

## Network Standard

### NETWORK

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NW000-S0044

NS100 FIELD RECORDING OF NETWORK ASSETS



## ISSUE

For issue to all Ausgrid and Accredited Service Providers' staff involved in the field recording of network assets, 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](http://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Where this standard is issued as a controlled document replacing an earlier edition, remove and destroy the superseded document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 2017 (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.

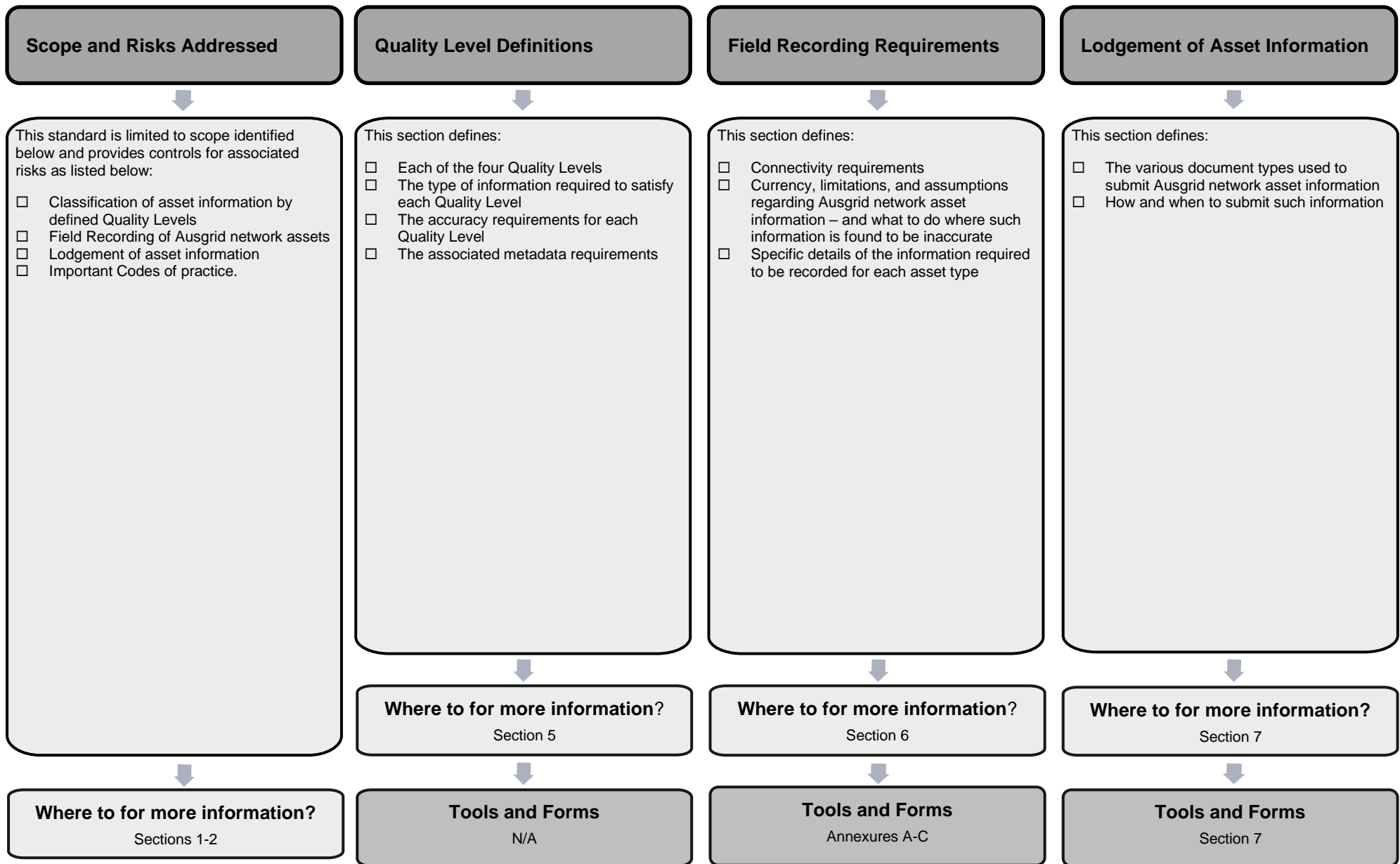
## KEYPOINTS

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 NS100 Field Recording of Network Assets

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## 1.0 PURPOSE

This Network Standard sets out the requirements of recording as-built asset information for Ausgrid's transmission and distribution networks, and third-party fibre assets interacting with company assets. The objective of field recording is to provide an accurate record of the position, type and quantity of Ausgrid's assets, to enable those assets to be quickly identified and located at a later date. In addition, this information is used to maintain Ausgrid's Geographic Information System (GIS).

## 2.0 SCOPE

Ausgrid's employees, Accredited Service Providers (ASPs) and contractors to Ausgrid must comply with the requirements of this Network Standard NS100 when field recording as-built asset information for Ausgrid's transmission and distribution networks, and third-party fibre assets interacting with company assets. Asset information should be recorded whenever an asset is installed, changed, or removed.

Field recording information may be presented in a number of ways, such as:

- Field Book Pages detailing work as constructed
- Data Incident Resolution documentation
- Data Correction documentation
- Notification of Service Works (NOSW)

This standard, Network Standard NS100, includes the requirements of all documents referenced in the Standard.

## 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](http://www.ausgrid.com.au).

### 3.2 Ausgrid documents

- Bushfire Risk Management Plan
- Company Form (Governance) - Network Technical Document Endorsement and Approval
- Company Procedure (Network) - Field Recording of Network Assets
- Company Procedure (Network) - Field Recording of Network Assets Authorisation
- Company Procedure (Governance) - Network Technical Document Endorsement and Approval
- Company Procedure (Network) – Network Standards Compliance
- Company Procedure (Network) - Production / Review of Engineering Technical Documents within BMS
- Customer Installation Safety Plan
- Division Workplace Instruction (Network) – Production /review of Network Standards
- Electrical Safety Rules
- Electricity Network Safety Management System Manual
- ES4 Service Provider Authorisation
- NS104 Specification for Electrical Network Project Design Plans
- NS130 Specification for Laying of Underground Cables Up to and including 11kV
- NS156 Working Near or Around Underground Cables
- NS161 Specification for Testing of Underground Cables

- NS168 Specification for the Design and Construction of 33kV, 66kV and 132kV Underground Cables
- NS172 Design Requirements for Cable Jointing Pits and Vaults
- NS181 Approval of Materials and Equipment and Network Standard Variations
- NS203 Telecommunications Network: Master Policy Document
- NS204 Communication Pits – Specification & Installation
- NS205 Telecommunications Route Markers
- NS212 Integrated Support Requirements for Ausgrid Network Assets
- NS234 Telecommunications Underground Physical Plant Installation
- NS241 Working Near or Around Ausgrid Telecommunication Cables
- NS242 Recording of Telecommunications Physical Network Assets
- NW000-T0005 Field Recording Guide
- Public Electrical Safety Awareness Plan
- Public Lighting Management Plan
- Tree Safety Management Plan

### **3.3 Other standards and documents**

- AS1742.3 Manual of uniform traffic control devices: Traffic control for works on roads
- AS/NZS 2053.2 Conduits and fittings for electrical installations: Rigid plain conduits and fittings of insulating material
- AS/NZS 4130 Polyethylene (PE) pipes for pressure applications
- AS 4799 Installation of underground utility services and pipelines within railway boundaries
- AS 5488-2013 Subsurface Utilities Information
- ENA Doc 001-2008 National Electricity Network Safety Code
- Master Access Deed for Railway Crossings 2002
- Streets Opening Conference publication Guide to Codes and Practices for Streets Opening, 2009
- WorkCover Guide, Work Near Underground Assets, 2007
- WorkCover Code of Practice, Work Near Overhead Power Lines, 2006
- WorkCover Code of Practice, Tunnels Under Construction, 2006

### **3.4 Acts and regulations**

- Electricity Supply (General) Regulation 2014 (NSW)
- Electricity Supply (Safety and Network Management) Regulation 2014
- National Energy Customer Framework (NECF) 2013
- Work Health and Safety Act 2011 and Regulation 2017

## 4.0 DEFINITIONS

### 4.1 General

<b>Accredited Service Provider (ASP)</b>	An individual or entity accredited by the NSW Department of Planning and Environment, Energy, Water and Portfolio Strategy Division, in accordance with the Electricity Supply (Safety and Network Management) Regulation 2014 (NSW).
<b>As-Built</b>	Drawing made during construction to record the actual size, location and nature of assets.
<b>Business Management System (BMS)</b>	An Ausgrid internal integrated policy and procedure framework that contains the approved version of documents.
<b>Conduit</b>	Duct and conduit are interchangeable terms to describe a tube or pipe through which electrical or communications cables may be installed.
<b>Contestable Work</b>	Contestable Work is work such as the design, construction and installation of electricity works, which are required to connect a customer's installation to an electricity network. Customers are required to fund the cost of contestable work and they have the choice of selecting the ASP to carry out the work. The legislation relevant to contestable work is the Electricity Supply (Safety and Network Management) Regulation 2014 (NSW).
<b>Document control</b>	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.
<b>Duct</b>	Duct and conduit are interchangeable terms to describe a tube through which electrical or communications cables may be installed.
<b>GIS</b>	Geographical Information System (GIS) is the database of records for spatial and connectivity data related to Ausgrid's network.
<b>Global Positioning System (GPS)</b>	A system incorporating a network of orbital satellites to calculate the position of a receiving unit near Earth's surface.
<b>National Electricity Customer Framework (NECF)</b>	The National Energy Customer Framework is an initiative to introduce a consistent national framework for providing electricity and gas services to retail customers.
<b>Network Standard</b>	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.
<b>Notification of Service Work (NOSW)</b>	The form used by Level 2 ASPs to inform Ausgrid whenever contestable work is carried out.
<b>Review date</b>	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.



## 4.2 GIS abbreviations (in use)

<b>AC</b>	Asbestos Cement
<b>ADSS</b>	All Dielectric Self Supporting – aerial optical fibre cable
<b>AHD (or AHD71)</b>	Australian Height Datum 1971
<b>AE</b>	Arc end
<b>AM</b>	Arc mid-point
<b>AS</b>	Arc start
<b>BDY</b>	Boundary line
<b>BFNR</b>	Back filled not recorded
<b>BFWR</b>	Back filled when recorded
<b>BL</b>	Building line
<b>BLDG</b>	Building
<b>BOK</b>	Back of kerb
<b>BORE</b>	Under bore
<b>CIP</b>	Cast iron pipe
<b>CL</b>	Centreline
<b>COMS</b>	Communication cables
<b>COV</b>	Cover depth
<b>CNR</b>	Corner
<b>CR</b>	Cable repair
<b>DCC</b>	Duct configuration change
<b>DIST</b>	Distributor
<b>DNE</b>	Does Not Exist
<b>EOC</b>	End of cable (cut cable not sealed)
<b>EOP</b>	End of pipe
<b>EP</b>	Existing pole
<b>ESMT</b>	Easement
<b>EWP or EW</b>	Earthenware pipe
<b>FB or FBK</b>	Field book (generally referring to a specific page)
<b>FC</b>	Fibre cement
<b>FireB</b>	Fire Blanket
<b>FL</b>	Fence line
<b>FLR</b>	Floor
<b>FOK</b>	Face of kerb

<b>FP</b>	Footpath
<b>GM</b>	Gas mains
<b>GND</b>	Ground
<b>GP or GI</b>	Galvanised iron pipe
<b>GS</b>	Galvanised steel
<b>HV</b>	High voltage
<b>JB</b>	Joint bay
<b>KL</b>	Kerb line
<b>LIP or SLIP</b>	Lead in pole
<b>LV</b>	Low voltage
<b>MGA (or MGA20)</b>	Map Grid of Australia 2020
<b>MH</b>	Manhole
<b>N/A</b>	Not applicable
<b>NC</b>	No cover
<b>N/O</b>	Normally open
<b>NR</b>	No record, not recorded
<b>OOG</b>	Out of ground
<b>OOS</b>	Out of service
<b>OPGW</b>	Optical Pilot Ground Wire – aerial earth wire wound around a stainless steel central tube which encases optical fibre cores
<b>PBJ</b>	Parallel branch joint (tee joint)
<b>PE</b>	Pot end
<b>PE</b>	Polyethylene ducts (often used in bores)
<b>PIT</b>	Access pit
<b>PL</b>	Property line
<b>PM</b>	Permanent mark
<b>POA</b>	Point of attachment
<b>PVC</b>	Polyvinyl chloride (conduits or covering)
<b>RailCorp</b>	Rail Corporation New South Wales
<b>RC</b>	Reinforced concrete
<b>RCP</b>	Reinforced concrete pipe
<b>REF</b>	Reference
<b>REO</b>	Reinstatement
<b>RM</b>	Reference mark (surveying)
<b>RMS</b>	Roads and Maritime Services
<b>RoW</b>	Right of way

<b>SE</b>	Sealed end
<b>SEW</b>	Sewer
<b>SL</b>	Streetlight
<b>SSM</b>	State survey mark
<b>STJ</b>	Straight through joint
<b>SUB</b>	Substation
<b>SWD</b>	Stormwater drain
<b>SWP</b>	Stormwater pit
<b>TBS</b>	Temporary building service
<b>TEL</b>	Telecommunications
<b>TR</b>	Transmission
<b>TRI</b>	Cable trifurcation point
<b>TSB</b>	Thermally stable bedding
<b>TX</b>	Transformer
<b>UG</b>	Underground
<b>UGOH</b>	Underground to overhead connection
<b>UGOP</b>	Underground to optic fibre overhead
<b>UMG</b>	Unmade ground
<b>WM</b>	Water main

### 4.3 Historical abbreviations (no longer in use)

<b>BWK</b>	Brickwork
<b>DH&amp;W</b>	Drill hole & wing
<b>DMR</b>	Department of Main Roads (see RMS)
<b>OC</b>	Optus cable
<b>RSA</b>	Rail Services Australia (see SRA)
<b>RTA</b>	Roads and Traffic Authority (see RMS)
<b>SRA</b>	State Rail Authority (See RailCorp)
<b>TJ</b>	Tee joint (see PBJ)
<b>VCP</b>	Vitrified clay pipe

## 5.0 QUALITY LEVELS

### 5.1 General

In order to ensure the quality of information stored in Ausgrid's Geographical Information Systems and Asset Management Systems, information gathered and submitted to Ausgrid's Data Maintenance section should meet defined Quality Levels.

The following Quality Levels are based on those detailed in Australian Standard AS 5488-2013.

### 5.2 Quality level A

Quality level A (QL-A) is the highest quality level. Assets must be exposed and visible at time of recording and must be measured to an absolute spatial position in three dimensions in terms of MGA2020 and AHD71.

Where relevant, asset information must include the following:

- Type of asset
- Asset number/label
- Status
- Material
- Size
- Configuration
- Date of installation / commissioning
- Supporting photographs

Positional accuracy requirements for both underground and surface assets shall be  $\pm 0.05\text{m}$  horizontally and vertically.

**Note:** Where surface cover/level is not established, field recording Quality Level A is mandatory.

#### Metadata

Submitted information that includes QL-A data must specify the survey and locating methods used, as well as the survey control information. Where GPS has been utilised, a copy of the GPS data file must also be included.

### 5.3 Quality level B

Quality level B (QL-B) is the normal quality level required for recording assets. Assets must be exposed and visible at time of recording and are measured relative to the property line and local ground level. Where no property line is available, measurements may be taken from local surface features, such as fences and buildings (providing the feature is geo-referenced).

QL-B may incorporate absolute spatial measurements with a positional accuracy between  $\pm 0.05\text{m}$  and  $\pm 0.1\text{m}$

Where relevant, asset information must include the following:

- Type of asset
- Asset number/label
- Status
- Material
- Size
- Configuration
- Date of installation / commissioning
- Supporting photographs

Positional accuracy requirements for both underground and surface assets shall be  $\pm 0.1\text{m}$  horizontally and vertically.

### **Metadata**

Submitted information that includes QL-B data must specify if GPS or Radio Frequency Tracing methods were used. A copy of any relevant GPS data file or bore log must also be included.

If QL-B information is compiled using electronic detection, it is only an indication of the existence of subsurface utilities and should not validate subsurface location or attributes.

Electronic detection should not be used for obtaining accurate depth information due to the potential for interference from other adjacent services or due to geological conditions.

## **5.4 Quality level C**

Quality level C (QL-C) describes the approximation of asset details based on a combination of existing records, anecdotal evidence, and spatial correlation to features visible at the site.

Approximate asset location is measured relative to local surface features, most commonly property lines and local ground level.

Where relevant and ascertainable, asset information must include the following:

- Type of asset
- Asset number/label
- Status
- Material
- Size
- Configuration
- Date of installation / commissioning
- Supporting photographs

Positional accuracy requirements for both underground and surface assets shall be  $\pm 0.3\text{m}$  horizontally and vertically.

## **5.5 Quality level D**

Quality level D (QL-D) is the lowest quality level and should only be used where no better information is available. Quality level D information may be derived from certified design drawings, existing records, anecdotal evidence, or site inspection.

Where relevant and ascertainable, asset information should include the following:

- Type of asset
- Asset number/label
- Status
- Material
- Size
- Configuration
- Date of installation / commissioning
- Supporting photographs

Accuracy requirements are not relevant to QL-D information.

## 6.0 RECORDING REQUIREMENTS

### 6.1 General

Spatial information regarding Ausgrid's transmission and distribution assets shall be recorded according to the table in Clause 6.7. Recordings that include relative measurements must include a North point indicator and relevant cadastral identifiers (eg street names, lot numbers).

In order to ensure the smooth operation of Ausgrid's electrical network and to meet state and federal regulatory obligations, including (but not limited to) the National Energy Customer Framework (NECF), details regarding the electrical supply and connectivity must be identified and recorded for commissioned conductors and other electrical components as described in Clause 6.2.

Where third party fibre assets that interact with company assets, such as a communications provider's private fibre cable running through company conduits or pits must be recorded. The recording should indicate the ownership of each asset for clarification and follow the standards listed within *NS100 Field Recording of Network Assets*.

Third party assets that do *not* interact with company assets do not need to be recorded but may be referenced on field recordings if their location improves locating company assets and/or is a safety risk if not documented.

### 6.2 Electrical connectivity

Information detailing the electrical supply and connectivity arrangement must be recorded for any conductors and electrical components where relevant during installation, commissioning, alteration or decommissioning.

Electrical supply information should specify the feeder, distributor, circuit, pilot, fibre, or any other identifier as relevant to the voltage or asset class. Where appropriate, any diagrams should indicate the next upstream and/or downstream point of isolation or electrical control.

### 6.3 Currency of information

The Quality Level and accuracy of recorded information is determined at the time of recording. Natural or man-made changes may, over time, affect underground assets or the area around them, causing variations to the position of assets. Assets located by means of relative measurements are more susceptible to this effect due to changes in local ground level or property lines.

Any recordings of Ausgrid assets represent the best information available at the time of recording.

### 6.4 Limitations and assumptions

Information gathered should meet the Minimum Quality Level specified in Clause 6.7. Where this is not possible, information may be submitted at a lowered Quality Level, subject to preapproval from the relevant Ausgrid recipient. Assets with reduced Quality Level must be indicated on the submitted documents.

The recorded Quality Level of each asset is assumed to be equal to the Minimum Quality Level set out in the table, unless specified on the submitted document.

It is common for linear assets, such as ducts and cables, to be installed over a period of time. As such, some parts of these assets will have been re-buried or otherwise unsighted at the time of recording.

For this reason, the specified Quality Level should only be applied at the position measured and dimensioned. Sections between recorded measurements should be considered to be one Quality Level lower than the Quality Level of surrounding measurements.

## 6.5 Photographs

### 6.5.1 General

All recordings of as-built asset information must be accompanied by supporting photographs.

Photos are useful for relocating work and verifying that details such as property lines have not changed. Photos can assist with solving ambiguity and can show many details that are not necessarily recorded on submitted drawings.

### 6.5.2 Requirements for photographs

Photographs must be of sufficient visual quality that relevant features are clearly visible. It may be necessary to use flash photography at night or in dark areas. Care must also be taken to ensure photographs are well focused and at an appropriate zoom level.

### 6.5.3 Subjects to photograph

One or more photos must show an overview of the work area to show each detail area in relation to the job as a whole, and to show the work area in relation to surrounding landmarks, such as property lines.

In addition to providing an overview, photographs must be used to show particular details.

Relevant detail areas include (but are not limited to):

- Duct and cable configurations;
- Cable joint or cable lay in relation to surrounding cables or assets;
- Pit walls, showing banks of ducts and the paths of cables (to the extent possible);
- Pillar and link box internal configurations;
- Origin point used in dimensions;
- Extended property lines used to establish an origin;
- Where major assets cross over or near Ausgrid assets;
- Other assets with relevance to the work being done;
- Cable internal (cut end showing cable composition);
- Cable drum or cable type details;
- Asset numbers for relevant assets; and
- Substations internal configurations (HV and LV Switchgear connections and types, and Transformer details). In particular include:
  - > Substation overview (including number);
  - > HV switchgear overview;
  - > HV switchgear nameplate;
  - > Transformer details;
  - > Transformer serial number;
  - > Transformer nameplate;
  - > Painted transformer T number;
  - > Transformer tap changer handle;
  - > LV switchgear overview;
  - > LV switchgear nameplate;
  - > LV distribution management and control; and
  - > LV switchgear detail.

## 6.6 Data corrections

Where existing Ausgrid GIS data is found to be erroneous, a Data Correction (see *Annexure D*) should be raised and submitted to Ausgrid via email to [gis@ausgrid.com.au](mailto:gis@ausgrid.com.au) with relevant topic and suburb in the subject line.

During or soon as practicable after an emergency event, a Data Correction also must be submitted to the GIS inbox ([gis@ausgrid.com.au](mailto:gis@ausgrid.com.au)) to ensure currency of GIS data.

## 6.7 Asset recording requirements

The following table sets out which part of the geometry of an asset should be used for measurements, the frequency with which such measurements should be recorded, and provides an indication of how the various Quality Levels are achieved based on the quality of recorded information.

**Table 1 - Asset recording requirements** - In each case, the required minimum Quality Level is marked by an asterisk (\*).

Asset Type	Measurement Requirement	When to Record	Quality Level	Example of information required to achieve Quality Level
Duct				
Horizontal	Centreline of ducts	Start and end of ducts, and every 20m continuous interval. Start/end, midpoint and PL crossing of every bend. At a deviation from alignment or vertical depth greater than 0.1m	A	Absolute spatial measurement of exposed asset using survey-grade equipment such as theodolite or corrected GPS (±0.05m)
			B*	Exposed asset measured relative to PL / GL using trade level equipment such as measuring wheel, tape measure, and/or laser distance meter (±0.1m)
Vertical	Topmost duct		C	Location of asset estimated in relation to visible surface feature, such as pole, pit, pillar, link box, etc
			D	No visible indication of location. Asset location estimated using design plans, historical documents, anecdotal accounts, etc.
Underbore duct				
Horizontal	Centreline of ducts	At start and end of underbore	A	Absolute spatial measurement of exposed asset using survey-grade equipment such as theodolite or corrected GPS (±0.05m)
			B*	Exposed asset measured relative to PL / GL using trade level equipment such as measuring wheel, tape measure, and/or laser distance meter (±0.1m)
Vertical (exposed)	Topmost duct		C	Location of asset estimated in relation to visible surface feature, such as pole, pit, pillar, link box, etc
			D	No visible indication of location. Asset location estimated using design plans, historical documents, anecdotal accounts, etc.
Bored section	Centre of underbore	Along the chainages of the underbore	*	Bore log to be provided
Duct configuration (inc service ducts)	Duct sizes, types, and configuration. Details of bedding / backfill if specialised	At least once per run, and where configuration and/or bedding / backfill thermal resistivity changes	N/A	
Requirements for Transmission and 11KV duct lines with 20+ ducts	Details of duct spacers used. Details of thermal resistivity.	At least once per run, and where configuration and/or thermal resistivity changes	N/A	



Asset Type	Measurement Requirement	When to Record	Quality Level	Example of information required to achieve Quality Level
Cable				
Horizontal	Centreline of cable	Start and end of cables, and every 20m continuous interval. Start/end, midpoint and PL crossing of every bend. At a deviation from alignment or vertical depth greater than 0.1m. Also where cables cross over cables or ducts.	A	Direct buried: absolute spatial measurement of exposed asset using survey-grade equipment such as theodolite or corrected GPS (±0.05m) In conduits: adopt the spatial information and Quality Level of the conduit if the configuration is sighted at time of installation
			B*	Direct buried: exposed asset measured relative to PL / GL using trade level equipment such as measuring wheel, tape measure, and/or laser distance meter. (±0.1m) In conduits: adopt the spatial information and Quality Level of the conduit if the configuration is sighted at time of installation
Vertical	Topmost cable	Sections in conduits: adopt the spatial information and Quality Level of the conduit if the configuration is sighted at time of installation	C	Direct buried: location of asset estimated in relation to visible surface feature, such as pole, pit, pillar, link box, etc. GPS (±0.3m) In conduits: cables known to be in conduits with at least QL-C location data
			D	Direct buried, in conduits (QL-D), or unknown: No visible indication of location. Asset location estimated using design plans, historical documents, anecdotal accounts, etc.
Cable configuration	Cable codes, voltage, and configuration. Details of bedding / backfill if specialised	At least once per run, and where configuration changes and/or bedding, backfill or fire blankets will change thermal resistivity	N/A	
Requirements for Transmission	Details of thermal resistivity. Direction of cable pull.	At least once per run, and where configuration changes and/or bedding, backfill or fire blankets will change thermal resistivity	N/A	
Joint / Termination				
Horizontal	Centreline of joint/termination	All joints and terminations	A	Absolute spatial measurement of exposed asset using survey-grade equipment such as theodolite or corrected GPS (±0.05m)
			B*	Exposed asset measured relative to PL / GL using trade level equipment such as measuring wheel, tape measure, and/or laser distance meter (±0.1m)
Vertical	Top of joint/termination		C	When combined with appropriate anecdotal accounts of location, asset may be estimated in relation to visible surface feature, such as pole, pit, pillar, link box, etc
			D	No visible indication of location. Asset location estimated using design plans, historical documents, anecdotal accounts, etc.

Asset Type	Measurement Requirement	When to Record	Quality Level	Example of information required to achieve Quality Level
Pit / Transmission Joint Bay				
Horizontal	Every corner		A	Absolute spatial measurement of asset using survey-grade equipment such as theodolite or corrected GPS (±0.05m)
Vertical (Pit only)	Depth to floor		B*	Asset measured relative to PL using trade level equipment such as measuring wheel, tape measure, and/or laser distance meter (±0.1m)
Hatch (Pit only)	Relative position		C	N/A
			D	Buried pits: No visible indication of location. Asset location estimated using design plans, historical documents, anecdotal accounts, etc.
Pit Configuration	Duct sizes and types as well as relative position of cables/ducts on pit wall	Any wall through which ducts or cables pass	N/A	
Cable/Duct within Pit	Exact lay and measurements not required. Emphasis on diagrammatical connectivity.		A	Adopt the spatial information and Quality Level of the pit if the configuration is sighted at time of recording.
			B *	Adopt the spatial information and Quality Level of the pit if the configuration is sighted at time of recording.
Joint/Termination within Pit	Measurements not required. Show position in relation to other joints along same cable.		C	Pit visible from surface. Contained assets not sighted. Information estimated using design plans, historical documents, anecdotal accounts, etc.
			D	Buried pit not visible from surface. Contained assets not sighted. Information estimated using design plans, historical documents, anecdotal accounts, etc.
Link Box / Pre-formed Pit				
Horizontal	Centre of structure		A	Absolute spatial measurement of asset using survey-grade equipment such as theodolite or corrected GPS (±0.05m)
			B*	Asset measured relative to PL using trade level equipment such as measuring wheel, tape measure, and/or laser distance meter (±0.1m)
Internals	Diagram of internal arrangement		C	Asset entered from plan without performing site inspection
			D	N/A

Asset Type	Measurement Requirement	When to Record	Quality Level	Example of information required to achieve Quality Level	
Pillars					
Horizontal	Centre of structure		A	Absolute spatial measurement of asset using survey-grade equipment such as theodolite or corrected GPS (±0.05m)	
			B*	Asset measured relative to PL using trade level equipment such as measuring wheel, tape measure, and/or laser distance meter (±0.1m)	
Internals	Diagram of internal arrangement		C	Asset entered from plan without performing site inspection	
			D	N/A	
Substations					
Horizontal	External corners (except pole mounted transformers)		A	Absolute spatial measurement of surface asset (or underground asset at time of construction) using survey-grade equipment such as theodolite or corrected GPS (±0.05m) Includes architectural plans of substation buildings	
			B*	Surface asset (or underground asset at time of construction) measured relative to PL / GL using trade level equipment such as measuring wheel, tape measure, and/or laser distance meter (±0.1m)	
			C	Underground/basement substation with no design plans - sighted in reference to building or access hatches	
			D	Underground substation with no design plans or visible access hatches	
Poles / Towers					
Horizontal	Centre of structure	Usually input to GIS system directly from plans. Where construction deviates from the plan, the plan does not provide a location (measurement), or where there is a direct connection to underground cables, the pole must be measured on site and recorded according to the following Quality Level requirements.	A	Absolute spatial measurement of asset using survey-grade equipment such as theodolite or corrected GPS (±0.05m)	
			B*	Asset entered from plan including location measurement Asset measured relative to PL using trade level equipment such as measuring wheel, tape measure, and/or laser distance meter (±0.1m) Location determined using overlaid aerial photography	
			C	Asset entered from plan – approximate location only Location approximated using aerial photography or other images	
			D	N/A (surface assets always visible)	
Mounted assets	Adopt location of parent	To be recorded where attribute data or connectivity deviates or missing from plans	*	Adopt location of parent	
Overhead Conductors					
Horizontal	Adopt location of pole or other mounting point	To be recorded where attribute data or connectivity deviates or missing from plans	*	Adopt location of parent	

Asset Type	Measurement Requirement	When to Record	Quality Level	Example of information required to achieve Quality Level
Trial Hole				
Horizontal	Centreline of hole		A	Absolute spatial measurement using survey-grade equipment such as theodolite or corrected GPS for any assets exposed during pot-holing (±0.05m)
			B*	Any exposed assets measured relative to PL / GL using trade level equipment such as measuring wheel, tape measure, and/or laser distance meter (±0.1m)
Assets found	Top & Centre of asset. Type of asset		C	N/A
			D	N/A
Telecommunications Route Markers				
Marker Balls				
Horizontal	Centre of device	Every maker ball	A	Absolute spatial measurement of exposed asset using survey-grade equipment such as theodolite or corrected GPS (±0.05m)
			B*	Absolute spatial measurement of asset using corrected GPS (±0.1m) Note: this is an exception to the usual requirements for a QL-B measurement
Vertical	Top of device		C	N/A
			D	N/A
Trace Wire / Tape				
Horizontal	Centre line		Start and end of wire/tape, and every 20m continuous interval. Start/end, midpoint of every bend. Trace wire/tape is usually installed at a shallower depth than the corresponding cable/duct and must be measured independently.	A
		B*		Absolute spatial measurement of asset using corrected GPS (±0.1m) Note: this is an exception to the usual requirements for a QL-B measurement
Vertical	Top of wire / tape	C		N/A
		D		N/A

## 7.0 LODGEMENT OF ASSET INFORMATION

Asset information supplied to Ausgrid should usually take the form of one of the document types from the following table. Upon receiving the information, the Ausgrid recipient should check the document for quality and completeness before allocating the information for data capture into the relevant Ausgrid database, and archival of the document.

Where information is found to be of unacceptable quality or completeness, the document in question may be rejected and will require correction within a timeframe specified by the relevant Ausgrid recipient.

Details of the method for the production of Field Book Pages and Incident Resolutions may be found in Technical Guide *NW000-T0005 NEG-NPR05 Field Recording Guide*.

**Table 2 – Asset information document types**

Document Type	
<b>Field Book Pages</b>	
Used for	General field recording of As-Built information regarding Mains and Service works for Ausgrid's transmission and distribution network.
Ausgrid recipient	Ausgrid Data Maintenance Regional Team Leader, or <a href="mailto:gis@ausgrid.com.au">gis@ausgrid.com.au</a> (External contractors)
Timeframe	Two (2) working days As per NW000-T0005 NEG-NPR05 Field Recording Guide
Forms	NW000-T0005 NEG-NPR05 Field Recording Guide – Annexure A, F, & G
<b>As-built Designs</b>	
Used for	Recording of As-Built information regarding overhead assets constructed for Ausgrid's transmission and distribution network.
Ausgrid recipient	<a href="mailto:gis@ausgrid.com.au">gis@ausgrid.com.au</a>
Timeframe	Two (2) working days
Forms	Mark-up of original design plan – As-built Verification section completed
<b>Data Incident Resolution documentation</b>	
Used for	Detailing the findings of an investigation into Ausgrid network assets by Ausgrid Data Maintenance employees.
Ausgrid recipient	Ausgrid Data Maintenance Regional Team Leader
Timeframe	Once resolved
Forms	N/A
<b>Data Correction documentation</b>	
Used for	Notifying Data Maintenance when an error is identified with existing GIS data, notification of minor overhead works, or during or soon as practicable after an emergency event.
Ausgrid recipient	<a href="mailto:gis@ausgrid.com.au">gis@ausgrid.com.au</a>
Timeframe	Two (2) working days
Forms	Written description, supporting diagrams, and photos emailed to Data Maintenance PrjTrak Data Correction template, Network Viewer mark-ups, and/or specifically designed mobile apps to be used internally
<b>Notification of Service Works (NOSW)</b>	
Used for	Information and recording of Services Work by ASPs
Ausgrid recipient	Installation Data Operations office
Timeframe	Two (2) working days from completion of works
Forms	<a href="http://www.ausgrid.com.au/Common/Industry/Accredited-service-providers/General-information.aspx">http://www.ausgrid.com.au/Common/Industry/Accredited-service-providers/General-information.aspx</a> (External contractors)

## 8.0 RECORDKEEPING

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

**Table 3 – 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	HPRM Work Folder for Network Standards (HPRM ref. 2014/21250/319)	Unlimited
Working documents (emails, memos, impact assessment reports, etc.)	HPRM Work Folder for Network Standards (HPRM ref. 2014/21250/319)	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 Engineering Technical Documents with BMS. 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.

## 10.0 DOCUMENT CONTROL





**Document Owner** : Manager - Data Maintenance

**Distribution Coordinator** : Manager – Asset Engineering Standards




## Annexure A –Symbols

All symbols must conform to the following Ausgrid GIS standard symbols. Diagrams may be produced in either black and white, or in colour. Colour can be useful for adding information, but where colour is used, it must conform to the following standard colours for Ausgrid GIS objects.
























































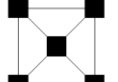










### FIELD RECORDING SYMBOLS

 HV Cable	 LV Cable	 SL Cable
 HV Cable Removed	 LV Cable Removed	 SL Cable Removed
 HV Joint	 LV Joint	 SL Joint
 HV Pot End	 LV Pot End	 SL Pot End
 HV Sealed End	 LV Sealed End	 SL Sealed End
 HV Cut End	 LV Cut End	 SL Cut End
 HV UGOH (on Pole)	 LV UGOH (on Pole)	 SL UGOH (on Pole)
 Aux Cable	 Service Cable	 Pole
 Aux Cable Removed	 Service Cable Removed	 Smart Pole
 Aux Joint	 Service Joint	 SL Standard
 Aux Sealed End	 Service Pot End	 Pillar Standard
 Aux Cut End	 Service Sealed End	 SL Control Point
 Aux UGOH (on Pole)	 Service UGOH (on Pole)	 SL Group Control
 Pole Substation (on Pole)	 Pillar	 SL Lamp
 Kiosk Substation	 Switch Pillar	 SL Lamp & PEC
 Chamber Substation	 Private Pillar	 Photo Reference
 Ground Substation	 Link Box (4 way)	 GPS Reference #
 Zone Substation	 Link Box (2 way)	 Aux Cable (in duct)
 Zone Substation	 Supply Point	 HV Cable (in duct)
 Conduit Coverage	 Service Cable (in duct)	 HV Singles (in duct)
 Break Line (area)	 SL Cable (in duct)	 Empty Duct
 Break Line (linear)	 LV Cable (in duct)	 Occupied Duct
	 LV Singles (in duct)	 Blocked Duct

#### HAND DRAWING

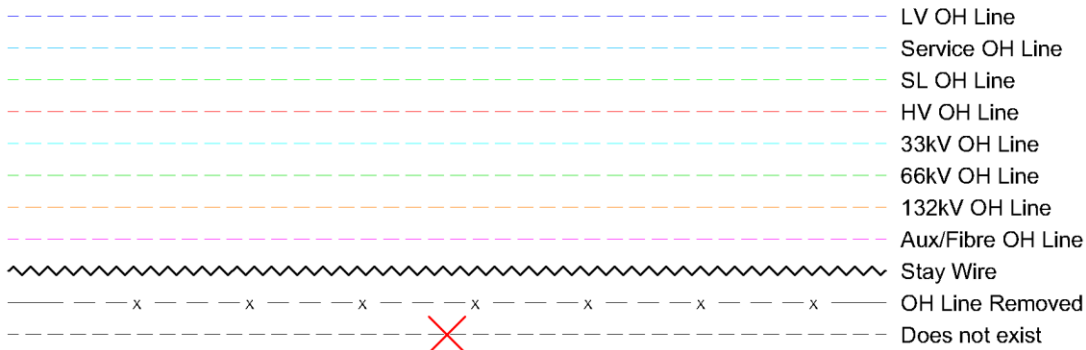
-  Joint
-  Pot End
-  Sealed End

## FIELD RECORDING SYMBOLS (TRANSMISSION)

	33KV Cable		66KV Cable		132KV Cable
	33KV Cable Removed		66KV Cable Removed		132KV Cable Removed
	33KV Joint		66KV Joint		132KV Joint
	33KV Pot End		66KV Pot End		132KV Pot End
	33KV Sealed End		66KV Sealed End		132KV Sealed End
	33KV Cut End		66KV Cut End		132KV Cut End
	33KV UGOH (on Pole)		66KV UGOH (on Pole)		132KV UGOH (on Pole)
	Aux Cable		Earth Cable		Joint - A(Red) Phase
	Aux Cable Removed		Earth Cable Removed		Joint - B(Yellow) Phase
	Aux Joint/Splice		Earth Joint		Joint - C(Blue) Phase
	Aux Sealed End		Earth Sealed End		A(Red) Phase (cable in duct)
	Aux Cut End		Earth Cut End		B(White) Phase (cable in duct)
	Aux UGOH (on Pole)		Earth UGOH (on Pole)		C(Blue) Phase (cable in duct)
	33KV Cable (in duct)		Earth Point		GPS Reference #
	66KV Cable (in duct)		Aux Cable (in duct)		Photo Reference
	132KV Cable (in duct)		Earth Cable (in duct)		Blocked Duct
	Empty Duct		Occupied Duct		Break Line (linear)
	Conduit Coverage		Break Line (area)		Fibre Loop
	Zone Substation		Tower		DTS Pit
	Subtransmission Substation		Link Box		Fibre Pit
	Bulk Supply Point		Oil Pit		
<b>HAND DRAWING</b>					
	Joint				
	Pot End				
	Sealed End				
	Tower				



FIELD RECORDING SYMBOLS (OVERHEAD)

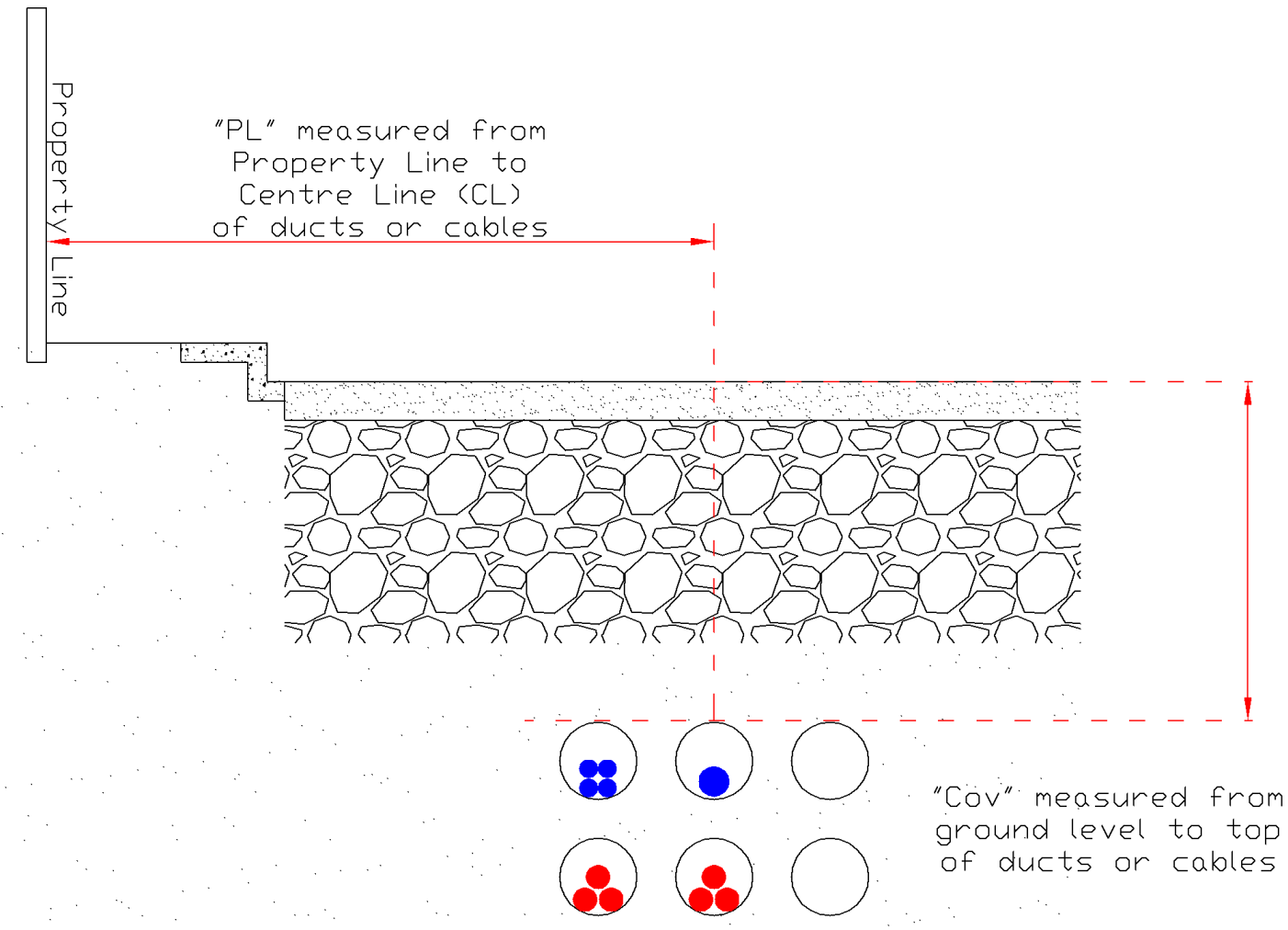


	Pole		LV USL		Supply Point
	Private Pole (A Pole)		IDT		Supply Point (LSC)
	Pillar Standard		Open Taps		Supply Point (RMS)
	SL Standard		HV USL		Supply Point (Phone Box)
	Smart Pole		ABS		Electromagnetic Emissions Source
	SL Standard (Private)		ABS Non Load		Mid-span Tee
	Pole Removed		HLC / LLC		Catenary Attachment
	UGOH (on Pole)		Recloser		SL Control Point
	UGOH w/ Link Box		Sectionaliser		SL Lamp
	Pole Substation (on Pole)		Line Fault Indicator		SL Lamp & PEC
			Fibre Loop		Photo Reference

HAND DRAWING

	Supply Point		Supply Point (RMS)		Supply Point (Comms Provider)
	Supply Point (PUMS)		Mid-span Tee		Catenary Attachment

Annexure B – GUIDE TO DIMENSIONS



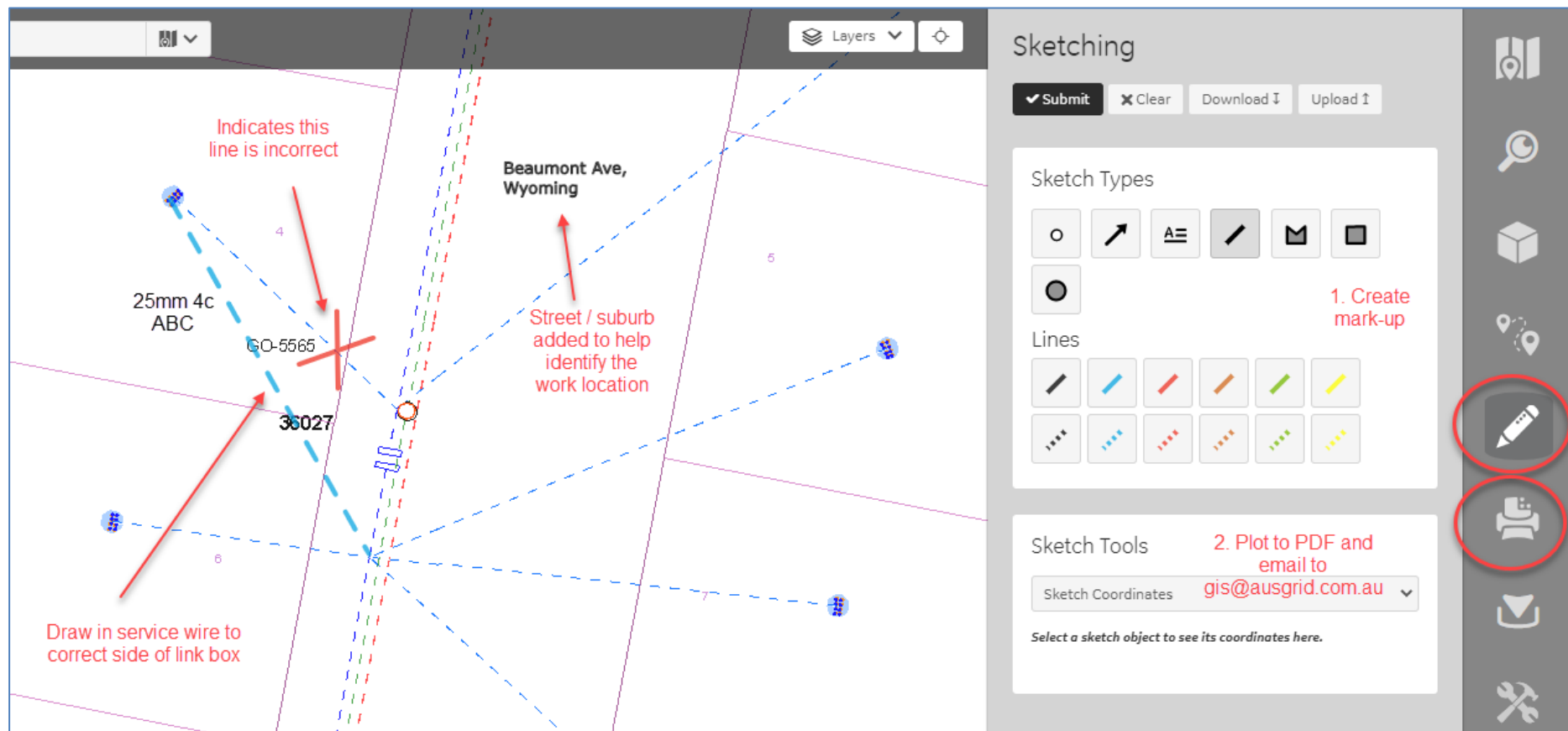
## **Annexure C – CABLE CODES & NOMENCLATURE**

This annexure is stored externally to this document.

## Annexure D – Sample GIS Data Correction

Ausgrid <b>DATA CORRECTION</b>				Data Correction No: (available from ProjTrak eg: Z123 for Zetland region) <b>B26202</b>						
<b>REGION:</b>	Sydney South	<b>1:2000 EA MAP Grid:</b>	RP73							
<b>Suburb:</b>	BASS HILL	<b>Street:</b>	CLARKE ST							
<b>UBD Grid:</b>	_____	<b>Nearest Cross Street:</b>	GEORGINA ST							
<b>No. of Documents Included:</b>	_____	<b>EA MAPS Theme:</b>	Source Material Ref: _____							
<table style="width: 100%;"> <tr> <td style="width: 20%;">Date: 30/10/2017</td> <td style="width: 40%;">Data Correction Raised by: Geary, Luke</td> <td style="width: 20%;">Fax No: _____</td> </tr> <tr> <td></td> <td>Phone No: _____</td> <td></td> </tr> </table>					Date: 30/10/2017	Data Correction Raised by: Geary, Luke	Fax No: _____		Phone No: _____	
Date: 30/10/2017	Data Correction Raised by: Geary, Luke	Fax No: _____								
	Phone No: _____									
Please notify me when Data Correction has been completed. <input style="border: 1px solid blue; padding: 2px 5px;" type="checkbox"/>										
<table style="width: 100%;"> <tr> <td style="width: 20%;">Date: / /</td> <td style="width: 40%;">Data Correction Verified by: _____</td> <td style="width: 20%;">Fax No: _____</td> </tr> <tr> <td></td> <td>Phone No: _____</td> <td></td> </tr> </table>					Date: / /	Data Correction Verified by: _____	Fax No: _____		Phone No: _____	
Date: / /	Data Correction Verified by: _____	Fax No: _____								
	Phone No: _____									
<p><b>Description of Situation:</b> (eg: error on UG Detail plan, LV Connectivity plan etc)</p> <p>please relocate USL 14955 from pole RP12539 to RP20658 in Clarke St Bass Hill. Note: services on pole RP20658 connected to north side of the USLs and supplied from S4349 dist.1</p>										
<div style="border: 2px solid red; padding: 10px; display: inline-block;"> <b>PLEASE REMEMBER TO ADD TIME TO TIMESHEET UNDER DATA CORRECTION</b> </div>										
<p>Please forward completed forms to either of two locations:</p> <table style="width: 100%;"> <tr> <td style="width: 50%; vertical-align: top;"> <b>1) Sydney North, Central Coast &amp; Hunter Regions</b>            Data Input Liaison Officer            GIS Data Operations Team            'B' Block East            145 Newcastle Road            WALLSEND         </td> <td style="width: 50%; vertical-align: top;"> <b>2) Sydney East &amp; Sydney South Regions</b>            Data Input Liaison Officer            GIS Data Operations Team            Roden Cutler House, Level 11            24 Campbell St            Sydney         </td> </tr> </table>					<b>1) Sydney North, Central Coast &amp; Hunter Regions</b> Data Input Liaison Officer GIS Data Operations Team 'B' Block East 145 Newcastle Road WALLSEND	<b>2) Sydney East &amp; Sydney South Regions</b> Data Input Liaison Officer GIS Data Operations Team Roden Cutler House, Level 11 24 Campbell St Sydney				
<b>1) Sydney North, Central Coast &amp; Hunter Regions</b> Data Input Liaison Officer GIS Data Operations Team 'B' Block East 145 Newcastle Road WALLSEND	<b>2) Sydney East &amp; Sydney South Regions</b> Data Input Liaison Officer GIS Data Operations Team Roden Cutler House, Level 11 24 Campbell St Sydney									

## Annexure E – Sample Network Viewer image



Example data correction showing notations added to network plot in Network Viewer