

ISSC 20

Guideline for the Management of Activities  
within Electricity Easements and Close to  
Electricity Infrastructure

---

Industry Safety Steering Committee

September 2012

**First published by the Electricity Council of New South Wales February 1992**

**Revised by the Electricity Association of New South Wales November 2001**

**Re Issued with minor amendments by Department of Water and Energy June 2009**

**Revised by an Industry Safety Steering Committee of New South Wales appointed Working Group comprised of representatives from TransGrid, RailCorp, Endeavour Energy, Ausgrid, Essential Energy and the Trade and Investment Division of Resources and Energy in 2012**

## **THE INDUSTRY SAFETY STEERING COMMITTEE OF NEW SOUTH WALES SERIES OF GUIDES**

In New South Wales, safety requirements for electricity transmission, distribution and utilisation are contained in the Network Management Plans prepared by Electricity Network Operators. These regulations specify the safety outcomes to be achieved whilst the means of achieving such outcomes are matters to be determined by the electricity industry.

The NSW electricity supply industry has responded to these regulatory reforms by publishing an extensive series of guideline documents. These set out the industry's view of minimum practices which would enable an organisation, or individual, to fulfil the regulatory requirements.

Whilst compliance with the regulation is mandatory, organisations or individuals may choose to depart from the recommendations of the guides provided that the necessary duty of care is exercised and the regulatory requirements are fulfilled.

Under the Electricity Supply (Safety and Network management) Regulation 2008, the Director General of NSW Trade & Investment may nominate any industry code or guide to be taken into account in developing Network Management Plans. The Industry Safety Steering Committee of New South Wales has recommended that the Director General 'nominate [this guide] to be taken into account' in the development of such Plans.

### **DISCLAIMER**

While due care has been exercised in the compilation of this Guide, much of the content has been sourced externally to the Industry Safety Steering Committee of New South Wales. Thus the Committee cannot accept responsibility for the content.

This Guide is designed on the basis that it will be used in its entirety, and persons who use or observe parts of the publication without paying heed to the entirety of the publication do so at their own risk.

This Guide has been prepared on the basis that the user will have a certain minimum level of technical qualifications and/or experience. The Guide is not intended for use by untrained or unqualified persons, and any one in that category using the guide does so at his/her own risk.

This Guide does not purport to ensure compliance with all relevant statutes and regulations, such as work place health and safety laws. Users must satisfy themselves as to the requirements of all relevant laws.

# CONTENTS

Page

SERIES OF GUIDES.....	3
<u>DISCLAIMER</u> .....	3
SCOPE .....	5
DEFINITIONS .....	6
REFERENCED MATERIALS.....	7
1. POWERS TO CONTROL ACTIVITIES WITHIN AN ELECTRICITY EASEMENT OR CLOSE TO ELECTRICITY INFRASTRUCTURE .....	8
1.1 Electricity Supply Act 1995, and associated Regulations .....	8
1.2 State Environmental Planning Policy (Infrastructure) 2007 .....	9
1.3 Land Acquisition (Just Terms Compensation) Act 1991 .....	10
1.4 WorkCover Authority of NSW Publications .....	10
2. REGISTERED EASEMENTS .....	11
2.1 Acquiring Easements.....	11
2.2 Powers to control activities on an Easement.....	11
3. ELECTRICAL INFRASTRUCTURE WITHOUT REGISTERED EASEMENTS.....	12
3.1 Electrical Infrastructure on Public Roads and Reserves.....	12
3.2 Electrical Infrastructure on other property.....	12
3.3 Electrical Infrastructure supplying a single property.....	12
4. TYPICAL ACTIVITIES IMPACTING ON ELECTRICITY EASEMENTS AND INFRASTRUCTURE .....	13
4.1 Basis of assessment of risks associated with particular activities.....	13
5. APPROVAL FOR ACTIVITIES .....	17
6. SPECIFIC RESTRICTIONS WITHIN EASEMENT AREAS .....	17
7. OVERHEAD POWER LINES.....	18
7.1 Permitted Activities.....	18
7.2 Controlled Activities.....	19
7.3 Prohibited Activities.....	24
8. UNDERGROUND CABLE EASEMENTS .....	25
8.1 Permitted Activities.....	25
8.2 Controlled Activities.....	25
8.3 Prohibited Activities.....	27
9. PADMOUNT/KIOSK DISTRIBUTION SUBSTATIONS .....	27
9.1 Permitted Activities.....	27
9.2 Controlled Activities.....	28
9.3 Prohibited Activities.....	28
10. APPLICATION GUIDE.....	29
10.1 For Existing Encroachments onto easements or close to electricity infrastructure .....	29
10.2 For Proposed Encroachments .....	30
10.3 Flow Chart of Approvals.....	30
11. MINOR MEASUREMENT ERRORS.....	32
12. PREFERRED EASEMENT WIDTHS.....	32

## SCOPE

The reissue of this document was commissioned and endorsed by the Industry Safety Steering Committee of New South Wales.

The purpose of this guide is to provide guidelines to assist Electricity Network Operators to:

- Ensure public safety.
- Protect the Electricity Network Operators' assets from damage.
- Minimise the likely impact of structures or other impediments on electricity easements and infrastructure.
- Maintain unimpeded access to electricity easements and infrastructure for the purposes of the Electricity Network Operators.
- Define the responsibilities of Developers, Property Owners and Occupiers, Consent Authorities and Proponents with respect to activities close to electricity easement and infrastructure.

Easements are primarily obtained or created in the electricity industry to ensure the safety of persons living, working or playing near electricity infrastructure. They are also created to ensure Electricity Network Operators can gain ready access to install, operate, maintain, repair, replace, upgrade and renew infrastructure.

Similarly, electricity infrastructure already constructed or installed without a formal easement is to be treated in the same manner as infrastructure that has a formal easement. Much of this infrastructure is protected by the *Electricity Supply Amendment (Protection of Electricity Works) Act 2006*.

This guide shall be read in conjunction with the provisions of the *Electricity Supply Act 1995*, the *Electricity Supply (Safety and Network Management) Regulation 2008*, the *Electricity Supply (General) Regulation 2001*, the *NSW Government Code of Practice for Electricity Transmission and Distribution Asset Management* and the *NSW Government Code of Practice Distribution Risk Management*, as well as any specific terms of the easement covenants.

The guidelines have been established after careful consideration of access and safety aspects associated with the operation and maintenance, repair, replacement, upgrade or renewal of electricity infrastructure on property, whilst being mindful of the property owner's rights to maximise use and enjoyment of the land.

Due to the varied circumstances that apply to electricity easements and infrastructure, there may be special circumstances that will require individual assessment. The particular circumstances, therefore, may call for restrictions over and above those outlined in this document.

For guidance on vegetation management, refer to ISSC3 Guideline for Managing Vegetation near Power Lines.

## DEFINITIONS

For the purpose of interpretation, the following definitions apply:

Consent Authority	Any body that has responsibility for approving an application for development in accordance with the provisions of the Environmental Planning and Assessment Act
Developer	Any person or organisation proposing to develop a parcel of land in accordance with the provisions of the Environmental Planning and Assessment Act
Easement Area	A term used in this document to refer to a formal Electricity Easement as defined in Section 2 or an area as defined in Section 3 where no formal easement exists, but the Electricity Network Operator has some control over the activities close to electrical infrastructure
Electricity Easement	Is an encumbrance on the title of land limited in width above or below the land conferring a right to construct, operate, maintain, repair, renew, replace or upgrade electrical infrastructure.
Electricity Infrastructure	Any electricity power lines, underground cables, substations or associated equipment or electricity structures that form part of a transmission or distribution system.
Electricity Network Operator	Abbreviated to NO. Ausgrid, Endeavour Energy, Essential Energy, TransGrid, RailCorp and their successors.
Induced Voltage/Current	The voltage or current on a metallic structure resulting from the electromagnetic or electrostatic effect of a nearby powerline or underground cable.
Step and Touch Voltages	Step Voltage is the voltage between two points on the earth's surface that are 1m distant from each other while a person is making contact with these points. Touch Voltage is the voltage between conductive parts when touched simultaneously.
Transferred Voltage	Voltage rise of an earthing system caused by a current to earth transferred by means of a connected conductor (for example, a metallic cable sheath, pipeline, rail) into areas with low or no voltage rise relative to reference earth resulting in a voltage difference occurring between the conductor and its surroundings. <i>NOTE: The definition also applies where a conductor, which is connected to reference earth, leads into the area of the voltage rise.</i>

## REFERENCED MATERIALS

AS/NZS 2187:2:2006	Explosives – Storage and Usage – Use of Explosives
AS/NZS 3835:1:2006	Earth Potential Rise – Protection of Telecommunications Network Users, Personnel and Plant – Code of Practice
AS/NZS 3835:2:2006	Earth Potential Rise – Protection of Telecommunications Network Users, Personnel and Plant – Application Guide
AS/NZS 4853:2000	Electrical Hazards on Metallic Pipelines
AS/NZS 7000:2010	Overhead line design - Detailed procedures
CIGRE TB95	Guide on the influence of High Voltage AC Power Systems on Metallic Pipelines
CIGRE TB290	International Council on Large Electrical Systems – Guide for AC Corrosion on Metallic Pipelines due to Influence from AC Power Lines
ENA EG-O	Electricity Networks Association EG-O – Power System Earthing Guide
HB 101-1997 (CJC5)	Coordination of Power and Telecommunications – Low Frequency Induction (LFI): Code of Practice for the Mitigation of Hazardous Voltages Induced into Telecommunications Lines
HB 101-1997 (CJC5)	Amendment 1-1998
Hazards in Pipeline Construction – Australian Pipeline Industry Association	
CJCJ – 1997	Low Frequency Induction Code

## 1. POWERS TO CONTROL ACTIVITIES WITHIN AN ELECTRICITY EASEMENT OR CLOSE TO ELECTRICITY INFRASTRUCTURE

An Electricity Network Operator (NO) manages the electrical network within the allocated location of roadways, managed, public and private lands.

Many of the powers exercised by a NO are contained within the legislative provisions mentioned in 1.1, 1.2 and 1.3 of this chapter or are detailed in the terms of registered easements.

In many locations, the NO has acquired special interests in land by obtaining a registered easement to ensure that its work force can gain access to its network assets and to safeguard members of the public, private owners and land managers by restricting activities or encroachments that may cause danger to land users or interference to the network assets.

In certain circumstances it is often in the best interests of all concerned that persons are prevented from doing anything within the proximity of network assets that may create a risk while not physically interfering with the assets.

Some activities beyond the scope of the acquired interest of the NO may impact on the continuous operation of the network assets and in these cases land managers and private owners should consult the NO.

Consideration has also been given in the preparation of this document to the recommendations of the Gibbs Inquiry into *Community Needs and Future High Voltage Transmission Line Development*, February 1991 and the *Land Acquisition (Just Terms Compensation) Act 1991*.

### 1.1 Electricity Supply Act 1995, and associated Regulations

**Section 44** enables a NO to acquire land (including an interest in land) for the purposes outlined within the Act. Land may be acquired by agreement or a compulsory process in accordance with the Land Acquisition (Just Terms Compensation) Act 1991.

**Section 45** grants an NO the right to carry out work "...connected with the erection, installation, extension, alteration, maintenance and removal of electricity works... in particular, may carry out any such work on a public road or public reserve...".

**Section 47** permits an NO to require the alteration of the position of any conduits (including pipes carrying substances, energy or signals) in a public road or other land on which no building or structure is located.

**Section 49** permits an NO to require that a structure or thing on or near its infrastructure be modified or removed, or to modify or remove it itself, if it has reason to believe that the structure could:

- destroy, damage or interfere with its infrastructure; or
- make the infrastructure become a potential cause of bush fire, or a risk to public safety.



If the NO performs the removal works itself, the cost of removal “may be recovered by the network operator in a court of competent jurisdiction as a debt owed to it by the person”. These rights exist regardless of whether or not the infrastructure is on private property, although if it is on private property, the NO may in certain circumstances have to meet the costs of the work itself.

It is important to note that section 49(8)(b) provides that the NO may have to pay for removing an interfering structure or thing from an easement, if the structure or thing does not contravene the terms of the easement.

**Section 49A** gives the NO similar rights to those in Section 49 where excavation works are being undertaken on or near its infrastructure. Part 11A of the *Electricity Supply (General) Regulation 2001* provides administrative support and details to the operation of this section.

**Section 53** of the Act provides that power lines erected on private property without an easement prior to 26 May 2006 (when this section commenced) are entitled to remain in place and be maintained and upgraded despite the absence of an easement. This protection is not available for new assets constructed on private land after 26 May 2006, so easements must be acquired prior to the installation of all such assets unless otherwise specified by the NO.

**Sections 54-63** make provision for powers of entry onto land in respect of electricity works. NOs should exercise their responsibilities with respect to the property owner's rights to maximise use and enjoyment of the land.

**Section 65** states that a person must not interfere with a NO's electricity works.

## **1.2 State Environmental Planning Policy (Infrastructure) 2007 (SEPP)**

Where the *Environmental Planning and Assessment Act 1979* makes local councils the consent authority for development applications in many instances, it requires a person proposing a development on land to prepare a development application and submit it to the Local Council for development consent.

The SEPP, which commenced on 1 January 2008, requires local councils to consult with NOs before granting development consent for proposals that might affect:

- existing electricity infrastructure; and
- easements for electricity purposes, even if no infrastructure has yet been constructed in the easement.

Local councils must give written notice to the NO of proposals for any development:

- within or immediately adjacent to an easement for electricity purposes;
- immediately adjacent to a substation;
- within 5m of an exposed overhead power line;
- involving excavation within 2m of an underground power line or a pole or within 10m of a tower;
- involving a swimming pool within 30m of a transmission tower or within 5m of an overhead line.

NOs should make sure local councils are aware of infrastructure not covered by easements. This is particularly important for underground infrastructure.

Any comments made by the NO within 21 days of receiving Council's written notification must be taken into consideration by Council before it determines the development application.

This SEPP gives NOs an additional tool to prevent inappropriate easement encroachments by ensuring that Councils are aware of the effect of new development proposals on electricity infrastructure and even on existing easement rights before infrastructure has been constructed in the easement.

Care should also be taken to assess the impact of any development on access to electricity infrastructure, whether it is subject to a formal easement for access or an informal land use agreement. The existence of an access track may not trigger the requirements for notification under the SEPP.

Sections 44 and 45 of the SEPP require a Consent Authority to provide written notice to an NO in certain circumstances.

### **1.3 Land Acquisition (Just Terms Compensation) Act 1991**

NOs are familiar with the provisions of the *Land Acquisition (Just Terms Compensation) Act 1991* (the just terms act) for acquiring land. Amongst the many requirements the just terms act provides details on the acquisition of land and the approval of the Minister is necessary before land can be acquired by compulsory process.

**Section 36** grants the NO the power to seek an order from the Land and Environment Court to prevent a person from building something or altering land compulsorily resumed by the NO, if the activity is inconsistent with the public purpose for which the land was acquired.

The just terms act effectively recognises the commercial value of the rights lost by the property owner and the rights gained by the NO. Where compensation has been paid as part of the acquisition of the easement, the NO should consider the impact of any proposed encroachment on the value of the easement.

### **1.4 WorkCover Authority of NSW Publications**

These WorkCover publications provide guidance on risk control measures when working close to electricity infrastructure both above and below ground.

- *Code of Practice – Work near Overhead Power Lines*  
This code of practice provides practical guidance on the risk control measures, competency requirements and approach distances for workers working near overhead power lines
- *Work Near Underground Assets Guideline*  
This Guideline provides practical guidance to prevent injury to people and damage to underground assets

## 2. REGISTERED EASEMENTS

The extent of land controlled by an easement is defined by the boundaries shown on the easement plan.

An electricity easement is an encumbrance on the title of land which confers the right to construct, operate, maintain, renew, repair, replace or upgrade an electricity power line, cable or infrastructure. The easement refers to a clearly defined area and enables the NO to control activities within that defined area. Easements therefore impose an obligation on affected property owners to avoid doing anything which may interfere with the rights of the NO. Conversely, NOs should try and minimise interfering with the rights of the property owner.

### 2.1 Acquiring Easements

There are basically two different means of acquiring easements. These are known as:

#### 2.1.1 Negotiation (Private Treaty)

The rights that an NO possesses in relation to a negotiated easement are set out in the recital annexed to the easement document.

#### 2.1.2 Resumption (Compulsory Acquisition)

The rights that an NO possesses in relation to a resumed easement are set out in the notification of the resumption in the Government Gazette.

For the purpose of these guidelines, resumed easements are equivalent to negotiated easements.

### 2.2 Powers to control activities on an Easement

The extent and nature of the powers granted to the NO by the easement are generally defined in the words of the easement instrument. If these rights are breached and the landowner will not remedy the breach, legal action may be taken to enforce the NO's rights.

However, the NO's power to constrain the landowner's use of the land is not unlimited, because the landowner must be able to make reasonable use of the easement consistent with the rights of the NO.

As a result, there is sometimes a point of difference between the NO's powers under the easement and its statutory powers to prevent interference with its infrastructure, and for that reason, some Acts provide supplementary or additional powers in certain circumstances.

Section 49(2) of the *Electricity Supply Act 1995* empowers a NO to require a landowner or occupier to remove any structure or thing that could destroy, damage or interfere with electricity works or make them a bushfire hazard or a risk to public safety or to remove the obstruction itself. This power exists whether or not the obstruction is consistent with the terms of an easement, although if it is permitted by the easement terms, the NO must fund the cost of removal.

Section 49(6) of the *Electricity Supply Act 1995* provides that a NO may apply for an injunction to prevent a structure or thing being placed in, on or near its electricity works.

### 3. ELECTRICAL INFRASTRUCTURE WITHOUT REGISTERED EASEMENTS

The Electricity Supply Act 1995 provides specific powers to NOs to protect electrical infrastructure installed on any property at the time of the *Electricity Supply Amendment (Protection of Electricity Works) Act 2006* whether or not an easement exists. Additional detail on the various Acts mentioned in this section is provided in section 1 above.

Where no easement exists but a landholder seeks consent to erect something near electricity infrastructure, the NO will make a decision based on an assessment of safety and bushfire risk factors. In general, the typical easement widths as outlined in AS/NZS7000 should be applied in the first instance. As an absolute minimum, the clearances recommended in applicable national and industry standards (eg. AS/NZS7000 and NENS 01) must be applied. These are also the clearances that should be taken into account when a structure or thing has been erected near electricity infrastructure and a decision needs to be made about whether it should be removed.

#### 3.1 Electrical Infrastructure on Public Roads and Reserves

Section 45 of the Electricity Supply Act grants NO's the right to carry out works in public roads and public reserves, including the placement and operation of electrical infrastructure. Other sections grant rights to control particular activities in public roads and reserves, for example:-

- Section 47 permits an NO to require the alteration of other infrastructure also in the road (pipes, conduits etc)
- Section 48 permits an NO to require the trimming or removal of trees that interfere with electrical infrastructure
- Section 49 permits an NO to require to modify or remove any structure that might damage or interfere with its infrastructure, and
- Section 49A permits an NO to require the modification or cessation of excavation works near electrical infrastructure

Rights for controlling activities close to electricity infrastructure are also provided by the State Environmental Planning Policy (Infrastructure) 2007 Reg 45. The Streets Opening Conference; an agreement between utilities and roads authorities is also relevant, in that it makes provision for the location of all infrastructure relative to the road boundary.

#### 3.2 Electrical Infrastructure on other property

Section 53 of the Electricity Supply Act operates in a similar manner to Section 45, granting NOs the right to maintain, renew, repair, replace and upgrade certain electrical infrastructure already located<sup>1</sup> on any other land without a registered easement. It also prevents a land owner requiring the electrical infrastructure to be removed from the land.

The Electricity Supply Act Section 49 specifically empowers NOs to protect equipment installed on private property whether or not an easement exists.

#### 3.3 Electrical Infrastructure supplying a single property

Dedicated High Voltage or Low Voltage supply to private property, located within that property, may not be covered by a registered easement or s53 but is to be treated under the same provisions as section 3.2 above.

<sup>1</sup> The infrastructure must have been in place at 26<sup>th</sup> May, 2006 to be covered by Section 53.

## 4. TYPICAL ACTIVITIES IMPACTING ON ELECTRICITY EASEMENTS AND INFRASTRUCTURE

From the NO's viewpoint, it is essential that:

- buildings, structures or other objects not be placed; and
- that no activities be undertaken

within an easement area or close to electrical infrastructure if doing so may affect the safe and continuous operation of the electricity infrastructure or prevent its maintenance, repair, renewal, replacement or upgrade.

From both the NO's and the property owner's viewpoints, it is essential that persons be prevented from carrying out an activity within the easement area or close to electrical infrastructure which may create a public safety risk. Such risks could possibly arise from induction, step or touch voltages under fault conditions, infringement of safety clearances to conductors and the failure of line materials or structures, uncovering an underground cable or interference with the earthing systems of the electrical works, such as power line structures and distribution substations.

The NO should also ensure that future augmentation or reconstruction of electricity infrastructure are not jeopardised by encroachments within the easement area.

The most important questions to be considered in the examination of a request for an encroachment within an easement area are the following:

- Will it affect the safe operation of the line, cable or other asset?
- Will it restrict access, particularly to overhead line structures, underground cable joint bays or surface installations?
- Will it comply with the requirements of the Code of Practice for Electricity Transmission and Distribution Asset Management or other relevant safety criteria, with respect to clearances including those which occur under "blow out" conditions?
- Will the encroachment create safety issues due to bushfire, electrostatic induction, electromagnetic induction or an earth fault?
- Will it affect any *anticipated* future works, including maintenance, repair, replacement, upgrading or renewal?

**NOs should consider future requirements with respect to land use pressures. Such possibilities as replacement, upgrading and/or renewal should therefore be carefully examined.**

### 4.1 Basis of assessment of risks associated with particular activities

The following section provides information on the likely risks associated with the presence of certain structures or activities close to electricity infrastructure, including future infrastructure on existing but unoccupied easements.

It may be that any construction phase, rather than the completed activity, encroaches on the easement. In this case, even if the final product is ok, it may not be permitted.

#### 4.1.1 Swimming Pools

The principal risks associated with swimming pools are exposure to step and touch voltages for people entering or leaving a pool (or in its immediate vicinity), electrocution for swimmers while immersed during a nearby earth fault, or a dropped conductor. Test programs have generally indicated that such voltages drop off rapidly with distance from the support structures.

ENA EG-0 Power System Earthing Guide provides guidance on acceptable levels of exposure voltage criteria applicable around the edge of the pool.

Above ground pools generally pose a considerably higher level of risk than inground pools, despite the plastic membranes normally used to hold the water. Hazards arise from the use of movable accessories such as A frame ladders which provide a path into the water, and the fact that they are frequently located on grass or soil, so that swimmers are in solid contact with earth on entering or leaving the pool. The fact that pool accessories are far more easily added or removed makes ongoing management of the risk considerably more difficult than with in-ground pools.

#### 4.1.2 Substantial Structures

Substantial structures commonly include houses, factories and tanks. Other substantial structures include earthworks, retaining walls, pipelines, telecommunication cables and pits, underground storm water retention tanks and underground car parks.

The chief potential risks associated with large structures within easements are restricted access, step and touch voltages and falling conductors.

**Access** - Access in this context means access by heavy plant for major works at a support structure. Access for minor maintenance and inspections can generally be achieved on foot. Access alone may not be sufficient justification to remove sheds or fences. Provided alternative means of access is available, it may be difficult to justify removal of major structures for access reasons alone.

Underground structures are a less common case, and require consideration of access in terms of construction period and future development of the network. Buried structures located close to supports pose construction stability risks (foundations), and potential erosion if they impact on subsurface water flows. Towards the middle of the span, they risk reducing the ability to install mid span structures required by later upratings or additional infrastructure.

**Step and Touch voltages** - Hazardous step and touch voltages associated with buildings are not common. However, risks can arise where metallic structures (including fences) can transfer voltages relatively long distances from the starting point, especially if they are located close to support structures. This would include, for example, fences, pipelines sharing or close to power easements, and copper based telecommunications networks (including rail communications).

Capacitive coupling is only relevant to above ground structures. Inductive coupling is common to both above and below ground structures. Earth fault currents can find a return path via metallic fences or pipelines located nearby the earth installation on support structures, causing voltages to appear considerable distances from the source.

Management of risks to people due to interactions between the power network and pipelines are covered in AS/NZ 4853:2000. CIGRE TB95 provides guidance on 'electromagnetic compatibility with telecommunication infrastructure, LV networks and metal structures'. Hazards arising from induced voltages on long metallic structures can include the following:

- transferred voltages creating shock hazards, potentially long distances from the point of failure;
- damage to pipeline coatings;
- damage to the metal pipe during faults;
- damage to flanges which may act to insulate one section of pipe from the next;
- damage to terminal equipment, especially in the case of telecommunications networks.

Power lines can also induce ac corrosion of pipelines – see CIGRE TB290.

The Australian Pipeline Industry Association has also published a document *Guidelines for Management of Electrical Hazards in Pipeline Constructing*, to assist pipeline engineers in understanding the potential hazards that can exist. Copies may be downloaded from its website.

Separation between telecommunications copper based installations and power lines (in easements or public roads) and interference matters are dealt with in AS/NZS 3835 and the Low Frequency Induction code CJC5 – 1997.

**Access roads to subdivided blocks of land** - While the road itself does not pose an unusual risk, the services run to the houses (eg water pipes, LV power and telecommunications cables) have the potential to cause safety issues. Also, the owner may install LV lighting fed from the house that could transfer a remote earth voltage close to a tower.

**Counterpoise Earthing** - Many structure earths are run a considerable distance from the structure, typically in a 'crows foot' configuration. These conductors may not be shown on a plan but will transfer high voltages during fault conditions. As earths often extend to the edges of easements, they can pass quite close to dwellings or pools. Such locations require careful management to avoid hazardous situations. Management requirements should be judged on an individual basis.

**Dropped conductor** - The most likely cause of a dropped conductor is failure of a component, typically insulators, terminations, mid span joints, crossarms or conductors. Risk studies have indicated that the probability of dropped conductors is very low, and options are available to minimise the main source of dropped conductors - lightning damaged insulators. Assuming appropriate maintenance programmes are implemented, this risk is considered acceptable.

### 4.1.3 Metallic Fences

Where metallic fences are located close to support structures, and extend away from the structure, they may introduce high transfer voltages to remote locations. Long metallic fences can also create additional touch voltages near pools or other conductive structures due to the introduction of remote earths into the area affected by voltage rise from earth faults. Long metallic fences are also prone to induced voltages and currents, see 4.1.2.

Metal fences cannot normally be identified from an aerial survey, and fences do not normally require local council approvals. Where a genuine hazard exists, it is possible to earth the fence or install one or more insulated sections at least 3 metres long to prevent dangerous voltage gradients.

### 4.1.4 Garages or large sheds

The main issues created by garages and sheds are:

- restricting access to the line;
- exposure of occupants to dangerous step and touch voltages;
- dropped conductors; or
- transferred voltages to adjacent residences, through any LV supply connected.

Most of these issues have been dealt with above. The additional issue is preventing recreational use of the garage (ie granny flats, study, games rooms), which would encourage people to spend long periods of time there. If LV supply is connected, the transfer hazard usually results from the difference between the soil voltage rising and the LV MEN voltage impressing a remote earth voltage on metallic frames, electrical equipment and water taps. Alternatively there is a risk of transferred voltages migrating beyond the building and into the house due to the MEN being less effective in such a situation. Depending on site specific conditions (proximity to a support structure, offset from OH wires etc), it may be possible to install lights or power points in a garage where the supply is isolated from the house supply using an isolating transformer.

### 4.1.5 Carports and metallic sheds

These will generally be acceptable, provided they are effectively earthed (normally the metal supports sunk into the ground will be adequate) and no power is connected. Height should also be limited.

Small sheds, aviaries and the like are very difficult to control, as they are easily relocated without the NO's knowledge. Their small size also tends to reduce any risks. Owners and/or occupiers should be advised to keep them as far as possible from towers/poles, and away from the line of the mains. The risk is considered small, as they are normally used for storage only, and people would not normally spend much time in them. The general risks are no greater than those associated with clothes lines and other minor structures which may be erected anywhere. Again, no power, telecommunications or pipework should be connected.

### 4.1.6 Non-conducting structures

Non-conducting structures, including fibro sheds, and the like are also common. These will normally pose no serious hazard, and will generally be allowed to remain with no further conditions, although the owner and/or occupiers will be advised of any potential hazards associated with their proximity to the lines.



Owners and/or occupiers should be made aware of conductive components that may be within fibro sheds, such as reinforced concrete slabs and steel frames. The size of the shed should be considered, in that a larger shed may create a greater hazard.

#### **4.1.7 Clearances**

Clearance distances relate to typical situations, and are provided to simplify the process of responding to enquiries. However, the appropriate values should be reconsidered where conditions vary from the normal. For example, the basis for the 5 metre clearance from conductors is blow-out for a typical span and conductor type. For very long spans or larger conductors, a greater distance may be required. Lines spanning depressed land or gullies and valleys may permit vertical height restrictions to be relaxed. Clearances to electricity infrastructure support structures should never be reduced, due to difficulties with subsequent earth voltage rises close to structures, and the need for vehicle and plant access for a variety of functions.

#### **4.1.8 Impacts on Underground Cables**

Changes in ground levels, installation of underground services, addition of above ground structures can all impact on cable ratings and access to cables. Increased ground levels, that is, additional material over the cable, will change the designed allowance for heat dissipation from the cable, reducing its rating or creating a localised hot spot that could lead to cable failure. Reduced ground level can leave the cable without enough mechanical protection from activities on the ground surface. Structures (above or below ground) built over the cable route, could impede access for repairs, and may be required to be removed. Similar issues can arise for earth voltage rise in the vicinity of cable joint bays where the cable outer sheath is earthed.

### **5. APPROVAL FOR ACTIVITIES/ENCROACHMENTS**

In order to ensure consistency of policy application in the approval of activities affecting easements and infrastructure, all approvals should be notified in writing by appropriately authorised and trained NO officers.

Prior to approval, it is strongly recommended that a site inspection be carried out.

Any approval should be subject to the encroachment(s) being removed or relocated at the owner's cost if later required by the NO. This may be difficult to negotiate for substantial structures such as inground swimming pools. This requirement is necessary, however, to avoid the need for ex-gratia payments or other assistance in the future should the encroachments need to be removed and serves to confirm the awareness of the land owner to the terms of the approval. In exceptional circumstances, an NO grant a permanent approval.

### **6. SPECIFIC RESTRICTIONS WITHIN EASEMENT AREAS**

Enquiries are frequently made with regard to the restrictions which apply to activities within easement areas and close to electricity infrastructure. The activities listed below have been categorised as being either "permitted", "controlled", or "prohibited" as applicable. The list is not exhaustive and the omission of a particular activity does not relieve those concerned from seeking advice from the NO where there is any doubt as to whether the NO's rights are likely to be infringed.

Any approval or agreement for an encroachment and any associated conditions of that approval are not binding on subsequent land owners unless they are included in the easement recital. Inclusion in the easement recital is at the land owner's expense.

## 7. OVERHEAD POWER LINES

Reference is made below to specific distances, eg keeping 5 metres from the vertical projection of the nearest conductor. Guidance on adjustment of these clearances can be found in 4.1.7.

### 7.1 Permitted Activities

The activities listed below would normally be permitted within electricity easements and close to electricity infrastructure provided that they do not interfere with the maintenance, repair, replacement, renewal, upgrade or safe operation of the line. In this regard, a clear access track at least 5m wide must be available to all poles or structures at all times and no obstruction is to be placed within a square the size of the easement around any line support structure to allow for a safe work space. Access is required for large trucks to the structures, so any bends require wide access for trucks to turn – 20m bend radius is required.

**Written approval would not normally be required for permitted activities.**

***NOTE: Consultation in some cases will be necessary to ensure all conditions are met such as minimum safety clearances from conductors at maximum sag being observed as per AS/NZS 7000:2010, and blow out and earthing requirements are assessed.***

#### 7.1.1 Cropping and grazing

Care should be taken when ploughing or operating other mobile machinery in the vicinity of conductors, structures and/or supporting guys. Earthing systems are particularly prone to damage from such activities. The restrictions applying to the heights of mobile plant and equipment should be required to be observed (see 7.1.5).

Other agricultural pursuits such as stockyards, orchards, vineyards, or crops requiring irrigation, aerial application (crop dusting), crop firing etc, are referred to the 'Controlled Activities' section below.

#### 7.1.2 Domestic activities

This can include the erection of minor structures such as clothes hoists, playground equipment, non-metallic fences (truck sized gates may be necessary for access to structures), brick barbecues and the like. These shall be subject to a height limitation of:

- 4.6 metres if not climbable; or
- 2.5 metres if climbable

Most taller structures will require equipment that may require approval to use within the easement.

Any metallic parts shall be earthed. The NO should reserve the right to remove the structure if and when required.

### **7.1.3 Gardening Activities**

These activities involving trees, shrubs or plants which grow to a height not exceeding 3.0 metres (see Section 7.2.4 for trees that grow higher than 3.0 metres). Note: Any climbable portion of the vegetation shall not be higher than 2.5m.

### **7.1.4 Parking of vehicles**

Subject to adequate precautions being taken to protect structures or supports from accidental damage and a 4.6 metre height limitation on the vehicles to be parked. Caravans and the like may be parked but not occupied. Caravans may not be connected to power, water or telephone.

Vehicles which a person may climb to the top of the vehicle should not be permitted.

### **7.1.5 Mobile plant and equipment operation**

The operation of mobile plant and equipment having a height not exceeding 4.6 metres when fully extended including any load carried. The Workcover Code of Practice *Work near Overhead Powerlines* provides requirements for clearances to be maintained to overhead power lines during operation of plant and equipment.

### **7.1.5 Non-flammable or non-combustible material storage**

This is subject to a height limitation of:

- 4.6 metres if not climbable; or
- 2.5 metres if climbable

The process of moving storage materials into an easement may require the use of unapproval equipment. Consideration should be given to this.

**7.1.7 The erection of non-climbable flagpoles, weather vanes, signs and the like:** Subject to a height limitation during operation and maintenance of 4.6 metres and the earthing of metallic parts.

### **7.1.8 Public open space areas.**

Where these areas are likely to encourage the flying of kites or model aircraft, signage to prevent this activity shall be installed.

## **7.2 Controlled Activities**

The activities listed below are not permitted within electricity easements and close to electricity infrastructure except where appropriate controls are designed and implemented to mitigate any safety risks. The application for a controlled activity must be made in writing to the NO to assess the activity within the easement. The proposed activity must not commence unless approval is received in writing from the NO.

In addition, any approved substantial structure must be set out by a Registered Surveyor, and on completion of the work, an Identification Survey must be carried out and a copy of the survey plan forwarded to the NO. This requirement must be specifically referenced in the approval.

In particular cases, where the conductor height above ground is substantially greater than the normal design minimum, eg in a gully span, approval may be given for height restrictions to be relaxed. This would normally only be done following detailed investigation of the situation.

The NO should also confirm by site inspection that there is not a suitable alternative site within the property where the proposal could be accommodated. The NO should work with the land owner to accommodate any activities.

### **7.2.1 Burning off or the lighting of fires**

Controlled burns under the authority of the Rural Fire Service and the Rural Fire Services Act are allowed subject to prior consultation with the NO. The NO may require staff to monitor the burn-off in some cases.

Lighting of fires relating to stubble burn off and sugarcane cultivations is subject to individual negotiation with the NO.

### **7.2.2 Operation of mobile plant/equipment**

Such equipment with a fully extended height greater than 4.6 metres including any load and/or person carried. The NO must be consulted to provide safe work requirements and locations.

### **7.2.3 The erection of metallic fencing**

The NO requires that safety controls such as breaks in the fence electrical continuity and earthing be in place to prevent induction and transferred voltage hazards. Access requirements to infrastructure will generally require that gates and locks be installed in suitable locations. Any fence must have a height limitation that does not allow any part of a person to be greater than 4.6m above the ground.

Special provisions such as isolation transformers and limitation of length of wiring run parallel to electricity infrastructure are to be made for the installation of electric fencing, particularly in relation to controlling induction and transferred voltage hazards, as the wires of the fence cannot be earthed.

### **7.2.4 The installation of utility services**

Low voltage electricity (less than 1000 volts), telecommunications water, sewerage, whether overhead, underground or on the surface: NO approval will only be given subject to:

- there being no practicable alternative;
- standard clearances are maintained to the overhead conductors and their supporting structures;
- any services within 15 metres of the supporting structures are of non conducting material; and
- hazards associated with induced voltages and transferred earth voltages are controlled.

Approval of the installation of high voltage electricity is subject to there being no practicable alternative location and provided that standard clearances are maintained to the overhead conductors and their supporting structures.

### **7.2.5 Agricultural Pursuits other than Cropping and Grazing**

The NO will only approve Agricultural Pursuits such as aerial application (crop dusting), harvesting, overhead irrigation, netting, orchards, vineyards, stockyards, plantations, grain bins, use of tipper trucks or grain augers and the like subject to the following conditions:

- Aerial application (crop dusting) may require the proponent to request the NO to mark electricity infrastructure as per appropriate Australian Standards
- Equipment shall have a height limitation of 4.6m
- Irrigation equipment shall not project a solid jet of water to within 3m of any overhead conductor
- Care shall be taken when moving equipment around such as long irrigation pipes or equipment, grain augers and the like.
- Access to structures is to be maintained at all times. This may require the NO to access across crops or the like if access is not maintained, possibly damaging this area of the crop.
- Any vegetation planted shall have a maximum mature height of 4m
- Dams are covered under the provisions in 7.2.13

### **7.2.6 Non-habitable type outbuildings such as detached garages, sheds, stables, carports and unroofed verandahs**

The NO will only approve these structures if there is no practicable alternative site. Safety issues are described in section 4.1 above.

Where there is no practicable alternative site, consideration and approval will be subject to:

- access not being hindered for large heavy plant and the encroachment not being located within 5 metres of a pole or supporting guy or 10 metres of a steel structure;
- the encroachment not being closer than 5 metres to the vertical projection of the nearest conductor;
- the encroachment is of a construction type which would permit relocation;
- metallic parts being locally earthed, using 50mm<sup>2</sup> copper earth conductor and 1.6m copper clad earth stake;
- electric power not being connected to the encroachment unless the circumstances have been given specific attention by the NO;
- the encroachment is not easily convertible to living quarters; and
- the encroachment is less than 2.5m in height

In particular cases, where the conductor height above ground is substantially greater than the normal design minimum, approval may be given for the height restriction to be relaxed. This would normally only be done following a detailed investigation of the situation.

### **7.2.7 Sporting and public recreational facilities**

Any climbable structures must not allow any part of a person to be higher than 4.6m from the ground. The orientation of any playing fields shall avoid overhead conductors. Approval will not be given for the construction of high flood-lighting or grandstands. Facilities associated with the use of fire-arms are discouraged but may be permitted under exceptional circumstances.

### **7.2.8 Tennis courts:**

Where no alternative space clear of the easement area is available, consideration may be given provided the following conditions are met:

- Safety clearances are maintained;
- Fence is non-conductive or suitably earthed on all corners;
- Fence height is 4.3 metres or less depending on clearances;
- Lighting is limited to a maximum height 4.3 metres and supplied via underground wiring. If within 15 metres of a tower or pole, it may be necessary to provide supply via an isolating transformer;
- Access to the NO's assets is not hindered. This may involve gates and court construction able to withstand large, heavy plant up to a 30 tonne truck; and
- Is not within 5 metres from a power pole or 10 metres from a steel structure.

In particular cases, where the conductor height above ground is substantially greater than the normal design minimum, approval may be given for the 4.3 metre height restriction on fences and lights to be relaxed. This would normally only be done following a detailed investigation of the situation.

### **7.2.9 Subdivisions for domestic or industrial purposes**

Approval shall be subject to the following requirements being met:

- standard clearances and access being maintained;
- access maintained to all line structures;
- line structures being suitably protected against motor vehicle impact;
- the lay-out of the sub-division not being such as to give rise to numerous utility crossings or later requests for encroachments due to insufficient space being left between the building alignment and the easement; and
- where a proposed road passes within 30 metres of a line structure or supporting guy the structure earthing system may require modification at the developer's expense in order to prevent fault currents from entering utility services which may be buried in the road.

Where registered easements do not exist for electricity infrastructure, NOs should be pro-active in the establishment of easements and include these requirements in dealings with Local Councils regarding the approvals for the subdivision.

### **7.2.10 Roads**

New roads shall only be approved subject to the following conditions:

- standard design clearances are maintained or conductor heights can be adjusted at the proponent's expense;
- line structures are adequately protected against motor vehicle impact; and
- roads and driveways required for access to electrical infrastructure must be capable of carrying a 30 tonne truck

### 7.2.11 Swimming pools

Above ground pools are not permitted. Where no alternative space clear of the easement area is available, in ground pools may be approved provided that:

- the pool shall not hinder access to the line structures;
- the pool is no closer than 5 metres from the vertical projection of the nearest outside phase conductor;
- the pool is not within a square area with sides equal to the easement width and centred on a supporting structure. Where system fault level is above 20kA, where the proposed pool is closer than 30 metres from the nearest supporting structure, earth injection tests shall be carried out to determine controls to mitigate risks identified;
- the pool should be of reinforced concrete construction, with reinforcing bonded together to form an effective electromagnetic shield around the water. The installation of fibreglass pools will require detailed electrical engineering analysis and site investigations;
- the pool must be surrounded by pavers on a sand bed for at least 3 metres from the water's edge, and no taps, electrical wiring, phone lines or other conductive objects to be installed in the paved area. If the pool is less than 3 metres from the property boundary, paving must extend to the boundary, and a fence at least 1.5 metres high must be erected along this section of the boundary fence. The fence must be non-conducting or bonded to the pool reinforcing, with an insulating section as described below;
- metallic fences surrounding the pool are to be bonded to the pool reinforcing at all corners, and not to extend away from the pool, unless an insulating section is installed, at least 5m wide;
- any taps or other metallic objects within 2m of the edge of the paved area must have an insulated section installed;
- wiring to the pool pump, etc. must be via an isolating transformer, with no MEN connections to any wiring in the vicinity of the pool; and
- no underwater lighting in the pool unless it is fibre optic construction, and the light source power supply is located outside the easement.

Clause 7.2.3 must also be followed when installing pool fencing.

### 7.2.12 Quarrying activities, earthworks, retaining walls, substantial excavations, dam construction, stockpiling or change of ground contours

Approval shall only be given subject to:

- the maintenance of standard ground clearances, or conductor heights can be adjusted at the proponent's expense;
- access maintained to all line structures;
- the subsoil stability and surface drainage in the vicinity of structures is not adversely affected and ; and
- excessive quantities of dust are not generated.

### **7.2.13 Climbable structures such as advertising signs, hoardings or highway type signs**

The NO will only approve these structures if safe clearances for the structure and any person climbing it can be maintained for construction, access and maintenance of the climbable structure.

### **7.2.14 Use of explosives**

Approval shall only be given subject to:

- satisfactory safety procedures are observed and the safe operation of the line is not jeopardised;
- blasting procedures being in accordance with the NO; and
- specific approval shall be required in each instance and arrangements made for appropriate NO supervision and monitoring.

### **7.2.15 Storage and/or Handling of Metallic pipes etc of lengths greater than 3 metres**

Approval shall only be given provided that the NO is satisfied that adequate warning signs and procedures are in place.

## **7.3 Prohibited Activities**

The activities listed below are prohibited within electricity easements and close to electricity infrastructure. Approval to engage in such activities will not be granted other than in the most exceptional circumstances when assessed in accordance with Section 10.

**7.3.1 The construction of houses, buildings, substantial structures**, or parts thereof including eaves. (Where difficulty is experienced in locating a residence between the building alignment and the easement or for an extension to a residence between the existing building and the easement, consideration may be given to permitting the eaves to encroach onto the easement area to a maximum distance of 600mm).

**7.3.2** The installation of **fixed plant or equipment** other than that permitted under Clause 7.1 and 7.2.

**7.3.3** The storage of materials, **refuse, flammable materials** or explosives.

**7.3.4** The planting or cultivation of **trees or shrubs** other than those allowed under Clauses 7.1 or 7.2

**7.3.5** The placing of **obstructions** of any type within 5 metres of any part of a line pole or supporting guy or 10 metres of a steel structure.

**7.3.6 Swimming pools, whether above or in-ground**, other than that permitted under 7.2.

Where an existing encroachment contravenes the requirements of this section, arrangements should generally be made for its removal.



## 8. UNDERGROUND CABLE EASEMENTS

Prior to carrying out any excavation work within cable easements and close to cable infrastructure, a Dial before You Dig enquiry shall be carried out in accordance with the requirements of the *Electricity Supply Act 1995* and associated Regulations. In particular, Part 11A (Infrastructure Protection) of the *Electricity Supply (General) Regulation 2001* provides further information on the requirements for excavation.

### 8.1 Permitted Activities

The activities listed below are permitted within cable easements and close to cable infrastructure provided that they do not interfere with the maintenance, repair, replacement, upgrade, renewal or safe operation of the cable. It is not generally necessary for written approval to be given for such activities.

#### 8.1.1 Domestic recreation activities.

**8.1.2** The storage of **non-flammable materials** provided they can be moved at short notice.

**8.1.3** The planting of small **shrubs and tilling of the soil** to a maximum depth of 250mm, except within 2 metres of joint bays, surface installations, cable marker plates and posts, and ground type/padmound substations (see also 8.3). Vegetation must not restrict access to assets, including those underground. It should not be of a type that may spread across a site or present a fire hazard.

### 8.2 Controlled Activities

The activities listed below are not permitted within cable easements and close to cable infrastructure without written approval.

Each case should be assessed on its merits in accordance with the guidelines indicated below and subject to the general provisions concerning installation, maintenance, repair, replacement, upgrade, renewal and safe operation as detailed for Permitted Activities.

#### 8.2.1 Parking of vehicles and the operation of mobile plant and equipment

Approval shall only be given where the applicant demonstrates that an adequate surface exists which is capable of supporting the vehicles likely to be parked, without risk of crushing of the cable/ducts or erosion of ground.

#### 8.2.2 Excavation

Approval will only be given for excavation close to cable infrastructure where such works are planned and undertaken:

- in accordance with relevant parts of the *Electricity Supply Act 1995* and *Electricity Supply (General) Regulation 2001*; and
- in compliance with the WorkCover Code of Practice for Excavation and the Work Near Underground Assets Guideline; and
- in compliance with any specific requirements of the NO for the excavation works.

### **8.2.3 Use of explosives**

Each instance requires specific approval. Approval will only be given if:

- satisfactory safety procedures are observed and the safe operation of the line is not jeopardised;
- blasting procedures being in accordance with NO requirements; and
- arrangements are made for appropriate NO supervision and monitoring.

### **8.2.4 Reducing Ground Cover**

Approval will only be given when additional and adequate mechanical protection can be provided or where the existing cover is in excess of the NO's design requirements.

### **8.2.5 Filling or Stockpiling**

The placing of additional fill on top of the surface is discouraged and will only be given subject to:

- the NO confirming that cable rating reduction due to the increased depth of burial is acceptable, and
- Reasonable access to the cable infrastructure is maintained.

### **8.2.6 Concrete Driveways**

Approval will only be given subject to the following conditions:

- cables are in existing continuous ducts or it is practical to place split ducts over the cables, and
- the thermal rating of the cable is not compromised, and
- the driveway is capable of supporting the heaviest vehicle likely to traverse the driveway.

No approval is possible where the driveway is proposed to be located with an impact on existing cable joints, pits, pillars and the like.

### **8.2.7 The installation of metal pipes, metal fences, underground or overhead cables**

Installation of such items close to cable infrastructure has the potential to create hazards including transferred voltages, induced currents and corrosion to the items. The items could also cause damage to the cable infrastructure during installation or maintenance. Approval will only be given subject to investigation by the NO confirming that the risks applicable to the particular application are adequately addressed by the proposal. Information on the various risks are provided in section 4.1.

### **8.2.8 The erection of structures spanning the cable infrastructure**

The erection of such structures is discouraged due to the restrictions imposed on access to the cable installation and possible impact on the cable rating. No approval is possible where the structure is proposed to be located with an impact on existing cable joints, pits and the like.

Where no other location for the structure is possible, approval of the structure over the cables will only be given subject to the following conditions:

- the cables are ducted and if necessary, encased in concrete, with sufficient spare ducts to meet the NO's future requirements;
- access to the remainder of the easement is maintained for at least a "bob-cat" type excavator;
- there is no risk of crushing of the cable/ducts; and
- the thermal rating of the cable is not compromised.

### **8.3 Prohibited Activities**

The activities listed below are normally prohibited within cable easements and close to cable infrastructure. Approval to engage in such activities should not be granted other than in the most exceptional circumstances which will be assessed in accordance with Section 10.

#### **8.3.1 Swimming Pools**

#### **8.3.2 The storage of materials, refuse, flammable materials or explosives.**

#### **8.3.3 The planting or cultivation of trees or shrubs with root systems likely to grow greater than 250mm below ground level.**

#### **8.3.4 The construction of houses, buildings or substantial structures other than those permitted under Clause 7.2.3**

#### **8.3.5 The installation of fixed plant or equipment.**

**Existing encroachments, without approval, that do not comply with these requirements should generally be removed.**

## **9. PADMOUNT/KIOSK DISTRIBUTION SUBSTATIONS**

Distribution substation sites, whether on public or private property, generally occupy the minimum area necessary for access to doors, adequate room to operate HV or LV apparatus, and for the provision of a buried earth grid. This means little scope exists for encroachments within these sites. Reference should also be made to relevant building codes and/or NO's standards for segregation with relation to fire risk mitigation.

Prior to carrying out any excavation work within padmount easements and close to padmount infrastructure, a Dial before You Dig enquiry shall be carried out in accordance with the requirements of the *Electricity Supply Act 1995* and associated Regulations. In particular, Part 11A (Infrastructure Protection) of the *Electricity Supply (General) Regulation 2001* provides further information on the requirements for excavation.

### **9.1 Permitted Activities**

Written approval would not normally be required for such activities.

#### **9.1.1 The landscaping or planting of small shrubs and tilling of the soil to a maximum depth of 250mm. Shrubbery must not restrict access to substation doors or be planted closer than 1m to the cabinet. Vegetation must not include species that would spread over the site and/or present a fire or access hazard.**

## 9.2 Controlled Activities

**9.2.1 The erection of metal fencing or bollards** on the boundary of the substation site should only be permitted where:

- the fence is segregated by an insulating panel to prevent transfer of earth voltage rise under fault conditions;
- that portion of the fence or any bollards adjacent to the substation is earthed to the NO's standard;
- any bollards or fence posts are clear of cable routes; and
- access is maintained at all times.

Any excavation work shall follow the same requirements as underground cables as described in 8.2.3.

### 9.2.2 Swimming Pools

Swimming pools proposed in a location near a distribution substation requires site specific study and risk assessment for earthing and the effects of earth faults.

### 9.2.3 Car parking facilities

Provision shall be made for crash and impact protection from vehicles while maintaining access for the NO's activities.

## 9.3 Prohibited Activities

The activities listed below are normally prohibited within padmount easements and close to padmount infrastructure. Approval to engage in such activities should not be granted other than in the most exceptional circumstances which will be assessed in accordance with Section 10.

**9.3.1 Any construction** within the substation site.

**9.3.2 Any mechanical excavation** deeper than 150mm or **any rise in ground level** above the concrete base of the substation.

## 10. APPLICATION GUIDE

This section provides a framework for NOs to consider existing encroachments or applications for permitted, controlled and prohibited activities within easements and in close proximity to electricity infrastructure. The approval or refusal is to be properly documented including any risk assessment prepared in the determination process.

### 10.1 For Existing Encroachments onto easements or close to electricity infrastructure

Should an unapproved encroachment or activity come to the NO's attention the approach should be:

- Step 1** Determine if it satisfies the requirements of either a Permitted or Controlled activity as outlined in this Guide. If it is Permitted, no further action is required, and the encroachment or activity can remain. If it is a Controlled activity, determine whether the encroachment should be approved, and issue any applicable conditions.
- Step 2** If the encroachment is defined as a Prohibited Activity, The encroachment should be modified, removed or relocated – to the extent permissible under the *Electricity Supply Act 1995* – or the electricity infrastructure modified/relocated at the appropriate party's expense, depending on the nature of evidence as to whether or not approval had been granted.
- Step 3** Notwithstanding Step 2, the NO may give consideration to **exceptional** circumstances and permit an existing Prohibited Activity providing a risk assessment has been completed addressing the concerns of section 4.

The approval shall include any particular remedial works and controls to mitigate the risks associated with the exceptional circumstances. The land owner shall be notified that the conditions of approval relate only to the present owner unless they are added to the easement recital.

## 10.2 For Proposed Encroachments

**Step 1** Provide the proponent with the NO's Easement Brochure.

**Step 2** Upon a further and more detailed submission relating to a controlled or prohibited encroachment or activity, a design review or field visit should assess compliance with the provisions of this Guide.

Depending on the results of the investigation, and subject to there being no viable alternative site away from the easement or electricity infrastructure, the enquirer may be offered the following choices:

- a) If the proposed encroachment or activity complies with the provisions of this Guide for controlled activities, conditions shall be prepared to allow approval to be given;
- b) If the proposed encroachment or activity is a prohibited activity, a notice of non-approval shall be issued to the proponent

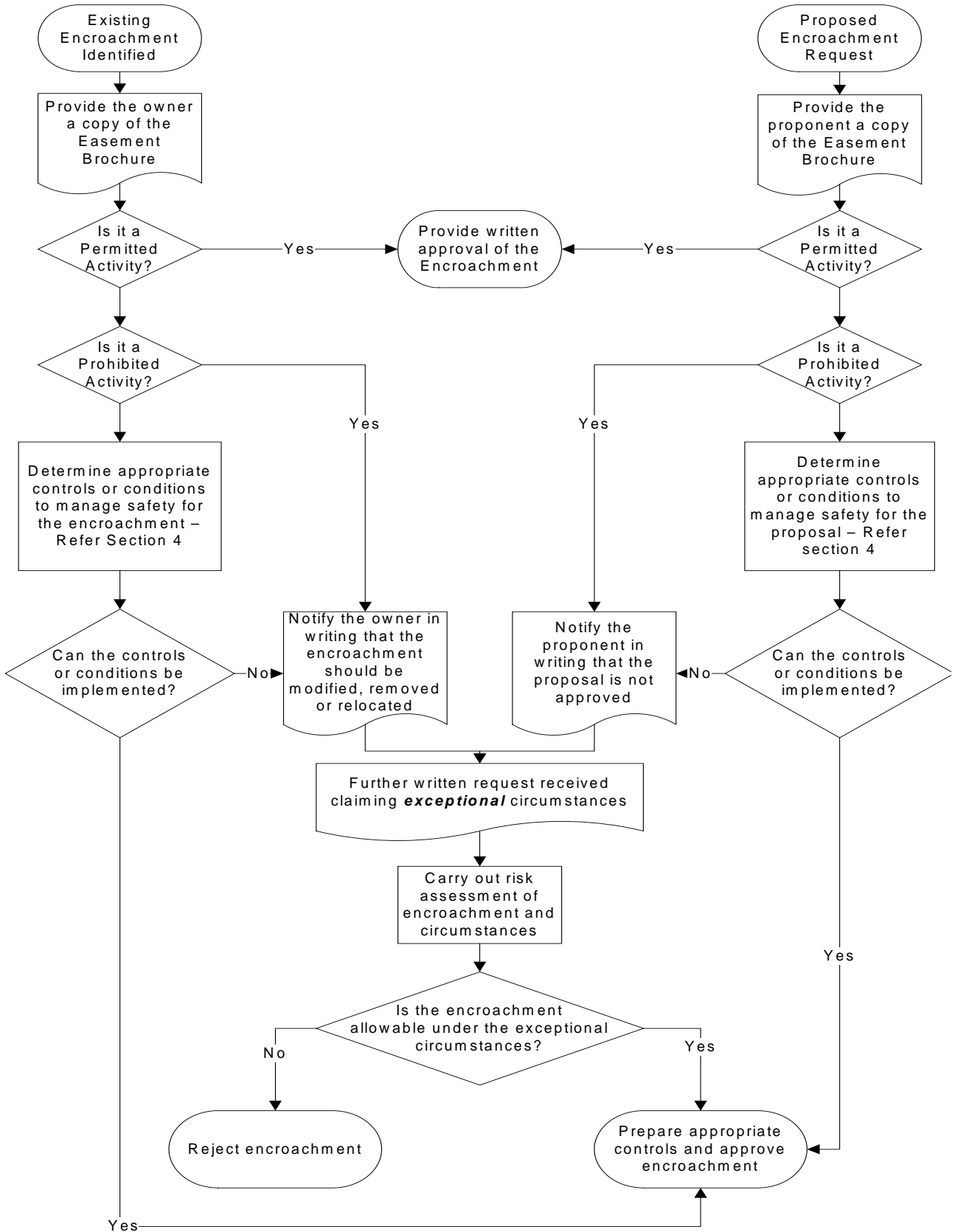
**Step 3** Notwithstanding Step 2, the NO may give consideration to **exceptional** circumstances and permit a proposed Prohibited Activity providing a risk assessment has been completed addressing the concerns of section 4.

The approval shall include any particular controls to mitigate the risks associated with the exceptional circumstances. The land owner shall be notified that the conditions of approval relate only to the present owner unless they are added to the easement recital.

### 10.3 Flow Chart

The following flow chart shows the normal sequence of events associated with these procedures.

#### ENCROACHMENT APPROVAL OR REJECTION



## **11. MINOR MEASUREMENT ERRORS**

Where minor measurement errors are identified relating to an encroachment or activity, a risk assessment of safety implications is required to determine the need for any further action or controls.

## **12. PREFERRED EASEMENT WIDTHS**

The width of an easement acquired by a NO depends on many factors. The major factors are voltage level, span lengths, the type of line construction, the size of conductor and stringing tension, land use, land value, terrain, weather potential, accessibility to the line and, the anticipated future use of the line easement.

Easement widths for electricity infrastructure are the prerogative of the individual NO, and will typically be in accordance with AS/NZS 7000:2010.