SERVICES SPATIALS

for

Genesis Campbelltown

Prepared By

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Amendments

Revision	Description	Date	Approved
A	Issued for review	5 Aug 2020	DS
B	Issued for Review	5 Aug 2020	DS
C	All Services Issued for Review	5 Aug 2020	DS
D	Lift Services added	1 Sep 2020	DS
E	Revised issue for review	15 Oct 2020	DS
F	Revised issue for DA	26 May 2021	EF

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PROPOSED BUILDING

The proposed works consists of the construction of a new cancer care centre for the Genesis in Campbelltown. The new centre is approximately 2610m2 of Nett lettable area consisting of
Ground floor

- Two Linac Bunkers
- CT Scan
- Radiation oncology
- Stores and ambulance

First floor

- GC consulting
- Pathology
- Medical Oncology
- GC Staff
- Clinical Trials

Second Floor

- Medical Imaging inclusive of:
  - PET CT,
  - MRI
  - CT
  - Xray

Roof

- Wellness centre
- EOT facilities
- Plant area

DESIGN DOCUMENTATION

DISCIPLINE	DRAWING NO.	REV	DESCRIPTION
Architectural			
	936-DA-010	8	SITE PLAN EXISTING
	936-DA-011	14	SITE PLAN PROPOSED OVERALL
	936-DA-012	17	SITE PLAN PROPOSED
	936-DA-101	23	FLOOR PLAN GROUND
	936-DA-102	19	FLOOR PLAN LEVEL 1
	936-DA-103	19	FLOOR PLAN LEVEL 2
	936-DA-104	20	FLOOR PLAN LEVEL 3
	936-DA-105	11	ROOF PLAN
	936-DA-201	11	ELEVATION NORTH/SOUTH
	936-DA-202	11	ELEVATION WEST/EAST
	936-DA-301	12	SECTION AA
	936-DA-302	11	SECTION BB
	936-DA-303	6	SECTION CC

MECHANICAL SERVICES

SYSTEM REQUIREMENTS

The air conditioning system is to be designed to conform with statutory guidelines and operational requirements for a Class 9A facility. The mechanical services system shall be suitable for the internal fit out, and to meet the operational requirements for the occupancy and compliance with life safety.

STANDARDS AND REGULATIONS

The mechanical installation shall be subject to the following Standards and Regulations:-

- Local Municipal Council. DA and CC conditions of Approval
- Building Code Of Australia (NCC 2019) Amendment 1.
- AS 1668 Parts 1 (1998) and 2.(2012)
- AS 3666 Microbial Control.
- Local Supply Authority Requirements (Electrical) .
- AS 3000 Wiring Rules
- AS 1055 Acoustics - Description and measurement of environment noise.
- AS 2107 Acoustics - Recommended design sound levels.
- AS 4254 (1995). (Ducting Standards).
- AS 4508 (Insulation Standards).
- AS 1851 Maintenance of Fire Protection Equipment
- AS 1735 (2003) Lift Code
- State Pollution Control Commission's "Environmental Noise Control Manual 1985".
- Occupational Health and Safety Act.
- Work Safe Australia

CODES TO BE CONSIDERED

The following documents need to be considered when designing a hospital

- NSW Health facility Guidelines

BCA ESD REQUIREMENTS

The BCA has provisions under section J for the mechanical services as follows:-

- Roof Insulation in the air conditioned portion R 3.2
- Wall Insulation in the air conditioned portion R 2.8 Note glazing and wall R values are assessed together for the walls and this will require an assessment to be undertaken to determine the final requirements of glassing and wall R values
- Spandrel panels are to be provided with R2.0 insulation as per the detail of Section J Specification J1.5b.
- Floor insulation R2.0 for external suspended floor, refer to BCA Section J report for location
- Air conditioning controlled by Time clock
- Air conditioning complying with Section J COP's
- Lighting loads 8 watts/m^2
- Non return dampers on all exhaust systems serving areas with air conditioning.
- Outside air economy cycles on all units over 35 kW in capacity
- Air handling equipment over 1000 l/s to Section J requirements for w/l/s
- Chillers COP 3.0 IPLV 3.5
- Pumps to meet the energy requirements of section J w/l/s
- Fan and air conditioning unit efficiencies to comply with Section J
- Insulation for the ductwork and pipework shall be in-accordance with section J BCA 2019:-
    - Flexible ducts R1.0 below 3m and R 2 above 3 metres in length.

  - Ductwork R1.2 where within the air conditioned space, R2.0 outside the air conditioned space and R 3.0 where exposed to the sun.

- Provide kWh CT's for the electrical sub mains to each mechanical MCC as required by Section J BCA.
- Greenstar 5 star

STATUTORY REQUIREMENTS

The building is assessed under the BCA 2019 two or more stories class 9a with the following provisions:-

- The new building to be provided with a shutdown system in-accordance with the BCA as sprinklers will be installed.
- Stair pressurization to the two stairs
- Smoke relief system for the stair pressurization in the compartments with stair access.
- Toilets ventilation to AS 1668.2 (2012),
- Ventilation rates in compliance with AS 1668.2 (2012)
- All system not engaged in smoke control operation will be provided with fire shut down.
- All systems to be installed in compliance with Section J BCA 2012.

The building will be subject to the requirements of the BCA, the Local Council, AHFG's, and the Fire Brigade. Each of these authorities or documents have requirements which have an effect on the design of the building.
The building is primarily a medical centre with the bulk of the building envelop a classification of 9A under the BCA. As the ground, first, and second floors of the building will contain Class 9A whilst the roof could be Class 5.
The height of any building plays an important role in the services required as the building is below 25 metres the implications of the BCA would be minimised.
The building will be divided into fire and smoke compartments, with each compartment containing a stair provided with smoke relief. The BCA Table E 2.2 Class 9A, requires patient care areas higher than two levels from the ground floor, to be provided with zone pressurisation or sprinklers. The building design has opted for the sprinkler path.
The Health Department and the Fire Brigade require the splitting up of the building in to fire compartments of no greater than 2000sqm, each floor will be divided into one fire zone and with medical oncology separated into a 60-60-60 fire zone on level 1 creating two fire zones on this level. As the medical oncology is below 500m2 there is not further requirement to divide into smoke zones. To minimise the crossing of the smoke zones and the requirement for smoke dampers the ventilation and air conditioning systems will be contained within individual smoke and fire zones. The mechanical spatial sketch has allowed each floor to be divided into 2 fire compartment with each fire compartment provided with stair pressurization and smoke relief.
Note that each fire zone is also a smoke zone.
As part of the Brigade's requirements in a hospital the ducted air handling units are provided with smoke detectors in their return and supply paths to provided protection and to minimise the spread of smoke within the building.

The building under the current BCA and Local Council requirements will be provided with essential services and our assessment of these would include:-

Fire dampers or sub ducts to all fire rated openings to AS 1668 and AS 1682
The air conditioning being provided with minimum ventilation rates to AS 1668.2
All systems within the building not being utilised in fire mode are shut down with the building fire trip.
2 off Smoke exhaust fans complete with fan fire control panel (FFCP) at the FIP will be provided at the roof with riser through the building and 2 sub ducts on each level for smoke relief as two

compartments. Motorised dampers will connect the sub ducts to each compartment and operate to maintain a stair relief system.
The air handling units are to shut down.
The stair pressurisation fans would operate
Each of stair fans and smoke relief fans are to be controlled from the FFCP at the FIP.

SUGGESTED SYSTEMS

The following systems are being considered for the building fit out:-

- Chilled water and heating hot water air handling units for each of the Linac Bunkers. The air handling units shall be provided with humidity control.
- Two off 50 kW air cooled chillers for cooling of the Linac's
- Two off 90 kW air cooled chillers for the cooling of the MRI.
- Central toilet exhaust system, including provisions for additional fit out toilets
- Mould exhaust system for radiation oncology.
- back up exhaust system for each bunker
- MRI quench pipe to the roof of the building
- 2 off air cooled 4 pipe heat pump chillers to provide cooling and heating to the building completed with storage tank.
- Central Chilled water and heating hot water air handling units for the ground floor radiation oncology. 3 air handling unit will be provided and located on the roof to serve northern, eastern and centre zone. Local chilled water and heating hot water fan coil units will be provided in the ceiling to serve the control rooms, CT and meeting rooms.
- Chilled water and heating hot water fan coil units for the level 1, level 2 and the wellness pavilion.
- Stand-alone split system for the switch room and UPS.

DESIGN CRITERIA

The air conditioning systems to be designed to the following parameters to maintain comfort conditions in the conditioned spaces.

Outside summer	37°C dB(dry bulb) 23.6°C WB (wet bulb). Non Critical areas 40oC dB 25oC WB for the Linac and MRI All condensers shall be selected at 45°C for the critical areas and 40oC for the non critical areas
Outside winter	4.0 °C DB.
Inside summer	General 22.5°C ± 1.5°C DB (with 50-55% room relative humidity used to determine the refrigeration load). Note humidity levels are not controlled Linac 20°C± 1.0°C complete with humidity control 55%RH ±10% MRI 20°C± 1.0°C complete with humidity control 55%RH ±10% CT 21°C± 1.5°C no humidity control PET CT 21°C± 1.5°C complete with humidity control 55%RH ±10%
Outside air	Outside air will be provided in accordance with AS 1668.2 (2012)
Occupancy	• Medical oncology 1 person per chair/bed • Office spaces 1 person per 10m2 • Staff stations 3 people. • Corridor 1 person per 20m2 • Meeting Room 1 person per 2 m2 • Staff Lounge as per chair numbers • Linac 2 people per room • Consulting/Exam room 1 person per chair (generally 3 people per room)

	• Waiting rooms 1 person per 1.5m^2 • Lounges 1 person per 1.5m^2 • Wellness 15 people
Outside air	In accordance with AS1668 for the respective Class of Occupancy Generally 10 l/s per person plus Greenstar requirement Linac 4-6 air changes as per Linac guideline
Lighting load	Generally 8 watts per metre square
Equipment load	Linac Gantry 2.5 kW Linac equipment 5 kW Linac cooling 15 kW MRI cooling 70 kW Generally 15 w/m2
Filtration	As per AS 1668 and AS 3666
Infiltration	0.5 ACH for façade rooms where glazing or doors are available. 1 ACH for main entrance.
Filtration	Not less than AS 1668.2 Ventilation Requirements & AS 3666 Consulting Min 20% Dust No1 Medical Min 30% Dust No1 Linac/MRIl Min 50% Dust No1
Ventilation	Minimum ventilation rate Toilets exhaust 10 l/s/m2 Linac exhaust 200 l/s Note that sufficient outside air is to be provided within the building so that the overall building pressure is maintained as positive to the external condition.
Ventilation	Minimum Air change per hour • Storage : 5 times • Garbage Room : 30 times Air change rates for mechanical and electrical rooms shall be determined based on the heat dissipation of equipment inside. Temperature difference between indoor and outdoor shall be maintained at a maximum of 8^{o}C.
Dirty Utility Exhaust	Minimum exhaust 100 l/s or 15 l/s/m2 (note provide 70% air conditioned make up air to dirty utility to reduce heat)
Windows	Double glazed U valve as per section J requirements. New windows in accordance with section J requirements
Wall R Value	In-accordance with section J requirements
Roof R Value	In-accordance with section J requirements
Floor R Value	In-accordance with section J requirements

Noise Criteria

Area	NR
* Linac	30
* Surgery and Critical Care	35
* Nursing Area	35
* Ancillary Area	40- 43
* Diagnostic and Treatment Area	38
* Offices	38
* Board room	35
* Staff Amenities	50
* Toilets and Change rooms	50

External Noise Levels shall not exceed the present boundary noise levels. Obtain boundary noise levels from the acoustic engineer. As a guide for design use AS 1055 Part 3 Appendix A Noise Category.

ELECTRICAL REQUIREMENTS FOR MECHANICAL SERVICES

Three phase power supply will be required for the following:-

- Level 3 plant TBA
- Level Grd plant TBA
- Level 1 plant TBA
- Note all fan coils will be connected to the tenant DB's.
- Stair pressurisation 2 off 10 amps essential
- Smoke exhaust 2 off 20 amps essential
- Power for the MRI will need generator back up

Other power supplies for miscellaneous ventilation still to be determined.

HYDRAULIC REQUIREMENTS FOR MECHANICAL SERVICES

Drainage for the fan coil and air handling unit and floor wastes to be provided in the roof plant.

Floor waste for the chillers and air handling units

Water supply for chiller 1 l/s

Town water backup for the Linac and MRI chillers

Drainage in each plant room

On floor tundishes regularly spaced on the floor for condensate waste drainage

BUILDING REQUIREMENTS FOR MECHANICAL SERVICES

The following spatial requirements should be considered for the buildings mechanical services.

Roof Plant

The following areas would apply:

Linac Chillers	18m2
Linac air handling units	40m2
GF air handling units	70m2
MRI AHU	12m2
MRI chillers	40m2
4 pipe heat pump chiller	100m2
Stair pressurisation plant rooms top of stairs	8m2 each two off 3.5m2 louvre intake per plant room
Smoke exhaust plant room fire rated	16m2, 2 off

Duct risers

Linac Supply and return	4 off 700 x 650 clear internal
GF AHU-N Supply air	700x550
GF AHU-E Supply air	550x550
GF AHU-C Supply air	850x550
GF return/relief air shaft	1300x750 fire rated shaft
Toilet exhaust	550 x 550 clear internal
Outside air riser	1600x500 or façade louvres could be utilised for outside air, this would be preferable for multi tenanted spaces, 6 off 1500 x 400 for outside air intake per floor.
Quench pipe rate shaft	600 x 600clear internal, separated fire
Pharmacy isolator exhaust rate shaft	300 x 300clear internal, separated fire
Isolation room exhaust	2 off 300 x 300 clear internal
garbage exhaust	500 x 500.clear internal
smoke exhaust	1500 x 1000 clear internal positions, 2 off on each floor.
stair pressurization risers	0.9-1m2 attached to each stair.

Pipe risers

A pipe risers for refrigeration pipework for UPS and switch room 650x200

Linac Chilled water	2 off Ø250mm chilled water pipe riser
MRI Chilled water	2 off Ø250mm chilled water pipe riser
Central Chilled water	2 off Ø350mm chilled water pipe riser
Central Heating hot water riser	2 off Ø300mm heating hot water pipe

The above pipe size has included insulation.

Electrical risers/cupboard

To reticulate the BMCS control system and mechanical power through the building a riser is proposed adjacent the core of the building, to house the active gear a small cupboard will be required as well. The riser will be 900 x 450.

ELECTRICAL SERVICES

SYSTEM REQUIREMENTS

The electrical and communications services are to be designed to conform to statutory guidelines and operational requirements for the proposed Class 9A facility. The electrical services and communications systems shall be suitable for the internal fit out, and to meet the operational requirements for the occupancy, and compliance with life safety.

Note: Smoke Detection and Alarms systems will be addressed within the fire services provisions brief and/or spatial provisions report

STANDARDS AND REGULATIONS

All services are to be installed to meet (but not limited to) the requirements of:

- NSW Service and Installation Rules
- Endeavour Energy standards
- AS3000
- AS3003
- AS/NZS3008.1
- AS3009
- NCC 2019 Amendment 1
- ACMA Manuals and associated Australian Standards
- All other relevant standards for MATV, Access Control and CCTV systems.

Codes to be Considered

The following documents need to be considered when designing a hospital

- NSW Health facility Guidelines, including engineering guidelines. (note, engineering guidelines refers mainly to public hospitals and not totally relevant to a private hospital which have different operational parameters and outcomes, it must however be considered and any changes from it documented to client)

BCA ESD REQUIREMENTS

The BCA has provisions under section J for the electrical services as follows:-

- Illumination densities to NCC Section J6
- Lighting control and switching
- Provide kWh CT's for the electrical sub mains to each mechanical MCC, lift, main plant, etc. as required by NCC2019 Section J8.
- Power supply to Emergency lifts to NCC2019 Section E3.4
- Emergency and EXIT lighting to NCC2019 Section E4.
- 35kW-66kW Solar Array installed to roof. (Subject to final installation arrangements and orientations of panels)
- Greenstar 5 star, minimum target points associated with electrical services.

STATUTORY REQUIREMENTS

The building is assessed under the NCC 2019 two or more stories class 9a with the following provisions:-

- Emergency and EXIT Lighting to Section E4.4 of the BCA.
- All systems to be installed in compliance with Section J6 NCC 2019

The building will be subject to the requirements of the NCC, the Local Council, AHFG's, and the NSW Fire and Rescue. Each of these authorities or documents have requirements which may have an effect on the design of the building.

The building is primarily a medical centre with the bulk of the building envelop a classification of 9a under the NCC. As the ground, first, and second floors of the building will contain Class 9a whilst the roof could be Class 5. It is anticipated the entire building will be classified as a Class 9a.

The height of any building plays an important role in the services required as the building is below 25 metres the implications of the BCA would be minimised.

ELECTRICAL SYSTEMS – GENERAL OVERVIEW

Substation

A preliminary maximum demand based on area methods give a preliminary demand of 890kVA. We have estimated the building will require 1 x 1000 kVA transformer substation. Final supply arrangements are required to be negotiated with the local supply authority.

It is anticipated that a kiosk type substation will be required to service the site. Anything within 3000mm of the substation is required to be 2hr fire rated. No opening permitted within 6000mm of the substation. Consumers mains from the substation to the site main switchboard cannot exceed 50m. The substation is located to allow for consumers main length to be less than 50m.

All constructional requirements are subject to the detailed criteria as outlined by the supply authority to suit the supply authority standards and appropriate building codes.

Main Switchboard/s

The site is required to be serviced via a site Main Switchboard (MSB).
The main switchboard minimal requirements:

- All base building loads, including lifts, house services, etc.
- All tenancy loads, including supplies to Radiation Oncology, Medical Imaging, BOH areas, Medical Oncology, etc.
- Bulk metering of Genesis Care tenancy spaces, Bulk Metering of Imaging tenancy and separate house services metering.
- MSB to be arranged into NCC life safety, unmetered, Genesis Care essential and non-essential sections.
- Inclusion of Automatic Transfer Switching (ATS) system for diesel generation system. Diesel generator section/s to cater for all NCC essential systems supplies, selected house services and essential tenancy loads.
- A dedicated diesel generator switchboard for distribution of diesel generator loads.

Main switchboards (including main diesel generator switchboard) are to be house in 2hr fire rated dedicated rooms to satisfy NCC and AS3000 requirements.

The new substation will supply the main switchboard. Consumers mains to be 2hr fire rated.

The new site main switchboard will be suitably sized and designed to utilise the full capacity of the proposed substations and to all code and supply authority requirements.

The main switchboards will be of minimum Form 3b construction to NSW Service and Installation Rules, AS/NZS3000 and AS/NZS61439.1.

Switchboard will be segregated and divided to allow for separate metering for:

1. House Services,
2. Genesis Care (Radiation Oncology, Medical Oncology and support areas/offices) – Ground, Level 1 and Level 3
3. Imaging Level 2

Diesel Generation System

The site is to be serviced via a diesel generation system to supply standby power to NCC essential supply systems and AS3000 requirements.

The generator system supplies generator supply to all Genesis Care clinical, administration and circulation areas to a minimum of AS3009 /AHFGs, with relevant modifications / deviations to suit risk analysis of the site and type of patients / procedures to be taken place.

Selected lighting to house common areas on all levels is required to allow for circulation and egress from non-critical areas and continued access to all building areas. (Note: Options will be presented in relation to extent of diesel generation requirements)

100% lighting to all fire / egress stairs.

Backup supply to medical imaging for protection of the MRI system only.

An anticipated estimated a requirement for a 350-400kVA generator set (dependant on final backup solution). Final size of the generator to be determined via detailed maximum demand during the detailed design phase.

The diesel generator shall be located separated from the building in weatherproofed acoustic enclosure (or equivalent). Allow for all attenuation and ventilation requirements to satisfy the running requirements of the generator and acoustic performance requirements.

Uninterruptable Power Supply (UPS) System

Genesis Care is to be serviced by a dedicated UPS system for Genesis Care tenancy spaces critical power requirements. Alarm indicators and sounders to AS3003 is required to all areas serviced by the UPS.

The UPS is to be located in a 2hr fire rated room.

A preliminary assessment has estimated a requirement for a minimum of 40-50kVA UPS system. Autonomy (battery) requirements are to be for minimum of 20-30 minutes. Final size of UPS system are to be determined via detailed maximum demand during detailed design phase.

Consumers and Submains Cabling

Consumers mains, Submains from standby generator, submains from generator switchboard, NCC essential supplies and tenancy critical supplies will be nominated WS53 to AS3013, NCC and AS3000 requirements.

Non-essential submains will be nominated of the XLPE/PVC type.

Dedicated submains are required for all mechanical plant, medical gases plant, etc. Provide separate NCC Essential, tenancy critical and non-essential supplies as required.

Consumers mains will be sized for the maximum demand and and/or full rating of the substation. Consumers mains will be 2hr fire rated to AS3000 and NCC requirements.

It is proposed submains will be sized for the maximum demand and provision for future capacities (provision for 15% spare capacity).

Submains will rise up a common electrical cable riser adjacent the lift core.

Fire rated submains to be installed onto fire rated ladder tray.

General Distribution Requirements

Distribution Boards

Generally Form 1 to AS/NZS61439.1., metal enclosed type distribution board.

Dedicated distribution boards for each level with dedicated switchboards to larger tenants/departments as required.

Distribution boards will be divided into essential and non-essential sections.

Carpark

Supply to carpark lighting from ground floor common house services distribution board.

Ground, Level 1, Level 2 and Level 3 (House Common Areas)

Essential and non-essential supplies to house lighting and power systems to allow for circulation and access to/from the building during normal and emergency power conditions.

Dedicated supplies to BCA essential systems

Ground Level (GC Radiation Oncology)

Essential and non-essential supplies to tenancy clinical, administration areas and to general circulation areas.

Dedicated non-essential supplies to each linear accelerators and CT.

Dedicated essential and non-essential supplies to mechanical services (as applicable to NCC requirements and client request)

Tenancy critical (limited to partial/full lighting only) to circulation areas and selected power systems to AHFGs. Non-essential supplies to remainder of areas.

UPS supplies to tenancy high level critical supplies (nurse call, etc.).

Level 1

Tenancy non-essential supplies to Medical Imaging tenancy areas

Critical (diesel backup) supply provisions for MRI power systems protection only.

Level 2 and Level 3

Dedicated essential, non-essential and UPS supplies to Medical Oncology.

Non-essential supplies to Genesis support areas and offices.

Dedicated essential and non-essential supplies to mechanical services switchboards to plant areas (Mechanical systems for critical clinical areas on diesel generator supply – final extent to be determined and advised by mechanical trades)

Plant

Dedicated NCC Essential, tenancy essential and non-essential supplies to mechanical services switchboards to plant areas and stairs (final extent to be determined and advised by mechanical trades).

Dedicated NCC essential supplies to lifts. Fire safety lift dedicated supply to NCC requirements and connected to standby diesel generator power system.

Lighting

General

Internal illuminance to the requirements of AS1680 unless otherwise specified. Lighting Illumination Power Densities (IPD) as per BCA2019 Section J6 will be incorporated.

Common Areas

Combination of fluorescent, LED lights, wall lights and pelmet type lighting to suit interior design.

Illumination levels to the recommendations of AS1680.2.1 & AS1680.2.5 and/or as directed/agreed by the user.

Clinical Areas

Combination of LED Panels, LED downlights, wall lights and pelmet type lighting to suit interior design. Lamp source will be colour corrected for cyanosis observation to the requirements of AS1680.2.5 and/or as directed/agreed by the user.

Illumination levels to the recommendations of AS1680.2.5

Patient Areas

LED lights, wall lights and pelmet type lighting to suit interior design.

Illumination levels to the recommendations of AS1680.2.5

Carpark

External pole mounted to AS1158.3.1 and AS4282 requirements.

Emergency and EXIT Lighting

To NCC, AS2293 and statutory requirements.

External Lighting

External lighting will be designed and installed to the requirements of AS1158 where required.

Lighting will be positioned in consideration with any CCTV system.

Power

General

Socket outlets, power supplies and control panels and permanent connection will generally be installed to service all proposed electrical equipment. Timer controls as applicable, will be installed as per the requirements of the NCC Section J6.

Sub-circuiting to all socket outlets will be arranged so not to overload the circuits and minimise disruption to any areas affected by any unforeseen circuit problem.

Dedicated power supplies will be documented for specialist clinical equipment.

Clinical Areas

Socket outlets and dedicated power supplies to suit clinical applications to each clinical space.

Installation to satisfy the requirements of AS3003:2018. Generally all clinical areas will be of the Body Protected type.

Common Areas

Provision will be made for a 10amp socket outlet to amenities/stores/etc. areas as may be required.

Sufficient socket outlets will be documented to all circulation spaces for cleaning purposes and other miscellaneous equipment power requirements.

A socket outlet will be installed adjacent each distribution board.

Patient and Patient Support Areas

The following will be provided generally to each ward/patient area:

- Patient Location – minimum 3 x 10amp double socket outlets. Additional outlets to specific treatment locations to suit clinical requirements and AHFGs.
- Socket outlets for AV systems.
- Patient Bathrooms – 1 x 10amp double socket outlet (

Installation to satisfy the requirements of AS3003:2018.

Provision will be made for socket outlets to administrative/support areas and other relevant areas to suit networked computing and AV power requirements. Additional socket outlets to suit other miscellaneous items of equipment such as fridges, fax and the like.

Telecommunications and Data Services

General

Generally the system will be a Cat 6a type installation.

It is anticipated that development will have a main building distributor for the distribution of data/voice/communications/MATV systems.

A combination of fibre optic services for backbone cabling and copper services for general distribution will be utilised.

A main communications room will be proposed at Ground Level of the Building containing NBN equipment and Genesis Care main communication racks, with interconnect backbone cabling (fibre optic and copper) between each of the Genesis Care Tenancy Levels.

An NBN NTD will be located on Level 1 for the imaging tenancy.

Clinical and Common Areas

The following will be provided generally to each student dwelling:

- Patient Area / Location – 1 x MATV point.
- Nurses Station and Support offices/rooms– 3 x voice/data point per seating location
- Other Areas – As required and/or to AHFGs

Provision will be made for data and communications outlets to reception areas as required.

Provision will be made for data/voice/communications and MATV to administrative areas, and other relevant areas to suit networked computing and AV power requirements.

Wireless data systems will be installed to the ward, administration and Physio areas. Data points will be installed to allow for wireless active gear.

Nurse Call

It is proposed to install a new IP Nurse Call system to the new building.

Nurse Call system will be based on the requirements of AS3801 and to user specific operation requirements.

Allowance will be made for the control of TVs at patient bed areas via the handset as/if required.

Access Control and Surveillance Systems

CCTV System

It is proposed to install a CCTV system to monitor the entry and exit points of the building, each lift, each lift lobby and any rooms containing drug safes.

Head-end and recording equipment located in the main communications room on podium level

Access Control

Access control will be via an electronic locking system.

Monitoring (reed switches) will be nominated to all external doors.

It is proposed to have access control to main entry doors and to all lifts. Lift control will allow authorised access only to certain levels with the appropriate accreditation (card).

Access control is also suggested to any clean utility rooms or other rooms containing drug fridges/stores.

ELECTRICAL REQUIREMENTS FOR MECHANICAL SERVICES

Three phase power supply will be required for the following:-

- Level 3 plant TBA
- Level Grd plant TBA
- Level 1 plant TBA
- Note all fan coils will be connected to the tenant BD's.
- Stair pressurisation 2 off 10 amps essential - TBC
- Smoke exhaust 1 off 20 amps - TBC
- Power for the MRI will need generator back up

Other power supplies for miscellaneous ventilation still to be determined.
Final locations of all mechanical systems control panels to be determined during detailed design.

BUILDING REQUIREMENTS FOR ELECTRICAL SERVICES

General

Electrical services zones will be required for lighting and distribution systems. A dedicated 150mm (minimum) lighting zone is recommended. The horizontal electrical distribution is in the order of 150mm (this may be shared with other services as required. Coordination will be required). These zones may need to be increased in critical clinical areas (ie. around bunkers) as required to house all required services and allow for coordination.

All vertical riser locations will be dedicated to the nominated services that rise through it. Risers and cupboards cannot be utilised for storage or the installation of other services (ie. Hydraulics, etc.).

All nominated electrical and communications rooms will be dedicated for the nominated service only unless noted otherwise.

Full lighting, power, horizontal communications systems, etc. are required to all levels to suit any room data sheets and the like.

Spatial Requirements

All spatials are nominated for information only and shall not be limited to the nominated dimensions.

Ground

- Substation - 5500 x 2750 easement located on boundary. Street access required. Estimate 1 x 1000kVA
- Diesel generator/s – anticipated 350-400kVA (dependent on extent of services to be backed up). In weatherproof acoustic enclosure (3500mmx1500mm) – tbc. Conditional on acoustic performance requirements as may be implemented as part of any DA conditions.
- Switchroom - 5700x3750 min clear (3000 min clear height).
- UPS room 3500x2000.
- Electrical cabling to rise through riser slots in slab via dedicated riser adjacent lifts.
- MDF/Comms Room 5000 x 2000 (house access control, NBN systems and genesis Care data racks)

Level 1 – Genesis Care

- New dedicated electrical cable riser adjacent lift shaft for rising electrical cables and communications cabling. Back wall to be 2hr fire rated for support of NCC life safety power supply cabling.
- New dedicated electrical cupboard (2000mmx550mm) for switchboard/s.
- Communications cupboard 1000 x 550.
- Miscellaneous services (MATV, security, etc.) cupboard 1000 x 550.
- Communications Room – 3000 x 2000.

Level 2 - Radiology

- New dedicated electrical cable riser adjacent lift shaft for rising electrical cables and communications cabling. Back wall to be 2hr fire rated for support of NCC life safety power supply cabling.
- New dedicated electrical cupboard (2000mmx550mm) for switchboard/s.
- Communications cupboard 1000 x 550.
- Miscellaneous services (MATV, security, etc.) cupboard 1000 x 550.

Note: Final switchboard and communications equipment locations by future Radiology Tenant

Level 3 – Genesis Care

- New dedicated electrical riser cupboard (1200mmx550mm) for rising cables from Ground Level. Back wall to be 2hr fire rated for support of NCC life safety power supply cabling.
- Communications riser cupboard 1000 x 550.
- Miscellaneous services (MATV, security, etc.) riser cupboard 1000 x 550.

Plant Area

- Riser into plant room for mechanical services. 500mm x 100mm slot under/adjacent final MCC panel location.

HYDRAULIC & FIRE SERVICES

SYSTEM REQUIREMENTS

The hydraulic and fire services are to be designed to conform to statutory guidelines and operational requirements for the proposed Class 9A facility. The hydraulic and fire systems shall be suitable for the internal fit out, and to meet the operational requirements for the occupancy, and compliance with life safety.

STANDARDS & REGULATIONS

The whole of the work shall be carried out by or under the full supervision of a fully licensed plumber in accordance with the drawings and specification, reviewed by the Superintendent and approved by all relevant authorities.

All work shall be at least equal to or better than the appropriate current Australian Standard. Any proposal to install alternative items to those specified shall be submitted in writing to the Superintendent, accompanied by a written confirmation by the Manufacturer that the proposed article complies in each and every respect to the relevant Australian Standards.

All work shall comply with the current National Construction Code (NCC).

Where some doubts exist as to the appropriate standard a decision shall be made by the Superintendent before commencement of any work on or off the site. If any doubt exists as to whether a section of the design is able to comply with the relevant authorities' regulations the Superintendent shall be notified prior to commencement of any work. No consideration of claims for redundant work shall be given if the Superintendent is not notified.

The submission shall be made and the approval obtained prior to ordering of materials and commencement of the respective sections of work.

The relevant standards shall include but not be limited to the following:

- Building Code of Australia (NCC 2019 volumes 1-3)
- AS3500.0-2003
- AS3500.1-2018
- AS3500.2-2018
- AS3500.3-2018
- AS3500.4-2018
- AS5601-2004
- AS2441-2005
- AS2444-2001
- AS2941-2013
- AS2118.1-2017 Amdt 2
- AS2419.1-2005 Amdt 1
- AS1670.1-2018
- AS1670.4-2018
- AS1670.3-2018

It is the responsibility of the Contractor to carry out all liaison and co-ordination with all Authorities and to ensure satisfaction of their requirements.

The relevant authorities and guidelines shall include but not be limited to the following:

- Water & Sewerage: NSW Fair Trading, Sydney Water Corporation
- AGL: Jemena
- Council: Municipal Council
- NSWFB: Fire & Rescue New South Wales

- DIR: Department of Industrial Relations
- WORKCOVER: Workcover Authority of NSW
- NSWHC: Health Department of New South Wales
- EPA: Environmental Protection Authority
- MSB: Mine Subsidence Board
- Work Safe Australia
- Australian Health facility Guidelines

HYDRAULIC AND FIRE SERVICES SPATIAL REQUIREMENTS

1. Typical hydraulic riser: 700mm x 300mm (internal dimensions)
   - Within or adjacent to amenities
   - Located within the lettable floor area to achieve tenancy fit out coverage
   - For staff break out areas

Main hydraulic riser: 1,000mm x 300mm (internal dimensions)
   - Adjacent lift shaft/amenities

Hydraulic riser ideally shall extend from the ground floor to the underside of the roof slab to enable venting of sanitary plumbing stacks to atmosphere and to accommodate roof storm water and or rainwater downpipes.
If possible, hydraulic risers to align on each level all the way through the building.

2. Master water meter and RPZD assemblies: 2500mm x 1000mm. Ideally located within landscaped area behind/adjacent to the fire booster assembly, depending on water main connection location.

3. Gas meter/regulator room: 3300mm x 2500mm. If gas meter is located within the building a hazardous area classification (HAC) report is required. Master gas meter/regulator ideally located externally within landscaping, subject to gas main connection location.

4. Central hot water heater plant: 5,000mm x 3,000mm. To be located on roof. Please confirm if there is a provision to use solar pre heating for water heating systems. Additional roof area and plant space will be required for solar hot water systems.

5. Thermostatic mixing valves (TMV's) within each male, female and disabled amenities on each level: 350mm x 350mm located 300mm above FFL located typically adjacent or beneath basins. If all basins within male, female and disabled amenities are within close proximity of each other, opportunity for one TMV to serve multiple rooms, will require review of architectural layouts. TMV typically installed within stainless steel lockable recessed cabinet. Health guidelines maximum warm water delivery pipe distances to be maintained.
Proposed development is not large enough to warrant a warm water system.

6. Fire hose reel cupboard: 900mm x 450mm (if required) within 4m of fire stair doors and main entrance / egress door for the ground floor.

7. Fire hydrant and fire sprinkler booster assemblies: 4,000mm x 600mm x 1,350mm (WDH). Booster assembly ideally located adjacent to the main vehicle entrance, kept 10m from the substation and fuel storage, and within the sight to building entrance. Booster assemblies to be located in accordance with AS2419.1.

8. Internal hydrant shall be located within corner of each fire stair in landing area. 200mm x 200mm.
9.Additional hydrant shall be provide within the corridor where the internal hydrant in the fire stair cannot achieve the coverage. A 800mm x 450mm cupboard is required for additional hydrant.

10.Sprinkler control valve enclosure to be located on ground floor with direct access from outside. The sprinkler control valve enclosure shall be 2,000mm x 600mm x 1,350mm (WDH) with 1 m clearance in front of the control valves. The sprinkler control valves can be located adjacent to the booster assembly or on the external façade of the building.

11, Sprinkler riser: 650mm x 300mm (internal dimensions) located centrally in the corridor area with access door.

12. FIP and EWIS panel located in ground floor entrance lobby/reception area: 1,200mm x 400mmx1,850mm (WDH) surface mounted. Or provide 1800x600 cupboard with the covering door fully opened at 135degrees.

LIFT SERVICES

BUILDING FORM

The intention is to provide a lift to transport for the two main functions of the hospital.

The first is to provide bed/patient transport between oncology and imaging floors.

The minimum car size required to meet NCC Emergency Lift Dimensions in Class 9a Buildings and Disabilities (Access to Premises – Buildings) Standards 2010 would be 1600mm W x 2280mm D x 2300mm H.

Note – There has been no allowances for provision of transportation of Bariatric Hospital Bed Dimensions 2400mm L x 1190mm W. Should this be required we would need to increase the car depth.

The second is to provide for general visitor service to the various floors for relatives, provide for outpatient/visitor transport to the medical suites.

The general from of the building is:

- Ground – Main entry, 87 car parking places and Radiology
- Level 1 – Imaging Suite and associated services
- Level 2 – Pathology, Staff facilities and specialist medical suites
- Level 3 – Wellness Pavilion and terrace

DESIGN CRITERIA

The following design criteria are based upon recommendations from CIBSE Guide D - Transportation Systems in Buildings for the expected level of performance: -

Floor to floor heights – per drawings.

Estimated population

Level 1 – 100 people

Level 2 – 100 people

Level 3 – 60 people

Arrival rate of 8-9% in five-minute interval.

Up peak interval not more than 50 seconds

RESULTS AND COMMENTS

Front of House

In terms of performance the front of house, this can be adequately served by two (2) passenger lift as follows: -

Number of lifts	2
Lift car capacity	2000kg/26 passenger
Load Rating (passenger)	Class A
Operating speed	1.0m/s
Main Results	
Interval (s)	38.9
Capacity Factor by Mass (%)	5.8
Capacity Factor by Area (%)	7.6 (no bed)

Additional Results	
Car Capacity (persons)	26
Average No. of Stops (including Home Floor)	3.2
Lowest Reversal Floor (where 1 = lowest floor)	1.0
Highest Reversal Floor (where 1 = lowest floor)	3.3
Average Passenger Transfer Time (s)	2.5
Distance Between Reversal Floors, Excluding Express (m)	11.7
Time Consumed When Stopping (s)	11.0
Round Trip Time (s)	77.8

RECOMMENDED LIFT CONFIGURATION

No. of Lifts	One and Two
Type	Passenger
Drive	VVVF Gearless PM
Control	Microprocessor Multicar Group
Floors Served	G, 1 -3
Travel	Approx. 14200 metres
Minimum Speed	1.0 m/s
Load	Min - 2000kg 26 Persons As defined by EN81
Size of Lift Car (To Meet BCA and DDA requirements)	Min clear size 1750mmW x 2300mmD x 2400mmH
Car Finishes	Two side wall COPs one on each side, floor to ceiling. Lift Car manufacturers premium design LED down lighting
Size of Shaft (Maximum) **Clear internal**	2800mmW x 3050mmD per lift 5800mmW x 3050mmD Overall assuming 200 mm trimmer beam or wall
Lift Doors	Min 1300W x 2100H mm Stainless Steel
Top Overrun	Maximum 4100mm
Pit Depth	Maximum 1600mm
Pit Reaction	150,000N
Shaft Reaction	3,500N
Car Finishes	Manufacturers standard design
Buttons and Indicators	Standard range DDA compliant
Power Requirements (Max)	45 Amps per lift (16mm2 neutral)

Special Requirements	
Access control in lifts	Required
Regenerative “Green” Drives	Required
Protective Blankets	Required – one set
Fire Service	Required
Automatic Rescue Device (ARD)	Required

Special Requirements	
NBN duel Sim auto-dialer	Required
Hospital priority response	Required

RECOMMENDATIONS

Our recommendation would be to go to select tenderers on this project, the following is a list of the companies that currently have good representation in and around the Campbelltown Area.

- Kone Elevators
- Schindler Lifts Australia
- Otis Elevator Company
- ThyssenKrupp

APPENDICES

TRAFFIC ANALYSIS

ANALYSIS DATA

Analysis Type	General analysis
Measurement system	Metric
Losses (%)	5.00

BUILDING DATA

Floor Name	Floor Height (m)	No of people	Area (m²)	Area/person	Entrance Floor
Level 0	6.50	0	-	-	Yes
Level 1	4.20	100	-	-	No
Level 2	3.50	100	-	-	No
Level 3		60	-	-	No

Absenteeism (%)	0.00

ELEVATOR DATA

No of Elevators	2
Type	Single Deck
Capacity (kg)	2000
Car area (m²)	4.20
Door Pre-opening Time (s)	0.00
Door Open Time (s)	2.00
Door Close Time (s)	3.50
Door Dwell 2 (s)	2.00
Speed (m/s)	1.00
Acceleration (m/s²)	0.40
Jerk (m/s³)	0.80
Start Delay (s)	0.50
Levelling Delay (s)	0.00
Home Floor	Level 0

PASSENGER DATA

Demand (% pop per 5 mins)	9.00
Incoming (%)	50.00
Outgoing (%)	50.00
Interfloor (%)	0.00
Passenger Mass (kg)	75
Passenger Area (m²)	0.21
Loading Time (s)	2.50
Unloading Time (s)	2.50
Stair Factor (%)	0.00

Floor Name	Entrance Bias
Level 0	100.00

GENERAL ANALYSIS RESULTS (2 No. 2000 kg elevators @ 1.00 m/s)

Main Results	
Interval (s)	38.9
Capacity Factor by Mass (%)	5.8
Capacity Factor by Area (%)	7.6

Additional Results	
Car Capacity (persons)	26
No of Stops (including Home Floor)	3.2
Lowest Reversal Floor (where 1 = lowest floor)	1.0
Highest Reversal Floor (where 1 = lowest floor)	3.3
Average Passenger Transfer Time (s)	2.5
Distance Between Reversal Floors, Excluding Express (m)	11.7
Express Zone Distance (m)	0.0
Time Consumed When Stopping (s)	11.0
Round Trip Time (s)	77.8