



# Guidelines for the safe management of private power poles and lines

September 2019 Revised May 2023



# Preface

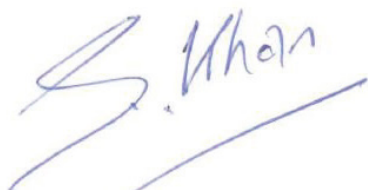
There are risks and potentially significant consequences of electrical or structural failure of private power poles and lines, including power interruptions, electrocution and fires. These risks and consequences can be mitigated through the proper selection of equipment and regular inspection and maintenance.

It is the property owner's legal responsibility (duty of care) under common law to install and maintain private power poles and lines so they do not pose a safety risk to the property occupants, adjacent properties and their occupants or the wider community. All activities which constitute electrical work must be carried out by licensed electrical contractors.

These guidelines are issued by the Director of Energy Safety under Section 33AA of the *Electricity Act 1945 (WA)*, to assist property owners and electrical contractors in the selection, installation and safe management of private overhead power lines and poles. They provide the recommended technical requirements and practices for the safe management of privately owned power poles and lines, including their construction, repair and maintenance.

I strongly recommend full compliance with the safety management practices set out in these guidelines. Should you have any suggestions or comments, please send them to me in writing and I will be pleased to consider them.

Saj Khan

A handwritten signature in blue ink that reads "S. Khan". The signature is stylized and includes a long horizontal stroke underneath the name.

**EXECUTIVE DIRECTOR BUILDING AND ENERGY**

*These guidelines replace the 2016 Building and Energy publication  
Private overhead power lines - guide for electrical contractors.*

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# 1. Introduction

## 1.1 What are private power lines and poles?

Power poles on private property support the network operator's overhead service cable, while poles supporting private power lines are private power poles.

Power lines on private property, which carry electricity from the main switchboard and meter to the home or other buildings and facilities, are termed private power lines.

Private power poles and lines do not include:

- the network operator's service cable;
- the meter (owned by the network operator); and
- power lines which cross private property in rural areas and are owned and managed by the network operator.

Some common private power line arrangements are shown in Figures 1 to 3 (below) and in the Appendix on pages 20-22.

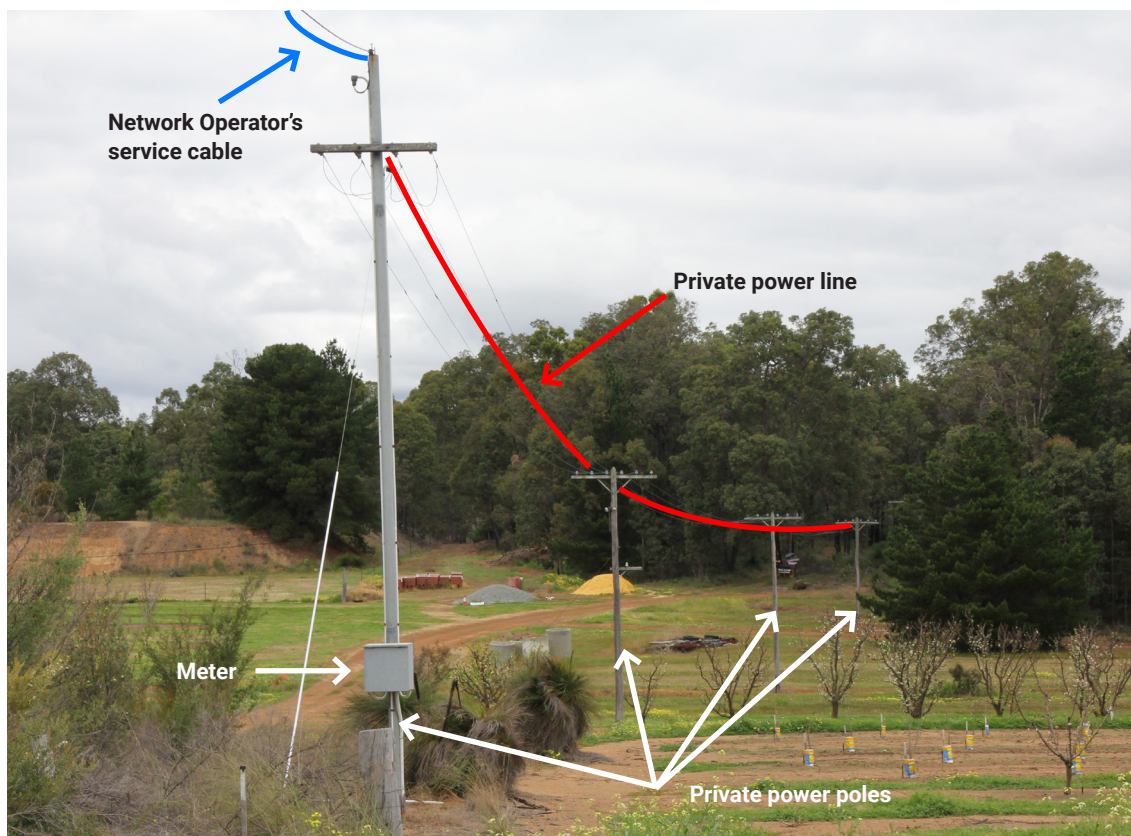


FIGURE 1 – TYPICAL RURAL PRIVATE OVERHEAD POWER LINE AND PRIVATE POLES



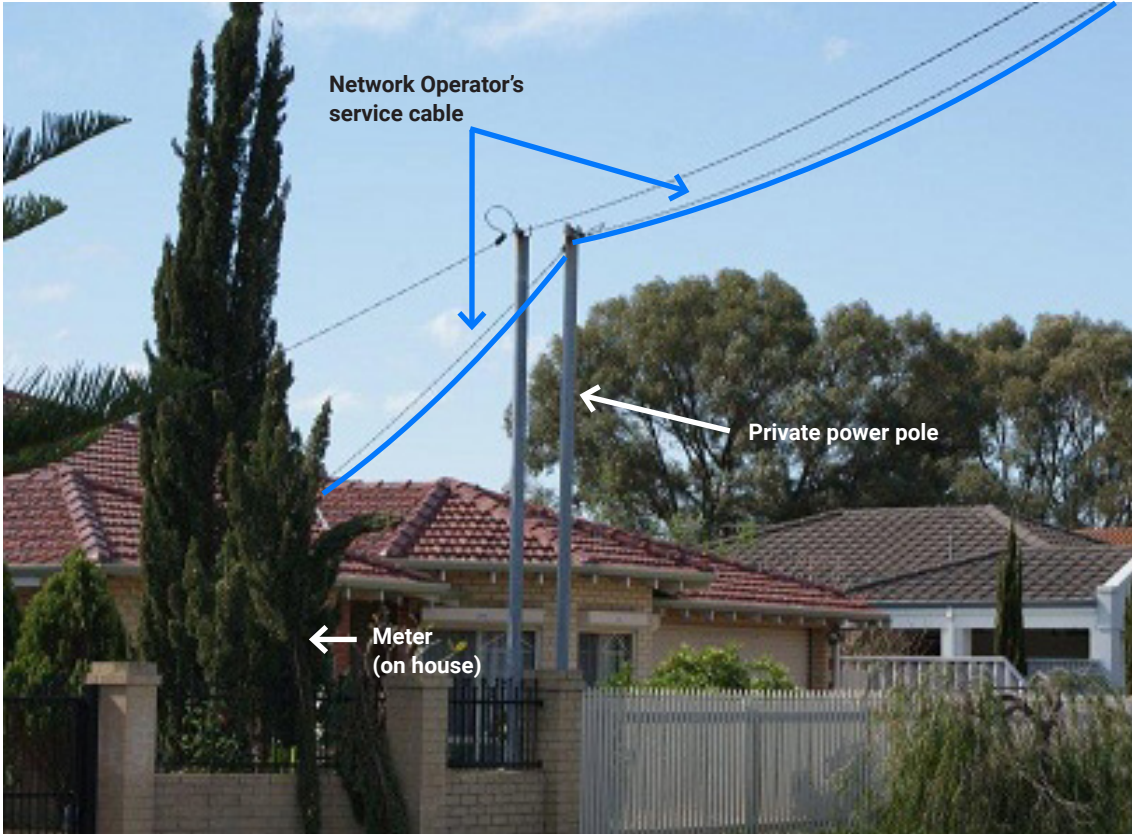


FIGURE 2 – TYPICAL URBAN RESIDENTIAL PRIVATE POWER POLES SUPPORTING NETWORK OPERATOR'S SERVICE CABLES

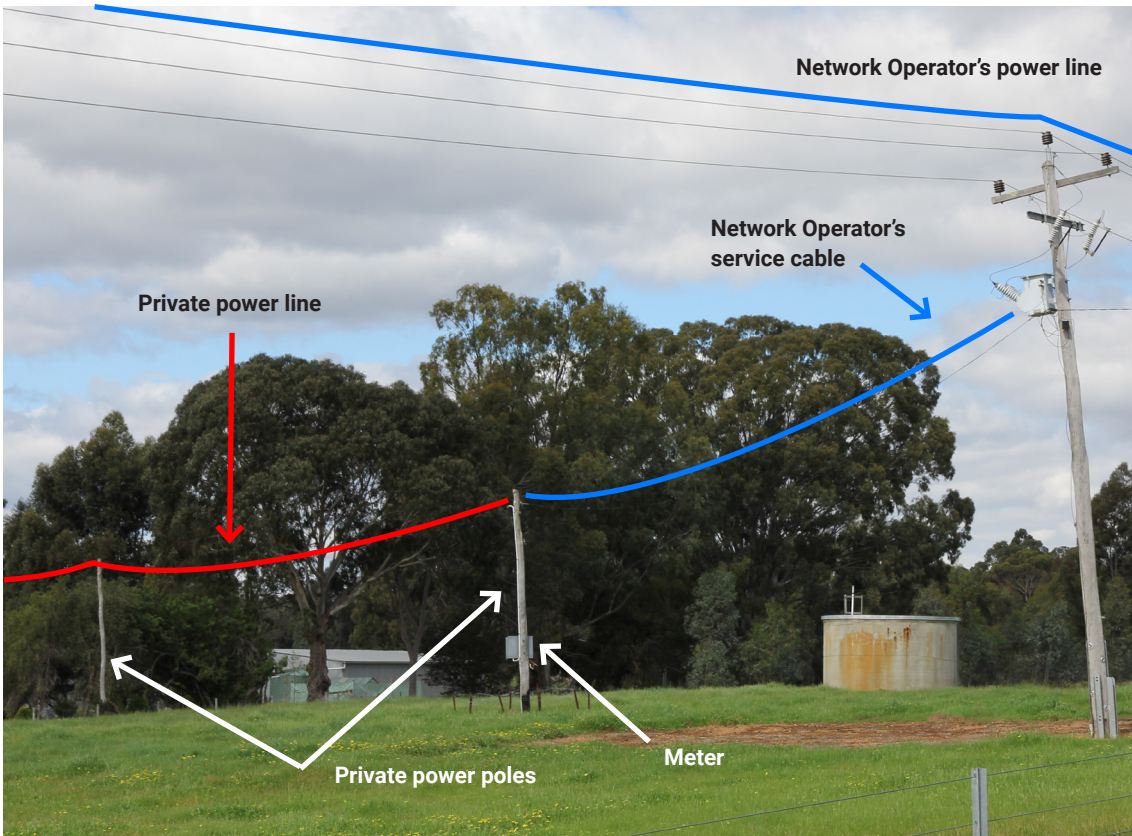


FIGURE 3 – TYPICAL RURAL ARRANGEMENT – NETWORK OPERATOR'S POWER LINE TRANSVERSING PRIVATE PROPERTY AND PRIVATE POWER LINE CONNECTION

## 1.2 Responsibilities

Property owners have a legal duty of care to ensure that the assets on their property are constructed and maintained in a manner that does not present a safety risk to occupants, adjacent properties and their occupants or the wider community. These assets include any private overhead power lines or private power poles installed on the property.

Property owners should maintain all electrical equipment for which they are responsible in a safe and serviceable condition. This reduces the risk of:

- injury or electrocution of residents or members of the public;
- igniting a fire on the property or causing a bushfire; and
- adversely affecting the quality of electricity supply to other consumers.

Construction and maintenance of private overhead power lines will generally constitute electrical work and must be carried out by a licensed electrical contractor.

## 1.3 Purpose of these guidelines

These guidelines provide information and recommend practices for the safe management of low voltage overhead lines on private property. They do not apply to:

- underground low voltage power lines on private property;
- high voltage (overhead or underground) power lines on private property; and
- Network operators' electrical installations covered by the Electricity (Network Safety) Regulations 2015.

These guidelines complement, and should be read together with, other related documents including (but not limited to):

- Electricity (Licensing) Regulations 1991;
- *WA Electrical Requirements (WAER)* published by Building and Energy;
- the national electrical technical standard AS/NZS 3000:2018, Wiring Rules;
- the Building and Energy publication *Guidelines for the management of vegetation near power lines*; and
- the *Western Australian Service and Installation Requirements (WASIR)* published by Western Power and Horizon Power.

## 1.4 Definitions

For the purposes of these guidelines:

**Low voltage** means an operating voltage of less than 1,000 volts.

**High voltage** means an operating voltage of 1,000 volts and higher.

**Overhead power line** means a power line constructed using aerial electrical wiring (insulated or uninsulated) supported by poles, and associated apparatus.

**Network Operator** has the meaning given in the Electricity (Network Safety) Regulations 2015.

**Point of attachment** means the point at which a network operator's aerial service cable is physically secured on a property owner's structure.

## 2. Technical requirements

All electrical installations (new and subsequent augmentations) must be designed and constructed to a standard consistent with good industry practice, with careful consideration of the ongoing safety of the owner, occupants of the premises and members of the public, integrity of equipment and risks to property.

The detailed technical requirements for the design and construction of private power lines are adequately covered by existing legislation and technical standards and are not repeated in these guidelines.

The relevant documents include, but are not limited to:

- AS/NZS 3000:2018, Wiring Rules;
- AS/NZS 7000:2016, Overhead line design – Detailed procedures;
- the WAER; and
- other network operator technical requirements such as the WASIR.

In particular, relevant provisions in the WAER require that:

- new low voltage private power lines should be in the form of underground cables except in extenuating circumstances; and
- where new overhead lines are installed, they must be constructed using only prescribed pole types and insulated conductors.

## 3. Inspection of private overhead power poles and lines

### 3.1 General requirements

Property owners should inspect private power poles and lines at least once a year for any visible signs of deterioration including:

- vegetation growth near or in contact with the power line conductors;
- wood poles which are cracked, leaning, rotting or damaged by white-ants/termites;
- steel poles showing signs of significant rust and corrosion; and
- obvious defects such as support brackets pulling away from poles/buildings, damaged staywires, splits in wooden crossarms, broken strands in wires, damaged insulators or wires hanging much lower than others in the same section.

Private power poles and lines should always be checked for possible damage following significant weather events involving lightning, high winds, heavy rain and/or extremes of cold and heat.

If property owners identify any apparent defects, they should immediately arrange for further detailed inspection and/or repairs by a licensed electrical contractor.

The network operator will only inspect the **first** private pole where that pole is connected to the network operator's overhead service cable. Property owners must engage a licensed electrical contractor to comply with any notice given by the network operator following the inspection.

Notwithstanding the network operator's inspection, property owners have an ongoing responsibility for inspecting, maintaining and replacing all of the private power poles on your property, including the first private power pole.

## 3.2 Detailed inspection requirements

The following sections provide recommended practices for inspection of private power lines and their primary components **by electrical contractors**.

### 3.2.1 Vegetation clearance

Trees and branches must be maintained at least two metres away from bare power line conductors (Fig 4).

Pruning vegetation within two metres of conductors must be carried out by a competent vegetation control service provider. Contact <https://arbwest.com/> for contact details of licensed contractors.

Safely remove any vegetation close to the base of all power poles and under the power lines to minimise the risk of starting fires or propagating ground fires.

Further detailed information is provided in the Building and Energy publication Guidelines for the management of vegetation near power lines (see [www.dmirs.wa.gov.au/building-and-energy](http://www.dmirs.wa.gov.au/building-and-energy)).

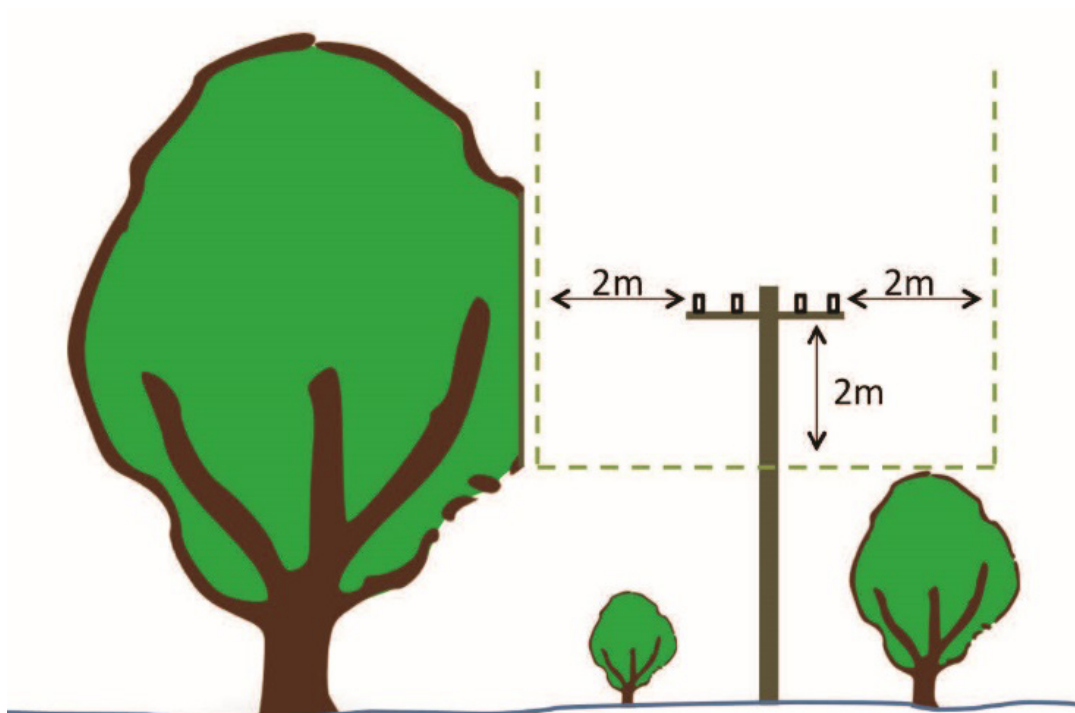


FIGURE 4 – VEGETATION MINIMUM CLEARANCE PROFILE

### 3.2.2 Power poles

Private power poles vary in type, with different life expectancies, and may be:

- timber
- hardwood (e.g. jarrah);
- softwood (e.g. pine); or
- steel (tubular or lattice).

If poles have been in service for longer than their expected life, there is a strong possibility that they are no longer safe, even though there may be no obvious evidence of deterioration. Also, the life expectancy of wood poles can vary significantly depending on their uses, species, climatic conditions and the location's soil properties. If there are any doubts about the strength of any pole, it should either be replaced or an expert assessment should be sought from a civil/structural engineer or asset management company.



## Timber poles:

- They should be inspected for obvious defects such as ground line rot, large cracks, splitting or excessive leaning.
- It is important to determine the species of the timber and age of the poles (where possible) to determine the appropriate treatment of any defects.
- If the poles are made of sawn timber, they should be replaced immediately. Sawn timber should not be used to support power lines because of the high risk of deterioration and early failure.
- If termites/white ants are detected during an inspection, prompt treatment should be sought from a white ant inspector/pest controller. If damage is significant, the pole should be replaced.
- In some cases, ground-line reinforcements using galvanised steel supports can be used to extend the life of wood poles. However, this work must only be performed by asset management companies specialising in such services. Electrical contractors must not attempt to reinforce poles unless they can certify that the reinforced poles satisfy the structural properties prescribed in Appendix D of AS/NZS 3000:2018.



FIGURE 5 – TYPICAL REINFORCEMENT OF TIMBER POLES WITH STEEL SUPPORTS

## Hardwood poles:

- The difficulty in assessing the extent of internal deterioration and rotting in wood poles makes age-based replacements the only reliable option.
- If the poles are hardwood such as jarrah and are likely to have been in service for more than 25 years, they should either be replaced or structurally reinforced, if possible.



FIGURE 6 – COMPLETE FAILURE OF JARRAH WOOD POLE DUE TO DECAY/ROTTING

## Softwood poles:

- If the poles are softwood such as treated pine, the manufacturer or supplier should be contacted (if possible) to determine their life expectancy. If they have exceeded the service life prescribed by the manufacturer, they should either be replaced or structurally reinforced.

## Steel poles:

- The life expectancy of steel poles is 30 years or more, dependent on soil conditions and provided they are galvanised and have well-constructed concrete footings. The correct installation method is for the footing to be finished at 100mm above ground level and shaped to shed water, as shown in Figure 7 below (refer AS/NZS 3000:2018 Appendix D2 Note 3(b)).
- However, all steel poles are subject to corrosion and should be checked. Where the concrete footing is not above ground level, there is a higher risk of below ground corrosion.



FIGURE 7 – CORRECT INSTALLATION OF STEEL POLE WITH CONCRETE FOOTING FINISHED ABOVE GROUND



### 3.2.3 Cross-arms

Cross-arms should be free from deterioration such as splitting, termite attack and fungal rot.



FIGURE 8 – A BADLY SPLIT LOW VOLTAGE CROSSARM

### 3.2.4 Spreaders

Spreaders in low voltage lines with bare conductors should be in sound condition and correctly installed.

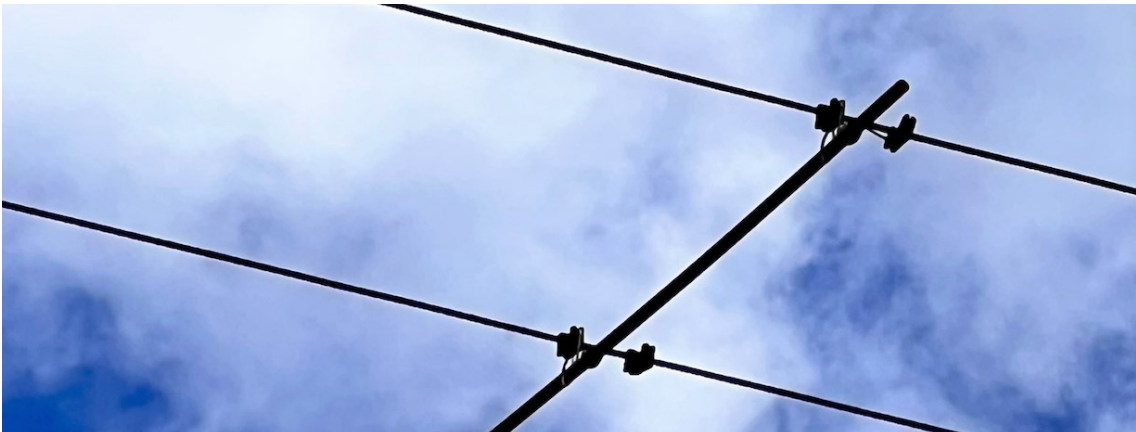


FIGURE 9 – LOW VOLTAGE SPREADER IN GOOD CONDITION

### 3.2.5 Stays

Stays should be free of any visible damage or deterioration and the integrity of the following elements confirmed:

Above ground:

- stay wire;
- insulator (where applicable); and
- preformed or bolted wire terminations.

Below ground:

- no in-ground corrosion of anchor; and
- no slippage of the anchor (indicated by a leaning pole).



FIGURE 10 – STAY INSULATOR CORRECTLY INSTALLED AND IN GOOD CONDITION

### 3.2.6 Conductors

Electrical conductors should be free of deterioration or any visible signs of damage such as:

- broken wire strands;
- burn marks caused by clashing conductors or contact with vegetation; and
- severe corrosion and any loss of cross section.

If any insulation is missing or damaged, the exposed wire may be live. Contact could be fatal and vegetation touching the bare conductor is more likely to start a fire. Damaged insulated conductors should be replaced, not repaired, so that the safety of the installation is not compromised.

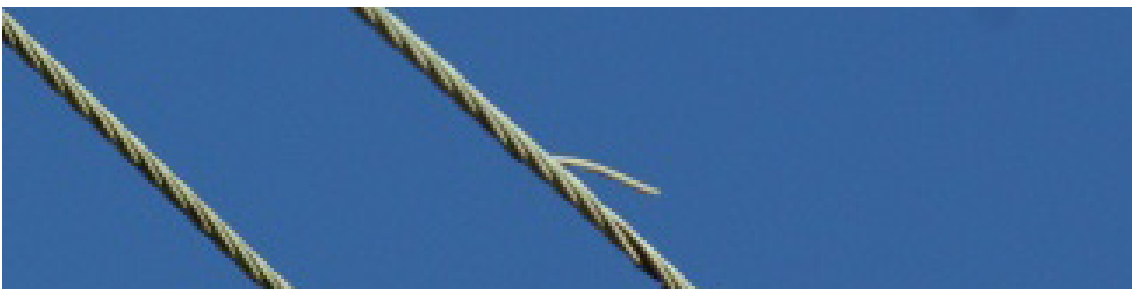


FIGURE 11 – BROKEN CONDUCTOR STRAND CLEARLY VISIBLE



- Conductor-to-conductor clearance: Clashing bare conductors are a fire risk. Clearance between bare conductors must be maintained to reduce the risk of clashing during windy weather. Table 3.10 of AS/NZS 3000:2018 prescribes the minimum spacing between conductors. In some cases, larger cross arms or spreaders may be required to increase or maintain the conductor clearance.
- Out of sag: If one conductor hangs much lower than the others on the same span, they are termed 'out of sag'. Conductors may become out of sag if the cross arms or king bolt on the pole have deteriorated, if the pole has twisted, or if the conductors were struck by tree limbs or machinery.
- Conductor ground clearance and tension: Contact with overhead conductors can be fatal. To ensure safety, conductors must meet minimum height requirements as prescribed in Table 3.8 of AS/NZS 3000:2018. Options to improve ground clearance include untying and re-stringing conductors or installing additional poles.
- Conductor building clearance: Minimum distances between buildings and conductors are essential to reduce the risk of accidental contact. Ensure structures have not been erected next to or underneath any power line which compromises clearance. If clearance cannot be achieved, installing an underground service may be an option. The minimum clearances to a building, structure, ground or elevated area are provided in Table 3.8 of AS/NZS 3000:2018.

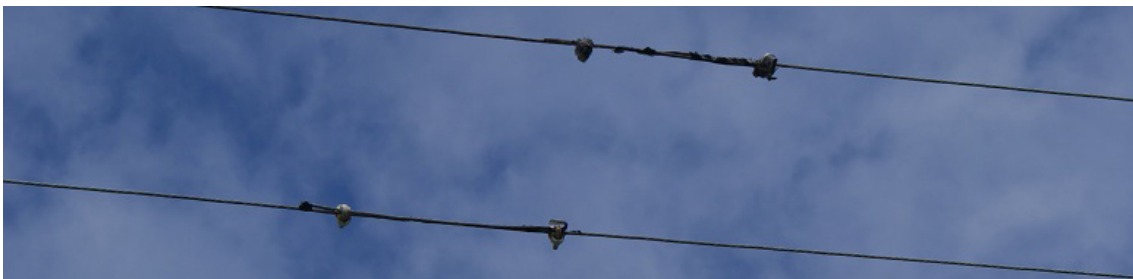


FIGURE 12 – EXAMPLE OF AGED CONDUCTOR JOINTS AND ONGOING SAFETY RISK

### 3.2.7 Insulators

Insulators should be free of cracks or chips and broken wire ties.

### 3.2.8 Hardware and fixings

Mounting brackets should be structurally sound and not pulling away from the pole(s) or buildings. Steel components that are significantly eroded should be replaced.

### 3.2.9 Connections and joints in aerial conductors

- All electrical connections and joints must comply with Clause 3.7 of AS/NZS 3000:2018.
- Any defective metallic preformed terminations ('twisties') on insulated service leads must be replaced.
- Damaged or corroded mains connection boxes should be repaired or replaced.

### 3.2.10 Cable supports

All cable supports must comply with Clause 3.9.3 of AS/NZS 3000:2018.

### 3.2.11 Switchboards

- Switchboards must be free of any visible damage/deterioration and comply with Clause 2.9 of AS/NZS 3000:2018.
- The correct sub-main fuse sizes must be installed.

## 4. Refurbishment options for existing lines and poles

If the power poles on a property have exceeded their serviceable life or if the overhead power line needs substantial repair, options for remedial treatment include:

- 1) replacing the overhead line with an underground cable. This option is safer, requires less maintenance and vegetation clearance is not an issue. Refer to section 3 of the Wiring Rules for guidance;
- 2) replacing defective poles with new poles of the types prescribed in the WAER and/or replacing defective bare conductors with insulated conductors; or
- 3) reinforcing existing timber poles at the ground line with galvanised steel supports. This approach will depend on detailed assessment of the condition of the poles at and above the ground line.

Installation of structural supports should only be undertaken by an asset management company specialising in such activities.

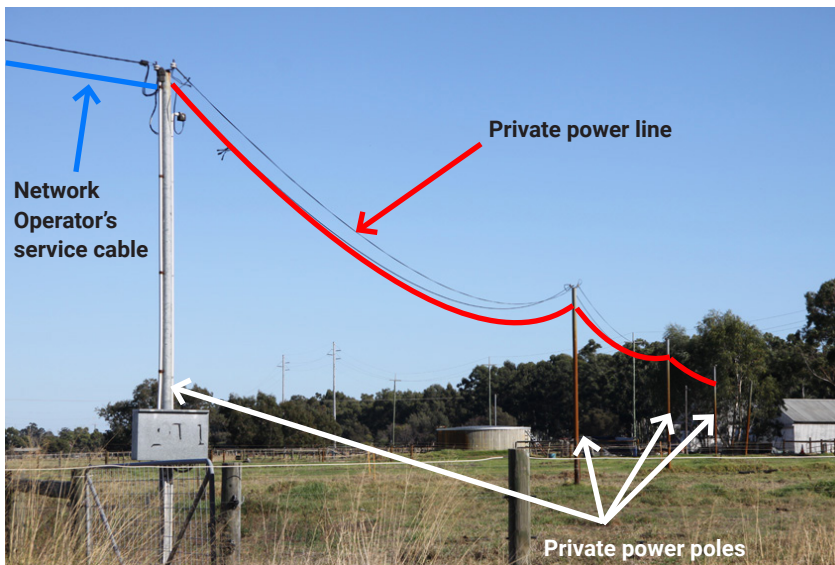


FIGURE 13 – EXAMPLE OF PRIVATE LINE USING STEEL POLES AND INSULATED CONDUCTORS

# 5. New construction options

Technical requirements for new privately owned low voltage power lines and poles are set out in Sections 3.6, 4.5 and 4.6 of the WA Electrical Requirements (WAER).

The WAER states that all new privately owned low voltage power lines should be in the form of underground cables to maximise the safety of property and people. However, it is acknowledged that this may not be practical or cost-effective in some circumstances.

For example:

- if it is difficult and expensive to install underground cables in ground conditions that are predominantly rock; and
- for long line lengths, underground cables may be cost prohibitive.

Installation of a new overhead line is justified where such circumstances can be demonstrated.

However the WAER requires that only prescribed pole types and insulated overhead electrical wires are used for constructing new, or replacing existing overhead lines.

The prescribed pole types are:

- timber poles treated with Copper Chrome Arsenic (CCA) wood preservative;
- fibre reinforced cement poles; or
- galvanised steel poles.

Sawn timber poles, untreated\* timber poles (both hardwood and softwood) and bare electrical wiring are no longer permitted for new lines and replacements.

*\* Not treated with CCA preservative*

## 6. Private power pole selection guide

- 1) Poles on private property that support the network operator's service cable should comply with the network operator's technical requirements. At the time of publication of these Guidelines, all network operators required these poles to be galvanised steel.
- 2) For all poles other than those used for supporting the network operator's service cable, the choice between galvanised steel, fibre reinforced cement and CCA treated timber poles is the decision of the property owner after advice from a licensed electrical contractor.
- 3) Where CCA treated timber poles are used, it is recommended that all poles are covered with a fire protection coating from 400mm below to 1.8 metres above the nominal ground line, as shown in Figure 16, to reduce the risk of damage from low intensity ground fires.

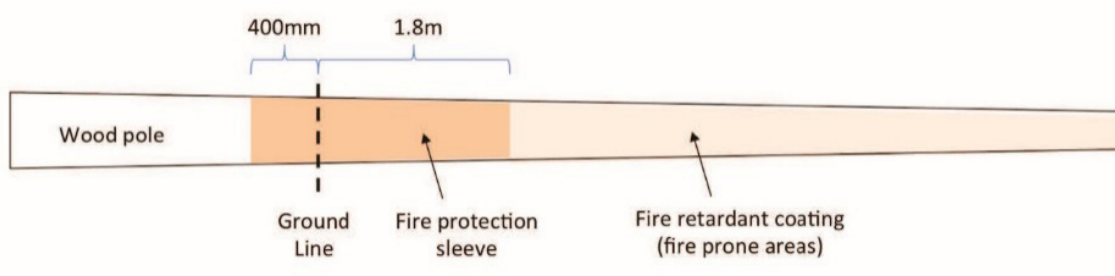


FIGURE 14 – WOODEN POLE FIRE PROTECTION DETAILS

- 4) Where galvanised steel poles are used in areas of known (or suspected) corrosive soil conditions, it is recommended that:
  - (a) an additional corrosion protection coating is applied from the base of the pole to 200mm above the nominal ground line; and
  - (b) the minimum standard of the coating is a paint system equivalent to System 3I (two pack epoxy) in Table 7.1 of AS/NZS 2312.2:2014\*\*.

Typical ground conditions likely to be highly corrosive to steel include:

- saline soils; or
- low lying areas subject to seasonal flooding and/or with a high water table.

\*\* *Guide to the protection of structural steel against atmospheric corrosion by the use of protective coatings Part 2: Hot dip galvanising*



5) The following Figures 15 and 16 illustrate the recommended application of pole options in different areas of the State:

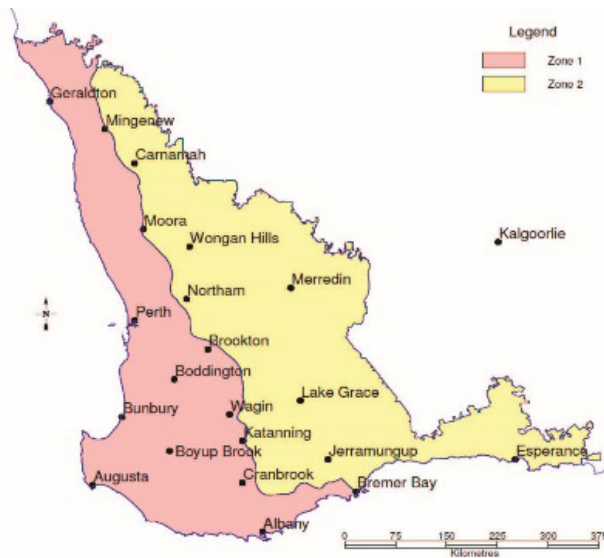


FIGURE 15 – RECOMMENDED POWER POLE APPLICATION ZONES

### Zone 1

This area is characterised by predominantly benign soils and low lying areas subject to seasonal flooding.

### Zone 2

This area is characterised by widespread saline soil conditions.

### Rest of Western Australia

This area is characterised by highly variable soil conditions.

RECOMMENDED POLE TYPES					
LOCATION	LOCAL GROUND CONDITIONS	Galvanised steel	Galvanised steel with corrosion protection coating	Fibre reinforced cement	CCA treated timber with fire protection sleeve
ZONE 1	Well-drained soil	✓		✓	✓
	Saline soil or low lying area subject to seasonal flooding		✓	✓	✓
ZONE 2	All soils		✓	✓	✓
Rest of WA	Well drained soil	✓		✓	✓
	Saline soil or low lying area subject to seasonal flooding		✓	✓	✓

FIGURE 16 – RECOMMENDED POLE APPLICATION GUIDE

\*Note: in fire-prone areas, application of a fire retardant to exposed timber surfaces above ground is also recommended.

# 7. Regulatory requirements

The Electricity (Licensing) Regulations 1991 require that:

- Under Regulation 62(1), any defects found in an electrical installation (including private power lines and poles) which render the installation unsafe must be reported by the electrical contractor to both the property owner and the network operator.
- For any notifiable electrical work (including new or modified private power lines and poles), Regulations 51 and 52 require the electrical contractor to submit a Preliminary Notice and Notice of Completion to the relevant network operator.
- Under Regulation 52B, the electrical contractor must provide an Electrical Safety Certificate to the property owner for any electrical work performed (both notifiable and minor work).

*NOTE: The property owner should also be advised that submission of the Notice of Completion may trigger a formal inspection of the electrical installation by the network operator.*

## 8. Further information

Any questions about the ownership of the overhead power lines and poles on private property should be directed to the relevant network operator:

Western Power – 13 10 87

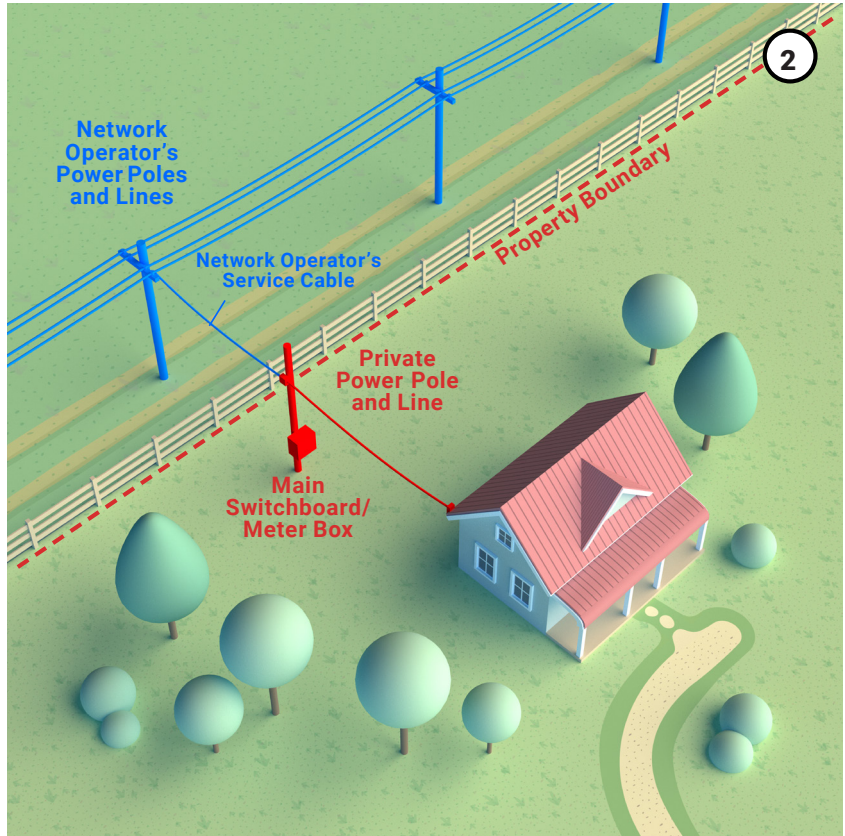
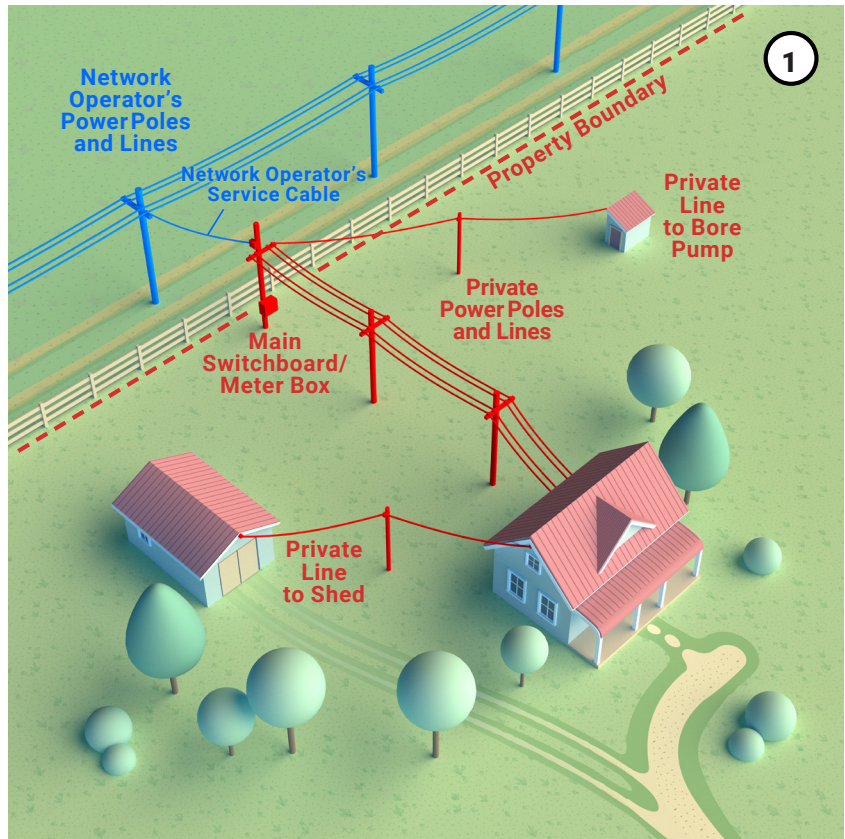
Horizon Power – 1800 267 926

Rio Tinto – 1800 992 777

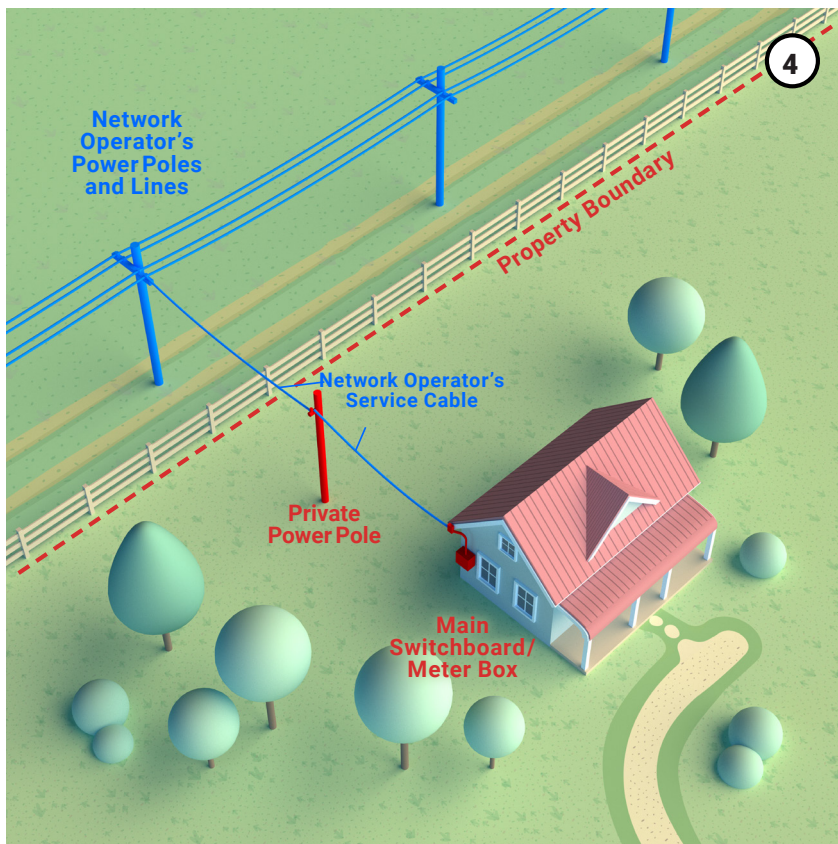
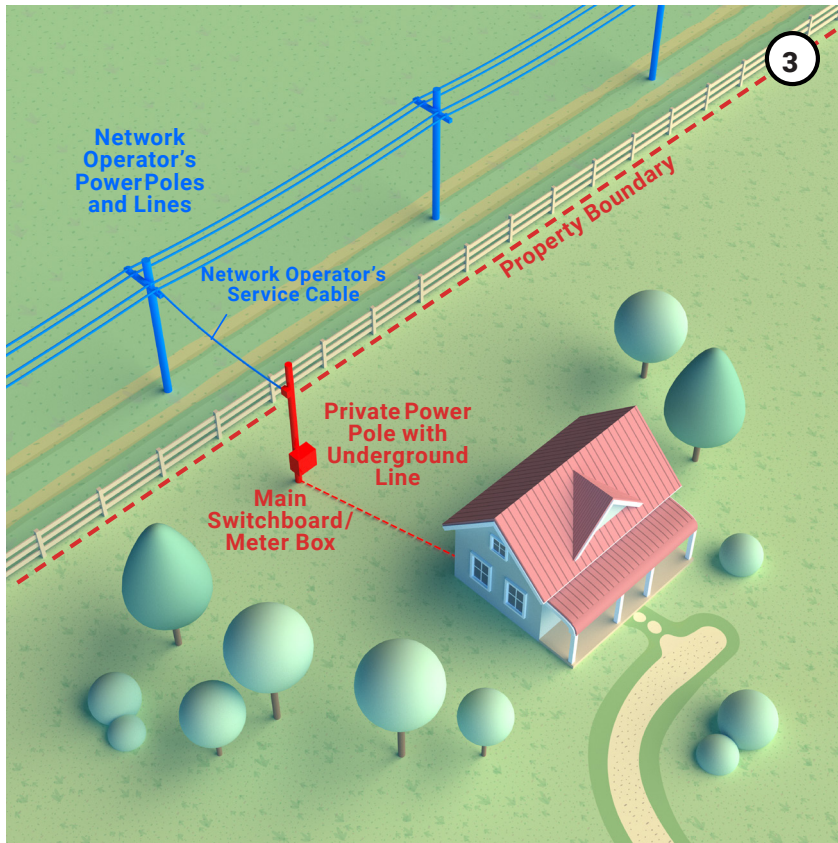
BHP – Newman 1300 632 483

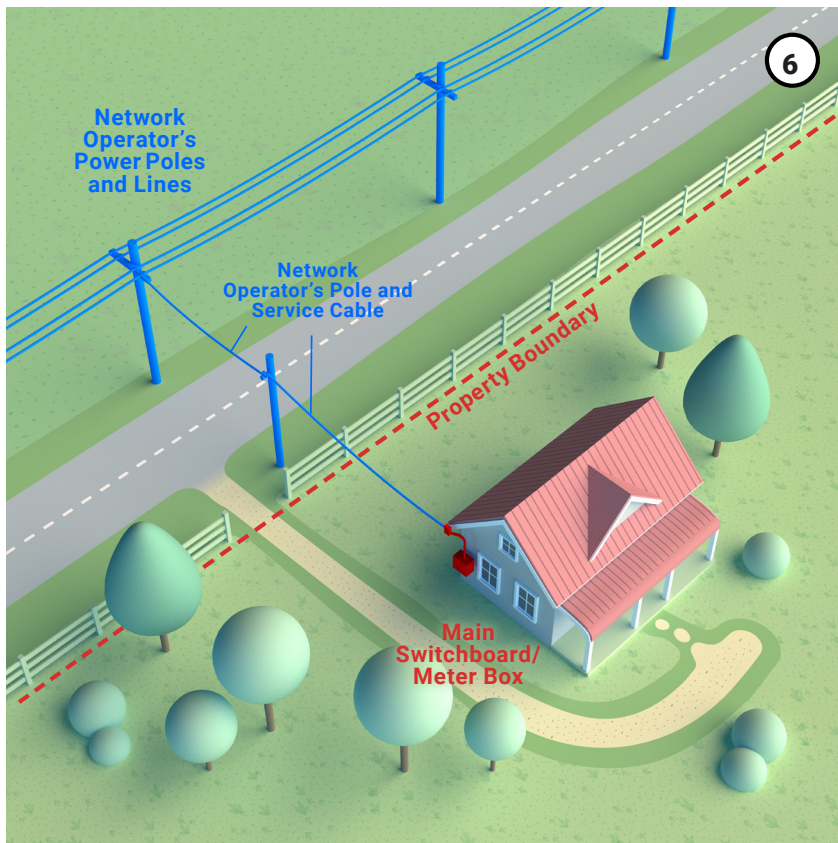
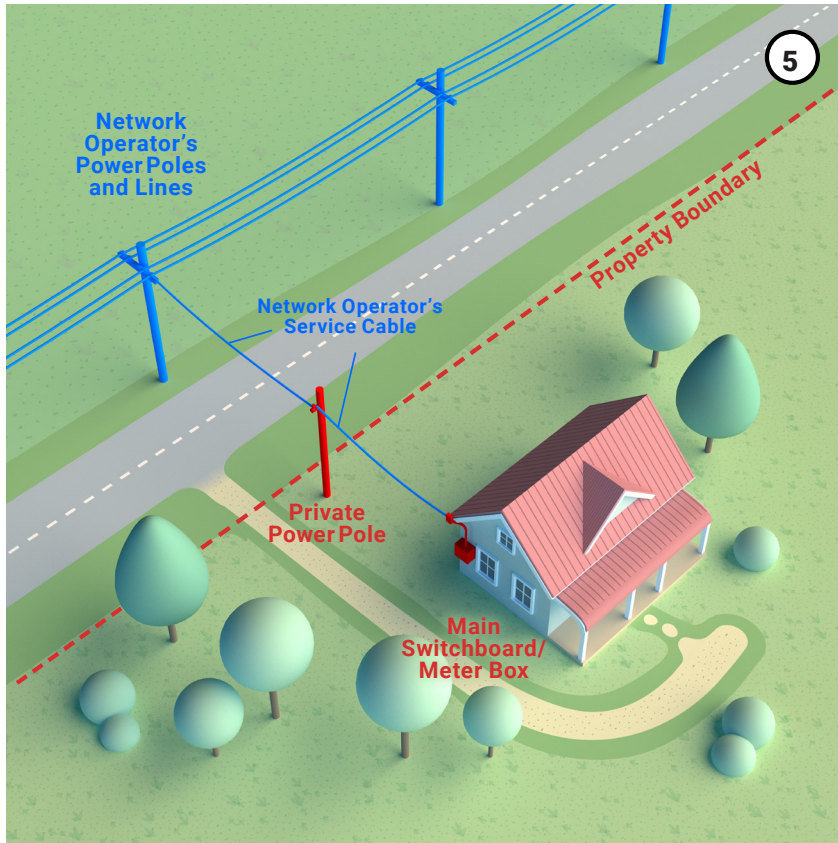
# Appendix

The following diagrams, for information only, show a number of private power pole configurations.









# Government of Western Australia

## **Department of Mines, Industry Regulation and Safety**

### **Building and Energy**

**1300 489 099**

8.30am – 4.30pm

Level 1 Mason Bird Building  
303 Sevenoaks Street  
(entrance Grose Avenue)  
Cannington Western Australia 6107

### **Online**

Website: [www.dmirs.wa.gov.au/building-and-energy](http://www.dmirs.wa.gov.au/building-and-energy)

Email: [be.info@dmirs.wa.gov.au](mailto:be.info@dmirs.wa.gov.au)

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East Perth WA 6892

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