

# **Meadowbank Education and Employment Precinct Schools Project**

## **Infrastructure Management Plan - Electrical, ICT and Lighting**

**SSD 18\_9343**

**Prepared by WSP**

**For School Infrastructure NSW**

**10 October 2019**



# Question today *Imagine tomorrow* Create for the future

## Meadowbank Education and Employment Precinct Schools Project

### Infrastructure Management Plan

#### Woods Bagot

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REV	DATE	DETAILS
1	29/08/2018	Infrastructure Management Plan
2	09/04/2019	Final Draft - Infrastructure Management Plan – Revised Scheme
3	11/04/2019	Final Draft - Infrastructure Management Plan – Revised Scheme
4	03/05/2019	SSDA Submission (Revised Scheme)
5	22/05/2019	SSDA Submission (Revised Scheme)
6	29/05/2019	SSDA Submission (Revised Scheme)
7	10/10/2019	SSDA Submission (Revised Scheme)

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	NAME	DATE	SIGNATURE
Prepared by:	Andy Aghdasi	29/05/2019	AXA
Reviewed by:	Sam Dib	29/05/2019	SD
Approved by:	Rob Beck	29/05/2019	RAB



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# 1 INTRODUCTION

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## 1.1 Overview

This Infrastructure Management report has been prepared by WSP on behalf of the NSW Department of Education (the Applicant). It accompanies an Environmental Impact Statement (EIS) in support of State Significant Development Application (SSD 18\_9343) for the new Meadowbank Education and Employment Precinct Schools Project (hereafter referred to as MEEPSP ) at 2 Rhodes Street, Meadowbank (the site).

The K-12 MEEPSP will cater for 1,000 primary school students and 1,620 high school students. The proposal seeks consent for:

- A multi-level, multi-purpose, integrated school building with a primary school wing and high school wing. The school building is connected by a centralised library that is embedded into the landscape. The school building contains:
  - Collaborative general and specialist learning hubs, with a combination of enclosed and open spaces;
  - Adaptable classroom home bases;
  - Four level central library, with primary school library located on ground floor and high school library on levels 1 to 3.
  - Laboratories and workshops;
  - Staff workplaces;
  - Canteens;
  - Indoor gymnasium;
  - Multipurpose communal hall;
  - Outdoor learning, play and recreational areas (both covered and uncovered).
- Associated site landscaping and public domain improvements;
- An on-site car park for 60 parking spaces; and
- Construction of ancillary infrastructure and utilities as required.

Infrastructure Management Plan for Electrical, ICT and Lighting services is to provide an overview of the impact on the existing site infrastructure and demonstrate negotiation with the relevant authorities in preparation for the proposed electrical, communication and lighting infrastructure for the MEEPSP.

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## 1.2 Response to SEARs

The Infrastructure Management report is required by the Secretary's Environmental Assessment Requirements (SEARs) for SSD 18\_9343. This table identifies the SEARs and relevant reference within this report.

Table 1 – SEARs and Relevant Reference

SEARs Item	Report Reference
14 - Utilities	Electrical, ICT and Lighting



## 2 ELECTRICAL INFRASTRUCTURE

### 2.1 Existing Electrical Infrastructure

The existing buildings within the new proposed boundary are fed from a kiosk substation located on Rhodes Street (Fig. 1). The existing distribution system is currently via Main Switch Board located in Building Y1 and Main Distribution board in building R1. Appendix A – Existing site services – identifies the existing power distribution system for the site.



Fig 1 – Existing Kiosk Substation (Image source – SIX MAPS)

The MEEPSP Project will be developed on a portion of the Meadowbank TAFE site now owned by the NSW Department of Education, with all existing buildings to be demolished and cleared. Infrastructure servicing the residual Meadowbank TAFE College (adjacent) will be preserved or diverted as might be required. Figure 2 shows the existing site layout identifying the scope of works area. The buildings that are to be demolished as part of the works are the following

- Building Y1, Y6, Y5, Y4, Y3
- Building S
- Building X, W, V, T, O, U
- Building R, Q

The Electrical and Communications infrastructure works for the development comprises of the following

- Disconnection of the electrical supply to Building Y from the kiosk substation.
- Disconnection and removal of all submain cabling interconnecting redundant buildings within the scope of works.
- New pad mount kiosk substation – 2 x 1000 KVA transformers

- New communications lead-in for the proposed development originating at the Rhode Street boundary and terminating at Main communication room (MCR) on the lower ground level.

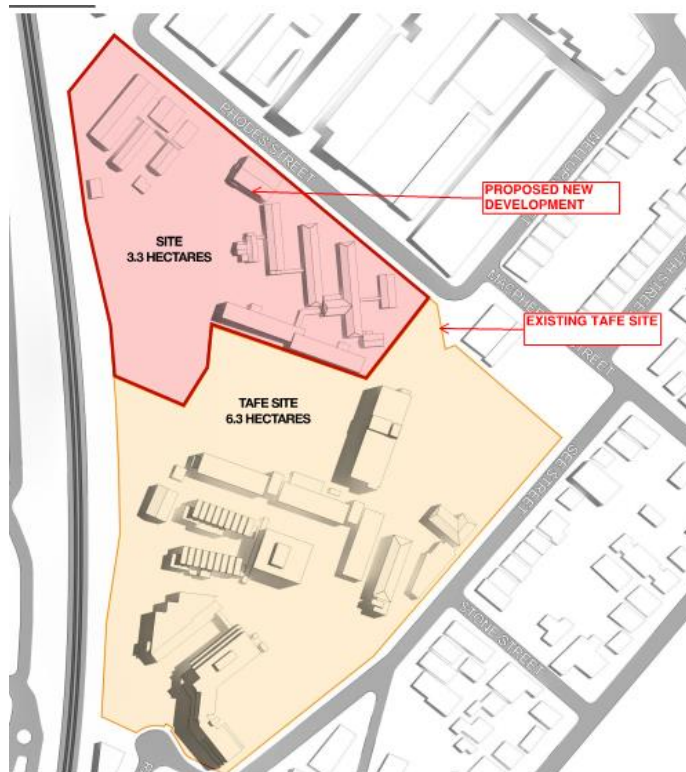


Fig 2 – Existing Site Layout with Proposed Boundary



Fig 3 – Main switchboard in Building Y to be demolished



## 2.2 Power supply for new facility

The current pad mounted substation has been assessed as having insufficient capacity to meet the electrical load requirements of the new schools.

WSP has undertaken a load study for the proposed new school based on the latest area schedules made available at the time of the assessment. The maximum demand calculation has been prepared as per AS/NZS 3000: 2018 Table C3 VA/m<sup>2</sup> which provides a summary of the calculated load to be at approximately 1700kVA (2,450 Amps).

A more detailed load assessment will be undertaken during detail design stage once building services loads have been confirmed and operation of the mechanical systems are understood.

The above calculated maximum demand does not consider the future space planned for the additional 500 high school students, although WSP has flagged the remaining 300kva spare capacity of the substation to the Distribution Network Service Provider (DNSP) as a potential load upgrade for future works.

Based on WSP's load assessment of the proposed new development, an application for connection was submitted to DNSP for review. The Ausgrid response is provided at Appendix B.

The correspondence received from Ausgrid confirms that the new school development will require the installation of a 2 x 1000kva kiosk substation.

Ausgrid's connection offer identifies this development as a standard project which requires submission of proposed design scope (PDS) for review. The design is currently in progress.

Fig 4 –Proposed location of the new Substation.



# 3 ICT INFRASTRUCTURE

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## 3.1 Existing

The disused former TAFE buildings on the Department of Education's development site remain connected to a fiber communications service crossing the TAFE Green between TAFE's Building E and the redundant Building R.

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## 3.2 Incoming Telecommunications Services

ICT design will be provisioned with the following:

- Physical infrastructure 2 x 100mm conduits from the nearest communications street pit - 1 to the MCR
- Physical infrastructure 2 x 100mm conduits from the nearest communications street pit - 2 to the MCR

Based on the coordination with the service provider, Dial Before You Dig and site survey reports (by others) the project site and adjacent areas are served by NBN fibre cable plant. There are two street pits available as per the report which can serve the project site to provide diverse incoming infrastructure to the MEEPSP.

However, upon the selection of service provider by the client, coordination and engagement with the nominated service provider will determine the actual requirements.

# 4 LIGHTING STRATEGY

## 4.1 General

The lighting that will be provided for the facility will fall under the following

Access lighting – This will be provided to provide safe and comfortable illumination for movement around the school both during and after normal hours

General Purpose lighting – This will be provided to allow the various areas to be used for their designed function

Exit /Emergency lighting – This will be provided in most areas to indicate exit routes and to maintain illumination in the event of a power failure

The lighting and lighting control for the facility will be provided in accordance with the following requirements

- EFSG
- NCC
- AS 1680 Lighting for workplace environment
- AS1158 Lighting for roads and public spaces
- AS2560 Sports lighting
- AS4282 Control of the effects of obtrusive lighting

## 4.2 Internal Lighting

Internal access lighting to illuminate circulation areas such as foyers, entry vestibules, corridors and stairs. Functional lighting to illuminate classroom, office, library, communal hall etc. Illumination level to comply with AS1680 and Department of Education design guide.

LED light source is proposed to achieve EFSG requirements.

The Design criteria / lighting strategy for each of the space will be as follows

Area	Type
Home base	High efficiency, low brightness, LED luminaires to achieve an average of 240 lux over at 720mm above FFL. Illumination power density 1.5W /m <sup>2</sup> /100lx Uniformity of min 0.7 at task area, and 0.5 for general areas
Lift Lobbies	Recessed LED downlights in accordance with Architectural design intent to achieve an average of 200 lux at floor level.
Circulation corridors	Recessed LED downlights in accordance with Architectural design intent to achieve an average of 150 lux at floor level. Illumination power density 8W /m <sup>2</sup> Uniformity of min 0.3
Amenities	Recessed LED downlights and decorative LED strips around vanity to achieve an average of 200 lux at 720mm above FFL. Illumination power density 6W /m <sup>2</sup>
Main Entry Foyer	Linear LED strip lighting, high output LED's recessed, washlights and wallwashers, in accordance with Architectural design intent to achieve an average of 200 lux at floor level Illumination power density 15W /m <sup>2</sup>

Area	Type
Plant rooms, BOH areas	LED battens as appropriate in accordance with AS 1680 Illumination power density 6W /m <sup>2</sup>
External Lighting	LED luminaires to suit the Architectural/Landscape features. Lighting level will be uniformly distributed in compliance with AS/NZS 1158 and AS/NZS 4282. Circuits will be BMS/PE switched.
Security lighting	24 hours lighting at areas to be nominated

## 4.3 External Area Lighting

This part of the report provides guidelines and design parameters for the proposed external lighting to be designed in accordance with Australian Standards, requirement of the Crime Prevention through Environmental Design (CPTED) report and to be integrated with the architecture and landscape.

The design has been assessed against all relevant standards/guidelines, including the following:

- AS 1158.3.1-2005 Lighting for Roads and Public Spaces Pedestrian area;
- AS 4282-1997 Control of the obtrusive effects of outdoor lighting; and

The proposed external lighting will minimize obtrusive light effects and spill light beyond the property line while considering the safe lighting levels for access and security of the property holistically after dark.

## 4.4 Lighting Management Plan

A lighting management plan for the project which considers the following measures would reduce potential light impacts significantly. Mitigation measures include the following:

- Ensure the lighting design is in accordance with relevant Australian Standards which provide recommended maximum values of light technical parameters for the control of obtrusive light. Ensure light spill and light pollution externally are avoided in accordance with this Standard.
- Appoint a qualified lighting designer who demonstrates a detailed understanding of lighting design and experience in the application of light within the interior architectural and exterior landscape environment.
- Restrict lighting to the minimum required for operations, safety and security requirements.
- Use directional lighting techniques to direct light away from sensitive viewpoints.
- Indirect glare from reflective surfaces must be avoided.
- Where luminaires are lighting a horizontal surface, use mounting locations of luminaires which ensure that the angle of the luminaires do not exceed 30 degrees from the vertical. Use luminaires with an asymmetric light distribution where possible.
- Where luminaires are lighting a vertical surface and the angle of adjustment justifies a greater than 45-degree position, ensure that direct views to the light source are eliminated or avoid lighting vertical surfaces.
- During construction phase, the lighting designer is to attend final commissioning of the lighting to ensure all luminaires are aimed correctly and illumination levels are set to appropriately for the application.

## 4.5 Project Specific Spill Light Mitigation Measures

Operations for the School will mainly be during day time with occasional after hours' activities such as parent night, staff meetings, use of indoor gym and external sport fields by the public during hours of darkness.

As such, a series of Project specific mitigation measures have been identified with the aim of minimising potential impacts to surrounding locations;

#### **4.5.1 General area and landscape lighting**

The following strategies should be implemented for lighting of general circulation pathways within the school grounds:

- For exterior areas, lower luminaire mounting heights (ground level or low level up to three to five metres) should be provided to minimise potential direct views of luminaires.
- Lighting to be applied to specific tasks, task zones and feature elements.
- Lighting controls to be separated by tasks and task zones to allow for flexible control of illuminance levels.
- Floodlighting of the sport fields using a smaller number of tall poles should be avoided, as this can cause obtrusive light effects.
- When choosing lighting categories from Australian Standards, preference should be given to choosing lower light levels where appropriate and considering lighting requirements for security and CCTV coverage. This will assist in avoiding unnecessary over-design of the lighting.

#### **4.5.2 Other areas**

The following measures would minimise spill light and obtrusive light impacts:

- Shielding of the perimeter should be provided through the use of planting or structural elements to prevent direct views of lit surfaces wherever practical.
- Intelligent lighting control system to control sport field lighting based on scheduled bookings, wherever practical.
- For buildings, which incorporate glazed / transparent façades, it is recommended that the internal lighting be dimmed down or designed with low glare luminaires to reduce the building luminance and direct views of the façade. Where windows are provided with automated block-out or shading devices for daylight these could be used at night to reduce spill light wherever practical.
- Lighting for illuminated signage must be localised to ensure that, as far as practical, there is no light spill into adjacent areas, must eliminate glare and be designed such that luminance is minimised.
- When choosing lighting categories for public road lighting for access lighting, including public access paths to the external sport fields and amenities for after hours use from AS1158, preference should be given to choosing categories with lower light levels where appropriate while considering the lighting requirements for public safety.
- Pathway lighting to and from tafe to use full cut-off luminaires to minimise glare and light spill wherever practical.
- Sports field lighting adjacent to Rhodes street and rail network property to utilise shorter poles to minimise direct views of luminaires and appropriate optics to reduce spill light.
- Security CCTV cameras to utilise IR lights wherever practical.
- Lighting for security to utilise full cut-off luminaires and glare control accessories wherever practical.

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### **4.6 Luminaires and lighting equipment**

Luminaires and lighting equipment for the Project should include the following to minimise spill light impacts:

- All external luminaires to include specifically designed optics, glare shields and accessories that minimise upward light spill and control light output to direct it where required.
- Full cut-off luminaires should be provided to minimise upward light spill above the horizontal.



- Use appropriate beam angles on luminaires to ensure lighting is focussed where required, that spill light is minimised and direct views into a light source are minimised.
- Luminaire correlated colour temperature (CCT) for all lamps to be consistent across the Project site. CCT to be between 3000K and 4500K, noting the warmer 3000K CCT tends to be less obtrusive at night.
- All external luminaires to include LED / fluorescent light sources. Light fittings must provide 60 percent of the lamp lumen output of the fitting in the peak intensity, as defined by the fitting beam angle.

In summary, the adoption of suitable best practise lighting design principles would minimise disability glare, reduce discomfort glare to acceptable levels and minimise sky glow therefore minimising the potential lighting impacts for the project.

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## 4.7 Lighting Control

Lighting control system to be proposed to achieve automatic switch, timer control, dimer control, daylight harvesting and integration with period bell alarm.

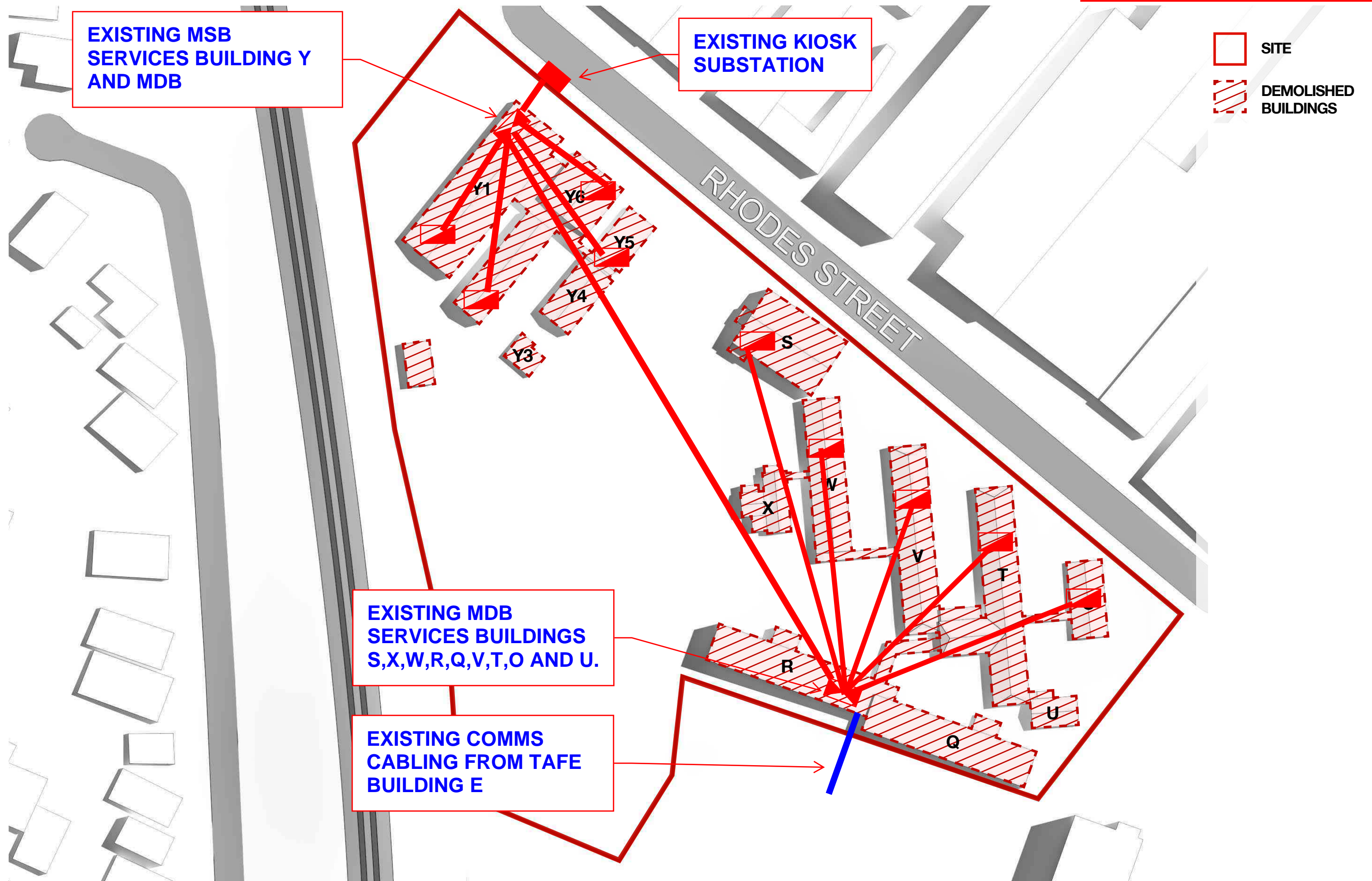
The LCS shall be able to directly connect to the BMS control systems

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## 4.8 Emergency Lighting

Emergency lighting system including single point emergency light fitting, exit sign and test switch to be provided to comply with NCC and AS2293.

# APPENDIX A – EXISTING SITE SERVICES



# APPENDIX B - AUSGRID ASSESSMENT



Address all relevant correspondence to:

Ausgrid Contestability Section  
Building 3, 51-59 Bridge Road  
Hornsby NSW 2077

E: [Contestability@ausgrid.com.au](mailto:Contestability@ausgrid.com.au)

11 March 2019

WSP

Attention: Andy Aghdasi  
Level 27, 680 George St,  
SYDNEY NSW 2000

Email: [andy.aghdasi@wsp.com](mailto:andy.aghdasi@wsp.com)

Reference Number: **SC13610 / 1900090817 – Revised Scope of Works - Category Standard**  
*(\*\*please disregard letter dated 08.03.2019 – wrong category and fees)*

Dear Andy,

**Electricity Network Connection Application at:** TAFE, 2 Rhodes St, Meadowbank

We have received your Connection Application and assigned it the reference number SC13610 / 1900090817.

We have made a preliminary assessment of your Connection Application and wish to advise the application is incomplete and we cannot proceed to a connection offer at this stage. To enable *Ausgrid* to further consider and process your request you will require a certified design and associated certification number, and you should include this on your application.

This letter provides guidance on how to obtain a certified design and associated certification number.

### Scope of Network Alterations

*Ausgrid's* assessment has determined that the following works are likely to be required to connect your development.

- ☐ Installation of a 2 x 1000kva Kiosk substation.

These works are classified as contestable, which means that you are required to fund the design and some or all of the construction works. If you have not already done so, you will need to engage and manage suitably qualified contractors, known as Accredited Service Providers (ASPs) to undertake the design and construction.

Initially, your ASP Level 3 (ASP/3) will undertake the design, and then your ASP Level 1 (ASP/1) will undertake construction in accordance with the design and *Ausgrid's* policies and standards. The timeframe for the works will vary depending on factors such as the complexity and the way in which you manage your ASP's.

Once the works have been satisfactorily completed and electrified, the premises connection assets will be owned and maintained by *Ausgrid* as part of the electricity distribution network.

### Design Stage

You or the person you represent must engage an ASP/3 to design the necessary network alterations. *Ausgrid* has classified the design information requirement for this connection as **standard**. Therefore, for this connection, the ASP/3 must submit a Proposed Design Scope (PDS) to *Ausgrid* for assessment. This will form the basis of



Design Information – Site Specific Terms and Conditions for the project, which your ASP/3 will use to prepare and submit a design that is certifiable.

You will also need to enter into a Contract for Design Related Services with *Ausgrid* as outlined below. This Contract sets out the rights and obligations of *Ausgrid* and yourself with respect to certification of your ASP/3's design by *Ausgrid*.

Once the design has been certified by *Ausgrid*, your Connection Application will be complete and you may use the design certification number to request that your Connection Application proceed to a connection offer or expedited connection, provided you assure *Ausgrid* that the development has not materially changed since you submitted your original Connection Application.

### Contract for Design Related Services

This letter is an offer to enter into a Contract for Design Related Services. It remains open for acceptance for 45 business days. A copy of the Contract for Design Related Services is available for your review on our website <http://www.Ausgrid.com.au> at the following link: <https://www.ausgrid.com.au/-/media/Documents/Technical-Documentation/Contracts-and-Deeds/Contract-for-Design-Related-Services/Design-Contract-2017.pdf>.

No work will be undertaken by *Ausgrid* until a Design Contract is in place.

You are encouraged to contact ASP/3's and ASP/1's to understand the likely overall costs you will incur for design and construction before you accept and commit to the Contract for Design Related Services.

**IMPORTANT:** The contractual arrangements provide the framework for a design to be prepared by your ASP/3, and NOT by *Ausgrid*. *Ausgrid*'s fees as outlined below are for the design related network services we provide during the design phase, and are IN ADDITION to the fees charged by your ASP/3 in preparing the design.

### Acceptance Fees

The acceptance fees relating to the Contract for Design Related Services are payable upon acceptance. *Ausgrid* will invoice you once we receive your signed acceptance form. The Contract will not commence until you pay the invoiced fee.

These fees are an estimate for the *Ausgrid* services required. Further fees may apply for any additional services required and these will be quoted on each occasion. *Ausgrid*'s published rates for our services are amended from time to time in our Connection Policy – Connection Charges publication, and in accordance with the Contract, *Ausgrid* reserves the right to charge the rates that are applicable at the time the service is provided.

Fees for *Ausgrid*'s services are in addition to the design and construction costs charged by your ASP's, and some fees may not be refundable if the service has already been provided.

The Acceptance Fee will be calculated as follows (GST inclusive). These fees and rates are set by the Australian Energy Regulator:

Design Information	\$3039.97
Design Certification	\$5668.76
Administration	\$659.40
Facilitation	\$2493.50
<b>TOTAL</b>	<b>\$11861.63.</b>

**\*\*Previous fees paid for initial scope of works balance of unused fees to be refunded/credited**

As follows:	Design Certification	\$8,076.15
	Connection/ Process Facilitation fee	\$2,493.50
	<b>Total of</b>	<b>\$10, 569.65</b>

## General

Standard *Ausgrid* documents mentioned in this letter, including those enclosed, are available on *Ausgrid's* website [www.ausgrid.com.au](http://www.ausgrid.com.au). If you do not have access to the web and would like to read any of the documents mentioned in this letter they may be obtained by contacting the phone number below.

Should you require any further information please contact me on the phone number or email address detailed below.

## What to do next

- ☐ Read the Contract for Design Related Services on our website. To accept our offer to enter into a Contract for Design Related Services,
  - Complete and sign the Acceptance of Offer in the space provided below and return it to *Ausgrid*.  
**Note that a tax invoice will be generated based on the details provided on the form.**
  - You will also need to pay *Ausgrid's* fees as detailed above. An invoice for the above total amount will be forwarded to you on acceptance of the contract.
- ☐ Engage the services of an ASP/3 to submit a Proposed Design Scope (PDS) to *Ausgrid* for assessment. Note that *Ausgrid* will not accept the PDS for assessment until the Contract for Design Related Services is in place. *Ausgrid* requires the PDS to be submitted within 12 months of the contract commencement date.

Yours sincerely,



Cedric Halforty  
Team Leader - Contestable Connections - Sydney North  
*Ausgrid*

Direct Telephone Number: 02 95855663

Email: [Chalfort@ausgrid.com.au](mailto:Chalfort@ausgrid.com.au)

Encl: Acceptance of Offer Form  
Contestable Connection or Relocation flowchart

Date of Design Offer: 11 March 2019  
 Design Offer Expiry Date: 16.05.2019

*Ausgrid* – MC Reference Number: SC13610 / 1900090817  
*Ausgrid* - AP/AE Reference Number: 800251981  
*Ausgrid* - HPRM Reference Number: 2018/10478


Premises: TAFE, 2 Rhodes St, Meadowbank

The Connection Applicant accepts the above *Ausgrid's* offer of a Contract for Design Related Services in relation to the design of connection assets at the above premises.

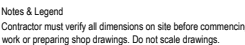
Please note that a tax invoice will be generated based on the details provided on this form.  
 Changes to this information following invoice processing will result in additional charges.

Details of Person or Company to invoice for the payment of <i>Ausgrid</i> Fees and Charges.		
<p>This is the party that will be billed and responsible for payment.</p> <p>If you are signing on behalf of a third party, we require their details for invoicing</p> <p><b>ALL FIELDS MANDATORY</b></p>	NSW Department of Education	print name of person or company
	40 300 173 822	ABN / ACN
	Level 8, 259 George Street, Sydney NSW 2000	postal address - line 1
		postal address – line 2
	Karissa Kendall	contact name
	0449 715 619	contact phone number
	karissa.kendall@det.nsw.edu.au	email address
	Purchase Order Number Obtained: Yes <input checked="" type="checkbox"/> NA <input type="checkbox"/> If yes, please provide Purchase Order Number: 4002371544	purchase order number

Signed by the Connection Applicant (as per application form details)

 \_\_\_\_\_ signature  
 Andy Aghdasi \_\_\_\_\_ print name of signatory  
 Electrical Engineer \_\_\_\_\_ print position of signatory  
 14 March 2019 \_\_\_\_\_ date  
 WSP Australia PTY LTD \_\_\_\_\_ company name  
 ABN 80 078 004 798 \_\_\_\_\_ ABN / ACN  
 andy.aghdasi@wsp.com \_\_\_\_\_ email address  
 T: +61 2 8907 0923 \_\_\_\_\_ contact phone number

# APPENDIX C – ELECTRICAL SINGLE LINE DIAGRAM



## NOTES

1. THE SINGLE LINE DIAGRAM REPRESENTS OVERALL LV DISTRIBUTION SCHEME
2. CIRCUIT BREAKER AND CABLE SIZES TO BE FINALISED DURING DETAIL DESIGN STAGE

HDC & Architectural  
**WOODS BAGOT**

Structural & Civil Engineering  
**ENSTRUCT**

Mechanical Engineering & ESD/Energy Modelling  
**STEENSEN VARMING**

Electrical Engineering

Hydraulic & Fire Engineering  
**WARREN SMITH & PARTNERS**

Landscape & Heritage  
**URBIS**

# Project MEADOWBANK SCHOOLS PROJECT

Cler



Project number  
PS109987

Size check \_\_\_\_\_  
25mm

Sheet size A1      Scale N.T.S.

Sheet title

## ELECTRICAL SERVICES - SINGLE LINE DIAGRAM

Sheet number                      Revision  
WSP-EL-SK003                      4  
Status  
**PRELIMINARY**

