



ELECTRICAL INFRASTRUCTURE MANAGEMENT PLAN FOR SSDA

Kincoppal Rose Bay School (Concept and Stage 1)

2 Vaucluse Road, Vaucluse NSW 2030

PREPARED FOR

Kincoppal-Rose Bay School of the Sacred Heart
C/- Mahady Management
terrymahady@gmail.com
0411 510 073

Ref: SY202367-ER01

Rev: 1

Date: 16.09.2020

Electrical Infrastructure Management Plan for SSDA

Revision Schedule

Date	Revision	Issue	Prepared By	Approved By
16.09.2020	1	Preliminary Issue	T. Sailing	Y. Maharaj

Northrop Consulting Engineers Pty Ltd

ACN 064 775 088 | ABN 81 094 433 100

Level 11, 345 George Street, Sydney NSW 2000

02 9241 4188 | sydney@northrop.com.au | www.northrop.com.au

© 2020 Northrop Consulting Engineers Pty Ltd. All rights reserved.

This document has been prepared on behalf of and for the exclusive use of Kincoppal-Rose Bay School of the Sacred Heart, and is subject to and issued in accordance with the agreement between Kincoppal-Rose Bay School of the Sacred Heart and Northrop Consulting Engineers. Northrop Consulting Engineers accepts no liability or responsibility whatsoever for it in respect of any use of or reliance upon this document by any third party. Copying this document without the permission of Kincoppal-Rose Bay School of the Sacred Heart or Northrop Consulting Engineers is not permitted.

Executive Summary

This Infrastructure Management Plan (IMP) report for Electrical and Telecommunications services has been prepared by Northrop Consulting Engineers Pty Ltd (Northrop) on behalf of Kincoppal-Rose Bay School of the Sacred Heart (the School) for the State Significant Development Application related to the Kincoppal Rose Bay School (Concept and Stage 1) projects (the Project).

This IMP outlines the existing infrastructure, detailing information on the existing capacity and any augmentation to the aforementioned services required for the proposed development. The report also details records of consultation with relevant agencies. The details within this report are preliminary and based on currently available information and correspondence undertaken at the time of writing.

This report is provided in response to the Secretary's Environmental Assessment Requirements (SEARs) issued for the project and has been prepared for lodgement to the State Significant Development (SSD) application for the Kincoppal Rose Bay School (Concept and Stage 1) project. This IMP addresses the Infrastructure Management Plan requirements held within Item 14 of the SEARs.

Table of Contents

Executive Summary	2
1. Development Description	4
2. SEARS Issues Addressed	7
3. Site Description	8
4. Existing Services.....	9
4.1 Power	9
4.2 Telecommunications	12
5. Proposed Infrastructure & Augmentation.....	17
5.1 Power	17
5.2 Telecommunications	20
6. Conclusion	21

1. Development Description

Client	Kincoppal-Rose Bay School of the Sacred Heart
Client Acronym	KRB
State Significant Development Number	SSD 10325
Project Name	Kincoppal Rose Bay School (Concept and Stage 1)
Project Address	2 Vaucluse Road, Vaucluse NSW 2030

The Project covered by this SSDA proposes an expansion and refurbishment of existing school facilities. Refer to Site Concepts produced by BVN in Figure 1, Figure 2 and Figure 3.

The proposed works comprise the following two components:

1.1.1 Concept Development

- Refurbishment of internal spaces within the Senior School to create an integrated circulation hub providing a greater level of access, circulation and permeability through the School (Precinct B).
- Internal alterations to the Hughes Centre (Precinct B).
- The extension and expansion of the existing boarding house (Precinct C).

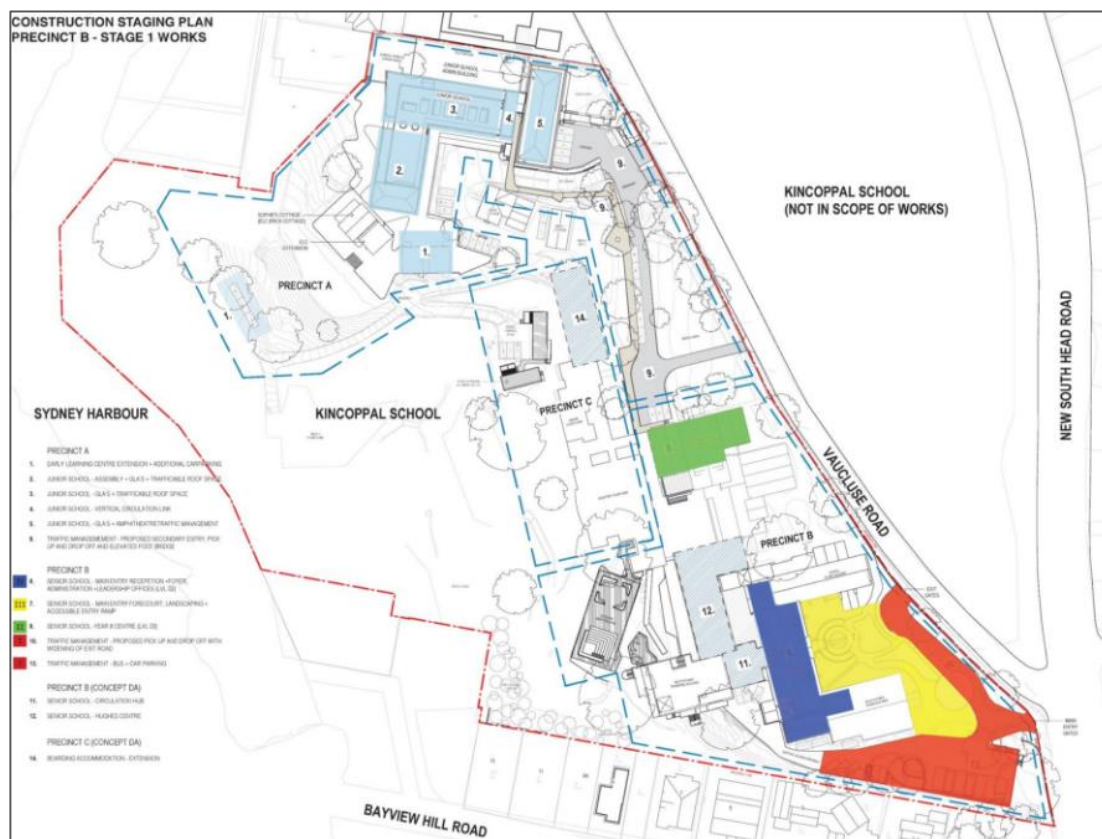
1.1.2 Detailed Development

1.1.2.1 Junior School (Precinct A)

- Provision of on on-site bus parking bay and associated parking area adjacent to the main entrance (Precinct B).
- Additional staff carparking at the lower levels of the campus below the Junior school playground.
- A trafficable roof space, encompassing Precinct A, (note this space is for KRB use only, and will be utilised out of school hours).
- An elevated pedestrian pathway/bridge for access to the Junior School (a developed design element to enhance pedestrian safety as part of Precinct B).

1.1.2.2 Senior School (Precinct B)

- Expansion and refurbishment of Level 3 of the North Wing to provide additional learning and staff areas for Year 8.
- Refurbishment of the Senior School Reception and upgrade of the Main Entrance, including replacement of vehicular access with pedestrian friendly access and associated landscaping.
- Reconfiguration of the main forecourt to provide a dedicated bus parking area for setdown/pickup, separate carpark area and separate pedestrian pathway.
- Provision of on on-site bus parking bay and associated parking area adjacent to the main entrance.
- Construction of a new driveway crossing and internal road from Vaucluse Road



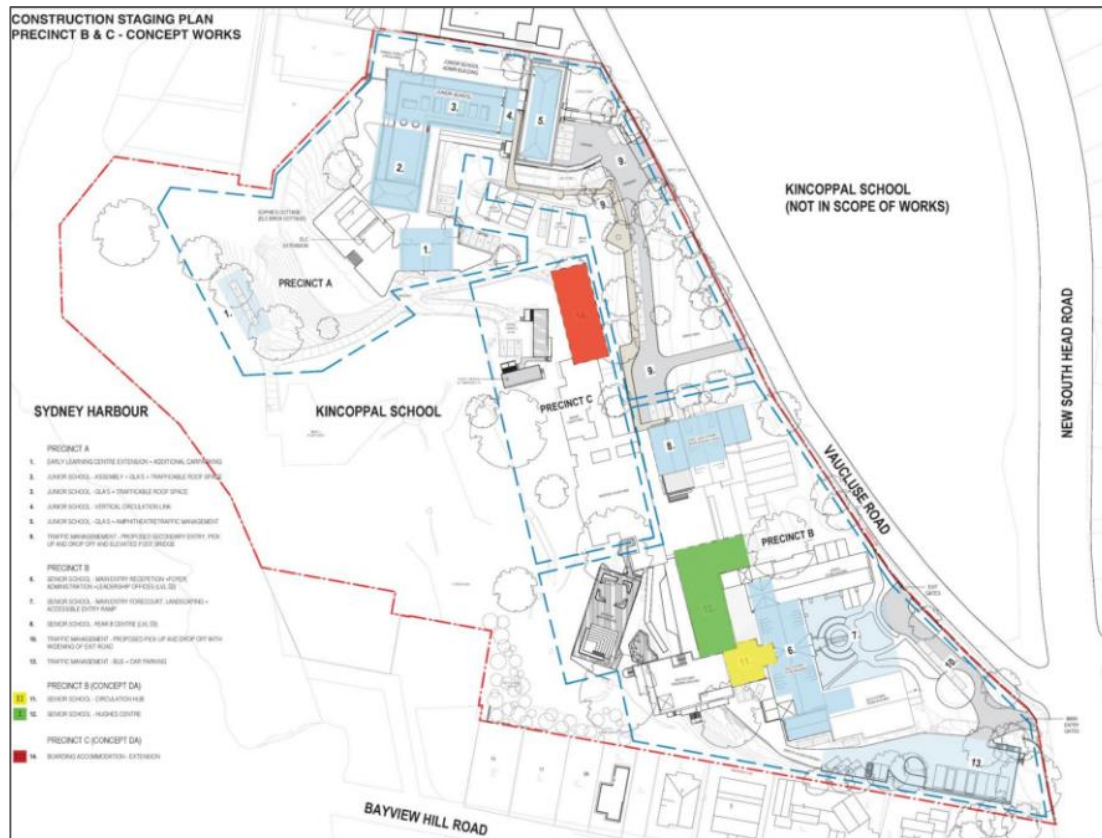


Figure 3: Precinct B & C Concept Building Envelope Design Elements

2. SEARS Issues Addressed

This report addresses how the proposed project addresses Item 14 of the SEARs and outlines strategies relating to Utilities. These requirements are outlined below alongside where the response to each can be found within this report;

Item	Action to Address the Requirement	Report Location
Prepare an Infrastructure Management Plan in consultation with relevant agencies, detailing information on the existing capacity and any augmentation requirements of the development for the provision of utilities including staging of infrastructure.	This IMP report details the existing electrical services infrastructure available to service the proposed development. This report also includes details regarding any augmentation / amplifications required to service the proposed development.	Section 4 & 5.

3. Site Description

The proposed site of works is located throughout predominantly existing envelopes of the current school site bounded by New South Head Road, Vaucluse Road and Sydney Harbour (Refer to hatched area in Figure 4 below).



Figure 4: Location of Proposed Site Works

The site is approximately 5 ha in size and is situated on a hill that slopes in a westerly direction.

The current site consists of significant impervious areas including paved roads, bitumen driveways, paved footpaths and buildings. Pervious areas include the grassed sports fields, bushland and garden beds.

Parameter	Information
-----------	-------------

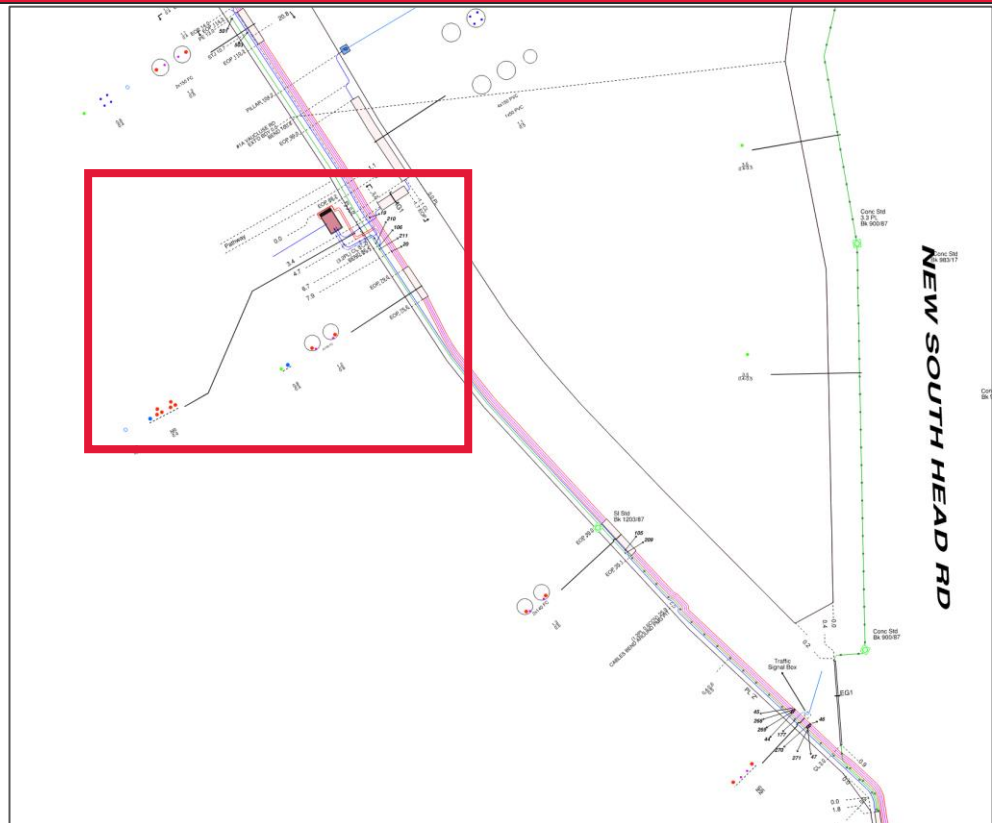


Figure 6: Ausgrid Electrical plan showing surveyed location of Substation 4621.

Image(s)



Impacts on Infrastructure

As an L-Type substation, the substation S.4621 may be rated at either 800 kVA or 1000 kVA. Confirmation of the substation's capacity and spare capacity shall be sought by Ausgrid upon application for connection of load. The substation is dedicated to the School site and does not supply any adjoining properties.

Based on previous readings of maximum demand indicators and historical data from the School, the substation's maximum load is in the order of 900 Amps/Phase (~630 kVA). This indicates that there may be up to 200 kVA or 400 kVA of spare capacity on the substation that could be allocated to future projects.

The substation is intended to be retained as part of this development.

The existing Junior School site is provided with a local low-voltage supply from the Ausgrid overhead network, as per the following:

Parameter	Information
Asset Number	SY01969
Type of Asset	Overhead LV aerial-bundled cable (ABC) supply from Utility to Private Pole
LV Operating Voltage	400 V

Off Vaucluse Road, near Junior School Admin building.

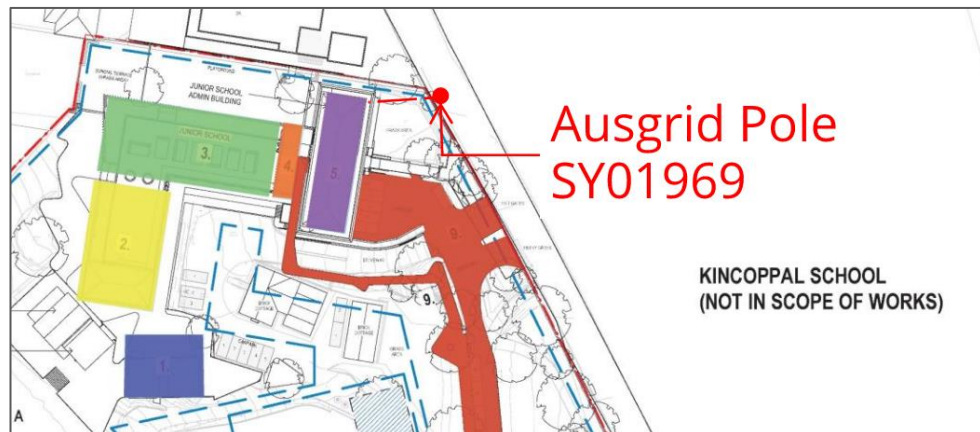



Figure 7: Site Plan showing Pole SY01969 location with respect to School context

Location on Site



Figure 8: Ausgrid Electrical plan showing surveyed location of Pole SY01969.

Parameter	Information
Image(s)	
Impacts on Infrastructure	<p>The low voltage feed carries a maximum rating of 100 kVA. The substation is dedicated to the School site and does not supply any adjoining properties.</p> <p>It is anticipated that should mechanical cooling be incorporated into the Junior School precinct projects, that the low voltage supply be decommissioned and replaced with a high voltage substation.</p>

4.2 Telecommunications

Following the review of the Dial Before You Dig (DBYD) plans, we have identified existing utility telecommunications services in the immediate vicinity of the development. Utility telecommunications cabling is installed in underground conduits on street verges, with regular access points through pits along New South Head Road and Vaucluse Road.

According to the information given on DBYD, no other utility communications services (private fibre, dark fibre or otherwise) are known to traverse the vicinity of the School site. This does not resolve the Contractor of their responsibility to conduct a thorough survey of all areas of excavation and ensure that no existing services shall be disrupted.

4.2.1 Shared Communications Pathways

It shall be noted that NBN trenches/ducts and cables are shared with Telstra services due to NBN taking ownership of the existing Telstra copper and hybrid-fibre-coaxial (HFC) network in Vaucluse. The ducts contain NBN backbone fibre optic cable and NBN customer copper/HFC cabling, as well as Telstra backbone fibre optic cable and Telstra customer copper and fibre optic cabling.

The following sections applicable to Telstra and to NBN shall thus be read with the assumption that infrastructure is shared.

4.2.2 NBN

Existing NBN ducts reticulate on all the boundary roads New South Head Road, and Vaucluse Road, on the western verge.

The Senior School site contains an NBN lead-in conduit comprising a single P50 conduit running through three Type P2 pits within the School site boundary, terminating into the Senior School's main communications room. This service is currently disused. Refer to Figure 9.

The Junior School site is not currently serviced by any NBN services.

NBN ducts exist on the same side of Vacluse road to the Senior School site and thus do encroach on the existing school site nor the proposed development site.

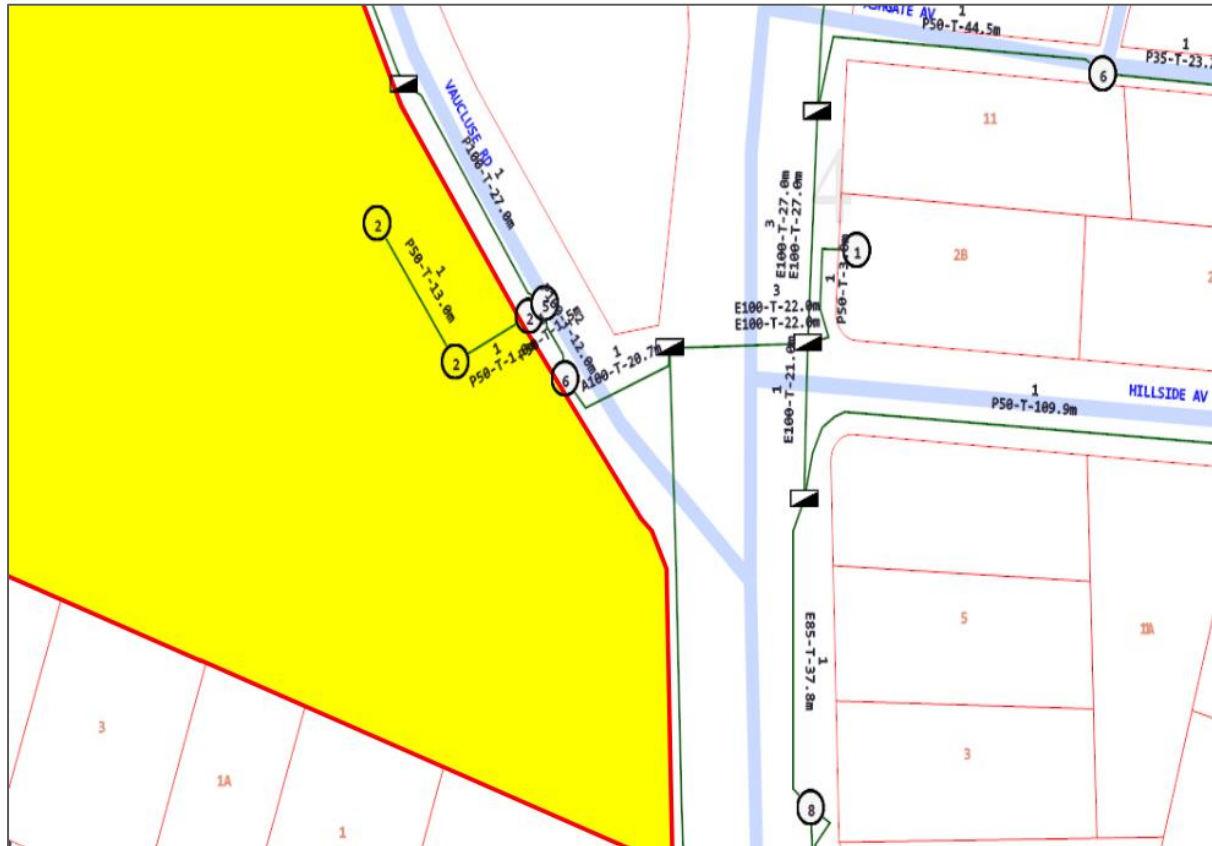


Figure 9: NBN Pit and Conduit Routes (School site highlighted in yellow)

Refer to Section 4.2.3 for further details of shared NBN/Telstra assets that may be impacted by the proposed development.

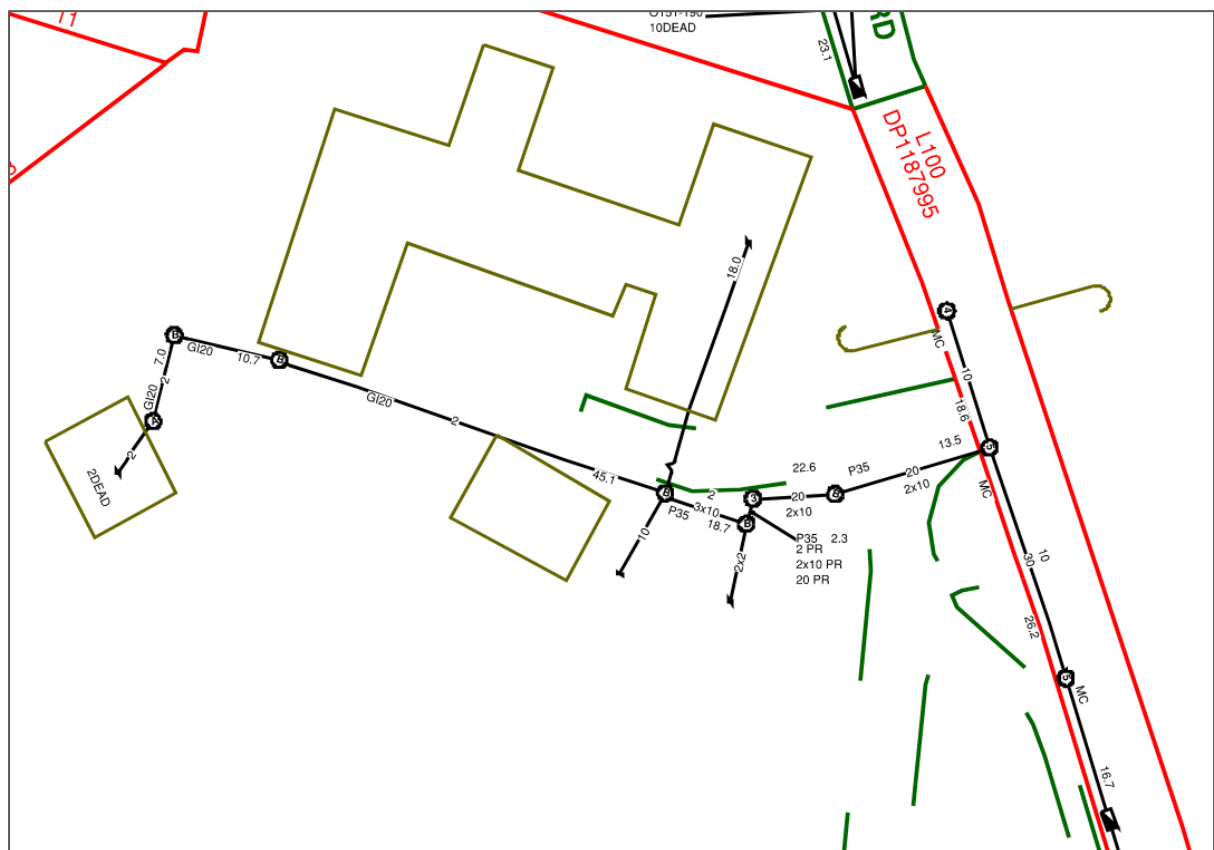
4.2.3 Telstra

Existing Telstra ducts reticulate on all the boundary roads New South Head Road, and Vacluse Road, on the western verge.

The Senior School site contains a Telstra lead-in conduit comprising a single P50 conduit running through three Type P2 pits within the School site boundary, terminating into the Senior School's main communications room. The conduit contains 2 x 30 pair copper lead-in cables in addition to a 10 core fibre lead-in cable. This service is currently disused. Refer to Detail A, Figure 10.

The Senior School site additionally contains a Telstra lead-in conduit comprising a single P50 conduit running supplied from the Vacluse Road verge, terminating into the Senior School's multi storey teaching building to the north of the chapel. The cable contained within this conduit is currently unknown. This service is currently disused. Refer to Detail B, Figure 10.

The Junior School site contains a Telstra lead-in conduit comprising a single P20 conduit running through several private pits within the School site boundary, terminating into the Junior School's main communications room and two outbuildings. The conduit contains 3 x 10 pair copper lead-in cables in addition to an unknown quantity of fibre optic lead-in cable. This service is currently disused. Refer to Figure 11.



Page 14 of 21

4.2.4 AARNet

Existing AARNet ducts reticulate on all the boundary roads New South Head Road, and Vacluse Road, on the western verge.

AARNet does not publish details of conduit and pit locations and types.

The Senior School site contains an AARNet lead-in conduit comprising a single conduit of unknown size running traversing within the School site boundary, terminating into the Senior School's main communications room. This connection contains the School's primary communications link, and is used for the Senior School and the Junior School. Refer to Figure 12.

The Junior School site is not directly serviced by any AARNet services. The Junior School uses an internal, private fibre link to leverage the Senior School's AARNet connection.

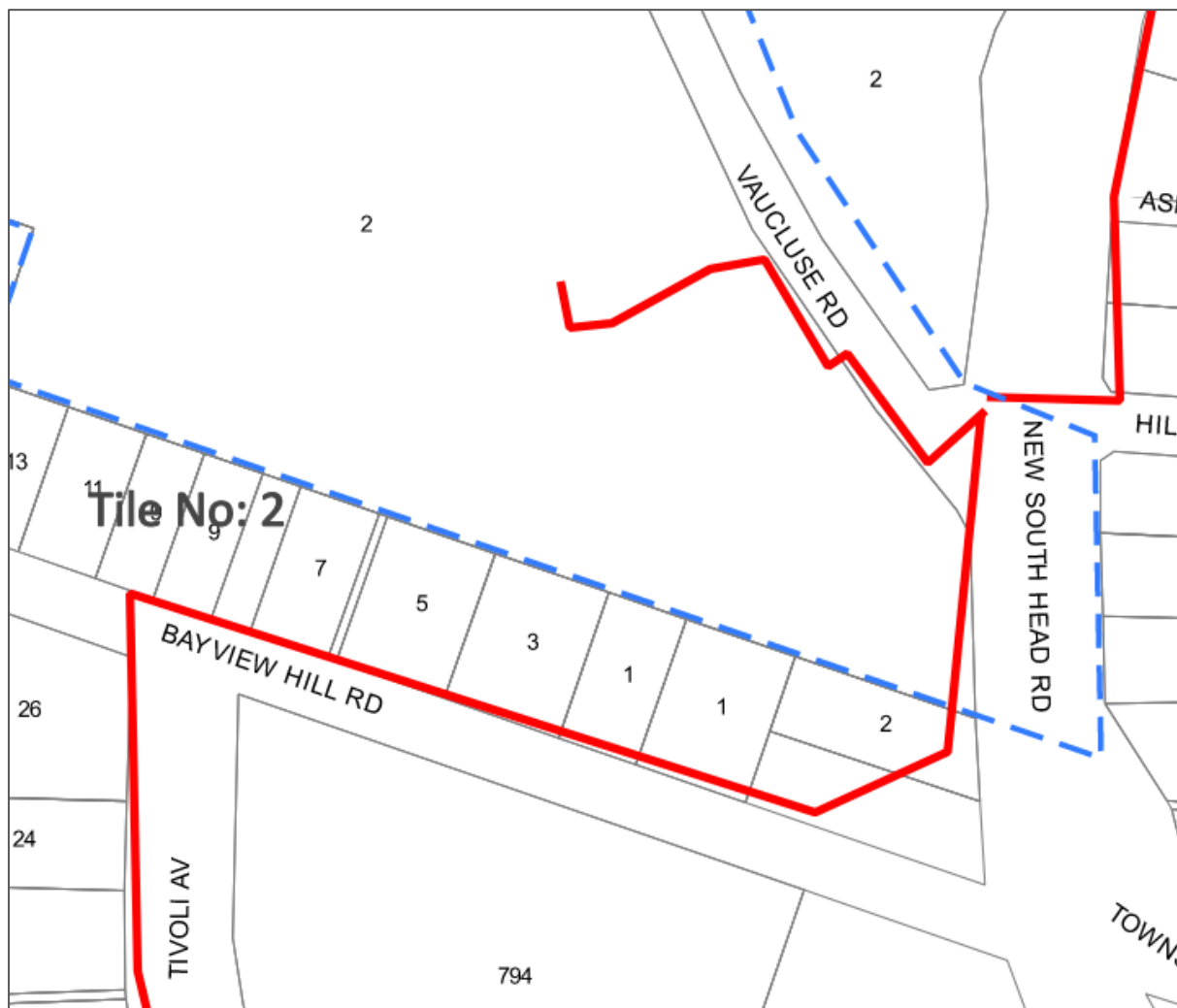


Figure 12: AARNet Lead-In Cabling for Senior School

4.2.5 PIPENetworks

Existing PIPENetworks (TPG) assets are present in the vicinity. PIPENetworks' fibre network runs along New South Head Road on the eastern verge and Vacluse Road on the western verge. There are two PIPENetworks pits on the western verge of Vacluse Road that appear to be trunk line conduits and do not appear to service the School.

The PIPENetworks assets do not appear to traverse the School site and should not affect the development in any capacity.

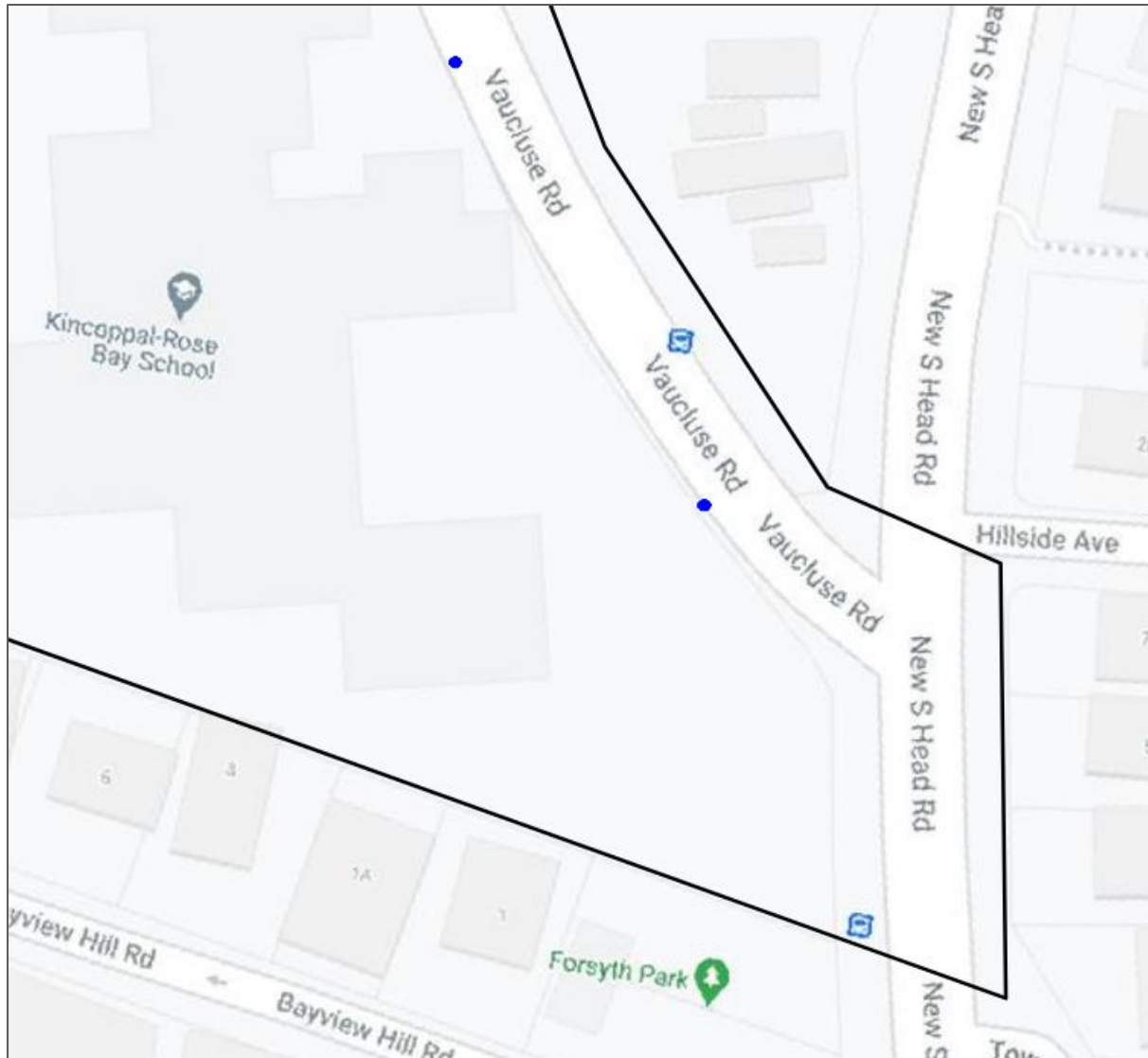


Figure 13: PIPENetworks Assets and Proximity to School Site (Blue dots represent pits)

5. Proposed Infrastructure & Augmentation

5.1 Power

Northrop has completed a preliminary maximum demand calculation based on the proposed architectural plans to determine the required augmentation to utility power services to service the development.

The maximum demand calculations are prepared based on AS/NZS 3000:2018 Table C3 using proposed floor areas and with assumptions of no substantive loads over and above typical education building requirements. Maximum demand calculations are expected to change subject to detailed design development of each development within the precinct. It has been assumed that refurbished areas may carry a slight increase in maximum demand over the present-day values, due to the assumed higher grades of fittings and fixtures, and upgrades/adjustments in coverage area for air conditioning.

5.1.1 Detailed Development – Junior School Precinct A

The Junior School precinct carries a proposed maximum demand increase over the present-day energy consumption by **246.99 kVA / 357 A/phase**.

The present-day overhead ABC connection to the Junior School will not be sufficient to carry this uplift in demand.

Table 1: Maximum Demand Calculation for Junior School Stage 1 (Precinct A)

Junior School (Precinct A)						
Description	Area	VA/m2	Load (kVA)	Load (A / Phase)	Comments / Assumptions	
1. Early Learning Centre Extension (2-Storey)	500	100	50.00	72.17	New, air-conditioned build.	
2. Assembly Space Refurbishment (Ground Floor)	360	80	28.80	41.57	Based on typical space allowances	
2. GLA Refurbishment (First and Second Floor)	900	30	27.00	38.97	Assumed net increase in max. demand	
2. Trafficable Roof Space	450	15	6.75	9.74		
3. GLA Refurbishment (Three Floors)	1860	30	55.80	80.54	Assumed net increase in max. demand	
3. Trafficable Roof Space	620	15	9.30	13.42		
4. Vertical Circulation Link	70	30	2.10	3.03	Assumed net increase in max. demand	
5. GLAs + Amphitheatre Traffic Management	320	30	9.60	13.86	Assumed net increase in max. demand	
9. Traffic Management	1810	5	9.05	13.06	Allowance for additional lighting	
Spare Capacity			25.00%			
Total AS3000 Maximum Demand (Non Domestic)			246.99 kVA	357.96 Amps/Phase		

Subject to an application being undertaken to Ausgrid, a new electrical substation will be required to supply the site. Due to the impending concurrent and long-term developments proposed at the school, it is proposed that an L-Type, 1000 kVA substation is provided in the vicinity of the Junior School site. This substation will supply the new and existing loads at the Junior School, as well as provide additional capacity to support the developments at Precinct B and Precinct C.

The kiosk carries an easement size of 5.3 metres by 3.3 metres. For all Ausgrid high-voltage cables, an additional 2 metre easement is required around the path the cable is laid.

The project shall be registered with Ausgrid by way of application for connection; detailed design of the infrastructure will be directed by a Design Information Package pertaining to this project.

The provision of a new substation shall be determined by Ausgrid and their confirmation that there is sufficient 11kV HV infrastructure in the vicinity to carry a new substation.

It is proposed that as part of this process, the existing aerial supply to the Junior School shall be decommissioned and removed.

The existing padmount substation at the School (S.4621) is located outside of the redevelopment site and shall continue to operate as normal during and after project completion.

The new substation should ideally be located along the Vaucluse Drive frontage (Figure 14) and comply with all Ausgrid spatial requirements.

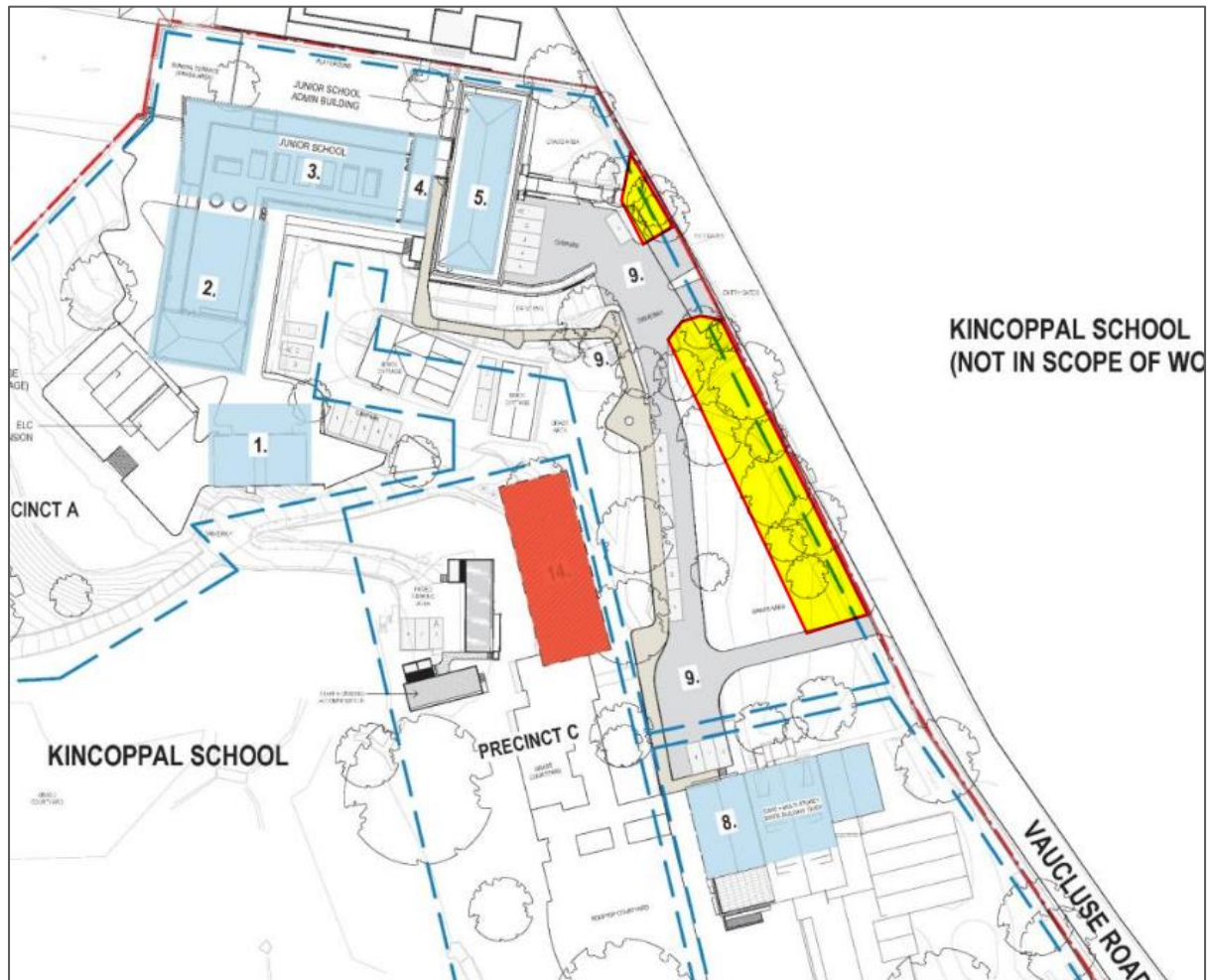


Figure 14: Proposed location of Ausgrid Kiosk Substation

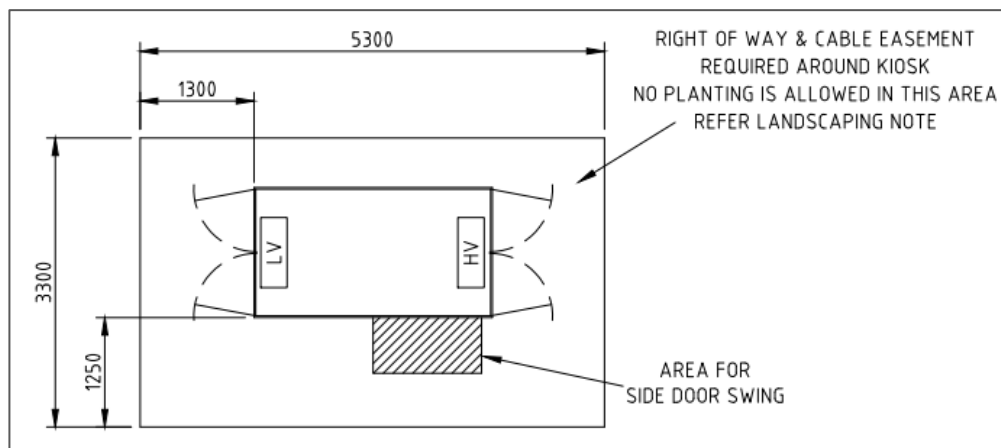


Figure 15: Spatial Requirements of Ausgrid L-Type Kiosk Substation

5.1.2 Detailed Development – Senior School Precinct B

The Senior School precinct carries a proposed maximum demand increase over the present-day energy consumption by **123.93 kVA / 179.61 A/phase**.

It is estimated that based on the extent of works proposed for Precinct B, the existing padmount substation S.4621, and associated electrical infrastructure, is likely to be sufficient to carry the minor uplift in demand.

Table 2: Maximum Demand Calculation for Senior School Stage 1 (Precinct B)

Senior School (Precinct B)						
Description	Area	VA/m2	Load (kVA)	Load (A / Phase)	Comments / Assumptions	
6. Main Entry / Reception Refurbishment	785	30	23.55	33.99	Assumed net increase in max. demand	
7. Main Entry / Forecourt Landscaping	1500	5	7.50	10.83		
8. Year 8 Centre (New Build)	260	100	26.00	37.53	New build, assumed A/C	
8. Year 8 Centre (Refurbished Build)	200	30	6.00	8.66	Assumed net increase in max. demand	
10. Traffic Management	1900	5	9.50	13.71		
13. Bus and Car Parking	900	30	27.00	38.97		
Spare Capacity			25.00%			
Total AS3000 Maximum Demand (Non Domestic)			123.93 kVA	179.61 Amps/Phase		

Subject to an application for increase in load being undertaken to Ausgrid, it is expected that Ausgrid will approve the site to be supplied by the existing padmount substation.

5.1.3 Detailed Development – Concept Precinct B & C

The Concept precinct carries a proposed maximum demand increase over the present-day energy consumption by **317.38 kVA / 459.97 A/phase**.

It is estimated that based on the extent of works proposed for this part of the Senior School, the existing padmount substation S.4621, and associated electrical infrastructure, will not be sufficient to carry the major uplift in demand.

Table 3: Maximum Demand Calculation for Concept

Concept DA (Precinct B & C)						
Description	Area	VA/m2	Load (kVA)	Load (A / Phase)	Comments / Assumptions	
11. Senior School - Circulation Hub	1520	30	45.60	65.82	Assumed 4 storey, max demand increase	
12. Senior School - Hughes Centre	2648	30	79.44	114.66	Assumed 4 storey, max demand increase	
14. Boarding Accommodation - Extension	1299	100	129.90	187.49	Assumed 3 storeys	
Spare Capacity			25.00%			
Total AS3000 Maximum Demand (Non Domestic)			317.38 kVA	459.97 Amps/Phase		

It is anticipated that the Concept Precinct B & C works will be undertaken following completion of the Junior School Precinct A works. Thus, the new substation allocated to the Junior School should be established. It is anticipated that assuming no further increase in works to the Junior School site, this new 1000 kVA substation should have sufficient spare capacity to carry the additional load from Concept Precinct B & C as currently proposed.

5.2 Telecommunications

The existing School site is presently serviced by an AARNet fibre link for wide-area network/data services. The AARNet fibre link terminates into the main communications room in the Senior School, and shall remain in place for the duration of the development. It is noted that the Senior School and the Junior School are linked via an internal, private fibre optic network. Thus, no utility communications requirements are identified for the Junior School Site.

The proposed developments shall be directly connected to the School's current private fibre optic network. Therefore no new utility telecommunications service will be required to service the site. Any development application clause which requires the sufficient provision of a telecommunications carrier service shall thus have been deemed to be met.

6. Conclusion

This Infrastructure Management Plan (IMP) outlines the proposed Utility Infrastructure servicing the proposed development addresses the Secretary's Environmental Assessment Requirements (SEARs) issues identified in this report.

It has been identified that an additional kiosk substation (subject to Ausgrid requirements) will be required to support the proposed development in full. Provision of such a substation requires further investigation of the current capacity of the local HV network to support the proposed utility works.

The development currently has sufficient telecommunications infrastructure via the existing Kincoppal Rose Bay School site, and thus no upgrades or modifications to the telecommunications network/s shall be required.

This IMP has addressed all aspects of the SEARs items identified in Section 2 of this report.