Electrolysis Mitigation Assets managed by Electricity Industry

Document history and status

Revision	Date	Description	By	Review	Approved
1	01/05/2024	Update agreement between Traction Operators and Electricity Industry and rebadged for VEC Guidelines Draft for Yarra Tram's input and Electricity Industry review	Gladys Chang John McNeill	Electricity Distributor Representative	VEC
2	05/09/2024	Final version endorsed by the VEC members	Gladys Chang John McNeill	VEC members	VEC

VICTORIAN ELECTROLYSIS COMMITTEE

Contents

1. Scope

This agreement sets out the requirements for the attachment and access of electrolysis feeders and associated equipment to poles owned by the Electricity Distribution Companies, pursuant to Section 95 and Section 96 of the Electricity Safety Act 1998.

The electrolysis feeders and associated equipment attached to poles are owned by Traction System Operators but installed and maintained by the Distribution Companies as part of their electrical installation.

As members of the Victorian Electrolysis Committee (VEC), the Distribution Companies are required by Energy Safe Victoria (Energy Safe) to install and maintain the electrolysis feeders as required.

For Electricity Industry members responsibility, refer to the VEC Terms of Reference for the Technical Sub-committee. Installation and maintenance costs are based on the VEC Cost Sharing Arrangement guideline for the Victorian Electrolysis Committee.

This agreement replaces the former agreement between the Victorian Railways (VR), Melbourne Metropolitan Tramway Board (MMTB) and the State Electricity Commission of Victoria (SECV).

2. Background

2.1 Electrolysis Mitigation System Overview

Electrolysis mitigation systems are prescribed by Energy Safe and part of the traction system infrastructure operated and maintained by the traction system operators. The mitigation system involves electrolysis feeders which enable underground metal structures such as water and gas mains to be bonded to the rails of the electric train and tram traction systems. They provide a return circuit for stray DC leakage currents produced by the traction systems, thereby reducing electrolytic corrosion of the underground structures.

The electrolysis feeders are connected to drainage bonds by which stray current is returned from a metal structure.

The electrolysis feeders are located on traction structures and electricity industry poles, with drainage bond boxes generally installed on poles, but may be ground mounted.

2.2 Definition

Words and phrases have the meaning given to them in the Electricity Safety Act 1998 and the Victorian Electrolysis Committee (VEC) documents, unless otherwise stated.

TSC – Technical Sub-Committee

Traction System Operators – TSC member for Tram and Train

Structure Owner – TSC member for Utility

Distribution Company – Electricity Industry TSC member

3. Agreement

At the request of the Traction System Operators, the Distribution Companies will carry out works in respect of electrolysis feeders in accordance with the procedures set out in this agreement.

Refer Section 4 for design and construction requirements and Section 5 for maintenance and access requirements between parties.

3.1 Responsibilities

Traction system operators: -

- Provide electrolysis mitigation system requirements
- Arrange supply and installation of drainage bond boxes and connections to underground structures
- Operate the electrolysis mitigation systems and provide isolations when requested

Distribution Companies: –

- Advise electrolysis mitigation route and any equipment requirements on their poles
- Installation/maintain/removal of electrolysis feeders based on the agreed requirements
- Request isolation of electrolysis feeders from traction system operators when required

3.2 Costs

Costs associated with construction or maintenance of electrolysis feeders and associated infrastructure are split based on the VEC Cost Sharing Arrangement guideline. Traction System Operators shall arrange payment for costs incurred by a Distribution Company in respect of the following:

a) Installation of the electrolysis feeders

b) Relocation, maintenance, and repairs of the electrolysis feeders

c) Extension of the height of a pole or replacement, to permit attachment of an electrolysis feeder

d) New pole or its replacement, when provided for the support of the electrolysis feeder, which is not necessary for the support of Distribution Company assets, irrespective of the future attachment of such assets

e) The Traction System Operators shall indemnify the Distribution Companies against any claims and liabilities incurred or sustained by the Distribution Companies (whether in respect of the Traction System Operators or of third parties, but not in respect of any person employed or entities engaged by the Distribution Companies) which may arise as a consequence of the presence of the Traction System Operator’s electrolysis feeders on Distribution Company’s poles, including any contact with power conductors.

f) Liability under the indemnity in paragraph (e) above will be reduced to the extent that the claim or liability is caused or contributed to by fraud, wilful default or negligent act or omission by the Distribution Companies, their employees or their contractors.

g) The Distribution Companies must take all reasonable steps to mitigate the loss, damage, costs, or liabilities incurred or sustained by the Distribution Companies, including by pursuing claims against third parties to the extent the loss, damage, cost or liability is caused or contributed to by such third parties.

3.3 Ownership

a) Electrolysis feeders are part of the Train and Tram traction systems, are controlled by the Traction System Operators and owned by the Government (VicTrack).

b) Distribution Company poles erected or retained for electrolysis purposes, remain the property of the relevant Distribution Company and shall be maintained in accordance with its requirements.

c) Electrolysis feeders (aerial or underground) and electrolysis only poles are to be included on the records of the relevant Distribution Company.

3.4 Diagrams

The Traction System Operators shall maintain schematic plans (Simplified Layouts) of the electrolysis mitigation systems and make them available to the Distribution Companies upon request.

Distribution Companies shall maintain detailed drawings showing the route and construction of electrolysis feeders installed on their poles or installed underground outside of VicTrack land within their distribution areas. These drawings shall be provided to the Traction System Operator at the time of installation, and upon request.

4. Design and Construction Requirements

4.1 Design Requirements for Electrolysis Aerial Feeders & Box Installations

The Traction System Operator is responsible for providing a route or equipment requirement for the electrolysis mitigation system which includes:

1. Route start and finish points
2. Minimum electrolysis feeder conductor cross sectional area
3. Supply and installation of any electrolysis mitigation equipment to be mounted on the Distribution Company poles
4. Local LV power requirement for the electrolysis mitigation equipment

When a new electrolysis feeder or rearrangement is proposed, the Traction System Operators representative will consult with the Distribution Company representative to determine and agree:

1. Feasibility of the route
2. Location for the electrolysis feeder and/or equipment
3. Technical requirements and required clearances applicable (The electrolysis feeder is installed and maintained as a Distribution Company asset in accordance with their technical standards, not as a Third party asset)
4. Electrolysis feeders are connected between underground metallic services and the train or tram rails and are considered extra low voltage (operates at less than 75 volts DC, with peak currents of up to 250 amps).

4.1.1 Clearances

Electrolysis feeders shall be installed at not less than the minimum clearances required under the Electricity Safety (General) Regulations.

Assets installed by the Distribution Companies in compliance with regulations that applied at the time of installation shall be deemed to continue to comply.

For the purposes of determining the required clearances to other circuits, electrolysis feeders shall be treated as a Distribution Company asset and not as a third party asset.

Installation of electrolysis feeders is not permitted above railway overhead DC Traction wiring, but is permitted, above Tram traction wiring, subject to the use of insulated conductors.

4.1.2 Method of Attachment

a) The Distribution Company shall erect electrolysis feeders on its poles, as if a Distribution Company asset, in accordance with:

i. The Electricity Safety (General) Regulations

ii. Distribution Company standards and requirements

iii. Route requirement provided by the Traction System Operators (agreed with the Distribution Company as per section 4.1)

iv. The electrolysis feeder is usually attached to the side of poles, using low voltage insulators.

Where clearances are difficult to achieve, the electrolysis drainage conductor may be suspended from below the low voltage crossarm, subject to Distribution Company's clearance requirements.

v. For high voltage concrete poles, high voltage insulators of the same rating as the conductors, shall be used.

b) The Traction System Operators may attach electrolysis boxes/cables to Distribution Company poles, subject to:

i. The satisfaction of the Distribution Company's representative, who shall be advised prior to the commencement of the works

ii. Compliance with the plans agreed as per Section 4.1

iii. A maximum height of works on poles of 4300mm.

iv. Equipment other than electrolysis feeders shall not be installed on concrete poles with high voltage conductors

c) The electrolysis feeder and boxes are to be identified using labels provided by the Traction System Operator representative

Refer to Appendix B for recommended methods of attachments details.

4.2 Design requirements for Electrolysis Underground Feeder Installations

Electrolysis feeders installed as underground cables shall follow the requirements:

a) Unless otherwise specified by the Traction System Operator, underground cables shall be 185mm² XLPE/PVC 0.6/1kV copper conductor to AS5000.1

b) Labelling – cable indelibly labelled with feeder number using painted and engraved or traffolyte type label at all pits and joints.

c) Jointing

- A pit or chamber shall be provided wherever a cable joint is required in a conduit route
- Cable joints shall be compression joints and insulated for low voltage

d) Pits or chamber

- Pits or chambers installed are required to be specified accordingly to its environment

e) Recording

- Cable route shall be recorded on Dial Before You Dig
- Distribution company shall provide plans and digital data showing the location and depth of the feeder cable per the requirements of the Electricity Safety (General) Regulation

f) Electrolysis feeders installed as underground cables by the Distribution Company will be subject to the design requirements in 4.1.

4.3 Removal/Relocation

Distribution Companies are required to provide continuity of electrolysis feeders unless otherwise advised by the Traction System Operator.

If a Distribution Company requires to remove and/or relocate electrolysis feeders to allow the undergrounding or dismantling of the Distribution Company`s power lines; or where the position being occupied on the poles by the electrolysis drainage conductor being required for electricity distribution purposes, they shall contact the Traction System Operator with at least 3 months' notice to determine the required arrangements and removal in relation to the electrolysis mitigation system.

Where Energy Safe requires an electrolysis drainage conductor to remain, the Distribution Company may be required to retain otherwise redundant assets or arrange relocation in conjunction with alterations to the electricity distribution assets.

Any Distribution Company poles required only for electrolysis remain the property and responsibility of the Distribution Company.

4.4 Installation

The Distribution Company is responsible for all works, including, detail design, installation, maintenance and/or removal of the electrolysis feeders, attached to its poles, with costs as per Section 3.2.

The Distribution Company is also responsible for the installation and connection of cables associated with the electrolysis equipment, above a height of 4300mm from ground.

5. Maintenance and Access

5.1 Tree Clearing

As the Distribution Company is required to maintain the electrolysis feeders, it is to be included with their assets for the purposes of tree clearing.

Owing to the extra low voltage rating of the electrolysis feeder, it is only necessary to avoid contact during the tree clearing period.

Generally, adequate clearances are maintained owing to the close proximity of the electrolysis feeder to the Distribution Company low voltage conductors,

5.2 Outage/Access/Isolation

Distribution Companies are responsible for ensuring safe work methods for persons under their control working on or around electrolysis feeders. Guidance may be sought from the Traction System Operators as required to aid in the development or review of procedures.

Distribution Companies shall not earth electrolysis feeders unless isolated or with the permission of the relevant Traction System Operator.

Since electrolysis feeders operate at extra low voltage, there is no requirement to exchange SCAPs, however if isolation is required, it should be arranged by making a request of the relevant Traction System Operator with a minimum of 10 business days notice for planned works.

As electrolysis feeders are connected to the negative traction return, isolation is recommended, particularly if connections and/or joints are required, otherwise low voltage live line techniques can be used.

5.2.1 Isolation Request

Where a Distribution Company requires isolation of electrolysis feeders, the Distribution Company shall submit a request to the Traction System Operator, giving 12 business days notice, details of work with associated drawings and a site contact.

Email request to hvplanning@metrotrains.com.au for Train operators.

Email request to permits@yarratrams.com.au for Tram operators.

Verbal confirmations of isolations can be provided by the Train and Tram Electrical Control Centres, prior to commencement of works.

The Distribution Company shall notify the Train and Tram Electrical Control Centres on completion of works.

TRAIN

Isolation of electrolysis feeders is recommended

TRAM

The Tram Operator has requested that electrolysis feeders remain connected to the rail (negative), owing to the close proximity of Tram 600 volt DC feeders, with the electrolysis boxes associated with the electrolysis feeder to be isolated

5.3 Emergency Works

In the case of an emergency, the Distribution Company may alter, remove, or disconnect the electrolysis feeder and/or equipment, as is necessary to maintain the electricity network and electrical safety. Distribution Company will co-coordinate with the Traction System Operator the proposed actions.

The Distribution Company must restore any damaged or disconnected electrolysis feeders at the earliest reasonable opportunity. Where an outage extends beyond one day, liaison with the Traction System Operator is required. The Traction System Operator is to be contacted at the time of the emergency and advised of the details, including the cause of the emergency.

For Train electrolysis systems on utility poles, Train operator personnel are not required to attend on site.

5.3.1 EMERGENCY WORKS: CONTINUITY OF ELECTROLYSIS FEEDERS WILL NOT BE BROKEN OR EARTHED

Where the work being carried out is such that the continuity of electrolysis feeders will not be broken, or the electrolysis feeders will not contact or be contacted by any earthed apparatus (including the ground, and other earthed conductors), isolation of the electrolysis feeders will not be necessary. Live work practices can be used to make the site safe and carry out reinstatement works.

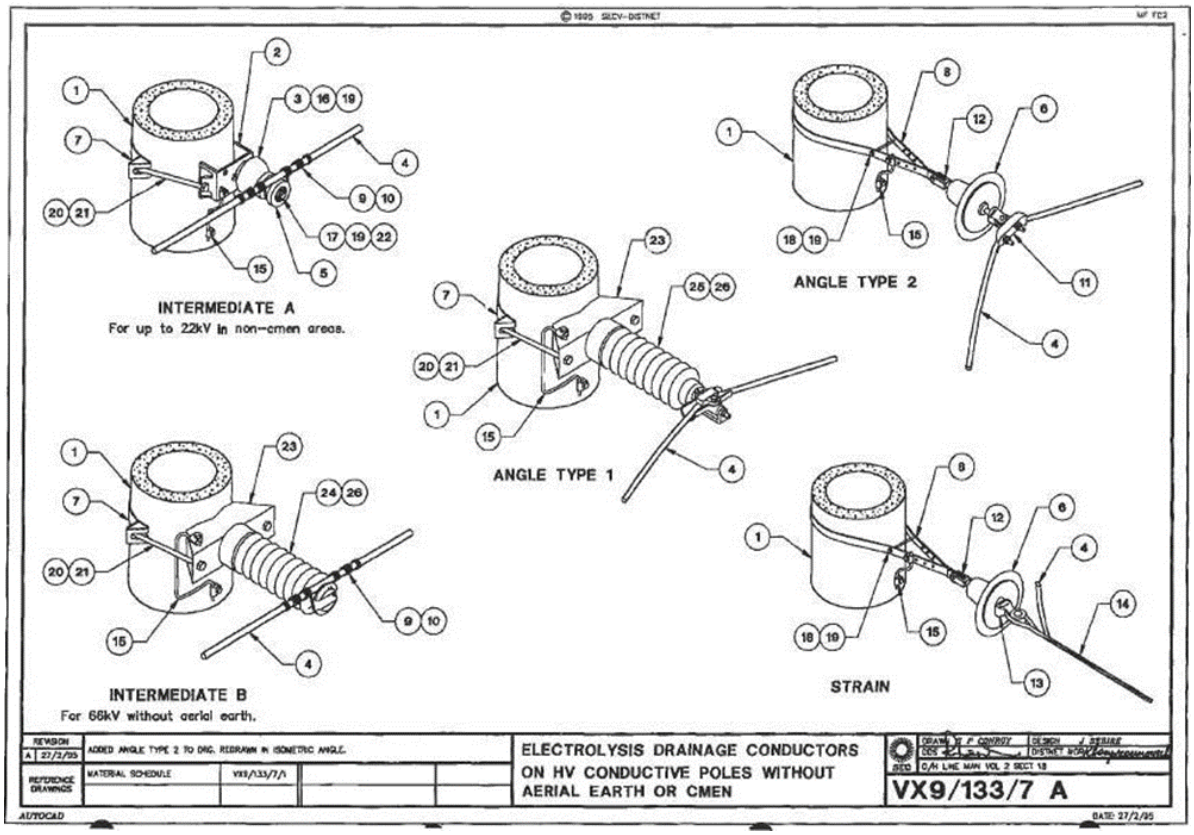
5.3.2 EMERGENCY WORKS: CONTINUITY OF ELECTROLYSIS FEEDERS WILL OR HAVE BEEN BROKEN AND EARTHED

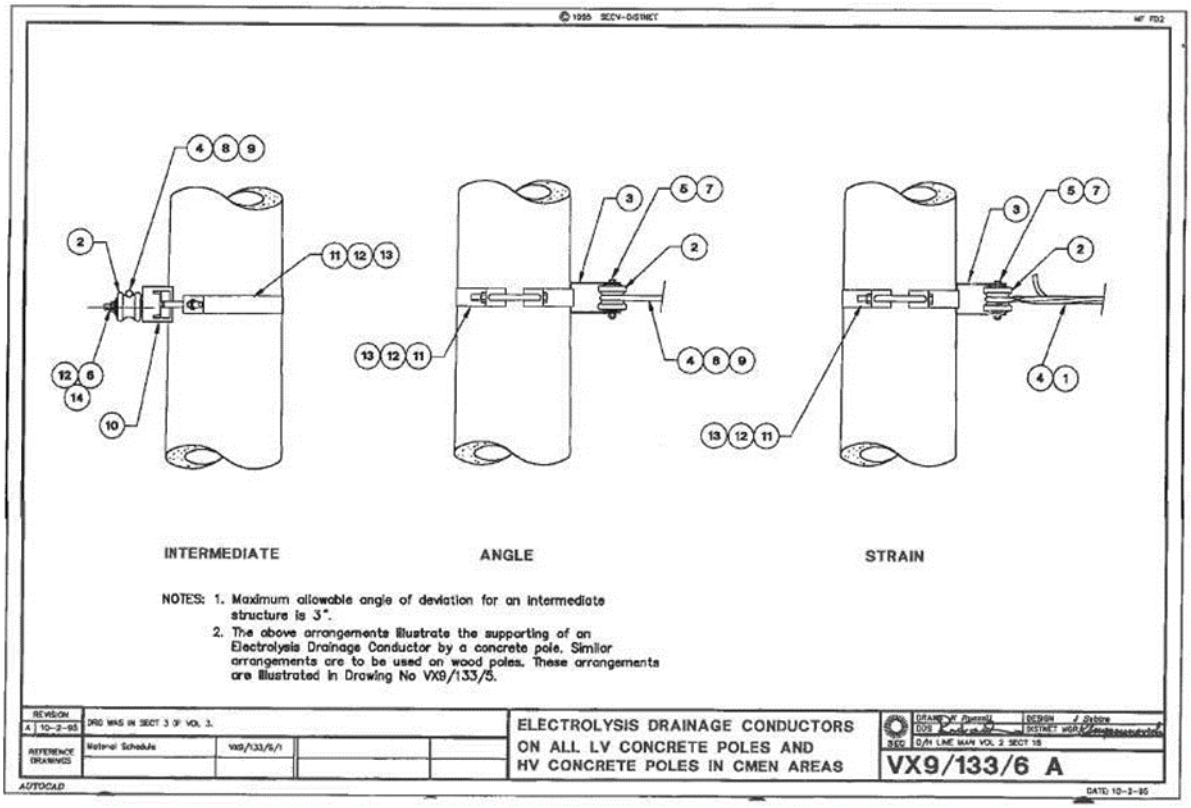
Where the work being carried out is such that the continuity of electrolysis feeders have or are to be broken, the electrolysis feeders are not to be contacted by any earthed apparatus (including the ground, and other earthed conductors), where practical live work procedures to be undertaken to make the site safe and request the Traction control centre arrange for emergency isolation to be undertaken. For electrolysis feeders that are connected to TDU and / or DCU, when turned off, the electrolysis feeders can be earthed, if emergency isolation cannot be provided when requested.

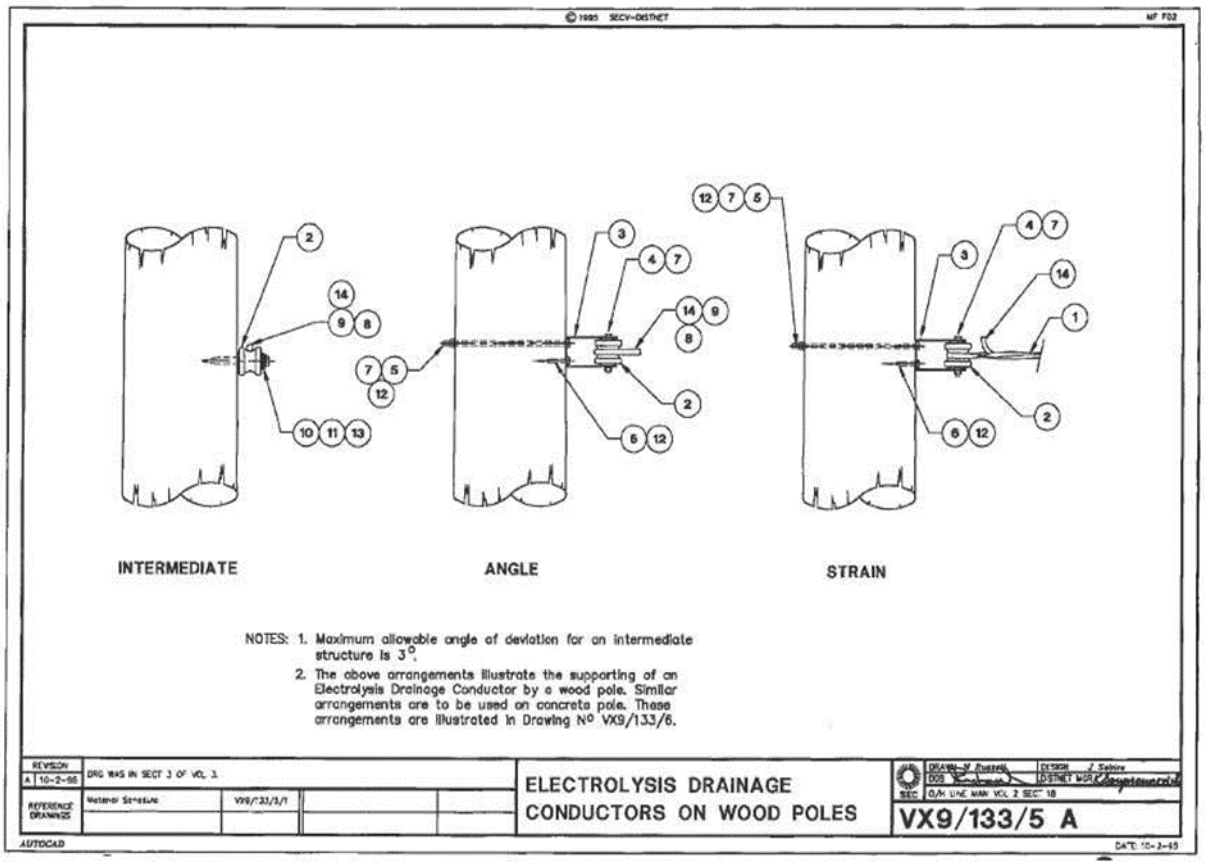
Appendix A. Contact Details

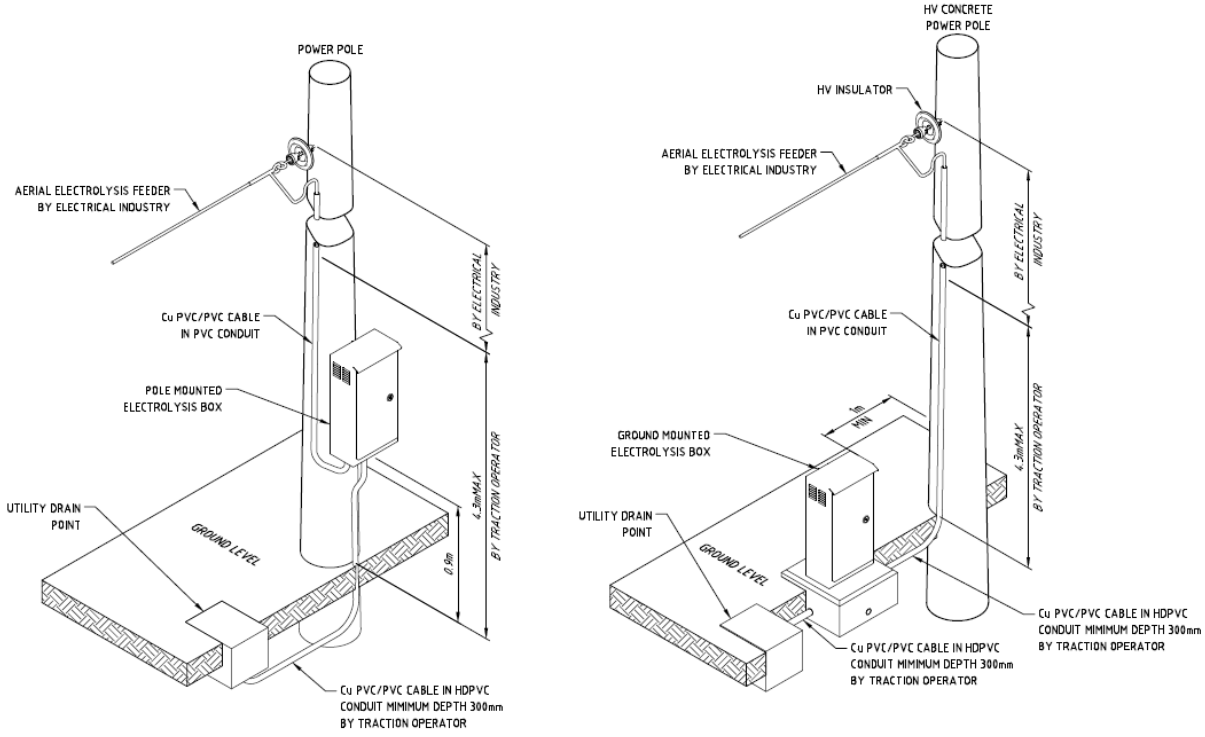
- Tramway Electrical Control Centre – 9610 3394
- Train Electrical Control Centre – 1800 443 656 (DC Operator)
- Train Electrolysis representative – Stefan Palatsides, Mob 0419 766 742
- Tram Team Manager, Power and Substations - Mark Desira, Mob 0410 473 744
- Energy Safe, Corrosion Protection Specialist – Peter Wade, Mob 0448 069 934
- Electrical Industry VEC representative – Francis Lirios - Mob. 0415 538 092

Appendix B. Typical Pole Attachment Designs









TYPICAL INSTALLATION OF ELECTROLYSIS BOXES

- ELECTROLYSIS BOXES MAY BE INSTALLED ON ELECTRICITY INDUSTRY POLES AS SHOWN
- ELECTROLYSIS BOXES ARE NOT TO BE INSTALLED ON FRANGIBLE OR HV CONCRETE POLES
- ELECTROLYSIS BOXES MUST BE KEPT CLEAR OF EARTHING