5 November 2018

Jason Maslen
Senior Planning Officer
Department of Planning & Environment
320 Pitt Street
SYDNEY NSW 2000

Dear Jason,

Wenona School - SSD6952 (MOD2)

I refer to our meeting on Friday 26 October 2018 that was also attended by your Andrew Beattie and Kate Tudehope of Ethos Urban, to discuss SSD6952 (MOD2). This letter responds to your request at the meeting for further information.

Request No. 1

A demonstrable explanation about how the position of the substation in relation to the tree that is proposed to be removed does not meet Ausgrid's current requirements.

Response

The current requirements of Ausgrid for the selection including the size and configuration a kiosk substation and the easement in which the substation is to be located are contained in the publication by Ausgrid entitled "NS141 Site Selection and Site Preparation Standards for Kiosk Type Substations" (Document No. NW000-S008, Review Date 1 March 2018). This publication forms **Appendix A**. **Appendix B** contains a series of drawings prepared by Connect Infrastructure ('Connect'), the ASP 3 that include a detailed design for the proposed substation. Sheet 4 of these drawings shows the position and size of the easement in which the substation is proposed to be located that conforms to the requirements of Ausgrid for an L Type Kiosk Substation (refer Site Plan B on page 22 of NW000-S008).

Item 7.7 of NW000-S008 states "Trees, shrubs, or plants, other than lawn grass, are not permitted on the substation site".

Connect has also pointed to Ausgrid's publication entitled "NS174C Environmental Procedures Supplementary Notes; Environmental Handbook for Construction and Maintenance". This publication defines Structural Root Zone (SRZ) as "the area where the roots [of a tree] provide critical structural stability for the tree". Section 6.1.4(c) points to a calculator as the method by which to identify the SRZ. The results of this assessment conducted by Connect are contained in **Appendix C.** This shows that the SRZ extends for a radius of 3.4 metres from outside of the trunk of the subject tree.

Ausgrid has advised that it is not willing to install the substation if the substation easement would create in incursion into the SRZ. Accordingly, the easement must be at least 3.4 metres from the outside of the trunk of the subject tree whereas at present as shown in the drawing in **Appendix D** it is 300mm from the outside face of the tree.

Request No. 2

A dimensioned diagram that clearly shows the position of the proposed substation easement in relation to the subject tree.

Response

This is contained in **Appendix D**.

Request No. 3

A clear explanation about why the substation cannot be positioned outside the SRZ by moving it to the north.

Response

We refer to the letter dated 16 October 2018 from Peter Ibrahim to George Youhanna of North Sydney Council, which we forwarded to you on 26 October 2018. This explains the process that Wenona went through to select a site for the new substation which included an assessment of three schemes. As you are aware, only one of these schemes (Scheme A) met all the requirements of Ausgrid and was adopted for this reason. However at that time, a below-ground structure forming part of the existing building in close proximity to the proposed substation was not apparent. The extent of this structure and its relationship to the subject tree is shown in the drawings in **Appendix E** (one drawing showing the substation in the presently approved position, the other drawing showing the substation in the now proposed position). This reinforced concrete structure was only identified after Ausgrid certified the location and design of the substation whereupon it was determined that the substation would need to move south to clear the structure. It is not possible therefore to move the substation to the north to avoid an incursion into the SRZ of the subject tree as this would place the substation over the structure which is unacceptable to Ausgrid as among other things this would prevent trenching, footings and earthing of the substation.

Request No. 4

A statement from an appropriately qualified arborist that construction of the proposed substation within the SRZ will be fatal to the survival of the subject tree.

Response

This is contained in **Appendix F**.

Request No. 5

Confirmation that Wenona is agreeable to appropriate replacement planting at a ratio higher than 1:1.

Response

We confirm that Wenona is agreeable to appropriate replacement planting at a ratio higher than 1:1 with at least one of these trees planted on the Miller Street frontage. However, Wenona has requested that the details of this be made a condition of consent rather than a condition precedent to the issue of the consent. This will give Wenona, NSC and DPE the opportunity to work through the optimum location and species of replacement planting without holding up the project.

We trust that the foregoing provides the necessary clarification being sought by DEP to enable an expeditious approval of this application. Please don't hesitate to contact me if you would like to discuss this matter further.

Request No. 6

Clarification about whether Ausgrid's Network Standard NW000-S008 prevents a tree's SRZ from being within a substation easement.

Response

Australian Standard 4970 defines a tree to include a crown, stem/trunk and a root system and an SRZ as comprising structural woody roots located nearest the trunk of the tree – refer section B2.1 and definition 1.4.5 of the standard in **Appendix G**. Whilst the trunk of the tree would be located outside of the proposed substation easement, the TPZ, SRZ and crown would all be within or over the substation easement which is not permitted by Item 7.7 of Ausgrid's Network Standard NW000-S008.

Request No. 7

The DEP acknowledges our advice that the substation cannot be moved northwards because of the existence of belowground structures which would conflict with Ausgrid's requirements. The DEP notes that we have also advised that the substation could not be positioned further to the north as this would position the substation within the blast zone of the substation. In this regard the DEP notes that Ausgrid Standard NW000-S008 states that windows (openable or otherwise) are not permitted within 3 metres of the substation unless they are sheltered by non-ignitable blast resisting barrier. Clarification is sought about whether this is also a factor in the need to locate the substation at the southern end of the site away from the existing nearby windows.

Response

See **Appendix H** for an excerpt from the certified substation design which shows the location of existing windows in the western façade of the existing school building. The excerpt also shows the extent of the 3m exclusion zone, which in the certified design is immediately adjacent to these windows. While Ausgrid will not place the substation over the existing subterranean structure for the reasons we have explained, if it was able to do this thereby positioning the substation further north away from the tree then this would require construction of a non-ignitable, blast-proof barrier to protect these windows. This would have an unacceptable impact on the amenity (natural light and outlook) of the spaces within the building and also on the streetscape. Additionally, such a barrier would require a foundation which would foul the same in-ground structure which caused the need for the relocation of the substation in the first place.

Attached in **Appendix I** is a drawing that consolidates all the relevant information about the proposed position of the substation in relation to the tree, the gate and the fence enclosing the substation.

Yours sincerely,
epm Projects Pty Ltd

Andrew Graham
CEO

cc: George Youhanna, North Sydney Council; Andrew Leake, Wenona; Kate Tudehope, Ethos Urban

Appendix A

Network Standard

NETWORK	Document No	:	NW000-S0082
	Amendment No	:	1
	Approved By	:	Head of AEP & S
	Approval Date	:	15/06/2015
	Review Date	:	01/03/2018

Minor amendments approved 11.09.2017

NW000-S0082 NS141 SITE SELECTION AND SITE PREPARATION STANDARDS FOR KIOSK TYPE SUBSTATIONS

ISSUE

For issue to all Ausgrid and Accredited Service Providers' staff involved with the siting and/or installation of kiosk distribution substations, and is for reference by field, technical and engineering staff.

Ausgrid maintains a copy of this and other Network Standards together with updates and amendments on www.ausgrid.com.au.

Where this standard is issued as a controlled document replacing an earlier edition, remove and destroy the superseded document.

DISCLAIMER

As Ausgrid's standards are subject to ongoing review, the information contained in this document may be amended by Ausgrid at any time. It is possible that conflict may exist between standard documents. In this event, the most recent standard shall prevail.

This document has been developed using information available from field and other sources and is suitable for most situations encountered in Ausgrid. Particular conditions, projects or localities may require special or different practices. It is the responsibility of the local manager, supervisor, assured quality contractor and the individuals involved to make sure that a safe system of work is employed and that statutory requirements are met.

Ausgrid disclaims any and all liability to any person or persons for any procedure, process or any other thing done or not done, as a result of this Standard.

All design work, and the associated supply of materials and equipment, must be undertaken in accordance with and consideration of relevant legislative and regulatory requirements, latest revision of Ausgrid's Network Standards and specifications and Australian Standards. Designs submitted shall be declared as fit for purpose. Where the designer wishes to include a variation to a network standard or an alternative material or equipment to that currently approved the designer must obtain authorisation from the Network Standard owner before incorporating a variation to a Network Standard in a design.

External designers including those authorised as Accredited Service Providers will seek approval through the approved process as outlined in NS181 Approval of Materials and Equipment and Network Standard Variations. Seeking approval will ensure Network Standards are appropriately updated and that a consistent interpretation of the legislative framework is employed.

Notes: 1. Compliance with this Network Standard does not automatically satisfy the requirements of a Designer Safety Report. The designer must comply with the provisions of the Workplace Health and Safety Regulation 2011 (NSW - Part 6.2 Duties of designer of structure and person who commissions construction work) which requires the designer to provide a written safety report to the person who commissioned the design. This report must be provided to Ausgrid in all instances, including where the design was commissioned by or on behalf of a person who proposes to connect premises to Ausgrid's network, and will form part of the Designer Safety Report which must also be presented to Ausgrid. Further information is provided in Network Standard (NS) 212 Integrated Support Requirements for Ausgrid Network Assets.

2. Where the procedural requirements of this document conflict with contestable project procedures, the contestable project procedures shall take precedent for the whole project or part thereof which is classified as contestable. Any external contact with Ausgrid for contestable works projects is to be made via the Ausgrid officer responsible for facilitating the contestable project. The Contestable Ausgrid officer will liaise with Ausgrid internal departments and specialists as necessary to fulfil the requirements of this standard. All other technical aspects of this document which are not procedural in nature shall apply to contestable works projects.

INTERPRETATION

In the event that any user of this Standard considers that any of its provisions is uncertain, ambiguous or otherwise in need of interpretation, the user should request Ausgrid to clarify the provision. Ausgrid's interpretation shall then apply as though it was included in the Standard, and is final and binding. No correspondence will be entered into with any person disputing the meaning of the provision published in the Standard or the accuracy of Ausgrid's interpretation.

KEYPOINTS

This standard has a summary of content labelled "KEYPOINTS FOR THIS STANDARD". The inclusion or omission of items in this summary does not signify any specific importance or criticality to the items described. It is meant to simply provide the reader with a quick assessment of some of the major issues addressed by the standard. To fully appreciate the content and the requirements of the standard it must be read in its entirety.

AMENDMENTS TO THIS STANDARD

Where there are changes to this standard from the previously approved version, any previous shading is removed and the newly affected paragraphs are shaded with a grey background. Where the document changes exceed 25% of the document content, any grey background in the document is to be removed and the following words should be shown below the title block on the right hand side of the page in bold and italic, for example, Supersedes – document details (for example, "Supersedes Document Type (Category) Document No. Amendment No.").

KEY POINTS OF THIS STANDARD

Scope and Risks Addressed

The site selection and site preparation requirements specified in this Network Standard are intended to satisfy site suitability requirements including environmental, access and safety and to meet all statutory obligations. It includes the following scope limitations:

- ☐ Applies only to Schneider kiosks with Ausgrid type designations J, K and L.
- ☐ Applies only to nominal 11kV primary voltage systems and nominal 415/240 volt distribution systems.
- ☐ Does not apply to SWER systems.
- ☐ Does not apply to kiosk substations used only for supplies within zone or Subtransmission substation sites.
- ☐ Applies to kiosk housings used for control points and for control of supply to HVCs.
- ☐ Does not apply to kiosk housings used for other purposes.
- ☐ Applies in all areas supplied by Ausgrid.
- ☐ Applies to supplies for all types of developments including URD, commercial/industrial and multiple dwelling housing developments.
- ☐ Applies to footpath sites and off-street locations.

Where to for more information?

Section 1, 2, 5

General Arrangements

This section of the network standard identifies the different kiosk types referenced and the limitations of their usage. It includes:

- ☐ J, K and L type kiosks.
- ☐ Usage, siting and installation limitations apply.
- ☐ References NS109 Design Standards for Overhead Supply Developments and Distribution Centres
- ☐ Specific requirements for sites using multiple kiosks.

Where to for more information?

Section 6

Tools and Forms

None

Substation Site

Kiosk substations are located with due consideration to safety of the general public and of personnel working in or around the substation. Requirements include consideration of:

- ☐ Spacing for construction and operation of equipment
- ☐ Site drainage
- ☐ Environmental factors
- ☐ Exposure to roadway traffic
- ☐ Contaminated or landfill sites
- ☐ Specifically restricted locations eg. In chambers or buildings, near swimming pools, etc.
- ☐ Specific site selection requirements apply to off-street and footpath sites
- ☐ Site plans and site preparation requirements
- ☐ Retaining walls and batter
- ☐ Pier foundations
- ☐ Avoiding services and encroachments
- ☐ Landscaping
- ☐ Fencing
- ☐ Substation tenure for off-street locations

Where to for more information?

Section 7

Tools and Forms

Annexure A - Site requirements for Off-street sites
Annexure C – List of Drawings

Access, Environmental and Fire Segregation Requirements

Access and environmental requirements include:

- ☐ Unimpeded access 24hours per day 7-days per week
- ☐ Heavy vehicle access is needed to install or remove the kiosk and equipment.
- ☐ Environmental requirements include oil containment and noise limitations

Fire Segregation requirements include:

- ☐ Segregation from buildings and structures
- ☐ Potential sources of fire
- ☐ Separation from combustible materials

Earthing requirements are detailed separately in NS116 and NS117.

Where to for more information?

Section 8, 9, 10, 11, 12

Tools and Forms

Annexure B - Weight of Kiosk Assemblies
Annexure D – Sample Compliance Checksheet

Network Standard
NS141
Site Selection and Site Preparation Standards for Kiosk Type Substations

Contents

1.0 PURPOSE

Ausgrid is responsible for the management and operation of Ausgrid's electricity supply network. The network is a major infrastructure investment and is required to operate economically and reliably in all weather and environmental conditions.

The site selection and site preparation requirements specified in this Network Standard are intended to satisfy site suitability requirements including environmental, access and safety and to meet all statutory obligations.

This Network Standard may be amended or updated at any time to reflect new or amended site requirements, or improvements in design, technology advances etc. The Service Provider shall ensure that the latest version of this Network Standard is used.

2.0 SCOPE

This Network Standard:

- applies only to Schneider kiosks, with Ausgrid type descriptors J, L and K,
- applies only to nominal 11 kV primary voltage systems,
- applies to nominal 415/240 volt distribution systems,
- does not apply to SWER systems,
- does not apply to kiosk substations that are located on zone or sub-transmission substation sites and are used only for supplies within the zone or sub-transmission substation sites,
- applies to kiosk housings used for control points and for control of supply to high voltage customer installations (HVCs), and
- does not apply to kiosk housings used for other purposes.

3.0 REFERENCES

3.1 General

A list of other documents (standards, codes, acts, annexure, policies and other procedures etc) related to the document being prepared or updated. Internal documents that are referenced are those that are above or at peer level of the document in the document hierarchy.

3.2 Ausgrid documents

- Bush Fire Risk Management Plan
- Company Form (Governance) - Network Document Endorsement and Approval
- Company Procedure (Governance) - Network Document Endorsement and Approval
- Company Procedure (Network) - Production / Review of Network Standards
- Customer Installation Safety Plan
- Electrical Safety Rules
- Electricity Network Safety Management System Manual
- NS104 Specification for Electrical Network Project Design Plans
- NS109 Design Standards for Overhead Supply Developments and Distribution Centres
- NS116 Design Standards for Distribution Equipment Earthing
- NS117 Design and Construction Standards for Kiosk Type Substations
- NS143 Easements, Leases and Rights of Way
- NS181 Approval of Materials and Equipment and Network Standard Variations
- NS212 Integrated Support Requirements for Ausgrid Network Assets
- NS261 Requirement for Design Compliance Framework for Network Standards
- Public Electrical Safety Awareness Plan

- Public Lighting Management Plan
- Tree Safety Management Plan

3.3 Other standards and documents

- ENA Doc 001-2008 National Electricity Network Safety Code

3.4 Acts and regulations

- Electricity Supply (General) Regulation 2014 (NSW)
- Electricity Supply (Safety and Network Management) Regulation 2014
- Work Health and Safety Act 2011 and Regulation 2011

4.0 DEFINITIONS

Accredited Service Provider (ASP)	An individual or entity accredited by the NSW Department of Planning and Environment, Energy, Water and Portfolio Strategy Division, in accordance with the Electricity Supply (Safety and Network Management) Regulation 2014 (NSW).
Business Management System (BMS)	An Ausgrid internal integrated policy and procedure framework that contains the approved version of documents.
Document control	Ausgrid employees who work with printed copies of document must check the BMS regularly to monitor version control. Documents are considered “UNCONTROLLED IF PRINTED”, as indicated in the footer.
Network Standard	A document, including Network Planning Standards, that describes the Company's minimum requirements for planning, design, construction, maintenance, technical specification, environmental, property and metering activities on the distribution and transmission network. These documents are stored in the Network Category of the BMS repository.
Review date	The review date displayed in the header of the document is the future date for review of a document. The default period is three years from the date of approval. However a review may be mandated at any time where a need is identified due to changes in legislation, organisational changes, restructures, occurrence of an incident or changes in technology or work practice.

5.0 INTRODUCTION

This Network Standard sets out the requirements for site selection and site preparation for kiosk distribution substations for reticulation of electricity to all types of premises, including underground residential distribution (URD), commercial/industrial and multiple dwelling housing developments, in all areas supplied by Ausgrid. It applies to footpath sites and off-street locations.

This Standard specifies the requirements for siting of the following types of kiosk distribution substations, designed to provide three-phase four-wire nominal 415/240 volt AC supply:

- Type J, nominal ratings up to and including 400 kVA,
- Type L, nominal ratings up to and including 1000 kVA, and
- Type K, nominal rating 1500 kVA.

Requirements for siting of type K kiosks (nominal 1500 kVA rating), although included in this standard, must be confirmed by Ausgrid's Regional Planning Office.

This Standard does not cover the design of electrical systems, the installation of high and low voltage mains, or the installation of substation equipment. These topics are specified in other network standards.

This Standard is to be read in conjunction with NS117 Design and Construction Standards for Kiosk Type Substations and the other standards listed in NS117. Refer also to NS117 for definitions of terms used in this Standard.

All site preparation work must be carried out in accordance with the relevant safety requirements indicated in NS117.

6.0 GENERAL ARRANGEMENTS

6.1 Kiosk types

This Network Standard refers to kiosk types J, L and K. These kiosks are for installation throughout Ausgrid's area, subject to the limitations indicated in Clause 6.2.

Refer to NS117, for details of the equipment installed in these kiosks, including transformers, high voltage switchgear, distributors and electrical protection equipment.

These kiosks are completely assembled and delivered by the manufacturer to a previously prepared site. The manufacturer's representative will contact the Service Provider regarding access to the site and provision of a crane, if required.

6.2 Limitations on usage, siting and installation of kiosk types

The following kiosk usage, siting and installation limitations apply:

(a) J type kiosks must be installed as specified in Drawing 151573. Installation is restricted to URD areas only.

(b) L type kiosks must be installed as specified in Drawing 151572.

(c) K type kiosks must be installed as specified in Drawing 151190.

(d) K type kiosks are not permitted on footpath sites.

(e) Various other usage and siting limitations apply, as specified in Sections 7, 8, 9, 10 and Annexure A.

In addition, NS109 limitations and limitations on usage of the various kiosk types.

6.3 Multiple kiosks

In some cases, Ausgrid may approve installation of more than one kiosk at a premises. Where approval is given, each installation must comply with the requirements of this Network Standard. Each individual kiosk site must also comply with the site dimensions required in Annexure A and each kiosk must be positioned within its individual site so as to achieve the specified minimum clearances to its site boundary. Unless agreed otherwise by Ausgrid, the HV ends shall be located facing each other (where kiosks are positioned end-to-end), or at the same end (where kiosks are positioned side-by-side).

Where blast resisting barriers are necessary in accordance with the requirements of Section 10, or where the customer requires blast resisting barriers between or beside kiosks, the blast resisting barriers must be constructed in accordance with Section 10 of this Network Standard and must not encroach into the clearance space required around each kiosk.

7.0 SUBSTATION SITE

7.1 General

Kiosk substations must be located with due regard to safety of the public and safety of personnel working in and around the substation.

It is essential to locate kiosk substations in areas that are well drained and are clear of underground or overhead obstructions. Sites should preferably also be level or near level, to minimise soil erosion effects and long term movement of the kiosk assembly. Kiosk sites must be able to withstand a bearing pressure of 55 kilopascals without movement.

Kiosk substation sites must also comply with the environmental requirements specified in Section 9 and the fire segregation requirements specified in Section 10.

Kiosk substations should not be installed in the following areas, unless Ausgrid determines that there is no reasonable alternative:

- areas prone to stormwater run-off,
- areas subject to declared 1in100 year (or less) floods,
- areas less than one metre above the highest tidal surge inundation limit,
- unstable areas,
- ocean-front areas where storm wave erosion could affect the site, or where storm wave conditions could cause access difficulties, and
- roadway areas including kerb blisters or similar traffic control narrowings,
- exposed ocean-front locations subject to salt laden winds or coastal environments which demonstrate accelerated corrosion to existing infrastructure.

Kiosk substations and/or associated cables must not be installed on contaminated sites, or on landfill sites where gas emanating from the landfill may cause construction problems or safety problems. Any proposals associated with landfill sites must be discussed at the initial stages of the project with Ausgrid's Regional Planning Officer, before any design work is commenced. (Note: This does not preclude the building-up of a kiosk site for levelling purposes on a non-landfill site, provided the site complies with all other Ausgrid requirements.)

Kiosk substations are not to be installed within buildings, on building roofs, in chambers, or in covered parking areas or garages.

Kiosk substations are not normally permitted in building alcoves or under roofed or partly roofed areas unless the surroundings and installation satisfy specific Ausgrid requirements. All proposals must be approved by Ausgrid before planning proceeds.

The level at the top of the kiosk base must be not more than two metres above or below the access roadway level or street footpath level adjacent to the kiosk site. The difference in levels is to be measured from where the usual point of personnel access adjacent to the kiosk site leaves the access roadway level or street footpath level. Safety railing must be installed where there is a reasonable likelihood that a person could fall from the site or the access path or steps.

The siting of kiosk substations in the vicinity of public swimming pools, service stations, flammable gas or liquid storage tanks should be avoided. The Service Provider is responsible for the control of any potentially hazardous situation that may arise from substations located near these structures. Refer also to:

- AS/NZS 1596 - The Storage and Handling of LP Gas
- AS 1940 – The Storage and Handling of Flammable and Combustible Liquids
- AS/NZS 2229.2 – Fuel Dispensing Equipment for Explosive Atmospheres.
- AS/NZS 2430 – Classification of Hazardous Areas.

Refer to Section 10 regarding fire segregation requirements including requirements relating to locations near gas meters/regulators.

It should be noted that in accordance with AS 2419.1:2005 – Fire Hydrant Installations – Part 1 System Design, Installation and Commissioning – external fire hydrants are required to be located in a position not less than 10m from any high voltage electrical distribution equipment such as transformers (kiosks) and distribution boards to avoid potential electrical hazards."

Kiosk substations must not be sited under overhead high voltage power lines of nominal voltage 22 kV or above. Kiosk substations should not be sited under overhead 11 kV power lines, unless there is no reasonable alternative. Kiosk substations must not be sited closer than 20 metres to a structure carrying 132 kV overhead power lines and where 132 kV overhead power lines are constructed along a public roadway, kiosk substations should not be located on the footpath on the same side.

Kiosk substations must not be sited on land owned or controlled by a rail authority, excepting where the kiosk site is approved by the rail authority and is required to provide supply for that authority or for installations approved by that authority. A kiosk substation sited on land owned or controlled by a rail authority must not be used for supply to an installation external to that land without Ausgrid's special approval and conditions, including special earthing arrangements.

For URD areas in particular, during the initial selection of kiosk sites at the subdivision stage, the likely future locations for swimming pools should be considered. For off-footpath sites, locations adjoining residential backyards or at corner allotments should be avoided.

All kiosk substation sites must comply with relevant Australian Standards and Standards Australia Handbooks including:

- SAA HB 100 – 2000 (CJC 4) Co-ordination of Power and Telecommunications: Manual for the establishment of safe work practices and the minimisation of operational interference between power systems and paired cable telecommunications systems.

Refer also to NS116 Design Standards for Distribution Earthing for further information on clearance requirements from telecommunications pits and pillars.

7.2 Site selection

Kiosk substation sites must also comply with the relevant requirements in the following sub-sections for off-street locations or footpath sites.

7.2.1 Off-street locations

The minimum site dimension requirements for the types of kiosk substations covered by this Network Standard are as indicated in Annexure A. (Attention is drawn to the notes in Annexure A, which indicate restrictions on some of the siting options.)

The overall area of land required for the substation site includes sufficient area around the actual kiosk for personnel access, for cable routes, for installation of earthing electrodes and for hinged or removable doors to be opened or removed. The required substation site is therefore much larger than the actual kiosk enclosure footprint.

Refer to Clause 7.9 for details of site tenure requirements.

7.2.2 Footpath sites

In addition to the other relevant siting requirements indicated in this Network Standard, the following issues are also to be addressed for footpath sites for kiosk substations:

- must not be used where the requirement for the substation is in the first instance created by an application by a single applicant or a developer (eg a factory, a commercial building, a parcel containing multiple residential or industrial units, or a community title development),
- must not obstruct a road user's view of traffic at or approaching intersections,
- must not obstruct a road user's view of traffic at crests, curves, roundabouts or other locations, where a traffic accident could reasonably be attributed to loss of view caused by the kiosk,
- must take into account a road user's view of traffic when the road user is about to enter the carriageway of a road from a driveway,
- must not be vulnerable to damage by reasonably expected traffic movements,
- must not be located at or adjacent to roundabouts and traffic calming devices,
- should not be located at "no stopping" zones unless no suitable alternative site is available and adequate traffic management is possible including nearby parking,
- should be not less than 500 mm from the footpath side edge of the kerb line, unless a lesser distance is essential and all other siting requirements are satisfied,
- must permit any kiosk access door to be opened and accessed without having to encroach over the footpath side edge of the kerb line (Annexure A shows access doors for most kiosks.),
- must not be located within three metres from the legally enforceable limits of public transport stops and pedestrian crossings,
- must not be positioned at intersections or in other locations frequented by pedestrians, where an accident to a pedestrian by traffic could reasonably be attributed to loss of view caused by the kiosk,
- shall be reviewed for their impact to adjacent environmentally sensitive or significant locations, including heritage sites, aboriginal sites, memorials, lookouts, etc.,
- must not be located where established access or probable future access to a property would be affected,
- shall be reviewed for their impact to the amenities of the adjacent environment, and
- must be sufficiently clear of trees and shrubs to ensure that present access is satisfactory and future access will not be compromised.

Refer also to NS104 Specification for Electrical Network Project Design Plans and in particular to the section on Responsibility for Obtaining Consent from Other Parties.

K type kiosks are not permitted on footpath sites.

7.3 Site plans and site preparation

7.3.1 General

In addition to the requirements of this Network Standard, kiosk substations must be installed in accordance with the relevant drawing:

- for J kiosk – drawing 151573
- for L kiosk – drawing 151572
- for K kiosk – drawing 151190.

For contestable work, the developer/customer is responsible for all substation site preparation to the satisfaction of Ausgrid and for all associated costs, including piers, retaining walls and excavation of rock for the kiosk base and cable entries.

Site plans or sketches of each individual substation site must be submitted for approval by Ausgrid, as part of the Design Certification process and before construction proceeds.

Site plans must show existing or proposed structures for a radius of 10 m from the kiosk, the street location name and the name of nearest cross street, the north point and the scale of the plan.

For J and L type kiosks, site contours must be such that the top of the kiosk base is not lower than 120 mm and not more than 240 mm above finished ground level. Refer to the relevant drawings indicated above for details and requirements for K type kiosks.

The kiosk site should not retain surface water and should not be in a location where sub-surface drainage will collect. If this is likely, it will be necessary for a sub-surface drainage system to be installed to the satisfaction of Ausgrid.

Unless specified otherwise by Ausgrid, kiosks installed on footpath sites should be oriented with the high voltage end facing the oncoming traffic i.e. such that the side door (HV connection / tap changer access) is on the property side of the kiosk - not on the road side.

7.3.2 Retaining walls and batter

Sites where retaining walls and/or batter would be required should be avoided unless there are no reasonable alternatives.

Where retaining walls and/or batter are necessary, they must comply with the following requirements:

- Retaining walls, including foundations and batter must be external to the minimum overall dimensions of the substation site.
- They must be constructed to the engineering requirements of the local council and the relevant Australian Standards (including AS 3798 and AS 4678). An Engineer’s Certificate is to be supplied by the Service Provider on request.
- They must be suitably drained away from the site.
- They must be constructed of non-perishable material such as concrete or brick.
- Backfill must be compacted and be of suitable clean material free from large solid material over 50 mm in diameter.
- If a retaining wall is used, a handrail may also be required.

- In ground other than rock, the level at the top of the foundations for retaining walls must be at or below the level at the bottom of excavations for the installation of cables and / or conduits.
- The bottom of the foundations for retaining walls must be at or below the level of the bottom of the substation piers. Refer also to Clause 7.4.
- The retaining wall must provide for concrete encased conduits where required for cable entry to the substation. Details must be included in the design by the Service Provider.
- Where the substation is located on rock, the retaining wall foundations must provide for concrete encased conduits where required for cable entry to the substation. Details must be included in the design by the Service Provider.
- For kiosk sites other than footpath, reserve or URD sites, the site owner/customer is responsible for ongoing maintenance where specified in the lease/easement conditions, for retaining walls, batter, handrails etc.

7.4 Pier foundations

Kiosk substations installed in Ausgrid's area shall be equipped with pier foundations to support the weight of the kiosk and concrete base during the installation of cables and to prevent subsidence of the kiosk over time. With the exception of K kiosks, pier foundations are not compulsory where the kiosk is installed on solid rock, but piers may assist in cable installation; and there are additional requirements, as indicated below, if piers are not installed.

Where the kiosk site is on solid rock and piers are installed, the piers must be socketed into the rock. Ausgrid may request a structural engineer's report in such cases.

Where J or L type kiosk sites are on solid rock and piers are not installed, the requirements for deletion of the pier foundations are as follows:

(a) For the entire width of the kiosk base, the area between the high voltage and low voltage cable entry holes in the kiosk base must remain as unexcavated solid rock.

(b) The unexcavated rock plinth must be level and at a finished height that will support the kiosk base at a finished level as indicated in the relevant kiosk type drawing listed below.

(c) Beneath both the high voltage and low voltage cable entry holes, the rock must be removed and replaced with compacted sand prior to the delivery of the kiosk to the site. This is to facilitate the subsequent installation of cables. The depth of rock excavation must be appropriate for the bending radius of the cables to be installed.

(d) A certificate must be provided to Ausgrid's Liaison Officer, from a certified and practicing structural engineer, certifying that the piers and rock plinth are adequate to support the maximum weight of the kiosk type to be installed, without movement, when the compacted sand beneath both the high voltage and low voltage cable entries is removed.

7.4.1 Pier foundation details

Prior to the pier foundations being installed, the developer/customer shall install site pegs to indicate the finished surrounding site level.

The tops of the pier foundations must be installed to support the kiosk base at a level which will achieve the specified ground clearance for the kiosk above the finished surrounding site level

Kiosk ground clearance, kiosk site levels, pier layout and minimum pier design specifications must comply with the requirements of the following drawings:

- for J kiosk – drawing 151573
- for L kiosk – drawing 151572
- for K kiosk – drawing 151190

The minimum depth for kiosk piers is the greater of:

- 1000 mm below the underside of the kiosk base level,
- 500 mm below the level of the ground that will be disturbed during excavation for installation of the cables,
- 500 mm below the bottom of any other service line (eg water, sewer, gas, telecommunications, stormwater) within 2000 mm of any one of the piers.

The maximum *length for kiosk piers complying with the design specifications in the above drawings shall not exceed 1500 mm. If it is necessary for piers to exceed 1500 mm in length to satisfy particular site conditions, as indicated below, a site specific design by a qualified structural engineer will be required.

(*length = depth of pier from underside of kiosk base)

Some kiosk site conditions may require pier design to exceed the minimum specifications indicated in the drawings and pier length to exceed 1500 mm. Examples include terraced sites or sites cut into sloping ground, or sites near other large services, such as large water, stormwater or sewer mains. The Service Provider is responsible for ensuring that pier foundations are stable and adequate and for engaging a qualified structural engineer to design pier foundations where necessary. A structural engineer's report may be required in such cases.

Where pier foundations are installed for J, L and K type kiosks, the area around the piers must be backfilled after installation of the piers with sand and compacted to remove voids under the area where the kiosk base will be installed. Excavations under and around the kiosk base for cable installations must also be backfilled with sand and compacted to remove voids.

The kiosk piers must be allowed at least seven days for the concrete to cure before the kiosk base is installed on the piers and before cables are installed in the kiosk base footprint area.

After completion of the installation, the area around the kiosk must be backfilled, compacted and restored to the finished surrounding site level.

7.5 Avoiding services and encroachments

For off-street locations, services such as drains, sewers, pipes and wiring, must not pass through or under the kiosk substation overall site area. For exact dimensions, refer to minimum site requirements in Annexure A and the drawings indicated in Clause 7.3.1. Refer also to the above drawings for the range of acceptable entry angles for consumers' mains at the kiosk.

For footpath sites it is generally not possible to have a site, the size of a standard kiosk easement, which is clear of other services. Therefore, instead of the arrangements discussed above, the following requirements shall apply which are in addition to the requirements outlined in Clause 7.2.2:

- there should be no other services directly beneath the footprint of the kiosk,
- there should be sufficient space around the kiosk to allow cables to be connected to the kiosk without encroaching on minimum separations to other services. Minimum separations are generally as follows, however in each case these should be confirmed with the other Utility/Service Providers in accordance with the NSW Streets Opening Conference Guide to Codes and Practices for Streets Opening:
  - Gas pipes ≤ 75mm: 150mm minimum to LV cables, 300mm minimum to HV cables
  - Gas pipes > 75mm: 300mm minimum to LV or HV cables
  - Telstra/Optus cables & conduits: 100mm minimum to LV cables, 300mm minimum to HV cables

  - Water Mains ≤ DN 375mm: 1000mm minimum horizontal clearance, 225mm vertical clearance
  - Water Mains > DN 375mm: advice on clearances is to be sought from relevant water supply organisation.
  - Sewer Mains < DN 200mm: 500mm minimum horizontal clearance
  - Sewer Mains > DN 200mm: 1000mm minimum horizontal clearance
  - Sewer Mains ≤ DN 300mm: 225mm minimum vertical clearance
  - Sewer Mains > DN 300mm: 300mm minimum vertical clearance
- Earthing should be in accordance with Clause 7.5 of NS116 i.e. the electrodes may be installed either in the footpath cable allocation in accordance with drawing 167433, or in the pole line allocation as per drawing 36377 for pole mounted substations. The pole line allocation is preferred.

7.6 Protection from vehicles in off-street locations

Kiosks must be protected from damage by vehicles in areas classified as high risk for vehicle impact, such as adjacent to driveways, etc.

7.7 Landscaping for off-street locations

For J, L and K type kiosks, the finished surface of the substation site may be blue metal, lawn grass, pine bark woodchips, pavers or mowing strips.

When selecting the landscaping surface, the customer is responsible to consider the impact the finished surface may have on the adjacent footways either by direct interference or the landscaping material spilling onto it.

Other surface finishes may be permitted, at the discretion of Ausgrid's Regional Planning Officer, provided the customer agrees in writing to bear all costs resulting from any future need to excavate and reinstate around the substation, irrespective of whether or not the excavation is associated with supply to the customer.

Ausgrid cannot accept responsibility for damage to landscaping where excavation for cable works or equipment replacement occurs in the future.

Screening vegetation must not interfere with access to the substation for both personnel and equipment.

Trees, shrubs, or plants, other than lawn grass, are not permitted on the substation site.

Watering systems must not be installed within the substation site or designated personnel access routes.

7.8 Fencing around off-street locations

Where it is intended to fence around off-street locations, attention must be given to the following issues:

- potential rise, under fault conditions, which may be transferred along a metallic fence. This may require wood fence posts in the vicinity of the kiosk, or in some cases the whole section of fence may need to be non-metallic. Each substation should be treated on its own merits with advice sought early in the project design from Ausgrid as required. The major factors which will affect this are: the local soil resistivity; whether the 11kV feeder is underground all the way back to the Zone Substation (i.e. providing a return path by cable sheath continuity), and is the kiosk connected to an adequate interconnected MEN system.

- kiosks should be “fenced out” of the property not “fenced in”. Also refer to Section 8 regarding access requirements.
- attention needs to be given to the distance between fence and kiosk to prevent people jumping from the top of one to the other.

7.9 Substation tenure for off-street locations

In all off-footpath kiosk site locations an easement shall be provided at the development stage, to minimise ongoing title problems. The following site criteria shall also apply:

- for URD areas preference should be given to siting of kiosk substations on park boundaries, access lanes and public land where available,
- for high/medium density residential developments, the kiosk substations siting is for one edge of the overall substation site boundary to be at the front road boundary of the development,
- for industrial or commercial developments, the preferred siting for kiosk substations is for one edge of the overall substation site boundary to be at the front road boundary of the development. Where the kiosk site is not located adjacent to a public roadway, an easement will be required for the kiosk site and an easement and right-of-way for cable and personnel access.

For further details of land tenure requirements and requirements for easements and rights-of-way refer to NS109 Design Standards for Overhead Developments and NS143 Easements.

8.0 ACCESS REQUIREMENTS

Kiosk sites must have unimpeded access for Ausgrid personnel and vehicles, directly from a public street, for 24 hours per day, 7 days per week.

A heavy truck with a vehicle-mounted crane is needed to install or remove the kiosk and equipment. Access routes, where required, must be suitable under all weather conditions and constructed to withstand the loading. The access route should be a minimum of 4 metres wide, have a minimum of 4 metres headroom and be continuous from the property boundary to the kiosk site.

For kiosk sites other than footpath, reserve or URD sites, the site owner/customer is responsible for providing and maintaining access routes and surface finishes, to the satisfaction of Ausgrid, as specified in the easement document.

Access from the street to the kiosk site must not be fenced or enclosed, unless approval is given in writing by Ausgrid and the conditions listed in the approval are complied with on an ongoing basis by the site owner/customer.

9.0 ENVIRONMENTAL REQUIREMENTS

9.1 Oil containment

- The oil containment measures in the J, L and K kiosks are designed to fully contain any oil that may leak from the transformer. However to further minimise any risk to the environment the location of kiosk substations in the following situations should be avoided wherever reasonably practicable:
- in close proximity to rivers, creeks, natural or man-made water courses, stormwater drains, or paved surfaces or concrete aprons that drain to the stormwater system,
- within 40 metres upstream of a waterway or sensitive environment, such as a wetland, national park or nature reserve,
- within 5 metres upstream of a grated drain or pit, where there would be less than 500 mm of permeable strip between the kiosk and the kerb,
- within an area of high groundwater, where the groundwater would be normally less than 1 metre below ground level,
- within an area prone to flooding, or a drainage path, or a stormwater ponding area,
- adjacent to steep downhill slopes, of 10% grade or greater, or
- within bush fire prone land areas, where there is a significant risk that a kiosk fault or fire could cause a bush fire.

9.2 Noise limitation

To reduce the possibility of noise interference complaints, the siting of the kiosk substation must comply with:

- the Protection of the Environment Operations (Noise Control) Regulation 2008 under the Protection of the Environment Operations Act 1997,
- the provisions of AS 1055 - 1997 Acoustics – Description and measurement of environmental noise,
- the NSW Industrial Noise Policy 2000
- any additional requirements of the local council.

The Environmental Protection Authority has the power to administer the Protection of the Environment Operations (Noise Control) Regulation. It is the responsibility of the Service Provider (Designer) to provide evidence that the substation location complies with these regulations.

9.3 Environmental assessment

The Service Provider (Designer) is responsible for providing an assessment of the environmental impacts of the proposed kiosk installation, in accordance with the requirements of Parts 4 and 5 of the Environmental Planning and Assessment Act 1979.

9.4 Other authorities to be considered

The kiosk site selection process must consider the requirements of other authorities. Particular aspects to be considered include clearance requirements from telecommunications installations (refer also to Clause 7.1 and NS116), gas lines, water mains and sewer mains and any requirements of the local council. Service Providers (Designers) are responsible for liaising and negotiating with other authorities, organisations and persons to obtain all necessary consents. Refer also to NS104 Specification for Electrical Network Project Design Plans.

10.0 FIRE SEGREGATION REQUIREMENTS

The siting of kiosk substations must comply with the requirements of all relevant authorities (including fire control authorities) in relation to segregation from buildings, structures, etc. Kiosk substations must also be separated from building air intake and exhaust openings and natural ventilation openings by separation distances that meet the requirements of all relevant authorities and Australian Standards.

Apart from any requirements to satisfy other authorities; Ausgrid has a general requirement for kiosk substations to be effectively segregated from neighbouring areas and buildings which are subject to fire risk. Pathways and or fire escape routes shall not encroach upon the kiosk easement and may require greater separation to ensure the route is not impacted in the event of a fire. The following specific additional requirements must also be satisfied.

Ausgrid requires kiosk substation housings to be separated from building ventilation system air intake and exhaust duct openings, by not less than *6 metres. This applies irrespective of whether the building ducted ventilation system is mechanical or natural and irrespective of whether or not fire dampers are installed in the ducts.

(* Measured by shortest string line between housing and duct.)

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

Any portion of a building other than a BCA class 10a structure constructed from non combustible materials, which is not sheltered by a non-ignitable blast-resisting barrier and is within 3 metres in any direction from the housing of a kiosk substation, is required to have a Fire Resistance Level (FRL) of not less than 120/120/120. Openable or fixed windows or glass blockwork or similar, irrespective of their fire rating, are not permitted within 3 metres in any direction from the housing of a kiosk substation, unless they are sheltered by a non-ignitable blast resisting barrier.

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

Any portion of an area which may be used for storage of combustible material, which is within 3 metres in any direction from the housing of a kiosk substation, must be sheltered by a non-ignitable blast-resisting barrier.

Blast resisting barriers and their foundations must be external to the overall area required for the substation site and must also comply with the following requirements:

- they must not interfere with personnel or equipment access to the substation or with cabling,
- they must be constructed of non-perishable material such as concrete or brick,
- they must not contain apertures or openings such as doorways or vents even if these have a Fire Resistance Level rating,
- they must provide for concrete encased conduits where required for cable entry to the substation,
- they must not interfere with the kiosk ventilation and the escape of heat from the kiosk,
- they must be constructed to comply with any relevant Australian Standards and the engineering requirements and the satisfaction of the local council,
- an Engineer's Certificate must be supplied by the Service Provider (Designer) if requested, and

- the foundation depths must be as specified for retaining walls in Clause 7.3.2 'Retaining Walls and Batter'.
- The barriers must have a minimum fire resistance level of 120/120/120 and be designed to withstand a live loading from the substation side of not less than 2 kPa uniformly distributed.

In all cases, the location of blast resisting barriers must be approved by Ausgrid's Regional Planning Office as part of the design certification process and before construction proceeds.

The site owner/customer is responsible for ongoing maintenance of blast resisting barriers.

11.0 EARTHING

Refer to NS116 and NS117 for information on earthing requirements.

12.0 REPORTING

The Service Provider (Designer) shall provide the following information in both hard and soft copy. The soft copy must be in a format compatible with AutoCad (.dwg or .dxf) or Adobe Acrobat (.pdf):

- Siting Information: A sketch or location plan as detailed in Clause 7.3.1 must be provided.

13.0 RECORDKEEPING

The table below identifies the types of records relating to the process, their storage location and retention period.

Table 1 – Recordkeeping

Type of Record	Storage Location	Retention Period*
Approved copy of the network standard	BMS Network sub process Standard – Company	Unlimited
Draft Copies of the network standard during amendment/creation	HPRM Work Folder for Network Standards (HPRM ref. 2014/21250/225)	Unlimited
Working documents (emails, memos, impact assessment reports, etc.)	HPRM Work Folder for Network Standards (HPRM ref. 2014/21250/225)	Unlimited

* The following retention periods are subject to change eg if the records are required for legal matters or legislative changes. Before disposal, retention periods should be checked and authorised by the Records Manager.

14.0 AUTHORITIES AND RESPONSIBILITIES

For this network standard the authorities and responsibilities of Ausgrid employees and managers in relation to content, management and document control of this network standard can be obtained from the Company Procedure (Network) – Production/Review of Network Standards. The responsibilities of persons for the design or construction work detailed in this network standard are identified throughout this standard in the context of the requirements to which they apply.

15.0 DOCUMENT CONTROL

Content Coordinator : Transmission and Distribution Substations Engineering Manager

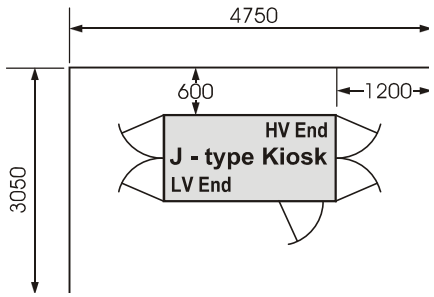
Distribution Coordinator : Senior Engineer – Guidelines Polices and Standards

Annexure A – Site Requirements for Off-Street Sites

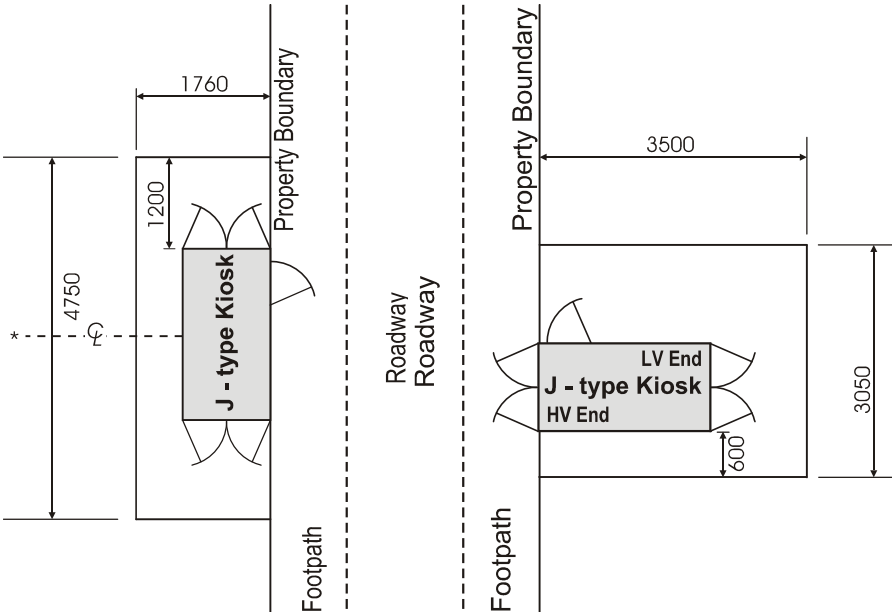
Note: For each kiosk type included in this Appendix, the minimum site requirements indicated apply only where the kiosk site is determined by Ausgrid to be adequately ventilated and fire segregated. For kiosk sites adjacent to buildings or other substantial structures, Ausgrid may require additional clearances for adequate kiosk ventilation.

A1 J type kiosk

J type kiosk minimum site requirements are indicated in the following site plans and notes:



Site Plan A



Site Plan B **Site Plan C**

(*Property boundary between lots, if kiosk site is located across adjacent residential lots)

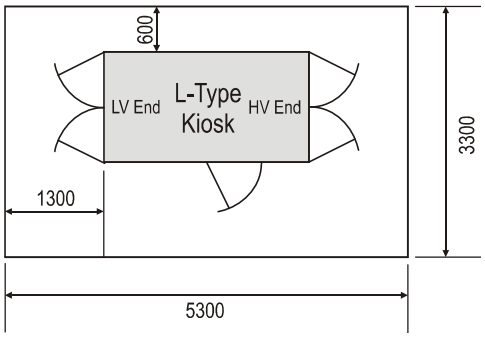
J Type Kiosk Notes

1. Where the 4750 mm x 3050 mm J kiosk site is set back from the street frontage property boundary (ie Site Plan A with additional set back), it will be necessary for an associated cable easement and a right-of-way for access to be established. (Refer to Clause 7.9.)

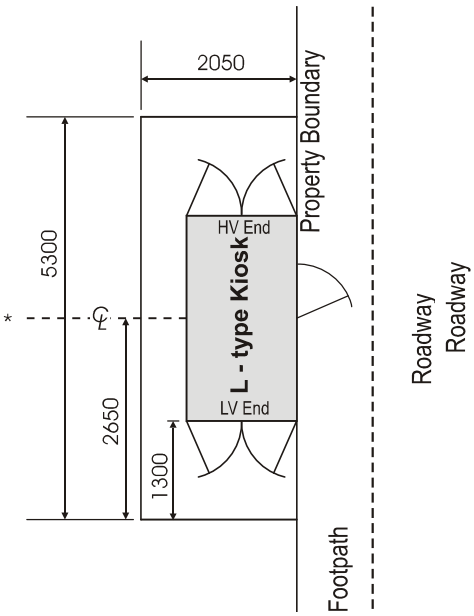
2. J kiosks are only approved for URD domestic supply areas. Approval for the use of J kiosks in other than URD supply areas will be at the discretion of Ausgrid Asset Engineering.

A2 L type kiosk

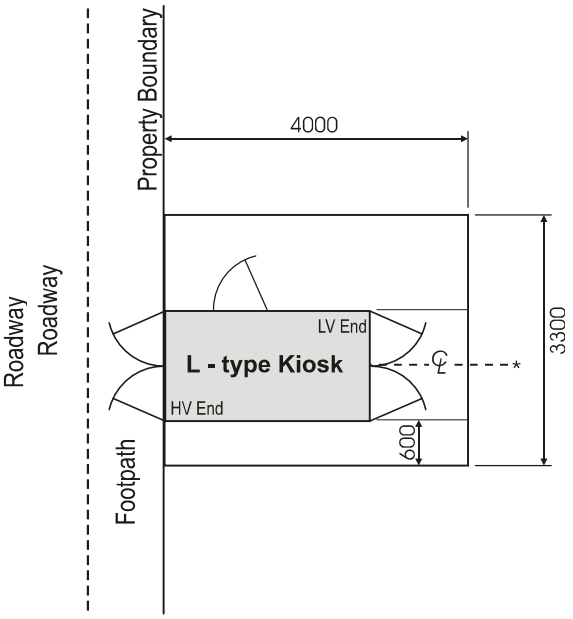
L type kiosk minimum site requirements are indicated in the following site plans and notes:



Site Plan A



Site Plan B



Site Plan C

(* Property boundary between lots, if kiosk site is located across adjacent residential lots.)

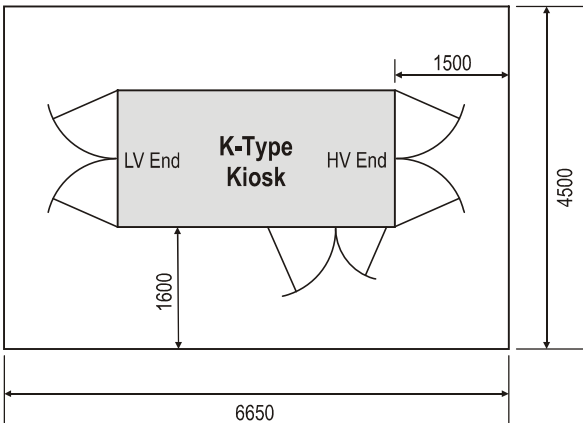
L Type Kiosk Notes

1. The L kiosk site plans shown with one edge of the kiosk structure on the street frontage property boundary (Site Plans B and C) are restricted options generally only available for underground residential distribution (URD) sites. Approval for these options in areas other than URD will be at the discretion of Ausgrid, after consideration of all relevant factors.

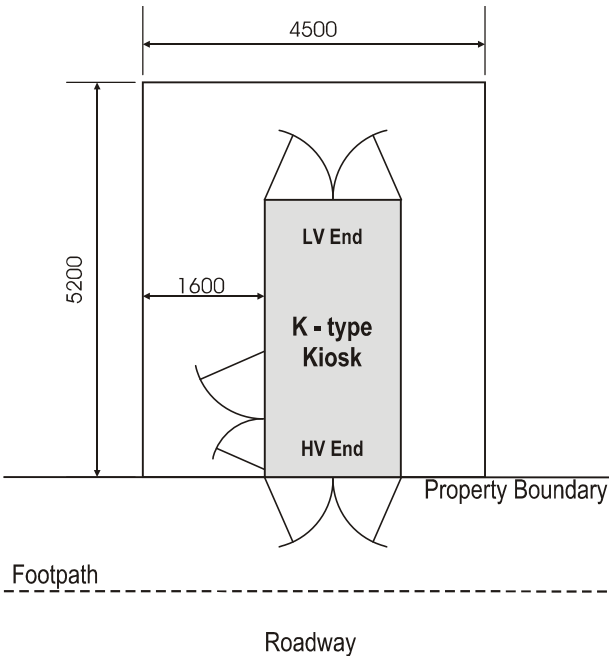
2. Where the 5300 mm x 3300 mm L kiosk site is set back from the street frontage property boundary (ie Site Plan A with additional set back), it will be necessary for an associated cable easement and a right-of-way for access to be established. (Refer to Clause 7.9.)

A3 K type kiosk

K type kiosk minimum site requirements are indicated in the following site plans:



Site Plan A



Site Plan B

Annexure B – Weight of Kiosk Assemblies

Typical weights of Kiosk Types J, L and K, complete with transformer, switchgear, bases and sundry equipment.

Table B1

J Type Kiosk		L Type Kiosk		K Type Kiosk	
Item	Weight	Item	Weight	Item	Weight
Kiosk with 160 kVA transformer	3215 kg	Kiosk with 400 kVA transformer	5275 kg	Kiosk with 1500 kVA transformer	6560 kg
Kiosk with 315 kVA transformer	3845 kg	Kiosk with 600 kVA transformer	5875 kg		
Kiosk with 400 kVA transformer	4005 kg	Kiosk with 800 kVA transformer	6475 kg		
		Kiosk with 1000 kVA transformer	7075 kg		
J Type - Maximum Weight (see Note)	4005 kg	L Type - Maximum Weight (see Note)	7075 kg	K Type – Maximum Weight (see Note)	6560 kg

Note: Supporting structures and piers must be suitable for the maximum weight applicable for the kiosk type.

Annexure C – List of Drawings

IMPORTANT: Users must ensure that the drawings they are using are the current versions with all amendments.

C1 Layout option plans

Table C1

Number	Title
151572	Type L Kiosk (Schneider Type T2) Layout Option Plan
151573	Type J Kiosk (Schneider Type T1) Layout Option Plan
151190	Type K Kiosk (Schneider Type T3) Layout Option Plan

Annexure D – Sample Compliance Checklist

Network Standard Checklist Form

NS141 Site Selection and Site Preparation Standards for Kiosk Type Substations

Project Identification:	
Prepared by: <Name & Position Title>	Date:

This checklist is for internal Ausgrid use only and does not apply to ASPs or contractors who have specific compliance requirements in relation to Contestable project works. The checklist is unique for each network standard and is available within BALIN and the BMS as a separate form that can be amended as required, completed and saved in TRIM with the other project documentation.

This section is used to identify compliance checks that when applied to the work associated with this Network Standard will satisfy an audit process to establish that the requirements of the standard have been followed. It is expected that applicable items would normally be checked as Comply (Yes) as non-compliance is generally not tolerated.

Where non-compliance is the result of specific site conditions or design decisions this needs to be identified in the notes section of the form for each non-compliance and approval sought from an appropriately authorised Ausgrid manager responsible for design approval per NS261 Compliance Framework for Network Standards.

Should additional information be available to document non-compliance decisions, these can be attached to the checklist form. The checklist and any attached explanatory notes should be saved in the project document repository.

Item	Description	Refer Clause	Completed/ Actioned
	Scope		
	This Network Standard sets out the requirements for site selection and site preparation for kiosk distribution substations for reticulation of electricity to all types of premises.		
	General Arrangements		
1	The submitted design complies with the kiosk usage, siting and installation limitations for the type of Kiosk supplied.	6.1, 6.2	Yes/No/NA
2	For multiple kiosk sites the requirements for spacing and orientation are met.	6.3	Yes/No/NA
	Substation Site		
3	The general requirements for kiosk siting are met.	7.1	Yes/No/NA
4	For off-street locations the site arrangement and size comply with this clause and the details in Annexure A (refer also tenure requirements Clause 7.9).	7.2.1	Yes/No/NA
5	For footpath site locations the requirements of this clause are met.	7.2.2	Yes/No/NA
6	Site plans and site preparation in accordance with requirements.	7.3	Yes/No/NA
7	Pier foundations are installed in compliance with requirements where appropriate.	7.4	Yes/No/NA
8	For off-street locations service encroachments do not occur.	7.5	Yes/No/NA
9	For footpath locations the service encroachments, where present, are within the limitations of the specific requirements of this clause.	7.5	Yes/No/NA

Item	Description	Refer Clause	Completed/ Actioned
10	Protection from traffic hazards has been applied where required in off-street kiosk site locations.	7.6	Yes/No/NA
11	Landscaping provisions of this clause have been met for off-street kiosk site locations.	7.7	Yes/No/NA
12	Where fencing is to be installed in off-street locations the fence has been installed to meet Ausgrid requirements.	7.8	Yes/No/NA
13	For off-street kiosk locations the required substation site tenure has been obtained.	7.9	Yes/No/NA
	Access, Environmental and Fire Segregation Requirements		
14	24-hour 7-day week access has been provided.	8.0	Yes/No/NA
15	Heavy vehicle access has been provided and maintained as required.	8.0	Yes/No/NA
16	Oil containment considerations have been met.	9.1	Yes/No/NA
17	Noise limitation considerations have been met.	9.2	Yes/No/NA
18	An environmental assessment report has been prepared.	9.3	Yes/No/NA
19	All the necessary consents have been obtained from other authorities by the ASP Designer.	9.4	Yes/No/NA
20	Fire Segregation requirements have been met.	10.0	Yes/No/NA
21	Earthing requirements have been identified in accordance with NS116 and NS117.	11.0	Yes/No/NA
22	Reporting requirements have been met.	12.0	Yes/No/NA

Notes:

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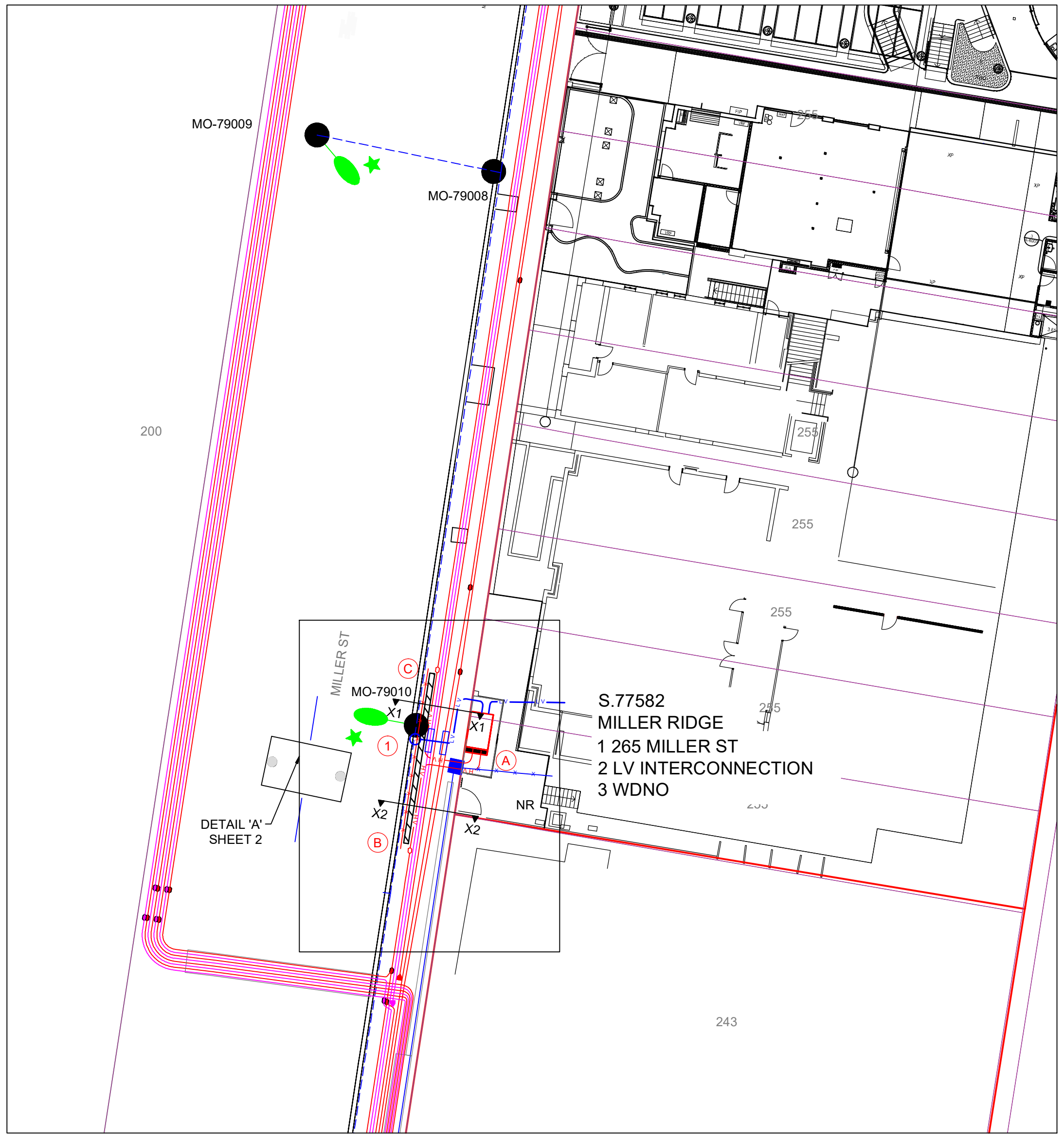
The signatures panel of this document has been removed for privacy considerations. The remainder of the document is unchanged.

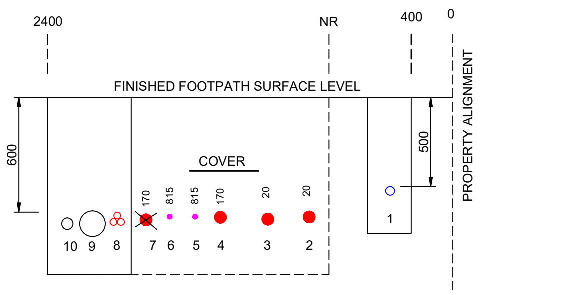
Appendix B

CHECK FOR OTHER SERVICES BEFORE BORING OR EXCAVATING



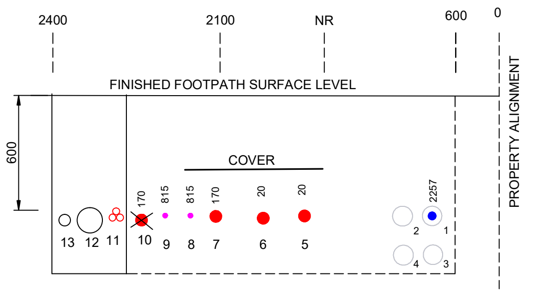
CONSTRUCTION PLAN

SCALE 1 : 250



SECTION X1

1 - PROPOSED 415V 240 AL4 XQZ/SAC DIRECT BURIED CABLE
2 - EXISTING 5KV 97 CU3 P L DIRECT BURIED CABLE
3 - EXISTING 5KV 97 CU3 P L DIRECT BURIED CABLE
4 - EXISTING 11KV 97 CU3 P L SW J DIRECT BURIED CABLE
5 - EXISTING 4.6 CU3 P H + .82 CU3PR P L SW J / BV DIRECT BURIED CABLE
6 - EXISTING 4.6 CU3 P H + .82 CU3PR P L SW J / BV DIRECT BURIED CABLE
7 - REMOVE EXISTING 11KV 97 CU3 P L SW J DIRECT BURIED CABLE
8 - PROPOSED 11KV 300CU1 EPR 70 CU(WS) Z YQ / Triplex DIRECT BURIED CABLE
9 - SPARE 150mm CONDUIT
10 - SPARE 63mm CONDUIT



SECTION X2

1 - EXISTING 415V 240 AL4 XQZ/SAC CABLE IN 125mm EXISTING DUCT
2 - SPARE 125mm EXISTING DUCT
3 - SPARE 125mm EXISTING DUCT
4 - SPARE 125mm EXISTING DUCT
5 - EXISTING 5KV 97 CU3 P L DIRECT BURIED CABLE
6 - EXISTING 5KV 97 CU3 P L DIRECT BURIED CABLE
7 - EXISTING 11KV 97 CU3 P L SW J DIRECT BURIED CABLE
8 - EXISTING 4.6 CU3 P H + .82 CU3PR P L SW J / BV DIRECT BURIED CABLE
9 - EXISTING 4.6 CU3 P H + .82 CU3PR P L SW J / BV DIRECT BURIED CABLE
10 - REMOVE EXISTING 11KV 97 CU3 P L SW J DIRECT BURIED CABLE
11 - PROPOSED 11KV 300CU1 EPR 70 CU(WS) Z YQ / Triplex DIRECT BURIED CABLE
12 - SPARE 150mm CONDUIT
13 - SPARE 63mm CONDUIT

NOTES

- CLAIMS FOR VARIATIONS TO THE COST OF NON-CONTESTABLE WORKS, INCLUDING ROCK EXCAVATION, WILL NOT BE ACCEPTED UNLESS VERIFIED ON SITE BY AUSGRID WHILE THE WORKS ARE IN PROGRESS.
- THE ASP1 IS RESPONSIBLE FOR UNDERTAKING SATISFACTORY CONSULTATION WITH ALL LOCAL CUSTOMERS WHO MAY POTENTIALLY BE AFFECTED BY THE CONSTRUCTION WORKS INCLUDING ALL ALTERATIONS TO SERVICE MAINS.
- THE ASP/1 MUST MINIMISE THE IMPACT OF THE WORKS ON THE ELECTRICITY SUPPLY TO CUSTOMERS AND INTERRUPTIONS TO SUPPLY MUST BE AVOIDED WHEREVER POSSIBLE. AT LEAST FOUR (4) CLEAR BUSINESS DAYS NOTICE MUST BE PROVIDED TO ALL AFFECTED CUSTOMERS PRIOR TO ANY PLANNED INTERRUPTIONS TO THE ELECTRICITY SUPPLY. NOTICE MUST BE IN WRITING IN ACCORDANCE WITH CLAUSE 90 OF THE NATIONAL ENERGY RETAIL RULES.
- SPECIFIC PRIOR APPROVAL MUST BE SOUGHT FROM AUSGRID FOR ANY PLANNED ELECTRICITY SUPPLY INTERRUPTIONS WHERE THE PLANNED INTERRUPTION WILL EXCEED ONE (1) HOUR IN DURATION OR THE DURATION WILL BE LESS THAN ONE HOUR, BUT A SUITABLE TIME FOR THE INTERRUPTION CANNOT BE MUTUALLY AGREED TO WITH THE AFFECTED CUSTOMER(S).
- THE ASP/1 MUST TO MAINTAIN ADEQUATE PUBLIC LIGHTING LEVELS FOR THE DURATION OF THE WORKS. IF NECESSARY, THE ASP/1 IS TO ARRANGE FOR SUITABLE TEMPORARY STREET LIGHTING TO BE PROVIDED UNTIL PERMANENT LIGHTING IS RE-ESTABLISHED.
- THE ASP1 IS REQUIRED TO COMPLY WITH THE CORRECT PROCEDURE(S) FOR WORKING WITH AND/OR NEAR ASBESTOS MATERIAL (REFER TO AUSGRID NUS 211 - WORKING WITH ASBESTOS PRODUCTS).
- "THIS INFORMATION INCLUDES DATE FROM THE NSW DIGITAL CADASTRAL DATABASE BY LAND & PROPERTY INFORMATION @2016. USED UNDER CREATIVE COMMONS LICENCE VERSION 4.0" NOTATION PLACED ON PLAN IF THE LAND BASE USED IS SUPPLIED BY AUSGRID.

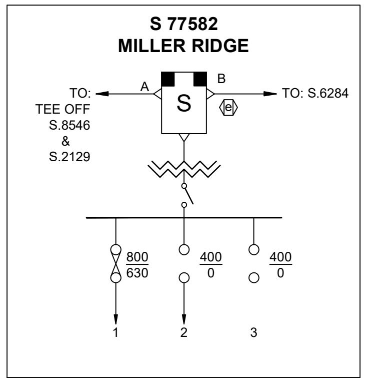
WARNING

- THIS DESIGN CANNOT BE USED FOR CONSTRUCTION PURPOSES UNTIL THE LOCATION OF ALL EXISTING SERVICES ARE VERIFIED.
- THE INFORMATION PROVIDED IN THIS DESIGN MUST BE CHECKED ON SITE AND THE MOST CURRENT INFORMATION ON THE CONFIGURATION OF ALL SERVICES, INCLUDING AUSGRID'S NETWORK, MUST BE VERIFIED IMMEDIATELY BEFORE CONSTRUCTION COMMENCES BY CONTACTING DIAL-BEFORE-YOU-DIG BY TELEPHONE ON 1100 OR AT www.1100.com.au.
- DIAL-BEFORE-YOU-DIG INFORMATION MUST NOT BE OLDER THAN 20 BUSINESS DAYS AT THE TIME OF CONSTRUCTION.

ASP LEVEL 2 WORK

ALL LEVEL 2 ASP WORK DEPICTED ON THIS DRAWING IS SHOWN FOR INFORMATION PURPOSES ONLY AND DOES NOT FORM PART OF THE CERTIFIED DESIGN.

KIOSK SUBSTATION DETAILS	
SUBSTATION NAME:	MILLER RIDGE
SUBSTATION NUMBER:	77582
ADDRESS:	265 MILLER STREET, MILLER STREET
SUBSTATION TYPE:	KL
SIZE (kVA):	600kVA
VECTOR GROUP:	Dyn1
TAP SETTING:	11000/433
HV SWITCHGEAR:	SCHNEIDER ELECTRIC RMI
HV FUSE DETAILS:	80amp SIBA 300.20.93.80
LOAD CYCLE:	A: COMMERCIAL / INDUSTRIAL
PHASING DETAIL:	TO BE VERIFIED ONSITE BY AUSGRID
LOW VOLTAGE BOARD:	800/400/400
TRANSF. LV LINK RATING:	1600A
CCT1 LV FUSE SIZE (Amps):	630A
CCT2 LV FUSE SIZE (Amps):	400A
CCT3 LV FUSE SIZE (Amps):	400A
CONFIGURE AS Dyn11:	NO
EARTHING REQUIREMENTS:	AS PER NS116 AND THE SITE SPECIFIC EARTHING SPECIFICATION
SUBSTATION PIERING:	AS PER NS-141 DRAWING 151573
EASEMENT PLAN DETAIL:	AS PER NS-141 DRAWING 151573 & SHEET 4

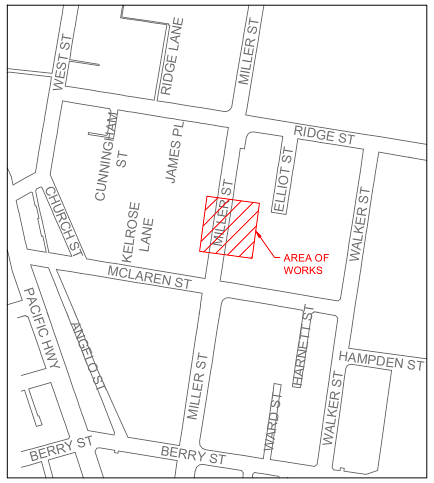


LV DISTRIBUTOR DETAILS	
DIST	DESTINATION
1	265 MILLER STREET (630/800)
2	LV INTERCONNECTION (0/400)
3	WDNO

SUBSTATION SCHEMATIC DIAGRAM

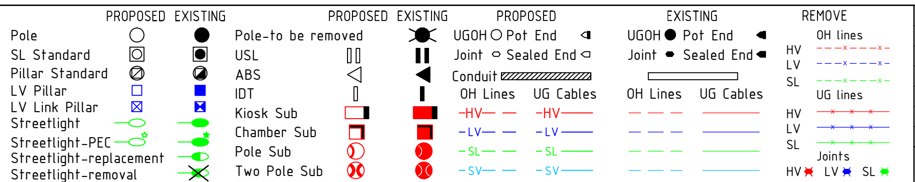
NOTES:

1. THIS DRAWING TO BE READ IN CONJUNCTION WITH AND MUST COMPLY WITH AUSGRID'S NETWORK STANDARDS. REFER TO BUT NOT LIMITED TO: - NS110, NS130, NS141, NS116 , NS117 & NS156.
2. ALL SERVICE WORK TO BE DONE IN ACCORDANCE WITH AS3000:2007 AND THE N.S.W. SERVICE AND INSTALLATION RULES.
3. ENSURE 6m REQUIREMENT FROM FORCED AND NATURAL VENTILATION IS MAINTAINED. REFER TO NS141 SECTION 10.
4. ALL TRENCHING, PITS, CABLES & CONDUITS ARE TO BE SURVEYED MARKED, & PHOTOGRAPHED (INSPECTED BY COMPLIANCE OFFICER PRIOR TO BACKFILLING). REFER TO POLICY FOR ASP/1 PREMISES CONNECTIONS FOR TESTING, INSPECTION AND CONNECTION REQUIREMENT.
5. CONSTRUCTOR IS TO ENSURE THAT ALL CABLES AND CONDUITS ARE INSTALLED RELATIVE TO FINAL LEVELS.
6. DO NOT PLACE ANY RELIANCE ON ANY QUANTITIES OR DIMENSIONS GIVEN IN THIS DRAWING. QUANTITIES AND DIMENSIONS GIVEN IN THIS DRAWING ARE BASED ON DESIGN INFORMATION AND SITE CONDITIONS AT THE TIME OF DESIGN. AS QUANTITIES AND DIMENSIONS ARE SUBJECT TO CHANGE, THE BUILDER OF THIS PROJECT MUST CHECK ALL QUANTITIES AND DIMENSIONS ON THE SITE PRIOR TO TENDERING AND PRIOR TO CONSTRUCTION.
7. THE PREPARATION OF THIS DESIGN, HAS BEEN UNDERTAKEN GIVING DUE CONSIDERATION TO THE EXISTING SERVICES. THE PROJECT CONSTRUCTOR IS, HOWEVER, WHOLLY RESPONSIBLE FOR VERIFYING THE EXACT LOCATION OF EXISTING SERVICES AND PERMANENT SURVEY MARKS BEFORE CONSTRUCTION COMMENCES, AND NO RESPONSIBILITY NOR LIABILITY WILL BE ACCEPTED BY THE DESIGNER OF THIS PROJECT FOR DAMAGE TO EXISTING SERVICES AS A RESULT OF THIS DESIGN.
8. HAND EXCAVATION IS TO BE USED IN THE VICINITY OF EXISTING UNDERGROUND CONSTRUCTION.
9. ALL CONDUITS ARE TO BE IN ACCORDANCE TO NS130.
10. SUPPORTING PIERS TO BE INSTALLED BY THE L1 ASP TO THE REQUIREMENTS OF AUSGRID DRWG 151572.
11. SUBSTATION SITE TO BE CLEAR OF ALL OBSTRUCTIONS AND SERVICES.
12. ACCREDITED DESIGNER TO BE CONTACTED REGARDING ISSUES RAISED WITH THIS DESIGN.
13. AUSGRID TO CONDUCT LV NETWORK PHASING. REFER TO NS117 SECTION 12.6.
14. THE FINISHED SURFACE OF THE KIOSK AREA IS TO COMPLY WITH NS141 SECTION 7.7 OR OTHER SURFACES AS APPROVED BY AUSGRID.
15. CUSTOMER TO PREPARE A REGISTERED SURVEY OF THE SUBSTATION AREA FOR EASEMENT ESTABLISHMENT PURPOSES. IN ADDITION CUSTOMER IS TO PROVIDE A SURVEY OF THE DUCTLINES AS THEY ARE LAID AND BEFORE TRENCH IS BACKFILLED FOR EASEMENT CREATION AND COMPLIANCE OFFICER INSPECTION.
16. CONSUMER MAINS LENGTH MUST COMPLY WITH THE REQUIREMENTS OF THE NSW SERVICE AND INSTALLATION RULES AND APPLICABLE AUSTRALIAN STANDARDS.
17. THE COMBINED SYSTEM EARTHING IS TO BE INSTALLED AS SHOWN IN THE DESIGN, REFER TO NS 116 AND DRAWING 167433 FOR DETAILS.
18. HV MAINS TO HAVE MIN 600mm COVER IN FOOTPATH & MIN 750mm COVER IN ROADWAY. LV MAINS TO HAVE MIN 500mm COVER IN FOOTPATH & MIN 750mm COVER IN ROADWAY.
19. TELSTRA AND OPTUS TO BE NOTIFIED OF PROPOSED WORK PRIOR TO CONSTRUCTION: CONTACTS: TELSTRA: f0204107@team.telstra.com (EMAIL) OPTUS: dartnsw@optus.com.au (EMAIL)
20. EXCAVATION NEAR TREES TO BE DONE IN ACCORDANCE WITH AS4970.
21. THE PHASING DETAILS ARE TO BE VERIFIED ON SITE PRIOR TO COMPLETING THE COMMISSIONING OF THE JOINTS. AUSGRID IDENTIFY, STAB & PHASE AS A MONOPOLY FUNCTION.
22. FOR IDENTIFICATION AND JOINTING PURPOSES, ALL CABLE ENDS SHALL BE LABELLED AT THE TERMINATIONS AND IN JOINT BAYS DURING CABLE INSTALLATION. THE CABLES MUST BE LABELLED AS PER THE CERTIFIED DESIGN.



LOCALITY MAP

NOT TO SCALE



AMENDMENTS

CAD DRAWING

ASSOCIATED DRAWINGS

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AUSGRID REF.	MO 71
PRJTRAK No.	XCC014738

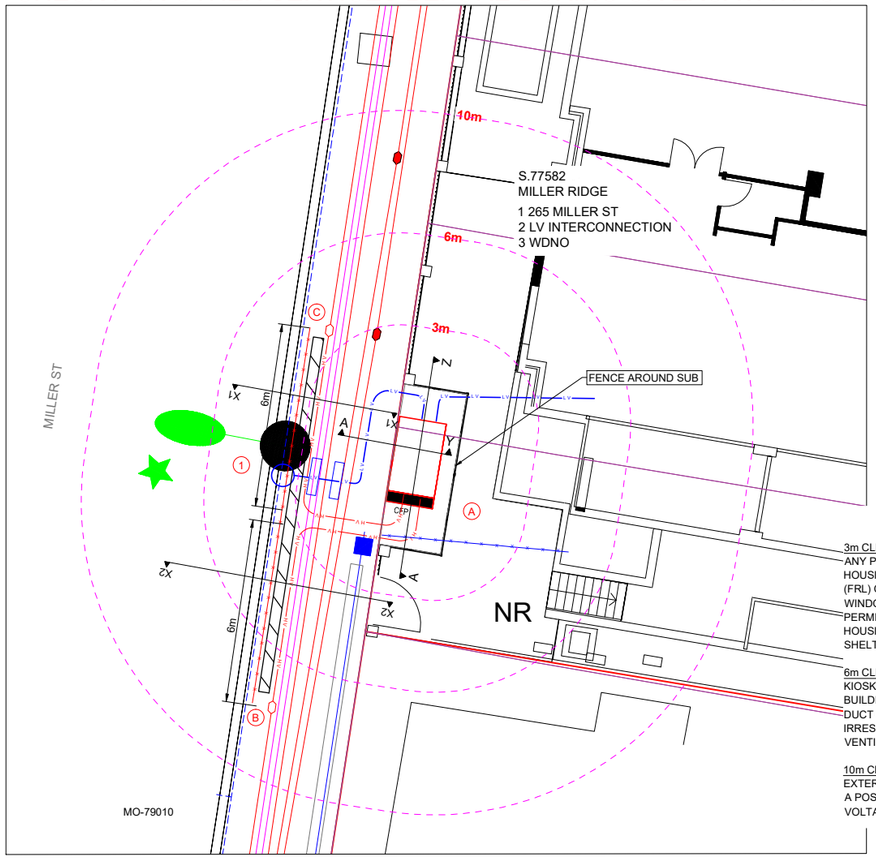
ESTABLISH SUBSTATION S.77582 'MILLER RIDGE' 265 MILLER STREET NORTH SYDNEY NSW

CERTIFICATION NUMBER 973725 / 20170208

SIZE	AUSGRID PROJECT No.	SHEETS	AMD.
A1	SC08715	1 of 4	0

20160817

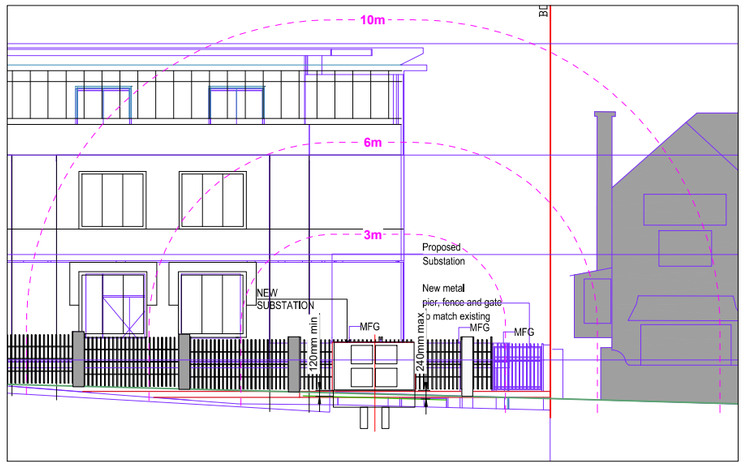
CHECK FOR OTHER SERVICES BEFORE BORING OR EXCAVATING



DETAIL 'A' SUBSTATION

SCALE 1 : 100

0 2 4 6 8 10 METRES



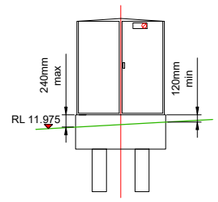
SECTION A-Z

NOTE

3m CLEARANCE:
ANY PORTION OF A BUILDING WITHIN 3 METRES OF KIOSK HOUSING IS REQUIRED TO HAVE A FIRE RESISTANCE LEVEL (FRL) OF NOT LESS THAN 120/120/120. OPENABLE OR FIXED WINDOWS OR GLASS BLOCKWORK OR SIMILAR ARE NOT PERMITTED WITHIN 3 METRES IN ANY DIRECTION FROM THE HOUSING OF A KIOSK SUBSTATION, UNLESS THEY ARE SHELTERED BY A NON-IGNITABLE BLAST RESISTING BARRIER.

6m CLEARANCE:
KIOSK SUBSTATION HOUSINGS TO BE SEPARATED FROM BUILDING VENTILATION SYSTEM AIR INTAKE AND EXHAUST DUCT OPENINGS, BY NOT LESS THAN 6 METRES. THIS APPLIES IRRESPECTIVE OF WHETHER THE BUILDING DUCTED VENTILATION SYSTEM IS MECHANICAL OR NATURAL.

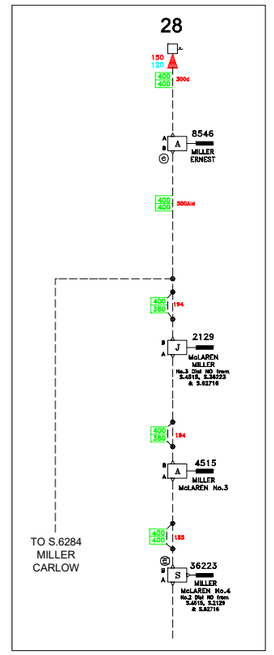
10m CLEARANCE:
EXTERNAL FIRE HYDRANTS ARE REQUIRED TO BE LOCATED IN A POSITION NOT LESS THAN 10 METRES FROM ANY HIGH VOLTAGE ELECTRICAL DISTRIBUTION EQUIPMENT.



SECTION A-Y

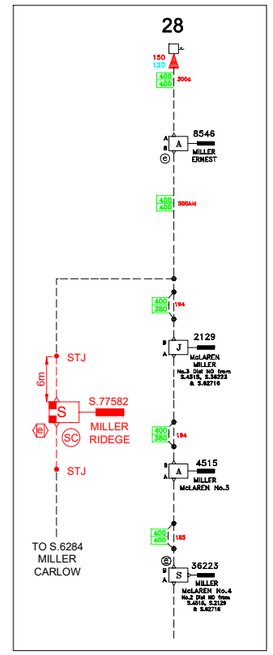
KIOSK SUBSTATION SITE PROFILES

NOT TO SCALE



EXISTING HV SYSTEM DIAGRAM

NOT TO SCALE



PROPOSED HV SYSTEM DIAGRAM

NOT TO SCALE

UNDERGROUND CONSTRUCTION WORKS SCHEDULE

REF. IDENTIFIER	ROUTE DISTANCE (m)	CIRCUIT VOLTAGE	CONDUCTOR OR ASSET DETAIL	CABLE CODE	MIN. INTERNAL BENDING RADIUS (mm) DURING INSTALLATION	MIN. INTERNAL BENDING RADIUS (mm) AFTER INSTALLATION	CALCULATED MAX. PULLING TENSION (kN) DURING INSTALLATION	CONSTRUCTION DETAIL
EXCAVATION AND DUCT LAYING								
A	N/A	N/A	S.77582 MILLER RIDGE 1 x HV SCHNEIDER ELECTRIC RMI, EFI 1 X 600kVA TRANSFORMER 1 X 800/400/400 LV DISTRIBUTION BOARD	N/A	N/A	N/A	N/A	ESTABLISH S.77582 MILLER RIDGE IN THE LOCATION SHOWN PREPARE SITE AND CARRY OUT CIVIL WORKS SUPPLY AND INSTALL TRANSFORMER SUPPLY AND INSTALL LV BOARD INSTALL AND TERMINATE HV AND LV TRANSFORMER TAILS TERMINATE EARTH CABLES TO EARTH BAR TERMINATE LV SERVICE CABLE TO DISTRIBUTION BOARD
B - C	12	N/A	1 x 150mm LD UPVC DUCT (1 SPARE), 1 x 63mm HD UPVC DUCT (SPARE)	N/A	N/A	N/A	N/A	EXCAVATE CABLE TRENCH AND LAY DUCTS WITHIN FOOTPATH AS PER CROSS SECTIONS X1 & X2.
CABLE LAYING								
A - C	6	11kV	1 x 11kV 300CU1 G EPR G CU(WS) ZYQ TRIPLEX	396	1335	890 (3) / 620 (1)	PULL BY HAND	INSTALL 1 x 11kV CU TRIPLEX TAILS FROM S.77582 TO REF 'C'. LAY CABLE AS PER CROSS SECTION X1.
A - B	6	11kV	1 x 11kV 300CU1 G EPR G CU(WS) ZYQ TRIPLEX	396	1335	890 (3) / 620 (1)	PULL BY HAND	INSTALL 1 x 11kV CU TRIPLEX TAILS FROM S.77582 TO REF 'B'. LAY CABLE AS PER CROSS SECTION X2.
A - 1	12	LV	1 x 415V 240 AL4 XQ Z/SAC	2257	600	390	PULL BY HAND	INSTALL 1 x 415V 240AL4 XQZ/SAC CABLE LV BOARD OF SUBSTATION S.77582 TO UGOH POLE REF '1'. LAY DIRECT BURIED CABLE FROM SUBSTATION 'A' TO '1' AS PER CROSS SECTION X1. ALLOWANCE FOR SUB TERMINATION (4m) AND LV UGOH (8m)
JOINTING AND TERMINATIONS								
B & C	N/A	LV	2 x HV STRAIGHT THROUGH JOINT (HV 2 - 27)	170 396	N/A	N/A	N/A	CUT EXISTING 11kV 97 CU3 P L SW J CABLE AT REFERENCES 'B' & C AND FORM 2 x HV STRAIGHT THROUGH JOINTS WITH PROPOSED 11kV 300 CU 1 G EPR G 70 CU(WS) Z YQ/3 CABLES.
A	N/A	HV	2 SET HV TERMINATION AT RMI (HV 1-52)	396	1335	620	N/A	TERMINATE NEW 300 CU1 HV TAILS (HV 1-54)
	N/A	LV	2 x KIOSK LV TERMINATIONS (LV 1 - 41)	2257	600	390		TERMINATE 2 x 240 AL4 XQ Z/ SAC CABLES FOR DEVELOPMENT SUPPLY (DIST 1) AND FOR STREET BACK UP (DIST 2).
	N/A	LV	TERMINATION OF CONSUMERS MAINS	0	0	0		MAXIMUM SIZE CABLE FOR CONNECTION AT THE SUBSTATION 800AMP LV PANEL IS 300mm2 CU1 XQZ/ MAXIMUM NUMBER OF CABLES PER PHASE IS TWO (2) - REFER TO NS117 FOR FURTHER DETAILS

OVERHEAD CONSTRUCTION WORKS SCHEDULE *(POLES & WIRES SOFTWARE VERSION 6.23.631)*

REF. IDENTIFIER	POLE NUMBER	SIZE (m)	STRENGTH (kN)	POLE TYPE TIMBER/CONC	DEPTH (m)	FOOTING DETAILS	HV CONSTRUCTION		LV/SL CONSTRUCTION		STAY DETAILS			No. of VIBRATION DAMPERS	No. of ARMOUR RODS	ADDITIONAL CONSTRUCT DETAIL
							CONST TYPE	ATTACHED (m) FROM HEAD OF POLE	CONST TYPE	ATTACHED (m) FROM HEAD OF POLE	STAY SIZE	ATTACHED (m) FROM HEAD OF POLE	STAY BEARING (Deg)			
1	MO-79010	11	EXT	TIMBER	EXT	EXT	N/A	N/A	LV : EXT 1-74 + LV UGOH + FUSE LINK DISCONNECTOR (1-46)	LV : 0.5	N/A	N/A	N/A	N/A	N/A	LV UGOH CONSTRCUTION, DOUBLE CIRCUIT OF LVABC TO 240 AL4 XQ Z/SAC CABLES WITH FUSE/LINK DISCONNECTOR (LV 1-46) UGOH SHALL BE ON THE NON TRAFFIC SIDE OF THE POLE. ALLOW SUFFICIENT CABLE LENGTH FOR UGOH CONSTRUCTION.

PROPOSED	EXISTING		PROPOSED	EXISTING		PROPOSED	EXISTING		REMOVE
Pole	Pole-to be removed		UGOH Pot End	UGOH Pot End		OH lines	
SL Standard	USL		Joint Sealed End	Joint Sealed End		HV	
Pillar Standard	ABS		Conduit			LV	
LV Pillar	IDT		OH Lines UG Cables	OH Lines UG Cables		SL	
LV Link Pillar	Kiosk Sub		-HV- -HV-	-HV- -HV-		UG lines	
Streetlight	Chamber Sub		-LV- -LV-	-LV- -LV-		HV	
Streetlight-PEC	Pole Sub		-SL- -SL-	-SL- -SL-		LV	
Streetlight-replacement	Two Pole Sub		-SV- -SV-	-SV- -SV-		SL	
Streetlight-removal						Joints	
						HV LV SL	

ASSOCIATED DRAWINGS

EARTHING DIAGRAM FOR PROPOSED KIOSK SUB (COMBINED EARTHING)

NOT TO SCALE

(REFER TO NS0116 FOR MORE DETAILS)

BLACK INSULATED 70mm² STRANDED COPPER CONDUCTOR

ELECTRODE

INSTALL SECOND ELECTRODE TO GROUP A & B ALONG THE FOOTPATH WITHIN AUSGRID TRENCH NORMAL ALLOCATION

REFER AUSGRID STANDARD DRAWING 167433 FOR COMBINED EARTHING DETAILS

SUBSTATION EARTHING MUST BE INSTALLED TO COMPLY WITH NS 116.

ALL ELECTRODES MUST BE INSTALLED TO A MINIMUM DEPTH OF 5.4m.

INSTALL FIRST ELECTORE OF GROUP A & B AT THE CORNERS OF SUBSTATION 500mm INSIDE THE EASEMENT. REFER NOTE 17 ON SHEET 1.

GENERAL	
EARTHING CONFIGURATION	COMBINED
DESIGN CURVE	ENA - TDMEN
ELECTRODES INSTALLATION :	DRIVEN
	DESIGN
HV ELECTRODES	
NUMBER OF ELECTRODES :	2
DEPTH OF EACH ELECTRODE :	5.4
SPACING BETWEEN ELECTRODES :	2.3
MAX RESISTANCE - NORMAL :	28.75
MAX RESISTANCE - DROUGHT :	43.26
MEASURED :	
LV ELECTRODES	
NUMBER OF ELECTRODES :	2
DEPTH OF EACH ELECTRODE :	5.4
SPACING BETWEEN ELECTRODES :	2.3
MAX RESISTANCE - NORMAL :	28.75
MAX RESISTANCE - DROUGHT :	43.26
MEASURED :	
COMBINED	
RESISTANCE :	25.27
MINIMUM SEPARATION DISTANCES *	
MINIMUM SEPARATION FROM TELCO ASSETS :	1.2
MINIMUM SEPARATION BETWEEN HV AND LV	4.3
AND/OR MEN ELECTRODES :	
REFERENCE DRAWINGS FOR THIS INSTALLATION	
167433	

CAD DRAWING DO NOT SCALE

AMENDMENTS

connect INFRASTRUCTURE Electrical Infrastructure Consultancy, Design & Construction
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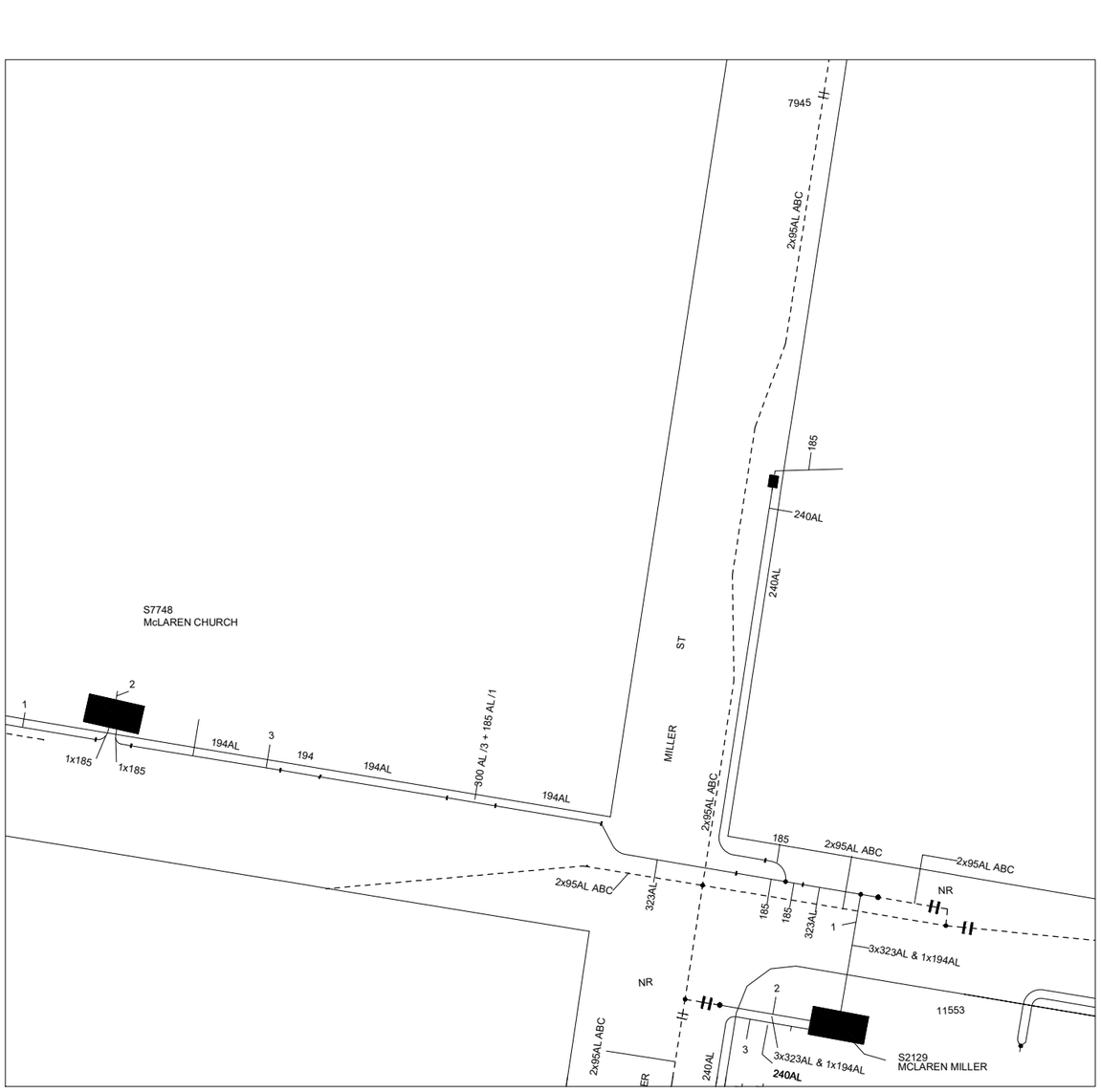
AUTH NO.	1104
SUBMIT DATE	SUBMITTED 18/01/2017
LGA	NORTH SYDNEY COUNCIL
MAP REF.	MAP 216 REF. D10
AUSGRID REF.	MO 71
PRJTRAK No.	XCC014738
ASP REF.	DT494 - 03
CERTIFICATION NUMBER	973725 / 20170208

ESTABLISH SUBSTATION S.77582 'MILLER RIDGE' 265 MILLER STREET NORTH SYDNEY NSW

SIZE A1 | AUSGRID PROJECT No. SC08715 | SHEETS 2 of 4 | AMD 0

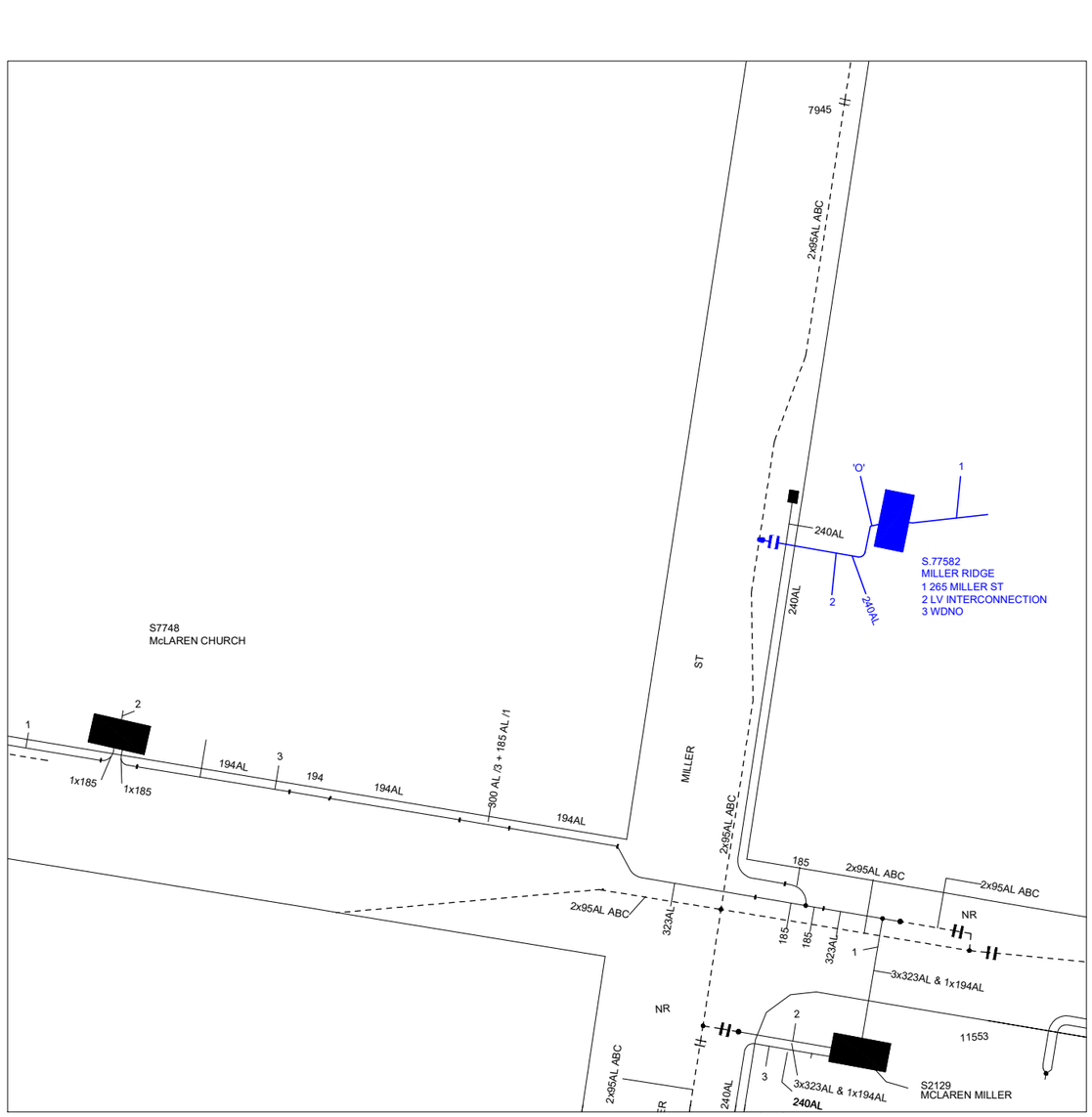
20160817

CHECK FOR OTHER SERVICES BEFORE BORING OR EXCAVATING



EXISTING LV GEOSCHEMATIC PLAN

NOT TO SCALE



PROPOSED LV GEOSCHEMATIC PLAN

NOT TO SCALE

CAD DRAWING
AMENDMENTS

	PROPOSED	EXISTING
Pole	○	●
SL Standard	⊠	⊡
Pillar Standard	⊘	◪
LV Pillar	□	■
LV Link Pillar	⊠	⧓
Streetlight	⊸	⊸
Streetlight-PEC	⊸	⊸
Streetlight-replacement	⊸	⊸
Streetlight-removal	⊸	⊸

	PROPOSED	EXISTING
Pole-to be removed		✳
USL	▯▯	▯▯
ABS	◁	◀
IDT	▯	▮
Kiosk Sub	▭	▬
Chamber Sub	▭	▬
Pole Sub	⊘	●
Two Pole Sub	⊗	⊗

	PROPOSED	EXISTING
UGOH	○ Pot End	● Pot End
Joint	⌔ Sealed End	⌔ Sealed End
Conduit	▨	▭
	OH Lines UG Cables	OH Lines UG Cables
	-HV- — -HV-	— — —
	-LV- — -LV-	— — —
	-SL- — -SL-	— — —
	-SV- — -SV-	— — —

REMOVE	
OH lines	HV, LV, SL
UG lines	HV, LV, SL
Joints	HV ✖ LV ✖ SL ✖

ASSOCIATED DRAWINGS

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ESTABLISH SUBSTATION S.77582 'MILLER RIDGE' 265 MILLER STREET NORTH SYDNEY NSW

SIZE	AUSGRID PROJECT No.	SHEETS	AMD
A1	SC08715	3 of 4	0

20160817

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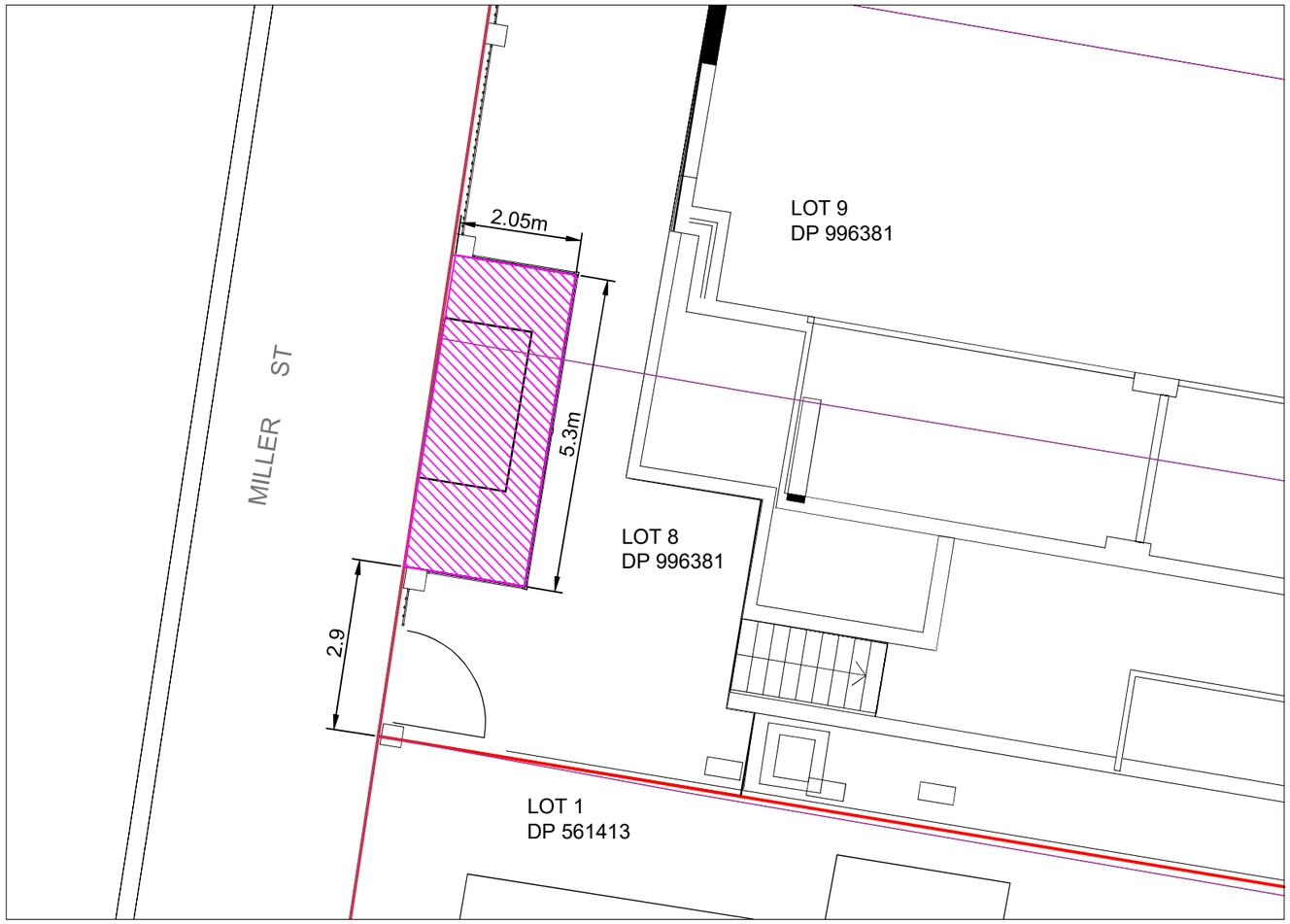

EASEMENT DIAGRAM

SCALE 1 : 100

0 4 8 METRES

2 6 10

"A" - EASEMENT FOR ELECTRICITY & OTHER PURPOSES 2.05 WIDE

CAD DRAWING DO NOT MANUALLY AMEND

AMENDMENTS

ASSOCIATED DRAWINGS

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ESTABLISH SUBSTATION S.77582 'MILLER RIDGE' 265 MILLER STREET NORTH SYDNEY NSW

SIZE A3 | AUSGRID PROJECT No. SC08715 | SHEETS 4 of 4 | AMD. 0

Appendix C

EGN 425: Tree Protection Zone and Structural Root Zone Calculator

Note: Must be used in conjunction with *AS 4970 Protection of trees on development sites*

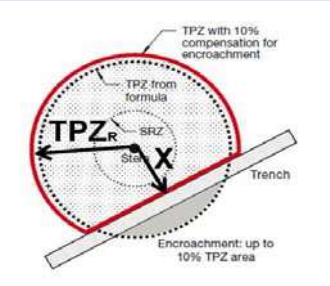
Version 1 - 9 May 2014

Tree protection zone (TPZ)

Diameter at 1.4m above ground (breast height) =	0.87	m
Is it a palm, other monocot, cycad or tree fern?	No	
TPZ radius =	10.4	**m**

If trenching must occur within the TPZ, use the below calculation and figure to determine the minimum radius distance (X) to allow for 10% encroachment of the TPZ.

Minimum radius distance (X) allowed for 10% encroachment =	7.2	**m**



INSTRUCTIONS

1. Measure the diameter of the tree at 1.4 m above the ground. Insert this number, in metres, into the first field.
2. Indicate in the second field if the tree is a palm, other monocot, cycad or tree fern. The TPZ radius of a tree of this type is 1 m outside the crown of the tree.
3. Plan your works according to the TPZ radius, implementing the below control measures. If trenching must occur within the TPZ, use the encroachment distance provided to determine how close the trench can come to the tree stem/trunk to ensure only 10% encroachment.

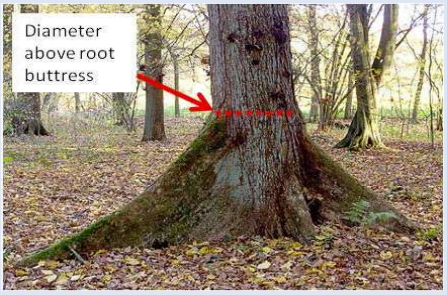
TPZ control measures:

- Where practical, trench outside the TPZ. Impacting more than 10% of the TPZ can affect the long-term health of the tree.
- Where cables must be laid within the TPZ, minimise the extent impacted and for significant encroachments, underbore/directional drill at least 600 mm beneath the ground surface, or if excavating, hand dig or use an air knife.
- Where possible, establish and work outside the TPZ. Fence off the TPZ to avoid physical damage to trees.

Where the control measures cannot be met, contact Environmental Services or an arborist to carry out a health and/or stability assessment of the tree.

Structural root zone (SRZ)

Diameter, measured above the root buttress =	1.1	m
Is the structural root zone generally symmetrical?	Yes	
SRZ radius =	3.4	**m**



INSTRUCTIONS

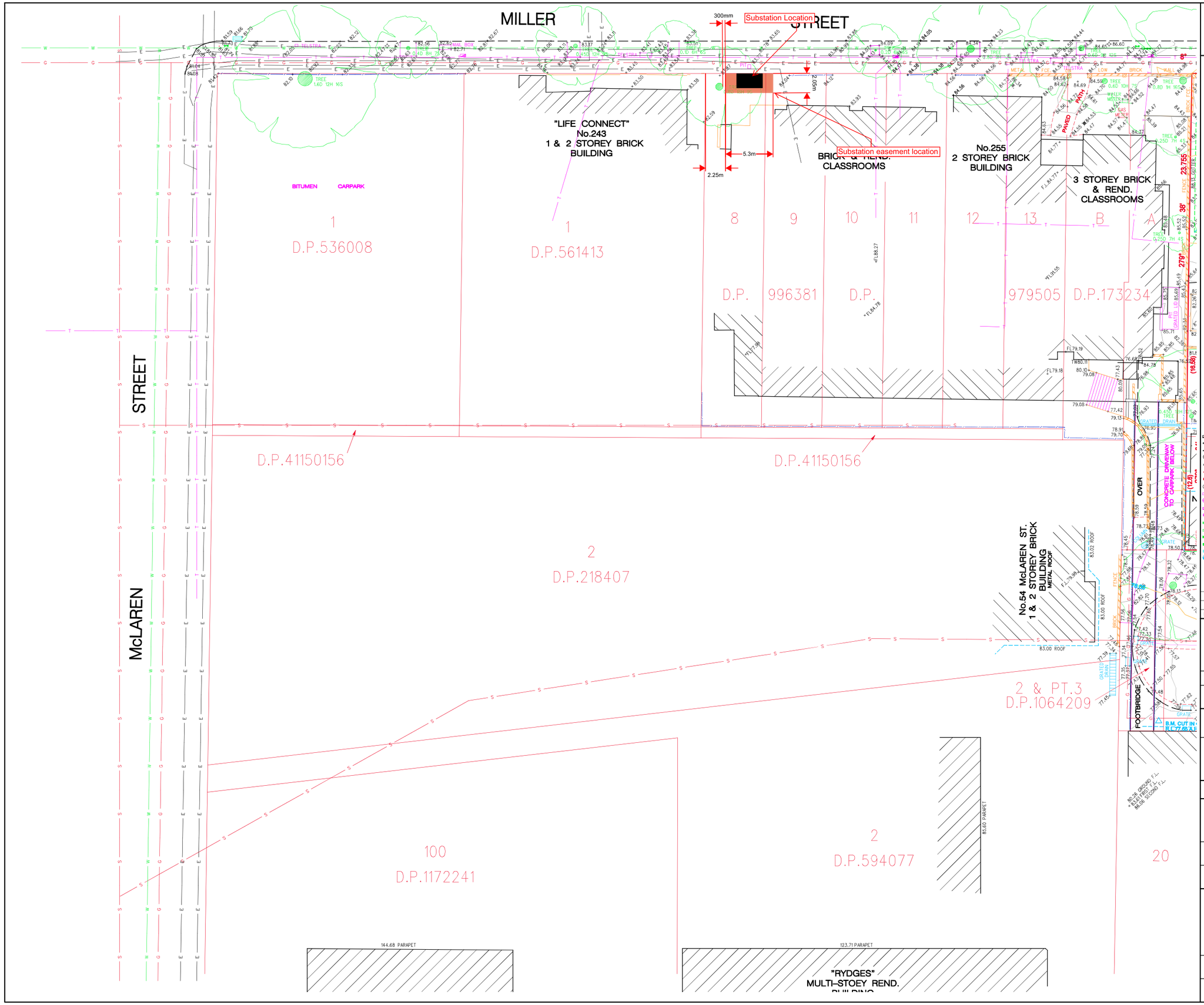
1. Measure the diameter of the tree above the root buttress. Insert this number, in metres, into the first field.
2. Indicate in the second field if the structural root zone is generally symmetrical. If it is not symmetrical, an arborist will need to be contacted for advice.
3. Plan your works according to the SRZ radius, implementing the below control

SRZ control measures:

- Trench outside the SRZ. Trenching within the SRZ can risk making the tree unstable.
- Where cables must be laid within the SRZ, underbore/directional drill at least 600 mm beneath the ground surface, or if excavating, hand dig or use an air knife.

Where the control measures cannot be met, contact Environmental Services or

Appendix D



NOTES:

BEARINGS SHOWN RELATE TO M.G.A. NORTH.

LIMITED BOUNDARY SURVEY MADE. IF ANY CONSTRUCTION IS INTENDED IN THE PROXIMITY OF THE BOUNDARIES IT IS RECOMMENDED THAT A FURTHER SURVEY BE REQUESTED FOR THE MARKING OF THE RELEVANT BOUNDARIES.

INFORMATION SHOWN ON PLAN & ELEVATIONS OF ADJOINING PROPERTIES HAS BEEN OBTAINED BY REMOTE SURVEY METHODS FROM WITHIN SUBJECT LAND AND STREET. RESTRICTED VISIBILITY ALONG THE NORTHERN, SOUTHERN & EASTERN BOUNDARIES OF THE SUBJECT LAND HAS PREVENTED DIRECT MEASUREMENTS TO THE ADJOINING BUILDINGS.

A MISCLOSE EXISTS IN THE TITLE DIMENSIONS BETWEEN LOTS A & B D.P.173234.
IF ACCURATE BOUNDARY INFORMATION IS REQUIRED IN THIS AREA MORE INVESTIGATION IS NEEDED.

CONSTRUCTION WORKS MUST BE RELATED TO THE SITE BENCH MARK AND NOT LEVELS OF STRUCTURES SHOWN ON THE PLAN.

TREE SPREADS & TRUNK DIAMETERS SHOWN ARE DIAGRAMMATIC ONLY AND TREE HEIGHTS ARE ESTIMATED. IF ANY OF THESE ELEMENTS ARE CRITICAL TO DESIGN (IN PARTICULAR DRIPLINES) MORE SPECIFIC DETAILS SHOULD BE REQUESTED FOR ACCURATE LOCATION.

SYMBOLS REPRESENTING SERVICE PITS, POLES AND STREET FURNITURE ARE NOT TO SCALE.

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POSITION OF UNDERGROUND SERVICES PLOTTED FROM INFORMATION SUPPLIED BY THE RELEVANT AUTHORITIES AND MAY BE APPROXIMATE ONLY.

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- GAS VALVE
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- WATER VALVE
- STOP VALVE
- HYDRANT
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- STORMWATER MANHOLE
- UNDERGROUND ELECTRICITY
- OVERHEAD POWER LINES
- UNDERGROUND GAS
- UNDERGROUND SEWER
- UNDERGROUND STORMWATER PIPE
- UNDERGROUND STORMWATER
- UNDERGROUND WATER
- TELECOMMUNICATIONS
- STORMWATER PIT
- SEWER PIT
- SEWER MANHOLE
- SEWER MANHOLE
- BOLLARD
- SIGN

REV.	DATE	AMENDMENTS
C	26/09/14	ADDITIONAL FLOOR LEVELS ADDED
B	26/09/14	ADDITIONAL LEVELS ADDED
A	18/09/14	ADDITIONAL LEVELS ADDED

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SURVEYOR	DRAWN	CHECKED	APPROVED
M.B.	S.K.	M.B.	A.C.D.

0 — 20
REDUCTION RATIO 1: 200 @ A1
99.99 mm

DATUM : AUSTRALIAN HEIGHT DATUM
CONTOUR INTERVAL : 0.2 METRES
ORIGIN OF LEVELS : P.M.35731
R.L.85.623 A.H.D.

CLIENT
WENONA SCHOOL

LOCALITY
NORTH SYDNEY

L.G.A.
NORTH SYDNEY

PLAN

SHOWING LIMITED DETAIL & LEVELS
WENONA SCHOOL AND
SURROUNDING PROPERTIES

CAD REFERENCE 76477_REV_C.dgn

REFERENCE No.	PLAN No.	DATE	SHEET No.
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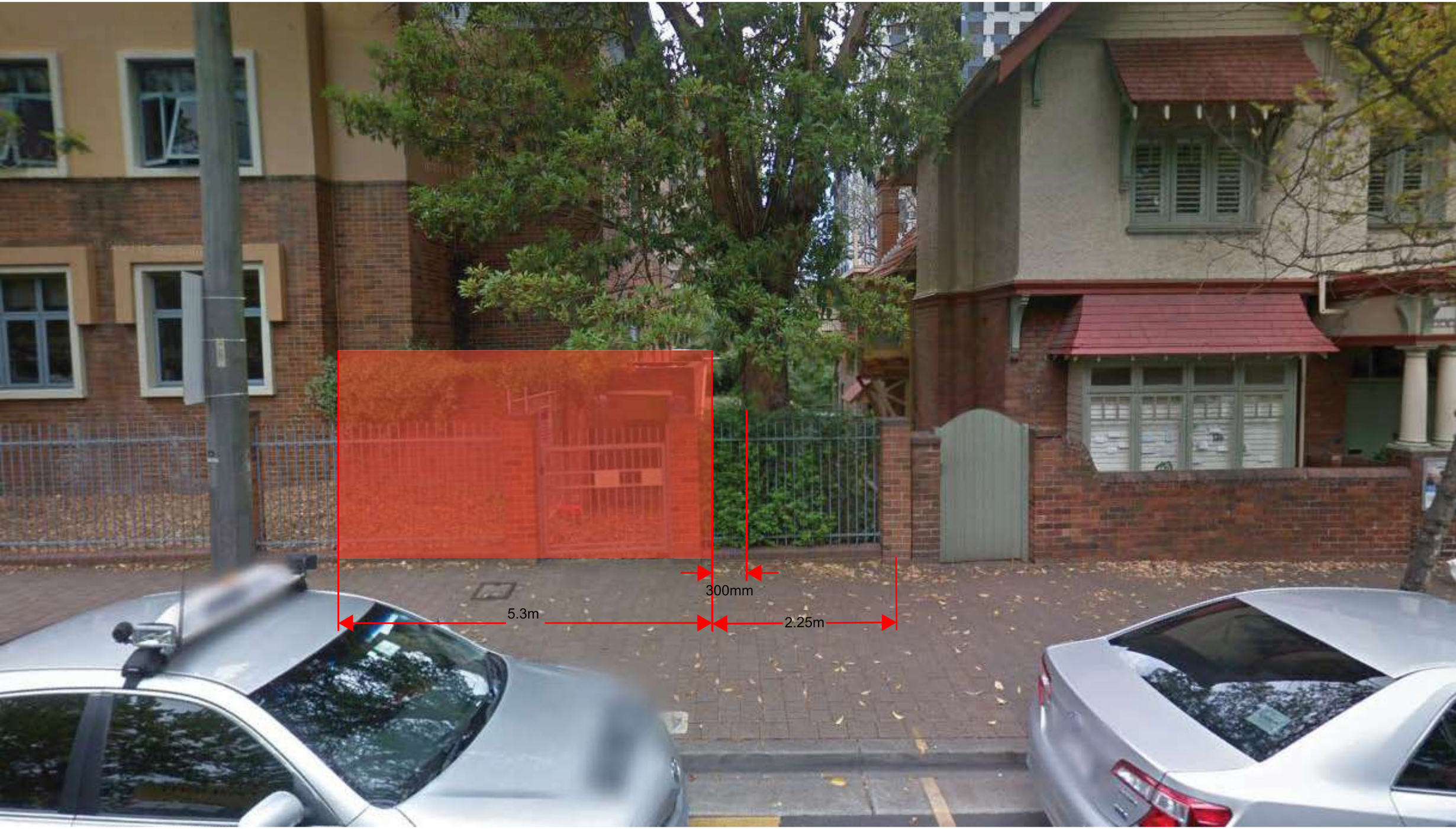
300mm
5.3m
2.25m

Appendix E

Substation clashes with below-ground structure

Substation location as per certified design

Below-ground structure

Substation easement location

"LIFE CONNECT" No.243 1 & 2 STOREY BRICK BUILDING

BRICK & REND. CLASSROOMS

No.255 2 STOREY BRICK BUILDING

3 STOREY BRICK & REND. CLASSROOMS

No.54 McLAREN ST. 1 & 2 STOREY BRICK BUILDING METAL ROOF

"RYDGES" MULTI-STOEY REND. BUILDING

FOOTBRIDGE

BITUMEN CARPARK

CONCRETE DRIVEWAY TO CARPARK BELOW

MILLER STREET

STREET

McLAREN

D.P.41150156

D.P.41150156

1 D.P.536008

1 D.P.561413

8 9 10 11 D.P. 996381 D.P.

12 13 B A 979505 D.P.173234

2 D.P.218407

2 & PT.3 D.P.1064209

100 D.P.1172241

2 D.P.594077

20

144.68 PARAPET

123.71 PARAPET

85.60 PARAPET

83.02 ROOF

83.00 ROOF

M.G.A. NORTH

NOTES:

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e surveyors@rygate.com.au
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SURVEYOR	DRAWN	CHECKED	APPROVED
M.B.	S.K.	M.B.	A.C.D.

0 — 20
REDUCTION RATIO 1: 200 @ A1

DATUM : AUSTRALIAN HEIGHT DATUM

CONTOUR INTERVAL : 0.2 METRE

ORIGIN OF LEVELS : P.M.35731
R.L.85.623 A.H.D.

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CLIENT

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LOCALITY

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L.G.A.

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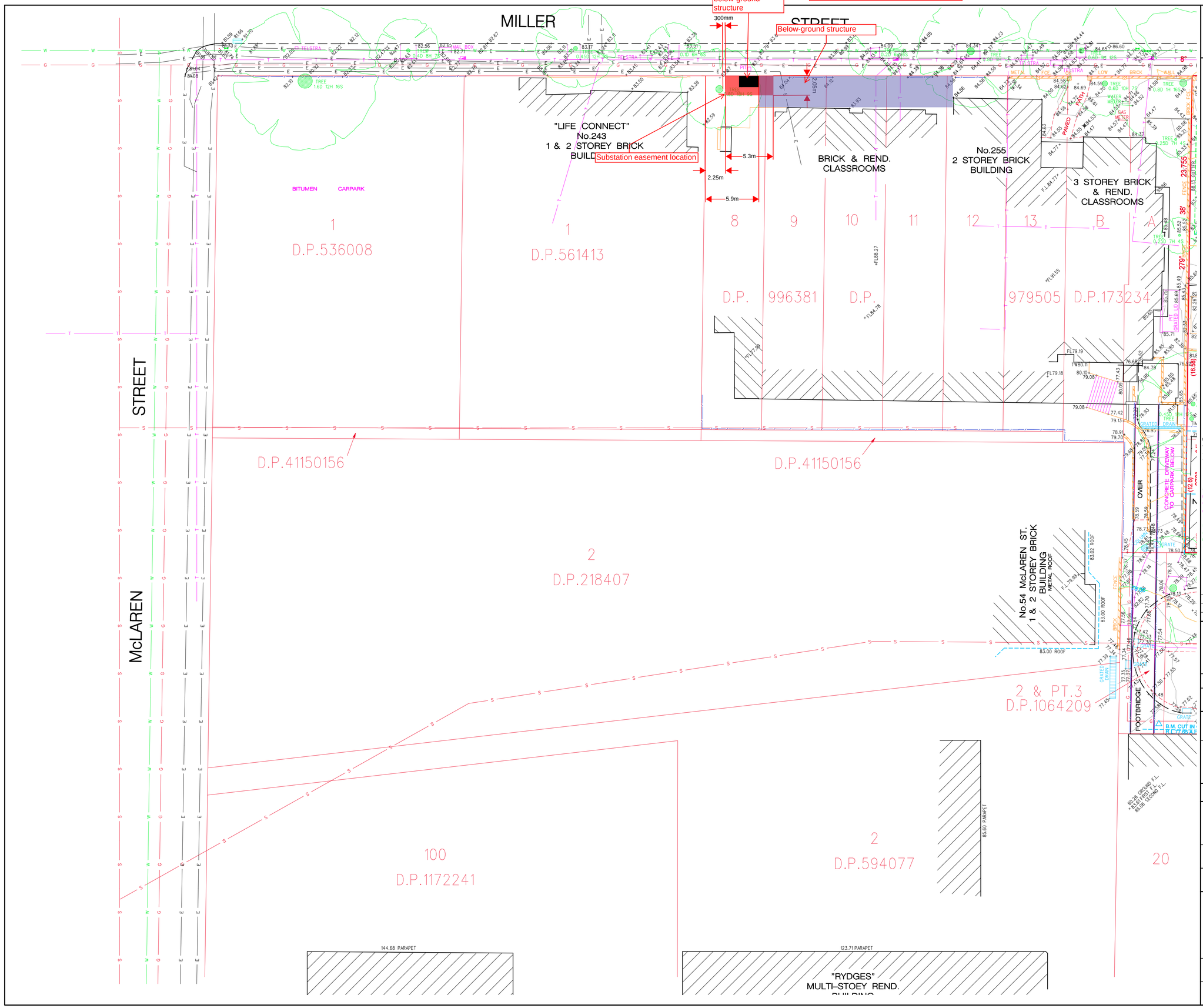

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SURVEYOR	DRAWN	CHECKED	APPROVED
M.B.	S.K.	M.B.	A.C.D.

0 — 20
REDUCTION RATIO 1: 200 @ A1

DATUM : AUSTRALIAN HEIGHT DATUM
CONTOUR INTERVAL : 0.2 METRE
ORIGIN OF LEVELS : P.M.35731
R.L.85.623 A.H.D.

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CLIENT
WENONA SCHOOL

LOCALITY
NORTH SYDNEY

L.G.A.
NORTH SYDNEY

PLAN

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WENONA SCHOOL AND
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76477	76477_REV_C	1/9/2014	2 OF 5 SHEETS

Appendix F

Arboricultural Consultation

Leigh Brennan
AQF 5 Consulting Arborist
ABN 50483304596

Date: 31st of October 2018
Company: Epm Projects
Property: Wenona School, North Sydney.

To whom it may concern,

Tree Management Strategies was approached to comment on the potential impact a proposed electrical substation will have on one *Lophostemon confertus*, also identified as Tree 13 in the Arboricultural Impact Report dated 9 June 2015 prepared for Wenona School, North Sydney.

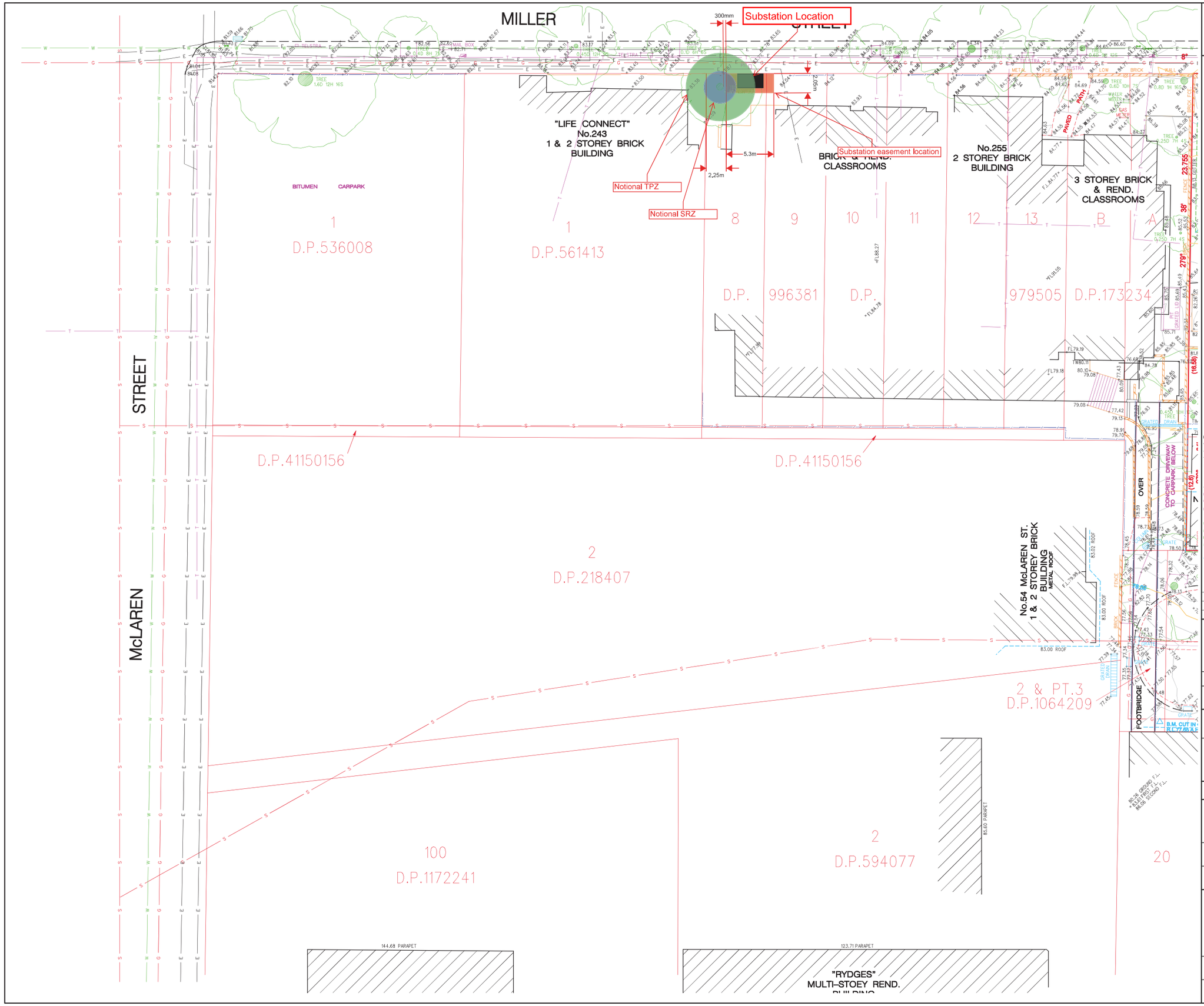
Discussion:

The Structural Root Zone is the area around the base of a tree required for its stability. The woody root growth and soil cohesion in this area are necessary to hold the tree upright. The SRZ of one Tree 13 is calculated to have a radius of 3.4 metres with the substation directly impacting on it.

Conclusion:

It was concluded that for the proposed substation to proceed Tree 13 should be removed as the placement of the substation will be fatal to the tree making it unsafe. We therefore recommend that Tree 13 be removed to facilitate the installation of the substation.

Leigh Brennan
Tree Management Strategies



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300mm
5.3m
2.25m

Appendix G

B2 BACKGROUND BIOLOGY

B2.1 General

All plants consist of three main sections: a crown (leaves), a stem or trunk and a root system. Each one of these sections carries out specific functions necessary for the survival of the tree as all of the parts interact. A tree is in a state of physiological equilibrium between the above ground and below ground sections, so that if one of these sections is damaged, the entire tree will suffer and symptoms may appear in any part of the tree.

Thus any demolition and construction operations that occur around trees must be carried out in such a way as to minimize the impact on the health of the tree.

1.4.5 Structural root zone (SRZ)

The area around the base of a tree required for the tree's stability in the ground. The woody root growth and soil cohesion in this area are necessary to hold the tree upright. The SRZ is nominally circular with the trunk at its centre and is expressed by its radius in metres.

This zone considers a tree's structural stability only, not the root zone required for a tree's vigour and long-term viability, which will usually be a much larger area.

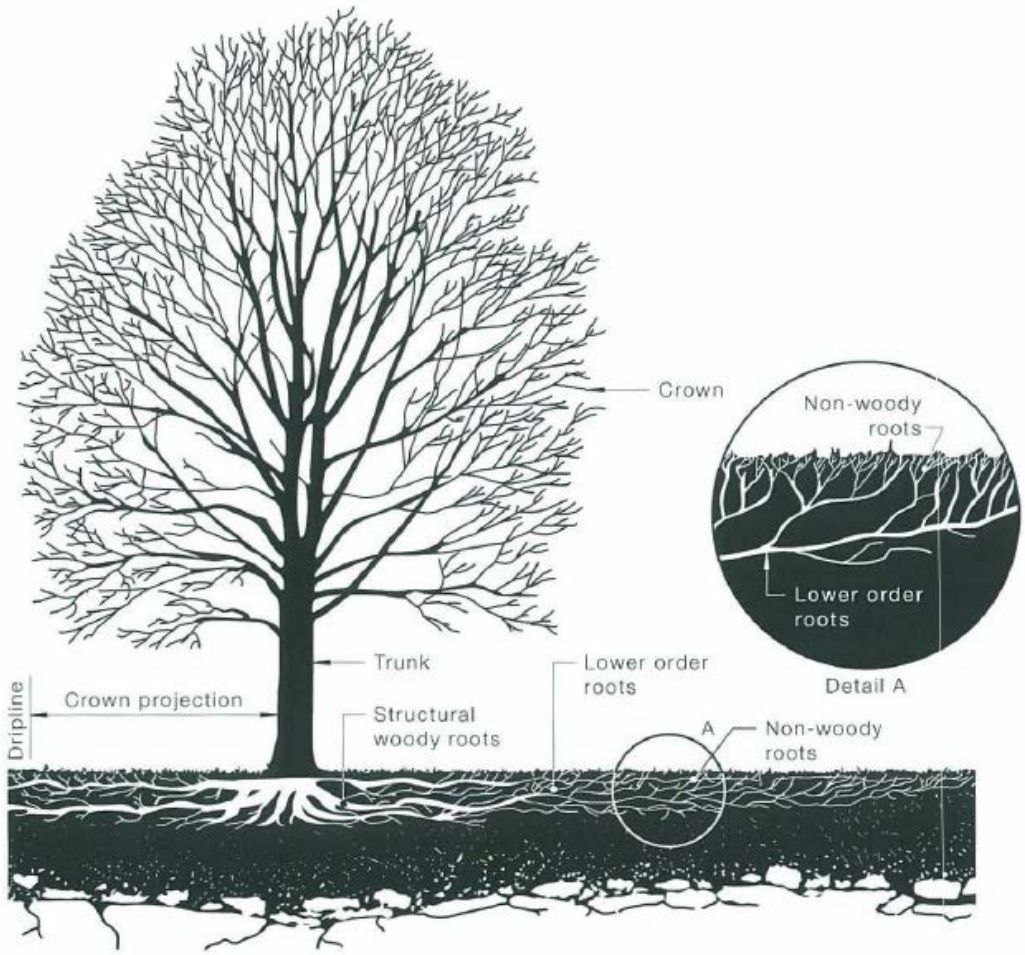
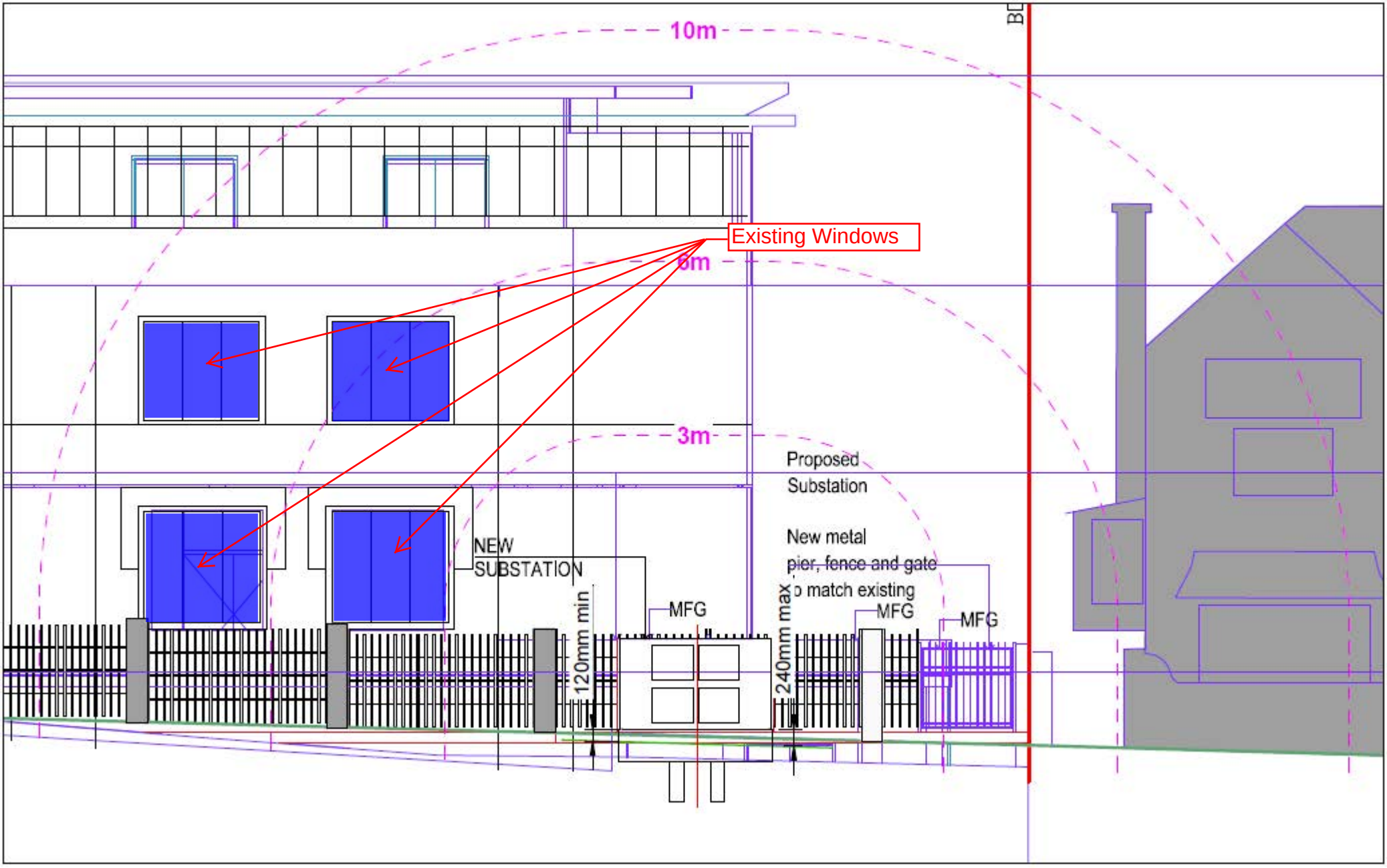


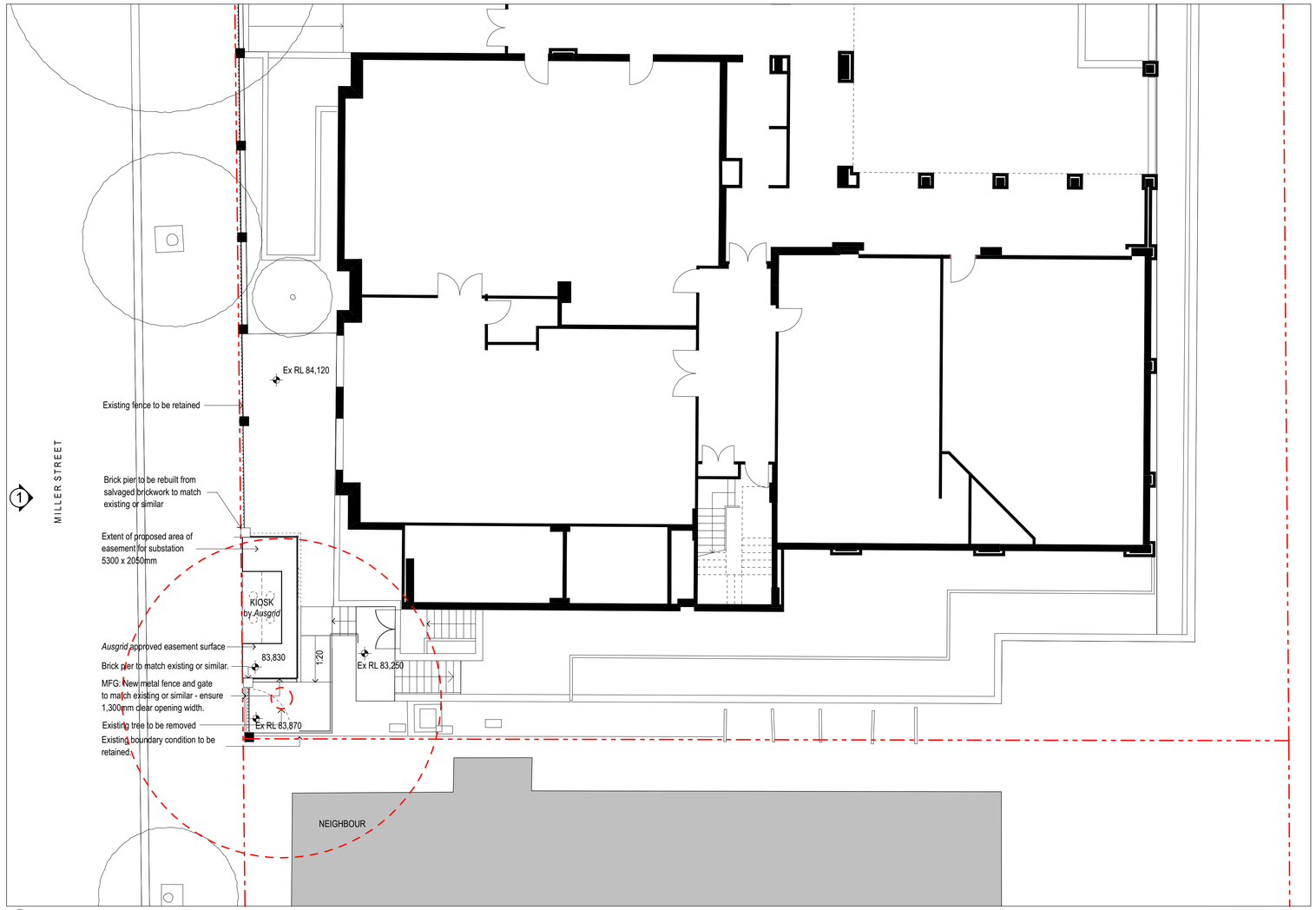
FIGURE B1 STRUCTURE OF A TREE IN A NORMAL GROWING ENVIRONMENT

Appendix H


10m
Existing Windows
6m
3m
Proposed
Substation
New metal
pier, fence and gate
to match existing
NEW
SUBSTATION
120mm min
240mm max
MFG
MFG
MFG

Appendix I

1 MILLER STREET ELEVATION
1:100



2 SUBSTATION PLAN
1:100

NOTES:
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