounting brackets, nozzles, hoses, operation instructions and location signs.

Selection and Location

Risk	Equipment Type and Rating	Preferred Location
Essential Service Switchboards	4.5 kg Dry Chemical Powder (4A 60B:(E)) or Carbon Dioxide 5 kg (5B(E))	Between 2m and 20m from essential service switchboards.
Electrical Switch Rooms	4.5 kg Dry Chemical Powder (4A 60B:(E)) or Carbon Dioxide 5 kg (5B(E))	Adjacent to and internal side of entry door between 2m and 5m maximum.
Plant Rooms	4.5 kg Dry Chemical Powder (4A 60B:(E)) or Carbon Dioxide 5 kg (5B(E))	Adjacent to and internal side of entry door between 2m and 5m maximum.

Risk	Equipment Type and Rating	Preferred Location
Commercial Kitchens (cooking oils and fats)	7Ltr Wet Chemical (2A:4F) including 1.8 m x 1.8 m Fire Blanket.	Adjacent to exit door and accessible from cooking area, between 2m and 20m maximum.
Throughout the entire site	4.5kg Dry Chemical Powder (4A 60B:(E))	Within 2m of each Fire Hose Reel.

7.11. Interfaces with other systems

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

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

8. Vertical Transportation

8.1. Standards and Design

The lift installation shall be installed in accordance with the following;

- AS1735.1 General Requirements - Lifts, Escalators and Moving Walks.
- AS1735.12 Facilities for Persons with Disabilities where practical.
- AS/NZS 3000 Wiring Rules.
- The Building Code of Australia (BCA). (stretcher facilities required by the BCA include for a lift car depth of 2000mm)
- Work Health and Safety Regulations.

8.2. Design Criteria

The lift design for both the Hotel section of the project and the apartment section of the project shall achieve a level of service commensurate with normal expectations for similar buildings of this type in the Westmead area.

Performance Guidelines

Population Density	1.5 persons per bedroom
Lift Traffic Type	Two way traffic period
Interval - Hotel	≤40 to 60 seconds
Handling Capacity Hotel	≥ 7%
Interval- Apartments	≤60 to 90 seconds
Handling Capacity - Apartments	≥ 7%

(Note that the requirements for a hotel or apartment complex lift service include for a passenger lift sized to carry a stretcher.

8.3. Hotel Passenger Lifts

Proposed Lift Specification:

Type:	Geared Overhead Traction Lifts.
Drive:	VVVF.
Machine Type/Rating:	Geared Traction.
Classification:	Passenger.
Rated Load:	1350 kg (17 passenger).
Rated Speed:	1.0 m/s
Control System:	Microprocessor.
Facilities for Persons with Disabilities:	Compliant with AS1735.12

8.4. Apartment Passenger Lifts

Proposed Lift Specification:

Type:	Geared Overhead Traction Lifts.
Drive:	VVVF.
Machine Type/Rating:	Geared Traction.
Classification:	Passenger.
Rated Load:	1350 kg (17 passenger).
Rated Speed:	1.75 m/s
Control System:	Microprocessor.
Facilities for Persons with Disabilities:	Compliant with AS1735.12

8.5. Medical Centre, Tavern, Gym Passenger Lifts

Proposed Lift Specification:

Type:	Geared Overhead Traction Lifts.
Drive:	VVVF.
Machine Type/Rating:	Geared Traction.
Classification:	Passenger.
Rated Load:	1350 kg (17 passenger).
Rated Speed:	1.75 m/s
Control System:	Microprocessor.
Facilities for Persons with Disabilities:	Compliant with AS1735.12

8.6. Supermarket Passenger Lifts

Proposed Lift Specification:

Type:	Geared Overhead Traction Lifts.
Drive:	VVVF.
Machine Type/Rating:	Geared Traction.
Classification:	Passenger.
Rated Load:	3000 kg (40 passenger).
Rated Speed:	1.0 m/s
Control System:	Microprocessor.
Facilities for Persons with Disabilities:	Compliant with AS1735.12

8.7. Hotel Goods Lift

Proposed Lift Specification:

Type:	Geared Overhead Traction Lifts.
Drive:	VVVF.
Machine Type/Rating:	Geared Traction.
Classification:	Goods.
Rated Load:	1490 kg (20 passenger).
Rated Speed:	1.6 m/s
Control System:	Microprocessor.
Facilities for Persons with Disabilities:	Compliant with AS1735.12

8.8. Supermarket Goods Lift

Proposed Lift Specification:

Type:	Geared Overhead Traction Lifts.
Drive:	VVVF.
Machine Type/Rating:	Geared Traction.
Classification:	Goods.
Rated Load:	1490 kg (20 passenger).
Rated Speed:	1.0 m/s
Control System:	Microprocessor.
Facilities for Persons with Disabilities:	Compliant with AS1735.12

8.9. Sustainable Design

The lifts shall be designed to minimise energy use where appropriate. The lifts shall feature Variable Voltage Variable Frequency (VVVF) power drives.

In addition to the above the following shall also be included in the design;

- LED down-lights or compact fluorescent type energy efficient car lighting.
- A facility to automatically switch off the car lighting and ventilation when the lifts are not in use.

8.10. Facilities for Persons with Disabilities

The lifts shall be provided with facilities for persons with disabilities in accordance with AS1735.12.

8.11. Fire Service

All lifts shall be fitted with fire service control to comply with the BCA.

8.12. Maintenance Requirements

The lifts shall be upgraded to include the latest proven technology, reliability and maintainability provided by reputable manufacturers.

9. Appendix 1 – Endeavour Energy Supply Offer

11 January 2017

Endeavour Energy Ref: UCL8599 – 2017/00003/001

SUPPLY OFFER

(Based on a desktop assessment)

Development Details & Applicant's Assessed Load:
This application a new mixed Residential and Commercial units located at 24-26 Railway Parade Westmead.
The type of occupancies are:
Level 1-2 includes Gym, Tavern, Offices, Medical Centre
Level 3-7 is a Hotel,
Level 8 and Level 15 - Plant
Levels 9-14 is Residential
UB1-Ground includes Supermarket and Retail
Lower Basement 1-4 is carpark.

The requested load for the development is 2000A/phase.

Connection Options:
Please engage a L3 ASP (Accredited Service Provider) to submit a method of supply for the development.

Endeavour Energy has assessed that a new substation will need to be installed to provide LV supply for the development. All works associated with the establishment and installation of the new substation will be funded by the customer.

The linkage point for the new substation is "Hainsworth St" HV feeder WM1142.

The Low Voltage being supplied from existing sub 7818, which is proposed to be removed, shall be maintained from the proposed substation.

The scope and works is to be undertaken in accordance with all the relevant policies, regulations and network standards.

All service works are to comply with the requirements of the NSW service and Installations Rules.