Ergon Energy - Telstra Corporation

Power Coordination Agreement
derived from
Joint Industry Codes of Practice

Power Coordination Guidelines
EPR AND LFI

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Electrical Standards
Engineer - Lines

Telstra Contact:
Keith Stewart
Senior Engineer
Power Coordination QLD

Implementation:

Issue 1 February 2007
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PURPOSE

The purpose of this document is to provide:

- A list of contact persons from Ergon Energy and Telstra who can assist each other to meet their respective organisation’s power coordination responsibilities,
- Some basic guidelines to assist persons in determining suitable separation distances between Telstra plant and Ergon HV plant in order to mitigate the effects of EPR on Telstra plant should an earth fault occur on Ergon HV plant.

SCOPE

The list of contact persons included within this document is not exhaustive. Other suitably qualified persons involved in the design and placement of Ergon and Telstra plant may exist. The contact persons listed will change from time to time and it is expected this list will need to be reviewed annually.

This document also provides power coordination guidance to:

- Ergon staff responsible for placing or designing HV plant that may adversely affect existing Telstra telecommunications plant,
- Telstra staff responsible for placing or designing telecommunications plant that may be adversely affected by existing Ergon HV plant.

Minimum EPR separation distances are listed in the table in Attachment 1. These separations apply to the distance between HV Distribution plant earths and specific Telstra telecommunications plant types. These separations are derived from the EPR Code of Practice.

Separation distances for Ergon HV Transmission plant are not discussed in this issue of the guideline but are intended to be addressed in a later issue of this document. EPR separations between Ergon HV Transmission plant and Telstra plant should be determined directly from the EPR Code of Practice.

The effects of LFI will need to be considered for HV Transmission and Distribution lines and cables. These requirements are discussed more fully in the LFI Code of Practice.

DEFINITIONS

The following words, acronyms and abbreviations are referred to in this document.

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC</td>
<td>Alternating current</td>
</tr>
<tr>
<td>ATC</td>
<td>Australian Telecommunication Commission (now Telstra Corporation)</td>
</tr>
<tr>
<td>CMEN</td>
<td>Common Multiple Earthed Neutral. The HV and LV neutral earthing is common. The combined resistance to true earth is improved.</td>
</tr>
</tbody>
</table>
## Power Coordination Guidelines

**Agreement between Ergon Energy and Telstra (Distribution Only)**

### Definitions

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMUX</td>
<td>Customer Multiplexer – street mounted equipment housing which can be regarded as an out-posted telecommunications exchange.</td>
</tr>
<tr>
<td>Distribution</td>
<td>Ergon’s electricity distribution network (up to 22kV)</td>
</tr>
<tr>
<td>EIS</td>
<td>Environmental Impact Statement (Study)</td>
</tr>
<tr>
<td>EPR</td>
<td>Earth Potential Rise – fault currents flowing into HV earthing systems raise the voltage on these systems and the surrounding soil.</td>
</tr>
<tr>
<td>ESAA</td>
<td>Electricity Supply Association of Australia</td>
</tr>
<tr>
<td>HV</td>
<td>High Voltage - a voltage greater than 1000V a.c.</td>
</tr>
<tr>
<td>LIS</td>
<td>An acronym for pole number used in NSW and VIC.</td>
</tr>
<tr>
<td>LFI</td>
<td>Low Frequency Induction – fault currents flowing along faulted HV lines electro-magnetically induce voltages into nearby telecommunications cables.</td>
</tr>
<tr>
<td>MEN</td>
<td>Multiple Earthed Neutral</td>
</tr>
<tr>
<td>OHEW</td>
<td>Overhead Earth Wire</td>
</tr>
<tr>
<td>U/G cable</td>
<td>Underground cable</td>
</tr>
<tr>
<td>Power Coordination</td>
<td>Somewhat of a misnomer in that Power-Telecommunication Coordination would be more appropriate as it accurately describes a coordinated attempt by power and telecommunications organisations to minimise the interference power systems have on telecommunications systems evidenced by EPR, LFI, or Noise Interference. The term Power Coordination also reflects the view from a telecommunications perspective and the alternative power related view - Telecom Coordination – was once in use.</td>
</tr>
<tr>
<td>RIM</td>
<td>Remote Integrated Multiplexer – street mounted equipment housing which can be regarded as an out-posted telecommunications exchange.</td>
</tr>
<tr>
<td>SIMPLEX Changeover</td>
<td>Telstra process description meaning:- Simple changes to power utility plant on joint use poles impact in a minor way on Telstra plant</td>
</tr>
<tr>
<td>Transmission</td>
<td>Ergon’s electricity transmission network (33 to 220kV)</td>
</tr>
</tbody>
</table>

### BACKGROUND

Over recent years extensive reorganisations in both Ergon, (and the boards that preceded Ergon), and Telstra have made power coordination activities between both organisations difficult. This has resulted in a loss of contact between staff working for both organisations as well as a loss of expertise in power coordination.

When a High Voltage Power System, (HV - greater than 1000 V a.c.), experiences an earth fault then current will flow through HV Power Station, Substation and Transformer earthing systems. This fault condition raises the voltage on HV station earthing systems and the surrounding soil with respect to remote earth. This rise in voltage can be hazardous and is
known as EPR - it may occur at any time without warning at, or near, a HV Power Station, Substation or Transformer, etc.

EPR can also affect telecommunications plant servicing an Ergon HV station and may be hazardous to Telstra personnel working on telecommunications lines entering HV stations. This also applies to any Ergon personnel who may be working on privately owned Ergon telecommunications equipment. EPR may also damage telecommunication plant or cause it to malfunction.

LFI occurs where Telstra cable, with metallic conductors, runs in proximity to a High Voltage power line that experiences a phase to earth fault. The current in a faulted power line produces a magnetic field that causes a low frequency voltage to be induced into Telstra cable. Power line faults can result from insulator flashovers, mechanical failures, storms, lightning, and contacts.

Under normal operating conditions a three-phase HV power line will not induce hazardous voltages on nearby Telstra cables. This is mainly because the load currents flowing in the three phase conductors are balanced. The magnetic field produced, and resultant LFI, will be negligible.
THE ERGON ENERGY NETWORK

Ergon Energy operates HV Transmission and Distribution networks. Potential earth fault currents vary considerably between these networks and each is discussed separately below.

1.1 HV Distribution Network

Ergon’s HV Distribution network operates at 11kV and 22kV. Earth fault currents can be greater than 8kA should a fault occur near the zone substation. However the magnitude of the earth fault current is progressively reduced for earth faults occurring at increasing distance from the zone substation.

Earth faults on the 11-22kV HV Distribution network can cause significant EPR in some circumstances - as there is no overhead earth wire on these networks providing a return path for the fault currents resulting from a failure of insulation.

1.2 HV Transmission Network

Ergon’s HV Transmission network operates at 33kV, 66kV, 132kV, and 220kV.

Earth faults on Ergon’s 33 kV sub-transmission network can result in earth fault currents which are typically less than 4 kA. An exception to this is the HV sub-transmission network in Mackay City where earth fault currents are typically higher than 4 kA.

Earth fault currents on Ergon’s 66kV transmission network are typically less than 8 kA. The high speed protection schemes associated with these lines will however mitigate the effects of EPR. Also, the interconnected earthing systems associated with the 66kV lines using conductive structures can limit EPR to moderate values.

Earth faults on Ergon’s 132 kV HV Transmission network can be significant but are usually less than 30 kA. In spite of these high currents, the interconnected earthing systems associated with 132 kV lines (OHEW and U/G cable sheaths) can limit EPR to moderate, although still hazardous, values.

Earth faults on Ergon’s 220kV HV transmission network cause fault currents which are typically greater than 4 kA.

2. COSTS ARISING FROM POWER COORDINATION

The costs associated with rectification of EPR / LFI problems can be substantial, since the solutions often involve the relocation of plant and/or changes to system fault levels. Both Ergon and Telstra should work towards the best engineering solution, and the responsibility for who pays for remedial action usually rests with the business that is last to change the status quo, e.g. last to install affected or affecting equipment, or change fault level. When considering costs the on-going cost of asset maintenance for mitigation should be taken into account as part of the cost study. For example a scheme of gas-filled protectors and associated earth systems installed at points along a telecommunications cable will need to be inspected every couple of years and repairs made if damage has been caused by lightning.

Ergon Energy will advise of new constructions or alterations to existing construction as early as practicable and will generally advise Telstra a required response time for planned works. Delays in responding could involve considerable extra costs to both parties.
3. CONSTRUCTION ACTIVITIES REQUIRING POWER COORDINATION

The following construction activities require power coordination (consideration of EPR and LFI aspects) and/or separation/segregation considerations and should be incorporated in the owner’s processes.

Plans of proposed Ergon construction will often need to be forwarded to Telstra for LFI and/or EPR assessment. Telstra’s preferred format for receiving plans is:

1. a DXF file based upon a GDA94 projection specifying latitude/longitude (if different please specify),
2. Line, line nodes and towers or trench in separate layers with each layer appropriately named, e.g. “power line” for the line, “towers” or “poles” or “towers and Poles” for the support structures,
3. Substations to show site boundary and earth mat extension for substation site in separate layers,
4. A supporting PDF or similar to show an over view of the power line and geographical features.

Electronic plans in the format above will allow Telstra to process LFI and EPR assessments faster than possible with hardcopy plans.

3.1 Simplex Pole Change-overs requiring removal or relocation of Telstra aerial attachments

Simplex pole change-overs occur where Telstra plant needs to be relocated or removed from Ergon poles. This may be due to pole replacement, removal, straightening or relocation of poles and associated work. Telstra should be notified prior to work commencing so that sufficient time is allowed for Telstra to programme work. The information needed to assist this is:

- For single pole maintenance the form in Attachment 2.1 should be used,
- For multiple pole maintenance both forms in Attachments 2.1 and 2.2 should be used.

Responsibility

<table>
<thead>
<tr>
<th>Ergon:</th>
<th>Far North Region</th>
<th>TELSTRA: NCI Aerial Asset Co-ordination Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Line Maintenance Service Co-ordinator</td>
<td>Mc Leod St, Cairns 4870</td>
<td>P.O Box 759, Orange NSW 2800</td>
</tr>
<tr>
<td>Phone: 4080 4442</td>
<td></td>
<td>Phone: 1800 047 909</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fax: 1800 807 573</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Email: <a href="mailto:f0204107@team.telstra.com">f0204107@team.telstra.com</a></td>
</tr>
</tbody>
</table>

Northern Region

| Line Maintenance Service Co-ordinator |
| Ergon Energy |
| PO Box 1090, Townsville 4810 |
| Phone 4727 6521 |

Central & Mackay Region

| Line Maintenance Service Co-ordinator |
| Ergon Energy |
| Ness St Office, Mackay 4740 |
| Phone 4951 5708 |
3.2 New or upgraded zone substations (including modular substations installed near existing substations)

EPR calculations should be carried out as necessary as part of the design of the substation. Telstra should be informed of the location and plans to build or augment a substation and be notified of the results of any EPR calculations. EPR testing can be performed as part of the commissioning phase.

Responsibility

Ergon: Principal Engineer  
Sub-transmission Planning & Investigation  
P.O. Box 1090  
Townsville QLD 4810  
Ph (07) 4727 6545

TELSTRA: Senior Engineer  
Power Coordination QLD  
Locked Bag 3546  
Brisbane QLD 4001  
Ph. (07) 3887 5149

3.3 Existing zone substations

Calculations are approximate and of limited value. Off-frequency injection tests may be performed at Telstra’s request, and are usually conducted in conjunction with Telstra who have specialised measurement equipment and expertise in this area (also Ergon Transmission and Distribution Services staff). Off-frequency injection tests can save both Ergon and Telstra significant costs that would otherwise be incurred should mitigation be adopted without testing. Ergon will generally provide a current source and injection circuit while Telstra will generally provide a Remote Earth for measurement purposes.

Responsibility

Ergon: Principal Engineer  
Sub-transmission Planning & Investigation  
P.O. Box 1090  
Townsville QLD 4810  
Ph (07) 4727 6545

TELSTRA: Senior Engineer  
Power Coordination QLD  
Locked Bag 3546  
Brisbane QLD 4001  
Ph. (07) 3887 5149
3.4 New 66/132/220 kV transmission lines (overhead or cable) and/or major alterations to existing transmission lines

Telstra should be informed of the location and alignment of new transmission lines at route selection time, as well as prospective fault levels and protection class/clearing times applicable. Details of HV earths and planned commissioning dates are also important to Telstra.

The Terms of Reference for any EIS should include assessment and mitigation strategies for EPR and LFI involving telecommunication lines.

Responsibility

Ergon: 1) Lines involving easements
Property Acquisition Manager
P.O. Box 1090
Townsville QLD 4810
Phone (07)476 773

2) All other lines
Principal Engineer Lines
P.O. Box 1090
Townsville QLD 4810
Phone (07) 4727 6827

TELSTRA: Principal Engineer
Power Coordination QLD
Locked Bag 3546
Brisbane QLD 4001
Ph. (07) 3887 5200

3.5 Existing 66/132/220 kV transmission lines (overhead or cable) and/or major alterations to existing HV transmission lines

If requested by Telstra, applicable fault levels and clearing times should be provided. Principal Engineer Sub-transmission Planning & Investigation is responsible for calculating fault levels and Protection Section can provide typical fault clearing times.

Responsibility

Ergon: Principal Engineer Sub-transmission Planning & Investigation
P.O. Box 1090
Townsville QLD 4810
Ph (07) 4727 6545

TELSTRA: Principal Engineer
Power Coordination QLD
Locked Bag 3546
Brisbane QLD 4001
Ph. (07) 3887 5200

3.6 New 11/22/33 kV HV distribution lines (overhead or cable) and extensions of 11/22/33 kV lines

Telstra should be informed of the location and alignment of the above lines during the design stage. This is particularly important for non-urban and rural areas where extensive MEN systems may not be present.

For EPR reasons Ergon should take into account the separation of Telstra systems from HV earthing systems as shown in Attachment 1 - Consideration Of EPR - Table of Minimum Separations between Telstra Plant and HV Distribution Plant Earthing Systems, when designing / laying out new 11/22/33 kV HV distribution lines and extensions of existing 11/22/33 kV HV distribution lines.

Note also that for some situations, e.g. long runs parallel with Telstra lines, LFI may be the problem and not EPR issues, and Telstra still needs information on these lines.
Power Coordination Guidelines
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Responsibility

Ergon:

All Regions:
For lines designed by Transmission & Distribution Services

Far North Region:
North of Cardwell Range, Atherton Tablelands

Northern Region:
North of Bowen to Cardwell, North and Mid-Western Queensland

Mackay Region
South of Proserpine to Sarina

Capricornia region:
South of Sarina to Marian Vale and Central west Queensland

Wide Bay Region

South West Region

TELSTRA:

QLD – All regions

Note: The use of “Aerial” in the Telstra area responsible for receiving proposals is somewhat misleading. Underground plant affected by Ergon activities should also be sent to this address where they will be forwarded to Telstra planners and designers undertaking recoverable works in QLD.

3.7 Distribution Transformers in New Subdivisions

As per Section 7.6 above.
3.8 Fault Level Reporting

Any system alteration which increases the fault level at a zone substation busbar by more than 10% should be reported to Telstra at the planning stage.

Network fault levels at 33/66/132 /220 kV shall be provided to Telstra annually at the following address -

Responsibility

Ergon: Principal Engineer
Sub-transmission Planning & Investigation
P.O. Box 1090
Townsville QLD 4810
Ph (07) 4727 6545

TELSTRA: Senior Engineer
Power Coordination QLD
Locked Bag 3546
Brisbane QLD 4001
Ph. (07) 3887 5149

3.9 Telecommunication lines into new and existing Ergon substations

Communication line isolation installed to 15 kV, 50 Hz rating as part of project.

Responsibility

Ergon: Communications and Control Systems Engineer
P.O. Box 1090
Townsville QLD 4810
Ph (07) 4727 6766

TELSTRA: Telecommunications Installation and Maintenance:
Use normal Telstra customer contacts.

Telecommunications HV Isolation advice:
Telstra Power Coordination QLD
1800 029 760
4. REFERENCES

<table>
<thead>
<tr>
<th>Document Number</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>TPH 2568 (Telstra reference number only)</td>
<td>Recommended Practices For Plant Underground, Joint ESAA and ATC publication, Issue 1, 1983.</td>
</tr>
</tbody>
</table>

5. ATTACHMENTS

<table>
<thead>
<tr>
<th>Document Number</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attachment 1</td>
<td>Consideration of EPR - Table of Minimum Separations between Telstra Plant and HV Distribution Plant Earthing Systems</td>
</tr>
<tr>
<td>Attachment 2</td>
<td>Attachment 2 Pages 1, 2 Advice Of Pole Maintenance Form</td>
</tr>
</tbody>
</table>

6. DOCUMENT CONTROL SHEET

Contact for Enquiries and Proposed Changes

If you work for, or are contracted to, **Ergon Energy** and have any questions regarding this document contact:

Name: Walter Martin  
Designation: Electrical Standards Engineer  
Phone: 07 4727 6644  
Fax: 07 4727 6799

If you work for, or are contracted to, **Telstra Corporation** and have any questions regarding this document contact:

Name: Keith Stewart  
Designation: Senior Engineer Power Coordination QLD  
Phone: 07 3887 5149  
Fax: 07 3236 0541
Record of Issues

<table>
<thead>
<tr>
<th>Issue No</th>
<th>Issue Date</th>
<th>Nature of Amendment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>30/11/2006</td>
<td>First issue</td>
</tr>
</tbody>
</table>

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# Power Coordination Guidelines
## Agreement between Ergon Energy and Telstra (Distribution Only)

**ATTACHMENT 1 – CONSIDERATION OF EPR - TABLE OF MINIMUM SEPARATIONS BETWEEN TELSTRA PLANT AND HV DISTRIBUTION PLANT EARTHING SYSTEMS**

<table>
<thead>
<tr>
<th>TYPE OF HV EARTHING SYSTEM</th>
<th>TELECOMMUNICATIONS PLANT TYPES</th>
<th>TELEPHONE EXCHANGES</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Includes: Pillars, Cabinets, Cable Pits, Manholes, Non-insulated Metal Sheathed Telstra Cables, Telstra Earths, Lightning Guard Wires, Payphones, Customer Equipment</td>
<td>Includes: Radio Sites, Street Mounted Equipment Housings (similar to but larger than a traffic signal box. See pictures over page)</td>
</tr>
<tr>
<td><strong>CONDUCTIVE POLES SUPPORTING HV LINES:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Without OHEW or pole commoned to MEN</td>
<td>15 metres</td>
<td>15 metres</td>
</tr>
<tr>
<td>• With pole bonded to OHEW</td>
<td>5 metres</td>
<td>5 metres</td>
</tr>
<tr>
<td>• With pole bonded to MEN</td>
<td>2 metres</td>
<td>2 metres</td>
</tr>
<tr>
<td><strong>POLE MOUNTED DISTRIBUTION TRANSFORMERS:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• HV and LV earths separate</td>
<td>15 metres</td>
<td>15 metres</td>
</tr>
<tr>
<td><strong>DISTRIBUTION TRANSFORMERS ON WOOD POLES:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• With HV and LV earths commoned (CMEN)</td>
<td>2 metres</td>
<td>15 metres</td>
</tr>
<tr>
<td><strong>DISTRIBUTION TRANSFORMERS ON CONDUCTIVE POLES:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• With HV and LV earths commoned (CMEN)</td>
<td>2 metres</td>
<td>15 metres</td>
</tr>
<tr>
<td><strong>PAD OR GROUND DISTRIBUTION TRANSFORMERS:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• HV and LV earths separate</td>
<td>15 metres</td>
<td>15 metres</td>
</tr>
<tr>
<td>• Fed via U/G HV cable with metal screen/sheath back to source</td>
<td>5 metres</td>
<td>5 metres</td>
</tr>
<tr>
<td>• With HV and LV earths commoned (CMEN)</td>
<td>2 metres</td>
<td>5 metres</td>
</tr>
<tr>
<td><strong>HV POLES (WOOD) WITH AIR BREAK SWITCHES:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Using metal operating rod</td>
<td>15 metres</td>
<td>15 metres</td>
</tr>
<tr>
<td>• Using insulated operating rod</td>
<td>1 metre</td>
<td>1 metre</td>
</tr>
<tr>
<td><strong>SWER TRANSFORMERS:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Isolation Transformer</td>
<td>25 metres</td>
<td>50 metres</td>
</tr>
<tr>
<td>• Distribution Transformer</td>
<td>15 metres</td>
<td>30 metres</td>
</tr>
<tr>
<td><strong>POLES WITH HV EARTH:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>e.g. HV Cable Pole Termination (Pot Head), HV Recloser, or Surge Diverter</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Without HV Earth bonded to CMEN</td>
<td>15 metres</td>
<td>15 metres</td>
</tr>
<tr>
<td>• With HV earth bonded to CMEN</td>
<td>2 metres</td>
<td>5 metres</td>
</tr>
<tr>
<td><strong>LV EARTH</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.3 metre</td>
<td>1 metre</td>
<td></td>
</tr>
<tr>
<td>1 metre</td>
<td>1 metre</td>
<td></td>
</tr>
<tr>
<td><strong>ANY OTHER POLE</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>e.g. power stations, switchyards, bulk supply substations, or zone substations</td>
<td>Consult Telstra Power Coordination Tel: 1800 029 760</td>
<td>Consult Telstra Power Coordination Tel: 1800 029 760</td>
</tr>
</tbody>
</table>

**NOTES TO THE TABLE:**

1) Where possible, new HV distribution plant earths should be placed at a minimum of 15 metre separation from Telstra plant listed above in columns 2 and 3. HV distribution earths at this separation are not required to meet any special conditions (e.g. bonded to MEN, HV, and LV earths commoned, etc) as listed in column 1 above. SWER HV earths are an exception as these require greater separations due to construction and load EPR considerations.

2) Where a reduced separation must be used it should be understood that its use relies upon the presence of a significant M.E.N. system and/or a specified type of power utility construction (e.g. OHEW, cable sheath return path, etc) as detailed in column 1 above – unless these conditions can be met a minimum 15 metre separation applies.

3) Caution: The power utility shall check with DIAL BEFORE YOU DIG (PH. 1100) to obtain physical locations before undertaking excavation.

4) Ring Main Units (RMUs) and Ground Mounted Switches (GMSs) have the same separation requirements as Pad Mounted Distribution Transformers.

5) Non-insulated metal sheathed Telstra cables are to be treated as for TELECOMMUNICATIONS PLANT TYPES columns 2 and 3 in the table above.

6) Insulated Telstra Cables allow closer separations than non-insulated metallic sheath cables mentioned in note 5 above. A minimum separation of 0.3 metre must be maintained between insulated (plastic sheathed or plastic jacketed) Telstra cables, (copper or optic fibre), and power utility HV or LV earthing systems excluding the HV earthing systems associated with a SWER network. A minimum separation of 1.0 metre must be maintained between the SWER HV earthing systems and insulated Telstra cables.
7) Consider carefully the type of Telstra plant likely to be affected as some types of plant are particularly difficult to mitigate or relocate (e.g. Pillars, manholes, exchanges). In these cases cost recovery for affected plant can be substantial.

8) Metallic sheathed Telstra cable types which one should be aware of are shown on page 13.

9) Some Telstra Street Mounted Equipment Housings shown on page 14.

10) Cable screen/sheath may not in all cases be connected back to zone substation and the Planner/Designer must confirm continuity back to zone substation before using the reduced separation of 5m.

**Telstra Non-insulated Metallic Sheathed Cable Types**

Telstra cable plans obtained from Dial-Before-You-Dig (1100) show the location and type of Telstra’s telecommunications plant. Cable installed into the network today has a polyethylene or plastic insulating jacket or sheath. However, telecommunications cables can have a very long service life of 30 to 40 years and metallic sheathed telecommunications cables were once used extensively throughout the telecommunication network.

A four, five, or sometimes six letter code identifies conductor insulation and physical arrangement – see diagram below. Older paper insulated conductor types point towards a metallic sheathed cable. Only, if the cable type starts with the letter PI (Paper Insulated) then one should suspect the cable type is metallic sheath.

---

```
PIxx
---
PIxxx
---
PIxxxx
```

However, many later issue PIxxxx cables use polyethylene or plastic jackets and these would not be considered to have a metallic sheath. These are identified by the letters PE, MB, MBHJ or HJ sometimes as the two letters of the cable type or as separate letters marked just above, or on, the cable.

---

```
PIxx
---
PIxxx
---
PIxxxx
---
PIxx
```

---

```
PE
---
MB
---
MBHJ
---
HJ
```
While the separations listed in the table above do not apply for non-metallic Telstra cable sheaths a minimum separation of 300mm between non-metallic (insulating) Telstra cable sheaths and HV earthing systems is still required as part of the joint codes, EPR Code of Practice and the Recommended Practices For Plant Underground.

Remote HV Earthing Systems

Sometimes the location of HV plant likely to cause EPR is within the allowable separation distances from Telstra plant. An EPR mitigation technique using a Remote (or Off-site) HV Earthing System can be used to relocate the HV earth system via an insulated earth conductor away from the Telstra plant. This solution meets the requirements for the EPR Code separations but unless the mitigation is known to others, (e.g. Telstra), then this technique creates more problems than it solves. Over time Telstra will place plant away from the HV site unaware that a remote HV earth system is nearby.

In some cases remote HV Earthing systems have been used where one was not required. For example, a pole mounted transformer 5m from a Telstra cable pit with cable joints. The planner has been under the assumption that a 15m separation was always required when in fact in a CMEN area with commoned HV-LV earths and an extensive MEN earthing system 2m would be acceptable.

In general to use a Remote HV Earthing System one should:

1. Indicate the presence of a Remote HV Earthing System by placing a sign on the pole with the wording “WARNING – Remote HV Earth due to Telstra Plant within 15m (non-CMEN area) or 2m (CMEN area),

2. Indicate the direction that the Remote HV Earthing system is installed by placing the sign on the side of the pole pointing to the earth system,

3. Indicate the distance to the Remote HV Earthing System by placing a No. 2 pit at the intersection of the insulated earth cable and the location of the 1st electrode which should have a marker tag attached with the wording “WARNING - Remote High Voltage Earth – DO NOT REMOVE”

Street Mounted Telecommunications Equipment

Various types of Telstra street-mounted telecommunications equipment are shown below. All of the equipment shown below can be very expensive to remove if affected by EPR from a HV earthing system.
### Cable pillar and associated cable pits
![Image of Cable pillar and associated cable pits]

### RIM Series 1
![Image of RIM Series 1]

### RIM Series 2
![Image of RIM Series 2]

### RIM Series 3
![Image of RIM Series 3]

### CMUX (Left) and Rim Series 1 (Right)
![Image of CMUX (Left) and Rim Series 1 (Right)]

### Cable Pillar and RIM
![Image of Cable Pillar and RIM]
### ATTACHMENT 2.1 ADVICE OF POLE MAINTENANCE FORM - VERSION 1 – 27/10/2003

(Replacement, Removal, Straightening or Relocation of Poles / Associated Work with Telstra Plant Attached.)

<table>
<thead>
<tr>
<th>COMPANY:</th>
<th>ADDRESS:</th>
</tr>
</thead>
</table>

Note: This form is designed for Australia-wide use. Telstra and Optus Broadband Cables, shown below greyed, are not known to be installed in the Ergon Distribution area.

#### Job/Task reference numbers for:

<table>
<thead>
<tr>
<th>Power Authority / Contractor</th>
<th>Optus Broadband CATV</th>
<th>Telstra Broadband CATV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Job Ref No.</td>
<td>Job Ref No.</td>
<td>Job Ref No. (CEL No.)</td>
</tr>
</tbody>
</table>

#### Work to be carried out (Check appropriate boxes):

- [ ] Power company assets relocated to new pole. Relocate your assets within 21 working days.
- [ ] WE REQUIRE YOU ON SITE ON THE DAY. PLANNED DATE / TIME.
- [ ] SINGLE POLE ADVICE
- [ ] MULTIPLE POLES SAME STREET. (SEE PAGE 2)
- [ ] Pole Replacement
- [ ] Pole Relocation
- [ ] Pole Straightening
- [ ] Line Maintenance
- [ ] High Voltage
- [ ] SUBSTATION
- [ ] Supply Outage Req.
- [ ] Pole Removal

#### Details:

- **Job Ref No.**
- **Power Authority / Contractor**
- **Optus Broadband CATV**
- **Telstra Broadband CATV**

#### Organised By: ____________________________ Ph: ____________ Fax: ____________ Date: ____________

#### Nearest Intersecting Road: ____________________________ UBD MapRef: ____________________________

#### Telstra Network Asset Coordination

<table>
<thead>
<tr>
<th>Telstra Network Asset Coordination</th>
<th>Optus Broadband / CATV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fax: 1800 807 573</td>
<td>Fax: ____________________</td>
</tr>
<tr>
<td>Ph: 1800 047 909</td>
<td>Ph: ____________________</td>
</tr>
<tr>
<td>Email: <a href="mailto:F0204107@team.telstra.com">F0204107@team.telstra.com</a></td>
<td>Email: ____________________</td>
</tr>
</tbody>
</table>

#### Telstra Telephone

<table>
<thead>
<tr>
<th>Telstra Telephone</th>
<th>Telstra Broadband (Foxtel Network)</th>
<th>Name: ____________________________</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aerial Cable</td>
<td>Aerial Cable/Catenary Wire</td>
<td>Aerial Cable / Catenary Wire</td>
</tr>
<tr>
<td>Customer Lead in Cable</td>
<td>Customer Lead in Cable</td>
<td>Customer Lead in Cable</td>
</tr>
<tr>
<td>U/Ground to O/Head</td>
<td>U/Ground to O/Head</td>
<td>U/Ground to O/Head</td>
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</tbody>
</table>

#### Replacement Pole

<table>
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<tr>
<th>Wood</th>
<th>Concrete</th>
<th>Other</th>
<th>Yes: We are able to make the organised work time. Your contact will be -</th>
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<tbody>
<tr>
<td>Node</td>
<td>Hub</td>
<td>Yes:</td>
<td></td>
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<tr>
<td>ESA/DA</td>
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</tbody>
</table>

#### Fax back to sender for confirmation (The Originator)

<table>
<thead>
<tr>
<th>Wood</th>
<th>Concrete</th>
<th>Other</th>
<th>Yes:</th>
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<tbody>
<tr>
<td>Node</td>
<td>Hub</td>
<td>No:</td>
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<td>ESA/DA</td>
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#### Initiated By: ____________________________ Ph: ____________________

---

Check this is the latest version before use.
## ATTACHMENT 2.2 ADVICE OF POLE MAINTENANCE FORM – VERSION 1 - 27/10/2003

### Advice of Pole Maintenance

<table>
<thead>
<tr>
<th>Pole or LIS* Number</th>
<th>House Lot No:</th>
<th>Street Name:</th>
<th>Suburb/Town</th>
<th>Postcode</th>
<th>Nearest Intersecting Street or Road</th>
<th>Map Reference</th>
<th>Comments</th>
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*LIS - Used in NSW and VIC only*