

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.

Where this standard is issued as a controlled document replacing an earlier edition, remove and destroy the superseded document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

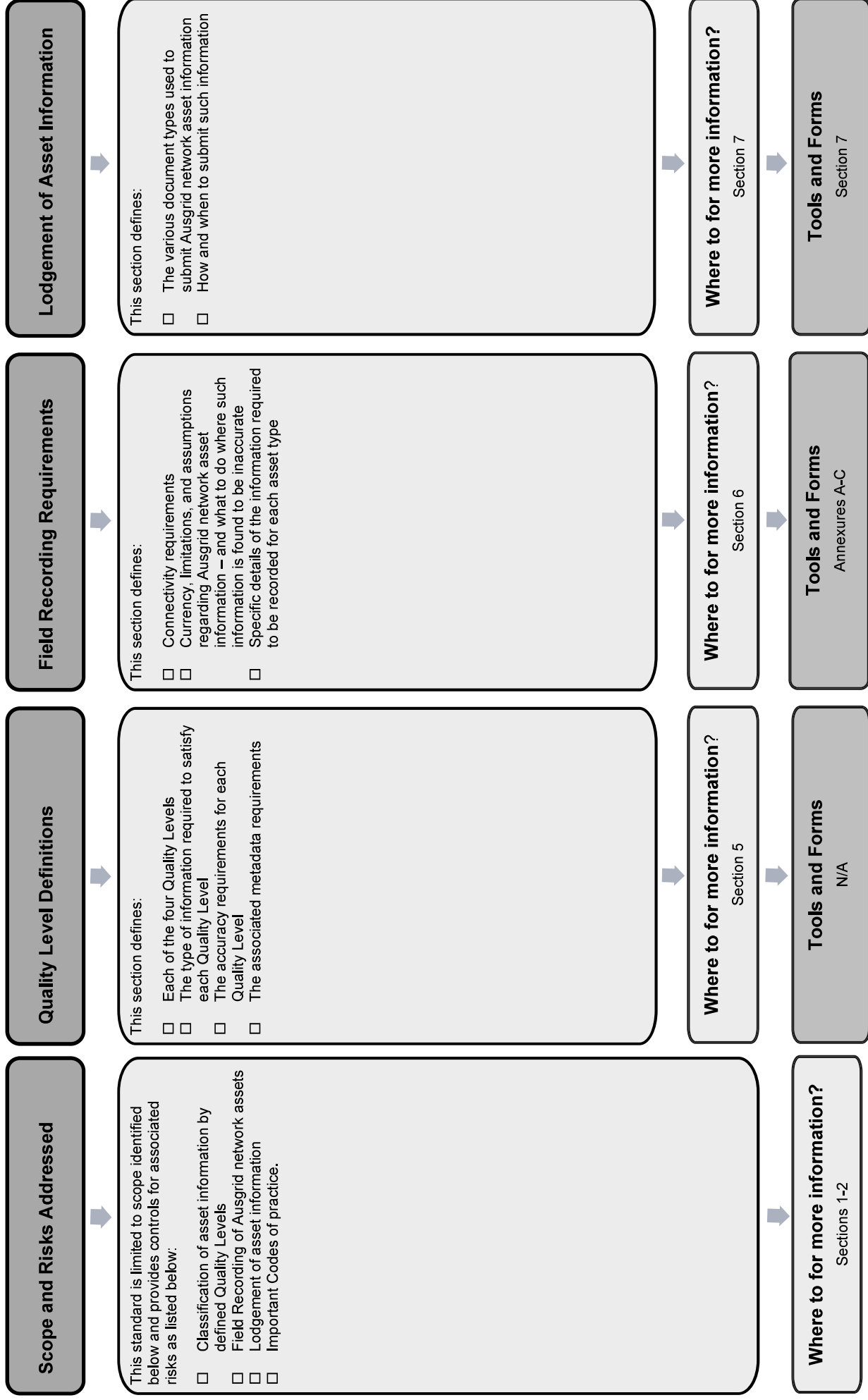
KEYPOINTS

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.

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 Document Endorsement and Approval
- Company Procedure (Network) – Network Standards Compliance
- Company Procedure (Network) - Production / Review of Engineering Technical Documents
- Customer Installation Safety Plan
- Division Workplace Instruction (Network) – Production /review of Network Standards
- Electrical Safety Rules
- Electricity Network Safety Management System Manual
- ES4 Accredited Service Provider Authorisation
- NS104 Specification for Electrical Network Project Design Plans
- NS130 Laying Underground Cables Up to and including 11kV
- NS156 Excavating Near Ausgrid Underground Cables or Conduits
- NS161 Specification for Testing of Underground Cables

- NS168 Design of 33kV, 66kV and 132kV Underground Cables
- NS172 Design Requirements for Cable Pits, Vaults and Bays
- 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
- 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 001-2019 National Electricity Network Safety Code
- Master Access Deed for Railway Crossings 2002
- Streets Opening Coordination Council publication Guide to Codes and Practices for Streets Opening, 2018
- 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

Accredited Service Provider (ASP)	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).
As-Built	Drawing made during construction to record the actual size, location and nature of assets.
Business Management System (BMS)	An Ausgrid internal integrated policy and procedure framework that contains the approved version of documents.
Conduit	Duct and conduit are interchangeable terms to describe a tube or pipe through which electrical or communications cables may be installed.
Contestable Work	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).
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.
Duct	Duct and conduit are interchangeable terms to describe a tube through which electrical or communications cables may be installed.
GIS	Geographical Information System (GIS) is the database of records for spatial and connectivity data related to Ausgrid's network.
Global Positioning System (GPS)	A system incorporating a network of orbital satellites to calculate the position of a receiving unit near Earth's surface.
National Electricity Customer Framework (NECF)	The National Energy Customer Framework is an initiative to introduce a consistent national framework for providing electricity and gas services to retail customers.
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.
Notification of Service Work (NOSW)	The form used by Level 2 ASPs to inform Ausgrid whenever contestable work is carried out.
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.

4.2 GIS abbreviations (in use)

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

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

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

4.3 Historical abbreviations (no longer in use)

BWK	Brickwork
DH&W	Drill hole & wing
DMR	Department of Main Roads (see RMS)
OC	Optus cable
RSA	Rail Services Australia (see SRA)
RTA	Roads and Traffic Authority (see RMS)
SRA	State Rail Authority (See RailCorp)
TJ	Tee joint (see PBJ)
VCP	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 GDA2020 MGA56 and AHD71.

QL-A is the quality level required for recording all new network assets.

Where relevant, asset information must include the following:

- Type of asset
- Asset number/label
- Status
- Material
- Size
- Configuration
- Local measurement of cover depth to assist relocation
- 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.

Metadata: Submitted information that includes QL-A data must be geo referenced and submitted in an electronic format using appropriate software utilising the GPS schema provided in Annexure E. The survey and locating methods must be documented, as well as the survey control information.

5.3 Quality level B

Quality level B (QL-B) describes where assets have been recorded relative to cadastre and local ground level or surface features, such as fences and buildings. Quality Level B was the predominant measuring standard used historically by Ausgrid.

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

Where relevant, asset information includes 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; and
- Asset numbers for relevant assets

Substations and switchgear

Photographs of the following equipment must be included when submitting TEI sheets and should also be included where relevant on other as-built documentation:

- Substation overview (including number);
- HV switchgear overview;
- HV switchgear nameplate;
- Transformer nameplate (all details must be legible);
- Painted transformer T number;
- Transformer tap changer handle;
- Distribution management and control (DM&C);
- LV switchgear overview; and
- LV switchgear nameplate.

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 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) 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 ($\pm 0.05\text{m}$)
Vertical	Topmost duct		B	Exposed asset measured relative to PL / GL using trade level equipment such as measuring wheel, tape measure, and/or laser distance meter ($\pm 0.1\text{m}$)
			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		A*	Absolute spatial measurement of exposed asset using survey-grade equipment such as theodolite or corrected GPS ($\pm 0.05\text{m}$)
Vertical (exposed)	Topmost duct	At start and end of underbore	B	Exposed asset measured relative to PL / GL using trade level equipment such as measuring wheel, tape measure, and/or laser distance meter ($\pm 0.1\text{m}$)
			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.
HDD Bored section	Centre of underbore	Along the chainages of the underbore	A	Bore log to be provided containing absolute spatial measurement at 20 metres intervals using survey-grade equipment such as theodolite or corrected GPS ($\pm 0.05\text{m}$)
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. Sections in conduits: adopt the spatial information and Quality Level of the conduit if the configuration is sighted at time of installation	A*	Direct buried: absolute spatial measurement of exposed asset using survey-grade equipment such as theodolite or corrected GPS ($\pm 0.05\text{m}$) In conduits: adopt the spatial information and Quality Level of the conduit if the configuration is sighted at time of installation NOTE: Where local depth of any cable provides less than 500mm cover, the location must be marked on the field recording "WARNING – SHALLOW CABLES"
Vertical	Topmost cable		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. ($\pm 0.1\text{m}$) 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 ($\pm 0.3\text{m}$) 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 ($\pm 0.05\text{m}$)
			B	Exposed asset measured relative to PL / GL using trade level equipment such as measuring wheel, tape measure, and/or laser distance meter ($\pm 0.1\text{m}$)
			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
Vertical	Top of joint/termination		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	All newly constructed or altered Joint Bays and Pulling pits for Transmission assets	A*	Absolute spatial measurement of asset using survey-grade equipment such as theodolite or corrected GPS ($\pm 0.05\text{m}$)
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 ($\pm 0.1\text{m}$)
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.
			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 ($\pm 0.05\text{m}$)
			B	Asset measured relative to PL using trade level equipment such as measuring wheel, tape measure, and/or laser distance meter ($\pm 0.1\text{m}$)
			C	Asset entered from plan without performing site inspection
Internals	Diagram of internal arrangement		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 ($\pm 0.05\text{m}$)
Internals	Diagram of internal arrangement		B	Asset measured relative to PL using trade level equipment such as measuring wheel, tape measure, and/or laser distance meter ($\pm 0.1\text{m}$)
			C	Asset entered from plan without performing site inspection
			D	N/A
Substations				
			A*	Absolute spatial measurement of surface asset (or underground asset at time of construction) using survey-grade equipment such as theodolite or corrected GPS ($\pm 0.05\text{m}$) Includes architectural plans of substation buildings
Horizontal	External corners (except pole mounted transformers)		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 ($\pm 0.1\text{m}$)
			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				
		Poles and Towers must be measured on site and recorded according to the following Quality Level requirements. Poles (other than poles associated with UGOHs) may be input to GIS system directly from plans where construction does not deviate from the plan and the plan provides a surveyed location. Pole replacements do not require updated location measurements if within 2m from original position	A*	Absolute spatial measurement of asset using survey-grade equipment such as theodolite or corrected GPS ($\pm 0.05\text{m}$). Measurement exceptions listed opposite are not valid for QL-A)
Horizontal	Centre of structure		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 ($\pm 0.1\text{m}$) 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 ($\pm 0.05\text{m}$)
Assets found	Top & Centre of asset. Type of asset		B	Any exposed assets measured relative to PL / GL using trade level equipment such as measuring wheel, tape measure, and/or laser distance meter ($\pm 0.1\text{m}$)
			C	N/A
			D	N/A
Route Markers				
Marker Balls				
Horizontal	Centre of device	Every marker ball	A*	Absolute spatial measurement of exposed asset using survey-grade equipment such as theodolite or corrected GPS ($\pm 0.05\text{m}$)
			B	Absolute spatial measurement of asset using corrected GPS ($\pm 0.1\text{m}$) 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*	Absolute spatial measurement of exposed asset using survey-grade equipment such as theodolite or corrected GPS ($\pm 0.05\text{m}$)
			B	Absolute spatial measurement of asset using corrected GPS ($\pm 0.1\text{m}$) 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
Access Tracks				
Horizontal	Centre of track	Start and end of access track, all gates, and every 20m continuous interval. Gates must be indicated separately from main track and include status conditions such as locks.	A*	Absolute spatial measurement of track/gate using survey-grade equipment such as theodolite or corrected GPS ($\pm 0.05\text{m}$)
			B	Absolute spatial measurement of track/gate using GPS ($\pm 0.1\text{m}$)
			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	
Field Book Pages	
Used for	General field recording of As-Built information regarding Mains and Service works for Ausgrid's transmission and distribution network, including Access Tracks
Ausgrid recipient	Lodged in Tracker (via Network Viewer), or Ausgrid Connections Portal (https://services.ausgrid.com.au)
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
As-built Designs	
Used for	Recording of As-Built information regarding overhead assets constructed for Ausgrid's transmission and distribution network.
Ausgrid recipient	Lodged in Tracker, or Ausgrid Connections Portal (https://services.ausgrid.com.au)
Timeframe	Two (2) working days
Forms	Mark-up of original design plan – As-built Verification section completed
Data Incident Resolution documentation	
Used for	Detailing the findings of an investigation into Ausgrid network assets by Ausgrid Data Maintenance employees.
Ausgrid recipient	Lodged in Tracker
Timeframe	Once resolved
Forms	N/A
Data Correction documentation	
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	Lodged in Tracker, or Ausgrid Connections Portal (https://services.ausgrid.com.au)
Timeframe	Two (2) working days
Forms	Written description, supporting diagrams, and photos emailed to Data Maintenance Network Viewer mark-ups, and/or specifically designed mobile apps to be used internally
Asset Data Capture Forms	
Used for	Specific forms detailing a particular class of asset data e.g. NOSW, TEI Sheets, Pole & Pillar data sheets, Streetlighting data sheets, TSB reports, etc
Ausgrid recipient	Lodged in Tracker, or Ausgrid Connections Portal (https://services.ausgrid.com.au)
Timeframe	Two (2) working days from completion of works
Forms	Various as applicable

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 - Network Stds & Electrical Safety

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)
 Conduit Coverage	 Supply Point	 HV Cable (in duct)
 Break Line (area)	 Service Cable (in duct)	 HV Singles (in duct)
 Break Line (linear)	 SL Cable (in duct)	 Empty Duct
	 LV Cable (in duct)	 Occupied Duct
	 LV Singles (in duct)	 Blocked Duct

HAND DRAWING

-  Joint
-  Pot End
-  Sealed End

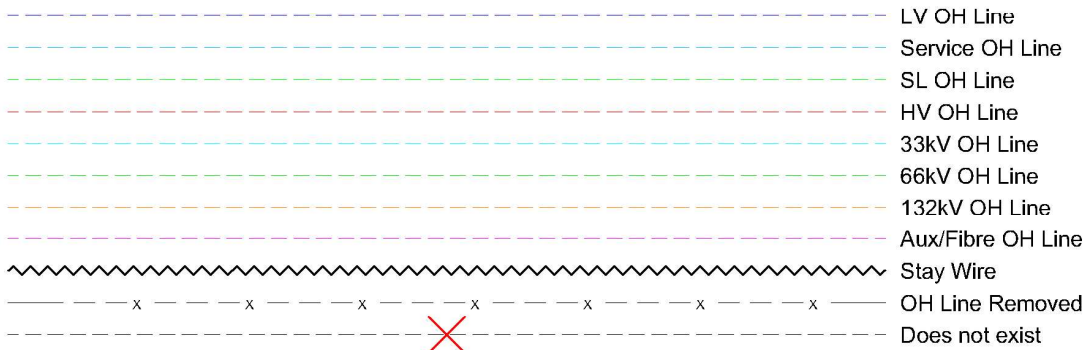
FIELD RECORDING SYMBOLS (TRANSMISSION)

	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		

HAND DRAWING

- Joint
- Pot End
- Sealed End
- Tower

FIELD RECORDING SYMBOLS (OVERHEAD)

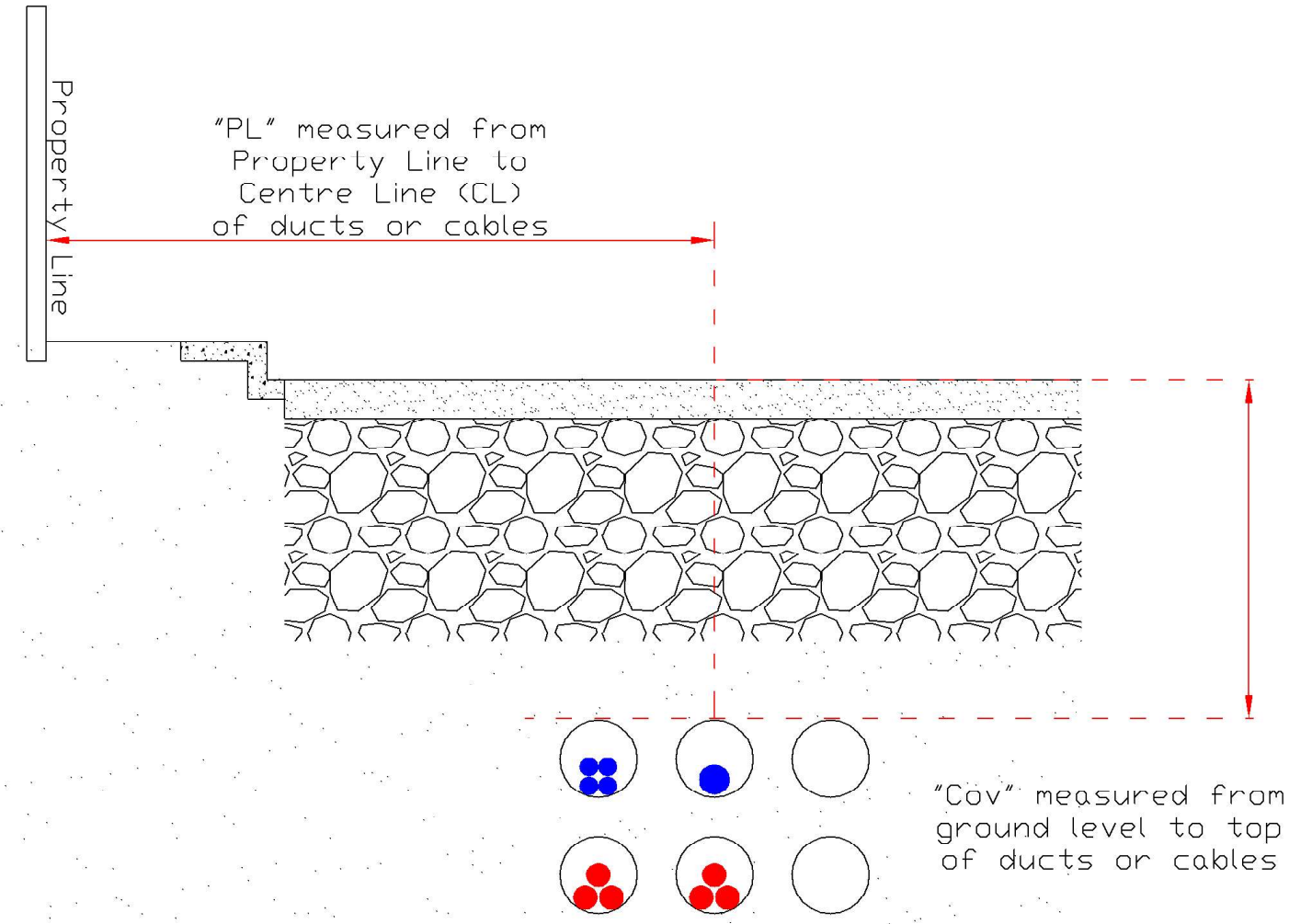


	Pole		LV USL		Supply Point
	Private Pole (A Pole)		IDT		Supply Point (LSC)
	Pillar Standard		Open Taps		Supply Point (RMS)
	SL Standard		HV USL		Supply Point (Phone Box)
	Smart Pole		ABS		Electromagnetic Emissions Source
	SL Standard (Private)		ABS Non Load		Mid-span Tee
	Pole Removed		HLC / LLC		Catenary 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 – Field Recording Errors

An error will be recorded where the requirements are not met

Category	Requirement
Asset Details & Admin	ANNOTATION CORRECTLY USED - STJ, PBJ, PE, SE, EOP etc
Asset Details & Admin	ASSET NUMBERS CORRECT & INCLUDED
Asset Details & Admin	DIMENSIONS - CHAINAGE, PL, COV INCLUDED
Asset Details & Admin	DUCT, CABLE & JOINT SIZE, TYPE, & NUMBERING CORRECT
Asset Details & Admin	DUCT, CABLE, JOINT CONFIG CORRECT - MATCHES PHOTOS
Asset Details & Admin	DUCTS NEW OR EXISTING MARKED AS SUCH
Asset Details & Admin	FIRE BLANKETS RECORDED (JOINTS IN PITS & ZONE SUBSTATIONS)
Asset Details & Admin	GENERAL LEGIBILITY & CLARITY
Asset Details & Admin	INTERNALS DRAWN (Link pillars only – Include service connections)
Asset Details & Admin	PHOTOS HAVE DATE, SUBURB, NORTH POINT, CORRECT RESOLUTION
Asset Details & Admin	PHOTOS SUFFICIENT FOR WORKS DONE
Asset Details & Admin	PIT WALLS SHOWN CORRECTLY & MATCH PHOTOS
Asset Details & Admin	PROJECT / RECORDER / ADMIN DETAILS
Asset Details & Admin	TRANSMISSION CRITICAL DATA
Connectivity	FEEDER / DIST DETAILS &/OR FEEDER NUMBERS AND NAMES CORRECT
Connectivity	LINKS OPEN OR CLOSED CORRECT FOR SAO and/or SITE
Connectivity	NEXT SWITCH/FEATURE THAT CABLE CONNECTS TO IS INCLUDED
Data Format and Geo Ref	CABLES DRAWN IN CORRECT LOCATION
Data Format and Geo Ref	GPS DATA FILE INCLUDED; CORRECT SCHEMA USED
Data Format and Geo Ref	GPS POINTS CLEARLY MARKED IN CORRECT LOCATION
Data Format and Geo Ref	PIT DEPTH FROM SURFACE TO BOTTOM (IF NEW)
Data Format and Geo Ref	SERVICE/COMMS (Inc 3 RD party) DUCTS/CABLES INCLUDED

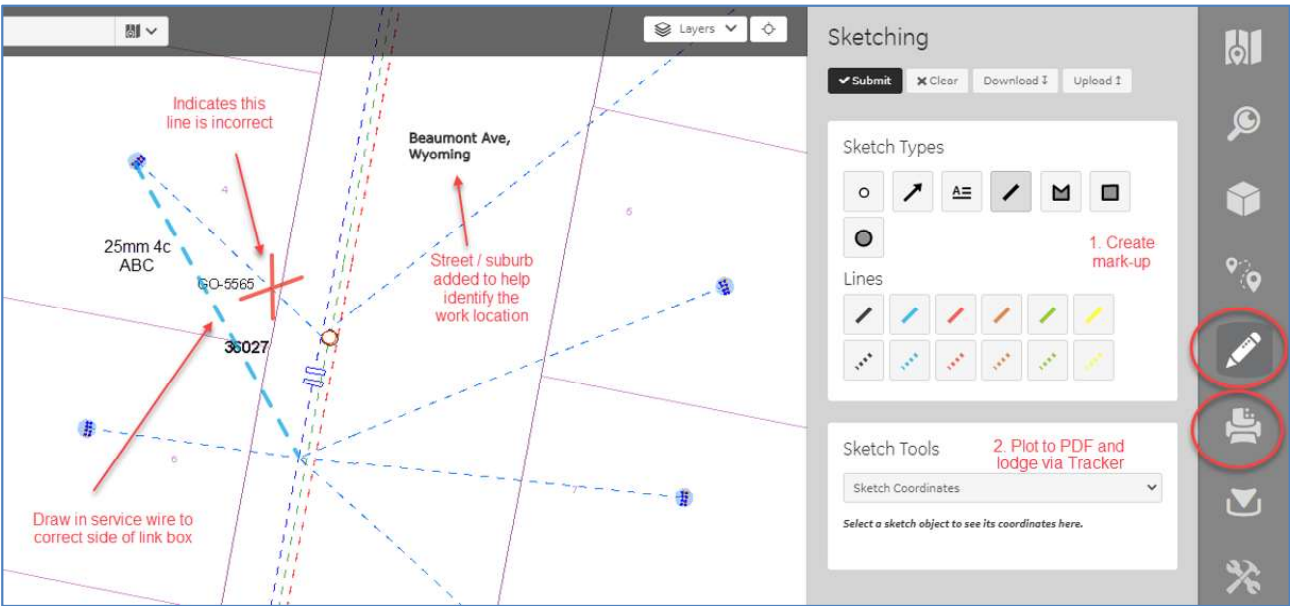
Annexure E – GPS Field Recording Schema

The schema embedded below is to be used for recording and digital submission of GPS asset locations.

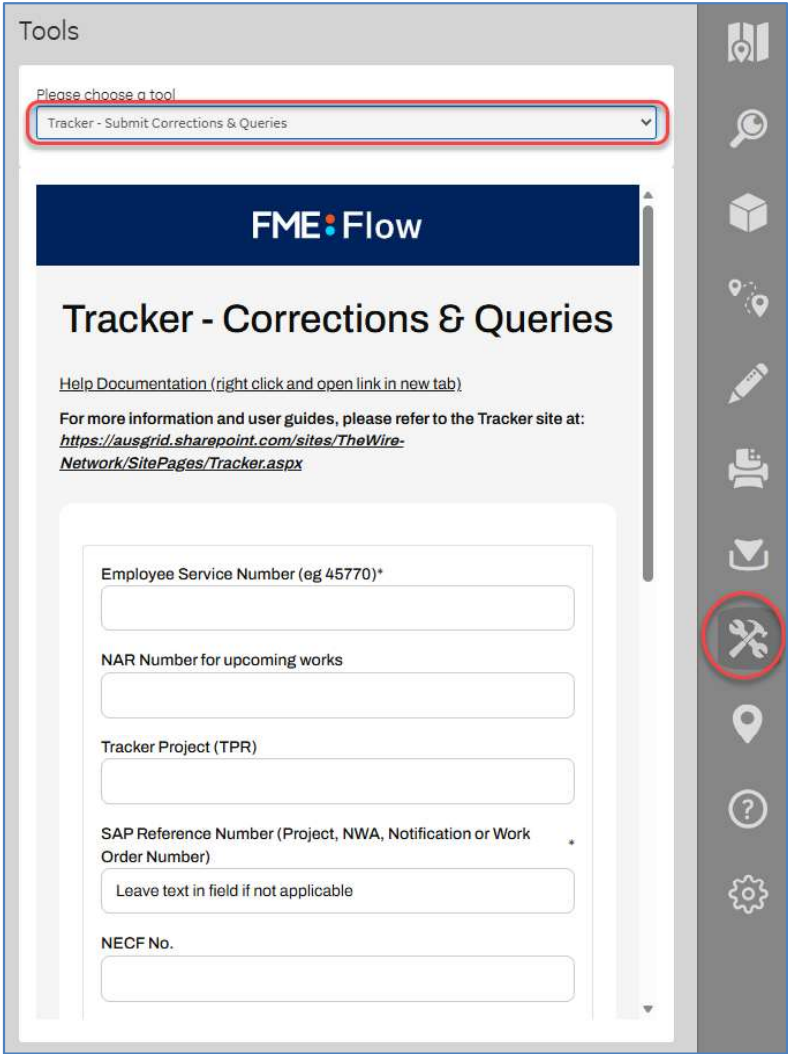


GPS FR Schema
V1.0.xls

Annexure F – Sample Data Correction in Network Viewer



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



Tracker Lodgement Tab