Division Procedure: Work Near Essential Energy's Underground Assets

CEOP8041

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Essential Energy

CONTENTS

1.0 PURPOSE

This procedure outlines the process to be followed by Essential Energy personnel, Accredited Service Providers, Contract Service providers, Contractors and the public who perform excavation work (that includes ground penetration) near Essential Energy's underground system. The limits of underground approach in section 11 & 12 do not apply to persons authorised by Essential Energy.

1.1 Audience

This manual is intended for all employees of the Company, including but not limited to executives, managers, staff, contractors, and third-party resources.

1.2 Disclaimer

Essential Energy may make this technical procedure available to external parties in the interests of providing general safety information to the Electricity Distribution Industry.

No warranty or guarantee is given or implied that this procedure (photos and diagrams) covers all situations as every electricity asset and worksite may be unique.

Any organisation utilising this procedure must undertake their own comprehensive Hazard and Risk assessment, ensure the competency of their workers, and provide them with a safe system of work in accordance with their own Safety Management System.

This procedure may illustrate techniques, tools, plant and equipment that Essential Energy has chosen and determined as suitable for its workers, but alternate options may exist that provide an equivalent (or better) safety outcome.

This procedure is subject to change at any time and printed or external electronic copies are UN-CONTROLLED.

2.0 INTRODUCTION

This procedure provides information on the process to be followed by personnel who perform excavation work (that includes ground penetration) near Essential Energy's underground system.

Persons must ensure that work near Essential Energy's underground system does not reduce the reliability of the electrical system or create safety hazards for Essential Energy's staff, Contractors, ASP's, the public and excavation workers.

Essential Energy's underground cables and assets operate at voltages up to 132,000 volts.

Before commencing any excavation work near Essential Energy's assets, you must read this document and incorporate the safety measures into your work documentation and practices.

This procedure is to be read in conjunction with:

- Work Health and Safety Act 2011
- Work Health and Safety Regulations 2017
- SafeWork Australia Guidelines and Codes of Practice
- SafeWork NSW Guidelines and Codes of Practice
- Electricity Supply(Safety and Network Management) Regulation 2014
- Essential Energy's CEOP8030 Electrical Safety Rules

3.0 WHY THESE INSTRUCTIONS ARE IMPORTANT

3.1 WH&S Act 2011 and Work Health and Safety Regulations 2017

Part 4.7 General Electrical Safety in Workplaces and Energised Electrical Work

Division 7 Overhead and Underground electric lines

166 Duty of person conducting a business or undertaking.

1. A person conducting a business or undertaking at a workplace must ensure, so far as is reasonably practicable, that no person, plant or thing at the workplace comes within an unsafe distance of an overhead or underground electric line.
2. If it is not reasonably practicable to ensure the safe distance of a person, plant or thing from an overhead or underground electric line, the person conducting the business or undertaking at the workplace must ensure that:

(a) a risk assessment is conducted in relation to the proposed work; and

(b) control measures implemented are consistent with:

I. the risk assessment; and
II. if an electricity supply authority is responsible for the electric line, any requirements of the authority.

3.2 Before You Dig Australia (BYDA)

Before You Dig Australia (BYDA) is set in NSW law under the (Infrastructure Protection) Act 2009.

These Regulations are titled the Electricity Supply (General) Amendment (Infrastructure Protection) Regulation 2010 and the Gas Supply (Safety and Network Management) Amendment (Infrastructure Protection) Regulation 2010.

Under the Regulations, Before You Dig Australia must be notified for:

(a) almost all work on private property, including work approved by a Council

(b) work by a public authority.

(c) work on underground utility services.

There are exemptions for:

- emergency work and
- potholing to find underground networks.

It is compulsory to notify Before You Dig Australia of the time and place of work before the excavation work starts. You can start work as soon as you have received the plans and are satisfied that the safe working distances outlined in this document can be applied and any other requirements set by the Electrical Network Operator have been implemented.

The maps received from a BYDA request are only accurate for 28 days from issue. A new request must be made after the expiry period.

3.3 Look Up and Live

The Look up and Live app is a powerline safety planning tool. [Look Up And Live (essentialenergy.com.au)]

The tool creates exclusion zones when zooming in on a location - providing the user with the ability to know when they must contact Essential Energy for powerline safety advice and a free initial onsite consultation.

4.0 WHY THESE INSTRUCTIONS ARE IMPORTANT

The challenge is to locate underground electrical assets and in particular cables of different voltages accurately, before proceeding with excavation work. Cables can be difficult to locate because the route in most cases cannot be physically traced and can be difficult to identify from physical characteristics or design parameters.

It is the responsibility of all persons working near Essential Energy's underground assets to ensure that they have identified and proven where cables are located by pot holing and have a safety management plan in place to apply safe working distances to electrical cables before excavation work takes place.

You must take appropriate precautions described in this standard when undertaking excavating works.

5.0 WORK NEAR UNDERGROUND CABLES

Work near underground cables include any work which alters the surface level above cables or conduits or places a structure above cables or conduits by powered/mechanical excavation within the distances below.

(d) Any work below the surface level and within **5 metres** either side of any **transmission cable or associated pilot cable.**

(e) Any work below the surface level and within **3 metres** either side of any **distribution cable**.

(f) Road boring work not already covered above, where the bore may pass within **3 metres** of any **distribution cable or conduit** and within **5 metres** either side of any **transmission cable or associated pilot cable.**

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 and associated assets

(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.

6.0 USE OF EXPLOSIVES

Essential Energy must be notified before any proposed use of explosives within **thirty (30) metres** of underground cables, conduits and assets, or overhead poles and wires, or within **fifty (50) meters** of any operational poles. Explosive work cannot proceed until Essential Energy's representative has given approval. Visit our Construction Safety web page to arrange the free initial safety consultation.

All blasting near Essential Energy's network assets to comply with AS2187.2, Workcover NSW Guidelines – Work Near Overhead Powerlines Code of Practice as well as the minimum requirements set by Essential Energy for ground vibration, air-blast overpressure and flyrock.

There also may be additional controls that need to be implemented for blasting works near Essential Energy's assets based on input from the Safety Advisory and Assurance Team:

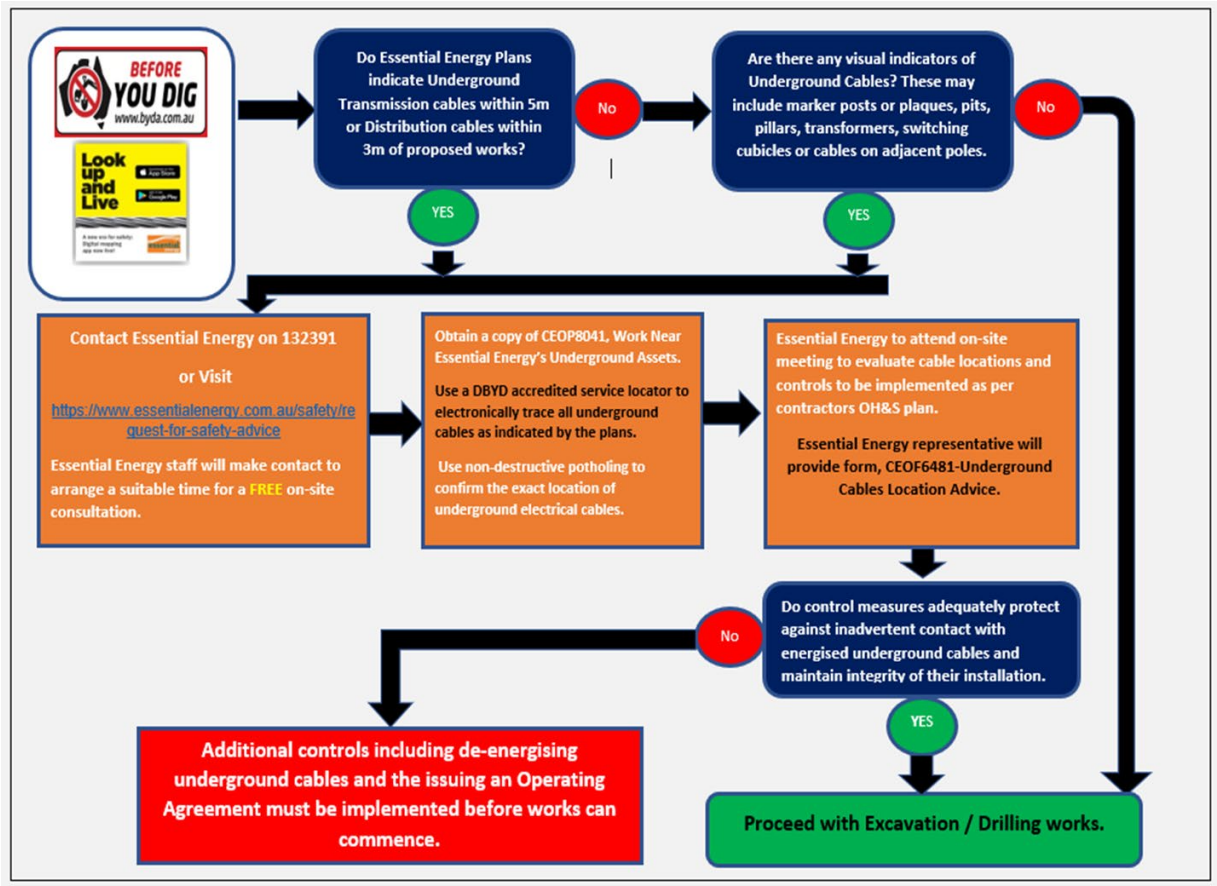
- Essential Energy contact to be added to the list of contacts in the blast plan and notified two hours prior to the blast. This will allow System Control to set up controls and monitor during and after the blast.
- Post blast - allowance for Essential Energy to visually inspect the electrical assets for any damage and communicate "all clear" to System Control
- Any recorded vibration readings that may exceed allowable limits to be communicated to Essential Energy allowing for a more comprehensive inspection of electrical assets.

Note: In all cases above, Essential Energy's System Controller must be notified prior to any blasting works.

7.0 EXCAVATION GUIDELINES

7.1 The Five Ps of Safe Excavation

1. **Plan** – Plan your job. Use the Before You Dig Australia service before your job is due to begin to receive the information you need to carry out a safe project. Also contact Essential Energy on 13 23 91 to identify any underground conduits and/or cables in the vicinity. Locate cables with electronic locating equipment.
2. **Prepare** - Prepare by reviewing the utility plans and contacting the utility if you need assistance. Look for onsite asset and infrastructure clues such as pit lids, marker posts and meters. Engage a BYDA Certified Locator which includes undertaking electronic location prior to potholing.
3. **Pothole** – Potholing (digging by hand or air/hydro/vacuum) is a method to assist in establishing the exact location of all underground infrastructure. Only use air/hydro/vacuum equipment to pothole that operates at or less than 13,790Kpa (2000psi).
4. **Protect** - Protecting and supporting exposed infrastructure is the responsibility of the excavator. Always erect safety barriers in areas at risk to protect underground networks.
5. **Proceed** – But ONLY when you have Planned, Potholed and put the Protective measures in place.



Note: If plans sent to you by Essential Energy indicate that cables are present, Essential Energy must be contacted before work commences.

7.2 Excavation Work Near Cables

Damage to underground electric cables may result in:

- Severe burns from the electrical arc or electric shock. Both have the potential to cause serious injury or death.
- Damage to excavation plant, tools and equipment.
- Responsibility for the cost of the interruption to power supply (Service Target Performance Incentive Scheme).
- Responsibility for the cost of repairs to damaged electrical infrastructure.
- Responsibility for the cost of any damage to customer premises or appliances or loss of trade.
- Possible Statutory Fines or prosecution.

7.3 Obtaining Plans

During the planning phase of a project, it is essential to check on the presence of any underground cables in the vicinity. To determine if cables or conduits (or other services) exist in a particular location, contact the Before You Dig Australia Service on:

- telephone 1100
- Guide to free plans - BYDA

8.0 CONTACTING ESSENTIAL ENERGY

Once you have received Essential Energy plans from BYDA, check the work site to determine whether excavating work will be in the vicinity of electrical apparatus/ equipment, cables and/or conduits as indicated on the plan.

A cover letter from Essential Energy will be attached to your BYDA request with links to this document and contact details. Visit our Construction Safety web page to arrange the free initial safety consultation.

For powered/mechanical excavation work near underground cables that are within the minimum clearances as set out in this procedure, it is compulsory for unauthorised persons to arrange for an Essential Energy representative to attend the worksite.

Essential Energy's representative must be booked four weeks before work commences, this is to ensure the work is undertaken safely and so as not to endanger the workers or damage underground assets.

Relevant details must be provided and the representatives attendance arranged.

When contacting Essential Energy information provided must include:

- name of the person in charge - site manager or coordinator
- contact details of the person in charge.
- address of the worksite.
- description of the work to be performed at site and time frames.

Essential Energy'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.

Essential Energy's representative is not responsible for the locating or pot holing of underground assets – these are the responsibility of the person in charge of the works.

Any work in the vicinity of underground cables and apparatus/ equipment must incorporate any requirements indicated by Essential Energy's representative and be in accordance with this procedure. Any safety advice provided by Essential Energy is only valid for 28 days from the date the advice was provided. After 28 days new safety advice must be sought from Essential Energy.

All powered/ mechanical excavation work in the vicinity of Essential Energy's underground assets within the limits of distance "B" of underground approach as set out in section 11.0, must have a written hazard and risk control assessment and safety management plan submitted to Essential Energy, an observer appointed to ensure safe approach distances are not encroached and a toothless bucket used.

The written hazard and risk control assessment and safety management plan must consider and address as a minimum the following:

- Name of the person in charge - site manager or coordinator.
- Duration of works.
- Electronic Cable Locating.
- Potholing parallel to any existing cable/s along the proposed route length at 10 metre intervals and along the radius in any change of direction of the cable.
- Marking the proposed excavation route to assist in holding the excavation line.

- The use of hydro vacuum excavation equipment to prevent cable damage.
- The use of a toothless bucket for excavating equipment
- Installing barriers to prevent contact with existing cables.
- Appointing an observer to maintain the excavation route course.
- Proximity of excavation in relation to any existing cable
- De energising effected cables at risk from excavation.
- Monitoring and engineering/ geotechnical supervision during the works - Protecting electrical assets from surface water runoff and erosion that may undermine the electrical asset or its bedding material.
- Soil conditions around the cable/s
- Proposed shoring methods to prevent trench excavation collapse.
- Duration of works
- Shoring installation and removal process
- Requirements to independently support existing cables during the works.
- Proximity of existing adjacent services and excavations
- Proposed backfilling methods - Reinstatement with approved cable bedding material and electrical warning tapes and covers
- Maintaining Essential Energy's access to existing electrical assets.

If appropriate controls of the risks of mechanical excavation/boring work or other construction activities near energised apparatus/cables cannot be met, the apparatus/cables must be de energised and a regulated charge will be made for this service.

An observer can be provided by Essential Energy and a **recoverable works charge will be made for this service** or an observer can be appointed by the worksite controller to provide dedicated attention to the activity being carried out.

Maintenance of records. All communications between Essential Energy and third parties requesting safety advice for working around Essential Energy's Overhead or Underground Electrical Networks must be entered into the corresponding Total Safe-Contractor Management-Construction Advice entry. This entry is generated when the Request for Safety Advice is received by Essential Energy.

Inclusions for the Total Safe entry may consist of the following

- CEOF1130 Request for Safety Advice.
- CEOF6481 Advice of Location of Underground Cables.
- CEOF1131 Authorised Person Site Visit for Safety Advice.
- CEOF1132 Safety Advice Response.
- Third Party Hazard and Risk Control Assessment.
- Third Party Safety Management Plan.
- Any Essential Energy Third Party communications i.e. e-mails or site diaries.

9.0 INSTALLED ESSENTIAL ENERGY ELECTRICAL UNDERGROUND ASSETS

Whenever powered/ mechanical excavation takes place, indications of underground cables in the vicinity include the presence of steel or concrete street lighting standards with no overhead lines attached, pits, cubicles and pillars in the footpath, electrical warning markers or the letter E cut into the gutter/pavement, 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 identification cover may have been used over Essential Energy's cables.

Examples include:

- 'electric' clay bricks
- concrete cover slabs
- 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.

10.0 WORK NEAR ABOVE GROUND ASSETS

Working near above ground assets such as steel or concrete street lighting standards, pits, cubicles and pillars and pad mounted substations creates additional risk to operators of plant. For excavation work, the approach distance that must be maintained for unauthorised persons is 3 metres regardless of the voltage concerned. The electrical network operator must be contacted prior to any excavation. It is compulsory for unauthorised persons to arrange for an Essential Energy representative to attend the worksite.

Visit our Construction Safety web page to arrange for an Essential Energy representative to attend the site and determine the appropriate action and controls to be adopted. This may involve the isolation of electricity supply while the excavation works are completed.

Any work within **3 metres** of exposed conductors associated with the above ground asset must be carried out by authorised or instructed persons only.

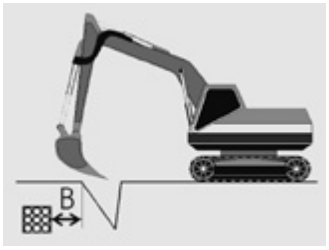
- Authorised persons are either Essential Energy employees or Accredited Service providers who are electrically qualified and have completed the appropriate electrical safety rules training and assessment and have been authorised in writing by Essential Energy.
- An instructed person is a person adequately advised or supervised by an authorised person to enable them to avoid the dangers electricity may create.

Note: Work that disturbs low voltage Concentric Neutral Solid Aluminium Conductor (CONSAC) or PILC cable terminations and joints, must not be undertaken while the cables are energised. Essential Energy's representative will assist in identifying CONSAC cables during the on-site Request for Safety Advice consultation.

An electrically qualified and authorised person can be provided by an Authorised Service Provider (information NSW Trade and Investment Website) or Essential Energy where a recoverable works charge will be made for this service.

- The appointment of an Accredited Service Provider does not negate the need to lodge a Request for Safety Advice with Essential Energy.
- It is not mandatory for an Accredited Service Provider to lodge a Request for Safety Advice if they are supervising excavation works directly associated with Certified, Level 1 Construction plan that they have been contracted to undertake.

11.0 MINIMUM APPROACH DISTANCES FOR UNAUTHORISED PERSONS

Electrical Assets	Clearances	No Go Zone for Powered Excavation	Controls	Typical Depths
Types of underground assets (Note: The owners of assets registered with the Before You Dig Australia service and covered by this Guideline require an enquiry through this free service and the compliance with any directive issued with information regarding the asset)	The minimum approach distance for individuals carrying out work near underground assets	Distance 'B' is the minimum approach distance for powered excavating machines  For directional boring across the line of an asset a minimum clearance of 300 mm from the asset must be maintained and a slit trench installed. For directional boring parallel to the asset and at the level of the asset, a clearance of 500 mm must be maintained from the edge of the nearest asset. It may be necessary to dig trial/potholes to prove the location of the nearest asset at points of 10-15 metres along the route. If this cannot be achieved the mains will be de energised	If the risk assessment identifies a potential risk of making contact with both underground and overhead assets, two observers would be required. One observer to ensure that the machinery maintains a safe distance from underground assets, the other observer to ensure a safe distance from the overhead powerlines In the case of gas or electricity assets, an appropriate fire extinguishing system must be at the work site. If the width and/or depth of the excavation will expose the asset, the asset owner must be contacted prior to commencing work	
Low Voltage Electricity Cables < 1000V	Hand dig or vacuum extraction only	300mm	Must contact asset owner for specific conditions. To work within 300mm a written hazard and risk control assessment and safety management plan required, and observer must be appointed.	450 – 750 mm
High Voltage Electricity Cables from > 1000V up to 11,000V (11kV)	Hand dig or vacuum extraction only	600 mm	Must contact asset owner for specific conditions. To work within 600mm a written hazard and risk control assessment and safety management plan required, and observer must be appointed.	450 – 750 mm
Electrical Assets	**Clearances**	**No Go Zone for Powered Excavation**	**Controls**	**Typical Depths**
High Voltage Electricity Cables from > 11,000V (11kV) up to 33,000V (33kV)	Must contact asset owner	3.0 metres or Do Not enter electrical easement	Must contact asset owner for specific conditions. To work within 3.0 metres a written hazard and risk control assessment and safety management plan required, and observer must be appointed.	600 – 1000 mm

Extra High Voltage Electricity Transmission cables – voltages above 33,000V (33kV)	Must contact asset owner	5.0 metres or Do Not enter electrical easement	Work must be carried out under the direct supervision of the asset owner.	800 – 1200 mm

11.1 Directional Boring

Essential Energy must be contacted if proposed directional boring is within **3 metres** of distribution cables and **5 metres** of transmission cables, or if there are any visual indicators that may alert to the presence of underground cables.

For directional boring across the line of an energised underground cable, a minimum clearance equal to that of the 'No Go Zone for Powered Excavation' must be maintained. A Slit trench must be installed a minimum of 2 metres on the approach side of electrical cables and extend a minimum of 300mm below the bottom of the lowest electrical cable, as determined by non-destructive potholing. This will provide a visual indication that the directional bore will safely maintain clearances from the underground electrical cables.

For directional boring across the line of Underground Electrical cables that have been de-energised, a minimum clearance of 300mm must be maintained.

For directional Boring parallel to underground cables, a minimum of 500mm clearance must be maintained.

When directional boring passes Power Poles / Streetlight columns or above ground electrical assets a clearance of 300mm must be maintained or as directed by Essential Energy representative.

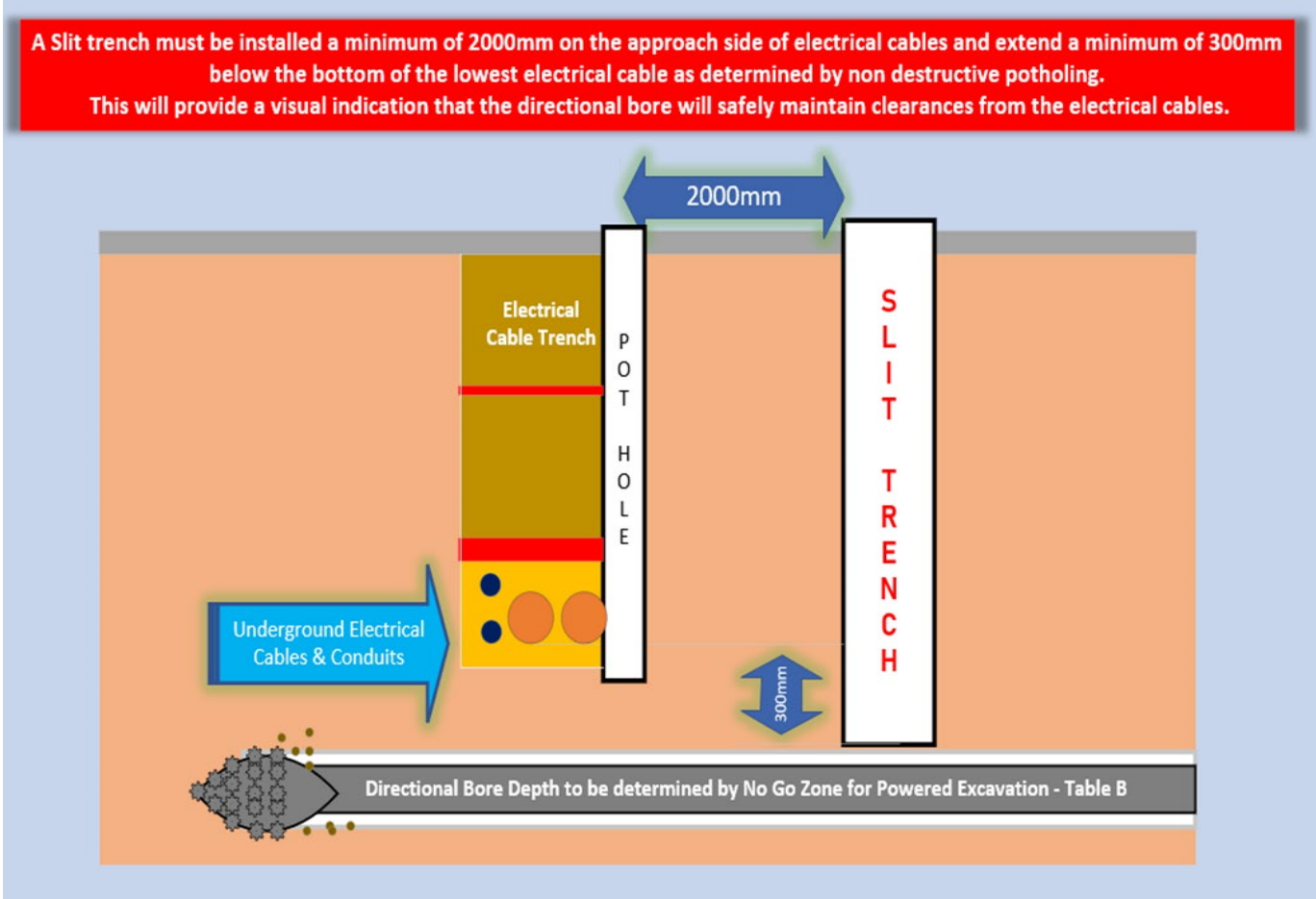
When directional boring passes the underground earth conductors of overhead or ground type transformers, or other electrical assets, a clearance of 500mm must be maintained.

Note: There are special requirements for assets on SWER (Single Wire Earth Return) networks.

All clearance dimensions to be measured from the outer circumference of the bore/reamer. Additional clearance may be required to avoid disturbing cable bedding materials.

If the minimum clearances cannot be maintained to underground cables the cables will have to be de-energised and may have to be retested prior to re-energisation. This service will be provided at the applicable regulatory charges.

If the minimum clearances cannot be maintained to Power Poles / Streetlight Poles or above ground electrical assets, approval must be granted by the Electrical Safety Office or Principle Civil Engineer.



12.0 EARTH GRIDS

If you are planning excavation work in the vicinity of a pole substation or padmount substation, visit our Construction Safety web page for an Essential Energy representative to attend the site to provide safety advice

Essential Energy's underground and overhead electrical distribution assets have earth grids buried 500mm below ground in their immediate vicinity. The earth conductor may or may not be covered with warning tape/barrier.

Buried grids typically consist of horizontal bare copper conductors and vertical electrodes and are not shown on a Before You Dig Australia enquiry.

If an earth grid is damaged or broken – stay clear, do not attempt a repair and immediately contact Essential Energy on 13 20 80.

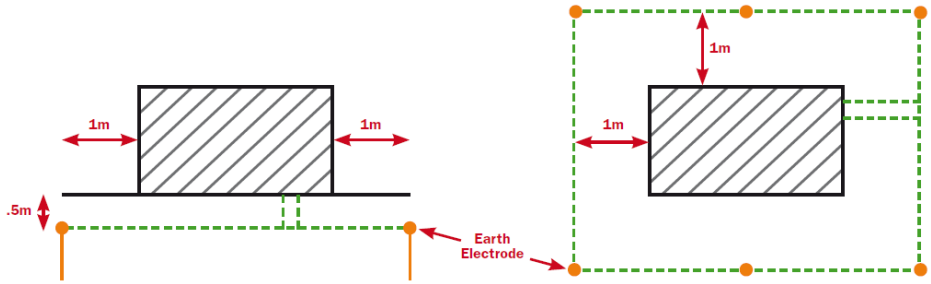
WARNING: The earth grid associated with a Single Wire Earth Return (SWER) network is particularly hazardous as it carries high voltage load current. Essential Energy's representative will assist in identifying SWER networks as part of the Request for Safety Advice on-site consultation

All excavation work in the immediate vicinity of Essential Energy electrical earth grids must be by hydro/air vacuum excavation or by hand digging.

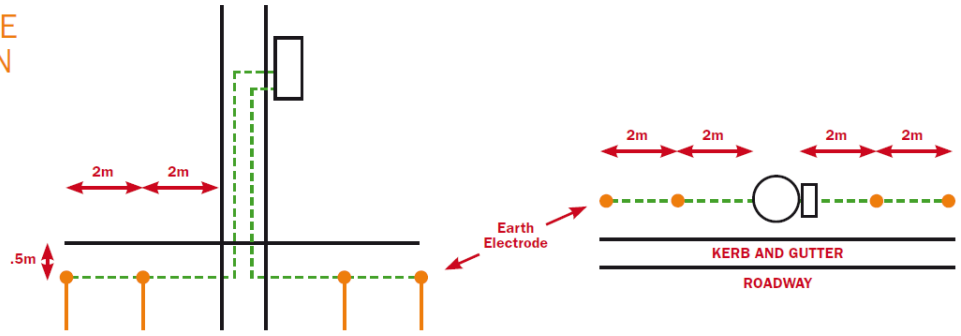
12.1 Earth Grid Examples

Earth grid examples are the current standard earth grid construction and are for illustration purposes only, as there have been many variations in construction standards over the years.

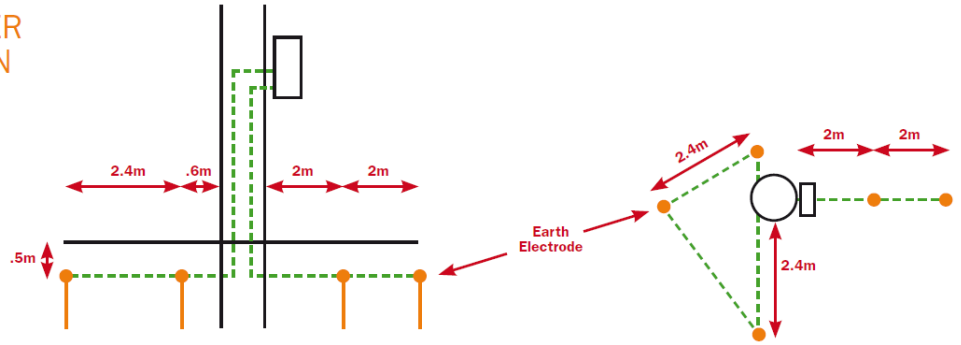
PADMOUNT



URBAN POLE SUBSTATION



RURAL SWER SUBSTATION



13.0 HYDRO VACUUM/AIR EXCAVATION EQUIPMENT

When performing hydro/air vacuum excavation near energised cables, the operator and any assistant must stand on an equipotential conductive mat that is electrically connected to the metalwork associated with the machine controls, the water lance, and the greater mass of earth via a driven earth stake or nearby Known Permanent Earth (KPE), or by creating an insulated work site by standing on insulated ground mat/s and wearing an insulating glove (with approved outer gloves) on EACH hand.

Equipment operators are reminded that high pressure water can be dangerous, and that high pressure equipment must only be used for the purpose intended. While pressure washers and hydro - excavation digging equipment can look similar, they can run at significantly different pressures and must only be used for the purpose intended.

Equipment operators must understand the pressure ratings of the equipment and ensure that safe system of work is implemented.

Hydro/Air Vacuum Excavation equipment is only considered “non-destructive” if it meets the following criteria.

- It operates at or less than 13,790kpa (2000psi) and.
- It utilises a rotating head for potholing electrical cables. A fixed or direct flow nozzle can damage electrical cables at this pressure.

Hydro/Air Vacuum Excavation must not be used in the vicinity of faulted underground cables, if that faulted cable remains energised i.e. fault on one phase of a multicore cable and that phase is the only one to be isolated to restore customer supply.

Note: A Risk Assessment must be completed where Hydro/Air Vacuum Excavation is to be used near above ground electrical assets where the pressurised water may penetrate the enclosure i.e. beneath the foundation of a ground mounted transformer or electrical pillar. Water ingress has the potential to cause damage to electrical asset

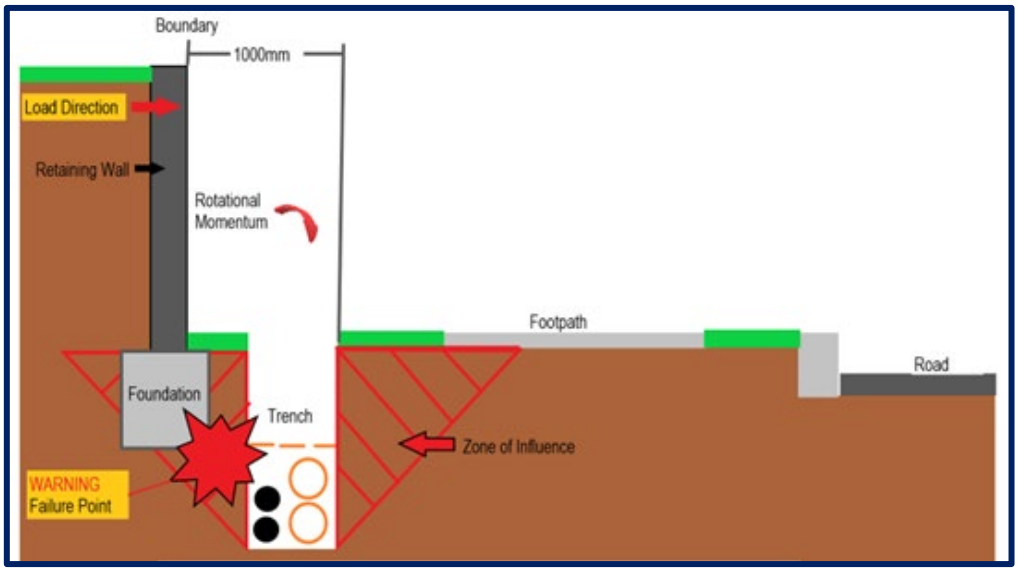
14.0 EXCAVATION COLLAPSE

Excavation work may seriously affect the security or stability of any part of a structure at or adjacent to the location of the proposed excavation which can lead to structural failure or collapse.

For any excavation work carried out by unauthorised persons within 3 metres of Essential Energy Essential Energy above ground assets or structures (other than poles) it is compulsory to arrange for an Essential Energy representative to attend the worksite. Visit our Construction Safety web page to arrange for an Essential Energy representative to attend the site to provide safety advice

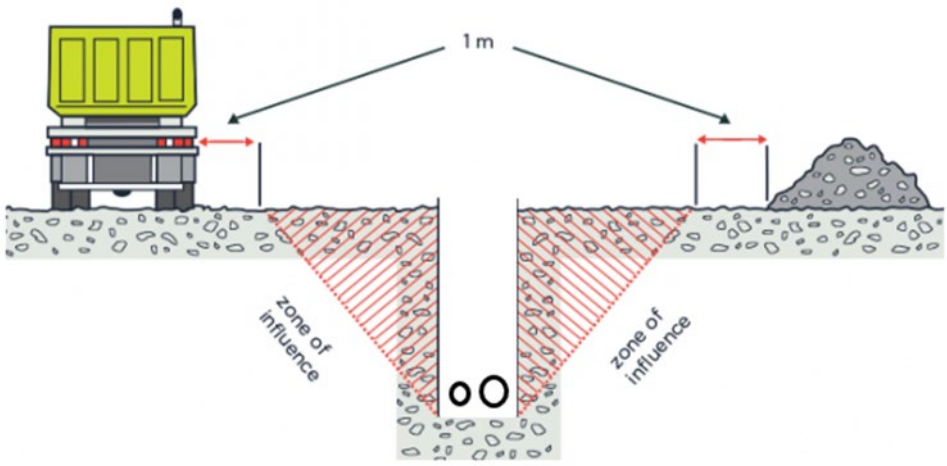
14.1 Adjacent Buildings and Structures

Excavation work must not commence until steps are taken to prevent the collapse or partial collapse of any potentially affected Essential Energy assets or structure. Trenching in the zone of influence near retaining walls or other structure foundations may cause foundation failure.



Any excavation that is below the level of the footing of any Essential Energy assets or structure including retaining walls that could affect the stability of the structure must be assessed by a competent person such as a civil engineer and secured by a suitable ground support system which has been designed by a competent person. Suitable supports to brace the structure may also be required and must be identified by a competent person.

Soil stockpiles also need to be considered as they increase ground loading and are often located close to the trench extremities.



It is also important that other buildings/structures in and around the excavation site are not adversely affected by vibration during the excavation work. Special precautions may need to be taken in the vicinity of hospitals and other buildings containing equipment sensitive to shock and vibration.

Excavation work must be carried out in a way that does not cause flooding or water penetration to any essential Energy assets or adjacent structures.

15.0 COMPLETION OF EXCAVATION WORKS

Before reinstating/backfilling of excavation works takes place where cables and conduits have been exposed, contact with an Essential Energy representative must be made to ensure Essential Energy underground design standards are met.

Essential Energy's representative must be consulted before compaction equipment is used over buried cables.

Unless otherwise stated, backfilling of trenches and other excavations must be carried out in accordance with Essential Energy's CEOM7201 Underground Construction Manual. Any excess spoil is to be removed from the work site, and the area to be restored to a minimum of its original state.

15.1 Bedding and Covering of Cables

Direct buried cables and conduits must be bedded on a layer of clean, approved bedding material, Details of approved bedding materials can be sought from Essential Energy's representative.

- The minimum thickness of the layer of bedding must be 50mm below the cable with 150mm over the top. Particular care must be taken when backfilling around cables to ensure that bedding material is free of any sharp objects, slag, organic or other harmful substances.
- 150mm Orange PVC hard cable cover and electrical warning tape must be laid to completely cover all conduits and any direct-laid distribution cables which have been disturbed. The PVC hard cable cover and electrical warning tape is used to provide a warning of the presence of cables and cover the entire width of the trench.

In the situation that the PVC hard cable cover or electrical warning tape is damaged during the excavation process, they must be replaced by the party that carried out the work before any backfilling can take place. The PVC hard cable cover/electrical warning tape must cover the entire width of the trench over the cable and/or conduit.

Where transmission cables are involved Essential Energy's representative will provide details of the backfill and cover required.

Following the installation of the PVC hard cable cover/ electrical warning tape, the trench may then be backfilled using backfill materials approved by Essential Energy's CEOM7201 Underground Construction Manual.

15.2 Backfilled Trench

In the situation that the PVC hard cable cover or electrical warning tape is damaged during the excavation process, they must be replaced by the party that carried out the work before any backfilling can take place as per section 15.1

PVC hard cable cover/electrical warning tape can be purchased from Essential Energy's Procurement Branch or through Essential Energy's representative.

15.3 Damaged Underground Assets

If any underground assets are damaged, you must contact Essential Energy immediately

- call Essential Energy's 24-hour supply interruptions line – 13 20 80 to switch off the power if required or report damage or exposure cables / conduits.
- never approach a damaged underground cable, as they can be still live.
- remain on/inside the machinery until the supply is isolated.
- keep everyone at least **8 metres** away from the incident site, the person or any machinery in contact with underground cable.
- untrained persons should not attempt to rescue a person receiving an electric shock or the rescuer may also receive an electric shock.
- if possible, the operator should break contact between the machinery and underground cable.

Note: Any person who has received an electric shock, no matter how small should seek medical advice.

16.0 EXCAVATION NEAR POLES AND STAYS

An assessment by a competent person is not required for excavation depths up to 250mm.

For excavation depths greater than 250mm near power poles and stays it is mandatory to arrange for an Essential Energy representative to attend the worksite 2 weeks prior to work commencing. Visit our Construction Safety web page to arrange for an Essential Energy representative to attend the site to provide safety advice.

For excavation depths greater than 250mm near power poles and stays a written assessment and safety management plan must be carried out by a competent person to ensure that the short and long term structural stability of Essential Energy poles and assets are maintained This assessment must be provided to Essential Energy for approval prior to the commencement of excavation works

Essential Energy form CEOF6481 Underground Cables Location Advice must be completed by the Essential Energy representative when excavating near Power Poles and Stays and recorded in TotalSAFE Global Audit ATE-0000048 Construction Work Underground along with the written assessment and safety management plan.

Examples of where an assessment is required:

(a) Where doubt exists as to the suitability of the soil within the 'Do Not Disturb' zone to adequately support the pole.

(b) Where excavation is required to be carried out within the 'Do Not Disturb' zone.

(c) Where the excavation near any pole will be 'open' for more than a week.

(d) Where a permanent channel, drain or similar is being constructed in the vicinity of a pole.

Note: In the cases of (c) and (d) the provisions of HB 331- 2012 (Standards Australia) may need to be applied, to increase the separation between pole and trench, support the pole during the works, or replace the pole with another of greater embedment.

The assessment must be forwarded to Essential Energy for review and comments prior to works being carried out. Essential Energy's Principle Civil Engineer may assist staff assessing the suitability of controls as outlined in the written Assessment and Safety Management Plan

The written assessment must consider and address as a minimum the following:

- Pole loading (vertical and lateral)
- Condition of pole (with and without pole nailing)
- Foundation depth of pole
- Proximity of excavation in relation to pole
- Soil conditions
- Proposed shoring methods.
- Duration of works
- Shoring installation and removal process
- Requirements to independently support pole/structure during the works
- Proximity of existing adjacent services and excavations
- Proposed backfilling method.
- Staging of work
- Monitoring and engineering/ geotechnical supervision during the works
- Alteration of drainage

16.1 Minimum Trench Depths and Distance from Pole Without Pole Support

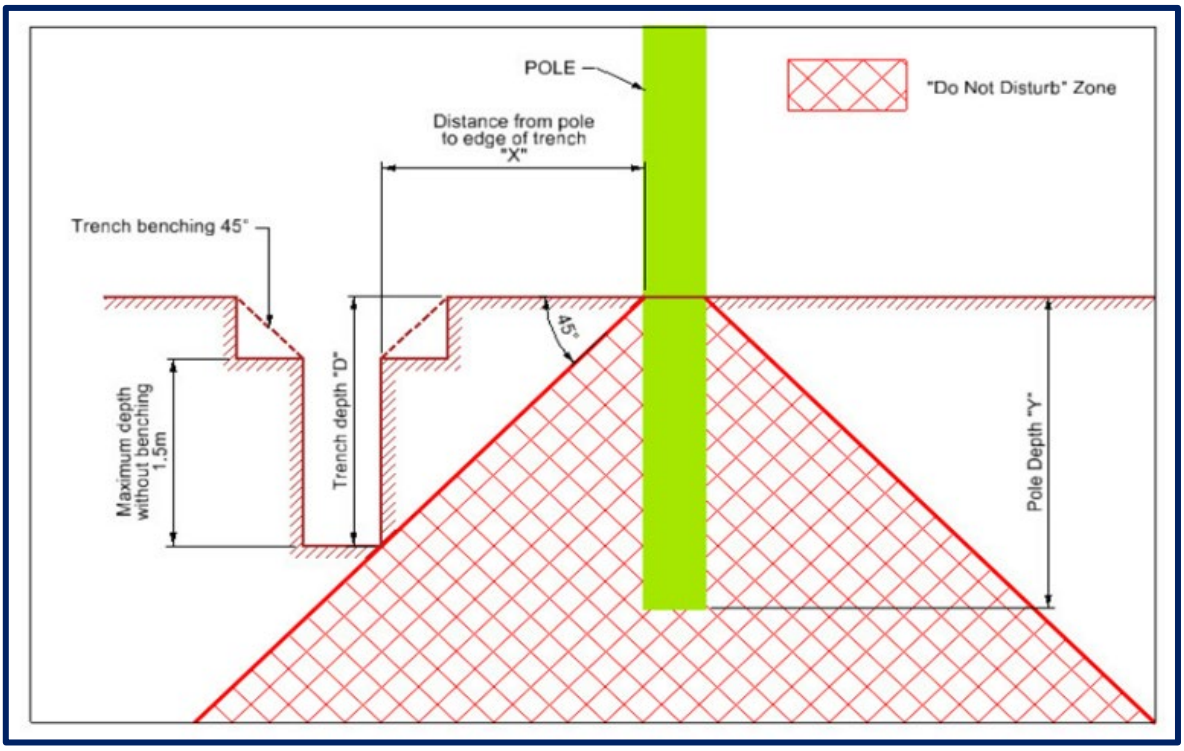
A written assessment and safety management plan must be carried out by a competent person to indicate how the pole will be supported to prevent falling during excavation within the "Do Not Disturb Zone" (zone of influence) as depicted below.

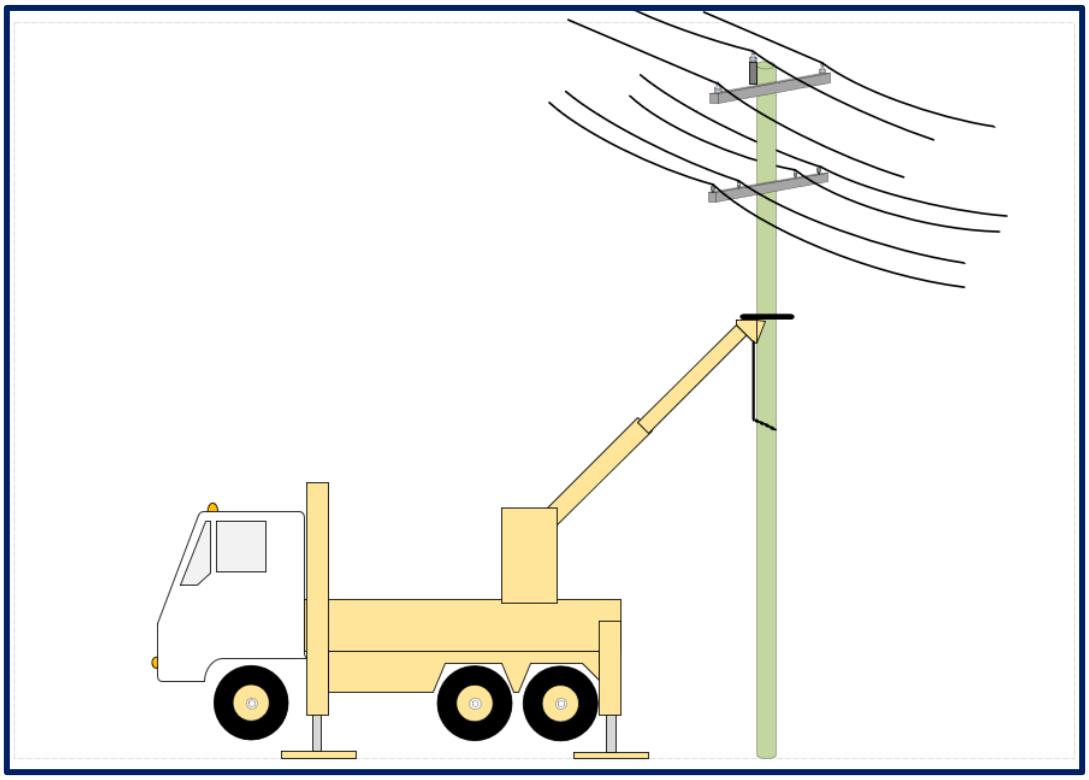
The competent person must determine the depth of trench "D", the pole depth "Y" and ensure the excavation (including benching) is no closer to the pole than distance "X" which is equal to "D".

Example: If the trench depth "D" is 1.5 metres then distance "X" is 1.5 metres

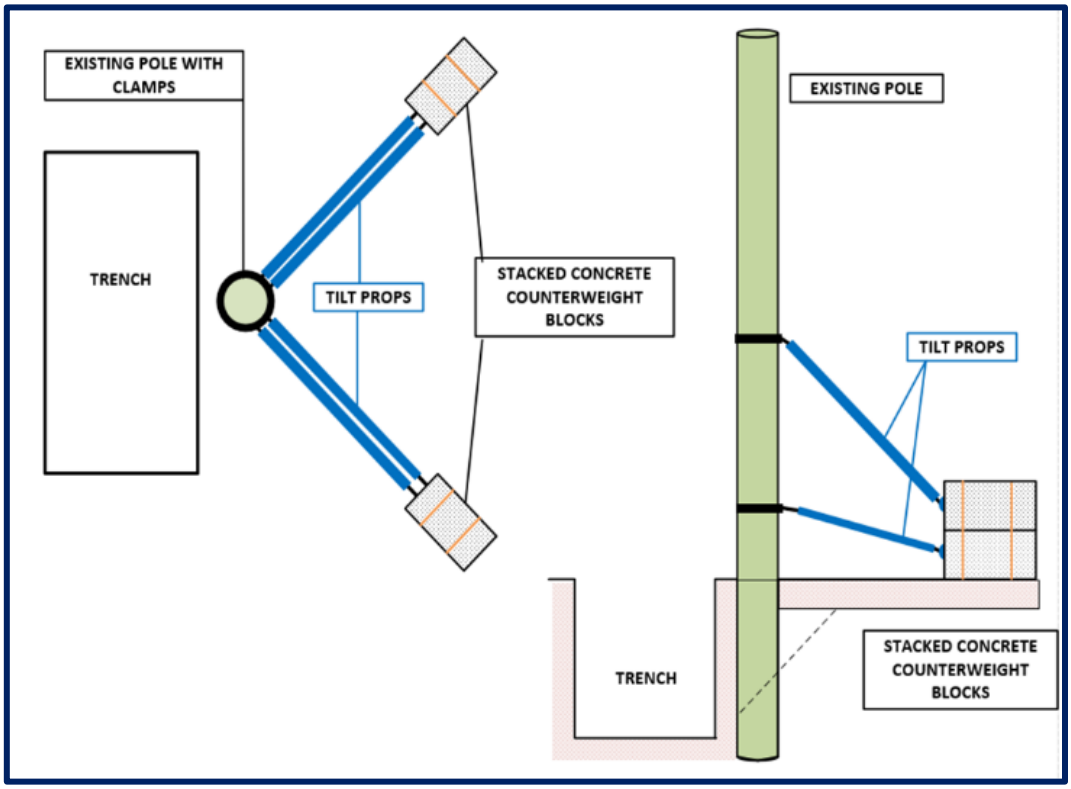
If an excavation/trench is required to be within the "Do Not Disturb Zone", the excavator must design a support system to retain the soil and /or support the pole by approved means.

Pole support is a monopoly function that can only be performed by Essential Energy unless it is associated ASP works carried out under a contestable certified design. Any additional works not directly associated with the electrical installation on a construction site will require a "Request for Safety Advice" and on-site visit by Essential Energy.


POLE
"Do Not Disturb" Zone
Distance from pole to edge of trench "X"
Trench benching 45°
45°
Maximum depth without benching 1.5m
Trench depth "D"
Pole Depth "Y"



Crane Lifter Borer supporting a pole to excavate within the do not disturb zone.



Struts and concrete blocks in combination for pole support.

Note: Alternate methods of Pole Support (other than a crane) require approval by Essential Energy's Principal Civil Engineer.

17.0 ENVIRONMENTAL CONSIDERATION

Worksite controllers need to be the complete environmental practitioner and be aware of any environmental implications of the excavation and route selection, materials and equipment etc. as they may impact on the environment.

It is a requirement that all proposed work must have an appropriate environmental impact assessment carried out in accordance with the Environmental Planning and Assessment Act 1979 (EPA Act) and in accordance with Essential Energy document - HSE Manual: Environmental Impact Assessment NSW. - CERM1000.70.

It is a requirement that a risk assessment be carried out to identify potential environmental and fire hazards which could be created at a proposed excavation site. Appropriate changes to the design must then be made to eliminate these hazards. The design and works must be carried out in accordance with the EIA and all relevant legislation and local requirements.

There are numerous and detailed legislative requirements regarding the disposal of waste generated from trenching and potholing. More information on these requirements can be found in the Operational Guideline - Trenching, Underboring & Vacuum Extraction-Excavation Waste - CERM1000.75c, or by contacting one of Essential Energy's Environmental Specialist

18.0 FOR MORE INFORMATION

For additional information and electrical safety advice please visit our construction safety web page Construction Safety - Essential Energy

19.0 AUTHORITIES AND RESPONSIBILITIES

Position / Title	Responsibility
All persons involved in excavation and civil works	• Entire document
Manager Electrical Safety	• Authorise document

20.0 DEFINITIONS

Accredited Service Provider (ASP)
An individual or entity accredited in accordance with the Electricity Supply (General) Regulation 2001.

Active Observation
To provide dedicated attention to the activity being carried out. This includes the clarification of any intended movement of plant with the observer prior to such movement taking place.

Authorised Person
Person with technical knowledge or sufficient experience who has demonstrated competency and has been approved, in writing, by Essential Energy to carry out specific duties associated with the supply or use of electricity.

Contract Service Provider (CSP)
An individual or entity authorised by Essential Energy to carry out work on the Essential Energy network under a contractual arrangement.

Excavation Work
Excavation work involves the process of removing earth, rock, or other materials to create an open space, hole, or cavity. This can include activities such as:

- Digging trenches
- Creating pits or shafts
- Removing soil for foundations
- Tunnelling/boring
- Ground penetration

Ground Penetration: This refers to any activity that penetrates the ground surface, typically exceeding 150mm in depth. It includes actions like surface excavations, drilling by mechanical devices, and penetration by objects (eg posts, stakes, spikes).

Hand Excavation
The use of shovels, picks, mattocks crow bars and similar tools with no mechanical 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 240/400 volts.

Transmission mains/cables
Cables and other equipment operating at 33,000 volts or higher.

Vacuum/hydro excavation
Excavation using equipment designed to use water or air pressure to loosen soil and other materials and a vacuum to remove it.

Observer
A person competent to observe the task and specifically assigned the duty of actively observing (see active observation) and warning against unsafe approach to live cables or other unsafe conditions.

Zone of Influence
Is the loading or unloading of the ground in the proximity of a structure that may impact its performance or integrity. This is typically measured 45° out from the object.

21.0 REFERENCES

Internal
Form - Advice of Location of Underground Cables – CEOF6481
Procedure – Electrical Safety Rules - CEOP8030
Manual – Excavation Manual – CEOM1000.95
Manual - HSE Manual – CECM1000.02
Operational Guideline - Trenching, Underboring & Vacuum Extraction-Excavation Waste - CERM1000.75c
HSE Manual: Environmental Impact Assessment NSW. - CECM1000.70

Process Construction Work Underground Global Audit - ATE-0000048

External
SafeWork NSW Guide 2007 - *Work Near Underground Assets - Guide*
WorkCover NSW - *Excavation work code of practice 2020*
Work Health & Safety *Act 2011*
Work Health & Safety *Regulations 2017*
Safe Work Australia – *Working in The Vicinity of Overhead and Underground Electric Lines*
Standards Australia – *HB 331- 2012*

22.0 RECORDKEEPING

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

Type of Record	Storage Location	Retention Period
Nil entry		

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

23.0 REVISIONS

Issue No.	Section	Details of changes in this revision	Change Risk Impact?
5	All	New template and formatting	Low
	All	Change DBYD to BYDA	
	All	Update Essential Energy contact – Construction Safety	
	6	Use of explosives. Added potential additional requirements	
	7	Update 7.0 Excavation Guidelines	
	7.1	7.1 Excavation Work Near Cables damage results dot points	
	8	Section 8 additions to requirements and maintenance of records wording	Low
	11.1	New section for directional boring	Low

	15	Revision of completion of excavation works	Low
6	All	Minor amendment - Dial Before You Dig (DBYD) reference updated to Before You Dig Australia.	Low