Electrical & Mechanical Services

Schematic Design Report

UPGRADE TO CAMMERAY PUBLIC SCHOOL

CPS-NDY-XX-XX-RP-N-0001

Revision 4 – 06/03/2025

CONTENTS

INTRODUCTION

Introduction
This Mechanical and Electrical Report has been prepared to support a Review of Environmental Factors (REF) for the Department of Education (DoE) for the upgrade of the Cammeray Public School (CPS) (the activity). The purpose of the REF is to assess the potential environmental impacts of the activity prescribed by State Environmental Planning Policy (Transport and Infrastructure) 2021 (T&I SEPP) as "development permitted without consent" on land carried out by or on behalf of a public authority under Part 5 of the Environmental Planning and Assessment Act 1979 (EP&A Act). The activity is to be undertaken pursuant to Chapter 3, Part 3.4, Section 3.37 of the T&I SEPP and in consideration of the stakeholder and community participation plan.
The proposed activity is for upgrades to the existing CPS at 68 Palmer Street, Cammeray NSW 2062 (the site).

The purpose of this report is to recommended actions and observations in relation to the Electrical, AV, Communications, Security and Mechanical systems to accommodate the upgrades to Cammeray Public School.

INTRODUCTION

Site Description
CPS is located at 68 Palmer Street, Cammeray on the northern side of Palmer Road, bound by Palmer Street to the south, Bellevue Street to the east and Miller Street to the west. The site has an area of 1.36 ha and comprises 11 allotments, legally described as:

- Lot 11 DP 837836
- Lot 1 DP 316130
- Lot 1 DP 316706
- Lot 1 DP 123406
- Lot 2 DP 174370
- Lot 1 DP 174370
- Lot 4 Sec 35 DP 758790
- Lot 5 Sec 35 DP 758790
- Lot 66 DP 1049613
- Lot 3 DP 571310
- Lot 4 DP 571310

The site currently comprises an existing co-education primary (K-6) public school with 6 permanent buildings, 3 demountable structures, covered walkways linked at multiple levels, play areas, on-grade parking, sports court, covered outdoor learning area (COLA) and vegetation/green spaces with mature trees.

The existing school buildings are clustered towards the southern portion of the site and comprise both single and 2 storey buildings. The northern portion of the site contains the sports court, vegetable garden and play equipment. The north-western portion of the site is heavily vegetated with trees of high landscape significance that are protected with fencing.

The site is identified as a locally listed heritage item (I0019) under Schedule 5 Environmental Heritage pursuant to the North Sydney Local Environmental Plan 2013 (NSLEP). The school is also identified in the Plateau Heritage Conservation Area (HCA) (Part 2 Schedule 5 of the NSLEP). The school is listed on the Department of Education (DoE) Section 170 Heritage Conservation Register as 'Cammeray Public School'. The site is approximately 115m from a State heritage item (I0004) being the electricity substation at 143 Bellevue Street and in close proximity to locally heritage listed items.

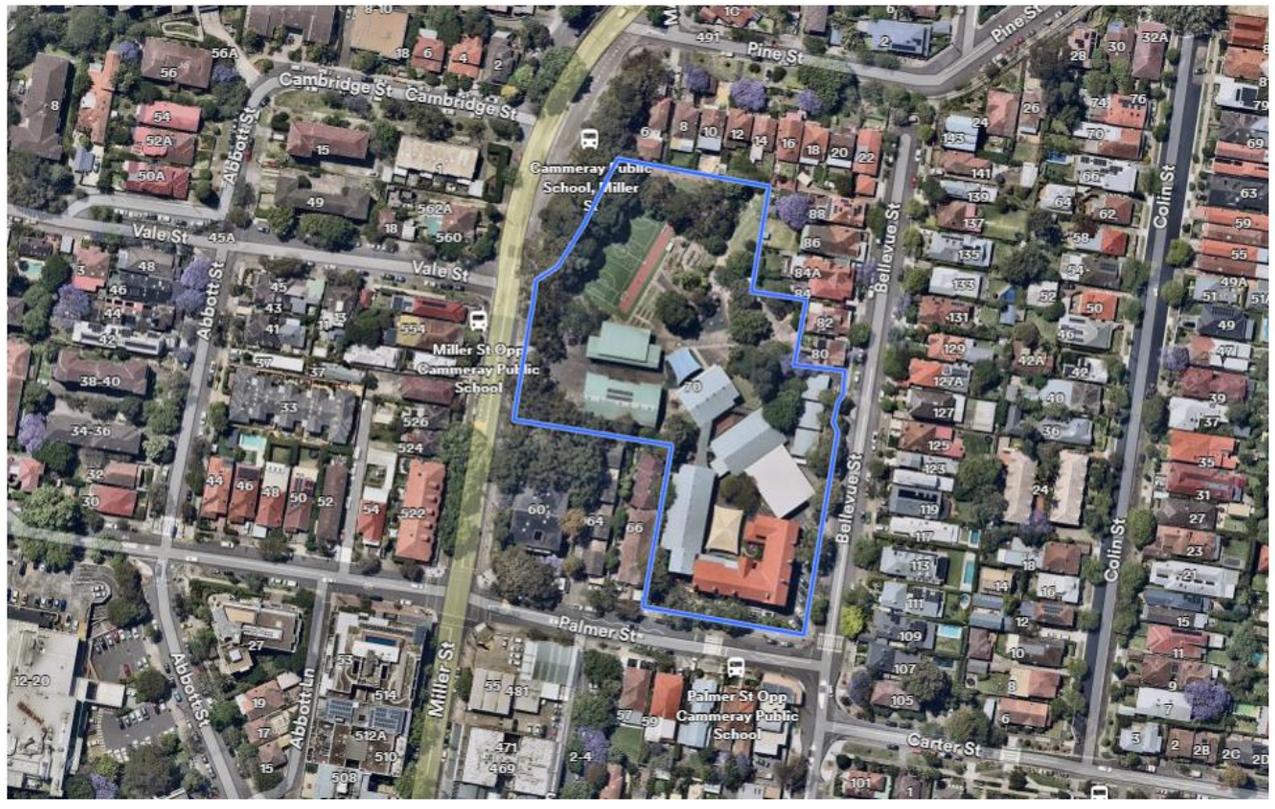


Figure 1 **Aerial image of the site, outlined in blue (Source: NearMap, taken 30 October 2024)**

INTRODUCTION

Proposed Activity Description
The proposed activity involves upgrades to the existing CPS, including the following:

- Construction of 4 new permanent teaching spaces in a two-storey building incorporating 2 general learning spaces and 2 practical activity areas
- New egress lift and stairs for access to all building levels
- External covered walkways connecting the new building to the existing school network
- Landscaping and external works including compensatory planting
- Upgrades to site infrastructure and services to support the new buildings
- Removal of 3 temporary (demountable) classrooms from the eastern side of the school
- 50 bicycle parking spaces

The intent of the activity is to provide 4 permanent teaching spaces (PTS) plus 2 practical activity areas (PAA) across a two-storey addition, adjoining Building E. This will result in CPS retaining the capacity of a 'large' school (553-1,000 students) under EFSG (SINSW Education Facilities Standards and Guidelines).

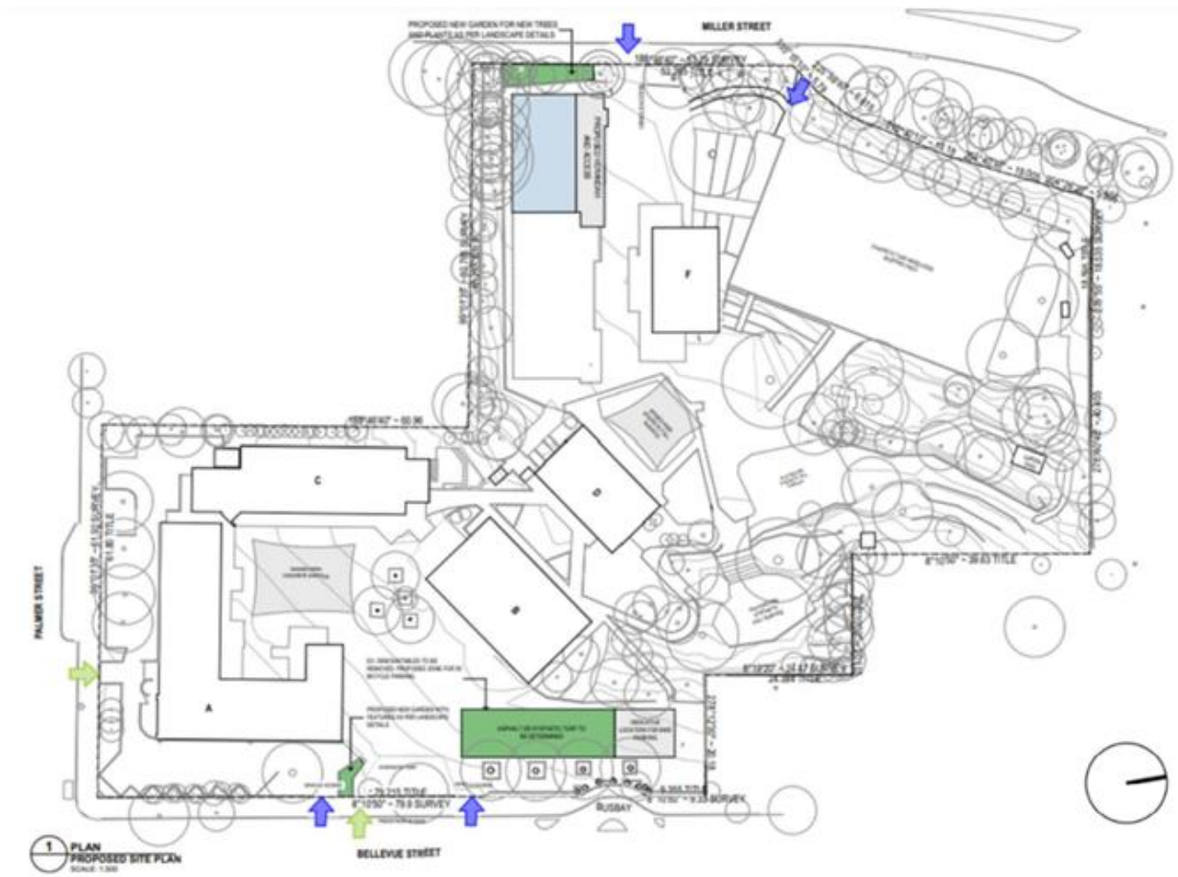


Figure 2 Proposed Scope of Works (Source: Fulton Trotter Architects, Proposed Site Plan (Rev 6))

MITIGATION MEASURES

Mitigation Measures			
Mitigation Number/ Name	**When is Mitigation Measure to be complied with**	**Mitigation Measure**	**Reason for Mitigation Measure**
Noise	During Works During normal operations	Refer to NDY Noise and Vibration Impact Assessment	Minimise noise impacts to nearby sensitive receivers.
Visual Impact of Electrical Services	During Works During normal operations	The proposed new MSB is to replace existing in-situ. This will ensure that an external MSB is not required.	Avoid impacting façade of Building A (which is heritage listed).
Visual Impact of Mechanical Services	During Works During normal operations	New Mechanical Plant to be located in undercroft.	Avoid visual impact of mechanical units along Miller Street.

Evaluation of Environmental Impacts

- We note that the Noise impacts and the visual impacts of the electrical and mechanical services can be adequately mitigated though the proposed measures and will not have a significant effect on the environment.

SCOPE

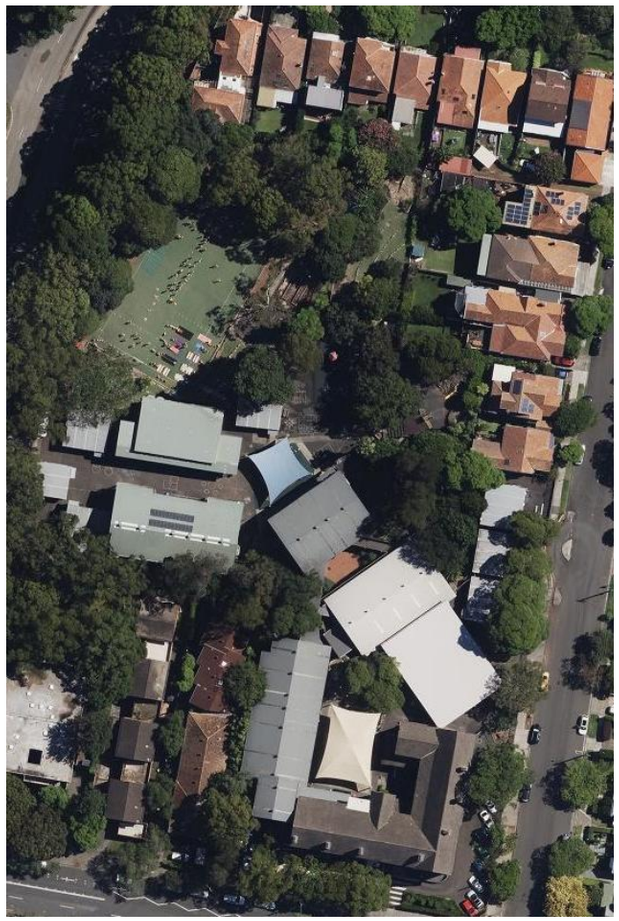
This report has been provided by Norman Disney & Young (NDY) to provide recommended actions and observations in relation to the Electrical, AV, Communications, Security and Mechanical systems to accommodate the upgrades to Cammeray Public School (CPS).

Recommendations and observations in relation to the Electrical, AV, Communications, Security and Mechanical services are provided herein. This electrical and mechanical services design has been developed in line with the SINSW Standard Hub Layout and the Pattern Book.

INTRODUCTION

General Overview

Cammeray Public School (CPS) is undergoing upgrades for the removal of demountable teaching spaces and the creation of new permanent teaching spaces.



Project Description

- Creation of 4 new permanent teaching spaces and 2 new practical activities areas.
- Removal of 3 demountable teaching spaces.
- Upgrades to site infrastructure.
- Adjustments to landscaping and external works

Scope

This report covers the following services:-

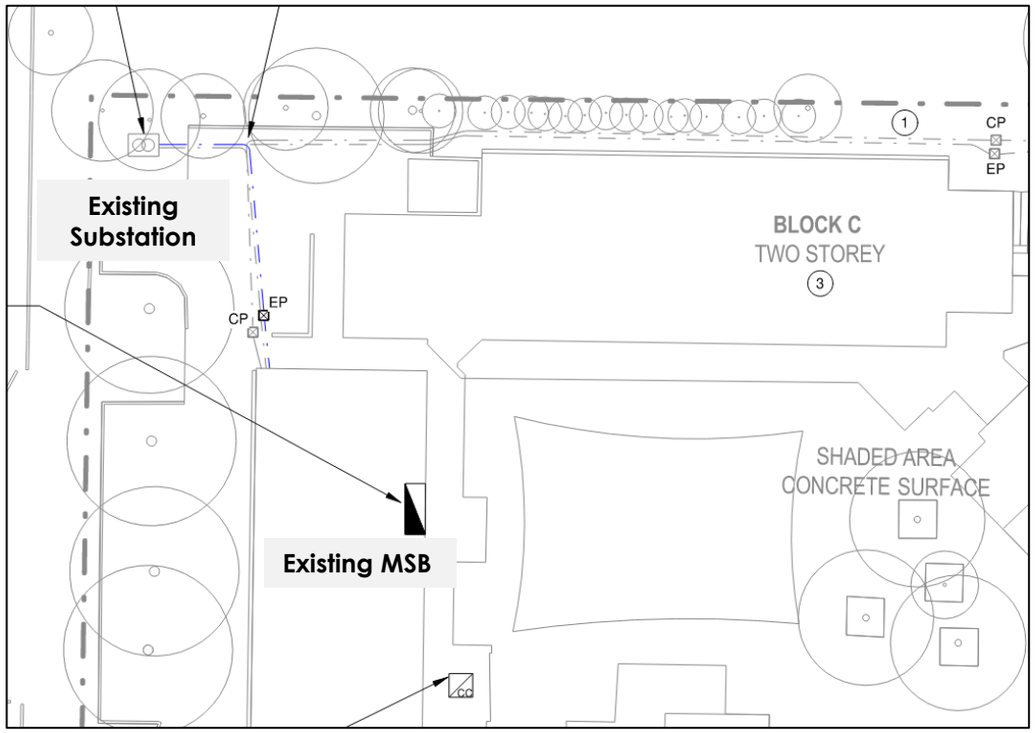
- Electrical
  - Lighting & Power
  - Audio Visual
  - Communications
  - Security
  - Vertical Transport
- Mechanical

NDY
A TETRA TECH COMPANY

ELECTRICAL SERVICES

Electrical Services

EXISTING ELECTRICAL SUPPLY



Cammeray Public School (CPS) is currently supplied by a single low voltage connection at substation 46899. This substation has a 800kVA transformer with two spare low voltage distributors each rated at 400A.

The school contains one (1x) main switchboard located in Block A, which supplies all sub-distribution boards throughout the site via a network of pits and conduits. The board has the following characteristics:

- Built to AS3439.1 – manufactured in 2002
- Form 1 Segregation
- 30kA fault rating
- Maximum demand for the site is 273A based on meter data
- Service protection device (no rating label)

There is also a 5kW solar array on the roof of Block E (a.k.a Homebase), with inverters connected to DB-HB2.

Existing Substation (to be retained)

Existing Main Switchboard (to be replaced in-situ)

Electrical Services

ELECTRICAL LOAD ANALYSIS

Demand Component	Load (A)
Existing School Maximum Demand	273A
Removal of Demountable Spaces	-11A
New Works (Block G, A/C upgrades etc.)	101A
Estimated New Maximum Demand	**363A**

Capacity/Demand	Load (A)
Substation Connection Limit*	400A
Existing Maximum Demand	273A
Spare Capacity Before Works	**127A**
Estimated New Maximum Demand with Spare Capacity	363A
Spare Capacity After Works*	**37A**

*It should be noted that while the School is currently is limited to a 400A supply size, the existing 800kVA substation has two (2x) spare 400A connections. Thus, there is capacity for future increases to the School's connection size to accommodate additional load increases.

Based on the latest maximum demand calculation for the school and our understanding of the existing electrical supply, there will be no requirement for a substation upgrade. The 800kVA substation on Palmer Street has sufficient capacity for the proposed works.

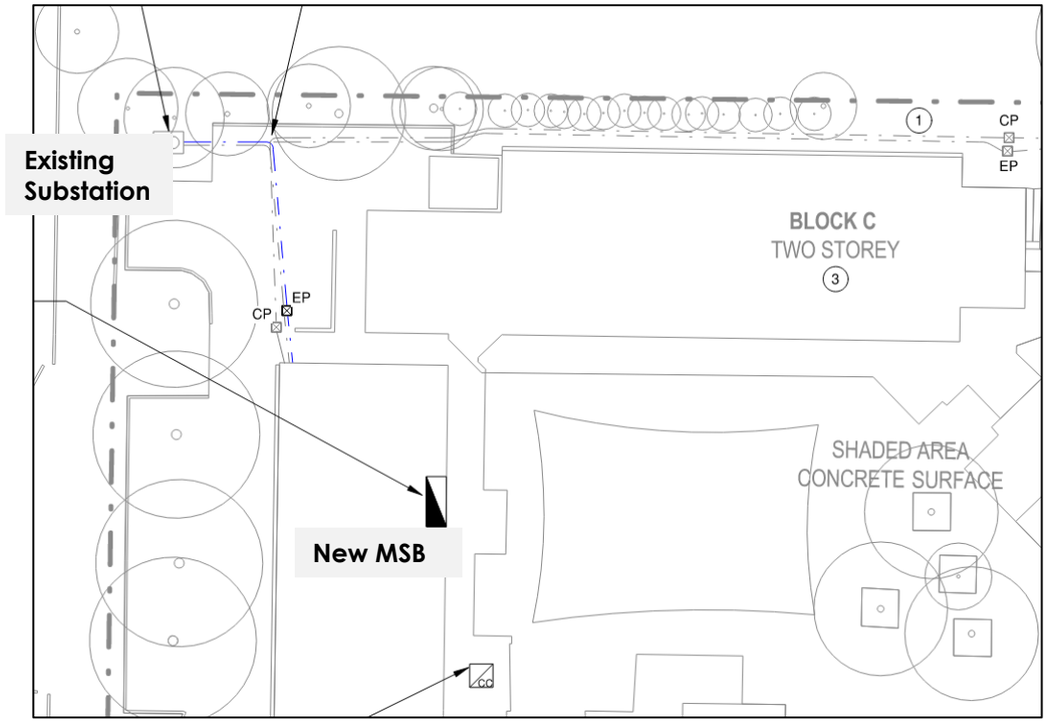
The existing MSB is not adequate for re-use for the following reasons:
- Built to old Australian Standard AS3439.1
- Inadequate spare physical capacity (no space for new connections)

Hence a new MSB is to be provided for the school.

Applicable Standards & Guidelines
The services concepts have been developed on the basis of the following:
- NCC 2022
- EFSG v1 & 2
- AS3000
- AS/NZS 1680
- AS/NZS 2293.1
- AS/NZS 1158
- NSW Department of Education Patternbook

Electrical Services

PROPOSED SUPPLY MODIFICATIONS



A load application was submitted to Ausgrid on 12/11/2024. Subsequently, a connection offer was provided by Ausgrid on 18/12/2024, indicating that the requested supply size for the School of 363A from the existing substation on the School's Palmer St Boundary is acceptable.

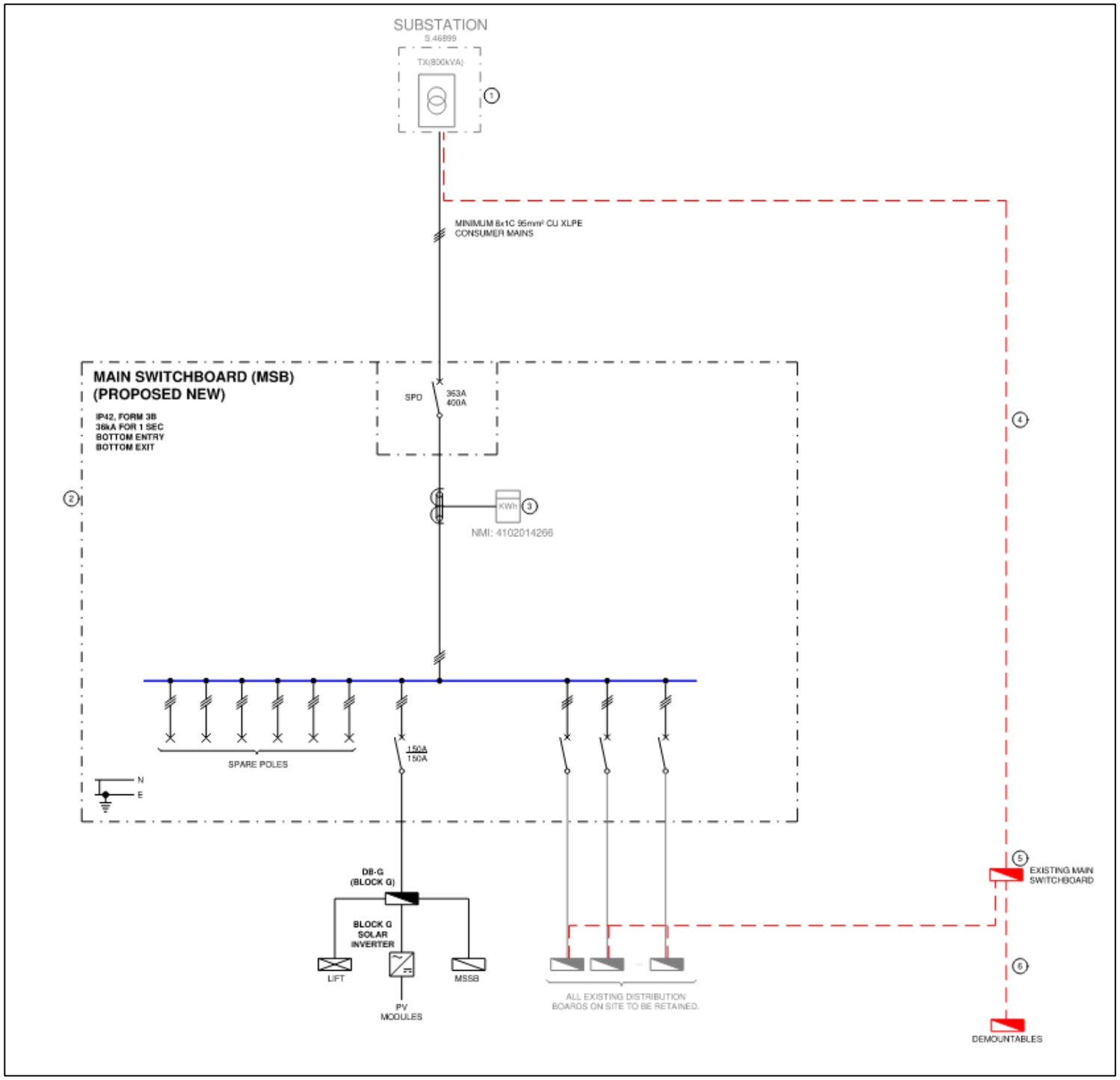
Therefore, the existing substation on the School's Palmer St Boundary is to be retained with no major upgrades required.

The existing main switchboard (MSB) is to be demolished and replaced with a new compliant MSB within the existing main switch room in Block A. All outgoing submain connections to the other existing school buildings will be re-established on this new MSB, in addition to the new Block G submain. It should be noted that a shutdown will be necessary during the MSB replacement works.

The existing consumer mains cabling between the substation and MSB is to be disconnected and removed. Subsequently, new consumer mains cables will be installed to accommodate the site load increase.

Additional spare conduits are to be installed adjacent to the new consumer mains as a provision for future installation of larger and/or parallel consumer mains cabling in alignment with EFSG requirements.

ELECTRICAL DISTRIBUTION – SITE LEVEL

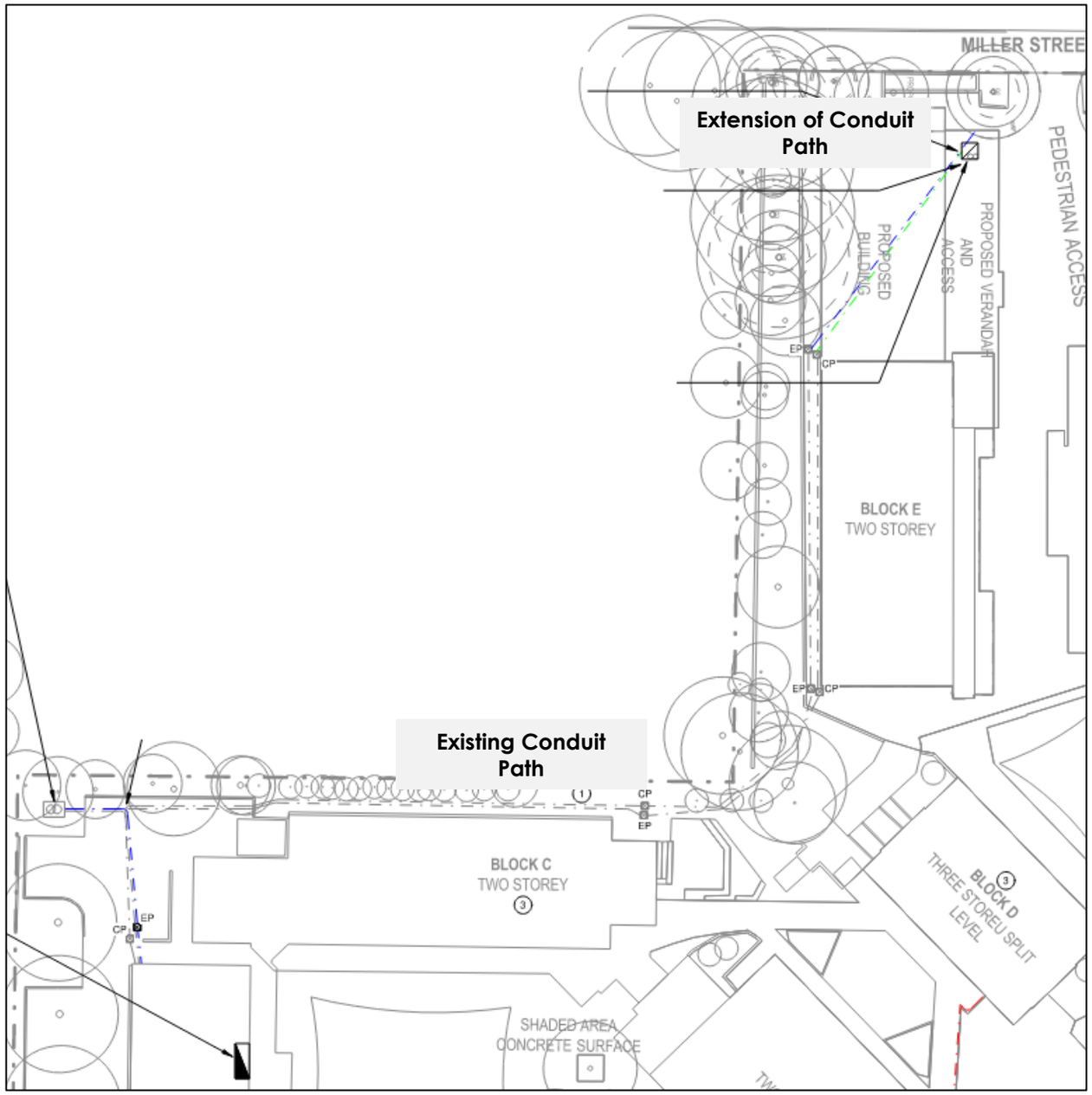


Cammeray Public School Single Line Diagram

ELECTRICAL DISTRIBUTION

The existing conduit pathway from the MSB to Block E is to be utilised for the reticulation of submain cabling. Additionally, new conduits will be provided to extend this network for the reticulation of the new submain to Block G.

The new Block G will be supplied via a new distribution board (DB-G) located in the level 1 electrical room.

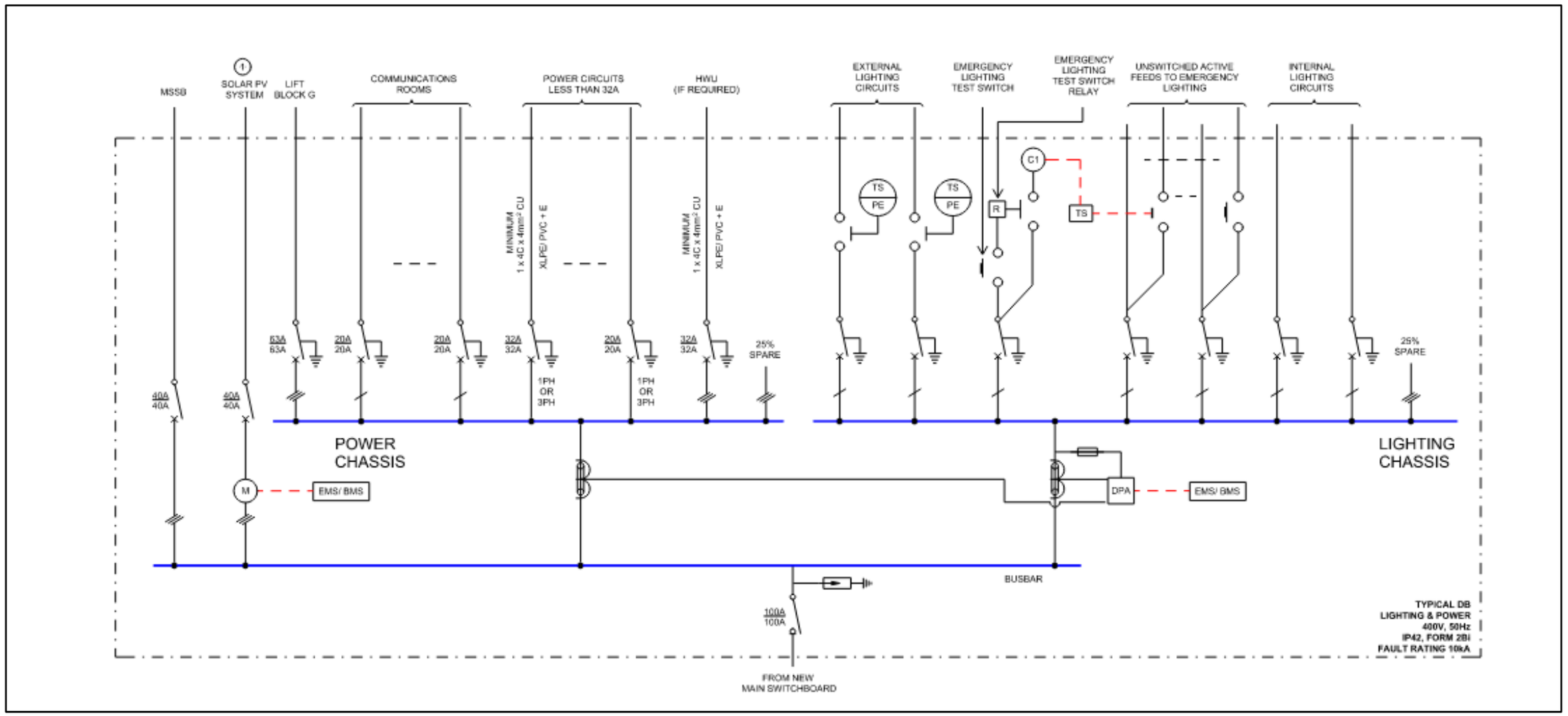


ELECTRICAL DISTRIBUTION PROPOSED NEW BUILDING – BLOCK G

The proposed new building, Block G, will include a new Electrical Distribution Board (EDB) contained in a purpose-built room, which will be 60-minute fire-rated, and smoke-sealed as per the EFSG.

The level one electrical room will be located within the services core and ventilated mechanically to prevent heat and moisture build-up. The room will include one (1x) EDB, one (1x) MSSB and one (1x) inverter.

The EDB will include separate sections for power and lighting as well as surge protection. The EDB will supply all spaces within Block G, including the MSSB and the inverter system.

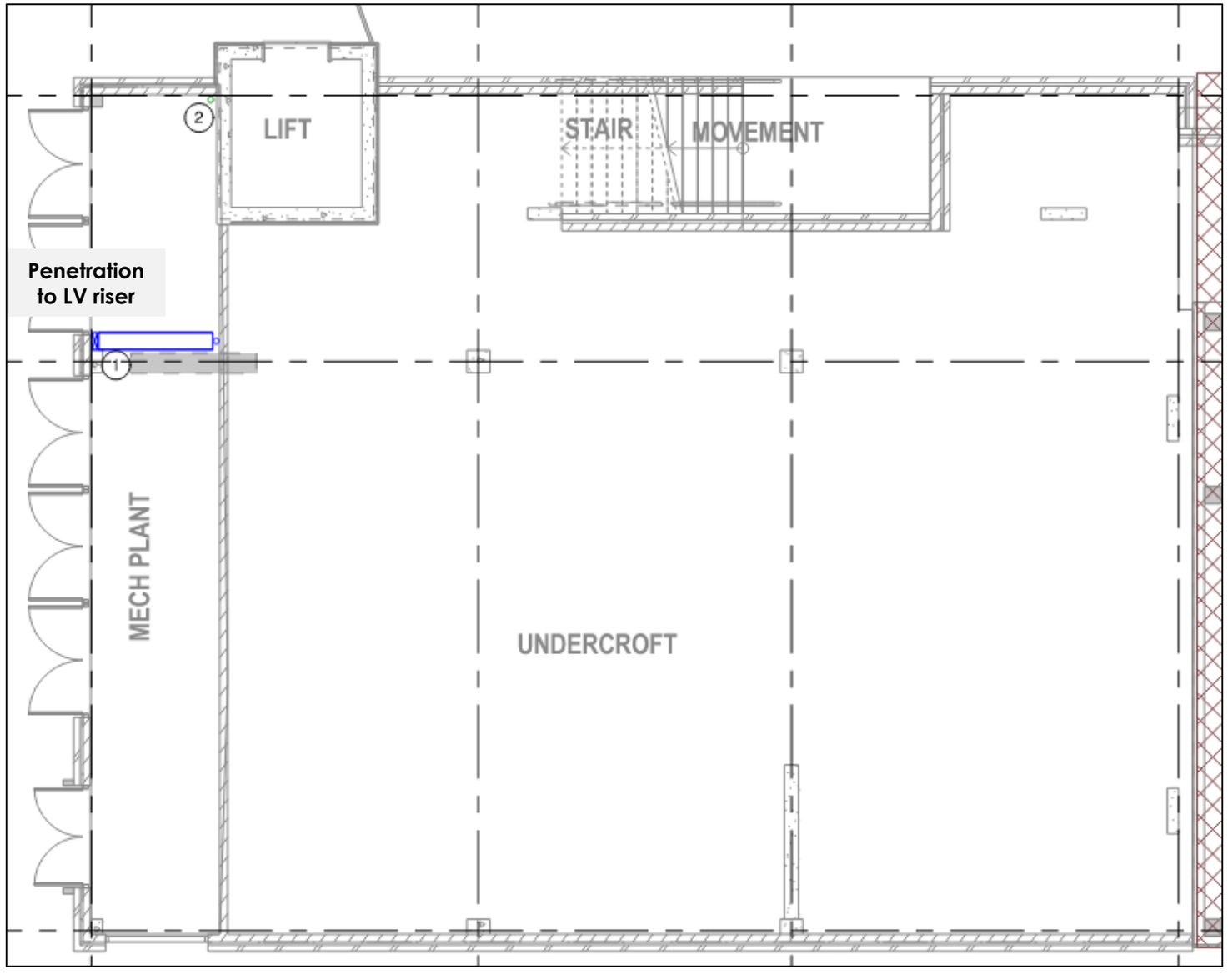


POWER ARRANGEMENT – BLOCK G UNDERCROFT

Cable trays will be provided to reticulate submain cabling for Block G to the EDB on level one.

Cable trays are to be sized based on final cable sizing and shall include spare capacity as required by the EFSG for future additions.

A low-voltage riser is to be utilised for vertical reticulation of cabling between the undercroft, ground and first floor.



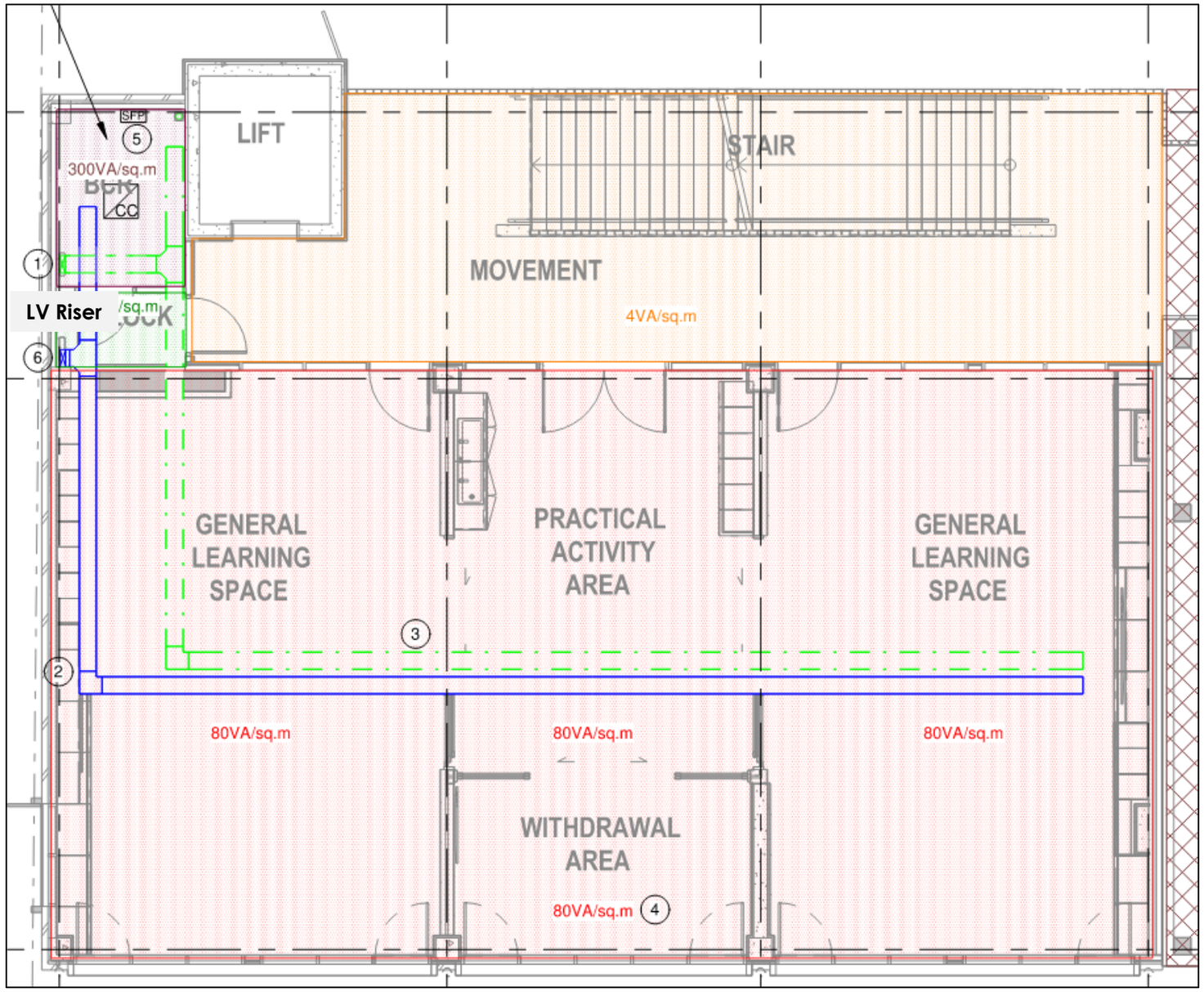
Electrical Services

POWER ARRANGEMENT – BLOCK G GROUND FLOOR

Cable trays reticulated within the ceiling void will be provided to reticulate cabling from the EDB to spaces on the ground floor. Final reticulation to outlets will be achieved using catenary wires.

Cable trays are to be sized based on the final number of circuits as per the DoE Pattern Book and shall include spare capacity as required by the EFSG for future additions.

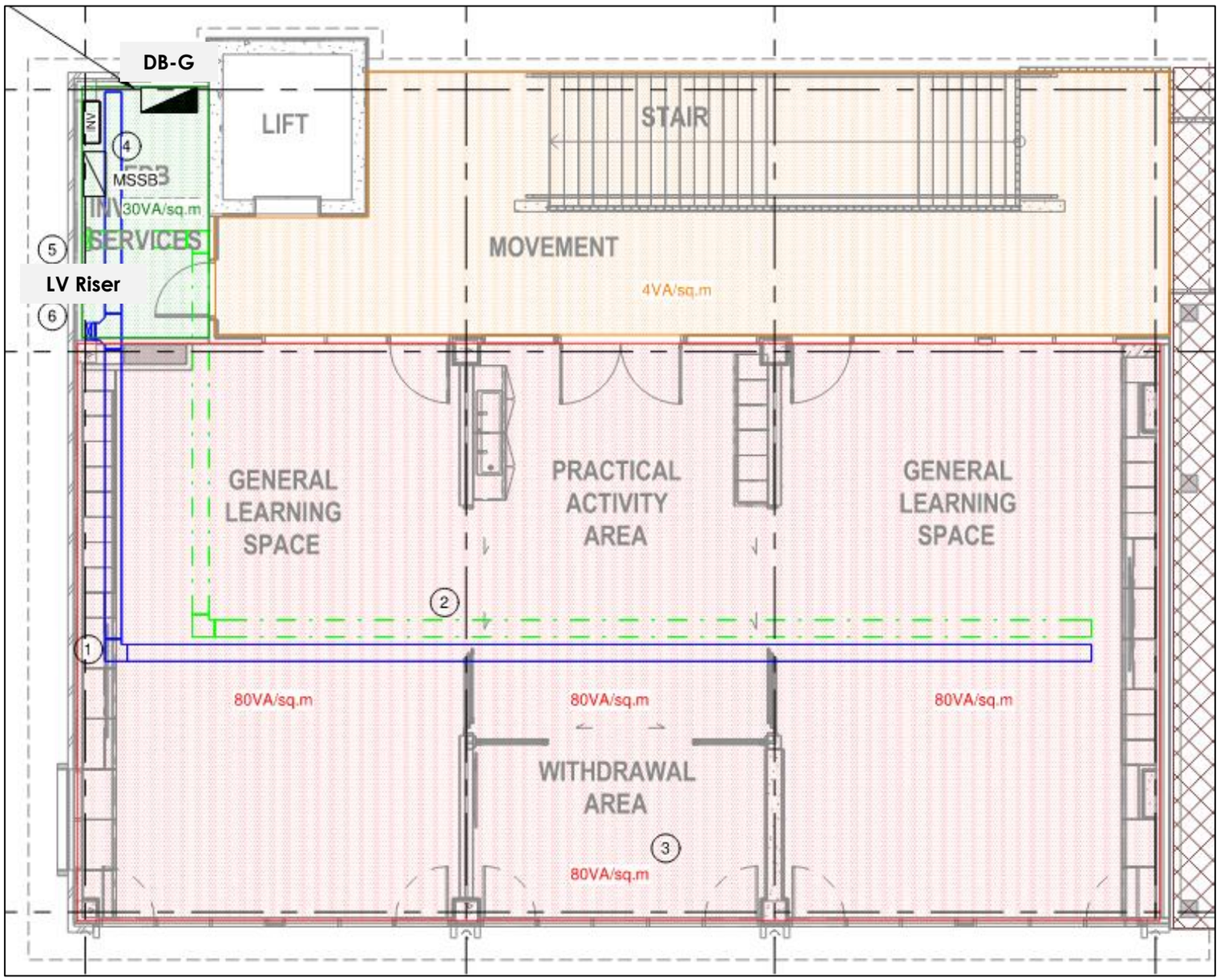
A low-voltage riser is to be utilised for vertical reticulation of cabling between the undercroft, ground and first floor.



POWER ARRANGEMENT – BLOCK G LEVEL ONE

Cable trays reticulated within the ceiling void will be provided to reticulate cabling from the EDB to spaces on level one. Final reticulation to outlets will be achieved using catenary wires. Cable trays shall also accommodate the submain cabling to the proposed new Mechanical Services Switchboard (MSSB)

Cable trays will be sized based on the final number of circuits as per the DoE Pattern Book and are to include spare capacity as required by the EFSG for future additions.



POWER & COMMUNICATIONS OUTLETS

INDICATIVE POWER AND TELECOMMUNICATIONS OUTLETS QUANTITIES BY LOCATION

ROOM TYPE	ROOM QUANTITY	GPO	DGPO	DTO	CAPTIVE OUTLETS	STO
BCR	1	-	4	2	2	-
GENERAL LEARNING SPACE	2	3	4	3	-	2
PRACTICAL ACTIVITY AREA	1	-	7	5	-	-
AIRLOCK	1	1	-	-	-	-

Ground Level Provisions

ROOM TYPE	ROOM QUANTITY	GPO	DGPO	DTO	CAPTIVE OUTLETS	STO
ELECTRICAL ROOM	1	-	2	2	-	-
GENERAL LEARNING SPACE	2	3	4	3	-	5
PRACTICAL ACTIVITY AREA	1	-	7	5	-	-

Level 1 Provisions

The proposed electrical design includes power outlets, telecommunications outlets and ceiling fans. Indicative quantities have been provided for each area of the proposed new building to align with requirements of the latest EFSG documents. These quantities are to assist with tendering for indicative pricing.

Final quantities and locations shall be based on the provisions documented in the DoE Pattern Book.

Electrical Services

SOLAR ARRANGEMENT

The School's existing solar arrangement consists of a 5kWp array located on the roof of Block E (a.k.a Homebase). The inverter for this array is connected to distribution board DB-HB2.

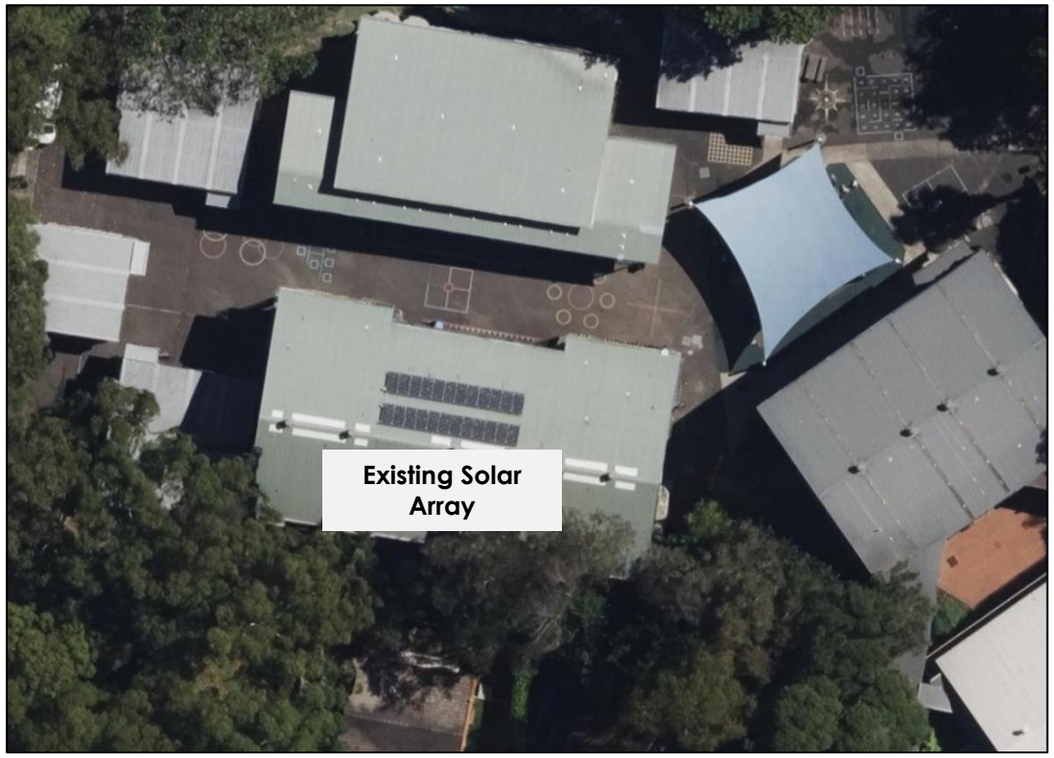
As per the latest EFSG, it is intended that a new PV system is sized to offset the power consumption of the proposed new building. In this instance, the proposed development requires a 20kWp system.

No shading issues are expected for an array installed on the north-facing section of the roof.

A preliminary layout has been designed based on 330W panels with Solar PV Inverters located in the Ground Floor Electrical Cupboard. A mounting system is to provide a minimum 10-degree tilt to the PV panels to enable self-cleaning as per the EFSG. DC cabling from the rooftop PV array to the inverter(s) located in the electrical room shall be reticulated through a roof penetration.

Minimum 500mm clearance is provided around the perimeter of PV array and minimum 700mm gap every fourth row to create sufficient maintenance access pathways.

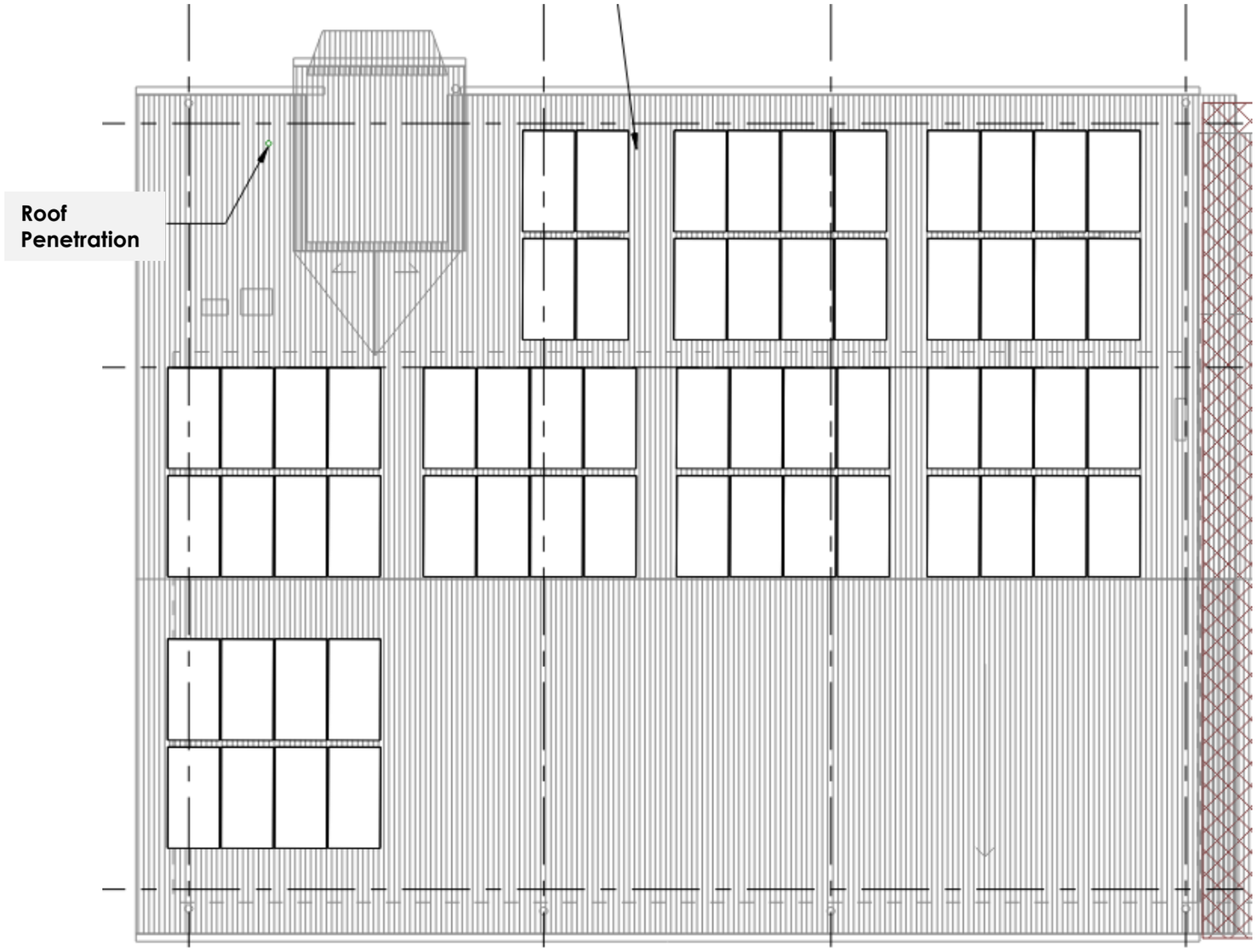
Final PV panel and inverter selection is to occur during detailed design to match system and site requirements. Spatial arrangement of the electrical cupboard is based on 1 x 25kW inverters. Final number and size of inverter(s) to be determined during detailed design. Inverter(s) shall be Fronius or SMA as per EFSG requirements.



Estimated consumption*	Building area (Interior)	Predicted power consumption	Size of proposed solar array	Payback period
130 Wh/sqm/day	417 sqm	35kWh/day	20kWp	5.4 - 7.1 years

*Value derived from energy modelling of a previous public school project with similar room layouts.

SOLAR ARRANGEMENT



Block G Proposed Roof Layout

Electrical Services

LIGHTING

General

Lighting will comply with all relevant Australian Standards, including AS1680 and AS1158 recommended illumination levels, the EFSG, Pattern Book and NCC 2022.

New LED luminaires will be provided for general lighting throughout the school. No specialist or feature lighting has been considered. Luminaires will be concealed and integrated within architectural details wherever possible to simplify the appearance of the ceiling and promote visual acuity. The lighting colour temperature to be used throughout the areas shall be 4000K unless noted otherwise.

Type of luminaires shall be coordinated with the Pattern Book and EFSG, indicatively:

- LED panels shall be used in general areas, such as general learning and multi-purpose spaces.
- LED downlights are to be used in common areas, corridors, amenities and cleaners' rooms.
- LED battens shall be used in electrical room, communications room and all plant areas.
- Weatherproof, vandal resistant LED battens shall be provided for all external areas including stairs and external corridors.

Emergency & Exit

Emergency luminaires and exit signs are to be provided in accordance with the NCC and AS/NZS 2293.1-2018. An emergency lighting test switch is to be provided at each EDB.

Control

As a part of value engineering initiatives, the digital programmable lighting control system (such as Dynalite DALI, KNX etc.) has been omitted from the scope. Instead, a simpler, 230V-based lighting control system is to be used.

An indicative lighting control strategy is:

- Internal luminaires shall be controlled via motion sensors and switch plates with timer shutoff.
- External luminaires shall be controlled via motion sensors and photocells with timer shutoff.

Internal areas such as general learning spaces shall offer dimming where appropriate.

Electrical Services

LIGHTING – BLOCK G UNDERCROFT

LIGHTING DESIGN LEGEND

80 LUX AVERAGE HORIZONTAL ILLUMINANCE AS PER EFSG AND AS/NZ AS1680.2.1-2008 TABLE D1
UGR AS PER EFSG AND AS/NZS AS1680.1-2006 TABLE 8.2
LIGHTING UNIFORMITY AS PER EFSGH AND AS/NZS AS1680.1-2006 TABLE 3.2

160 LUX AVERAGE HORIZONTAL ILLUMINANCE AS PER EFSG AND AS/NZ AS1680.2.1-2008 TABLE D1
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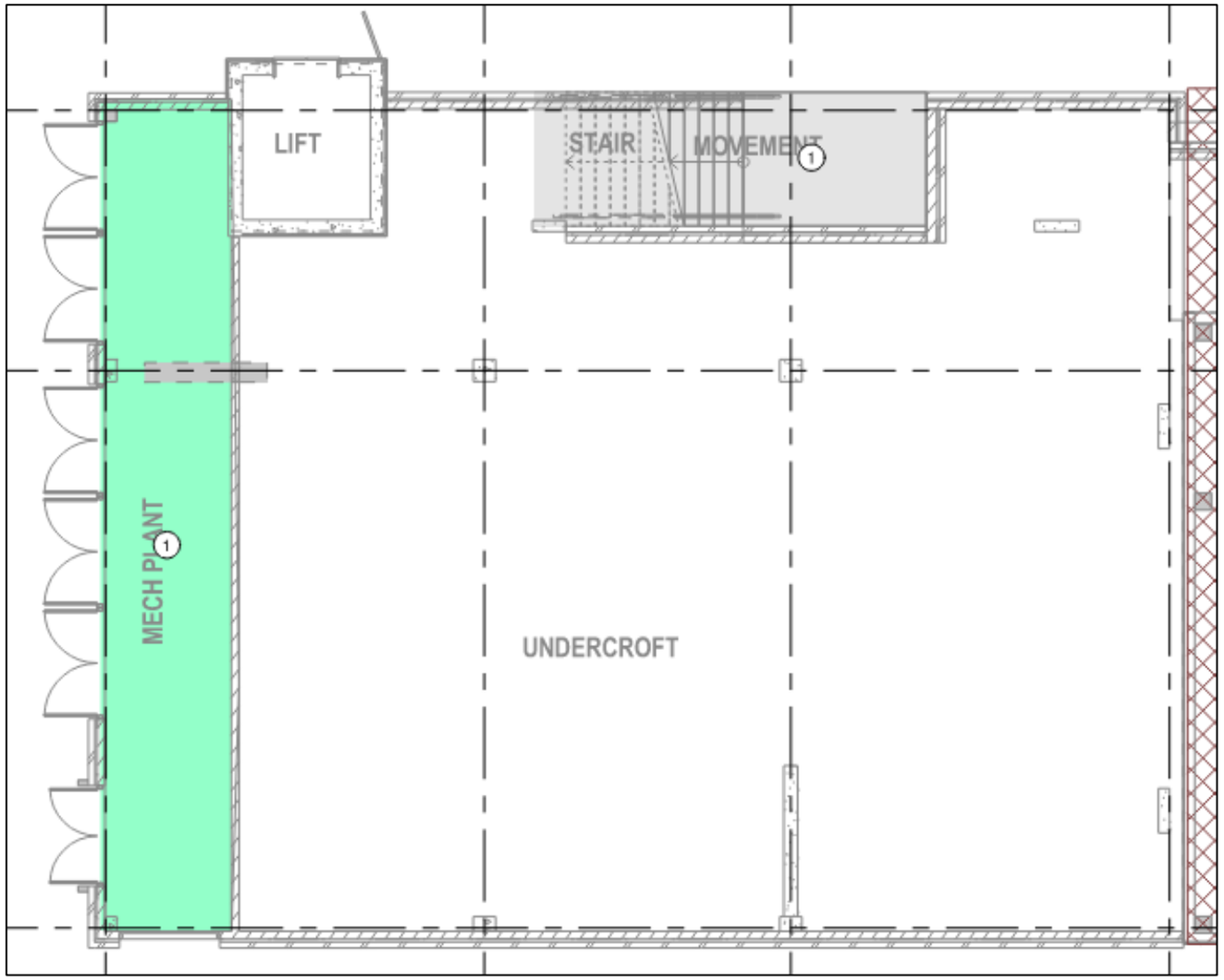

LIGHTING – BLOCK G GROUND

LIGHTING DESIGN LEGEND

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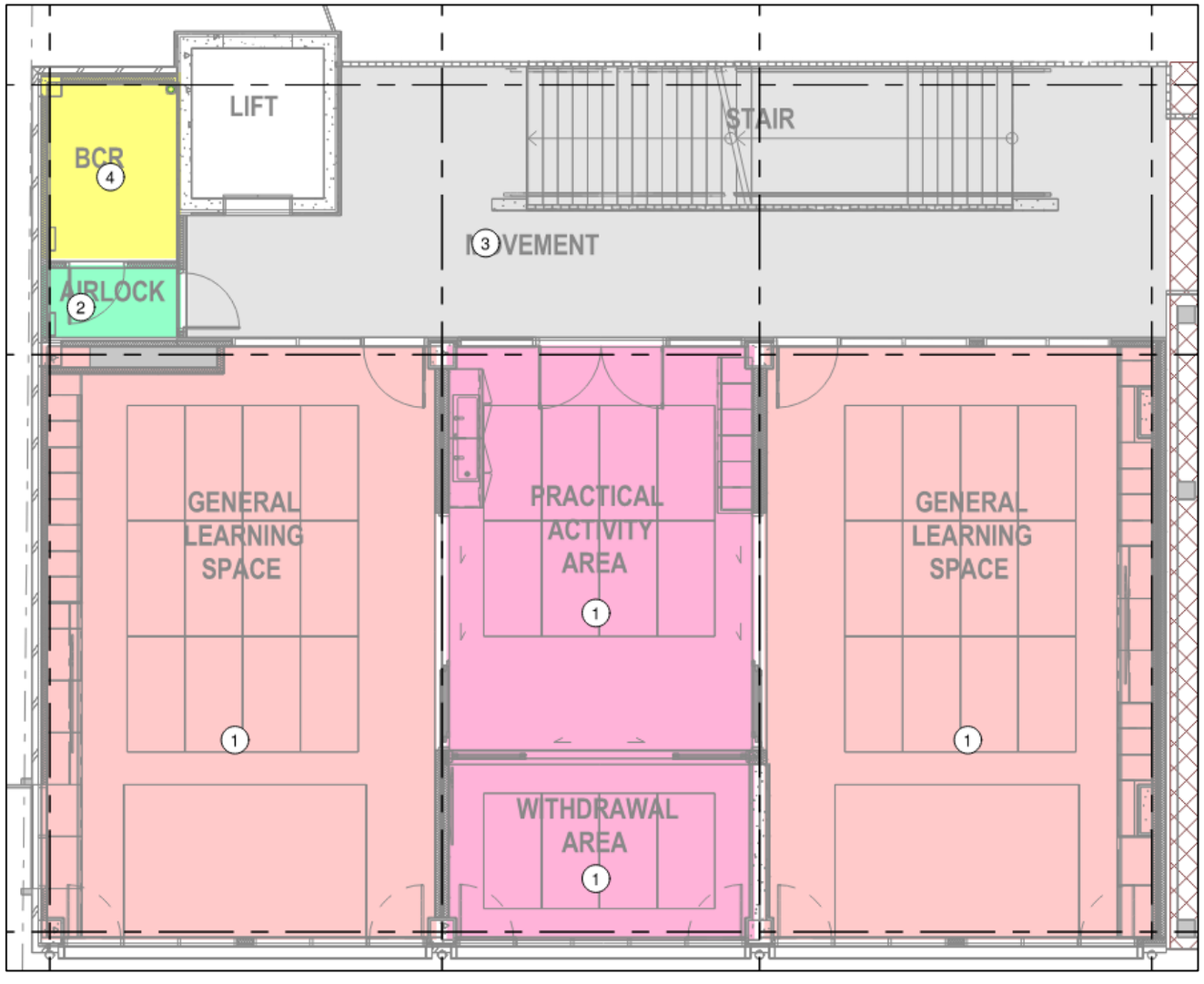

LIGHTING – BLOCK G LEVEL ONE

LIGHTING DESIGN LEGEND

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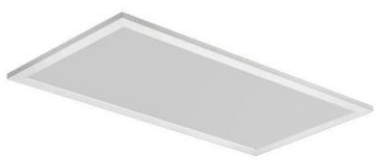

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Electrical Services

COMMUNICATIONS NETWORK

Existing

The existing communications network at Cammeray Public School is serviced by Telstra and NBN lead-ins. The Network Termination Device (NTD) is located within the MCR which is located on level 1 of Block A in a room currently used for storage. The existing MCR consists of two (2x) racks. These racks have spare capacity for new connections associated with the new Block G BCR.

It is noted that the existing communications room does not comply with the EFSG.

The School utilises fibre backbones between the MCR and other buildings. These are reticulated around the site using a network of pits and conduits. Preliminary investigations on site indicate that there is sufficient capacity within the existing communications conduits to the neighbouring Block E to run a new backbone to the Block G BCR.

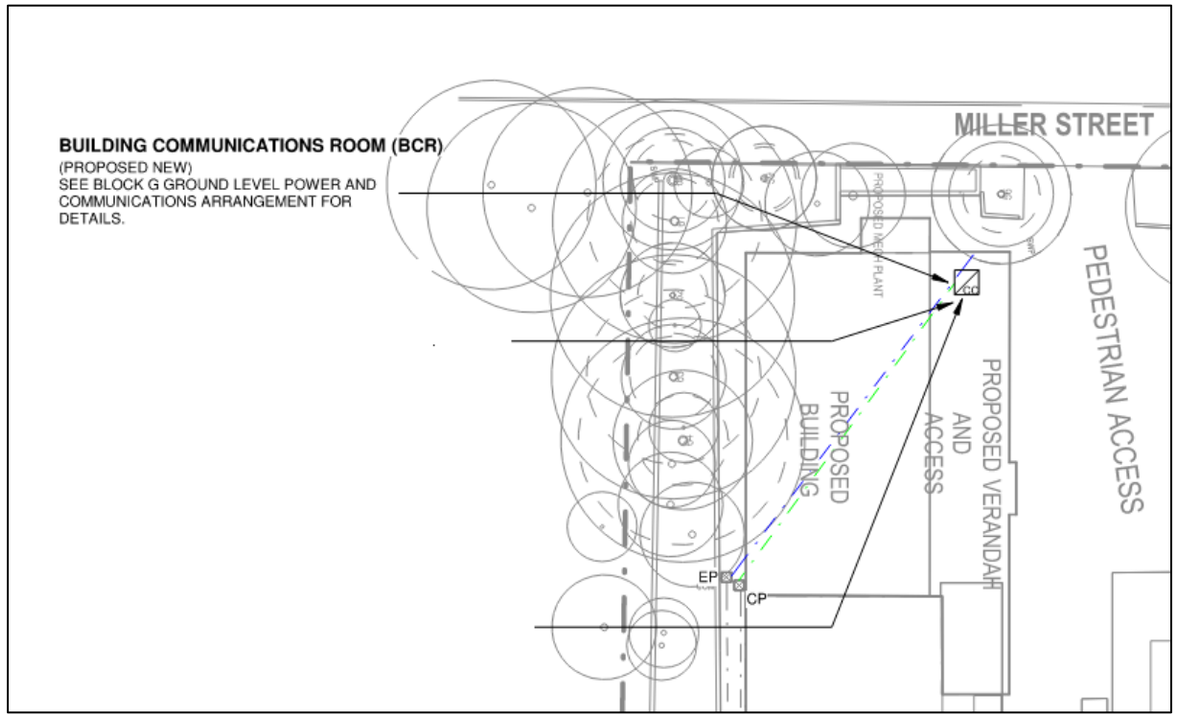
Proposed

The existing MCR is to be retained in its current location for this scope of works. However, modifications are required in alignment with the recommended upgrades documented in the Cammeray ICT survey. New fibre is to be reticulated from the existing campus distributor to the new BCR in Block G.

The new BCR will be located on the ground floor of Building G, with the plan area dimensions of 2.4m x 3.1m. This BCR will house a security field panel and communication rack(s) – the quantity of which will be determined in coordination with the DoE information Technology Directorate (ITD) at a later stage.

The new BCR will service both floors of the new Block.

The existing pit and conduit network will need to be extended to reticulate the new communications cabling to Block G.



PROPOSED COMMUNICATIONS, AV & SECURITY

Site Communications Upgrades

According to the Cammeray ICT survey, the following upgrades are proposed for the existing communications systems:

- New switch is to be provided for the MCR,
- Existing switches across blocks C, D, E, F, D are to be replaced.
- Communications racks in Blocks D and F are to be replaced with new 18RU 600W racks.
- The existing 33 WAPs are to be replaced. Additionally, WAP data outlets above 2.4m AFFL are to be relocated so they meet the latest EFSG requirements.

Refer to the ICT audit for additional details.

Telephony

The existing NEC system can be expanded to suit the works. A CPU upgrade and additional telephone handsets will be required for the new spaces within Block G.

PA

The existing PA system on site is to be expanded to suit the new building.

New speakers, interconnecting cabling and amplifiers are to be provided.

AV

The final AV design shall be completed by the contractor is consultation with the EFSG and Pattern Book.

Indicatively, this will involve:

- Interactive Learning Displays
- Mounting Hardware/ Mobile Trolleys
- Portable Hearing Augmentation

Security

A new Security Field Panel (SFP) is to be provided within the new BCR in Block G. New RS-485 LAN cabling is to be extended from the MCR to the new BCR in a star topology.

Indicatively, this will involve:

- PIR sensors throughout all new rooms.
- All perimeter doors leading will have reed switches to monitor door status.
- All electrical cupboards will be lockable with a master PWD “E” key.
- A sounder/screamer within each floor.

In addition to the above, the existing ‘Concept’ intruder alarm system controller is required to be replaced with an ‘Integriti’ system as detailed in the SSU security design

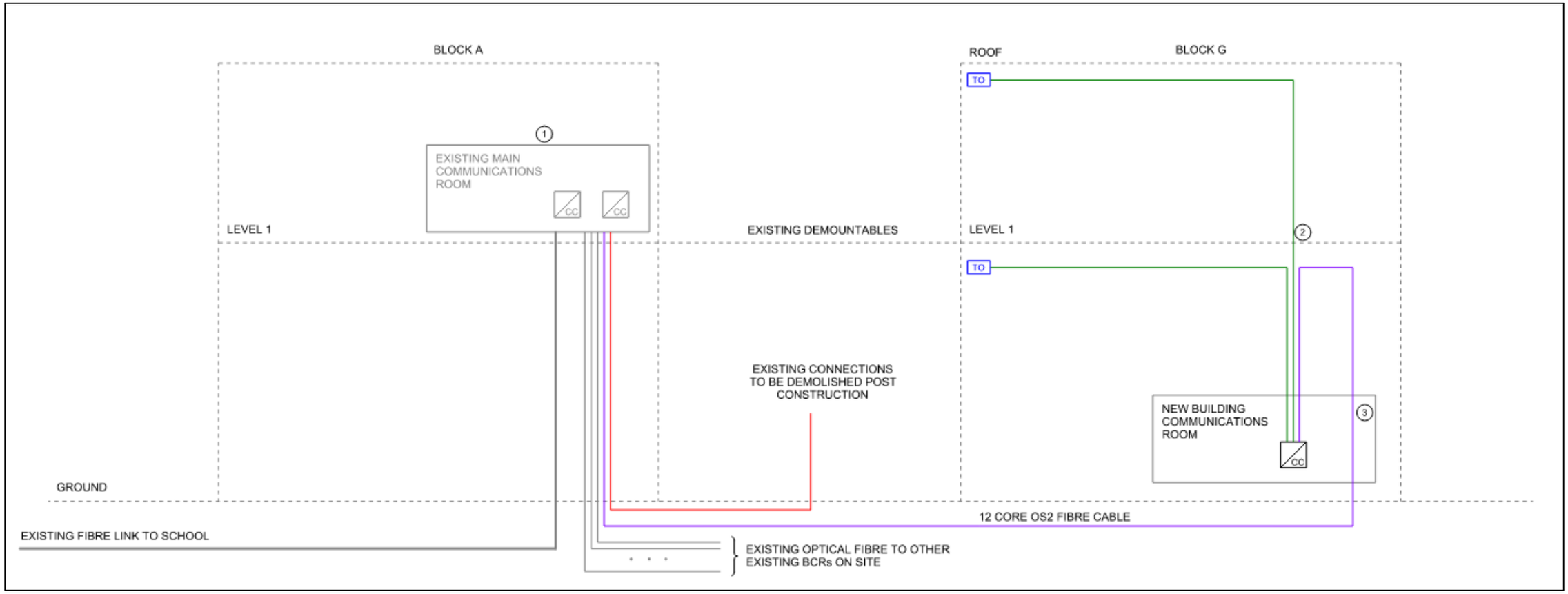
The final security design shall be based on the SSU brief.

Video Security

A video security system shall be provided as per the SSU Brief. Indicatively this will involve:

- Minimum 6MP POE Camera
- NVR upgrades to enable recording for 42 days at 20 frames per second.
- Cat6A cabling.

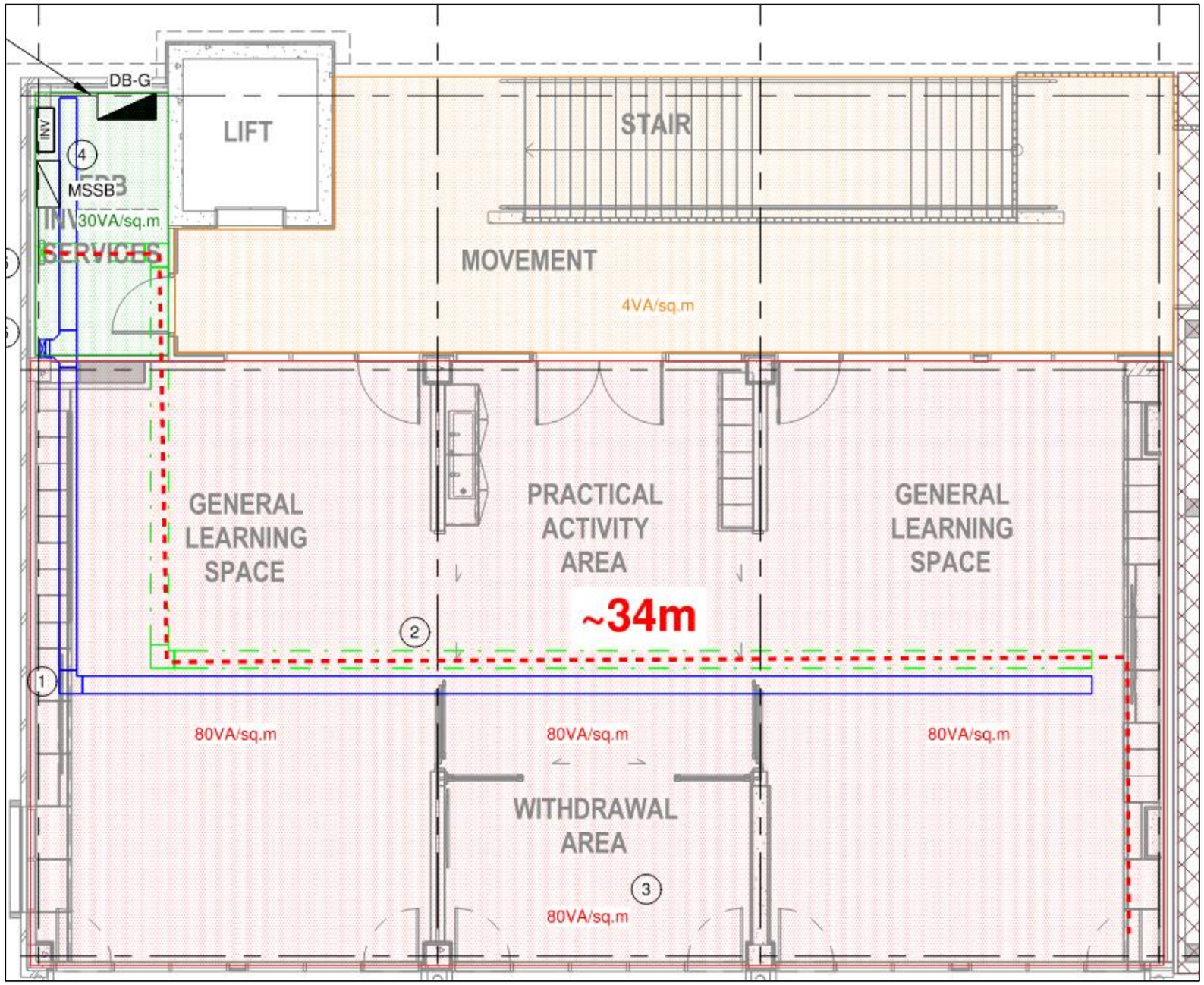
COMMUNICATIONS NETWORK



Cammeray Public School Communications Schematic

COMMUNICATIONS NETWORK

The placement of the new BCR is such that the maximum length of horizontal structured cabling will be less than 75m as per the ESFG.



RISKS & OPPORTUNITIES

Pattern Book Development and Release

The School Infrastructure Pattern Book is currently in development with portions released to date. The current designs have been based on the available sections of the pattern book, with the existing EFSG utilised where the relevant sections of the pattern book have not yet been released. Subsequent issue of the pattern book may result in the current designs varying from requirements documented in the pattern book. This may result in further design work being required if the plans are to be updated to the new requirements.

Connection Offer Time Limit

A connection offer for the required supply capacity of 363A per phase from the existing substation in a neighbouring lot has been received from Ausgrid. This connection offer is valid for a period of 45 business days. As the substation may also be used to supply other properties along Palmer Road, other works in the vicinity after the offer lapses may result in a reassessment indicating that the required supply capacity is no longer available.

Spare Capacity of Existing Electrical Reticulation System

The proposed reticulation system includes the use of existing conduits. Site surveys indicate the presence of spare capacity in the existing communications and low voltage conduits near the proposed new building. However, this will be need to be re-evaluated as the project progresses to detailed design once cable sizing is finalised.

Use of these existing conduits will reduce the disruption and damage to landscaping that results from trenching for the installation of new conduits as well as reducing project costs. However, this will necessitate common conduits and pits for both security and communications which does not technically comply with SSU requirements for separation of security services. A dispensation has been sought.

In-situ Replacement of MSB

For the reasons outlined in this report, the existing MSB is not fit for purpose and is proposed to be replaced. Replacement of the old board in-situ would be advantageous as it eliminates the need to relocate the main switch room elsewhere in or around Block A (heritage).

However, this will necessitate a shutdown period during the replacement works, which is recommended to occur during a school holiday period. Moreover, the sizing of the existing main switch room will need to be validated on-site once a board manufacturer has been engaged.

NDY
A TETRA TECH COMPANY

MECHANICAL SERVICES

Mechanical Services

CLIMATIC CONDITION & DESIGN CRITERIA

CAMMERAY PUBLIC SCHOOL

Ambient condition:
- Summer: 31.6°C DB, 23.7°C WB
- Winter: 7.1°C

(temperatures based on Sydney Observatory Hill weather station)

Site is not mapped as Bushfire Prone Land (BFPL). No impact on services identified at this stage.

Internal design condition for <u>new</u> buildings per EFSG DG 55.02:
- Cooling: 24 ~25.5 °C
- Heating: 19.5 ~ 21°C

Occupancy density:
- 2 sqm/person in accordance with EFSG for GLS
- 10 sqm/person for office / admin spaces in accordance with AS 1668.2

Internal equipment gains: 30 W/person, which allows for 1 laptop/person

Lighting heat gains: 4.5 W/m2 in accordance with NCC 2022

Fresh air provision:
- 12 L/s/person in classrooms
- 11.25 L/s/person in staff spaces

This meets 50% above AS 1668.2 requirements for Greenstar indoor air quality point, provided that high efficiency filter is provided.

AIR-CONDITIONING PROVISION REQUIREMENT

The following is noted from the SINSW Design Guidelines 55 on the provision of air conditioning:

Avg Mean Max Jan Temperature	New/Major Upgrade/Redevelopments Areas
≥33°C	**Provide to permanent learning spaces, staff, and administration areas.**
<33°C	**Provide to permanent learning spaces and libraries only.** Administration and staff areas to be conditioned ONLY when included in the project upgrade scope and inclusion is required to achieve compliance with the relevant standards. When not included, school can source their own fundings

Avg Mean Max Jan Temperature	Existing Areas
≥33°C	**Provide to permanent learning spaces and libraries only**. Admin and staff areas sourced by school own funding only.
≥30°C	**Provide to permanent learning spaces and libraries only.** No requirement for admin and staff areas
<30°C	**Schools may apply to SINSW for A/C to be installed in permanent learning spaces and libraries**

As Cammeray Public School is 31.6 C, which is <33°C but more than 30° C isotherm, AC is required to be provided to the followings per the EFSG:

- **New Building: learning spaces, admin/staff offices, and communications rooms**
- **Existing Building: learning spaces and libraries only**

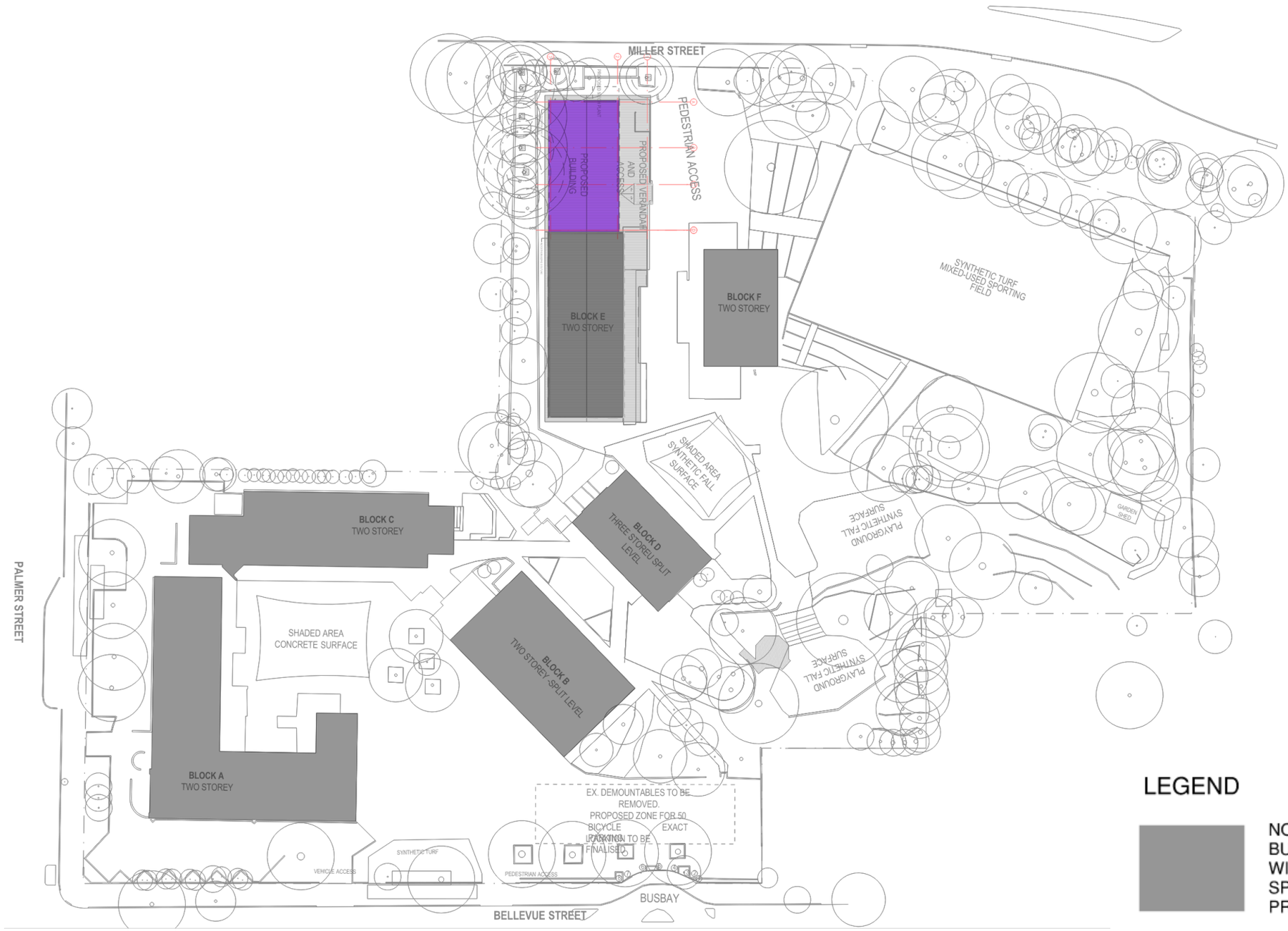
EFSG Cooler Classroom Program (CCP) Guideline defines the followings existing spaces as learning spaces:

Primary School	Secondary Schools
Home Base HB and associated Practical Activity Areas PAA (normally one space). Where separated by wall, PAA requires separate A/C	General Learning Spaces
Libraries and associated areas (reading, study, seminar rooms), provided the area is >17sqm. No A/C, fresh air, or controls for spaces <17sqm	
Withdrawal rooms (generally shared with Home Base and will share A/C and fresh air system with HB via vents/louvres or opening the door, unless separated and larger than 17sqm).	Practical rooms, including laboratories, kitchens & hospitality spaces, and performance and fitness workshops (but not gyms.)

Not Considered as Learning Spaces per CCP Guideline
• Preparation rooms (food & science) • Library workrooms and library offices • Storerooms • Any eligible rooms <15 sqm adjacent to air-conditioned space • Any room with open or meshed walls • Workshops • Hot metal area • Tin sheds • Craft room (if not learning space or PAA) • Seminar rooms (which are not part of library) • Study spaces • Darkrooms • Any spaces not used for learning by students

Cammeray Public School

Existing Site Plan and Existing A/C Provision



LEGEND

NO UPGRADES PROPOSED WITHIN THE BLOCK. BUILDING IS GENERALLY ALREADY PROVIDED WITH A/C OR A/C IS NOT REQUIRED FOR THE SPACES AS PER EFSG COOLER CLASSROOM PROGRAMS

NEW BLOCK TO BE PROVIDED WITH A/C AND VENTILATION AS REQUIRED. REFER TO ASSOCIATED DRAWINGS OF THE BLOCK FOR FURTHER DETAILS

Mechanical Services

TYPICAL COOLING & HEATING INFRASTRUCTURE SYSTEMS

From EFSG DG 55.02:

School Type	Air Conditioning System	Ventilation	Design Considerations
Cooling system capacity below 900 kW	Centralised ducted VRF	Ducted fresh air	• Refrigerant Charge • Energy Recovery Ventilator requirements due to specific conditions
Cooling system above 900 kW in a single building	Centralised ducted VRF Or Chilled/Heated Water System	Ducted fresh air	• Refrigerant Charge • Energy Recovery Ventilator requirements due to specific conditions • Centralised energy recovery ventilator to be considered • Chilled water system should be considered

For Cammeray Public School, it is expected that the cooling system capacity load will be <900 kW and thus a centralised ducted VRF system shall be applied. However, due to the constraint on the outdoor plant spatial, the VRF system has been proposed to be modified to split system which has similar refrigerant-based arrangement, except that each indoor unit is connected to its own smaller dedicated condenser.

Mechanical Services

AIR-CONDITIONING STRATEGY

NEW LEARNING BLOCK

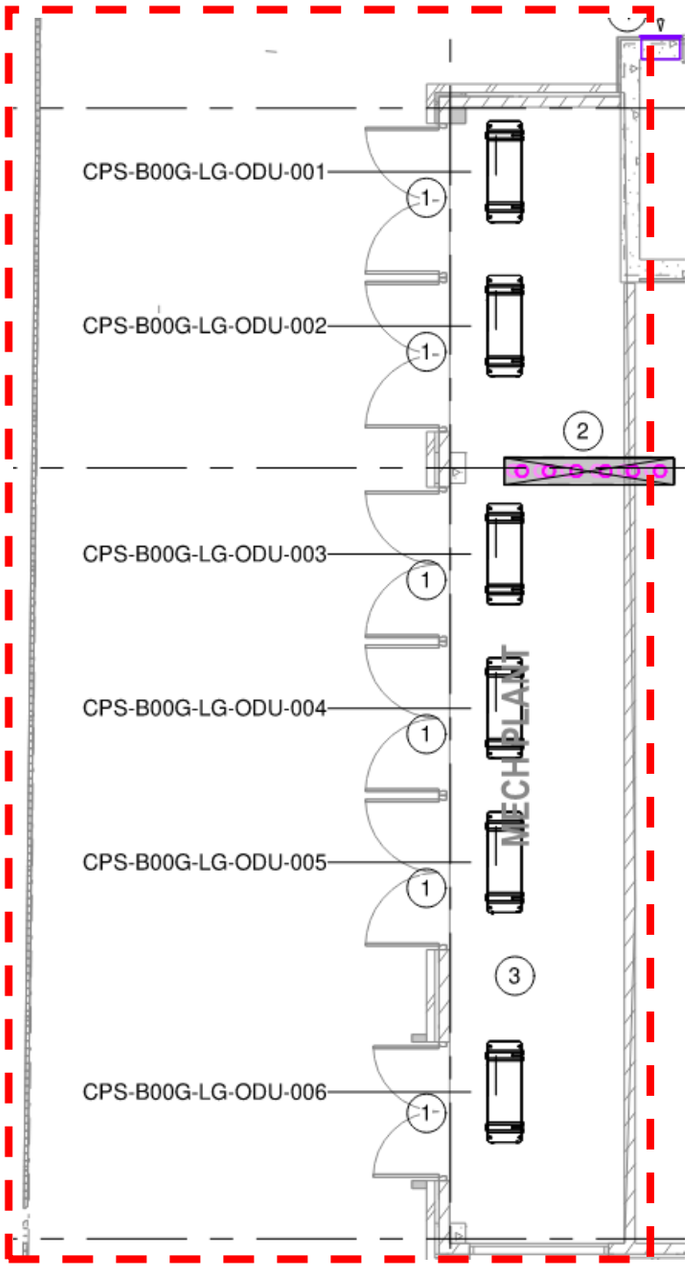
- GLS shall be air-conditioned with ducted split air-conditioning unit with side-discharge condensers located in the undercroft void below. Fresh air louvre for intake and relief air louvre for discharge are located on façade
- BCR room will be mechanically ventilated as allowed by EFSG DG 55 in lieu of air-conditioned due to limited plant space. Makeup air will be via corridor
- EDB room will be mechanically ventilated with discharge to external via roof cowl
- Lift is assumed to be of concrete and will be mechanically ventilated with exhaust discharge via roof cowl on roof and makeup air louvres at low level

Air-Conditioning Plant Spatial

OUTDOOR PLANT

New Learning Building

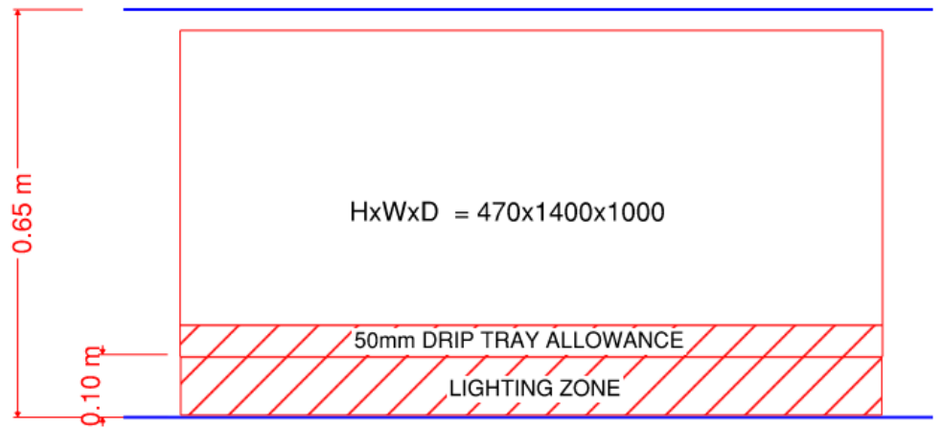
As dedicated plant space is not feasible due to the heritage nature of the surrounding area, the A/C condensers for the new learning building are proposed to be located within the void below the Ground Level, as shown in the snippet below. The units will be located behind hinged louvre, allowing access to units.



INDOOR CEILING SPACE

The indoor ceiling space required to accommodate the new ducted indoor unit in the new building space is estimated to be:

650 mm (clear) high minimum.



Mechanical Services

MECHANICAL CONTROL STRATEGY

Standalone proprietary control is proposed for Cammeray Public School to serve the mechanical system.

NEW BUILDING

The standalone proprietary control shall meet EFSG requirements, which include:

- Weather measurement will be used to determine favorable ambient conditions, to inform traffic light system of favorable outdoor conditions
- Dedicated space temperature sensor and CO2 sensor shall be provided to each general learning space
- User interface for operation of the systems via a Local Control Point incorporating pushbutton & Blue, Green and Yellow mode LED indication lights
- Controller to control the A/C in the new building

For general learning space, the traffic light Indication