

Electrical Services Overview Report

For

Site 2 Sydney Olympic Park – Electrical Services

This report dated 13 August 2019 has been prepared by Haron Robson Australia Pty Ltd for Ecove Group.

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SITE 2 - SYDNEY OLYMPIC PARK
ELECTRICAL SERVICES OVERVIEW REPORT
DATED: 13 AUGUST 2019

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1 INTRODUCTION

The development at Site 2 - Sydney Olympic Park is a new Mixed Use Development comprising of Hotel, Commercial and Ground Level Retail for the redevelopment of the Sydney Olympic Park site on the corner of Australia Avenue & Parkview Drive.

Site 2 incorporates the following:

- Building 2A, comprising;
 - 304 Room Hotel & associated facilities
 - 7,239m² NLA of Commercial office space
 - Ground floor lobby & 2 off retail tenancies
- Building 2B, comprising;
 - 19,982m² NLA of Commercial office space
 - Ground floor lobby & 6 off retail tenancies
- Shared Space;
 - Four (4) Levels of underground car park facilities
 - One (1) Landscaped Ground floor level

Haron Robson Pty Ltd have been engaged as Electrical Engineering Consultants to advise on the electrical services and overall master planning of the site services for the Hotel & Commercial Buildings and associated spaces.

This overview document is a general statement of the aims and inclusions of the electrical services installation.

2 ELECTRICAL SERVICES

The electrical services component of this project comprises many electrical / electronic systems. The briefing stage of this project will involve the collection of detailed information about the areas and the equipment to be installed so that there can be appropriate detailed allowances for each space. There will be a need to further address the electrical requirements of the other active systems in the building such as air conditioning and hydraulic services during the detailed design process.

This detail design will address the functional requirements of the users of the building by locating power outlets for general use, and connections for installed electrical equipment. Also the design of the electrical reticulation system so that it has sufficient capacity to provide reliable and safe power to the development. All systems will be designed to exceed the requirements of the relevant Australian Standards.

3 OUTLINE OF PROVISIONS

3.1 General

Electrical services will be provided to comply with all relevant mandatory Australian Standards and the requirements of Statutory Authorities having jurisdiction in the matter including the National Construction Code 2019 Volume 1.

3.2 Electricity and Telecommunications Authorities

All relevant Electrical Distribution and Telecommunications Carrier authorities shall be consulted with respect to the provision of the required services to the development and the street reticulation to service the development.

All involved authorities will be notified of the details of the development in an orderly time to allow service arrangements and local network augmentation to be carried out without incurring delays in the development's construction schedule.

3.3 Stratum

A Strata Title will be established for the development which will consist of multiple Stratum types. The Stratum types are:

- Building 2A House Services (Communal areas such as Carpark & External areas)
- Building 2B House Services (Common areas such as Carpark & Commercial Lobbies)
- Hotel
- Commercial Offices
- Retail Tenancies

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3.4 Electricity Supply

Electricity Supply to the development shall be via the establishment of a total of four (4) new standard chamber type substations, two (2) substations to be constructed within the Building 2A envelope & two (2) within the Building 2B envelope at the nominated locations. An Application for Connection shall be submitted to Ausgrid to further develop a scope of works.

AN initial enquiry has been submitted to Ausgrid and they have confirmed that there is sufficient capacity to supply this development within the existing High Voltage network around the site.

It is proposed that the High Voltage Cabling shall run within deep soil garden areas where possible, otherwise the High Voltage shall run within conduits under the public roadways / footpaths or cast in to the Concrete Slab to the approval of Ausgrid.

New Low Voltage Electrical Supplies (Service/Consumers Mains) from the Designated Substations to the development shall be installed via cable ladder support systems, at high level within the basement carpark, to the Main Switchboards throughout the development. The installation of the Low Voltage Electrical Supply cables shall achieve a 2-Hour Fire Rated capacity to maintain Electrical Supply Provisions for the Emergency and Essential Services Equipment.

3.5 Public Domain Lighting

The Public Domain lighting across the site will be developed as an integrated and coherent system, which comprehensively addresses the lighting requirements in terms of effective functional, aesthetic and energy solutions. Our detailed solutions will:

- Provide an appropriate level of lighting for pedestrian areas to a category P4 level which for the footpaths means "Local Roads or streets used primarily for access to abutting properties" with "Mixed vehicle and pedestrian traffic" and "low pedestrian/cycle activity" and "Low risk of crime" and "No requirement to enhance prestige" as per Australian Standards for pedestrian lighting AS/NZS 1158.3.1:2005.
- Provide lighting to the entry of the two buildings and building perimeters

Generally our approach will be to use low wattage high efficiency light sources throughout the development. These light sources will be housed in fittings with good light control to minimise light spill to residents and generally directed downward avoid "cloud staining". The form / style of all light fittings will be matching throughout to unify the development to the site.

The external lighting for the Public areas will be provided by a combination of Pole top lanterns, low level landscape lighting, uplighting to the fig tree, handrail lighting and wall lights.

The external lighting for the building terrace areas will be provided by a combination of low level wall lighting and downlighting in the building overhang.

Building 2A crown will be externally lit with concealed LED strip to wash the building elements.

3.6 Telecommunications Provisions

The incoming Telecommunications Cable Entry Provisions will be provided for National Broadband Network Company (NBNCo) Fibre Optic Network Cabling.

NBNCo Roll-out Map website indicates that the site is NBNCo ready & will be serviced by a Fibre to the Node network connection.

NBNCo Distribution Network (Distribution Equipment and Cabling) within the development will be supplied and installed by NBNCo Contractors. The "pit and pipe" plus cable pathways conduit and cable trays for the network cabling within the site will be supplied and installed as part of the Electrical Services Scope Of Works.

All work shall be carried out to comply with the Australian Communications and Media Authority's requirements and regulations. Spatial provisions shall be provided within the allocated telecommunications rooms/riser cupboards throughout the development to accommodate the NBNCo Active and Distribution Equipment.

4 BUILDING SERVICES

The Electrical Services installation within the development shall be designed and installed to comply with all relevant standards/statutory authority requirements, which have jurisdiction over the development. These include, but are not limited to:-

- National Construction Code (NCC)
- Australian Standard AS/NZS 3000 (Wiring Rules)
- Australian Standard AS/NZS 3008 (Electrical Installations – Selection Of Cables)
- Australian Standard AS/NZS 2293 (Emergency Escape Lighting and Exit Signs For Building)
- Australian Standard AS 1670 (Fire Detection, Warning, Control and Intercom Systems)
- Australian Communications and Media Authority (ACMA) Regulations
- Service and Installation Rules of New South Wales (SIRNSW)

Electrical Supplies to Emergency/Safety and Essential Equipment shall be 2 Hour Fire Rated and segregated, as required by the National Construction Code and Australian Standard AS/NZS 3000.

An Automatic Smoke Detection System shall be provided throughout the development (excluding the Car Park) in accordance with the National Construction Code and Australian Standards AS 1670.1.

A Building Occupant Warning System shall be provided in the carpark areas including ancillary storage/plant areas in accordance with the National Construction Code and Australian Standards AS 1670.1 and AS 4428.

A Sound System & Intercom System for Emergency Purposes (EWIS) shall be provided in the common areas and hotel /commercial/retail areas in the buildings in accordance with the National Construction Code and Australian Standards AS 1670.4 and AS 4428.

Emergency and Exit Lighting shall be provided throughout the development, complying with the National Construction Code and Australian Standard AS 2293.

4.1 Regulations and Authorities

The whole of the work will be carried out strictly in accordance with:

- | | |
|---|--|
| • Australian Standard AS/NZS 1158 | Road Lighting |
| • Australian Standard AS 1428.1 | General Requirements for access - Buildings |
| • Australian Standard AS/NZS 1680 | Interior Lighting |
| • Australian Standard AS/NZS 2293 | Emergency Evacuation Lighting in Buildings |
| • Australian Standard AS/NZS 3000 | Wiring Rules |
| • Australian Standard AS/NZS 3008 | Electrical Installations - Selection of Cables |
| • Australian Standard AS/NZS 3012 | Electrical Installations - Demolition and Construction Sites |
| • Australian Standard AS/NZS 3013 | Electrical Installations - Wiring Systems for Specific Applications |
| • Australian Standard AS/NZS 3017 | Electrical Installations - Testing and Inspection Guidelines |
| • Australian Standard AS/NZS 3080 for Commercial Premises | Telecommunications Installations - Integrated Tele Cabling Systems |
| • Australian Standard AS/NZS 3100 | Approval and Test Specification - General requirements for electrical equipment (Parent specification for essential safety requirements) |
| • Australian Standard AS/NZS 3131 | Plugs and Socket Outlets for use in Installation Wiring Systems |
| • Australian Standard AS 3137 | Approval and Test Specification - Luminaires |
| • Australian Standard AS/NZS 3760 | In-service Safety Inspection and Testing of Electrical Equipment |
| • Australian Standard AS/NZS 3947 | Low Voltage Switchgear and Control gear |
| • Australian Standard AS/NZS 4251.1 | EMC - Generic Emission - Residential, Commercial, Light Industrial |
| • Australian Standard AS/NZS 4252.1 | EMC - Generic Immunity - Residential, Commercial, Light Industrial |
| • Australian Standard AS 4282 | Control of Obtrusive Effects of Outdoor Lighting |

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- Australian Standard AS/NZS 4778:2001 Electromagnetic Compatibility for Radio Communications Equipment
- Australian Standard AS/NZS 61000.3.2 Limits for harmonic current emissions (equipment input current less than or equal to 16A per phase)
- Australian Standard AS/NZS 61000.3.3 Limitation of voltage fluctuations and flicker in low-voltage supply systems for equipment with rated current less than or equal to 16A
- Australian Standard AS/NZS 61000.3.5 Limitation of voltage fluctuations and flicker in low-voltage supply systems for equipment with rated current greater than 16A
- BS EN 50081.2 EMC
- BS EN 50082.2 EMC
- Local Government Authority
- Department of Industrial Relations
- Sydney Water
- Insurance Council of Australia
- New South Wales Fire Brigade
- Australian Communication Authority
- NBNCo Requirements
- Environmental Protection Agency
- SAA Lift Code
- National Construction Code 2012 Volume 1
- Electricity Distributor's Requirements
- Electricity Retailer's Requirements
- Occupational Health and Safety Act
- Disability and Discrimination Act
- WorkCover Authority Requirements
- Electricity Service and Installation Rules of New South Wales.
- Sydney Olympic Park Authority
- The Requirements of all other Authorities having jurisdiction over the work

4.2 Extent of Work

The following items will be arranged to be supplied and installed by the relevant Third Parties and Authorities:-

- High Voltage Network Mains to the New Kiosk Substations & the augmentation of the Existing High Voltage Network Mains
- Four (4) new standard chamber type substations
- Electricity Distribution Authority / Electricity Retailer Tariff Meters and Associated Equipment
- Incoming Lead-In NBNCo Telecommunications Cable
- NBNCo Active Distribution Equipment and Cabling

The following items will be arranged to be supplied and installed by the Engaged Electrical Contractor:-

- Service/Consumer Mains from the Point of Supply to the New Main Switchboards
- Four (4) New Main Switchboards including Protective and Control Devices as required
- Energy Monitoring Equipment in accordance with the National Construction Code - Section J8 requirements
- Electrical Submains to House Services Distribution Boards, Hotel, Commercial & Retail tenancy Meter Panels, Hotel, Commercial & Retail Distribution Boards and other Building Services Control Panels

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- Hotel Distribution Boards
- House Services Distribution Boards
- Commercial Tenancy & Retail Tenancy Distribution Boards
- Hotel, Commercial Tenancy & Retail Tenancy Meter Panels
- Electrical Final Sub-circuit Cabling and Circuit Protection
- General Power Services in accordance with National Construction Code - Section J6 and the nominated Basix requirements
- General Lighting Services in accordance with National Construction Code - Section J6 and the nominated Basix requirements
- Emergency Lighting and Illuminated Exit Sign Services in accordance with National Construction Code and Australian Standard AS 2293
- Pathways for NBNCo Backbone (Vertical) Cabling
- Pathways for NBNCo Distribution (Horizontal) Cabling
- Television Distribution System for Pay TV and Free-to-Air Television Services
- Automatic Smoke Detection, BOWS and EWIS in accordance with National Construction Code and Australian Standard AS 1670 requirements
- Security, Access Control & Intercom Systems Services
- Lightning & Surge Protection
- ESD Design Principles

These items are listed in further detail below.

4.2.1 High Voltage Network Mains

The High Voltage Mains will be required to run to the New Substations in the nominated locations of the development via underground ducts and/or ducts within the concrete slab.

(Please find attached layout sketches for further information)

A nominated Level 3 Accredited Service Provider will be engaged to carry out the electrical design works for the High Voltage Mains.

A nominated Level 1 Accredited Service Provider will be engaged to carry out the electrical installation works for the High Voltage Mains and Network augmentation.

4.2.2 Chamber Substations

The development will require the supply and installation of Four (4) new 1000kVA standard chamber type substations in the nominated locations of the development.

Each 1000kVA chamber substation shall have a 400V Three (3) Phase, 4 Wire, 50 Hertz, Low Voltage Output capacity of approximately 1440 Amps per phase.

The anticipated Electrical Maximum Demand for the development is approximately 4,000kVA (5,600 Amps/Phase).

A nominated Level 3 Accredited Service Provider shall be engaged to carry out this portion of the electrical design works for the new chamber substations.

A nominated Level 1 Accredited Service Provider shall be engaged to carry out the electrical installation works for the new chamber substations. The Main Contractor shall carry out the chamber substation construction works, in accordance with Ausgrid requirements and approved Level 3 ASP design drawings.

According to Ausgrid Network Standard NS113 Specification - Substations must have access for Ausgrid personnel and vehicles, directly from a public street, for 24 hours per day, 7 days per week. A heavy truck with a vehicle-mounted crane is needed to install or remove the substation equipment. Access routes, where required, must be suitable under all

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weather conditions and constructed to withstand the loading (Max 22,500kg). The access route should be a minimum of 4 metres wide, have a minimum of 4 metres headroom and be continuous from the property boundary to the substation site.

(Please find attached Ausgrid Standard Chamber Substation Details for further information)

4.2.3 Service/Consumer Mains

New Service/Consumer Mains shall be reticulated from each of the New Substations to Four (4) New Main Switchboards. New Service/Consumer Mains shall be installed with a methodology for achieving a 2 Hour Fire Rated in accordance with the National Construction Code and Australian Standard AS/NZS 3000 for the sustained operation of the Emergency and Essential Services Equipment within the development.

The Engaged Electrical Contractor shall carry out the New Service/Consumer Mains installation works, in accordance with Ausgrid requirements, Service and Installation Rules of New South Wales (SIRNSW), National Construction Code (NCC) and Australian Standard AS/NZS 3000.

Service/Consumer Mains Cables shall be calculated and sized in accordance with AS/NZS 3008.

4.2.4 Electrical Switch Rooms

It is proposed that Two (2) Electrical Switch rooms be provided, one (1) for building 2A on Basement Level 01 & one (1) for building 2B on the Ground Floor. House Distribution Boards, Unmetered Distribution Boards, Meter Panels and Lighting Control equipment (as required) shall be located within these Electrical Switch rooms.

(Please find attached layout sketches for further information)

4.2.5 Main Switchboards

The development will require the installation of Four (4) New Main Switchboards which will be located within the Main Switch Rooms 1 and 2 located as stated above.

The New Main Switchboards will incorporate the following requirements:-

- Dead Front
- Free-Standing with Front Access (Rear where applicable)
- Ingress Protection Rating of IP42 (minimum)
- Form 3b Construction in accordance with Australian Standard AS/NZS 3000 (Wiring Rules) and AS/NZS 3439.1 (Low Voltage Switchgear and Control gear Assemblies) requirements
- Service Protection Device on the Incoming Electrical Supply within the Main Switchboard Assemblies in accordance with Service and Installation Rules of New South Wales (SIRNSW).
- Surge Protection Devices
- Power Analysing & Monitoring Devices in accordance with National Construction Code – Section J8
- Sealed Compartments for Electrical Supply Authority Tariff Metering in accordance with the Service and Installation Rules of New South Wales (SIRNSW), Electrical Distribution Authority and Electricity Retailer requirements
- Non-Essential, Essential and Emergency /Safety Services Sections in accordance with National Construction Code and Australian Standard AS/NZS 3000 requirements
- Outgoing Circuit Breakers for House Distribution Boards, Meter Panels, Building Services Control Panels and Equipment.

Main Switchboard dimensions will vary and further investigation will be required to determine an approximate size.

4.2.6 Electricity Supply Authority Tariff Metering

The New Main Switchboards shall have sealable compartments for the installation of current transformers to facilitate the Tariff Metering of the House Services. The sealable compartments for current transformers shall be in accordance with the Service and Installation Rules of New South Wales (SIRNSW) and the relevant Electrical Distribution Authority's requirements. The House Services Tariff Metering equipment shall be installed within the Main Switch rooms provided.

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4.2.7 Submain Cabling

Submain Cables will be reticulated from the New Main Switchboards via cable ladders, conduits, vertical risers and service cupboards to each Tariff Meter Panel, Distribution Board, Building Services Control Panel and Associated Equipment.

Submain Cabling shall be 2 Hour Fire Rated, where they are supplying nominated Emergency and Essential Services Equipment within the development.

Submain Cables shall be calculated and sized in accordance with AS/NZS 3008 with each submain to generally have 20% spare capacity over and above the designed final maximum demand for the normal usage of that section of installation being supplied by the respective submain cable.

4.2.8 House Distribution Boards

New House Services Distribution Boards shall be supplied and installed within the development for the distribution of electricity for General Lighting, Emergency Lighting and Illuminate Exit Sign Services, General Power Services & Building Services Equipment as required.

New House Services Distribution Boards shall be a Split Chassis Arrangement (Separate Light Chassis and Power Chassis) for compliance with National Construction Code - Section J8 requirements. New House Services Distribution Boards shall incorporate Main Isolating Switch, Miniature Circuit Breakers (MCBs) and Energy Monitoring Facilities.

The House Distribution Boards will incorporate the following requirements:-

- Dead Front
- Free-Standing with Front Access
- Ingress Protection Rating of IP42 (minimum)
- Surge Protection Devices
- Main Switch/Circuit Breaker to isolate power
- Contactors for General Lighting & Emergency/Exit Lighting
- Emergency Lighting Test Switch
- Time Clocks
- Fuses
- Power Analysing & Monitoring Devices in accordance with National Construction Code – Section J8
- Outgoing Circuit Breakers complete with RCD Protection for final sub-circuits as required by AS/NZS 3000:2007.

4.2.9 Hotel Distribution Boards

New Hotel Distribution Boards shall be supplied and installed within the development for the distribution of electricity for Hotel Lighting, Emergency Lighting and Illuminate Exit Sign Services, Hotel Power Services & Hotel Services Equipment as required.

New Hotel Distribution Boards shall be a Split Chassis Arrangement (Separate Light Chassis and Power Chassis) for compliance with National Construction Code - Section J8 requirements. New Hotel Distribution Boards shall incorporate Main Isolating Switch, Miniature Circuit Breakers (MCBs) and Energy Monitoring Facilities.

The Hotel Distribution Boards will incorporate the following requirements:-

- Dead Front
- Free-Standing with Front Access
- Ingress Protection Rating of IP42 (minimum)
- Surge Protection Devices
- Main Switch/Circuit Breaker to isolate power
- Contactors for General Lighting & Emergency/Exit Lighting
- Emergency Lighting Test Switch
- Time Clocks
- Fuses
- Power Analysing & Monitoring Devices in accordance with National Construction Code – Section J8
- Outgoing Circuit Breakers complete with RCD Protection for final sub-circuits as required by AS/NZS 3000:2007.

4.2.10 Commercial Office & Retail Tenancy Meter Panels

Commercial Office and Retail Tenancy Metering Panels shall be supplied and installed within Electrical Riser Cupboards on each associated level). The Electricity Supply Authority shall supply and install their Tariff Meters and associated equipment on the nominated Meter Panels.

Combined Meter Panels will contain active links to allow for multiple supply authority tariff meters to be installed with meter combinations of 6, 9, 12 or 16 meters. Individual protection fuses for each meter and Single Phase Circuit Breakers or Switches will be also be provided as per the requirements of the Electricity Service and Installation Rules of New South Wales.

4.2.11 Final Sub-circuits

Generally, all cabling for general lighting and power sub-circuits will be run in Thermoplastic (PVC) Sheathed Cable concealed in the false ceilings, wall cavities or wiring installation accessories (i.e. conduits, ducting). Conduits will be provided where necessary for protection of cables installed within structural slabs and walls.

All final sub-circuits shall be installed utilizing Residual Current Circuit Breakers with Over-Current Protection (RCBOs) on all sub-circuits in accordance with Australian Standard AS/NZS 3000:2018, Clause 2.6 requirements.

4.2.12 General Power Services

The General Power Services installation will be provided in common areas for maintenance and servicing purposes (i.e. cleaning), and as nominated for ancillary equipment and building services equipment.

General Power Services within each Hotel Room / Hotel Facility / Commercial & Retail Tenancy Space shall be in accordance with the Principal's requirements.

4.2.13 General Lighting Services

The General Lighting Services installation involves both Interiors and Exteriors and will be designed to co-ordinate and enhance the architecture, interiors and landscape, whilst providing lighting for the safe movement of occupants throughout the development. Also ESD principles shall be applied.

The General Lighting Services shall be designed in accordance with National Construction Code - Section J6, AS 1680 requirements.

4.2.14 Emergency Lighting and Illuminated Exit Sign Services

Emergency Lighting and Illuminated Exit Signs shall be installed throughout the development to comply with the National Construction Code and Australian Standard AS 2293 (Emergency Escape Lighting & Exit Signs for Buildings) requirements.

Emergency Lighting Test Switches shall be supplied and installation in accordance with Australian Standard AS 2293 on all Distribution Boards supplying circuits with Emergency and Exit Sign Lighting incorporated.

4.2.15 Commercial Office Spaces

The Commercial Office Spaces shall be of a "Cold Shell" base building fit-out. This includes the supply and installation of a Distribution Board, Communications Hub, General Power and General Lighting or as required by the Principal's Project Requirements.

4.2.16 Retail Tenancy Spaces

The Retail Tenancy Spaces shall be of a "Cold Shell" base building fit-out. This includes the supply and installation of a Distribution Board, Communications Hub, General Power and General Lighting or as required by the Principal's Project Requirements & the nominated BASIX requirements.

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4.2.17 Fire Control Centre

The development shall incorporate a Fire Control Centre within the Basement in accordance with the National Construction Code requirements E1.8.

The Fire Control Centre shall be located within an easily accessible location for the attending New South Wales Fire and Rescue (NSWFR) personnel. The Fire Control Centre shall house the essential equipment for the Smoke Detection, BOWS, EWIS and Fire Fighting Equipment including the Main Fire Indicator Panel (FIP) and the EWIS Indicator Panel (IP)

Electrical Equipment installed within the Fire Control Centre shall be electrically supplied via a dedicated Emergency Services Distribution Board installed within the Fire Control Centre. The Emergency Services Distribution Board shall be supplied via a 2hr Fire Rated Sub-main source from the Emergency Electrical Supply section of the House Services Main Switchboard.

4.2.18 Automatic Smoke Detection & Alarm System

An Automatic Smoke Detection & Building Occupant Warning System and/or Sound System and Intercom System for Emergency Purposes (EWIS) shall be installed as required.

The systems shall be designed and installed in accordance with the National Construction Code, any associated Fire Engineered Solution Report, New South Wales Fire and Rescue Requirements, Australian Standards AS 1670.1, AS 1670.4, AS 44283 and all relevant statutory authority regulations and requirements.

The Automatic Smoke Detection & Alarm System, Emergency Warning and Intercommunication System (EWIS) shall be integrated into other Smoke Detection and Fire Control measures for the development, including Australian Standard AS 1668 for Mechanical Ventilation Systems and Hydraulic Fire Suppression Equipment (i.e. Fire Hydrants, Fire Hose Reels, and Fire Sprinklers).

Mimic Panels shall be provided within the Lobby of each Tower, linked back to the Main Fire Indicator Panel within the Fire Control Centre.

4.2.19 Telecommunication Rooms

It is proposed that a Telecommunication Room within the Basement Level 02 area to allow for NBNco Distribution Equipment which will be provided by NBNco, House Services Building Distributor and Security/Access/Intercom Racks will also be located within this room.

(Please find attached layout sketches for further information)

4.2.20 Telecommunications Fibre Optic Lead-In Cabling

The Engaged Electrical Contractor shall provide the Building Entry/Lead-In Cabling Conduits and accessories from the site boundary to the nominated Telecommunications Room. All works shall be in accordance with NBNco Network Standards and requirements.

NBNCo shall provide all the Fibre Optic cabling and equipment to development as necessary to deliver Fibre Optic connectivity to each individual Apartment / Unit within the development in accordance with the NBNco Network Standards, Australian Standards, Australian Communication and Media Authority requirements.

An application to NBNco will be required to undertake these works and to further establish a detailed scope of works for the entire development.

4.2.21 Telecommunications Fibre Optic Distribution Equipment

Spatial Provisions shall be provided within the allocated Telecommunications Room within the development for the installation of all necessary NBNCo Distribution Equipment.

A Premises Distribution Hub (PDH) shall be provided by NBNco. The Engaged Electrical Contractor shall provide all necessary installation accessories (conduits, cable ladders, ducts etc) to ensure the NBNco Installing Contractor can install the required cabling and equipment.

4.2.22 Telecommunications Fibre Optic Vertical (Backbone/Trunk) Cabling

Spatial Provisions shall be provided for the installation of Fibre Distribution Terminals (FDT) within the Telecommunications Room. The Engaged Electrical Contractor shall provide all necessary installation accessories (conduits, cable ladders, ducts etc) to ensure the NBNco Installing Contractor can install the required cabling and equipment on each level as required.

Telecommunications distribution racks will be provided within Cupboard/Risers on each floor level. The Engaged Electrical Contractor shall provide all necessary installation accessories (conduits, cable ladders, ducts etc).

4.2.23 Telecommunications Tenancy Provisions

The Engaged Electrical Contractor shall provide a Communications Hub to provide connectivity between each Tenancy and the NBNco Network. The connectivity of the Television System for the Tenancy will also be within the Communications Hub.

The "Communications Hub" shall comprise a flush mounted communications panel complete with:

- One (1) double GPO (10 Amp switched socket outlets)
- Ethernet Data switcher
- Outgoing Data Cabling patch panels
- Multi-switch for TV Distribution (Splitter)
- 10 Pair Telephone FDP

Communications Hub Enclosure and associated equipment shall be installed to the Manufacturer's specifications.

The Engaged Electrical Contractor shall provide RJ45 Telecommunications Outlets within the development. Locations and quantities shall be in accordance with the Principal's requirements.

The Engaged Electrical Contractor shall provide a Cat.6A (Copper) Cabling to the Telecommunication Outlets within the Development. Cabling shall be installed within concealed conduits, ceiling spaces and wall cavities.

The cabling shall be installed in accordance with AS/ACIF S009, Australian Standards AS 3080 and AS 3085 and any other statutory authorities' requirements.

4.2.24 Essential & Emergency House Services Communications Distribution Network

The Engaged Electrical Contractor shall provide a Cat.6A (Copper) Cabling between each Emergency and Essential Services Equipment and/or Panel to individual NBNco fibre Network Termination Devices (NTD) located in the Main Telecommunications Room to provide telecommunications connectivity for the Emergency and Essential Services Equipment.

4.2.25 Television Distribution System

The Engaged Electrical Contractor shall provide a combined free-to-air / pay-TV television distribution system throughout the development in accordance with the Principal's requirements, which includes Head-End Equipment, Amplifiers, Multi-taps, Splitters, and Television Outlets and associated cabling. The system shall all be installed in accordance with all relevant Australian Standards and Foxtel Installation requirements.

Engaged Electrical Contractor shall provide all necessary Television Signal Distribution Equipment to ensure broadcast signal is conveyed throughout the development.

4.2.26 Security, Access Control and Intercom Systems

An Intruder Security System will be provided for the monitoring of the communal areas, common areas and fire isolated stairway exits.

An Access Control and Intercom System will be provided for the external entry points to provide access for tenants and visitors to the development.

**SITE 2 - SYDNEY OLYMPIC PARK
ELECTRICAL SERVICES OVERVIEW REPORT
DATED: 13 AUGUST 2019**

Tenant /Staff and Visitor Carparking Facilities shall be incorporated into the Access Control and Intercom System to control vehicle access to the facilities, by the means of Roller Shutters and Boom Gates, Induction Loops and Air (Radio Frequency) Keys.

The Lift Card Key Controls shall be incorporated within the Security/Access & Intercom System to provide control so that lift travel can only be authorised by the approved occupants / guests of the building.

4.2.27 Lightning and Surge Protection

A lightning protection system shall be installed to comply with AS 1768.

The system shall be installed comprising an air termination roof conductors connected to earth electrodes by down conductors. Other Premises components shall be bonded to the system, these include:

- Electrical earth - Main Switchboard MEN
- Communications earth - MDF earth
- Incoming water pipes
- Incoming gas pipes
- Curtain wall - facade metalwork
- Steel reinforcement and structure
- External metal handrails.

All bond connections shall use the appropriate bimetallic connection to eliminate any corrosion caused by contact between dissimilar metals.

Down conductors shall be installed in conduits cast into the concrete columns indicated on the drawings.

Surge protection shall be provided for the Main Switchboards and Distribution Boards as detailed earlier in this report.

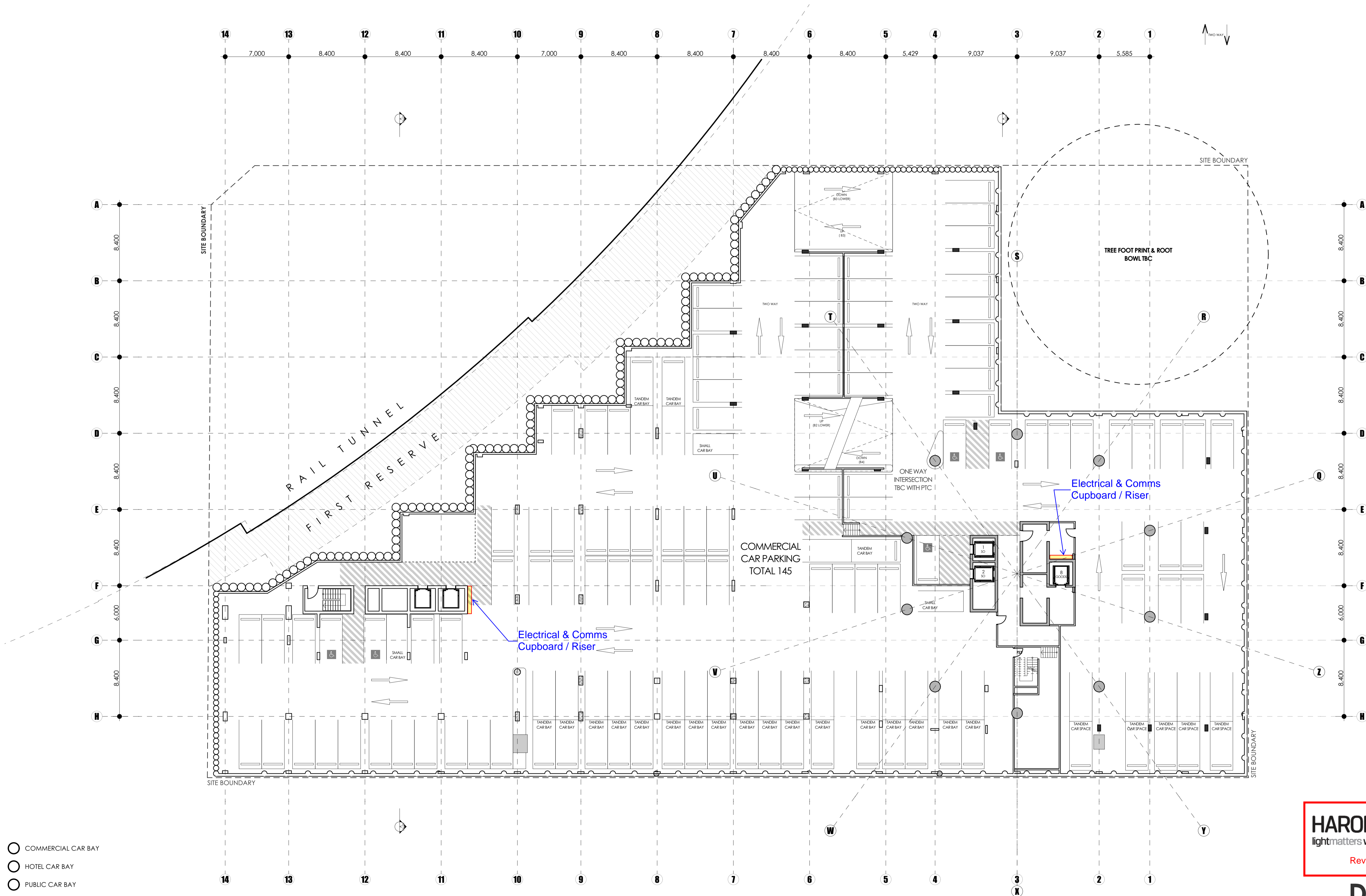
4.2.28 ESD - Design Principles

The aim of our detailed design solutions will be to minimise the greenhouse gas emissions associated with building materials (embedded energy) and building operations as well as to minimise running and maintenance costs.

All design solutions shall be in accordance with the minimum requirements of the Building Code of Australia – Section J and BASIX Requirements.

5 ANNEXURES

- **Electrical Preliminary Reticulation Plans (Total of 18 Pages)**
- **Chamber Substation Details**



- COMMERCIAL CAR BAY
- HOTEL CAR BAY
- PUBLIC CAR BAY

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ABBREVIATIONS

COL	COLUMN	FS	FIRE STAIR	SPEC	SPECIFICATION
COS	CHECK ON SITE	FW	FLOOR WASTE	SSL	STRUCTURAL SLAB LEVEL
DP	DOWNPIPE	HYD	HYDRAULIC	TBC	TO BE CONFIRMED
ELEC	ELECTRICAL	MISC	MISCELLANEOUS	TOW	TOP OF WALL
EXT	EXISTING	MIN	MINIMUM	TYP	TYPICAL
FCL	FINISHED CEILING LEVEL	MAX	MAXIMUM		
FHL	FINISHED FLOOR LEVEL	NOM	NOMINAL	U/S	UNDERSIDE
FHR	FIRE HYDRANT	REL	RELATIVE LEVEL		
FHR	FIRE HOSE REEL	RWC	RAIN WATER OUTLET		
FRL	FIRE RESISTANCE LEVEL	SIM	SIMILAR		

CODING LEGEND

AM	ACCESS HANDICAP PANEL	CP	CARPET	RF	ROOFING	WM	WATERPROOF MEMBRANE
AP	ACCESS PLATFORM	FU	FURNITURE	RM	RESILIENT MATERIAL	WT100	WALL TYPE CONCRETE
BF	BATHROOM FITTING	FX	FITTINGS & FIXTURES (MISC.)	RN	RENDER	WT200	WALL TYPE MASONRY
BH	BATHHOUSE	GL	GLAZING	ST	SANITARY FITTING	WT300	WALL TYPE DRY WALL
BL	BUILDING CURTAINS	HR	HANDRAIL	SK	SORTING	WT500	WALL TYPE SHIRT WALL
BO	BOLLARD	IN	INSULATION	ST	STONE	WT100	WALL TYPE COMPOSITE WALL
CD	CLADDING	J	JAMB	TC	TILE CLADDING/PARTITION		
CG	CORNER GUARD	LV	LOUVER	TF	TIMBER FLOOR/DECK		
CL	CEILING	MR	MIRROR	TL	TILING/PAVING		
CO	CONCRETE FINISH	PA	PAINT	TW	TIMBER		

AMENDMENTS

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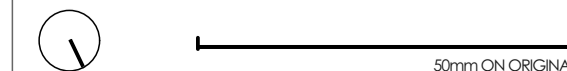
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PROJECT

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AUSTRALIA AVE, SYDNEY OLYMPIC PARK, NSW 2127

PROJECT NORTH



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BASEMENT LEVEL 04 PLAN

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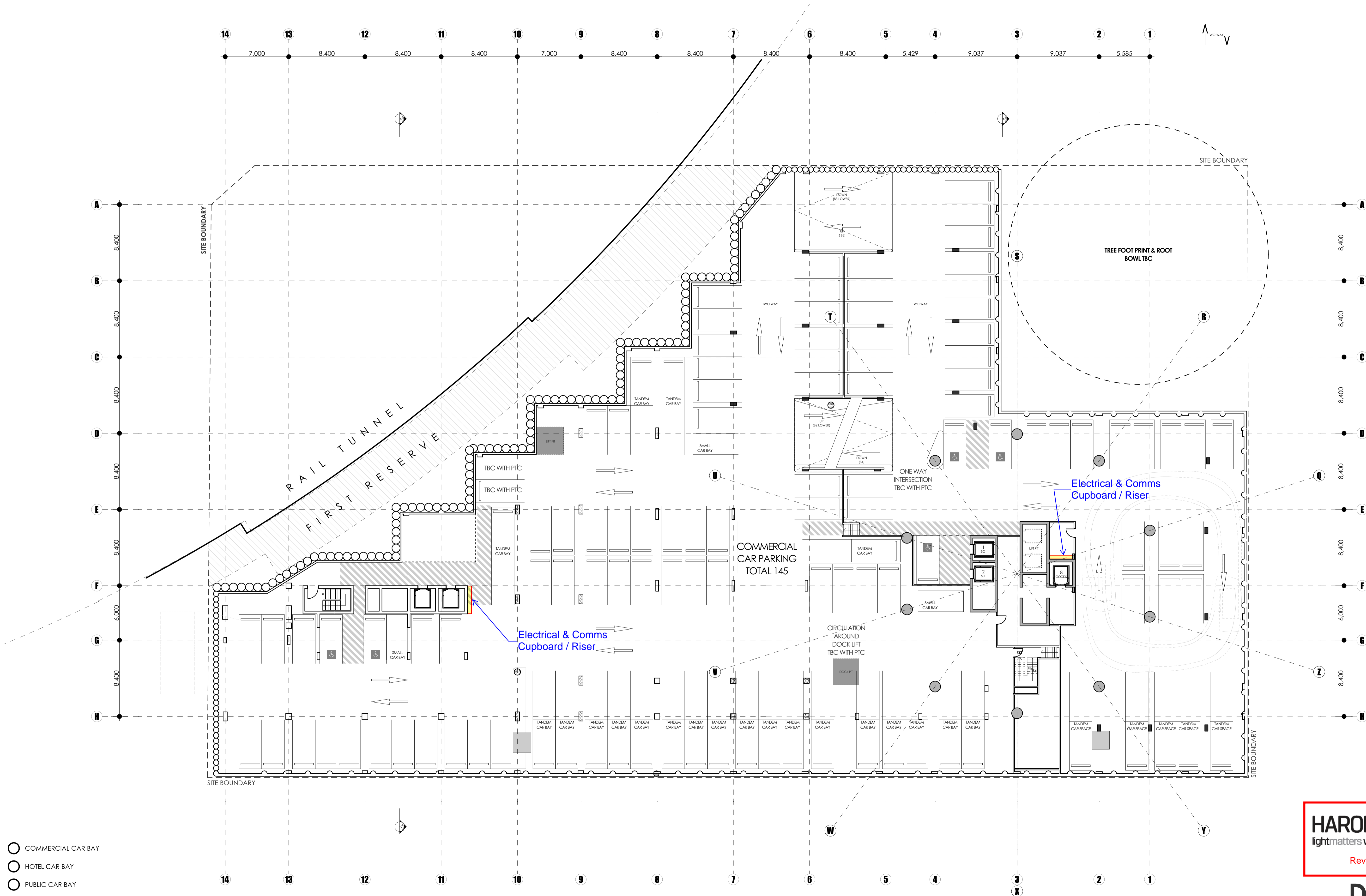
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- COMMERCIAL CAR BAY
- HOTEL CAR BAY
- PUBLIC CAR BAY

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DP	DOWNPIPE	HYD	HYDRAULIC	TBC	TO BE CONFIRMED
ELEC	ELECTRICAL	MISC	MISCELLANEOUS	TOW	TOP OF WALL
EXT	EXISTING	MIN	MINIMUM	TYP	TYPICAL
FCL	FINISHED CEILING LEVEL	MAX	MAXIMUM		
FHL	FINISHED FLOOR LEVEL	NOM	NOMINAL		
FR	FIRE RISK	RL	RELATIVE LEVEL		
FRH	FIRE HOSE REEL	RWO	RAIN WATER OUTLET		
FRS	FIRE RESISTANCE LEVEL	SM	SHOWER		

CODING LEGEND

AM	ACCESS HANDICAP PANEL	CP	CARPET	RF	ROOFING	WM	WATERPROOF MEMBRANE
AP	ACCESS PLATFORM	FU	FURNITURE	RM	RESILIENT MATERIAL	WT100	WALL TYPE CONCRETE
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BH	BATHROOM	GL	GLAZING	ST	SANITARY FITTING	WT300	WALL TYPE DRY WALL
BL	BUILDING CURTAIN	HR	HANDRAIL	SK	SORTING	WT500	WALL TYPE SHIRT WALL
BO	BOLLARD	IN	INSULATION	ST	STONE	WT100	WALL TYPE COMPOSITE WALL
CD	CLADDING	J	JAMB	TC	TILE CLADDING/PARTITION		
CG	CORNER GUARD	LV	LOUVER	TF	TIMBER FLOORING/DECK		
CL	CEILING	MR	MIRROR	TL	TILING/PAVING		
CO	CONCRETE FINISH	PA	PAINT	TW	TIMBER		

AMENDMENTS

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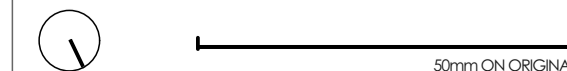
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BASEMENT LEVEL 03 PLAN

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COL	COLUMN	FS	FIRE STAIR	SSC	SPECIFICATION
COS	CHECK ON SITE	PW	FLOOR WATER	SSL	STRUCTURAL SLAB LEVEL
DP	DOWNPIPE	HYD	HYDRAULIC	TBC	TO BE CONFIRMED
ELEC	ELECTRICAL	MECH	MECHANICAL	TOW	TOP OF WALL
EXT	EXISTING	MIN	MINIMUM	TYP	TYPICAL
FCL	FINISHED CEILING LEVEL	MAX	MAXIMUM	U/S	UNDERSIDE
FFL	FINISHED FLOOR LEVEL	NOM	NOMINAL		
FH	FIRE HYDRANT	RL	RELATIVE LEVEL		
FHR	FIRE HOSE REEL	RWO	RAIN WATER OUTLET		
FIR	FIRE RESISTANCE LEVEL	SIM	SIMILAR		

AP	ACCESS HATCHWAY	CP	CARPET	RF	ROOFING	WM	WATERPROOF MEMBRANE
AA	ACCESS PLATFORM	FU	FURNITURE	RM	RESILIENT MATERIAL	WTG	WALL-TYPE CONCRETE
AB	BATHROOM FITTING	FX	FITTINGS & FIXTURES (ELECTRICAL)	RN	RENDING	WDOO	WALL-TYPE MASONRY
BA	BALCONY	GU	GLASS	SE	SANITARY WARE	WDOO	WALL-TYPE DRY WALL
BL	BUILDINGS/CLIMATE	HR	HANDICAP	SE	SERIES	WDOO	WALL-TYPE SHAPED WARE
BO	BOLLARD	IN	INSULATION	ST	STONE	WDOO	WALL-TYPE COMPOSITE WALL
CB	CLADDING	JO	JOINERY ITEM	TC	TOLERANCE CUBICAL PARTITION		
CG	CORNER GUARD	LD	LOADING	TR	THINER FLOOR PARTITION		
CL	CEILING	MR	MIRROR	TR	TRIMMING WARE	TL	TRIM
CO	CONCRETE FINISH	PA	PAINT	TW	TAPWARE		

REV	DATE	DESCRIPTION
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PROJECT NORTH

SCALE @ A1 STATUS
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APPENDIX A

PROJECT NO.	DRAWING NO.	ISSUE
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DP	DOWNPIPE	HYD	HYDRAULIC	TBC	TO BE CONFIRMED
ELEC	ELECTRICAL	MEC	MECHANICAL	TOW	TOP OF WALL
EXT	EXTENDING	MIN	MINIMUM	TYP	TYPICAL
FCL	FINISHED CEILING LEVEL	MAX	MAXIMUM	U/S	UNDERSIDE
FHL	FINISHED FLOOR LEVEL	NOM	NOMINAL		
FI	FIRE HYDRANT	RL	RELATIVE LEVEL		
FIR	FIRE HOSE REEL	RWC	RAIN WATER OUTLET		
FR	FIRE RESISTANCE LEVEL	SM	SEMI		

CODING LEGEND

AM	ACCESS HANDICAP PANEL	CP	CARPET	RF	ROOFING	WM	WATERPROOF MEMBRANE
AP	ACCESS PLATFORM	FU	FURNITURE	RM	RESILIENT MATERIAL	WT100	WALL TYPE CONCRETE
BF	BATHROOM FITTING	FX	FITTINGS & FIXTURES (MISC.)	RN	RENDER	WT200	WALL TYPE MASONRY
BH	BATHROOM	GE	GLAZING TYPE	SP	SANITARY FIXTURE	WT300	WALL TYPE DRY WALL
BL	BUILDING CURTAINS	HR	HANDRAIL	SK	SORTING	WT500	WALL TYPE SHIRT WALL
BO	BOLLARD	IN	INSULATION	TC	TILE CLINICAL/PARTITION	WT500	WALL TYPE COMPOSITE WALL
CD	CORNER GUARD	CL	CLADDING	TF	TRIMMER FLOORING		
CG	CORNER GUARD	LV	LOUVER	TL	TILING/PAVING		
CL	CEILING	MR	MIRROR	TW	TIMBER		
CO	CONCRETE FINISH	PA	PAINT				

AMENDMENTS

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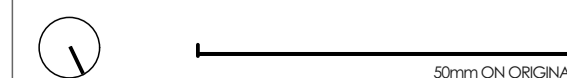
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PROJECT

SITE 2A+2B SYDNEY OLYMPIC PARK
AUSTRALIA AVE, SYDNEY OLYMPIC PARK, NSW 2127

PROJECT NORTH



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PRINT DATE

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DRAWING

GROUND LOWER PLAN

SCALE @ A1

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STATUS

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PROJECT NO.

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COS	CHECK ON SITE	FW	FLOOR WASTE	SSL	STRUCTURAL SLAB LEVEL
DP	DOWNPIPE	HYD	HYDRAULIC	TBC	TO BE CONFIRMED
ELEC	ELECTRICAL	MEC	MECHANICAL	TOW	TOP OF WALL
EXT	EXISTING	MIN	MINIMUM	TYP	TYPICAL
FCL	FINISHED CEILING LEVEL	MAX	MAXIMUM	U/S	UNDER SIDE
FHL	FINISHED FLOOR LEVEL	NOM	NOMINAL		
FR	FIRE HYDRANT	REL	RELATIVE LEVEL		
FRH	FIRE HOSE REEL	RWC	RAIN WATER OUTLET		
FRS	FIRE RESISTANCE LEVEL	SM	SHOWER		

CODING LEGEND

AM	ACCESS HANDICAP PANEL	CP	CARPET	BF	BROOKING	WM	WATERPROOF MEMBRANE
AP	ACCESS PLATFORM	FU	FURNITURE	RM	RESILIENT MATERIAL	WT100	WALL TYPE CONCRETE
BF	BATHROOM FITTING	FX	FITTINGS & FIXTURES (MISC.)	RN	RENDER	WT200	WALL TYPE MASONRY
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CD	CORNER GUARD	IV	LOUVER	TF	TIMBER FLOOR/DECK	WT500	WALL TYPE COMPOSITE WALL
CL	CEILING	LABOR	LABOR	TL	TILING/PAVING		
CO	CONCRETE FINISH	PA	PAINT	TW	TIMBER		

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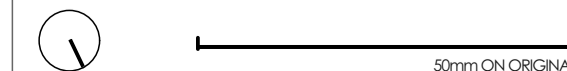
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PROJECT

SITE 2A+2B SYDNEY OLYMPIC PARK
AUSTRALIA AVE, SYDNEY OLYMPIC PARK, NSW 2127

PROJECT NORTH



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2A - GROUND UPPER PLAN
2B - LEVEL 01 COMMERCIAL PLAN

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DP	DOWNPIPE	HYD	HYDRAULIC	TBC	TO BE CONFIRMED
ELEC	ELECTRICAL	MEC	MECHANICAL	TOW	TOP OF WALL
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FRIL	FIRE RESISTANCE LEVEL	SM	SHOWER		

CODING LEGEND

AM	ACCESS HANDICAP PANEL	CP	CARPET	BF	BROOKING	WM	WATERPROOF MEMBRANE
AP	ACCESS PLATFORM	FU	FURNITURE	RM	RESILIENT MATERIAL	WT100	WALL TYPE CONCRETE
BF	BATHROOM FITTING	FX	FITTINGS & FIXTURES (MISC)	RN	RENDER	WT200	WALL TYPE MASONRY
BH	BALLAST	GZ	GLAZING TYPE	SP	SANITARY FIXTURE	WT300	WALL TYPE DRY WALL
BL	BLOCKS/CURTAINS	HR	HANDRAIL	SK	SORTING	WT400	WALL TYPE SHIRT WALL
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CG	CORNER GUARD	LV	LOUVER	TF	TRAVEL FLOORING		
CL	CEILING	MR	MIRROR	TL	TILING/PAVING		
CO	CONCRETE FINISH	PA	PAINT	TW	TILEWORK		

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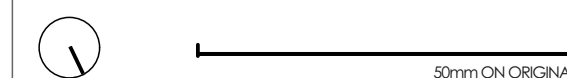
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PROJECT

SITE 2A+2B SYDNEY OLYMPIC PARK
AUSTRALIA AVE, SYDNEY OLYMPIC PARK, NSW 2127

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PRINT DATE

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2A - LEVEL 01 FUNCTION CENTRE
2B - LEVEL 02 COMMERCIAL PLAN

SCALE @ A1

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FHL	FINISHED FLOOR LEVEL	NOM	NOMINAL		
FR	FIRE HYDRANT	REL	RELATIVE LEVEL		
FRH	FIRE HOSE REEL	RWC	RAIN WATER OUTLET		
FRL	FIRE RESISTANCE LEVEL	SM	SHOWER		

CODING LEGEND

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BH	BATH	GLZ	GLAZING TYPE	SP	SANITARY FIXTURE	WT300	WALL TYPE DRY WALL
BL	BLENDS/CURTAINS	HR	HANDRAIL	SK	SORTING	WT400	WALL TYPE SHIRT WALL
BO	BOLLARD	IN	INSULATION	ST	STONE	WT500	WALL TYPE COMPOSITE WALL
CD	CLADDING	J	JUNCTION	TC	TOILET CUBICLE/PARTITION		
CG	CORNER GUARD	LV	LOUVER	TF	TIMBER FLOORING/DECK		
CL	CEILING	MR	MIRROR	TL	TILING/PAVING		
CO	CONCRETE FINISH	PA	PAINT	TW	TIMBER		

AMENDMENTS

REV	DATE	DESCRIPTION
K	19/07/19	PRELIM - FOR WIND ENVELOPE
L	23/07/19	PRELIM ISSUE FOR INFO
M	02/08/19	PRELIM ISSUE FOR INFO

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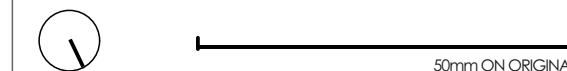
CLIENT



PROJECT

SITE 2A+2B SYDNEY OLYMPIC PARK
AUSTRALIA AVE, SYDNEY OLYMPIC PARK, NSW 2127

PROJECT NORTH



DRAWN

MM

APPROVED

JF

PRINT DATE

2/08/2019

DRAWING

2A - LEVEL 01 MEZZANINE PLANT
2B - LEVEL 03 COMMERCIAL PLAN

SCALE @ A1

1:200

STATUS

PRELIMINARY

PROJECT NO.

21810

DRAWING NO.

DA-015

ISSUE

M

HARON ROBSON
light matters watt matters av matters

Reviewed 13/08/2019

DRAFT

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ABBREVIATIONS

COL	COLUMN	FS	FIRE STAIR	SPC	SPECIFICATION
COS	CHECK ON SITE	FW	FLOOR WASTE	SSL	STRUCTURAL SLAB LEVEL
DP	DOWNPIPE	HYD	HYDRAULIC	TBC	TO BE CONFIRMED
ELEC	ELECTRICAL	MEC	MECHANICAL	TOW	TOP OF WALL
EXT	EXTENDING	MIN	MINIMUM	TYP	TYPICAL
FCL	FINISHED CEILING LEVEL	MAX	MAXIMUM		
FHL	FINISHED FLOOR LEVEL	NOM	NOMINAL		
FR	FIRE HYDRANT	RL	RELATIVE LEVEL		
FRH	FIRE HOSE REEL	RWO	RAIN WATER OUTLET		
FRL	FIRE RESISTANCE LEVEL	SM	SMALL		

CODING LEGEND

AP	ACCESS PLATFORM	CP	CARPET	BF	ROOFING	WM	WATERPROOF MEMBRANE
AP	ACCESS PLATFORM	FU	FURNITURE	RM	RESILIENT MATERIAL	WT100	WALL TYPE CONCRETE
BF	BATHROOM FITTING	FX	FITTINGS & FIXTURES (MISC.)	RN	RENDER	WT200	WALL TYPE MASONRY
BL	BUILDING CURTAINS	HR	HANDRAIL	SK	SORTING	WT300	WALL TYPE DRY WALL
BO	BOLLARD	IN	INSULATION	ST	STONE	WT400	WALL TYPE SHIRT WALL
CD	CORNER GUARD	IV	LOUVER	TF	TIMBER FLOORING/DECK	WT500	WALL TYPE COMPOSITE WALL
CL	CEILING	LR	LARCOR	TL	TILING/PAVING		
CO	CONCRETE FINISH	PA	PAINT	TW	TIMBER		

AMENDMENTS

REV	DATE	DESCRIPTION
K	19/07/19	PRELIM - FOR WIND ENVELOPE
L	23/07/19	PRELIM ISSUE FOR INFO
M	02/08/19	PRELIM ISSUE FOR INFO

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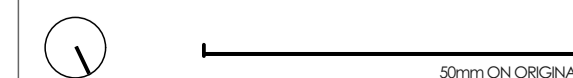
CLIENT



PROJECT

SITE 2A+2B SYDNEY OLYMPIC PARK
AUSTRALIA AVE, SYDNEY OLYMPIC PARK, NSW 2127

PROJECT NORTH



DRAWN

MM

APPROVED

JF

PRINT DATE

2/08/2019

DRAWING

2A - LEVEL 02 COMMERCIAL & TERRACE
2B - LEVEL 04 COMMERCIAL PLANSCALE @ A1
1:200STATUS
PRELIMINARYPROJECT NO.
21810DRAWING NO.
DA-016ISSUE
MHARON ROBSON
light matters watt matters av matters

Reviewed 13/08/2019

DRAFT

NOTES

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ABBREVIATIONS

COL	COLUMN	FS	FIRE STAIR	SPC	SPECIFICATION
COS	CHECK ON SITE	FW	FLOOR WASTE	SSL	STRUCTURAL SLAB LEVEL
DP	DOWNPIPE	HYD	HYDRAULIC	TBC	TO BE CONFIRMED
ELEC	ELECTRICAL	MEC	MECHANICAL	TOW	TOP OF WALL
EXT	EXISTING	MIN	MINIMUM	TYP	TYPICAL
FCL	FINISHED CEILING LEVEL	MAX	MAXIMUM		
FHL	FINISHED FLOOR LEVEL	NOM	NOMINAL		
FI	FIRE HYDRANT	REL	RELATIVE LEVEL		
FIR	FIRE RESISTANCE REL	RWC	RAIN WATER OUTLET		
FRL	FIRE RESISTANCE LEVEL	SM	SHOWER		

CODING LEGEND

AM	ACCESS HANDICAP PANEL	CP	CARPET	BF	ROOFING	WM	WATERPROOF MEMBRANE
AP	ACCESS PLATFORM	FU	FURNITURE	BM	RESILIENT MATERIAL	WT100	WALL TYPE CONCRETE
BP	BATHROOM FITTING	FX	FITTINGS & FIXTURES (MISC.)	BN	RENDER	WT200	WALL TYPE MASONRY
BH	BALLAST	GZ	GLAZING TYPE	SP	SANITARY FIXTURE	WT300	WALL TYPE DRY WALL
BL	BLOCKS/CURTAINS	HR	HANDRAIL	SK	SORTING	WT400	WALL TYPE SHIRT WALL
BO	BOLLARD	IN	INSULATION	ST	STONE	WT500	WALL TYPE COMPOSITE WALL
CD	CLADDING	J	JAMB	TC	TILE CLINICAL/PARTITION		
CG	CORNER GUARD	LV	LOUVER	TF	TIMBER FLOORING/DECK		
CL	CEILING	MR	MIRROR	TL	TILING/PAVING		
CO	CONCRETE FINISH	PA	PAINT	TW	TIMBER		

AMENDMENTS

REV	DATE	DESCRIPTION
K	19/07/19	PRELIM - FOR WIND ENVELOPE
L	23/07/19	PRELIM ISSUE FOR INFO
M	02/08/19	PRELIM ISSUE FOR INFO

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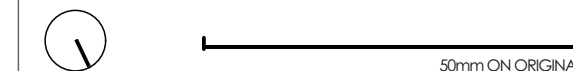
CLIENT



PROJECT

SITE 2A+2B SYDNEY OLYMPIC PARK
AUSTRALIA AVE, SYDNEY OLYMPIC PARK, NSW 2127

PROJECT NORTH



DRAWN

MM

APPROVED

JF

PRINT DATE

2/08/2019

DRAWING

2A - LEVEL 03 COMMERCIAL
2B - LEVEL 05 COMMERCIAL

STATUS

PRELIMINARY

PROJECT NO.

21810

DRAWING NO.

DA-017

ISSUE

M

HARON ROBSON
lightmatters wattmatters avmatters

Reviewed 13/08/2019

D R A F T

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ABBREVIATIONS

COL	COLUMN	FS	FIRE STAIR	SPEC	SPECIFICATION
COS	CHECK ON SITE	FW	FLOOR WASTE	SSL	STRUCTURAL SLAB LEVEL
DP	DOWNPIPE	HYD	HYDRAULIC	TBC	TO BE CONFIRMED
ELEC	ELECTRICAL	MEC	MECHANICAL	TOW	TOP OF WALL
EXT	EXISTING	MIN	MINIMUM	TYP	TYPICAL
FCL	FINISHED CEILING LEVEL	MAX	MAXIMUM		
FHL	FINISHED FLOOR LEVEL	NOM	NOMINAL		
FR	FIRE HYDRANT	REL	RELATIVE LEVEL		
FRH	FIRE HOSE REEL	RWO	RAIN WATER OUTLET		
FRS	FIRE RESISTANCE LEVEL	SM	SHOWER		

CODING LEGEND

AP	ACCESS HANDICAP PANEL	CP	CARPET	BF	ROOFING	WM	WATERPROOF MEMBRANE
AP	ACCESS PLATFORM	FU	FURNITURE	RM	RESILIENT MATERIAL	WT100	WALL TYPE CONCRETE
BF	BATHROOM FITTING	FX	FITTINGS & FIXTURES (MISC.)	RN	RENDER	WT200	WALL TYPE MASONRY
BH	BALLAST	GLZ	GLAZING TYPE	SP	SANITARY FIXTURE	WT300	WALL TYPE DRY WALL
BL	BLENDS/CURTAINS	HR	HANDRAIL	SK	SORTING	WT400	WALL TYPE SHIRT WALL
BO	BOLLARD	IN	INSULATION	ST	STONE	WT500	WALL TYPE COMPOSITE WALL
CD	CLADDING	J	JUNCTION	TC	TILE CLINICAL/PARTITION		
CG	CORNER GUARD	LV	LOUVER	TF	TIMBER FLOORING/DECK		
CL	CEILING	MR	MARKER	TL	TILING/PAVING		
CO	CONCRETE FINISH	PA	PAINT	TW	TIMBER		

AMENDMENTS

REV	DATE	DESCRIPTION
K	19/07/19	PRELIM - FOR WIND ENVELOPE
L	23/07/19	PRELIM ISSUE FOR INFO
M	02/08/19	PRELIM ISSUE FOR INFO

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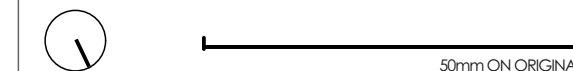
CLIENT



PROJECT

SITE 2A+2B SYDNEY OLYMPIC PARK
AUSTRALIA AVE, SYDNEY OLYMPIC PARK, NSW 2127

PROJECT NORTH



DRAWN

MM

APPROVED

JF

PRINT DATE

2/08/2019

DRAWING

2A - LEVEL 04 - 12 TYPICAL
2B - LEVEL 06 COMMERCIAL PLAN

STATUS

PRELIMINARY

PROJECT NO.

21810

DRAWING NO.

DA-018

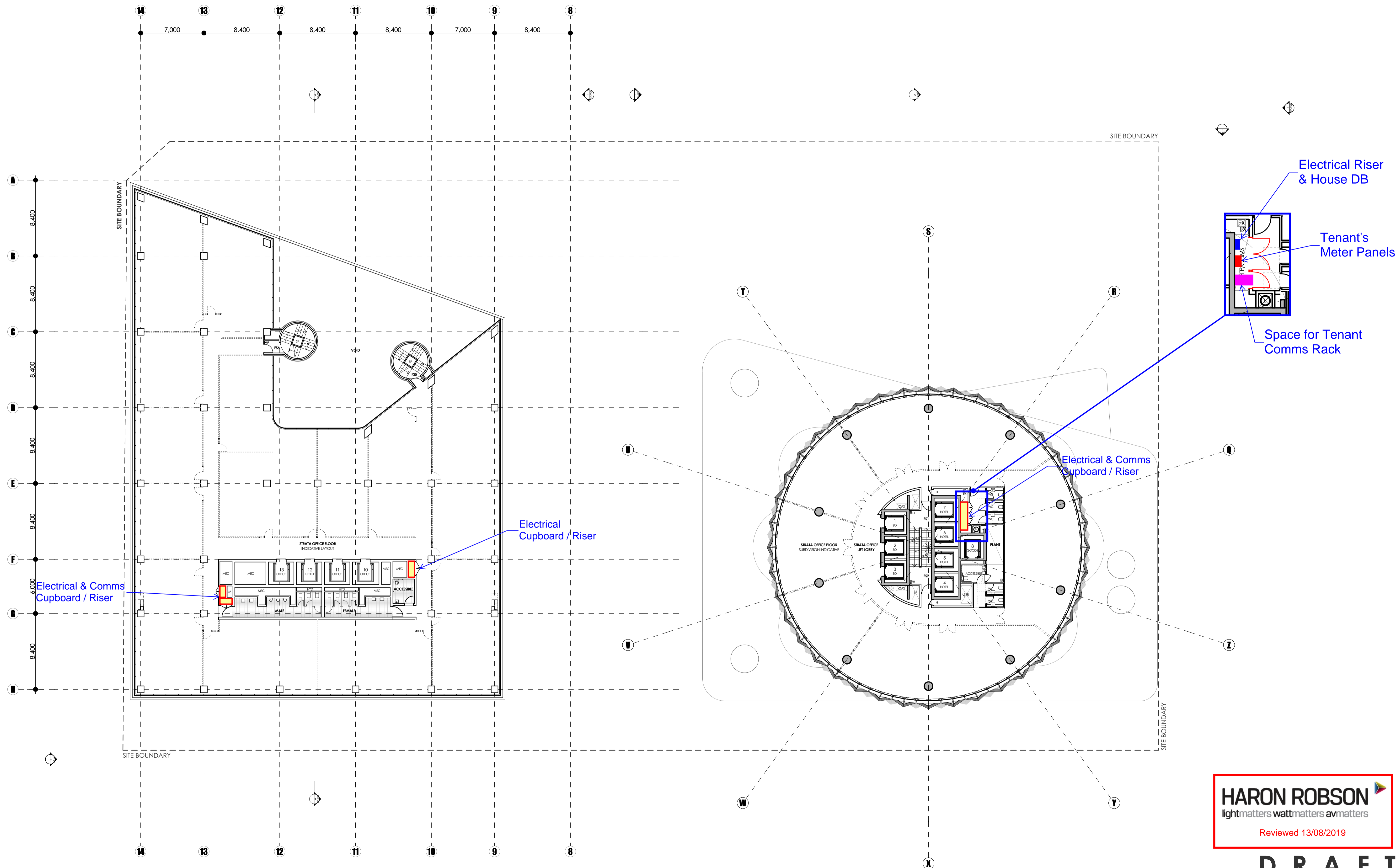
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HARON ROBSON
lightmatters wattmatters avmatters

Reviewed 13/08/2019

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ABBREVIATIONS

COL	COLUMN	FS	FIRE STAIR	SPEC	SPECIFICATION
COS	CHECK ON SITE	FW	FLOOR WASTE	SSL	STRUCTURAL SLAB LEVEL
DP	DOWNPIPE	HYD	HYDRAULIC	TBC	TO BE CONFIRMED
ELEC	ELECTRICAL	MEC	MECHANICAL	TOW	TOP OF WALL
EXT	EXISTING	MIN	MINIMUM	TYP	TYPICAL
FCL	FINISHED CEILING LEVEL	MAX	MAXIMUM		
FHL	FINISHED FLOOR LEVEL	NOM	NOMINAL		
FR	FIRE HYDRANT	REL	RELATIVE LEVEL		
FRH	FIRE HOSE REEL	RWC	RAIN WATER OUTLET		
FRL	FIRE RESISTANCE LEVEL	SIM	SIMILAR		

CODING LEGEND

AP	ACCESS HANDICAP PANEL	CP	CARPET	RF	ROOFING	WM	WATERPROOF MEMBRANE
AP	ACCESS PLATFORM	FU	FURNITURE	RM	RESILIENT MATERIAL	WT100	WALL TYPE CONCRETE
BF	BATHROOM FITTING	FX	FITTINGS & FIXTURES (MISC.)	RN	RENDER	WT200	WALL TYPE MASONRY
BH	BALLBASE	GL	GLAZING TYPE	ST	SANITARY FIXTURE	WT300	WALL TYPE DRY WALL
BL	BLOCKS/CURTAINS	HR	HANDRAIL	SK	SORTING	WT400	WALL TYPE SHIRT WALL
BO	BOLLARD	IN	INSULATION	ST	STONE	WT500	WALL TYPE COMPOSITE WALL
CD	CLADDING	J	JAMB	TC	TOILET CUBICLE/PARTITION		
CG	CORNER GUARD	LV	LOUVER	TF	TIMBER FLOORING/DECK		
CL	CEILING	MR	MIRROR	TL	TILING/PAVING		
CO	CONCRETE FINISH	PA	PAINT	TW	TIMBER		

AMENDMENTS

REV	DATE	DESCRIPTION
K	19/07/19	PRELIM - FOR WIND ENVELOPE
L	23/07/19	PRELIM ISSUE FOR INFO
M	02/08/19	PRELIM ISSUE FOR INFO

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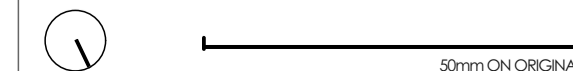
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PROJECT

SITE 2A+2B SYDNEY OLYMPIC PARK
AUSTRALIA AVE, SYDNEY OLYMPIC PARK, NSW 2127

PROJECT NORTH

DRAWN
MMAPPROVED
JFPRINT DATE
2/08/2019DRAWING
2A - LEVEL 05 COMMERCIAL
2B - LEVEL 07 COMMERCIAL PLANSCALE @ A1
1:200STATUS
PRELIMINARYPROJECT NO.
21810DRAWING NO.
DA-019ISSUE
MHARON ROBSON
lightmatters wattmatters avmatters

Reviewed 13/08/2019

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NOTES

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ABBREVIATIONS

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ELEC	ELECTRICAL	MEC	MECHANICAL	TOW	TOP OF WALL
EXT	EXTENDING	MIN	MINIMUM	TYP	TYPICAL
FCL	FINISHED CEILING LEVEL	MAX	MAXIMUM		
FHL	FINISHED FLOOR LEVEL	NOM	NOMINAL		
FR	FIRE HYDRANT	RL	RELATIVE LEVEL		
FRH	FIRE HOSE REEL	RWO	RAIN WATER OUTLET		
FRS	FIRE RESISTANCE LEVEL	SM	SHOWER		

CODING LEGEND

AM	ACCESS HANDICAP PANEL	CP	CARPET	BF	ROOFING	WM	WATERPROOF MEMBRANE
AP	ACCESS PLATFORM	FU	FURNITURE	BM	RESILIENT MATERIAL	WT100	WALL TYPE CONCRETE
BF	BATHROOM FITTING	FX	FITTINGS & FIXTURES (MISC.)	BN	RENDER	WT200	WALL TYPE MASONRY
BH	BALLAST	GZ	GLAZING TYPE	SP	SANITARY FIXTURE	WT300	WALL TYPE DRY WALL
BL	BLOCKS/CURTAINS	HR	HANDRAIL	SK	SORTING	WT400	WALL TYPE SHIRT WALL
BO	BOLLARD	IN	INSULATION	ST	STONE	WT500	WALL TYPE COMPOSITE WALL
CD	CLADDING	J	JOINT	TC	TILE CLINICAL/PARTITION		
CG	CORNER GUARD	LV	LOUVER	TF	TIMBER FLOORING/DECK		
CL	CEILING	MR	MIRROR	TL	TILING/PAVING		
CO	CONCRETE FINISH	PA	PAINT	TW	TIMBER		

AMENDMENTS

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M	02/08/19	PRELIM ISSUE FOR INFO

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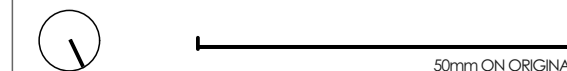
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PROJECT

SITE 2A+2B SYDNEY OLYMPIC PARK
AUSTRALIA AVE, SYDNEY OLYMPIC PARK, NSW 2127

PROJECT NORTH



DRAWN

MM

APPROVED

JF

PRINT DATE

2/08/2019

DRAWING

2A - LEVEL 13 LOWER MID PLANT ROOM
2B - LEVEL 12 COMMERCIAL PLAN

STATUS

PRELIMINARY

PROJECT NO.

21810

DRAWING NO.

DA-020

ISSUE

M

HARON ROBSON
lightmatters wattmatters avmatters

Reviewed 13/08/2019

DRAFT

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ABBREVIATIONS

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DP	DOWNPIPE	HYD	HYDRAULIC	TBC	TO BE CONFIRMED
ELEC	ELECTRICAL	MEC	MECHANICAL	TOW	TOP OF WALL
EXT	EXISTING	MIN	MINIMUM	TYP	TYPICAL
FCL	FINISHED CEILING LEVEL	MAX	MAXIMUM		
FHL	FINISHED FLOOR LEVEL	NOM	NOMINAL		
FR	FIRE HYDRANT	RL	RELATIVE LEVEL		
FRH	FIRE HOSE REEL	RWO	RAIN WATER OUTLET		
FRS	FIRE RESISTANCE LEVEL	SM	SHOWER		

CODING LEGEND

AP	ACCESS PANEL	CP	CARPET	BF	ROOFING	WM	WATERPROOF MEMBRANE
AP	ACCESS PLATFORM	FU	FURNITURE	RM	RESILIENT MATERIAL	WT100	WALL TYPE CONCRETE
BF	BATHROOM FITTING	FX	FITTINGS & FIXTURES (MISC.)	RN	RENDER	WT200	WALL TYPE MASONRY
BH	BALLAST	GZ	GLAZING TYPE	SP	SANITARY FIXTURE	WT300	WALL TYPE DRY WALL
BL	BLOCKS/CURTAINS	HR	HANDRAIL	SK	SORTING	WT400	WALL TYPE SHIRT WALL
BO	BOLLARD	IN	INSULATION	ST	STONE	WT500	WALL TYPE COMPOSITE WALL
CD	CLADDING	J	JOINT	TC	TILE CLINICAL/PARTITION		
CG	CORNER GUARD	LV	LOUVER	TF	TIMBER FLOORING/DECK		
CL	CEILING	MR	MARKER	TL	TILING/PAVING		
CO	CONCRETE FINISH	PA	PAINT	TW	TIMBER		

AMENDMENTS

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K	19/07/19	PRELIM - FOR WIND ENVELOPE
L	23/07/19	PRELIM ISSUE FOR INFO
M	02/08/19	PRELIM ISSUE FOR INFO

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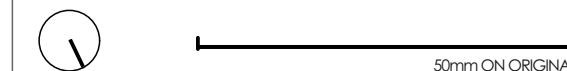
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PROJECT

SITE 2A+2B SYDNEY OLYMPIC PARK
AUSTRALIA AVE, SYDNEY OLYMPIC PARK, NSW 2127

PROJECT NORTH



DRAWN

MM

APPROVED

JF

PRINT DATE

2/08/2019

DRAWING

2A - LEVEL 14 UPPER MID PLANT ROOM
2B - LEVEL 13 COMMERCIAL PLAN

STATUS

PRELIMINARY

PROJECT NO.

21810

DRAWING NO.

DA-021

ISSUE

M

HARON ROBSON
lightmatters wattmatters avmatters

Reviewed 13/08/2019

DRAFT

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ABBREVIATIONS

COL	COLUMN	FS	FIRE-STAR	SPEC	SPECIFICATION
CHK	CHECK ON SITE	FW	FLOOR WASTE	SSL	STRUCTURAL SLAB LEVEL
DN	DOWNPIPE	HYD	HYDRAULIC	TBC	TO BE CONFIRMED
ELC	ELECTRICAL	MEC	MECHANICAL	TOW	TOP OF WALL
EXT	EXTENDING	MIN	MINIMUM	TYP	TYPICAL
FCL	FINISHED CEILING LEVEL	MAX	MAXIMUM	U/S	UNDERSIDE
FHL	FINISHED FLOOR LEVEL	NOM	NOMINAL		
FR	FIRE HYDRANT	REL	RELATIVE LEVEL		
FRH	FIRE HOSE REEL	RWO	RAIN WATER OUTLET		
FRL	FIRE RESISTANCE LEVEL	SM	SHOWER		

CODING LEGEND

AM	ACCESS HANDICAP PANEL	CP	CARPET	BF	BROOKING	WM	WATERPROOF-MEMBRANE
AP	ACCESS PLATFORM	FU	FURNITURE	RM	RESILIENT MATERIAL	WT100	WALL TYPE-CONCRETE
BP	BATHROOM FITTING	FX	FITTINGS & FIXTURES (MISC.)	RN	RENDER	WT200	WALL TYPE-MASONRY
BR	BRAKE	GL	GLAZING TYPE	SP	SANITARY FITTURE	WT300	WALL TYPE-DRY WALL
BL	BLENDS/CURTAINS	HR	HANDRAIL	SK	SKIRTING	WT400	WALL TYPE-SHAFT WALL
BO	BOLLARD	IN	INSULATION	ST	STONE	WT500	WALL TYPE-COMPOSITE WALL
CD	CLADDING	J	JAMB	TC	TILE CLINICAL/PARTITION		
CG	CORNER GUARD	LV	LOUVER	TF	TRIMMER FLOORING/DECK		
CL	CEILING	MR	MIRROR	TL	TILING/PAVING		
CO	CONCRETE FINISH	PA	PAINT	TW	TYPING		

AMENDMENTS

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M	02/08/19	PRELIM ISSUE FOR INFO

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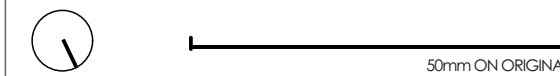
CLIENT



PROJECT

SITE 2A+2B SYDNEY OLYMPIC PARK
AUSTRALIA AVE, SYDNEY OLYMPIC PARK, NSW 2127

PROJECT NORTH



DRAWN

MM

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JF

PRINT DATE

2/08/2019

DRAWING

2A - LEVEL 15 HOTEL
2B - LEVEL 14 COMMERCIAL PLAN

SCALE @ A1
1:200

STATUS
PRELIMINARY

PROJECT NO.
21810

DRAWING NO.
DA-022

ISSUE
M

HARON ROBSON
lightmatters wattmatters avmatters

Reviewed 13/08/2019

DRAFT

NOTES

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ABBREVIATIONS

COL	COLUMN	FS	FIRE-STAR	SPEC	SPECIFICATION
CS	CHECK ON SITE	FW	FLOOR WASTE	SSL	STRUCTURAL SLAB LEVEL
DP	DOWNPIPE	HYD	HYDRAULIC	TBC	TO BE CONFIRMED
ELEC	ELECTRICAL	MISC	MECHANICAL	TOW	TOP OF WALL
EXT	EXISTING	MIN	MINIMUM	TYP	TYPICAL
FCL	FINISHED CEILING LEVEL	MAX	MAXIMUM	U/S	UNDERSIDE
FHL	FINISHED FLOOR LEVEL	NOM	NOMINAL		
FR	FIRE HYDRANT	RL	RELATIVE LEVEL		
FRH	FIRE HOSE REEL	RWO	RAIN WATER OUTLET		
FRS	FIRE RESISTANCE LEVEL	SIM	SIMILAR		

CODING LEGEND

AP	ACCESS HANDICAP PANEL	CP	CARPET	RF	ROOFING	WM	WATERPROOF MEMBRANE
AP	ACCESS PLATFORM	FU	FURNITURE	RM	RESILIENT MATERIAL	WT100	WALL TYPE-CONCRETE
BF	BATHROOM FITTING	FX	FITTINGS & FIXTURES (MISC.)	RN	RENDER	WT200	WALL TYPE-MASONRY
BH	BALLERASTRADE	GZ	GLAZING TYPE	SP	SANITARY FIXTURE	WT300	WALL TYPE-DRY WALL
BL	BULKHEADS/CURTAINS	HR	HANDRAIL	SK	SKirting	WT400	WALL TYPE-SHAFT WALL
BO	BOLLARD	IN	INSULATION	ST	STONE	WT500	WALL TYPE-COMPOSITE WALL
CD	CLADDING	J	JAMB	TC	TILE CLINICAL/PARTITION		
CG	CORNER GUARD	LV	LOUVER	TF	TRIMMER FLOORING/DECK		
CL	CEILING	MR	MIRROR	TL	TILING/PAVING		
CO	CONCRETE FINISH	PA	PAINT	TW	TYPING		

AMENDMENTS

REV	DATE	DESCRIPTION
K	19/07/19	PRELIM - FOR WIND ENVELOPE
L	23/07/19	PRELIM ISSUE FOR INFO
M	02/08/19	PRELIM ISSUE FOR INFO

CHK

MM	JR	MA
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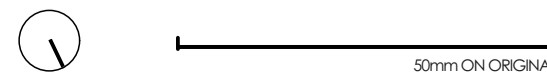
CLIENT



PROJECT

SITE 2A+2B SYDNEY OLYMPIC PARK
AUSTRALIA AVE, SYDNEY OLYMPIC PARK, NSW 2127

PROJECT NORTH



DRAWN

MM

APPROVED

JF

PRINT DATE

2/08/2019

DRAWING

2A - LEVEL 16 - 30 TYPICAL HOTEL
2B - LEVEL 15 PLANT MEZZANINE

STATUS

PRELIMINARY

PROJECT NO.

21810

DRAWING NO.

DA-023

ISSUE

M

HARON ROBSON
lightmatters wattmatters avmatters

Reviewed 13/08/2019

DRAFT

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ABBREVIATIONS

COL	COLUMN	FS	FIRE STAIR	SPEC	SPECIFICATION
COS	CHECK ON SITE	FW	FLOOR WASTE	SSL	STRUCTURAL SLAB LEVEL
DP	DOWNPIPE	HYD	HYDRAULIC	TBC	TO BE CONFIRMED
ELEC	ELECTRICAL	MCH	MECHANICAL	TOW	TOP OF WALL
EXT	EXTERNAL	MIN	MINIMUM	TYP	TYPICAL
FCL	FINISHED CEILING LEVEL	MAX	MAXIMUM	U/S	UNDERSIDE
FHL	FINISHED FLOOR LEVEL	NOM	NOMINAL		
FR	FIRE RISK	RL	RELATIVE LEVEL		
FHR	FIRE HYDRANT	RWC	RAIN WATER OUTLET		
FRL	FIRE RESISTANCE LEVEL	SM	SHOWER		

CODING LEGEND

AP	ACCESS PLATFORM	CP	CARPET	RF	ROOFING	WM	WATERPROOF MEMBRANE
AP	ACCESS PLATFORM	FU	FURNITURE	RM	RESILIENT MATERIAL	WT100	WALL TYPE CONCRETE
BF	BATHROOM FITTING	FX	FITTINGS & FIXTURES (MISC.)	RN	RENDER	WT200	WALL TYPE MASONRY
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CL	CEILING	MR	MIRROR	TL	TILING/PAVING		
CO	CONCRETE FINISH	PA	PAINT	TW	TIMBER		

AMENDMENTS

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K	19/07/19	PRELIM - FOR WIND ENVELOPE
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CHK
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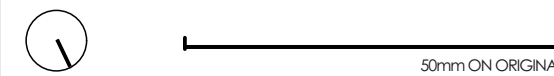
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PROJECT

SITE 2A+2B SYDNEY OLYMPIC PARK
AUSTRALIA AVE, SYDNEY OLYMPIC PARK, NSW 2127

PROJECT NORTH



DRAWN

MM

APPROVED

JF

PRINT DATE

2/08/2019

DRAWING

2A - LEVEL 31 PLANT ROOM
2B - ROOF PLAN

SCALE @ A1
1:200

STATUS
PRELIMINARY

PROJECT NO.
21810

DRAWING NO.
DA-024

ISSUE
M

HARON ROBSON
light matters watt matters av matters

Reviewed 13/08/2019

DRAFT

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FH	FIRE HYDRANT	RL	RELATIVE LEVEL		
FHR	FIRE HOSE REEL	RWO	RAIN WATER OUTLET		
FRL	FIRE RESISTANCE LEVEL	SM	SWIMMING		

CODING LEGEND

AM	ACCESS HANDICAP PANEL	CP	CARPET	RF	ROOFING	WM	WATERPROOF MEMBRANE
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AMENDMENTS

REV	DATE	DESCRIPTION
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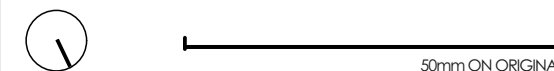
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PROJECT

SITE 2A+2B SYDNEY OLYMPIC PARK
AUSTRALIA AVE, SYDNEY OLYMPIC PARK, NSW 2127

PROJECT NORTH



DRAWN
MM

APPROVED
JF

PRINT DATE
2/08/2019

DRAWING
LEVEL 32 POOL / GYM / PLANT ROOM

SCALE @ A1
1:200

STATUS
PRELIMINARY

PROJECT NO.
21810

DRAWING NO.
DA-025

ISSUE
M

HARON ROBSON
lightmatters wattmatters avmatters

Reviewed 13/08/2019

D R A F T

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CS	CORNER GUARD	PA	PAINT	TW	TWEE		

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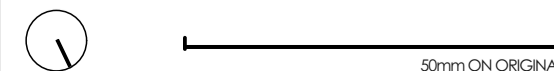
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PROJECT

SITE 2A+2B SYDNEY OLYMPIC PARK
AUSTRALIA AVE, SYDNEY OLYMPIC PARK, NSW 2127

PROJECT NORTH



DRAWN

MM

APPROVED

JF

PRINT DATE

2/08/2019

DRAWING

LEVEL 33 LIFT OVERRUN

STATUS

PRELIMINARY

PROJECT NO.

21810

DRAWING NO.

DA-026

ISSUE

M

HARON ROBSON
lightmatters wattmatters avmatters

Reviewed 13/08/2019

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FR	FIRE HYDRANT	RL	RELATIVE LEVEL		
FHR	FIRE HOSE REEL	RWG	RAIN WATER OUTLET		
FRL	FIRE RESISTANCE LEVEL	SM	SWIM		

CODING LEGEND

AM	ACCESS HANDICAP PANEL	CP	CARPET	RF	ROOFING	WM	WATERPROOF MEMBRANE
AP	ACCESS PLATFORM	FU	FURNITURE	RM	RESILIENT MATERIAL	WT100	WALL TYPE CONCRETE
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CD	CLADDING	J	JAMB	TC	TOILET CUBICLE/PARTITION		
CG	CORNER GUARD	LV	LOUVER	TF	TIMBER FLOORING/DECK		
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CO	CONCRETE FINISH	PA	PAINT	TW	TIMBER		

AMENDMENTS

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M	02/08/19	PRELIM ISSUE FOR INFO

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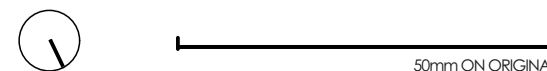
CLIENT



PROJECT

SITE 2A+2B SYDNEY OLYMPIC PARK
AUSTRALIA AVE, SYDNEY OLYMPIC PARK, NSW 2127

PROJECT NORTH



DRAWN

MM

APPROVED

JF

PRINT DATE

2/08/2019

DRAWING

ROOF PLAN

STATUS

PRELIMINARY

PROJECT NO.

21810

DRAWING NO.

DA-027

ISSUE

M

HARON ROBSON
lightmatters wattmatters avmatters

Reviewed 13/08/2019

DRAFT

A

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NOTES

- THIS DRAWING SHOWS THE LAYOUT OF EQUIPMENT FOR A STANDARD SINGLE 750 OR 1000kVA TRANSFORMER SURFACE CHAMBER TYPE DISTRIBUTION SUBSTATION AND UTILISES THE EQUIPMENT SHOWN IN THE EQUIPMENT TABLE ONLY. EQUIPMENT SELECTED FROM THE OPTIONS SHOWN IN THE EQUIPMENT TABLE MUST BE SHOWN ON THE DESIGN PLAN FOR THE SUBSTATION. THE DRAWING MUST BE READ IN CONJUNCTION WITH NETWORK STANDARDS 113 AND 114.
- TO ENSURE ACCEPTABLE TRANSFORMER VENTILATION, THE SUBSTATION CHAMBER MUST BE LOCATED ON THE OUTSIDE FACE OF THE BUILDING, ADJACENT TO A SUITABLE ROADWAY AND NOT BEHIND FENCING. PARTICULAR ATTENTION MUST BE GIVEN TO COMPLYING WITH NETWORK STANDARD REQUIREMENTS ASSOCIATED WITH FIRE RATING AND VENTILATION SEPARATION OF THE BUILDING SURROUNDING THE SUBSTATION VENTILATION LOUVRES.
- ALL DIMENSIONS SHOWN ARE FINISHED SIZES.
- BOTH THE HV AND LV PITS AND THEIR ASSOCIATED STEELWORK ARE CONSTRUCTED TO THE DETAILS SHOWN ON DRAWING 191085 BUT TO THE DEPTHS SHOWN ON THIS DRAWING.
- IF THE SUBSTATION FLOOR IS OF SUSPENDED CONSTRUCTION OR CONDUITS ARE CONTAINED IN A VOID UNDER THE SUBSTATION FLOOR, ALL CONDUITS ARE REQUIRED TO BE ENCASED IN 150mm OF CONCRETE FOR THEIR ENTIRE RUN.
- THE HV CABLE SUPPORT BRACKET IS TO BE CONSTRUCTED TO THE DETAILS FOR THE NON CT SUPPORT BRACKET SHOWN ON DRAWING 162655 BUT WITH THE LEGS EXTENDED TO THE PIT FLOOR AND THE FOOT DELETED. THE EXTENDED LEGS ARE TO THE FIXED TO THE PIT WALL WITH UNISTRUT SADDLES. SADDLES ARE TO BE 150mm BELOW THE FINISHED SUBSTATION FLOOR LEVEL AND 150mm ABOVE THE PIT FLOOR.
- DM&C EQUIPMENT MAY BE FITTED TO THE SUBSTATION BY AUSGRID AFTER COMMISSIONING.
- GENERAL POWER FOR THE CHAMBER IS PROVIDED BY A 240 VOLT SINGLE PHASE DOUBLE OUTLET WHICH IS PART OF THE LV BOARD.
- SINGLE 36 WATT FLUORESCENT BATTENS ARE TO BE FITTED IN THE POSITIONS SHOWN. THEY ARE TO BE POWERED FROM THE 240 VOLT OUTLET ON THE LV BOARD VIA AN IMPACT RESISTANT SINGLE WAY LIGHT SWITCH IN THE POSITION SHOWN. LIGHTING POWER IS TO BE WIRED VIA SOLID UPVC CONDUIT TO THE JUNCTION BOX SHOWN. THE JUNCTION BOX IS TO BE A CLIPSAL 265 SERIES OR SIMILAR AND IS TO BE PROVIDED WITH A SUITABLE CABLE TERMINAL BLOCK. A DOUBLE INSULATED 3 CORE CABLE IS TO BE PROVIDED FROM THE JUNCTION BOX TO THE POWER OUTLET ON THE LV BOARD. THE LV BOARD END OF THE CABLE IS TERMINATE IN A 3 PIN PLUG WHILST THE JUNCTION BOX END IS TO TERMINATE IN THE BOX'S TERMINAL BLOCK.
- TRANSFORMER LV AND CUSTOMER CABLES SHOULD BE ARRANGED SUCH THAT CROSSINGS ARE MINIMISED AND CABLE BENDING RADII IS NOT EXCEEDED. ALL USED AND UNUSED CUSTOMER'S CONDUITS ARE TO BE FIRE STOPPED AS INDICATED IN NETWORK STANDARD 177 AFTER THE INSTALLATION OF THE CUSTOMERS CABLES. THE EXACT LOCATION AND NUMBER OF CUSTOMER CONDUITS IS TO BE SHOWN ON PROJECT DESIGN PLANS.
- AN EARTHING DESIGN IS REQUIRED FOR EACH SITE. THE LOCATION OF EARTH RODS SHOWN ON THIS DRAWING ARE TYPICAL ONLY.
- THE AREA BETWEEN THE LOUVRED DOORS IS TO BE FILLED WITH TWO FULL HEIGHT REMOVABLE LOUVRED PANELS OF EQUAL WIDTH.
- LOUVRED DOORS AND REMOVABLE PANELS SHOULD NOT EXCEED 3500mm IN HEIGHT. ANY AREA ABOVE THE MAXIMUM 3500mm SHOULD BE FILLED WITH REMOVABLE LOUVRED PANELS.
- THE LOCATION OF THE TRANSFORMER IS TO BE ADJUSTED SO THAT THE WHEELS ARE EQUALLY SPACED FROM BOTH PIT EDGES.

SECTION A-A
SCALE 1:50

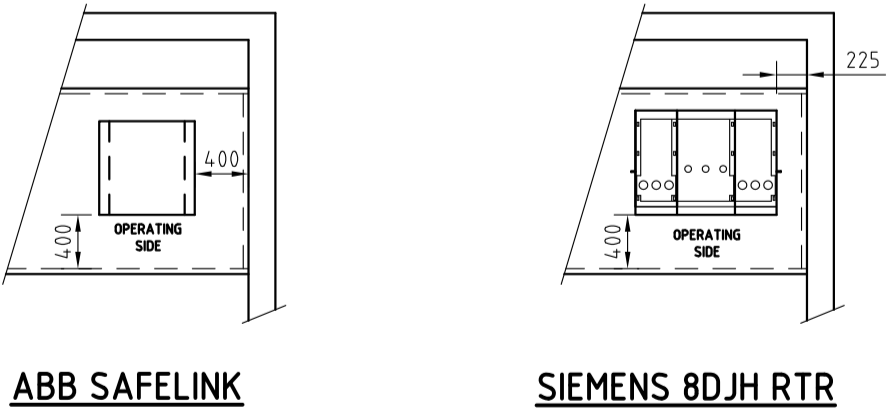
SECTION B-B
SCALE 1:50

PLAN SHOWING EQUIPMENT LAYOUT
SCALE 1:50

PLAN SHOWING PIT & CONDUIT LAYOUT
SCALE 1:50

PLAN SHOWING LIGHT AND POWER LAYOUT
SCALE 1:50

LINE DIAGRAM
NOT TO SCALE



DETAIL 1
HV SWITCH SET OUT
SCALE 1:50

EQUIPMENT TABLE REFER NOTE 1			
NAME	TYPE	WEIGHT	STOCKCODE
HV SWITCH	SIEMENS 8DJH RTR WITH INTEGRATED EFI	360kg	185192
	ABB SAFELINK 2 WITH INTEGRATED EFI	280kg	184921
TRANSFORMER	750kVA	3400kg	180357
	1000kVA	4000kg	180358
LV BOARD	SAIF CHAMBER TYPE	210kg	181790 TO 181793, 181834 & 181835

REFERENCE DRAWINGS	
EARTH ROD INSTALLATION	25121
REFER NOTE 13 DETAILS OF WEATHERPROOF LOUVRED DOORS	43140
CONSTRUCTION DETAILS - MISCELLANEOUS	48008
REFER NOTE 6 HV CABLE SUPPORT MOUNTING STAND	162655
REFER NOTE 4 HV PIT CONSTRUCTION AND SUPPORT STEELWORK	191085
INSTALLATION OF SIEMENS 8DJH RTR (RMI)	234377
INSTALLATION OF ABB SAFELINK 2	224420

CONDUIT SCHEDULE				
NUMBER	DIAMETER	MATERIAL	RADIUS mm BEND	FUNCTION
1-2	125	UPVC	1000	HV FEEDERS
3-6	125	UPVC	1000	LV NETWORK DISTRIBUTORS
7	100	UPVC	1000	EARTHING
8	100	UPVC	1000	FUTURE DM&C

CONSTRUCTION



SCALE	AS SHOWN
DESIGNED	P.JARVIS
DRAWN	P.JARVIS
CHECKED	P.TURRIN
APPROVED	D.GRCEV
DATE	22.9.11
PROJECT NUMBER	PM 02-2010-1-5-1
PROJTRAK NUMBER	

STANDARD SURFACE CHAMBER
DISTRIBUTION SUBSTATION
SINGLE 750 OR 1000kVA TRANSFORMER
LAYOUT 2

SIZE	DRAWING No	SHEET	AMD
A1	224408	1	4

NS113 Site Selection and Construction Design Requirements for Chamber Substations

In general the construction of chamber substations (including access chambers, Control Point Chambers and chambers for the control of HVC connections) shall provide a chamber which is dry and completely isolated from the remainder of the building with walls, floor, ceiling and doors providing a minimum FRL of 180/180/180 where the substation contains oil-filled equipment, or 120/120/120 where there is no oil-filled equipment.

Due to requirements for ventilation, fire and explosion ratings, confined spaces legislation, oil containment and other environmental issues, Substations which may be classified under WHS Legislation as 'confined spaces' will not be approved for use or connection of power by Ausgrid.

Surface chamber substations are located at or above ground level. For a surface chamber substation the highest point of the floor of the substation chamber shall be not more than 2000mm above the lowest finished surface level of the roadway or footpath from the point where personnel and equipment access is gained. The substation transformer access doors are to be located such that they have a 120mm minimum and 600mm maximum rise up from outside of the chamber.

The following items, as a minimum, must be taken into account when assessing a site or location for establishment of a chamber substation.

- The substation, the required access ways, conduit routes, ventilation ducts and cable risers as appropriate must in general be provided in accordance with NS143 Easements, Leases and Right of Way, Ausgrid's Policy for ASP/1 Premises Connections and the associated lease or easement memoranda.
- The substation, the required access ways, conduit routes, ventilation ducts and cable risers as appropriate must be located in areas which are free of any other building, structure or services excluding services or conduits directly related, required and approved by Ausgrid for the chamber substation.
- The selected site is required to be geotechnically stable and certified by a Geotechnical engineer as having sufficient capacity for the intended loadings by the substation building, substation equipment and any underground conduits servicing the substation.
- The structure of the substation or chamber must be certified, as being designed to Australian Standards which provide a 50 year life cycle, by a practicing Structural Engineer prior to Ausgrid approval or supply being made available to the Substation.
- The selected site/location shall be clear of all obstructions which may interfere with the installation of any part of the substation earthing system.

Note: Electrodes from the earthing system may extend some 10 metres into the ground below the substation and/or ground level near the substation.

- Any services including, but not limited to, stormwater or subsoil drains, sewers, gas, water, fire services, air-conditioning installations, electrical or communications cables, conduits or pipe work other than those specified by Ausgrid, must not pass through or encroach into the substation site area or its required or associated access, services passageways, ventilation duct or cable riser clearances.
- Columns, beams, footings or any part of any other building or structure shall not encroach on the clearances referred to in this Network Standard, within any portion of the substation or associated access or services passageways area or any space required for ventilation ducts.

The Substation and the access route to the substation must not be within an area or location:

- classified as a hazardous area as defined in Clause 7.7 of AS/NZS 3000: Australian/New Zealand Wiring Rules, or
- deemed to be a Confined Space according to Work Health and Safety Regulations, or
- likely to be used for such purposes or in such a manner which would increase the risk of fire, explosion or cause access difficulties in the event of fire or any other environmental issue, or
- which may be utilised as a possible storage or collection area for combustible or dangerous materials or goods, or
- likely to contain any portion of another building other than the building in which the substation is housed, which is not sheltered by a non-ignitable blast resisting barrier and which is within 3 metres in any direction from the ventilation openings of a chamber substation. The blast resisting barrier is required to have a Fire resistance Level (FRL) of not less than 180/180/180 and a blast resistance of 2kPa.

Compliance with the following conditions is necessary to gain approval to receive supply from

Ausgrid:

- Ausgrid personnel must have 24 hour access seven days a week, through dedicated access ways which must be at least 1200mm wide. Doorways must be 1000mm wide when the door is in the open position.
- No public or occupant access must be through the Ausgrid dedicated access ways. This includes periods of emergency evacuation when Ausgrid or fire fighting personnel may require unhindered access into the chamber substation and associated access ways.
- There must not be any requirement to move any material or traverse around any item or persons in or at the entry/exit points of the access ways.

All access ways must be located to ensure egress and ingress from or onto a public street or an all-weather heavy-duty access roadway which complies with the Building Code of Australia (BCA)

egress and ingress requirements.

Access ways must not be located in areas where access may be obstructed by persons, vehicles, equipment, material storage areas, site usage, enclosed or partially enclosed car parks, loading docks, similar facilities or any other possible impediments.

Access to chamber substations must not involve or permit access into or through other parts of the building.

No access ways must be by, or involve access through, areas which may be deemed to be dangerous to personnel. This includes, but is not limited to, access through areas patrolled by guard dogs or operations involving vehicles, machinery or equipment.

Access is prohibited where egress or access is into or through enclosed or courtyard locations other than those dedicated to the substation.

All access ways which involve access by stairs or passageway must be constructed from the same material as the substation chamber. This is to include the stairs, floors, support structures, walls and roofs or ceilings.

Substation openings, access ways and building openings in the vicinity of any chamber substation openings, must comply with all BCA fire resistant construction requirements and fire segregation requirements.

All openings and access ways must comply with Local Authority requirements. All public roads, access ways or access roads utilised for access into a chamber substation must comply with the requirements in Clause 8.4.

All access ways or roadways servicing access points must be capable of withstanding construction and service loadings and loads applied by vehicles transporting or moving equipment to and from the substation and ensure clear access at all times. See Clause 8.4.

The dividing wall between any access way or corridor and the substation chamber must be fire and blast rated to the same levels as the substation chamber.

Unless noted otherwise and approved by Ausgrid in writing the minimum structural component ratings are FRL 180/180/180 and 2kPa blast rating.

All components of a fire rated access corridor must be constructed from reinforced concrete or reinforced blockwork and achieve 180/180/180 fire rating. All substation chambers and access way walls are to be structurally tied at the floor and the ceiling.

All chamber substation personnel access doors must provide a minimum clear opening of 2400mm high and 1000mm wide when the door is in the fully open position.

Any internal doors between substation chamber and access passageways are to be fire rated to the same level as the substation.

All doors must swing on heavy duty non corroding metal hinges.

All fire rated doors are to be supplied certified and tagged with the fire rating.

Each transformer access door is to provide an opening which is full height (i.e. minimum clear height of 3100mm high) and minimum clear width of 1700mm, with the door in the fully open position.

External transformer access doors shall be louvered doors as shown on drawing 43140 provided the use of such doors in the particular application complies with all other Ausgrid requirements and the BCA.

Alternatively, doors with solid core pressed metal folded type construction and fire rating to the same level as the substation chamber shall be used, and a ducted ventilation system shall be installed.

For surface chamber substations it is preferable that the transformer access doors swing outwards.

If an access door is required to swing into the substation chamber, it must be positioned to ensure the minimum clearances around equipment are maintained when the door is being opened or is in the fully open position. Also the following requirements apply:

- outward swinging doors may need to be fitted with hinges to allow a swing of 180degrees to provide sufficient manoeuvring space in front of the substation entry,
- the threshold of each step is to be finished with an angle nosing,
- doors are to have a 120mm minimum and 600mm maximum rise up from outside of the chamber,
- a raised transformer handling area is to be provided outside the transformer access doors where the rise up from outside the chamber would otherwise be greater than 600mm.

For multi transformer or 1500kVA single transformer chambers, the inside or substation chamber side of each transformer access is to have facilities to contain an oil spill.

Each door leaf is to swing on its frame using heavy-duty non-corroding metal hinges.

All fire rated doors are to be supplied certified and tagged with the fire rating.

Each substation chamber must be provided with two separate dedicated access ways for personnel.

At each substation both access ways must originate, and allow access from:

- an area which is non-trafficable by vehicles in a public street or,
- an open, uncovered, unenclosed, outer area,

that is acceptable to Ausgrid and in compliance with the BCA.

Substation chamber access doors should be diagonally opposite where possible or at either extreme of the chamber substation.

each access way may consist of:

- A doorway opening directly from the substation chamber to a public street or open, uncovered, unenclosed, outer area, acceptable to Ausgrid and in compliance with the BCA.
- an adjoining access passageway that leads to a doorway which opens to a public street or open, uncovered, unenclosed, outer area, acceptable to Ausgrid and in compliance with the BCA. There is no need for a door between the substation and the access passageway.

- a combined transformer and personnel louvered door as shown on drawing 43140, however only one such access way is permitted per substation.

Each doorway leading from an external area into a substation, access chamber, or control point is to:

- have a 120mm minimum, 190mm maximum step up from the external level to the access chamber. If more than one step up is required, these additional steps shall be accommodated on the outside of the substation, access chamber or control point and include an appropriate handrail.
- have the threshold of each step up finished with an angle nosing as shown on drawing 48008.
- if at street level it is to have bollards placed around doors where there is a risk of personnel stepping onto roadways when using them or there is a risk of the door being blocked by such things as motorcycles, bicycles, delivery vans or the storage of goods being delivered or awaiting collection.
- be positioned such that their use does not create a personnel hazard.
- be fitted with doors that;
 - swing into the substation, access chamber or control point.
 - are positioned so that suitable clearances are maintained from any internal stairways when the doors are in the fully open position.
 - have a danger sign fixed to it as required by NS114 Electrical Design and Construction
 - Standards for Chamber Type Substations (Annexure C).
 - are fire resistant.
 - are weatherproof if leading from an outdoor area.
 - are fitted with fire rated hydraulic door closers.

All stairs must be constructed in reinforced cast in-situ concrete. Steel or precast concrete stairs are not acceptable.

Stairways must be large enough to allow for the passage of equipment or personnel, and must be not less than 1200mm wide. Stairway headroom must be a minimum of 2200mm.

Stairways must be fitted with appropriate handrails, and must be constructed and installed in accordance with AS 1657 and other relevant Australian Standards and Building Codes.

The heavy-duty access roadway and associated transformer landing area must be suitable for use under all weather conditions. The access roadway must be constructed to withstand all loads likely

Common methods of heavy equipment delivery are as follows:

(a) Articulated crane (eg. Franna).

This is the most common method of transformer delivery. For a 20 tonne Franna crane lifting a 5 tonne transformer, the roadway must be suitable for a front-axle loading of 15 tonnes. The rear axle loading should not exceed 12 tonnes and the overall loading of the crane with transformer would be 25 tonnes spread across the two axles.

Note: A 20 tonne Franna crane has one front and one rear axle, with 4 tyres on each axle.

b) Mobile crane and truck.

The surface of the Right of Way (ROW) from the street to the transformer delivery point must be capable of withstanding a rear-axle loading of 21 tonnes.

Where the crane with outrigger pads extended, lifts the transformer from the truck in the manoeuvring area adjacent to the substation, the surface of the ROW must be capable of withstanding a rear-axle group or outrigger loading of 21 tonnes. The loading on any one pad may be up to 15 tonnes with a total loading on any two pads of 21 tonnes.

This loading must be provided for in the design of any paving or suspended slab within 1.9 metres of the roadway kerb in those cases where the position to which the transformer has to be lifted is more than 4 metres from the kerb.

In this regard, 5.2 metres from kerb to transformer centre line at the landing position is the maximum reach with a 1500 kVA transformer unless approved in writing by Ausgrid.

(c) Self-loading truck.

(eg. Heavy table-top truck with boom-lift crane, eg. Hiab or Palfinger.)

This method is generally only suitable in cases where the truck can park immediately adjacent to the transformer landing area in front of the substation louvres. This is because the boom-lift crane can only set the transformer down immediately adjacent to the truck. From this point it is necessary to winch the transformer into the substation. The surface of the ROW should be capable of withstanding a rear-axle group or outrigger loading of 21 tonnes, with the loading on any one pad being up to 15 tonnes.

A transformer handling area with sufficient space for vehicle manoeuvring must be included adjacent to the substation. The transformer and equipment handling area shall be of a size which will allow all of the substation transformers to be stored within the area at any time. The floor grade of the transformer handling area should not exceed 1:20.

For surface chamber substations a raised transformer handling area is to be provided outside the transformer access doors where the rise up from outside the chamber would otherwise be greater than 600mm.

Adequate ventilation must be provided to dissipate heat generated by the substation equipment during normal operation. All areas nominated for the purpose of ventilating the substation are to terminate on an external face, to free open air. Vents must not terminate in areas where heat or smoke dissipation will cause inconvenience or are subject to fire risk. Areas such as those under awnings, under car park ramps or adjacent to the entry to buildings, foyers, lobbies and car parks are to be avoided.

The efficiency of any louvre used must not cause a reduction in the free area by more than 35%. If this figure is exceeded the louvered panel must be increased in size to achieve the required effective free area.

The section of the external face of the substation wall, from ground level up to the base of any transformer access doors, and extending horizontally to 2m beyond the side walls of the chamber (the hatched area as shown in the diagram below):

- must be of solid brickwork, reinforced concrete blockwork or cast in-situ concrete, with a FRL of not less than 180/180/180, and
- must have no openings, windows, fixed glass, glass bricks or similar.

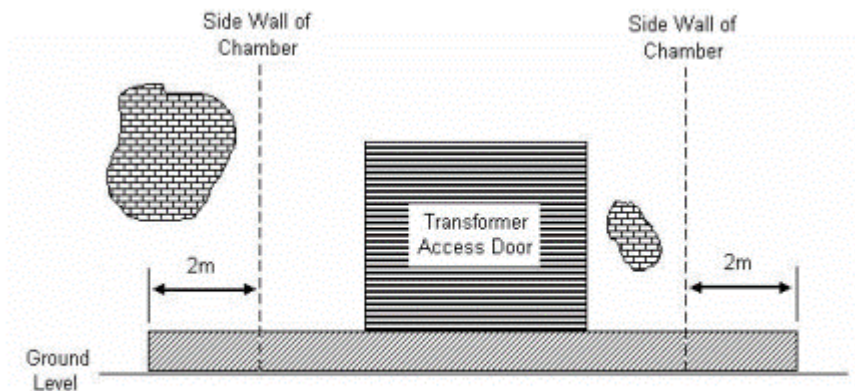


Figure 12.1 Surface chamber substations

The substation ventilation openings, including substation duct openings and louvered panels, as described in this Network Standard, must be separated from building air intake and exhaust openings, natural ventilation openings and boundaries of adjacent allotments, by separation distances which meet the requirements of all relevant authorities, building regulations, BCA and Australian Standards including AS 1668.2: The use of ventilation and air-conditioning in buildings - Mechanical ventilation in buildings.

In addition to above, Ausgrid requires the substation ventilation openings, including duct openings and louvered panels, as described in this Network Standard, to be separated from building ventilation system air intake and exhaust openings, including those on buildings on adjacent allotments, by not less than 6 metres.

Note: 6 metres is measured by the shortest string line between substation ventilation openings and building ventilation system air intake and exhaust openings. This separation requirement by Ausgrid applies irrespective of whether the building or substation ventilation is mechanical or natural and irrespective of whether or not dampers are installed in the building and/or substation ventilation systems.

Where the dimensions of the allotment make the 6 metre separation from ventilation system openings on an adjacent allotment impossible to achieve, the proposal must be submitted to the Manager - Primary Systems and approval must be obtained before design proceeds.

Note: For the purposes of this Section, Ausgrid does not regard openable windows, that provide natural ventilation to one building compartment only, as a building ventilation system opening.

Electric and magnetic fields (EMF) and electromagnetic interference (EMI)

Ausgrid exercises “Prudent Avoidance” when locating electrical substations, refer NS174 Environmental Procedures.

Substations shall be located, constructed and equipment layout optimised so as to minimise magnetic fields within and external to the substation chamber consistent with prudent avoidance.

The selection of the site for a chamber substation should take into account the possible effects of Electric and Magnetic Fields (EMF) and Electromagnetic Interference (EMI) on adjacent sensitive receptors such as residential or childcare areas or sensitive medical equipment.

Note: Installation of EMI screening is not permitted inside any chamber substation, at any HVC connection, or associated chambers and cable risers. The addition of EMI screening must not interfere with access to, maintenance of, air circulation or the efficient operation of the substation equipment or cables.

exterior parts of buildings within 3 metres in any direction from substation ventilation openings, including duct openings and louvered panels, must have a fire rating level (FRL) of not less than 180/180/180 where the substation contains oilfilled equipment or 120/120/120 where there is no oil-filled equipment.

Any portion of an area which may be utilised for storage of combustible materials which is within 3 metres of any ventilation opening from a chamber substation must be sheltered by a non-ignitable blast resisting barrier.

Any meter, regulator or exposed pipe work associated with the reticulation of gas, which is within 3 metres in any direction from any ventilation opening from a chamber substation and which does not have a FRL of 120/120/120, must be sheltered by a non-ignitable blast-resisting barrier.

Non-ignitable and blast resisting barriers constructed of openable or fixed windows or glass blockwork or similar, irrespective of fire rating, do not comply with this requirement unless such items are sheltered by an approved non-ignitable and blast resisting barrier.

Non-ignitable and blast resisting barriers must comply with the following:

- The barriers and associated footings must be external to the substation operational building and site area.
- Is not to interfere with or impede cable, personnel or equipment access to the substation.
- Shall be constructed of non-perishable material such as concrete or masonry.
- Provide access for concrete encasement to conduits into or out of the substation.
- Not interfere with the substation ventilation or release of heat from the substation.
- Be constructed to comply with Local Council and Building Code of Australia.
- Be certified by an independent Structural Engineer.
- Prior to construction an Engineer’s Certificate must be provided to Ausgrid certifying the design of the works complies with Ausgrid, all Authority and BCA requirements.
- All foundations are to be approved in writing by a certified practicing Structural Engineer.
- The barriers must have a minimum FRL of 120/120/120 and be designed to withstand a live loading from the substation side of not less than 2 kPa uniformly distributed.

The location and construction of all blast resisting barriers must be approved by Ausgrid's as part of the Design certification prior to approval for construction from Ausgrid.

Ongoing maintenance of the blast resisting barrier is the responsibility of the building owner/occupant.