



Bowral & District Hospital Main Works Redevelopment (SSD 8980)

Electrical, ICT and Security Services Report
For the State Significant Development Application

Prepared for:

Health Infrastructure
c/o TSA Management

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Prepared by:

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Executive Summary

1. Executive Summary

The scope of the Main Works redevelopment includes:

- A new Main Entry;
- New Inpatient Units comprising 34 acute medical/ surgical beds, 2 mental health beds;
- 10 new sub-acute beds;
- 2 medical day only beds;
- 8 bed Close Observation Unit;
- 7 bed Maternity Unit plus Special Care Nursery;
- 5 bed Paediatric Unit;
- Perioperative Suite including 3 new Theatres and 1 Procedure Room and surgical day only beds;
- Linkways and connections back to existing buildings and supporting services in the retained buildings
- A reconfigured public and ambulance entry into ED which allows for delivery of the Project and subsequent relocation of the ED in a future stage;
- On-grade car parking and drop off facilities, and overall improved access and wayfinding throughout the campus; and
- Upgrades to IT and engineering services infrastructure supporting the B&DH.

The major issues with respect to site infrastructure detailed in this report include:

1. As part of the Main Works, a new 1,000kVA padmount substation and associated easements will be required within the site. The current proposed location is to the South West of the proposed new building.
2. As part of the Main Works, the new substation will serve a new main switchboard located in the proposed new building.
3. As part of the Main Works, a new generator is proposed to be installed in an external acoustic enclosure. The generator will have a nominal standby rating of 440kVA (352kWe).
4. As part of the Main Works, a new centralised UPS room is to be established to supply continuous power to the proposed new building.
5. As part of the Main Works, new distribution boards are to be located within each new fire compartment as per requirements of the Engineering Services Guidelines to suit the new departments. In some areas, where the fire compartments are particularly small, it is proposed to provide one set of distribution boards to supply two (2) adjacent fire compartments.
6. As part of the Enabling Works, the existing Carrier lead-ins (Telstra & NBN) will be relocated.
7. The existing Carrier Entrance Facility (EF) / Campus Distributor (CD) will be retained. As part of the Main Works, a second Carrier EF/CD will be provided within the new building. As part of the Main Works, new Carrier lead-ins will be provided to the second Carrier EF /CD.
8. As part of the Main Works, services to the new building will be provided as follows:
 - UPS – A new modular/expandable UPS shall be provided to suit the load of the new building
 - Lighting – new LED lighting will be provided. Lighting control will be provided where required to suit dimming and automated switching requirements. Cost-effective 240V occupancy sensors will be provided where appropriate.
 - Emergency Evacuation Lighting – A new computer monitored emergency & exit lighting system will be provided to the new building.
 - Telecommunications Cabling – A new structured cabling system will be provided to the new building. The cabling system will comply with the NSW Health ICT Cabling Standard and SWSLHD Generic Cabling Specification (2017).

- Telephony – The existing site is served by a NEC NEAX 2000 IPS PABX system. A new VoIP system will be provided for the new building. The existing system will continue to serve retained areas until it is eventually phased out.
 - Wi-Fi Network –Wi-Fi coverage will be provided throughout the new building.
 - Mobile Duress – A new Mobile duress alarm system will be installed in areas such as ED requiring mobile duress. As per the current norm for NSW Health, this will consist of Wi-Fi RTLS devices provided as Group 3 ICT items.
 - Wireless Telephony – DECT phones are currently utilized on the site. Voice over Wi-Fi is proposed for the new building. Lack of interoperability of DECT and Wi-Fi-based devices between the new and existing areas will need to be addressed.
 - Paging – No paging system is currently utilized on site. It is not proposed to introduce a paging system.
 - Mobile Distributed Antenna System (including GRN) – Mobile DAS system has been proposed as a VE item and if funds are available should be included back in scope.
 - Patient Entertainment System – A Free-To-Air MATV patient entertainment system is proposed to be installed in the new building. A Cat 6A RJ45 outlet will be provided to each TV/PES location for future proofing and eMR functionality.
 - Access Control System –A new Inner Range Integrity access control system will be provided to the new building.
 - CCTV Surveillance – A new IP Based System will be provided.
 - Fixed Duress – Fixed duress buttons will be provided where required to comply AHFG. Fixed duress buttons will be connected to the access control system. Alarms will be transmitted via the paging and messaging systems via an interface to the messaging integration system.
 - Nurse Call System – A new nurse call system will be provided to the new building.
 - Master clock system – A master clock system will be provided within the ED, operating rooms and ICU/HDU bays where required to comply with AHFGs.
 - Public Address – Not to be provided as part of electrical services scope.
9. Sustainability and energy saving initiatives will be implemented in the design.
 10. It is acknowledged that hospitals rely heavily on information technology and suitable IT infrastructure is being provided to support this.

2. Introduction

2.1 General

This services report has been prepared at the request of TSA Management and is to be read in conjunction with the Environmental Impact Statement (EIS) for State Significant Development Application 8980

This report aims to provide detailed information on the existing capacity and any augmentation or easement requirements of the proposed development for the provision of electrical and telecommunications utilities, including any staging requirements.

2.2 Basis of the Report

- Site visits carried out by Wood & Grieve Engineers.
- Services Drawings viewed on site for the various buildings.
- Architectural drawings produced by McConnel Smith & Johnson.
- Design Team Meetings.
- ICT Meeting held on 06 June 2016 and 12 December 2017
- South Western Sydney LHD ICT Strategy document
- HI Engineering Services Guidelines Aug 2016
- HI Design Guidance Notes 1-33

2.3 Limitations of the Report

This report is based on the above information, investigative work carried out by WGE and drawings and information provided by the Local Health District, McConnel Smith & Johnson Architects and Bowral & District Hospital Facilities Managers.

WGE have based our report on the assumption that the information provided can be taken at face value and in general terms accurately reflect the installation on site.

WGE does not accept any liability in regards to the accuracy of the existing documentation.

WGE's site visit involved a walk around the site, and an overall visual inspection. As such, this report should be read with the limitation of such a site visit in mind. Only items visible were considered and where buildings were not being affected as part of the new works the investigation of the building was cursory only.

The investigation did not include a complete examination of all buildings, WGE did not investigate any non-visible aspects of the installation, and WGE did not physically verify the capacity of any installed systems.

3. Design Criteria

The Electrical Services will comply with but will not be limited to the following relevant codes and standards:

NSW Health Engineering Services Guidelines (August 2016)

Australasian Health Facility Guidelines

NSW Health ICT Cabling Standard

NSW Health Wi-Fi Standard

Building Code of Australia 2016

Service and Installation Rules of New South Wales

Australian Standards

1158	Lighting for roads and public spaces
1680	Interior lighting
1768	Lightning protection
1940	The storage and handling of flammable and combustible liquids
2067	Substations and high voltage installations exceeding 1 kV a.c.
2293.1	Emergency evacuation lighting for buildings
2381.1 + 10	Electrical equipment for explosive gas atmospheres – Selection, installation and maintenance – General requirements
2500	Guide to safe use of electricity in patient care
2834	Computer Accommodation
3000	Electrical Installations (Wiring Rules)
3003	Electrical installations – Patient treatment areas of hospitals and medical, dental practices and dialyzing locations
3008.1.1	Electrical installations – Selection of cables – Cables for alternating voltages up to and including 0.6/1 kV
3009	Electrical installations – Emergency power supplies in hospitals
3010	Electrical installations – Generating sets
3013	Electrical installations – Classification of fire and mechanical performance of wiring system elements
3100	Approval and test specification – General requirements for electrical equipment
3200.2.41	Medical electrical equipment – Particular requirements for safety – Surgical luminaires and luminaires for diagnosis

61439.1 + 2	Low-voltage switchgear and control gear assemblies
4897	The design, installation and operation of underground petroleum storage systems
5000.1	Electric cables - Polymeric insulated - For working voltages up to and including 0.6/1 (1.2) kV

Existing Electrical Services Arrangement

4. Existing Electrical Services Arrangement

Existing conditions based on site visit carried out by WGE on 27 April 2016, existing drawings viewed on site and information provided by MSJ Architects and Bowral & District Hospital Facilities Managers.

Refer to Concept Design Report dated 15 August 2016 for details.

Proposed Electrical Services Arrangement

5. Proposed Electrical Services Arrangement

5.1 Main Electrical Supply

New Substation

The maximum demand of the new building (Main Works) is estimated at 700kVA (1011A).

As the effective spare capacity of the existing Main Switchboard is in the order of 140kVA (200A), there is insufficient spare capacity on the existing LV supply to serve the new building (Main Works).

As part of the Main Works, a new 1,000kVA padmount substation and associated easements will be required to be provided on the site.

The location of the substation shall be selected with due consideration of:

1. Minimum separation distances to combustible building surfaces required by Endeavour Energy standards and recommended by AS 2067.
2. Electromagnetic compatibility.
3. Distance to the new main switchboard.
4. Future expansion space.
5. Proximity to joints in telecommunications cabling.
6. Proximity to fire hydrant booster pump rooms.

5.2 Standby Generator

The generator load of the new building (Main Works) has been estimated based on the requirements of the NSW Health Engineering Services Guidelines (Aug 2016). The estimated generator load is 322kVA (258kW).

A new generator is proposed to be installed in an external acoustic enclosure. The generator will nominally have a standby rating of 350kVA (280kW).

A new 2000L inground bulk storage fuel tank with fill point shall be provided.

The generator would be installed in weatherproof acoustic enclosure. Depending on the final location, a wall may also be required for fire rating, acoustic and/or aesthetic purposes. A diesel fuel tank will be provided as an integral part of the generator set (skid base tank), sized to provide in excess of 24 hours of standby power as recommended in the Engineering Services Guidelines.

Generator load allocations have been based on NSW Health Engineering Service Guidelines (Aug 2016) and AS 3009, with a high level summary as follows:

AS 3009

AS 3009 Table 2.1 identifies the extent and classification (delay) of emergency (essential) supplies in for several types of systems and areas. The extent of emergency supplies identified herein comply with the minimum requirements identified in AS 3009.

NSW Health Infrastructure Engineering Services Guidelines Aug-2016

The Engineering Services Guidelines requires standby power to be connected to all critical patient equipment required for critical procedures to allow completion should there be an outage. Standby power is to be provided to all subsidiary mechanical, hydraulic and medical gas systems (which are dependent on an electrical power source to operate) and is essential in delivering services to the critical care areas. Standby sub-mains to be provided with standby generator supply are to be separate from the normal supply sub-mains.

The capacity of the standby generating plant is to be sized to match the diversified maximum demand adjusted to the standby coverage agreed for the project. In determining the coverage of standby power provision, the following principles apply:

- All life and safety requirements as required by the NCC;

- All ICT communications room active equipment;
- Medical air and suction equipment;
- Approximately 30% of lighting and power in all areas. This can vary depending on the number of light fittings and power outlets used in any particular room;
- Full lighting and power in critical areas, which includes emergency, operating theatres, coronary care unit (CCU), intensive care unit (ICU), neonatal intensive care unit (NICU), burns and mortuary. All air handling fans and exhaust fans serving these areas;
- All air handling and exhaust fans serving isolation rooms, central sterile services department (CSSD) and pathology;
- Selected Imaging areas required for emergency departments only;
- Critical storage such as -80°C fridges and blood fridge;
- Sewage pumping stations if required; and,
- Domestic water pumps if required.

Spare capacity is only to be provided from the difference between the actual “next size” rating of the generator and the calculated standby requirement.

- The generator shall be rated for standby duty;
- The generator shall be able to meet the power load on start up without stalling;
- Large medical equipment loads will need to be considered; and,
- Motor loads shall incorporate delay start up where necessary to diversify the start-up currents over time in lieu of a peak current condition to allow the set to reach satisfactory operating conditions without stalling

5.3 New Main Switchboard

As part of the Main Works, a new Form 4A main switchboard will be installed within a new 2-hour fire-rated Main Switchroom in the new building. Automatic transfer switches will be provided within the main switchboard. For monthly testing purposes, synchronised closed transfer trip will be implemented to enable the testing of the generator using the essential load, without load interruption. Means will be provided to connect a temporary mobile generator to supply the essential loads. The main switchboard will be fitted with surge protection.

Consideration must be made of the impact of electromagnetic fields (EMF), resulting from the main switchboard and associated cabling, on adjacent clinical areas, particularly with respect to compliance with the limits mandated by AS/NZS 3003. It is noted that typically the most cost-effective means of compliance is the careful selection of switchroom and submains cable route locations, such that sensitive clinical areas are separated from the principal EMF sources.

5.4 Uninterruptible Power Supplies (UPS)

As part of the Main Works, a new dedicated central UPS room will be established in the new building.

A new three phase UPS with 15 minutes of battery autonomy will be provided for ICT and medical power.

A new single phase UPS with 90 minutes of battery autonomy will be provided for surgical lighting in the new operating theatres, in order to comply with AS 3009.

Indication of failure of supply to the UPS will be provided where required to comply with AS/NZS 3003.

The new UPS units will be modular to allow for future expansion.

The UPS units will be accommodated in a room having an FRL of 120/120/120 in order to comply with the BCA.

5.5 Power Factor Correction Unit

As part of the Main Works, a new Power Factor Correction (PFC) unit set at a minimum of 0.95 will be provided.

The unit will be located in the Main Switchroom.

Proposed Electrical Services Arrangement

5.6 Electrical Distribution System

5.6.1 Containment

All cabling systems will be installed on cable ladder, cable tray, cable baskets, catenary wire or underground conduits.

5.6.2 New Consumers Mains Cables

The consumer mains cables will be run from the substation to the main switchboard in underground conduits.

5.6.3 New Submains Cables

Submains cables will run from either the new main switchboard or central UPS (via an output distribution board) to the distribution boards generally via underground ducts or via cable tray located in the ceiling void.

On the Ground Floor, submains shall generally run via underground ducts to the floor's Electrical Distribution Cupboards. This is due to the layout of the Future Emergency Department not being finalized. This will eliminate the need to relocate any cable trays and extend or rerun any submains that would otherwise reticulate through the Future Emergency Department when it is fitted out.

Dedicated submains will run to Critical Care Unit general lighting and power distribution boards.

Cabling shall generally consist of copper XLPE insulated cables with different coloured PVC outer sheaths to identify Non-Essential, Essential and Uninterruptible Power Supply (UPS) submains. Submains to essential services will generally not be fire-rated. Submains supplying safety services will be fire-rated where required to comply with AS/NZS 3000.

5.6.4 New Final Circuit Cables

Final circuit cables will be suitably sized to comply with voltage drop allowances as per AS/NZS 3000.

5.7 Distribution Boards

Distribution boards have generally been located per fire compartment.

Distribution boards serving critical care areas shall have a means of transferring supply between the essential and non-essential sections of the main switchboard.

The distribution boards will generally be specified with a Schneider Isobar or similar chassis, which provides Form 4ah segregation.

The switchboard locations are indicated on the drawings provided in the Appendix of this report.

5.8 Power Outlets

Power outlets shall be colour-coded in accordance with AS/NZS 3003 as follows:

1. Non-Essential supply = WHITE
2. Essential supply = RED
3. UPS supply = BLUE
4. Cleaner's outlets = Beige

Each of the circuits will be protected by an RCD, as per the requirements of AS3000 or AS3003.

5.9 Wiring in Medical Treatment Areas

Where electrical services are within or adjacent to body/cardiac protected areas, they will comply with AS/NZS 3003. It is anticipated that Critical Care Unit bays will be cardiac-protected.

Leakage protection devices will generally consist of 10mA residual current devices. Isolation transformers and line isolation and overload monitors will be provided for selected UPS circuits.

5.10 Lighting

Luminaires being proposed will generally consist of LED fittings.

All Lighting will be colour temperature of 4000K within patient areas and 3000K in entrances and spaces which require a warmer feel to the space.

Cyanosis compliant lamps are not proposed to be used in the new building.

The lighting levels will comply with AS 1680, AS1158, NSW Health Engineering Services Guidelines and BCA requirements. The below lighting levels have been allowed for:

1. Stairs - 160Lux
2. Patient Transfer Corridors – 160Lux
3. Patient Treatment rooms – 400Lux
4. Emergency Department Patient Bays – 400Lux
5. Renal Patient Bays – 400Lux
6. Main Entrances – 160Lux
7. Accessible WC – 200Lux
8. Resuscitation Area – 400Lux
9. Procedure Rooms – 320Lux
10. Inpatient Unit Rooms – 240Lux (reading above bed)
11. Inpatient Unit Rooms – 320Lux (examination)

5.10.1 Patient Care Areas

Luminaires used in these areas will generally consist of LED CRI>90 luminaires with an easily cleaned diffuser.

5.10.2 General Non-Patient Areas

Luminaires used in these areas will generally consist of LED CRI>85 luminaires with an easily cleaned diffuser.

5.10.3 External Lighting

Luminaires will consist of LED fittings, pole mounted, wall-mounted and soffit-mounted as required. External luminaires will be controlled by PE cells, time clock and/or the lighting control system.

5.10.4 Lighting control

Automatic lighting controls will be provided as an energy-saving measure such rooms as offices, store rooms, cleaner's rooms. Preference will be given to low-cost, easily maintained 240V controls.

Where necessary to provide the required functionality, a lighting control system utilising DALI will be implemented.

It is anticipated that a lighting control system will be provided to control the lighting in the following areas:

1. Public corridors (between departments);
2. Inpatient wards (corridors only);
3. Stairs
4. Selected imaging rooms.

5.11 Emergency Evacuation Lighting

New emergency lighting and exit signs will be provided to comply with AS/NZS 2293.1. Emergency lighting will additionally be provided in the following areas:

1. Patient treatment areas
2. Stairs/Toilets/Change rooms
3. Rooms greater than 120m² that are accessible to patients
4. Staff areas where public address announcements are made
5. Fire control area (where applicable)

Proposed Electrical Services Arrangement

6. Staff stations
7. Locations where fire locations can be identified (e.g. Fire/Mimic panels)
8. Near Manual Call Points
9. Plantrooms

A computer monitored system will be provided for emergency lighting in new areas. Luminaires incorporating lithium-ion batteries with a minimum 5-year warranty are highly recommended due to the favourable whole-of-life comparison with nickel cadmium / nickel metal hydride batteries.

The Area Controller (head-end) shall typically be located within the Facility Manager's office/workshop.

Area Controller Routers shall typically be located within the Floor's Electrical Distribution Board cupboards

5.12 Telecommunications Cabling Installation

5.12.1 Incoming Carrier Lead-ins

The existing incoming lead-ins to the existing "Primary" Entrance Facility/Campus Distributor/PABX room will be relocated during redevelopment Enabling Works.

A new "Secondary" Entrance Facility/Campus Distributor room is proposed to be established within the new building. New incoming lead-ins will be provided to the new room.

Refer to the Appendix drawings for the proposed fibre backbone pathways between the two Campus Distributors.

5.12.2 New Campus Distributor Room – (Secondary Entrance Facility)

It is proposed that the topology recommended by the NSW Health ICT Cabling Standard be implemented in the new building.

The new Secondary EF/CD will be connected via fibre optic cabling to the existing CD/PABX Room (Primary EF).

All Floor Distributors (FDs) located within the new building will have primary and secondary backbone connections. Connections shall be made via redundant pathways.

Refer to the Appendix drawings for the proposed fibre backbone network topology.

A new Comms (Floor Distributor) Room is located on each level of the new building.

It is envisaged that each Comms Room will be populated with 45RU open racks. The quantity of racks required is dependent on the quantity of ports, LAN switches and building services (e.g. nurse call) equipment.

The following equipment shall be housed in the racks

1. Networking equipment.
2. FOBOTs/Patch panels
3. Nurse Call equipment
4. Cable Management Systems

Rack details and configurations shall be as per the requirements of the SWSLHD.

It is proposed that 45RU racks are to be used in the Communications Rooms for housing equipment and patch panels, with good horizontal and vertical cable management provisions. Each rack will be provided with a UPS supply and a non UPS supply (both will be generator backed up). A front-terminated earth link bar will be provided within each communications rack. A Communications Earth Terminal (CET) system will be installed in accordance with AS/CA S009.

Communications Rooms will be provided with 24/7 air conditioning.

5.12.3 Backbone Cabling

Backbone cabling, labelling and patching shall comply with the NSW Health ICT Cabling Standard and SWSLHD Generic Cabling Specifications (Jun 2017).

Fibre optic backbone cabling shall be run from each Telecommunications Room (Floor Distributor) to each Campus Distributor/Building Distributor.

Fibre optic backbone cabling shall be Optical Single Mode 2 (OS2) and Optical Multi Mode 4 (OM4) cables with all cores terminated in Fibre Optic Break Out Trays (FOBOTs) at either end and terminated or spliced to LC connectors.

A second (redundant) set of fibre optic backbone cables shall be run to each new Telecommunications Room (Floor Distributor). This second cable shall be run via a different (redundant) physical pathway to the primary fibre backbone cable.

Fibre optic backbone cabling shall generally be 24-core.

Fibre optic backbone cabling between Campus Distributors and/or Building Distributors shall be 48-core.

Copper voice backbone cabling shall be minimum Category 3.

25 pair copper voice backbone cabling shall be reticulated to each new Telecommunications Room (Floor Distributor) from one of the Campus Distributor Rooms.

Copper voice backbone cabling between Campus Distributors and/or Building Distributors shall be 50 pair.

5.12.4 Horizontal Cabling

Horizontal cabling, patching and labelling will be as per the requirements of the NSW ICT Cabling Standard and SWSLHD Generic Cabling Specifications (Jun 2017).

Horizontal cabling will generally consist of Category 6A/Class EA F/UTP or U/FTP (screened) horizontal cabling system.

The route length of all horizontal cable runs from the communications rack patch panels to the telecommunications outlets will not exceed 90m. Horizontal cabling will cross other runs of cables at ninety (90) degrees wherever possible.

All pairs of all horizontal cabling will be terminated at both ends and will be installed to avoid stretching, kinking, tight bends and damage from adjacent fixtures or plant.

Telecommunications outlets will be provided mounted to the ceiling to support wireless access points. Heat mapping is to be conducted during Design Development.

5.12.5 Data and Telephone Services

LHD ICT have advised that VOIP provisions are to be provided throughout the site. The existing PABX system is to eventually be phased out.

Copper backbone cabling will be provided, such that "red" PSTN phones can be connected in any department in the new building.

Wi-Fi network for data/telephony to be allowed for. Wireless access will be provided throughout the building. As Wi-Fi Mobile Duress is being utilised, the wireless access point grid will largely be governed by the Duress requirements.

The cabling and outlet provisions will be designed to support the following facilities:

- networked data systems,
- a single service carrier, integrating all modes of data and voice communications;
- client and customer hub concepts, eliminating local solutions that cannot be shared across the broader organisation, and
- reticulated through a comprehensive, integrated cabling system capable of broad band transmission.

5.13 Information and Communications Technology (ICT)

5.13.1 Telephony

The SWSLHD have advised that the existing PABX (non VoIP) may be replaced with a VoIP system prior to the completion of the new build. SWSLHD to advise the timing of the PABX replacement to VoIP.

Proposed Electrical Services Arrangement

A new standalone VoIP system incorporating a Cisco Unified Communications Manager (CUCM) cluster will be provided to the new building. The new and existing PABX systems will be interfaced to enable both to operate on the site, until the existing PABX system is eventually phased out.

A small number of PSTN telephones, which will be capable of operating in the event of a power failure to PoE switches will be provided.

5.13.2 Wi-Fi Network

The new building will be provided with Wi-Fi coverage throughout. The system will support RTLS and Wi-Fi telephony services, including mobile duress alarms.

The project is to conduct heat mapping of the new building during Design Development, which the SWSLHD will sign-off.

The SWSLHD have advised that all new WAPs are to be provided with a single RJ45 data outlet.

5.13.3 Mobile Duress

A Wi-Fi based mobile duress system is proposed to be installed in the new building where required.

Heat mapping to be conducted during Design Development shall take into account the coverage required for Mobile Duress.

5.13.4 Wireless Telephony

Mobile Voice over Wi-Fi is proposed to be provided to take advantage of the Wi-Fi network. Interoperability of devices between the new building and existing buildings will need to be addressed. Replacement of existing DECT services with VoWiFi services may be an option; however, this may result in additional costs outside of the current projects scope.

5.13.5 Paging

After discussions with SWSLHD ICT, it is not proposed to install a Paging System within the new building. This will be confirmed with SWSLHD ICT during Design Development.

5.13.6 Mobile Distributed Antenna System (DAS)

Installation of a Mobile Distributed Antenna System within the new building has been proposed as a VE item. If funds are available it should be added back into scope.

Construction of the MDAS room and provision of conduits shall only be provided should the MDAS system remain a VE item.

The MDAS room shall be large enough to cater for all the major providers.

A coverage (desktop) assessment report should be compiled by an RF specialist to determine if DAS is required within the new building.

The MDAS system would be designed, supplied and installed by a specialist RF designer and installer subcontracted to the main works contractor. The antenna system would be owned by NSW Health. Carrier equipment would be installed in a designated room on Level 3 of the new building and this equipment would be maintained and owned by the carriers. The carriers would connect to the MDAS system within the same room and would share the common distributed antenna system infrastructure to distribute their services to the building, under terms agreed for shared facilities in the Mobile Carriers Forum (MCF).

5.13.7 Patient Entertainment System

A coaxial-based Free-To-Air TV Patient Entertainment system will be provided within the new building. Each TV/PES location will be provided with one (1) double general power outlet, one (1) Type F coaxial outlet and one (1) RJ45 Cat 6A data outlet. The provision of a data outlet at each of these points will allow the LHD to install an IP based Patient Entertainment System in the future or allow each of these locations to have eMR functionality.

5.13.8 Audio Visual Systems System

The SWSLHD indicated during discussions that Video-Conferencing is to be a Group 1 item. Video Conferencing provided will comply with E-Health requirements. The scope of telehealth and video conferencing will be further developed during Design Development.

The SWSLHD has indicated a preference for Cisco manufactured equipment.

5.13.9 2-Way Radios

The SWSLHD have advised that Disaster Management and Hotel services currently utilize 2-way radios.

The existing base station coverage shall be extended to account for the new building.

5.14 Security Systems

5.14.1 Access Control System

SWSLHD have advised that upgrade works of the existing Inner Range Concept access control system are planned to occur during the 1st quarter of 2018. The existing system shall be upgraded to the new Inner Range Integrity system.

A new Integrity access control system or extension of the upgraded system is proposed to be provided in the new building.

Door intercoms will be provided where required to suit the access control arrangements. Electronic access control provisions will generally be limited to departmental perimeters and specific areas of high crime risk, such as high value stores. Communications rooms will be provided with electronic access control.

Generally, plant rooms will not be provided with electronic access control.

5.14.2 CCTV Surveillance

It is proposed to provide a new IP-based system in the campus distributor room. Cameras will be colour and IP-based. Viewing facilities will be provided where agreed with the LHD.

5.14.3 Fixed Duress Alarm System

It is proposed to connect duress buttons to the access control system panels and to utilize a high level interface to the messaging integration engine to distribute duress messages to alarm devices.

5.15 Intercom Systems

A new IP based audio/video system will be provided in the new building. The SWSLHD has indicated that they have no preferred manufacturer.

5.16 Nurse Call System

A new Nurse Call system is to be installed in the new build. The SWSLHD has indicated that Rauland is their preferred manufacturer.

5.17 PACS

Any PACS servers required as part of the new build are proposed to be housed in the new Secondary Entrance Facility/Campus Distributor Room.

5.18 Master Clock System

A Simplex master clock system or similar is to be installed in the new build. Where required to meet AusHFGs requirements, slave clocks will be installed.

Proposed Electrical Services Arrangement

5.19 Public Address System

No Public Address system separate to the Emergency Warning and Intercommunication System is currently envisaged.

5.20 Lightning Protection System

A lightning protection risk assessment shall be done for the Bowral & District Hospital Redevelopment. If required a lightning protection system, compliant to AS1768, shall be provided.

5.21 Electromagnetic Field (EMF) Shielding

Australian Standard, AS/NZS 3003 – Electrical Installations – Patient Areas, sets out appropriate electromagnetic field requirements which will be adhered to.

The following areas proposed within the new building are identified in AS/NZS 3003 as areas of high sensitivity to electromagnetic fields:

- Intensive care units.
- Resuscitation units.
- Emergency departments.

WGE recommend that it is prudent to also consider operating rooms as areas of high sensitivity to electromagnetic fields.

It is noted that typically the most cost-effective means of compliance is the careful selection of switchroom and submains cable route locations, such that sensitive clinical areas are separated from the principal electromagnetic field sources.

6. Sustainability & Energy Saving Initiatives

The key sustainability objectives are:

- Comfortable and healthy indoor environment.
- Minimise non-renewable resource consumption.
- Cost-effectiveness over whole life span.

The design minimised electrical consumption by:

- Utilising energy efficient lamps, luminaires and associated control gear;
- Consideration of lamp life and maintenance requirements in the selection of luminaires;
- Optimisation of the use of natural lighting during daylight hours;
- Individual light switching for individual spaces and master switches for each functional area;
- Separate sub-metering of lighting and power services;
- The provision of automatic lighting control including:
 - Photoelectric controls
 - Time switches
 - Movement detectors
- Use of sub metering for substantive energy uses within the building (Greater than 100kVA.)

7. Risks

The following particular risks have been identified:

- The LHD propose that a new Cisco VoIP system be rolled out to new building. Maintenance of telephony services to all of the remaining departments on the site will need to be carefully considered.
- DECT-based wireless telephony has been provided within the existing Hospital. Voice over Wi-Fi (VoWiFi) telephony is proposed for the new building. DECT phones will not be operable in areas that do not have DECT base station coverage. Wi-Fi phones will only be operable in areas having the required Wi-Fi coverage. Where staff require devices to work seamlessly between departments, the means of achieving this will need to be addressed. This may involve significant costs in unrefurbished areas.
- The Mobile Distributed Antenna System has been proposed as a VE item. If funds are available it should be included back into scope. The requirement for a mobile distributed antenna system should be assessed by an RF specialist.

Order of Costs

8. Order of Costs

8.1 Electrical Services – Order of Costs

ELECTRICAL SERVICES	QTY	UNIT	RATE	TOTAL
HV Cabling & Padmount Kiosk Substation	1	Item	\$300,000	\$300,000
Existing Telstra & NBN Lead-Ins relocation works	1	Item	\$100,000	\$100,000
New Telstra Lead-in cabling	1	Item	\$25,000	\$25,000
Consumer Mains including trenching	1	Item	\$200,000	\$200,000
New Main Switchboard, PFC & Distribution Boards	1	Item	\$150,000	\$150,000
New Uninterruptible Power Supply System	1	Item	\$100,000	\$100,000
New Generator, Controls & Bulk Fuel Tank	1	Item	\$400,000	\$400,000
Mobile Distributed Antenna System (DAS)	1	Item	\$175,000	\$175,000
External Lighting	1	Item	\$100,000	\$100,000
Lightning Protection	1	Item	\$75,000	\$75,000
IPU – Acute Medical	795	m ²	\$800	\$800
Close Observation Unit	399	m ²	\$1000	\$1000
IPU – Medical, Mental Health & Sub Acute	925	m ²	\$800	\$800
Perioperative, Surgical	1079	m ²	\$1,300	\$1300
Emergency Department	825	m ²	\$1,200	\$1200
Paediatric Unit	435	m ²	\$800	\$800
Maternity Unit	649	m ²	\$800	\$800
Front Of House	155	m ²	\$500	\$500
Plant	808	m ²	\$300	\$300
Total (ex GST)				\$1,632,500

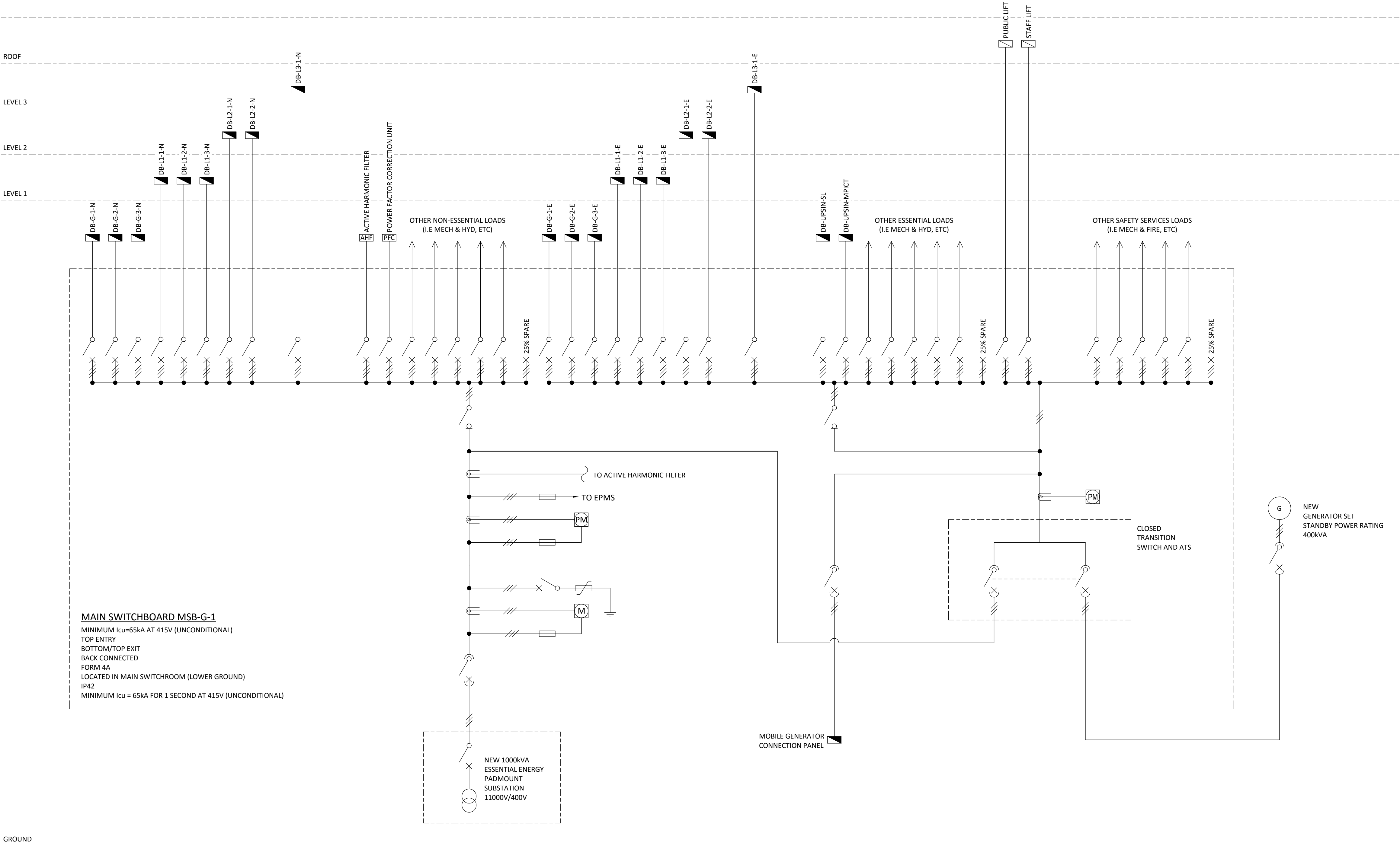
8.2 Exclusions:

- Refurbishment works
- Staging Costs
- Early works
- Digital imaging systems
- Builders Works
- Builder’s mark up and GST
- Site Preliminaries
- Escalation to Tender
- Builder’s electrical supplies and preliminary costs
- Fire Detection and Emergency Warning Systems
- White goods and medical equipment
- Contingency
- EMF Screening
- Televisions, Printers, Fax machines, MFD’s, Mobile phones, PC, Blu-ray/DVD players
- Software
- Medical Equipment
- Medical Service Pendants
- Procedure/Surgical Lighting
- Group 2/3 ICT Budget

Appendix 1 – Drawings

Appendix 1 – Drawings

NOTE:
THIS DOCUMENT HAS BEEN PRODUCED FOR THE PURPOSE
OF SCHEMATIC DESIGN AND IS NOT INTENDED FOR PRICING
PURPOSES.



THIS DRAWING HAS BEEN DOCUMENTED IN COLOUR
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& WHITE DOCUMENTS HAVE BEEN OBTAINED FROM WGE

0	SCHEMATIC DESIGN			08/12/17
REV	DESCRIPTION	DRAWN	APP'D	DATE



Billard Leece Partnership Pty Ltd



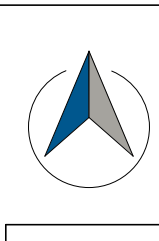

ARCHITECT/CLIENT

BOWRAL & DISTRICT HOSPITAL
REDEVELOPMENT
97-103 Bowral St, Bowral NSW
2576

PROJECT

MAIN POWER SINGLE LINE
DIAGRAM

TITLE

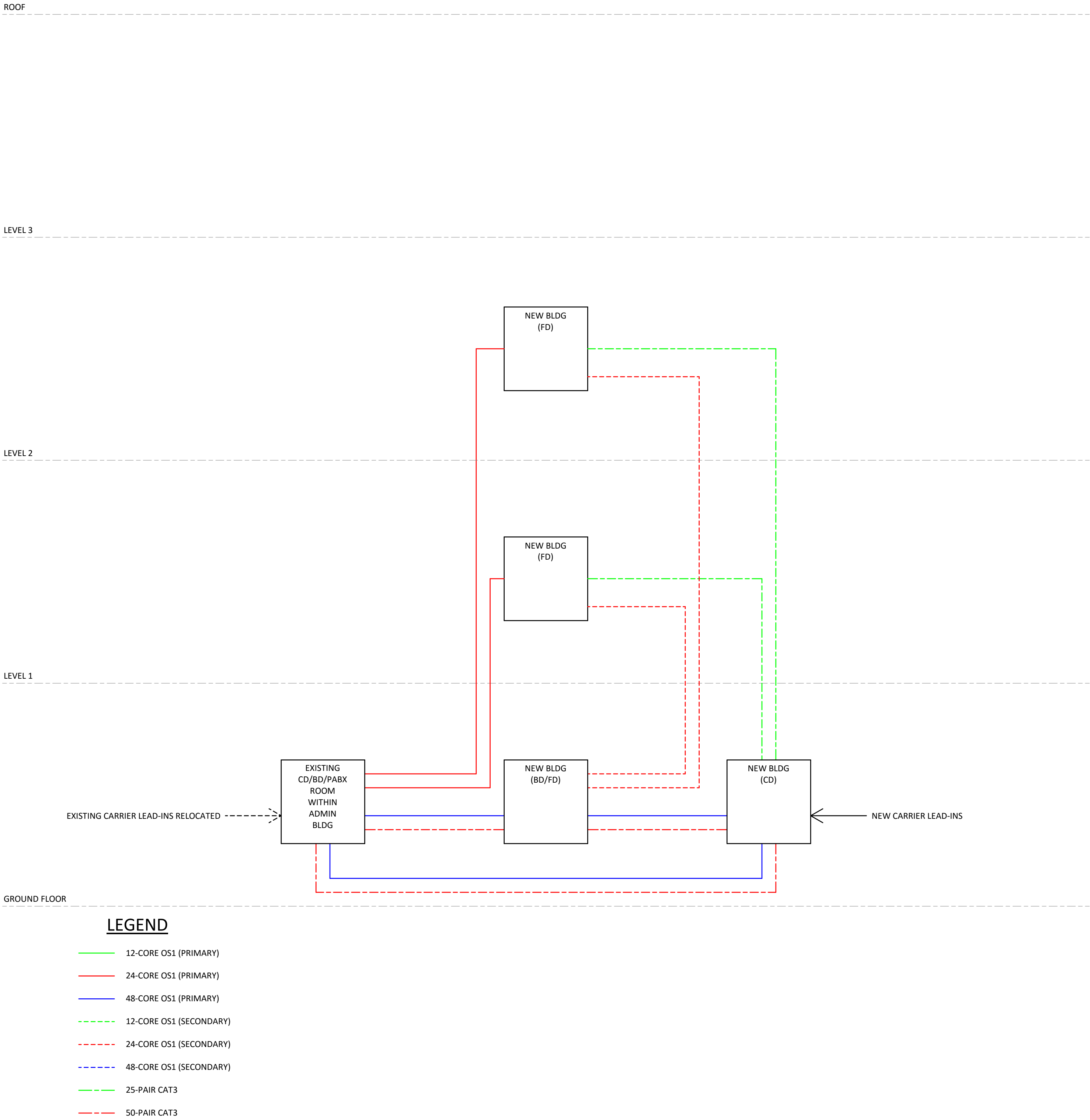


WOOD & GRIEVE ENGINEERS

PRELIMINARY
NOT FOR CONSTRUCTION
ELECTRICAL

1 : 100	130443	WGE-EL-SK-SD1000	0
SCALE @ A1	PROJECT No	DRAWING No	REV

NOTE:
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& WHITE DOCUMENTS HAVE BEEN OBTAINED FROM WGE

REV	DESCRIPTION	DRAWN	APP'D	DATE
0	SCHEMATIC DESIGN			08/12/17



Billard Leece Partnership Pty Ltd



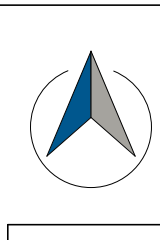

ARCHITECT/CLIENT

BOWRAL & DISTRICT HOSPITAL REDEVELOPMENT
97-103 Bowral St, Bowral NSW 2576

PROJECT

MAIN COMMS SINGLE LINE DIAGRAM

TITLE



PRELIMINARY
NOT FOR CONSTRUCTION
ELECTRICAL

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SCALE @ A1	PROJECT No	DRAWING No	REV

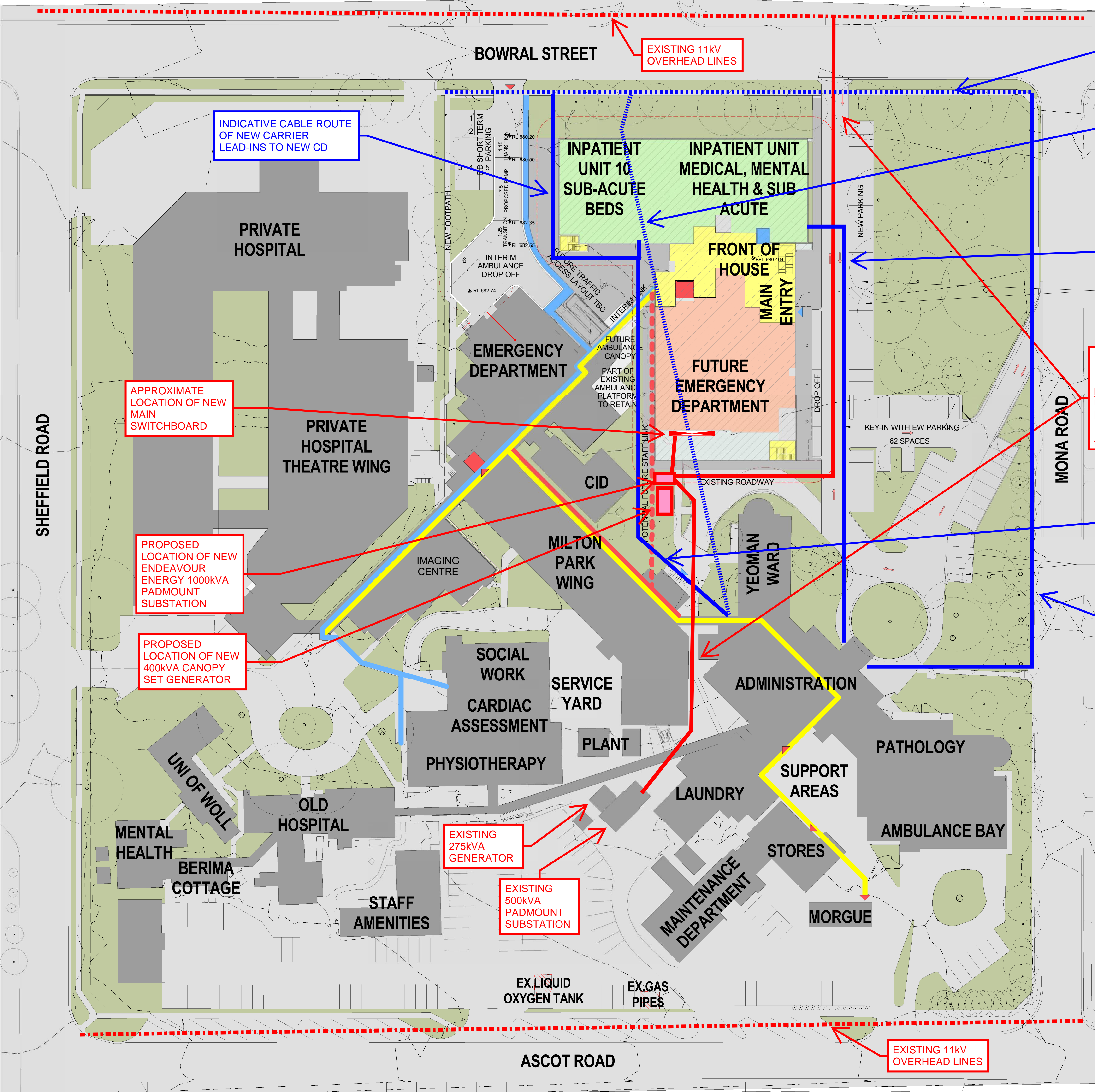
Project Name **BOWRAL & DISTRICT HOSPITAL**

Project No **29586**

Sketch Title **SITE PLAN**

Sketch No **130443-WGE-EL-SK-SD0100**

Date 11/12/2017 By allan.wong



INDICATIVE PATH OF EXISTING TELSTRA CONDUITS

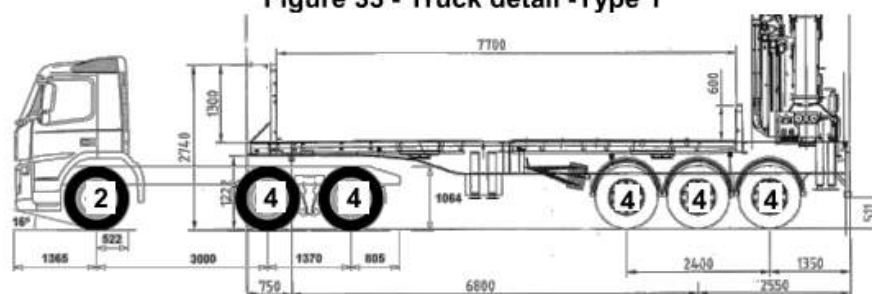
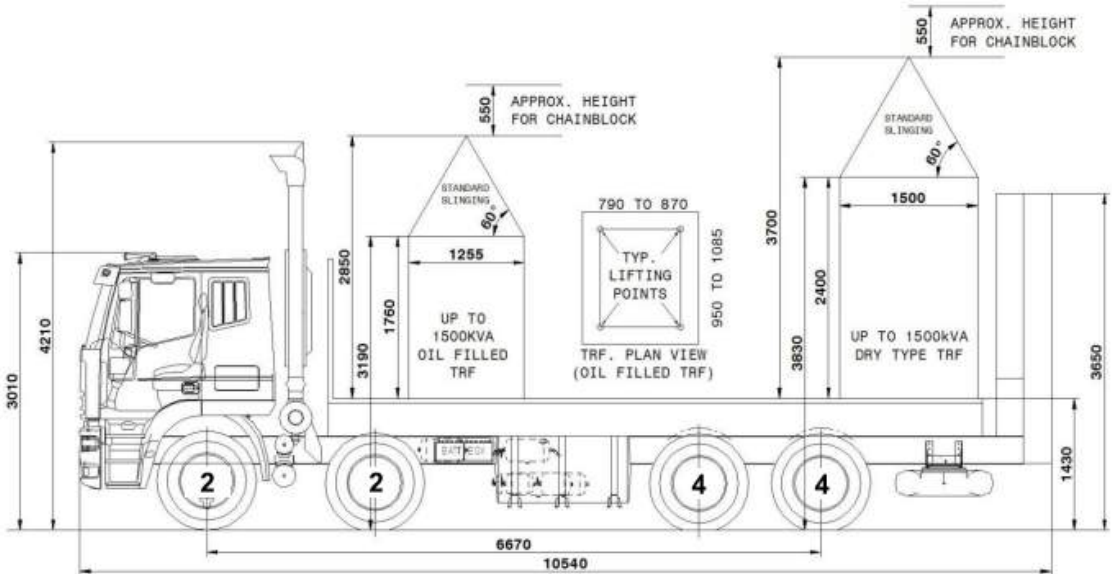
EXISTING TELSTRA & NBN LEAD-INS TO BE RELOCATED

INDICATIVE CABLE ROUTE OF SECONDARY (REDUNDANT) FIBRE BACKBONE CONNECTION BETWEEN CDS

POSSIBLE HV PATHWAY & EASEMENT REQUIRED BY ENDEAVOUR ENERGY
MINIMUM EASEMENT WIDTH REQUIRED:
UNDERBOR / DUCTED / DIRECT BURIED = 3m
DUCTED < 100m WITH MIN 50mm CONCRETE COVER = 1m
AS PATHWAY > 100m, EASEMENT REQUIRED TO BE 3m.

INDICATIVE CABLE ROUTE OF PRIMARY FIBRE BACKBONE CONNECTION BETWEEN CDS

INDICATIVE CABLE ROUTE OF RELOCATED TELSTRA & NBN LEAD-INS



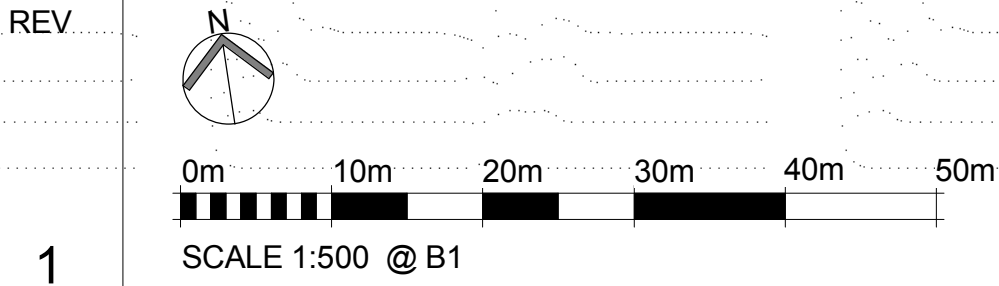
1 SITE PLAN - PROPOSED - MW PRE ED 500
1:400

AMENDMENTS			
NO.	DATE	SUBJECT	BY



PROJECT
BOWRAL & DISTRICT HOSPITAL REDEVELOPMENT
97-103 BOWRAL ST.,
BOWRAL NSW 2576

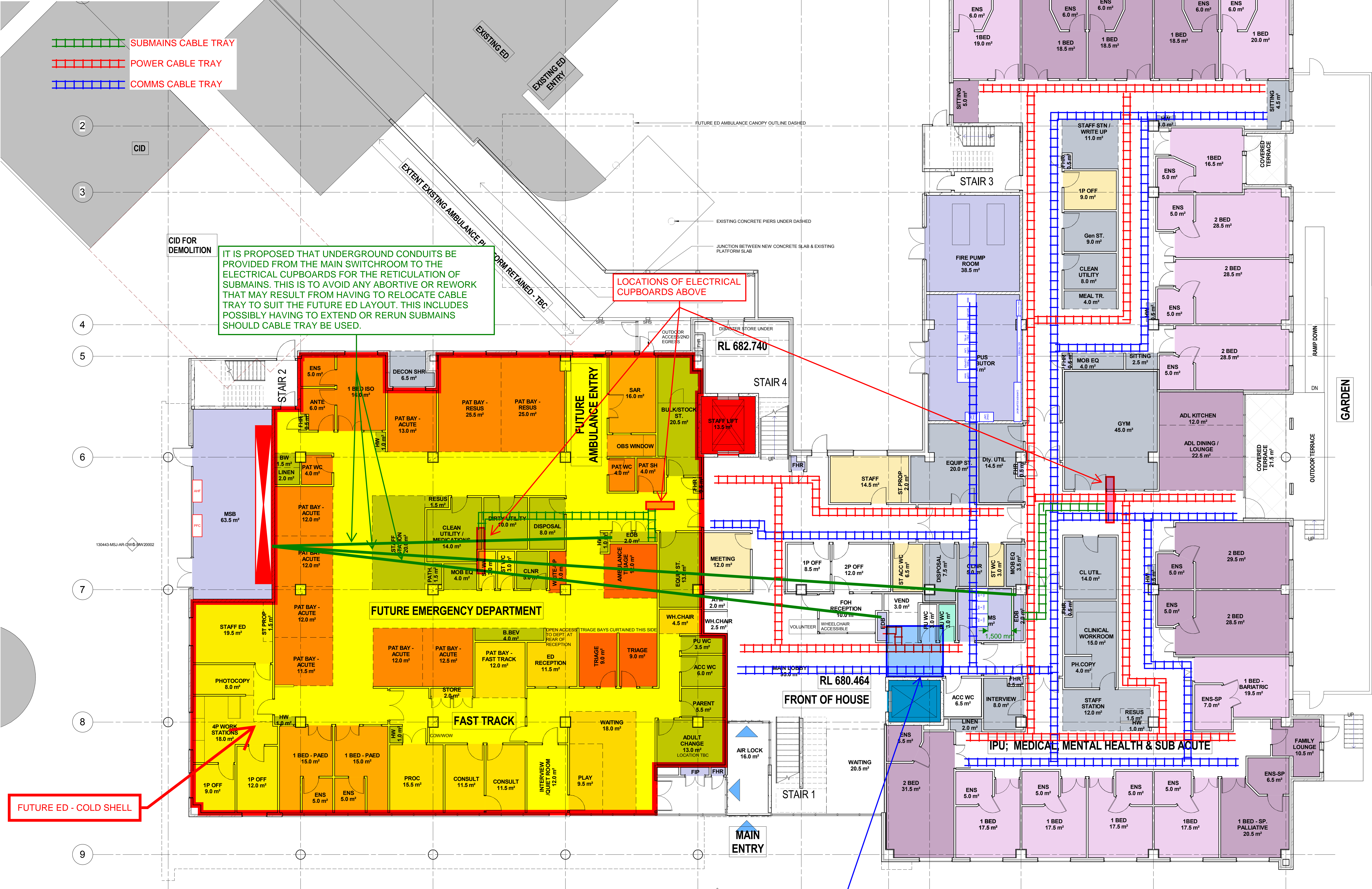
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130443-MSJ-AR-DWG-MW01001
DRAWING NAME
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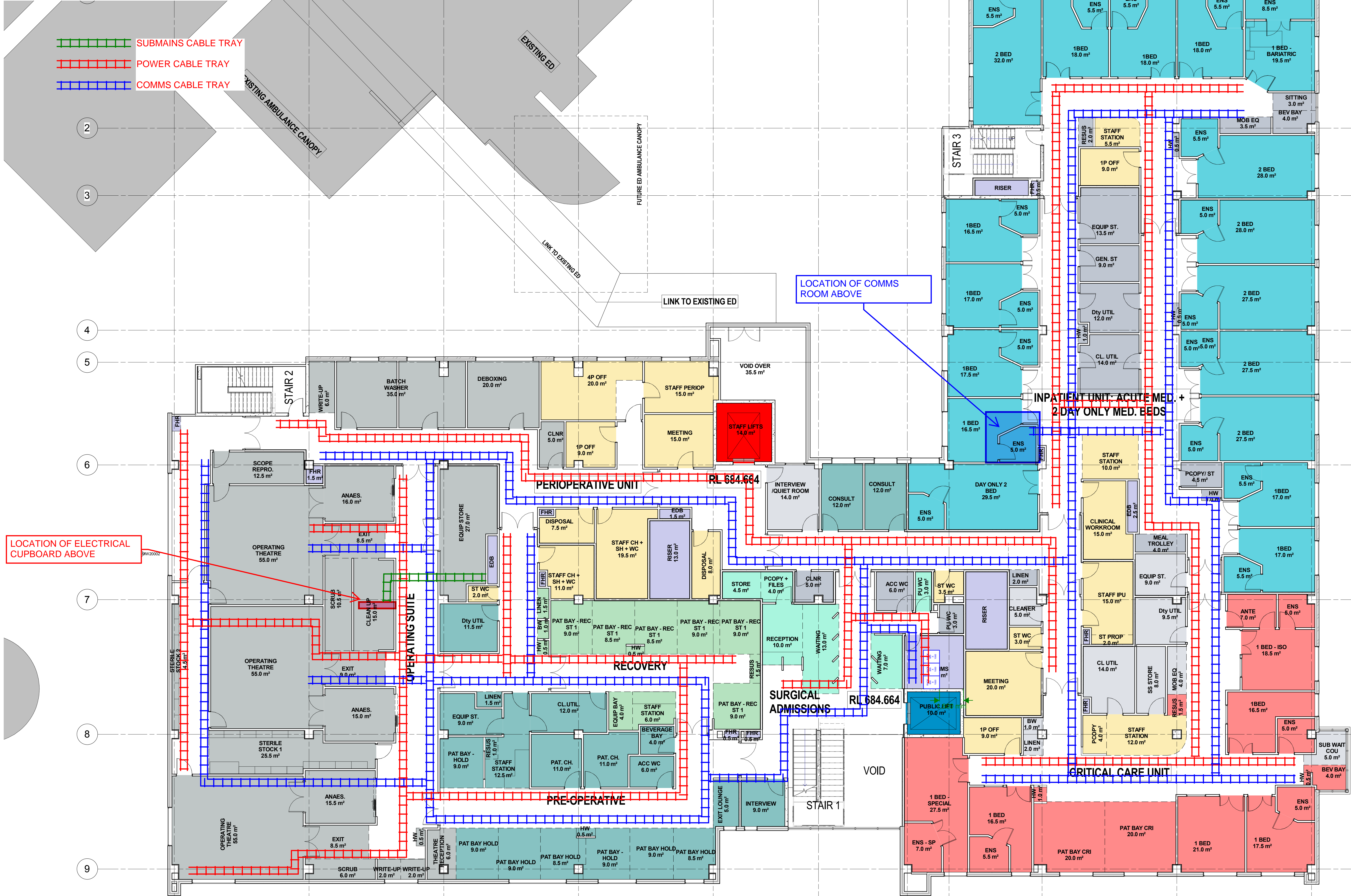


ISSUE DATE
17/10/17

Project Name **BOWRAL & DISTRICT HOSPITAL**
Project No **29586**
Sketch Title **CONTAINMENT - GROUND**
Sketch No **130443-WGE-EL-SK-SD2000**
Date 11/12/2017 By allan.wong

WOOD & GRIEVE ENGINEERS
Level 6, Building B
207 Pacific Highway
St Leonards NSW 2065
Phone 02 8484 7000
Fax 02 8484 7100





AMENDMENTS			
ISSUE	DATE	SUBJECT	AUTH
5	25-10-17	FOR INFORMATION	EC
6	06/11/17	FOR COORDINATION	EC
7	08/11/17	FOR COORDINATION	EC
8	13/11/17	FOR REVIEW	EC
9	14/11/17	FOR ENDORSEMENT	EC
10	15/11/17	FOR ENDORSEMENT	EC
11	21/11/17	FOR ERG	EC
12	27/11/17	FOR COORDINATION	EC
13	01/12/17	FOR INFORMATION	EC
14	11/12/17	FOR INFORMATION	EC

ARCHITECT



CLIENT



PROJECT MANAGER



PROJECT

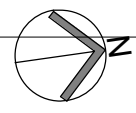
BOWRAL & DISTRICT HOSPITAL REDEVELOPMENT

97-103 BOWRAL ST.,
BOWRAL NSW 2576

DRAWING NUMBER
130443-MSJ-AR-DWG-MW03002

DRAWING NAME
FIRST FLOOR SD PLAN

REV



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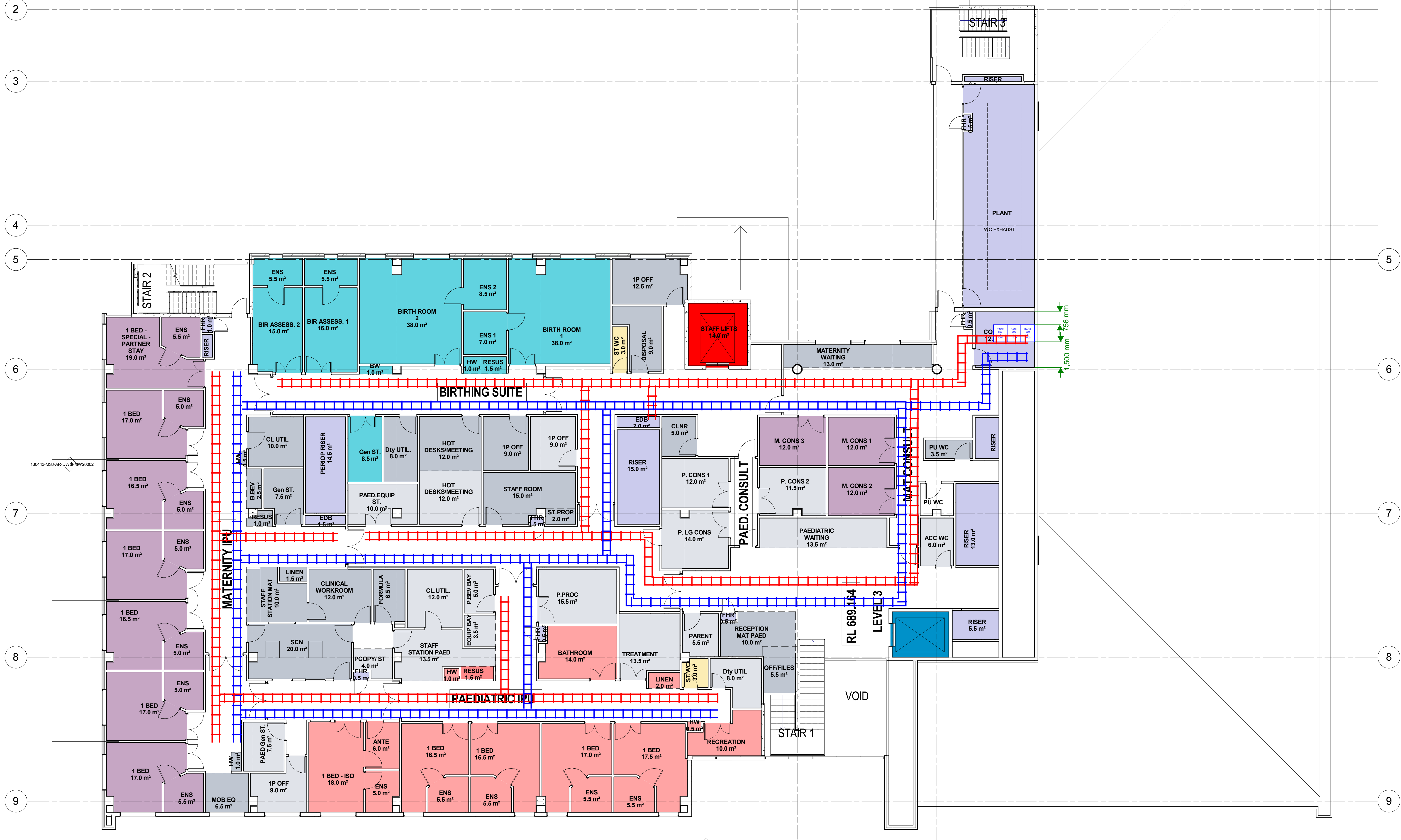
SUE DATE

11/12/17

Project Name **BOWRAL & DISTRICT HOSPITAL**
Project No **29586**
Sketch Title **CONTAINMENT - LEVEL 2**
Sketch No **130443-WGE-EL-SK-SD2002**
Date 11/12/2017 By allan.wong

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----- SUBMAINS CABLE TRAY
----- POWER CABLE TRAY
----- COMMS CABLE TRAY



AMENDMENTS		
NO.	DATE	SUBJECT
1	14/11/17	FOR REVIEW
2	14/11/17	FOR ENCLOSURE
3	14/11/17	FOR ENCLOSURE
4	14/11/17	FOR ENCLOSURE
5	14/11/17	FOR ENCLOSURE
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15	14/11/17	FOR ENCLOSURE
16	14/11/17	FOR ENCLOSURE
17	14/11/17	FOR ENCLOSURE



BOWRAL & DISTRICT HOSPITAL REDEVELOPMENT
97-103 BOWRAL ST.,
BOWRAL NSW 2576

DRAWING NUMBER
130443-MSJ-AR-DWG-MW03003
DRAWING NAME
SECOND FLOOR SD PLAN

REV 17

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ISSUE DATE
11/12/17

Project Name **BOWRAL & DISTRICT HOSPITAL**

Project No **29586**

Sketch Title **CONTAINMENT - LEVEL 3**

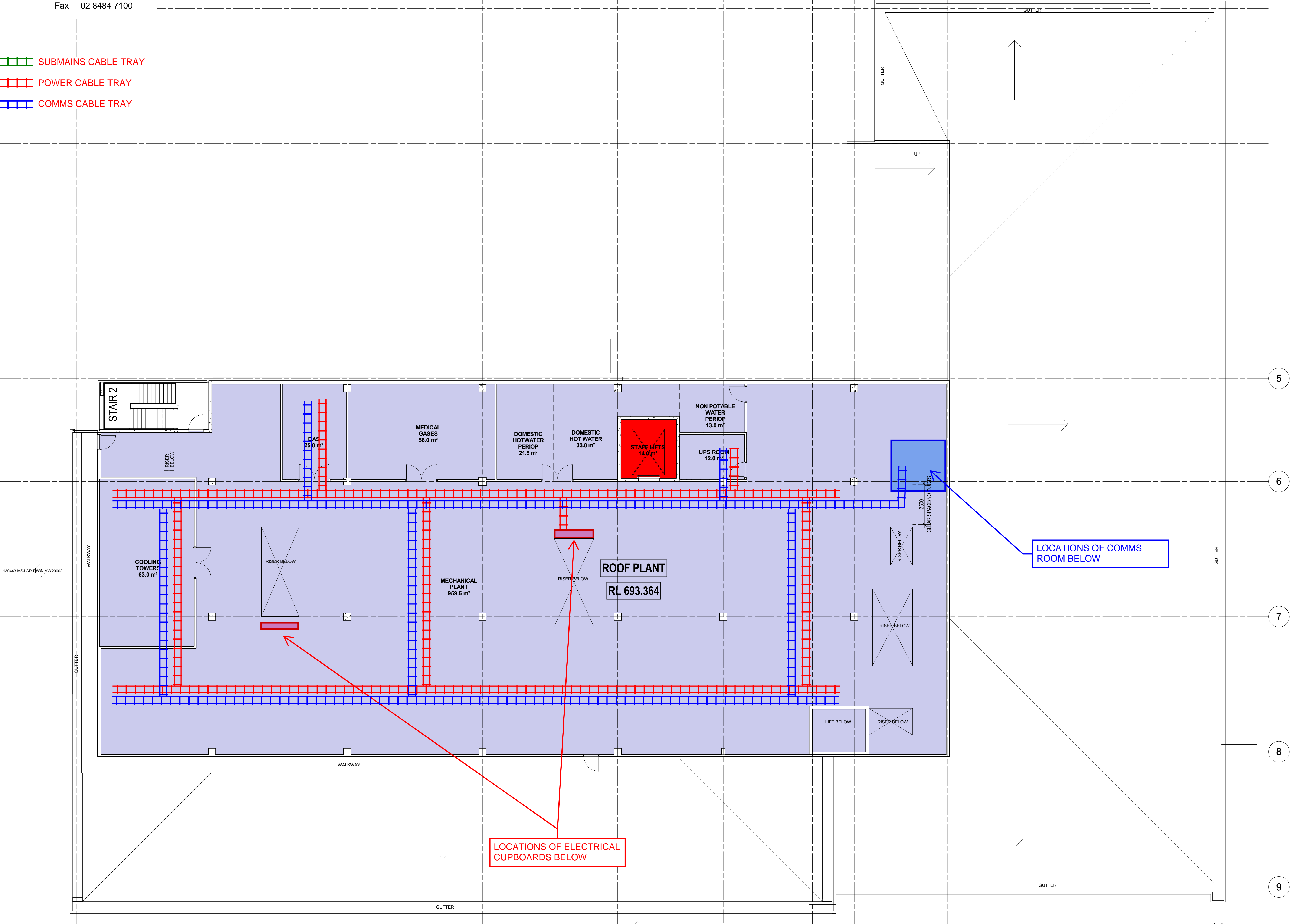
Sketch No **130443-WGE-EL-SK-SD2003**

Date 11/12/2017 By allan.wong

WOOD & GRIEVE ENGINEERS

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207 Pacific Highway
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- SUBMAINS CABLE TRAY
- POWER CABLE TRAY
- COMMS CABLE TRAY



AMENDMENTS			
NO.	DATE	SUBJECT	BY
1	08/11/17	FOR COORDINATION	SG
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15	14/11/17	FOR ENDORSEMENT	SG



BOWRAL & DISTRICT HOSPITAL REDEVELOPMENT

97-103 BOWRAL ST.,
BOWRAL NSW 2576

DRAWING NUMBER
130443-MSJ-AR-DWG-MW03004

DRAWING NAME
THIRD FLOOR SD PLAN

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ISSUE DATE
11/12/17

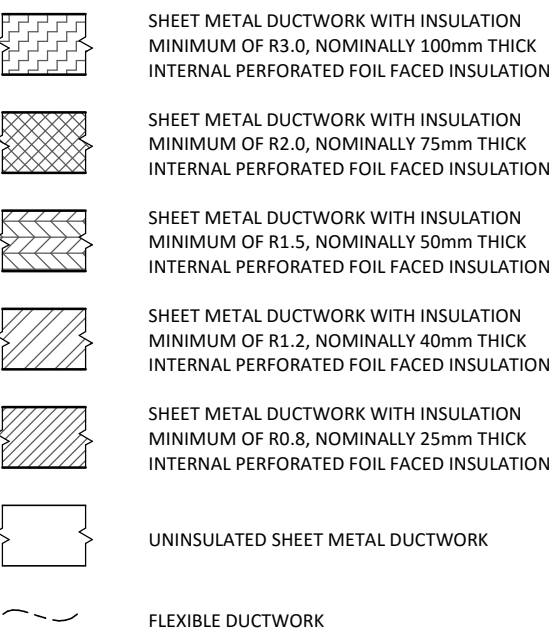
MECHANICAL SERVICES

DRAWING NUMBER	DRAWING TITLE
13044-WGE-ME-DWG-MW0001	COVER SHEET
13044-WGE-ME-DWG-MW0002	NOTES AND LEGENDS
13044-WGE-ME-DWG-MW2001	GROUND FLOOR DUCTWORK LAYOUT
13044-WGE-ME-DWG-MW2002	FIRST FLOOR DUCTWORK LAYOUT
13044-WGE-ME-DWG-MW2003	SECOND FLOOR DUCTWORK LAYOUT
13044-WGE-ME-DWG-MW2004	THIRD FLOOR DUCTWORK LAYOUT
13044-WGE-ME-DWG-MW2005	ROOF PLAN DUCTWORK LAYOUT
13044-WGE-ME-DWG-MW3001	GROUND FLOOR PIPEWORK LAYOUT
13044-WGE-ME-DWG-MW3002	FIRST FLOOR PIPEWORK LAYOUT
13044-WGE-ME-DWG-MW3003	SECOND FLOOR PIPEWORK LAYOUT
13044-WGE-ME-DWG-MW3004	THIRD FLOOR PIPEWORK LAYOUT
13044-WGE-ME-DWG-MW9000	HEATING HOT WATER PLANT SCHEMATIC
13044-WGE-ME-DWG-MW9001	HEATING HOT WATER FIELD SCHEMATIC
13044-WGE-ME-DWG-MW9010	CHILLED WATER SCHEMATIC PLANT
13044-WGE-ME-DWG-MW9011	CHILLED WATER SCHEMATIC FIELD
13044-WGE-ME-DWG-MW9020	AIR SCHEMATIC SHEET 1
13044-WGE-ME-DWG-MW9021	AIR SCHEMATIC SHEET 2
13044-WGE-MG-DWG-MW4001	GROUND FLOOR MEDICAL GAS LAYOUT
13044-WGE-MG-DWG-MW4002	FIRST FLOOR MEDICAL GAS LAYOUT
13044-WGE-MG-DWG-MW4003	SECOND FLOOR MEDICAL GAS LAYOUT
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13044-WGE-MG-DWG-MW4100	MED GAS SITE PLAN

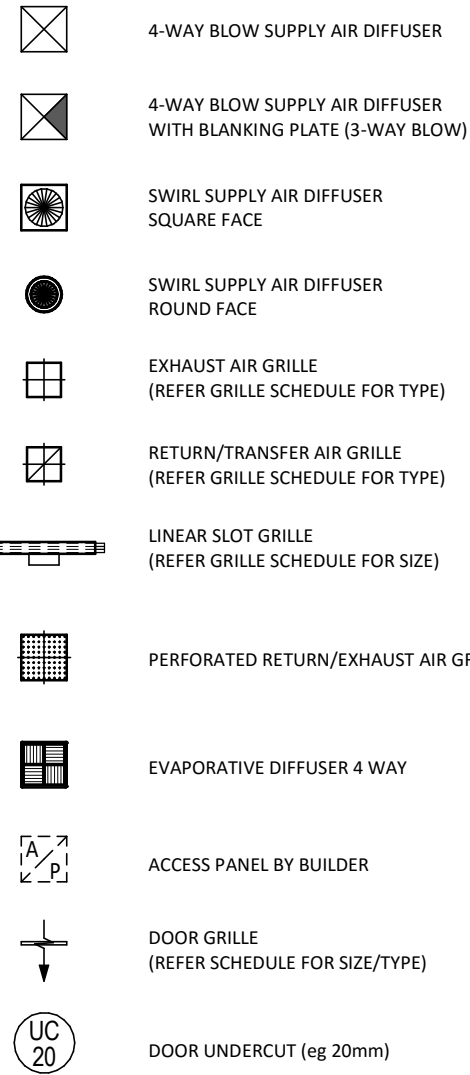


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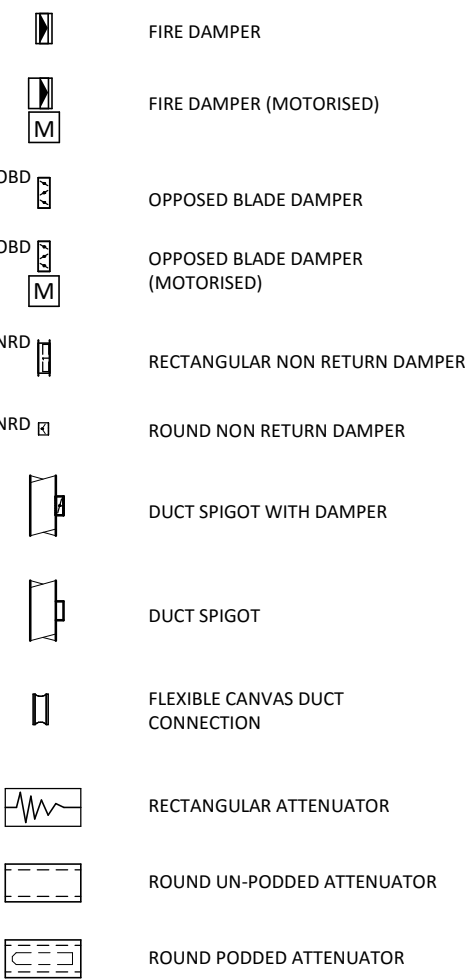
INTERNAL INSULATION
(BASED ON BRADFORD MULTITELL)



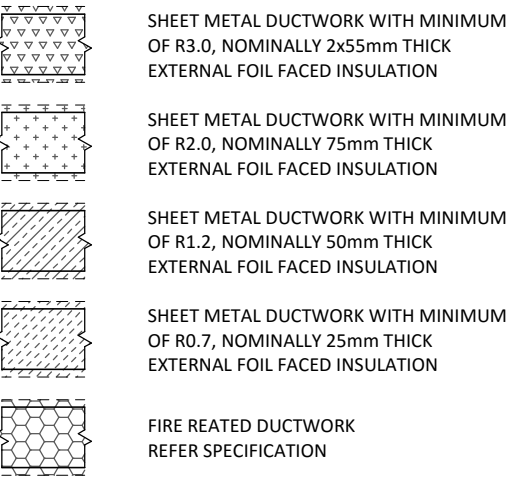
AIR TERMINALS



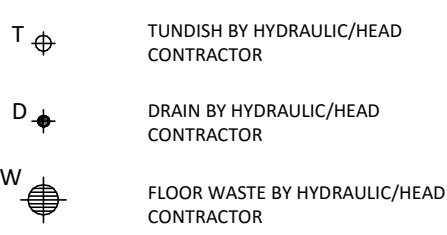
DUCT FITTINGS



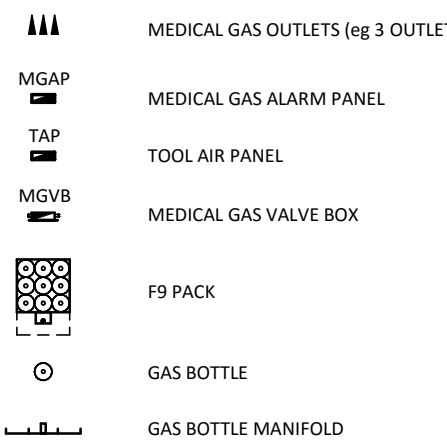
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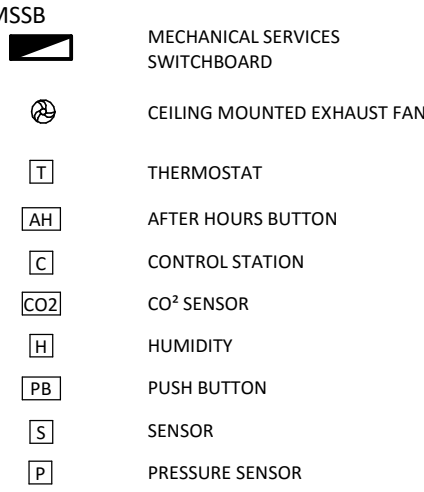
PIPEWORK



MEDICAL GASES

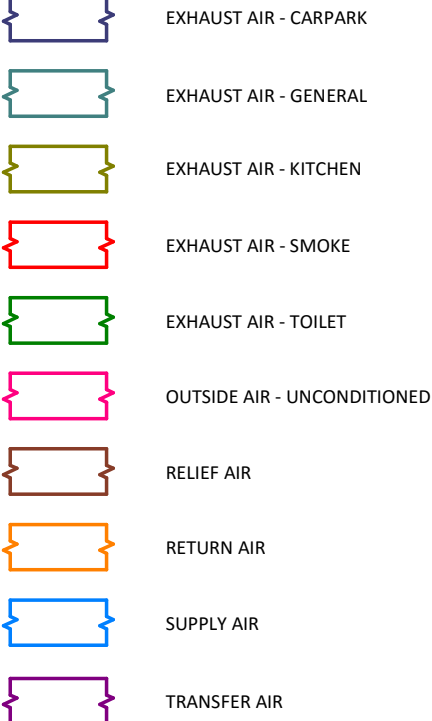


OTHER

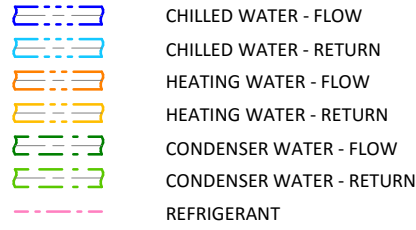


COLOURS

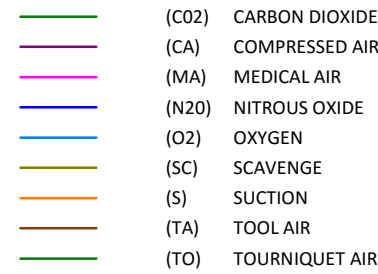
DUCTWORK



PIPEWORK



MEDICAL GAS



FLEXIBLE DUCT SCHEDULE		
MAX FLOW (L/s)	SIZE	
45	150Ø	
80	200Ø	
150	250Ø	
220	300Ø	
330	350Ø	
425	400Ø	
540	450Ø	
650	500Ø	
R1.0 + 40mm INSULATION		
R2.0 + 75mm INSULATION		

SEMI-RIGID DUCT SCHEDULE		
MAX FLOW (L/s)	SIZE	
80	150Ø	
160	200Ø	
250	250Ø	
360	300Ø	
490	350Ø	
640	400Ø	
810	450Ø	
1050	500Ø	
R1.0 + 40mm INSULATION		
R2.0 + 75mm INSULATION		

ABBREVIATIONS

AIRSIDE

A/C	AIR CONDITIONING
ACU	AIR CONDITIONING UNIT
AF	AIR FILTER
AHU	AIR HANDLING UNIT
AP	ACCESS PANEL
ATT	ATTENUATOR
C/W	COMPLETE WITH
CU	CONDENSING UNIT
E/A	EXHAUST AIR
EAF	EXHAUST AIR FAN
EDH	ELECTRIC DUCT HEATER
F/A	FROM ABOVE
F/B	FROM BELOW
FD	FIRE DAMPER
HF	HEPA FILTER
KE	KITCHEN EXHAUST
KEF	KITCHEN EXHAUST FAN
MCP	MECHANICAL SERVICES CONTROL PANEL
MFO	MOTORISED FIRE/SMOKE DAMPER
MSSB	MECHANICAL SERVICES SWITCHBOARD
O/A	OUTSIDE AIR
OAF	OUTSIDE AIR FAN
OBD	OPPOSED BLADE DAMPER
PAC	PACKAGED UNIT
P/C	PROCESS COOLER
R/A	RETURN AIR
RAF	RETURN AIR FAN
S/A	SUPPLY AIR
SAF	SUPPLY AIR FAN
SD	SET DOWN
SJ	STEP UP
SEF	SMOKE EXHAUST FAN
T/A	TO ABOVE
T/B	TO BELOW
T/E	TOILET EXHAUST
TEF	TOILET EXHAUST FAN
U/S	UNDERSIDE
VAV	VARIABLE AIR VOLUME BOX
VCD	VOLUME CONTROL DAMPER

WATER SIDE

ACC	AIR COOLED CONDENSER
CHWF	CHILLED WATER FLOW
CHWR	CHILLED WATER RETURN
CHWP	CHILLED WATER PUMP
CP	CIRCULATING PUMP
CDT	CHEMICAL DOSING TANK
CDWF	CONDENSER WATER FLOW
CDWR	CONDENSER WATER RETURN
CDWP	CONDENSER WATER PUMP
CH	CHILLER
CRT	CONDENSATE RECOVERY TANK
D	DRAIN
FW	FLOOR WASTE
HEX	HEAT EXCHANGER
HHWF	HEATING HOT WATER FLOW
HHWR	HEATING HOT WATER RETURN
HHWP	HEATING HOT WATER PUMP
HTHWF	HIGH TEMPERATURE HOT WATER FLOW
HTHWR	HIGH TEMPERATURE HOT WATER RETURN
HTHWP	HIGH TEMPERATURE HOT WATER PUMP
LR	LIQUID RECEIVER
NW	MAKE-UP WATER
N/C	NORMALLY CLOSED
N/O	NORMALLY OPEN
PET	PRESSURISED EXPANSION TANK
ST	STEAM
TD	TUNDISH
REF	REFRIGERANT

MEDICAL GAS

MGVB	MEDICAL GAS VALVE BOX
MGAP	MEDICAL GAS ALARM PANEL
TAP	TOOL AIR PANEL
CA	COMPRESSED AIR
CO2	CARBON DIOXIDE
En	ENTONOX
MA	MEDICAL AIR
N	LABORATORY GRADE NITROGEN
N2O	NITROUS OXIDE
O2	OXYGEN
S	SUCTION
Sc	SCAVENGE
TA	TOOL AIR
TO	TOURNIQUET AIR

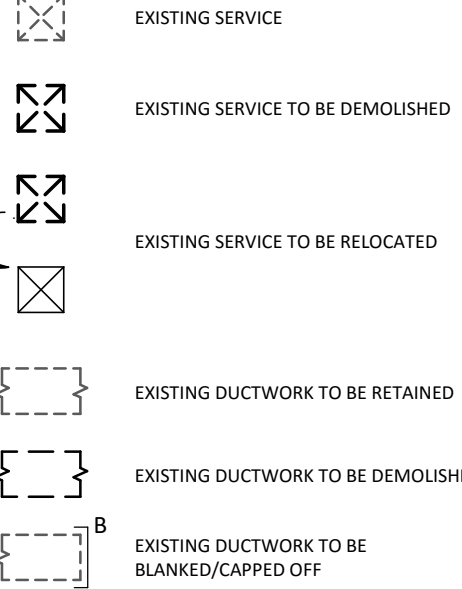
NOTES

- DRAWINGS TO BE READ IN CONJUNCTION WITH THE SPECIFICATION.
- ALL DUCT DIMENSIONS ARE CLEAR AIRWAY SIZES.
- ALL AIR QUANTITIES ARE IN LITRES PER SECOND (L/s)
- DRAWINGS ARE DIAGRAMMATIC ONLY. FOR DIMENSIONAL & CONSTRUCTION DETAILS OF THE BUILDING, SEE ARCHITECTURAL DRAWINGS.
- FLEXIBLE DUCTWORK RUNS SHALL BE AS SHORT AND STRAIGHT AS POSSIBLE. BENDS SHALL INCORPORATE A BEND CENTRE RADIUS OF NOT LESS THAN 1.5 TIMES THE FLEX DIAMETER. TOTAL LENGTH MUST NOT TO EXCEED 3M.
- FLEXIBLE DUCTWORK SHALL BE ACOUSTIC TYPE WITH A MINIMUM INSULATION RATING OF R1.0
- EXTERNAL WEATHERPROOF LOUVERES TO BE NOT LESS THAN 50% FREE AREA AND PROVIDED BY BUILDER EXCEPT WHERE STATED OTHERWISE. UNUSED AREAS TO BE BLANKED OFF BEHIND BY MECHANICAL CONTRACTOR.
- ALL REFRIGERANT LINES TO BE RUN IN PGI COVERS WHERE EXTERNAL TO THE BUILDING. PAINT TO APPROVED COLOUR.
- MECHANICAL CONTRACTOR TO SIZE REFRIGERANT PIPEWORK & INCLUDE ALL NECESSARY FITTINGS/COMPONENTS IN ACCORDANCE WITH THE EQUIPMENT MANUFACTURERS RECOMMENDATIONS.
- MECHANICAL CONTRACTOR TO ALLOW FOR DUCTWORK TRANSFORMS, OFFSETS ETC WHEREVER TWO DUCTS OR OTHER SERVICES CROSS-OVER AND FOR FINAL CONNECTION TO EQUIPMENT AND FITTINGS.
- THE CONTRACTOR SHALL PROVIDE FULLY CO-ORDINATED INSTALLATION/DROP DRAWINGS FOR APPROVAL PRIOR TO PROCURING EQUIPMENT AND EXECUTING SITE INSTALLATION WORKS. DIFFUSERS/GRILLES TO BE POWDER COATED. ARCHITECT TO CONFIRM EXACT COLOURS PRIOR TO ORDERING EQUIPMENT.
- ALL EXHAUST SYSTEMS TO INCLUDE NON RETURN DAMPERS.
- INTERNAL DUCTWORK/LIVING VISIBLE THROUGH GRILLES/REGISTERS TO BE PAINTED MATTE BLACK.
- EXHAUST SYSTEMS WITH TWO OR MORE GRILLES TO INCLUDE BALANCING DAMPERS FOR COMMISSIONING.
- MECHANICAL CONTRACTOR TO INCLUDE ALL REQUIRED SECONDARY STEELWORK, UNISTRUT & DROP RODS ETC FOR SERVICES EQUIPMENT.
- PROVIDE SAFETY DRIP TRAYS BELOW ALL DUCTED FAN COIL UNITS INCLUDING FLEXIBLE CONNECTIONS, PIPING AND FITTINGS. PROVIDE INSULATED PIPE CONDENSATE TO TUNDISH. TUNDISH PROVIDED BY HEAD/HYDRAULICS CONTRACTOR.
- ALL CEILING CASSETTE UNITS TO HAVE INSULATED CONDENSATE DRAINS RUN TO TUNDISH. TUNDISH PROVIDED BY HEAD/HYDRAULICS CONTRACTOR.
- ALL CONDENSING UNITS TO HAVE CONDENSATE DRAINS RUN TO TUNDISH. TUNDISH PROVIDED BY HEAD/HYDRAULICS CONTRACTOR.
- ALL CARPARK EXHAUST GRILLES TO BE COMPLETE WITH MANUAL VOLUME CONTROL DAMPERS.
- CAR PARK CO SAMPLING POINT LOCATIONS TO COMPLY WITH AS 1668. LOCATE BETWEEN 900 & 1800mm AFL.
- MECHANICAL CONTRACTOR TO LIAISE WITH OTHER DISCIPLINES FOR FINAL INTEGRATION OF SERVICES.
- FINAL LOCATION OF THERMOSTATS/SENSORS & CONTROLS TO BE COORDINATED WITH ARCHITECT. ALL FAN COIL UNIT TEMPERATURE SENSORS SHALL BE MOUNTED 1500mm AFL WITH OCCUPANT ADJUSTABLE CONTROLS BETWEEN 900-1100mm AFL.
- KITCHEN EXHAUST DUCTWORK (AND TO FALL DUCTWORK) TO HAVE AIR TIGHT EASILY REMOVABLE ACCESS PANELS AT 3 METER INTERVALS & AT EVERY CHANGE OF DUCTWORK DIRECTION.
- ACCESS PANELS IN BUILDER'S AIR PLENUMS SHALL BE PROPRIETARY AIRTIGHT TYPE.
- SUNSHADES TO BE FITTED ABOVE ALL EXTERNAL SUPPLY & RETURN AIR DUCTWORK.
- SUNSHADES TO BE PAINTED TO ARCHITECTS APPROVAL.
- MECHANICAL CONTRACTOR TO SEAL ALL PENETRATIONS THROUGH FIRE-RATED WALLS, SLABS, ETC. WITH APPROPRIATE FIRE RATED MATERIALS TO MAINTAIN INTEGRITY OF FIRE RATING.
- IN-CIRCUIT FAN COIL UNITS TO BE COMPLETE WITH FLEXIBLE CONNECTIONS, EMERGENCY DRIP TRAY & SPRING ISOLATORS.
- ALL WALL MOUNTED FAN COIL (INDOOR) UNITS INSTALLED SHALL HAVE NEOPRENE RAWLNUITS AND OFFSET FROM WALL WITH 6mm EMBELTON IMPACTA-MAT PADS.

COASTAL AND MARINE

- ALL CONDENSING UNITS SHALL BE CORROSION TREATED SUITABLE FOR A MARINE ENVIRONMENT.
- ALL CONDENSING COILS TO BE EPOXY COATED WITH "HERESITE" PRIOR TO DELIVERY TO SITE.
- ALL CABINET FRONTS TO BE SUITABLE FOR THE APPLICATION AND NON RUSTING TYPE.
- CONDENSATE DRAINS TO BE INSULATED.
- SERVICES TO BE INSULATED AND VAPOUR SEALED AGAINST CONDENSATION SUITABLE FOR LOCAL CONDITIONS.

EXISTING SERVICES



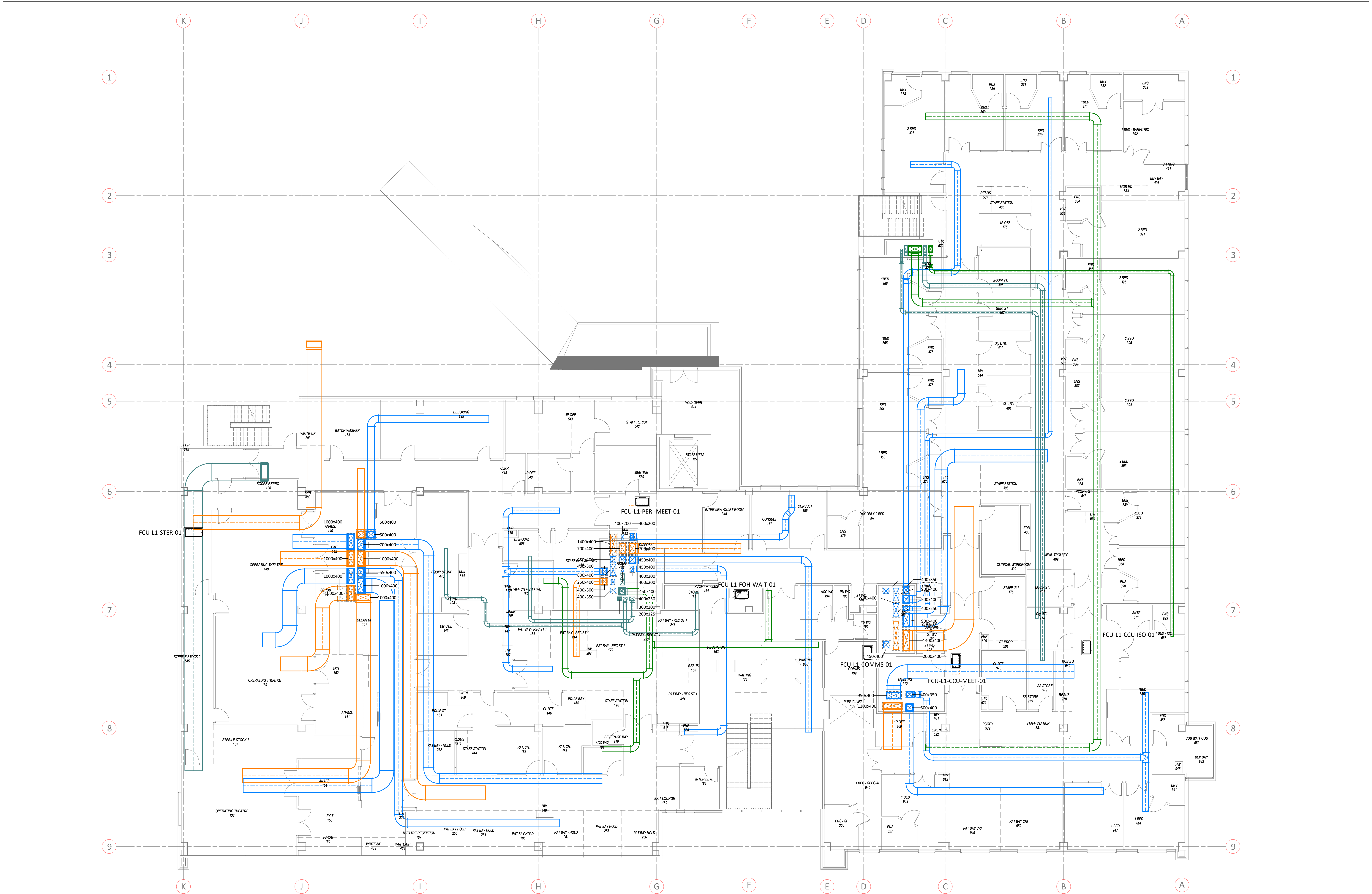
C	SCHEMATIC DESIGN ISSUE	AKAS	KPR	22.12.17
B	FOR REVIEW	AKAS	KPR	08.12.17
A	PRELIMINARY ISSUE	AKAS	KPR	01.12.17
REV	DESCRIPTION	DRAWN	APP'D	DATE

CLIENT		ARCHITECT

BOWRAL & DISTRICT HOSPITAL REDEVELOPMENT 97-103 BOWRAL ST., BOWRAL NSW 2576	NOTES AND LEGENDS
PROJECT	TITLE

		PRELIMINARY NOT FOR CONSTRUCTION MECHANICAL SERVICES
NTS	29586	13044-WGE-ME-DWG-MW0002 C
SCALE @ B1	PROJECT No.	DRAWING No.
		REV





F	SCHEMATIC DESIGN ISSUE	AKAS	KPR	22.12.17
E	FOR REVIEW	AKAS	KPR	08.12.17
D	PRELIMINARY ISSUE	AKAS	KPR	01.12.17
C	FOR INFORMATION	PTH	KPR	16.11.17
B	FOR INFORMATION	PTH	KPR	15.11.17
A	FOR INFORMATION	PTH	KPR	14.11.17
REV	DESCRIPTION	DRAWN	APPRO	DATE



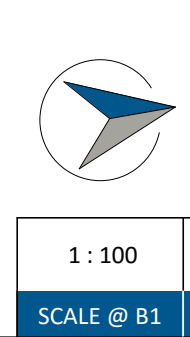



BOWRAL & DISTRICT HOSPITAL
REDEVELOPMENT
97-103 BOWRAL ST., BOWRAL NSW
2576

FIRST FLOOR DUCTWORK LAYOUT

PROJECT

TITLE



PRELIMINARY
NOT FOR CONSTRUCTION
MECHANICAL SERVICES

1:100
SCALE @ B1

29586 13044-WGE-ME-DWG-MW2002 F

PROJECT No. DRAWING No. REV

