

## DCP 140 – Legal Drafting

### Inclusion in DCUSA of the Common Connection Charging Methodology

#### Amend the Contents Page as follows

Schedule [XX] Common Connection Charging Methodology

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#### Amend the following definitions in Clause 1 as follows

##### CCCM

means the common connection charging methodology set out in Schedule XX (Common Connection Charging Methodology). As described in that Schedule, the CCCM only comprises part of the connection charging methodology that each DNO Party is obliged to have in force under its Distribution Licence.

##### CDCM

means the common distribution charging methodology for determining certain of the Use of System Charges of the DNO Parties that are to be recovered pursuant to Section 2A, Section 2B, and the Relevant Charging Statements, as set out in Schedule 16 (Common Distribution Charging Methodology).

##### **Charging Methodologies**

means each of the CDCM, the EDCM and the CCCM~~, the methodologies for determining the Use of System Charges of the DNO Parties that are to be recovered pursuant to Section 2A, Section 2B, and the Relevant Charging Statements, as set out:~~

~~(a) — with effect from 1 April 2010, in Schedule 16 (Common Distribution Charging Methodology) in respect of all of the DNO Parties; and~~

~~(b) — with effect from 1 April 2012:~~

- ~~(i) — in Schedule 17 (EHV Distribution Charging Methodology A) in respect of those DNO Parties that are named in that schedule; and~~
- ~~(ii) — in Schedule 18 (EHV Distribution Charging Methodology B) in respect of those DNO Parties that are named in that schedule.~~

**EDCM**

means the EHV distribution charging methodology for determining certain of the Use of System Charges of the DNO Parties that are to be recovered pursuant to Section 2A, Section 2B, and the Relevant Charging Statements, as set out:

- (a) in Schedule 17 (EHV Distribution Charging Methodology A) in respect of those DNO Parties that are named in that Schedule; and
- (b) in Schedule 18 (EHV Distribution Charging Methodology B) in respect of those DNO Parties that are named in that Schedule.

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**Amend Clause 3.3 as follows**

For the purposes of this Agreement, each of the Charging Methodologies achieves the Charging Objectives if it achieves them in the round, taking each Charging Objective with every other Charging Objective, and having due regard to any particular implications for the determination of the Use of System Charges or connection charges (as applicable) of the DNO Parties (or of any DNO Party) under any other Charging Methodology.

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**Amend Clause 9.5.5 as follows**

9.5.5 Schedule 2A (Mandatory Terms for Contracts), Schedule 2B (National Terms of Connection), Paragraph 6.1 of Schedule 5 (Disputes Under Approval and Permission Procedures), Paragraph 13 of Schedule 8 (Rota Load Block Alpha Identifiers), Schedule 16 (Common Distribution Charging Methodology), Schedule 17 (EHV Distribution Charging Methodology A), Schedule 18 (EHV Distribution Charging Methodology B), Schedule 19 (Portfolio Billing), ~~and~~ Schedule 21 (Portfolio Billing for Nested Networks), and Schedule XX (Common Connection Charging Methodology); and

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**Amend Clause 11.14.3 as follows**

11.14.3 evaluating, developing and refining the proposed variation to the Agreement (and, in undertaking such evaluation in respect of a Change Proposal to vary one or more of the Charging Methodologies (but not the CCCM), the Working Group shall have regard to the ability of the Authority to veto any Change Proposal that appears to the Authority to have as its purpose or effect the full or substantial substitution of one Charging Methodology for another);

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**Add a new schedule as follows**

**SCHEDULE [XX] – COMMON CONNECTION CHARGING  
METHODOLOGY**

**Introduction**

1. This Schedule [XX] sets out the Common Connection Charging Methodology (CCCM). The CCCM is the whole of this Schedule [XX] excluding only this introductory section.
2. Each DNO Party is obliged by Standard Licence Condition 13 to have a connection charging methodology in force (each a **Connection Charging**

Methodology). Each DNO Party is obliged by Standard Licence Condition 13 to include the CCCM within its Connection Charging Methodology.

3. The DNO Party will include within the document containing its Connection Charging Methodology other matters which are outside the scope of the CCCM.
4. The CCCM is split into two sections numbered '1' and '2', and refers to other sections of the document in which the CCCM is to be included. When each DNO Party includes the CCCM within the document containing its Connection Charging Methodology, the DNO Party shall replace such section numbering and cross-references with the section numbers and cross-references appropriate for its document.
5. Modifications to this Schedule [XX] are governed by the provisions of this Agreement.
6. The glossary forming part of the CCCM contains definitions of terms and acronyms used in the CCCM. In the case of any conflict between the defined terms and acronyms set out in the CCCM (on the one hand) and the definitions and rules of interpretation set out in Clause 1 of this Agreement (on the other), the defined terms and acronyms set out in the CCCM shall prevail for the purposes of the CCCM.

#### Common Connection Charging Methodology

## **Section 1 – Common Connection Charging Methodology**

This Section sets out the Common Connection Charging Methodology that is implemented to ensure a consistent approach in the way your Connection Charge is calculated.

### **Minimum Scheme**

1.1 The Minimum Scheme is the Scheme with the lowest overall capital cost (as estimated by us), solely to provide the Required Capacity. The Minimum Scheme will be subject to:

- accepted industry standards, including the requirements of the Distribution Code;
- the status and configuration of the Relevant Section of Network (RSN);
- the standard sizes and types of equipment currently used by us on our Distribution System which shall be reasonable in all the circumstances;

- maintaining our ability to minimise regulatory penalties associated with the Interruptions Incentive Scheme and the Guaranteed Standards of Performance; and
- where the Customer is an LDNO, maintaining the Customer's ability to minimise regulatory penalties associated with the Guaranteed Standards of Performance.

and shall be consistent with our statutory and licence obligations including the requirement to develop, maintain and operate an efficient, co-ordinated and economical electricity Distribution System.

1.2 We will make available our design policies and standards as appropriate.

1.3 Subject to paragraphs 1.4 and 1.7 below, we will calculate the Connection Charge based on the estimated costs of the Minimum Scheme.

1.4 In certain circumstances we may decide to design an Enhanced Scheme. This will include one or more of the following:

- additional assets not required as part of the Minimum Scheme;
- assets of a larger capacity than required by the Minimum Scheme;
- assets of a different specification than required by the Minimum Scheme.

1.5 If we decide to design an Enhanced Scheme, then, the Connection Charge that will apply will be the lower of the Connection Charge associated with the Minimum Scheme and the Connection Charge associated with the Enhanced Scheme.

1.6 The Connection Charge associated with the Enhanced Scheme will be calculated subject to the exclusion of costs of any additional assets not necessary for the provision of your connection.

1.7 We may recover the reasonable costs incurred, both direct and indirect, in providing a connection and may, where allowed by our Licence, apply a margin on some of those costs. The factors taken into account by us to calculate the Connection Charge will include, but are not limited to:

- industry standards governing the Distribution System;
- the Required Capacity;
- available capacity of the existing Distribution System;
- whether any necessary extension or Reinforcement of the existing Distribution System is by underground cable or overhead lines;
- whether any diversionary work is required as a result of the development and the required disconnection of any assets;
- the length of cable or line required;
- type of ground requiring excavation, the type and extent of reinstatement necessary (including New Roads and Street Works Act requirements and any other relevant legislation), and the need for road, bridge crossings etc;
- any Electrical Plant and civil costs required, allowing for any civil works undertaken by you with our agreement;
- the requirement to work outside of normal working hours;
- the costs of undertaking the design;
- the costs of securing wayleaves/easements for plant, cables or lines including any consents;
- the costs of securing suitable substation sites including any necessary Land Rights;
- any overhead line surveys required;
- the costs of public enquiries and environmental impact studies;
- charges for any other costs associated with the work on Sites of Special Scientific Interest (SSSI), railway lines etc; and
- any variations in respect of the actual costs that were reasonably incurred as specified in the Connection Offer.

## Cost Allocation

1.8 The costs to be charged to you as a Connection Charge may be split into three categories:-

- Costs for providing the connection which are to be paid in full by you (see paragraphs 1.10 to 1.15);
- Costs for providing the connection which are to be apportioned between you and us (see paragraphs 1.16 to 1.28; and
- Costs to be paid by you in respect of works that have previously been constructed or are committed and are used to provide the connection (see paragraph 1.29).

1.9 Some costs may be borne in full by us and will not be included in your Connection Charge (see paragraphs 1.30 to 1.32).

## Costs to be paid in full by you

1.10 The costs of providing Extension Assets are charged in full to you.

1.11 Where you have requirements for additional security or the characteristics of your load requires us to install assets in excess of the Minimum Scheme then you will pay the costs in excess of the Minimum Scheme in full.

1.12 The costs of the future operation and maintenance of any additional assets requested by you (over and above those associated with the Minimum Scheme) will be payable in full. This would normally be levied as a one-off charge representing the net present value of the future operation and maintenance costs and calculated as a percentage (specified in Section [6]) of the additional capital cost of the Scheme. See Example 3 for an illustration of where you request additional security.

1.13 Work required to reconfigure the Distribution System to meet your requirements where no additional Network or Fault Level Capacity is made available shall be charged in full to you. See Example 8B.

1.14 Where the Extension Assets would normally require the extension of existing switchgear equipment and this is not possible, the cost of the full replacement of the switchgear (using the nearest standard size) will be charged to you, provided that there is no Reinforcement of the Distribution System (see paragraph 1.20).

1.15 For generation connections only, Reinforcement costs in excess of the high-cost project threshold of £200/kW shall be charged to you in full as a Connection Charge.

## Costs to be apportioned between you and us

1.16 Reinforcement is defined as assets installed that add capacity (network or fault level) to the existing shared use Distribution System. The costs of Reinforcement shall be apportioned between you and us. The methods used to apportion the costs of Reinforcement are set out in paragraphs 1.23 – 1.28. There are five exceptions to this rule. Where an exception applies Reinforcement will be treated as Extension Assets and costs will not be apportioned. These exceptions are described below and the application of exceptions 1, 2, 4, and 5 is demonstrated in the Examples.

1.17 Exception 1: Where the Reinforcement is:

- down stream of the POC; and
- over and above the Minimum Scheme; and
- provided at our request; and
- provided by connecting two points on the existing Distribution System; and
- there is little or no prospect of the capacity created being required within the next five years,

then the apportionment rules will not apply. You will pay the costs associated with the Minimum Scheme and we will pay the costs over and above the Minimum Scheme. See Example 2B.

1.18 Exception 2: Where the Reinforcement is in excess of the Minimum Scheme and is at your request, the Reinforcement will be treated as Extension Assets and the apportionment rules will not apply. The costs in excess of the Minimum Scheme will be borne in full by you (see paragraphs 1.11 and 1.12 above).

1.19 Exception 3: Where the Reinforcement is provided to accommodate a Temporary Connection the Reinforcement will be treated as Extension Assets and the apportionment rules will not apply. The costs associated with the Temporary Connection will be borne in full by you. Temporary Connections are defined as connections that are only required for a period of up to five years, but exclude connections to provide the initial connection to a development, where the Reinforcement will subsequently be required for the permanent connection.

1.20 Exception 4: Where the replacement of switchgear results in an increase in fault level capacity and:

- that increase is solely as a result of the fault level rating of the standard switchgear equipment used by us being higher than that of the existing switchgear; and
- that increase in fault level capacity is not needed to accommodate your connection.

then, unless the switchgear adds network capacity and the Security CAF applies, the switchgear replacement will be treated as Extension Assets and the apportionment rules will not apply. You will pay the full cost of the switchgear replacement. See Example 7B.

1.21 Exception 5: Where the Reinforcement:

- is provided by connecting two points on the existing distribution system; and
- is providing connection is to a development with a number of Entry/ Exit Points, then the additional network length (measured from suitable points close to the site boundaries which would allow for a clear demarcation of Contestable and Non-Contestable Work) required to provide connectivity within the development will be considered to be Extension Assets and the apportionment rules will not apply. You will pay the full cost of the additional network length. See Example 8A.

1.22 For avoidance of doubt, where the costs of Reinforcement are borne in full by you and any capacity created is used to accommodate new or increased connections within five years, the ECCR will apply (see paragraphs 1.35 - 1.38).

1.23 The costs of Reinforcement will be apportioned using one of two Cost Apportionment Factors (CAFs), dependent upon which factor is driving the requirement for Reinforcement:

- The 'Security CAF'; and
- The 'Fault Level CAF'.

1.24 The following definitions are used in the application of the CAFs.

<b>Existing Capacity</b>	For existing Customers their Existing Capacity will be either:- a) the Maximum Capacity used in the calculation of their use of system charges; or b) for Customers who are not charged for use of system on the basis of their Maximum Capacity the lower of: • No. of phases x nominal phase-neutral voltage (kV) x fuse rating (A); and • The rating of the service equipment.
<b>Fault Level Contribution from Connection</b>	is the assessment of the Fault Level contribution from the equipment to be connected taking account of its impact at the appropriate point on the Distribution System. Where an existing Customer requests a change to a connection

	then the “Fault Level Contribution from Connection” is defined as the incremental increase in Fault Level caused by the Customer.
<b>New Fault Level Capacity</b>	is the Fault Level rating, following Reinforcement, of the equipment installed after taking account of any restrictions imposed by the local network Fault Level capacity. For the avoidance of doubt this rule will be used for all equipment types and voltages.
<b>New Network Capacity</b>	is the secure capacity of the Relevant Section of Network following Reinforcement. This is our assessment of the resultant capacity and will be considered in respect of thermal capacity, voltage drop and upstream restrictions and compliance with our relevant design, planning and security of supply policies. The equipment ratings to be used are the appropriate operational rating at the time of the most onerous operational conditions taking account of seasonal ratings and demand.
<b>Relevant Section of Network (RSN)</b>	is that part or parts of the Distribution System that can be used to supply you in both normal and abnormal running arrangements. There may be more than one RSN, e.g. at different voltage levels.
<b>Required Capacity</b>	is the Maximum Capacity agreed with the Customer. In the case of multiple connections (e.g. a housing development) it may be adjusted after consideration of the effects of diversity. Where an existing Customer requests an increase in capacity then it is the increase above their Existing Capacity.

- 1.25 The ‘Security CAF’ is applied, where the costs are driven by either thermal capacity or voltage (or both) as assessed against the relevant standard. This rule determines the proportion of the Reinforcement costs that should be paid by you as detailed below.

$$\text{Security CAF} = \frac{\text{Required Capacity}}{\text{New Network Capacity}} \times 100\% \quad (\text{max } 100\%)$$

- 1.26 The ‘Fault Level CAF’ is applied, where the costs are driven by Fault Level restrictions. This rule determines the proportion of the Reinforcement costs that should be paid by you as detailed below.

$$\text{Fault Level CAF} = 3 \times \frac{\text{Fault Level Contribution from Connection}}{\text{New Fault Level Capacity}} \times 100\% \quad (\text{max } 100\%)$$

- 1.27 For clarity, where you require an augmentation to an existing connection, both the Security and Fault Level CAFs will be based on the increase in Required Capacity and increase in Fault Level Contribution from the connection respectively. Any related increases within the previous three year period will be taken into account in determining the increase in the Required Capacity or increase in the Fault Level Contribution from the connection to be applied within the CAF.
- 1.28 On some Schemes there may be interaction between the two rules. In such cases, the ‘Security’ CAF will be applied to costs that are driven by the security requirement. The ‘Fault Level CAF’ will be applied to costs that are driven by Fault Level requirements. See the Examples for illustrations on the application of the CAFs.

## Recovery of costs for previous works

- 1.29 Where, in order to provide your connection; ,
- we propose to utilise existing Distribution System assets that were previously installed to provide a connection to another Customer, and



- the other Customer has paid us (either in part or in full) a Connection Charge for those assets

you may be required to make a payment towards them. The ECCR prescribes the circumstances where such payment is required. Charges for such works only apply where the new connection is provided within five years of the original Distribution System assets being provided.

## Costs to be paid in full by us

1.30 We will fully fund Reinforcement carried out greater than one voltage level above the voltage at the POC to the existing Distribution System.

1.31 Where another LDNO with a distribution network that is connected to our Distribution System requires an increase in capacity to its distribution network, the voltage at the POC for assessing the one voltage rule will be:

- In the case of a new extension to the network of the other LDNO, the voltage of connection at which the Extension Assets will connect to the other LDNO's network; or
- In the case of additional capacity required in respect of a Customer connected to the existing assets of the LDNO, the voltage at which the Customer connects to the LDNO's network; or
- In the case of additional capacity required to meet general load growth on the LDNO's network then the Reinforcement costs will be borne by us. The LDNO will be required to provide justification in such circumstances.

1.32 The table below illustrates the application of the one voltage rule in relation to Reinforcement. You will be required to contribute towards the cost of any Reinforcement provided at one voltage level above the POC, up to and including the cost of circuit breakers provided at that voltage.

### England & Wales

Voltage of Scheme Assets	Voltage at the POC			
	LV (below 1000V)	HV (above 1kV but less than 22kV)	EHV (above 22kV but less than 72kV)	132kV
<b>132kV Network</b>	We fund	We fund <sup>1</sup>	Apportioned	Apportioned
<b>132kV/ EHV Substation</b>	We fund	EHV circuit breakers only Apportioned	Apportioned	Not applicable
<b>EHV Network</b>	We fund	Apportioned	Apportioned	Not applicable
<b>132kV/ HV Substation</b>	HV circuit breakers only Apportioned	Apportioned	Not applicable	Not applicable
<b>EHV/HV Substation</b>	HV circuit breakers only Apportioned	Apportioned	Not applicable	Not applicable
<b>HV Network</b>	Apportioned	Apportioned	Not applicable	Not applicable
<b>HV/ LV Substation</b>	Apportioned	Not applicable	Not applicable	Not applicable
<b>LV Network</b>	Apportioned	Not applicable	Not applicable	Not applicable

Except where there is direct transformation from 132kV to HV when the costs are apportioned.

### Scotland

Voltage of	Voltage at the POC		
	LV	HV	EHV

<b>Scheme Assets</b>	<b>(below 1000V)</b>	<b>(above 1kV but less than 22kV)</b>	<b>(above 22kV but less than 72kV)</b>
<b>EHV Network</b>	We fund	Apportioned	Apportioned
<b>EHV/HV Substation</b>	HV circuit breakers only Apportioned	Apportioned	Not applicable
<b>HV Network</b>	Apportioned	Apportioned	Not applicable
<b>HV/ LV Substation</b>	Apportioned	Not applicable	Not applicable
<b>LV Network</b>	Apportioned	Not applicable	Not applicable

## Recovered Equipment and Deferment of Asset Replacement

- 1.33 You will not receive any credit for the value of any equipment recovered by us as a result of the connection.
- 1.34 You will not receive any credit for the value of any deferment of asset renewal expenditure by us.

## Rebates

- 1.35 For Distribution System assets where you have paid in full, then you may be entitled to a future rebate of charges should another Customer connect to those assets. These circumstances are detailed in the ECCR.
- 1.36 For Distribution System assets where you have paid in proportion to your Required Capacity, then you are not entitled to a future rebate of charges should another customer connect to those assets.
- 1.37 Your entitlement to receive payments under paragraph 1.35 only applies to connections made within five years from the first provision of the connection.
- 1.38 These provisions do not apply where we have adopted the assets from an ICP as we have not incurred the relevant expenses nor has an initial contributor made payment to us in accordance with Regulations 5 and 5(b) of the ECCR.

## Speculative Developments

- 1.39 Developments which have one or more of the following characteristics may be considered as speculative:-
- their detailed electrical load requirements are not known;
  - the development is phased over a period of time and the timing of the phases is unclear;
  - the capacity requested caters for future expansion rather than the immediate requirements of (an) end user(s);
  - the capacity requested caters for future speculative phases of a development rather than the initial phase(s) of the development; or
  - the infrastructure only is being provided, with no connections for end users requested.
- 1.40 Where we are asked to provide a connection to a speculative development then the cost of the work including any Reinforcement is charged in full and the CAFs do not apply. Additional charge to reflect ongoing operation, repair and maintenance costs may also be levied.

- 1.41 We may, at our sole discretion, allow capacity to be reserved on the infrastructure provided to service the speculative development on the commercial terms agreed between you and us in respect of the development.

## **Connection Alterations**

- 1.42 Where you request an alteration to your connection arrangements, including a change in the supply voltage, the costs are charged in full to you. For the avoidance of doubt increases in the Required Capacity are dealt with in accordance with the [previous] Sections.

## **National Grid Electricity Transmission (NGET) Charges to us**

- 1.43 We have an obligation under the CUSC to discuss certain requests for connection or changes in connection with NGET. Such requests are typically for large electrical demand or generation projects. Under certain circumstances, as determined by NGET, they may apply charges to assess the potential impact on the transmission system of a request or the combined effect of a number of requests and these will be included in the Connection Charge, or through a separate mechanism agreed between you and us.
- 1.44 Subsequent to such assessment NGET may also require works to be undertaken on the GB Transmission System as a condition of the connection being permitted. In the event of NGET applying charges for these works or where they require security in respect of the works, we will reflect such costs in our charges to you.

## **Land Rights**

- 1.45 Where Land Rights are required from a third party, the cost of acquiring those rights will be included in either the Connection Charge to you or through a separate mechanism agreed between you and us.
- 1.46 If the Land Rights that we require cannot be obtained by negotiation, we may, following discussion with you, exercise our powers of compulsory purchase (Section 10 and Schedule 3 of the Act) or apply to the Secretary of State or the Scottish Government in Scotland for a 'necessary wayleave' (paragraphs 6-8 of Schedule 4 of the Act). If we do so, the costs that we incur, including those of the Lands Tribunal/ Lands Tribunal for Scotland (which determine issues of compensation) will be charged to you. The Lands Tribunal may award compensation to the landowner and/or anyone who holds an interest in the land and this will be included in the Connection Charge or through a separate mechanism agreed between you and us.

## **Unmetered Supplies**

- 1.47 For some street lighting and other installations, we may allow items of equipment to be connected to our Distribution System without a meter. This is subject to the equipment having a low and predictable pattern of consumption and meeting the requirements of The Electricity (Unmetered Supply) Regulations 2001.
- 1.48 Where we agree that a meter is not required the provision of such a connection is dependent on the owner entering into an unmetered Connection Agreement and providing and maintaining an auditable inventory, in a format agreed with us, so that an accurate estimate of the consumption can be produced.
- 1.49 Where certain criteria are met the provision of services for unmetered connections may be made via a time-based connection service charge, e.g. Rent-a-Jointer Services. This is subject to us entering into a contract with you for the provision of such services.
- 1.50 You may elect to appoint an accredited ICP to carry out the Contestable Work for unmetered connections. The ICP will be allowed to carry out live jointing on low voltage,

single phase, underground service cables more than one metre from the distributing main. Where you use an ICP a triangular arrangement must first be established:

- You will enter into an agreement with the ICP to carry out and complete the Contestable Work;
- We will enter into an Adoption Agreement with you and/or your appointed agent as appropriate;
- We will enter into an enabling agreement with the ICP to allow the ICP to work on the Distribution System (this may be the same document as the Adoption Agreement).

## Capacity Ramping for LDNOs

- 1.51 For an LDNO the Required Capacity (expressed in kVA) is the Maximum Capacity to be provided at the boundary between the LDNO's distribution network and our Distribution System. This value will be agreed with us and stated in the Bilateral Connection Agreement for the relevant embedded network.
- 1.52 When a connection is provided to an LDNO the take-up of capacity may grow over a period of time as the site develops and individual customers are connected. In such circumstances the Bilateral Connection Agreement shall include a phased Required Capacity based on the Development Phase.
- 1.53 During the Development Phase a review may be undertaken annually on the anniversary of the Energisation of the embedded network. Any unused capacity identified in such review may be released for use by other customers and the Maximum Capacity reduced to an agreed level within the Bilateral Connection Agreement.
- 1.54 The Required Capacity agreed with us as being required at the end of the Development Phase shall be used to determine the Required Capacity for determination of the Cost Apportionment Factors where applicable.
- 1.55 Should additional capacity subsequently be required, the LDNO may incur additional Connection Charges for any Reinforcement based on the increase in capacity.

## Disconnection and De-Energisation

- 1.56 If we either Disconnect or De-energise your Entry/ Exit Point
- at the request of your Supplier; or
  - due to a failure of your Supplier to comply with the terms of the DCUSA
- then the cost of such disconnection or De-energisation will be borne by your Supplier.
- 1.57 If we either Disconnect or De-energise your Entry/ Exit Point
- at your request; or
  - due to a failure by you to comply with the terms of your Connection Agreement,
- then the cost of such disconnection or De-energisation will be borne by you.
- 1.58 On termination of your Connection Agreement, we retain the right to remove our Electrical Plant and Electric Lines and charge you if we do so. Apparatus which is not cost effective for us to recover (e.g. Electric Lines laid underground) will normally be made safe and left at the Premises, but if you require us to remove them, the cost of removal will be payable by you. All such apparatus will remain our property unless otherwise agreed in writing.

## Adoption Payments

- 1.59 Where we adopt assets installed by an ICP we will not make any adoption payment in respect of those assets.

## **Competition in Connection**

1.60 Where you choose to have any Contestable Work undertaken by an ICP, we levy CIC Charges associated with the design approval, inspection and adoption of the Contestable Works as set out in Section [6] and Section [7].

## **Worked Examples Illustrating the Application of the Connection Charging Methodology**

The following Examples are to illustrate the application of the Connection Charging Methodology and are not intended to provide an accurate estimate of the charges which a person would become liable in respect of the provision of a connection. The Examples do not necessarily represent the Minimum Scheme for a specific connection application.





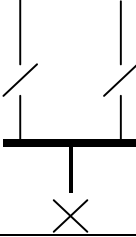




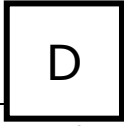

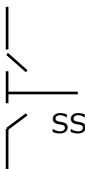
The figures quoted in the Examples are illustrative. Section [7] of this statement provides our charges and indicative costs to undertake various activities.

The Examples illustrate where we undertake both the Contestable and Non-Contestable Work. These costs will include the determination of the POC and assessment and design costs, though these may not be explicitly identified in the Examples.

Where Contestable Work is undertaken by an ICP, we will apply CIC Charges for services associated with the Contestable Works which would cover activities including design approval, inspection and monitoring. The CIC Charges shown in the Examples are for illustration only. For the avoidance of doubt, in each Example, where an ICP undertakes the Contestable Work, our Connection Charge will include the cost of the Non-Contestable Work and the CIC Charges but exclude the cost of Contestable Work.

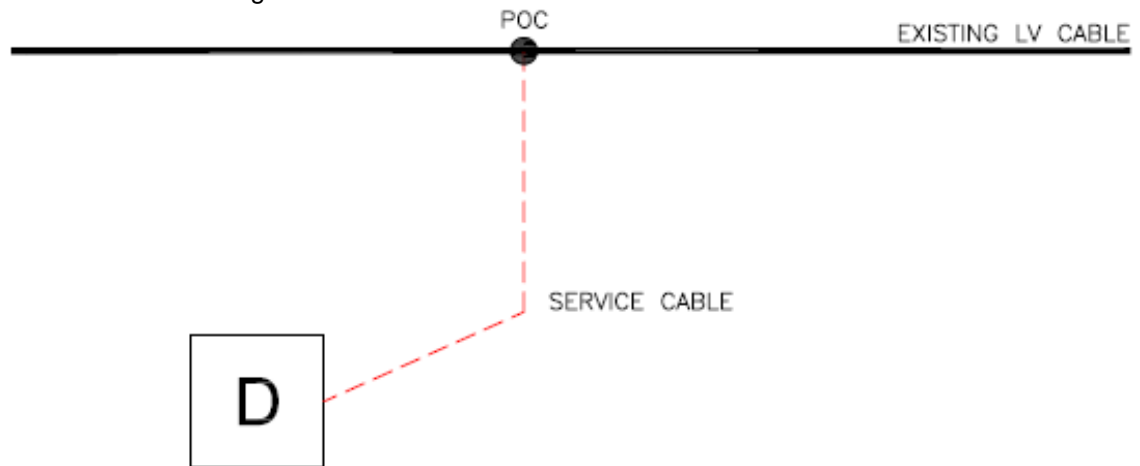
The Examples are generic and standard for all LDNOs. The actual designs are subject to our design policies.

**Key to Illustrations**

	Circuit Breaker (any voltage)
	Switch
	Transformer
	Joint on cable
	High voltage ring main unit
	Existing cable
	Proposed cable
	Normal Open Point (NOP)
	Generator Customer
	Demand Customer
	Point of Connection (POC)
	Sub Station

**Example 1: A new connection to a domestic premise**

A Customer requests a LV single phase connection to a new house. The Premises can be connected to an existing LV main cable in the street.



The Connection Charge for this Scheme is calculated as follows:

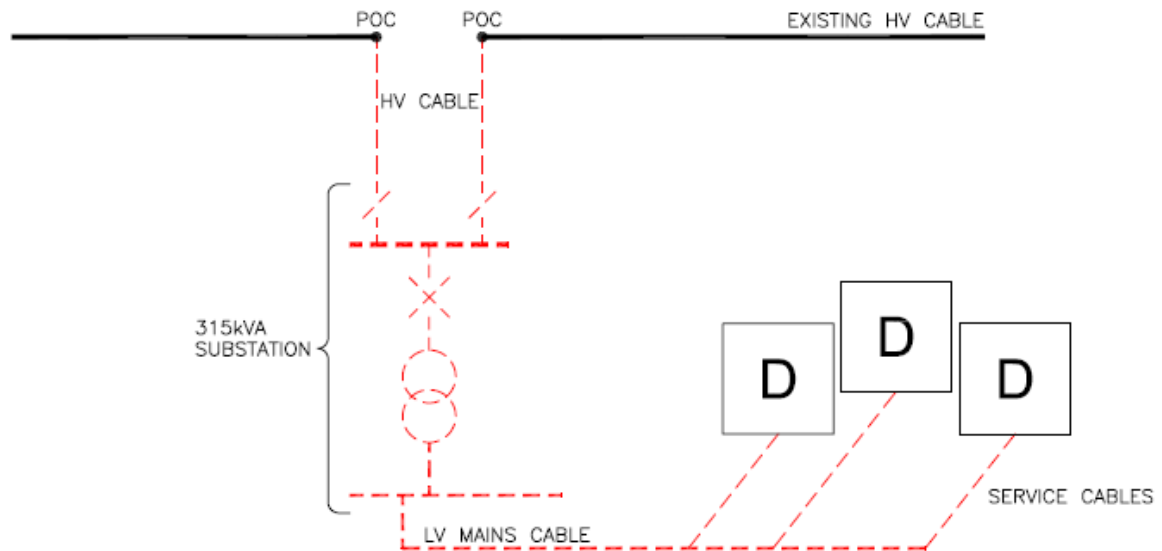
**Extension Assets:**

	<b>Cost</b>	<b>Apportionment</b>	<b>Customer Contribution</b>
<b>Contestable Work</b>			
15m service cable, excavation in footpath for joint hole to Customer laid duct, backfill and termination	£700	n/a	£700
<b>Non-Contestable Work</b>			
Single service breach joint	£400	n/a	£400
<b>Total Extension Asset Cost</b>			<b>£1,100</b>
<b>CIC Charges</b>			£100

**Total Connection Charge = £1,100**

## Example 2A: New connections on a domestic housing development

A housing developer requests connections for 200 domestic Premises. The Required Capacity to supply the 200 homes is 250kVA. A new distribution substation will be established to provide the Required Capacity of the site. The Minimum Scheme requires the substation to be looped into the existing HV network.



The Connection Charge for this Scheme is calculated as follows:

### Extension Assets:

	Cost	Apportionment	Customer Contribution
<b>Contestable Work</b>			
Provision and installation 100m HV cable	£11,000	n/a	£11,000
315kVA substation	£24,000	n/a	£24,000
LV mains, service cables and terminations	£170,000	n/a	£170,000
<b>Non-Contestable Work</b>			
Two HV cable joints	£2,000	n/a	£2,000
<b>Total Extension Asset Cost</b>			<b>£207,000</b>
<b>CIC Charges</b>			£1,500

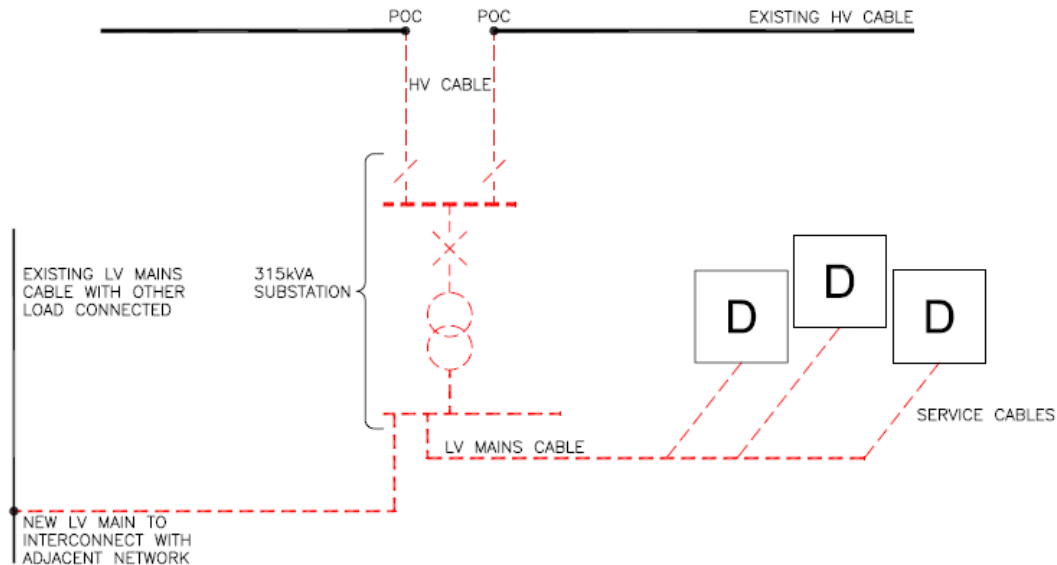
**Total Connection Charge = £207,000**



## Example 2B: New connections on a domestic housing development with interconnection.

This Example demonstrates the application of two of the exceptions to the apportionment rules, Exception 1 (paragraph 1.17) and Exception 2 (paragraph 1.18).

As in Example 2A, a housing developer requests connections for 200 domestic Premises. The Required Capacity to supply the 200 homes is 250kVA. A new distribution substation will be established to provide the Required Capacity of the site. The Minimum Scheme requires the substation to be looped into the existing HV network. However, in this Example there is an option to provide an additional LV cable to interconnect the distribution substation with the existing LV network. This option is over and above the Minimum Scheme.



Interconnecting into the existing LV network will increase the capacity of the existing Distribution System. Therefore, the assets that connect the HV and LV network would normally be considered to be Reinforcement. These assets (as shown on the diagram above) include the HV cable, the 315kVA substation and the interconnecting LV main. They exclude the LV mains and service cables from the 315kVA substation to the Customer's development. However, whether these assets are to be considered Reinforcement or Extension Assets depends upon who requested the LV interconnection and whether any capacity created is likely to be used. One of three scenarios will apply –

### a) The LV interconnection is requested by the Customer (Exception 2).

In this case the Reinforcement is over and above the Minimum Scheme and requested by the Customer. Therefore, Exception 2 applies and all assets (including the interconnecting LV cable) will be treated as Extension Assets and their costs will be borne in full by the Customer. As the interconnecting LV main and associated LV joint are over and above the Minimum Scheme, a charge for their future operation and maintenance will be made.

The Connection Charge for this Scheme is calculated as follows:

#### Extension Assets:

	Cost	Apportionment	Customer Contribution
<b>Contestable Works</b>			
Provision and installation 100m 11kV cable (from existing HV network to substation)	£11,000	n/a	£11,000
315kVA substation	£24,000	n/a	£24,000

LV mains, service cables and terminations (from substation to the Customer's development)	£170,000	n/a	£170,000
Interconnecting LV Cable (from substation to existing LV network)	£10,000	n/a	£10,000
<b>Non-Contestable Works</b>			
Two HV cable joints	£2,000	n/a	£2,000
LV cable joint	£1000	n/a	£1,000
Difference between Minimum and the actual Scheme is £11,000. Operation & Maintenance @20%* of £11,000		n/a	£2,200
<b>Total Extension Asset Cost</b>	<b>£218,000</b>		<b>£220,200</b>
<b>CIC Charges</b>			£1,500

**Total Connection Charge = £220,200**

\*Note, the 20% Operation and Maintenance figure is illustrative.

- b) The LV interconnection is requested by us in order to create additional network capacity (No exception).

In this case, the assets connecting the existing HV and LV network add capacity to the existing network and none of the exceptions described in paragraphs 1.17-1.21 apply. Therefore they will be treated as Reinforcement. The costs of the Reinforcement assets that form part of the Minimum Scheme (the HV cable and associated HV joints; the 315kVA substation) will be apportioned. The interconnecting LV cable and associated LV joint are considered to be Reinforcement but, as they are over and above the Minimum Scheme and requested by us, the costs will be borne in full by us.

**Reinforcement:**

The RSN is that part or parts of the Distribution System that can be used to supply the Customer in both normal and abnormal running arrangements which, in this case, is the distribution substation and the HV Cables.

Security CAF calculation: the numerator in the CAF calculation is based upon the Required Capacity of the Customer, which is 250kVA. The denominator is based on the New Network Capacity following Reinforcement, which is 315kVA, i.e. the secure capacity of the distribution substation and HV cables.

The Connection Charge for this Scheme is calculated as follows:

**Reinforcement:**

	<b>Cost</b>	<b>Apportionment</b>	<b>Customer Contribution</b>
<b>Non-Contestable Work</b>			
Provision and installation 100m 11kV cable (from existing HV network to substation)	£11,000	250/315 =79.4%	£8,730
315 kVA substation	£24,000	as above	£19,048
Two HV cable joints	£2,000	as above	£1,587
Interconnecting LV Cable (from substation to existing LV network)	£10,000	In excess of Minimum Scheme	£0
LV Cable Joint	£1,000	In excess of Minimum Scheme	£0

<b>Total Reinforcement Cost</b>	<b>£48,000</b>		<b>£29,365</b>
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**Extension Assets:**

	<b>Cost</b>	<b>Apportionment</b>	<b>Customer Contribution</b>
<b>Contestable Work</b>			
LV mains, service cables and terminations (from the substation to the Customer's development)	£170,000	n/a	£170,000
<b>Total Extension Asset Cost</b>	<b>£170,000</b>		<b>£170,000</b>
<b>CIC Charges</b>			£1,500

**Total Connection Charge = £29,365 + £170,000 = £199,365**

- c) The LV interconnection is requested by us but there is little prospect of the capacity created being used (Exception 1).

In this case all the requirements of Exception 1 (paragraph 1.17) are met so the assets that connect the existing HV and LV Distribution System will be treated as Extension Assets and their costs will not be apportioned. The Customer will pay the costs associated with the Minimum Scheme in full. The interconnecting LV cable and associated LV joint as they are over and above the Minimum Scheme and requested by us, therefore the costs will be borne in full by us.

The Connection Charge for this Scheme is calculated as follows:

**Extension Assets:**

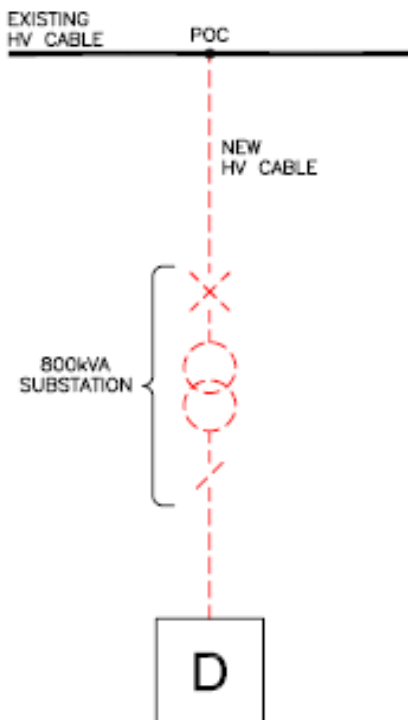
	<b>Cost</b>	<b>Apportionment</b>	<b>Customer Contribution</b>
<b>Contestable Works</b>			
Provision and installation 100m 11kV cable (from existing HV network to substation)	£11,000	n/a	£11,000
315 kVA substation	£24,000	n/a	£24,000
LV mains, service cables and terminations (from substation to the Customer's development)	£170,000	n/a	£170,000
<b>Non-Contestable Works</b>			
Two HV cable joints	£2,000	n/a	£2,000
Interconnecting LV Cable (from substation to existing LV network)	£10,000	In excess of Minimum Scheme	£0
LV Cable Joint	£1000	In excess of Minimum Scheme	£0
<b>Total Extension Asset Cost</b>	<b>£218,000</b>		<b>£207,000</b>
<b>CIC Charges</b>			£1,500

**Total Connection Charge = £207,000**

### Example 3: A new connection to a commercial Premises

A Customer requests a new LV three phase 600kVA connection to commercial Premises. Four scenarios for connection are considered below. The Minimum Scheme will be dependent on the specific circumstances as set out in paragraphs 1.1 to 1.7.

- a) Where the Minimum Scheme is a new 800kVA substation teed onto the existing HV network.



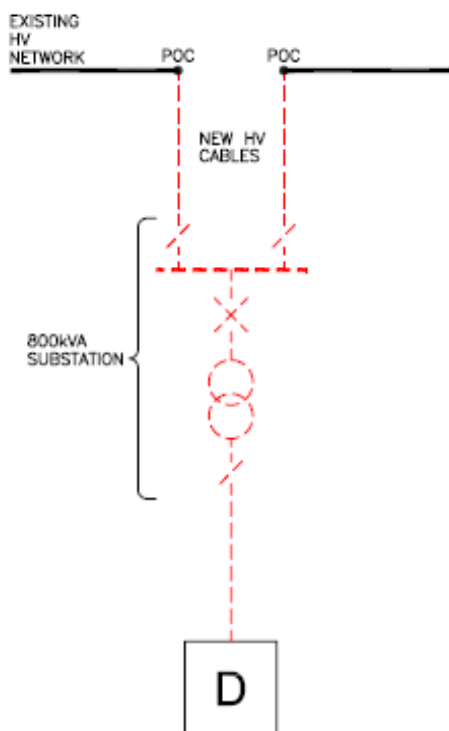
The Connection Charge for this Scheme is calculated as follows:

#### Extension Assets:

	Cost	Apportionment	Customer Contribution
<b>Contestable Work</b>			
Provision and installation of 150m of HV cable	£30,000	n/a	£30,000
800kVA substation	£17,000	n/a	£17,000
Provision and installation LV cabling	£4,400	n/a	£4,400
Metering panel	£800	n/a	£800
<b>Non-Contestable Work</b>			
HV joint to network	£1,900	n/a	£1,900
<b>Total Extension Asset Cost</b>	<b>£54,100</b>		<b>£54,100</b>
<b>CIC Charges</b>			<b>£1,500</b>

#### Total Connection Charge = £54,100

In each of the following scenarios the Customer is connected with a looped connection, as illustrated in the following diagram.



- b) The Minimum Scheme is as for scenario a) above but the Customer requests an enhanced connection arrangement where the substation is looped into existing HV network.

The Connection Charge for this Scheme is calculated as follows:

**Extension Assets:**

	Cost	Apportionment	Customer Contribution
<b>Contestable Work</b>			
Provision and installation of 300m of HV cable	£35,000	n/a	£35,000
800kVA substation	£20,000	n/a	£20,000
Provision and installation LV cabling	£4,400	n/a	£4,400
Metering panel	£800	n/a	£800
<b>Non-Contestable Work</b>			
HV joints to network	£2,900	n/a	£2,900
Total Extension Asset Cost	£63,100		£63,100
Difference between Minimum and the actual Scheme is £9,000. Operation & Maintenance @20%* of £9,000			£1,800
<b>Total Extension Asset Cost</b>			<b>£64,900</b>
<b>CIC Charges</b>			£1,500

**Total Connection Charge = £64,900**

\*Note, the 20% Operation and Maintenance figure is illustrative.

- c) The Minimum Scheme is as for scenario a) above but we request an Enhanced Scheme where the substation is looped into the existing HV network.

The Connection Charge for this Scheme is calculated as follows:

**Extension Assets:**

	<b>Cost</b>	<b>Apportionment</b>	<b>Customer Contribution</b>
<b>Contestable Work</b>			
Provision and installation of 300m of HV cable	£35,000	Minimum Scheme	£30,000
800kVA substation	£20,000	Minimum Scheme	£17,000
Provision and installation LV cabling	£4,400	n/a	£4,400
Metering panel	£800	n/a	£800
<b>Non-Contestable Work</b>			
HV joints to network	£2,900	Minimum Scheme	£1,900
<b>Total Extension Asset Cost</b>	<b>£63,100</b>		<b>£54,100</b>
<b>CIC Charges</b>			£1,500

**Total Connection Charge = £54,100**

d) The Minimum Scheme is a new 800kVA substation looped into existing HV network.

The Connection Charge for this Scheme is calculated as follows:

**Extension Assets:**

	<b>Cost</b>	<b>Apportionment</b>	<b>Customer Contribution</b>
<b>Contestable Work</b>			
Provision and installation of 300m of HV cable looped to network, HV Ring Main Unit, 800kVA transformer	£35,000	n/a	£35,000
800kVA substation	£20,000	n/a	£20,000
Provision and installation LV cabling	£4,400	n/a	£4,400
Metering panel	£800	n/a	£800
<b>Non-Contestable Work</b>			
HV joints to network	£2,900	n/a	£2,900
<b>Total Extension Asset Cost</b>	<b>£63,100</b>		<b>£63,100</b>
<b>CIC Charges</b>			£1,500

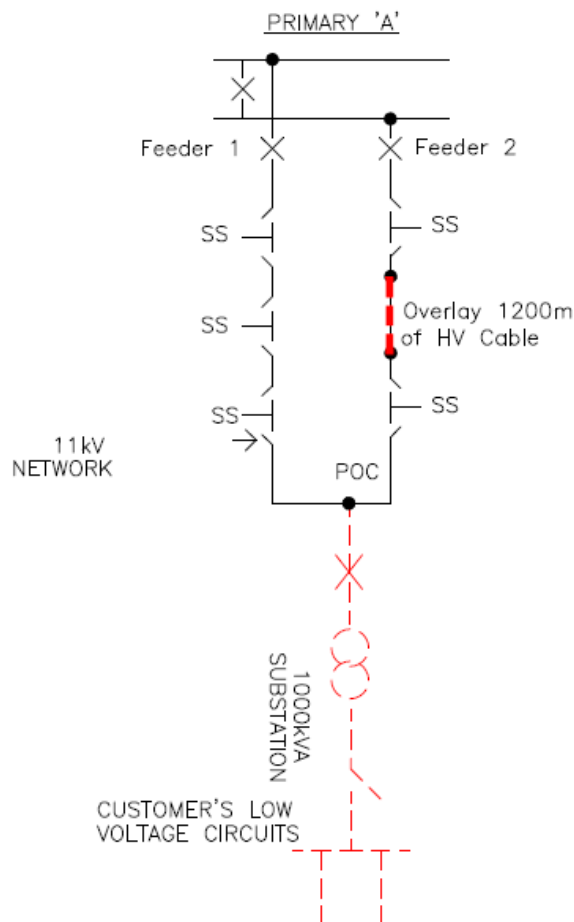
**Total Connection Charge = £63,100**

#### Example 4: Additional load application for commercial Premises (requiring a new connection from the HV network)

A Customer requests to increase the Maximum Capacity of their existing LV connection from 200kVA to 850kVA; an increase of 650kVA (the Required Capacity).

As the Customer's existing LV connection is unable to deliver the Required Capacity a new connection will be required from the local HV network. The Minimum Scheme is to overlay part of the nearest HV circuit (Feeder 2) which only has spare capacity of 200kVA. The Reinforcement to make the capacity available requires 1200m of existing HV cable to be overlaid with a larger capacity cable.

Following the Reinforcement the New Network Capacity will be 8000kVA. (i.e. after Reinforcement, in this particular case, the section of cable with the lowest rating in the ring represented by Feeder 1 and Feeder 2 is rated at 8000kVA).



#### Reinforcement:

The RSN is the two feeder ring comprising Feeder 1 and Feeder 2.

Security CAF calculation: As this request is from an existing customer the numerator in the CAF calculation is based upon the increment of capacity requested, i.e. 650kVA (850kVA – 200kVA). The denominator is based upon the New Network Capacity following the Reinforcement.

Fault Level CAF calculation: This Scheme does not have any significant Fault Level contribution to the existing shared use distribution network and the Fault Level CAF is therefore not applicable here.

The Connection Charge for this Scheme is calculated as follows:

#### Reinforcement:

	<b>Cost</b>	<b>Apportionment</b>	<b>Customer Contribution</b>
<b>Non Contestable Work</b>			
Overlay 1200m of HV cable	£120,000	650/ 8000 X 100% = 8.1%	£9,750
HV Jointing	£4,800	As above	£390
<b>Total Reinforcement Cost</b>	<b>£124,800</b>		<b>£10,140</b>

**Extension Assets:**

	<b>Cost</b>	<b>Apportionment</b>	<b>Customer Contribution</b>
<b>Contestable Work</b>			
Provision and installation HV cable	£29,000	n/a	£29,000
1000kVA substation	£20,000	n/a	£20,000
Termination of Customer's LV cables	£1,400	n/a	£1,400
LV Metering panel	£800	n/a	£800
<b>Non-Contestable Work</b>			
HV Jointing	£1,600	n/a	£1,600
<b>Total Extension Asset Cost</b>	<b>£52,800</b>		<b>£52,800</b>
<b>CIC Charges</b>			£1,100

**Total Connection Charge = £10,140 + £52,800 = £62,940**

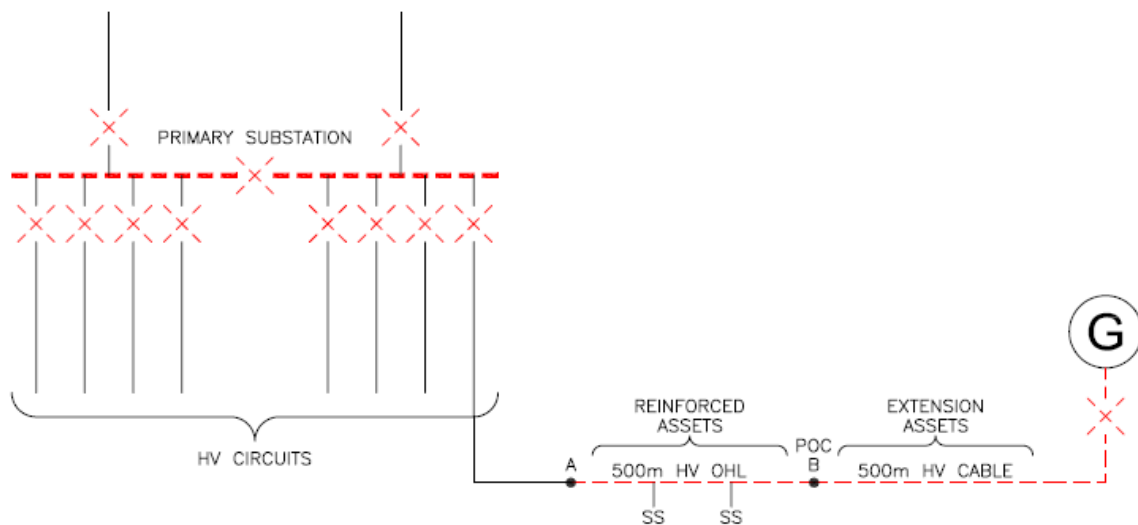


### Example 5: Connection of a new embedded generator that requires Reinforcement involving Security and Fault Level CAFs.

A Customer requests a connection to a generator with a Required Capacity for export purposes of 3MVA. The Fault Level contribution at the primary substation from the generation connection is 10MVA.

The POC is to the existing HV network at point B and it is proposed to install 500m of HV underground cable from the POC to the Customer's installation.

The connection requires the Reinforcement of 500m of HV overhead line between points A and B and replacement of the existing 11 panel HV switchboard at the primary substation which will increase its fault level rating from 150MVA to 350MVA. However, this will be limited by the fault level rating of the local network of 250MVA.



#### Reinforcement:

The RSN is the HV network from the primary substation to Point B.

Security CAF calculation: the numerator in the CAF calculation is based upon the Required Capacity of the Customer, i.e. 3MVA. The denominator is based on the New Network Capacity following Reinforcement, which is 7.6MVA, i.e. after Reinforcement, in this particular case, the section of cable with the lowest rating.

Fault Level CAF calculation: The numerator in the CAF calculation is based upon the Fault Level contribution from the Customer's new generator connection, in this Example 10MVA. The denominator is based upon the New Fault Level Capacity, which is the lower of the Fault Level capacity of the new HV switchboard, 350MVA or of the local system, 250MVA in this Example.

The Connection Charge for this Scheme is calculated as follows:

#### Reinforcement:

	Cost	Apportionment	Customer Contribution
<b>Non Contestable Work</b>			
Re-conductor of 500m of HV overhead line	£49,000	$3/7.6 \times 100\% = 39.5\%$ Security CAF	£19,342
Replacement of existing 11 panel 11kV	£540,000	$3 \times (10/250) \times$	£64,800

switchgear		100% = 12.0% Fault Level CAF	
<b>Total Reinforcement Cost</b>	£589,000		<b>£84,142</b>

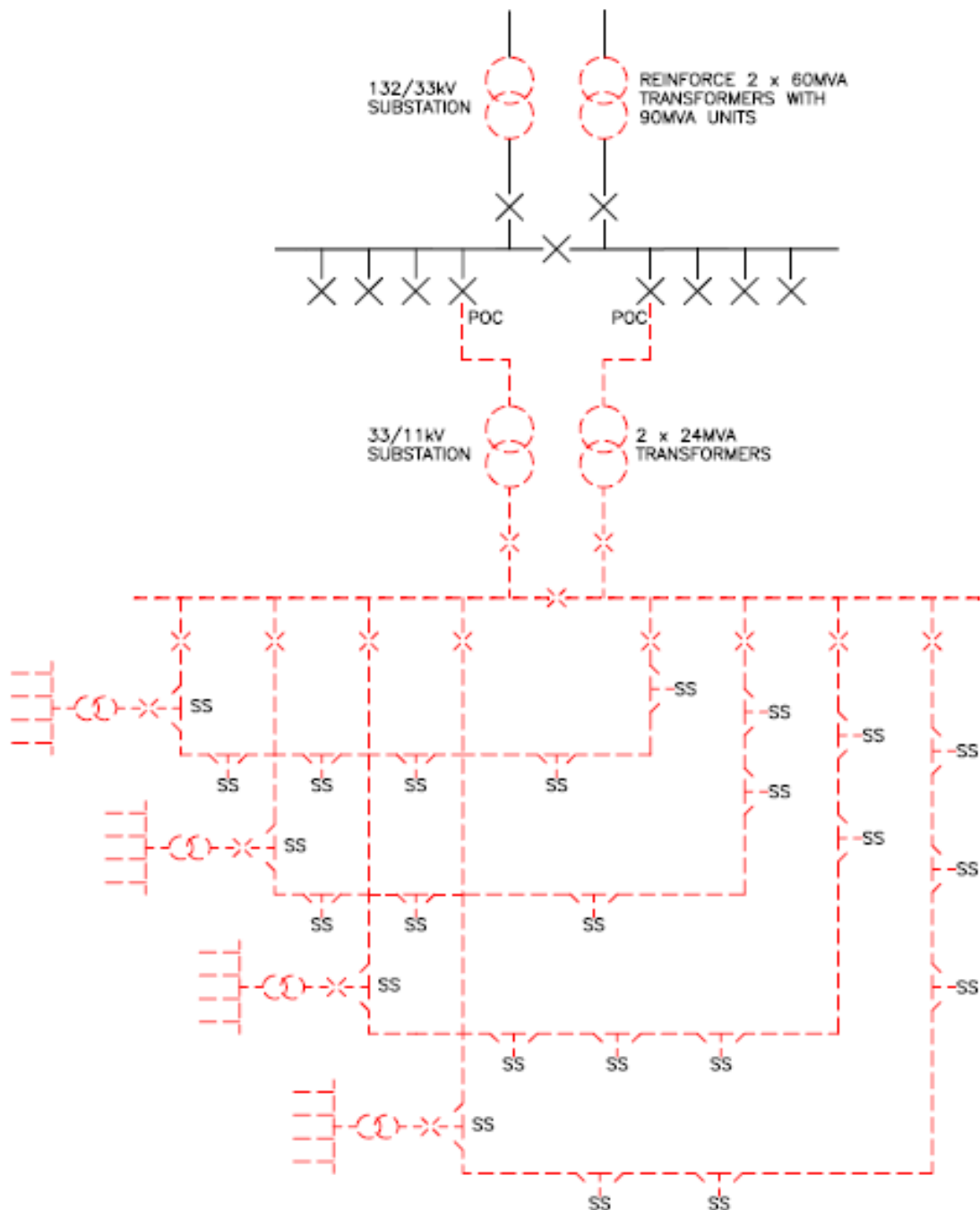
**Extension Assets:**

	<b>Cost</b>	<b>Apportionment</b>	<b>Customer Contribution</b>
<b>Contestable Work</b>			
Installation of 500m HV cable	£47,000	n/a	£47,000
HV circuit breaker at Customer's substation	£10,000	n/a	£10,000
<b>Non-Contestable Work</b>			
HV pole top termination	£1,400	n/a	£1,400
<b>Total Extension Asset Cost</b>	£58,400		<b>£58,400</b>
<b>CIC Charges</b>			£1,100

**Total Connection Charge = £84,142 + £58,400 = £142,542**

### Example 6: Connection of Mixed Housing and Commercial Development

The Customer requests 18MVA for a new mixed housing & commercial development site which comprises of 7,000 plots and a mixture of small commercial Premises. The POC on the network will be at the two existing 33kV circuit breakers located at the 132/33kV substation approximately 600m from the site boundary. In order to accommodate the Required Capacity it will be necessary to reinforce the two 60MVA, 132/33kV, transformers with 90MVA transformers. It will then be necessary to extend the network and establish a 2 by 24MVA transformer 33/11kV substation on site with an extendable HV board in this new substation. The HV board will comprise of 2 incomer, 1 bus section and 8 outgoing circuit breakers. From this substation there will be 3km of HV cable required to supply 24 substations. From each of these 24 substations there will be associated LV cable and services as required.



**Reinforcement:**

The RSN for the Reinforcement is the existing 132/33kV substation

Security CAF calculation: the numerator in the CAF calculation is based upon the Required Capacity of the Customer, i.e. 18MVA. The denominator is based on the New Network Capacity following Reinforcement, i.e. 90MVA.

Fault Level CAF calculation: This Scheme does not have any significant Fault Level contribution to the existing shared use distribution network and Fault Level CAF is therefore not applicable here.

The Connection Charge for this Scheme is calculated as follows:

**Reinforcement:**

	Cost	Apportionment	Customer Contribution
<b>Non Contestable Work</b>			
Replace two 60MVA, 132/33kV transformers with two 90MVA transformers.	£1,500,000	18/90 X 100% = 20.0%	£300,000
<b>Total Reinforcement Cost</b>			<b>£300,000</b>

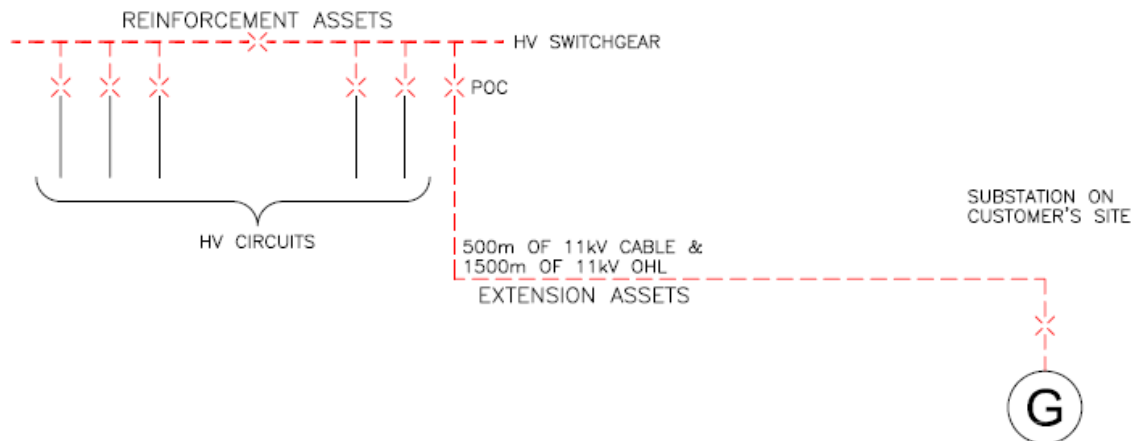
**Extension Assets:**

	Cost	Apportionment	Customer Contribution
<b>Contestable Work</b>			
600m of 2 by 33kV cable	£180,000	n/a	£180,000
3000m of HV circuits, 24 HV/LV substations, LV cable and services	£7,000,000	n/a	£7,000,000
2 by 24MVA transformer substation	£2,000,000	n/a	£2,000,000
<b>Non-Contestable Work</b>			
Terminate two 33kV cables on to two existing 33kV circuit breakers.	£25,000	n/a	£25,000
<b>Total Extension Asset Cost</b>	<b>£9,205,000</b>		<b>£9,205,000</b>
<b>CIC Charges</b>			<b>£15,000</b>

**Total Connection Charge = £9,205,000 + £300,000 = £9,505,000**

### Example 7A: New 3MVA Generation Connection, Fault Level Triggered Reinforcement

A Customer wishes to connect a new generator with a Required Capacity for export purposes of 3MVA. The connection of the generator requires the installation of 500m of 11kV cable and 1500m of overhead line between a new circuit breaker, added to the 11kV extensible switchgear panel at an existing primary substation and a new substation at the Customer's Premises. The 24MVA Fault Level contribution from the generator necessitates Reinforcement works to replace the 11kV switchgear at the existing primary substation with switchgear of a higher fault level rating.



#### Reinforcement:

Fault Level CAF calculation: The numerator in the CAF calculation is based upon the Fault Level contribution from the Customer's new generator connection, in this Example 24MVA. The denominator is based upon the New Fault Level Capacity, in this Example the Fault Level capacity of the new 11kV switchboard, 315MVA.

The Connection Charge for this Scheme is calculated as follows:

#### Reinforcement:

	Cost	Apportionment	Customer Contribution
<b>Non Contestable Work</b>			
Replacement HV switchboard (excluding Customer's sole use circuit breaker)	£450,000	$3 \times (24/315) \times 100\% = 22.9\%$	£102,857
<b>Total Reinforcement Cost</b>	<b>£450,000</b>		<b>£102,857</b>

#### Extension Assets:

	Cost	Apportionment	Customer Contribution
<b>Non-Contestable Work</b>			
HV circuit breaker at primary substation	£25,000	n/a	£25,000
<b>Contestable Work</b>			
Installation of a 500m HV cable	£40,000	n/a	£40,000

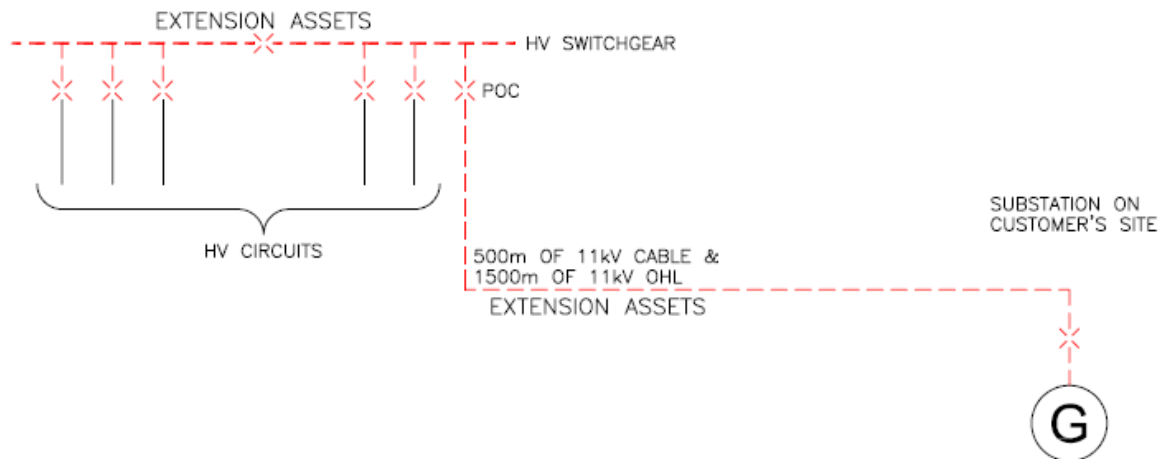
Installation of a 1500m HV overhead line	£35,000	n/a	£35,000
HV circuit breaker at Customer substation	£25,000	n/a	£25,000
<b>Total Extension Asset Cost</b>	£100,000		<b>£125,000</b>
<b>CIC Charges</b>			£1,100

**Total Connection Charge = £102,857 + £125,000 = £227,857**

### Example 7B: New 3MVA Generation Connection, Switchgear Extension Not Possible

This example demonstrates the application of Exception 4 (paragraph 1.20).

A Customer requests to connect a new generator with a Required Capacity for export purposes of 3MVA. The connection of the generator requires the installation of the works as provided in Example 7A above. In this scenario, however, there is no Fault Level issue but, as the connection cannot be facilitated by an extension of the existing switchgear equipment in our primary substation, a full replacement of the existing switchgear installation is required. As no capacity is added to the existing shared use distribution network, the Customer will be required to fund the full cost of the switchgear installation replacement.



The existing switchgear had fault level rating of 250MVA. The company no longer uses switchgear with a fault level rating of 250MVA, so uses the closest equivalent switchgear used by it as standard, which has a slightly higher rating. Whilst the replacement switchgear increases the fault level capacity and could be considered Reinforcement, in this case this is due solely to the fault level rating of the standard equipment used by the company being higher than the fault level rating of the existing switchgear. The increase in fault level capacity is not required to connect the customer. Therefore, Exception 4 (Paragraph 1.20) applies and the switchgear will be considered to be Extension Assets and its costs will be charged in full to the customer.

The Connection Charge for this Scheme is calculated as follows:

#### Extension Assets:

	Cost	Apportionment	Customer Contribution
<b>Contestable Work</b>			
Installation of a 500m HV cable	£40,000	n/a	£40,000
Installation of a 1500m HV overhead line	£35,000	n/a	£35,000
HV circuit breaker at Customer substation	£25,000	n/a	£25,000
<b>Non-Contestable Work</b>			
Replacement 11kV switchboard	450,000	n/a	450,000
New Extension Asset circuit breaker	£25,000	n/a	£25,000
<b>Total Extension Asset Cost</b>	<b>£575,000</b>		<b>£575,000</b>
<b>CIC Charges</b>			£1,100

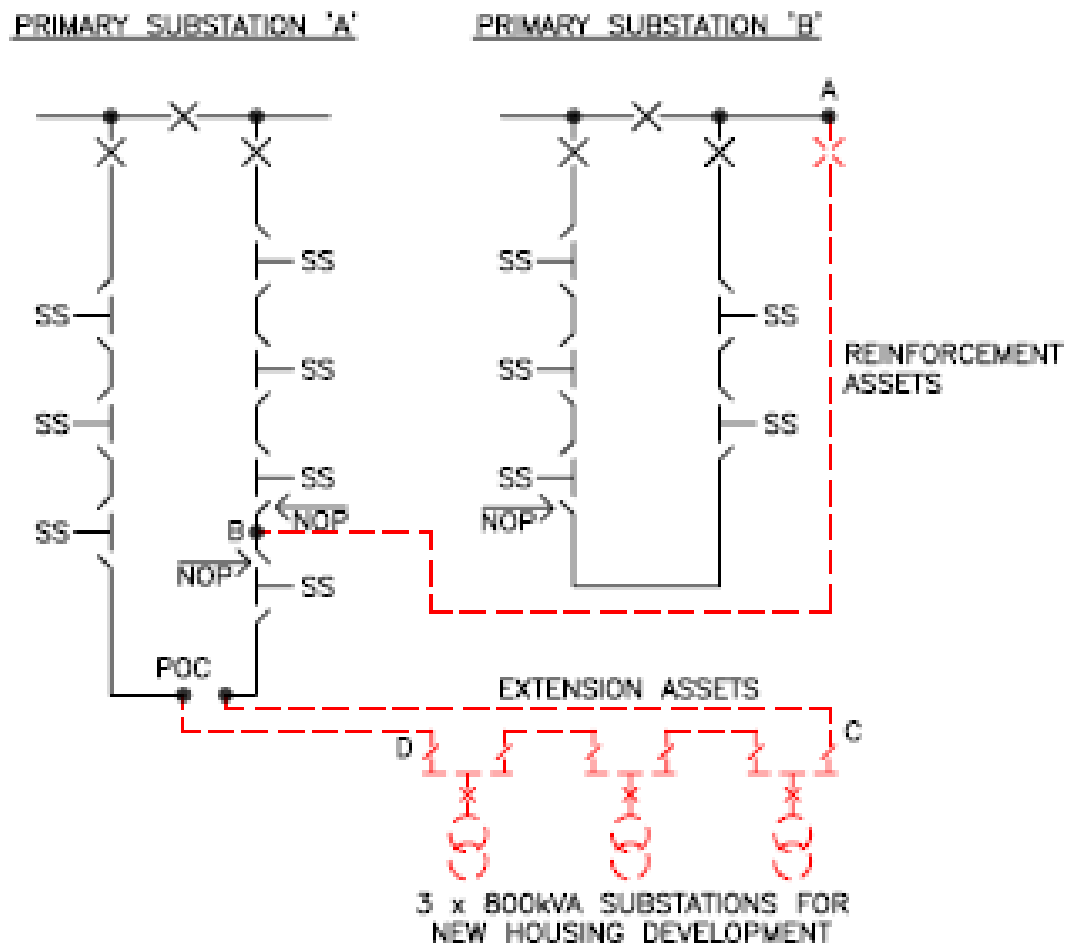
**Total Connection Charge = £575,000**

### Example 8A: Connection of housing development with network Reinforcement

A new housing development has a Required Capacity of 2MVA to serve 900 plots. The local 11kV feeder has a network capacity of 7.7MVA based upon the limitation of the existing 400 Amp circuit breakers at Primary Substation A. The existing load on the circuit is 7.6MVA. It is therefore not possible to connect the new load to this circuit without Reinforcement works. To reinforce the circuit it is proposed to install a new circuit breaker at Primary Substation B and install a new 11kV feeder (also rated at 7.7MVA) to the local 11kV circuit. The new 11kV feeder is used to split the existing circuit from a two to a three feeder network. The newly installed cable between point A and B is 1300m long. The newly installed cable to connect the development from the POC is 1200m.

This Reinforcement will allow a POC to be taken from the local 11kV circuit to supply the new development. Three 800kVA distribution substations are established onsite. The above work represents the Minimum Scheme to provide services to the new site.

The figure below shows the proposed Reinforcement and POC to the 11kV network:



#### Reinforcement:

##### The RSN for the Reinforcement

For the Reinforcement CAF the RSN is considered to be the three feeder 11kV network comprising the two feeders from Primary Substation A and the new feeder from Primary Substation B as this new feeder is capable of feeding either of the existing circuits. The numerator in the CAF calculation is based upon the Required Capacity of the new



development, i.e. 2MVA. In this case, the New Network Capacity (under N -1 conditions) following the Reinforcement works is equal to  $(3 - 1) \times 7.7\text{MVA} = 15.4\text{MVA}$

Fault Level CAF calculation: This Scheme does not have any significant Fault Level contribution to the existing shared use distribution network and Fault Level CAF is therefore not applicable here.

The Connection Charge for this Scheme is calculated as follows:

**Reinforcement:**

	<b>Cost</b>	<b>Apportionment</b>	<b>Customer Contribution</b>
<b>Non Contestable Work</b>			
1300m of 11kV Cable	£130,000	$2/15.4 \times 100\% = 13.0\%$	£16,883
11kV Circuit Breaker at Primary Substation B	£45,000	As above	£5,844
11kV jointing at Point B	£3,000	As above	£390
<b>Total Reinforcement Cost</b>	<b>£178,000</b>		<b>£23,117</b>

**Extension Assets:**

	<b>Cost</b>	<b>Apportionment</b>	<b>Customer Contribution</b>
<b>Contestable Work</b>			
1200m of 11kV Cable	£120,000	n/a	£120,000
3 by 800kVA distribution substations	£150,000	n/a	£150,000
On site LV mains and services	£330,000	n/a	£330,000
<b>Non-Contestable Work</b>			
2 by 11kV closing joints	£5,000	n/a	£5,000
<b>Total Extension Asset Cost</b>	<b>£605,000</b>		<b>£605,000</b>
<b>CIC Charges</b>			<b>£3,500</b>

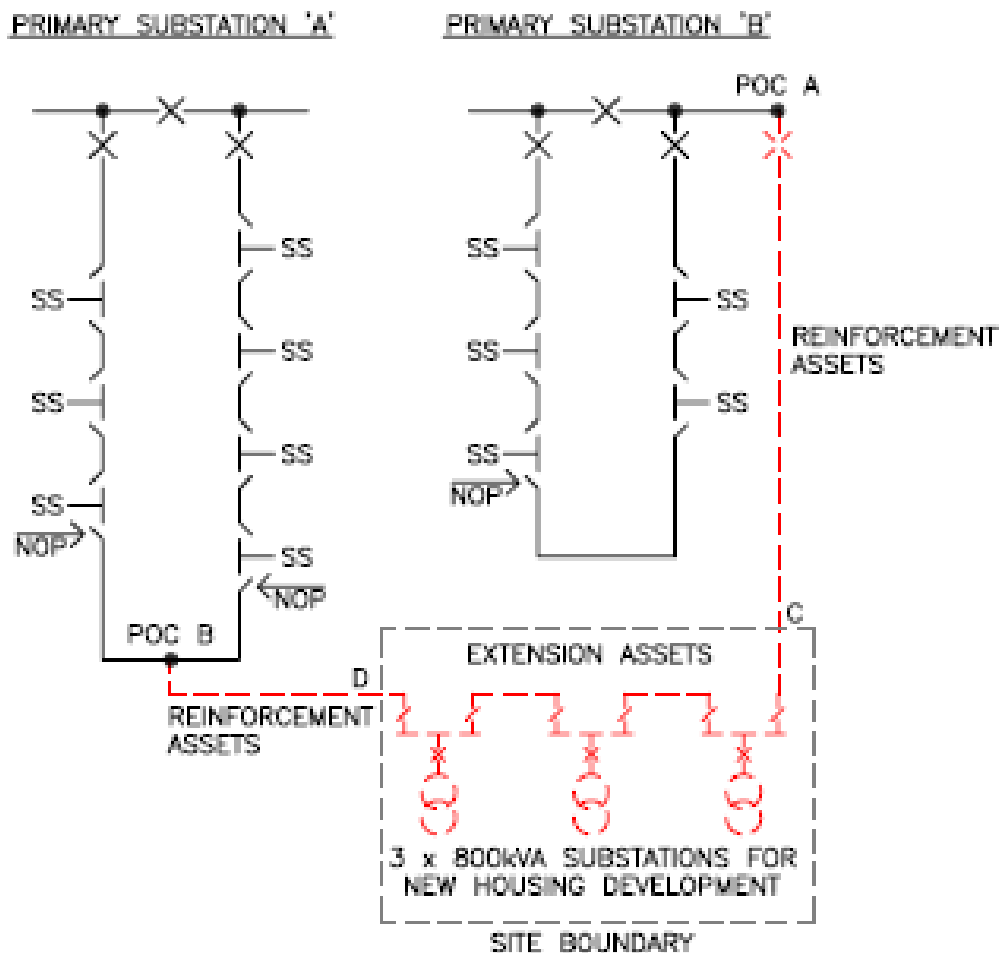
**Total Connection Charge = £23,117 + £605, 000 = £628,117**

### Example 8B: Connection of housing development

This example demonstrates the application of Exception 5 (paragraph 1.21)

In this variation of the previous Example the site is closer to Primary Substation B and the Minimum Scheme is to connect the new load to the new 11kV feeder from Primary Substation B and provide interconnection to an existing 11kV feeder from Primary Substation A. In this Example 600m of 11kV cable on site (between Points C and D) is required to provide connectivity within the development and is considered to be Extension Assets.

The figure below shows the proposed network.



The assets connecting POC A and POC B add capacity to the existing network, so would normally be treated as Reinforcement. These comprise –

- the assets between the Customer's site and POC A (POC A to point C);
- the assets between the Customer's site and POC B (POC B to point D); and
- the 600m of 11kV cable on site.

The three 800kVA substations are not considered to provide connection between POC A and POC B. The 600m of 11kV cable on site is additional network length to provide connectivity between multiple exit points on the Customer's site. Therefore, Exception 5 applies and the 600m of 11kV cable on site will be treated as Extension Assets and its costs will be charged in full to the customer. No exceptions apply to the assets between POC A and point C and POC B and point D. Therefore, these will be treated as Reinforcement and their costs will be apportioned.

#### Reinforcement:

The RSN for the Reinforcement

The RSN is considered to be the three feeder 11kV network comprising the two feeders from Primary Substation A and the new feeder from Primary Substation B as any of these can be used to supply the Customer in normal and outage conditions. As in the above example the numerator in the CAF calculation is based upon the Required Capacity of the new development, i.e. 2MVA. In this case, however the work to provide the connection will increase the capacity of the existing shared use Distribution System from 7.7MVA to 15.4MVA. The New Network Capacity (under N -1 conditions) following the Reinforcement works is equal to  $(3 - 1) \times 7.7\text{MVA} = 15.4\text{MVA}$

Fault Level CAF calculation: This Scheme does not have any significant Fault Level contribution to the existing shared use Distribution System and Fault Level CAF is therefore not applicable here.

The Connection Charge for this Scheme is calculated as follows:

**Reinforcement:**

	Cost	Apportionment	Customer Contribution
<b>Non Contestable Works</b>			
1 new 11kV Circuit Breaker tailed out from primary substation A	£45,000	$2/15.4 \times 100\% = 13.0\%$	£5,844
2 by 11kV closing joints	£5,000	As above	£649
700m of 11kV cable from primary A to site	£70,000	As above	£9,091
600m of 11kV cable from POC B to site	£60,000	As above	£7,792
<b>Total Reinforcement Cost</b>	<b>£180,000</b>		<b>£23,376</b>

**Extension Assets:**

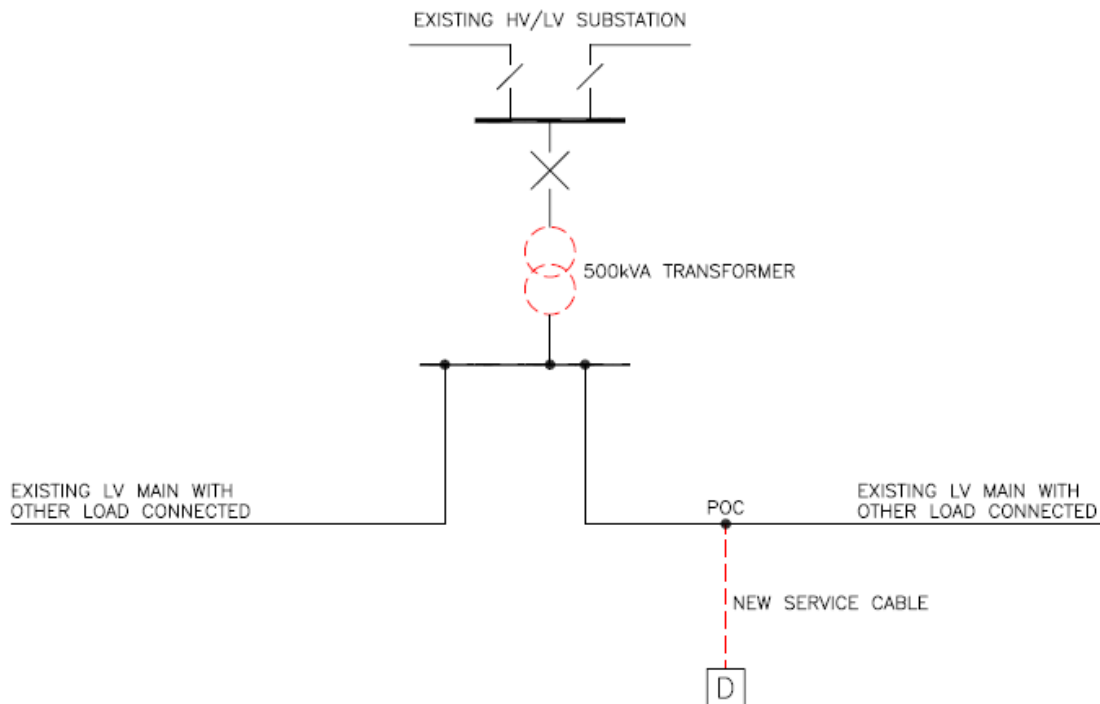
	Cost	Apportionment	Customer Contribution
<b>Contestable Works</b>			
600m of 11kV cable on site	£60,000	n/a	£60,000
3 by 800KVA unit Substation	£150,000	n/a	£150,000
On site LV mains and services	£330,000	n/a	£330,000
<b>Non-Contestable Work</b>			
2 by 11kV cable box terminations	£2,000	n/a	£2,000
<b>Total Extension Asset Cost</b>	<b>£542,000</b>		<b>£542,000</b>
<b>CIC Charges</b>			£3,500

**Total Connection Charge = £23,376 + £542, 000 = £565,376**

### Example 9: Minimum Scheme

A Customer requests a new 100kVA connection. There is sufficient spare capacity on the adjacent LV main but the existing 300kVA transformer at the local 11kV/LV substation is fully loaded.

- a) The Minimum Scheme is to provide a new service cable and to replace the 300kVA transformer at the local substation with a 500kVA transformer.



#### Reinforcement:

The RSN for the Reinforcement is the HV/LV transformer

Security CAF calculation: the numerator in the CAF calculation is based upon the Required Capacity of the Customer, i.e. 100kVA. The denominator is based on the New Network Capacity following Reinforcement, i.e. 500kVA.

Fault Level CAF calculation: This scheme does not have any significant Fault Level contribution to the existing shared use distribution network and Fault Level CAF is therefore not applicable here.

The Connection Charge for this Scheme is calculated as follows:

#### Reinforcement:

	Cost	Apportionment	Customer Contribution
<b>Non Contestable Work</b>			
Replacement 500kVA transformer	£10,000	$100/500 \times 100\% = 20.0\%$	£2,000
<b>Total Reinforcement Cost</b>	£10,000		<b>£2,000</b>

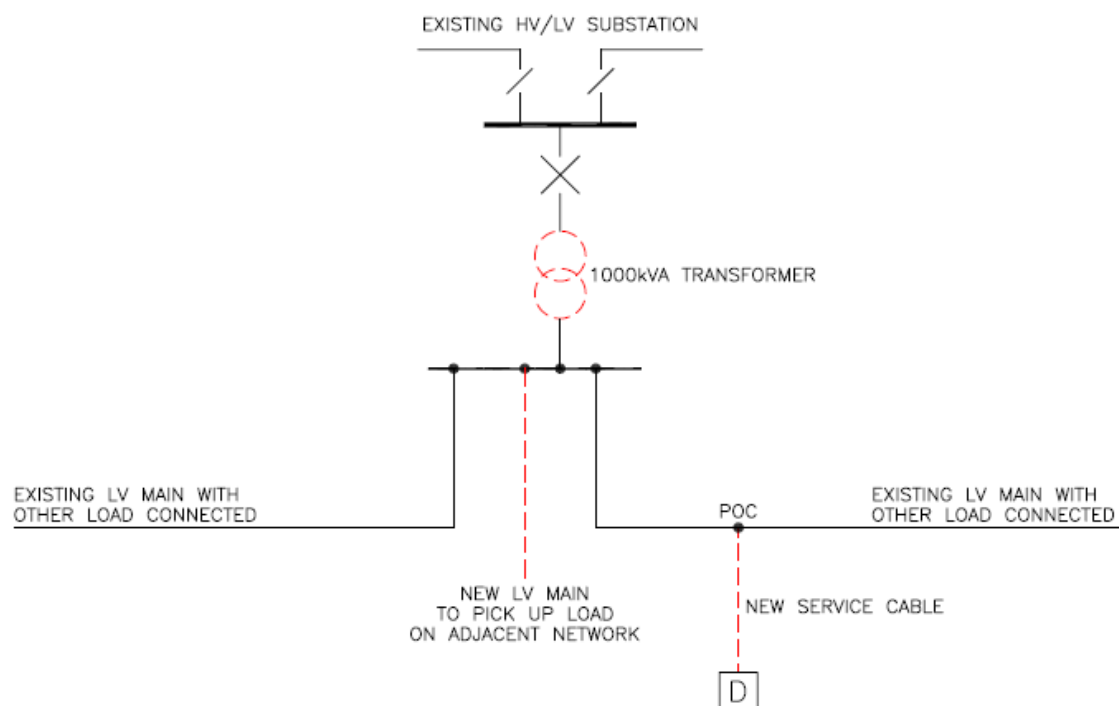
#### Extension Assets:

	Cost	Apportionment	Customer Contribution

<b>Contestable Work</b>			
Provision and installation of LV service cable	£1,500	n/a	£1,500
<b>Non-Contestable Work</b>			
LV joints to network	£500	n/a	£500
<b>Total Extension Asset Cost</b>	<b>£2,000</b>		<b>£2,000</b>
<b>CIC Charges</b>			<b>£200</b>

**Total Connection Charge = £2,000 + £2,000 = £4,000**

- b) However the DNO wishes to carry out an Enhanced Scheme to install a 1000kVA transformer at the local substation and install a new LV main that will connect to and pick up load from an adjacent LV network.



The RSN for the Reinforcement is the HV/LV transformer

Security CAF calculation: the numerator in the CAF calculation is based upon the Required Capacity of the Customer, i.e. 100kVA. The denominator is based on the New Network Capacity following Reinforcement, i.e. 1000kVA.

Fault Level CAF calculation: This scheme does not have any significant Fault Level contribution to the existing shared use distribution network and Fault Level CAF is therefore not applicable here.

**Reinforcement:**

	<b>Cost</b>	<b>Apportionment</b>	<b>Customer Contribution</b>
<b>Non Contestable Work</b>			
Replacement 1000kVA transformer	£15,000	$100/1000 \times 100\% = 10.0\%$	£1,500

<b>Total Reinforcement Cost</b>	£15,000		<b>£1,500</b>
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**Extension Assets:**

	<b>Cost</b>	<b>Apportionment</b>	<b>Customer Contribution</b>
<b>Contestable Work</b>			
Provision and installation of LV service cable	£1,500	n/a	£1,500
<b>Non-Contestable Work</b>			
LV joints to network	£500	n/a	£500
<b>Total Extension Asset Cost</b>	£2,000		<b>£2,000</b>
<b>CIC Charges</b>			£200

**Total Connection Charge = £1,500 + £2,000 = £3,500**

**The cost of the new LV mains will be met by us and does not form part of the Connection Charge.**

- c) In this instance the Connection Charge resulting from the Enhanced Scheme is lower than that resulting from the Minimum Scheme and the Customer would benefit from the lower Connection Charge and pay £3,500 (paragraph 1.5 refers).

If, however under the proposed DNO Scheme the transformer cost was £25,000 then the resultant Connection Charge would be considered as follows:

**Reinforcement:**

	<b>Cost</b>	<b>Apportionment</b>	<b>Customer Contribution</b>
<b>Non Contestable Work</b>			
Replacement 1000kVA transformer	£25,000	100/1000 x 100% = 10.0%	£2,500
<b>Total Reinforcement Cost</b>	£25,000		<b>£2,500</b>

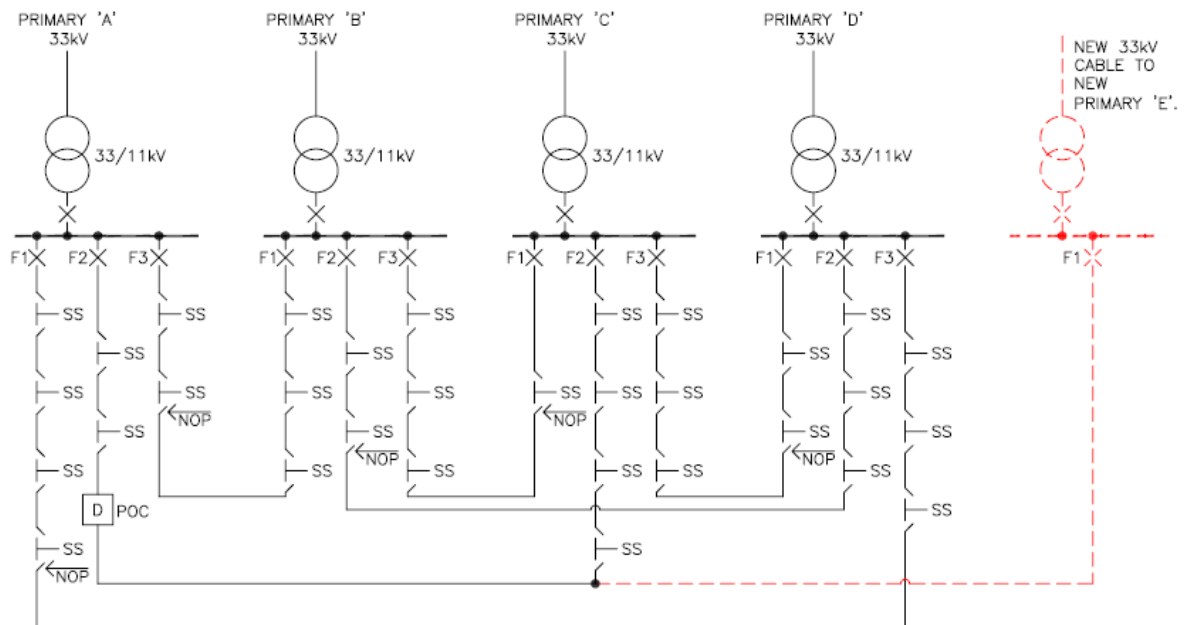
**Extension Assets:**

	<b>Cost</b>	<b>Apportionment</b>	<b>Customer Contribution</b>
<b>Contestable Work</b>			
Provision and installation of LV service cable	£1,500	n/a	£1,500
<b>Non-Contestable Work</b>			
LV joints to network	£500	n/a	£500
<b>Total Extension Asset Cost</b>	£2,000		<b>£2,000</b>
<b>CIC Charges</b>			£200

**Total Connection Charge = £2,500 + £2,000 = £4,500 but in this instance the Customer contribution will be capped at the contribution that would have been due under the Minimum Scheme, i.e. £4,000 (paragraph 1.5 refers).**

### Example 10: A new connection application for commercial Premises on a meshed 11kV distribution system requiring Reinforcement.

A Customer requests a new connection to a commercial premise requiring a 4MVA HV metered connection. The local 11kV network is of a meshed design whereby the 11kV network is supplied from single 33/11kV primary transformers via 33kV radial feeds as shown below.



The existing network consists of four 10MVA primary transformer substations and associated 11kV switchgear. A new connection of 4MVA has been requested in the vicinity of F2 from Primary A.

The existing relevant primary transformer group is loaded to its secure capacity so the primary transformer group will require Reinforcement to enable the new connection to progress.

To provide the Required Capacity, the 11kV network will be reinforced by the installation of a new primary substation connected to the nearest 33kV circuit. The new primary substation (Primary E) will contain a 10MVA transformer, associated 11kV switchgear and a new 11kV (7.7 MVA) cable installed to interconnect into the existing 11kV network (from F2 at Primary A to F2 at Primary C).

#### Reinforcement:

Security CAF calculation: In this example there are two different security CAFs applied. This is because the RSN is different when considering the new network capacity in respect of different elements of the Reinforcement works.

#### The RSN for the Reinforcement comprising the 11kV Cable Works:

For the 11kV cable assets the RSN is considered to be the three feeder 11kV network from Primary A (Feeder 2), Primary C (Feeder 2) and Primary E (Feeder 1). In this case the New Network Capacity (under N -1 conditions) following the Reinforcement works is equal to  $(3 - 1) \times 7.7\text{MVA} = 15.4\text{MVA}$

This is due to the fact that following the Reinforcement work both of the existing circuits; Primary A, Feeder 2 and Primary C, Feeder 2 can be loaded to their full capacity and will have the newly installed clean feeder from Primary E to act as a back feed to meet the requirements of P2/6.

The security CAF for these assets will therefore be  $4/15.4 \times 100\% = 26.0\%$

The RSN for the Reinforcement comprising the Primary substation assets:

In this instance the RSN is the three primary transformers (Primary A, C and E) within the group that can be used to supply the customer in normal and abnormal conditions. The New Network Capacity of this RSN (under N -1 conditions) following the Reinforcement works is equal to 17.7MVA. (10MVA from either Primary A or Primary C and 7.7MVA from Primary E which is limited by the single 11kV cable connected to it.

The security CAF for these assets will therefore be  $4/17.7 \times 100\% = 22.6\%$

Fault Level CAF calculation: This Scheme does not have any significant Fault Level contribution to the existing shared use distribution network and Fault Level CAF is therefore not applicable here.

The Connection Charge for this Scheme is calculated as follows:

**Reinforcement:**

	Cost	Apportionment	Customer Contribution
<b>Non Contestable Works</b>			
500m 11kV cable from new primary substation E	£50,000	$4/15.4 \times 100\% = 26.0\%$	£12,987
1 by 11kV closing joints	£4,000	As above	£1,039
11kV switchgear at new Primary E	£80,000	$4/17.7 \times 100\% = 22.6\%$	£18,079
Primary transformer	£600,000	As above	£135,593
2.5km of 33kV cable installation	£500,000	As above	£112,994
33kV Circuit Breaker	£70,000	As above	£15,819
33kV Terminations	£10,000	As above	£2,260
<b>Total Reinforcement Cost</b>	<b>£1,314,000</b>		<b>£298,771</b>

**Extension Assets:**

	Cost	Apportionment	Customer Contribution
<b>Contestable Work</b>			
HV ring main unit	£20,000	n/a	£20,000
HV metering unit	£10,000	n/a	£10,000
500m of 11kV cable	£100,000	n/a	£100,000
<b>Non-Contestable Work</b>			
2 by 11kV closing joints	£5,000	n/a	£5,000
<b>Total Extension Asset Cost</b>	<b>£135,000</b>		<b>£135,000</b>
<b>CIC Charges</b>			<b>£3,500</b>

**Total Customer Contribution = £298,771 + £135,000 = £433,771**



## Section 2 – Glossary of Terms

<b>Act</b>	the Electricity Act 1989 (as amended)
<b>Adoption Agreement</b>	<p>is an agreement for us to adopt the Contestable Work, subject to the satisfaction of certain conditions. This agreement, amongst other things, addresses a number of fundamental principles:</p> <ul style="list-style-type: none"> <li>• The transfer of title from the asset owner (normally the Customer or the ICP) to us;</li> <li>• The quality and safety of the adopted asset;</li> <li>• Any required sureties;</li> <li>• The transfer of Land Rights;</li> <li>• The procedure for us to Energise the assets installed by the ICP during the works;</li> <li>• The payment of any residual Connection Charges or fees;</li> <li>• Planning permissions and compliance with street works legislation; and</li> <li>• Defect correction processes, where applicable.</li> </ul> <p>The parties to the Adoption Agreement may vary depending on the circumstances and may be between:-</p> <ul style="list-style-type: none"> <li>• us and you</li> <li>• us and your appointed ICP</li> <li>• us, you and your appointed ICP</li> </ul>
<b>Bilateral Connection Agreement</b>	an agreement between us and another LDNO setting out the terms and conditions under which an embedded network shall be entitled to be and remain connected to the Distribution System
<b>Business Day</b>	any day other than a Saturday, a Sunday, Christmas Day, Good Friday or a day which is a bank holiday within the meaning of the Banking and Financial Dealings Act 1971 and will be from 9:00am to 5:00pm (GMT or BST as applicable).
<b>CIC Charges</b>	are the charges detailed in parts D, E, G, H, I, and J of Section [7] of this document.
<b>Connection Agreement</b>	<p>The owner/ occupier of the Premises to which the connection is to be provided will be required to enter into a Connection Agreement with us. The Connection Agreement will set out the terms upon which they will be, and remain, connected to our Distribution System. The Connection Agreement will normally be provided on our behalf by the owner/occupier's chosen Supplier for the Premises as part of their application for a supply of electricity.</p> <p>However, in some cases for larger connections, or where non-standard conditions exist, we will provide a site-specific Connection Agreement, which replaces any Connection Agreement put in place via the Supplier, as part of the connection process. This particular Connection Agreement will only take effect upon completion of the connection and will set out, in more detail, our rights and obligations to one another. Additionally, it may contain the technical detail of the installation being connected to the Distribution System and will require the owner/occupier of the Premises to comply with the provisions of the Distribution Code.</p>
<b>Connection Charge</b>	the payment to be made by the applicant to us for the provision of the connection.
<b>CUSC</b>	the Connection and Use of System Code which constitutes the contractual framework for connection to, and use of, the GB Transmission System.

<b>Customer</b>	the person requesting the connection.
<b>DCUSA</b>	the Distribution Connection and Use of System Agreement designated as such by the Authority under condition 22 of the Licence
<b>De-energise</b>	to deliberately prevent the flow of electricity to or from an Exit/ Entry Point for any purpose other than a system outage on the our Distribution System (and cognate expressions shall be construed accordingly).
<b>Development Phase</b>	the three year period, unless otherwise agreed with us, commencing on the date of Energisation of an embedded network over which the development is constructed.
<b>Disconnect</b>	means to permanently De-energise an Exit/ Entry Point by the removal of all or part of our equipment (and cognate expressions shall be construed accordingly).
<b>Distributed Generation Connections Guide</b>	The guide produced by us as required by our Licence which provides guidance on the connection process for distributed generation.
<b>Distribution Code</b>	covers, amongst other matters, all material technical aspects relating to: <ul style="list-style-type: none"> <li>• connection to, and the operation and use of a LDNO's Distribution System; and</li> <li>• the operation of electrical lines and electrical plant or apparatus connected to an LDNO's Distribution System.</li> </ul> A copy of the Distribution Code can be downloaded from the Distribution Code website at <a href="http://www.dcode.org.uk">www.dcode.org.uk</a> .
<b>Distribution System</b>	the system (as defined in the Licence) consisting (wholly or mainly) of electric lines owned or operated by us and used for the distribution of electricity.
<b>ECCR</b>	the Electricity (Connection Charges) Regulations 2002 (SI 2002/93) as amended from time to time.
<b>EHV</b>	more than 22kV but not more than 72kV
<b>Electric Lines</b>	means any line which is used for carrying electricity to or from an Exit/ Entry Point and includes, unless the context otherwise requires: <p>(a) any support for such line, that is to say, any structure, pole or other thing in, on, by or from which any such line is or may be supported, carried or suspended;</p> <p>(b) any apparatus connected to such line for the purpose of carrying electricity; and</p> <p>(c) any wire, cable, tube, pipe or other similar thing (including its casing or coating) which surrounds or supports, or is surrounded or supported by, or is installed in close proximity to, or is supported, carried or suspended in association with, any such line.</p>
<b>Electric Plant</b>	means any plant, equipment, apparatus or appliance used for or for purposes connected with the distribution of electricity (including any metering equipment) other than an Electric Line.
<b>Energise</b>	to deliberately allow the flow of electricity to or from an Exit/ Entry Point where such a flow of electricity has never previously existed (and cognate expressions shall be construed accordingly).
<b>Enhanced Scheme</b>	is defined in paragraph 1.4.
<b>Entry/ Exit Point</b>	A point at which electricity, whether metered or unmetered, enter or exit our Distribution System.
<b>Existing Capacity</b>	is defined in paragraph 1.24.
<b>Extension Assets</b>	are assets installed to connect a party or parties to the existing distribution network but which exclude Reinforcement assets.
<b>Fault Level</b>	the maximum prospective current or power that will flow into a short circuit at a point on the network, usually expressed in MVA or kA.
<b>Fault Level Contribution from Connection</b>	is defined in paragraph 1.24.
<b>GB Transmission System</b>	the system consisting (wholly or mainly) of high voltage electric wires owned or operated by transmission licensees within Great Britain.
<b>Guaranteed Standards</b>	standards of service backed by a guarantee and set out in the Electricity

<b>of Performance</b>	(Standards or Performance) Regulations 2005 (as amended).
<b>HV</b>	more than 1kV but not more than 22kV
<b>Independent Connections Provider (ICP)</b>	a person with sufficient accreditation to carry out all or part of the Contestable Work.
<b>Interruptions Incentive Scheme</b>	the scheme which provides incentives on us to deliver a good level of performance in respect of customer interruptions and customer minutes lost.
<b>Land Rights</b>	all such rights in, under or over Land as are necessary for the construction, installation, operation, repair, maintenance, renewal or use of the Contestable Work or Non-Contestable Work.
<b>Licensed Distribution Network Operator (LDNO)</b>	the holder of a Licence to distribute electricity.
<b>LV</b>	not more than 1kV
<b>Maximum Capacity</b>	means in relation to any connection the maximum amount of electricity, as agreed with us and expressed in kW or kVA, that can be imported from or exported onto our Distribution System.
<b>Meter Point Administration Number (MPAN)</b>	is a 21 digit reference to uniquely identify Exit/ Entry Point, such as individual domestic residences.
<b>Minimum Scheme</b>	is defined in paragraphs 1.1 to 1.7.
<b>New Fault Level Capacity</b>	is defined in paragraph 1.24.
<b>New Network Capacity</b>	is defined in paragraph 1.24.
<b>NGET</b>	National Grid Electricity Transmission plc
<b>Point of Connection (POC)</b>	is the point (or points) of physical connection to our existing Distribution System.
<b>Premises</b>	means any land, building or structure
<b>Reinforcement</b>	is defined in paragraphs 1.16 to 1.21.
<b>Relevant Section of Network</b>	is defined in paragraph 1.24.
<b>Rent-a-Jointer Services</b>	the service relating to hiring of resource from us to facilitate the provision of unmetered connections.
<b>Required Capacity</b>	is defined in paragraph 1.24.
<b>Scheme</b>	our network design to provide the connection.
<b>Speculative Developments</b>	is defined in paragraph 1.39.
<b>Supplier</b>	a person who holds a Supply Licence.
<b>Supply Licence</b>	a licence granted under section 6(1)(d) of the Act.
<b>Supply Number</b>	a unique identifier of those Entry/ Exit Points on the Distribution System which are used for the purposes of either taking a supply of electricity or for the connection of a distributed generator, and which forms the basis of the metering point record on the Company's registration system.
<b>Temporary Connections</b>	is defined in paragraph 1.19.
<b>Validity Period</b>	The period for which a connection Offer or POC Offer is open for acceptance.
<b>Voltage of Connection</b>	is the voltage at the POC between the existing distribution network and the assets used to provide the connection. For clarity, this is not necessarily the voltage of supply to the Customer
<b>Working Day</b>	Any day other than a Saturday, a Sunday, Christmas Day, Good Friday or a day which is a bank holiday within the meaning of the Banking and Financial Dealings Act 1971.