NSP/007/028 – Guidance on Substation Design: Drawing Submission Requirements

1. Purpose

The purpose of this document is to provide guidance on the submission of design drawings for proposed substations to be adopted by Northern Powergrid.

This document supersedes the following documents, all copies of which should be destroyed.

Document Reference	Document Title	Version	Published Date
NSP/007/028	Guidance On Substation Design: Drawing Submission Requirements	1.0	September 2015

2. Scope

This document applies to the design of all substations intended for connection to the Northern Powergrid network.

2.1. Table of Contents

3. Drawing Submission

Northern Powergrid will review and approve submitted design drawings in the following stages.

Stage 1 Outline Drawings - Feasibility drawings showing general site layout.

Stage 2 Electrical Drawings – Detailed electrical layout drawings showing equipment layout / electrical requirements.

Hold Point - Northern Powergrid will not review stage 3 drawings before stage 2 drawings have been submitted and approved.

Stage 3 Civil drawings – Detailed civil drawings with supporting documentation.

Drawings should be submitted to the Primary Engineering Projects Substation Design Section via the scheme Project Manager.

A comprehensive list of all drawings required is given in Section 3.3.

Drawings submitted should conform to the following Northern Powergrid policies:

NSP/007/001 - Guidance on Substation Design: Key Design Parameters
NSP/007/019 - Guidance on Primary Substation Design: Electrical Drawings

3.1. Stage 1 Drawings (Outline)

Stage 1 drawings should show the general site layout. This stage should be the initial submission and include the following:

1. Site Layout (Showing overall layout with cable routes, ducts & troughs)
2. Building Layout (Showing equipment layout, plan view, section view, clearances & electrical requirements)
3. Compound Layout (Showing plan and section views of outdoor equipment with clearances)

3.2. Stage 2 Drawings (Electrical)

Stage 2 drawings should detail the electrical layout. These drawings will outline the electrical requirements and need to be submitted and approved before the commencing the civil design. They show equipment layout and are required by the civil contractors when producing the detailed construction drawings. These drawings include the following:

1. Transformer Layout (Showing Plan view and sections)
2. Bund details – Enclosure requirements
3. Building Layouts
4. Earthing layout(s)

Refer to section 3.3.2 for a full breakdown of the electrical drawing requirement.

HOLD POINT

A hold point is set at this stage. No stage 3 civil drawings will be checked by Northern Powergrid until the Stage 2 electrical drawings have been approved.

3.3. Stage 3 Drawings (Civil)

Stage 3 drawings should provide the detailed civil drawings used during construction. These drawings include the following:

1. Site layout
2. Building design
3. Compound design
4. Transformer enclosure and bund design
5. Structural calculations

Refer to section 3.3.3 for a full breakdown of the civil drawing requirement.

3.4. Drawing Requirement

Drawing numbering	Refer to NSP 007 019
Drawing title block content	Refer to NSP 007 019
Drawing office contact details	Refer to NSP 007 019

3.5. Drawing Format

All drawings should be provided electronically in an industry standard CAD format – AutoCAD (.dwg or .dxf) or microstation (.dgn).

Drawings should be self-contained with no external reference files or attachments.

3.6. Drawing Content

All drawings shall conform to a similar standard of detail as provided by the Northern Powergrid standard substation electrical layout drawings which can be obtained from the Primary Engineering Projects Substation Design section on request.

3.7. Drawing Appearance

All drawings provided should be clear and concise.
All drawings shall be to an industry standard scale as found on traditional scale rules.
All drawings shall use appropriate colour for the drawing content. Content should be clear on screen and on print.
Colours such as yellow which is not visible on a white paper or screen background should be avoided.
Text and dimensions should be placed away from any patterning or below any drawing lines for clarity.
The excessive use of grid lines should be avoided for clarity.
All text must be legible when printed at A3.

3.8. Drawing Approval

Drawings will be approved by the Northern Powergrid Design Section.
Drawings will be approved within 20 days of submission in line with Northern Powergrid Guaranteed standards.
Appendices 1 to 15 are the checklists used by Northern Powergrid to assess the drawing submissions and provide a breakdown of the detail required within each key drawing type.

3.9. Drawings Required For Submission

The following drawings provide a comprehensive list of requirements for the substation design.
Note – Some drawings can be combined for smaller sites to reduce the number of drawings required.

3.9.1. Drawings Required

Note – A breakdown of the content requirement for key drawings can be found in NSP 007 019

3.9.2. Electrical Drawings

DRAWING:	Typical Scale:	Typical Size:
Site Plan / Location Plan	1:200	A1/A0
Substation Layout (Electrical / Civil requirement)	1:100	A1/A0
Sections Through Substation	1:100	A1/A0
Switchroom Layout (Electrical / Civil requirement)	1:50	A1
Control Room Layout (Electrical / Civil requirement)	1:50	A1
Building Sections	1:50	A1
Compound Layout	1:100	A1
Transformer Layout (Electrical / Civil requirement)	1:50	A1
Sections Through Transformer Layout	1:50	A1
Oil Containment Calculations	-	-
Troughing and Conduit Layout	1:100	A1/A0
Site Earthing Details (Inc Earthing Study)	1:100	A1/A0
Building Earthing Details	1:50	A1
Compound Earthing Details	1:50	A1
Transformer Layout Earthing Details	1:50	A1
Heating and Lighting Layout	1:50	A1
Heating and Lighting Calculations	-	-
Fire Mitigation Plan (Inc Fire Risk Assessment)	1:50	A1
NCT (Neutral Current Transformer) Support Steelwork Details	1:20	A2
Cable Route Layout	1:100	A1/A0
Support Structure Details	1:50	A1/A0
CDM (Construction Design and Maintenance Regulations) Plan	1:100	A1/A0
Setting Out Details	1:100	A1/A0
Site Welfare Arrangements	1:100	A1/A0
Phased Construction Details	1:100	A1/A0
Feasibility Study Options	1:100	A1/A0
Remote End Layouts	-	-
Connection and Protection Drawings	-	A1
Schedule Of Drawings	-	A4
Designers Risk Assessment	-	-
Flood Risk Assessment	-	-

3.9.3. Civil Drawings

DRAWING:	Typical Scale:	Typical Size:
Planning Drawing	1:200	A1/A0
Site Layout	1:100	A1/A0
Setting Out Details	1:100	A1/A0
Building Layout	1:50	A1
Building Sections	1:50	A1
Door Detail and Locking Arrangement	1:20	A1
Roof Detail	1:50	A1
Foundation Detail	1:50	A1
Windpost Detail	1:50	A1
Concrete Reinforcing Detail and Schedule	1:50	A1

Trench Support Steelwork Details	1:50	A1
Trench Cover Details	1:50	A1
Structural Calculations	-	-
Compound Civil Layout / Foundation Detail	1:50	A1
Structure Base Detail	1:20	A1
Structure Details	1:20	A1
Road Detail	1:20	A1
Fence Detail	1:50	A1
Gate Detail	1:20	A2
Landing Details	1:50	A1
Transformer Bund Layout – Plan and Section views	1:50	A1

4. References

4.1. Internal Documentation

Reference	Title
ENV 003 001	Management of Waste
IMP 002	Security Measures at Operational Sites
NSP 002	Policy for the Installation of Distribution Power Cables
NSP 002 001	Guidance Document for the Installation of Fibre Optic Underground Cables
NPS 003/033	Technical Specification for Substation Support Structures
NSP 007 001	Guidance on Substation Design: Key Design Parameters
NSP 007 003	Guidance on Substation Design: Construction Details
NSP 007 005	Guidance on Substation Design: Electrical Design Clearances
NSP 007 007	Guidance on Substation Design: 11kV and 20kV Switchgear
NSP 007 008	Guidance on Substation Design: 33kV Switchgear
NSP 007 010	Guidance on Substation Design: Fire Hazards and Precautions
NSP 007 011	Guidance on Substation Design: Heating and Lighting
NSP 007 013	Guidance on Substation Design: LVAC Systems
NSP 007 014	Guidance on Substation Design: 110V, 48V and 24V DC Systems
NSP 007 019	Guidance on Primary Substation Design: Electrical Drawings
NSP 007 020	Guidance on Substation Design: Transformer Noise
NSP 007 022	Guidance on Substation Design: Oil Containment

4.2. External Documentation

Reference	Title
CDM	Construction Design And Maintenance Regulations
ENATS 09-02	Specification for the supply, delivery and installation of power cables with operating voltages in the range 33kV to 400kV and associated auxiliary cables
ENATS 41-24	Guidelines For The Design, Installation, Testing And Maintenance Of Main Earthing Systems In Substations
S2/4	ENA Engineering Recommendation: Limitation of Fire Risk In Substations At 132kV And Below

4.3. Amendments from Previous Version

Reference	Description
NSP/007/028	Full document review

5. Definitions

Term	Definition
CAD	Computer Aided Design
CDM	Construction Design and Maintenance Regulations
CVT	Capacitor Voltage Transformer
LVAC	Low Voltage Alternating Current (Distribution Board)
NER	Neutral Earthing Resistor
NDVT	Neutral Displacement Voltage Transformer
PIR	Passive Infrared Sensor
SCADA	Supervisory Control and Data Acquisition (system operating with coded signals over communication channels so as to provide control of remote equipment)
SLC15	Regulatory guaranteed standard covering the level of service that Customers receive when sourcing connections from electricity distributors

6. Authority for issue

6.1. CDS Assurance

I sign to confirm that I have completed and checked this document and I am satisfied with its content and submit it for approval and authorisation.

		Date
Andy Leggett	CDS Administrator	02/01/2019

6.2. Author

I sign to confirm that I have completed and checked this document and I am satisfied with its content and submit it for approval and authorisation.

Review Period - This document should be reviewed within the following time period.

Standard CDS review of 3 years?	Non Standard Review Period & Reason	
Yes	Period: n/a	Reason: n/a
Should this document be displayed on the Northern Powergrid external website?		Yes

		Date
Steve Wilkinson	PEP Specification and Design Manager	02/01/2019

6.3. Technical Assurance

I sign to confirm that I am satisfied with all aspects of the content and preparation of this document and submit it for approval and authorisation.

		Date
Dave Sillito	PEP Manager	03/01/2019

6.4. Authorisation

Authorisation is granted for publication of this document.

		Date
Steve McDonald	Head of Programme Delivery	09/01/2019

Appendix Index - Check Sheets

The following check sheets are for guidance only. The check sheets will form the basis for drawing approval and should be used prior to submission to ensure drawing content is in line with Northern Powergrid expectations.

Further guidance can be obtained from the Northern Powergrid standard substation drawings which can be obtained from the Primary Engineering Projects Substation Design section on request.

Appendix 1 – General - Title Box Layout

TITLE BOX LAYOUT	OK?	INCORRECT/REASONS
Title box Layout		
Title Format		
Sub Titles		
Substation Name		
Drawing Number(s)		
Scale		
Date		
Revision		
Revision Details / Date		
Drawn By Details		
Grid Reference		
Company Logo		
Other		

Appendix 2 – General – Drawing Content

DRAWING CONTENT	OK?	INCORRECT/REASONS
Text Size		
Dimensioning		
Clarity and Quality		
Level of Detail		
Section Arrows		
Views		
Projection		
Layout		
Patterning		
Existing Equipment Detail		
Other		

Appendix 3 – Site and Location Plans

SITE AND LOCATION PLANS	OK?	INCORRECT/REASONS
Location Plan		
Local Authority		
Grid Ref		
Scale		
North Points		
Site Boundary		
Other:		

Details shown on these drawings should conform to the following Northern Powergrid policies:

NSP 007 003 - Guidance on Substation Design: Construction Details

Appendix 4 – Substation and Compound Layouts

SUBSTATION AND COMPOUND LAYOUTS	OK?	INCORRECT/REASONS
Views		
Civil Details / Electrical Requirements		
Phase Indicators		
Equipment Details		
Schedule of Equipment		
Duct Key / Key To Conduits		
Conduit Positions		
Troughing Detail		
Clearances (S2/4)		
Clearances (Other)		
Clearance Table		
Insulation Height Pedestrian Access		
Ground Clearance to Live Metal		
Phase - Earth		
Phase - Phase		
Busbar Centres		
Busbar Sizes		
Busbar Span Lengths		
Setting Out Lines		
Datum		
Flood Level		
Notes		
Location Markers		
Earth Blade Boxes (EB)		
Mechanism Boxes (MB)		
Table of Structures		
Cable Routes		
Troughing (Multicore & Power)		
Gates		
Transformer Access & Haulage Bollards		
Transformer Positioning		
Lighting		
Structure References		
Circuit Names		
Section References		
Location Marks		
Spill Kit Location		
Other		

Details shown on these drawings should conform to the following Northern Powergrid policies:

NSP 007 003 - Guidance on Substation Design: Construction Details
NSP 007 005 - Guidance on Substation Design: Electrical Design Clearances

Appendix 5 – Section Drawings

SECTION DRAWINGS	OK?	INCORRECT/REASONS
Views		
Equipment Details		
Schedule of Equipment		
Duct Key / Key To Conduits		
Conduit Positions		
Troughing Detail		
Clearances (S2/4)		
Clearances (Other)		
Clearance Table		
Setting Out Lines		
Datum		
Flood Level		
Notes		
References to Master Drawing		
Busbar Length Detail		
Busbar Span Table		
Fixed / Sliding Clamps		
Busbar Bending Details		
Other		

Details shown on these drawings should conform to the following Northern Powergrid policies:

NSP 007 003 - Guidance on Substation Design: Construction Details
NSP 007 005 - Guidance on Substation Design: Electrical Design Clearances

Appendix 6 – Control and Switchroom Layouts

CONTROL AND SWITCHROOM LAYOUTS	OK?	INCORRECT/REASONS
Views		
Civil Details / Electrical Requirements		
Equipment Details		
SCADA / Talus		
Relay Panels		
110V Battery / Charger		
24V Battery		
LVAC Board		
Desk / Filing Cabinet		
Alarms / Galaxy Unit		
Bund Pump Controls		
Telecoms Radio / Panel		
Schedule of Equipment		
Duct Key / Key To Conduits		
Conduit Positions		
Troughing Detail		
Clearances (S2/4)		
Clearances (Other)		
Clearance Table		
Setting Out Lines		
Datum		
Flood Level		
Notes		
Section Arrows		
Equipment Layout		
Circuit Breaker Withdrawal		
Door Types		
Door Size		
Trenches		
Ventilation		
Store Room		
Metering Annexe		
W/C (Toilet)		
Relay Panel Numbering		
Section Transformer Unit		
Section Feeder Unit		
Minimum Cable Bending Radii		
Switchgear Setting Out		
Multicores		
Switchgear Handing		
Switchgear Numbering / Naming		
Cable Details		

Trench Cover Details		
Steelwork Detail		
Spacing Between Batteries		
Door Between Switch And Control Rooms		
Switchgear Ventilation Panels		
Other		

Details shown on these drawings should conform to the following Northern Powergrid policies:

NSP 007 003 - Guidance on Substation Design: Construction Details
NSP 007 005 - Guidance on Substation Design: Electrical Design Clearances
NSP 007 007 - Guidance on Substation Design: 11kV and 20kV Switchgear
NSP 007 008 - Guidance on Substation Design: 33kV Switchgear

Appendix 7 – Transformer Layouts

TRANSFORMER LAYOUTS	OK?	INCORRECT/REASONS
Views		
Civil Details / Electrical Requirements		
Phase Indicators		
Equipment Details		
Schedule of Equipment		
Duct Key / Key To Conduits		
Conduit Positions		
Troughing Detail		
Clearances (S2/4)		
Clearances (Other)		
Clearance Table		
Setting Out Lines		
Section References		
Busbar Length Detail		
Busbar Span Table		
Fixed / Sliding Clamps		
Datum		
Flood Level		
Notes		
Transformer Enclosure Details		
NER (Neutral Earthing Transformer)		
NDVT (Neutral Displacement Voltage Transformer)		
Fault Thrower		
Transformer Identification		
Noise / Harmonic Clearance		
Bund Pumps		
Bund Depth		
Oil Containment Calculations		
Bucholtz Position		
Sockets (outdoor)		
Transformer Weights		
Cable Outlets		
Sarcophagus		

Phase Indicators		
Bund Construction / Type		
Transformer Access & Haulage Bollards		
Transformer Positioning		
Turret Positions / Phase Connections		
Other		

Details shown on these drawings should conform to the following Northern Powergrid policies:

NSP 007 003 Guidance on Substation Design: Construction Details
NSP 007 005 Guidance on Substation Design: Electrical Design Clearances
NSP 007 020 Guidance on Substation Design: Transformer Noise
NSP 007 022 Guidance on Substation Design: Oil Containment
NPS Document replacing NSP 007 006 Guidance on Substation Design: Power Transformers

Appendix 8 – Troughing and Conduit Layouts

DRAWING SPECIFIC	OK?	INCORRECT/REASONS
Views		
Civil Details		
Duct Key / Key To Conduits		
Conduit Positions		
Troughing Detail		
Setting Out Lines		
Notes		
Earthing Ducts		
Earthing To Door Ducts		
Interconnecting Ducts Between Trenches		
Switchroom To Control Room Ducts		
Transformer To Control Room Ducts		
Metering Room To Control Room Ducts		
Multicore Ducts To Customers Control Room		
Multicore Ladder Racking		
Sump Pump / Interceptor Duct		
Powerfence Duct		
Telephone Cable Duct		
Fibre Optic Cable Ducts		
Spare Ducts		
Future Provision Ducts		
Feeder Cable Ducts		
Transformer Cable Ducts		
Auxilliary Cable Ducts		
Neutral Cable Duct		
Transformer Cooler Control Cabinet Ducts		
Other:		

Appendix 9 – Cable Route Layouts (Within Substation)

CABLE ROUTE LAYOUTS	OK?	INCORRECT/REASONS
Duct Key / Key To Conduits		
Conduit Positions		
Troughing Outline		
Notes		
Key To Cables		
Cable Sizes		
Cable Route Design		
Cable Crosses		
Cable Support Details		
Cable Traywork Arrangements		
Cable Pit Details		
Cable Spacing		
Other		

Details shown on these drawings should conform to the following Northern Powergrid policies:

NSP 002 Policy for the Installation of Distribution Power Cables
NSP 002 001 Guidance Document for the Installation of Fibre Optic Underground Cables
ENATS 09-02 Specification for the supply, delivery and installation of power cables with operating voltages in the range 33kV to 400kV and associated auxiliary cables

Appendix 10 – Earthing Layouts

EARTHING LAYOUTS	OK?	INCORRECT/REASONS
Views		
Notes		
Key		
Estimated Tape Route Lengths		
Number of Earth Rods Indicated		
Location Marks		
SITE EARTHING		
Earth Links		
Earth Rods		
Test Earth Rods		
Fence Earthing		
Gates		
Perimeter Earth Tape Loop		
BUILDING EARTHING		
Equipment Earthing		
Cable Bonds		
Switchgear Bonding Bar		
Relay Panel Bonding Bar		
Building Earth Tape Loop		
Doors		
Handrails		
Support Steelwork		
Cable Trays		
Rebar		
Windposts		
COMPOUND EARTHING		
Structure Earths		
Mech Box Earths		
Stance Earths		
High Frequency Earths (CVT's)		
TRANSFORMER EARTHING		
NER Earth Rods		
NDVT		
Fault Thrower		
Tank (2)		
UAT		
Cooler Feet (2)		
Tap Changer		

Cable Boxes		
Cable Sheaths		
NCT		
NCT Support Steelwork		
Pump and Fan Motors		
Cooler Control Cabinet		
Sump Pump Controls		
Other		

Details shown on these drawings should conform to the following Northern Powergrid policies:

NSP 007 012 Guidance on Substation Design: Substation Earthing (In Draft)
Earthing Solutions Draft Northern Powergrid Earthing Design Policy Documents
ENATS 41-24 Guidelines For The Design, Of Earthing Systems In Substations
Yorkshire Electricity Standard DSS 002 012 (Obsolete)

Appendix 11 – Heating and Lighting Layouts and Fire Mitigation Plans

Heating and Lighting Layouts and Fire Mitigation Plans	OK?	INCORRECT/REASONS
Key to Symbols		
LVAC Layout indication		
LIGHTING		
Ceiling Lighting		
Wall Lighting		
Non Maintained Emergency Lighting		
Light Switching		Guidance note - Current Northern Powergrid policy requires only one light switch to control all lighting within the building. The control room would contain the alarm. This would be the first room accessed by staff and should have the switch adjacent the entrance door beside the alarm panel control keyboard. This switch would control all lights for both switch and control room.
Bulkhead Lighting		Guidance note - Current practice has bulkhead lighting above the door positions switched from within the control room.
Bulkhead With PIR and photocell		Guidance note - The bulkhead above the control room door would also be PIR controlled with the PIR positioned to detect movement on the approach access steps
Floodlighting		
Compound Lighting		
Direction of Fall (Columns)		
Lighting In External Buildings		
HEATING		
Control Room Heating		
Switchroom Heating		
W.C. (Toilet) / Store / Metering Annexe Heating		
Heating In External Buildings		
Heating Calculations		
Thermostat Locations		Guidance note - Current Northern Powergrid policy requires a thermostat for rooms with more than one heater and a contactor on the LVAC board. Individual thermostatically controlled heaters can be used for smaller rooms with only one heater.
Fan Heater Above Desk, 1 hour timeswitch		
Heater Types		
MISCELANEOUS		
Sockets		
3 Phase Socket Adjacent Transformers		
1 Phase Socket On External Wall		
Phone Socket		
Alarms		

Hand Drier		
PIR Detectors		
FIRE PLAN		
Heat Detectors		
Smoke Detectors		
Sounders		
Emergency Break Glass		
Zone Delineation		
Other		

Details shown on these drawings should conform to the following Northern Powergrid policies:

NSP 007 010 - Guidance on Substation Design: Fire Hazards and Precautions
NSP 007 011 - Guidance on Substation Design: Heating and Lighting
NSP 007 013 - Guidance on Substation Design: LVAC Systems
NSP 007 014 - Guidance on Substation Design: 110V, 48V and 24V DC Systems
NSP 007 017 - Guidance on Substation Design: Security (In draft)
IMP 002 – Security

Appendix 12 – Support Structure Drawings

SUPPORT STRUCTURE DRAWINGS	OK?	INCORRECT/REASONS
Views – Side, Front, Plan		
Phase Centres		
Phase Indicators		
Equipment Details		
Schedule of Equipment		
Clearance Requirements		
Datum		
Structure Heights		
Location Marks		
Earthing Points (2 Per Structure)		
Earth Tag Details		
Earth Loops		
Structure Reference Numbers		
Foot Positions Fit On Bases		
Isolator Moving Part Clearances		
Mechanism Box Positions		
Mechanism Box Identifier Symbols		
Number Of Structures Required		
Equipment Weights		
Wind Loading Projected Area		
High Bar / Low Bar Indication		
Cable Fixings		
Notes		
Other		

Details shown on these drawings should conform to the following Northern Powergrid policies:

NSP 003 – Document replacing NSP 007 024 Guidance on Primary Substation Design: Structural Design

Appendix 13 – CDM Plan, Site Welfare Arrangements, Setting Out Details

CDM PLAN, SITE WELFARE ARRANGEMENTS, SETTING OUT DETAILS	OK?	INCORRECT/REASONS
Views		
Notes		
Temporary Site Supply Details		
CDM (Construction Design And Maintenance Regulations)		
Live Compound Indication		
Storage Area		
Skip Location		
Hazardous Waste Storage Area		
Vehicle Access Routes		
Site Access & Egress Points		
Temporary Parking Arrangements		
CDM Office Location		
Statutory Notices Location		
Safety Notice Board Location		
Access Notice Display Board		
Limits Of CDM Area		
SITE WELFARE		
Emergency Assembly Points		
Pedestrian Walkway Routes		
Mess Hut Location		
W/C (Toilet)		
First Aid Facility Location		
Fire Extinguisher Location		
SETTING OUT DETAILS		
Setting Out Lines		
Dimensions		
Key		
Other		

Details shown on these drawings should conform to the following Northern Powergrid policies:

SAF CONS 03 – CDM Regulations (Construction Design And Maintenance)
ENV 003 001 - Environmental Documentation Relating to Waste Management

Appendix 14 – Civil Drawings

CIVIL DRAWINGS	OK?	INCORRECT/REASONS
Views		
Civil Details / Electrical Requirements		
Phase Indicators		
Equipment Details		
Schedule of Equipment		
Duct Key / Key To Conduits		
Conduit Positions		
Troughing Detail		
Clearances (S2/4)		
Clearances (Other)		
Clearance Table		
Setting Out Lines		
Datum		
Flood Level		
Notes		
Other		
Roof		Guidance note - Traditional Northern Powergrid roof construction would be concrete beam arrangement with pitched roof. Alternative roof structures are acceptable providing the required fire protection is provided and an equivalent security provision rating to that of a standard construction is achieved and that the overall stability is maintained, particularly with reference to wind loadings, blast loadings or catastrophic failure. Northern Powergrid would typically use a 150mm thick by 1200 wide pre stressed concrete unit. This provides blast and fire resistance, security and an ideal attachment point for the windpost top fixings; the truss arrangement providing support for the pitched roof covering

Details shown on these drawings should conform to the following Northern Powergrid policies:

NSP 007 003 - Guidance on Substation Design: Construction Details
NSP 007 019 - Guidance on Primary Substation Design: Electrical Drawings

Appendix 15 – Other Drawings

General check sheet to cover miscellaneous drawings, typically:

Phased Construction Drawings
Feasibility Study Drawings
Remote End Layout Drawings
Connection and Protection Drawings
Schedules Including Drawing Schedule

OTHER DRAWINGS	OK?	INCORRECT/REASONS
Views		
Civil Details / Electrical Requirements		
Phase Indicators		
Equipment Details		
Schedule of Equipment		
Duct Key / Key To Conduits		
Conduit Positions		
Troughing Detail		
Clearances (S2/4)		
Clearances (Other)		
Clearance Table		
Setting Out Lines		
Datum		
Flood Level		
Notes		
Other		

Details shown on these drawings should conform to the following Northern Powergrid policies:

NSP 007 001 - Guidance on Substation Design: Key Design Parameters
NSP 007 019 - Guidance on Primary Substation Design: Electrical Drawings