ELECTRICAL SAFETY

FOR BUILDING AND CONSTRUCTION WORKERS

WORKPLACE FACT SHEET

KNOW THE DANGERS

Employees and contractors in the building and construction industry may run the risk of receiving an electric shock and causing substantial damage to plant and equipment when operating plant near overhead power lines or when excavating. This fact sheet has been developed to help you understand why you may be at risk and what you can do to work safely.

THINGS YOU SHOULD DO BEFORE STARTING WORK

- Complete a risk assessment. This should identify hazards (including work practices and procedures) and help you implement appropriate control measures.
- Find out the location of underground and overhead power lines and their proximity to your work activities and transit routes before commencing digging or other activities by phoning **131 081**.
- Know the location of underground and overhead power lines and their proximity to your work activities and transit routes before commencing digging or other activities.
- Dial **1100** or visit **www.1100.com.au** when planning underground work.
- Visually inspect points of attachment, at both ends, before commencing work as gutters and metal roofs may become "alive" due to deteriorating insulation on electrical wiring.
- Use a safety switch to reduce the risk of shock from portable tools.
- Before commencing work, install eye level visual markers in any area where overhead power lines are identified.
- Carefully monitor weather conditions – power lines can sway in the wind, sag as temperatures increase and are difficult to see at dawn and dusk.
- Ensure operators are aware of the height and reach of their machinery in their travel, stowed and working positions to ensure that minimum approach distances to power lines are maintained. For more information refer to *Work Near Overhead Power Lines Code of Practice 2006*, WorkCover NSW.
- Determine electricity asset safety clearances and whether an isolation needs to occur by referring to *Where to draw the line on safety clearances from electricity assets*, available at www.endeavourenergy.com.au
- Ask the occupant if they have experienced any minor electrical shocks from plumbing or appliances.

Call 131 081 and put safety first.
www.endeavourenergy.com.au

Endeavour Energy

BEFORE YOU DIG

- Apply for Dial Before You Dig plans for each location where you intend to dig.
- Use cable location services and technologies such as Global Positioning Systems (GPS) and Ground Penetrating Radar (GPR) to accurately identify the location of underground utilities.
- Pothole once you reach the applicable approach distance – for more information on approach distances for underground assets refer to *Work Near Underground Assets Guide 2007*, WorkCover NSW.

SAFE WORK HABITS

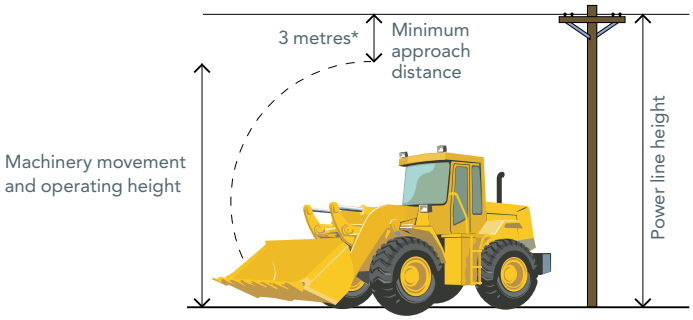
- Look up and locate overhead power lines and maintain at least the minimum approach distance from them.

Minimum safe approach distances when working near power lines

Workers and their equipment should not approach overhead power lines any closer than the following, when machinery is being operated:

Power lines with voltages up to 132,000 volts	e.g. low voltage distribution and subtransmission lines, usually on poles	3 metres
Between 132,000 and 330,000 volts	e.g. subtransmission and transmission lines, usually on either poles or towers	6 metres
More than 330,000 volts	e.g. transmission lines usually on towers	8 metres

The distance that must be assessed prior to work



*Voltages up to 132,000 volts.

- Remember that WorkCover requires a minimum approach distance of at least three metres from overhead power lines (up to 132,000 volts).
- Exercise extreme caution when working near the point of attachment of the electrical service line to the house/building.
- Look for cables and the signs of underground assets whenever digging, such as changes in grass, depressions or mounds and pipe work.
- Look out for electrical arcs. If identified, do not commence work and contact Endeavour Energy immediately on **131 003**.
- To eliminate the possibility of making contact with power lines on a job site, plan and communicate safe traffic paths by providing diagrams of plant and vehicle travel paths away from overhead power lines.
- Assign a spotter to each operator of high machinery and excavators to guide movements near overhead power lines and underground cables and ensure that minimum approach distances are maintained.
- Before every relocation, lower all machinery into the transport position.
- Use proximity sensor technologies on plant while you dig.

PERMIT TO WORK SYSTEMS

Using a permit to work (PTW) system can be an effective way to be sure preventative measures have been taken before any digging commences. It acts as a checklist that can only enable digging work to commence (usually with supervisor sign off) once all preventative actions have been taken *first*.

A typical permit to work checklist should ask/specify the following:

01 Has Dial Before You Dig been undertaken?

02 Have cable location services/technologies been used and their results compared with the DBYD plans?

03 Have the plans been marked up to reflect any new information/changes?

04 Has the safest plant suitable for the job been selected and ordered?

05 Has a spotter been allocated to this job to observe hand, mechanical or powered digging?

06 Is potholing included in the safe work procedure?

07 Has the job been assessed to use non-destructive digging?

08 Have overhead power lines been identified as a risk? If so, has this risk been managed as low as reasonably practicable?

09 Have all persons who may face/are affected by the risk of hitting underground utilities been consulted/made aware of the safe work procedures?

SAFETY EXCELLENCE

IN EMERGENCIES CALL 131 003

24 hours a day, 7 days a week

If you have any questions about what you should do to stay safe please call 131 081 or visit us at www.endeavourenergy.com.au

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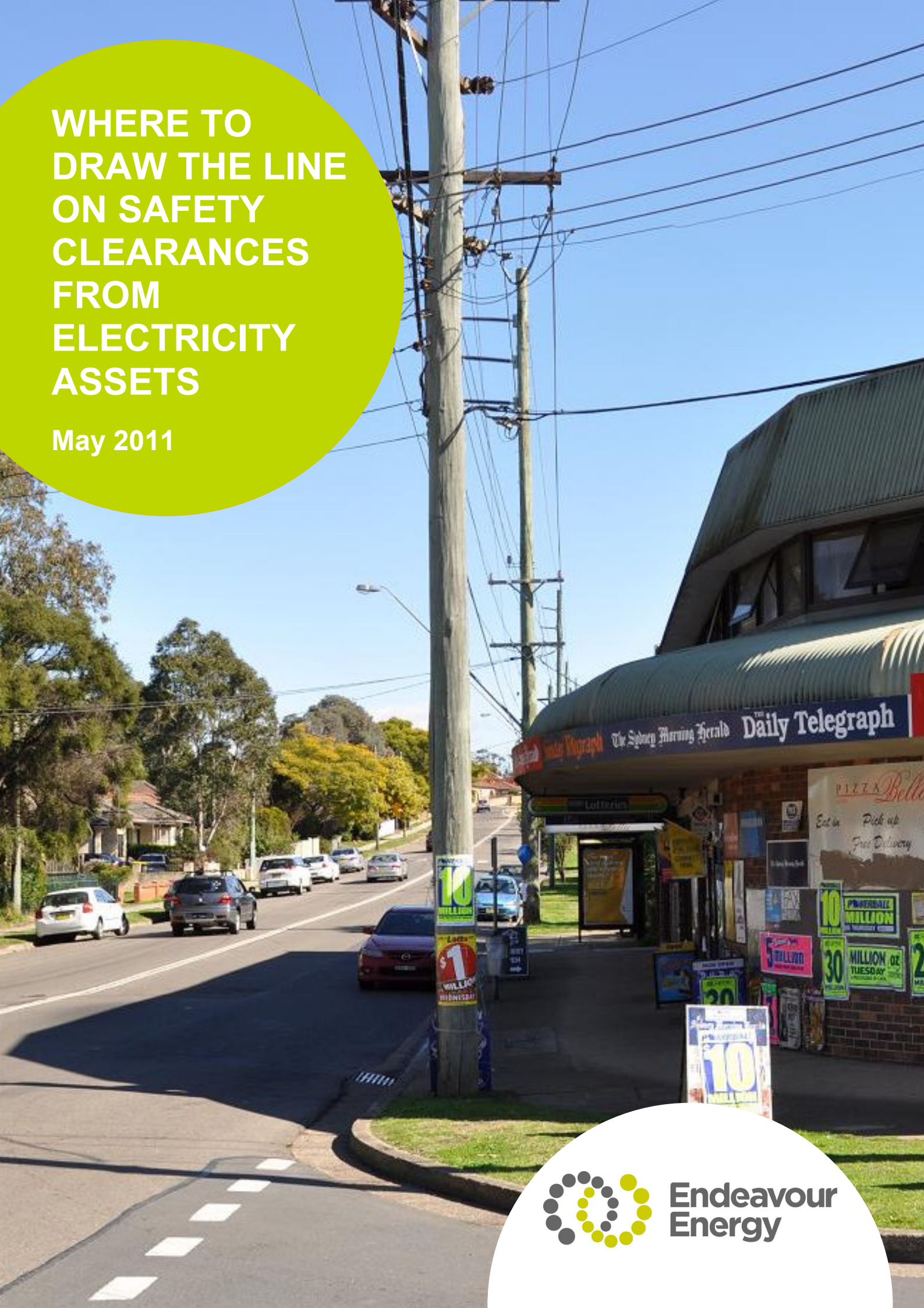
WHERE TO DRAW THE LINE ON SAFETY CLEARANCES FROM ELECTRICITY ASSETS

May 2011



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Where to draw the line on safety clearances from electricity assets

Are you in the clear?

Important information on safe distances

This brochure is designed to inform anyone working on or around buildings or sites that are connected to or in the vicinity of electricity assets of safe distances that must be maintained from electricity assets, overhead or underground.

Awareness of safety clearances could mean the difference between a safe, successful project and a fatal accident.

It may also save time and money by ensuring the design of a home or building complies with safety requirements without additional measures being taken.

Drawings in this brochure specify the minimum safety clearances for working or living near electrical assets.

Note: Full details about safe work practices, including penalties for non-compliance, are set out in the WorkCover NSW document *Work near overhead power lines: Code of practice 2006*. The Code can be viewed at the following link:

www.workcover.nsw.gov.au/formspublications/publications/Documents/work_near_overhead_power_lines_code_of_practice_1394.pdf

The requirements for maintaining safe distances from electricity assets are also set out in the **State Environmental Planning Policy (Infrastructure) Regulation, 2007** (Division 5 - Electricity transmission or distribution, Subdivision 2 - *Development likely to affect an electricity transmission or distribution network*).

This requires local councils to seek comments from Endeavour Energy before approving any development application where electricity infrastructure is present.

Types of assets

The following pictures show typical electricity assets that may be installed in residential areas.

High and low voltage overhead mains

Underground service pillar

Ensuring you're in the clear

All buildings and other structures must comply with minimum safety clearances from overhead electricity conductors.

The minimum distances from the closest conductor to the building or other structures must be maintained during strong winds or high operating temperatures. Under these conditions, the conductor can swing or sag considerably towards the building or structure.

The minimum safety clearances are shown in the illustrations in this brochure. They have been prepared to suit Endeavour Energy's asset construction practices.

If it appears that conductors are closer than the minimum safety clearances shown in the table, call Endeavour Energy for advice.

Some important considerations regarding minimum safety clearances include:

- Knock-down/rebuilds, where a small, single storey home is replaced by a larger or double storey home, or where land is rezoned to allow multi-storey construction, such as apartments or town houses.
- Moving the location of a driveway or building driveways close to pillars or poles.
- Installing a tall antenna in areas where broadcast reception is poor.
- Erecting a flagpole.
- Any building work near underground or overhead power lines.
- Erecting a cubby house.
- Raising the ground level below power lines.
- Erecting metal fences or scaffolding close to poles or lines.
- Excavating near poles or where electricity assets run underground.
- Using a crane near overhead lines

Swimming pools are generally unsuitable for installation near electricity assets, and are rarely allowed. Above-ground pools, in particular, are regarded as inherently unsafe.

Working with safety near the point of attachment

The point of attachment is where the electrical wires attach to a home or building. When work is being carried out near the point of attachment, special care must be taken to avoid contact with these electrical wires, and the mounting bracket, or to avoid damaging them.

The safe distance from a point of attachment is 1000mm.

Care must be taken with activities such as:

- Cleaning leaves from guttering.
- Painting gutters, fascias and eaves.
- Pruning trees and shrubs (particularly around the electrical wires).
- Attaching aluminium cladding to the fascias and the eaves.
- Replacing the guttering.

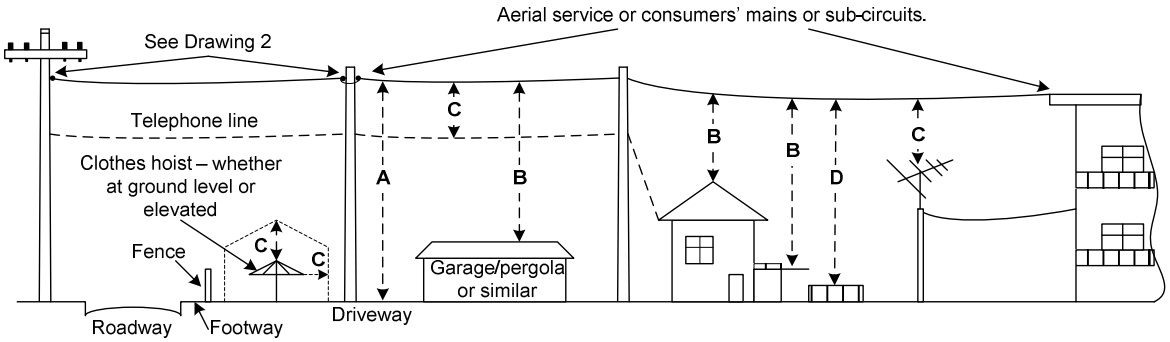
Keeping your distance

The minimum safety clearances over structures, roads and driveways are shown in the following drawings.

Remember – these are the **minimum** safe distances. In some cases, the distance may increase to ensure public safety.

Drawing 1: Minimum safety clearances over structures

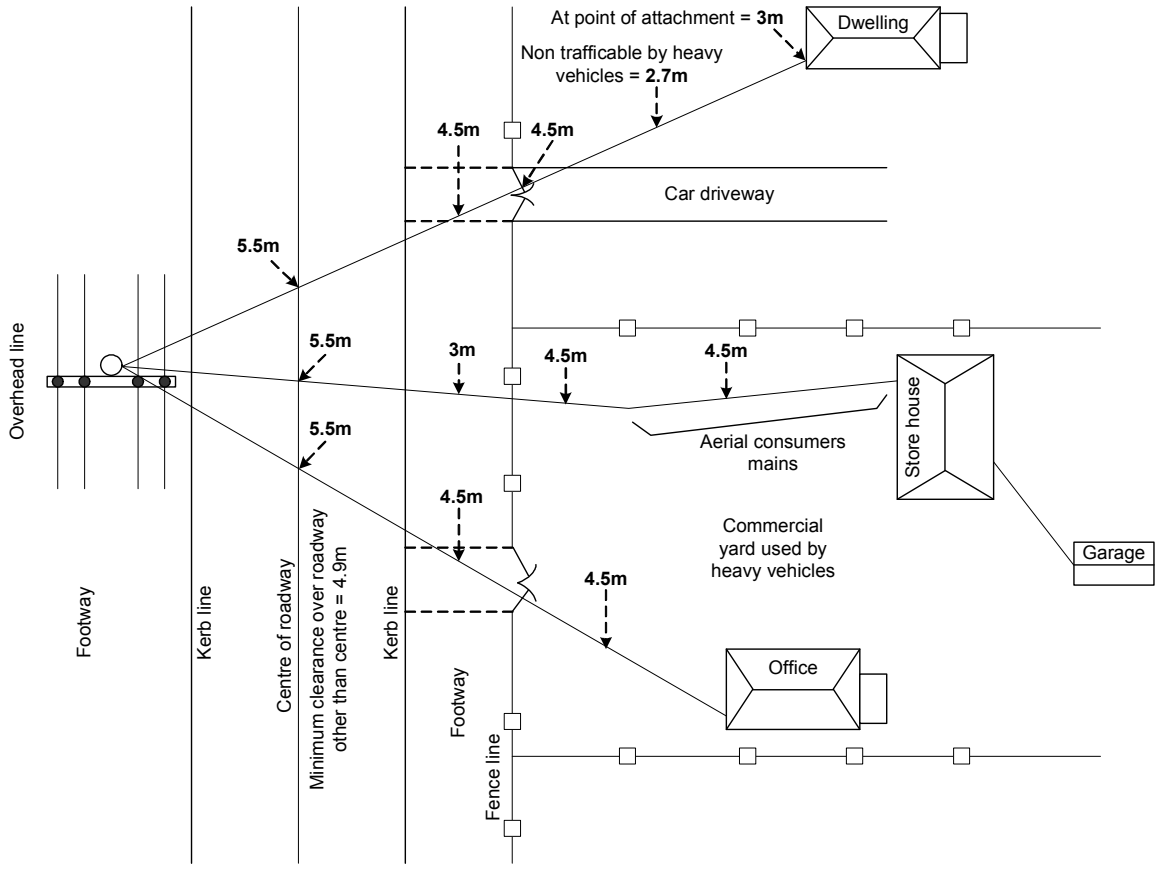
Aerial consumers' and service mains



Application / Type of aerial conductor	Minimum height above buildings, structures, ground or elevated areas (mm)		From, **buildings, TV/ radio** antenna or stay wire and **telephone lines** (mm)**.**	Above water level in swimming pool, above walkway around pool	Above areas where irrigation pipes are used, or above areas where sail craft are used
	Over ground	Over roofs			
	A	B	C	D	
Bare or insulated live conductors	Bare 5500 Insulated 4500	3700	2000 3000 for clothes lines	Not permitted	Refer to Integral Energy

Drawing 2: Minimum safety clearances over roads and driveways

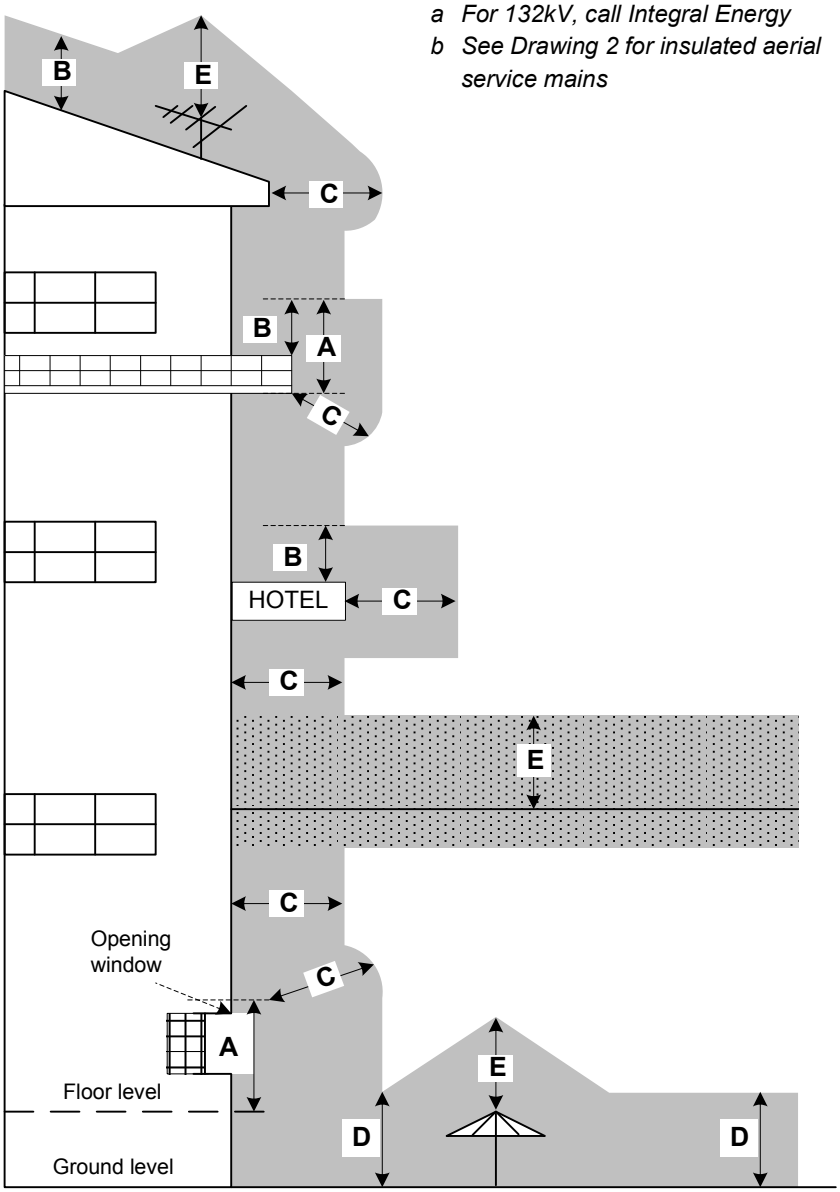
For insulated aerial service mains



Drawing 3: Minimum safety clearances near structures

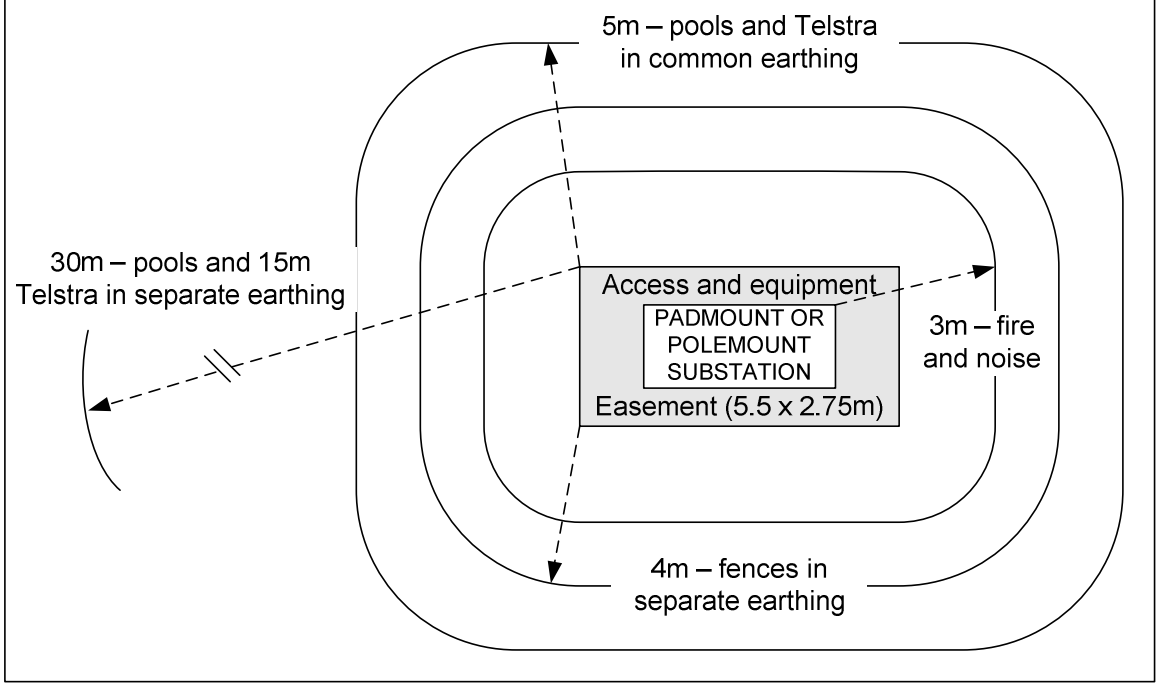
	0-1000V LV	1-22kV HV	33kV[a] Trans.
A Above standing areas	3700mm	3700mm	5000mm
B Accessible areas	2700mm	2700mm	4500mm
C Non-accessible areas	1000mm	2100mm	2500mm
D Ground	5500mm[b] (bare)	7300mm	7300mm
E Above outdoor TV antennas, aerial cables or clothes lines	1800mm	3000mm	3000mm

a For 132kV, call Integral Energy
b See Drawing 2 for insulated aerial service mains



The above drawing specifies the minimum safety clearances for working or living near electrical power lines.

Drawing 4: Substations - segregation requirements from other structures



Padmount substation (above) and pole mounted substation (right)

Underground services

Care must also be taken to ensure that building or excavation activities do not infringe on underground cable, ducts and protective covers. Before undertaking any work in the vicinity of underground cables, advice should be obtained from the ***Dial Before You Dig*** service (see page 7 for phone number).

Who to call

For further information on safe distances, please call:

Region	Local government areas	Contact name and number
North	Bathurst, Baulkham Hills, Blacktown, Blue Mountains, Hawkesbury, Lithgow, Parramatta, Penrith, plus parts of Hornsby, Mid-Western and Ryde.	Project Manager **131 081**
Central	Camden, Campbelltown, Fairfield, Holroyd, Liverpool, Wingecarribee, Wollondilly, plus parts of Bankstown.	Customer Service Manager **131 081**
South	Kiama, Shellharbour, Shoalhaven, Wollongong.	Customer Service Manager **131 081**

Application forms for asset relocation on connection can be found on Endeavour Energy's website at ***www.endeavourenergy.com.au/Our network/How do I get started?*****,** or by calling Endeavour Energy's Network Connections Customer Consultant on **9853 6234**.

Drawings contained in this document are a general guide only to Endeavour Energy's safe distances requirements. Full details are contained in Endeavour Energy's design and construction drawings and Standards, which are available on request.

The key drawings are:

- Drawing no. 0011985, sheets 1 and 2; Drawing no. 086232; and, Drawing no. 086242.

Reference should also be made to Mains Maintenance Instruction MMI 0015 – Management of Endeavour Energy's electricity easements.

Dial Before You Dig service - **1100**.

WorkCover Assistance Service - **13 10 50**.

LIVING SAFELY WITH ELECTRICITY

When working outside, whether it's a small job or large job or even something you do every day, you need to be aware of the electrical dangers of working near overhead power lines or underground cables.

Endeavour Energy wants to help protect you from potential electrical dangers on your work site. In turn, this will ensure families, households and businesses can continue to enjoy a safe and reliable electricity supply.

This brochure highlights some of the things you can do to avoid electrical dangers on the job.

Did you know?

Australian households receive communication, gas, water and electrical services via a labyrinth of cables stretching millions of kilometres underground. If just one of these cables is damaged, you could potentially be seriously injured and/or isolate thousands of households from essential services. Such incidents can result in hefty fines.

01 Call Emergency Services on **000**.

02 Request an ambulance if anyone is injured.

03 Report the incident to Endeavour Energy on **131 003** as soon as possible.

SAFETY EXCELLENCE

IN EMERGENCIES CALL 131 003

24 hours a day, 7 days a week

If you have any questions about what you should do to stay safe around damaged power lines and other electrical infrastructure please call 131 081 or visit us at www.endeavourenergy.com.au

0611-ENE2351-CONT

SAFETY ON THE JOB

51 Huntingwood Drive
Huntingwood NSW 2148
PO Box 6366 Blacktown NSW 2148
T: 131 081 • F: 61 2 9853 6000

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Call 131 003 and put safety first.
www.endeavourenergy.com.au

Endeavour Energy

BE ALERT AT WORK

Do you know where the underground cables are?

Unfortunately, serious incidents occur when excavators hit underground cables because cables aren't identified before work has commenced. Obtaining information about underground cable locations once involved making numerous calls to many utility providers.

Now there's really no excuse. Information and site maps showing the general location of underground services can be obtained by calling **1100** or visit **www.1100.com.au**. Remember it's the law.

Check, double check, triple check and reassess

Always check, double check, triple check and reassess for electrical dangers on the job. Remember, earthmoving operations often require material to be relocated to mounds or piles. When this happens under and around power lines it reduces the clearance distances between plant and the electrical infrastructure.

Completed your job?

Stay alert when packing up or removing scaffolding or equipment or when returning plant to its transit position.

Transporting trees?

Remember tall trees and shrubs such as palms can come into contact with power lines. Water is a good conductor of electricity and can therefore conduct through vegetation due to its water content.

Excavating?

Always check the voltage of cables listed on plans so that you can then apply this to *Work Near Underground Assets Guide 2007*, WorkCover NSW, to determine what the clearance and other requirements are to commence excavation. Select the safest plant for the job, e.g. toothless buckets and blunt hand tools. Before using mechanical plant to dig, use a cable location service to check the accuracy of plans. Always pothole by hand with non-conductive, blunt hand tools.

Look up and live

If a tip-truck, scaffolding, pump, ladder, crane or metal platform approaches or comes in contact with overhead power lines, the operator and even people nearby, could be electrocuted. Before starting work always look up and identify the location of any overhead power lines. Plan the job to minimise work near and around power lines.

Compare the height of power lines to the maximum height of your equipment, and ensure the full reach of your equipment will not breach the approach distances outlined in the *Work Near Overhead Power Lines Code of Practice 2006*, WorkCover NSW. For "ordinary persons" WorkCover requires an approach distance of at least three metres from overhead power lines (up to 132,000 volts).

Additional clearances are required when working near power lines carrying higher voltages. It's also a good idea to nominate a co-worker to observe and check that you and your equipment do not go into the approach distance zone.

HOW CAN YOU HELP?

Electricity can jump

You don't have to be touching power lines to get an electric shock because electricity can 'jump' – also known as arcing. A safe 'clearance' distance needs to be maintained to prevent electricity from arcing across to you and your equipment.

Five things to remember

01 Check, double check, triple check and reassess – always assess your work site for electrical dangers before you start and stay alert until you've left the site.

02 Look up and live – identify the location of overhead power lines and plan your job away from them.

03 Dial **1100** or visit **www.1100.com.au** before you dig – confirm the location of all underground cables before you begin any excavation work.

04 Before using mechanical plant to dig, check the accuracy of your plans using a cable location service. Pothole by hand using blunt plant items.

05 Always maintain a minimum approach distance from power lines and assign a co-worker as an observer while you operate and move machinery around power lines.

DIAL BEFORE YOU DIG® www.1100.com.au