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

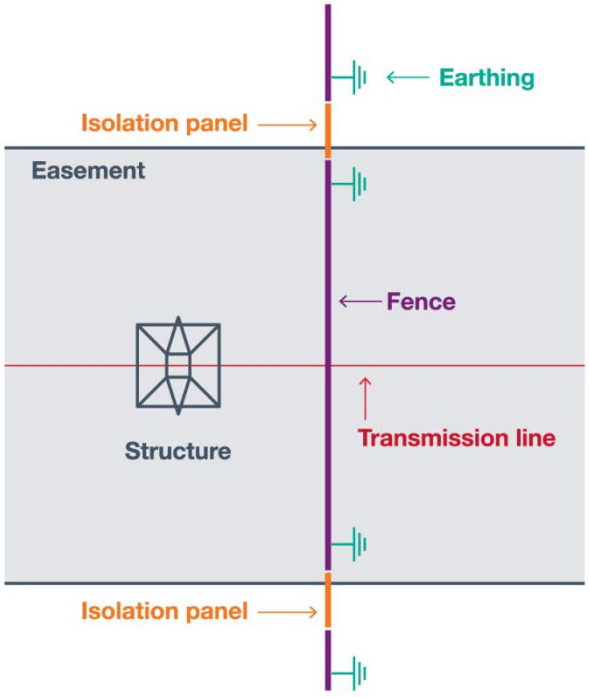
Metal fences that run across an easement, near the base of a transmission line structure, pose specific risks. To manage this risk the following steps must be taken:

- 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

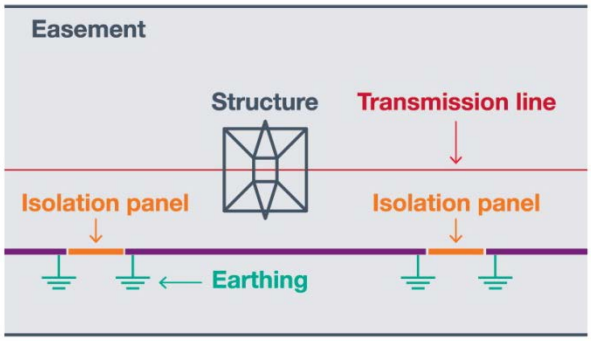


Fences parallel to a transmission line

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



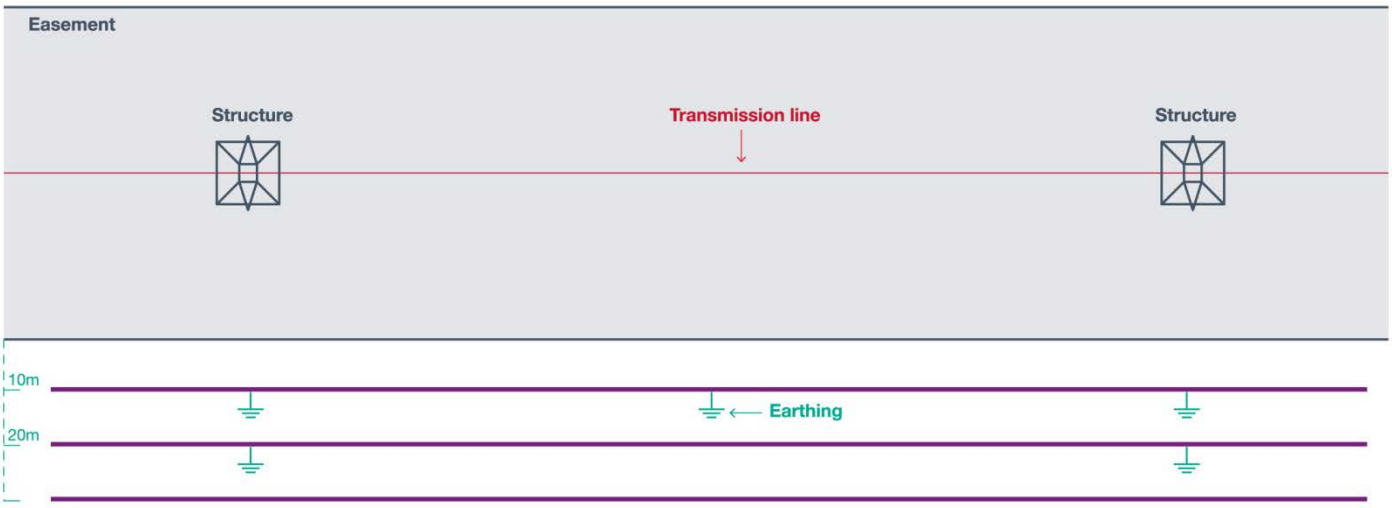
Fences outside the easement

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

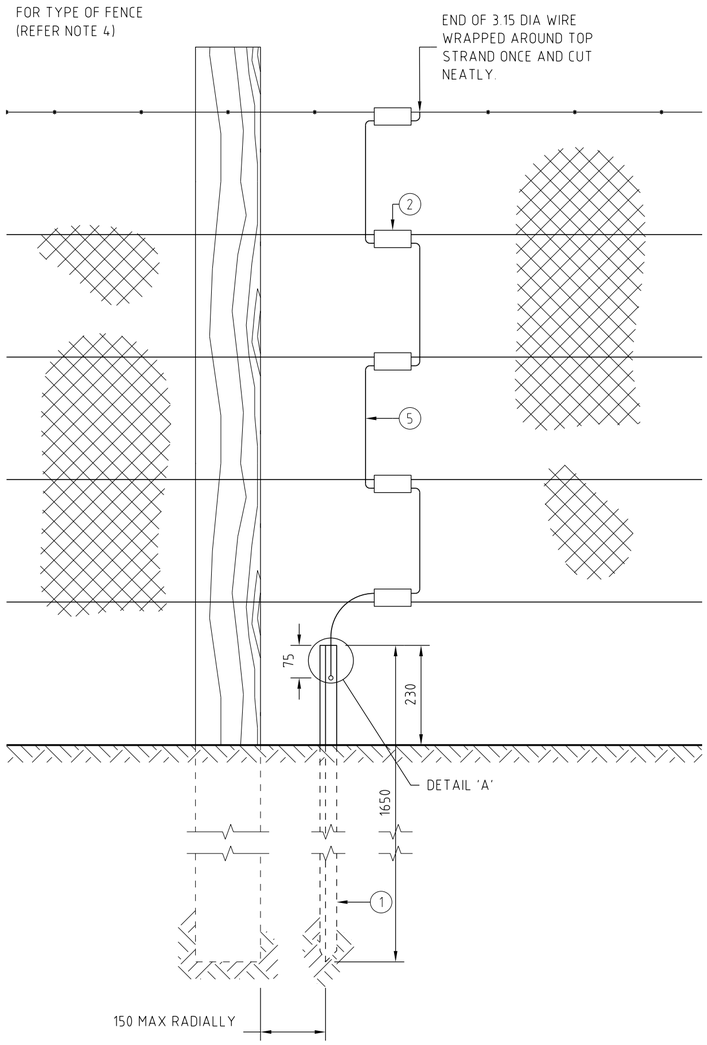
Temporary fencing installed within an easement needs to be earthed. Where a typical chain-wire or weldmesh panel fence supported by concrete or plastic block bases is used, every second panel should be earthed and the pipe clamp between posts of adjoining panel posts should be replaced with a clamp arrangement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

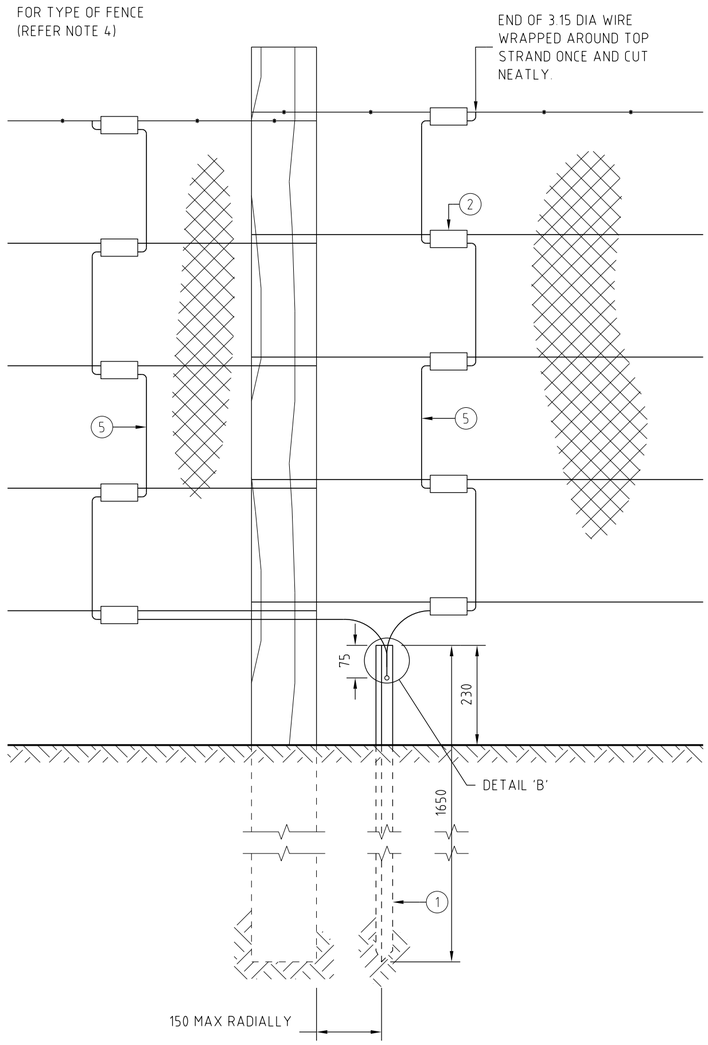
For more information

For further information please contact TransGrid on 1800 222 537.

Appendix A: Earthing of wire fence



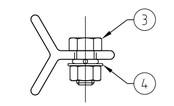
ARRANGEMENT 'A'
(REFER NOTE 3)

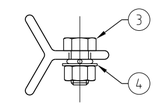


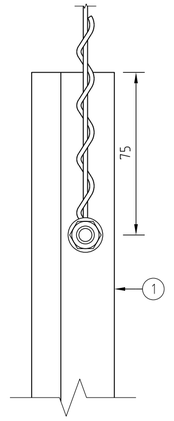
ARRANGEMENT 'B'
(REFER NOTE 3)

NOTES:

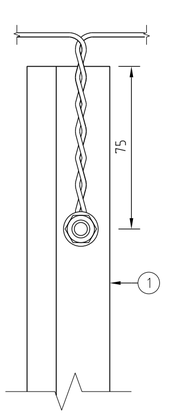
1. THE QUANTITY OF LINE CLAMPS (ITEM 2) IS DEPENDENT UPON THE NUMBER OF STRAIN WIRES ON EXISTING FENCES.
2. WHEN THE EARTH STAKE CANNOT BE DRIVEN TO POSITION AS SHOWN THE FOLLOWING PROCEDURE IS TO BE ADOPTED
   a) WHERE DRIVEN LESS THAN 610 mm:
      CUT OFF AT 230 mm ABOVE GROUND LEVEL AND DRILL TO 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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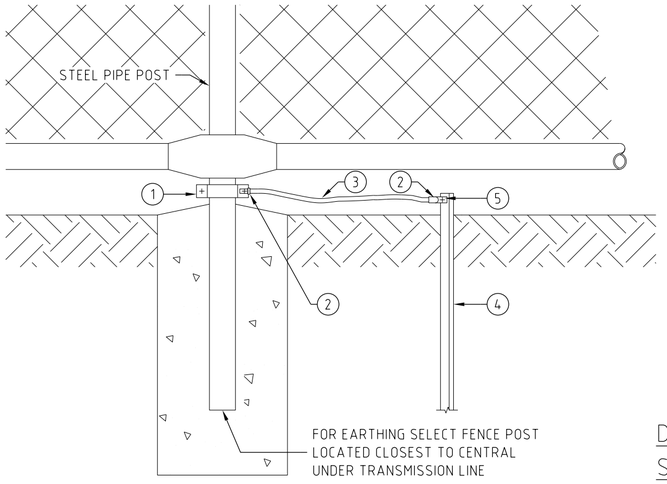
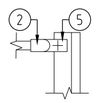
SOURCE DESIGN FILE: \\vsw08323\ics_share$\5710\3650_647\TL-140089_01.DGN

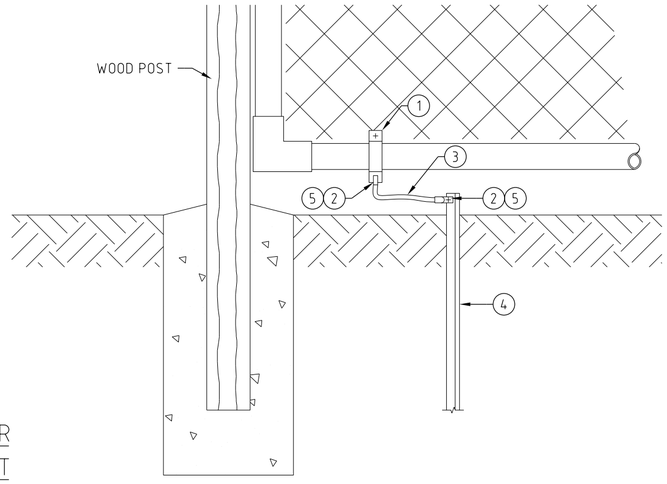
Appendix B: Earthing of steel fences



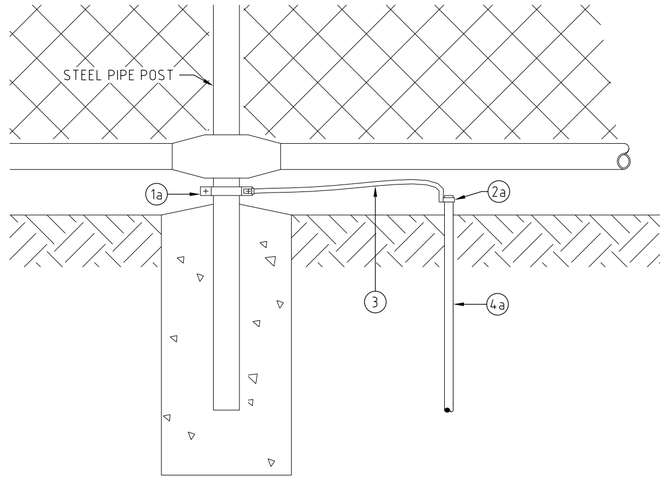
CHAINWIRE FENCE
ARRANGEMENT 1



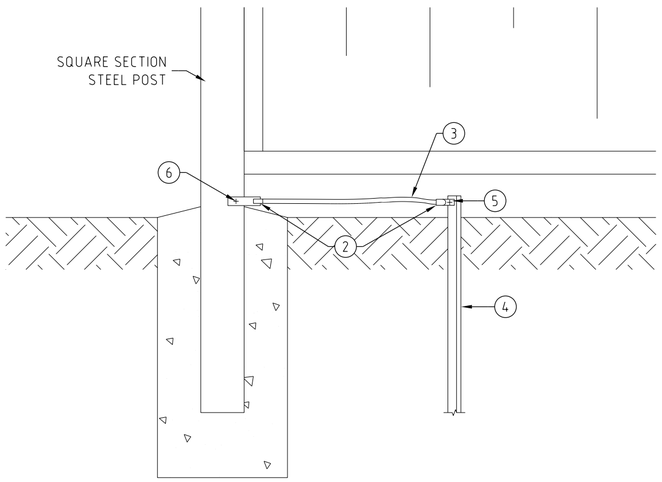
DETAIL FOR
STAR POST
ATTACHMENT



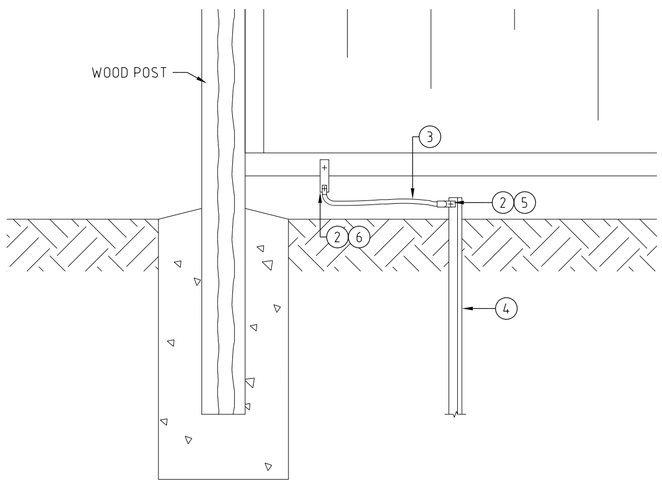
CHAINWIRE FENCE WITH WOOD POST
ARRANGEMENT 1A



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

400x566

PLOT ISSUE DATE 23/11/2016 10:29:15 AM

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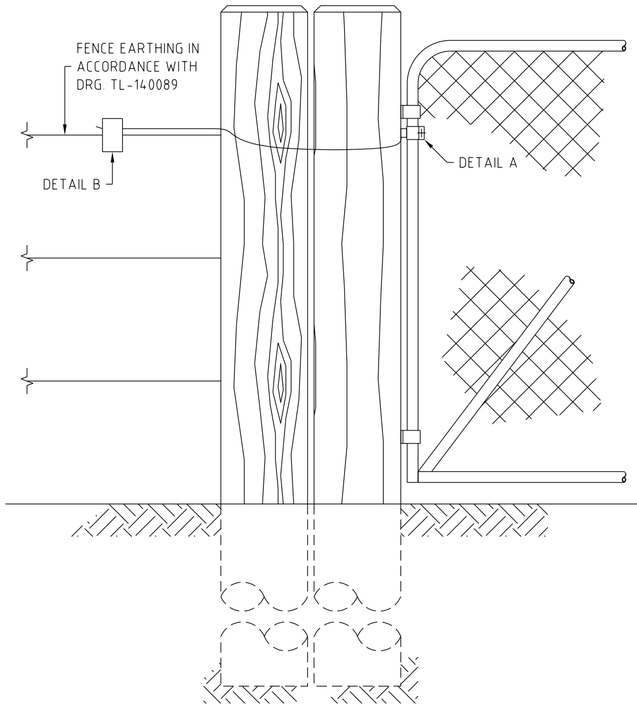
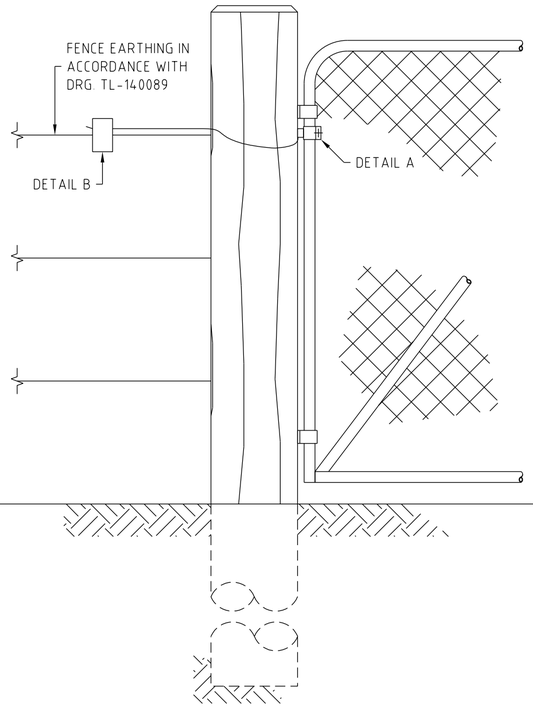
Appendix C: Gate earthing arrangement



'TYPE 1'



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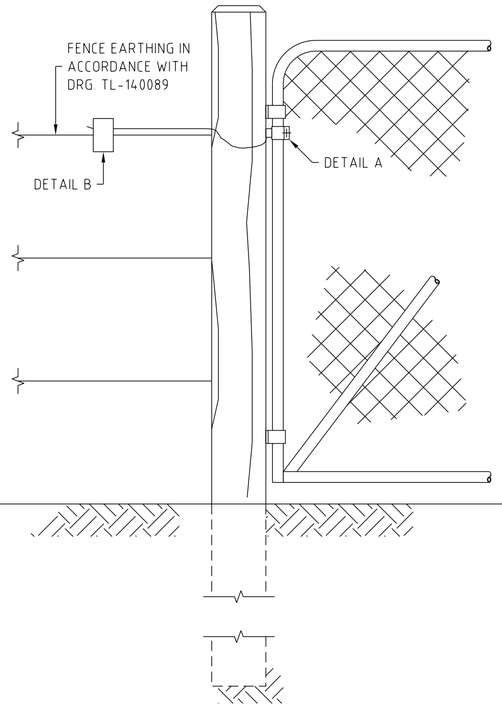

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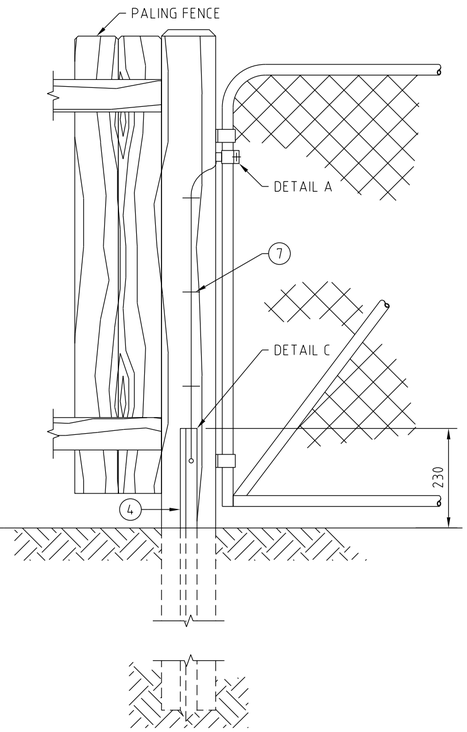
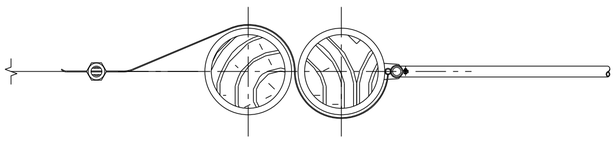
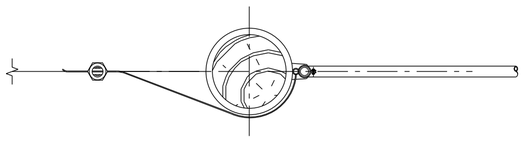
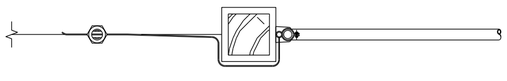


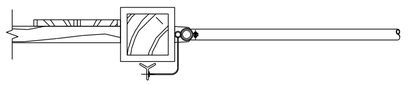
'TYPE 4'

ELEVATION
(TYPES 1 - 4)

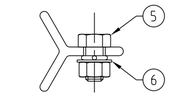


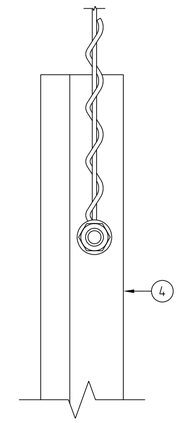






PLAN
(TYPES 1 - 4)

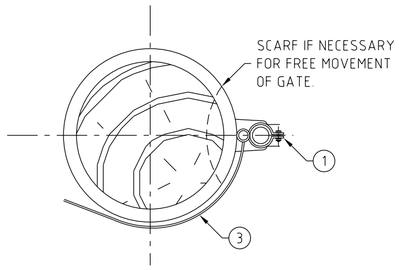




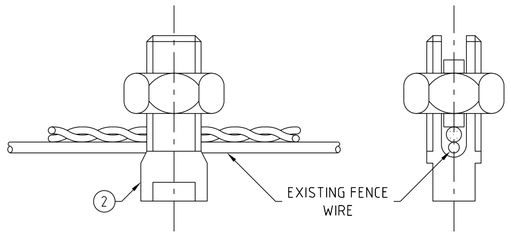
DETAIL 'C'

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

400x566

PLOT ISSUE DATE $$$$$$SYTIME$$$$$$PLOT_TIME$$

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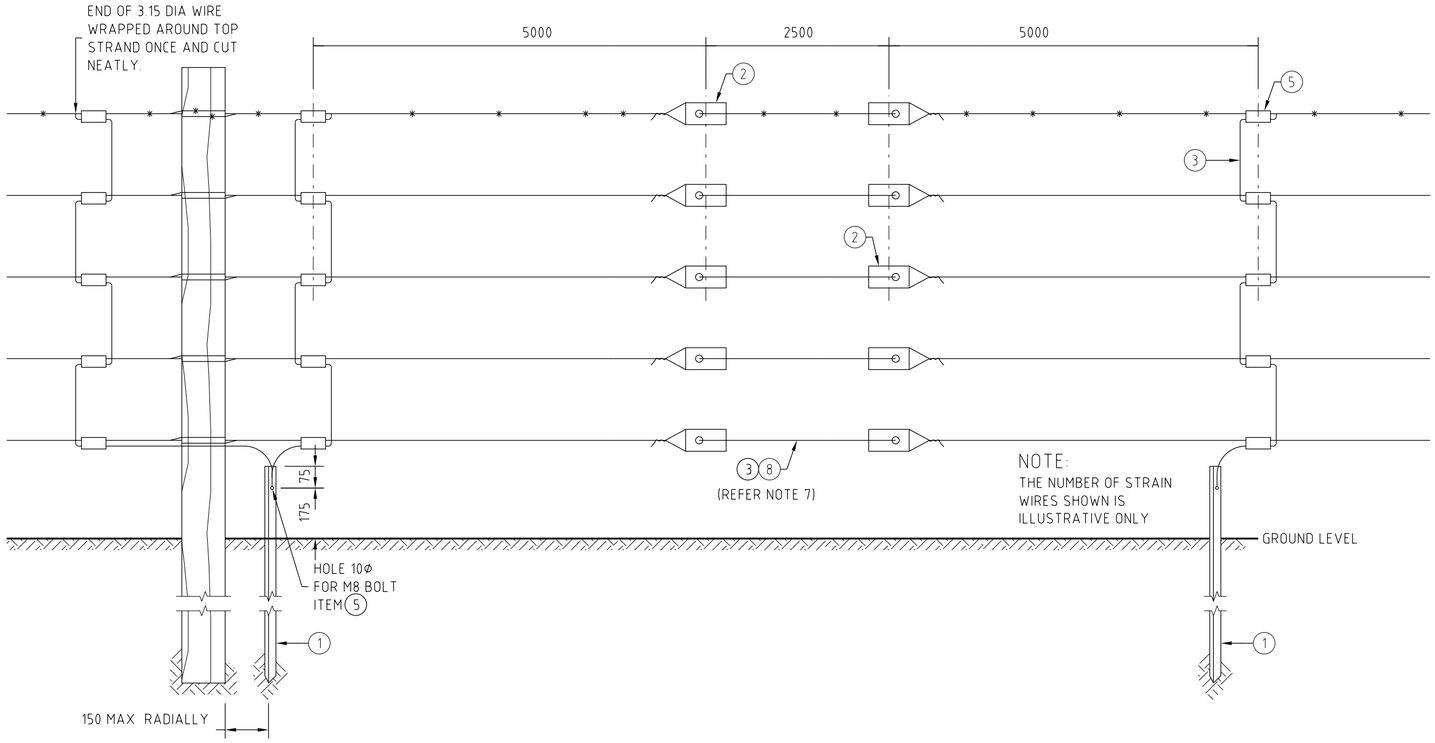
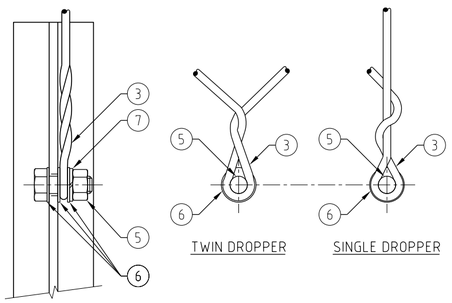
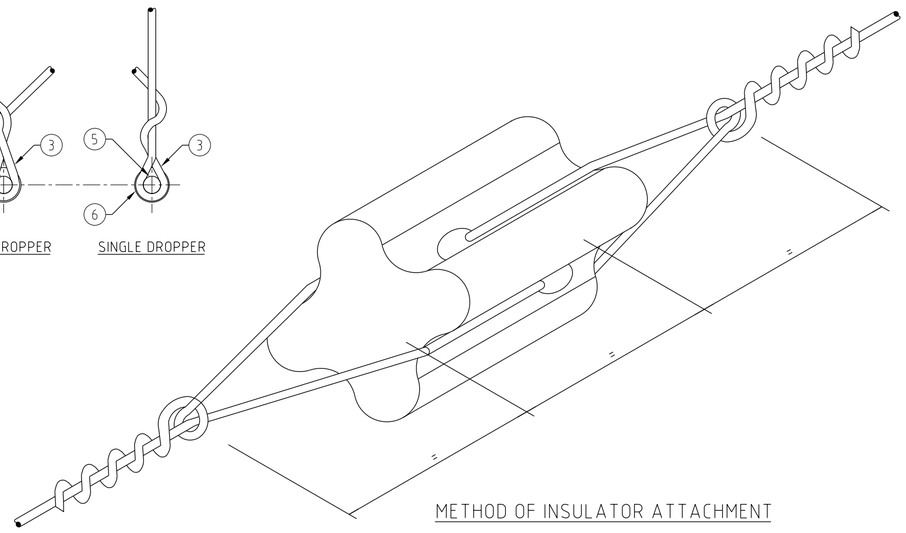
Appendix D: Wire fence isolation panel







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

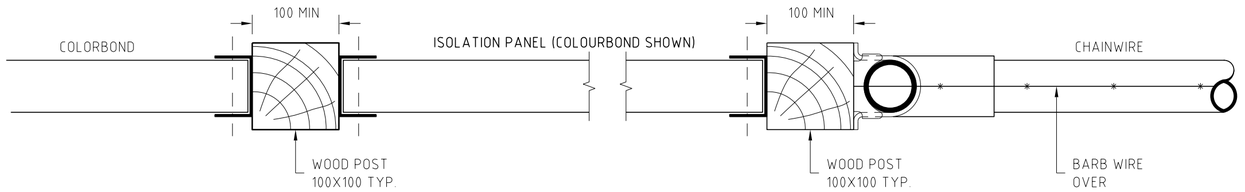
A2 | TL167142 | 01
PREFIX NUMBER SHEET | AMDT

400x566

PLOT ISSUE DATE 21/11/2016 10:00:26 AM | COPIED FROM | SUPERSEDES | SUPERSEDED BY | INDEX CLASS'N 36-03

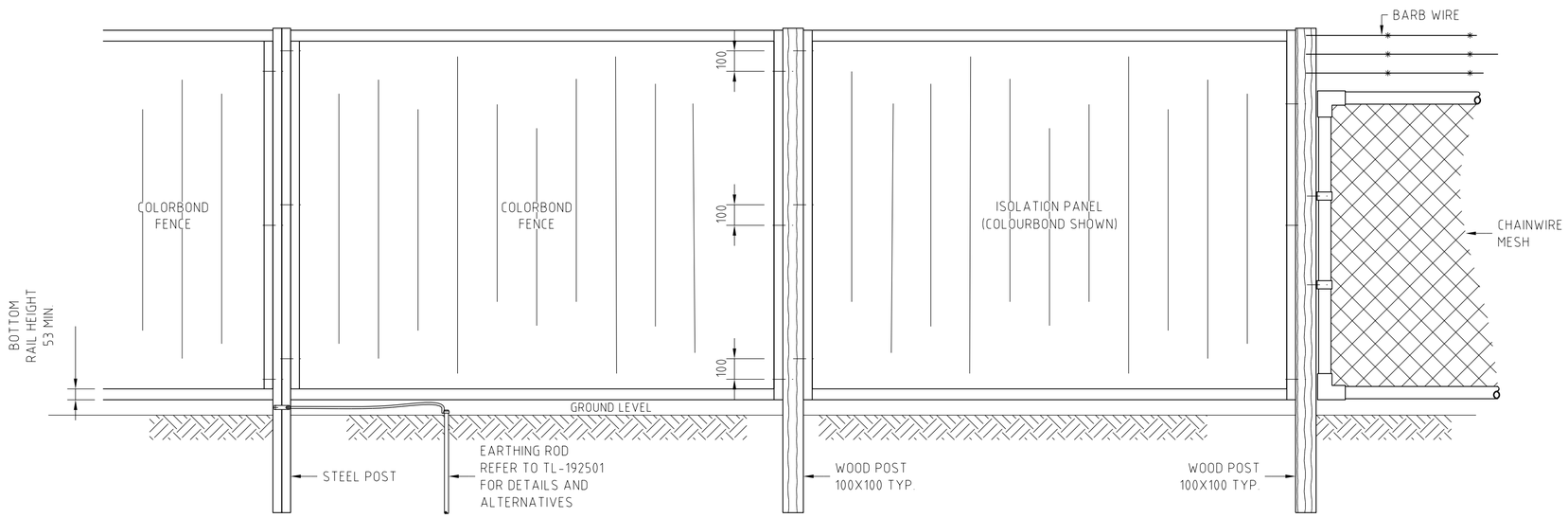
SOURCE DESIGN FILE: \\vsw08323\ics_share$\6\5468_13\TL-167142_01.DGN

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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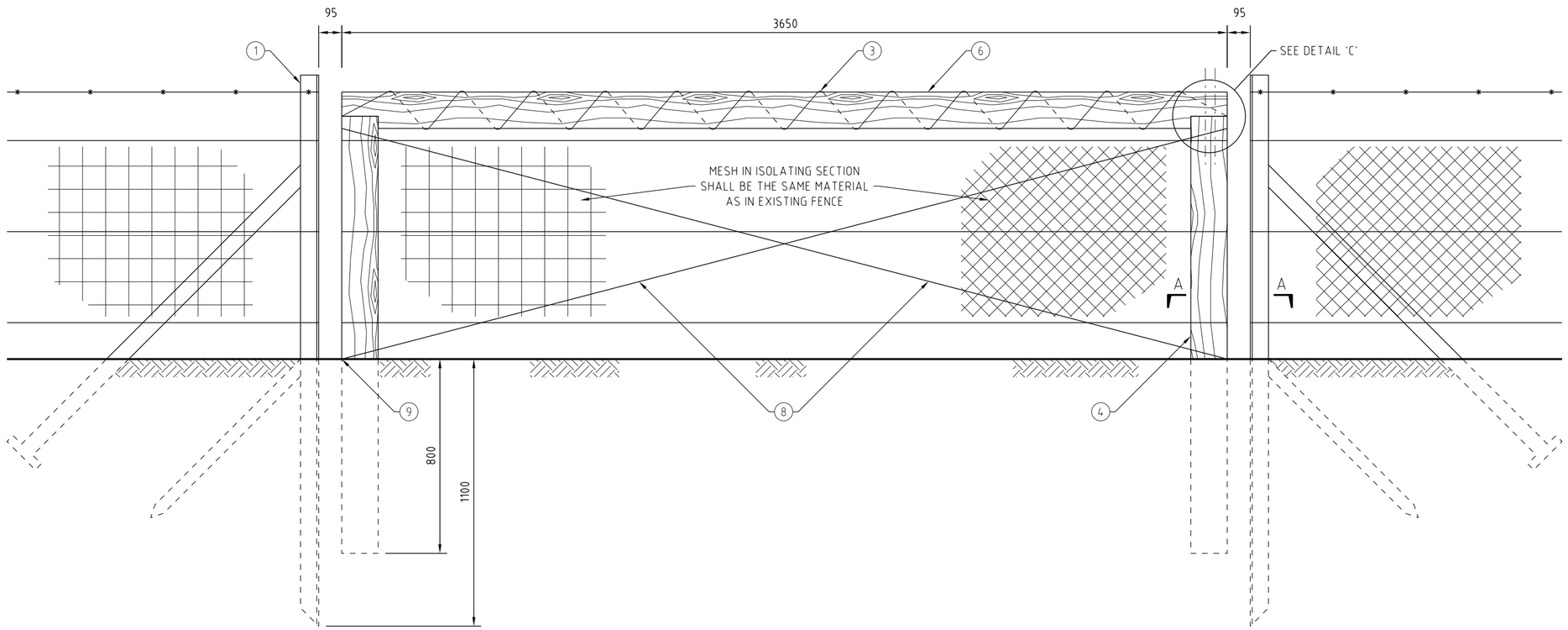
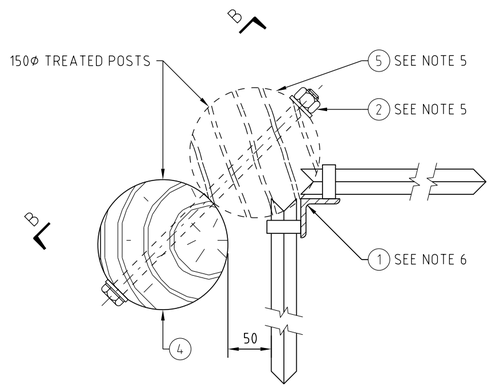
SUPERSEDED BY

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

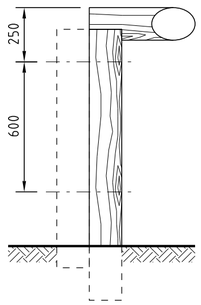
Appendix F: Wire mesh fence isolation panel



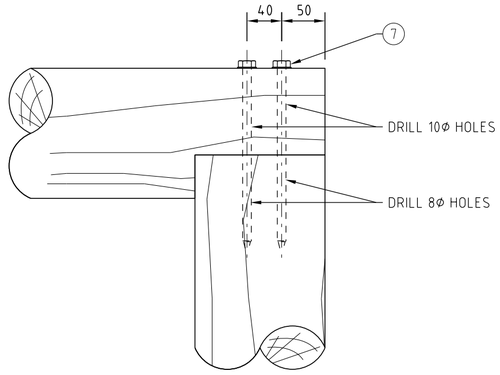
ELEVATION
SCALE: N.T.S.



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

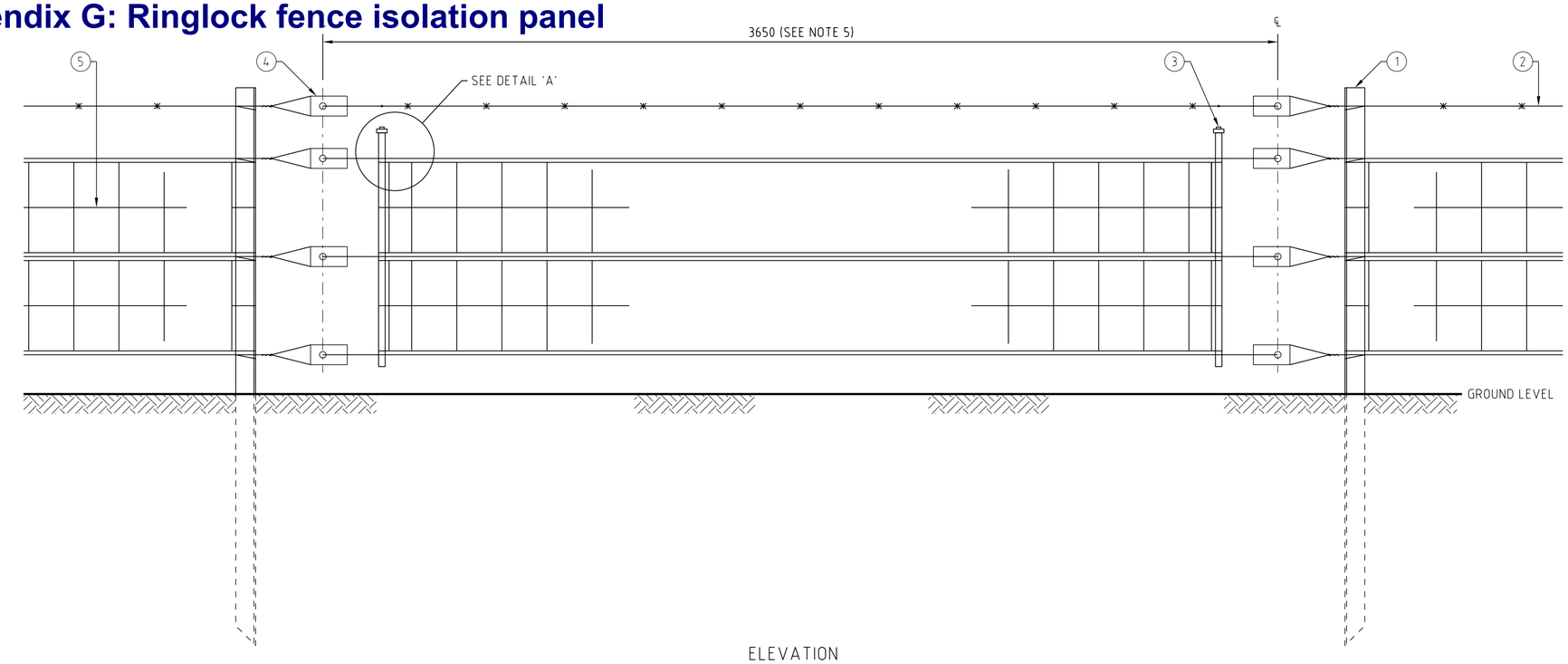
A2 | TL173774 | 01
PREFIX NUMBER SHEET | AMDT

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

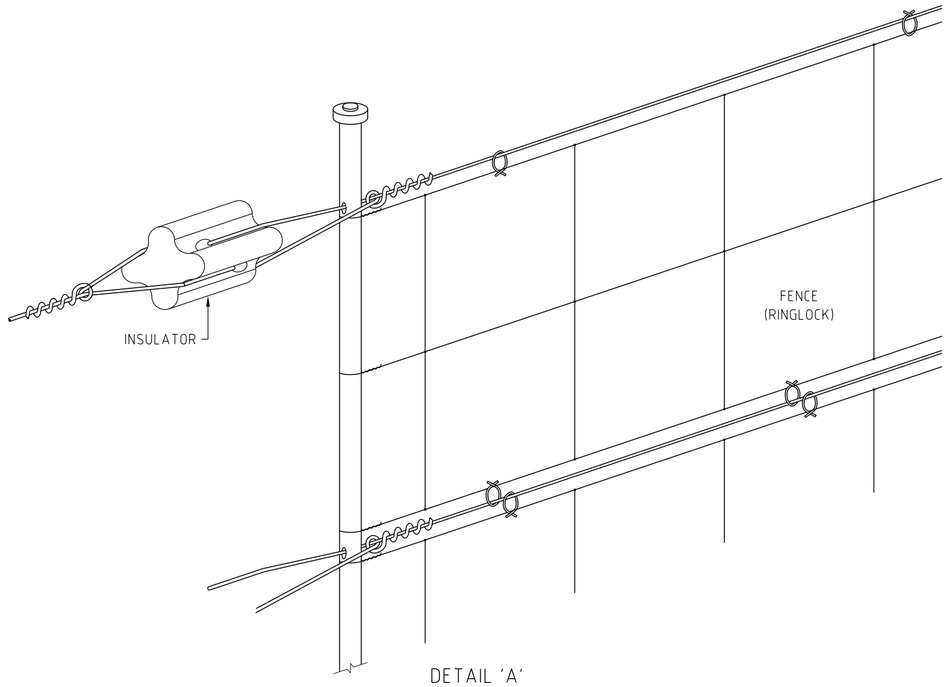
Appendix G: Ringlock fence isolation panel



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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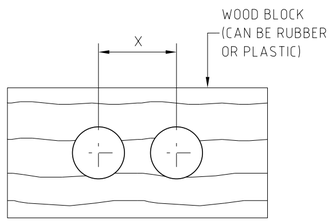
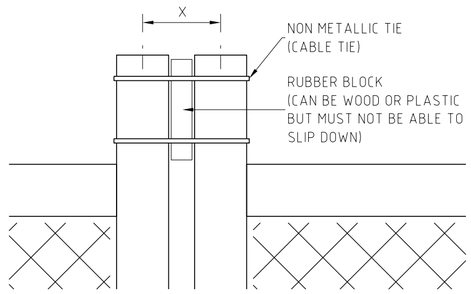
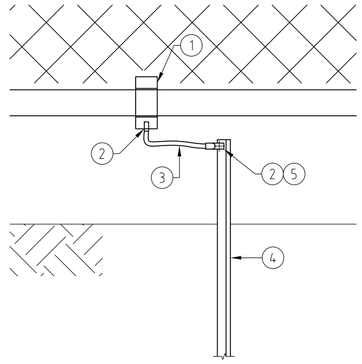
Appendix H: Earthing and isolation of temporary fencing



DETAIL 1
SCALE 1:5



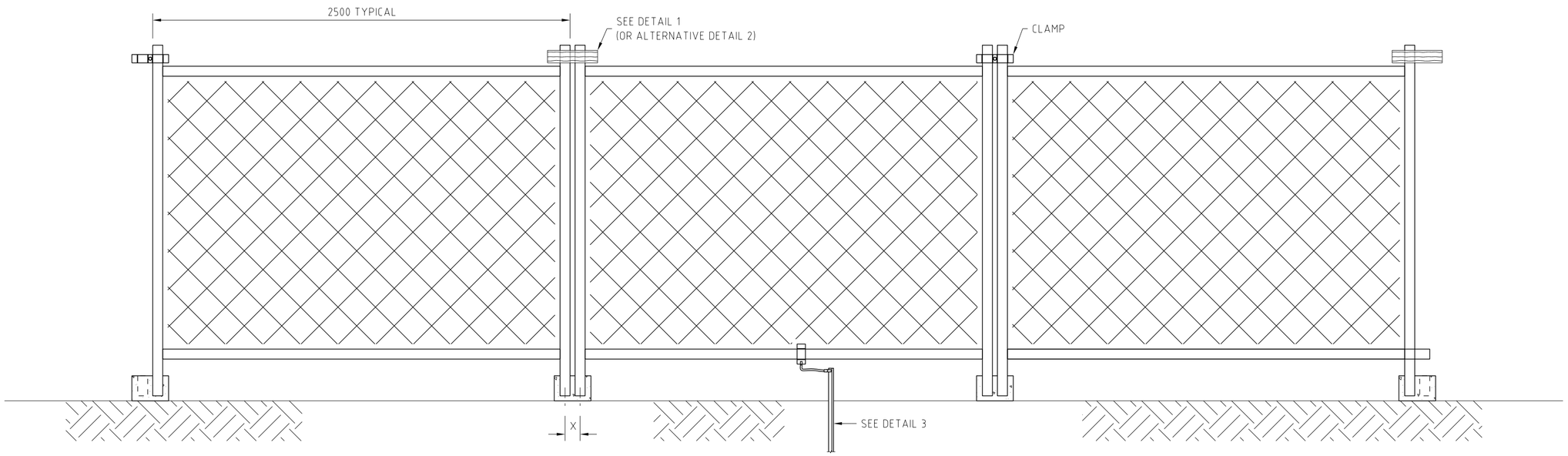
DETAIL 2
SCALE 1:5



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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