Network Standard

NETWORK		
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	Approved By	: Chief Engineer
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NW000-S0083 NS156 WORKING NEAR OR AROUND UNDERGROUND CABLES.

ISSUE

For issue to all Ausgrid and Accredited Service Providers' staff involved near or around underground cables 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Where this standard is issued as a controlled document replacing an earlier edition, remove and destroy the superseded document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

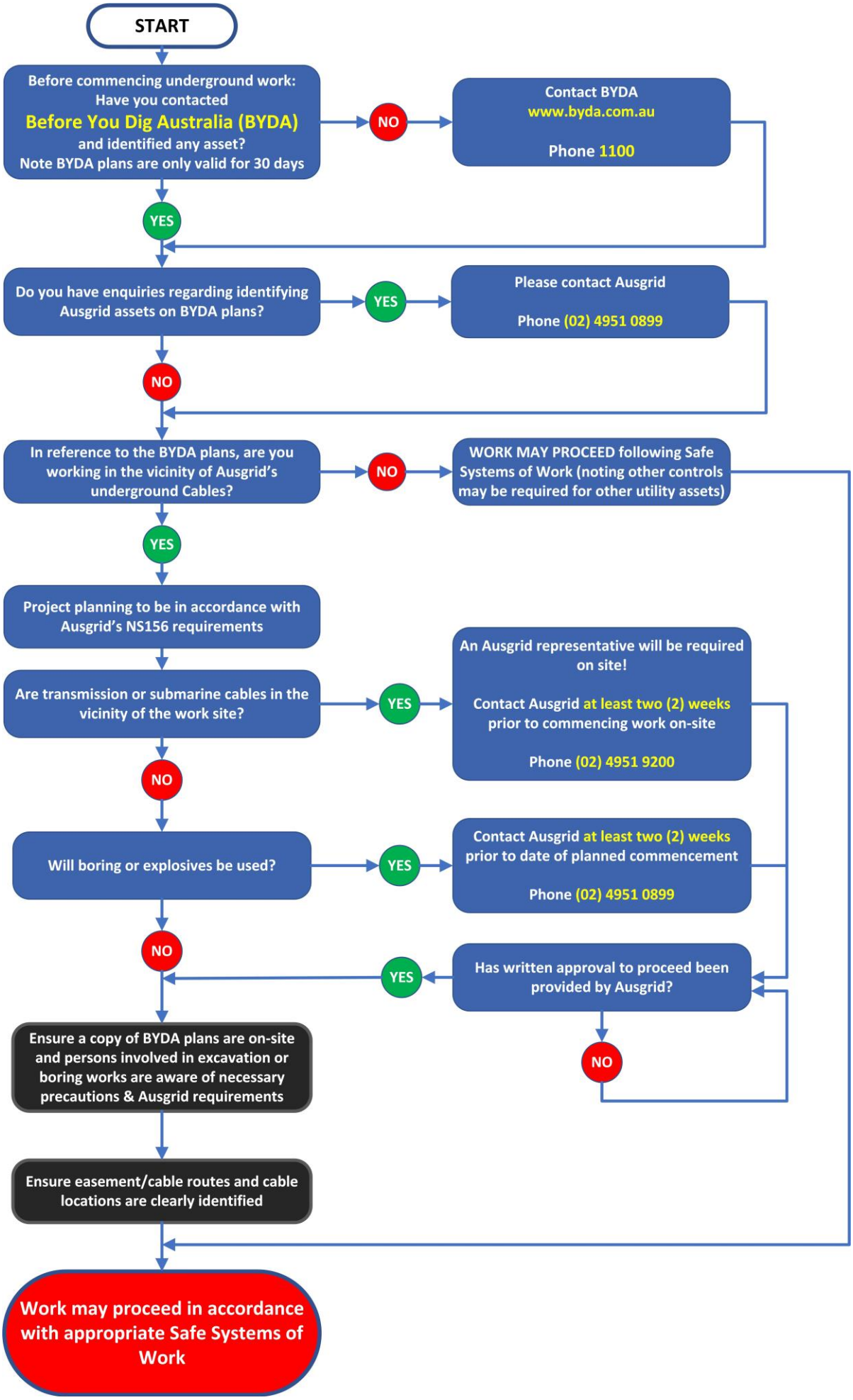
In the event that any user of this Standard considers that any of its provisions is uncertain, ambiguous or otherwise in need of interpretation, the user should request Ausgrid to clarify the provision. Ausgrid's interpretation shall then apply as though it was included in the Standard, and is final 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.").


START
Before commencing underground work: Have you contacted Before You Dig Australia (BYDA) and identified any asset? Note BYDA plans are only valid for 30 days
NO
Contact BYDA www.byda.com.au Phone 1100
YES
Do you have enquiries regarding identifying Ausgrid assets on BYDA plans?
YES
Please contact Ausgrid Phone (02) 4951 0899
NO
In reference to the BYDA plans, are you working in the vicinity of Ausgrid's underground Cables?
NO
WORK MAY PROCEED following Safe Systems of Work (noting other controls may be required for other utility assets)
YES
Project planning to be in accordance with Ausgrid's NS156 requirements
Are transmission or submarine cables in the vicinity of the work site?
YES
An Ausgrid representative will be required on site! Contact Ausgrid at least two (2) weeks prior to commencing work on-site Phone (02) 4951 9200
NO
Will boring or explosives be used?
YES
Contact Ausgrid at least two (2) weeks prior to date of planned commencement Phone (02) 4951 0899
NO
YES
Has written approval to proceed been provided by Ausgrid?
NO
Ensure a copy of BYDA plans are on-site and persons involved in excavation or boring works are aware of necessary precautions & Ausgrid requirements
Ensure easement/cable routes and cable locations are clearly identified
Work may proceed in accordance with appropriate Safe Systems of Work

Ausgrid Checklist for Work near or Around Underground Cables

It is the responsibility of the Constructor to ensure that underground pits, ducts and cables are not damaged as a result of construction work. It is also your duty to protect your workers from harm or injury. This Checklist is intended to be used as a guide to what Constructors should do to make sure they have satisfied the minimum requirements to minimise damage to underground networks.

PLANS, LOCATION and NOTIFICATIONS	Completed
All relevant utilities plans obtained from Before You Dig Australia? (www.byda.com.au or call 1100 - allow at least 5 working days for plans).	
Checked issue date on all the above plans to ensure issue was within the last 30 days?	
Examined plans and assessed all possible impacts on Ausgrid's network?	
Do you have both Underground Distribution & Transmission Plans (if applicable), on site at all times?	
All cables and conduits shown on the Ausgrid plans been located and marked on the ground?	
If you are planning to use a bore, have you ensured that the equipment is calibrated?	
Have you read and understood the requirements of NS156? (for copies of NS 156 visit Ausgrid's Website or phone Ausgrid 13 13 65) http://www.ausgrid.com.au/	
Have you notified Ausgrid as specified by NS156 and complied with requirements? Where an Ausgrid representative is required, two weeks' notice is required before work commencing on site. Contact phone number for Transmission cable enquiries is (02) 4951 9200. For all other cases contact Ausgrid on (02) 4951 0899	
INSPECTION OF WORK BY AUSGRID'S REPRESENTATIVE	**Completed**
Is the Ausgrid representative on site for any work near or around* any transmission cable before you start? (*Refer to NS156.)	
For proposed work near or around* cables other than transmission and/or conduits, are any requirements specified by Ausgrid's representative clearly understood and ready to be applied before you start the work? (*Refer to NS156.)	
PROTECTION	**Completed**
Check that all people on-site have been made aware of the presence & location of ALL Ausgrid underground cables and/or conduits; especially boring, drilling and trenching machine operators?	
Is there any asbestos or asbestos containing material in Ausgrid's underground network assets?	
Have you checked for the presence of any Organo-Chloride Pesticides (OCP) in transmission trenches?	
Is the site supervisor monitoring all machine operators working near or around Ausgrid's underground cables and/or conduits?	
Are the requirements specified by Ausgrid's representative being followed?	
Are Ausgrid's requirements in place for any exposed cables and/or conduits to be supported and protected?	
Have you marked all exposed underground cables and/or conduits with flags that are clearly visible from within all machinery used on-site?	
Have safety barriers, fencing or para-webbing been erected to protect staff and the public as well underground cables and/or conduits in areas that are at risk?	

In the event of DAMAGE to Ausgrid's cables or conduits, call 13 13 88 immediately.

DO NOT PROCEED IF CABLES OR CONDUITS HAVE BEEN DAMAGED It is your responsibility to protect Ausgrid's cables and conduits from damage and your Duty of Care to protect your workers from harm or injury.

Signed: (Responsible person on site)_____ Date: ___ / ___ / ___

KEYPOINTS OF THIS STANDARD

Scope and Risks Addressed

This standard details information on steps you must take to ensure that work near Ausgrid's network does not reduce the reliability of the electrical network or create safety hazards. The scope of the standard and risk addressed include:

- ☐ Applies to Ausgrid cables up to 132kV.
- ☐ Applicable to all persons performing works in the vicinity of underground equipment owned by Ausgrid.
- ☐ Not all cables are recorded on Ausgrid plans
- ☐ Ausgrid does not guarantee the accuracy of plans.

Work near underground cables includes:

- ☐ Any work which raises or lowers the surface level above cables or conduits or places a structure above them.
- ☐ Any work below the surface level and within 2 metres of a Subtransmission cable
- ☐ Any work below the surface level and within 0.3 metres of a distribution cable
- ☐ Road boring work within 2 metres of a cable/conduit.
- ☐ Digging by hand or with machinery that exposes or otherwise disturbs cables/conduits or uncovers protective covers or warning tapes.

Where to for more information?

Section 1, 2, 5, 6

Planning Your Project

The standard identifies the potential and consequences of causing damage to Ausgrid cables and equipment and includes the following planning advice:

- ☐ Consequences of damage can include serious injury with possibility of death, financial loss, interruption of supply and damage to equipment.
- ☐ Known cable information can be obtained from Before You Dig Australia.
- ☐ Ausgrid can assist with positive cable location for work on land other than public roads.
- ☐ For Subtransmission cables an Ausgrid representative must attend the worksite.
- ☐ For distribution cables where work involves using explosives or boring equipment an Ausgrid representative must attend the worksite.
- ☐ There are documents that can assist with the understanding of your obligations (WorkCover, NSW Street Openings Conference and Ausgrid plans).
- ☐ Pot holing is an effective procedure for safely identifying the location of cables when using machinery.
- ☐ Preparing safe work method statements and plans with cable information will improve work safety.

Where to for more information?

Section 7

Tools and Forms

None

Construction Work

During construction work precautions taken should include:

- ☐ Complete and sign the Ausgrid checksheet (page 3 and 4)
- ☐ Ensure plans are current and staff aware of the potential dangers as well as follow the approved safe work methods.
- ☐ A detailed list of precautions and potential hazards is provided in this standard.
- ☐ Any damage to cables must be reported irrespective of the assessed severity.
- ☐ When using heavy machinery adequate ground cover must be maintained as identified.
- ☐ Proposed use of explosives must be notified to Ausgrid with the required minimum 2-weeks' notice.
- ☐ Work requiring backfilling and/or bedding and covering of cables and conduits must comply with NS130.
- ☐ Re-instatement of surfaces must be done to the satisfaction of the appropriate authority.

Where to for more information?

Section 8

Tools and Forms

None

Emergencies and other topics

The standard includes information on specific situations and conditions that may arise and includes the following:

- ☐ Handling emergencies.
- ☐ Warning notices
- ☐ Useful indicators that cables may be found nearby.
- ☐ The potential for cables to be unmarked or not shown on plans.
- ☐ Special conditions for aero/hydro vacuum excavation techniques.
- ☐ Special requirements for under boring and directional boring.
- ☐ Environmental issues including the potential presence of asbestos and the possibility of organo-chloride pesticides in some transmission trenches.
- ☐ Some examples of cable trench layouts are provided to provide potential locations for other related cables if a cable is detected.

Where to for more information?

Section 9-16

Tools and Forms

Annexure A – Spoil from Ausgrid 132kV Cable trenches

Annexure B – Sample Compliance Checksheet

Network Standard
NS156
Working Near or Around Underground Cables

Contents

1.0 PURPOSE

This Network Standard provides information on steps you must take to ensure that work near Ausgrid's network does not reduce the reliability of the electrical network or create safety hazards for Ausgrid's staff, the public and your workers.

Ausgrid cables operate at voltages up to 132,000 volts. Before commencing any work near Ausgrid assets, it is essential that you read this document and incorporate the safety measures into your work documentation.

This Network Standard is to be read in conjunction with other documents including:

- Work Health and Safety Act and WH&S Regulation 2011;
- WorkCover Guidelines and Codes of Practice.

Figure 1 – Ausgrid assets

2.0 SCOPE

This Network Standard applies to:

- Underground electrical supply network cables and other equipment throughout Ausgrid's network franchise;
- All persons performing works in the vicinity of underground equipment owned by Ausgrid.

3.0 REFERENCES

3.1 General

All work covered in this document shall conform to all relevant Legislation, Standards, Codes of Practice and Network Standards. Current Network Standards are available on Ausgrid's Internet site at www.ausgrid.com.au.

3.2 Ausgrid documents

- Bushfire Risk Management Plan
- Company Form (Governance) - Network Technical Document Endorsement and Approval
- Company Procedure (Governance) - Network Technical Document Endorsement and Approval
- Company Procedure (Network) – Network Standards Compliance
- Company Procedure (Network) - Production / Review of Engineering Technical Documents within document repository
- Customer Installation Safety Plan
- Division Workplace Instruction (Network) – Production /review of Network Standards
- Electrical Safety Rules
- Electricity Network Safety Management System Manual
- How to Read Ausgrid Plans (Supplied with Ausgrid plans or from our website)
- NS130 Laying Underground Cables up to and Including 11kV
- NS145 Pole Inspection and Treatment
- NS146 Safety Inspection Procedure for Working on Poles
- NS181 Approval of Materials and Equipment and Network Standard Variations
- NS199 Safe Electrical Working on Low Voltage Assets
- NS212 Integrated Support Requirements for Ausgrid Network Assets
- Public Electrical Safety Awareness Plan

3.3 Other standards and documents

- ENA Doc 001-2019 National Electricity Network Safety Code
- Guide to Code of Practices for Street Opening (NSW Street Opening Conference) (www.streetsopening.com.au);
- NSW DECC's Waste Classification Guidelines
- NSW Service and Installation Rules
- WorkCover Guidelines and Codes of Practice

3.4 Acts and regulations

- Electricity Supply (General) Regulation 2014 (NSW)
- Electricity Supply (Safety and Network Management) Regulation 2014
- Environmentally Hazardous Chemicals Act 1985
- Protection of the Environment Operations Act 1997
- Scheduled Chemical Wastes Chemical Control Order 2004
- Work Health and Safety Act 2011 and Regulation 2017

4.0 DEFINITIONS

Accredited Service Provider (ASP)	An individual or entity accredited by the NSW Department of Industry, Division of Resources and Energy, in accordance with the Electricity Supply (Safety and Network Management) Regulation 2014 (NSW).
Distribution mains/cables	Cables operating at voltages lower than transmission mains.
Document control	Ausgrid employees who work with printed copies of document must check the document repository regularly to monitor version control. Documents are considered “UNCONTROLLED IF PRINTED”, as indicated in the footer.
Hand Excavation	The use of shovels, picks, mattocks crow bars and similar tools with no independent source of power, that have a limited capacity to penetrate soil
High voltage (HV) cable	A distribution cable operating at 11,000 volts or higher, or a Transmission cable.
Low voltage (LV) Cable	A distribution cable operating at nominal 230/400 volts
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 document repository.
Thermally stable bedding (TSB)	Bedding or backfill material which has been designed to achieve specific thermal characteristics. TSB mix consists of cement, flyash, gravel and sand with a typical compressive strength of 5Mpa. During excavations TSB may appear as a weak, unreinforced concrete.
Transmission mains/cables	Cables and other equipment operating at 33,000 volts or higher.
Vacuum excavation	Excavation using equipment designed to use water or air pressure to loosen soil and other materials and a vacuum to remove it – see Section 13.0

5.0 THINGS YOU MUST KNOW ABOUT WORK NEAR AUSGRID'S CABLES

- Not all cables are recorded on Ausgrid's plans. Some are missed due to errors while some cables may not belong to Ausgrid.
- Ausgrid does not guarantee the accuracy of the plans. Errors may arise as roads are moved or levels change. You must take appropriate precautions described in this standard when undertaking excavating works.
- If your work involves underbores or explosives, you MUST contact Ausgrid 2 weeks before commencing work.
- A single line drawn on the pavement by service locators does not reflect the width or depth of the utilities it is marking – it's a centreline only. See Clause 7.4 on Reading Plans and Section 16 for typical trench configurations.
- If plans sent to you by Ausgrid say you are working near Transmission cables, you MUST contact Ausgrid 2 weeks before commencing work.
- See Clause 7.5 for contact details.

Figure 2 - Photo of typical joint bay

Figure 3 – Danger sign

6.0 DEFINITION OF WORK NEAR UNDERGROUND CABLES

The following requirements are the minimum to be applied when working in the vicinity of underground electrical cable systems.

'Work near Underground Cables' includes any of the following:

- Any work which lowers or raises the surface level above cables or conduits or places a structure above cables or conduits.
- Any work below the surface level and within 2 metres either side of any transmission cable or associated pilot cable. See Figure 4 below. Any work inside shaded area is 'Near Underground cables'.

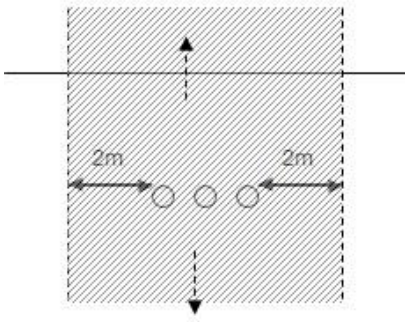


Figure 4 – Transmission cables

Figure 5 – Work below surface level

- Any work below the surface level and within 0.3 metres either side of any distribution cable.
- Road boring work not already covered above, where the bore may pass within 2 metres of any cable or conduit. See Section 14 for more information.
- Any other work, whether by hand or involving machinery or plant, which has caused, or may cause any of the following:

  (a) Hazards to persons from contact with cables

  (b) Damage to cables or conduits

  (c) Cables or cable protective covers or warning tapes or conduits or earthing conductors becoming exposed

  (d) Washout or removal of cable or conduit bedding material or backfill or replacement with different material

  (e) Collapse of cable trench

(f) Cables or conduits being undermined or unsupported.

Refer also to Table B (Clause 5.2) of WorkCover Guide - Work Near Underground Assets.

7.0 PLANNING YOUR PROJECT

7.1 Consequences of damaging Ausgrid cables and equipment

Underground cables can exist anywhere – see Section 12 for information on **unrecorded cables**. Even if poles and overhead wires are in the street, underground cables may also be present.

CAUTION

All sites where excavation work is proposed to be carried out should be treated with caution and thoroughly checked for the presence of underground cables.

Damage to underground electric cables may result in:

- Injury from electric shock or severe burns, with the possibility of death;
- Interruption of the electricity supply to wide areas of the city;
- Damage to your excavating plant;
- Responsibility for the cost of repairs.

7.2 Obtaining plans

During the planning phase of a project, it is essential to check on the presence of any underground cables in the vicinity.

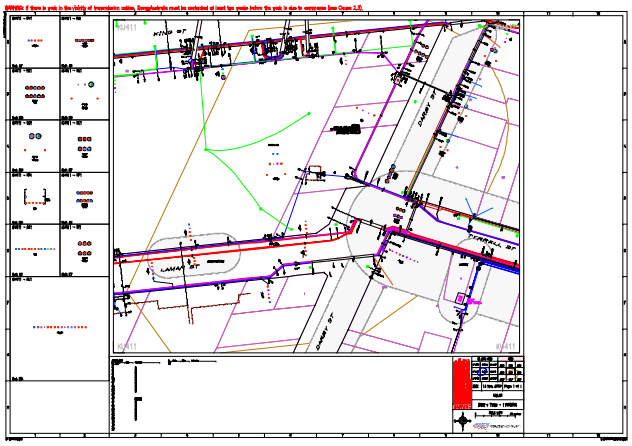


Figure 6 – Typical plan

To determine if cables or conduits (or other services) exist in a particular location, contact the **Before You Dig Australia (BYDA)** Service @ www.byda.com.au or telephone 1100.

This is a free service, providing information on which utilities have an interest in a particular location and the relevant contact details.

Figure 7 – Before You Dig Australia logo

Ausgrid will respond to the enquiry, advising you of whether our records indicate that Ausgrid underground cables and/or conduits are present or are not present in the vicinity of the location you forwarded to us. If cables are within your defined location, the advice will be accompanied by Ausgrid's underground cable plans.

Note for work by Ausgrid:

When a BYDA request is submitted by Ausgrid, no Ausgrid network plans will be included in the returned BYDA information. The Ausgrid network plans must be obtained via the Ausgrid internal Geographic Information System (GIS).

7.3 Work on private land or in parks and reserves

For work on land other than public roads, if cable locations are not clearly marked on site or easily traceable from measurements to permanent marks, call Ausgrid to arrange an Ausgrid representative to assist in positively locating cables before commencing excavations, or planning the position of any significant structures.

7.4 Reading and interpreting Ausgrid plans

If your job site is in the Sydney or Central Coast areas, you may receive separate plans for transmission and distribution cables. Transmission cables operate at voltages between 33,000 and 132,000 volts. For work in the Newcastle and Hunter areas, both transmission and distribution cables are shown on the same plan, but additional warnings and marking indicate if transmission mains are on the plans.

CAUTION
Work close to transmission mains requires special precautions which are described in this Network Standard.

For information on reading Ausgrid plans, refer to the document COMN0119 How To Read Ausgrid Plans supplied with the response to your BYDA request, or available on Ausgrid's website, at the BYDA information page:

http://www.ausgrid.com.au/

Note: At least one person trained in reading Ausgrid plans should be on site during excavation works.

See also Section 10 Warning notice on Ausgrid cable plans for further information.

7.5 Contacting Ausgrid

Once you have received Ausgrid plans, take them and physically check the work site to determine whether the work will be in the vicinity of cables and/or conduits.

Note: Cable locating services can be found under Underground Service Locators in the yellow pages phone book.

If the work is in the vicinity of cables and/or conduits proceed as follows:

Note: For work near transmission cables it is compulsory to arrange for an Ausgrid representative to attend the worksite. Contact with Ausgrid must be made at least two weeks before work commences on site. Phone the Ausgrid Transmission enquiries line on (02) 4951 9200 to arrange for an Ausgrid representative in your region.

This is to ensure the work is undertaken safely and so as not to endanger the cables or workers. The relevant details should be provided and the representative's attendance arranged. A regulated charge will be made for this service.

For distribution cables, it is not necessary to contact Ausgrid (unless you are using explosives or boring machinery). However, if you have questions or need additional information about Ausgrid's underground construction contact the Ausgrid on (02) 4951 0899. Where an Ausgrid representative is needed, at least two weeks' notice is required.

Ausgrid may then provide the relevant contact details for the Field Services branch which manages the area in which the work is being undertaken.

Note: Ausgrid's representative is not supervising the work, nor providing safe work methods for undertaking the work – these are the responsibility of the person in charge of the works.

However, work in the vicinity of underground cables must incorporate any requirements indicated by Ausgrid's representative and be in accordance with this Network Standard.

7.6 Other documents you need to read

Where Ausgrid cables are located near to your proposed work, several other documents will be important in helping you understand your obligations and plan your work:

- WorkCover Guide - Work Near Underground Assets (Workcover - work near UG assets);
- Guide to Code of Practices for Street Opening (NSW Street Opening Conference) (http://www.streetsopening.com.au/);
- How to Read Ausgrid Plans (Supplied with Ausgrid plans or from our website).

7.7 Plan for safe work – keep clear, pot hole, arrange OH outages

If your work involves boring close to or across Ausgrid cables or equipment, you need to undertake pot holing to positively locate the cables and to locate the drilling head as it approaches the cables. Refer to Section 14 on Underboring and Directional Drilling for details.

Figure 8 – Pot holing

7.8 Include information in work methods and plans

When preparing your work method statements and plans, ensure that the warnings and precautions listed in this Network Standard, including the need to arrange Ausgrid representative

when necessary, are included in your work methods or plans issued to any persons involved in work near underground cables.

Note: If work is going to be contracted out, you should include a requirement in the conditions that the contractor must contact Ausgrid if this is required by any part of this Network Standard (e.g. work near transmission cables).

8.0 CONSTRUCTION WORKS

8.1 Before starting work

Before starting work carry out the following:

Note: The Constructor responsible for the work must consult the flow chart and complete and sign the check sheet provided at the front of this Network Standard and run through its requirements with all staff on site. A copy must be kept on site at all times.

- Check the date on your Ausgrid plans – plans are normally only valid for 30 days and you may need to place a new request to ensure nothing has changed.
- Ensure at least one person on site is trained in first aid and that a first aid kit is on site at all times.
- Take notice of all warning signs and instructions from authorised persons.
- Ensure a phone is on site or nearby, that it is working correctly and that staff are aware of the emergency numbers they may require (Ausgrid emergencies – 13 13 88).
- Check that any cable location work, including use of utility locators, pot holes and plans or other information provided by Ausgrid is available to site staff before they begin work.
- Ensure all requirements of this Network Standard that apply to your job have been completed or included in your work method statements and all persons working on the site when you are excavating near cables are aware of the hazards and necessary precautions.

WARNING

If you fail to adhere to the safety requirements of this publication and relevant legislation the consequences could include:

- **Injury or death.**
- **Fines or prison terms under the Electricity Supply Act or the Work Health and Safety Act.**
- **Penalties under Work Health and Safety Regulation, e.g. Liability for the cost of repairs, plus contingent costs.**
- **All work being stopped and any construction dismantled on direction of Ausgrid or WorkCover.**

8.2 Precautions

A hazard assessment must be carried out by the work crew prior to commencement of work to ensure that:

- All hazards have been identified and assessed.
- The appropriate controls have been put in place to mitigate the hazards.
- All members of the work crew are aware of the hazards.
- The safety of the public and other workers has been ensured.

- Ausgrid has been notified of any proposed work in the vicinity of underground cables, where required and described in Clause 7.5.

The following precautions must be taken whilst working on or near underground cables:

- Ensure you hand excavate or vacuum excavate to locate Ausgrid's assets before machinery is used – refer to Section 13.
- No workers shall physically handle a distribution cable of any type, if its condition is suspect or doubtful unless the cable is proved to be de-energised.
- No personnel shall physically handle a high-voltage cable while it is live unless it is completely surrounded by an earthed sheath or screen, or both, and precautions are taken, where necessary, to avoid danger from induced voltages and transferred earth potentials. Contact Ausgrid for assistance if you believe you may need to move a cable.
- A high-voltage cable shall be isolated, earthed and proved to be de-energised on site prior to commencing work on the cable.
- Placing any pressure or load on exposed cables and or cable joints is not permitted. This is inclusive of stepping onto or using the cable or cable joint for support whilst working on or near the asset. If this is physically impractical, Ausgrid must be consulted on an alternate work method.

You should also refer to the precautions provided in NS199 Safe Electrical Working on Low Voltage Assets for other hazards associated with some LV cables.

Some transmission trenches contain Organo-Chloride Pesticides (OCP) which are harmful to human health. Refer to Clause 15.2 for more information.

CAUTION

All individuals on the work site must also comply with any safety instructions given by an Ausgrid representative.

The site manager or supervisor is responsible for ensuring that all construction staff are fully conversant with the necessary clearances from exposed live overhead conductors.

8.3 Excavation works

8.3.1 Damage to Ausgrid cables during excavation works

Any damage no matter how small or large, even though not immediately causing failure, must be reported to Ausgrid's Emergency contact number **13 13 88**. Refer also to Section 9 for information on dealing with emergencies.

8.3.2 Excavation and removal of sub-surface material

Excavators must also comply with the requirements of environmental legislation and WorkCover. Refer to the WorkCover Guide - Work Near Underground Assets and the WorkCover Codes of Practice: Excavation Work for all works, and Work Near Overhead Powerlines if OH lines are nearby.

Figure 9 – Excavation and removal of sub-surface material

If excavating where cables may be nearby, hand excavation or vacuum excavation must be used to establish the depth and location of all existing services and the Ausgrid cables/cable covers. Even where hand excavation is used, care must be exercised not to damage the outer sheath of cables. This damage must be reported immediately to Ausgrid. See Section 13 for information on vacuum excavation. These excavations shall be spaced close enough to ensure that any cables and services between the hand/vacuum excavated locations are at the same depth. Once the exact location of the cable is known, mechanical excavators may then be utilised.

Note: Mechanical excavation shall only be permitted for excavation down to 150mm above the top of the cable covers, marker tape, bricks or tiles and no closer than 300mm to the side of the cable. All excavations closer than 150mm shall be carried out by hand digging or vacuum excavation. All excavations below the cable covers, marker tape, bricks or tiles shall be carried out by hand digging only.

All cables, once exposed, should be treated with caution. Exposed cables will operate safely if undisturbed. However slight impacts to unsupported lengths of cable can lead to failures.

Note: If any unrecorded underground cables, conduits or bare earth wires are exposed, Ausgrid must be notified immediately. See Clause 7.5 for more information on contacting Ausgrid.

8.3.3 Heavy machinery operating over cables and/or conduits

Where heavy “Crawler” or “Vibration” type machinery is to operate over the top of cables and/or conduits, the following minimum cover requirements must be maintained whilst the machinery is in operation:

(a) For transmission cables, requirements will be indicated by Ausgrid’s representative when notified of the work.

(a) For other cables and/or conduits, minimum cover must be maintained as follows:

(i) 300mm to cable cover slabs or marker tapes, where provided above the cables or conduits.

(ii) 450mm to low voltage cables or conduits, if there are no cable cover slabs or marker tapes.

(iii) 600mm to high voltage cables, if there are no cable cover slabs or marker tapes.

If you find it difficult to achieve these minimum covers, contact Ausgrid who will direct you to the appropriate section for assistance.

8.3.4 Use of explosives

The proposed use of explosives within five metres of underground cables and/or conduits must be notified to Ausgrid before use. Refer to Clause 7.5 for contact numbers depending on whether the cables are for transmission or distribution. Requirements will be notified by Ausgrid's representative.

8.4 After work completion

8.4.1 Bedding and covering of cables and conduits

Unless otherwise stated, the bedding of distribution cables and conduits shall be carried out in accordance with Ausgrid's Network Standard NS130. The bedding of transmission cables and conduits shall be as indicated by Ausgrid's representative.

Distribution cables and conduits are normally bedded in compacted stone-free sand, 20:1 sand-cement mix or Thermally Stable Bedding (TSB) installed to the requirements of NS130 Specification for Laying Underground Cables up to and Including 11kV. Where this bedding has been disturbed, it shall be re-instated using the same or equivalent bedding material. The cables/conduits must lie on a layer of bedding material having a minimum depth of 50mm. The same bedding material must also cover the cables/conduits by at least 100mm. Particular care shall be taken when backfilling around cables to ensure that broken pavers and other sharp objects are not mixed with the bedding material.

Figure 10 – Thermally stable bedding during installation works

On steep inclines and other locations where the scouring of backfill material is likely to occur, it is Ausgrid's practice to place bulkheads consisting of packed sand/cement bags (20:1 mixture) at regular intervals. Hence if applicable the party responsible for the excavation work should follow a similar practice.

Orange polymeric cable covers must be laid to completely cover all conduits and any direct-laid distribution cables which have been disturbed. The polymeric cable covers are used to provide a warning of the presence of cables. Only cable covers approved by Ausgrid shall be used. Where transmission cables are involved, Ausgrid's representative will provide details of the backfill and cover required.

Ausgrid uses the following two sizes of cable covers:

- 150mm wide cable covers for single-cable or single conduit installations, and
- 300mm wide cable covers for two cables side-by-side, or two conduits side-by-side, or a cable and a conduit side-by-side.

Following the installation of the cover strip, the trench may then be backfilled using backfill materials approved by Ausgrid.

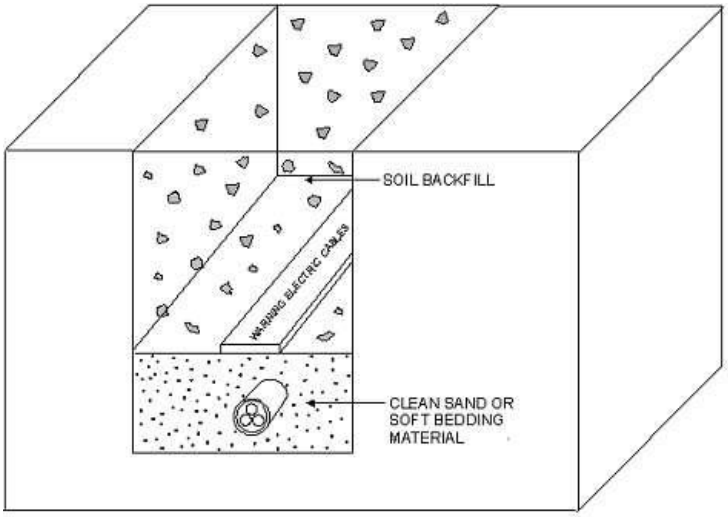


Figure 11 – Backfilled trench

In the situation that the polymeric cable covers are damaged during the excavation process, they shall be replaced by the party that carried out the work before any backfilling can take place. The polymeric cable covers should be centrally positioned over the cable and/or conduit.

Cable covers can be obtained from Ausgrid's Procurement Branch or through Ausgrid's representative.

8.4.2 Backfilling of excavations

Unless otherwise stated, backfilling of trenches and other excavations shall be carried out in accordance with NS130. For transmission cables and conduits the backfilling shall be as indicated by Ausgrid's representative. Any excess spoil is to be removed from the work site, and the area to be restored to at least its original cleanliness.

Refer to Clause 8.3.3 for information on using heavy machinery over buried cables and conduits.

8.4.3 Reinstatement of excavations

Temporary reinstatement

Temporary reinstatement of trenches shall be carried out in accordance with the requirements of the appropriate road controlling Authorities.

Responsibility for the maintenance of the temporary reinstatement will rest with the party responsible for the excavation work until permanent reinstatement is effected.

Permanent reinstatement

The party carrying out the work shall arrange permanent reinstatement with the appropriate road controlling authority.

Figure 12 – Permanent reinstatement

9.0 EMERGENCIES

9.1 Emergencies arising from damage caused to Ausgrid assets

9.1.1 Make safe

Machinery (including hand operated plant such as jack hammers) can become alive if it contacts or damages electrical cables or equipment. In the event that a cable or electrical equipment is damaged, all people should be warned to keep away from machinery as well as the work site in general.

WARNING

If anyone is working on a machine that damages electrical equipment they should stay on the machine unless there is a risk of fire or explosion. If the person needs to get off, they must endeavour to leave the plant without making contact with the ground while still touching the machine. For example, try to jump clear of the machine, and then "bunny hop" (both feet together) away from the machine until they are at least 5 metres away.

9.1.2 Contact Ausgrid and emergency services

Contact Ausgrid Emergency Service on telephone 13 13 88 and provide information on the location of the damage and any information on the extent of damage and the contact details of the person in charge of the worksite.

Contact other emergency services according to the nature of the incident and your company work practices.

Figure 13 – Damaged cable

9.2 Others dealing with emergencies which may be close to Ausgrid assets

If emergency work is being carried out and it is believed that Ausgrid assets may be located in the vicinity of excavation works required to deal with the emergency, the manager of the incident should contact Ausgrid's emergency contact number – 13 13 88 – in order to arrange for an Ausgrid representative to attend the site or provide any necessary assistance as soon as practicable.

10.0 WARNING NOTICE ON AUSGRID CABLE PLANS

Attention is drawn to the warning notice printed on copies of cable plans:

WARNING

Ausgrid's plans show the position of assets at the time of installation and may not account for subsequent changes to road alignments, fences or buildings. The plans show no more than the presence or absence of Ausgrid assets in the street.

Persons working near electricity networks must exercise care and will be held responsible for any damage caused.

You must excavate by hand or use vacuum excavation to establish the location of Ausgrid underground cables and associated assets.

Underground: Working near a cable may result in electric shock even if no contact is made. Any work within 300mm of LV or HV cables should only be performed using safe work methods developed in accordance with the recommendations included in WorkCover Code of Practice for Excavation and WorkCover Guide - Work Near Underground Assets as well as recommendations of Ausgrid's Network Standard NS156.

Overhead: Do not excavate near poles or towers until the stability of the foundation has been assessed by Ausgrid. Cables or earth conductors may be present close to substations, poles or towers.

Workers must maintain safe approach distances and follow applicable WorkCover Codes of Practice.

NOTE: You must keep Ausgrid plans onsite during excavation works. If the workers performing the excavation works do not know how to read and interpret Ausgrid's plans, then the work must be directed by a person who knows how to read and interpret the Ausgrid plans.

Note: Care and caution should always be in mind when carrying out excavation work.

11.0 INDICATIONS THAT CABLES MAY BE NEARBY

Above ground indications of underground cables include the presence of steel or concrete street lighting standards with no overhead lines attached, pits and pillars in the footpath, or cables running down the side of poles into the ground.

Careful observation of the spoil while excavating or boring can alert the individual to the presence of underground cables. A noticeable change in soil may indicate backfill material which could have been used in a cable trench.

Various forms of cover are used over Ausgrid's cables. These may include:

- 'electric' bricks
- concrete or PVC cover slabs
- PVC or asbestos cement (AC) conduit, earthenware, galvanised or iron pipe
- concrete encased PVC or AC pipe
- polymeric cable covers
- thin plastic marker tape
- wooden troughing
- steel plate.

Note: Underground electric cables are not necessarily covered with slabs, marker tapes, or other indicators of their presence, and are frequently not enclosed in conduits. Some underground electricity cables may have been encased in bitumen (refer to photos below).

Figure 14 – Forms of cover

Particular attention should be paid to areas surrounding pole-mounted substations and high voltage switches, as there are often unrecorded bare or covered earth wires buried in the vicinity.

Underground earthing conductors may also have been installed adjacent to certain other poles and structures. These conductors are not recorded on Ausgrid's network plans.

Refer also to Table A (Clause 4.9) of WorkCover Guide - Work Near Underground Assets.

Care and caution must be taken when carrying out any excavation work.

Figure 15 – Damaged bitumen encased cable with polymeric cable cover

Figure 16 – Damaged bitumen encased cable

IMPORTANT: All excavation sites should be examined thoroughly for indications of underground cables and/or conduits, by careful hand excavation or use of vacuum excavation (as described in Section 13). Cable covers, such as cover slabs or marker tapes if present must not be disturbed, except where permission is given by Ausgrid's representative for cable covers etc. to be carefully removed by hand to enable the exact locations of cables to be ascertained. Ausgrid must be notified (via Ausgrid number – see Section 7.5) and any conditions included in Ausgrid's permission must be strictly observed.

12.0 UNMARKED OR INCORRECTLY MARKED CABLES

12.1 General

Electricity cables have been installed underground for over 100 years. Because of this, not all cables may still be recorded. If you are opening or boring beneath the ground, it is wise to always work carefully and be prepared for the unexpected.

Note also that there may be certain instances where there are underground cables buried which are not marked on the cable plans. This applies to all locations, but in particular to underground service lines on customers' premises. It is now a requirement of the NSW Service and Installation Rules for a sketch showing the route of underground service lines to be placed in the main switchboard enclosure of the premises. Installations completed prior to this requirement may not be recorded. In these cases the service line route should be determined by other means, such as by cable locating equipment, before work commences in the vicinity of underground cables.

All reasonable care is taken to ensure that the location and level of cables and conduits shown on Ausgrid's plans is correct at the time of installation; however, reference points may change and road works may be carried out that change ground levels. Therefore, proving the location of the cables and conduits is essential when working in close proximity to them.

If you discover unmarked or incorrectly marked cables while excavating, please contact Ausgrid on (02) 4951 0899 and forward relevant information to GIS@ausgrid.com.au so that details may be captured and our plans brought up to date.

12.2 Work near poles

Accredited Service Providers carrying out pre-climbing pole checks or pole inspection and treatment must comply with the requirements of Ausgrid's Network Standards NS145 Pole Inspection and Treatment Procedures and NS146 Safety Inspection Procedure for Working on Poles. In this case, the presence of any cables in the work area at a pole will normally be able to be visually determined.

CAUTION

All work and all excavations around poles must be carried out with caution, as cables may not follow expected routes or may not be attached.

13.0 AERO/HYDRO VACUUM EXCAVATION FOR LOCATING CABLES (POTHOLING) AND FOR EXCAVATIONS

Figure 17 – Aero/Hydro vacuum excavator

Aero/Hydro vacuum excavators use high-pressure air or water to excavate holes without damaging underground cables. The air is used to disaggregate porous substances such as sand, while the water is used in all other cases. The disaggregated material is then vacuumed and stored in a tank for transportation. Air excavated material can generally be used to backfill the excavation; whilst water excavated material must be disposed of at an approved landfill or liquid waste site.

Ausgrid permits the use of this equipment to physically locate its underground assets under the following conditions:

- The device should not be used to dig below cable cover strips/tiles. If it happens to expose Ausgrid's cables where cover strips do not exist, the cable bedding must be reinstated using sand or a similar product, in accordance with the requirements of the Ausgrid's Network Standards NS130 Specification for Laying Underground Cables up to and Including 11kV, to ensure that the cables are not damaged when the hole is backfilled.
- The pressure wand tip must be rotary or fan style only.
- A minimum distance of 200mm must be maintained from the tip of the pressure wand to the cable or cable cover strips/tiles.
- The maximum working pressure for the water excavator is 2,000 pounds per square inch (psi) (13,790 kilopascals), as at higher pressures it is possible to damage fibre optic cables. When potholing in the presence of gas mains, this pressure may be required to be reduced. It is necessary to contact the local gas supplier to find out what pressure is acceptable. The air excavator is to be used at a maximum pressure of 175 psi (1207 kilopascals).
- The device must not be used when locating cable faults. (Apart from any safety issues, this is to prevent further damage to the cable insulation from high-pressure water or air entering through the damaged sheath).
- The device must not be used where asbestos-containing material is known or suspected to be present.

14.0 UNDER BORING AND DIRECTIONAL DRILLING

Note: Road boring work, where the bore may pass within 2 metres of any cable or conduit, must be notified to Ausgrid - refer to Clause 7.5 for contact details.

Where it is required to bore across a line of cables and/or conduits, the actual location of the cables and/or conduits must be first proven by hand digging or vacuum excavation as described in Section 8.

Note: This work must not proceed except in accordance with these requirements.

A 1 metre wide observation trench must be hand dug on the approach side, a minimum of 2 metres from the cables and/or conduits. This trench is to expose the drilling head before it is within 2 metres of the cables and/or conduits. Before the bore continues, the clearance requirements between the auger and the cables and/or conduits, and any other site specific requirements, must be obtained from Ausgrid's representative.

Where a parallel bore will be within 2 metres of cables and/or conduits, the actual location of the cables and/or conduits must first be proven by hand digging at the commencement of the bore, and at further locations along the bore, where specified by Ausgrid's representative.

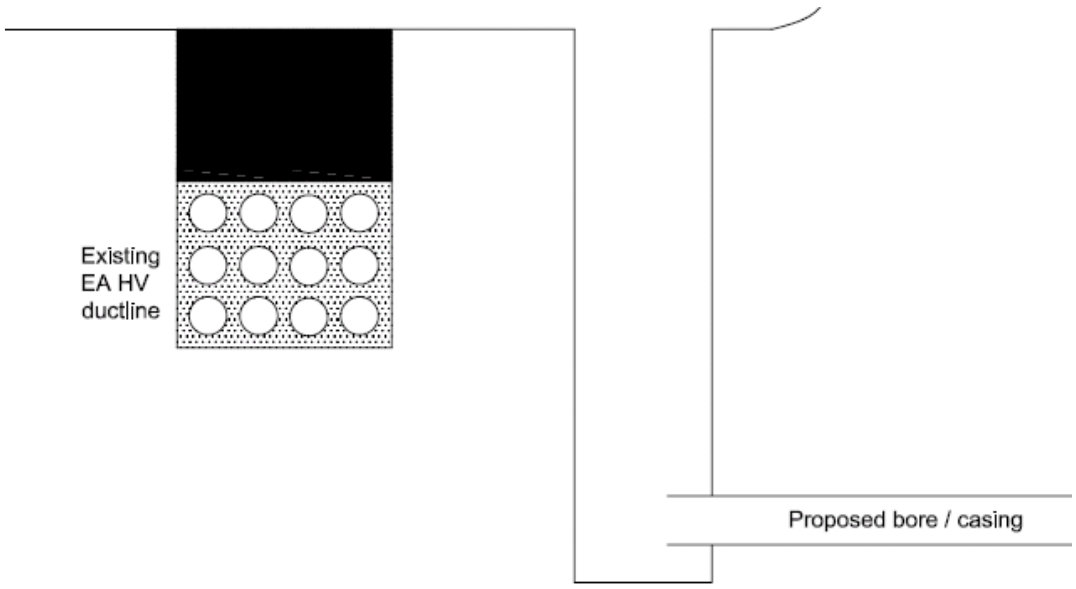


Figure 18 – Bore details

15.0 ENVIRONMENTAL ISSUES

15.1 Asbestos

CAUTION

Any persons performing excavation in the vicinity of Ausgrid's underground network assets should have received asbestos awareness training. Any persons removing, repairing or disturbing asbestos (whether bonded or friable) must have been appropriately trained and must comply with the requirements of the Work Health and Safety Act and Regulation.

Asbestos or asbestos-containing material was used and may still be present in Ausgrid's underground network assets. Materials containing asbestos have been identified in some conduits/ducts, troughing used to house cable joints both in the ground and in pits, cable bandage/tape in pits and substations, and 'NC' cable duct caulking compound.

Conduits known to contain asbestos are identified by the symbol 'AC' on cross-section details in Ausgrid's cable plans.

Asbestos poses a negligible risk when it is in bonded form, is still in good condition and is not disturbed or broken (e.g. AC conduits). Friable asbestos material (i.e. any material that contains asbestos and is in the form of a powder or can be crumbled, pulverised or reduced to powder by hand pressure when dry) poses significant health risks if it is inhaled.

Asbestos dust may be generated by brushing past asbestos cable tape, or may be lying on surfaces underneath and immediately adjacent to taped cables. Aged and dry 'NC' compound, used as putty to seal cable entries to substations, may have a white dust on its surface. Asbestos dust presents a hazard if disturbed.

CAUTION

All materials and equipment used for construction of Ausgrid's assets are to be free from Asbestos and/or Asbestos related products. Suppliers are expected to comply with the Work Health and Safety Act (NSW) together with the Work Health and Safety Regulation (NSW) and confirm in writing that all products supplied to Ausgrid contain no Asbestos related material.

Figure 19 – Asbestos cable tape in substation and broken NC compound

15.2 Organo-Chloride Pesticides (OCP)

Some transmission trenches contain Organo-Chloride Pesticides (OCP) which are harmful to human health. If the proposed excavation work involves OCP contaminated soils in the vicinity of underground transmission cables, special protective gear must be worn and special handling procedures must be followed. Details of these requirements and precautions will be provided by Ausgrid's representative.

See Annexure A for more details.

16.0 TYPICAL TRENCH CONFIGURATIONS

16.1 Distribution cable network

Distribution cable networks vary in configuration, some typical trench layouts are shown below:

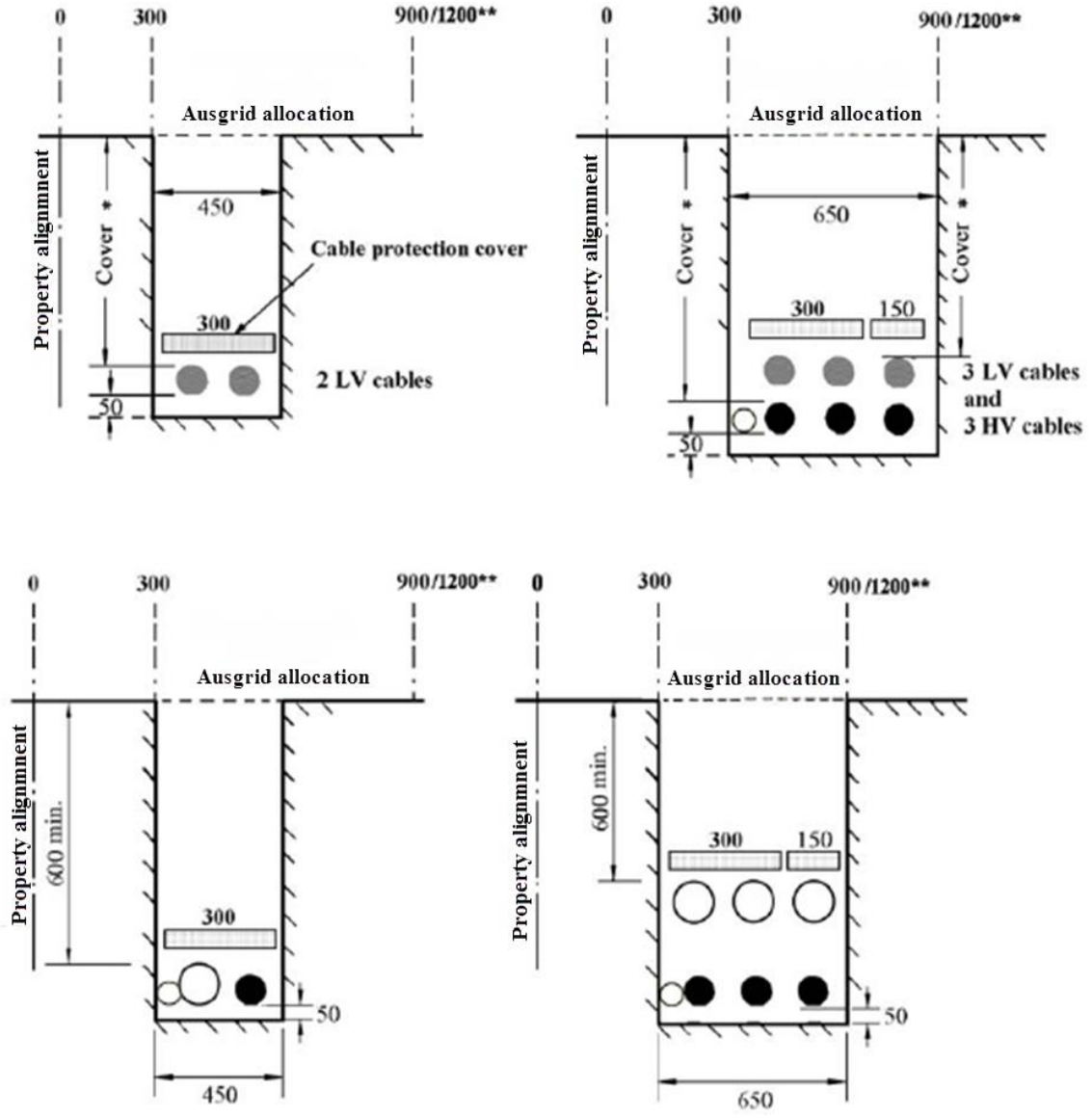


Figure 20 – Typical trench layout

16.2 Transmission cables

Transmission cables – operating at between 33,000 and 132,000 volts may be installed in trenches similar to the examples shown below:

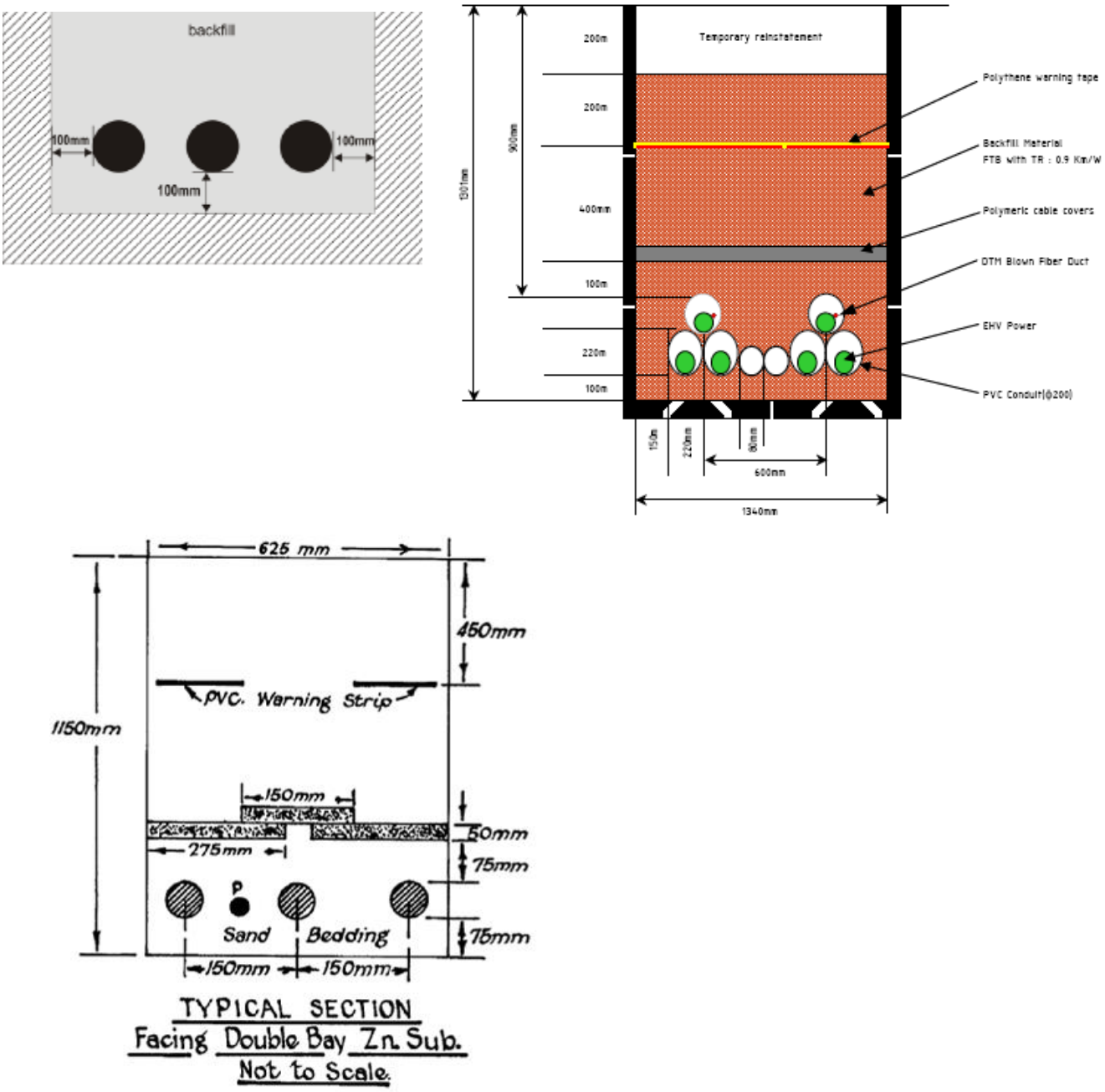


Figure 21-Transmission cable trench profile

17.0 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	Document repository Network sub process Standard – Company	Unlimited
Draft Copies of the network standard during amendment/creation	Work Folder for Network Standards (Trim ref. 2014/21250/167)	Unlimited
Working documents (emails, memos, impact assessment reports, etc.)	Records management system Work Folder for Network Standards (Trim ref. 2014/21250/167)	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.

18.0 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 Engineering Technical Documents within document repository. 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.

19.0 DOCUMENT CONTROL

Content Coordinator : Electrical Safety Manager

Distribution Coordinator : Manager Asset Standards

Annexure A – Spoil from Ausgrid 132kV Transmission Cable Trenches

A1 Introduction

During installation between 1960 and 1980 the soil in some Ausgrid 132kV fluid filled cable trenches was treated with Organo-Chlorine Pesticides (OCPs), specifically Aldrin and Dieldrin, which may be harmful to human health. 132kV fluid filled cable trenches installed during this period should be assumed to contain OCPs unless tested to prove otherwise.

If any proposed excavation work involves disturbing soils in the vicinity of underground 132KV fluid filled transmission cables which may have been treated with OCPs, appropriate Personal Protective Equipment (PPE) must be worn and specific soil handling and management procedures followed.

In addition to the requirements outlined in this Network Standard, anyone handling, working in or storing soil treated with OCPs must comply with the following:

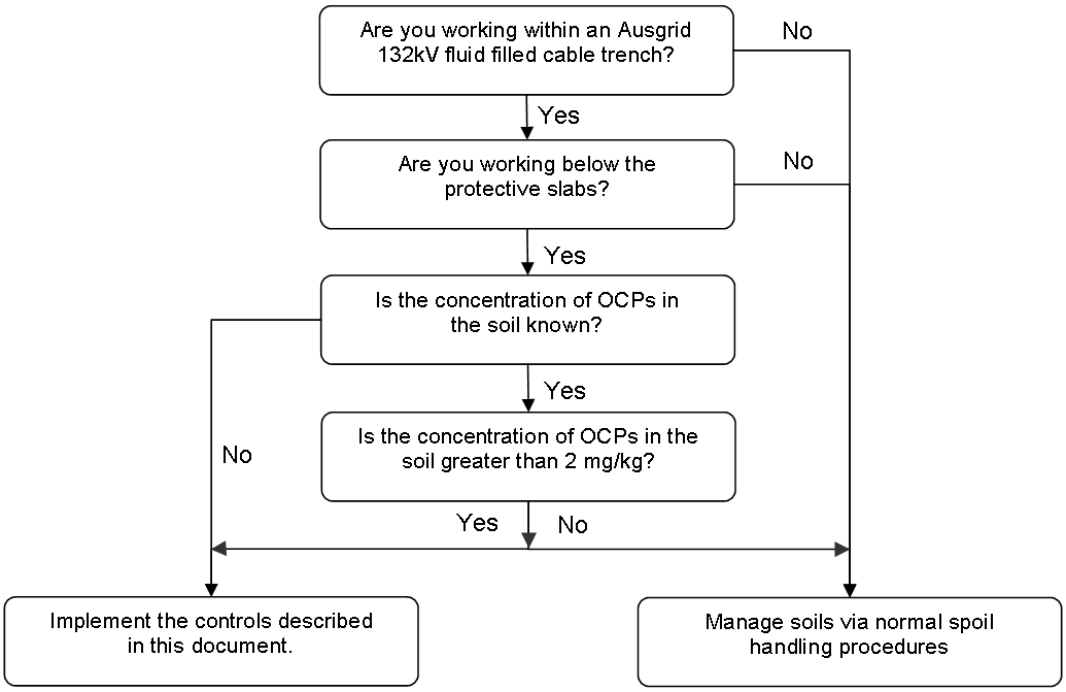
- Protection of the Environment Operations Act 1997
- Environmentally Hazardous Chemicals Act 1985
- Scheduled Chemical Wastes Chemical Control Order 2004
- Work Health and Safety Act 2011

A2 Determining the presence of OCPs

Soil from trenches expected to contain OCPs can be tested to confirm if OCPs are present. Sampling must be undertaken by a laboratory which is NATA accredited to test for OCPs. When sampling for OCPs, samples must be taken from below the protective slabs.

Where the concentration of Aldrin or Dieldrin in the soil is greater than 2mg/kg the soil is classified as a Scheduled Chemical Waste under the Environmentally Hazardous Chemicals Act 1985 and the requirements listed in this document must be applied when excavating within the trench alignment, below the protective slabs.

The flow chart below can be used to assist in determining when OCPs may be present.



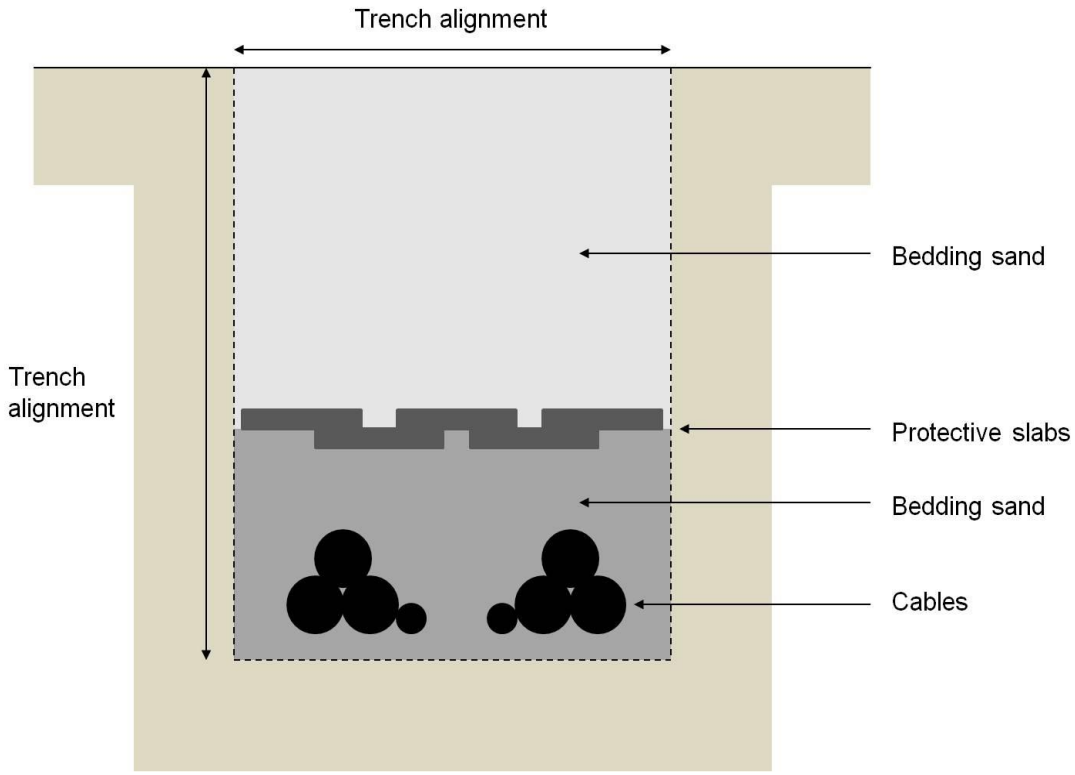


Figure 22 – Example of a Typical Ausgrid 132kV Fluid Filled Cable Trench

A3 Procedure

When excavating below the protective slabs in these trenches, the following additional minimum controls must be applied where the presence of OCPs has been identified or has not been ruled out (eg by chemical assessment):

1. Apply WH&S Controls as per Section A4 of this Annexure
2. Prevent water runoff as per Section A5 of this Annexure
3. Handle soil as per Section A6 of this Annexure
4. Store soils as per Section A7 of this Annexure
5. Where possible reinstate soil to original depths as per Section A8 of this Annexure
6. Segregate and manage wastes as per Section A9 of this Annexure

A4 WH&S controls

The following minimum safety requirements must be implemented for the management of OCPs in Ausgrid's 132kV fluid filled cable trenches:

- **Wear protective clothing.** Clothing must provide coverage of arms and legs (i.e. overalls or long sleeved shirts and long trousers). Normal laundering is considered suitable for decontamination purposes.
- **Wear safety footwear.** In wet conditions gumboots are recommended. Bulk accumulated soil (such as mud or soil build up) should be removed from footwear before leaving the site.
- **Wear gloves.** Leather gloves are considered suitable, however, PVC coated gloves are preferred. Gloves should be disposed after use (Gloves are not required where their use is impractical provided the work area is clear of excess soil from below the protective slab and any adjacent cables are covered. Hands should be washed after working without gloves).

- **Apply good industrial hygiene practices.** No smoking, eating or drinking whilst working in contaminated areas and wash hands and face prior to smoking, eating or drinking.
- **Use eye protection.** Wear safety glasses or safety goggles where excessive dust is generated. The use of dust masks should be assessed and if considered prudent they should be used. Dust control measures must be applied.

Note: An Occupational Hygienists can provide more specific advice regarding the handling of OCPs.

These matters must be included in any site specific hazard assessments prior to the commencement of works.

A5 Managing water

Where the presence of OCPs has been identified or has not been ruled out, accumulated water from Ausgrid's 132kV fluid filled cable trenches may contain OCPs. The following minimum controls must be applied:

- **Minimise the volume of contaminated water generated.** Where possible, minimise rainwater or 'run-on' water entering trenches e.g. cover trenches and divert water around trenches.
- **Do not allow uncontrolled water to leave the site.** Accumulated water from the trench must not be released to any waterway or discharged onsite. Accumulated water must be collected and managed in accordance with Section A9 Waste Management.
- **Do not allow uncontrolled soil to leave the site.** Prevent soil or any contaminants entering any waterway e.g. use sediment control devices.

Note: Handle and dispose of used sediment control devices as OCP contaminated. See Section A9 Waste Management.

A6 Handling soil

Where the presence of OCPs has been identified or has not been ruled out, the following minimum controls must be applied when soil is being handled:

- Prevent dust generation, especially from stockpiled soil.
- Keep soil from below the protective slab separate from soil from above the protective slab. Manage soil from below the protective slab in accordance with Section A7 Storing Soil. Soil from above the protective slab has no special handling requirements with respect to OCPs.

A7 Storing soil

Where the presence of OCPs has been identified or has not been ruled out, the following minimum controls must be applied when soil is being stored:

Note: These requirements can be satisfied by using a waste facility licensed to store Scheduled Chemical Waste.

- Soil excavated from Ausgrid's 132kV fluid filled cable trenches must be contained in a plastic lined and covered secure bin to prevent water ingress or dust escape.
- Any person handling the waste is trained in handling Scheduled Chemicals and methods of containing Scheduled Chemical spills, and wears Personal Protective Equipment (PPE).
- All packages / storage containers are clearly labelled and maintained in good order.
- Where more than 50kg but less than 1 tonne is stored, ensure that:
  - There is a clearly defined storage area with conspicuous warning notices identifying the area.
  - The storage area is constructed to prevent discharge into the external environment. For soil this can be satisfied by storing in a lined and covered bin.

  - An adequate supply of personal protective equipment, clean-up material and equipment is available in a secure location external to the storage area.

- Where 1 tonne or more is stored you will also require and need to comply with the conditions of a licence under the Environmentally Hazardous Chemicals Act 1985.

A8 Reinstatement

When reinstating trenches where the presence of OCPs has been identified or has not been ruled out, the following minimum controls must be applied:

- Where possible soils should be reinstated and not disposed of off-site.
- If soil is not contaminated with cable fluid (or anything other than OCP) it can be replaced in the trench to original depths. Soil excavated from below the protective slab must be reinstated below the protective slab. This reduces potential exposure pathways as contaminated soils are not at the surface and provides continued termite protection for the cables.
- Where soil contains contaminants such as cable fluid, etc, the fill material should be disposed off-site to a suitably licensed waste facility. Refer to Section A9 Waste Management.

A9 Waste management

There are two options for the management of spoil from Ausgrid's 132kV fluid filled cable trenches:

Option 1: Where possible soils should be reinstated to the original depth and not disposed of off-site.

Option 2: Where spoil and liquid waste is required to be disposed off-site the waste must be classified in accordance with the NSW DECC's Waste Classification Guidelines. This sampling must include OCPs.

Note: When working below the protective slabs, sediment control devices from the work site and liquid waste (i.e. water) from the trench should be managed the same as spoil from below the protective slabs.

When transporting spoil where the concentration of Aldrin or Dieldrin in the soil is 50mg/kg or greater, or the presence has not been ruled out, the following additional controls apply:

- The transport vehicle must carry personnel trained in containing spills of OCP contaminated spoil.
- Appropriate PPE, clean up material and equipment must be carried on the transport vehicle.

Annexure B – Sample Compliance Checklist

Network Standard Checklist Form

NS156 Working Near or Around Underground Cables

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 Section	Completed/ Actioned
	SCOPE		
	Works in in the vicinity of underground equipment owned by Ausgrid	2.0	
	WORK NEAR UNDERGROUND CABLES		
1	Confirm all 'Things to know' are understood.	5.0	Yes/No/NA
2	Understand the minimum requirements to be applied when working in the vicinity of underground electrical cable systems.	6.0	Yes/No/NA
	PLANNING YOUR PROJECT		
3	Understand the consequences of damaging Ausgrid cables and equipment.	7.0	Yes/No/NA
4	Know how to obtain plans, read and interpret them.	7.0	Yes/No/NA
5	Know Ausgrid contact details.	7.0	Yes/No/NA
6	Understand safety implications.	7.0	Yes/No/NA
	CONSTRUCTION WORKS		
7	Understand what to do prior to starting work.	8.0	Yes/No/NA
8	Know of safety precautions.	8.0	Yes/No/NA
9	Understand the requirements for excavation works, including, reporting damage, removal of material, heavy machinery use, and explosives use.	8.0	Yes/No/NA
10	Understand work completion requirements, including bedding and covering, backfill and reinstatement.	8.0	Yes/No/NA

	EMERGENCIES		
11	Know how to deal with emergencies arising from damage caused to Ausgrid assets.	9.0	Yes/No/NA
	WARNING NOTICE ON AUSGRID CABLE PLANS		
12	Be aware of the Warning notice on Ausgrid cable plans.	10.0	Yes/No/NA
	INDICATIONS THAT CABLES MAY BE NEARBY		
13	Recognise all types of above ground indications of underground cables.	11.0	Yes/No/NA
	AERO/HYDRO VACUUM EXCAVATION		
14	Understand the use of an Aero/Hydro Vacuum Excavator.	13.0	Yes/No/NA
15	Be aware of Ausgrid's requirements for the use of Aero/Hydro Vacuum Excavator.	13.0	Yes/No/NA
	UNDER BORING AND DIRECTIONAL DRILLING		
16	Understand Ausgrid's requirements for under boring and directional drilling.	14.0	Yes/No/NA
	ENVIRONMENTAL ISSUES		
17	Be aware of all environmental issues including, asbestos and Organo-Chloride Pesticides (OCP).	15.0	Yes/No/NA
	TYPICAL TRENCH CONFIGURATIONS		
18	Be aware of typical Distribution Cable Networks and Transmission Cables trench configurations	16.0	Yes/No/NA
	DEALING WITH SPOIL		
19	Understand how to deal with spoil from Ausgrid 132kV Transmission Cable trenches.	Annexure A	Yes/No/NA

Notes: .....

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Endorsement and approvals section of form removed for privacy concerns. Remainder of sample form unchanged.