

Network Standard

NETWORK

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NS158 LABELLING OF MAINS AND APPARATUS



ISSUE

For issue to all Ausgrid and Accredited Service Providers' staff involved with labelling of mains and apparatus forming part of Ausgrid's network, and is for reference by field, technical and engineering staff.

Ausgrid maintains a copy of this and other Network Standards together with updates and amendments on www.ausgrid.com.au.

Where this standard is issued as a controlled document replacing an earlier edition, remove and destroy the superseded document

DISCLAIMER

As Ausgrid's standards are subject to ongoing review, the information contained in this document may be amended by Ausgrid at any time. It is possible that conflict may exist between standard documents. In this event, the most recent standard shall prevail.

This document has been developed using information available from field and other sources and is suitable for most situations encountered in Ausgrid. Particular conditions, projects or localities may require special or different practices. It is the responsibility of the local manager, supervisor, assured quality contractor and the individuals involved to make sure that a safe system of work is employed and that statutory requirements are met.

Ausgrid disclaims any and all liability to any person or persons for any procedure, process or any other thing done or not done, as a result of this Standard.

All design work, and the associated supply of materials and equipment, must be undertaken in accordance with and consideration of relevant legislative and regulatory requirements, latest revision of Ausgrid's Network Standards and specifications and Australian Standards. Designs submitted shall be declared as fit for purpose. Where the designer wishes to include a variation to a network standard or an alternative material or equipment to that currently approved the designer must obtain authorisation from the Network Standard owner before incorporating a variation to a Network Standard in a design.

External designers including those authorised as Accredited Service Providers will seek approval through the approved process as outlined in NS181 Approval of Materials and Equipment and Network Standard Variations. Seeking approval will ensure Network Standards are appropriately updated and that a consistent interpretation of the legislative framework is employed.

Notes: 1. Compliance with this Network Standard does not automatically satisfy the requirements of a Designer Safety Report. The designer must comply with the provisions of the Workplace Health and Safety Regulation 2011 (NSW - Part 6.2 Duties of designer of structure and person who commissions construction work) which requires the designer to provide a written safety report to the person who commissioned the design. This report must be provided to Ausgrid in all instances, including where the design was commissioned by or on behalf of a person who proposes to connect premises to Ausgrid's network, and will form part of the Designer Safety Report which must also be presented to Ausgrid. Further information is provided in Network Standard (NS) 212 Integrated Support Requirements for Ausgrid Network Assets.

2. Where the procedural requirements of this document conflict with contestable project procedures, the contestable project procedures shall take precedent for the whole project or part thereof which is classified as contestable. Any external contact with Ausgrid for contestable works projects is to be made via the Ausgrid officer responsible for facilitating the contestable project. The Contestable Ausgrid officer will liaise with Ausgrid internal departments and specialists as necessary to fulfil the requirements of this standard. All other technical aspects of this document which are not procedural in nature shall apply to contestable works projects.

INTERPRETATION

In the event that any user of this Standard considers that any of its provisions is uncertain, ambiguous or otherwise in need of interpretation, the user should request Ausgrid to clarify the provision. Ausgrid's interpretation shall then apply as though it was included in the Standard, and is final and binding. No correspondence will be entered into with any person disputing the meaning of the provision published in the Standard or the accuracy of Ausgrid's interpretation.

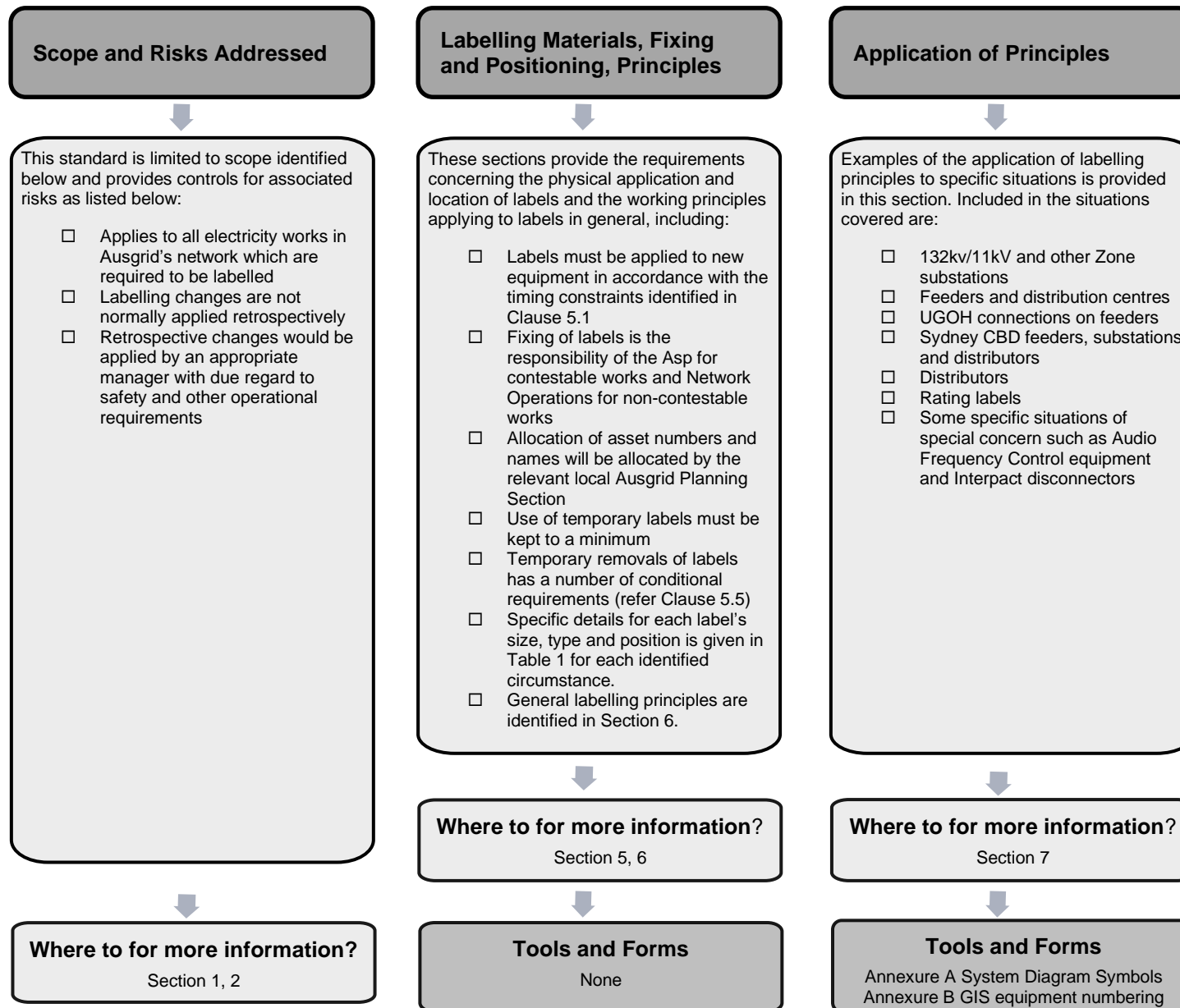
KEYPOINTS

This standard has a summary of content labelled "KEYPOINTS FOR THIS STANDARD". The inclusion or omission of items in this summary does not signify any specific importance or criticality to the items described. It is meant to simply provide the reader with a quick assessment of some of the major issues addressed by the standard. To fully appreciate the content and the requirements of the standard it must be read in its entirety.

AMENDMENTS TO THIS STANDARD

Where there are changes to this standard from the previously approved version, any previous shading is removed and the newly affected paragraphs are shaded with a grey background. Where the document changes exceed 25% of the document content, any grey background in the document is to be removed and the following words should be shown below the title block on the right hand side of the page in bold and italic, for example, Supersedes – document details (for example, "Supersedes Document Type (Category) Document No. Amendment No.").

KEY POINTS OF THIS STANDARD



Network Standard NS158 Labelling of Mains and Apparatus

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1.0 PURPOSE

This Network Standard supersedes the document 'Rules for Labelling Mains and Apparatus' issued by the Sydney Electricity System Control Branch, dated June 1994. The labelling principles and the application of labelling principles from that document remain substantially unaltered in this document. Additional information has been included on labelling materials, fixings and positioning.

The objectives of this Network Standard are:

- to standardise labelling
- to ensure correct identification of equipment for all purposes associated with management of the network, including maintenance, network operations, asset recording and planning for new works
- to specify requirements needed to satisfy the Ausgrid Electrical Safety Rules, which state:

Where the identity of such things as a switch, transformer, cable, end box or termination is not obvious, it must be clearly labelled.

If the connections to mains and apparatus have been altered causing an alteration to the network, then when it is necessary to alter labels they must be changed at the same time.

The authorised person in charge of the work must make sure that the mains and apparatus are clearly and permanently labelled to comply with:

- Electricity Transmission and Distribution Asset Management (Asset Code), subject to the exception indicated in the Safety and Operating Plan, and
- this Network Standard.

2.0 SCOPE

This Network Standard applies to all electricity works in Ausgrid's network which are required to be labelled in accordance with the Code of Practice for Electricity Transmission and Distribution Asset Management (Asset Code), subject to the exception indicated in the Ausgrid Safety and Operating Plan.

Where changes are made to this network standard, the revised labelling requirements apply from that point in time onwards. The decision to retrospectively apply any changes to labelling requirements will be made by the appropriate manager with due consideration to safety and other operational requirements

3.0 REFERENCES

3.1 General

All work covered in this document shall conform to all relevant Legislation, Standards, Codes of Practice and Network Standards. Current Network Standards are available on Ausgrid's Internet site at www.ausgrid.com.au.

3.2 Ausgrid documents

- Company Form (Governance) - Network Document Endorsement and Approval
- Company Procedure (Governance) - Network Document Endorsement and Approval
- Company Procedure (Network) - Production / Review of Network Standards
- Electrical Safety Rules
- Electricity Network Safety Management System Manual
- NS104 Specification for Electrical Network Project Design Plans
- NS114 Electrical Design and Construction Standards for Chamber Type Substations
- NS116 Design Standards for Distribution Equipment Earthing

- NS117 Design and Construction Standards for Kiosk Type Substations
- NS122 Pole Mounted Substation Construction)
- NS148 OH Line Support, Street Lighting Columns & Pillars, Numbering.
- NS181 Approval of Materials and Equipment and Network Standard Variations
- NS212 Integrated Support Requirements for Ausgrid Network Assets

3.3 Other standards and documents

- ENA Doc 001-2008 National Electricity Network Safety Code

3.4 Acts and regulations

- Electricity Supply (General) Regulation 2014 (NSW)
- Electricity Supply (Safety and Network Management) Regulation 2014
- Work Health and Safety Act 2011 and Regulation 2011

4.0 DEFINITIONS

Accredited Service Provider (ASP)	An individual or entity accredited by the NSW Government Trade & Investment in accordance with the Electricity Supply (Safety and Network Management) Regulation 2014 (NSW).
Business Management System (BMS)	An Ausgrid internal integrated policy and procedure framework that contains the approved version of documents.
Document control	Ausgrid employees who work with printed copies of document must check the BMS regularly to monitor version control. Documents are considered "UNCONTROLLED IF PRINTED", as indicated in the footer.
Network Standard	A document, including Network Planning Standards, that describes the Company's minimum requirements for planning, design, construction, maintenance, technical specification, environmental, property and metering activities on the distribution and transmission network. These documents are stored in the Network Category of the BMS repository.
Review date	The review date displayed in the header of the document is the future date for review of a document. The default period is three years from the date of approval however a review may be mandated at any time where a need is identified. Potential needs for a review include changes in legislation, organisational changes, restructures, occurrence of an incident or changes in technology or work practice and/or identification of efficiency improvements.

5.0 LABELLING MATERIALS, FIXING AND POSITIONING

5.1 General

Labels shall be in accordance with Table 1. Where there is no reference in the Table, and equipment must be labelled in accordance with this Network Standard [Refer Labelling Principles (Section 6) and Application of Labelling Principles (Section 7)]; details of label size, type and location requirements must be obtained from Ausgrid's Manager – System Control, or that manager's authorised representative.

The Manager – System Control may at any time vary the following requirements and/or specify additional requirements.

Labels must be attached to new equipment, as required by this Network Standard, before new equipment is connected. Labelling (including WDNO designations where applicable) must be completed before the equipping permit* for mains and apparatus is cancelled. When high voltage circuit breaker WDNO panels or other items of equipment are under access permit*; labels indicating changed designations, such as any newly connected feeder or distributor designations, must be attached before the access permit is cancelled.

(*Refer to Ausgrid Electrical Safety Rules.)

Old labels on equipment being relocated and re-commissioned must be replaced with new labels where necessary, to comply with the requirements of this Network Standard.

5.2 Responsibilities

Unless indicated otherwise in Table 1, the Accredited Service Provider responsible for carrying out a contestable works project is also responsible for the provision of labels and the fixing of labels for the contestable works project, in accordance with the requirements of this Network Standard. For non-contestable works projects, Ausgrid's Network Operations Division is responsible for the provision and fixing of labels.

Adequate labelling must be provided by the Accredited Service Provider as part of the construction works for the project. Whether specifically referred to in the project design brief or not, adequate labelling in accordance with this Network Standard is deemed to be part of the construction works.

Project inspections by Ausgrid's inspectors include checks to ensure that all necessary asset and operational numbers are in place before projects are accepted as completed.

Refer also to items on labelling in:

- NS114 Electrical Design and Construction Standards for Chamber Type Substations
- NS117 Design and Construction Standards for Kiosk Type Substations
- NS122 Pole Mounted Substation Construction)
- NS148 OH Line Support, Street Lighting Columns & Pillars, Numbering.

5.3 Allocation of asset numbers (and names)

Asset numbers for network components (and asset names where applicable) will be allocated by the relevant local Ausgrid Planning Section, normally before certification of the design plan in accordance with NS104 Specification for Network Project Design Plans. These details will include distribution centre numbers and names, distributor numbers and names, street light numbers, air break switch numbers and HV and LV link set numbers.

Substation names and numbers must be unique and not duplicated under any circumstances, such as where a new substation is built adjacent to an existing one, which may be earmarked for decommissioning.

Asset numbers shall be generated by Ausgrid's iAMS and allocated to the designer and indicated in relevant design documentation.

For poles and pillars, asset numbers are now also generated by iAMS, and labeled in accordance with NS148. For contestable works projects, the Project Co-ordinator will indicate arrangements for

allocation of asset numbers for poles and pillars. For non-contestable works projects, allocation of asset numbers for poles and pillars is carried out by the relevant Area Planning Section in accordance with NS148.

Street lights will be identified by the asset number of the support structure.

Note: For street lights mounted on structures other than Ausgrid poles or pillar standards (eg on walls, inside tunnels, walkways or on other non-Ausgrid structures) a pole ID with a structure type of "Other material type" shall be created in iAMS

5.4 Temporary labels

The use of temporary labelling must be kept to a minimum, and is only permitted under emergency supply conditions or as outlined in Clause 5.5.

Temporary labels should be legibly and indelibly printed with the necessary information, in print size not less than the relevant size where indicated in the Table of Labelling Materials, Fixing and Positioning. Temporary labels should be made from PVC sheet or other durable material suitable for the purpose, unless otherwise specified in this Network Standard.

5.5 Temporary removal of labels

Labels must not be removed from any equipment during painting or any other maintenance, except by the person in charge of the project and then only after approval is given by the Ausgrid Project Co-ordinator, and the following conditions are complied with:

- any permanent labels which are removed must be replaced with adequate temporary labels;
- as soon as the maintenance work is completed, the person in charge of the project must ensure that the permanent labelling is restored correctly.

5.6 Table of labelling materials, fixing and positioning

(Refer also to the Notes at the end of the Table.)

The Notes form part of the requirements of the Table.

Table 1 Label size, type and location

Type of Installation and Item	Label Size, Type and Location	References and Comments
Zone Substations, Sub-transmission Substations and Switching Stations (Labelling requirements specified and authorised in design documentation for the project will take precedence over the following requirements, if there is any conflict.)		
Zone substation, sub-transmission substation or switching station establishment name and number.	a) Establishment name and number shall be displayed near the entrance to the establishment, as specified in design documentation. b) The number and name is also to be displayed adjacent to the telephone, using laminated adhesive backed tape labels on white PVC sheet of minimum thickness 1.5 mm and nominal size 350 mm x 200 mm. Minimum letter height is 30 mm.	Design documentation for project to take precedence.
Equipment in 132kV, 66kV, 33kV and 22kV outdoor yards, other than transformers and reactors.	Each piece of equipment shall be labelled, and the information shall be visible from as many operating points as practicable. Labels to be nominal 300 mm x 200 mm, or other size suitable for the equipment. Material to be minimum 3 mm thick aluminium or galvanised steel plate, with black characters sign written on yellow background (see note 3) Minimum letter height is 50 mm.	Design documentation for project to take precedence.
Zone and sub-transmission transformers and reactors.	Each transformer and reactor shall be labelled on a convenient part facing the transformer (or reactor) roadway. Labels to be nominal 300 mm x 200 mm, or other size suitable for the equipment. Material to be minimum 3 mm thick aluminium or galvanised steel plate, with black characters sign written on yellow background (see note 3) Minimum letter height is 50 mm.	Design documentation for project to take precedence.
Auxiliary transformers and earthing transformers.	Each transformer shall be labelled in a suitable position. Labels to be nominal 300 mm x 100 mm, or other size suitable for the equipment. Material to be minimum 3 mm thick aluminium or galvanised steel plate, with black characters sign written on yellow background (see note 3) Minimum letter height is 50 mm.	Design documentation for project to take precedence.

Type of Installation and Item	Label Size, Type and Location	References and Comments
Panel title labels for indoor switchgear, control and protection panels.	<p>Each panel shall be labelled with laminated adhesive backed tape on white PVC sheet of minimum thickness 1.5 mm and nominal size 300 mm x 100 mm, or other size suitable for the panel.</p> <p>Minimum letter height is 30 mm.</p>	Design documentation for project to take precedence.
Labels for relay, link etc. identification on control and protection panels.	<p>All components on the panel are to be labelled with engraved 'Traffolyte' or equivalent label.</p> <p>Label size, thickness, colours and lettering to be as specified in design documentation and drawings.</p> <p>For contestable works projects, the Ausgrid Project Co-ordinator will arrange for protection and voltage regulating equipment labels, such as link labels and relay labels, to be provided and fixed by DOR.</p>	Design documentation for project to take precedence.
Pilot end boxes.	<p>Each pilot end box shall be labelled with laminated adhesive backed tape on white PVC sheet of minimum thickness 1.5 mm and nominal size 100 mm x 50 mm, or other size suitable for the equipment.</p> <p>Minimum letter height is 20 mm.</p>	
Audio Frequency Load Control units	<p>Each AFLC unit installation shall be labelled above the door of the enclosure (cage), or other suitable obvious location.</p> <p>Labels to be laminated adhesive backed tape on white PVC sheet of minimum thickness 1.5 mm and nominal size 300 mm x 100 mm, or other size suitable for the equipment.</p> <p>Minimum letter height is 30 mm.</p>	
Other equipment	Refer to Clause 5.1.	

Type of Installation and Item	Label Size, Type and Location	References and Comments
Chamber Substations and Control Points		
Chamber substation number (eg S 1234)	<p>(a) Doors: Substation number in 50 mm high black letters/numerals on class 2 reflective yellow background shall be attached to all entrance doors of surface chambers.</p> <p>(b) Hatches: Substation number and name labels to be under the lock flap of each hatch. Labels to be either, (i) nominal 75 mm x 25 mm engraved 'Traffolyte' or equivalent type with black letters on white background, or (ii) laminated adhesive backed tape on white PVC sheet of minimum thickness 1.5 mm and nominal size 75 mm x 25 mm. Minimum letter height in each case is 15 mm..</p> <p>(c) In Sydney City CBD substations, the number and name is also to be displayed adjacent to the telephone. Labels to be laminated adhesive backed tape on white PVC sheet of minimum thickness 1.5 mm and nominal size 350 mm x 200 mm. Minimum letter height is 30 mm.</p>	Prefix number on substation door with distribution centre class (eg 'S' or 'HS') where there could be confusion with street numbers.
Transformers	<p>Each transformer shall be labelled to indicate the transformer number; eg No. 1, 2 or 3 etc., (except in triplex networks - see Clause 7.5.1).</p> <p>Labels are to be laminated adhesive backed tape on white PVC sheet of minimum thickness 1.5 mm and nominal size 100 mm x 100 mm, or other size suitable for the equipment.</p> <p>Minimum letter height is 30 mm.</p>	Section 11 of NS114.
Panel title labels for racking type high voltage switchgear panels, and panel title labels for control and protection panels.	<p>Each panel shall be labelled with laminated adhesive backed tape on white PVC sheet of minimum thickness 1.5 mm and nominal size 300 mm x 100 mm, or other size suitable for the panel.</p> <p>Minimum letter height is 30 mm.</p>	Sections 10 and 16.47 of NS114.
High voltage switchgear – Non-racking types, eg RMI's and fuse switches.	<p>All switches are to be labelled using laminated adhesive backed tape on white PVC sheet of minimum thickness 1.5 mm and nominal size 100 mm x 50 mm, or other size suitable for the equipment.</p> <p>Minimum letter height is 20 mm.</p>	Section 10 of NS114.
Labels for relay and link & etc. identification on control and protection panels.	<p>All components on the panel are to be labelled with engraved 'Traffolyte' or equivalent labels.</p> <p>Label size, thickness, colours and lettering to be as specified in design documentation and drawings.</p> <p>For contestable works projects, the Ausgrid Project Co-ordinator will arrange for protection and voltage regulating equipment labels, such as link labels and relay labels, to be provided and fixed by Network Operations.</p>	Clause 16.4.7 of NS114

Type of Installation and Item	Label Size, Type and Location	References and Comments
Pull-out gear	<p>A label shall be fixed to the handle of each pull-out gear, to show the travel required for correct operation, eg 'Danger 4 Metres'. These labels are to be laminated adhesive backed tape with white letters on red background. Unless specified otherwise by the Ausgrid Project Co-ordinator, these labels are to be attached to red PVC sheet of minimum thickness 1.5 mm. Minimum letter height is 15 mm.</p> <p>Each pull-out gear shall be labelled to indicate the switchgear it is connected to operate. These labels are to be of nominal size 100 mm x 50 mm, engraved 'Traffolyte' or equivalent, or laminated adhesive backed tape on red PVC sheet of minimum thickness 1.5 mm. Letters are to be white on red background. Minimum letter height is 15 mm.</p>	
Low voltage switchboard.	<p>All equipment and distributor circuits on LV switchboards are to be clearly and indelibly marked detailing the function and the nominal current rating in Amps.</p> <p>The number allocated to each distributor shall be attached beside the distributor control. For LV fuse-strip boards eg. SAIF Fuseways, the distributor number shall be positioned centrally directly above and in-line with the relevant fuseway.</p> <p>Refer to Clauses 7.5.3 or 7.6, as applicable, regarding numbering and naming of distributors and the use of a legend where necessary.</p> <p>The nominal current rating of each distributor circuit control shall be labelled beside the control or in the legend. (The current rating is not necessarily the same as the rating of an installed fuse cartridge.)</p> <p>Labels are to be laminated adhesive backed tape on white PVC sheet of minimum thickness 1.5 mm. Size shall be suitable for the equipment and position of the label. Minimum letter height is 12 mm.</p>	Clause 13.4 of NS114.
Substation light and power distribution board.	<p>Labels are to identify all the components on the panel.</p> <p>Labels are to be (i) engraved 'Traffolyte' or equivalent, or (ii) laminated adhesive backed tape on white PVC sheet of minimum thickness 1.5 mm.</p> <p>Minimum letter height is 10 mm.</p>	Clause 17.1of NS114
Other equipment.	Refer to Clause 5.1.	Also refer to Clause 13.4 of NS114..

Type of Installation and Item	Label Size, Type and Location	References and Comments
Kiosk Substations and Kiosk Type Control Points		
Kiosk substation (or control point) number	<p>Kiosk substation numbers shall be 50 mm high black letters/numerals embossed on class 2 reflective yellow background. The characters shall be riveted to the roadway side of the kiosk housing.</p> <p>For contestable works projects, the Ausgrid Project Co-ordinator will arrange for the numbers to be provided.</p>	
High voltage switchgear	<p>RMI's: All switches shall be labelled using laminated adhesive backed tape on white PVC sheet of minimum thickness 1.5 mm and nominal size 100 mm x 50 mm, or other size suitable for the equipment.</p> <p>Minimum letter height is 20 mm.</p> <p>Hazemeyers etc. Laminated adhesive backed tape labels are to be mounted vertically on side frames alongside isolators and fuses. Where space is insufficient, allocated numbers etc. as per Clause 5 may be mounted to identify the switch and fuse units, and a legend used for description of designations.</p> <p>Minimum letter height is 20 mm.</p>	
Low voltage switchboard	<p>All distributor circuits, and all items of equipment on LV switchboards, are to be clearly and indelibly marked detailing the function and the nominal current rating in Amps.</p> <p>The number allocated to each distributor shall be attached beside the distributor control.</p> <p>The nominal current rating of each distributor circuit control shall be labelled beside the control or in the legend. (The current rating is not necessarily the same as the rating of an installed fuse cartridge.)</p> <p>For LV fuse-strip boards eg. SAIF Fuseways, the distributor number shall be positioned centrally directly above and in-line with the relevant fuseway.</p> <p>Labels are to be laminated adhesive backed tape on white PVC sheet of minimum thickness 1.5 mm. Size must be suitable for the equipment and position of the label but not less than 25 mm x 25 mm.</p> <p>Minimum letter height is 12 mm.</p>	<p>Refer also to relevant kiosk drawings.</p> <p>Refer to Clause 7.7 as applicable, regarding numbering and naming of distributors and use of a legend where necessary.</p> <p>Refer also to Clause 12.6 of NS117 re phase labelling.</p>
Interpact switch disconnecter	<p>Some 1500kVA (K-type) kiosks are fitted with Merlin Gerin (Schneider) "Interpact" low voltage switch disconnectors. Refer to Clause 7.6 for labeling requirements.</p> <p>Labels shall be laminated adhesive backed tape on white PVC sheet of minimum thickness 1.5 mm. Size must be suitable for the equipment and position of the label – refer to Figure 39 for guidance.</p> <p>Minimum letter height is 12 mm.</p>	<p>Refer also to Network Engineering Guideline NEG SD06</p>
Other equipment	<p>Refer to Clause 5.1</p>	<p>Refer also to NS117.</p>

Type of Installation and Item	Label Size, Type and Location	References and Comments
Pole mounted distribution substation number.	<p>The pole transformer number shall be located approximately 3.6 metres above ground level.</p> <p>The number should be on the road side of pole, or on the normal approach side if the pole substation is remote from the road.</p> <p>The number shall be in 50 mm high aluminium letters as used in the ex Sydney Electricity area, or a black on yellow number plate (200 x 80 with 50 mm numbers) as used in the Hunter area.</p> <p>The numbers shall be fixed with non-corrosive wood screws or galvanised clouts not less than 40 mm x 2.5 mm.</p> <p>For contestable works projects, the numbers will be supplied by the Ausgrid Project Co-ordinator.</p>	<p>For pole mounted distribution substations built in accordance with NS122, refer also to the labelling specifications in that standard. The requirements in this standard are additional to NS122, however if any requirements in NS122 conflict with the requirements of this standard, NS122 will prevail.</p>
Distributors	<p>Each distributor shall have labels for:</p> <p>Distributor number, eg 1, 11, 12, 2 or 3 (each phase to be labelled)</p> <p>Distributor number and corresponding name, eg '1 Blenheim St', on a combined distributor legend (see example below).</p> <p>Each distributor number shall be located beside the relevant fuse, either on the crossarm, or on the underside of the fuse assembly, in a position clearly visible from the ground. The numbers shall be black on white background laminated adhesive backed tape, either, (i) affixed directly to the fuse assembly, or (ii) affixed to white PVC sheet of minimum thickness 1.5 mm and size not less than 40 mm x 40 mm attached to the crossarm with galvanised clouts not less than 40 mm x 2.5 mm.</p> <p>Minimum size of letters is 25 mm.</p> <p>Distributor numbers and corresponding names shall be displayed using laminated adhesive backed tape attached to a white PVC sheet of minimum thickness 1.5 mm and minimum size 75 mm x 200 mm. The PVC sheet shall be attached to the face or underside of the crossarm in a position clearly visible from the ground, with galvanised clouts not less than 40 mm x 2.5 mm.</p> <p>Minimum size of letters is 10 mm.</p> <p>Refer also to Clause 8.6 re distributor numbering and numbering conventions.</p> <p>Example:</p> <div style="text-align: center;"> <p>1. FOREST RD.</p> <p>⊙ 2. WOOD ST. ⊙</p> <p>3. FLORA ST.</p> </div>	

Type of Installation and Item	Label Size, Type and Location	References and Comments
Street Lighting Control Points		
Number	The SLCP number shall be applied in 50 mm high grey reflective stick-on letters to the door of the street lighting control point. Number shall be prefixed by SLCP.	Refer to Clause 7.5.4 for labelling rules for Sydney City SLCP's with 'smart' poles.
Poles, Street Lighting Standards and Pillars		
Overhead line supports, including timber poles, steel and concrete poles. Street light columns, including multi-purpose poles ('Smart Poles'). Distribution pillars, including steel, HDPE plastic, fibreglass and fibrous cement.		Refer to NS148, Overhead Line Support, Street Light Column and Pillar Numbering.
Miscellaneous		
Air break switch number labels. HV and LV link set number labels.	These labels are provided by Ausgrid, as pre-manufactured number plates, or stick-on number sets for standard plates. The label types and number sequences may vary between regions. Labels to be fixed approximately 3 metres above the ground.	For contestable works, Accredited Service Providers should obtain the required number labels and fixing instructions from the Project Co-ordinator.
Reclosers and sectionalisers (including line fuses).	Unless indicated otherwise by Ausgrid's Project Co-ordinator, the following labelling arrangements apply. The recloser or sectionaliser number in 50 mm high aluminium letters shall be located approximately 3.6 metres above ground level. The numbers shall be fixed with wood screws or galvanised clouts not less than 40 mm x 2.5 mm. Each feeder description shall be indicated with laminated adhesive backed tape on white PVC sheet of minimum thickness 1.5mm and minimum size 200 mm x 100 mm, attached to the relevant side of the crossarm or other suitable location. Minimum size of letters is 25 mm.	For contestable works projects, the recloser or sectionaliser numbers will be supplied by the Ausgrid Project Co-ordinator.
Miscellaneous		
Link boxes at LV paralleling points and UGOH isolation points in LV ABC systems.	Refer to Clause 7.7. The lettering may be sign written, or on laminated adhesive backed tape. Where separate label plates are used, the label material shall be minimum 3 mm thick aluminium or galvanised plate.	
Underground to overhead connections. (UGOH's)	Where labelling is required, labels shall be laminated adhesive backed tape on white PVC sheet of minimum thickness 1.5mm and minimum size 200 mm x 100 mm, attached to the crossarm. Minimum size of letters is 25 mm.	Labelling is required only in specific circumstances. Refer to Clauses 7, 7.3 and 7.7.

Notes to Table 1.

(These notes form part of the requirements of the Table.)

1. Additional requirements

The Ausgrid Project Co-ordinator may specify and require the Accredited Service Provider to provide and install labels in addition to those indicated in Table 1 and Section 6 of this Standard. The additional labelling requirements may be described in the project design brief or may be part of the general requirement for adequate identification of equipment in accordance with Clause 5.1 of this Network Standard.

2. Label lettering

Label lettering must be in upper case, unless specified otherwise in the project design brief, or unless permitted otherwise in Section 7.

Where laminated adhesive backed tape is used for labels, in accordance with Table 1; the lettering shall be black on white tape, unless specified otherwise in the Table.

Letter height must be as specified in Table 1, unless specified otherwise in the project design brief. Where letter heights are not specified in this standard or in the project design brief, the heights shall be as specified by Ausgrid's Project Co-ordinator.

3. Label consistency

Where new apparatus is being installed in an existing installation and a satisfactory labelling system already exists that does not comply with this Standard, new labels should be consistent with the existing labels.

4. Label material.

The material to be used for labels is as specified in Table 1.

Where there is no material specified for a particular labelling requirement, the Accredited Service Provider must obtain details of requirements from the Ausgrid Project Co-ordinator.

Where laminated adhesive backed tape is specified or permitted for labelling, the laminated adhesive backed tape labels must be at least equivalent to the labels currently being used by Ausgrid. The lamination must be UV resistant and must be applied over the letters by the labelling machine during the label forming process.

5. Fixings for labels.

Fixings for labels are as indicated in Table 1.

Where the method of fixing is not indicated in Table 1, fixings must satisfy the following requirements:

Fixing screws must be brass, of adequate gauge and length, and of suitable type for the material to which the label is being attached.

The number of attaching screws must be appropriate for the size of label.

The Ausgrid Project Co-ordinator may specify additional or varied requirements for fixing of labels.

6. Cables connected for the first time.

Each HV or LV network cable being terminated at equipment shall be identified by means of a 'luggage' type label tied to the cable. The designation on the associated permanent equipment label must agree with the Ausgrid System Alteration Order and must agree with the description on the 'luggage' type label on the cable. When the newly terminated and connected cable is commissioned, the Ausgrid authorised operator will discard the 'luggage' label.

7. System alterations.

The Accredited Service Provider must label equipment to agree with the System Alteration Order and to remove and tie the former label to the appropriate item of equipment. The Ausgrid authorised operator will discard the former label after checking that the work is complete.

However, when equipment is to be re-energised outside normal working hours, the Accredited Service Provider may arrange with the Ausgrid authorised operator to make label changes which can be readily carried out.

The required new labels must be provided by the Accredited Service Provider and either left tied to the equipment or fixed permanently in position and temporarily covered by the old labels.

8. Phase labelling.

Where labelling is required for identification of phases; laminated adhesive backed tape with 25 mm high letters shall be used indoors, and 50 mm aluminium letters used outdoors.

9. Zone substation AC supply boards.

AC supply main boards and distribution boards in zone substations shall be labelled to show sources of supply and destination of outgoing circuits.

10. Earthing labelling

Earthing labelling must be in accordance with NS116 Design Standards for Distribution Earthing and relevant earthing drawings

11. Frame leakage protection.

Each unit of 11kV switchgear at zone substations, where frame leakage protection is installed, must have an 'EARTH' label fitted to each side of the bar to which hand plugging earths are to be applied.

This label shall be laminated adhesive backed tape with red lettering on white PVC sheet of minimum thickness 1.5 mm and nominal size 100 mm x 50 mm.

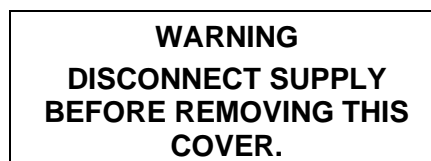
When a new earth bar is being installed in an existing substation in conjunction with the provision of frame leakage protection, it must be temporarily labelled 'NOT IN SERVICE' in such a manner to prevent premature use.

12. Warning labels.

In addition to equipment identification labels, warning labels shall be installed where necessary to alert personnel to safety requirements, or process step requirements. Requirements for warning labels will be specified in project documentation or by the Ausgrid Project Co-ordinator.

Unless specified otherwise, safety warning labels shall be laminated adhesive backed tape with red lettering on white PVC sheet of minimum thickness 1.5 mm and minimum nominal size 100 mm x 50 mm. Minimum letter height shall be 10 mm. The actual size of the label and letters shall be appropriate for the application and position.

An example of a safety warning label is as follows:



Unless specified otherwise, process warning labels shall be laminated adhesive backed tape with black lettering on white PVC sheet of minimum thickness 1.5 mm and minimum nominal size 100 mm x 30 mm. Minimum letter height shall be 8 mm. The actual size of the label and letters shall be appropriate for the application and position.

An example of a process warning label is as follows:

<p style="text-align: center;">WARNING ENSURE 240 VOLT LINK IS REPLACED BEFORE RESTORING TOP COVER</p>
--

6.0 LABELLING PRINCIPLES

A label is intended to unmistakably identify or distinguish a particular piece of mains or apparatus.

Labels must at all times be in accordance with the examples in this Network Standard. However it is not intended that the details on a label provide all of the information necessary for operating purposes.

A label must be clear and as concise as possible.

Mains and apparatus need not be labelled if labelling would serve no significant purpose (eg labelling low voltage UGOH's).

The labelling of high voltage cable end boxes must only be carried out in the types of installations specifically as shown in this Network Standard.

Details relating to the materials used, the types of letters and methods of fixing, the number of labels required and position of fixing, is specified in Table 1.

The practice of covering a new permanent label with an interim label until alterations are completed is acceptable. Labels must be checked for correctness after alteration.

Identification of phases shall be made by labelling when there is a departure from accepted standards.

Equipment associated with high voltage mains and apparatus such as pilot cable end boxes, relays and relay panels, gas and oil filled cable equipment etc., must be labelled to reflect the association. Label sizes must be as detailed in the project design brief.

The use of abbreviation 'Tx' is acceptable in place of the full word 'Transformer'.

Refer also to the Clause 'Labelling Mains and Apparatus' in the Ausgrid Electrical Safety Rules.

7.0 APPLICATION OF PRINCIPLES

7.1 132 kV/11 kV zone substations

7.1.1 Bus coupler, bus section and bus tie labelling

A circuit breaker or switch that connects the front and back busbars of double-bus switchgear is defined as a “bus coupler”.

A circuit breaker or switch that directly connects two adjacent busbar sections is defined as a “bus section” circuit breaker or switch.

A circuit breaker or switch that connects two busbar sections via a cable or overhead conductor within the same site is defined as a “bus tie” circuit breaker or switch.

Relevant switchgear shall be labelled as “bus coupler”, “bus section” or “bus tie” as defined above along with the position/numbering descriptors specified in this standard.

7.1.2 Sydney city CBD type

Each 132/11 kV Sydney City CBD type zone substation will require separate attention. Labelling will be specified in a drawing prepared at the time of construction of the substation.

7.1.3 Suburban type
(Four Transformer Design)

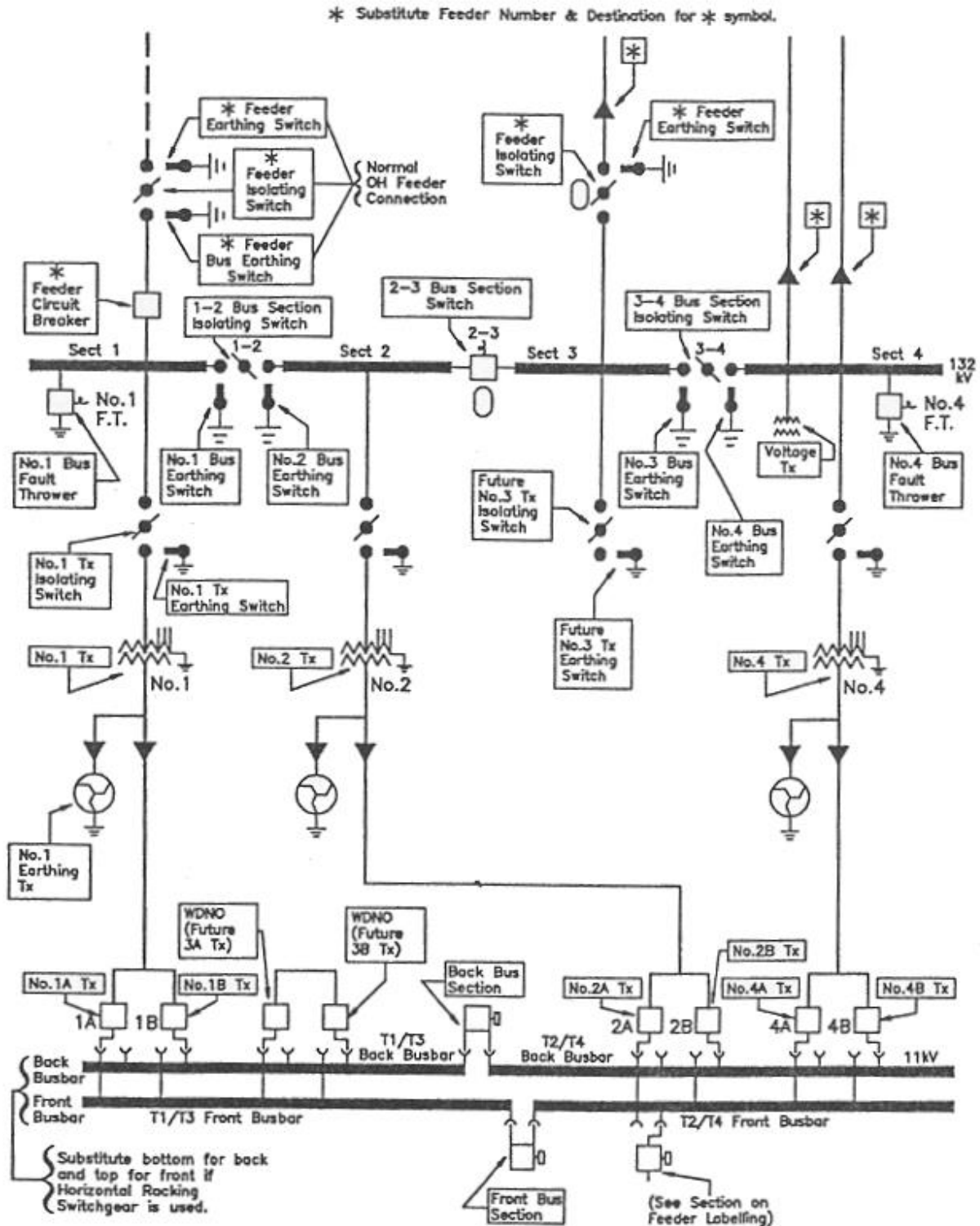


Figure 1

7.1.4 Suburban type (Two or Three Transformer Design)

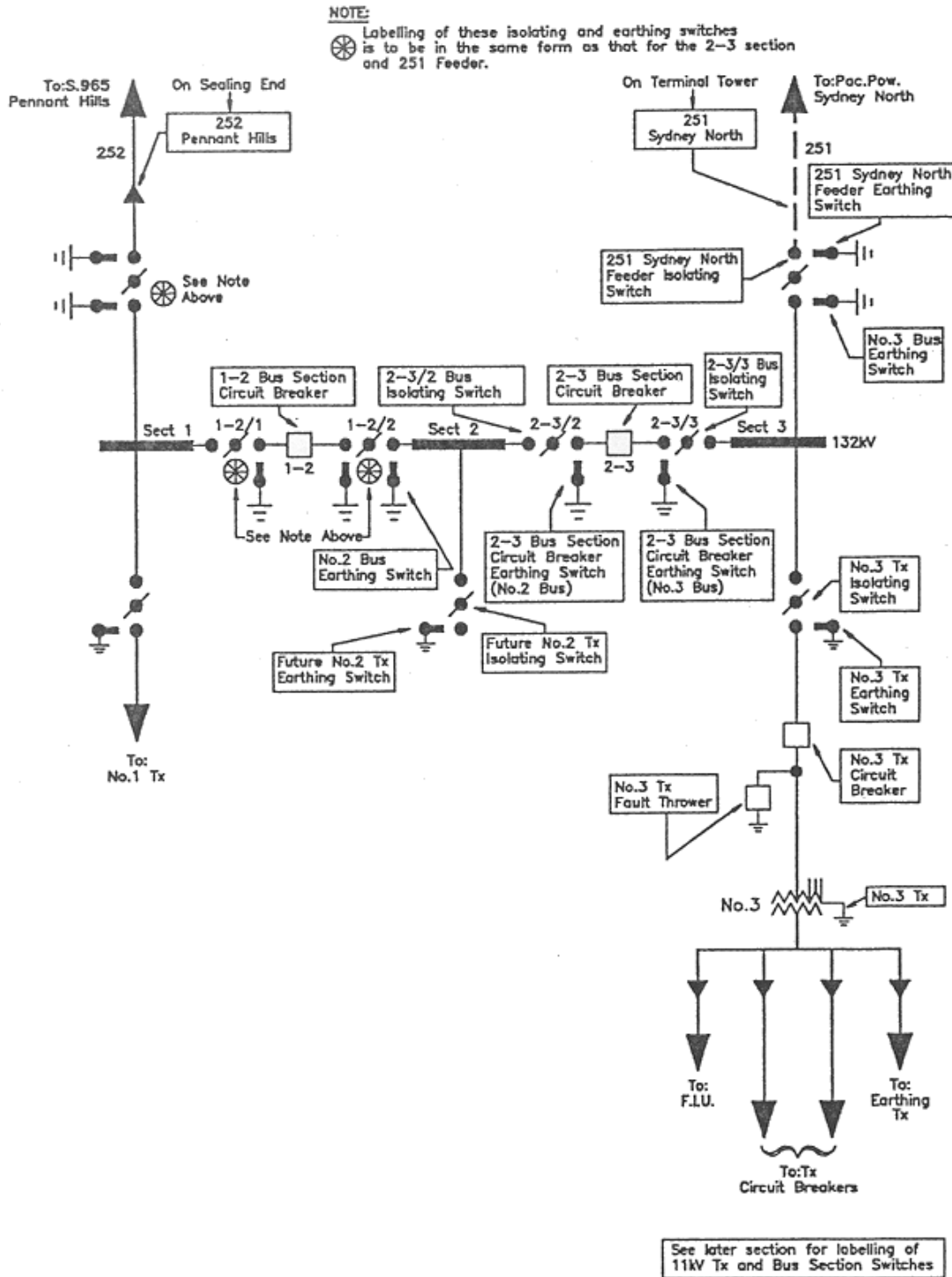


Figure 2

7.1.5 Suburban type

(Two or Three Transformer Design with five or seven circuit breakers respectively - portion only shown).

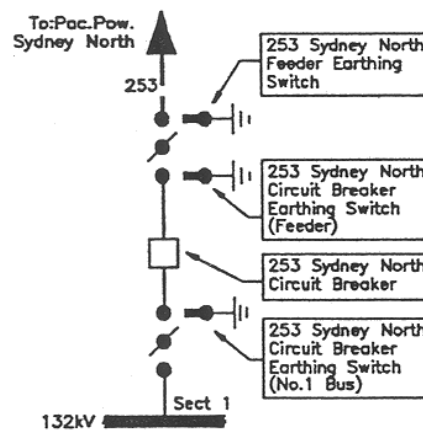


Figure 2a

Some isolators with high current breaking capacity are referred to as interrupter switches (eg the SF6 switchgear at Drummoyne). Labels for these switches should use the term 'interrupter switch'.

7.2 Feeders and distribution centres

7.2.1 Feeder labelling at distribution centres and in the distribution network

The distribution centre class identifier, eg PT, S, HP or HS must precede the distribution centre number, and the letters CP precede a control point number. Feeder switches will be labelled with the substation number, followed by a slash and a letter A, B, C, D etc. The letter identifying the feeder switch will be displayed on system diagrams.

At a switchboard, the lettering will be A, B, C etc., left to right in order, as viewed from the front, including transformer panels, which must also be labelled with the transformer numbers.

At single RMI installations, the feeder switches will be labelled A and B. The tee-off circuit will be labelled Tx or for control points, with the substation or PT number and name. However, where the control point tee-off controls supply to more than one distribution centre, then a letter should be used, eg C.

Multiple RMI installations requires the feeder switches to be labelled A, B, C, D, E, F, etc. and the tee off circuits labelled Tx 1, Tx 2, Tx 3, etc, as appropriate.

Normally open switches must not be labelled with the words normally open or the symbol N/O.

The letters I and O will not be used, to avoid confusion with the numbers 1 and 0.

In distribution centres, a feeder labelled with a switch letter **must** also be identified with a WDNO label **when required by Electrical Safety Rules clause 6.17.1**.

Note 1: In this and following sections, protection symbols have been omitted for the sake of diagram clarity. The following configurations are examples of labelling and may not reflect actual system connections.

Note 2: Where an earth fault indicator is located at a UGOH pole, the location of the earth fault indicator shall be shown on the system diagram, as indicated for example in Figure 4, '(E) Potts St nr Tennyson St.', and Figure 5, '(E) Victoria Rd. opp. Pearson St.'

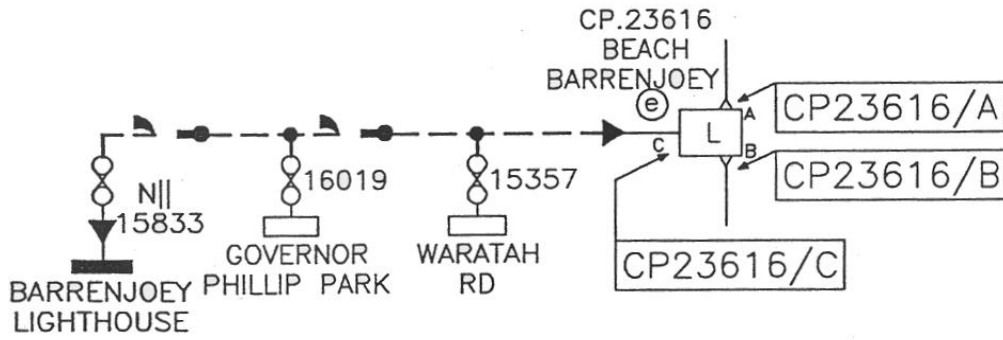


Figure 3

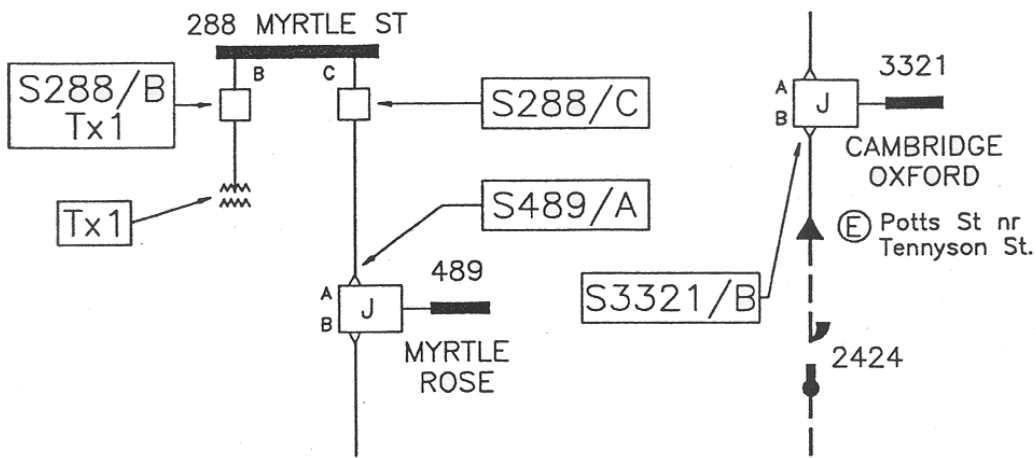


Figure 4

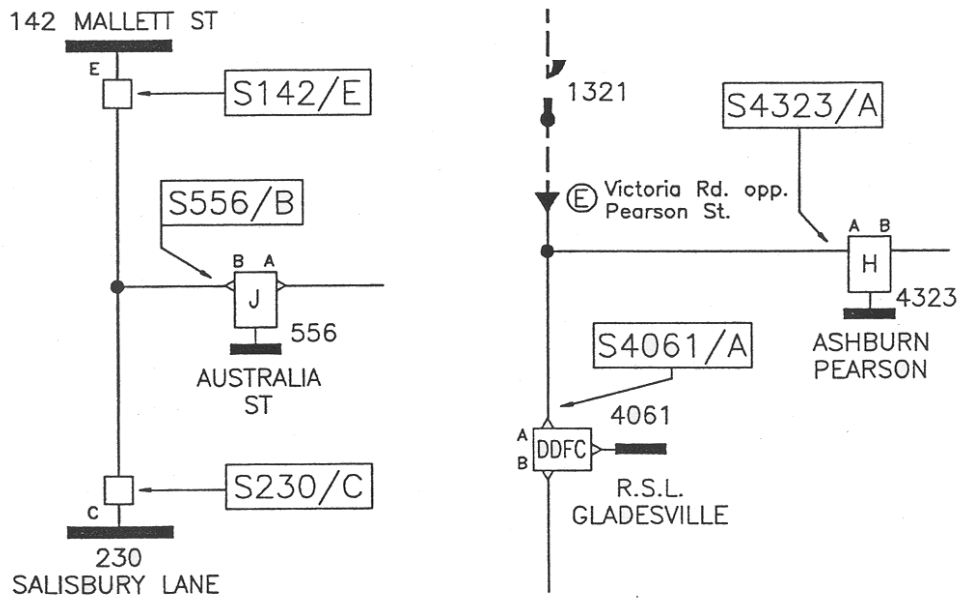


Figure 5

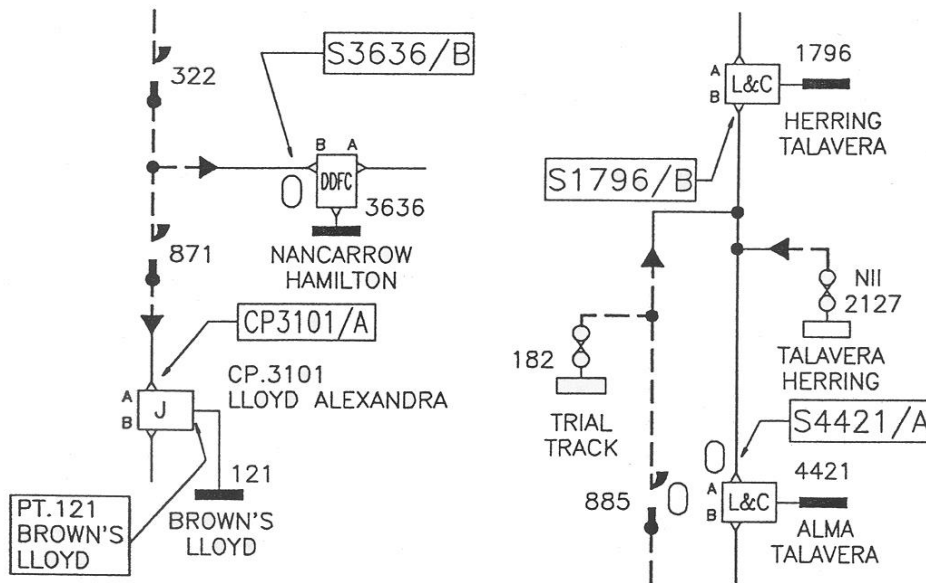


Figure 6

7.2.2 Feeder labelling at zone substations

(a) Individual Feeders

- Feeder panels in zone substations will be labelled with the feeder name and a panel number. The number will be the number shown on the Layout of Equipment Drawing for the particular zone substation. The number will also be displayed on system diagrams.
- Panels controlling Audio Frequency Load Control Units will be labelled in the same manner as feeder panels.
- In the example below, the switchgear panel shall be known as 'panel number 42'. The name of the feeder controlled from panel number 42 is '2063 Schwebel St' not 'Feeder 42'
- The label at the zone substation must show all points of control for that feeder, except in the case of a teed fuse switch or PT, when the term 'etc' shall be used.

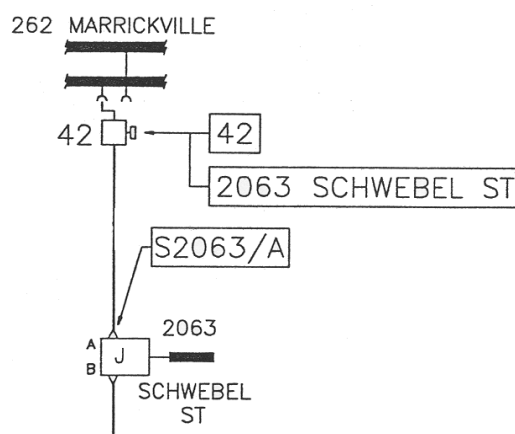


Figure 7

- Both the panel and feeder name shall be shown on the front, with the number only on the rear of feeder panels and control panels in zone substations. See Clause 7.4 for labelling of transformer, bus coupler and bus section switches.

(b) Double Banked 11 kV Feeders at Suburban Zone Substations

Double banked feeders are arranged with connections either side by side, or front and back, depending on the switchgear manufacturer or style of connection within the endbox. In keeping with the general principle of identifying panels from the left, when looking from the front; each leg of the feeder must be clearly identified as follows:

- (i) Each leg shall be identified by the feeder panel number followed by “L” and “R”. For example, the legs of panel 24 at Paddington would be 24 L and 24 R.
- (ii) On the protection panel, the relays associated with each individual feeder leg must be separated with a vertical or horizontal white or yellow line, as appropriate to the layout. Looking from the front:
 - if divided vertically, 24 L must be on the left, and 24 R must be on the right
 - if divided horizontally, 24 L must be on the top, and 24 R must be on the bottom.

All relays associated with a particular feeder leg must be located on the area of the panel identified with that feeder leg number.

The feeder panel must be labelled with normal zone feeder panel label. In addition, each protection panel must be separately labelled to show the first load control point(s) along that feeder leg.

- (iii) For FRONT AND BACK arranged double banked cable connections - As a standard, the feeder leg closest to the FRONT of the switchgear will be “L” and the feeder leg at the REAR will be “R”.

For SIDE BY SIDE arranged double banked cable connections - As a standard, the feeder leg associated with the “L” protection panel will be on the left side looking at the front of the switchgear.

NOTE - Care must be taken for panels with feeder cables arranged with side by side connection, because cable “L” will be on the RIGHT and cable “R” will be on the LEFT (when looking from the REAR).

- (iv) System Alteration Orders and System Diagrams must show the panel number with the “L” and “R” identifiers as currently shown on system diagrams.

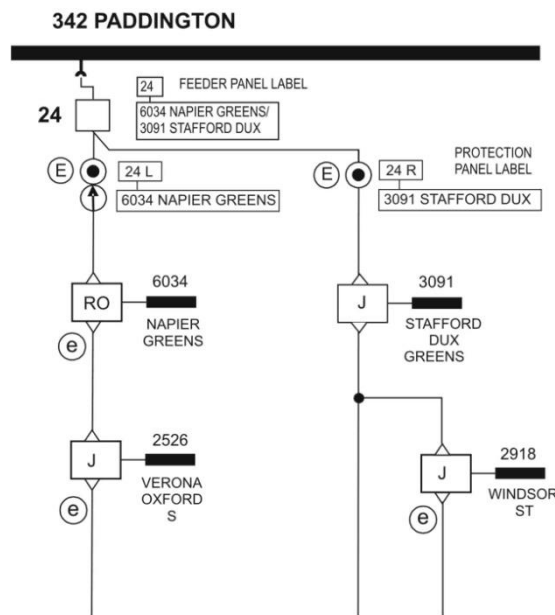


Figure 8

7.2.3 Several exceptions occur

- (a) For the case of sub transmission feeders which are also allocated a feeder number, the panel label must contain the feeder number and the NAMES ONLY of the substations at the remote points of isolation of the feeder. Mention of Audio Frequency Load Control units (AFLC's) will be made as shown below.

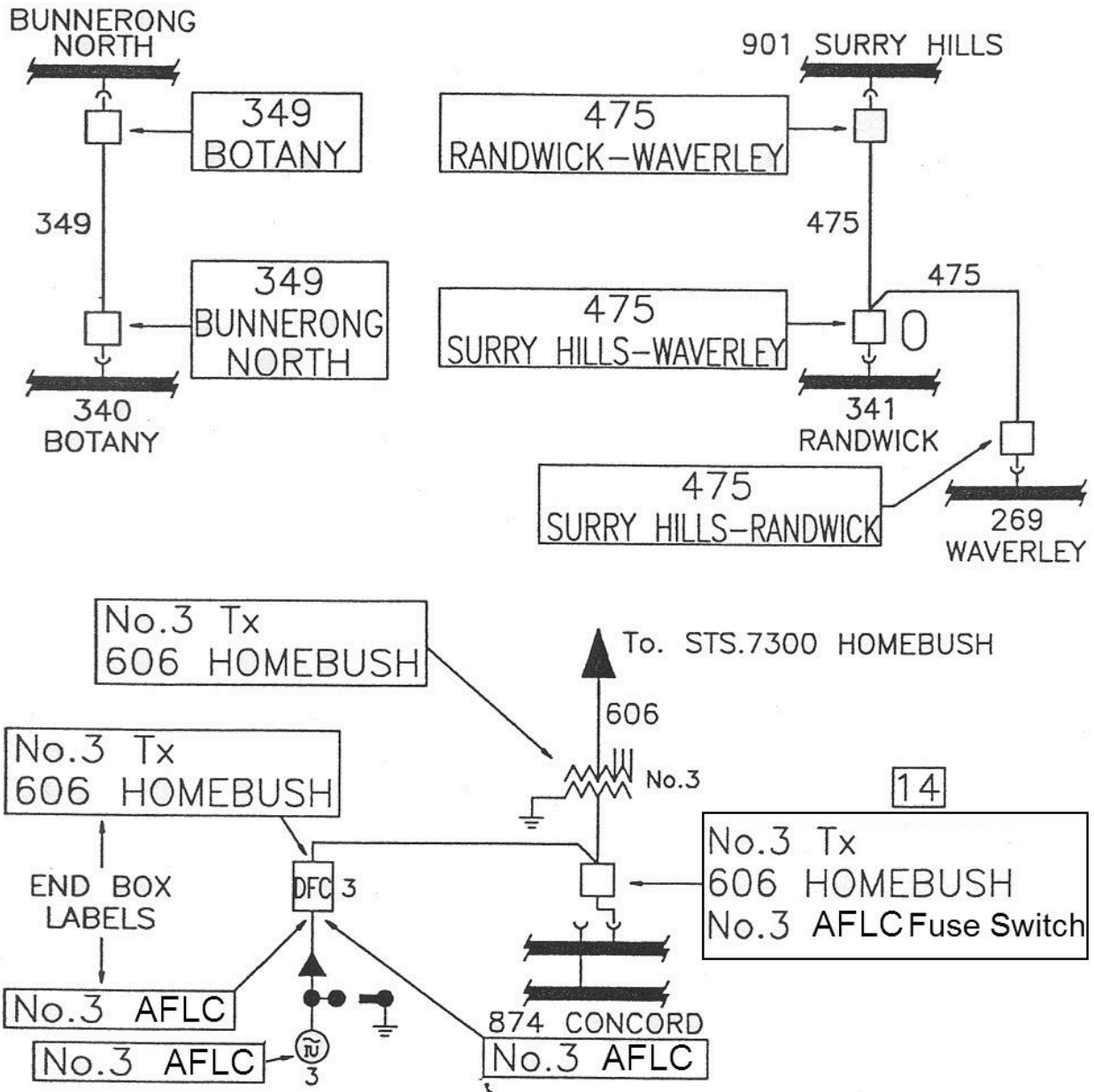


Figure 9

In the case of sub-transmission feeders that are capable of being divided into several sections (eg by means of removable sections of busbar) each section of the feeder will be identified by a numbered suffix.

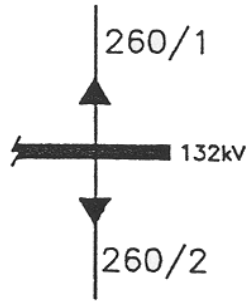


Figure 10

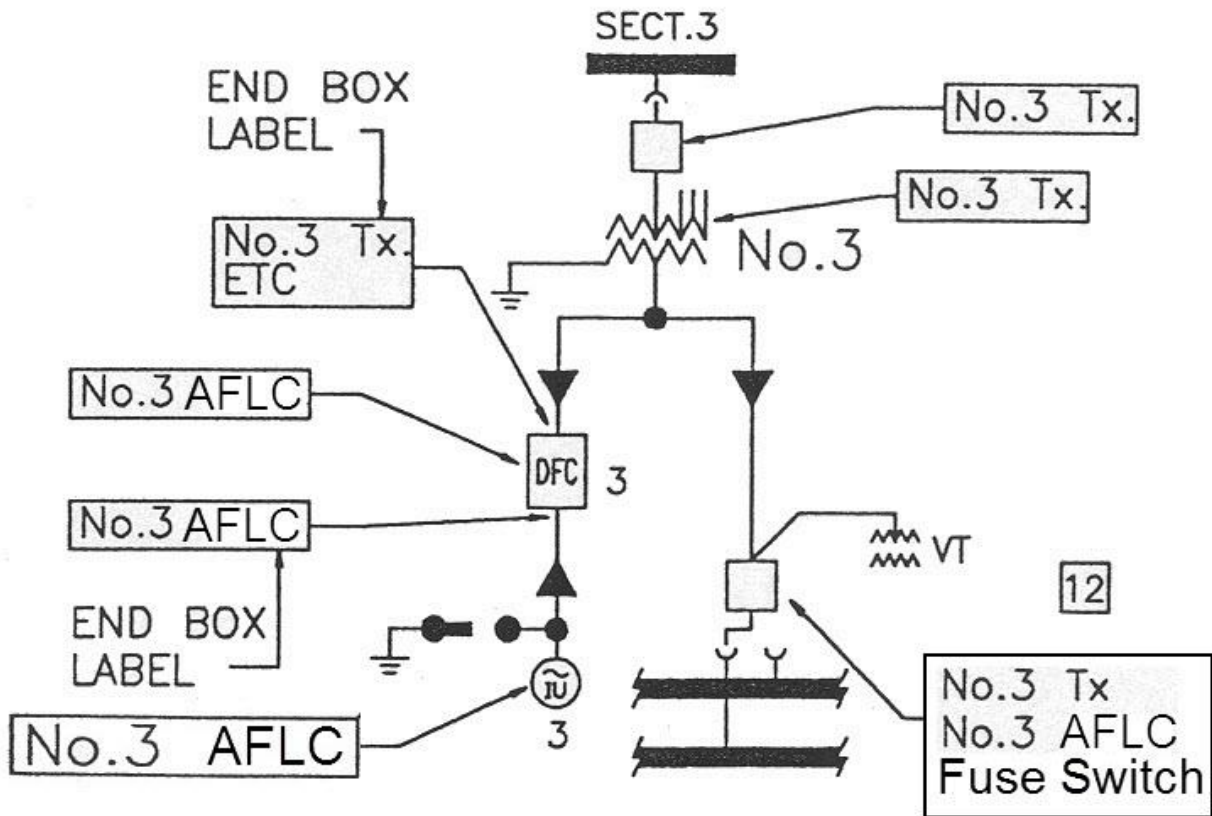


Figure 11

- (b) Fuse switch units must have the feeder and transformer end boxes labelled.

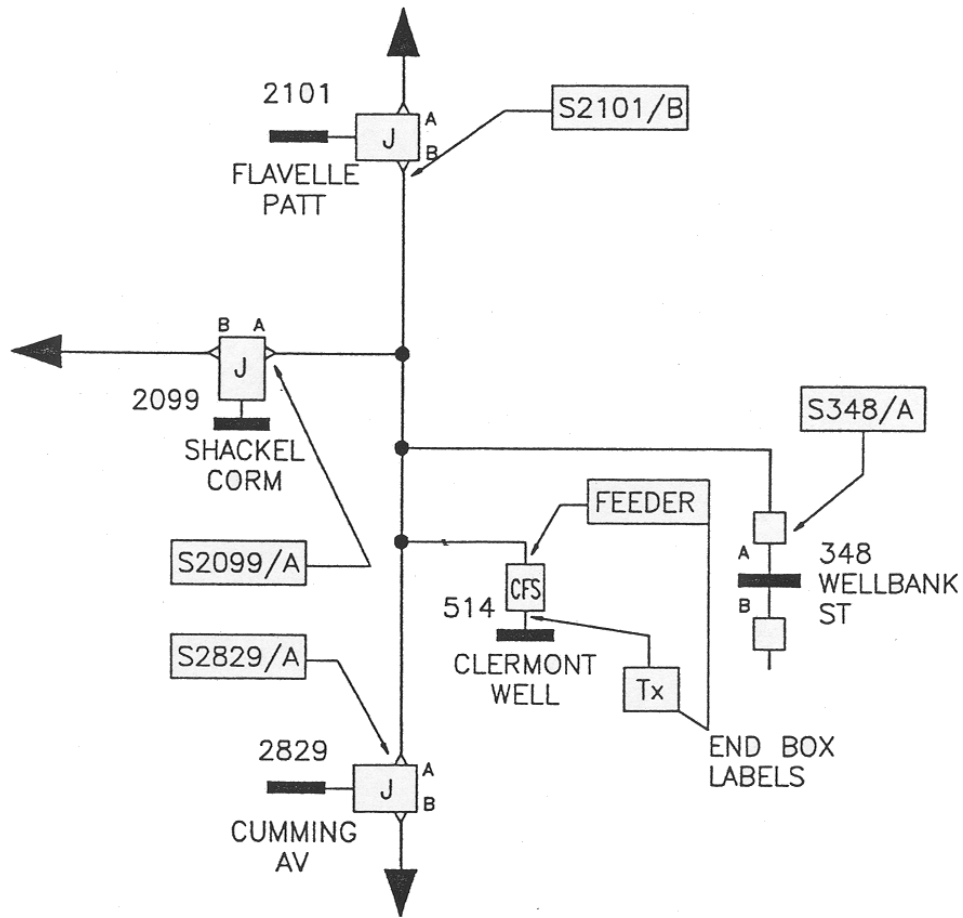


Figure 12

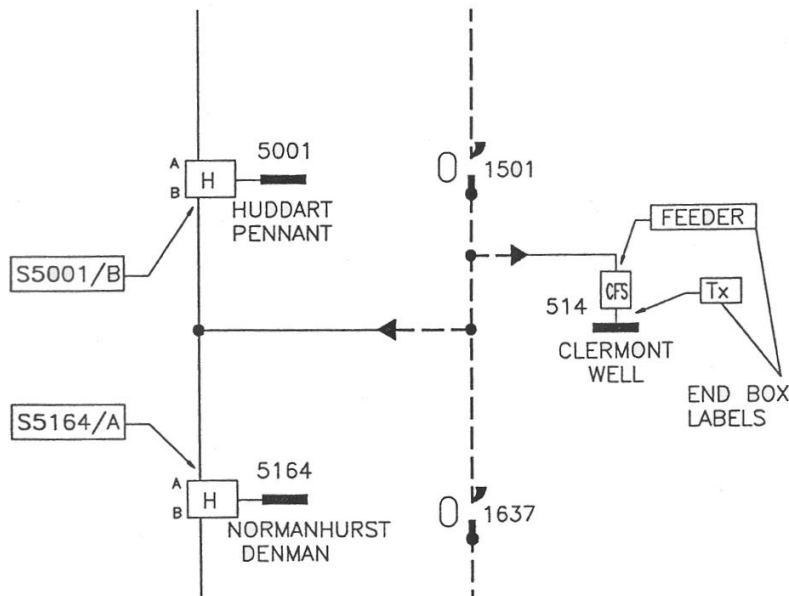


Figure 13

- (c) Circuit breakers equipped with auto-reclosing, ie those controlling predominantly overhead feeders, will be given district or street names, except that if not all the remote points of isolation are air break switches or underslung links, the switch must be labelled with the remote points of isolation. The district or street name will be shown on the system diagram. The district or street name will be selected by the Manager – Network Security, and will be shown on Development Plans.

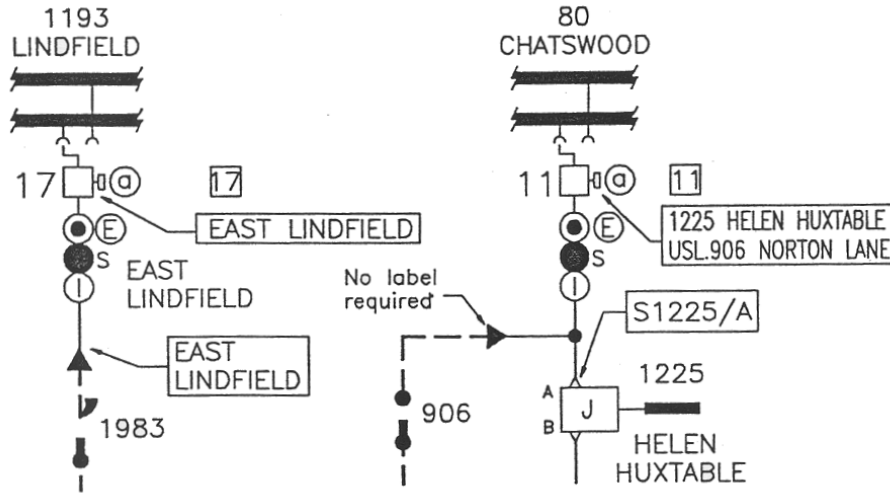


Figure 14

- (d) For suburban feeders, distribution centres tee connected to sections of feeder will not be designated by the word 'etc.' on feeder switch labels, except where tee connected to a zone front line feeder. In this case the zone substation label will have the word 'etc.'. For Sydney City CBD feeders see Clause 7.5.

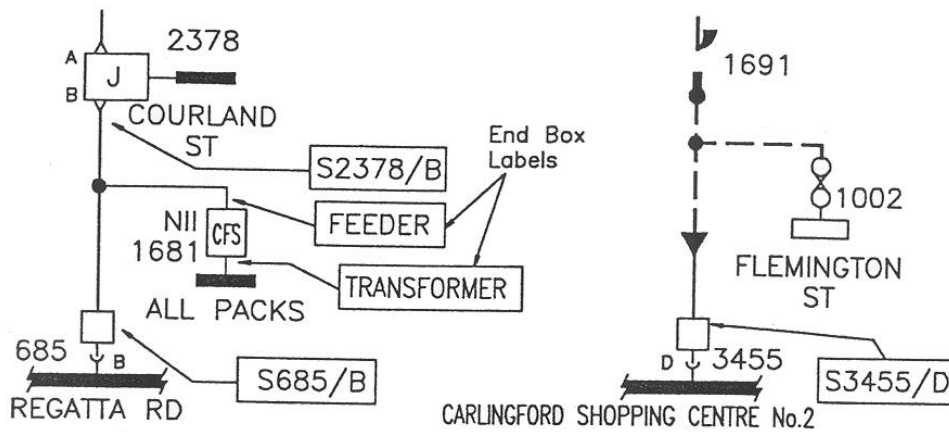


Figure 15

- (e) Local transformers tee connected to feeders as in the case of single circuit breaker substations will be mentioned in the feeder switch label at the substation in which the transformer is located. Shutters must have permanent labels as shown below. It will not be necessary to identify the switch at a **single** circuit breaker substation with the letter "A", however, end boxes, equipment panels and shutters are to be labelled as shown.

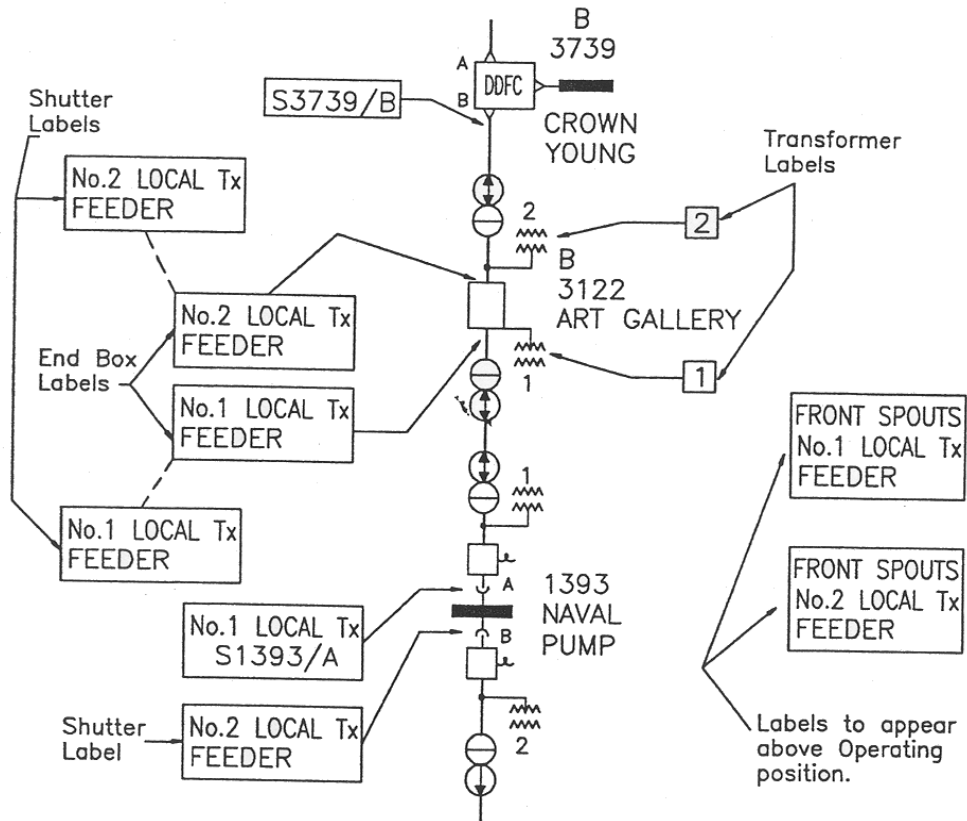
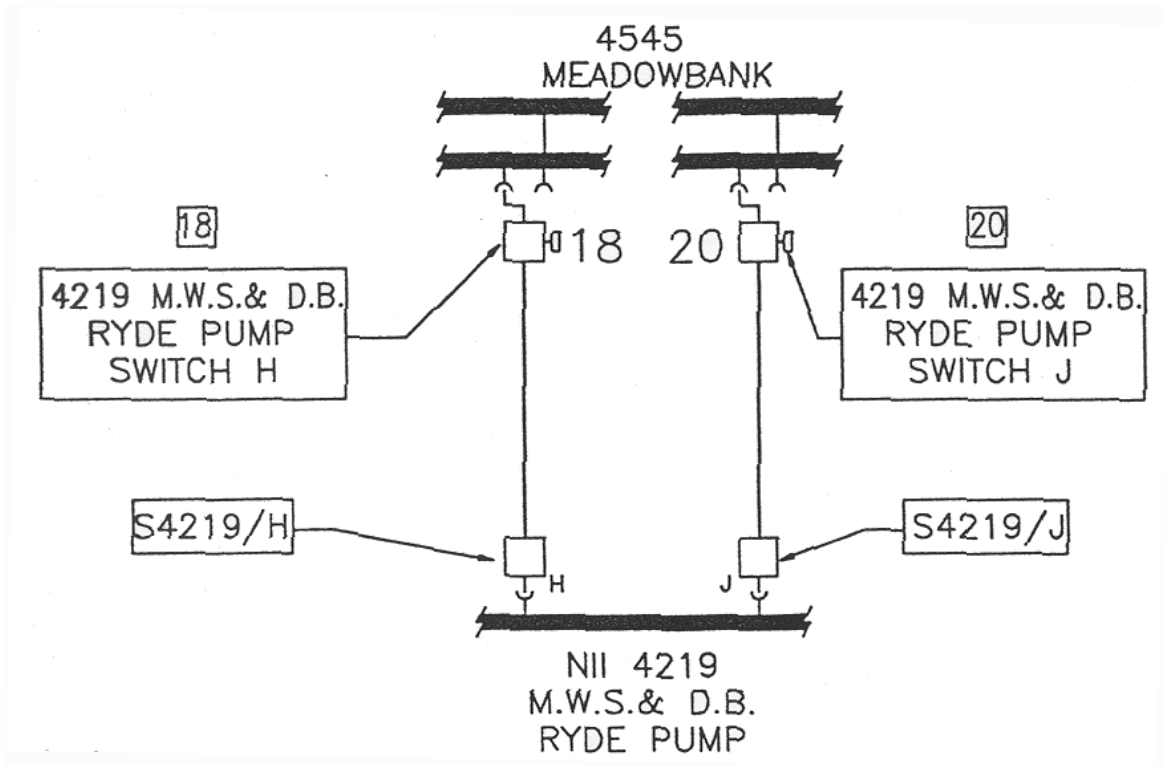


Figure 16

- (f) Sydney City CBD feeders shall be labelled in accordance with the methods given in the special section on labelling in Sydney City CBD substations, see Clause 7.5.
- (g) Feeders at the same zone substation that would otherwise have identical descriptions shall be identified with the letter of the switch at the termination, in addition to the normal labelling information required by the foregoing.

Identical Feeders



Non Identical Feeders

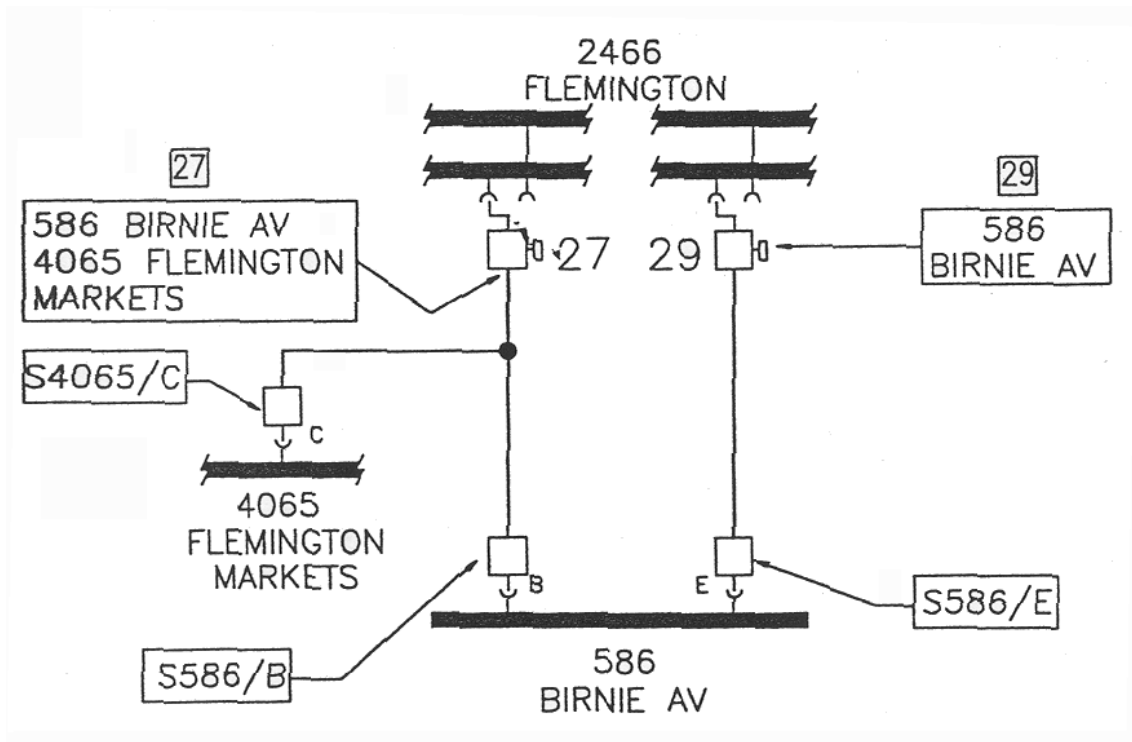


Figure 17

7.3 Underground to overhead connections on feeders

These must not be labelled except when they are connected to a cable that is connected to an auto-reclosing circuit breaker. The only UGOH on such feeders that should be named is the first UGOH out from the automatic circuit breaker. Where the feeder splits into multiple branches before becoming overhead construction, each UGOH shall be numbered 1, 2, etc.

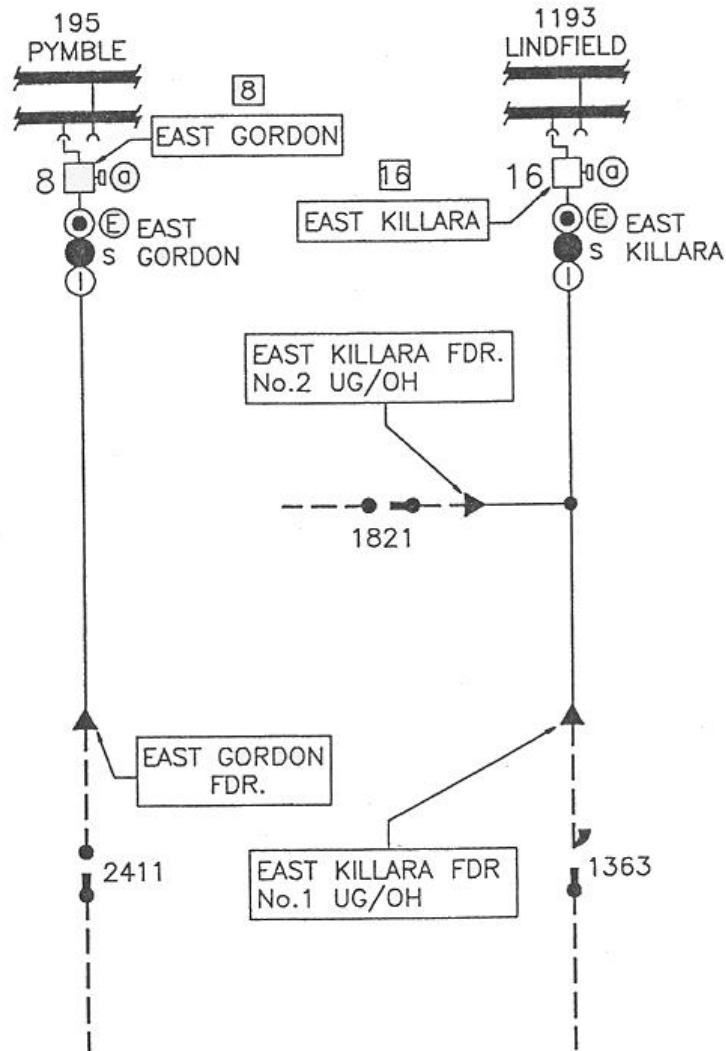


Figure 18

7.4 Zone substation and distribution centre equipment

When a feeder interconnects two circuit breakers in a zone substation, the label on each switchgear panel must contain the name of the remote substation(s) (or feeder name), followed by a reference to the panel number of the other panel at the zone substation.

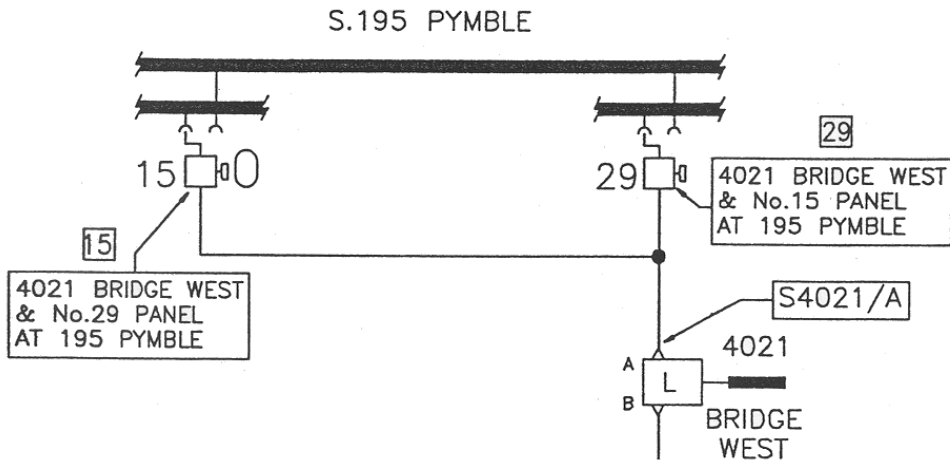


Figure 19

When a feeder interconnects two panels in a distribution centre, in addition to the usual feeder switch label, the panels shall be labelled with the identifying Switch letter of the other switch, eg. Sw A and Sw C.

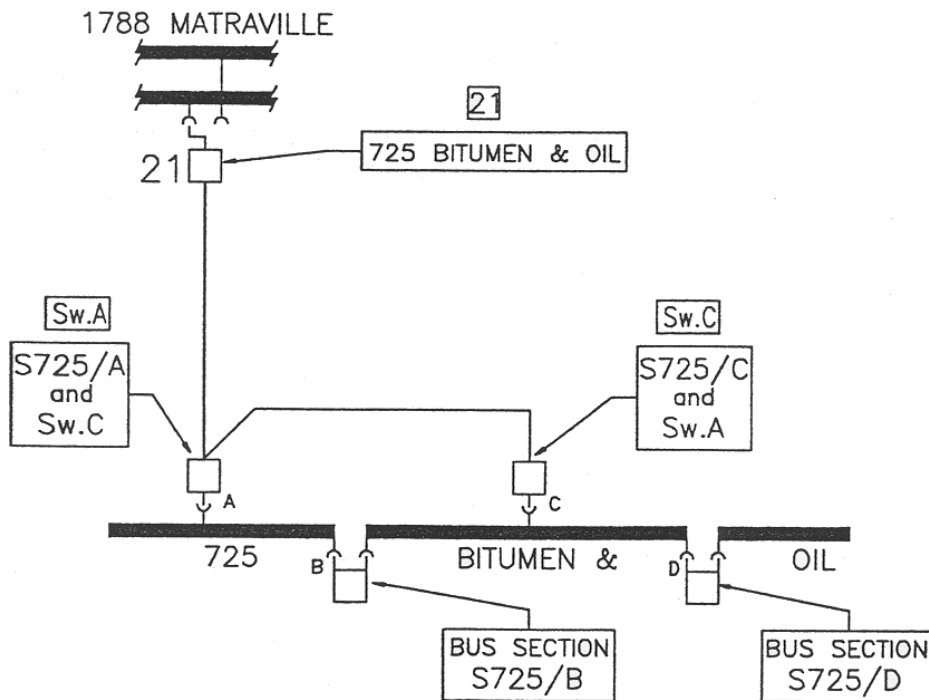


Figure 20

Protection panels and relays associated with a feeder or substation equipment shall be given the same name as that feeder or equipment.

Identical equipment installed in the same substation (transformers, fuse switches, ring main isolators, reactors, audio frequency load control units, HVC supplies etc) must be given distinguishing numbers. Pieces of equipment associated with each other must normally be given the same number, eg No. 1 RMI must control No. 1 Tx.

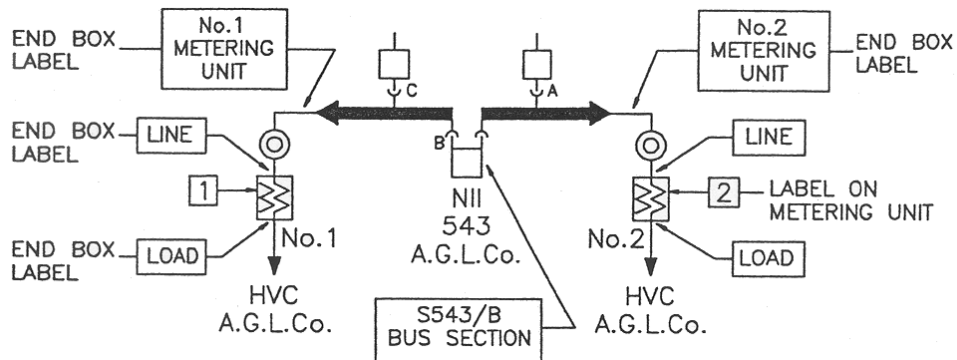


Figure 21

Where two or more different HV customers are supplied from the one substation, each HV supply must be labelled with the customer's name.

In the case of multiple RMI substations the letters A, B, C, D, E, F etc, shall be used to identify feeder switches.

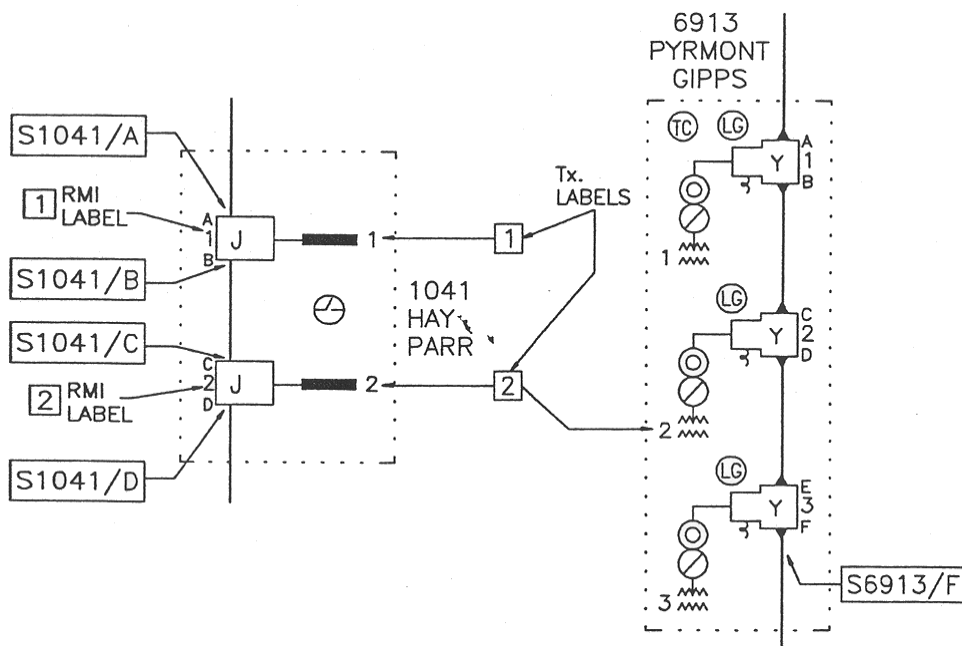


Figure 22

On RMI's, the switch controlling the transformer shall be labelled 'Tx', with a distinguishing number if applicable.

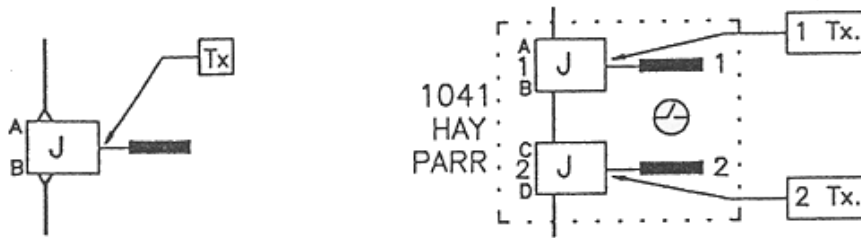


Figure 23

When transformers are double banked they shall be distinguished with letters, eg No. 1A and No. 1B transformers.

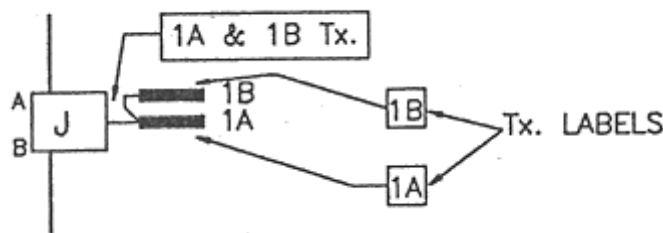


Figure 24

Sub-transmission bus section switches shall be labelled with numbers. Switches in outdoor switchyards shall be labelled as shown below.

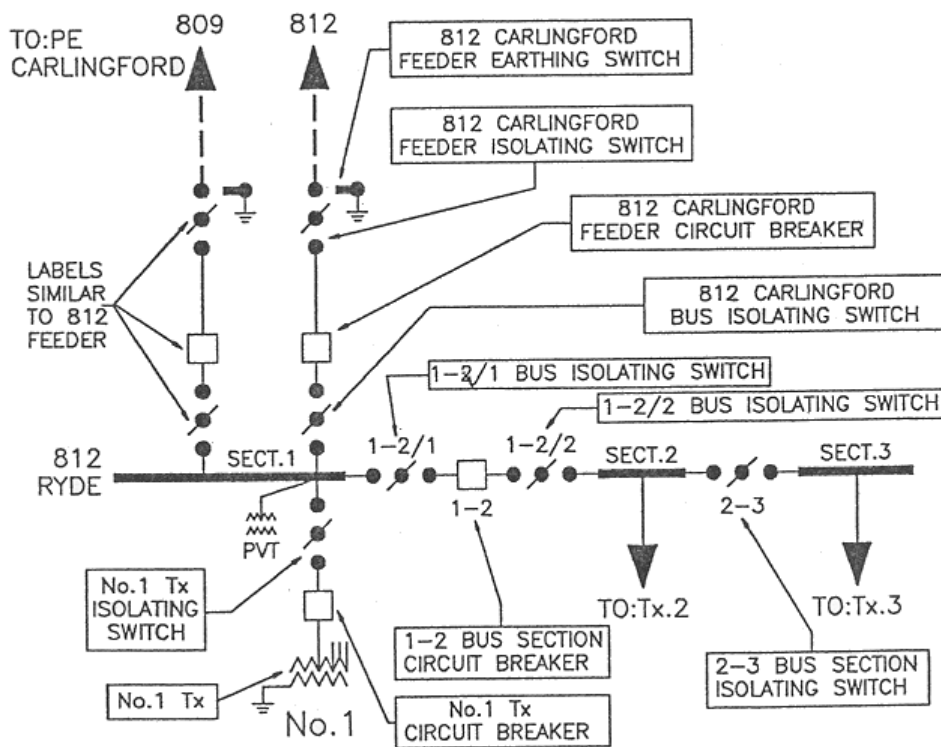


Figure 25

Ripple filters for Ausgrid's network in Endeavour Energy substations or TransGrid substations shall be labelled as shown below, noting that at Ausgrid substations the letters 'EA' are required.

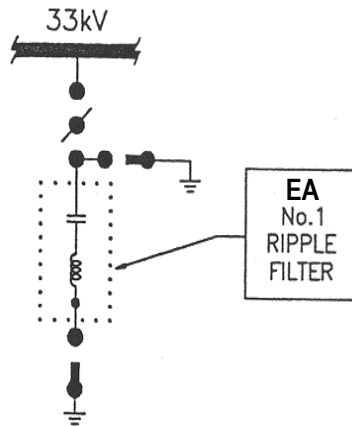


Figure 26

The end boxes of fuse switch units must be labelled so as to distinguish the incoming and outgoing end boxes of the fuse switch unit.

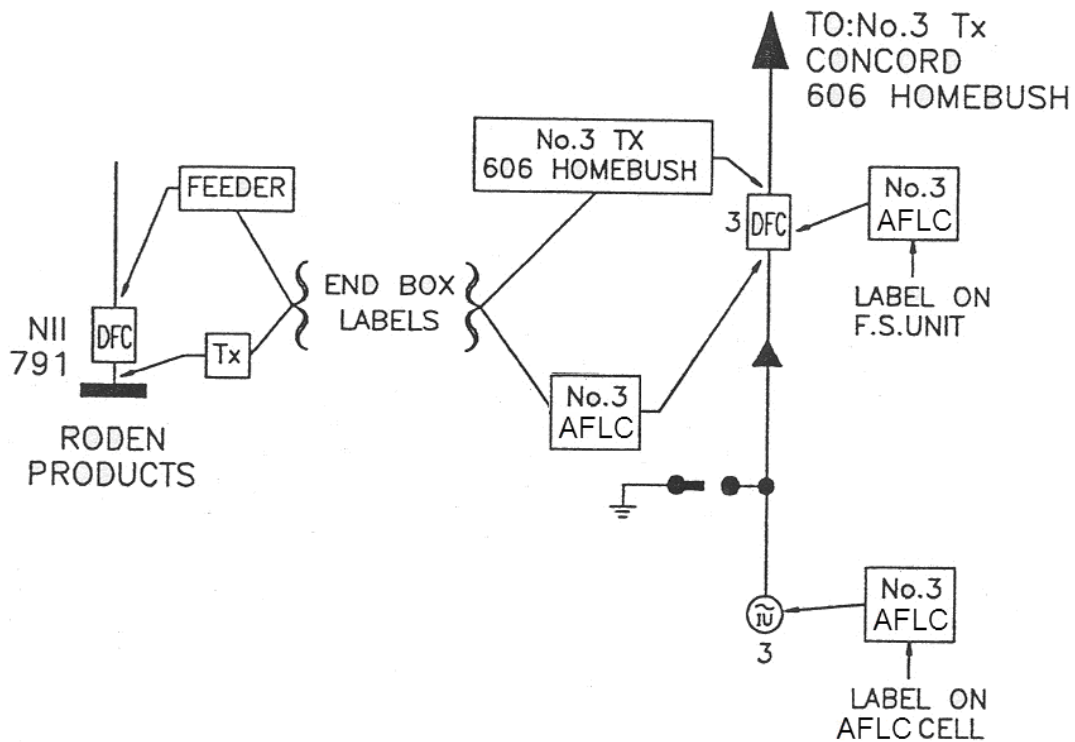


Figure 27

Distribution substation bus section switches shall be labelled with the letter as appropriate to the panel positions and with the words 'Bus Section'. See figure 18. Zone substation bus coupler switches shall be labelled with the letters 'A', 'B', 'C' etc. At suburban 132 kV/11 kV zone substations, the 11 kV bus section and transformer panels shall be labelled in accordance with Clause 7.1 of this Network Standard and the following examples.

Labelling of transformer and bus section circuit breakers in suburban two and three transformer design zone substations, with double and single bus equipment, is shown below. Feeders have not been shown.

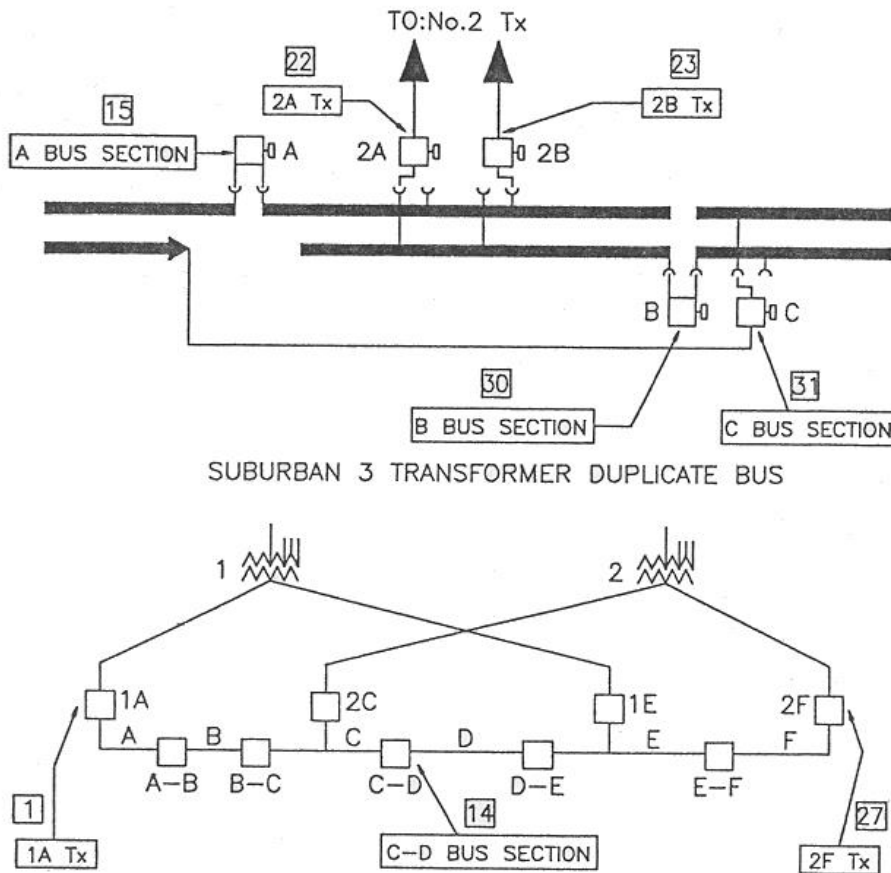


Figure 28

Labelling for three transformer suburban zones with single bus switchgear uses the same principles.

Note: for transformers, bus couplers and bus sections, both the number and name of the panel must be displayed on the front and rear of switchgear and control panels. The number will be the number shown on layout of equipment drawing for the particular zone substation. The number will not be shown on the system diagram.

Test and earthing point shutters on single bus vacuum switchgear shall be labelled as shown below.

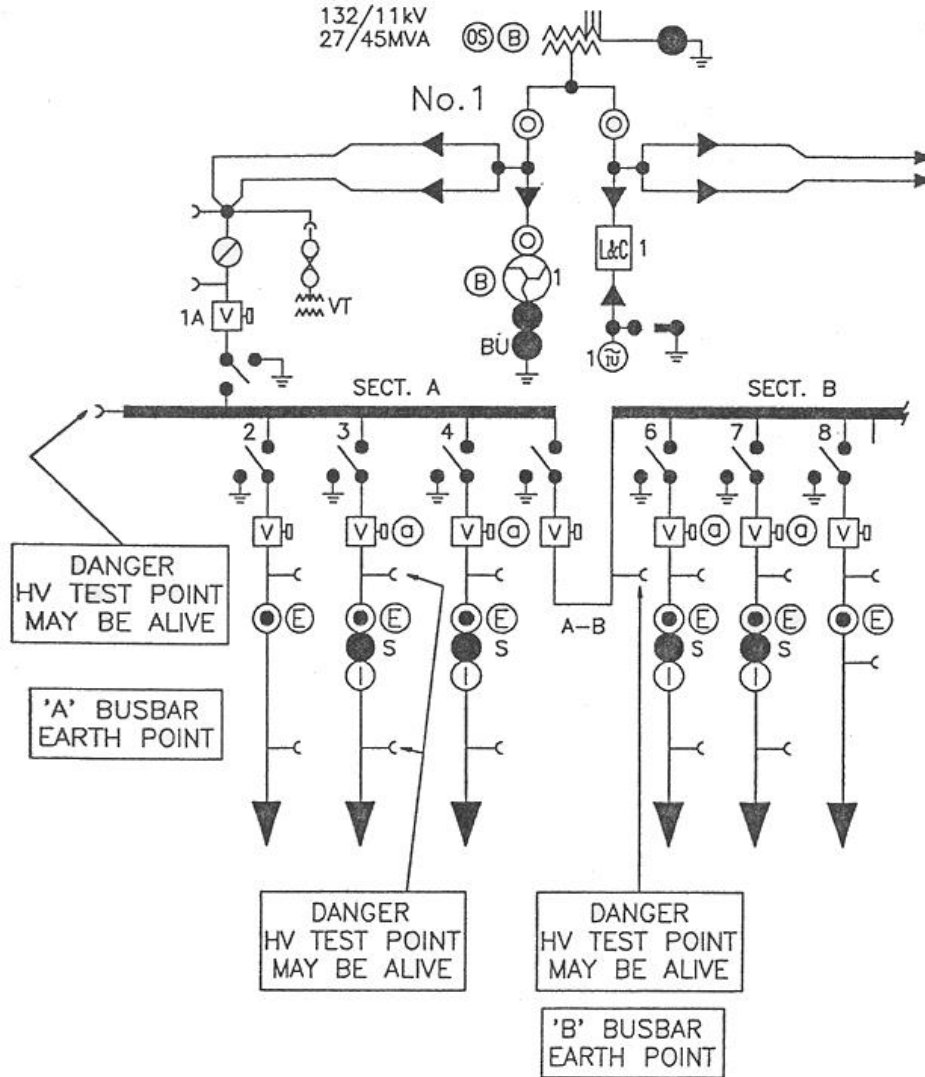
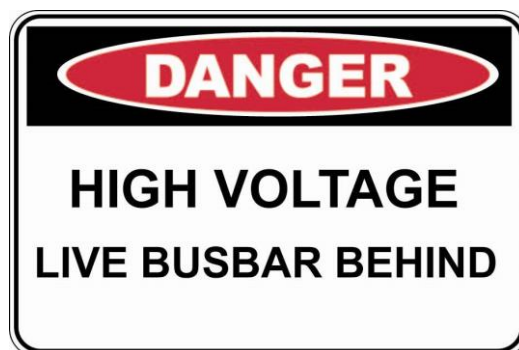


Figure 29: Only shutter labels shown

Tamco and Reyrolle/ Vartec (or other Internally Arc Classified protected) switchgear cannot be walked on so all top cover plates must be labelled “NO STEP” as well as the area that they cover .eg Circuit Breaker, Busbar, Feeder.

Because these cover plates cannot be safely accessed to apply red and white tape when necessary then a continuous line shall be marked over the route of busbar enclosed below.

Internal Cover plates that can be removed and give access to live busbars must be labelled as shown below.



Reactors shall be labelled with the word 'Reactor'. The label must also include sufficient information to show the terminal connections.

However, where the reactor is situated at a location that is not at one of the substations identified as a terminal connection, the feeder labels at each end must identify the remote reactor location.

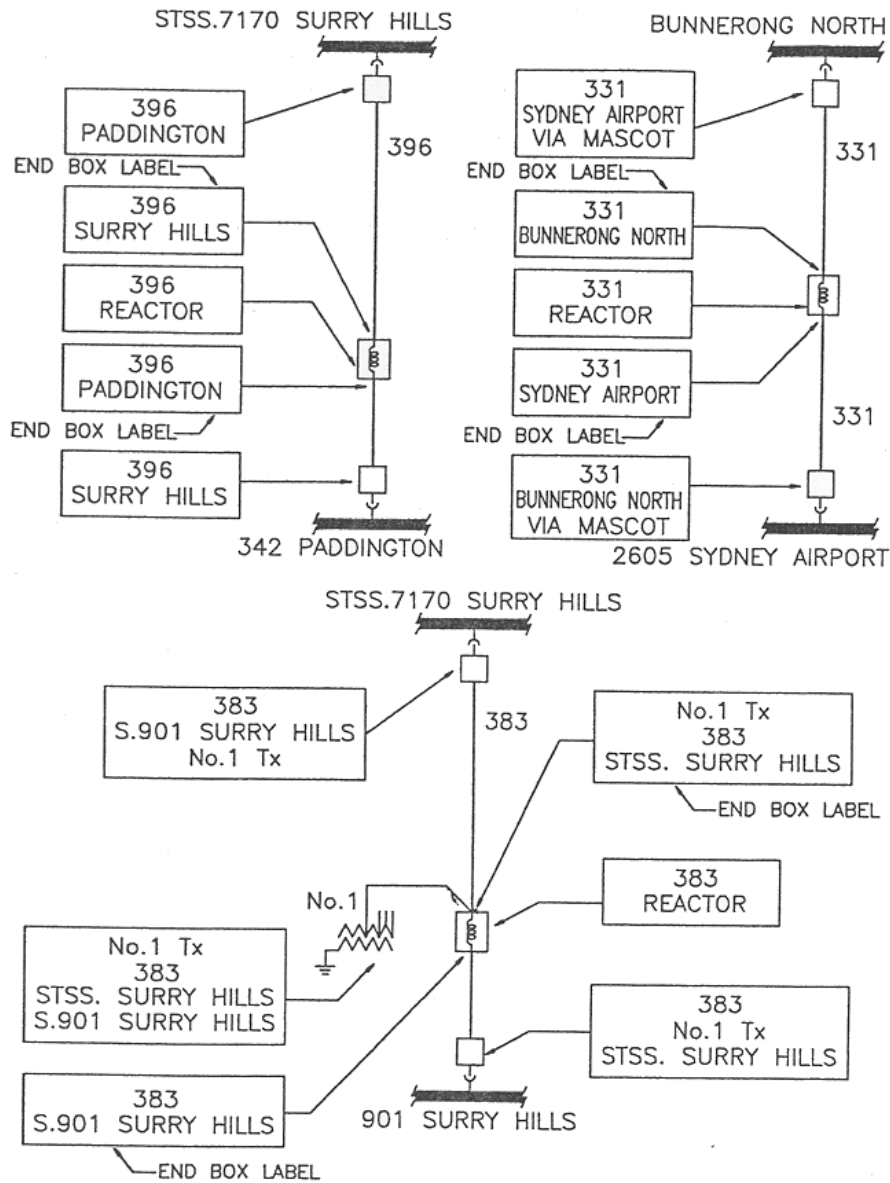


Figure 30

WDNO panels at zone substations should contain information (if known) relating to the future destination of the feeder or the type of equipment to be connected to the panel. See Figure 31.



Figure 31

The words 'WDNO' and 'Future' can be made 'tear-off' type labels to reduce printing if required or the final label can be printed on the reverse side of the WDNO label.

7.4.1 Audio frequency load control

In instances where Audio Frequency Load Control Units within a zone are connected via an RMCB and are not directly interconnected to other RMCBs within the zone, the RMCB will be given a unique Control Point number.

In the example below the following labelling is applied

The weatherproof door at the front of the RMCB is labelled CP12345 No.3 AFLC

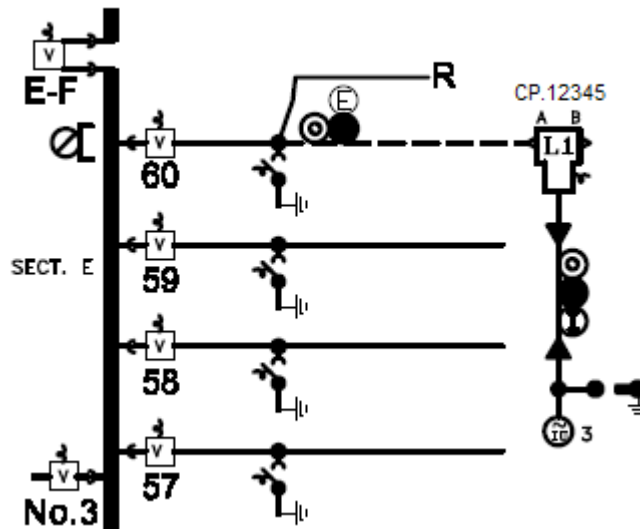
Switch A is labelled CP12345 SW/A Panel 60 (substitute Tx number for Pnl number when an RMCB feeder switch is connected to a zone transformer)

Switch B is labelled CP 12345 SW/B WDNO

The tee off end box is labelled No.3 AFLC

The tee off CB and is labelled No.3 AFLC CB

The tee off isolating and earth switch is labelled No3 AFLC Isolating and earthing switch



7.5 Sydney City CBD feeders, substations and distributors

7.5.1 General

Apparatus in Sydney City CBD type substations shall be identified by letters and/or numbers which must remain identifiable should the substation be subjected to fire or explosion damage.

The labels of the various items of equipment in Sydney City CBD type substations, such as isolating and earthing switches, transformers, LV network protectors, air circuit breakers, three way switches, two way switches, RMI's and fuse switches, must bear the same identification numbers and letters as the feeders to which they are connected.

7.5.2 Sydney city CBD 11 kV feeders

- (a) All of the Sydney City CBD 11 kV feeders have a number of substations connected to them. The identification to each feeder must consist of a number and a capital letter only, the capital letter being derived from the identifying letter of the group to which the feeder is connected at the zone substation.

For City North Substation, the figures are 11, 12, 13 and 14.

For City East Substation, the figures are 21, 22, 23 and 24.

For Dalley Street Substation, the figures are 31, 32, 33, 34, 35, 36 and 37.

For City South Substation, the figures are 41, 42, 43, 44, 45, 46 and 47.

For City Central Substation, the figures will be 51, 52, 53, 54, 55, 56 and 57.

For City North (new) Substation, the figures will be 61, etc.

In each case, these numbers are to be combined with the following capital letters, A, B and C, D, E and F, G, H and J, K, L and M, for example 1A, 12D, 23E, 36J. (Note that I is not used).

Feeders connecting two City zone substation busbars and not broken by a normally open feeder isolating switch other than the circuit breakers at the zone substation, should have the same label at each end of the feeder. The name of the feeder must be the name that would be allocated to a feeder connected in the normal manner at the normally closed end of the feeder.

- (b) Feeders in the City Area that connect two zone substations and are broken by a feeder isolating switch remote from the zone substation shall be labelled in accordance with normal City feeder labelling techniques. The feeders on either side of the normally-open feeder isolating switch will have different numbers.

The feeder switches on three way switch units are to be labelled with the feeder number and letter, and on the incoming side, the zone substation number.

If the switch is normally open between zones, the labels should identify both zones and the switch unit labelled as per the normal supply.

For two way switch units, the equipment panels shall be labelled as shown below.

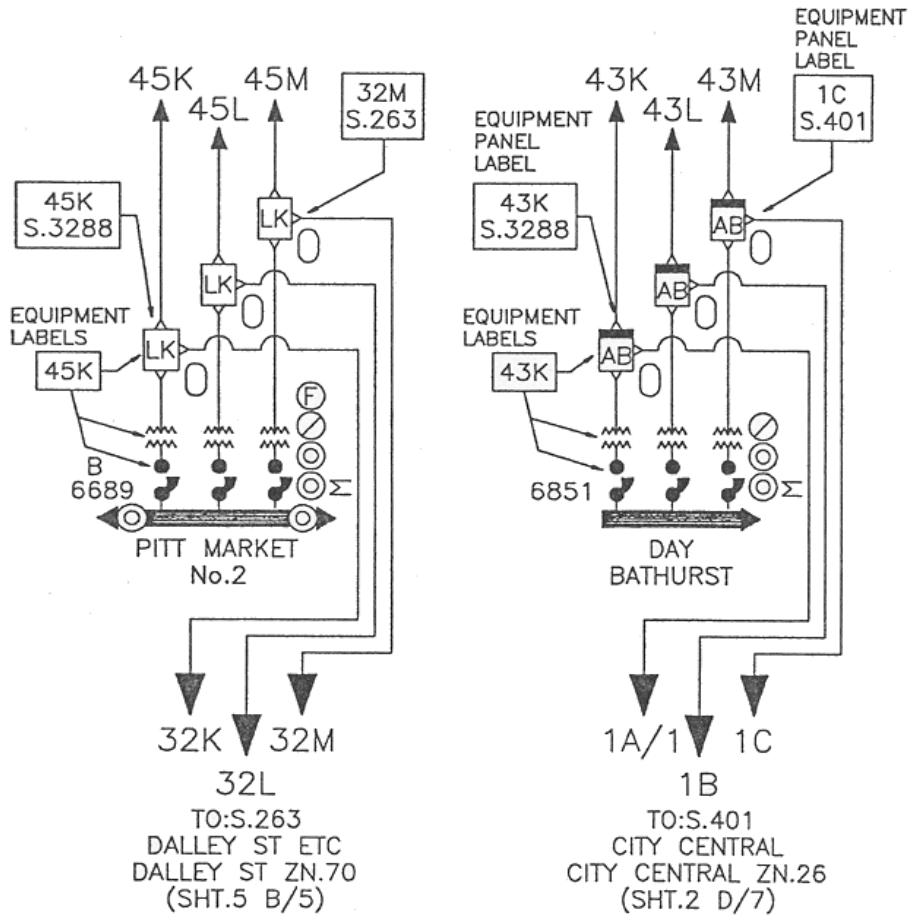


Figure 32

Where another RMI control switch is looped into the feeder before the zone substation, the number of that substation shall be shown on the label, ie the next controllable switch. The term "etc" must be included on the label when distribution centres are tee connected to that feeder section.

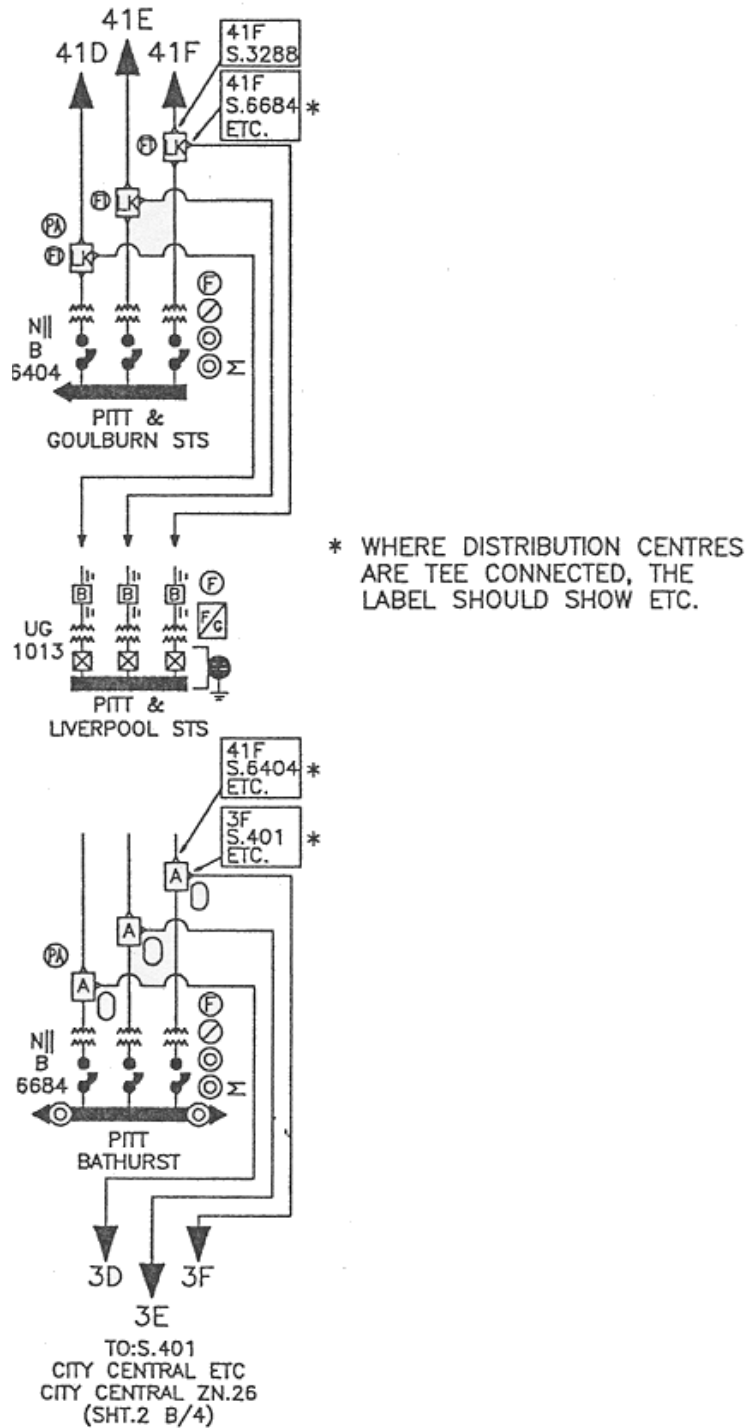


Figure 33

- (a) Feeders being double banked in 11kV Sydney City CBD zones shall be labelled in the same manner as 11kV zones described in Clause 7.2.2 (b)
- (b) Labelling in Sydney City CBD multiple substation control points, where RMI's are connected in series, shall be carried out in accordance with the following general principles and Figure 34.

General principles:

- This form of labelling should only be used where RMIs are connected in series, within the one control point, or control point and associated substation chamber.
- RMIs (or I&E switches) that are tee connected to feeders in the normal way, should NOT be labelled N, P and Q. They should be labelled in accordance with the normal principles in this standard. The labelling will show the connection to the zone, and the substations controlled. Per figure 33
- Owing to the designed capability in multiple substation control points for transfer of several substations from one feeder to another, it is likely that there will be an open point between RMIs. Accordingly, only the feeders to (or from) the network at the outer RMIs will indicate the normal supply feeder numbers, eg in Figure 34, the incoming feeder cables to the top RMIs have the feeder numbers 45A, 45B and 45C, and the incoming feeder cables to the bottom RMIs have the feeder numbers 3A, 3b and 3C.
- The intermediate RMIs shall be labelled N1, P1, Q1 and N2, P2, Q2, etc with labels on the switches as for suburban multiple RMI substations.
- There are situations on the Sydney City CBD network where an RMI controls the outgoing feeder to other substations, and the transformers at the controlled substations are labelled as per the normal supply feeder. In all Sydney CBD substations, the 11 kV switchboard is labelled ABC, DEF, GHJ, or KLM, with the appropriate feeder number from left to right. So if a section of the feeder is abnormally supplied from another feeder bank, the relationship in each substation is readily interpreted. However, no such relationship or means of checking exists for the RMIs in a large control point.
- The transformers supplied from each RMI should be labelled with the feeder of normal supply and the destination substation, because each substation has the 11 kV switchboard as reference.
- The letters N, P and Q have been chosen for the intermediate labelling, as there will not be a feeder bank NPQ. Sydney City network feeder banks are ABC, DEF, GHJ and KLM. There is no number '1' as this could be confused with '1' (one), and '0' has not been chosen as it could be confused with '0' (zero).

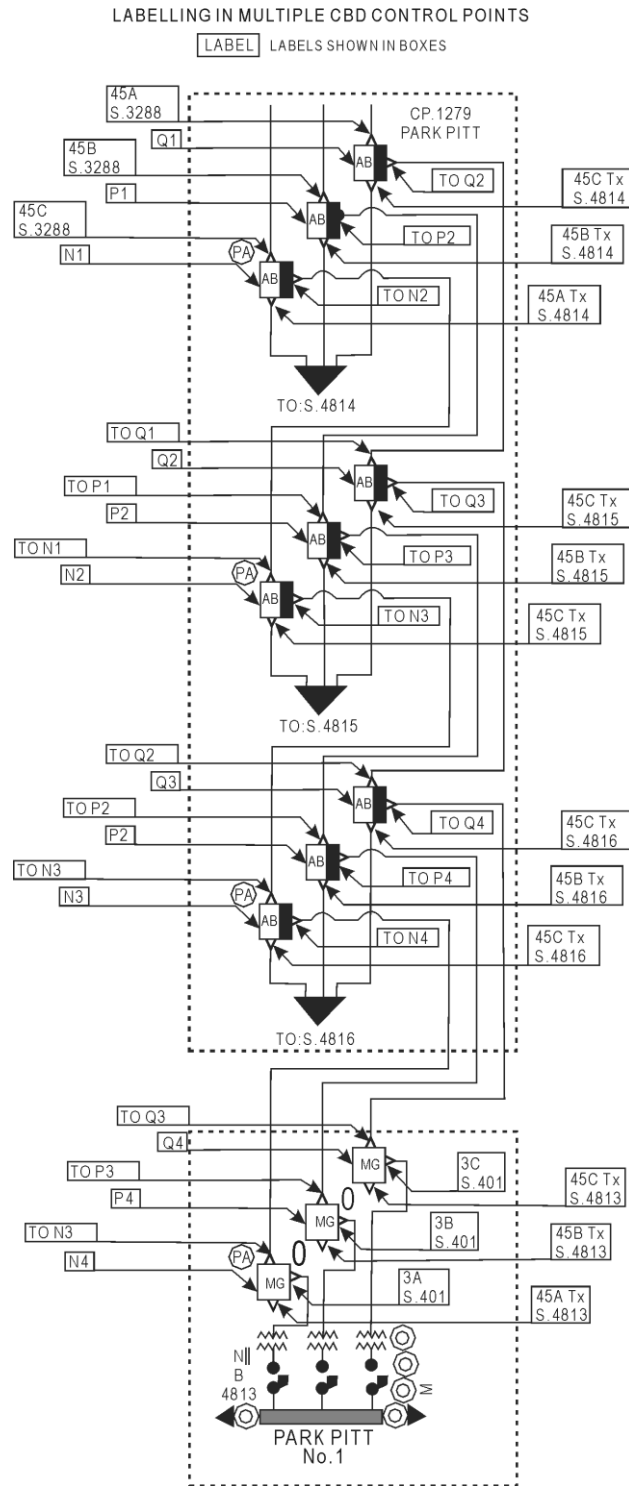


Figure 34

- (a) Except as described in figure 35, fuse switches tee connected to a Sydney City CBD feeder shall be labelled in accordance with Clause 7.5.1 General.

Where a suburban type network is connected across a Sydney City CBD feeder bank, the RMIs and fuse switches (that are not tee connected to the zone feeders) shall be labelled the same way as for suburban networks. However, the switch identifiers to be used are Z, Y, X, W etc, to avoid any confusion with feeder numbering and lettering as used in the City system. In addition, at RMIs the switch control on the feeder connected to the zone substation must be labelled with the feeder number and letter.

A transformer controlled by a fuse switch tee connected to a section of feeder that is controlled from the zone or an in-line RMI shall be labelled in accordance with the normal Sydney City CBD feeder labelling. However, where the fuse switch is tee connected to a section of feeder that can be supplied from alternate high voltage sources, it shall be labelled 'feeder' and 'transformer', see Clause 7.2.3 b. A transformer controlled by an RMI that can be supplied from alternate sources must be labelled 'Tx', with an identifying number if appropriate, see Clause 7.4.

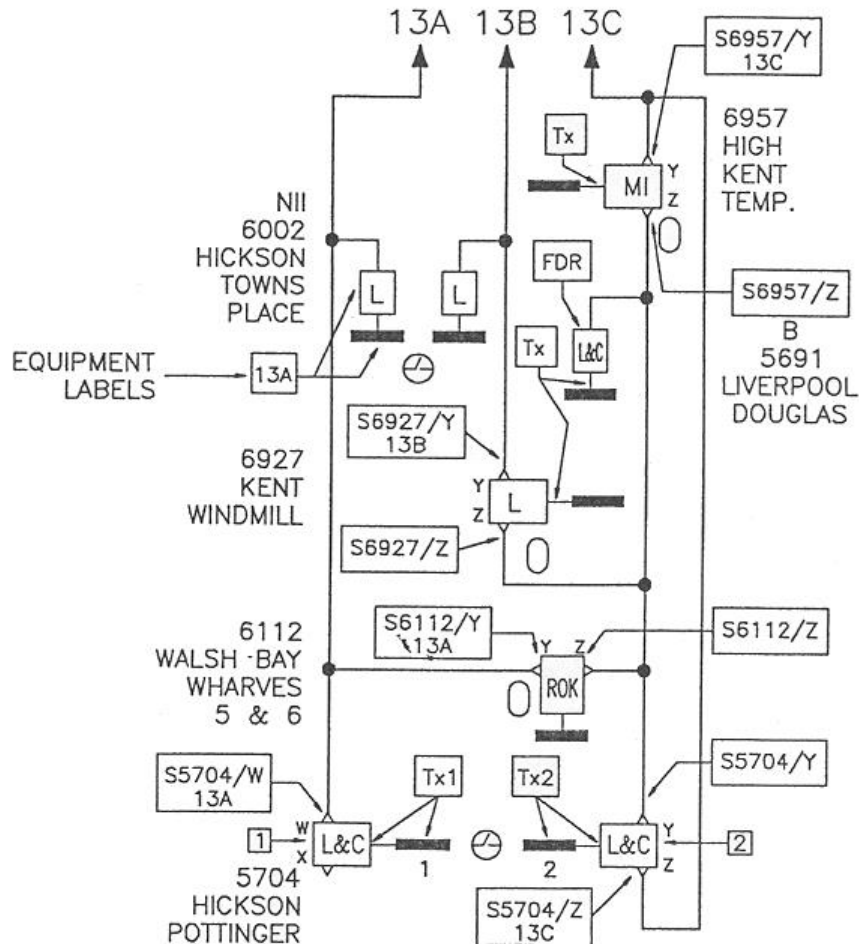


Figure 35

7.5.3 Sydney city CBD low voltage switchboards

In addition to the usual name label on each distributor panel or busbar supply, a fire resistant number must be used adjacent to the name label. For the fully enclosed arrangement, the distributor panels must be numbered from the left hand end of the LV switchboard, odd numbers on the top panels and even numbers on the lower panels. There is a new open type switchboard arrangement, with network distributors arranged in groups of four, which can be isolated from the busbar by links. Distributors are numbered sequentially, left to right in groups of four. A special symbol is used on system diagrams to identify this arrangement. Busbar supplies are to be numbered 13 or 14 depending whether the supply is from the left or right hand end of the board respectively.

In the substation entrance in which the telephone is located, a further set of labels must be arranged in a frame fixed to the wall. The set of labels must show the names and numbers of all distributors and busbar supplies and the identification of all network protectors in the substation arranged according to their position in the low voltage switchboard.

The number allocated to each distributor and busbar supply must be shown on the system diagrams of the Sydney City CBD LV Network.

The method of labelling LV distributors supplying the general network in the Sydney City CBD shall be such that labels will generally include, in order:

1. the name of the street
2. the side of the street
3. the direction the distributor runs away from the substation.

The selection of names for these distributors is to be the responsibility of the Manager – Network Security.

A distributor which operates as a radial to either a major customer or the general network shall be given a second label carrying the word 'radial'.

A distributor which connects to another substation will carry a second label at the first substation, which will have inscribed on it the word 'to' followed by the panel number(s) on which the distributor terminates in the remote substation(s) and the number of the remote substation(s).

Such distributors may or may not have network load connected to them. The word 'interconnector' should not be used in conjunction with such distributors that supply no network load. It is not intended that the label contain all the information necessary for operating purposes, (See section on labelling principles.)

The Manager – Network Security is responsible for selecting names for busbar supplies in Sydney City CBD Substations. Busbar supplies must be labelled adjacent to the point of exit of the busbars from the substation. When there are two busbar supplies from one substation to the same customer they shall be named No. 1 and No. 2, except that, when there is more than one substation supplying the customer and there are more than two busbar supplies, the additional supplies should be named No. 3 and No. 4, etc. The name chosen for the supply must be building address supplied by the busbar. It will not be necessary to use the label 'Radial' in conjunction with busbar supplies. The label at the customer's end of each supply should preferably correspond to the label in the substation, eg 'No. 3 Supply'.

Special network services supplied from the substation auxiliary panel, eg Optus, are identified as 'Distributor 99' and are identified on the Sydney City CBD LV Network system diagram with a special symbol.

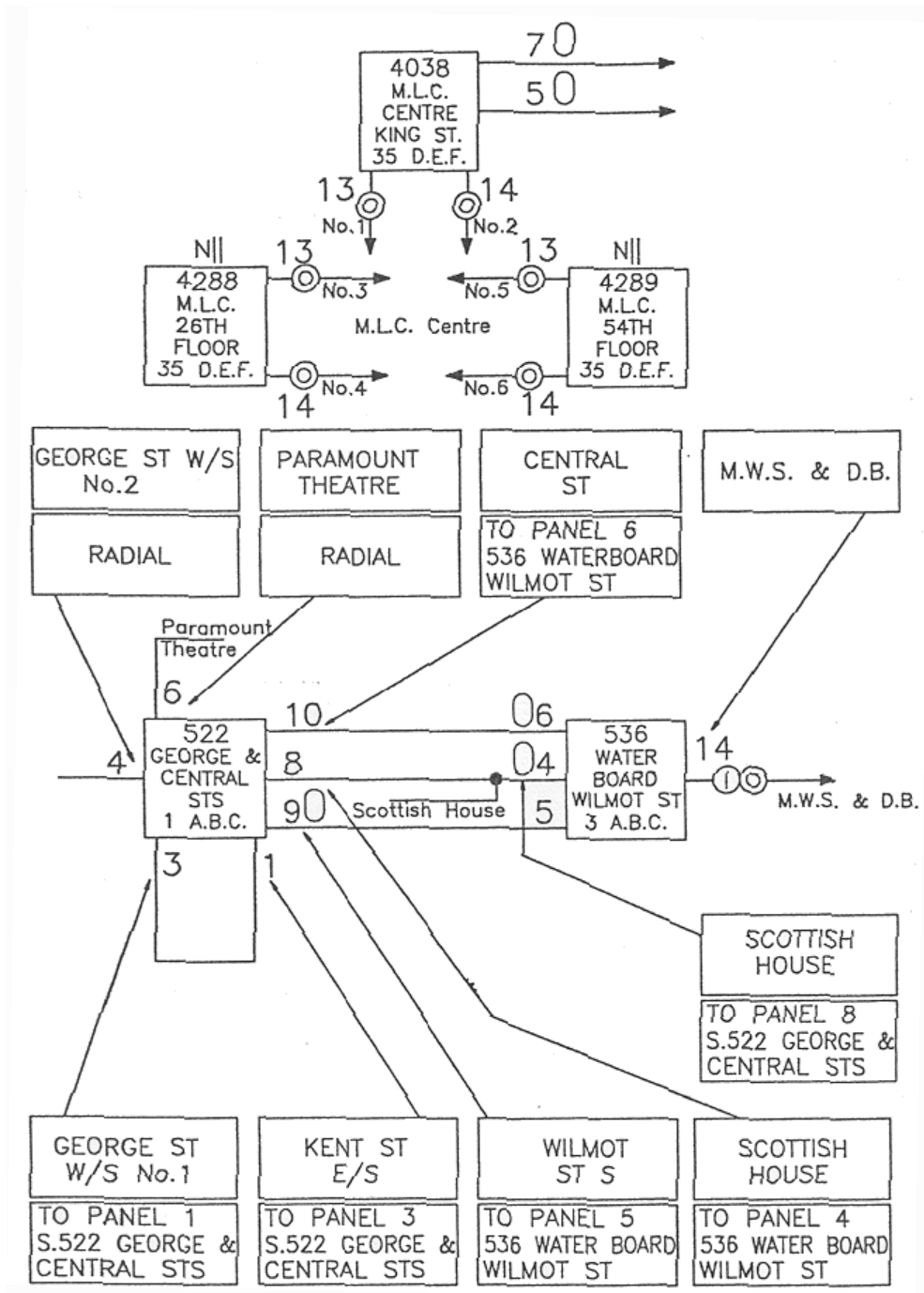


Figure 36

7.5.4 Sydney city distributors for SLCP's and 'smart' poles

The circuit arrangement for Sydney City Distributors for SLCP's and 'Smart' poles is shown in Figure 37. Distributor labelling information and requirements are included in the notes to Figure 37.

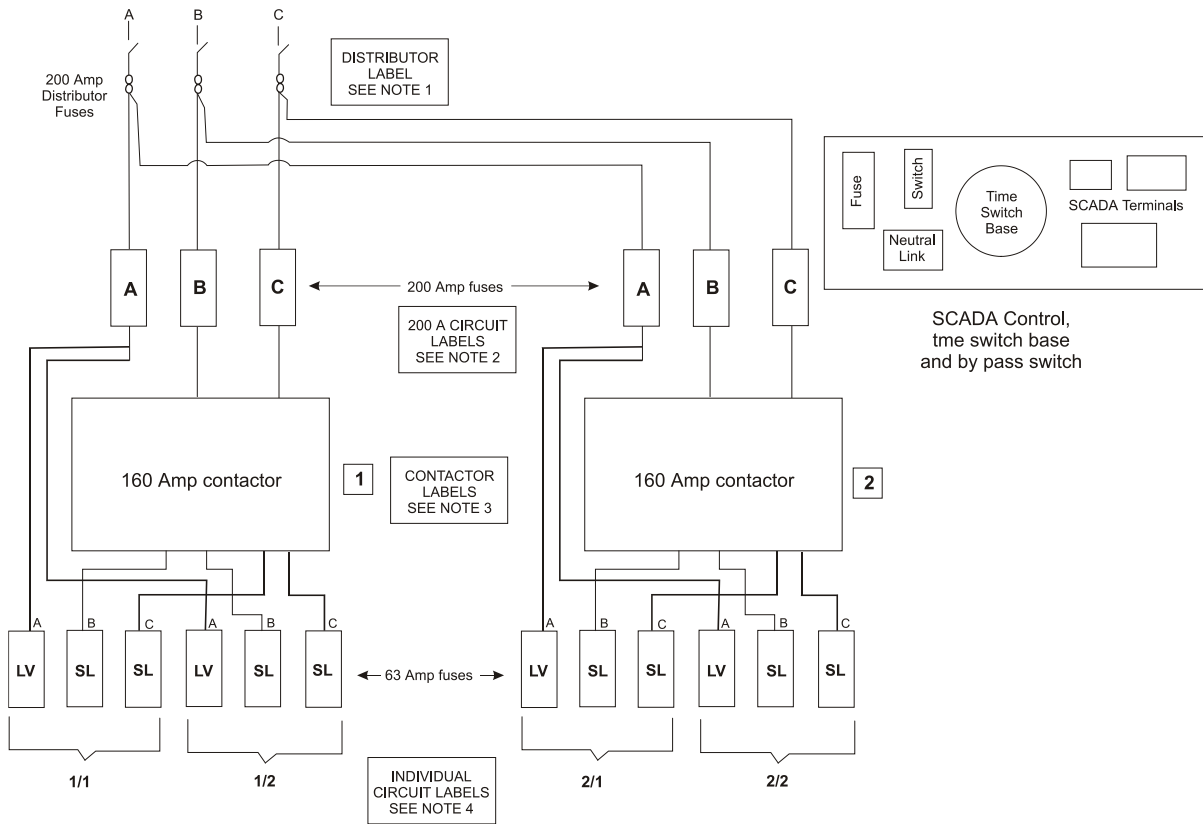
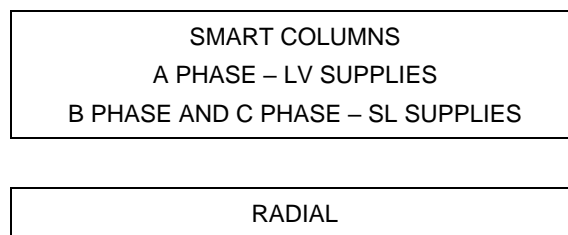
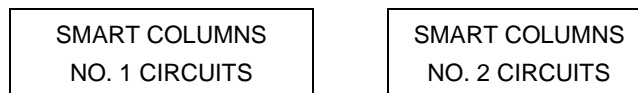


Figure 37

Note 1. Distributors are to be labelled as follows:

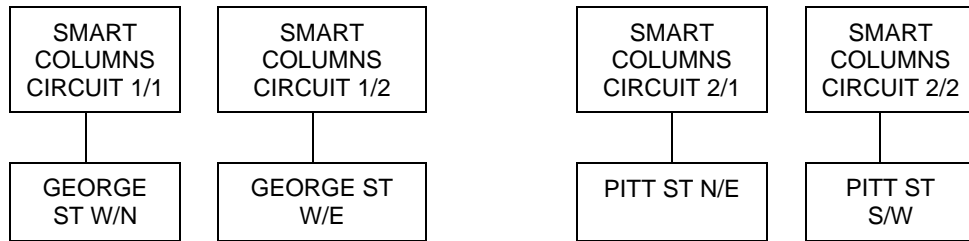


Note 2. The 200 Amp circuits are to be labelled as follows:



Note 3. The street lighting contactors are to be labelled no. 1 and no. 2.

Note 4. The individual circuits are to be labelled ‘smart columns circuit 1/1’ etc, followed by the street destination, as illustrated in the following example. The street destination designations are as indicated in Clause 7.5.3.



Note 5. Labelling materials are as indicated in Table 1 for distributors.

7.6 Interpact disconnectors (1500kVA K-type kiosks)

Some 1500kVA K-type kiosk substations are being fitted with Merlin Gerin (Schneider) “Interpact” low voltage switch disconnectors. A single line diagram representing this arrangement is shown in Figure 38a.

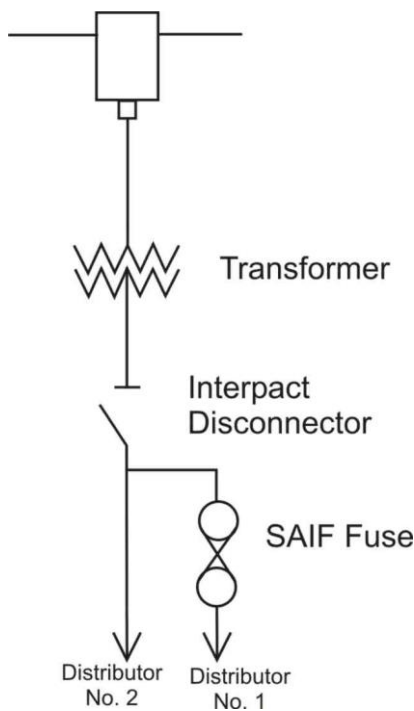


Figure 38a

Tx and Dist No. 1 Tee Dist No. 2

Figure 38b

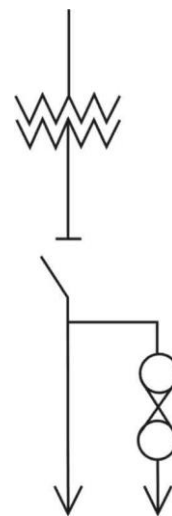


Figure 38c

Interpact disconnectors shall be clearly labelled with two labels: 1. The configuration identifier - Figure 38b and 2, the single line diagram - Figure 38c. Labels shall be sized in accordance with Table 1 and positioned as shown in Figure 39. Refer to Network Engineering Guideline NEG SD06 for further information on Interpact disconnectors.

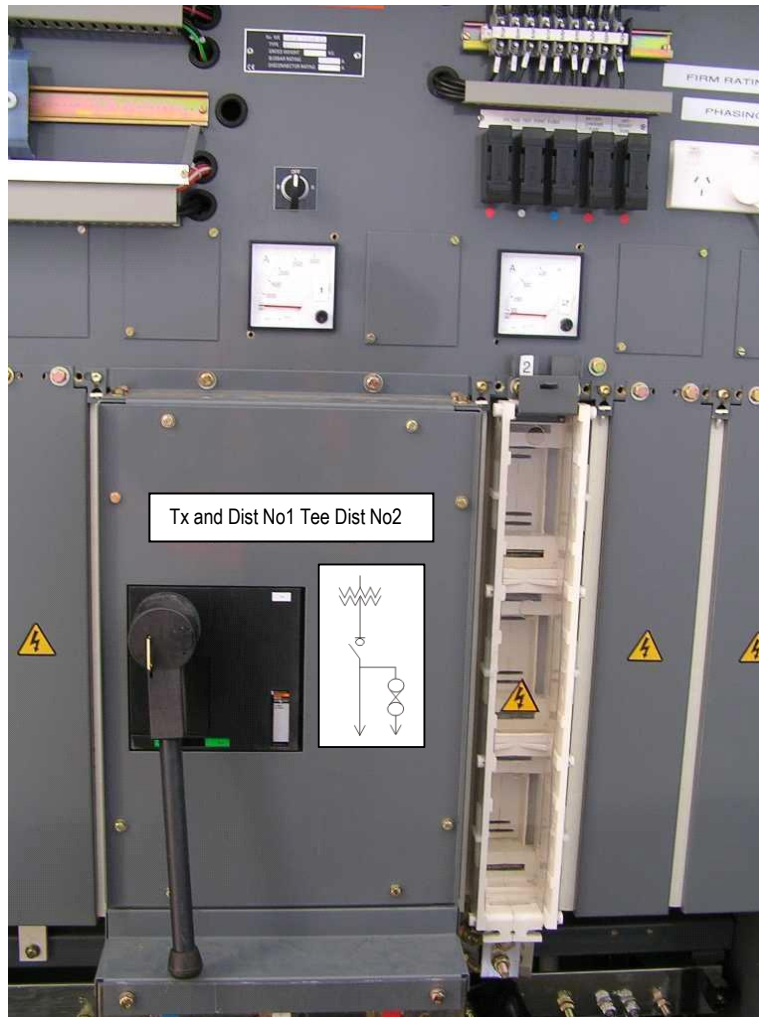


Figure 39

7.7 Distributors

(Other than in Clause 7.5)

Low voltage distributors must be distinguished by the use of an appropriate name and number attached to the distributor panel, except that at pole transformers with only one distributor, a number only may be sufficient. Existing single distributors controlled by 600 A fuses at substations or pole transformers and which supply load in more than one direction may have additional numerical labels affixed at the cross-arm level to distinguish each direction. Such a distributor shall be labelled '1' and each direction may be distinguished by labels '1 1', and '1 2', etc.

Where the rating of a fuse is not visible (i.e. LV switchgear is fully enclosed), a label indicating the actual fuse rating should be positioned underneath the corresponding distributor name.

For pole transformers with two or three circuits, constructed to NS122 (2001 edition), the conventions for distributor numbering are as follows;

- When standing at the pole and facing the rear of the transformer (i.e. standing in the operating position), each phase set of fuses is numbered 1, 2, etc, from left to right; for distributors 1, 2, etc.

- For a simple two distributor arrangement, the left hand fuse (distributor number 1) connects to the circuit in front of the transformer and the right hand fuse (distributor number 2) connects to the circuit at the rear of the transformer.
- If one of the distributors goes in both directions, the part of that distributor in front of the transformer should be distinguished by a suffix '1', and the part at the rear of the transformer should be distinguished by a suffix '2'. This is illustrated, for one phase only, in Figure 38.
- Refer also to Table 1 for further information on labelling arrangements.

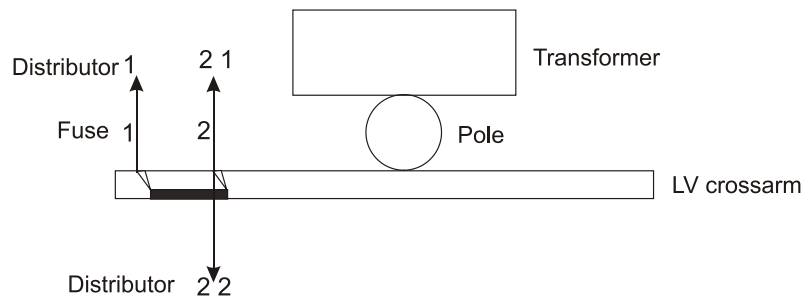


Figure 40

All numbers used must correspond to those on LV network plans, LV paralleling diagrams and iAMS load record information. The selection of names and numbers is the responsibility of the Manager – Network Security.

Where it is difficult to attach distributor names in a satisfactory manner to the distributor panels, eg because of the physical arrangement of fuses and space limitations on some kiosk boards, it is permissible to label distributor panels with a number only. Adjacent to the LV board, a panel will be erected showing distributor names with corresponding numbers.

In suburban areas the distributor name should generally describe the area fed by that distributor. To help positively identify network distributors at a distribution centre, any of the following particulars may be used (in the order (1), (2), (3) for underground distributors):

1. Name(s) of the street(s) or part of street(s) in which the major load is supplied.
2. The side of the street along which the distributor runs.
3. The direction of the distributor runs from the distribution centre.
4. Distinguishing numbers where two network distributors supply identical areas, eg 'Crown St. E/N No. 1' and 'Crown St. E/N No. 2', ie supplying Crown St with the cable on the eastern side and running in a northerly direction from the substation.
5. The location of the UGOH.

It will generally not be necessary to use more than two or three of the above items on a distributor label.

When a distributor supplies customers on both its underground and overhead portions, the word 'and' or symbol '&' must be used as follows, eg Botany Rd UG and OH, the usage of UGOH is not permitted.

The words 'tee', 'tee off', 'interconnected to', 'interconnected from', 'interconnector', 'normally open' or 'normally closed', must not appear on distributor labels. Although normally open distributors are referred to on system diagrams.

Mention of a remote distribution centre must be made on a distributor label when a distributor panel at one distribution centre is connected to another distribution centre by mains that do not contain normally open links, bonds or tees.

Distributor names should not include mention of multiple UGOH's.

A customer's name should be included in the distributor name only where it is a direct distributor to that customer or where a cable direct to that customer is double banked to a distributor panel.

In all cases where cables are double banked to a distributor panel this must be indicated in the name by nominating the destination of both cables, eg 'Smith St. South and 24 Smith St.'

Labels such as 'Home Units', 'No. 1 Service', 'Office Building' must not be used. An address, building name or customer's name etc. must be given on the label.

For direct and specified customers connected to a paralleling distributor, the distributor name must include mention of the paralleling path, eg 'Goodsell Building and LV//'.

Substation LV busbars are themselves not to be labelled.

Busbar supplies are to be labelled adjacent to the point of exit of the busbars from the substation. The label at the customer's end of each supply should preferably correspond to the label in the substation.

Mention of Street Lighting Points are to be deleted from distributor panels except when the SLCP is the only service supplied by the distributor or when the SLCP is double banked to a distributor panel.

Special network services supplied from the substation auxiliary panel, eg Optus, are identified as 'Distributor 99'.

Zone substation auxiliary and standby supplies should be labelled as shown in the following examples:

- Sub 2400 Auxiliary Supply' - for the normal supply
- Sub 2400 Standby Supply' - for the standby supply.

Low voltage underground to overhead connections must not be labelled.

Some examples of distributor labelling are:

- For a substation with three distributors, all three UGOH's in the one street:
 - (1) Colin St. Central
 - (2) Colin St. North
 - (3) Colin St. South
- For a substation with four distributors, all four UGOH's in the one street:
 - (1) MacDonald St. near North
 - (2) MacDonald St. far North
 - (3) MacDonald St. near South
 - (4) MacDonald St. far South
- For a pole transformer with two distributors:
 - (1) Trevanion St. North
 - (2) Rodd Rd and Trevanion St. South
- For a direct distributor:
 - (1) No. 27 Collingwood St.
(Do not use Collingwood St. No. 27)
 - (2) El Cortez Units
 - (3) Gadsden-Hughes
 - (4) Connelleys General Supply
 - (5) Connelleys Welder Supply
 - (6) Water Board SPS. No. 15
- For a substation with a mixture of OH and UG consumers:

- (a) (1) Cecil St.
- (2) Webbs Ave. OH and Chandos St. UG.
- (3) Chandos St.
- (b) (1) Elizabeth St. E.
- (2) Orpington St. OH and Elizabeth St. S/E UG.
- (3) Orchard Cres.
- (4) Elizabeth St. W.
- For a substation with all underground supplies:
 - (1) Belmore St. W/N UG.
 - (2) Belmore St. E/N and Belmore St W/S UG.
 - (3) Belmore St. E/S UG.
- For a substation with double banked cables:
 - Orpington St. S and El Cortez Units.
- For a distributor that supplies only a SLCP:
 - SLCP NO. 33
- For a distributor connecting two substations (say Sub. 1234 and Sub. 2639, normally open at Sub. 2639):
 - At Sub. 2639: Burt St. and Sub. 1234
 - At Sub. 1234: Burt St and Sub. 2639

Note: Abbreviations N, S, E and W for North, South, East and West are allowable to help reduce label size.

The letters UG are to be used even though all distributors are underground.

7.8 Network labelling (remote from distribution centres)

High voltage control points, such as air break switches, underslung links, reclosers, sectionalisers and line fuses (including tri-fuses and bi-fuses), and low voltage underslung links must be labelled in accordance with this Network Standard and other relevant network standards.

Where aerial bundled cable (ABC) is installed on the low voltage network, identical link boxes are used for low voltage paralleling points, IDTs, and for LV UGOH isolation points. The following labelling methods will apply:

- (a) Low voltage paralleling points shall be identified with a unique number:
 - where the paralleling point is cross zone, the letter 'Z' will follow the number;
 - where the paralleling point is across power sources, the letter 'X' will follow the number.
- (b) At LV UGOH isolation points the link box will be identified only by the letter 'U', representing UGOH. Should more than one UGOH be present on a single pole, the link box shall be labelled with the letter U plus the corresponding distributor number eg. "U1" for distributor 1 UGOH, "U2" for distributor 2 UGOH, etc.
- (c) Link boxes for IDTs shall be labelled as "IDT". Should more than one IDT be present on a single pole, each link box shall be labelled IDT plus the corresponding interconnected distributor numbers, eg. "IDT1-2" for IDT between distributors 1 and 2; "IDT2-3" for IDT between distributors 2 and 3, etc.

Note: Some LV network IDTs are actually paralleling tees between substations and therefore upon conversion to ABC, link boxes replacing the tees shall be considered paralleling points and labelled as per Clause (a) above.

- (d) Where any LV work takes place on a pole fitted with ABC link boxes then the labelling of these must be upgraded to this labelling standard

In both cases, two sets of labels must be applied, one on the lid of the link box and the other on the base facing the road.

The labelling colour shall be black on yellow, except for the 'X' which shall be red on silver. Numbers and letters must be 17mm x 32mm in size (nominal) and be reflective.

7.8.1 Reconciliation of obsolete numbers applied to equipment with new numbers in the geographic information system

Some numbering systems used previously for recording of items of equipment, such as high voltage control points (air break switches, underslung links and line fuses) and low voltage underslung links, were not totally compatible with requirements for numbering of these items in the Geographic Information System (GIS); either because the numbers used previously were not unique across Ausgrid or were not in GIS acceptable format. Annexure B provides information to assist in reconciling numbers previously used, compared with the numbers used in the GIS.

Where it is necessary to record the reference numbers of items of equipment on instructions for switching, such as disconnection and reconnection orders, both the old number and the new number should be indicated to avoid confusion. For example, in the Dee Why district, for low voltage links numbered B830 on the equipment and 31830 in the GIS system; the low voltage link number field in the Disconnection and Reconnection Ordering System (DAROS) should show 31830 and the "Remarks" field should indicate that the corresponding number on the equipment is B830.

7.9 Firm/non-firm rating labels

Distribution multi transformer substations shall display either a label with the assigned Firm or if applicable the Non-Firm Rating of the substation as well as the Normal and Emergency Throughput Rating of each transformer. For multi transformer substations the label shall be fixed adjacent to the MDI (where applicable).

Refer to Figure 41 for examples of either suitable label design.

For kiosks the words "Firm Rating – xxxxA" (include actual rating) is to be included as part of the overall LV distributor name legend and phasing label fitted on the inside surface of the right hand kiosk door at the LV end.

Labels shall be laminated adhesive backed tape on white PVC sheet of minimum thickness 1.5mm. Size must be suitable for the equipment and position of the label. Minimum letter height is 12mm.

Examples of Multi-Transformer Substation Firm and Non-Firm Rating Labels

<p>Substation 98765 Clark Kent</p> <p>Issued 13 Aug. 08</p> <p>Substation Rating 2000 A Firm</p> <p>Limit HV Fuse</p> <hr/> <p>Tx No. 1 Throughput Rating</p> <p>Normal 1000 A</p> <p>Emergency 2000A</p> <p>Limit HV Fuse</p> <hr/> <p>Tx No. 2 Throughput Rating</p> <p>Normal 1000 A</p> <p>Emergency 2000 A</p> <p>Limit HV Fuse</p>	<p>Substation 98765 Clark Kent</p> <p>Issued 13 Aug. 08</p> <p>Substation Rating 2880 A Non-Firm</p> <p>Limit Transformer</p> <hr/> <p>Tx No. 1 Throughput Rating</p> <p>Normal 1440 A</p> <p>Emergency 1440 A</p> <p>Limit Transformer</p> <hr/> <p>Tx No. 2 Throughput Rating</p> <p>Normal 1440 A</p> <p>Emergency 1440 A</p> <p>Limit Transformer</p>
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Figure 41

8.0 RECORDKEEPING

The table below identifies the types of records relating to the process, their storage location and retention period.

Table 2 – Recordkeeping

Type of Record	Storage Location	Retention Period*
Approved copy of the network standard	BMS Network sub process Standard – Company	Unlimited
Draft Copies of the network standard during amendment/creation	TRIM Work Folder for Network Standards (Trim ref. 2014/21250/151)	Unlimited
Working documents (emails, memos, impact assessment reports, etc.)	TRIM Work Folder for Network Standards (Trim ref. 2014/21250/151)	Unlimited

* The following retention periods are subject to change eg if the records are required for legal matters or legislative changes. Before disposal, retention periods should be checked and authorised by the Records Manager.

9.0 AUTHORITIES AND RESPONSIBILITIES

For this network standard the authorities and responsibilities of Ausgrid employees and managers in relation to content, management and document control of this network standard can be obtained from the Company Procedure (Network) – Production/Review of Network Standards. The responsibilities of persons for the design or construction work detailed in this network standard are identified throughout this standard in the context of the requirements to which they apply. responsibilities allocated to employees (by job/position title) within the process specified under Actions.

10.0 DOCUMENT CONTROL

Content Coordinator : Electrical Safety Manager

Distribution Coordinator : Engineering Information and Services Manager

Annexure A – System Diagram Symbols

System diagram symbols used in section 8 can be found at on Ausgrid's intranet site, Balin by navigating as shown below:

Balin > System Diagrams – Sydney/Hunter > Symbols Used on Diagrams

Annexure B – Geographic Information System Equipment Numbering

This Annexure provides information to assist in reconciling equipment numbers previously used compared with the corresponding numbers used in the GIS.

(a) Dee Why District low voltage underslung links:

Dee Why Number Prefix	GIS Number Prefix	Dee Why Number Prefix	GIS Number Prefix	Dee Why Number Prefix	GIS Number Prefix
A	30	H	37	R	47
B	31	J	39	T	49
C	32	K	40	U	50
D	33	M	42	V	51
E	34	N	43	W	52
F	35	P	45	X	53
G	36	Q	46		

Note: I, L, O, S, Y, Z and the corresponding numbers 38, 41, 44, 48, 54, and 55 were not used.

Example: The physical label A123 was converted to read 30123 in the GIS.