## Rob Beckett

**From:** Lauren Player <Lauren.Player@transgrid.com.au> on behalf of Easements&Development <Easements&Development@transgrid.com.au>
**Sent:** Thursday, 27 February 2020 1:49 PM
**To:** Rob Beckett
**Cc:** Easements&Development
**Subject:** 2020-067 - Maxwell Solar Farm - SSD 9820
**Attachments:** TransGrid Easement Guidelines.pdf; 161214_TransGrid Fencing Guidelines_Final.pdf

**Follow Up Flag:** Follow up
**Flag Status:** Flagged

**Hi Rob,**

**RE: 2020-067 - Maxwell Solar Farm - SSD 9820**

**Proposal: Environmental Impact Statement EIS for the Maxwell Solar Farm**

Thank you for referring to TransGrid for review.

Please see the below comments from TransGrid**:**

1. Solar Farm will be required to lodge a Connection Enquiry and work through the Connection process with TransGrid to develop and finalise connection. Any connection to TransGrid infrastructure would require a connection agreement

2. Please refer to the attached TransGrid Easement Guidelines and Fencing Guidelines (attached).

If you have any questions, please do not hesitate to contact our team.

Kind regards,

**Lauren Player**
*Development Assessment Officer* | Network Planning and Operations
_____
**TransGrid** | 200 Old Wallgrove Road, Wallgrove, NSW, 2766
**T:** (02) 9620 0297 **M:** 0427 094 860
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Easement guidelines

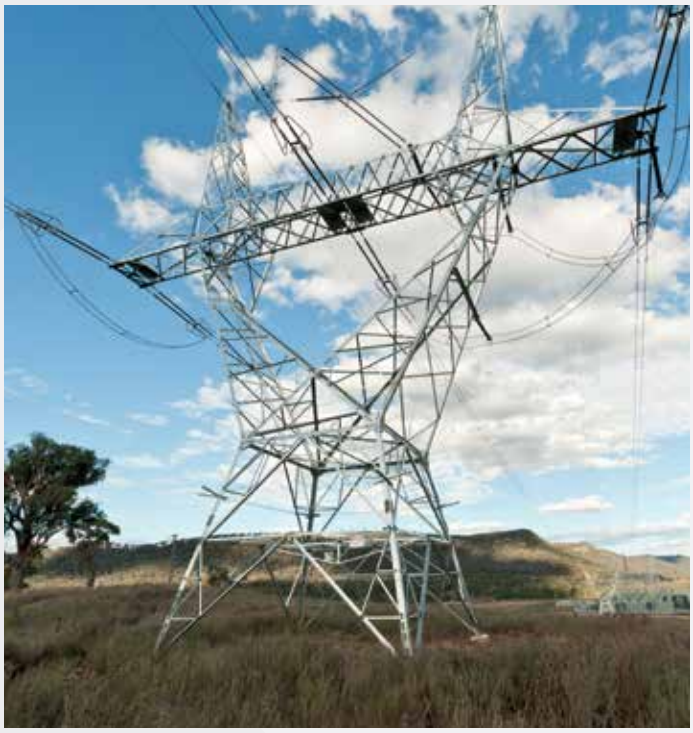
# Living and working with electricity transmission lines

We all rely on electricity to power our homes and businesses, however coming into contact with high voltage electricity can cause serious injury or death.

To protect your safety and provide a safe, reliable network, TransGrid has easements over its transmission lines, which restrict the activities that can be carried out. Easements are also “rights of way”, which allow our staff and contractors access to construct, operate and maintain TransGrid’s infrastructure.

TransGrid’s primary concern is the **safety of people and the environment**, and we are committed (and required by legislation) to providing a safe and reliable transmission network.

For more information on potential electrical safety risks, please see our **Electrical safety risks fact sheet**. You can learn more about electricity infrastructure by reading our **High voltage transmission line fact sheet**.



### What activities may be carried out within or adjacent to transmission line easements?

High voltage transmission lines have different safety risks from urban powerlines, and this is why TransGrid encourages the principle of "prudent avoidance"[1]. When planning houses, schools, sensitive land uses and other types of new development, proximity to existing or planned high voltage transmission lines should always be considered.

Where developments cannot avoid transmission line easements, open space uses – that do not encourage people to congregate under the transmission lines or close to electricity infrastructure – should be given preference over other land uses, such as residential or commercial.

These guidelines will assist you to work out:

> whether your proposed activity or development within (or adjacent to) an electricity easement is **permitted**; **requires TransGrid's permission**; or is **prohibited**; and

> the process for seeking TransGrid's permission prior to carrying out the activity or lodging your development application with a consent authority.

TransGrid can only give its permission to your proposal as holder of the easement. TransGrid's permission is not a development consent.

Councils are required to refer development applications that affect TransGrid's transmission line easements to TransGrid. Seeking TransGrid's permission prior to lodging your development application will help expedite this process.

If you undertake an activity or development that is not in accordance with the Easement guidelines, you may be required to remove it or relocate it at your expense.

Please note that if you have received TransGrid's written permission under previous guidelines, this permission remains valid.

## Is your proposal located within or adjacent to a TransGrid easement?

Transmission line easements vary in width depending on the operating voltage and design of the infrastructure. Generally, the higher the voltage, the wider the easement. Figure 1 below shows the typical widths of transmission line easements.

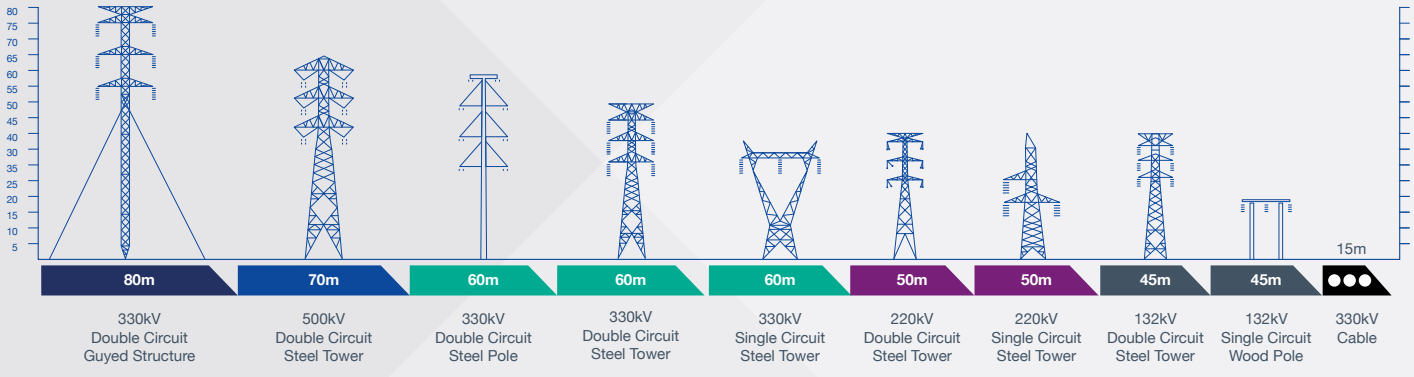



*Figure not to scale. Typical widths only, may vary on a case by case basis.*

**Figure 1: Typical Easement Widths**

[1] As identified by The Right Honourable Harry Gibbs Report, Inquiry into Community Needs and High Voltage Transmission Line Development, 1991.

The distances in the Easement guidelines are based on the typical easement widths shown in Figure 1. However, because there are some variations to easement widths, you will need to know the width of the easement near your proposal.

To work out whether there is a TransGrid easement on your property and how wide it is, you can contact the New South Wales Land Registry Services for a detailed survey plan.

NSW Land Registry Services can be contacted on 1300 052 637 or via their website at **www.nswlrs.com.au**.

# Is your proposal outside the exclusion zone?

TransGrid has developed an **exclusion zone** to enable suitable activities within easements, while providing a safe clearance area around TransGrid transmission lines and structures to protect public safety and the network.

Please check the criteria and diagrams below to ensure that your proposal is outside the exclusion zone.

If your proposal is located within the **exclusion zone**, you will need to relocate it or seek permission from TransGrid. Most activities are prohibited within the **exclusion zone**, to meet TransGrid's public safety obligations.

**Exclusion zone criteria** activities/developments/structures must:

1. not impede TransGrid's access to its transmission infrastructure;
2. where transmission lines are **132kV and below:**
   - be located at least 20 metres away from any part of a transmission structure or guy wire;
   - for metallic structures, be located at least 22 metres away from any part of a transmission structure or guy wire;
   - be located at least 10 metres from the centre of the transmission line;
3. where transmission lines are **220kV and above:**
   - be located at least 30 metres away from any part of a transmission line structure or guy wire;
   - be located at least 17 metres from the centre of the transmission line.

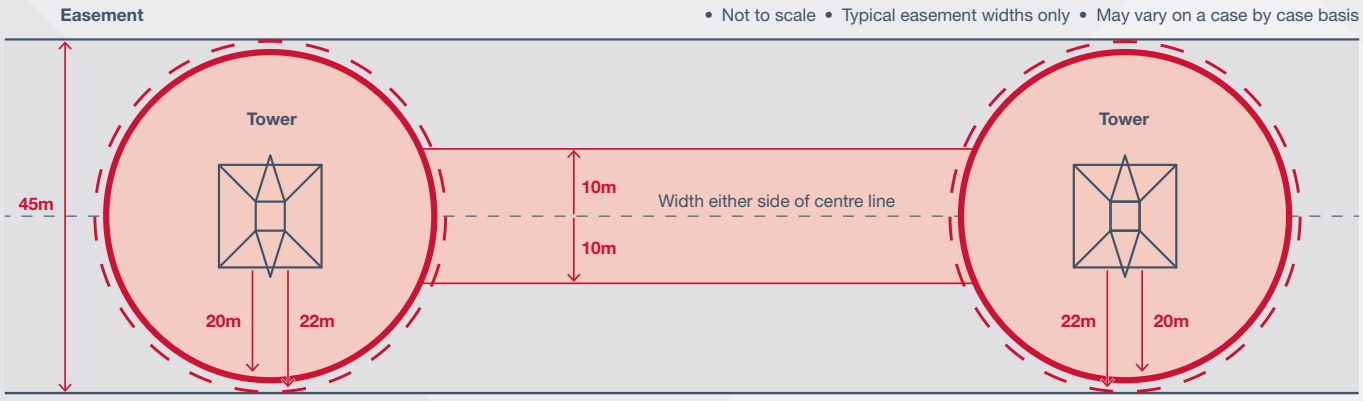



Figure 2: 132kV and below Exclusion Zone

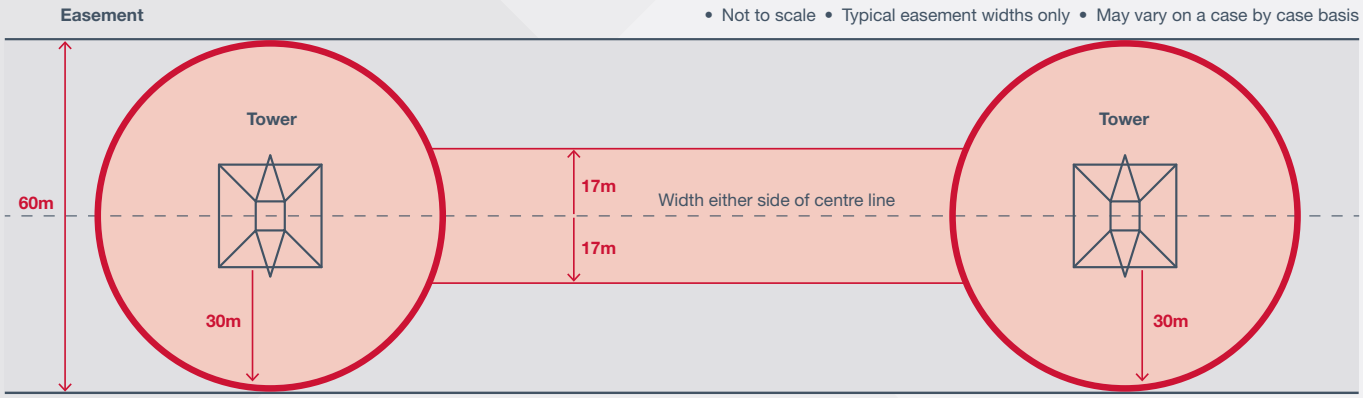



Figure 3: 220kV and above Exclusion Zone

If you are uncertain whether your proposal is within the exclusion zone, please contact TransGrid by submitting an enquiry via our online Easement Enquiries Portal: https://www.transgrid.com.au/being-responsible/public-safety/Living-and-working-with-electricity-transmission-lines

# Is your proposal permitted within TransGrid easements?

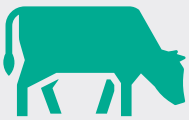
If your proposal is described below and is outside the **exclusion zone,** no further permission from TransGrid is required.

Where your proposal within a transmission line easement will require development consent, the consent authority must still refer the development application to TransGrid. For this reason, we recommend you seek TransGrid's confirmation that your proposal is permitted within the easement **before** you lodge your development application with Council, by submitting an enquiry via TransGrid's online Easement Enquiries Portal.

*Please note: TransGrid reserves the right to review each activity individually and apply controls on a case-by-case basis. TransGrid will take into account public safety risks, and the safe operation, access and maintenance of TransGrid's electricity infrastructure.*

If you are unsure whether your proposal is **permitted,** please contact TransGrid by submitting an enquiry via our online Easement Enquiries Portal.

The following activities where located outside the **exclusion zone** are **permitted** within TransGrid's easements:



### Cropping and grazing, provided:

1. Machinery cannot extend more than 4.3 metres above ground level

*Note: Exclusion zone requirements to be at least 10/17 metres from the centre of transmission lines do not apply to cropping and grazing, however all other exclusion zone requirements apply. TransGrid's Fencing guidelines must be complied with.*

### All other agricultural activities including irrigation, provided:

1. Machinery cannot extend more than 4.3 metres above ground level
2. All fixed metallic objects are earthed
3. Machinery, including irrigation, must remain outside the exclusion zone
4. No solid jet of water is to be within 4 metres of overhead conductors
5. Must use non-metallic piping
6. No fuel storage
7. No transmission line outages are required to undertake agricultural activities

*Note: TransGrid's Fencing guidelines must be complied with.*

### Planting or cultivation of trees and shrubs, provided:

1. Mature plant / tree height is less than 4 metres

### Short flag poles, weather vanes, single post signs, provided:

1. Height above ground is no greater than 4.3 metres
2. Non-climbable
3. All fixed metallic parts are earthed

### Vehicle parking provided:

1. Height of vehicles no greater than 4.3 metres
2. No flammable liquid containers or carriers

3. Caravans are not occupied or connected (ie, temporary parking only)
4. All fixed metallic parts are earthed

*Note: **Lighting** requires TransGrid's permission to meet height and electrical safety constraints.*

## Public open spaces, such as fields, cycle ways, walkways or fenced dog parks, provided:

1. No unmanned aerial vehicles (drones), kite flying or model aircrafts, and "warning signs" are installed
2. Any structures, obstructions, seating or features (such as picnic areas) are located outside the exclusion zone and do not block access tracks to transmission line structures or guy wires
3. Parallel roads, walking tracks, footpaths, cycleways and fenced dog parks are located outside the exclusion zone

*Note: Roads, tracks, footpaths, cycleways and fences which propose to cross the transmission line as a thoroughfare, require TransGrid's permission.*

## Storage, provided:

1. No greater than 2.5 metres height
2. Stored material is non-flammable and non-combustible
3. Non-corrosive or explosive materials
4. No garbage, refuse or fallen timber or other material which could pose a bush fire risk
5. Metallic objects earthed

## Operation of mobile plant and equipment, provided:

1. It cannot be extended more than 4.3 metres in height within easement
2. Equipment or plant do not encroach into Ordinary Persons Zone - please refer to the WorkCover *NSW Work Near Overhead Power Lines Code of Practice 2006 (https://www.safework.nsw.gov.au/__data/assets/pdf_file/0020/52832/Work-near-overhead-power-lines-code-of-practice.pdf)*
3. Work is carried out by accredited persons in accordance with WorkCover NSW *Work Near Overhead Power Lines Code of Practice 2006 (https://www.safework.nsw.gov.au/__data/assets/pdf_file/0020/52832/Work-near-overhead-power-lines-code-of-practice.pdf)*

## Non-electric fencing and yards, provided:

1. No greater than 2.5 metre height
2. Fencing does not restrict access to TransGrid assets
3. Metallic fencing is earthed
4. TransGrid's Fencing Guidelines are complied with

*Note: Parallel metallic fencing has specific safety risks and requirements under the Fencing Guidelines.*

## Domestic recreational activities including structures, provided:

1. Structures must not be identified as requiring **TransGrid's permission** or **prohibited**
2. Structures must be non-metallic and no greater than 2.5 metre height
3. Floor area no greter than $20m^2$, where any portion is within easement
4. Not connected to electricity supply
5. Structures (including play equipment and BBQs) must remain outside the exclusion zone
6. No unmanned aerial vehicles (drones), kite flying or model aircrafts

**What if my activity does not meet the permitted criteria or is not listed above?**

You will need to seek TransGrid's permission so that we can assess potential risks to your safety and the electricity transmission infrastructure.

# Does your proposal require TransGrid's permission?

If your proposal does not meet the **permitted** criteria, it may fall within the following categories which **require TransGrid's permission**. Further information about the process for seeking TransGrid's permission is provided below, under "How can I seek TransGrid's Permission?"

TransGrid reserves the right to assess each request for permission on a case-by-case basis, taking into account public safety risks, and the safe operation, access and maintenance of TransGrid's electricity infrastructure.

TransGrid may grant permission with conditions, or may refuse permission where the activity could put public safety or the operation of the transmission network at risk.

If your proposal is described below and is **outside the exclusion zone,** you will **require TransGrid's permission:**

## Any proposal which falls within a "permitted" catgegory but does not meet the listed criteria

### Detached garages, carports, sheds, stables, pergolas and unroofed verandahs where no practicable alternative exists, provided:

1. Structures are no greater than 4.3 metres height
2. Non-habitable
3. Metallic structures are earthed
4. Floor area no greater than 20m$^2$, where any position is within easement
5. Power connection only permitted if electrically isolated in accordance with *AS/NZS 3000:2018 Electrical installations* outside easement

### Sporting and recreational facilities, including tennis courts, basketball courts, playgrounds, exercise equipment provided:

1. Structures are no greater than 4.3 metres height
2. Metallic structures are earthed

### Native plant or other nurseries, community gardens, provided:

1. Mature plant / tree height is less than 4 metres
2. Structures are no greater than 4.3 metres height
3. Any fixed structures, including pumps, are located outside the exclusion zone
4. Metallic structures must be earthed

### Mobile plant with a height greater than 4.3m, provided:

1. It is operated by accredited persons in accordance with WorkCover *NSW Work Near Overhead Power Lines Code of Practice 2006 (https://www.safework.nsw.gov.au/__data/assets/pdf_file/0020/52832/Work-near-overhead-power-lines-code-of-practice.pdf)*

### In-ground swimming pools including coping, provided:

1. It is located at least 30 metres from transmission line structures or supporting guy wires
2. Must be located at least 15 metres from transmission line centre (132kV or below) OR 25 metres from transmission line centre (220kV or above)

3. Power connection only permitted if electrically isolated in accordance with AS/*NZS 3000:2018 Electrical installations* outside easement
4. Site specific assessment will be required by TransGrid

## Lighting/external sources of power no greater than 4.3m height:

1. Non-climbable
2. Must be electrically isolated in accordance with AS 3000 outside easement

*Note: Exclusion zone requirements to be at least 10 metres from centre of 132kV and below transmission lines or 17m from centre of above 132kV lines do not apply to lighting and external sources of power, however all other exclusion zone requirements apply.*

## Electric fencing, where:

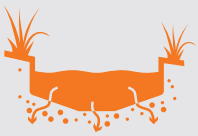
1. Height is no greater than 2.5 metres
2. Must be located at least 30 metres from transmission structures or supporting guy wires
3. TransGrid Fencing Guidelines are complied with

## Roads and pathways that cross the transmission line as a thoroughfare:

1. Where it is proposed that a road passes within 30 metres of a transmission structure or supporting guy wires:
   - TransGrid may refuse consent or impose additional restrictions and other conditions
   - The structure's earthing system may require modification to prevent fault currents from entering other utility services in the road. The option of raising conductors or relocation of structures, at the full cost to the proponent, may be considered
2. TransGrid may require additional protection (such as safety barriers) where there is a risk of vehicle impact
3. Intersections shall not be located within the exclusion zone

## Low voltage utilities and services such as electricity, gas, telephone and water:

1. Not located within the exclusion zone (additional clearances apply to metallic services)
2. Parallel metallic services will require specific safety assessment
3. Additional design and safety requirements will apply



## Excavation, quarrying and earth works, including dam and artificial lake construction, basins, swales, drains and dispersion channels, provided:

1. No more than 3 metres in depth
2. No generation of significant amounts of dust or smoke that can compromise the transmission line high voltage insulation
3. Must not raise ground level, or reduce clearances below that required in *AS 7000:2010 Overhead line design*
4. No ponding or water retention around TransGrid's structures
5. Batter no steeper than 1 in 6 where access is required by TransGrid vehicles

## Any other change in ground levels that reduce clearances below that required in AS 7000:2010 Overhead line design:

1. Criteria assessed on a case by case basis


## Use of explosives:

1. Criteria assessed on a case by case basis


### Mining:

1. Criteria assessed on a case by case basis

### Subdivisions (see Subdivision and Development Guidelines):

1. Criteria assessed on a case by case basis
2. Subdivisions that encourage unauthorised encroachments (for example, where the majority of usable outdoor space in a proposed lot is located within a transmission line easement), will not be permitted, due to public safety risks

## Is your proposal prohibited within a TransGrid easement?

If your proposal is described below, it is **prohibited** from being carried out within any part of a transmission line easement. This is due to the inherent risk to people, public safety, and to ensure the safe, reliable operation of the network.

### Buildings, accommodation and structures:

1. Buildings or structures which are not listed as **permitted** or **require TransGrid's permission**
2. Construction of houses
3. Site construction offices or workshops
4. Camping or occupied caravans or other camping vehicles
5. Above ground pools

### Fixed plant or equipments

### Interference with transmission lines:

1. The placing of obstructions within 20 metres of any part of a transmission line structure or supporting guy wires
2. Placing any obstructions on access tracks or within the easement area that restricts access
3. Any structure whatsoever that during its construction or future maintenance will require an Accredited Person to access as per the WorkCover *NSW Work Near Overhead Power Lines Code of Practice 2006 (https://www.safework.nsw.gov.au/__data/assets/pdf_file/0020/52832/Work-near-overhead-power-lines-code-of-practice.pdf)*
4. The attachment of any fence, any signage, posters, or anything else, to a transmission line structure or guy wire
5. Any work that generates significant amounts of dust or smoke that can compromise the transmission line high voltage insulation
6. Movement of any vehicle or plant between tower legs, within 5 metres of a transmission line structure, guy wire or between a guy wire and the transmission pole
7. Kite flying or model aircraft within the easement, flying of remote controlled or unmanned aerial vehicles (such as drones), any manned aircraft or balloon within 60 metres of any transmission line structure, guy wire or conductor
8. Structures or objects that encourage or facilitate climbing (including working from vehicles)

*Note: The final structure may meet AS7000 clearances, but may be accessible by Ordinary Persons within the Ordinary Persons Zone.*

### Storage of flammable, combustible, corrosive or explosive materials, garbage, refuse or fallen timber

### Burning off or the lighting of fires

### Unsafe work practices under Work Near Overhead Power Lines Code of Practice:

1. Any vegetation maintenance (such as felling tall trees) where the vegetation could come within the Ordinary Persons Zone as per the *WorkCover NSW Work Near Overhead Power Lines Code of Practice 2006*
2. Any activity (including operation of mobile plant or equipment having a height when fully extended exceeding 4.3 metres) by persons not Accredited or not in accordance with the requirements of the *WorkCover NSW Work Near Overhead Power Lines Code of Practice 2006*.

## What about underground cable easements

Different risks and requirements apply near TransGrid transmission cables. For further guidance, please see the **Working near TransGrid cables guidelines**.

Underground cables are not obvious, and you may not know there is one located on your property. A **Dial Before You Dig (DBYD)** search is essential prior to any excavation works.

Given the nature of underground cables, all proposals within cable easements require TransGrid's permission.

*Please note: TransGrid reserves the right to review each activity and apply controls on a case-by-case basis, taking into account public safety risks, and the safe operation, access and maintenance of TransGrid's electricity infrastructure.*

## How can I seek TransGrid's permission?

You can seek TransGrid's permission to carry out proposals within or adjacent to an easement via TransGrid's online Easement Enquiries Portal: https://www.transgrid.com.au/being-responsible/public-safety/Living-and-working-with-electricity-transmission-lines

This should be done **prior** to lodging your development application or planning agreement application with your consent authority. TransGrid's permission is given as holder of the easement only, and does not constitute approval to carry out the activity or development.

Please check that your proposal is consistent with these Easement Guidelines before you seek TransGrid's permission, so that we can respond as efficiently as possible.

Your request for permission should include the following information:

| | |
|---|---|
| Name of applicant and/or company or Council | ✓ |
| Street address and Lot-DP | ✓ |
| Description of proposal with height, depth and location of proposed activities/ structures/ development and assessment of impact on transmission infrastructure | ✓ |
| Contact information including phone number, address and email address | ✓ |
| A detailed, legible and to-scale plan showing property boundaries, proposal and distance of proposal to TransGrid's easement and transmission line structures and guy wires (if applicable)<br>For large scale subdivisions, a Site Plan showing all new access points and access ways to the easement and transmission line structures | ✓ |
| A three dimensional CAD drawing in 3D-DXF format | Only if proposal changes ground levels ✓ |

**If we do not receive this information we may need to request further details from you, and this will delay your request for permission.**

TransGrid has also prepared supplementary Technical Guidelines and Fact Sheets to provide additional information for specific activities:

> High voltage transmissions network fact sheet

> Electrical safety risks fact sheet

> Work near TransGrid cables

> Subdivision and development guidelines

> Fencing guidelines

> Working near TransGrid cables information brochure

These are available on the TransGrid website at **www.transgrid.com.au/being-responsible/public-safety/living-and-working-with-transmission lines**.

If your proposal is complex (for example, master-planned subdivision), we recommend a meeting with TransGrid before you submit your application for permission. You can arrange this via our online Easement Enquiries Portal.

# Can I use TransGrid's permission as part of my development application to Council?

Your consent authority is required to consult with TransGrid before granting development consent for proposals that impact transmission line easements, or where the proposal might adversely affect electricity infrastructure.

Consent authorities must take into consideration any comments made by TransGrid within 21 days of written notification of a development application.

If you have received TransGrid's permission, this should be included as part of the development application. This will enable the referral process to be as efficient as possible.

**If you have changed your proposal, you will need to lodge another request for TransGrid's permission via our online Easement Enquiries Portal, as your original permission will no longer be valid. This may delay the development application process.**

Seeking TransGrid's permission and applying for development consent are two separate processes. TransGrid's permission does not allow you to carry out an activity nor does it guarantee development consent.

# What if I build something without TransGrid's permission?

Please contact TransGrid to discuss on:

Phone: (02) 9620 0515

Email: Easements&Development@transgrid.com.au

# Relocating or modifying infrastructure and interruption to transmission

Some proposals require modifications to existing electricity infrastructure or easements.

A contract may be needed with TransGrid where you will be required to pay TransGrid's costs, such as design and construction works.

You can make a modification enquiry with TransGrid's Infrastructure team at **infrastructure@transgrid.com.au** or find further information on our website: **https://www.transgrid.com.au/what-we-do/our-network/connections-and-modifications/network-modifications/Pages/default.aspx**

You will also be responsible for any costs incurred as a consequence of interruptions to TransGrid's transmission operations arising from the development.

## Contact TransGrid

If you are uncertain or require further information regarding works around or in TransGrid easements, please contact us via our online Easement Enquiries Portal: https://www.transgrid.com.au/being-responsible/public-safety/Living-and-working-with-electricity-transmission-lines

You can also reach us by contacting:

Phone: (02) 9620 0515

Email: Easements&Development@transgrid.com.au

# TransGrid Fencing Guidelines

Earthing and isolation of fences in easements

TransGrid operates and maintains the high voltage electricity network across NSW and the ACT, which includes 99 substations and more than 12,900 kilometres of transmission lines and underground cables. The majority of this infrastructure is located on private land and is accessible by an easement.

An easement provides a 'right of way', allowing access for our staff and contractors to build and maintain electrical infrastructure on private property. If you have an easement registered on your property, there may be some restrictions on the activities performed or structures that can be placed within the easements, including fences.

All fences installed within TransGrid easements should be built with wooden or other non-conductive materials to minimise the risk of injury and/or damage to property. Where this is not possible and metal fences must be installed, certain requirements must be met and are outlined in these guidelines.


As the operator and manager of the high voltage transmission network across NSW and the ACT, TransGrid connects generators, distributors and major end users to the electricity they need, when they need it. At TransGrid, we keep you and your way of life connected. Our core role is to provide safe, reliable and efficient transmission services to NSW, the ACT and the National Electricity Market.

While transmission is a small component of the electricity bill, around 7% for households and businesses, we do not believe that consumers should pay more than necessary for a reliable electricity supply.

Our network comprises 99 bulk supply substations and more than 12,900 kilometres of high voltage transmission lines and cables. Interconnected to QLD and VIC, the network provides a strong electricity system enabling energy trading between Australia's three largest states along the east coast and supporting a competitive wholesale electricity market.

We believe in working with the communities we operate in. We help them learn about energy through our BeSafeKidz primary school education program. Each quarter we partner with different communities to support them grow and develop through our Community Partnership Program. While our easement teams work with landowners to ensure the safety of easements. For more information visit our website www.transgrid.com.au.

## Risks posed by metal fences on easements

If a metal fence is installed near a high voltage transmission line, there is a possibility it could act as a conductor of electricity and dangerous currents may be carried along the fence.

These voltages may be an induced voltage from the fence being parallel to a nearby transmission line, or they may be a transferred voltage (or transferred potential), which occurs when a fence is installed too close to the high voltage transmission pole or tower (structure).

The amount of induced or transferred voltage can vary between different transmission lines and structures, and is also affected by the soil beneath the transmission line.

In some cases where a metal fence must be installed, TransGrid may request a detailed earthing assessment and additional measures may be required beyond those outlined in this guideline.

## Ensuring the safety of existing metal fences

In some easements, metal fences have been installed by previous owners. It is important these existing fences meet TransGrid's guidelines to minimise the risk of injury or damage to property. This section outlines the guidelines for a fence which is located near or adjacent to a structure, or runs parallel to a transmission line. Despite the location of the fence, you should always follow these simple rules:

- A metal fence should never touch a transmission line structure
- A metal fence should always be at least 1m away from an underground earthing system

To find out the location of any underground earthing systems call "Dial before you dig" on 1100.

### Fences near a structure

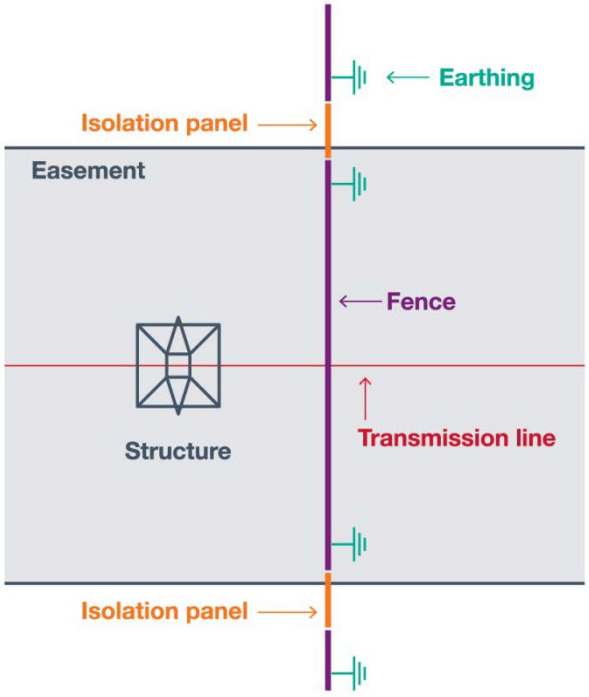
Metal fences that run across an easement, near the base of a transmission line structure, pose specific risks. To manage this risk the following steps must be taken:

- Install Isolation panels where the fence enters or exits the easement
- Provide earthing either side of the isolation panels

The diagram below (Diagram 1) shows an example where a fence runs across the easement. It is important the fence has isolation panels installed as it enters and exits the easement, ensuring it is earthed at either side. If the fence stops inside the easement, it will need to be earthed next to the last post.

If the fence is within 1m of the structure, the fence may need to be modified to ensure safety.

**Metal fencing running across the easement near a structure**

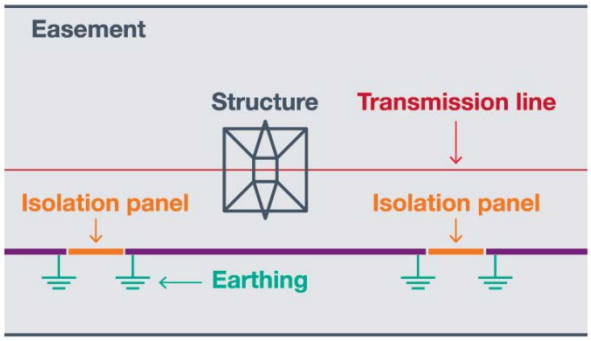



### Fences parallel to a transmission line

Metal fences located within an easement and running parallel to a transmission line (see Diagram 2) also pose specific risks. To manage this, adhere to these requirements:

- Fences that run parallel with a transmission line past a structure should have earthing and isolation panels installed near each the structure
- An additional earth should be installed around the middle of each span if the fence passes more than one structure
- In addition to the above, any fence should be earthed at each end.

**Metal fencing running parallel to the line in the easement**



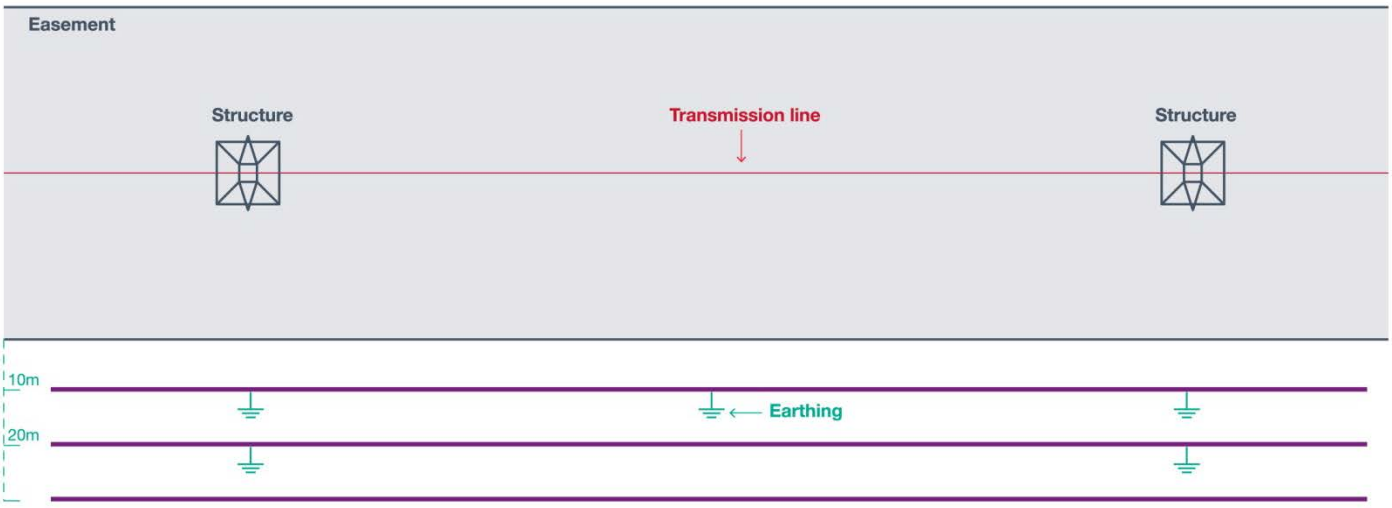

## Fences outside the easement

The risk of transferred voltage reduces when the distance between the transmission line and the metal fence is greater. However, to minimise any potential risk of induced voltages, you must follow these requirements:

- Fences within 10m of the easement should be earthed once in line with each structure and once in the middle of each span
- Fences within 20m of the transmission line should be earthed once in line with each structure
- Fences more than 20m from the easement would not generally require earthing

The below diagram (diagram 3) shows the distance of a fence running parallel to an easement and the subsequent level of earthing required.

**Metal fencing running parallel to the line on the edge of the easement**



## Installing a new metal fence in an easement

It is recommended all fencing located within an easement is made from wood or non-conductive materials. However, we understand in some cases metal fencing may be required. In these cases, follow these requirements to reduce the risks:

- Each separate strand of wire or metal fence panel should be effectively earthed at the edge of the easement, wherever the fence passes in or out of the easement area, and at any end of the fence located within the easement area
- Metal gates should be earthed by bonding across the hinges to the fence (in the case of a wire or other metal fence), or by suitable earthing arrangements at the gate post for fences of wooden construction
- All fence and gate earthing must be installed in accordance with the diagrams provided in this guideline.

### Temporary fencing

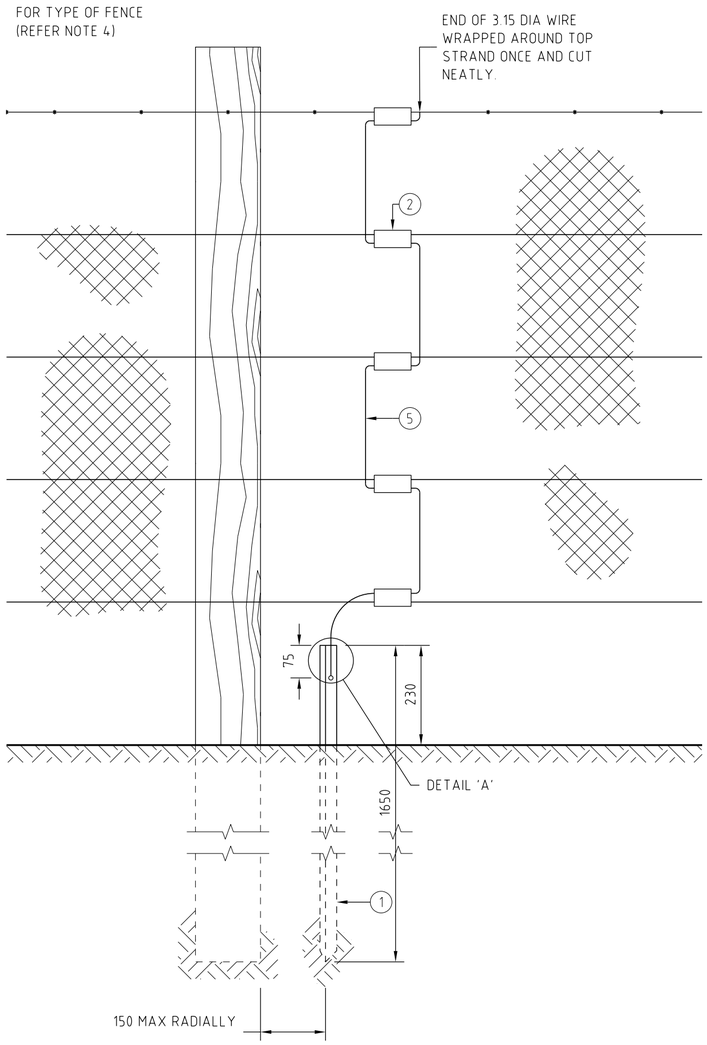
Temporary fencing installed within an easement needs to be earthed. Where a typical chain-wire or weldmesh panel fence supported by concrete or plastic block bases is used, every second panel should be earthed and the pipe clamp between posts of adjoining panel posts should be replaced with a clamp arrangement made of wood or other non-metallic material.

Other types of temporary fencing should be earthed and isolated in accordance with the requirements set out in this guideline.

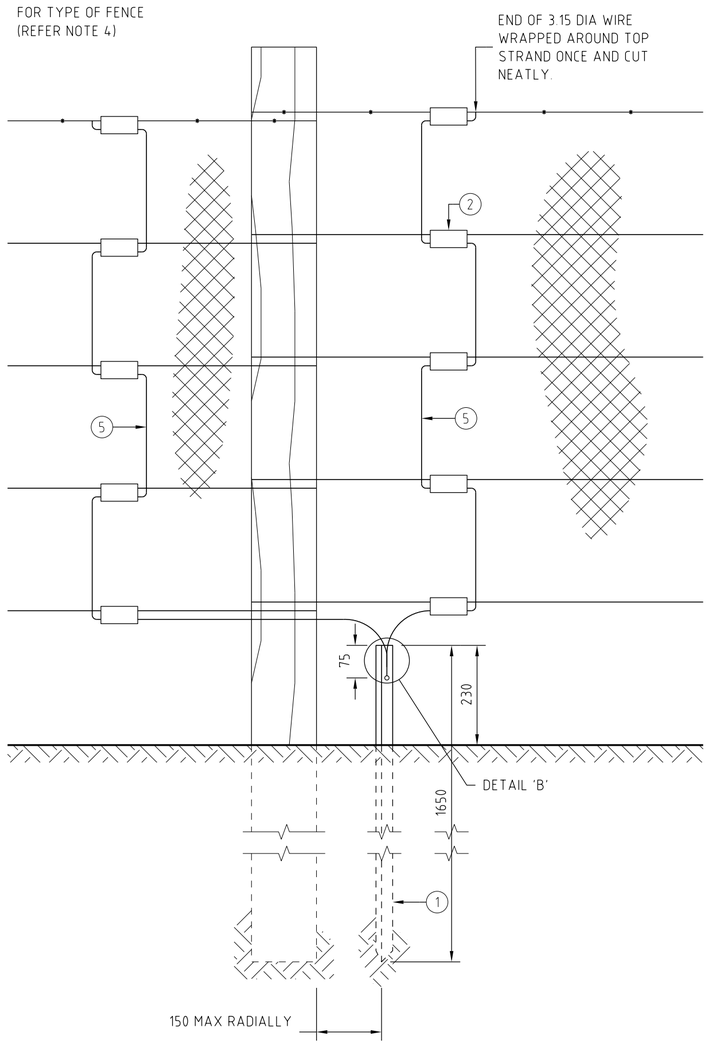
### For more information

For further information please contact TransGrid on 1800 222 537.

# Appendix A: Earthing of wire fence



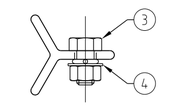

ARRANGEMENT 'A'
(REFER NOTE 3)

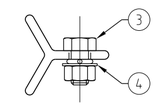


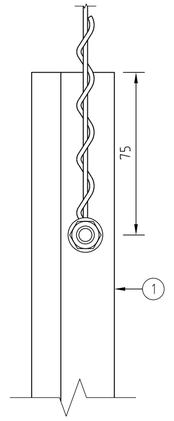

ARRANGEMENT 'B'
(REFER NOTE 3)

NOTES:

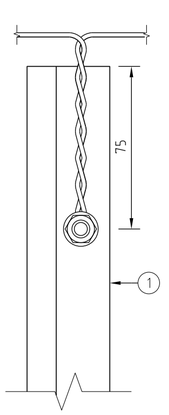
1. THE QUANTITY OF LINE CLAMPS (ITEM 2) IS DEPENDENT UPON THE NUMBER OF STRAIN WIRES ON EXISTING FENCES.
2. WHEN THE EARTH STAKE CANNOT BE DRIVEN TO POSITION AS SHOWN THE FOLLOWING PROCEDURE IS TO BE ADOPTED
   a) WHERE DRIVEN LESS THAN 610 mm:
      CUT OFF AT 230 mm ABOVE GROUND LEVEL AND DRILL TO TAKE CONNECTION BOLT.
   b) WHERE DRIVEN MORE THAN 610 mm:
      TO REMAIN UNCUT AND CONNECTION MADE IN THAT POSITION.
3. i) ARRANGEMENT 'A'
      ARRANGEMENT 'A' TO BE USED WHERE STRAIN WIRE IS CONTINUOUS AND UNBROKEN AT POST.
   ii) ARRANGEMENT 'B'
      ARRANGEMENT 'B' TO BE USED WHERE STRAIN WIRE TERMINATES AT POST AND IS NOT CONTINUOUS.
4. THE NUMBER OF STRAIN WIRES AND USE OF WIRE NETTING IS SHOWN AS ILLUSTRATIVE ONLY AS THE FENCE MAY BE AN OPEN STRAIN WIRE TYPE FENCE OR BE A WIRE NETTING CLAD STRAIN WIRE FENCE.




DETAIL 'A'




DETAIL 'B'

| AS REQ'D | | RW 85 017 | 5 | ——— | FENCING WIRE 3.15 mm DIA. | S. GALV. |
|---|---|---|---|---|---|---|
| 1 | 1 | WA 65 011 | 4 | ——— | 8 (NOM) FLAT WASHER | S. GALV. |
| 1 | 1 | NA 01 181 | 3 | ——— | M8 x 25 mm HEX. HD. BOLT & NUT | S. GALV. |
| AS REQ'D | | EF 16 209 | 2 | ——— | LINE SPLIT BOLT CLAMP. | BRASS |
| 1 | 1 | LM 76 003 | 1 | TL-145554 | EARTH STAKE 1650 mm LONG | S. GALV. |
| A | B | S/L No. | ITEM | DRG No. | DESCRIPTION | MAT'L. |
| REQUIRED | | | | | | |

UNLESS OTHERWISE STATED ALL DIMENSIONS ARE IN MILLIMETRES.

| AMENDMENT TEXT. | TAM | 18-07-2016 |
|---|---|---|

REDRAW FROM TIFF TO DGN

TransGrid

TL-167142 WIRE FENCE ISOLATION PANEL

REFERENCE DRAWINGS

| DRAWN | TAM | |
|---|---|---|
| REVIEWED | SBH | 21-11-2016 |
| VERIFIED | KTA | 21-11-2016 |
| APPROVED | KTA | 21-11-2016 |

APPROVED
APPROVAL STATUS

SCALE



TRANSMISSION LINES
DESIGN DATA - EARTHING
EARTHING OF WIRE FENCES

ARRANGEMENT

| A2 | TL140089 | 01 |
|---|---|---|
| | PREFIX NUMBER SHEET | AMDT |

INDEX CLASS'N 36-03



400x566

PLOT ISSUE DATE 22/11/2016 8:30:55 AM

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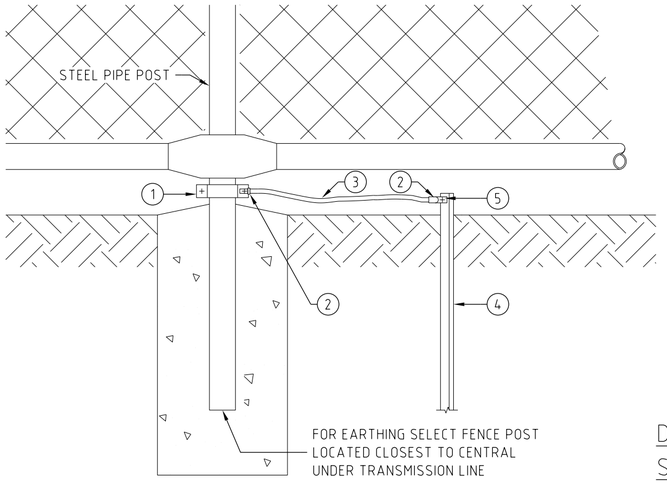
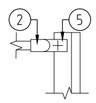
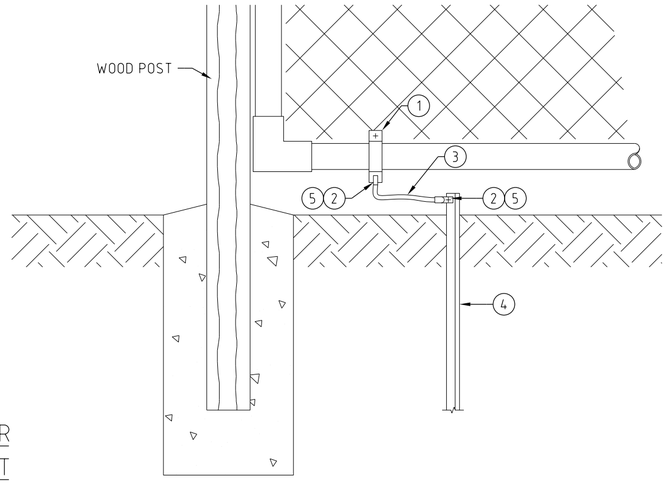
# Appendix B: Earthing of steel fences



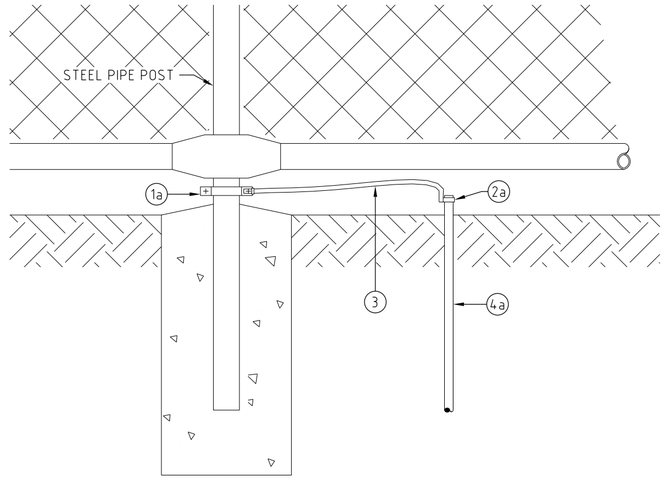

CHAINWIRE FENCE
ARRANGEMENT 1



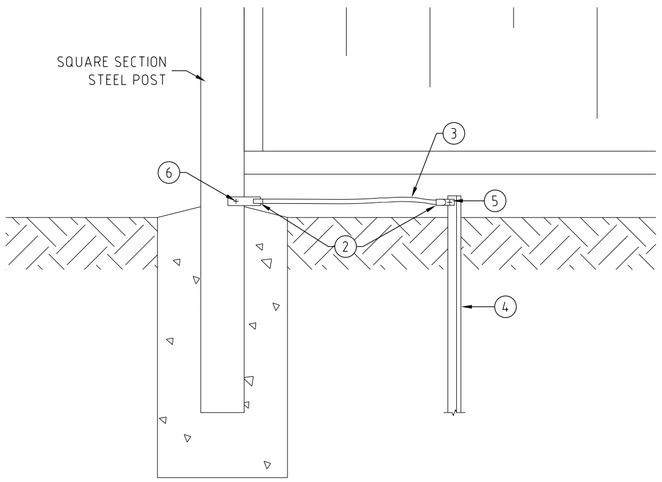

DETAIL FOR
STAR POST
ATTACHMENT



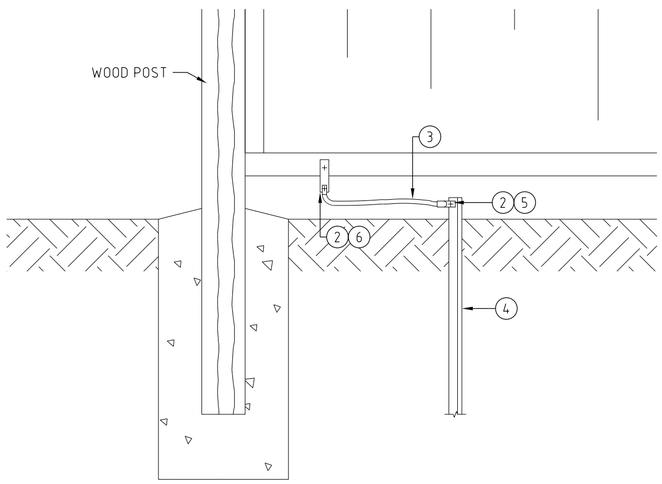

CHAINWIRE FENCE WITH WOOD POST
ARRANGEMENT 1A




DETAIL 1
ALTERNATIVE METHOD OF
EARTHING CONNECTION




COLORBOND FENCE
ARRANGEMENT 2




COLORBOND FENCE WITH WOOD POST
ARRANGEMENT 2A

NOTES:

1. DRIVEN EARTH RODS:
   RODS MUST BE DRIVEN TO A DEPTH OF AT LEAST 1200mm.
   RODS MUST BE LOCATED AT LEAST 300mm CLEAR OF CONCRETE FOOTING FOR FENCE POST.
   ROD MUST BE LOCATED AS CLOSE AS POSSIBLE TO BOTTOM FENCE RAIL.

2. CONNECTIONS TO FENCE & EARTH ROD TO BE PAINTED WITH AN "EXTERIOR GRADE" OF PAINT AFTER MAKING & TIGHTENING OF JOINTS.

3. STAR STAKES MUST BE GALVANIZED & NOT OF THE FULLY PAINTED TYPE.

4. FENCE EARTHING SHALL BE APPLIED TO THE FENCE POST. EARTHING OF THE BOTTOM RAIL (ARRANGEMENT 1A & 2A) SHALL ONLY BE APPLIED WHERE INSTRUCTED BY TRANSGRID.

5. DETAIL 1 SHOWS ALTERNATIVE ARRANGEMENT WHERE AN EARTH ROD IS USED IN PLACE OF A STAR STAKE.

| DRG No. | S/L No. | ITEM | DESCRIPTION | MAT'L. |
|---|---|---|---|---|
| | | 6 | M6/M8 SELF TAPPING SCREW WITH WASHER. | |
| | | 5 | M8 BOLT AND NUT. | |
| TL-146911 | ST50101 | 4a | COPPER CLAD EARTH ROD. | |
| TL-145554 | LM76003 | 4 | EARTH STAKE 1650 LONG. | M.S.GAL'V |
| | | 3 | 6mm$^2$ STRANDED GREEN/YELLOW PVC INSUL. | COPPER |
| | | 2a | EARTH ROD CLAMP. | |
| | | 2 | CRIMP LUG 6mm$^2$ x 10mm ATTACHMENT HOLE. | E.TIN COPP. |
| | | 1a | "MUFFLER" CLAMP. | M.S.GAL'V |
| TL-140529 | | 1 | FENCE EARTHING CLAMP. | M.S.GAL'V |

UNLESS OTHERWISE STATED ALL DIMENSIONS ARE IN MILLIMETRES.

| AMENDMENT TEXT: | TAM | 18-07-2016 |
|---|---|---|
| REDRAW FROM TIFF IMAGE TO DGN | | |

TransGrid

TL-829305 STEEL FENCE ISOLATION PANEL

REFERENCE DRAWINGS

| | | |
|---|---|---|
| DRAWN | TAM | |
| REVIEWED | SBH | 21-11-2016 |
| VERIFIED | KTA | 21-11-2016 |
| APPROVED | KTA | 21-11-2016 |

APPROVED
APPROVAL STATUS

SCALE



TRANSMISSION LINES
DESIGN DATA - EARTHING
EARTHING OF STEEL FENCES

ARRANGEMENT

| A2 | TL192501 | 01 |
|---|---|---|
| | PREFIX NUMBER SHEET | AMDT |

INDEX CLASS'N 36-03



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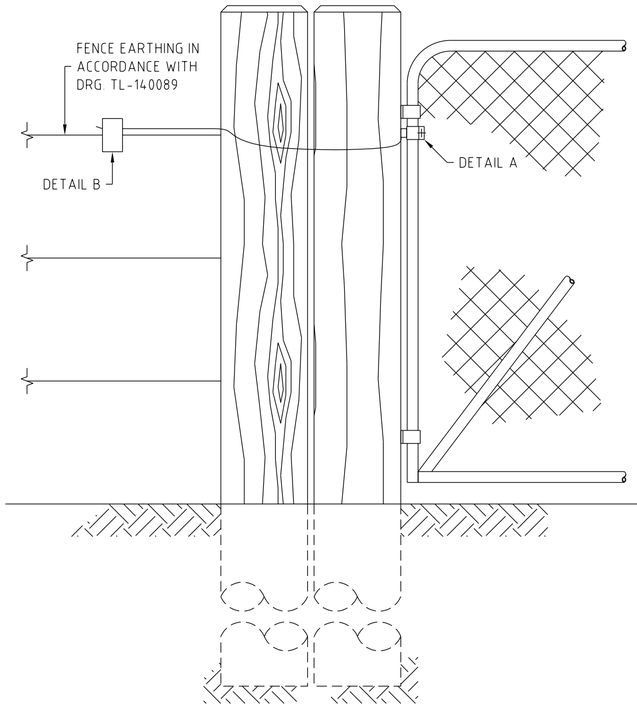
# Appendix C: Gate earthing arrangement

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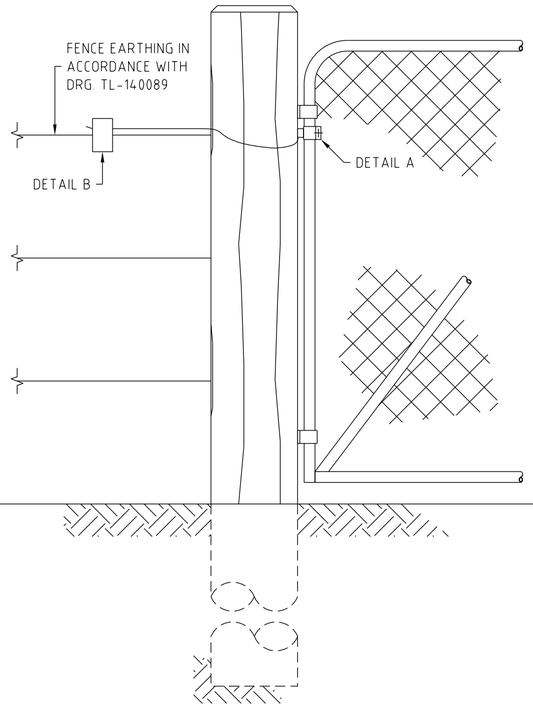


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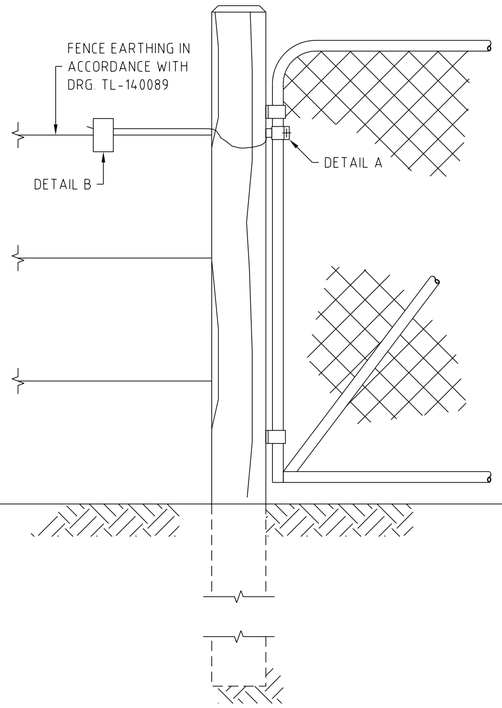


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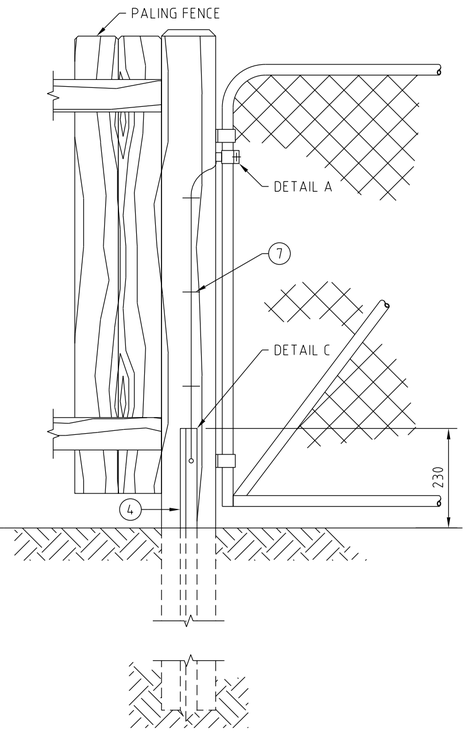
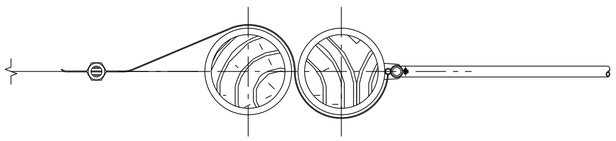
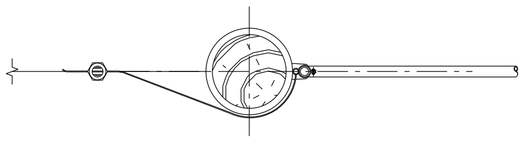
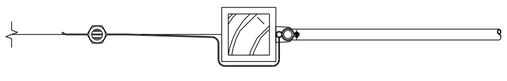


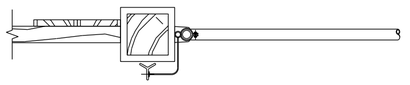

'TYPE 4'

ELEVATION
( TYPES 1 - 4)

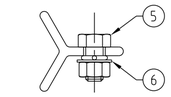


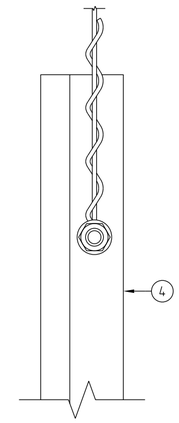






PLAN
( TYPES 1 - 4)

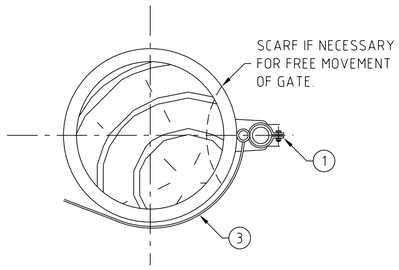


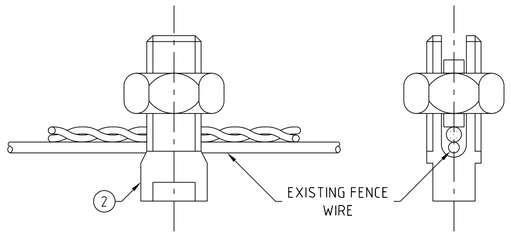

DETAIL 'C'

NOTES:

1. THE GATE EARTHING ASSEMBLY IS TO BE POSITIONED SO THAT MOVEMENT OF THE GATE IS NOT RESTRICTED AND AN EFFECTIVE ELECTRICAL CONNECTION TO THE FENCE EARTHING IS MADE.
2. WHERE EXISTING FENCE EARTHING IS CONSIDERED TO BE INADEQUATE OR ALTERNATIVELY IS NON EXISTENT THEN FENCE EARTHING TO DRG. TL-140089 IS TO BE INSTALLED.
3. IN THE CASE OF A PALING FENCE (TYPE 4). THE GATE IS TO BE EARTHED AS SHOWN. WITH THE EARTH STAKE AS CLOSE TO THE FENCE AS PRACTICABLE.




DETAIL 'A'




DETAIL 'B'

ARRG'T TYPE 4

| | | | | | |
|---|---|---|---|---|---|
| 4 | SN 92 289 | 7 | ——— | STAPLES 4 x 40 | S. GALV. |
| 1 | WA 65 011 | 6 | ——— | M8 FLAT WASHER | S. GALV. |
| 1 | NA 01 181 | 5 | ——— | M8 x 25 BOLT & NUT | S. GALV. |
| 1 | LM 76 003 | 4 | TL-145554 | EARTH STAKE 1650 LONG | S. GALV. |
| AS REQ'D | RW 68 031 | 3 | ——— | GATE EARTHING 7/1.25 (6mm$^2$ MIN) | S. GALV. |
| 1 | CD 45 110 | 1 | ——— | EARTH CLIP | S. GALV. |

ARRG'T TYPE 1, 2 & 3

| | | | | | |
|---|---|---|---|---|---|
| AS REQ'D | RW 68 031 | 3 | ——— | GATE EARTHING 7/1.25 (6mm$^2$ MIN) | S. GALV. |
| 1 | EF 16 209 | 2 | ——— | LINE SPLIT BOLT CLAMP | BRASS |
| 1 | CD 45 110 | 1 | ——— | EARTH CLIP | S. GALV. |
| REQ'D | S/L No. | ITEM | DRG No. | DESCRIPTION | MAT'L. |

UNLESS OTHERWISE STATED ALL DIMENSIONS ARE IN mm

| AMENDMENT TEXT: | TAM | 18-07-2016 |
|---|---|---|

REDRAW FROM TIFF IMAGE TO DGN

TransGrid

| | | |
|---|---|---|
| DRAWN | TAM | |
| REVIEWED | SBH | 21-11-2016 |
| VERIFIED | KTA | 21-11-2016 |
| APPROVED | KTA | 21-11-2016 |

APPROVED
APPROVAL STATUS

REFERENCE DRAWINGS

SCALE



TRANSMISSION LINES
DESIGN DATA - EARTHING
GATE EARTHING ARRANGEMENT

ARRANGEMENT

| A2 | TL140098 | 01 |
|---|---|---|
| | PREFIX NUMBER SHEET | AMDT |

INDEX CLASS'N 36-03



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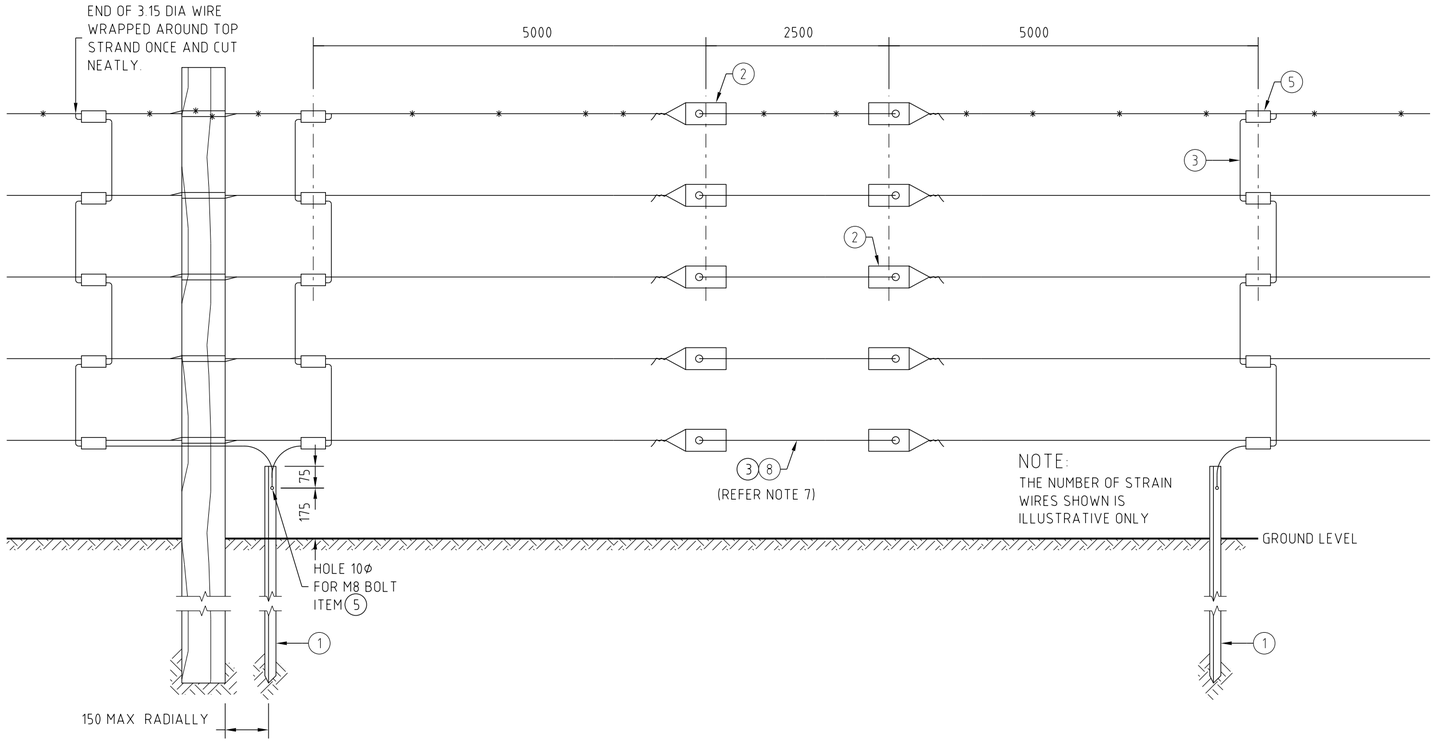
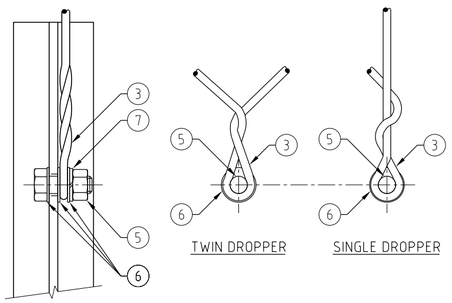
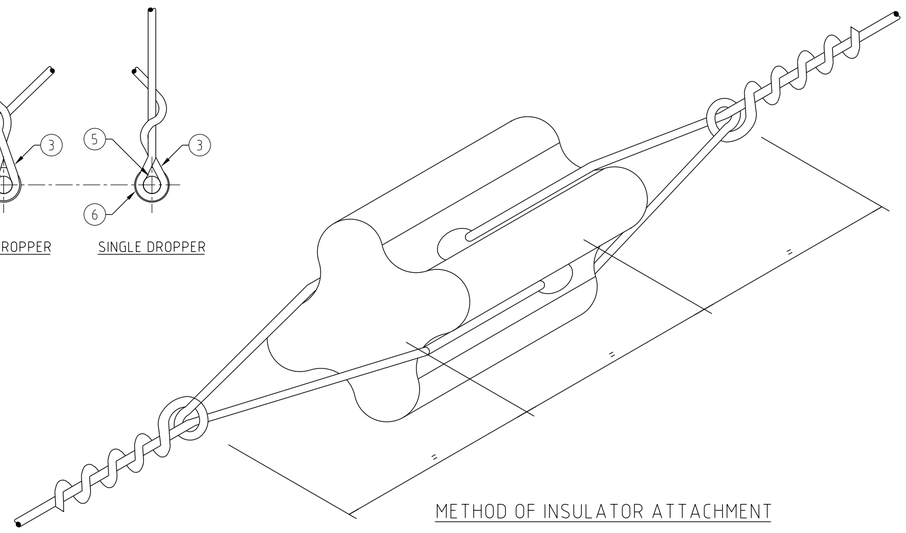
# Appendix D: Wire fence isolation panel



METHOD OF INSULATOR ATTACHMENT

NOTES:

1. FENCE NOT TO BE RETENSIONED TO MORE THAN 2kN.
2. THE QUANTITY OF LINE CLAMPS (ITEM 4) & INSULATORS (ITEM 2) IS DEPENDENT UPON THE NUMBER OF STRAIN WIRES ON EXISTING FENCES.
3. WHERE ROCK PREVENTS THE EARTH STAKE FROM BEING DRIVEN INTO POSITION AS SHOWN. THE STAKE MAY BE CUT OFF AT 250mm ABOVE GROUND PROVIDED A MINIMUM DEPTH OF 600mm IS ACHIEVED. WHERE THE STAKE IS DRIVEN INTO ROCK. THE HOLE SHALL BE BACK FILLED AND TAMPED WITH CLAY, SOFT SOIL OR ELSE A SLURRY CONSISTING OF A MIXTURE OF
   - 1 PART BY VOLUME OF CASTING PLASTER
   - 1 PART BY VOLUME OF BENTONITE
   - 4 PARTS BY VOLUME OF WATER
4. EARTH STAKES TO BE CONNECTED TO FENCE SECTION BEFORE FENCE IS CUT FOR INSULATOR INSTALLATION.
5. STAFF INSTALLING FENCE INSULATORS SHALL WEAR APPROVED INSULATING FOOTWEAR, OR STAND ON AN INSULATING RUBBER MAT ABLE TO WITHSTAND AN APPLIED VOLTAGE OF 15kV FOR ONE MINUTE.
6. THE METHOD OF ATTACHMENT SHOWN IN THE INSULATOR ATTACHMENT DETAIL IS APPLICABLE TO ALL PATTERNS OF INSULATORS HELD UNDER S/L LM 50 001.
7. WHERE FENCE INSULATORS ARE TO BE INSTALLED IN BARBED WIRE SECTIONS, BARBED WIRE IS TO BE USED IN PLACE OF 3.15mm FENCING WIRE. BARBS MAY HAVE TO BE SUITABLY TRIMMED TO ALLOW THE WIRE TO PASS THROUGH HOLES IN INSULATOR.

| AS REQ'D | RW 78 119 | 8 | ——— | BARBED WIRE 2.5 mm / STRAND | S. GALV. |
|---|---|---|---|---|---|
| 2 | WA 80 011 | 7 | ——— | M8 SPRING WASHER | SP. S. GALV. |
| 6 | WA 65 011 | 6 | ——— | M8 WASHER | S. GALV. |
| 2 | NA 01 181 | 5 | ——— | M8 x 25 BOLT & NUT | S. GALV. |
| AS REQ'D | EF 16 209 | 4 | ——— | LINE SPLIT BOLT CLAMP | BRASS |
| AS REQ'D | RW 85 017 | 3 | ——— | FENCING WIRE 3.15 DIA | S. GALV. |
| AS REQ'D | LM 50 001 | 2 | ——— | INSULATORS | PORCELAIN |
| 2 | LM 76 003 | 1 | TL-145554 | EARTH STAKE 1650 mm LONG | S. GALV. |
| REQ'D | S/L No. | ITEM | DRG No. | DESCRIPTION | MAT'L |

UNLESS OTHERWISE STATED ALL DIMENSIONS ARE IN MILLIMETRES.

| AMENDMENT TEXT: | TAM | 18-07-2016 |
|---|---|---|

REDRAW FROM TIFF IMAGE TO DGN

TransGrid

TL-829305 STEEL FENCE ISOLATION PANEL
TL-205446 RINGLOCK FENCE ISOLATION PANEL
TL-173774 WIRE MESH FENCE ISOLATION PANEL
TL-140089 EARTHING OF WIRE FENCES

REFERENCE DRAWINGS

| DRAWN | TAM | |
|---|---|---|
| REVIEWED | SBH | 21-11-2016 |
| VERIFIED | KTA | 21-11-2016 |
| APPROVED | KTA | 21-11-2016 |

APPROVED
APPROVAL STATUS
SCALE



TRANSMISSION LINES
DESIGN DATA - EARTHING
WIRE FENCE ISOLATION PANEL

ARRANGEMENT

A2 | TL167142 | 01
PREFIX NUMBER SHEET | AMDT

400x566

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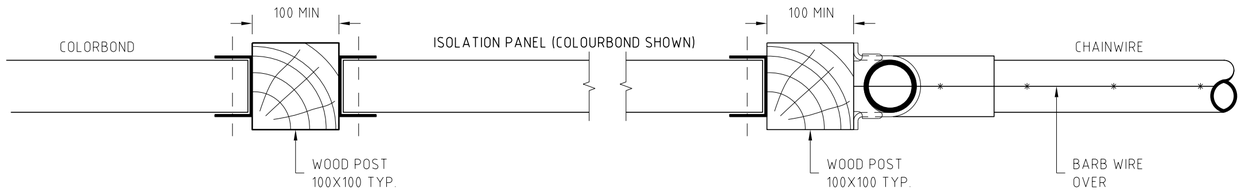
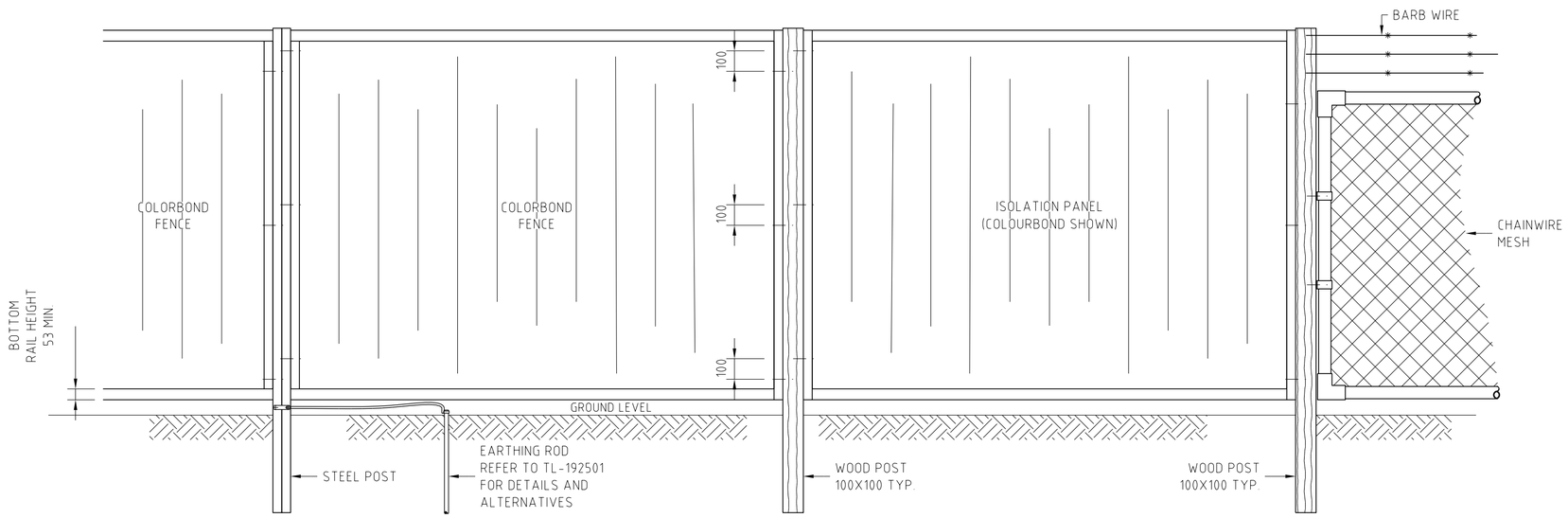
SOURCE DESIGN FILE: \\vsw08323\ics_share$\6\5468_13\TL-167142_01.DGN

# Appendix E: Steel fence isolation panel




PLAN

SCALE 1:5




FRONT ELEVATION

SCALE 1:20

NOTES:

1. THE ISOLATION PANEL SHALL NOT BE EARTHED UNLESS SPECIFICALLY DIRECTED BY TRANSGRID.
2. THE FENCE ON EITHER SIDE OF THE ISOLATION PANEL SHALL BE EARTHED IN ACCORDANCE WITH TL-192501.
3. THE SCREWS USED TO FIX THE FENCE PANELS TO THE WOOD POST SHALL NOT PENETRATE MORE THAN 50mm INTO THE POST AND SHALL BE OFFSET AT LEAST 100mm FROM ANY SCREWS USED TO FIX THE PANEL ON THE OPPOSITE SIDE OF THE POST.
4. BOLTS SHALL NOT BE USED TO FIX THE FENCE PANELS TO THE WOOD POSTS.
5. IF WOOD POST ARE TO BE PAINTED THE PAINT SHALL BE NON-CONDUCTIVE.
6. THERE MUST BE NO METALLIC CONNECTIONS (INCLUDING BARBED SECURITY WIRE) WHICH CONNECT TO THE FENCE PANELS ON OTHER SIDE OF THE WOOD POST.
7. COLORBOND AND CHAINWIRE ARE SHOWN ON THIS DRAWING AS TYPICAL EXAMPLES.
   THIS DESIGN CAN BE APPLIED TO OTHER TYPES OF METAL FENCING PROVIDED THE GENERAL ARRANGEMENT CAN BE MAINTAINED.

UNLESS OTHERWISE STATED ALL DIMENSIONS ARE IN MILLIMETRES.

| AMENDMENT TEXT: | | |
|---|---|---|

TransGrid

| | |
|---|---|
| TL-192501 | EARTHING OF STEEL FENCES |
| TL-829305 | STEEL FENCE ISOLATION PANEL |
| TL-173774 | WIRE MESH FENCE ISOLATION PANEL |
| TL-167142 | WIRE FENCE ISOLATION PANEL |

REFERENCE DRAWINGS

| | | |
|---|---|---|
| DRAWN | TAM | |
| REVIEWED | SBH | 21-11-2016 |
| VERIFIED | KTA | 21-11-2016 |
| APPROVED | KTA | 23-11-2016 |

APPROVED
APPROVAL STATUS

SCALE



TRANSMISSION LINES
DESIGN DATA - EARTHING
STEEL FENCE ISOLATION PANEL

ARRANGEMENT

| A2 | TL829305 | 00 |
|---|---|---|
| | PREFIX NUMBER SHEET | AMDT |

INDEX CLASS'N 36-03



400x566

PLOT ISSUE DATE 23/11/2016 8:30:20 AM

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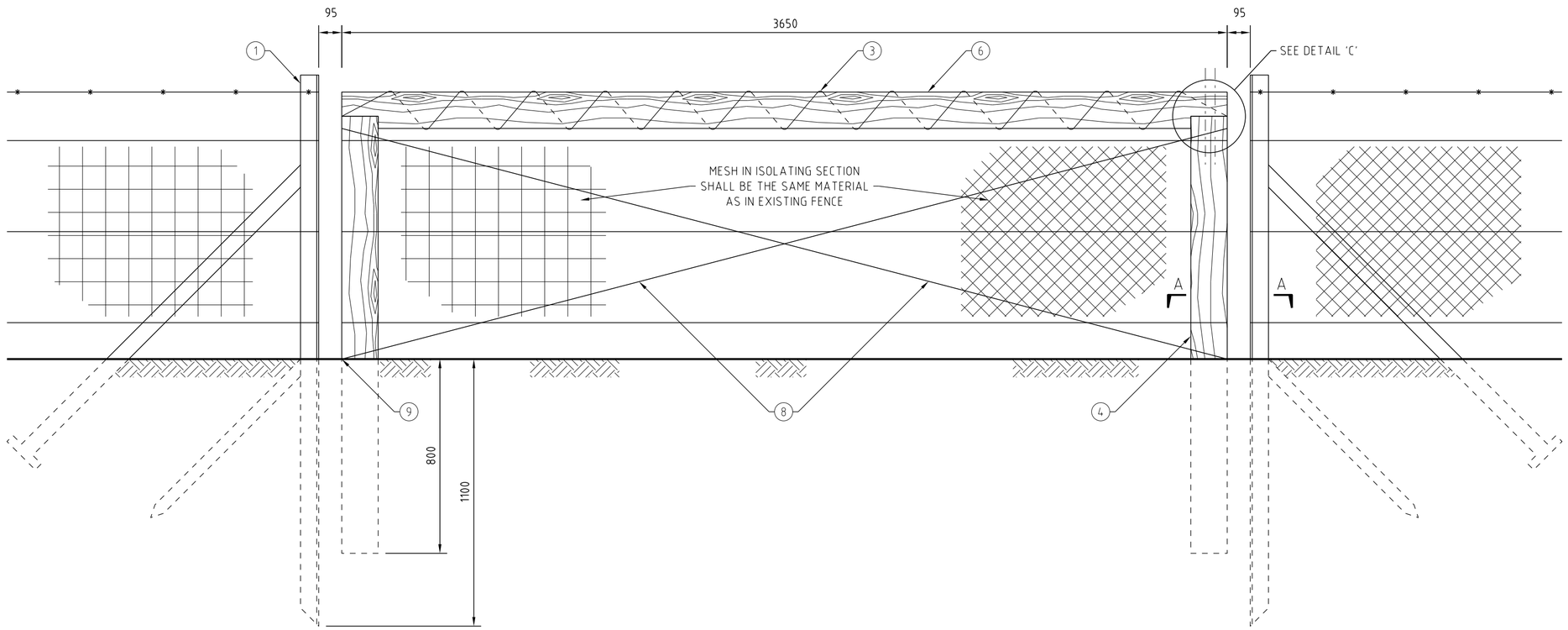
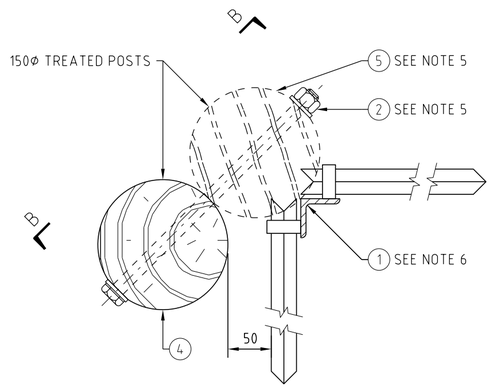
SOURCE DESIGN FILE: \\vsw08323\ics_share$\6\10519_2\TL-829305_00.DGN

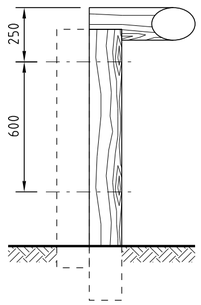
# Appendix F: Wire mesh fence isolation panel



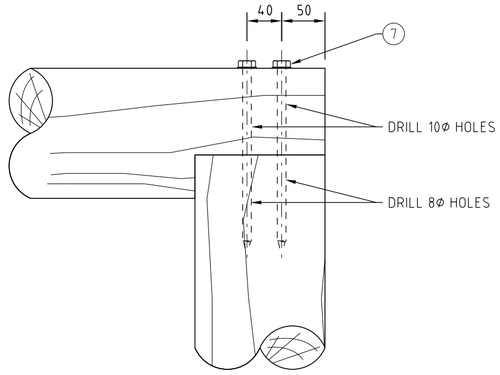

ELEVATION
SCALE: N.T.S.




SECTION A-A
SCALE: 1:5




VIEW 'B-B'
SCALE: 1:20




DETAIL 'C'
SCALE: 1:5

NOTES:
1. THE CENTRAL ISOLATING FENCE SECTION SHALL BE INSTALLED PRIOR TO THE INSTALLATION OF THE STEEL POST ASSEMBLY.
2. TREATED POSTS (ITEM 4) SHALL BE INSTALLED IN BORED HOLES 300Ø & 800 DEEP. BACKFILL SHALL BE BROKEN UP & TAMPED IN LAYERS NOT EXCEEDING 150.
3. STEEL POSTS & ANCHORS SHALL BE DRIVEN INTO THE GROUND IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.
4. THE TWO SIDE FENCE SECTIONS SHALL BE TERMINATED ON THE STEEL POST ASSEMBLIES. NO METALLIC CONNECTION SHALL BE MADE BETWEEN THESE FENCE SECTIONS & THE CENTRAL ISOLATING SECTION.
5. IN THE CASE OF RABBIT PROOF FENCING, WHERE REQUIRED BY THE PROPERTY OWNER, THE GAP AT EACH END OF THE CENTRAL ISOLATING FENCE SECTION SHALL BE CLOSED BY THE INCLUSION OF A SECOND POST (ITEM 5) AS DETAILED IN SECTION A-A.
6. THE CLEARANCE BETWEEN METAL PARTS OF THE CENTRAL ISOLATING FENCE SECTION & METAL PARTS OF THE FENCE SECTIONS ON EITHER SIDE SHALL BE A MINIMUM OF 50mm.
7. PINE POST & RAIL SHALL BE PRESSURE IMPREGNATED WITH COPPER CHROME ARSENATE SALTS.

| REQ'D | S/L No. | ITEM | DRG No. | DESCRIPTION | MAT'L. |
|---|---|---|---|---|---|
| 4 | ——— | 9 | ——— | 5 x 50 CLOUT HEAD NAIL | S. GALV. |
| AS REQ'D | ——— | 8 | ——— | 3.15 FENCING WIRE | S. GALV. |
| 4 | ——— | 7 | ——— | M10 BOLT x 200 LONG | S. GALV. |
| 1 | ——— | 6 | ——— | TREATED RAIL 150Ø x 3650 LONG | PINE |
| * 2 | ——— | 5 | ——— | TREATED POST 150Ø x 1100 LONG | PINE |
| 2 | ——— | 4 | ——— | TREATED POST 150Ø x 1800 LONG | PINE |
| 10m | ——— | 3 | ——— | BARBED WIRE | S. GALV. |
| * 4 | ——— | 2 | ——— | M16 BOLT & NUT | S. GALV. |
| 1 | HG 69 009 | 1 | TL-806057 A2 | STEEL POST ASSEMBLY | S. GALV. |

*SEE NOTE 5

UNLESS OTHERWISE STATED ALL DIMENSIONS ARE IN MILLIMETRES

| AMENDMENT TEXT: | TAM | 18-07-2016 |
|---|---|---|

REDRAW FROM TIFF IMAGE TO DGN

TransGrid

TL-167142 WIRE FENCE ISOLATION PANEL
TL-205446 RINGLOCK FENCE ISOLATION PANEL
TL-829305 STEEL FENCE ISOLATION PANEL

REFERENCE DRAWINGS

| | | |
|---|---|---|
| DRAWN | TAM | |
| REVIEWED | SBH | 21-11-2016 |
| VERIFIED | KTA | 21-11-2016 |
| APPROVED | KTA | 21-11-2016 |

APPROVED
APPROVAL STATUS

SCALE



TRANSMISSION LINES
DESIGN DATA - EARTHING
WIRE MESH FENCE ISOLATION PANEL

ARRANGEMENT

A2 | TL173774 | 01
PREFIX NUMBER SHEET | AMDT

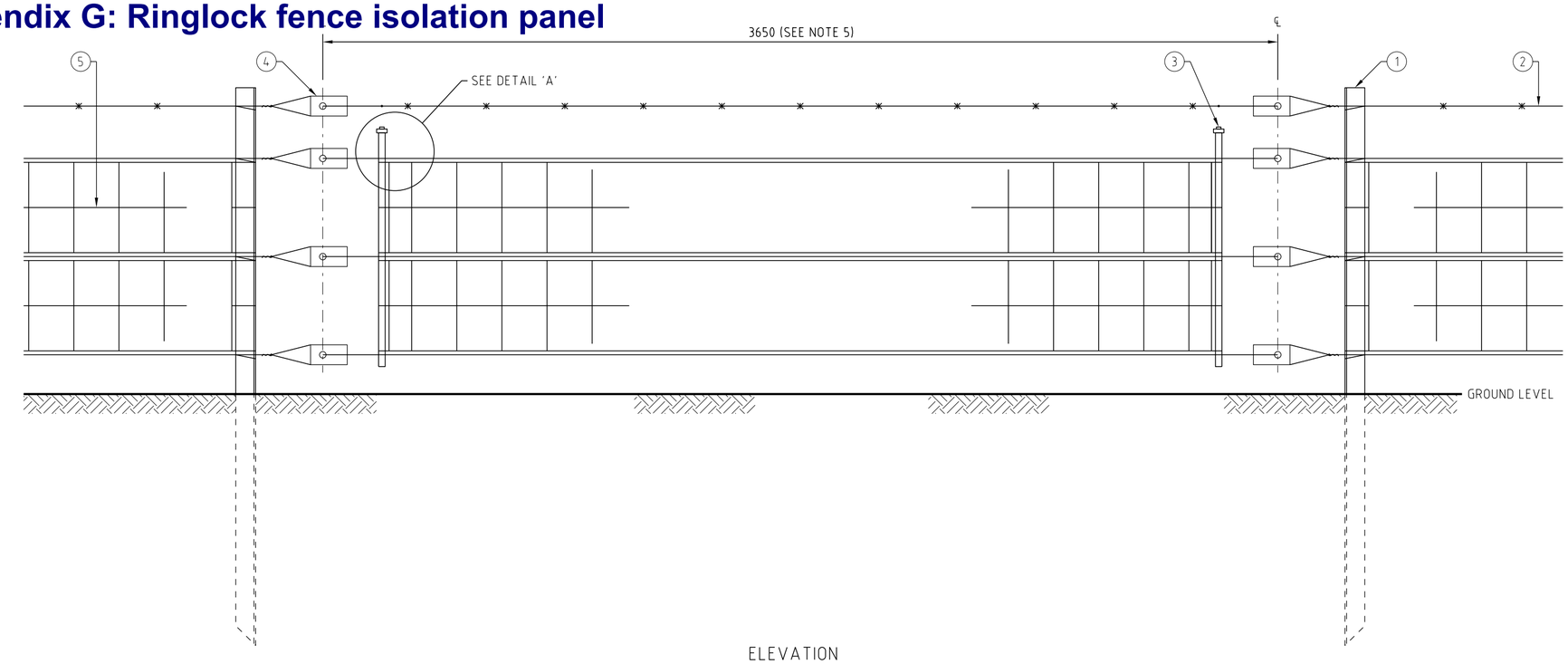


400x566

PLOT ISSUE DATE 22/11/2016 12:07:51 PM | COPIED FROM | SUPERSEDES | SUPERSEDED BY | INDEX CLASS'N 36-03

SOURCE DESIGN FILE: \\vsw08323\ics_share$\5716\3582_926\TL-173774_01.DGN

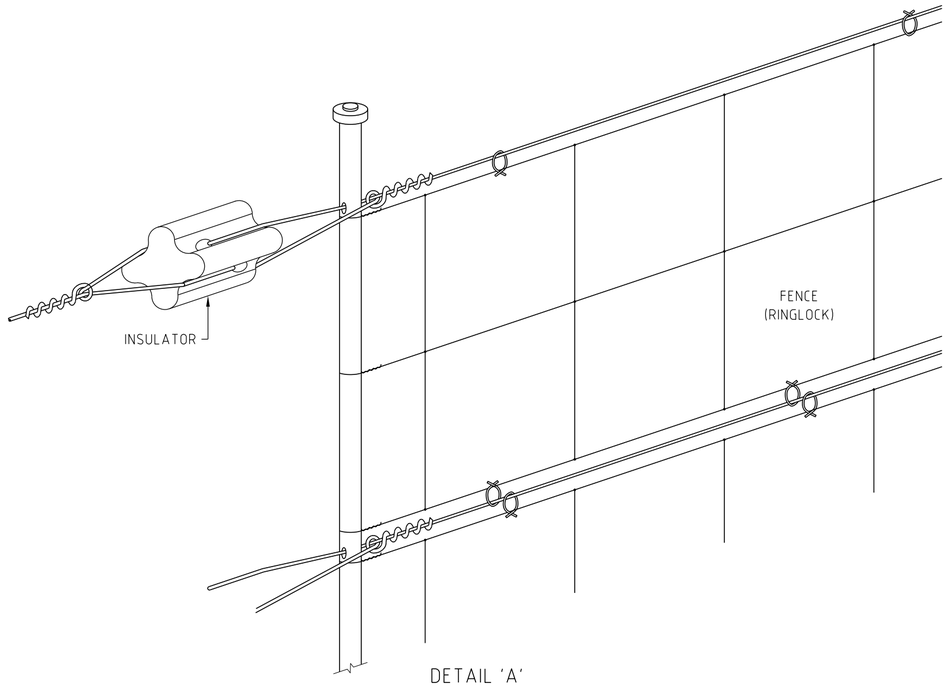
# Appendix G: Ringlock fence isolation panel




ELEVATION
SCALE: N.T.S.

NOTES:

1. STEEL POSTS (ITEM 1) ARE TO BE DRIVEN INTO THE GROUND IN ACCORDANCE WITH MANUFACTURE'S INSTRUCTIONS.
2. THE NUMBER OF PLAIN & BARBED WIRE STRANDS IN THE ISOLATING SECTION TO BE AS IN THE ORIGINAL FENCE. FENCE TENSION TO BE MAINTAINED THROUGH ISOLATING SECTION.
3. WIRE & RINGLOCK OF ORIGINAL FENCE IS TO BE TIED TO THE STEEL POSTS ON EITHER SIDE OF THE ISOLATING SECTION (TO EARTH FENCE).
   RINGLOCK OF ISOLATING SECTION PANEL IS TO BE TENSIONED & TIED TO PIPES (ITEM 3) AT EACH END & TIED TO PLAIN STRANDS WITH STAPLES IN ACCORDANCE WITH MANUFACTURE'S INSTRUCTIONS.
4. NO METALLIC CONNECTION IS TO BE MADE BETWEEN THE MAIN FENCE SECTION & THE CENTRAL ISOLATING SECTIONS.
5. DISTANCE BETWEEN INSULATORS TO BE 3650mm MINIMUM. WHERE AN ISOLATING SECTION IS SPECIFIED TO BE INSTALLED IN A FENCE THAT IS LESS THAN 2600mm FROM A CONCRETE POLE OR STEEL TOWER THE LENGTH OF THE ISOLATING SECTION IS TO BE INCREASED TO PROVIDE A MINIMUM CLEARANCE OF 2600mm BETWEEN THE NEAREST POINT OF THE CONCRETE POLE / STEEL TOWER & THE EARTHED SECTION OF THE FENCE.
6. STAFF INSTALLING FENCE INSULATORS SHALL WEAR APPROVED INSULATING FOOTWEAR, OR STAND ON AN INSULATING RUBBER MAT ABLE TO WITHSTAND AN APPLIED VOLTAGE OF 15kV FOR ONE MINUTE.




DETAIL 'A'

| AS REQ'D | | 5 | | RINGLOCK | S. GALV. |
|---|---|---|---|---|---|
| 8 | LM 50 001 | 4 | | INSULATOR | PORCELAIN |
| 2 | | 3 | | WATER PIPE (25mm N.B.) | S. GALV. |
| AS REQ'D | | 2 | | BARBED WIRE | S. GALV. |
| 2 | HG 69 009 | 1 | TL-806057 | STEEL POST L 90x6 | S. GALV. |
| REQ'D | S/L No. | ITEM | DRG No. | DESCRIPTION | MAT'L. |

UNLESS OTHERWISE STATED ALL DIMENSIONS ARE IN MILLIMETRES

| AMENDMENT TEXT | | |
|---|---|---|
| REDRAW FROM TIFF IMAGE TO DGN | TAM | 18-07-2016 |

TransGrid

| | |
|---|---|
| TL-167142 | WIRE FENCE ISOLATION PANEL |
| TL-173774 | WIRE MESH FENCE ISOLATION PANEL |
| TL-829305 | STEEL FENCE ISOLATION PANEL |
| TL-205446 | RINGLOCK FENCE ISOLATION PANEL |

REFERENCE DRAWINGS

| | | |
|---|---|---|
| DRAWN | TAM | |
| REVIEWED | SBH | 21-11-2016 |
| VERIFIED | KTA | 21-11-2016 |
| APPROVED | KTA | 21-11-2016 |

APPROVED
APPROVAL STATUS
SCALE



TRANSMISSION LINES
DESIGN DATA - EARTHING
RINGLOCK FENCE ISOLATION PANEL

ARRANGEMENT

A2 | TL205446 | 01
PREFIX NUMBER SHEET | AMDT

INDEX CLASS'N 36-03



400x566

PLOT ISSUE DATE 22/11/2016 12:07:51 PM

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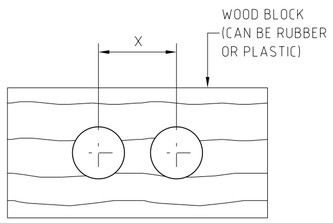
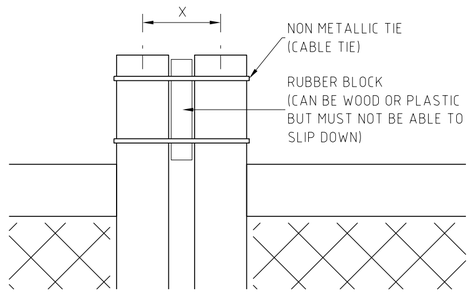
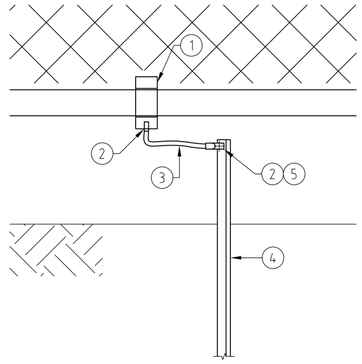
# Appendix H: Earthing and isolation of temporary fencing




DETAIL 1
SCALE 1:5



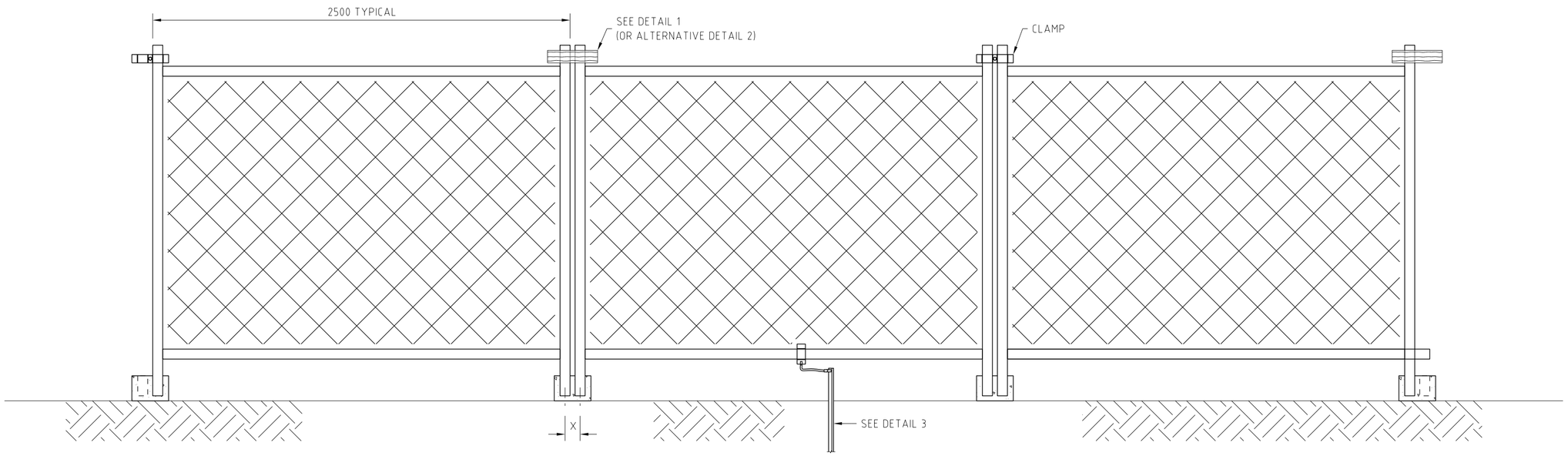

DETAIL 2
SCALE 1:5




DETAIL 3
SCALE 1:10

NOTES:

1. EARTH STAKES:
   MUST BE DRIVEN TO A DEPTH OF AT LEAST 1200mm.
   AND MUST BE LOCATED AS CLOSE AS POSSIBLE TO BOTTOM FENCE RAIL.
2. CONNECTIONS TO FENCE & EARTH STAKE TO BE PAINTED WITH AN "EXTERIOR GRADE" OF PAINT AFTER MAKING & TIGHTENING OF JOINTS.
3. STAR STAKES MUST BE GALVANIZED & NOT OF THE FULLY PAINTED TYPE.
4. REFER TO DRAWING TL-192501 FOR ALTERNATIVE EARTH STAKE/ROD CONNECTIONS.
5. ISOLATION AT EVERY SECOND PANEL CAN BE MADE AS PER DETAIL 1 OR DETAIL 2.
6. POST SEPARATION AT THE MOUNTING BLOCK (DIMENSION 'X') SHOULD BE MAINTAINED AS A MINIMUM AT THE TOP OF THE POST. POST SEPARATION SHOULD NOT BE LESS THAN 50mm IN ANY CASE.
7. FOR FENCES WHERE PANELS ARE SIGNIFICANTLY LONGER OR SHORTER THAN 2500mm THE DISTANCE BETWEEN ISOLATIONS SHOULD BE MAINTAINED AT THE PANEL INTERVAL CLOSEST TO 5000mm.




ELEVATION
SCALE 1:20

| | | | | |
|---|---|---|---|---|
| | | 5 | M8 BOLT AND NUT. | |
| TL-145554 | LM76003 | 4 | EARTH STAKE 1650 LONG (STAR STAKE). | M.S.GAL'V |
| | | 3 | 6mm$^2$ STRANDED GREEN/YELLOW P.V.C INSUL. | COPPER |
| | | 2 | CRIMP LUG 6mm$^2$ x 10mm ATTACHMENT HOLE. | E.TIN COPP. |
| TL-140529 | | 1 | FENCE EARTHING CLAMP. | M.S.GAL'V |
| DRG No. | S/L No. | ITEM | DESCRIPTION | MAT'L. |

UNLESS OTHERWISE STATED ALL DIMENSIONS ARE IN MILLIMETRES.

| AMENDMENT TEXT: | | |
|---|---|---|

TransGrid

TL-192501 EARTHING OF STEEL FENCES.

REFERENCE DRAWINGS

| | | |
|---|---|---|
| DRAWN | TAM | |
| REVIEWED | SBH | 21-11-2016 |
| VERIFIED | KTA | 21-11-2016 |
| APPROVED | KTA | 21-11-2016 |

APPROVED
APPROVAL STATUS
SCALE



TRANSMISSION LINES
DESIGN DATA - EARTHING
EARTHING AND ISOLATION OF TEMPORARY FENCING
ARRANGEMENT

A2 | TL899207 (PREFIX NUMBER SHEET) | 00 (AMDT)

INDEX CLASS'N 36-03



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