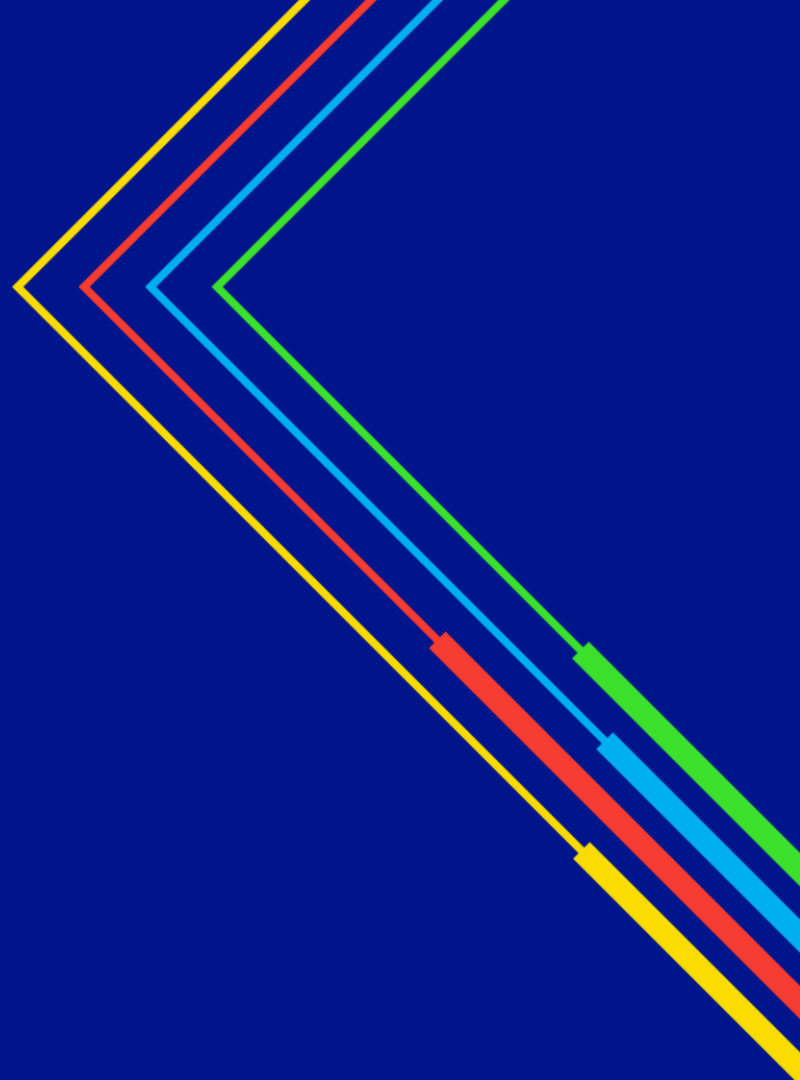


Connections: Operators

Tuesday 24th June 2025



Agenda

Agenda Item

Registration

Housekeeping & NGED Welcome from Leader

Insights to ICP Inspections

Break

Framework Network Access and Adoption Agreements

Changing to Earthing Form Data

Lunch

The 11kv Design Guide

ICP feedback submission and associated resolution

Open Q&A Session

Close

Insights into ICP Inspections

Understanding the NGED Inspections Regime

Ephie Chalakateva
Connections Policy Engineer

Agenda

01 Key Points from Inspection Policies NC2M & NC2N

02 Inspection Levels

03 Inspection Failure Categories & Impact

04 FNA&AA Relevant Clauses

05 Inspections Reporting

06 Q&A

ICP Inspections Policy NC2M | Key points from the Inspections Regime Section

Clause 2.2

- ❑ The number of inspections required shall vary according to the **size and complexity of the scheme** and the **inspection level for the relevant activities** held by the relevant ICP.

Clause 2.7

- ❑ Prior to work starting, the **ICP shall supply NGED with the program it intends to follow to construct the contestable works** and thereafter supply an updated version in the event of any material change.

Clause 2.10

- ❑ NGED will make a **site visit to carry out inspections in accordance with the Inspection Regime and the program of works submitted by the ICP**. If the ICP amends the construction programme without informing NGED, and as a consequence an inspection is not made during the site visit then NGED shall charge the ICP the standard inspection charge for the abortive visit. An additional visit shall be raised.

Clause 2.11

- ❑ The NGED Inspection Regime consists of three levels of Inspection; **Inspection Level 1 will attract the highest number of site Inspections and Level 3 the lowest**.

Clause 2.12

- ❑ Where **an ICP is at Inspection Level 3 they can apply to join the Self-inspection Regime**. When a request is made in writing the Connections Policy Team will send an invitation to the ICP for an in person meeting.

ICP Inspections Policy NC2M | Key points from the Inspections Regime Section

Clause 2.13

- ❑ The invitation shall provide details in the form of an **Extension of Contestability agreement (EOC) which the ICP must sign and is supplemental to the Framework Network Access and Adoption Agreement (FNA&AA)**. The ICP must be party to the FNA&AA in order to enter into the supplemental EOC. The ICP will be required to submit a list of categories and Activities that they wish to be considered under the self-inspection regime. This list will be included in the EOC. ICPs may only nominate Activities where they have attained inspection level 3 for a continuous 12 month period.

Clause 2.14

- ❑ The invitation for an ICP to undertake Self-Inspection is at the discretion of NGED **based upon the ICP's previous performance**.

Clause 2.15

- ❑ **The Self-inspection Regime will allow the ICP to undertake site inspections of their own work.** The inspections undertaken by the ICP shall meet the requirements of NGED Policy and Standard Techniques.

Clause 2.18

- ❑ Where an ICP joins the Self-inspection regime, they shall be allocated to SIL 1.

Clause 2.19

- ❑ At SIL 1 and SIL 2 there will be a **low number of Inspections**.



All work that is adopted by NGED is covered by a 2 year ICP warranty, however installations within excavations 1.5m or greater in depth are covered for 3 years. Any assets that are constructed and adopted under the Self-inspection regime shall have a 10 year warranty. When an ICP is working to Self-inspect and any Activity is at Inspection Level 3 or higher, the work will have a 10 year warranty. Where an ICP moves back to inspection Level 3, all the work shall continue to be subject to a 10 Year warranty .

ICP Inspections Policy NC2M | Key points from Charges for Re-inspections Section

Clause 2.3

- ❑ Inspections shall not be directly chargeable within Connection Offers and **NGED will not charge for initial site inspections. Charges may be applied for abortive visits and re-visits.**

Clause 8.2

- ❑ Where a re-inspection is required as a result of identifying a defect during a previous inspection, or any of the reasons stated below a charge shall be made:
 - **The work not meeting the required standards.**
 - Where agreed inspections are **not carried out due to the ICP not being on site.**
 - The work has been previously **completed without allowing NGED opportunity to inspect.**
 - Where **pre-arranged inspections have been cancelled with less than 5 working days' notice.**

Clause 8.3

- ❑ The **charge will be based on a Technician or Project Engineer hourly rate and include traveling and inspection times.** The average visit duration shall be deemed to be 3 hours.

Clause 8.4

- ❑ **Where the works are requested outside of normal working hours and an inspection is generated, this will be charged at the appropriate out of hours rate.**

ICP Inspections Policies NC2M and NC2N | Summary of Inspection Levels

Level 1

- ❑ All new ICPs are allocated to Inspection Level 1, which is the Level with the highest number of inspections. Depending on the activity, for an ICP on Level 1 either 20%, 50% or 100% of their works have to be inspected. Upon good performance, the ICP can move to the next Level (which is Level 2) after completing 20 consecutive successful inspections. For Category 1 Failures, the ICP will drop back to Level 1 regardless of their Level prior to failure.

Level 2

- ❑ Depending on the activity, for an ICP on Level 2 either 5%, 10%, 20%, 25%, 50%, 75% or 100% of their works have to be inspected. Upon good performance, the ICP can move to the next Level (which is Level 3) after completing 20 consecutive successful inspections.

Level 3

- ❑ **Depending on the activity, for an ICP on Level 3 either 2%, 5%, 10%, 50%, or 100% of their works have to be inspected. Upon good performance, the ICP can move to the next Level (which is SIL1) after following the process mentioned previously (submit written request, sign up to NGED EoC, have in person meeting, submit their list of Activities and Categories they wish to self-inspect and for which they need to be in Level 3 for a minimum of 12 consecutive months).**

SIL1

- ❑ **Depending on the activity, for an ICP on SIL1 either 5% or 10% of their works have to be inspected. They can move to the highest self-inspection Level (which is SIL2) after completing 20 consecutive successful inspections.**

SIL2

- ❑ **Depending on the activity, for an ICP on SIL2 either 2% or 5% of their works have to be inspected.**



ICP Defect Inspection Categories Policy NC2N | There are three types of Category failures and each is addressed by a different process

Category 1



ICP will automatically drop to the lowest Inspection Level 1 with the highest number of inspections

- ❑ This is a severe or dangerous defect indicating serious non-compliance with NGED's policies and procedures and/or breach of the Framework Network Access & Adoption Agreement (FNA&AA). Such defect will result in immediate suspension of that specific activity of work by that ICP on that site and scheme. As a consequence, NGED shall:
 - contact the ICP to arrange an urgent meeting to discuss the failure(s).
 - carry out investigation to ensure that the ICP has not had any Category 1 Failures within the last 12 months.
 - as soon as is reasonably practicable suspend Adoption of the failed activity by the ICP on that site.
 - meet with the ICP and carry out an investigation and agree a program of work to resolve the issues identified. The ICP shall provide in writing, details of how they intend to prevent a reoccurrence.
 - move the ICP to Inspection Level 1 automatically (lowest level with the highest number of inspections).
- ❑ If the ICP is at Inspection Level 1 due to poor performance, the system issues an Inspection Level 1 Failure Notice, NGED shall:
 - contact the ICP to arrange an urgent meeting to discuss the failure(s).
 - following the meeting, ask the ICP to provide in writing details of how they intend to prevent poor performance in the future.
 - **refer the ICP to LRQA for non-compliance**, where the historic information indicates a Category 1 Failure notice has been issued within the last 12 months.
 - suspend the ICP from undertaking any activity in the four license areas until such time as LRQA reports that the ICP has been investigated and they are confident the ICP has resolved all the issues and are capable of undertaking work.
 - be unable to adopt any further Assets constructed under this accreditation where LRQA have withdrawn the ICP's accreditation and until the accreditation is reinstated.
- shall invoke the FNA&AA and refer the ICP to the NGED legal team where the ICP shall be suspended from working in all of the four licensed areas, if at any time within the next 12 months the ICP has further Category 1 Failure Notices

ICP Defect Inspection Categories Policy NC2N | There are three types of Category failures and each is addressed by a different process

Category 2



ICP will automatically drop to the lowest Inspection Level 1 with the highest number of inspections

Category 3



No change to Inspection Level


- ☐ This is a **serious defect** where there is a **serious non-compliance** with NGED's policies and procedures and/or breach of the FNA&AA. Such defect may not be recoverable at the same time of the inspection, and may result in failure to adopt the asset until rectified. Further inspections will normally be required, and NGED may determine the action required to rectify the defect. As a consequence, NGED shall:
 - raise an additional chargeable inspection
 - send an automated email to the ICP to inform about the new inspection
 - receive notification from the ICP when the remedial works have been completed and a re-inspection can be carried out

- ☐ This is a **minor defect resulting from a minor non-compliance** with NGED's policies and procedures and/or the FNA&AA. Such defect **will normally be recoverable at the time of inspection and will not require further inspections**. The system will send a notice to the ICP informing them of the failure.


Inspections and FNA&AA| Section 12 covers all the details about inspections, and these are the main points

12.6 The Connection Provider shall **allow NGED access at all times** to all places where the Contestable Connection Works are to be carried out, are in the process of being carried out, or have been carried out, for the purposes of inspecting the Contestable Connection Works and all materials used or intended for use in the Contestable Connection Works.

12.7 NGED acting reasonably, may, by giving the Connection Provider reasonable written notice, require the Connection Provider to uncover or make openings in any part of the Contestable Connection Works. The Connection Provider shall bear its own costs and all costs incurred by NGED in complying with such notice if such inspection of the Contestable Connection Works reveals any Defect or material non-compliance with the requirements of this Agreement. NGED shall be liable for all reasonable costs incurred by the Connection Provider in complying with such notice if such inspection of the Contestable Connection Works fails to reveal any Defect or material non-compliance with the requirements of this Agreement.

 **NGED will only require this should there be concerns about uninspected work or poor quality or non-compliance**

12.8 If NGED serves a notice on the Connection Provider to uncover works which NGED was unable to inspect due to the Connection Provider failing to notify NGED of a change to the Programme or the Contestable Connection Works not being carried out, the Connection Provider shall be liable for all costs incurred by the Connection Provider and NGED in uncovering and inspecting such works irrespective of whether any Defects are revealed by such uncovering and inspection. Any costs incurred by NGED shall be reimbursed by the Connection Provider pursuant to Clause 22.

 **The best approach is to ensure that any changes to the schedule are communicated in a timely manner to avoid such inconveniences on site**

Inspections and FNA&AA| Sections 12 & 13 cover all the details about inspections, and these are the main points

- 12.11 Notwithstanding any inspections or tests by NGED, the Contestable Assets shall remain the property of and at the risk of the Connection Provider who shall continue to be liable for them unless and until the Adoption of the Contestable Assets.
- 12.12 NGED shall be entitled to carry out additional inspections which fall outside of the Chargeable Inspection Regime at any time. Subject to Clause 12.2, the costs of such additional inspections shall be borne by NGED.



- 13.4 The Connection Provider shall provide to NGED every 5 Working Days a schedule detailing the daily Associated Contestable Works due to be undertaken within the following 14 calendar days which shall detail the Associated Contestable Works to be undertaken in each half-day period.
- 13.5 The Connection Provider shall provide safe and secure access at all reasonable times to all places where the Associated Contestable Works are to be or have been carried out for NGED and its representatives for the purpose of inspecting the Associated Contestable Works and all materials used or intended for use in the Associated Contestable Works and witnessing the carrying out of any Commissioning Requirements.

Inspections Reporting | An automated report is sent monthly to all ICPs with a summary of their inspections

ICP Name

Inspection Results for April 2025

This document contains the inspection levels across all activities.

Report run at 13 MAY, 2025

KEY

Level 1	Highest Inspection Level
Level 2	Second highest Inspection Level
Level 3	Lowest Inspection Level
SIL 1	Highest Self Inspection Level
SIL 2	Lowest Self Inspection Level

Inspection results for the month

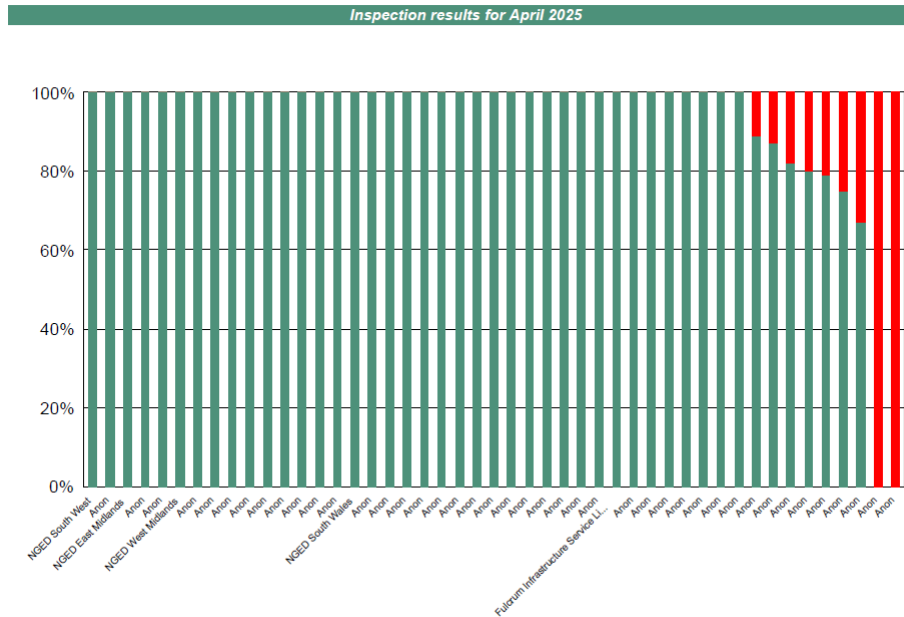
Inspections

Total Inspections	2
Total Inspections Passed	2
Total Inspections Failed	0

Mains Activity

ACTIVITY

HV Mains	Level 1
LV Joints	Level 2



Framework Network Access and Adoption Agreements

Kelly McLaughlin
Connections Policy Officer



Framework Network Access & Adoption Agreements (FNA&AAs) | Purpose and Types of Agreements

1

FNA&AAs

The Framework Network Access and Adoption Agreement is intended to govern the overall relationship between NGED and an Independent Connection Provider (ICP). The FNA&AA specifically sets out the terms on which:

- i) the ICP will access NGED's network to carry out contestable connection works
- ii) NGED will adopt the ICP's contestable connection works upon energisation.

2

Types of FNA&AAs

Design & Construction

For ICPs that are accredited for both design & construction elements, or ICPs that only hold accreditation for Construction but accept the liability for the design.

Construction Only

For ICPs that are only accredited/accept liability for Construction works.

Design Only

For ICPs that are only accredited/accept liability for Design works.

ICP Work Options | As part of the sign on process for the FNA&AAs, the ICPs are required to inform NGED of what options they are working towards.

Options for LV

1

Competition in Connection s code of Practice	Option 1	Option 2
Description	ICP works to their own DSRs procedures and Policy. ICP Authorise their own Staff.	ICP works to NGED DSRs procedures and Policy. NGED to authorise ICP Staff.

Options for HV

2

Competition in Connection s code of Practice	Option 1	Option 2	Option 3	Option 4
Description	ICP works to their own DSRs procedures and Policy. ICP Authorise their own Staff (only available with option 3).	ICP works to NGED DSRs procedures and Policy. NGED Authorise ICP Staff.	NGED transfers control of a specific part of the distribution system to ICP. Only available with Option 1.	ICP authorised SAP Switches to NGED DSRs procedures and Policy. Work on 'Defined System' under ICP DSRs procedures and Policy.

Extension of Contestability Agreement (EoC)| Content and Eligibility Requirements

1

Content

- Issue and Return of Keys for Access to NGED Substations
- Rent a Test Probe
- LV Cable Identification Service
- Self inspection
- Self Determination of a Point of Connection - this also includes Self-approval for Design

2

Eligibility Requirements

To be able to sign on to the Self Inspection EOC, the ICP would need to:

- have reached Level 3 on the inspection level
- have had 20 consecutive passed inspections
- approach NGED for authorisation to Self Inspect - this would be dependant on the inspection category.

To be able to sign on to the Self-Determination of POC, the ICP would need to:

- hold the correct accreditation for Self-Determination for POC
- or request that they would like to self-approve their own designs

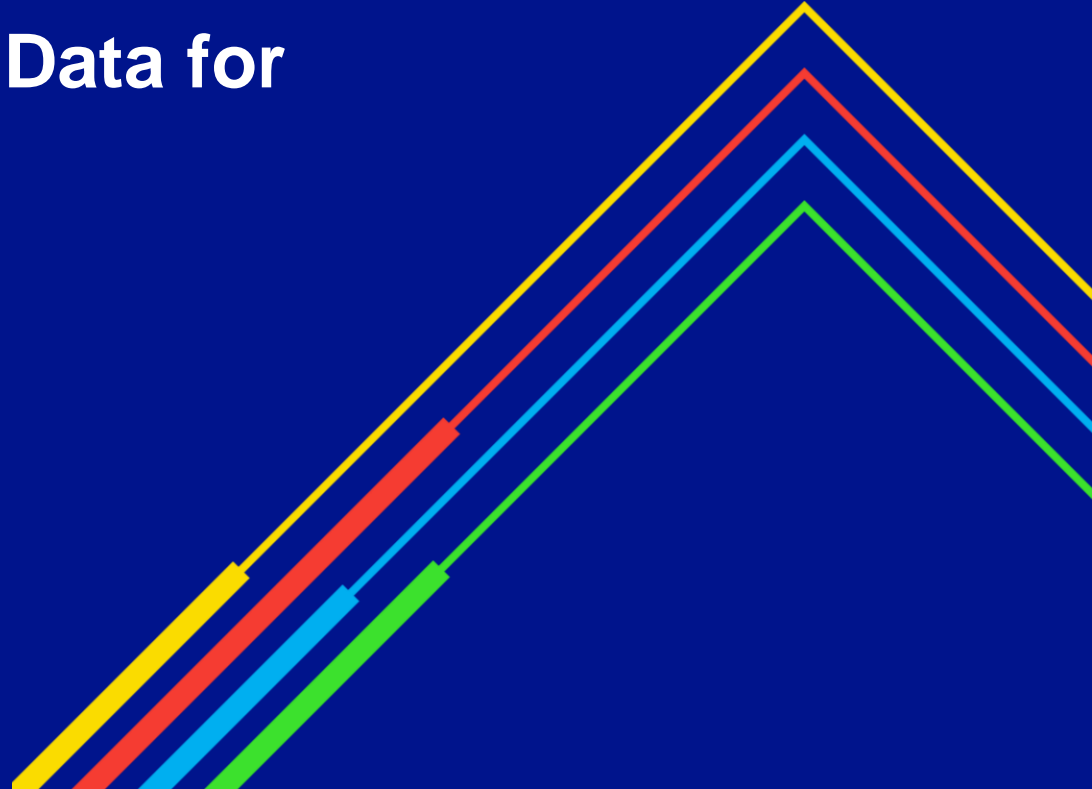
Sign Up to NGED FNA&AAs | Process and Required Information

- Please email nged.connections@nationalgrid.co.uk
- Include the following information:
 - Company Registered Name
 - Company Registered Address
 - Company Registration Number
 - Contact Name for notices
 - Contact Address for notices
 - Contact fax & email address for notices

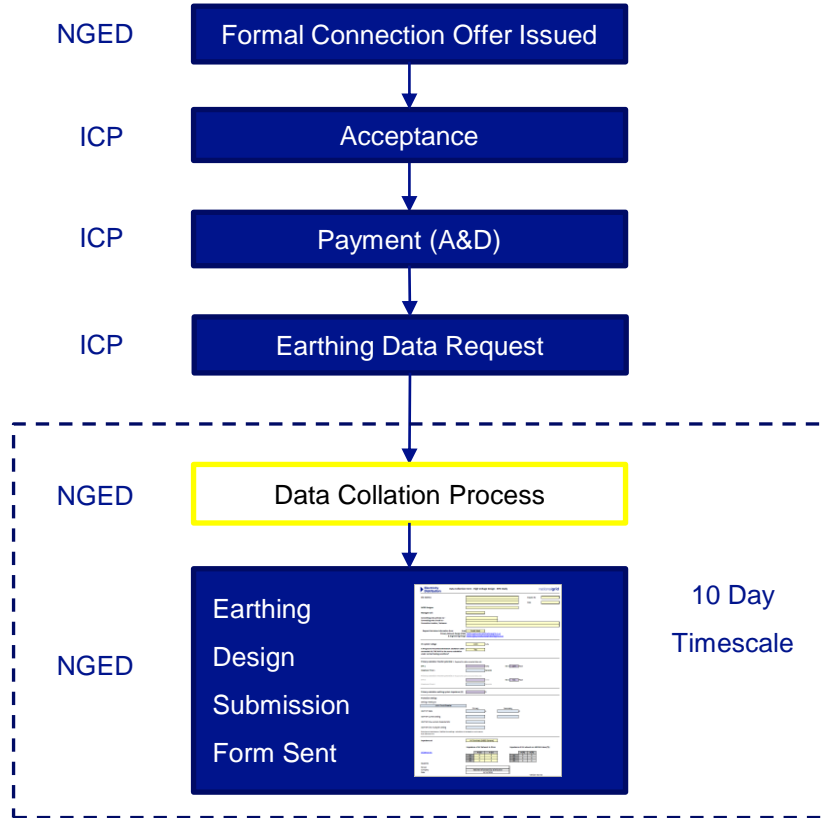
As part of the registration process, ICPs are required to declare the Distribution Safety Rules Option that their organisation shall comply with when undertaking Low and High Voltage Operational activity on the existing NGED network.

Provision of Earthing Data for PoC's

Mark Kneebone
Policy Engineer



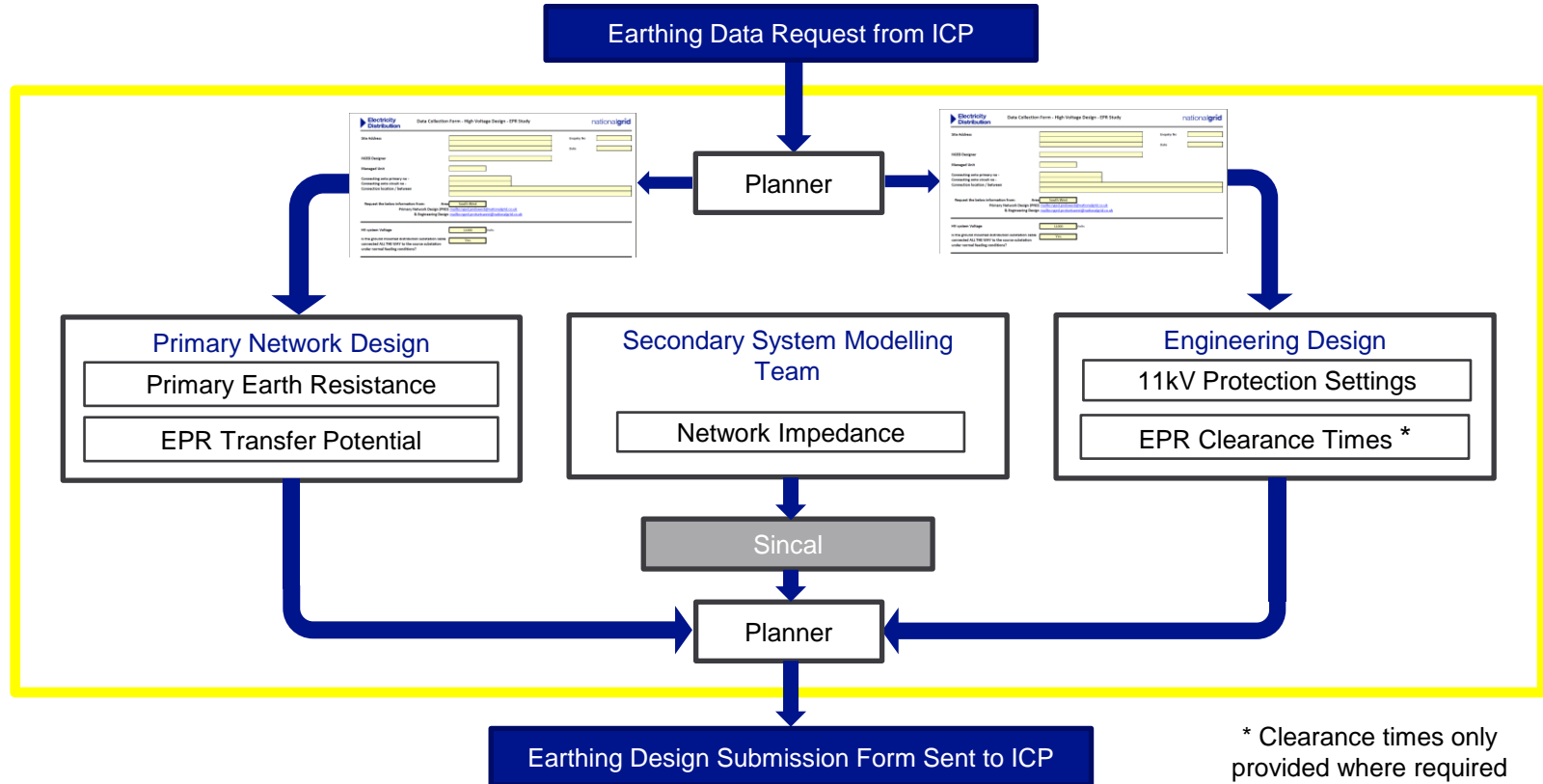
NGED Earthing Data Request Process



We aim to provide the earthing data within 10 working days from the receipt of the request.

Where the design of upstream reinforcements or other works influence the earthing information we supply, an explanation for the delay along with any available data will be provided.

NGED Data Collation Process



Earthing Data Provided (Original Form)

Following feedback we have modified the earthing data we supply to customers and ICPs. The original form was developed to provide data derived from DINIS and included extra information to allow 'Basic' studies within the NGED Earthing Design Tool (EDT).

When calculating earth fault levels, and where network impedance data has been provided, the fault level should be calculated using the provided data rather than estimated. If an ICP chooses to use the NGED Earthing Design Tool (EDT) this information would be entered into an 'Advanced' study.

Data Collection Form - High Voltage Design - EPR Study nationalgrid

Site Address:

NGED Designer - requested by: Enquiry No:

Managed Unit: Date:

Connecting onto primary no -
 Connecting onto circuit no -
 Connection location / between

Send to:
 Area:
 &
 NGED, PSD SWart case@dpr@nationalgrid.co.uk;
 NGED, PSD Prttrst SWart case@dpr@nationalgrid.co.uk;

HV system Voltage = 11000 Volts Earthing System at Primary Reactor

Primary substation earthing system impedance (Ω)

Primary substation EPR - Transfer potential - Required for cable connections only

V ----- 18kV Fault V ----- 33kV Fault

Fault clearance times at primary c/s for above fault condition - Required for cable connections only

S ----- 18kV Fault S ----- 33kV Fault

Data provided by: Date:

Impedance at Primary Substation busbar on 100 MVA base

	R (Ω)	X (Ω)
Z1	<input type="text"/>	<input type="text"/>
Z2	<input type="text"/>	<input type="text"/>
Z0	<input type="text"/>	<input type="text"/>

Single phase A Three phase A

Fault current at HV busbar / check value
 Settings relating to:
 18kV Circuit Breaker

IDMT CT Ratio Primary A Secondary A

IDMT EF Current Setting

IDMT EF time-current characteristic

IDMT EF time multiplier setting Data provided by:

Note, ensure both time multiplier & fault level settings - calculations to be based on maximum fault clearance time

Date:

Impedance at HV Terminals (NGED Scheme)

Impedance of HV network is ohms

	R (Ω)	X (Ω)
Z1	<input type="text"/>	<input type="text"/>
Z2	<input type="text"/>	<input type="text"/>
Z0	<input type="text"/>	<input type="text"/>

Impedance of HV network on 100 MVA base (Ω)

	R (Ω)	X (Ω)
Z1	<input type="text"/>	<input type="text"/>
Z2	<input type="text"/>	<input type="text"/>
Z0	<input type="text"/>	<input type="text"/>

Guidance doc: [Link](#)

Issued to:

Person: Mark Kaczkowski
 Company: National Grid Electricity Distribution
 Date: 11/06/2025

Earthing System arrangement at the Primary no longer provided. Electrical details of the neutral earthing arrangement are factored in the Network Impedance data below

Layout of Primary substation EPR data improved

Network Impedance of the source primary substation no longer provided to avoid confusion

Earthing Data Provided (Updated Form)

The latest version of the form provides just the critical data. Where a PoC is not cable connected to the source primary the requirement to obtain EPR data from Engineering Design has been removed.

Electricity Distribution Data Collection Form - 6.6kV & 11kV Networks nationalgrid

Site Address: [] Enquiry No: []
Request Date: []

NGED Designer: []
Managed Unit: []

Connecting onto primary no - []
Connecting onto circuit no - []
Connection location / between []

Request the below information from: Area: South West
Primary Network Design (PND) nauto:naed.pnd@nationalgrid.co.uk
& Engineering Design nauto:naed.pnd@nationalgrid.co.uk

HV system Voltage: 11000 volts
Is the ground mounted distribution substation cable connected ALL THE WAY to the source substation under normal feeding conditions? Yes

Primary substation Transfer potential 1 - Required for cable connected sites only
EPR 1: [] Volts for a 33kV Fault
Clearance Time 1: [] Seconds

Primary substation Transfer potential 2 - Required for cables connected sites only
EPR 2: [] Volts for a N/A Fault
Clearance Time 2: [] Seconds

Primary substation Transfer potential 3 - Required for cables connected sites only
EPR 3: [] Volts for a N/A Fault
Clearance Time 3: [] Seconds

Primary substation earthing system impedance (Ω) []

Protection Settings
Settings relating to Feeder Circuit Breaker
IDMT CT Ratio: Primary [] A Secondary [] A
IDMT EF Current Setting: []
IDMT EF time-current characteristic: []
IDMT EF time multiplier setting: []

Note: Ignore instantaneous / definite time settings - calculations to be based on most onerous fault clearance time

Impedance at HV Terminals (NGED Scheme)

Impedance of HV Network in Ohms

R (Ω)	X (Ω)
21	0
22	0
20	0

Impedance of HV network on 100 MVA base (%)

R (%)	X (%)
21	0
22	0
20	0

Guidance doc: []

Issued to: []
Person: []
Company: National Grid Electricity Distribution
Date: 26/01/2025

Version Dec-24

- Site and enquiry details
- Location details of PoC
- Region specific email address required to obtain data
- System voltage
- For sites that are cable connected back to the source substation we provide the Earth Potential Rise and associated Fault Clearance Time for the worse case EHV faults to enable the assessment of transfer potentials. This data will only be supplied for cable connected sites
- Primary earth electrode impedance
- The protection settings of the upstream protective device will be provided allowing a site specific fault clearance time to be calculated. *Note: these are not the protection settings to be applied at the new Point of Supply*
- Network impedance data allowing the calculation of fault at the PoC. *Note: Any impedance from ICP installed assets will need to be added to these values*
- Form Version added

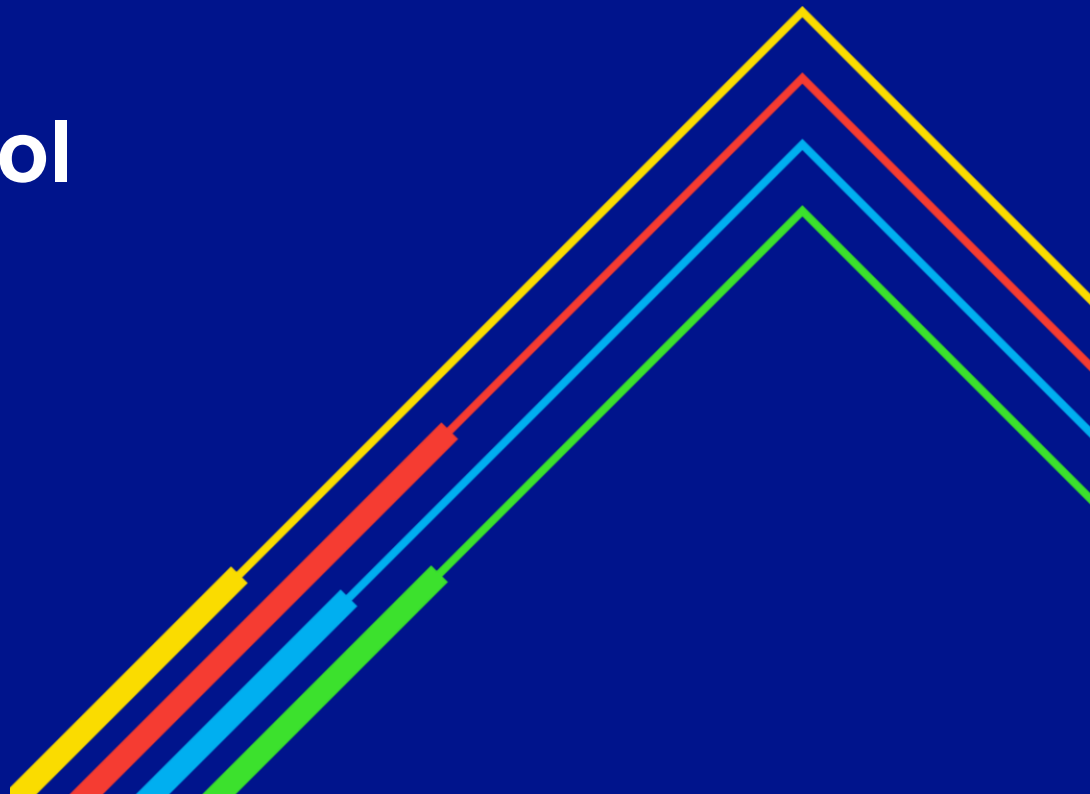
Old

Data Collection Form - High Voltage Design - EPR Study		nationalgrid												
Site Address														
NGED Designer - requested by														
Managed Unit														
Enquiry No	124032023													
Date														
Connecting onto primary no - Connecting onto circuit no - Connection location / between														
Send to Area	South West													
	NGED, PSD Smart case4.prd@nationalgrid.co.uk; NGED, PSD Protect Smart case4.prd@nationalgrid.co.uk;													
HV system Voltage =	11000	Volt												
Primary substation earthing system impedance (Ω)		Ω												
Primary substation EPR - Transfer potential - Required for cable connection only														
V --- 11kV Fault	V --- 33kV Fault													
Fault clearance time at primary p/s for above fault condition - Required for cable connection only														
S --- 11kV Fault	S --- 33kV Fault													
Data provided by	Date													
Impedance at Primary Substation busbar on 100 MVA base														
	<table border="1"> <thead> <tr> <th></th> <th>R (Ω)</th> <th>X (Ω)</th> </tr> </thead> <tbody> <tr> <td>Z1</td> <td></td> <td></td> </tr> <tr> <td>Z2</td> <td></td> <td></td> </tr> <tr> <td>Z0</td> <td></td> <td></td> </tr> </tbody> </table>			R (Ω)	X (Ω)	Z1			Z2			Z0		
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Guidance doc														
Issued to														
Person	Mark Kneebone													
Company	National Grid Electricity Distribution													
Date	11/06/2025													
	Print to PDF													

New

Electricity Distribution		Data Collection Form - 6.6kV & 11kV Networks	nationalgrid
Site Address			Enquiry No
NGED Designer			Request Date
Managed Unit			
Connecting onto primary no - Connecting onto circuit no - Connection location / between			
Request the below information from:	Area		South West
Primary Network Design (PRD)	mailto:case.prd@nationalgrid.co.uk		
Engineering Design	mailto:case.eng@nationalgrid.co.uk		
HV system Voltage	11000		Volts
Is the ground mounted distribution substation cable connected ALL THE WAY to the source substation under normal feeding conditions?	Yes		
Primary substation Transfer potential 1 - Required for cable connection only			
EPR 1			Volts for 33kV Fault
Clearance Time 1			Seconds
Primary substation Transfer potential 2 - Required for cable connection only			
EPR 2			Volts for N/A Fault
Clearance Time 2			Seconds
Primary substation Transfer potential 3 - Required for cable connection only			
EPR 3			Volts for N/A Fault
Clearance Time 3			Seconds
Primary substation earthing system impedance (Ω)			Ω
Protection Settings			
Settings relating to:			
Feeder Circuit Breaker			
IDMT CT Ratio	Primary	Secondary	
IDMT EF Current Setting			
IDMT EF time-current characteristic			
IDMT EF time multiplier setting			
Note: ignore instantaneous / definite time settings - calculations to be based on next nearest fault clearance time			
Impedance at	HV Terminals (NGED Scheme)		
Guidance doc			
Issued to			
Person	National Grid Electricity Distribution		
Company	18/01/2025		
Date			
	Version Dec-24		

Earthing Design Tool Version 3



Earthing Design Tool (EDT) – What is it?

SUBSTATION FORMAT & LOCATION [DESIGN STEP A]

Substation format

Design Input A1 HV Connection substation in freestanding GMP or masonry housing Standard Earthing Design = 19230-G

What type of freestanding housing?

Design Input A2 GMP

Is the ground mounted distribution substation a special design?

Design Input A3 YES - Supplies mobile phone base station on tower line
This earthing design tool is NOT appropriate for a special design

Is the ground mounted distribution substation within 40m of an electrified railway or tramway?

Design Input A4 YES

Is the ground mounted distribution substation within 40m of a susceptible installation?

Design Input A5 YES - Outdoor swimming pool, paddling pool or shower Employ Earthing Specialist to carry out design if actual separation distance does not exceed minimum permitted by all local DM

ENSURE VOLTAGES TRANSFERRED ONTO AN ELECTRIFIED RAILWAY OR TRAMWAY ARE SAFE [DESIGN STEP N]

Is the EPR due to an HV or EHV fault less than the safety limit for an electrified railway or tramway?

	HV Faults	EHV Faults
EPR	75	275
Safety limit for an electrified railway or tramway	550	75
EPR > Safety limit for a electrified railway or tramway	YES	NO

Electrified Railway or Tramway Impact Classification

HIGH EPR

Electrified Railway or Tramway Impact Classification means the following stipulations apply:

HV Separation Distance to electrified railway or tramway REQUIRED

Minimum HV separation distance to an electrified railway or tramway

2 m

HV SEPARATION DISTANCE = 2 m

Diagram showing a substation with a lightning rod and a railway/tramway. The distance between them is 2m. The voltage gradient on the ground surface is shown as a red line.

V = EPR

V = 75V (UNACCEPTABLE SAFETY LIMIT FOR RAILWAY OR TRAMWAY)

V = DV

VOLTAGE GRADIENT ON GROUND SURFACE

HV FAULT CURRENT & GROUND RETURN CURRENT [DESIGN STEP F]

Calculated total earth fault current (I_{t1})

628 A

Percentage of fault current flowing into the ground

100 % I_{t1} 1

Calculated fault current flowing into the ground (I_{g1})

628 A

Diagram showing a fault on a HV line. The fault current is 628A. The ground current is 628A. The sheath current is 0A. The diagram shows the fault current flowing into the ground and the ground current flowing back to the source substation.

Total Fault Current 628A

Ground Current 628A

Sheath Current 0A

Earth Electrode THIS SUBSTATION

Earth Electrode SOURCE SUBSTATION OR POLE TERMINATION

HV FAULT CLEARANCE TIME [DESIGN STEP E]

HV fault clearance time

Design Input E1 0.40 s Modify? YES

Enter CT ratio and IDMT earth-fault protection settings on HV feeder CB at source substation

CB operating time	100 ms
IDMT CT Ratio	/
IDMT EF current setting	0 A (Primary Equivalent)
IDMT EF time-current characteristic	/
IDMT EF time multiplier setting	0 ms
IDMT EF protection operating time	0.10 s
Total fault clearance time	0.10 s

Compulsory Fields

Design HV fault clearance time (0.4s margin)

0.50 s

CONDUCTOR & ELECTRODE DIMENSIONS FOR CORROSION, MECHANICAL & THERMAL PERFORMANCE [DESIGN STEP G]

Earth conductor cross sectional area

70 mm²

Enter number of parallel conductors used for 'tail' electrode

Design Input G1 3 1

Change length of HV electrode tail

Minimum HV electrode surface area required

1,103,127 mm²

Actual HV earth electrode surface area

Surface area of perimeter electrode	0 mm ²
Surface area of 4 x 1.2m earth rods	0 mm ²
Surface area of electrode 'tail'	3,559,080 mm ²
Total surface area	3,559,080 mm ²
Electrode surface area criteria met	YES

Diagram showing a tail electrode with 3 parallel conductors. The length of the tail is 1.2m. The diagram shows the electrode tail and the conductors.

Electrode 'tail' = 1 single conductor

Electrode 'tail' = 4 parallel conductors

Electrode 'tail' = 3 parallel conductors

SOIL RESISTIVITY DATA [DESIGN STEP D]

Soil Resistivity Assistant (Optional)

	Soil Resistivity (Ωm)		Soil Depth (m)	
	From	To	From	To
Top Soil Layer	400	500	1	1.5
Midsize Soil Layer	50	175	1.5	3.0
Bottom Soil Layer	35	45	3.0	3.0

Design Input D1 Get middle soil layer values to zero if upper is not present

RECOMMENDED resistivity of the upper layer of soil 200 Ωm

RECOMMENDED upper layer to lower layer soil resistivity ratio 5:1

RECOMMENDED combined depth of the upper & middle layers of soil 6 m

Select the resistivity of the upper layer of soil

Design Input D2 200 Ωm 1

Select the upper layer to lower layer soil resistivity ratio

Design Input D3 5:1 1

Resistivity of the lower layer of soil

10.4 Ωm 1

NOTE: above LOW resistivity soil

Select the combined depth of the upper & middle layers of soil

Design Input D4 6 m 1

Diagram showing a cross-section of the soil layers. The top layer is 1.5m deep, the middle layer is 1.5m deep, and the bottom layer is 3.0m deep. The total depth is 6.0m.

200 Ωm

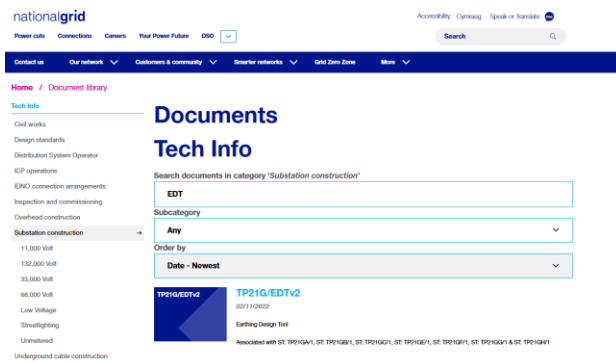
10.4 Ωm

6.0m

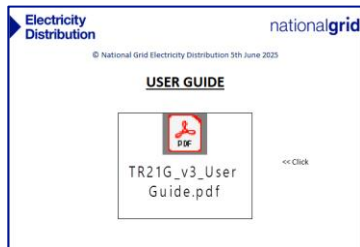
Why use it?

- Earthing data contained in the tool
- Adheres to NGED earthing policy requirements
- Provides an earthing report in a familiar format for the design submission

Where to find it?



How to use it?

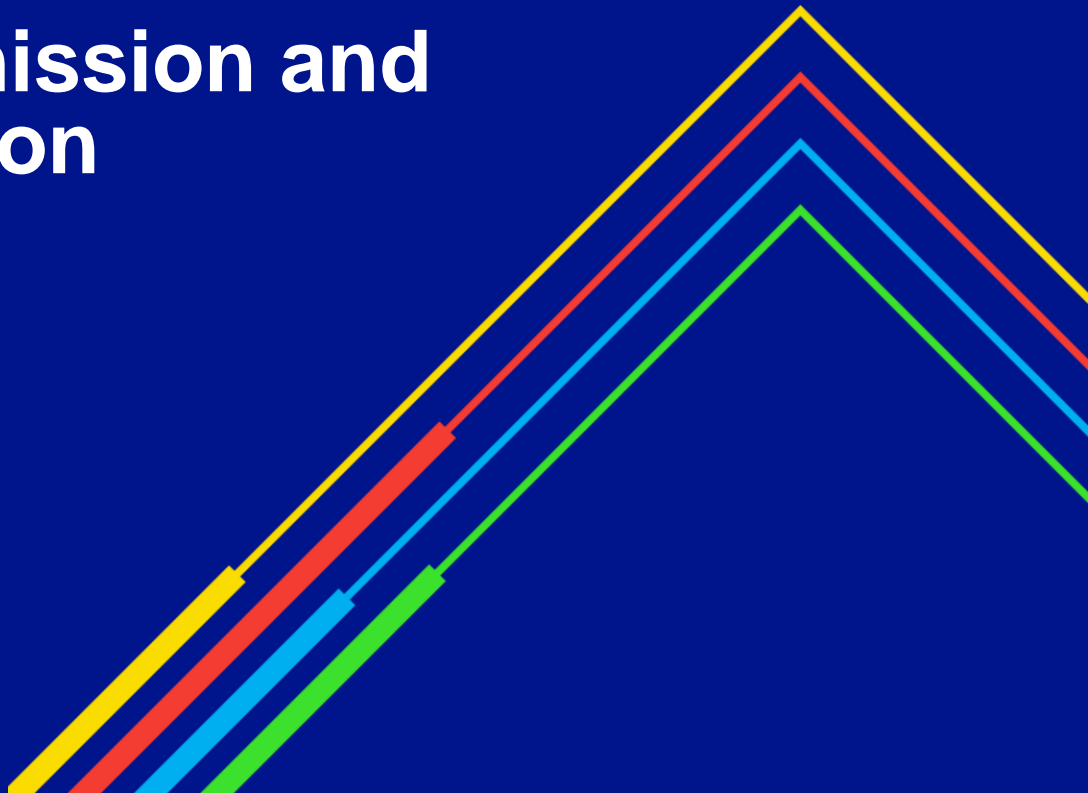


Why Update the Tool?

- Version 2b was released in 2022!!
- Update of embedded primary data
- Refinement of separation distance calculations
- Refinement of Total Fault Current calculations
- Inclusion of Stance Gratings
- Additional support for proximity to railways etc.
- Direct entry of earth electrode / network contribution measurements
- Re-write of background code structure to facilitate new features

ICP feedback submission and associated resolution

Ephie Chalakateva
Connections Strategy Engineer



ICP Complaints Procedure | Code of Practice confirms that the DNO complaints process will be followed for complaints resolution

10. Dispute Resolution

10.1. The DNO's complaints process will be used where any party considers that a DNO is not meeting their obligations under this code of practice. The complaints process will include appropriate levels of escalation within the DNO organisation. Each DNO shall publish their complaints resolution process on their website.

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National Grid - ICP Complaints procedure

This complaints procedure applies to ICPs only.

Included in the scope are:

- Accreditation
- Determining Point of Connection
- Convertible Quotations
- Design approval
- Link boxes
- Inspection

This complaints procedure does not apply to:

- customers who have accepted a DNO quotation for both the Contestable and Non- Contestable Works;
- connection charges -these are subject to the Connection Charging Methodology and Statement ;
- a DNO's detailed procedures and forms; and
- standards and reference documents that support the Connections process.

The Voice of the Networks



10.2. Either party may request that the panel established under the governance arrangements in appendix 1 provides a view on any matter being disputed.

10.3. Once that complaints process has been exhausted the party may refer their issue to Ofgem. This would not affect the ability of parties to raise issues of alleged noncompliance with competition law or licence obligations directly with Ofgem at any time.

Step 1 “Review by your Local Manager”

Step 2 “Referral to a Senior Manager”

Step 3 “Final Review by Regulatory Compliance Manager”

Step 4 “Dispute Resolution (CoP Panel)”

Final Step “Escalate to Ofgem”

1

Connections Policy Inbox

nged.connpolicysupport@nationalgrid.co.uk

2

Ephie Chalakateva

Connections Policy Engineer

echalakateva@nationalgrid.co.uk

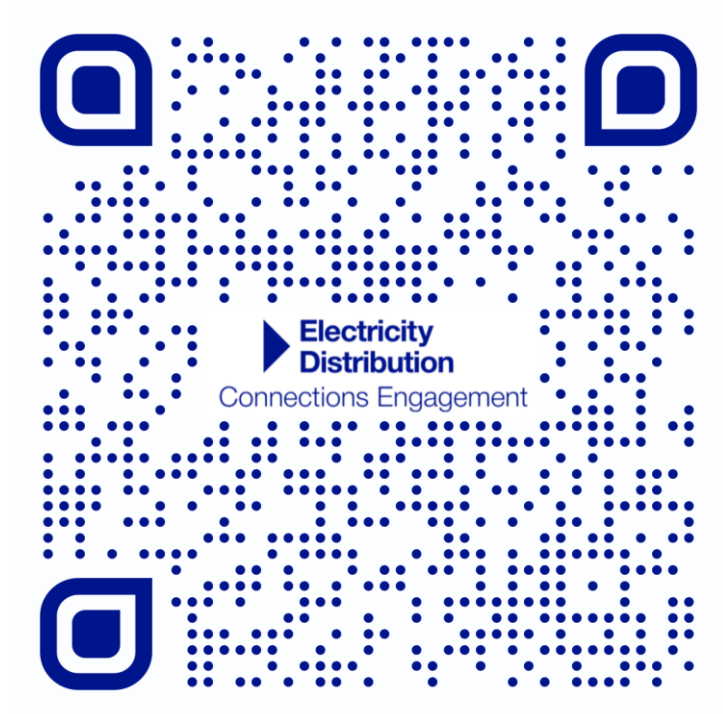
3

Kelly McLaughlin

Connections Policy Officer

kmclaughlin@nationalgrid.co.uk

Thank you for attending Connections: Operator



Stay Connected! Scan the QR Code to Register
for Upcoming Events and to find out more

nationalgrid