Donnelley Simpson Cleary
Consulting Engineers

71-89 CHANDOS ST
ST LEONARDS

Building Services Report

Mechanical, Electrical, Hydraulic & Fire Protection

Project No : 8165

Revision : A

REVISION SCHEDULE

NO	DATE	DESCRIPTION
1	14th March, 2022	Planning Proposal Issue

Note: Revisions to the text subsequent to the Preliminary Issue are indicated with yellow highlight as follows:-

Modified text - eg: Outdoor air will be filtered utilising dry media particulate filters.

Deleted text, no longer applicable - eg: ~~Outdoor air will be filtered utilising dry media particulate filters.~~

INTRODUCTION

SCOPE

Donnelley Simpson Cleary have been engaged by Argentum Group to design and document the following services for the mixed-use development located at 71-89 Chandos Street, St Leonards.

- Mechanical
- Electrical
- Hydraulic
- Fire Protection

This report is intended to outline the proposed scope of works, design requirements and criteria for the services, for submission to North Sydney Council. It responds to the project brief established with the Client during meetings and discussions held to date.

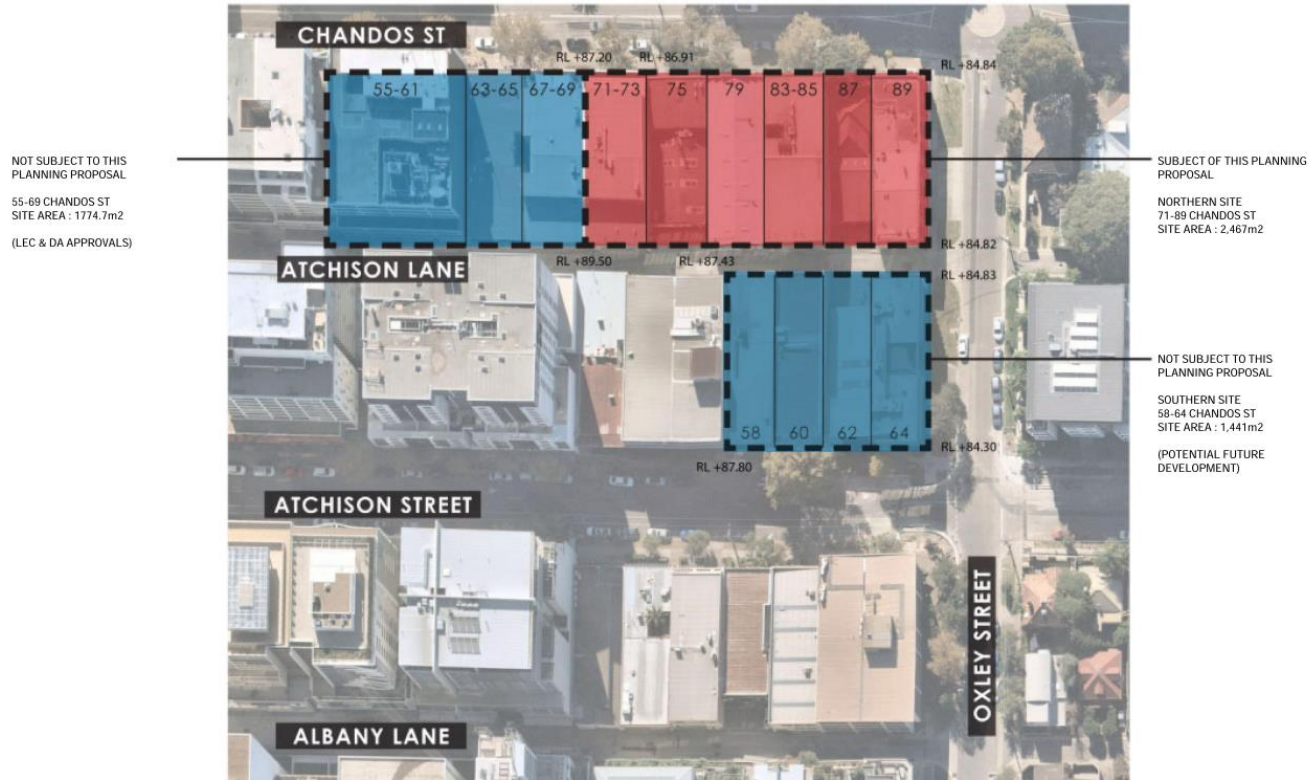
The report is not intended to be a specification for the services.

PROJECT DESCRIPTION

The project involves the development of 68 residential apartments, retail and commercial spaces, communal open spaces, site through link, basement B1 & B2 car parking and utility spaces.

It is intended new carpark will be shared with the adjacent carpark at 55-69 Chandos Street in the future.

The site is bound by Chandos Street to the north, Atchison Lane to the south and Oxley Street to the east – red shaded area in the image below.



RELEVANT CODES AND STANDARDS

All work will be designed to comply with the requirements of the following codes, standards and authorities.

- Design and Building Practitioners Regulations.
- National Construction Code (NCC) / Building Code of Australia (BCA) 2019 Amendment 1, as modified by the NSW BCA Appendix
- Fire Engineering Report / Fire Engineering Brief, as applicable.
- BASIX requirements.
- Council Conditions of Consent.
- NSW DoPIE SEPP 65 & Apartment Design Guide.
- Relevant Australian Standards.
- Electrical Supply Authority.
- Water Supply Authority.
- Relevant Government Authority Regulations.
- Fire & Rescue NSW requirements and guidelines.
- Workcover.
- National Broadband Network.

OTHER REQUIREMENTS

The design will respond to and coordinate with the requirements of all other disciplines as applicable to the project, including but not limited to the following.

- Accessibility.
- Acoustics.
- Civil.
- Landscaping.
- Traffic.
- Waste Management.

ACOUSTIC PERFORMANCE

Assessment of the requirements for acoustic performance and recommendations for treatment of the various systems will be made by the acoustic consultant. Where available within the documentation period, and feasible within the spatial and budget constraints of the project, these requirements will be incorporated into the services documentation.

SUSTAINABILITY

The project will comply with the mandatory requirements of BCA Section J and BASIX as applicable to the Class 2 residential portions.

MECHANICAL SERVICES

The following outlines the requirements for air conditioning and ventilation systems.

AIR CONDITIONING

Scope

Air conditioning will be provided to or provisioned for the following spaces:

- Apartment living areas and bedrooms.
- Retail spaces.
- Commercial spaces
- Main lobbies, offices, etc.
- Switch Rooms and Comms Rooms as necessary.

Design Conditions and Capacities

Ambient Conditions

The equipment capacities will be based on the following approximate ambient conditions, representing “comfort” ambient conditions for the location.

Summer, do not exceed	32°C DB	23°C WB
Winter, do not drop below	6°C DB	

Internal Conditions

Air conditioning systems will be designed to provide cooling and heating capacities to satisfy the base level criteria and loads to be agreed with the Client during design development.

Humidity will not be specifically controlled, however the inherent psychrometric characteristics of the cooling process will normally provide some dehumidification in summer.

Building Fabric

Equipment capacities will be based on the specified building fabric, which will be compliant the requirements of BASIX and Section J as a minimum.

Air Conditioning System Description

Air conditioning will be provided to the nominated areas as follows.

Apartment Air Conditioning

System Type

Apartments will be provided with air cooled, reverse cycle, multi-split or variable refrigerant volume (VRF) type air conditioning systems.

Indoor Units

Concealed type fan coil units will be provided to all apartments, typically located above lowered ceiling areas in living spaces and above robes in bedrooms.

Condensing units

Condensing units will be located external to the apartment served, typically on the associated building roof or in the basement carpark.

Controls

Air conditioning controls in the apartments will integral to and provided with the systems.

Condensate Drainage

Where feasible, condensate will be drained via gravity, such that condensate pumps are not required.

Retail / Commercial Air Conditioning

The retail / commercial spaces will be served by shared VRF systems, with condensing units located on the associated building roof. Systems will incorporate ducted or cassette type fan coil units located above the ceiling of the space served.

Main Switch Room, Comms Room Air Conditioning

Where required, the Main Switch Room and Comms Rooms will be provided with dedicated, split system air conditioning units, utilising exposed wall mounted fan coil units. Condensing units will be located in suitable locations within the carpark. Systems will operate continuously.

Refrigerant Concentrations

As assessment will be undertaken of the refrigerant concentrations against the requirements of AS5149, and measures taken where required to ensure compliance.

VENTILATION

Scope

Mechanical supply and exhaust systems will be provided to serve the following areas where applicable.

Apartments	Common Areas
▪ Exhaust – Bathrooms – Laundries – Rangehoods	▪ Supply – Carpark – Main Switch Room (as required) – Comms Room (as required) – Retail / Commercial spaces – Plant and Utility spaces (as required) ▪ Exhaust – Carpark – Garbage Rooms – Grease Arrester Rooms – Retail / Commercial toilets – Retail kitchen exhaust (as required) – Plant and Utility spaces (as required) ▪ Smoke Management – As required by code

Carpark Ventilation System

The below ground carpark and loading dock areas will be provided with mechanical supply and exhaust systems. The solution may utilise jet fans for air distribution.

The carpark in 71-89 Chandos Street and it's ventilation systems will be common to the adjacent building at 55-69 Chandos Street.

Where utilised, the use of jet fans will not comply with the DTS requirements of the BCA and AS1668.2 and therefore require a BCA Alternative Solution, to be provided by others. This may warrant Computational Fluid Dynamics (CFD) modelling of carbon monoxide, and may also require smoke modelling, subject to the requirements of the Certifying Authority and/or Fire Engineer.

The system will incorporate a carbon monoxide monitoring system in accordance with the requirements of BCA Section J and AS1668.2.

Overriding controls and associated functionality will be provided on the FIP for Fire Brigade use, in accordance with AS1668.1.

Smoke Management

Smoke control systems will be provided as required to satisfy the requirements of the BCA and AS1668.1. These will include system shutdown, stair pressurisation and relief, as well as control and indication of applicable systems at the FIP. The requirements for Zone Smoke Control to retail / non-residential spaces have not yet been established.

Stair Pressurisation and Relief

Pressurisation and relief systems will be provided to all required fire isolated exists serving a storey with an effective height greater than 25m, or more than two below-ground storeys, as required under BCA Table E2.2a.

Note: *The determination of the building's "rise in storeys", "effective height" and associated requirements have not yet been undertaken.*

Apartment Lobbies and Corridors

Apartment lobbies are anticipated to be naturally ventilated. Where corridors are unable to satisfy the BCA requirements for natural ventilation, mechanical ventilation will be provided.

Apartments – Outdoor Air

The apartments are assumed to satisfy the requirements for natural ventilation under the BCA, and further that the acoustic requirements associated with aircraft, rail and traffic noise can be satisfied concurrently with the requirements for natural ventilation.

Consequently, outdoor air is not proposed to be provided to the apartments.

Apartments – Bathrooms/Laundries

Apartment bathrooms/ensuites and laundries will be provided with mechanical ventilation, incorporating one or more dedicated fans per apartment, serving all such spaces within the apartment.

The fan(s) will be controlled via the associated light switch (bathrooms) and/or linked to the operation of the dryer (laundries). All fans will incorporate an adjustable run-on timer.

Makeup air to the bathroom/laundry exhaust systems will be provided via natural means through the façade.

Apartments – Rangehoods

Rangehoods will be provided with ducted mechanical exhaust to the facade, incorporating ductwork and a louvre on the facade. Where required due to excessive duct length and/or bends, booster fans will be provided and interlocked with the fan integral to the rangehood.

Garbage Rooms, Grease Arrester Rooms

These spaces will be provided with mechanical exhaust systems, to the requirements of AS1668.2.

The exhaust discharges will be treated as objectionable and discharged at roof level at a suitable distance from all outdoor air intakes and natural ventilation devices.

Plant and Utility Spaces (Main Switch Room, Comms Room, Pump Rooms, etc.)

These rooms will be provided with mechanical supply and/or exhaust ventilation as required to satisfy the requirements of the BCA.

Outdoor air will be sourced at ground level to minimise the riser requirements.

FILTRATION

Outdoor air will be filtered utilising dry media particulate filters. For air conditioning systems, filters will be supplied by the manufacturer with the system. For outdoor air supply systems, filter media will be of the disposable type.

MAINTAINABILITY

Within the constraints imposed by the planning, mechanical systems will be designed to facilitate easy and thorough long term maintenance, for compliance with BCA Section J and as good practice.

ELECTRICAL SYSTEMS

The mechanical systems serving the common areas of the building will be supplied electrically from Mechanical Control Panels located in plant rooms or dedicated cupboards.

Air conditioning, bathroom/laundry and rangehood systems serving the apartments will be supplied from the associated apartment distribution board.

Retail and Commercial air conditioning and ventilation systems will be supplied from the associated tenancy distribution board.

Minor ventilation systems may be served from house distribution boards where suitable.

ELECTRICAL SERVICES

The following outlines the requirements for the electrical services.

SUBSTATIONS

A preliminary maximum demand self-assessment in accordance with AS3000 was undertaken. The calculation is based on full A/C, general light and power, gas cooktop, electric ovens, and centralised hot water.

An Accredited Level 3 Service Provider (ASP3) shall be engaged to undertake an assessment of the Ausgrid network and negotiate the spatial requirements for the integration of a surface chamber substation with the architect.

From an architectural perspective the location of substations below any permanent occupied spaces will require consideration relative to perceived issues with electromagnetic frequency (EMF).

Advice on specific Ausgrid requirements in relation to substation dimensions, Trenches/cable pit that may impact on levels below the substation, location, flood level and wet services restrictions, EMF considerations, clearances and inferior openings, construction details and access etc. along with the detailed high voltage (HV) and substation design will be carried out separately by the ASP3.

The substation supply, installation and fit-out and any subsequent HV and Ausgrid augmentation works will be carried out by an authorised and Accredited Level 1 Service Provider (ASP 1).

MAIN SWITCHBOARDS

The main switchboard shall be located in a central position to efficiently serve the building. The consumers mains shall originate from the Substation and connect to the MSB. The cabling shall be fire rated as required and sized to accommodate the full load capacity of the substation.

The main switchboard will be constructed to AS60849 Form 3bih and be free standing modular construction, IP 42 and have a fault rating of 35kA for 1 Sec (min) to be confirmed with the ASP3.

Spare spaces will be provided on all busbars so that 10% spare capacity is provided. Main busbars will be sized to accommodate the full rated load capacity of the substation. An element of spare capacity will exist by default given the size of the substation. Such naturally occurring spare capacity can be utilised to provide flexibility for future load changes resulting from commercial and retail tenancy requirements.

SUBMAIN CABLING DISTRIBUTION

Submains will be distributed throughout for:

- Apartment supplies – Rising mains per lift core with tee offs to meter panels at strategic levels for efficient distribution and reduction in riser cupboard sizing taking into consideration the limited space available in the building design.
- Retail and commercial tenancies – Direct supplies via a meter panel in the main switchroom to each tenancy.
- For other services to agreed locations E.g. Lifts and mechanical, hydraulic and fire services.

Submains will consist of Copper XLPE/PVC insulated cables. Submains for essential safety services will be fire rated.

Spare capacity on submains will be limited to 10% or as a maximum to that dictated by the cable size. However for the apartments and as these are furnished with air conditioning and other services have fixed provisions spare capacity provisions will be minimal.

METERING

It is not currently proposed to split metering over co-operative and strata lots to suit common areas and common residential/retail/commercial portions. Therefore a metering system in accordance with Supply Authority requirements will be provided and generally consist of:

- 'House Services' meter.
- Individual apartment meters.
- Residential and commercial tenancy meters.

A separate private Energy Metering System (EMS) interlinked to a communications system to BCA Section J8.3 will be provided. The EMS will be configured to enable time-of-use energy consumption data recording for the following common services: -

- Lifts.
- Mechanical plant.
- Central hot water plant.
- Appliance power.
- Artificial lighting

In accordance with Section J8.3 a computer monitored network linking the private energy meters to allow remote meter reading and analysis will be provided.

'HOUSE' LIGHTING & POWER CIRCUIT PROVISIONS

It is not currently proposed to split metering over co-operative and strata lots to suit common areas and common residential/retail/commercial portions. Therefore at this stage it is envisaged that 'House' lighting and power circuits will support the following:

- Common external lighting and power.
- Carpark lighting and power including storage areas, bin rooms, plant rooms and other ancillary areas.
- Electric vehicle charging stations.
- Car park ventilation system and other common mechanical systems E.g., stair pressurization systems etc.
- Fire, hydraulic and stormwater pump systems (as applicable).
- Any roof top plant maintenance lighting.
- Entry foyer lighting and power.
- Lift core/residential corridor lighting between apartments and for retail and commercial tenancies.
- Fire stair lighting.
- Lifts.
- Foyer & Lobby Ventilation Systems.

Other areas not noted above will be developed as the detailed design progresses.

Lighting to various areas will generally be provided as follows:

- Car park – Surface mounted LED weatherproof luminaires with LED high powered luminaires at the carpark entry for enhanced transition lighting.
- Plant rooms – Surface mounted LED weatherproof luminaires.
- Entry lobbies – Recessed LED downlights augmented with feature/concealed pelmet lighting in close consultation with the ID/Architects.
- Lift core/residential corridors – Recessed LED downlights and feature/concealed pelmet lighting in close consultation with the ID/Architects.

- Fire stairs – LED surface luminaire with integral motion sensor.
- Retail and commercial tenancies – Cold shell with surface mounted or suspended LED diffused batten luminaires to suit an open plan layout and to provide minimum provisions for safe movement lighting as per the requirements of BCA.
- External areas – A combination of LED downlights, feature/concealed lighting systems with landscape feature luminaires to be specified in close consultation with the ID/Architects and the Landscape Architect

  All external general area lighting, feature lighting and landscape lighting including any public art specific lighting will be selected in conjunction with the Interior Designer/Architects and the Landscape Architect. The light fittings shall be high performance, energy efficient, robust, and capable of being exposed to local weather conditions whilst not compromising the aesthetic requirements. Lighting will need to comply with the requirements of AS1158 Lighting standards.

  Lighting will be selected to comply with: -

  - AS4282 Control of the obtrusive effects of outdoor lighting.
  - Australian Standards
  - BCA.
  - BASIX requirements.
  - Local Council requirements.

The final numbers and types of light fittings will be confirmed as the design progresses.

Lighting to other areas not noted above will be developed as the detailed design progresses.

EMERGENCY & EXIT LIGHTING

Emergency & exit lighting will be installed throughout in accordance with the BCA and AS 2293.1 and will generally consist of:

- Recessed LED luminaires within entry lobbies, lift core/ residential corridors and areas where false ceilings exist.
- Emergency units integrated with the primary luminaire in carparks, plant areas and ancillary areas and fire stairs etc.
- Pictorial LED exit lights throughout the building to suit nominated egress paths as defined by the architect or the BCA consultant. Recessed Edgelit models used in public lobbies and corridors and surface/suspended units in plant, basement carparks and other ancillary places.
- Retail and commercial tenancies – Cold shell with surface mounted or suspended emergency luminaires along with exit signs to suit an open plan layout and to provide minimum provisions per the requirements of BCA and AS 2293.1.

APARTMENT LIGHTING, POWER & COMMUNICATION LAYOUTS

Each apartment will be provided with lighting and power circuitry from a local apartment load centre/DB located above the fridge but positioned no more than 2m measured between the finish floor and the main switch. All general power and lighting circuits will be fitted with individual RCD protection to the requirements of AS/NZS 3000:2018.

Typically, each apartment electrical load centre/DB will be single phase.

Lighting will be developed in conjunction with the architect and to meet BASIX requirements with control via conventional individual switching to rooms.

Bathroom, ensuite and laundry exhaust fan/s will be interfaced to the lighting control of the room with a run on timer facility.

Power and communications outlet provisions (i.e. voice / data) will be developed to support the individual spares and in conjunction for the architect. All voice / data services will be wired in a star formation in Cat 6 cabling from the apartment NBN Home Distribution Panel.

Outlet types and colours are to be selected by the architect.

COMMON AREA LIGHTING CONTROL

Common areas of the building will be provided with a lighting control system with local after hour's sensors and manual OFF override switches.

The system will be developed in the design stage but generally provide for:

- Lobby entry motion detector lighting control.
- Common corridor motion detector lighting control.
- Carpark motion detector lighting control.
- Control of the external lighting will be via a combination of photoelectric and time clock control with manual override to OFF.
- A simple intelligent light control system shall be considered to reduce wiring and equipment complexity.

NATIONAL BROADBAND NETWORK

NBN Services are available to this site. An application for removal of any existing services and a new service for the new building shall be submitted.

NBN infrastructure will be designed and installed throughout. Typically the NBN infrastructure will include the following:

- NBN Co. Building Distribution Enclosure (BUDI) located in the communications room.
- Combined electrical/communications risers within each lift core. These can also be in separated enclosures.
- Conduit provision on each floor linking each apartment to the floor distribution terminals.
- Apartment Home Distribution Panel integrating the NBN Network termination devices (NTD) equipment and Pay TV distribution equipment etc. with space for the residents Wi-Fi modem and patching outlets.
- NBN Network termination devices (NTD) located in each commercial and residential tenancy.

IP AUDIO VISUAL INTERCOM SYSTEMS

An IP based audio visual intercom system will be installed to each apartment and each commercial and retail tenancy.

The intercom system will have entry stations installed throughout the building at major entrances, the location of which will be developed as the detailed design progresses. At this stage it is envisaged the following minimum entry station locations will be serviced:

- Lobby entries for both Residential and Non-residential lobbies
- Car park vehicle entry.
- Lifts on car park and street access levels.
- Loading dock.

And for internal answering stations

- Each residential apartment, retail and commercial space.

INTEGRATED FREE TO AIR AND PAY TV SYSTEM

A Foxtel compliant integrated free to air and pay TV system utilising dedicated riser cabling will be provided to each apartment and each retail and commercial tenancy. A splitter will be integrated within the apartment Home Distribution Panel and adjacent each retail and commercial tenancy Network termination device (NTD).
For apartment RG6 cabling distributing to outlets within the apartment will be connected back to the splitter.

Cabling will consist of RG11 Risers and RG6 horizontal quad shield cabling.

It is envisaged that the head-end will be located either in the main communications room or top comms riser location.

Quantity and positioning of TV outlets in apartments will be developed in conjunction with the architect during the detailed design.

LIGHTNING AND SURGE PROTECTION

Lightning protection to a building is not a mandatory requirement as it is not listed in the BCA. A protection assessment per AS 1768, will be performed at the detailed design stage. This will allow the client to make an informed decision on its provision as an extra over building / life safety provision.

Notwithstanding surge protection will be provided on the main switchboard, to common area distribution boards and on final circuits that support the likes of head-end equipment for access control, intercom, and pay TV systems.

ACCESS CONTROL & INTRUDER DETECTION

An electronic access control and intruder detection system will be provided. The head-end master security control panel will be located in the building main comms room. Field panels will be located in the floor riser locations.

The system will use proximity readers of the HID type. Proximity/Remote transmitters will be made available for pedestrian and Vehicle entry.

The system will be capable of restricted hour's access for building staff and/or residential cleaning services. Logging of entry against key numbers will be provided.

'Hold points' will be developed as the detailed design progresses. At this stage it is envisaged the following minimum locations will be serviced:

- Lobby entries for both Residential and Non-residential lobbies
- Car park vehicle entry.
- Carpark lift lobbies.
- Lifts.
- Loading dock.
- Fire Stair entries.

As a minimum the following doors will be provided with electronic monitoring (reed switches):

- All access system controlled doors.
- Vehicle entry roller shutter.
- All common area external doors. E.g. fire stair egress doors.

Each lift will be provided with an internal card reader to enable access to an individual floor.

IPCCTV

An IP colour closed circuit television system with digital recording of events up to 30 days based on normal operation will be provided. The CCTV system shall be 'digital' video matrix switching Megapixel streams to monitor and recording devices controlled via an IP Surveillance Management System (IPSMS). The Head-end CCTV rack mount hardware will be located within the building main communications room.

All internal cameras will be housed within domes fixed to the ceilings. External cameras will be in weatherproof/insect proof with anti-vandal enclosures.

Camera locations will be developed as the detailed design progresses. At this stage it is envisaged the following minimum locations will be serviced:

- Lobby entries for both Residential and Non-residential lobbies. External and Internal spaces.
- Car park vehicle entry. External and Internal spaces.
- Car park main intersections.
- Lifts and lift lobbies.
- Loading dock.

SOLAR PV SYSTEM

If not required by BASIX the merits of a PV system will be addressed during the detailed design.

HYDRAULIC SERVICES

The following outlines the requirements for hydraulic services.

SEWER DRAINAGE

- All soil and waste fixtures will connect to the single 225mm Water Authority's sewer main, located in Atchison Lane, via a system of graded sewer pipes and fittings.
- Pipes and fittings will be uPVC (DWV) and will be jointed with solvent cement glue. Where drainage is below three metres in depth, uPVC (Heavy Grade) will be used.
- A sewer overflow gully will be installed in the sewer drainage in a position external to the building at ground level to prevent surcharge of sewage within the building in case of a blockage.
- Any fixtures located below gully height will be protected by the installation of a reflux valve and installed in accordance with Sydney Water.

GREASE WASTE

- Grease arrestor will be located as close as practical to the point of grease discharge.
- Internal installation will be provided within a mechanically ventilated room.
- Truck access is required for remote pump out.
- Treated discharge will drain to the site sewer drainage for discharge to authority network.

SANITARY PLUMBING

- The sanitary plumbing system will be a fully vented modified type system, incorporating a stack, relief vent and branch back vents in accordance with the AS 3500.2 and the Water Authority's regulations. The sanitary plumbing systems will extend vertically from the sewer drainage and terminate above roof level.
- Branch lines will connect into the vertical stacks through slope junctions. Where applicable, branch lines will incorporate a back vent that will connect to the relief vent above the sanitary fixture being serviced.
- Each relief vent where applicable will connect into the stack below the lowest branch line. This will have the effect of minimising positive and negative pressures within the stack.
- Sanitary plumbing stacks, relief vents and branch vents will be constructed of uPVC (DWV) pipes and fittings with solvent cement glue joints.
- Inspection openings in pipes and fittings will be placed in accessible positions to facilitate maintenance procedures for each individual section of pipework. Each soil stack will have one test gate of the same diameter located at its base.
- Expansion joints will be installed along the pipework in such a manner that movement of the pipes will not cause damage to the pipes or fittings.
- Header vents will be provided at roof level where possible to minimise roof penetrations.
- Garbage areas will be provided with trapped floor wastes with stainless steel lift out baskets to reduce the possibility of blockage.
- All exposed waste traps will be chrome plated copper universal pattern. Basins will be 'P' trapped with the waste pipes located in the wall (no access panel required). This will provide maximum vanity cupboard space for vanity basins and allow easier maintenance, reduce water proofing problems associated with pipes penetrating the vinyl floor covering, simplify tiling and enhance the appearance of the installation.
- Any sanitary plumbing pipework located in ceiling voids and bulkheads above habitable areas will be acoustically treated.

RAINWATER DOWNPIPES

- Roof gutters and rainwater downpipes will be sized in accordance with AS 3500.3 (or the CSIRO's EBS notes on the Science of Building where capacities exceed AS 3500.3) and Local Council guidelines.
- External downpipes will be circular Colorbond, coloured to match the roof and eaves gutter.

TERRACE, BALCONY AND PLANTER DRAINAGE

Rainwater from terraces, balconies and planters will be collected by grated outlets. Rainwater from terraces, planters and balconies will discharge directly into the civil stormwater system and not be discharged to the rainwater re-use tank due to increased risk of contamination.

STORMWATER DRAINAGE

Stormwater drainage, rainwater re-use tank, sub-soil drainage on-site detention and the like will be documented by the Civil engineer.

DOMESTIC COLD WATER

- Domestic cold water will be supplied from the Water Authority's 150mm watermain in Chandos St to be installed as part of the site establishment works.
- Sydney Water Pressure and Flow enquiry has been submitted. We expect that the water main will not have adequate pressure to meet the requirements for potable cold water services. There-fore a cold water pumpset will be located in the basement of the building.
- A boundary back flow prevention device will be installed downstream of the water meter in accordance with the Water Authority's requirements.

METERING

- One primary main/master water meter is proposed for the site located at the boundary with street frontage.
- Additional domestic residential meters will be allocated to monitor Cold water supply to apartments.
- Additional domestic residential meters will be allocated to monitor Hot water supply to apartments.
- Additional meters will be allocated to monitor cold water supplying cold water to the hot water plant to meter total hot water usage.
- Water usage will be calculated on a probable simultaneous flow basis. The probable simultaneous flow is derived from:
  - Rate of flow at water outlets
  - Duration of flow at water outlets
  - Frequency of use of water outlets
  - Type of water outlet
  - Type of sanitary fixture served by the water outlet
- Cold water will be supplied with maximum and minimum water pressures of 450KPa and 250KPa respectively.
- The cold water service will supply all cold water points, including the hot water plant, air conditioning make up, and irrigation system.
- Cold water reticulation pipework will be generally located in the roof and ceiling voids and will drop down in the services ducts to supply individual fixture groups.
- Cold water pipes will be sized to have a maximum velocity of 1.8 metres per second. This will reduce noises that can be generated within the pipework.
- Control valves will be provided where necessary for ease of control and maintenance of the cold water supply system.

- Individual apartments will be separately connected to the service riser and will have individual isolation valves.
- Flow control valves will be installed in all hot and cold water taps. The flow control valves reduce water wastage and help reduce pressure fluctuations when other taps are being used.

DOMESTIC HOT WATER

- The central hot water system will be split into two systems to supply hot water to the buildings. This approach will assist with the monitoring of hot water usage and associated energy consumption.
- The central hot water plant will be an electric heat pump or gas fired hot water system. Hot water pipework will be reticulated throughout the building via separate flow and return circuits.
- The domestic hot water plant will be located within roof level or basement plant spaces.
- Where hot water is required i.e. kitchen areas this water will be delivered at 60°C - 65°C.
- Remote fixtures will be provided with an individual hot water unit where this is found to be more cost effective.
- Hot water pipes will be sized to have a maximum velocity of 1.2 metres per second. This will reduce noises that can be generated within the pipework. Hot water will be supplied with maximum and minimum water pressures of 450KPa and 250KPa respectively.
- Exposed pipework and pipework located in roof voids will be lagged with 20mm thick Thermotec 4-zero insulation, pipework located within plantroom and subject to damage will also incorporate sprung annealed zinc sheeting.
- Control valves will be provided where necessary for ease of control and maintenance of the hot/warm water supply system.

HOT WATER CIRCULATION

Hot water will be reticulated to each fixture (where possible) with a flow and return circulating hot water system. This will minimise lag time for hot water to be available at fixtures.

Balancing valves will be located in accessible positions for ease of adjustment and maintenance.

Dual hot water circulating pumps will be installed on a 24 hour, 7 day programmable timer with 24 hour alternation to allow for even usage of pumps.

NATURAL GAS

A Jemena 210kpa Gas main is available on Chandos St adjacent to the site for connection. As required by the client, the following Natural Gas supply system will be provided

- Gas Meter - Located within an enclosure at the boundary preferable at 90° to the connection to the main.
- External location will require 1m x 2.5m.
- Internal locations will require 2.5m x 3.5m.
- The size required is dependent on the size of the incoming service.
- Readily accessible to the gas authority Internal installation will be located in (naturally) ventilated room.

SANITARY WARE AND TAPWARE

All sanitary ware fixtures and tapware will be selected in conjunction with the architect and have a Wels rating.

Toilet suites will incorporate dual flush with ultra-quiet inlet cistern fill valve. Basins will have a 40mm diameter waste outlet and be ‘P’ trapped with waste pipes located in wall.

All taps will be solid brass chrome plated loose jumper type and be Wels rated to reduce water wastage and minimise pressure "spikes".

FIRE PROTECTION SERVICES

WET FIRE

COMBINED FIRE HYDRANT AND FIRE SPRINKLER SYSTEM

Fire protection will be provided to the buildings throughout including residential apartments and basement carpark based on the combined fire sprinkler and fire hydrant system. The combined fire hydrant and sprinkler system will be designed based on AS 2118.6:2012.

The combined fire hydrant and sprinkler booster valve assembly will be located at the front boundary of the 71-89 Chandos Street site on Chandos Street. The booster assemblies will be within the sight of the main entrance to the building.

Fire hydrant and sprinkler water will be supplied from the Water Authority's watermain for each site and a 100m^3 onsite fire tank for each site. The incoming supply will pass through an inground path valve located at the street frontage. A boundary back flow prevention device will be installed downstream fire hydrant and sprinkler supply main/master valves in accordance with the Water Authority's requirements.

A pressure and flow statement will be obtained to confirm design requirements. The requirement for the on-site storage tank will be evaluated upon receiving the pressure and flow statement of the nominated town main.

We expect that the water pressures from the Sydney Water watermain will be inadequate and therefore pumps will be required. Fire pumpset for combined system will be located in the fire pump room and the fire tanks to be located in close proximity. If a site building height exceeds 50 mtr, then an additional fire pump (relay) will be required with controls in the fire control room. This additional relay fire pump can be located in the basement or on another level in the building to a maximum of four (4) levels above Ground. (dependent upon available pressure and flow). This enclosure will have direct access to open space or direct access via fire stairs to open space.

Sprinkler control assemblies will be located in an egress (Fire Stairs) with fire hydrants. Sprinkler control assemblies will be located where practicable such that one stair entry provides access to all sprinkler control assemblies. The installation contained within the building will be completed using steel pipe.

Combined fire hydrant and sprinkler system will incorporate ring main(s).

As the building consists of more than three levels, areas of the building which cannot be protected by external fire hydrant standpipes (which allows 60 metre coverage) will be covered by internal fire hydrants (which allows 30 metre coverage) located within fire stairs and other internal locations. Internal fire hydrants will be required in each fire stairs. The fire hydrant installation will comply with AS 2419.1 and the BCA. If additional fire hydrants are required, they will be located in accordance with the requirements of AS 2419.1:2005.

Sprinkler heads will be located in the building throughout in accordance with the requirements of AS 2118.1:2017. Sprinkler heads located in the carparks will be exposed standard response head.

FIRE HOSE REELS

Fire hose reels are required in the carpark, retail and commercial parts of the building.

They will be located within 4 metres of required exits and will be located were possible, in recessed cabinets. Fire hose reels will consist of 36 metre length hoses and will be located to adequately cover all floor areas in accordance with AS 1221, AS 2441 and the BCA.

The fire hose reel system will be supplied from the domestic cold-water service and will be installed in Type B copper tube with silver brazed joints.

Double check valves will be installed on the supply pipe to fire hose reels where there is a possibility of cross connection with contaminated water.

FIRE EXTINGUISHERS

Fire extinguishers will be provided in accordance with BCA and AS 2444.

DRY FIRE

FIRE DETECTION SYSTEM

A Fire Control Centre Facility in accordance with BCA E1.8 is to be established. It will contain the buildings Fire Brigade Panel (FBP) and EWIS Panels. The Fire Control Centre will be located in the designated building entry point (DBEP).

MIMIC panels will be provided at each alternative residential and non-residential entry lobby.

Final locations and arrangements are to be approved by the fire authority.

A smoke and thermal detection system complying with BCA, any fire engineer's requirements and AS 1670.1 will be provided throughout the building.

The FBP will have a direct connection to the Fire Brigade via an approved monitoring station to the requirements BCA and AS1670.3 and will support associated services E.g., monitoring of hydrant and sprinkler systems along with associated pump status and incorporate a fire fan control panel for individual stair pressurisation systems and car park ventilation system control and status indication. In addition, the FBP will interface with the access control to fail safe nominated electric locking systems and shut down mechanical systems not required to operate in fire mode.

Provisioning will be made in the FBP for any retail areas that may incorporate kitchen exhaust as part of a future fit-out.

EMERGENCY WARNING AND INTERCOMMUNIUCATION SYSTEM (EWIS)

The EWIS panel will be provided in the designated building entry point (DBEP) within the building along with the FBP (See above).

An EWIS comprises of emergency warning speakers, visual alarm and warning devices, WIP's and manual call points will be provided throughout in accordance with BCA, any fire engineer's requirements and AS 1670.4 will be provided throughout the building.

SMOKE ALARMS

AS3786 240/9v smoke alarms will be provided within apartments located in accordance with BCA.