PYMBLE LADIES COLLEGE
GREY HOUSE PRECINCT
ELECTRICAL REPORT

SSDA – ELECTRICAL INFRASTRUCTURE REPORT

Prepared for: Pymble Ladies' College

Attention: Kate Bimson

Date: 16 August 2021

Prepared by: Theodore Mirabile

Ref: 3013503239

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Revision

Revision	Date	Comment	Prepared By	Approved By
001	16.07.21	Draft	TMM	TMM
002	16.08.21	Final	TMM	TMM

Contents

1. Introduction

This report has been prepared to accompany a detailed State Significant Development Application (SSDA) for the new Pymble Ladies College (PLC) Grey House Precinct (GHP) development, located within the PLC grounds at Avon Road, Pymble 2073. This report has been prepared in response to the requirements contained within the Secretary's Environmental Assessment Requirements (SEARs) SSD-17424905 specifically, in response to the following SEARs:

SEARs Reference	SEARs Description	Report Section
13	In consultation with relevant service providers: • Assess the impacts of the development on existing utility infrastructure and service provider assets surrounding the site • Identify any infrastructure upgrades required off-site to facilitate the development and any arrangements to ensure that the upgrades will be implemented on time and be maintained. • Provide an infrastructure delivery staging plan, including description of how infrastructure requirements would be co-ordinated, funded and delivered to facilitate the development.	Section 2 Section 3 Section 4

1.1 Development Description

The Grey House Precinct is the first major project resulting out of the newly adopted 2020 Pymble Ladies College Master Plan. The new development will include spaces for Early Learning Centre, Out of School Hours Care, Health Services, Dance Studios and learning spaces for years 5 & 6 accommodating classroom spaces for approx. 400 students.

The proposed site for the new building is located between the existing gym and Centenary Sports precinct to the west, and existing Junior School buildings to the east.

Figure 1: Development Site Location Plan

2. Existing Infrastructure

2.1 General Power Information

The Supply Authority for the site is Ausgrid.

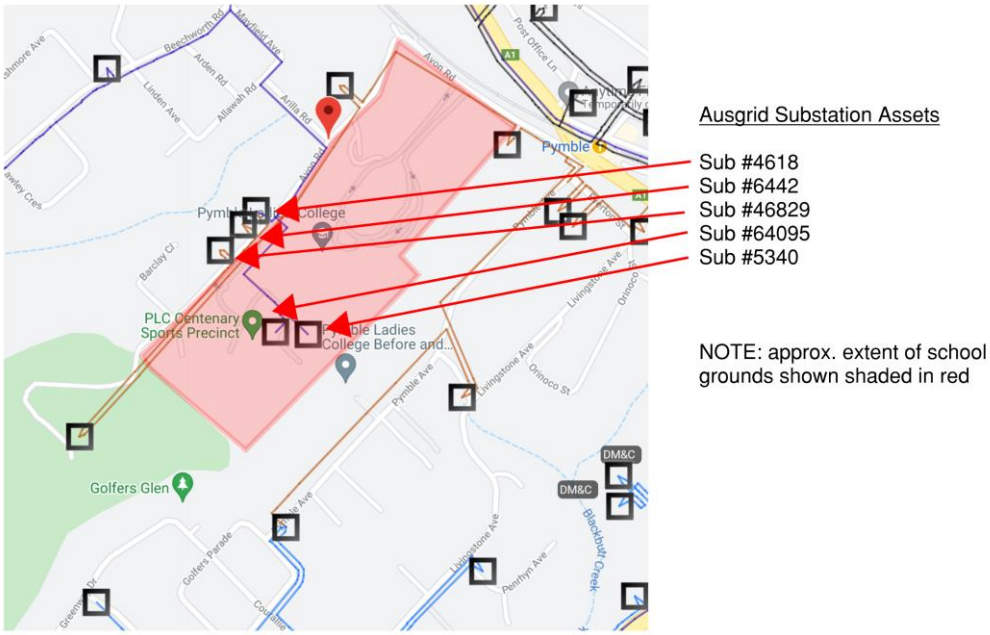

Figure 2 – Ausgrid Assets Surrounding the Site

The electrical infrastructure assets surrounding the site form part of the local Ausgrid distribution network for the local area and mainly consists of HV feeders and distribution substations that supply power the school as well as the local neighbourhood. The existing school has multiple supply points and is supplied via several substations along Avon Rd and within the school grounds including:

1. Sub # 4618 (Avon Rd) - supplies 'Zone 4'
2. Sub # 6442 (Avon Rd) - supplies 'Zone 3'
3. Sub # 46829 (Avon Rd) - supplies 'Zone 2'
4. Sub # 64095 (within school) - supplies 'Zone 5'
5. Sub #5340 (within school) - supplies 'Zone 1'

Refer to Appendix 1 for indication of school reticulation zones.

2.2 Existing Substation #5340

The proposed location for the GHP development currently accommodates and existing Ausgrid kiosk type substation (asset #5340). The relatively inaccessible and seemingly non-compliant location (to current Ausgrid Network Standards) seems to suggest that the substation is an older installation that has been around for some time.

Existing substation #5340 is required to be 'relocated' as part of the new GHP development works.

Figure 3 - Existing substation #5340 in relation to the proposed new GHP development site

The Single Line Diagrams received to date indicate that two off low voltage supplies emanate from existing substation #5340 (red) to supply power both Main Switchboard # 2 – Year 5 Block (blue) and Main Switchboard # 3 - Gymnasium (green). From here, power is distributed downstream to various other distribution boards in various other buildings. Refer to Appendix 1 for further details.

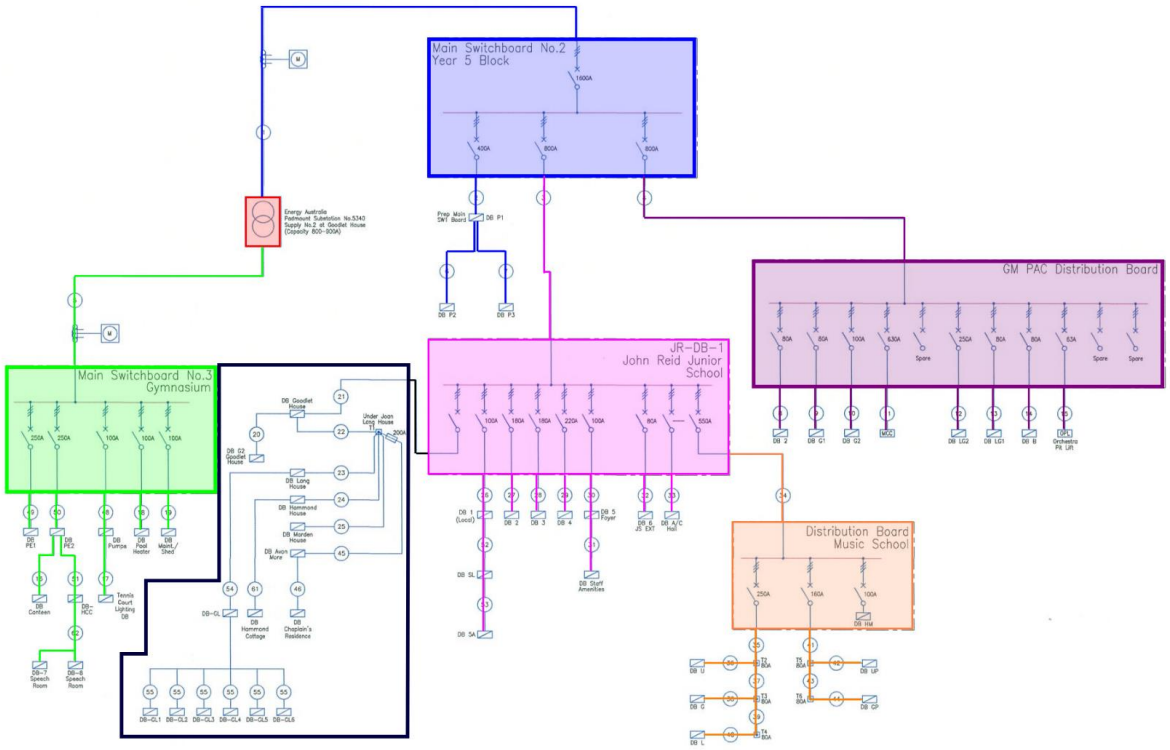

Figure 4 - Single Line Diagram showing substation #5340 and downstream switchboards

2.3 Existing Communications Infrastructure

The new GHP development will connect into the existing PLC private fibre LAN network which currently links all buildings together on site. Existing fibre network infrastructure is located adjacent to the proposed GHP development site and it is intended that the new development will simply plug into the existing network.. The image below indicates the approximate location of the existing school LAN fibre infrastructure located in underground conduit.

Utility network infrastructure will not be affected by the new development.

Figure 5 - Site fibre reticulation diagram showing existing fibres close to the construction zone circled in red.

3. Proposed Infrastructure Upgrades

3.1 New Substation

A preliminary max demand calculation for the new development (incorporating and allowance for the reconnection of existing MSB#3 and MSB#5) has determined that the new substation shall be sized to 1000kVA. Refer to Appendix 2 for further details on the max demand calculation.

Due to the nature of the site, the preferred configuration for the new substation is a new kiosk substation. The required easement dimensions for the new kiosk are noted below:

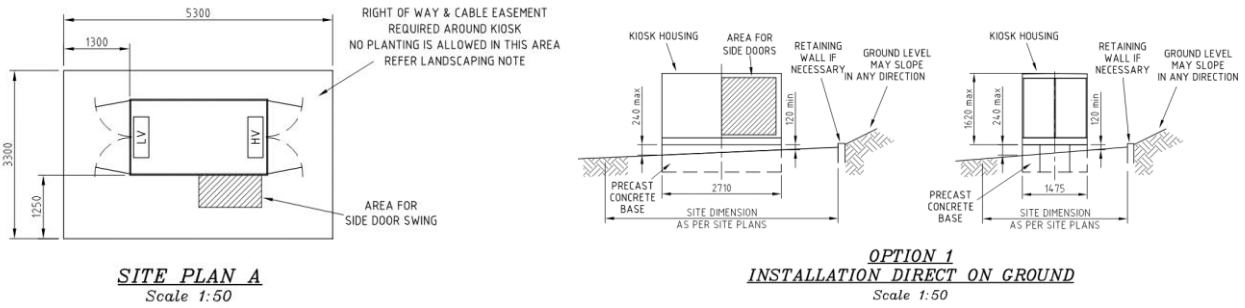

Figure 6 - Ausgrid standard details for new kiosk substation

Various options for the location of the new kiosk substation have been assessed (mainly being behind Goodlet House or behind Lang House adjacent to existing substation #64095) and due access and constructability issues it has been decided that the preferred location for the new substation is behind Lang House adjacent to the existing substation per below.

Note: As the existing substation #5340 supplies power to MSB #2 and MSB #3, there is a requirement to keep these building operational during the substation works. As such, in order to maintain supply a staged approach for the new substation installation is required. The new substation will need to be established while the existing remains online to supply the MSBs, and then services cutover to the new substation over a staged shutdown (likely overnight or over the weekend).

Figure 7 - Proposed location of new kiosk substation behind Lang House adjacent to existing

An Application for Connection has been submitted to Ausgrid and the Level 3 ASP design for the new substation is progressing on this basis.

3.2 New Site Main Switchboard

Due to non-compliances in the existing supply configuration, and as a method to introduce flexibility into the proposed supply configuration, a new Site Main Switchboard will be provided as part of the new works.

Note: the non-compliances exist in the existing configuration where the supplies to MSB#2 and MSB#3 pass through Authority meters (circled in red below) without a Service Protection Device. NSW Service and Installation Rules require that a Service Protection Device (similar to a Main Isolator) be provided before the Authority metering position such that the supply can be isolated. Currently these SPDs does not exist.

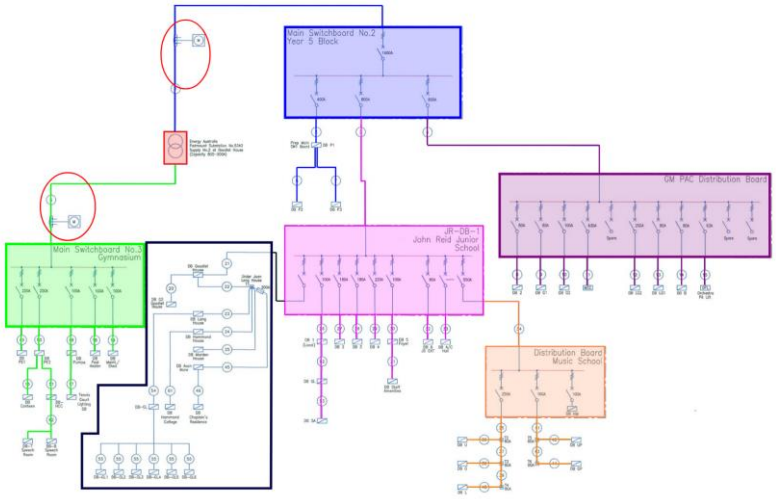

Figure 8 - Existing Single Line Diagram showing Authority meter locations without upstream SPDs

The introduction of a new Site Main Switchboard upstream of existing MSB#3 and MSB#5 means that a new compliant configuration can be provided (incorporating a new SPD as required) with minimal works required to the existing MSBs. The additional benefit of providing a new Site Main Switchboard means that there will be a single connection from the new substation to the new Site MSB meaning that there will be a single Authority Meter – the two existing separate billing arrangement for MSB #3 and MSB #5 will now be a combined meter (which may introduce other benefits such as lower tariff rates for a larger combined electrical consumption).

In the image above, the introduction of a new site main switchboard will consolidate Authority metering and the requirement to provide new SPDs, as demonstrated in below.

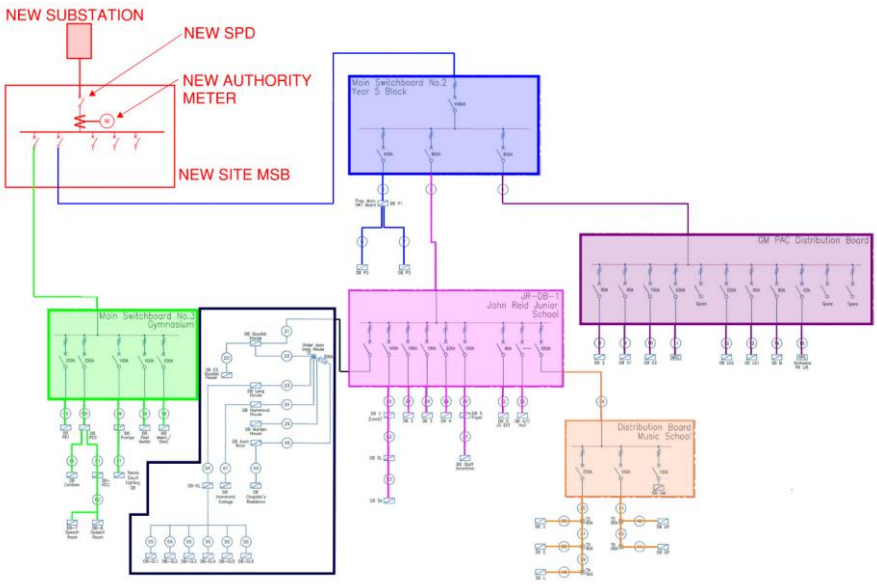

Figure 9 - Existing Single Line Diagram showing new Site Main Switchboard

Due to the fact that the new Site Main Switchboard is required to supply existing MSB#3 and MSB#5, the location of the new switchboard needs to be close to the existing (removed) substation location as possible in order to minimise new submains cabling and/or cable extensions to the new location. For this reason the location of the new Site Main Switchboard is proposed to be behind Goodlet House. Refer to Appendix 3 for details on the proposed location and staged approach to install the new substation and associated site Main Switchboard.

Figure 10 - Proposed location of new site Main Switchboard behind Goodlet House

3.3 Existing Main Switchboard # 3 and MSB #5

The existing main switchboard MSB #3 and MSB #5 affected by the new substation and site main switchboard installation are anticipated to remain. Existing consumers mains cabling from the demolished substation to these existing switchboard locations will be relocated and extended to be fed from the new site Main Switchboard location. Refer to Appendix 3 for further details on the proposed configuration.

4. New Infrastructure Delivery

4.1 New Substation Works

As noted previously in this report, the existing substation #5340 (being removed/relocated as part of the new GHP development) supplies power to MSB#2 and MSB#3 which in turn supply power to existing parts of the school required to remain operational during the relocation works. In order to facilitate the requirement for the existing school to remain operational, the installation of the new substation and the associated new site Main Switchboard (located outside the new development boundary) are required to be brought forward as an early works package such that the new substation can supply the existing switchboards prior to the demolition of the existing substation.

4.2 Proposed Staging

The staging methodology associated with proposed substation works is noted below. It is expected that the final staging of the works will be further coordinated by the Level 1 ASP at the time of construction and be funded as part of the overall construction cost for the new development.

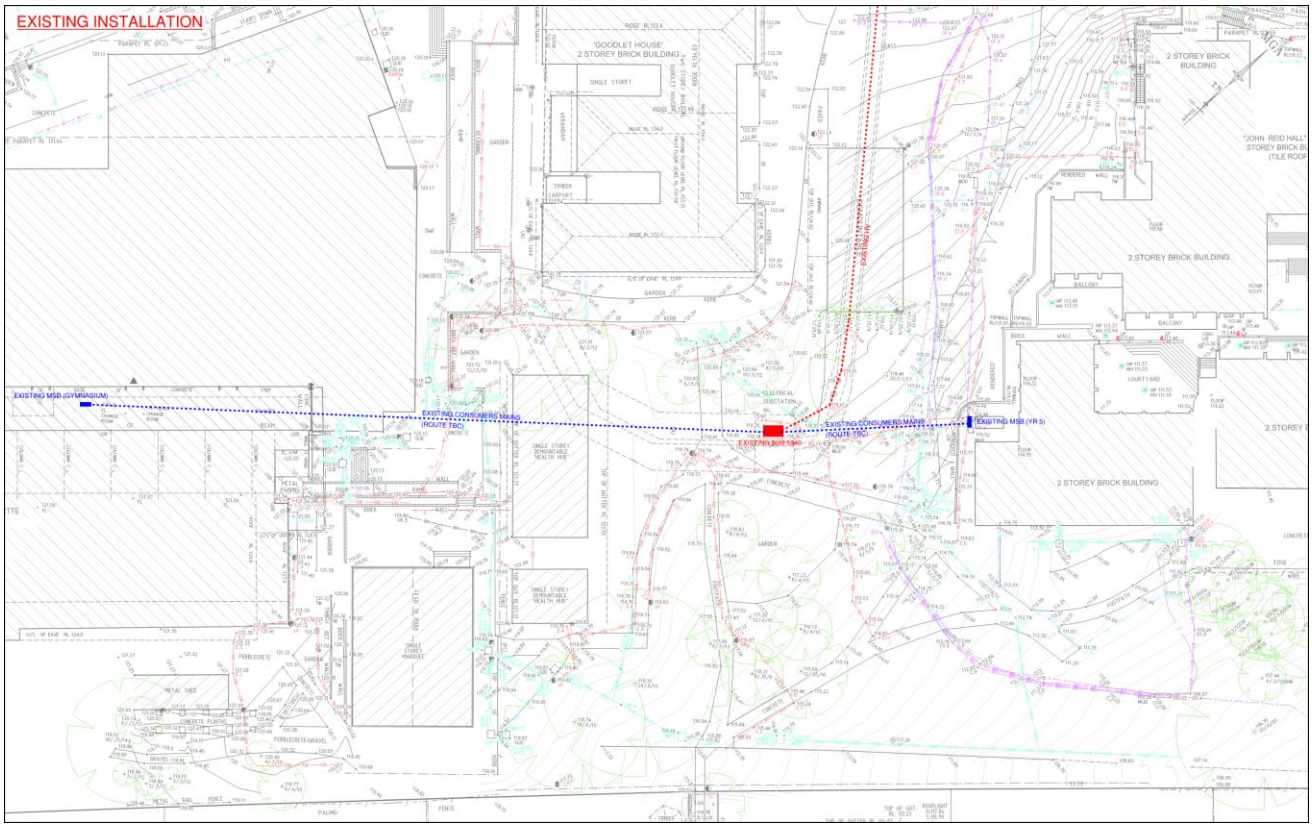

Figure 11 - Existing Installation

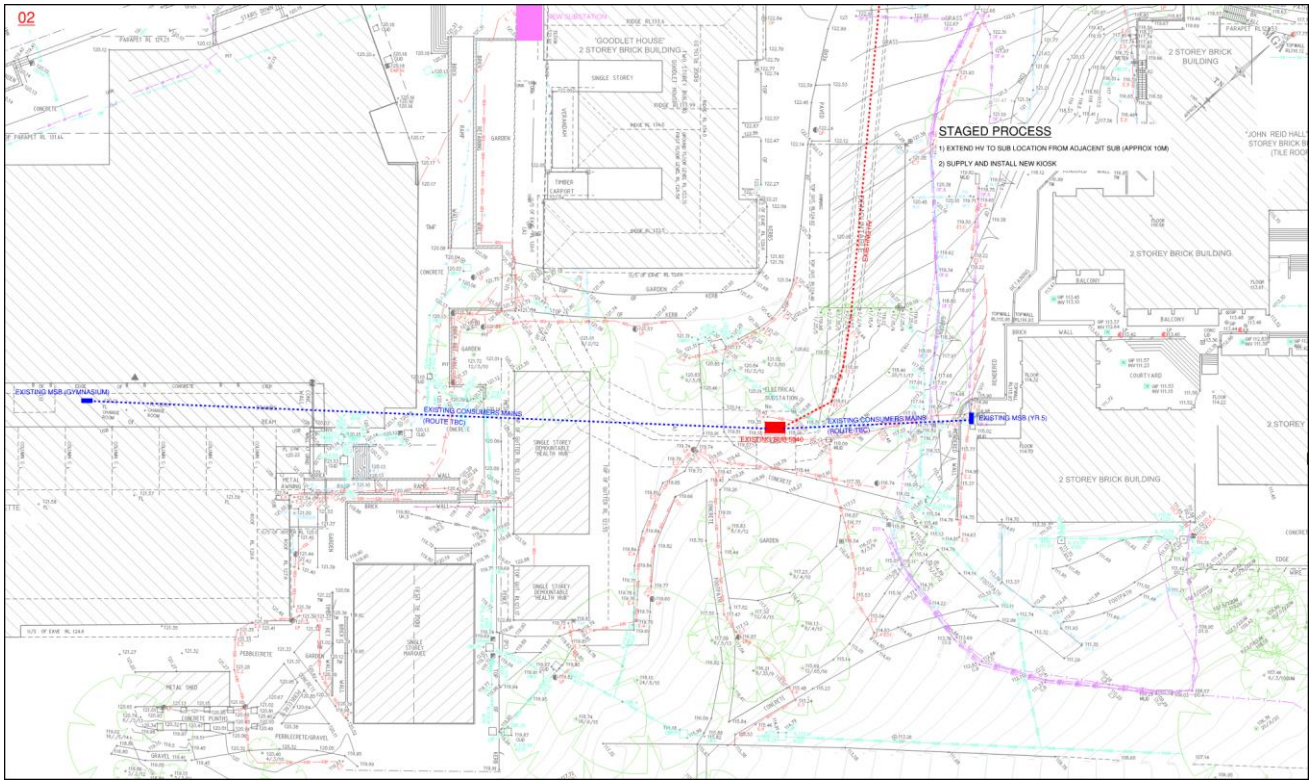

Figure 12 - Stage 1 – Extend existing HV cables to new substation location and install new kiosk substation adjacent to existing substation #46095

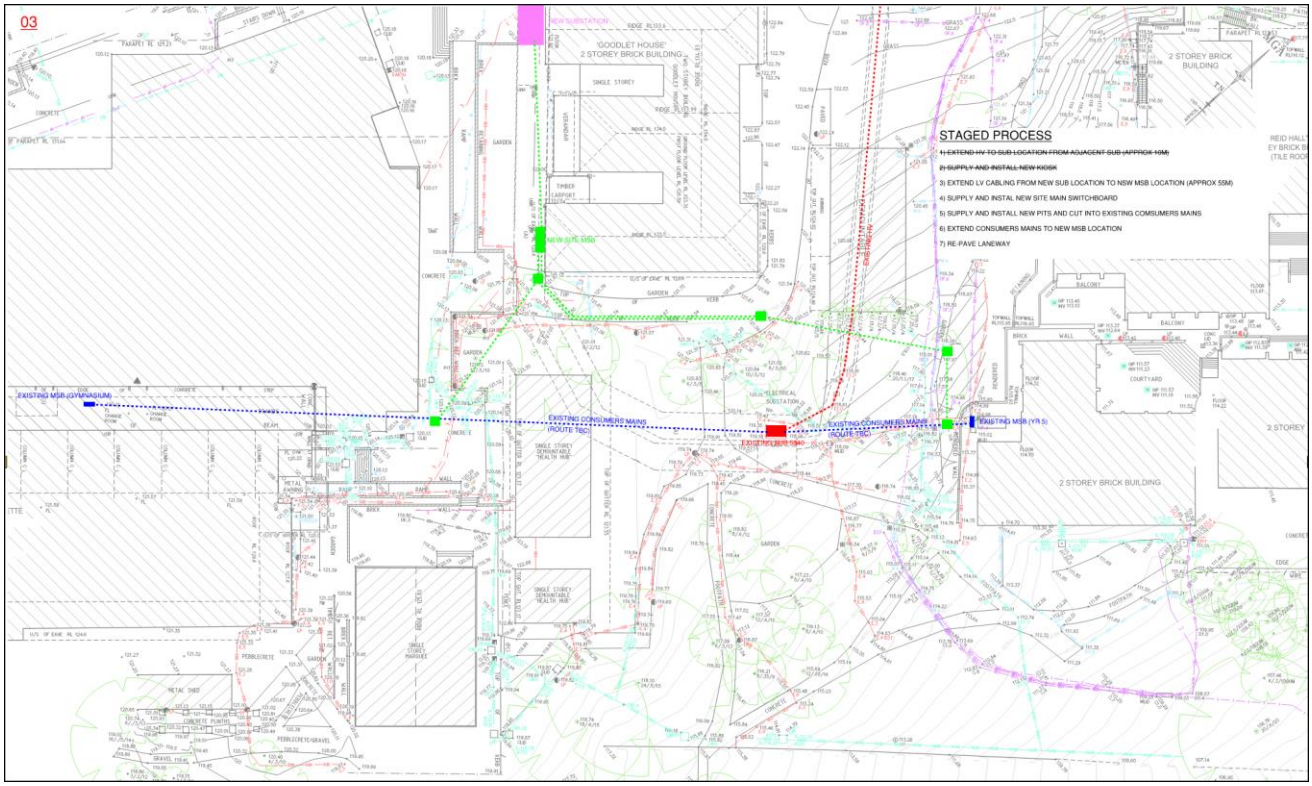

Figure 13 - Stage 2 – Supply new Main Switchboard and LV cabling from new substation to new Main Switchboard. Extend new submains from new Main Switchboard to existing MSBs in existing buildings to remain.

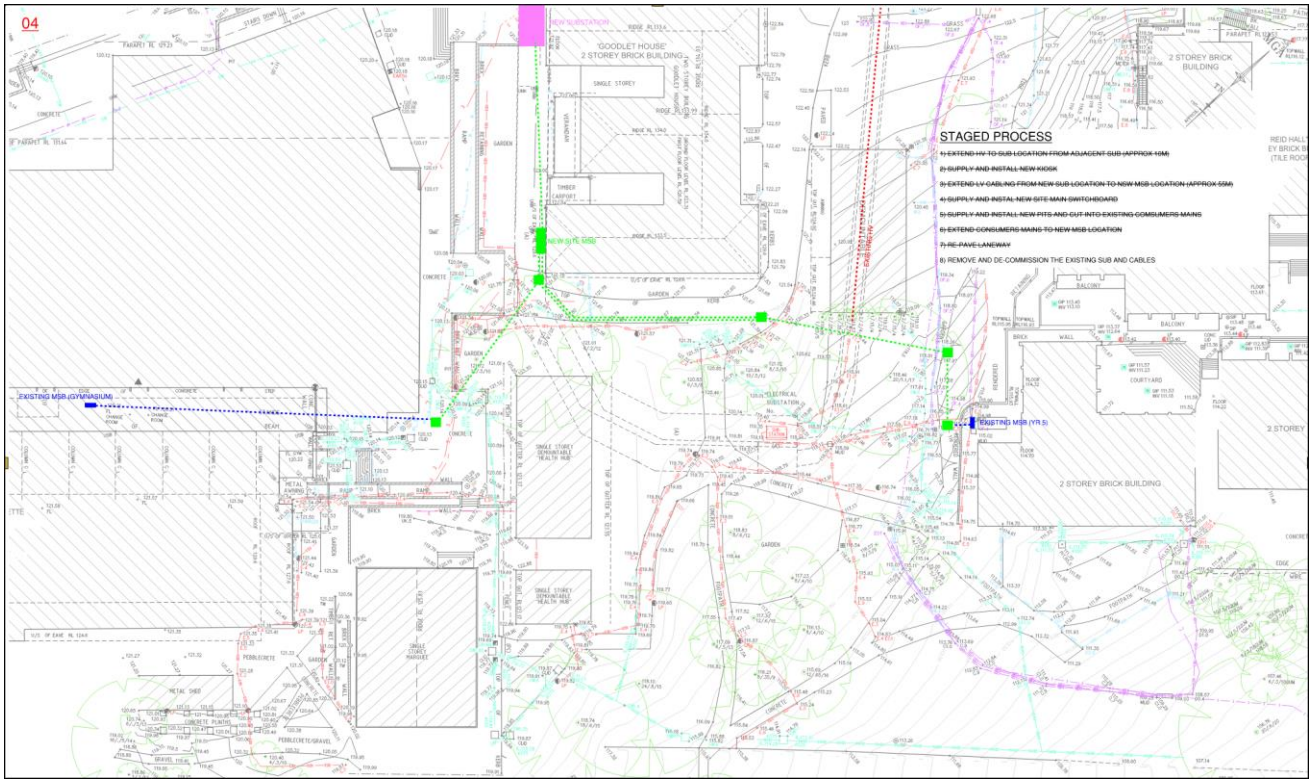

Figure 14 - Stage 3 – Remove existing substation

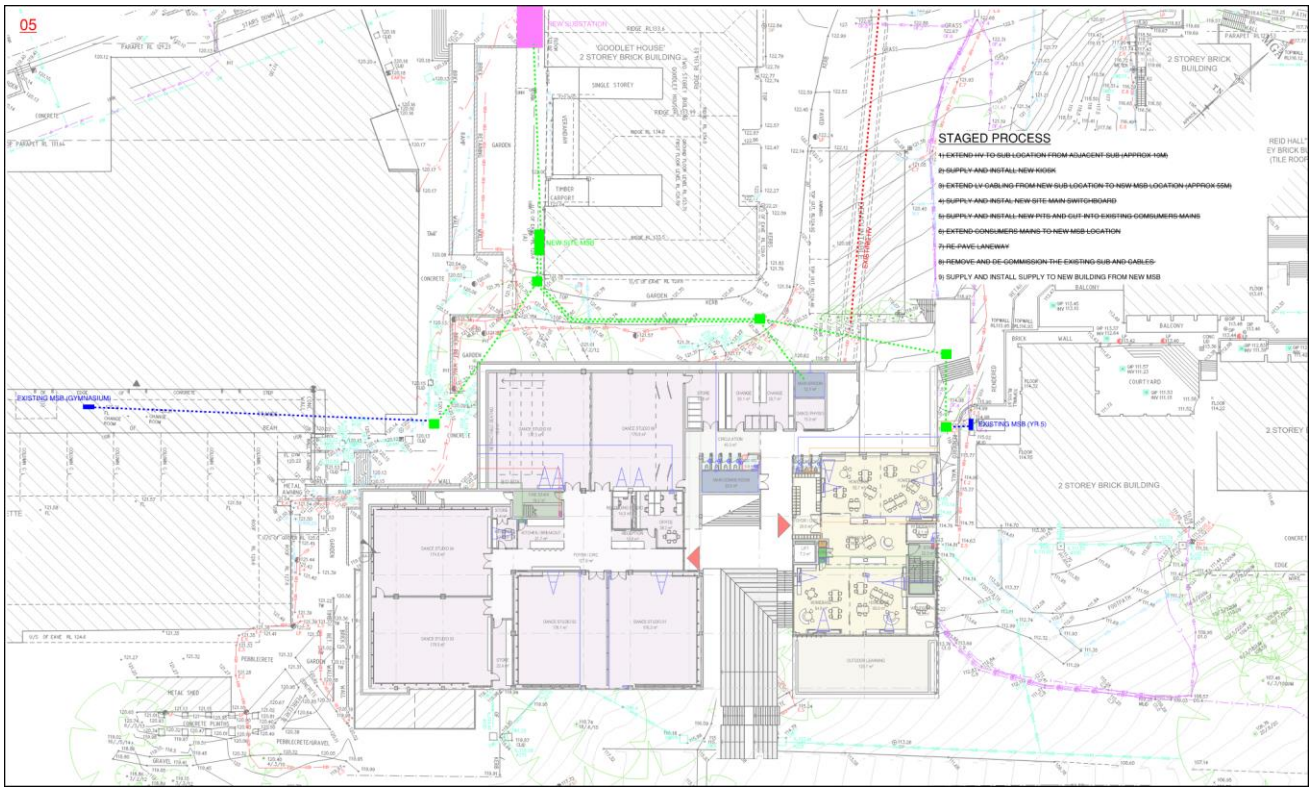

Figure 15 - Stage 4 – Supply new LV cabling from new Main Switchboard to new GHP building

5. Appendices

5.1 Appendix 1 – School Reticulation Zones

REFERENCE DOCUMENT REGISTER

DESCRIPTION	DRAWING NO.	REVISION OR DATE
ARCH		
HYDRAULIC		
MECH		
INTERIOR DESIGN		
KITCHEN/BAR		
OTHER		

PYMBLE LADIES COLLEGE - MASTER PLAN

NOTES:
1. Haron Robson is the owner of the copyright subsisting in these drawings and specifications which must not be reproduced or copied without prior written consent.
2. Do not scale drawing. Verify all dimensions on site.
3. Outlet locations are diagrammatic only, refer to Architect's drawings for exact location.

Legend

Reticulation

- Existing main switchboard to remain
- Existing distribution board to remain
- MCC — Motor Control Centre
- Electrical Pit
- DB-## — Existing Switchboard Name
- DB-## — New Switchboard Name

Smoke Detection System and Sound system & intercom system For emergency purposes

- FIP — Fire indicator panel

Switchboard

- Busbar no. of bars = no. of phases
- 20 — Circuit breaker, rating in amps
- Current transformer, one for each phase with removable links
- 1 — Cable number, refer to reticulation schedule
- Substation Transformer

ZONE 1

ZONE 2

ZONE 3

ZONE 4

ZONE 5

REDIRECTED TO BE FED FROM NEW POOL BUILDING?

SUPPLY FROM WHERE?

POOL BUILDING NOT SHOWN

FOR CONTINUATION REFER TO DRAWING ES02

A	AS-INSTALLED	01-10-13
P1	PRELIMINARY ISSUE	07-06-13

Amendments:

Project:
PYMBLE LADIES COLLEGE
MASTER PLAN

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WE UNDERSTAND AUDIO VISUAL, LIGHTING, ENERGY AND ELECTRICAL SYSTEMS AND ADVISE ON THESE ISSUES WORLDWIDE.

Drawing Title:
ELECTRICAL SERVICES
PART SITE PLAN (SOUTH)

Date Printed:	Scale:	Brd Size:	Drawn:	Chkd:	Date:
09:48 01-10-13	N.T.S.	A0			

Project No.:	No. In Set/Drawing No.:	Issue:
13857	05/ES01	A

5.2 Appendix 2 – Max Demand Assessment

Stantec

Memo

Project:	PLC GHP	**Project No:**	301350239
To:	Kate Bimson	**Date:**	23 March 2021
From:	Theodore Mirabile		

RE: Electrical Max Demand

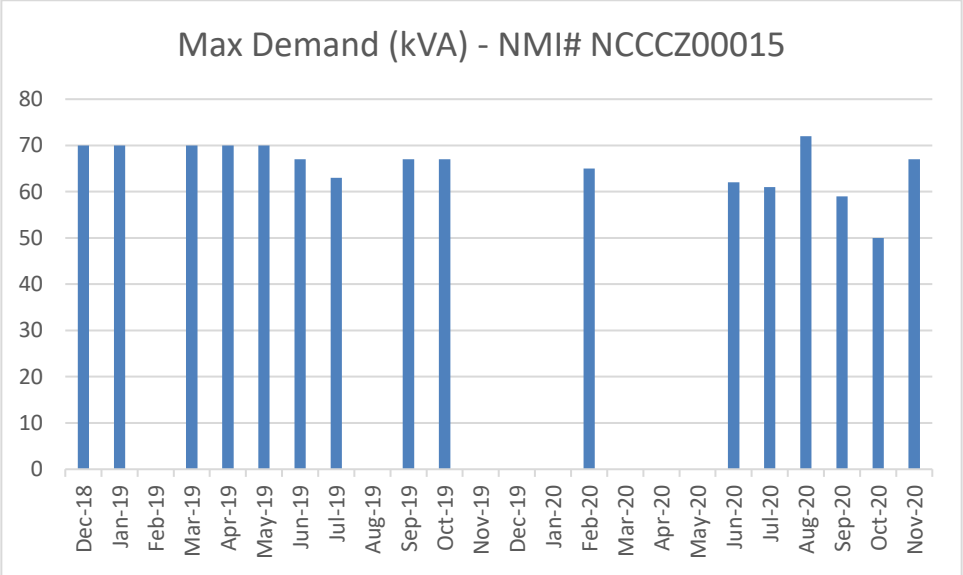
Dear Kate,

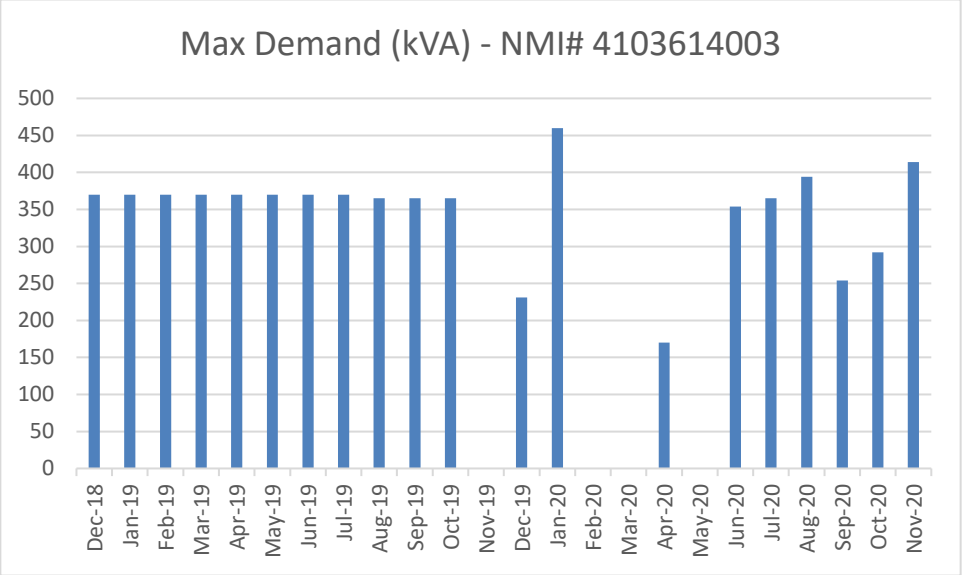
Existing Max Demand – Existing Substation

The kiosk substation located within the development site (Ausgrid asset #5340 - required to be relocated as part of the new works) is currently supplying two off main switchboards as listed below (refer to Single Line Diagram attached):

- Main Switchboard #3 (Gymnasium) – and associated downstream switchboards (highlighted green)
    - Supply Authority Metering NMI# NCCCZ00015
- Main Switchboard #2 (Year 5 Block) – and associated downstream switchboards (highlighted red)
    - Supply Authority Metering NMI# 4103614003

Billing information received for each of these Main Switchboards indicates a corresponding monthly max demand as noted below:





Based on the above the max demand for each Main Switchboard (and therefore the existing substation) is as follows:

- Main Switchboard 3 (Gymnasium) NMI# NCCCZ00015 - 72 kVA
- Main Switchboard 2 (Year 5 Block) NMI# 410364003 - 460 kVA

Existing substation max demand - 532 kVA

Proposed Max Demand – New Substation

The max demand for the new substation (proposed to replace the existing substation in the new location) has been determined using AS3000 Table C3 as follows:

- New building max demand - 5600m2 (new building area) @ 80VA/m2 - 448 kVA
- Existing max demand (noting existing supplies are to remain) - 532 kVA

Total max demand of new substation - 980 kVA

NOTE: The max demand for the new substation noted above is based on preliminary information available at this stage of the project and will be refined as the project develops and the details around the electrical loads of the building are finalised.

Based on the above, it is anticipated that a single 1000kVA kiosk substation will be adequate to replace the existing substation.

Yours sincerely

Stantec Australia Pty Ltd

Theodore Mirabile
Electrical Project Engineer

Design with
community in mind

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For more information please visit www.stantec.com

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