

NP021

Easement Guidelines

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2. Scope

This procedure provides guidelines covering the management of electricity easements. It is applicable to all electricity easements covering Power and Water underground and overhead power lines.

3. Definitions

Controlled Activities are activities and developments that are acceptable provided the conditions of use are agreed in writing by Power and Water beforehand.

Easement is an encumbrance on private land that gives Power and Water the right to use and have access to the land for the purpose for which the easement is granted. It is noted on both the Title and the Survey Plan, which shows the exact dimensions of the easement.

Permitted Activities are activities and developments that may be carried out within overhead line easements without risk to personal safety or line integrity.

Prohibited Activities are activities or developments within an easement that cannot be tolerated under any circumstances or at any time. If such activities or developments do occur, Power and Water will require that they be discontinued or removed as appropriate.

4. Introduction

4.1 Purpose of an Easement

Wherever Power and Water assets such as overhead power lines or underground cables cross private land it is necessary for Power and Water to have an assured right of access to construct, inspect and maintain the asset. Easements are established to safeguard these needs. Rules for the use of an easement by others are set up to ensure the safety of persons within the easement and to protect Power and Water's plant.

This in turn ensures that the security and reliability of service to customers can be maintained, and requires that Power and Water can restrict activities within the easement to minimise the risk of personal injury and to retain unimpeded access.

Throughout this Policy references to overhead lines and cables include all associated equipment such as substations, switch yards and distribution pillars.

4.2 Establishing an Easement

The need for an electricity easement arises when Power and Water is required to install new plant to supply new customers or reinforce supply to existing customers and cannot reasonably do so using public land. Most commonly, in new URD subdivisions, pillars and substations are located on easements off the road reserve. The developer is required to provide these at no cost to Power and Water.

Where it is necessary to install new network assets on private property, Power and Water will approach private land owners affected by the proposal and seek easements across the land.

If a land owner requests a change to the route or location, then these wishes will be incorporated wherever practicable.

Wherever practicable, a valuation for the easement should be obtained from the Office of the Valuer General. However, if the landowner refuses to grant an easement at the value decided upon by the Valuer General, then consideration must be given to a higher offer, or compulsory acquisition. The latter is generally a last resort, and legal costs and time mean that the cost of this alternative is often very high.

Compensation amounts in excess of the Valuer General's valuation should be referred to the Manager Network Engineering.

On completion of these negotiations, the easement will be surveyed.

On receipt of the survey plan, the matter should be referred to the Office of the General Counsel for registration of the easement and payment of the agreed amount.

If the line or cable is required to cross the land to supply the owner or occupier of the land, then the granting of an easement shall be a condition of the supply of electricity and all costs are borne by the applicant.

If the line or cable is to be installed to supply customers other than the land owner or occupier then the owner may decline to grant an easement. In that event further attempts should be made to find an alternative route. If no satisfactory alternative route is found then Power and Water may invoke its powers of compulsory acquisition to acquire the easement. This is not preferred and is a last resort.

An easement granted to or acquired by Power and Water is an easement in gross within the meaning of the Crown Lands Act¹ for leased Crown Land, and within the meaning of the Land Titles Act² for other land.

4.3 Easements and Change of Land Ownership

Where, for example, an overhead power line has been erected over Vacant Crown Land (VCL) and that land is subsequently released for development, the prospective developer is normally advised by DPE that a power line exists and that an easement will be taken to cover it. The developer is then bound by the conditions set out in the Development Permit and this Policy and is required to abide by them.

Where an easement already exists and the ownership of land changes, the easement is

¹ NT Crown Lands Act 2000 Division 4

² Land Titles Act 2007 Division 4

already registered as an encumbrance on the title and remains in full force.

Where an easement exists over a pastoral lease over which Native Title has been granted, there is no effect on the easement.

If Power and Water wishes to construct a line across land over which Native Title has already been granted, the only course open is to negotiate an easement, which is within the power of the Native Title holders to grant.

Power and Water has no power of compulsory acquisition of an easement over land covered by Native Title. For land that is the subject of a Native Title Claim, refer to the Corporation's Legal Counsel.

4.4 Effect on Land Use

To fulfil its purpose every easement must be kept clear for access, but some use is permissible. The activities that are/are not permissible are detailed in Section 6. Approval may be given for encroachments outside these Guidelines if it is considered that the proposed use will not limit Power and Water access or cause hazards.

4.5 Relinquishing an Easement

Where an easement is no longer required, it may be relinquished with the approval of the General Manager Power Networks.

Easements have value to both Power and Water and the property owner, and where Power and Water paid the land owner for the original easement, relinquishment should only occur where the land owner compensates Power and Water at a value agreed by the Valuer General.

5 Safety in Electricity Easements

5.1 Introduction

Section 4 of this Policy describes the nature and purpose of easements along overhead lines and underground cables in private property. Section 6 defines the dimensions of the easements and lists various activities which are/are not acceptable within an easement.

Many activities are permissible within easements without reference to Power and Water, while others may only be undertaken with the written permission of Power and Water, and then under controlled conditions.

5.2 Types of Hazards within Easements

There are two principal types of hazards within an easement, namely accidental contact with live conductors, and induced or transferred voltages.

(a) Accidental Contact

The *Electricity Reform (Safety and Technical) Regulations* provide safe working distances for overhead and underground lines. Failure to observe these

clearances is an offence under the Regulations, and has the potential to cause a serious accident.

The *Work Health (Occupational Health and Safety) Regulations* also provide approach limits to overhead lines.

Guidance on measures required to maintain safety are detailed in Appendix A.

(b) Induced and Transferred Voltages

Overhead conductors carrying fault current produce an unbalanced electromagnetic field, which will induce voltages in any conducting object parallel to them. Under fault conditions it is possible for significant voltages to be induced in nearby metallic structures, such as fences.

Earth faults will cause the earthing system to rise in potential above earth. A fault some distance away may still cause local earthing systems to rise in voltage appreciably – this is known as a “transferred” voltage. Line supports may become momentarily energised by transferred voltages.

Under fault conditions hand-foot voltages can be experienced if touching a line support. This is known as “touch” potential, and is potentially dangerous. Less dangerous, but still of concern, is “step” voltages, caused by a voltage “gradient” radiating out from line supports. Voltages of several kV per metre have been measured, creating a possibility of an electric shock between a person's feet.

The potentially most dangerous situation is a “hand to hand” shock caused by simultaneously touching conducting objects at different potentials. A nearby fence or building which is not connected to the line is likely to be at a different potential than the line support. A person simultaneously touching a pole and a nearby unattached fence could be subjected to a significant voltage under fault conditions. As a general rule, metallic structures within 2 metres of a line support should be electrically connected to it, or insulated. All such situations should be referred to the Manager Network Engineering.

Electrostatic effects are possible with higher voltage lines (e.g., 132,000 volt transmission lines), while all power lines generate some EMFs (50 Hz electromagnetic fields). These effects are not known to be hazardous, but may cause concern to some people. Refer to the ARPANSA EMF standard for more information on permissible electric and magnetic fields.

Precautions to be taken to avoid contact with, or the effects of, induced or transferred voltages are discussed in Section 6.

6. Conditions of Use

6.1 General

The purpose of an easement is to safeguard Power and Water's right of access to

construct, inspect and maintain an asset which stands on private property, and to regulate the activities of others within the easement to ensure the safety of all people and safe and reliable operation of the asset.

6.2 Easements for Overhead Lines

The needs related to overhead lines are:

- ◆ access for construction and inspection
- ◆ cleared space to prevent accidental contact with trees in high winds
- ◆ access for reconstruction or repairs where necessary.

Overhead lines need to be patrolled and inspected, often from Elevating Work Platform (EWP) vehicles. During construction or major repairs such as pole replacement, even larger vehicles, such as crane / borer vehicles, may be used to erect line supports.

The easement width needs to be sufficient to facilitate control of vegetation that is potentially likely to contact conductors. Refer to Network Policy NP 013 *Management of Vegetation Near Overhead Power Lines*.

Current Power and Water policy is based on the following easement widths:

Line Voltage (kV)	Easement Width (metres)
0.400	8.0
11	10.0
22	10.0 to 20.0 (depending
66 (single circuit)	25.0 to 35.0 (on the type
132 (single circuit)	35.0 to 45.0 (of construction
275 (single circuit)	50.0

For 66, 132 and 275kV lines, it is common to establish transmission "corridors" which are designed to take two or more lines in ultimate configuration. Consequently, it is often the case to find that single circuit lines have quite large easements, to cope with future lines.

As well as securing access to the line, Power and Water has the responsibility of keeping trees and other objects far enough from the wires to avoid accidental contact. For this purpose there is a standard buffer zone within which trees will be felled or trimmed as necessary and this is illustrated in Drawing Number S1-4-1-4 (see Appendix A). In addition an area of 2 m radius around supporting guys will be cleared of all vegetation.

6.3 Activities within Overhead Line Easements

Some activities and developments may be carried on within overhead line easements without risk to personal safety or line integrity. These are classified as *Permitted Activities*.

Prohibited Activities cannot be tolerated under any circumstances or at any time. If such activities or developments are found, action shall be taken to have them discontinued or removed as appropriate.

Between these extremes are *Controlled Activities* that are acceptable provided the conditions of use are agreed in writing by Power and Water beforehand.

It should be kept in mind that overhead line easements may need to be traversed at any time by heavy vehicles for line maintenance or other work. A clear path must be maintained to allow this access.

6.3.1 Permitted Activities

Activities which are permitted provided safe practices are observed are:

- agricultural grazing, planting and harvesting subject to the height restrictions shown in Drawing S1-4-1-4.
- gardening including the planting of trees and shrubs within the limits specified in Drawing S1-4-1-4.
- parking of vehicles below 4.0 m in height, including caravans which are not occupied and have no power supply connected
- domestic recreation, but excluding those activities described in Section 6.3.3
- operation of mobile plant not capable of extension beyond 4.0 m in height
- storage of non inflammable materials up to a height of 4.0 m in height (or 2.5 m if they or their housing are climbable)
- erection of minor domestic equipment or non metallic fences up to 2.5 m in height. All metallic components must be earthed correctly
- wherever fences are erected across easements, gates or removable panels with a minimum width of 3.6 m must be provided to give access for plant and machinery. Locks on gates must include a standard Power and Water padlock.

6.3.2 Controlled Activities

The following activities may only be undertaken with the written consent of Power and Water and then only under such controlled conditions as Power and Water may specify. Any activities not listed and not permitted under Section 6.3.1 must be referred to Power and Water for written consent to proceed.

- earthworks, except as specified in Section 6.3.3
- operation of mobile plant capable of extension above 4.0 m in height
- erection of metallic fencing up to 2.5 m in height provided it is earthed correctly

- installation of irrigation equipment provided no part of the equipment exceeds 4.0 m in height and no solid jet of water can come within 3.0 m of line conductors. Water jets must be such that they cannot cause conductor clashing.
- erection of electric fencing up to 2.5 m in height provided it does not pass beneath the line
- installation of other services such as water, telephone etc. provided safe working clearances are maintained and due consideration is given to the risk of induced voltages
- construction of roads provided design clearances are maintained (see Drawings S1-4-1-2 and S1-4-1-3)
- construction of dams and creation of bodies of water
- burning off or lighting of fires
- conduct of sporting and recreational activities which cannot, even by misuse, constitute a hazard to the line or persons

Wherever controlled activities are approved but their implementation is subsequently found to not comply with the terms of the approval, or create a hazard or impediment, action shall be taken to rectify the situation.

6.3.3 Prohibited Activities

The following activities are prohibited in overhead line easements except under the most extreme circumstances.

- camping
- construction of houses, out buildings, pergolas or other substantial structures
- installation of fixed plant or equipment
- storage of flammable materials
- storage or use of explosives
- placing of garbage, refuse or fallen timber
- planting trees which will encroach upon the clearances specified in Drg S1-4-1-4
- excavation within 5 m of any overhead line structure
- placing any obstruction within 5 metres of any part of a structure
- installation of a swimming pool or spa

- placing of caravans for occupation
- attachment of anything to structures (except where fences need to be bonded to a pole – see 5.2(b) above)
- flying kites or model aircraft
- flying aircraft, hang gliders, balloons etc.
- erecting fences greater than 2.5 m in height

6.4 Easements for Underground Cables and Associated Plant

The width of an underground cable easement is again dependent on voltage, but more particularly on the space required for access by excavating and cable laying equipment that will in many cases exceed the width required for the cables alone. Drawing S2-2-6-17 shows the width of easement required for the access of cables to and from a distribution substation, where the substation is set back from a property boundary and/or access is required to an adjoining street. This width also applies to a general run of cable across open ground for voltages up to and including 33 kV.

At voltages in excess of 33 kV the easement width will be determined by the number and spacing of circuits and the separation of phases in a circuit comprising single core cables. This can only be determined by individual circuit design but may be assumed to be a minimum of 5 m.

Drawing S2-2-6-17 also shows the easement required to accommodate ground mounted distribution substations and distribution pillars.

Underground cable	3 metres wide
Package substation	3.5 x 3.5 metres
Kiosk substation	3.0 x 7.0 metres
Low voltage URD pillar	1.0 x 1.0 metres
Low voltage fused pillar	2.0 x 2.0 metres
Ring Main Unit	3.5 x 2.5 metres (typically)

6.5 Use of Underground Cable Easements

6.5.1 Permitted Activities

Activities which are permitted within underground cables easements are:

- domestic recreation
- planting of grass for lawns provided no tilling of the soil occurs to a depth greater than 200 mm.

6.5.2 Controlled Activities

The following activities may only be undertaken with the written consent of Power and Water and then only under such controlled conditions as Power and Water may specify:

- earthworks
- storage of non inflammable materials
- parking of vehicles within weight limitations which will avoid cable damage
- operation of mobile plant within weight limitations which will avoid cable damage
- excavation by hand or mechanised plant after due investigation by Power and Water for cable locations
- reduction of ground cover over cables; in which event additional mechanical protection shall be provided. Drawings S2-2-6-2 and S2-2-6-3 show minimum required standards
- increasing ground cover within limits which will not adversely affect cable ratings
- installation of structures spanning the easement provided a minimum 4 m headroom is maintained below the structure to ground level
- installation of driveways across the easement and where protection can be given for vehicle wheel loads
- installation of other buried services after due investigation by Power and Water of cable locations
- erection of fences after due investigation by Power and Water of cable locations
- planting of shallow rooted crops where the depth of tilling does not exceed 200 mm.

6.5.3 Prohibited Activities

The following activities are prohibited in underground cable easements:

- storage of flammable materials
- storage and use of explosives

- planting of trees and shrubs
- construction of houses, out buildings or other substantial structures
- installation of fixed plant or equipment
- placing of garbage or fallen timber
- removal of artefacts or disturbance of significant sites within the meaning of the Commonwealth *Aboriginal and Torres Strait Islander Heritage Protection Act 1984*.

6.6 Activities around Distribution Substations and Service Pillars

6.6.1 Permitted Activities

The following activities are permitted around distribution substations and service pillars:

- planting of screening shrubs with limited spread and root system and not requiring excavation below 200 mm.

6.6.2 Controlled Activities

The following may only be undertaken with Power and Water approval and then only under such controlled conditions as Power and Water may specify:

- erection of fencing on the boundary of the easement provided all exposed metal parts are earthed correctly and access to Power and Water equipment is maintained (such as by the fitting of gates or removable panels).

6.6.3 Prohibited Activities

The following activities are prohibited in underground cable easements except under the most extreme circumstances. All other activities not specified as "permitted" or "controlled" shall, unless and until ruled otherwise by Power and Water in writing, be prohibited.

- any construction within the easement, including above ground swimming pools
- any storage on the easement
- any increase in ground level above that existing at the substation or pillar base and within 3 m of the easement boundary
- any excavation greater than 200 mm deep within 3 m of the easement boundary

- any excavation that would endanger the foundations of the substation or pillar
- any earthworks that might direct stormwater onto the easement or cause pooling of water in the vicinity of a substation, ring main unit or pillar
- any changes to construction within 8 m of a substation that could cause the fire design of the installation to be compromised

Appendix A

Part 1 – General Information on Electricity Easements

1.1 The Purpose of an Easement

Wherever Power and Water assets such as overhead power lines or underground cables cross private land it is necessary for Power and Water to have an assured right of access to construct, inspect and maintain the asset. Easements are established to safeguard these needs. Rules for the use of an easement by others are set up to ensure the safety of persons within the easement and to protect Power and Water's plant.

This in turn ensures that the security and reliability of service to customers can be maintained, and requires that Power and Water can restrict activities within the easement to minimise the risk of personal injury and to retain unimpeded access.

Throughout this document references to overhead lines and cables include all associated equipment such as substations, switch yards and distribution pillars.

1.2 Definition of an Easement

An easement is an encumbrance on private land that gives Power and Water the right to use and have access to the land for the purpose for which the easement is granted. It is the subject of an Agreement which includes a description on the Title Plan showing the dimensions of the easement.

1.3 How an Easement is Established

The need for an electricity easement arises when Power and Water is required to install equipment to supply new customers or reinforce supply to existing customers, and cannot reasonably do so using public land.

Most easements are established by developers when constructing subdivisions, together with the power, water and sewerage assets required for the subdivision.

If the line or cable is required to cross land to supply the owner or occupier of the land, then the granting of an easement is a condition of the supply of electricity and all costs are borne by the applicant.

If the line or cable is to be installed to supply customers other than the land owner or occupier then the owner may decline to grant an easement. In that event Power and Water will make further attempts to find an alternative route. If no satisfactory alternative route is found then Power and Water may invoke its powers of compulsory acquisition to acquire the route across the private land. This is not preferred and is a last resort.

An easement granted to or acquired by Power and Water is an easement in gross within the meaning of the Land Titles Act.³

³NT Land Titles Act Division 4

1.4 Easements and Change of Land Ownership

Where, for example, an overhead power line has been erected over vacant Crown Land and that land is subsequently released for development, the prospective developer is advised by DIPE that a power line exists and that an easement will be taken to cover it. The developer is then bound by the conditions set out in this brochure and is required to abide by them.

Where an easement already exists and the ownership of land changes, the easement is already registered as an encumbrance on the title and remains in full force.

Where an easement exists over a pastoral lease over which Native Title has been granted, there is no effect on the easement.

1.5 Safety within Easements

There are two principal types of potential hazard within an easement:

- ◆ contact with a live overhead conductor or underground cable, and
- ◆ induced voltages during "fault" conditions, which might cause poles or nearby metallic structures to become momentarily "alive"

Guidance on measures required to maintain safety are covered in detail in Part 2 of this brochure.

1.6 Effect on Land Use

Usually an easement covers a very small area. To fulfil its purpose every easement must be kept clear for access, but some use is permissible. The activities that are/are not permissible are detailed in Part 3 of this brochure. Note that some activities may be permissible by negotiation with Power and Water.

Part 2 – Safety in Electricity Easements

2.1 Introduction

Part 1 of this brochure describes the nature and purpose of easements along overhead lines and underground cables in private property. Part 3 defines the dimensions of the easements and lists various activities that are/are not acceptable within an easement.

Many activities are permissible within easements without reference to Power and Water, while others may only be undertaken with written permission, and then under controlled conditions.

This part of the brochure is intended to highlight the dangers which can arise if these permitted activities are undertaken without due regard to commonsense safe behaviour.

If you are in any doubt about safety, ask Power and Water for advice.

2.2 Types of Hazards

The following hazards need to be taken into account within easements:

- accidental contact with live wires
- approaching too close to live wires
- high voltages arising from lightning strikes
- induced voltages in metallic objects
- impact with supports (ie poles, towers)
- contact with buried cables during excavation.

2.3 Keeping Out of Trouble

All of these can be avoided by observing a few simple precautions.

- avoid anything which may bring you into even indirect contact with live wires
- when trimming trees close to an overhead line, do not cut any branch that could touch the line once it is cut, even if you think you can control it. This is the single most common cause of fatalities involving high voltage lines.
- do not operate plant close to lines – in particular, plant operators are required to observe the requirements set out in the *Electricity Reform (Safety and Technical) Regulations* and the *Work Health (Occupational Health and Safety) Regulations*.
- do not attempt to cross under lines with truck trays elevated, backhoe buckets raised, crane jibs raised, or just high loads
- measure the height of CB aerials attached to trucks or machinery – remove if higher than 4 m
- do not fly kites or model aeroplanes near overhead lines
- do not attempt to lift long objects such as aluminium irrigation pipes or long aluminium ladders which may get out of control
- do not wheel sailing dinghies with their masts raised under power lines
- keep at least 3 metres away from overhead line conductors
- stay away from lines during thunder storms or high winds: lines can attract lightning strikes and you may be in the way
- in storms it is possible for trees or lightning to cause a breakdown several km away, which can result in poles becoming alive for a brief period
- conductors may break and fall to the ground whilst still alive
- avoid contact with metal objects near lines. Under fault conditions they can carry a high voltage
- if you must erect metallic structures near lines make sure they are earthed correctly – better still, don't erect them in the first place
- do not connect power supplies to structures in easements – better still, do not erect structures in easements
- do not light fires under lines. They may cause the line to flash over, and once again dangerous voltages can arise
- avoid impact with lines and their supporting structures

- do not drive too close to the supports
- be aware that stays or guys may not be easily visible
- avoid flying light aircraft, gliders, or hang-gliders near power lines
- control aerial crop-dusting so that aircraft are not put at risk
- be aware that many overhead line supports have associated bare metal straps or cables attached to them just below ground level. Damaging these will reduce the effectiveness of the earthing system, and increase the possibility of injury to persons near the line.

2.4 Dial Before You Dig

- ring 1100 (“Dial Before You Dig”) when excavating in any area where there is a possibility of underground cables
- do not dig in a cable easement until you know where the cable is located. Always request a cable location from Power and Water, and follow any directions given
- even then dig very carefully at first until you find either the cable, or a marker tape or protective slab warning of its presence, and then dig by hand
- maintain an observer alongside the excavation to warn if you are getting too close to the cable
- do not bore holes for fence posts until you know the exact location of the cables.

Again - if in doubt, ask Power and Water. Help us to treat electricity with the respect it demands.

Part 3 – Particulars of Easements and Conditions of Use

3.1 General

The purpose of an easement is to safeguard Power and Water's right of access to construct, inspect and maintain an asset that is located on private property. It also allows Power and Water to regulate activities within the easement so as to ensure the safety of persons and the safe and reliable operation of the asset.

Electricity is transmitted and distributed at different voltages either by overhead lines or underground cables and their associated equipment. Power and Water establishes a substation where-ever a change of voltage is required. Large substations or bulk supply points are normally located on land owned by Power and Water because large areas are involved and the type of construction and level of security required make the land unusable for any other purpose.

Smaller substations and distribution pillars such as those that service commercial, residential and small industrial consumers are usually located on public land or on private land abutting the property boundary.

3.2 Easements for Overhead Lines

The needs related to overhead lines are:

- access for construction and inspection
- cleared space to prevent accidental contact with trees in high winds
- access for reconstruction or repairs where necessary

An easement for an overhead line is related to voltage and to the length of span between supports; generally each voltage has its own typical construction and characteristic span length.

Current Power and Water policy is based on the following easement widths:

Line Voltage (kV)	Easement Width (metres)
0.400 (low voltage)	3.0
11	10.0
22	10.0 to 20.0) depending
66	25.0 to 35.0) on the type
132	35.0 to 45.0) of construction
275	50.0

For 66, 132 and 275kV lines, it is common to establish transmission “corridors” which are designed to take two or more lines in ultimate configuration. Consequently, it is often the case to find that single circuit lines have quite large easements, to cope with future lines.

As well as securing access to the land, Power and Water has the responsibility of keeping trees and other objects far enough from the wires to avoid accidental contact. For this purpose it has a standard buffer zone within which trees will be felled or trimmed as necessary and this is illustrated in Drawing Number S1-4-1-4 attached. In addition an area of 2 m radius around supporting guys will be cleared of all vegetation.

3.3 Activities within Overhead Line Easements

Some activities and developments may be carried out within overhead line easements without risk to personal safety or line integrity. These are classified as *Permitted Activities*.

Prohibited Activities cannot be permitted under any circumstances or at any time. If such activities or developments do occur Power and Water will require that they be discontinued or removed as appropriate.

Between these extremes there are *Controlled Activities* that are acceptable provided the conditions of use are agreed in writing by Power and Water beforehand.

It should be kept in mind that overhead line easements may need to be traversed at any time by heavy vehicles for line maintenance or other work. A clear path must be maintained to allow this access.

3.3.1 Permitted Activities

Activities which are permitted, provided safe practices are observed as described in Part 2 of this brochure, are:

- agricultural grazing, planting and harvesting subject to the height restrictions shown in Drawing S1-4-1-4 attached
- gardening including the planting of trees and shrubs within the limits specified in Drawing S1-4-1-4
- parking of vehicles below 4.0 m in height, including caravans which are not occupied and have no power supply connected
- domestic recreation, but excluding those activities described in Section 3.3.3
- operation of mobile plant not capable of extension beyond 4.0 m in height
- storage of non inflammable materials up to a height of 4.0 m in height (or 2.5 m if they or their housing are climbable), provided that access by Power and Water vehicles along the easement is not inhibited
- erection of minor domestic equipment or non metallic fences up to 2.5 m in height. All metallic components must be earthed correctly – if in doubt consult Power and Water or a qualified electrician
- wherever fences are erected across easements, gates or removable panels with a minimum width of 3.6 m must be provided to give access for plant and machinery. Locks on gates must include a standard Power and Water padlock.

If in doubt consult Power and Water

3.3.2 Controlled Activities

The following activities may only be undertaken with the written consent of Power and Water and then only under such controlled conditions as Power and Water may specify. Any activities not listed, or not permitted under Section 3.3.1, must be referred to Power and Water for written consent before proceeding.

- earthworks, except as specified in Section 3.3.3
- operation of mobile plant capable of extension above 4.0 m in height
- erection of metallic fencing up to 2.5 m in height provided it is earthed correctly – if in doubt consult Power and Water or a qualified electrician
- installation of irrigation equipment provided no part of the equipment exceeds 4.0 m in height and no solid jet of water can come within 3.0 m of line conductors. Water jets must be such that they cannot cause conductor clashing.
- erection of electric fencing up to 2.5 m in height provided it does not pass beneath the line
- installation of other services such as water, telephone etc. provided safe

working clearances are maintained and due consideration is given to the risk of induced voltages

- construction of roads provided design clearances are maintained (refer to Power and Water for details)
- construction of dams and creation of bodies of water
- burning off or lighting of fires
- conduct of sporting and recreational activities which cannot, even by misuse, constitute a hazard to the line or persons

Wherever controlled activities are approved but their implementation is subsequently found not to comply with the terms of the approval, or create a hazard or impediment, Power and Water will require its removal.

3.3.3 Prohibited Activities

The following activities are prohibited in overhead line easements:

- camping
- construction of houses, out buildings, pergolas or other substantial structures
- installation of fixed plant or equipment
- storage of flammable materials
- storage or use of explosives
- placing of garbage, refuse or fallen timber
- planting trees which will encroach the clearances specified in Drawing S1-4-1-4
- excavation within 5m of any overhead line structure except low voltage poles (3m)
- placing any obstruction within 3 metres of any structure or stay
- installation of a swimming pool or spa
- placing of caravans for occupation
- attachment of anything to structures, except where directed by Power and Water to connect a fence that is within 2m of a pole or structure
- flying kites or model aircraft
- flying aircraft, hang gliders, balloons etc.
- erecting fences greater than 2.5 m in height

3.4 Easements for Underground Cables and Associated Plant

The width of an underground cable easement is again dependent on voltage, but more particularly on the space required for access by excavating and cable laying equipment that will in many cases exceed the width required for the cables alone. Power and Water will negotiate easements required for the access of cables and equipment located on private property, together with any access conditions.

Easements are required for ground mounted substations, switchgear and pillars. The size of these will vary with the type of equipment.

Underground cable	3 metres wide
Package substation	3.5 x 3.5 metres
Kiosk substation	3.0 x 7.0 metres
Low voltage URD pillar	1.0 x 1.0 metres
Low voltage fused pillar	2.0 x 2.0 metres
Ring Main Unit	3.5 x 2.5 metres (typically)

3.5 Use of Underground Cable Easements

3.5.1 Permitted Activities

Activities which are permitted within underground cable easements are:

- domestic recreation
- planting of grass for lawns provided no tilling of the soil occurs to a depth greater than 200 mm.

3.5.2 Controlled Activities

The following activities may only be undertaken with the written consent of Power and Water and then only under such controlled conditions as Power and Water may specify:

- earthworks
- storage of non inflammable materials
- parking of vehicles within weight limitations which will avoid cable damage
- operation of mobile plant within weight limitations which will avoid cable damage
- excavation by hand or mechanised plant after due investigation by Power and Water for cable locations
- reduction of ground cover over cables in which event additional mechanical protection shall be provided. Power and Water can advise on details.
- increasing ground cover within limits which will not adversely affect cable ratings
- installation of structures spanning the easement
- installation of driveways across the easement, where protection can be given for vehicle wheel loads

- installation of other buried services after due investigation by Power and Water of cable locations
- erection of fences after due investigation by Power and Water of cable locations
- planting of shallow rooted crops where tilling depth does not exceed 200 mm.

3.5.3 Prohibited Activities

The following activities are prohibited in underground cable easements:

- storage of flammable materials and explosives
- storage and use of explosives
- excavation that could undermine any cable, or direct runoff water under a cable
- planting of trees and shrubs (it should be noted that where shrubs, trees, etc., located within an easement are damaged by Power and Water when it is necessary to excavate within the easement, no compensation is payable)
- construction of houses, out buildings or other substantial structures
- installation of fixed plant or equipment
- placing of garbage or fallen timber
- removal of artefacts or disturbance of significant sites within the meaning of the Aboriginal and Torres Strait Islander heritage Protection Act 1934.

3.6 Activities around Distribution Substations and Service Pillars

3.6.1 Permitted Activities

The following activities are permitted around distribution substations and service pillars:

- planting of screening shrubs with limited spread and root system and not requiring excavation below 200 mm

3.6.2 Controlled Activities

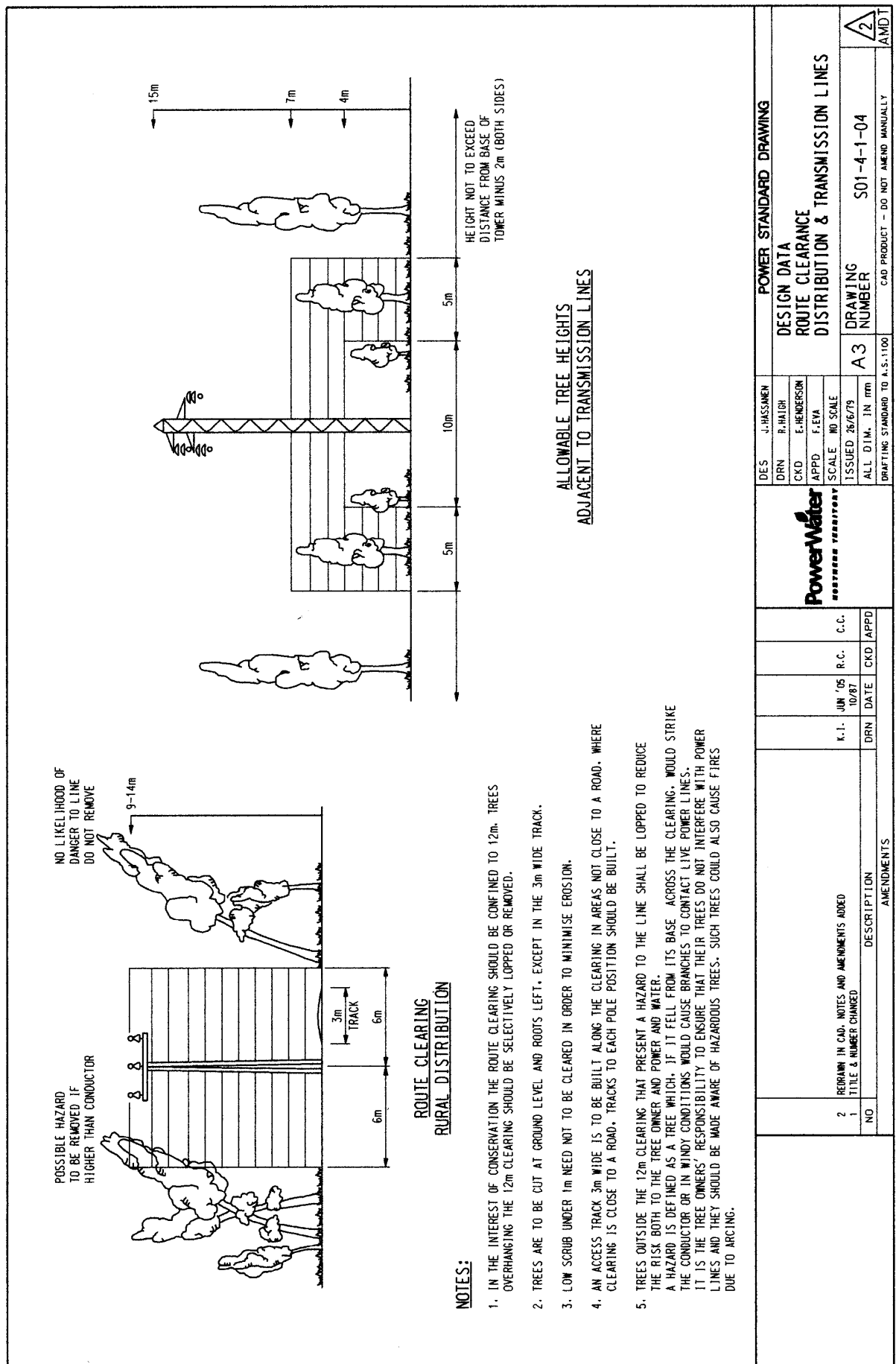
The following may only be undertaken with Power and Water approval and then only under such controlled conditions as Power and Water may specify:

- erection of fencing on the boundary of the easement provided all exposed metal parts are earthed correctly and access to Power and Water equipment is maintained (i.e., by installation of a gate or removable panel)

3.6.3 Prohibited Activities

The following activities are prohibited in substation/pillar easements. All other activities not specified as "permitted" or "controlled" shall, unless and until ruled otherwise by Power and Water in writing, be prohibited.

- any construction within the easement
- any storage on the easement
- any increase in ground level above that existing at the substation/pillar
- any excavation that would endanger the foundations of the substation or pillar
- any earthworks that might direct stormwater onto the easement, or allow pooling of water in the vicinity of electrical equipment
- any changes to construction within 8 m of a substation that could cause the fire design of the installation to be compromised



NOTES:

1. IN THE INTEREST OF CONSERVATION THE ROUTE CLEARING SHOULD BE CONFINED TO 12m. TREES OVERHANGING THE 12m CLEARING SHOULD BE SELECTIVELY LOPPED OR REMOVED.
2. TREES ARE TO BE CUT AT GROUND LEVEL AND ROOTS LEFT, EXCEPT IN THE 3m WIDE TRACK.
3. LOW SCRUB UNDER 1m NEED NOT TO BE CLEARED IN ORDER TO MINIMISE EROSION.
4. AN ACCESS TRACK 3m WIDE IS TO BE BUILT ALONG THE CLEARING IN AREAS NOT CLOSE TO A ROAD. WHERE CLEARING IS CLOSE TO A ROAD, TRACKS TO EACH POLE POSITION SHOULD BE BUILT.
5. TREES OUTSIDE THE 12m CLEARING THAT PRESENT A HAZARD TO THE LINE SHALL BE LOPPED TO REDUCE THE RISK BOTH TO THE TREE OWNER AND POWER AND WATER. A HAZARD IS DEFINED AS A TREE WHICH, IF IT FELL FROM ITS BASE ACROSS THE CLEARING, WOULD STRIKE THE CONDUCTOR OR IN WINDY CONDITIONS WOULD CAUSE BRANCHES TO CONTACT LIVE POWER LINES. IT IS THE TREE OWNERS' RESPONSIBILITY TO ENSURE THAT THEIR TREES DO NOT INTERFERE WITH POWER LINES AND THEY SHOULD BE MADE AWARE OF HAZARDOUS TREES. SUCH TREES COULD ALSO CAUSE FIRES DUE TO ARCING.

DESIGN DATA ROUTE CLEARANCE DISTRIBUTION & TRANSMISSION LINES		DES	J. HASSAMEN	POWER STANDARD DRAWING	
		DRN	R. HAIGH	A3	
DRAWING NUMBER S01-4-1-04		CKD	E. HENDERSON	DRAFTING STANDARD TO A.S. 1100	
SCALE		APPD	F. EVA	CAD PRODUCT - DO NOT AMEND MANUALLY	
ISSUED 26/6/79		NO SCALE	AMDT		
ALL DIM. IN mm					

NO	REVISION IN CAD, NOTES AND AMENDMENTS ADDED TITLE & NUMBER CHANGED	DRN	DATE	R.C.	CKD	APPD
2		K.1.	JUN '05	R.C.		
1			10/87			
NO	DESCRIPTION AMENDMENTS					