

Company Directive

STANDARD TECHNIQUE: SD5F/1

Relating to connecting multiple small low voltage connections with limited network analysis

Policy Summary

This document specifies the procedure for connecting multiple street furniture connections (metered or unmetered) with a demand of up to 5.75kVA with minimal design analysis and minimal input services from National Grid Electricity Distribution.

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Implementation Date: March 2025

Approved by



Craig Sharp
Engineering Policy Manager

Date: 3rd March 2025

Target Staff Group	Staff involved in the design, installation, maintenance and operation of the LV system.
Impact of Change	Amber - Changes affect staff involved in the design, installation, maintenance and operation of the LV system.
Planned Assurance checks	Managers shall ensure that all staff involved in the design, installation, maintenance and operation of the LV system are familiar with, and follow, the requirements of this document.

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IMPLEMENTATION PLAN

Introduction

This document specifies the procedures that shall be followed by National Grid Electricity Distribution (NGED) and Independent Connection Provider (ICP) or street electrical fixture owners/operators where they wish to determine the point of connection onto NGEDs distribution network or add load to existing connections, in accordance with the ENA Competition in Connections Code of Practice (COP).

Main Changes

The document has been updated to facilitate the increase of load to existing street electrical fixtures, the change primarily relates to the connection of electric vehicle charging equipment, however, other type of load may be connected to the electricity distribution system when in scope of this document.

Impact of Changes

The change will facilitate third parties to safely add demand to existing street electrical fixtures without the need for input services from NGED.

Implementation Actions

The policy has been communicated to nominated planning engineers for each depot within the month of February 2025.

Implementation Timetable

This document can be implemented with immediate effect.

REVISION HISTORY

Document Revision & Review Table		
Date	Comments	Author
March 2025	<ul style="list-style-type: none">• The document has been revised to further simplify the process to connect small loads to street furniture connections• The document has been updated to include loads of up to 5.75kVA / 25A• A greater number of installations are permitted per circuit	Seth Treasure
October 2017	<ul style="list-style-type: none">• This is a new document	Seth Treasure

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1.0 INTRODUCTION

- 1.1 This document specifies the procedure for connecting multiple street furniture connections (metered or unmetered) or increasing the demand at existing connections to a capacity of up to 5.75kVA, with minimal design analysis and minimal input services from National Grid Electricity Distribution (NGED). Installations will be permitted to connect if they comply with the set network and demand criteria detailed within this document.
- 1.2 This document has been written in coordination with the Energy Network Association 'Competition in Connections Code of Practice' (COP) which has been created to facilitate competition in the market of new electricity connections through minimising the input services from host DNOs and to ensure that the input services are provided on an equivalent basis to internal data systems.
- 1.3 The COP can be viewed by clicking on the following link: - [Code of Practice](#)
- 1.4 Where all the criteria specified in this document cannot be satisfied further detailed analysis shall be carried out to determine the point of connection or acceptability of the existing connection, before any load can be connected and will be undertaken in all cases for loads in excess of those identified in the scope of this document.
- 1.5 Where further detailed analysis is required, the appropriate Low Voltage design software package (i.e. ConnectLV), transformer and customer load data and profiles must be considered / consulted in the determination of the impact of the proposed connection.

2.0 SCOPE

- 2.1 The principle of this document is to enable the quick determination of multiple new or augmented (disconnection and reconnection) street furniture connections (demand) onto the existing NGED owned and operated low voltage networks without the requirement for in depth network analysis with computer based software.
- 2.2 Multiple installations of up to 5.75kVA of load are permitted subject to compliance with section 3 of this document. Connections incorporating the export of energy (e.g. vehicle to grid) shall be considered to be outside of the scope of this document.
- 2.3 For proposed connections out side of the scope of technical requirements of this document, the determination of the point of supply or impact on the network can be ascertained via one of the following routes;
 - Following the requirements of Standard Technique: SD5B which relates to connections with minimal design analysis
 - Following the requirements of Standard Technique: SD5H which relates to the assessment of connections using load flow software
- 2.4 ICP's wishing to determine the point of connection in line with this Standard Technique shall be signatory to the NGED 'Framework Agreement relating to Network Access and Adoption of Electricity Connection and Distribution Equipment' (FNA&AA). ICP's will also have to sign the 'Extension of Contestability' (EOC) Agreement for the determination of the 'Point of Connection' (POC).
- 2.5 Street electrical fixture owners / Charge Point Operators (CPOs) seeking to increase demand at existing Connection Points shall be signatory to the following Technical Standards Agreement [<link>](#).

3.0 TECHNICAL REQUIREMENTS

3.1 Proposed Installation

3.1.1 Multiple installations of up to 5.75kVA of load are permitted subject to compliance with the following;

- No more than two installations per substation where the supplying transformer is rated $\leq 200\text{kVA}$
- No more than four installation per circuit where the supplying transformer is rated $\geq 315\text{kVA}$.

3.2 Network capacity

3.2.1 The proposed load (aggregate capacity) does not overload the transformer

Substation ratings and capacity can be found via the following link

[Dataset - Connected Data Portal | National Grid](#)

3.3 Connection characteristics

3.3.1 The connection impedance shall comply with the following requirements,

Cut-out Fuse Rating	Maximum Phase to Neutral Loop Impedance (PNLI)	Maximum Earth Fault Loop Impedance (EFLI)		
		PME / PNB Connection	SNE Connection	Directly Earthed (TT) Connection
Street lighting type cut-out (i.e. 25A cut-out)				
6A	1.50 Ω	As per PNLI requirement	13.50 Ω	N/A
10A	1.38 Ω		7.10 Ω	N/A
16A	0.86 Ω		3.80 Ω	N/A
20A	0.69 Ω		2.70 Ω	N/A
25A	0.55 Ω		2.10 Ω	N/A

Table 1 Maximum impedance for Metered and unmetered connections

For new connections, measurements undertaken at locations 'upstream' and 'downstream' may be used to determine the expected impedance of the proposed connection.

3.3.2 The supplying cable shall have a sustained rating in excess of 25A.

Note,

A 4mm² CU cable has a current carrying capacity in excess of 25A.

3.3.3 For loads other than for street lighting alone, the supply shall not form part of a loop of supplies.

3.4 Earthing arrangements

- 3.4.1 The majority of new and existing connections will have a PME earthing system, however, when in doubt, consult NGED Field Operations for confirmation of the earthing facility available.
- 3.4.2 Street electrical fixtures located on or adjacent a footpath or footway, will typically rely on the chassis of the column to provide an earthing system in line with Table 2 below, this would be correct where the demand of the connection is less than 500W and where the column is deemed to provide an Earth electrode with a resistance $\leq 100\Omega$.
- 3.4.3 Where the proposed load is in excess of 500W, the installer shall comply with one of the following requirements to ensure compliance with EREC G12.
- The installation includes an earthing system compliant with Table 2 below (maximum demand 5kW)
 - The installation shall incorporate a TT earthing system installed in isolation of the wider PME earthing system ⁽¹⁾
 - The installation shall form part of a guaranteed SNE network⁽²⁾
 - The installation incorporates a broken neutral detection device to mitigate high voltages being presented to exposed metalwork during a network fault⁽³⁾

Notes,

(1) Consideration shall be given to the required segregation between differing earthing types. See Table 3 within Appendix D

(2) SNE shall be considered to not be available unless otherwise specified by NGED

(3) Broken neutral detection equipment is only permitted for use with vehicle charging infrastructure.

3.4.5 Earthing electrode requirement for customer's installation (Class I / metallic enclosure)

Connection	Maximum single phase load or overall unbalance on split or three phase connection	Maximum consumer earth electrode resistance bonded to main earth terminal
single phase, unbalanced split or three phase	500 W	100 Ω
	1kW	60 Ω
	2kW	20 Ω
	3kW	14 Ω
	4kW	11 Ω
	5kW	9 Ω

Table 2 Customer installation earthing requirements

- 3.4.6 Installations categorised as 'Class II construction', where an earth terminal is neither provided or required, is not permitted for vehicle charging infrastructure used in conjunction with street electrical fixtures.

3.5 Extension asset requirements

- 3.5.1 New overhead connections may be provided by either a 16mm² or 25mm² copper concentric conductor.
- 3.5.2 New underground connections may be supplied via a 25 mm² or 35mm² aluminium hybrid conductor.
- 3.5.3 The 'street light' cutout shall be compliant with EE Spec 116 with a minimum rating of 25 amps.
- 3.5.4 Service conductor circuit lengths shall not exceed 30m.
- 3.5.5 The extension asset for metered load, active measured load or for capacities >500W, shall connect directly to the 'mains' circuit i.e. shall not extend from an existing service position.
- 3.5.6 Extension assets may only connect to 'main' route conductors where the cross sectional area of the main route conductor is $\geq 35\text{mm}^2 / 0.05 \text{ Sq in}$ per phase.

3.6 Materials

- 3.6.1 The connection materials shall comply with ENA Engineering Recommendation G81 and the associated NGED framework appendices as amended. These documents are available from NGEDs Technical standards folder hosted on our website, www.nationalgrid.co.uk.

3.7 Power Quality

- 3.7.1 The installation shall comply with the Class A limits of BS EN 61000-3-2 relating to harmonic current emissions for items rated up to 16A per phase.
- 3.7.2 The installation shall comply with the technical requirements of BS EN 61000-3-3 relating to flicker for items rated up to 16A per phase.

Note,

Equipment may comply with the technical requirements of BS EN 61000-3-3 and BS EN 61000-3-2 and be rated greater than 16A.

NGEDs extensive research into vehicle chargers concludes that equipment rated up to 32A and with an AC output will be deemed to be compliant with the above standards.

3.8 Metering

- 3.8.1 An unmetered connection is acceptable for on street electric vehicle charge points when a measured Central Management System (mCMS) is utilised.

- The exit point demand (in line with this policy) shall be $\leq 5.75\text{kW}$
- An Elexon approved active measuring device shall be used

A list of approved active measurement devices can be found [here](#).

4.0 CONNECTION PROCEDURE

- 4.1 The electrical designer will assess the proposed electrical installation for compliance with this document. Only installations and networks that comply in full with this document may be processed via the 'Street furniture matrix'.

A charge point operator / local authority may only utilise this connection procedure for a single phase of works and therefore any subsequent work programs shall be assessed via the traditional connection procedures.

- 4.2 The competent electrical designer will assess the NGED record maps (Dataportal 2 - [Log In - NGED DataPortal2](#)) and Connected Data portal to establish compliance of the below requirements ([Connecteddata.nationalgrid.co.uk](https://connecteddata.nationalgrid.co.uk));

- 'Mains' cable size
- Transformer rating
- Transformer utilization
- Number of installations per transformer / circuit
- Identification of looped supplies
- Service cable size (existing supply)

- 4.3 The impedance of the connection can be measured at existing installations or alternatively measurements can be undertaken at available locations 'upstream' and 'downstream' of the proposed location to enable the determination of an expected impedance value at the proposed connection. This process should only be undertaken when a high degree of certainty can be provided to show that the proposed location will satisfy the target impedance values.

The impedance of the extension asset shall also be taken into consideration

Any installations that do not conform with the requirements of this document will require technical analysis in accordance with Standard Technique: SD5H.

- 4.4 Once the electrical designer has established compliance with the above requirements, they shall raise an enquiry '**CIC Demand LV – ICP Multiple Design and POC**' (one enquiry) via our 'Enquiry Tracker' system which can be found at [Connections.nationalgrid.co.uk](https://connections.nationalgrid.co.uk) or via an email to the NGED Records Team (providing the minimum information) for installations of a pre-agreed number of sites within a single Distribution region. Distribution regions can be found via the NGED Network Info maps which are available from the NGED Website, Connections > Network Plans and Information.

The ICP/CPO shall raise an individual enquiry per installation type / demand requirement.

- 4.5 When making an application to connect multiple street furniture installations the ICP/CPO shall provide the following;

- An overview map detailing the location/s of the connections
- A suitably scaled location map detailing the 'Point of Connection' (POC) and 'Point of Supply' (POS) – where appropriate.
- The demand of the installation and fusing requirements
- The earthing arrangement of the installation e.g. PME / SNE / TT and associated technical conformity documentation (e.g. proposed resistance values of earthing system or literature for broken neutral detection equipment).

- Information regarding the connection materials – where appropriate
- Information regarding the declaration of conformity with the Power Quality standards BSEN 61000-3-2 and BSEN 61000-3-3
- Proposed timescale of works
- Completed and signed application form (Appendix C)

5.0 INSTALLATION PROCEDURE

5.1 Connect & Notify

5.1.1 The installation of additional load within an existing street furniture connection may follow a 'Connect and Notify' procedure when the installation complies in full with the requirements of this document.

5.1.2 NGED shall provide a confirmation of acceptance on full receipt of all relevant documentation.

5.2 Application

5.2.1 Where it is proposed to make a new connection onto the distribution system, the installation shall follow a fast-track application procedure, this enables NGED the opportunity to inform the applicant of any proposed works i.e. reinforcement, diversionary works or regulatory payments.

5.2.2 NGED will assess the initial connection enquiry from the ICP per installation type / setup with the requirements of this document (this may include multiple locations). If the installation is acceptable with the requirements of this document, NGED shall issue an acceptance notice per single installation type (Appendix C).

5.2.3 Following a design submission to NGED, if the installation or low voltage system is deemed to be non-compliant with the requirements of this Standard Technique. The design submission will be rejected by NGED and a traditional CIC enquiry shall be raised by the ICP.

5.2.4 If a circuit is subject to the ECC Regulations (Potential Refund) the applicable installation will be rejected by NGED and the ICP will be required to raise a traditional CIC enquiry, enabling the appropriate costs to be refunded.

The ICP may resubmit a new design not including the connections affected by the ECC Regulations.

5.2.5 If the ICP wish to connect installations with different equipment, configurations or demand, the installer shall raise an enquiry per similar arrangement per Distribution region.

5.2.6 Once NGED has issued an acceptance confirmation notice, the ICP shall follow the Live Joining Notification procedure (as detailed within Standard technique: NC2L).

5.2.7 The ICP shall provide the NGED Records team with a schedule of works as detailed within ST:NC2L

5.3 Meter Point Administration Numbers (MPANs)

- 5.3.1 The responsible NGED Field Operations team will provide any required MPAN's for whole current metered connections
- 5.3.2 The unmetered supplies team will provide MPAN numbers for installations that are unmetered or utilise measured Central Management Systems (mCMS) / active measurement devices.

6.0 RECORD KEEPING

- 6.1 The installation company or asset owner, shall provide NGED with a record of 'as laid' conductors in line with Standard Technique: DO6A.
- 6.2 The asset owner shall provide NGED with an update to the Unmetered Supplies Asset Register.

7.0 INSPECTIONS AND DESIGN ASSESSMENT

- 7.1 Any ICP physical works and POC assessment will be reviewed in accordance with the 'Inspection & Monitoring regime'.

8.0 INFORMATION ON REQUEST

- 8.1 ICP's can obtain the following information from our data portal [Connecteddata.nationalgrid.co.uk](https://connecteddata.nationalgrid.co.uk)

- Substation Name
- Substation Number
- HV Feeder Reference
- Primary Substation Name & Number
- Total number of Customers
- Day MD*
- Night MD*
- Transformer Size & Voltage
- Inaccurate figures may appear where MPAN numbers are incorrectly profiled or the meter supplier has provided inaccurate data. In the event of spurious or suspicious data, NGED's local responsible team must be contacted for interpretation.

8.2 Any information not available from the NGED website and required for the design of the connection can be obtained by requesting it within the application of the enquiry or by contacting the local Field Operations team. The contact details of the responsible team will be provided in the confirmation email during the notification process. This requested information shall be provided within five working days where the information is readily available or up to six weeks where monitoring equipment needs to be fitted on site to collect data.

8.3 Information obtained via responsible NGED team –

- Earthing arrangements (PME, PNB, SNE or TT)

8.4 Information to be obtained via the central Primary Network Design Planning team (PND) –

- Earthing Arrangements within close proximity to Primary Substations

To obtain information from PND, the ICP shall make a request by emailing nged.psdicpdata@nationalgrid.co.uk

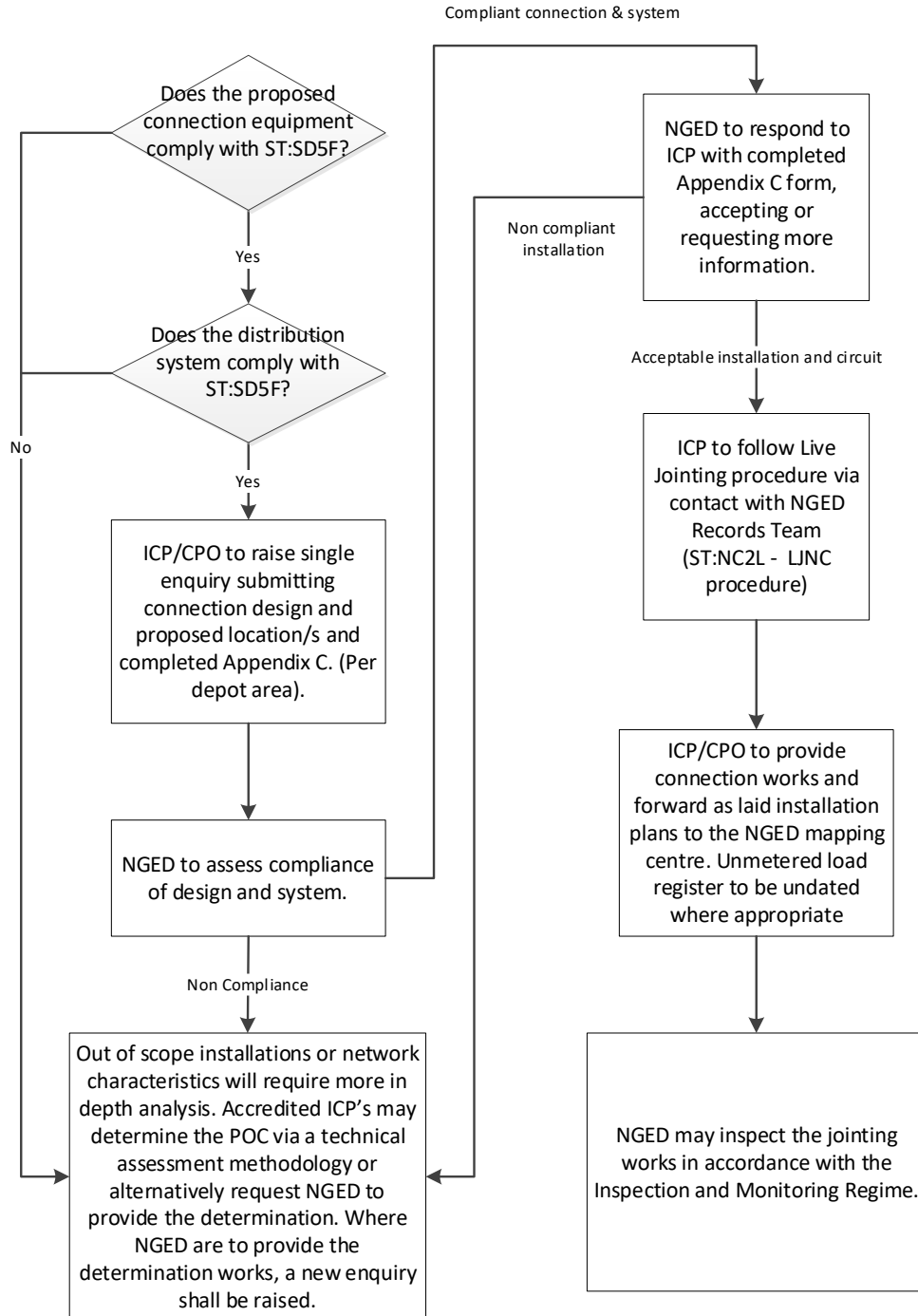
9.0 LAND RIGHTS

9.1 ICPs must ensure that all statutory consents and land rights are negotiated in accordance with NGED's Estates and Wayleaves Policy documents.

9.2 Land rights should be negotiated so as to be in accordance with the terms of NGED's standard legal document templates.

9.3 NGED Estates and Wayleaves documents and standard legal document templates will be made available on the NGED Technical information website.

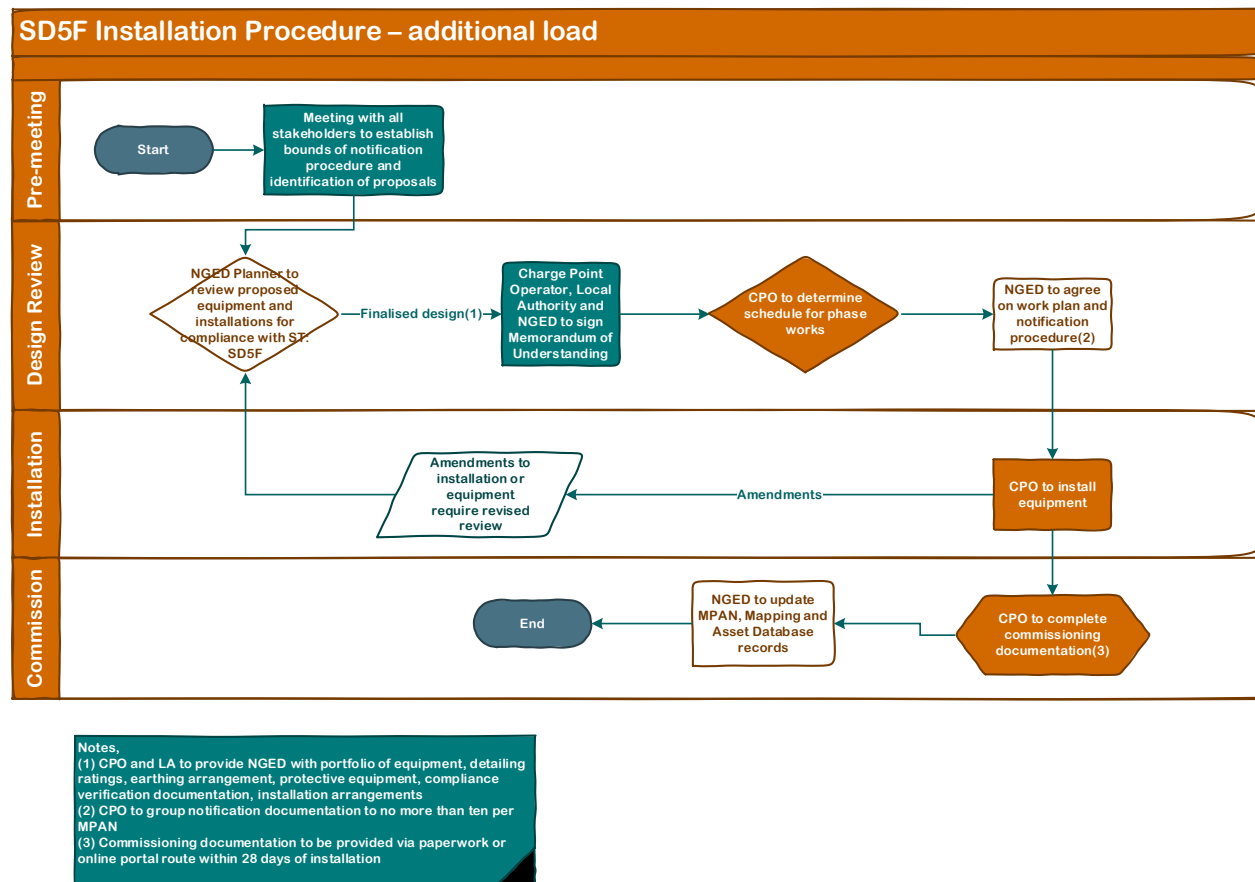
STREET FURNITURE CONNECTION MATRIX FLOW CHART – NEW CONNECTIONS



Reference ST:NC2L with particular reference with Appendix C.

APPENDIX B

INSTALLATION PROCEDURE FLOW CHART – EXISTING CONNECTIONS



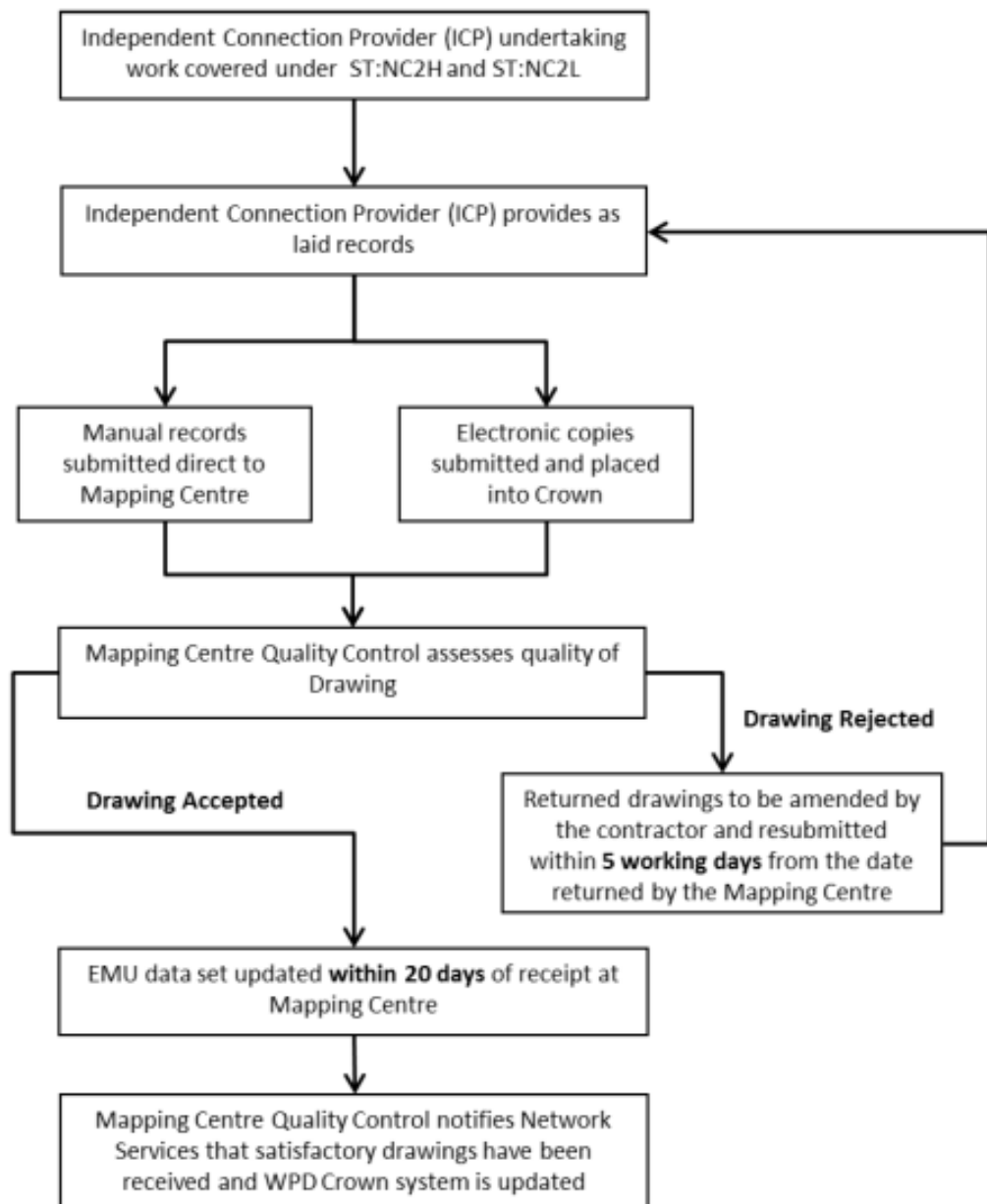
[Link to comprehensive flow chart for Pre-approval and Notification process](#)

APPENDIX C

APPLICATION FORM

[Application form](#)

MAPPING RESPONSE FLOW CHART



EARTHING SEPARATION

The customers buried TT earthing system shall be segregated from any NGED buried earthing systems (including buried LV metalwork and traditional Paper Insulated Lead Covered cables) by the required distance detailed within Table 3:

Connection:	Single Phase or Unbalanced 3 Phase Connection	Balanced Three Phase Connection
Minimum Segregation	3.6m	0.3m

Table 3 – Segregation requirement between Earthing Zones

HYPERLINKS

- 1.3 [Code of Practice](#)
- 2.5 [Technical Standards Agreement](#)
- 3.2.1 [Dataset - Connected Data Portal | National Grid](#)
- 3.8.1 [Active Measurement Equipment.](#)
- 4.2 [Log In - NGED DataPortal2](#)
- Appendix B - [Link to comprehensive flow chart for Pre-approval and Notification process](#)
- Appendix C - [Application form](#)
- Appendix I - <https://www.elexon.co.uk/operational/unmetered-supplies/central-management-systems/>
- Appendix I – [LEVI Presentation](#)

APPENDIX G

SUPERSEDED DOCUMENTATION

This document supersedes ST: SD5F/0 dated October 2017 which has now been withdrawn.

APPENDIX H

RECORD OF COMMENT DURING CONSULTATION

No comments received.

APPENDIX I

ASSOCIATED DOCUMENTATION

- Electricity Act 1989
- Electricity, Safety, Quantity and Continuity Regulations 2002
- ST:SD1F – Relating to the Code of Practice
- ST:SD5A - Design of Low Voltage Domestic Connections
- ST:SD5B – Relating to the determination of the Point of Connection with minimal analysis
- ST:SD5C - Design of Low Voltage connections to Multiple Occupancy buildings
- ST:SD5D - Arrangement of Low Voltage Cut outs
- ST:SD5K - Relating to the use of Windebut computer software
- ST:SD5P - Design of Unmetered Connections
- ST:SD5R - Earth Fault loop Impedances and Phase to Neutral Loop Impedances at LV installations
- ST:SD6J - Connection Design – Potentially disturbing Electrical Equipment rated up to 75A
- ST:SD8B - Relating to Cable Ratings
- ST:TP21D - 11kV, 6.6kV and LV earthing
- ST:TP21E - Provision of NGED earth terminals to customer LV installation
- ENA ER G81 (all parts)
- NGED G81 Appendices (all parts)
- ENA Competition in Connections Code of Practice
- ENA ER G12 – Earthing requirements
- <https://www.elexon.co.uk/operational/unmetered-supplies/central-management-systems/>
- [LEVI roll out presentation](#)

APPENDIX J

KEY WORDS

Point of Connection, ICP Design, Code of Practice Agreement, street furniture, street lights