



# Distribution As-Built Records Standard

## Document summary

Northpower requires new construction, corrective and reactive maintenance activities that impact the Northpower Network to be provided to an approved As-Built standard.

This document details the Network's requirements for all As-Built documentation, including As-Built plans, data capture forms, test records and photographs.

## Document approval

Version	2
Document Owner	Mike GIBBS Asset Strategy & Planning Manager
Document Approver	Anthony MILES Asset Information Manager
Date Published	9/03/2023
Date for Next Review	8/03/2026

Controlled Document



## Table of contents

<b>1.0</b>	<b>Introduction</b>	<b>4</b>
1.1	Purpose	4
1.2	Scope	4
1.3	Application	4
<b>2.0</b>	<b>References</b>	<b>5</b>
<b>3.0</b>	<b>Definitions</b>	<b>5</b>
<b>4.0</b>	<b>As-Built Overview</b>	<b>7</b>
<b>5.0</b>	<b>Network Construction</b>	<b>8</b>
5.1	Scope	8
5.1.1	Exclusions	8
5.2	Assets Covered (but not limited to)	8
5.3	As-Built Requirements	8
5.3.1	As-Built Construction Plan	9
5.3.1.1	Map of Work Area	10
5.3.1.2	Work Schedule	10
5.3.1.3	Title Block	10
5.3.2	As-Built Records	11
<b>6.0</b>	<b>Corrective Maintenance</b>	<b>11</b>
6.1	Scope	11
6.2	Assets and Components Covered	12
6.3	As-Built Requirements	12
6.3.1	As-Built Corrective Maintenance Plan	12
6.3.1.1	Map of Work Area	12
6.3.1.2	Title Block	13
6.3.2	As-Built Records	13
<b>7.0</b>	<b>Reactive Maintenance</b>	<b>13</b>
7.1	Scope	14
7.2	Assets Covered	14
7.3	As-Built Requirements	14
<b>8.0</b>	<b>Service Connections and Permanent Disconnections</b>	<b>14</b>



---

8.1	Scope	14
8.2	Assets Covered	15
8.3	As-Built Requirements	15
8.3.1	Service Connection As-Built Plan	15
8.3.1.1.	Map Area	15
8.3.1.2.	Work Schedule	16
8.3.1.3.	Title Block	16
<b>9.0</b>	<b>Document Review History</b>	<b>17</b>
	<b>Appendices</b>	<b>18</b>
	<b>Appendix 1 Examples of Plans and Schedules</b>	<b>18</b>
	<b>Appendix 2 Examples of Photographs for each asset</b>	<b>21</b>
	<b>Appendix 3 Northpower Approved symbols for use on Construction Plans</b>	<b>24</b>



## 1.0 Introduction

### 1.1 Purpose

This document details Network's requirements for all As-Built documentation including As-Built plans, data capture forms, test records and photographs.

### 1.2 Scope

This document covers the following work types that impact the Northpower distribution network and require the network's core record systems to be updated.

- **New construction** - including subdivisions, network extensions and modifications to the distribution network
- **Corrective maintenance** - including replacement, remediation, removal or the relocation of network distribution assets
- **Reactive maintenance** - including asset fault replacements
- **Service Connections** – including permanent disconnections from Northpower's network

### Exclusions:

The As-Built standard will be extended to Zone Substation assets in the next release of this document.

### 1.3 Application

This standard applies to all Northpower employees and Contractors.



## 2.0 References

Internal Reference	Details
New LV Service Connections Standard	Network's core processes and technical requirements for low voltage service connections to Northpower's network.
Customer Initiated Works Standard	This document details Northpower's Standard for managing Customer Initiated Works
<b>Data Capture Forms (support this standard)</b>	
Distribution Assets Data Capture Spreadsheet	This spreadsheet has been provided for use by contractors without an electronic version of data capture forms

## 3.0 Definitions

Terminology	Definition
Northpower Network	Northpower Network, owner and operator of the electricity distribution network.
Customer	People, organisations, agencies and companies, for example general public, local Councils, Transit, developers, and commercial & industrial businesses other than Northpower Limited, that request or require Customer Initiated Work to be undertaken
Contractor	For the purposes of this standard, this means the party authorised by Northpower to undertake the relevant works, and is responsible for preparing As-Built to meet the requirements of this standard. This includes both Field Service Providers (providing services to Northpower) and Network Approved Contractors (providing services to customers and third parties)
Field Service Provider (FSP)	A contractor with the health & safety, competency and delivery frameworks that enable them to provide complex services on the network (such as construction or maintenance activities) including Northpower's contracting division
Network Approved Contractor (NAC)	Businesses that have been approved by Northpower Group to perform design, construction or maintenance work on, or in close proximity to, Northpower's network and that have a current Network Approved Status Agreement executed with Northpower
Asset Information Team (AIT)	The team responsible for maintaining data integrity and ensuring data entered into network's asset management systems complies with the Northpower standard
Contractor QA & Audit Lead (CONQUAL)	Provides a quality assurance and audit function for Northpower. Includes responsibility for reviewing and approving designs and As-Built documentation for Customer Initiated Work undertaken by Network Approved Contractors





Terminology	Definition
Engineering Delivery Team (EDT)	The team within Northpower responsible for administering the managing and/or delivering network design and works programmes. Responsible for monitoring and ensuring work carried out on Northpower's network complies with Northpower construction standards
Network Initiated Work (NIW)	Works initiated by Northpower
Customer Experience Team (CET)	The team responsible for administering the Customer Initiated Work process.
Construction Plan	A scaled geographic representation of the proposed works with all relevant property boundaries included and the proposed work referenced to a location on the plan Construction Plans are required for all projects involving subdivisions, extensions or modifications to the Northpower Network. Files associated with the construction include construction plans (proposed and As-Builted), asset data capture forms, test records and photographs
As-Built	As-Builts are records prepared by the contractor as the work proceeds in which the actual locations of the network assets and changes to the original approved design are recorded. These also include completed asset data capture forms, test records and photographs.
Landbase	Proprietary digital database defining road and property boundaries and descriptions, as used in the Northpower GIS
Permanent Disconnection	The physical disconnection of a consumer's supply in instances where the supply is no longer required, including the removal of all metering and equipment that is the property of Northpower. For example, when a building is removed or condemned



## 4.0 As-Builts Overview

As-Builts are records prepared by the contractor as the work proceeds and the actual locations of assets and changes to the original design are recorded. These also include completed forms, data sheets, test records, and photographs.

As-Built requirements for each of the following work types are covered in detail in the following sections:

- Network construction
- Corrective maintenance
- Reactive maintenance
- Service Connections (including Permanent Disconnections)

Depending upon the work type, As-Built documentation will include some or all of the following records.

### As-Built plans

The following Plan templates provided by Northpower are to be used for Network Construction, Corrective Maintenance and Service Connection work. These are available by request to the Asset Information Team.

**Electronic copies of plans in PDF format are preferred but final signed copies shall be of a high resolution and clearly legible after scanning.**

### As-Built data capture forms

Where the required asset data is not captured on an As-Built plan or associated schedule of work, As-Built data shall be captured on an approved data capture form. For Contractors without an electronic version of these forms, the Distribution Assets Data Capture Spreadsheet may be used. This is available by request to the Asset Information Team.

### Test Certificates

Test certificates must be provided for new and refurbished distribution switchgear, transformers, and controllers.

### Photographs

Photographs can be a valuable aid to the Asset Information Team as they interpret the information to be updated in the network's asset management systems. This helps them to ensure the correct placement and connectivity of equipment. Typically, photos would include the following:

- A general view of the work area showing equipment placement and location
- Pole-top details especially where a more complex installation is constructed
- Equipment locations including a reference point such as an existing pole, street intersection, building, driveway or boundary peg
- Detail views of pillar internals or transformer LV panel



- Manufacturers' nameplates and serial numbers e.g. pole numbers and metal tags on pillars
- Open trenches of earth installations and larger jobs to show trench location, cable route, ducts etc.

Sample photographs are provided. Refer to **Appendix 2**.

## 5.0 Network Construction

As-Built records are to be returned to the network following completion of all construction jobs. As-Built records for work undertaken by a Network Approved Contractor shall be returned to the Network Quality Lead, who will review and forward to the Asset Information Team. For work undertaken by a Field Services Provider these records shall be forwarded direct to the Asset Information Team.

### 5.1 Scope

- All construction activities including subdivisions, network extensions and modifications. Note, These activities exclude minor alterations and extensions to the LV distribution network associated with new service connections
- HV feeder reconfigurations as a consequence of a switch installation, removal, relocation or permanent change to a switch status
- LV feeder reconfigurations as a consequence of a transformer installation, removal, relocation or permanent change to an LV open point

#### 5.1.1 Exclusions

Zone Substation As-Built records

### 5.2 Assets Covered (but not limited to)

- Overhead Lines – Conductors, Poles
- Underground Cables – Cables, Ducts, Joints
- Distribution Equipment – Distribution Transformers, Switchgear (including Reclosers), HV Links and Fuses, Earths, Lightning Arrestors, Poles, Pillars, and Streetlights

### 5.3 As-Built Requirements

The Contractor shall forward all As-Built documentation to Northpower Network within ten (10) working days of the completion of the work.

- For work undertaken by a Field Services Provider the documentation shall be forwarded directly to the Asset Information Team for review and upload to Network's asset management systems.
- For work undertaken by a Network Approved Contractor the documentation shall be forwarded to the Network Quality Lead, who will review the documentation before forwarding it to the Asset Information Team for final review and upload to Network's asset management systems.

**Note**, if assets are installed over a period that exceeds 10 days and there is uncompleted work remaining on the construction plan, a partial As-Built for all commissioned assets shall



be submitted. The As-Built must be stamped PARTIAL AS BUILT and clearly note which work has been completed.

### 5.3.1 As-Built Construction Plan

The Construction Plan shall be marked “AS BUILT”, and completed in accordance with the post work signoff requirements detailed in the Title Block section.

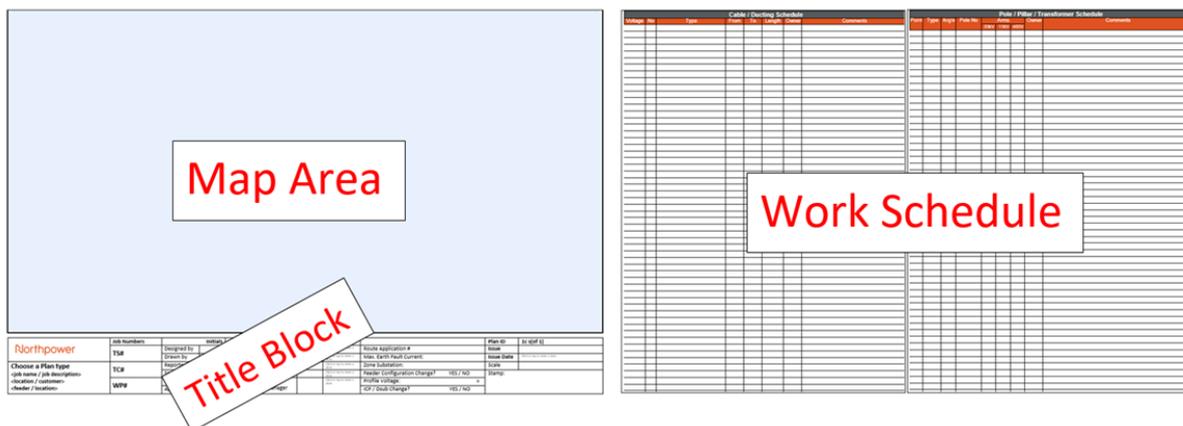
As-Built Construction Plans shall:

- Provide a scaled representation of the works with all relevant property boundaries included.
- Show the final line route and location of equipment relative to existing network and reference points such as transport corridors, parcel boundaries, street intersections, buildings, driveways or boundary pegs
- Identify which equipment is owned by Northpower, privately owned or shared. All ownership demarcation points with Northpower Network shall be clearly shown
- Include a final schedule of work completed at each work site referenced to a location on the map
- Clearly identify the asset numbering, as allocated by Northpower

Two A3 sized Construction Plan templates are available on to suit the layout of the work. They allow the insertion of images, schedules, and title information.

A Construction Plan comprises three sections:

- Map of Work Area
- Work Schedule
- Title Block



Please note: Work Schedules now include a title block as well.

The preferred format for submitting As-Built Construction Plan is a .docx or .pdf of high resolution. Additionally, the Asset Information Team will accept any GIS or CAD files that can be uploaded into network's asset management systems.



### 5.3.1.1. Map of Work Area

All changes to the proposed design shall be clearly shown on the As-Built Construction Plan. New reticulation shall be accurately located on the map and any existing reticulation within the work area which is incorrectly shown in the GIS will need to be corrected on the map.

Unless it is impractical to do so, e.g. long spans over a gully, the minimum line height on a span and ambient temperature shall be recorded and the location marked on the map. If a conductor crosses a road, a second measurement must be taken on the crossing if this differs from the minimum height over the entire span. This requirement applies to all situations where a pole is installed or a conductor resagged / replaced. All circuits carried by the pole must be measured.

### 5.3.1.2. Work Schedule

A description of the completed work at each work site shall be provided. Each item on the work schedule is to be referenced to the corresponding work site on the map. If new and existing works are shown on the same Construction Plan, each type of work shall be clearly identified to minimise ambiguities.

The As-Built map and associated work schedule shall include the following information:

- The final route of any additional or altered network with orientation, voltage, number of phases and phasing, termination points, conductor type and size
- Proposed Services – source pole or pillar, proposed conductor type, number of phases, allocated phasing and indication of direction to premise
- In Use and Spare Ducting with route, position referenced to boundary lines
- For underground network the location of all Cable Joints
- All assets that have been added, altered, replaced or removed are to be clearly shown on the map and referenced by the work schedule. These shall include, but are not limited to, poles, pillars, distribution transformers, HV switches, HV links and fuses, earth banks, open points and streetlights
- A configuration diagram for all new or altered LV distribution panels, distribution cabinets or link pillars
- Where existing LV is to be altered, a record of ICPs transferred from one transformer to another, or added to a new transformer

Examples of the above content are shown for reference in the appendices

### 5.3.1.3. Title Block

As-Built Construction Plans include:

- A. A brief description of the work (job description) the customer name, and location / address where the work is taking place
- B. Pre-works sign off (date and first and last name) from the designer, the draftsman ("Drawn by",) and design approver
- C. Post-works sign off (date and signature) from the person who did the overhead work (OH,) underground work (UG,) the project manager, and any other relevant construction lead





- D. Job or cost reference numbers (examples shown)
- E. Route Application number for work on high voltage (the same as the Plan ID,) maximum earth fault current, the zone substation, if there is a feeder configuration change, profile voltage, and if there’s an ICP or Dsub change.
- F. Drawing information: the Plan ID (issued by Asset Information Team) and number of sheets in the drawing, the Issue / version of the drawing (starting at A,) the date the drawing is issued, scale of the drawing. When the work is complete and the drawing is updated to reflect the work that was completed it should be stamped “AS BUILT.”

		Pre-Construction Sign Off		Date	Construction Sign Off	Date
		Designed by		<small>Click or tap to enter a date.</small>	OH	<small>Click or tap to enter a date.</small>
Choose a Plan type <del>job name / job description</del> <del>location / customer</del> <del>feeder / location</del>		Drawn by		<small>Click or tap to enter a date.</small>	UG	<small>Click or tap to enter a date.</small>
		Reported by		<small>Click or tap to enter a date.</small>	Other	<small>Click or tap to enter a date.</small>
		Checked by		<small>Click or tap to enter a date.</small>	Project Manager	<small>Click or tap to enter a date.</small>
		Approved by		<small>Click or tap to enter a date.</small>		
Reference Numbers		Details for New or Altered Assets			Plan ID	1c s(of 1)
TS#		Route Application #			Issue	
TC#		Max. Earth Fault Current:			Issue Date	<small>Click or tap to enter a date.</small>
WP#		Zone Substation:			Stamp:	
		Feeder Configuration Char		YES / NO		
		Profile Voltage:		v		
		ICP / Dsub Change?		YES / NO		

**Note**, items crossed out are not relevant to a Construction As-Built

### 5.3.2 As-Built Records

Each As-Built Construction Plan is to be provided with the relevant As-Built Records – completed data capture forms, test records where applicable, and photographs.

## 6.0 Corrective Maintenance

These activities require As-Built copies of Corrective Maintenance Plans to be returned following completion of work including associated files – asset data capture forms, test records and photos.

Electronic copies of plans are preferred but final signed copies shall be of a high resolution and clearly legible after scanning.

### 6.1 Scope

All voltages – subtransmission, high voltage, low voltage

Corrective maintenance activities include:

- Asset relocation
- Asset relabel
- Remediation of unsafe lines
- Asset and component replacements (like-for-like and capacity upgrades/downgrades)
- Asset removal



## 6.2 Assets and Components Covered

Assets that require update to network's asset management systems include the following:

- Overhead Lines – Conductors, Poles
- Underground Cables – Cables, Ducts, Joints
- Distribution Equipment – Transformers, Switchgear (including reclosers), HV Links and Fuses, Earths, Lightning Arrestors, Pillars

Component replacements shall also be recorded. These include crossarms, insulators, guys etc.

## 6.3 As-Built Requirements

As-Built records are to be returned to the Asset Information Team no more than 10 working days following completion of the work.

Corrective Maintenance activities involving assets and components are to be included on As-Built Corrective Maintenance Plans.

### 6.3.1 As-Built Corrective Maintenance Plan

On completion of work an As-Built Corrective Maintenance Plan is to be provided. This shall be marked up with a description of the work at each location and shall be marked "AS BUILT" and completed in accordance with the post work signoff requirements detailed in the Title Block section.

As-Built plans for Corrective Maintenance use the same general template as used for New Construction. For larger work areas, multiple maintenance plans may be required to maintain legibility. In these cases an overview map which shows the extent of each work area is required.

An As-Built Corrective Maintenance Plan comprises two sections:

- Map of work area
- Title Block

#### 6.3.1.1. Map of Work Area

As-Built Corrective Maintenance Plans shall provide sufficient information to update network's asset management systems and shall:

- Identify the location of each work location with an asset number
- Identify the asset type or component
- Describe the activity (e.g. Replace, Remove, Relocate, Relabel) and provide details of the work undertaken e.g.
  - *Replace pole 11m Busck*
  - *Replace HV S2.1P Crossarm including insulators*
  - *Replace guy across road to stub pole*
  - *Replace existing 2W Gopher with 3W Fluorine (10 spans)*





- Any network physically removed including overhead spans, underground cables, transformers, poles and pillars
- Describe any other action taken to make a site safe or additional notes for clarification e.g. 'Reduce Beetle to 25mm Copper and take into fuse base'
- Unless it is impractical to do so, e.g. long spans over a gully, the minimum line height on a span and ambient temperature shall be recorded and the location marked on the map. If a conductor crosses a road, a second measurement must be taken on the crossing if this differs from the minimum height over the entire span. This requirement applies to all situations where a pole is installed or a conductor resagged / replaced. All circuits carried by the pole must be measured.

### 6.3.1.2. Title Block

As-Built Corrective Maintenance Plans include:

- A brief description of the completed work (job name) the location or address, and the feeder.
- Pre-work sign off (date and first and last name) from the designer (if required,) the draftsman ("Drawn by,") and the approver.
- Post-work sign off (date and signature) from the person who did the overhead work (OH,) underground work (UG,) and any other relevant construction lead.
- Job or cost reference numbers (examples shown below.)
- Box E is not needed for like for like replacements.
- Drawing information: If there are multiple sheets, please include the number of sheets in the drawing. When the work is complete and the drawing is updated to reflect the work that was completed it should be stamped "AS BUILT".

		Pre-Construction Sign Off		Date	Construction Sign Off		Date	
		Designed by			OH			
<b>Choose a Plan type</b> <job name / job description> <location / customer> <feeder / location>		Drawn by			UG			
		Reported by			Other			
		Checked by			Project Manager			
		Approved by						
Reference Numbers		Details for New or Altered Assets			Plan ID	1 of 1		
WP# TS# TC#		Route Application #			Issue			
		Max. Earth Fault Current:			Stamp:			
		Zone Substation:				Issue Date		
		Feeder Configuration Change?	YES					
Profile Voltage:								
ICP / Dsub Change?		YES / NO						

**Note,** items crossed out are not relevant to a Corrective Maintenance As-Built

### 6.3.2 As-Built Records

Each As-Built Corrective Maintenance Plan is to be provided with the relevant As-Built Records – completed data capture forms, test records and photographs.

## 7.0 Reactive Maintenance

Reactive maintenance work is recorded in Footprints and a notification sent to the Asset Information Team where an update to network's asset management systems is required.

As-Built records are to be returned to the Asset Information Team no more than 5 working days following completion of the work



## 7.1 Scope

Assets replaced in response to a fault.

## 7.2 Assets Covered

Asset replacements that require network's asset management systems to be updated include the following – Northpower owned conductors (lines and cables) including LV distribution, distribution transformers, distribution switchgear (including reclosers), HV links and fuse (sets), joints, terminations, poles and pillars.

## 7.3 As-Built Requirements

Where an update to Network's asset management systems is required a Data Capture Form shall be completed and returned to the Asset Information Team within three (3) working days of the completion of the job.

**Note**, if overhead lines or underground reticulation are replaced, a marked up map of the work area shall also be provided. This shall clearly identify all lines, poles, cables and underground assets including joint and pillars replaced. These must be shown in relation to existing network and the diagram must be sufficiently clear to enable accurate update to network's asset management systems.

The map must include a job reference.

Minimum line heights of Northpower-owned overhead reticulation impacted by this work shall be recorded on the As-Built map. The lowest point shall be marked on the map and ambient temperature at the work site shall also be recorded.

## 8.0 Service Connections and Permanent Disconnections

This section covers work related to service connections with the exception of new service connections, which are covered in *New LV Service Connections Standard*. However, this section will apply where a new connection requires works to amend or upgrade the LV distribution network in order to enable a connection to proceed.

An As-Built copy of a Service Connection As-Built Plan is to be returned following completion of the work. A proposed design is not required to be captured in Network's asset management systems prior to construction.

As-Built information is required for all installations permanently disconnected from the Northpower Network. This information is used to update Network's asset management systems to reflect the asset changes and decommission the ICP.

## 8.1 Scope

These activities cover minor alterations and extensions to network associated with new service connections and include:

- Pole top connections
- Provision of power to boundary



- Overhead to underground conversions
- Fusing upgrades
- Customer installations which are to be permanently disconnected from the Northpower Network

## 8.2 Assets Covered

Assets covered by this activity include poles, pillars, fuses, transformers, overhead lines and underground reticulation

## 8.3 As-Built Requirements

An As-Built copy of a Service Connection As-Built Plan is to be returned to the Asset Information Team within ten (10) working days of completion of the work. This shall be marked “AS BUILT”, and completed in accordance with the post work signoff requirements detailed in the Title Block section.

### 8.3.1 Service Connection As-Built Plan

The Service Connection As-Built Plan is to be used to capture the required information.

Northpower		Service Connection As-Built	
Reference Numbers	Contractor	Designed By	Date
Work Type	Foreman	Project Manager	Stamp
Work Schedule		AS BUILT	
Location	Work Description		

#### 8.3.1.1. Map Area

A marked-up As-Built drawing showing the equipment added, altered or removed at each location – fuses, poles, pillars, transformers and reticulation (lines and cables). All ownership demarcation points with Northpower Network shall be clearly shown.

Minimum line heights of Northpower-owned overhead reticulation impacted by this work shall be recorded on the As-Built map. The lowest point shall be marked on the map and ambient temperature at the work site shall also be recorded.

If new and existing works are shown on the As-Built map, each type of work shall be clearly identified to minimise ambiguities.





A permanent disconnection shall:

- Identify the disconnection point from the Network (premise, pole and/or pillar)
- Identify which assets have been physically removed or disconnected and left in place (including lines and cables). Example: *“removed pole fuse on pole 12345 and removed two spans of overhead between premise and network connection point (pole 12345) ”*

### 8.3.1.2. Work Schedule

The Work Schedule is to include a description of work performed at each site, referenced to a location on the map.

For additions or changes to existing network the following data is to be recorded:

- Poles – pole number (if available), pole model, voltage level, number of services off the pole
- Pillars – pillar number (if available), pillar model, fuse rating, number of fuses
- Reticulation (overhead lines and underground cables) – voltage level, orientation, number of phases, phasing, conductor type

### 8.3.1.3. Title Block

#### Service Connections (excluding Permanent Disconnections)

Service Connection As-Built shall include:

- A brief description of the completed work (job name,) the customer name, and the location or address
- Job or cost reference numbers
- The name of the Contractor and Designer
- A general description of the work done, from a drop down list
- Post-work sign off (date and initials) from the person who did the overhead work (OH,) underground work (UG,) the foreman and project manager
- When the work is complete and the drawing reflects the work that was completed it should be stamped “AS BUILT”
- The ICP Premise Number

<b>Northpower</b>		<b>Service Connection As Built</b>			
				<div style="border: 1px solid black; padding: 2px; display: inline-block;">A</div> <job name> <customer> <location>	
Reference Numbers	<div style="border: 1px solid black; padding: 2px; display: inline-block;">B</div>	Construction Sign Off		Date	Stamp
Contractor	<div style="border: 1px solid black; padding: 2px; display: inline-block;">C</div>	OH			<b>AS BUILT</b> <div style="border: 1px solid black; padding: 2px; display: inline-block;">F</div>
Designed by		UG	<div style="border: 1px solid black; padding: 2px; display: inline-block;">E</div>		
Work Type	Choose an item.	Foreman			
	<div style="border: 1px solid black; padding: 2px; display: inline-block;">D</div>	Project Manager			ICP <div style="border: 1px solid black; padding: 2px; display: inline-block;">G</div>

Controlled Document





## Permanent Disconnections

Service Connection As-Built for Permanent Disconnections shall include:

- A. A brief description of the completed work (job name,) the customer name, and the location or address
- B. Reference Numbers include the Retailer Request Number and Northpower Job Numbers
- C. The name of the Contractor, a Designer is not required
- D. From the drop down list choose Permanent Disconnection
- E. Post-work sign off (date and initials) from the person who did the overhead work (OH,) underground work (UG,) the foreman and project manager
- F. When the work is complete and the drawing reflects the work that was completed it should be stamped "AS BUILT"
- G. The ICP Premise Number

Northpower		Service Connection As Built			
Reference Numbers <b>B</b>		Construction Sign Off		Date	Stamp
Contractor <b>C</b>		OH			<b>AS BUILT</b> <b>F</b>
<del>Designed by</del>		UG			
Work Type <b>D</b> Choose an item.		Foreman			
		Project Manager			ICP <b>G</b>

Note, items crossed out are not relevant to a Service Connection As-Built

## 9.0 Document Review History

Version Number	Date	Revision Notes (reason for change)
1.0	17/11/2021	New Document Release. Replaces ENS 02.01.030 Design and As Built Plans With Service Connections
2.0	10/03/2023	Updated document with removing references to the template – Construction Work Schedule (no longer required).





## Appendices

### Appendix 1 Examples of Plans and Schedules

Shown below are examples of content included on construction plans and associated work schedules

#### Cable / Ducting Schedule

Cable/Ducting Schedule							
Voltage	No	Type	From	To	Length	Owner	Comments
400V	1	4c185mm XLPE Al Sector	0	E via A, B, D	450m	NP	Haul through 110mm duct installed by Northdrill Ltd.
400V	1	4c25mm XLPE Cu Cable	B	C	20m	NP	Haul through 65mm duct installed by others
400V	1	4c95mm XLPE	F	G	125m	NP	Haul though duct 63mm duct installed by Northdrill Ltd, & lay in 65mm duct under warning tape in the trench supplied by others.

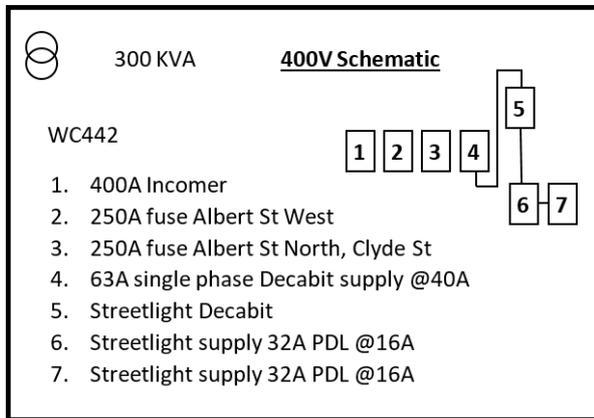
Cable/Ducting Schedule							
Voltage	No	Type	From	To	Length	Owner	Comments
11,000V	1	3c 185mm <sup>2</sup> Aluminium	3B	Switch 2360	270m	NP	Install in 100mm Orange duct as per 2F250s3. Trifurcate and terminate into Switch 2360 using Type A Screened Elbows.
400V	1	1c 16mm <sup>2</sup> Neutral Screen	3B	3C	270m	NP	Install in 100mm Orange duct and drain coil as per 2F250s3. Terminate into RMU as per drawing fleet NSF-21011

#### Pole / Pillar / Transformer Schedule

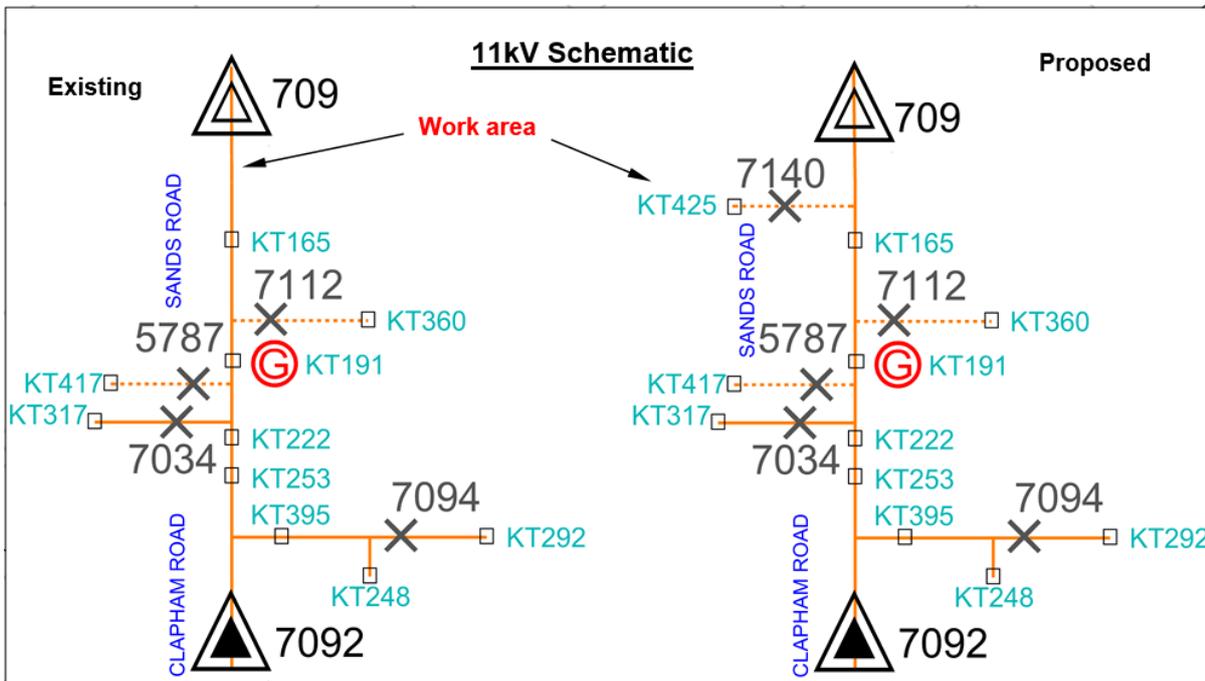
Pole / Pillar / Transformer Schedule							
Point	Type	Angle	Pole No	Arms		Owner	Comments
				11kV	400V		
1	B13.65		20766	2.4m BTB	3.3m DAP 2.1m SAT	NP	Replace Existing 40T with B13.65 with donut. Face pole edge to be in line with 11kV and install 1200 block for new Iodine conductor. Back fill with Limestone chip. Rebuild Transformer Structure. Ampact Mink ACSR to new Iodine AAAC. Install LA's and LA earth bank. Install Floater arm for road crossing service (4W Kutu). Reinststate Guy. Re-label bSub 6109-LS Record Pole Number.....
2	B12.4		44965	2.0m SAP 2.4m DAT	2x 2.1m DAT	NP	Replace Existing 36L with B12.4 with donut. Install with edge facing towards Fluorine tap off down Village Road and install 1200 block. Back fill with Limestone chip. Remove both road-crossing guys. Connect new 35mm ABC to existing 16mm Copper via IPCs. Re-instate Links 3200 and re-label. Record Pole Number.....
3	B13.65			2.0m SAP 2.0m DAT		NP	Install new B13.65 with donut at peg. Install 1200 Block for SH12 Road Crossing. Back fill with Limestone chip. Record Pole Number.....
3A	B9.5		414490			NP	Remove now redundant stub pole
3B	B12.4			2.4m DAT		NP	Install new B12.4 with donut at peg. Install 1200 Block for SH12 Road Crossing. Back fill with Limestone chip. Install S&C cut-outs on the top arm and load with solid links. Label Links 3385. Install new 11kV cable and crucifix. Connect to cut-outs and Iodine mainline via 70mm PVC Copper jumpers and Ampacts with Gelpacts. Install earth bank as per 2F188s5. Do not connect screen. Install single-phase N/Sc cable riser and fuse box with 32A fuses on White Phase. Connect to ABC via IPCs. Record Pole Number.....
3C						NP	Install new Automated Siemens 8DJH LR Ring Main Unit at pegged position. Construct as per drawing fleet NSF-21011. Undertake required testing and complete data sheets.



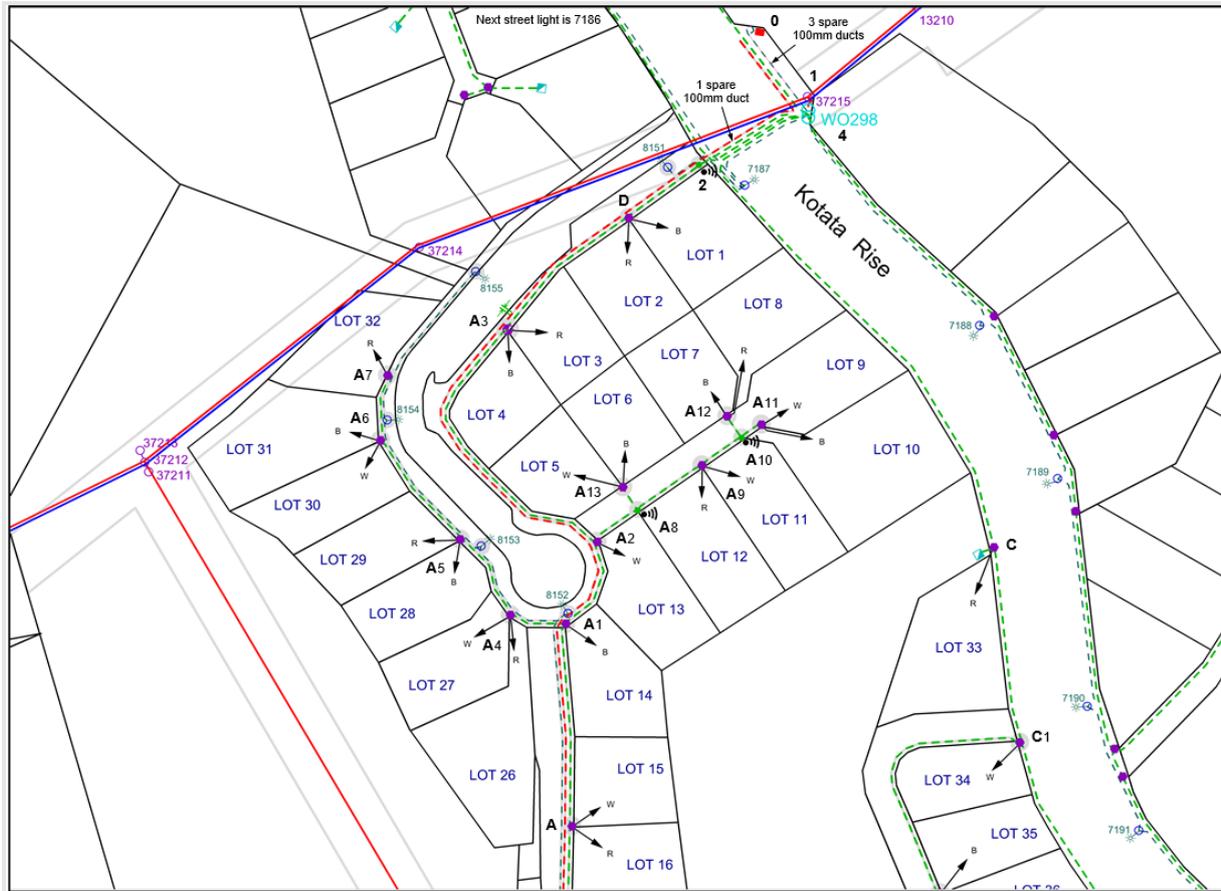
### LV Schematic



### HV Schematic



### Construction Plan – Subdivision



### Construction Plan – Network Extension



## Appendix 2 Examples of Photographs for each asset

The following examples are thumbnails of photographs and are intended as guidelines. Individual installations may require additional photographs in order to clarify detail. Where required identifying numbers must be visible and readable

### Overhead Lines

- A clear view of the overhead structure, zoomed in to capture as much detail as possible. Additional photographs to be taken to where required to capture insulators and connectors
- A locational view showing the entire pole on background and surface at base of pole
- A clear view of the pole number with name plate detail and age (etched into the pole) where available



### Distribution Transformers

#### Ground Mount Transformers

- Transformer on base with kVA rating, serial number and DSub number
- HV panel with terminations
- LV panel showing equipment including circuit numbers of main fuse and LV fuses
- Name plate



## Overhead Distribution Transformers

- A locational view showing the entire pole on background and surface at base of pole
- A zoomed in view of transformer kVA rating, tap position and serial number clearly shown



## Distribution Switchgear

### Overhead Enclosed Switchgear

- A locational view showing the switch and pole
- Close-up view of switchgear and mounting



### Manufacturer's name plate



### Ground Mounted Switchgear

- External view of switchgear on pad
- Switch panel with numbers clearly shown
- Switchgear name plate



### Pillar



## Appendix 3 Northpower Approved symbols for use on Construction Plans

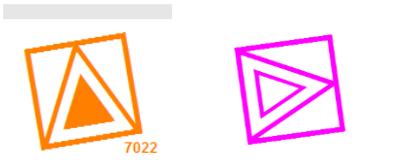
See symbology document for the full list.

Asset and Components	Symbol
<b>Sub Transmission Line (OH)</b> Colour: <ul style="list-style-type: none"> <li>Blue</li> <li>Grey halo means proposed</li> </ul>	
<b>Sub Transmission Cable (UG)</b> Colour: <ul style="list-style-type: none"> <li>Blue</li> <li>Grey halo means proposed</li> </ul>	
<b>High Voltage Line</b> Colour: <ul style="list-style-type: none"> <li>Red</li> <li>Grey halo means proposed</li> </ul>	
<b>High Voltage Cable</b> Colour: <ul style="list-style-type: none"> <li>Red</li> <li>Grey halo means proposed</li> </ul>	
<b>Low Voltage Line / Streetlight Line</b> Colour: <ul style="list-style-type: none"> <li>Dark green</li> <li>Grey halo means proposed</li> </ul>	
<b>Low Voltage Cable / Streetlight Cable</b> Colour: <ul style="list-style-type: none"> <li>Dark green</li> <li>Grey halo means proposed</li> </ul>	
<b>Hot Water Line</b> Colour: <ul style="list-style-type: none"> <li>Light green</li> </ul>	
<b>Hot Water Cable</b> Colour: <ul style="list-style-type: none"> <li>Light green</li> </ul>	
<b>Private Network</b> Any line or cable type with PVT written along it.	
<b>Ducting</b> Colour: <ul style="list-style-type: none"> <li>Black</li> <li>Grey when proposed</li> </ul>	
<b>Poles</b> Colour: <ul style="list-style-type: none"> <li>Purple (Northpower owned)</li> <li>Blue (privately owned)</li> <li>Grey halo means proposed</li> </ul>	

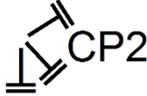


Asset and Components	Symbol
<p>Number of circles indicates pole structure:</p> <ul style="list-style-type: none"> <li>One circle = single pole</li> <li>One large circle = double pole</li> <li>Two circles = two pole structure</li> <li>Three circles = three pole structure</li> </ul>	
<p><b>Pillars</b> Colour:</p> <ul style="list-style-type: none"> <li>Purple (Northpower owned)</li> <li>Blue (privately owned)</li> <li>Grey halo means proposed</li> </ul> <p>Filled symbols are Service Pillars Patterned symbols are metered Pillars.</p>	
<p><b>Open Points</b> Colour:</p> <ul style="list-style-type: none"> <li>Green</li> <li>LV open point red</li> <li>HV open point</li> </ul> <p>A “?” indicates it’s an assumed open point, no “?” is a confirmed open point.</p>	
<p><b>Joints</b> Colour:</p> <ul style="list-style-type: none"> <li>Green</li> <li>LV Joint Red</li> <li>HV Joint Blue</li> <li>ST Joint Grey halo means proposed</li> </ul>	
<p><b>Street Light</b> Colour:</p> <ul style="list-style-type: none"> <li>Green (example on a private pole)</li> </ul>	
<p><b>Marker Ball</b> Colour:</p> <ul style="list-style-type: none"> <li>Black</li> </ul>	
<p><b>Distribution Transformers</b> Colour:</p> <ul style="list-style-type: none"> <li>Turquoise</li> <li>Grey halo means proposed</li> <li>Grey small box on schematics</li> </ul>	
<p><b>Link</b> Colour:</p> <ul style="list-style-type: none"> <li>Green</li> <li>HV link Black</li> <li>ST link Black on schematic</li> <li>Grey halo means proposed</li> </ul>	



Asset and Components	Symbol
<p><b>LV Link</b> Colour:</p> <ul style="list-style-type: none"> <li>▪ Dark Green</li> <li>▪ Grey halo means proposed</li> </ul>	<p style="text-align: center;"><i>Closed</i></p>  <p style="text-align: center;"><i>Open</i></p> 
<p><b>Switch – Overhead Enclosed</b> Colour:</p> <ul style="list-style-type: none"> <li>▪ Orange - closed HV switches (filled in)</li> <li>▪ Pink - open HV switches (outlines only)</li> <li>▪ Black - open or closed ST switches</li> <li>▪ Black on schematic</li> <li>▪ Grey halo means proposed</li> </ul>	
<p><b>Switch – Remote Controlled Overhead Enclosed</b> Colour:</p> <ul style="list-style-type: none"> <li>▪ Orange - closed HV switches (filled in)</li> <li>▪ Pink - open HV switches (outlines only)</li> <li>▪ Black - open or closed ST switches</li> <li>▪ Black on schematic</li> <li>▪ Grey halo means proposed</li> </ul>	
<p><b>Ring Main Units (only showing 2 options)</b> Colour:</p> <ul style="list-style-type: none"> <li>▪ Orange - closed switches</li> <li>▪ Pink - open switches (outline only)</li> <li>▪ Black on schematic</li> <li>▪ Grey halo means proposed</li> </ul>	
<p><b>Recloser</b> Colour:</p> <ul style="list-style-type: none"> <li>▪ Orange - Black on schematic</li> <li>▪ Grey halo means proposed</li> </ul>	
<p><b>Sectionaliser</b> Colour:</p> <ul style="list-style-type: none"> <li>▪ Orange - black on schematic</li> <li>▪ Grey halo means proposed</li> </ul>	
<p><b>Earth</b> Colour: black</p>	



Asset and Components	Symbol
<b>Lightning Arrestor</b> Colour: <ul style="list-style-type: none"> <li>▪ Black</li> </ul>	
<b>Capacitor / Capacitor Bank</b> Colour: <ul style="list-style-type: none"> <li>▪ Black</li> </ul>	
<b>Existing Installation</b> Colour: <ul style="list-style-type: none"> <li>▪ Turquoise</li> </ul>	
<b>Regulating Transformer</b>	

