

Electricity Specification 287

Issue 4 December 2021

Connections to Multiple Occupancy Buildings



Amendment Summary

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Issue 4 December 2021	<p>Supplies to masts and antennae - policy modified to allow a second supply under specified conditions (subsection 9.2)</p> <p>Document revised into the new template.</p> <p>Prepared by: Peter Twomey Approved by: Policy Approval Panel and signed on its behalf by Steve Cox, Engineering and Technical Director</p>

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1 Introduction

The electricity distribution network (Network) owned and operated by Electricity North West Limited (Electricity North West), has previously had a wide range of connection options for Multiple Occupancy Buildings. The Energy Networks Association (ENA) Engineering Recommendation (ER) G87 - Guidelines for the Provision of Low Voltage Connections to Multiple Occupancy Buildings provides a nationally agreed framework, referenced in the Distribution Code, for the provision of such connections. This Electricity Specification (ES) describes the application of ENA ER G87 within the Network.

2 Scope

This ES applies to the installation of low voltage (LV) connections to multiple occupancy domestic (flats and apartments), commercial (retail and offices) and industrial (small units and subdivided factories) buildings. The scope is effectively limited to connections from the LV Network of up to 300kVA capacity or from a substation on site of up to 1000kVA. For a larger capacity, the Building Network Operator would be expected to have a connection at high voltage.

Except for the requirements concerning labelling, stated in [Section 4](#), the application of this ES is not retrospective, but shall be applied to all new applications for connections in new and refurbished Multiple Occupancy Buildings.

3 Definitions

BNO	Building Network Operator: the organisation that owns or operates the electricity distribution network within a Multiple Occupancy Building, between the Intake Position and Customers' Installations; in many cases, the owner or landlord, in some cases an IDNO.
CNE	Combined Neutral and Earth: referring to a cable or other electric line in which the functions of neutral and protective conductors are combined in a single conductor.
Customer	The owner or occupier of Premises, each having its own meter, housed within a larger building.
Customer's Installation	The electrical installation within and servicing an individual Customer's Premises.
DNO	Distribution Network Operator: the organisation holding an electricity distribution licence, responsible for confirming requirements for the connection of equipment to its network and providing the incoming connection to the building.
DUoS	Distribution Use of System
ENA	Energy Networks Association

EPD	Electricity Policy Document
ER	Engineering Recommendation
ES	Electricity Specification
ESQCR	The Electricity Safety, Quality and Continuity Regulations 2002
HV	11kV or 6.6kV
IDNO	Independent Distribution Network Operator
Intake Position	The location within the building where the boundary between the Network and the BNO's network or Customers' Installations occurs.
LV	Low Voltage: 400/230V
MPAN	Meter Point Administration Number: otherwise known as Supply Number, a unique number provided for each metering point by the relevant licensed distributor for use in the settlement system.
Multiple Occupancy Building	A building comprising more than one Premises, generally including communal areas.
Network	The electricity distribution network owned and operated by Electricity North West.
PEN conductor	A conductor combining the functions of both protective conductor and neutral conductor.
Premises	A part of a Multiple Occupancy Building occupied by a single Customer.
SNE	Separate Neutral and Earth: referring to a cable or other electric line in which separate conductors are used for neutral and earth.

4 General

All connections to new Multiple Occupancy Buildings shall be generally in accordance with ENA ER G87, as described in this ES. There shall be no deviation from this ES without the written agreement of the Network Planning Policy Manager, Central Engineering Services, Electricity North West.

Refurbishment of Properties with Electricity North West Owned Individual Customer Service Positions.

4.1 Properties with Privately Owned Rising Lateral Mains

If, during refurbishment, the rising and lateral mains are being refurbished then the opportunity shall be taken to reconfigure the connection arrangements in accordance with this ES.

If, during refurbishment, the rising and lateral mains are **not** being refurbished then existing arrangements may be maintained.

4.2 Properties with Electricity North West Owned Rising and Lateral Mains

When the Landlord is carrying out significant refurbishment work (i.e. work which will significantly extend the life of the property) the connection arrangement shall be reconfigured in accordance with this ES.

NOTE: Where work on the existing Network within a Multiple Occupancy Building is undertaken, eg fault repair or other alteration, which is not part of a significant refurbishment, any cable installed as rising or lateral mains, within the building, shall be of approved low-smoke zero halogen type.

Electricity North West's policy toward acting as a BNO is described in EPD 283 Distribution System Design – Low Voltage Network.

This ES (in [section 5](#)) describes three approved methods of connection to Multiple Occupancy Buildings. The method chosen will be determined by the layout and size of the Multiple Occupancy Building and through negotiations with the Landlord. 4.5 The preferred location for all Electricity North West equipment shall be the ground floor of the building.

Where an Intake Position is required (for all arrangements except those described in [subsections 5.1](#) and [5.2](#)), the Landlord shall provide and maintain a secure room or cubicle at the Intake Position, for the accommodation of Electricity North West equipment, with adequate heating, lighting and a 230V 13A socket outlet. The Landlord shall ensure that Electricity North West staff shall have unrestricted access to this equipment, whenever any part of the building is occupied.

The preferred arrangement is that there shall be only one Electricity North West Intake Position per Multiple Occupancy Building. Multiple Intake Positions may be acceptable in certain building designs, e.g. low-rise flats, with several communal stairwells with no internal communication between them, or similar suitable layouts of commercial or industrial buildings. Nevertheless, consideration shall be given to the problems of earthing and bonding, and of the possibility of interconnection of the Intake Positions via Landlord's wiring. Exceptions shall be referred to the Network Planning Policy Manager.

Where it is necessary, or is considered economical to provide more than one LV cable incoming to one Intake Position, it shall be done only by one of the following arrangements: all incoming cables shall be derived directly from the same substation; or all incoming cables shall be jointed on the same LV distributor, such joints being located as close together as practicable and as close as practicable to the cable entry into the building, in order to avoid the possibility of using distributors, which are, or could, in the future, be fed from different sources.

For safety reasons, all such associated LV terminations shall be clearly labelled to indicate that there is another Electricity North West exit point within the Intake Position. Every opportunity shall be taken to apply, replace, correct or clarify labelling; this is especially important where existing installations do not comply with this requirement for labelling.

The installation of service cables, incoming to an Intake Position, shall be in accordance with the requirements of ES214 - New LV Connections of up to 300kVA Capacity.

The preferred method of connection external to the building shall be PME.

Individual connections to privately owned rising or lateral mains and services shall be SNE.

All multi-way distribution fuseboards shall conform to ES502 - Multi-way Service Distribution Boards, or be of a similar standard of function and construction.

When multi-way distribution fuseboards are used in conjunction with group metering, the installer is advised, in accordance with ES502 to:

‘tail out’ to metering blocks (two insulated and one uninsulated, for each metered way) the same number of ways as there are known customers. The cut-out fuse(s) relating to any unoccupied premises shall be removed and the fuse carrier(s) sealed in position with an approved seal; and ensure sufficient space is left around the distribution board for the fitting of future trunking arrangements, meters and associated switchgear.

A typical layout of distribution board and trunking is illustrated in [Appendix B, Figure 1](#).

So far as is reasonably practicable the load shall be balanced over the three phases.

The complete installation shall comply with the ESQCR. In order to satisfy this requirement, the installation within the building shall comply with the current edition of BS 7671 - Requirements for Electrical Installations also known as the “IEE Wiring Regulations”. Whilst the design of the installation within the building remains the responsibility of the BNO, where Electricity North West believes that an installation does not comply, it is bound, under the Regulations, to refuse to connect the installation. In order to assist Electricity North West in its fulfilment of this duty, the BNO shall submit to Electricity North West a layout drawing showing the BNO equipment between the Electricity North West cut-out and any whole-current meters. Such a drawing shall be submitted prior to energisation by Electricity North West of any BNO equipment.

Earthing arrangements shall be generally in accordance with EPD332 – Customer Installation Earthing. Particular requirements for Multiple Occupancy Buildings are given in section 7 of this ES.

All equipment owned or adopted by Electricity North West shall be sealed using approved seals.

The Landlord shall be responsible for the costs of replacement of Electricity North West owned equipment, should it be damaged or destroyed, e.g. due to inadequate building maintenance, fire, acts of vandalism etc. These requirements shall be included in the Terms of Connection.

5 Types of Installation

5.1 Building Network Derived Directly from a Substation

An example of this arrangement is illustrated in [Appendix A, Figure A1](#).

The arrangement is similar in many respects to a connection to an IDNO network, derived from a substation and reference shall be made to ES225 - Connections for Embedded Distribution Networks.

Where the BNO is a licensed distributor and chooses to have the exit point at HV, DUoS boundary metering shall be installed, albeit that the metering equipment may be connected at LV, as described in ES225. Otherwise, no boundary metering is required.

Where the BNO is a licensed distributor, the connection from the substation to the Multiple Occupancy Building may use CNE cable. However, it is advisable that all other cabling within the building should be SNE.

5.2 Separate Services Originating outside the Building

This type of arrangement is suitable where each of the Premises, eg flats, maisonettes, retail and small industrial, has separate access at ground floor level, or where first-floor Premises, eg flats, have external access via a staircase and landings and rising services can be safely accommodated external to the building. There shall be no communication between Premises and no indoor communal area.

Services shall be installed in accordance with ES212 - New Whole-current Metered Connections up to 60kVA. Service terminations and meters may be accommodated in outside viewing cabinets or inside the Premises.

5.3 LV Connection to Intake Position within the Building

5.3.1 Group Metering at the Intake Position

An example of this arrangement for a small number of Customers is illustrated in [Appendix A, Figure A2](#) and for a larger numbers of Customers, [Figure A3](#).

This type of arrangement is suitable for any number of floors and Customers.

Where the arrangement described in [subsection 5.2](#) cannot be applied and there are fewer than five floors or fewer than 24 customers, it is expected that no more than one multi-way distribution fuseboard, located at the Intake Position, will be sufficient, with either group metering, as described here or distributed metering, as described in [subsection 5.3.3](#).

Boundary metering (for DUoS purposes) is not required. Electricity North West will install a cut-out at the Intake Position. Up to three Customers, with an additional single-phase connection for a landlord's service, may be connected directly to the Electricity North West cut-out connected via a 3-core 35mm² SAC incoming service cable ([Figure A2](#)). Where the number of Customers, or their demand exceeds that which can be accommodated in this way, the BNO shall install a main switch (or switches) and multi-way distribution fuseboard for connection to the cut-out ([Figure A3](#)). A 200A distribution board fed via a 3-core 95mm² SAC incoming service cable may be used to feed more than 3 customers, up to 6 customers.

The BNO shall be responsible for all equipment that is beyond the Electricity North West cut-out.

The BNO shall arrange for the fitting and connection, by the appropriate Meter Operator, of the appropriate meters to the main switches or to the multi-way distribution fuseboard, or, where a 3-core 35mm² SAC incoming service cable is sufficient for up to three domestic Premises plus 1 landlord's connection, directly to the Electricity North West cut-out. This includes any related trunking. In designing the layout for metering at a group metering position, account shall be taken of the need for access to the meters, the space required for the meters and switch-fuses to be installed, including for any additional Customers likely to be added in the future. See the example layout illustrated in [Appendix B, Figure B1](#).

The BNO shall provide a means of fusing and isolation of each metered circuit immediately adjacent to the meter position.

Customers shall have access to their meters. This access shall be provided by the Landlord and shall take account of the need to make provision for disabled persons.

Where one or more of the Customers requires a connection with current transformer metering, Electricity North West will install in the Intake Position, for each such Customer, a separate metering panel. Each such metering panel will be connected via a separate incoming cable, derived as described in [subsection 4](#). Such

incoming cables may be in addition to cables connecting multi-way distribution fuseboards for whole-current meters, for other Customers. A typical arrangement is shown in [Appendix B, Figure B2](#).

Electricity North West will seal the cut-out(s) in which the incoming cable(s) is/are terminated. The BNO shall seal the main switch(es), multi-way distribution fuseboard(s) and the trunking containing the meter tails.

Responsibilities for equipment at the Intake Position shall be clearly marked by labelling. In particular Electricity North West's cut-out(s) shall bear the name "Electricity North West Limited" (A suitable label is illustrated in ES212, subsection 4.16.1.) and the BNO's switchgear, immediately downstream of the cut-out shall bear the name of the BNO.

5.3.2 Group Metering remote from the Intake Position

Examples of this arrangement are illustrated in [Appendix A, Figures A3, A4 and A5](#).

This type of arrangement is suitable where there are 5 or more floors or 24 or more Customers. Typically, group metering positions are located on every floor, on alternate floors or on every third floor.

Boundary metering (for DUoS purposes) is not required. Electricity North West will install, in the Intake Position, a heavy duty cut-out, to which the BNO's switch/fusegear, controlling his rising and lateral sub-mains shall be connected.

The BNO's sub-mains shall be installed in positions where they are secure from interference and segregated from other infrastructure.

The BNO shall be responsible for all equipment that is beyond the Electricity North West cut-out, including the multi-way distribution fuseboards at the group metering positions.

The BNO shall arrange for the fitting and connection, by the appropriate Meter Operator, of the appropriate meters to the main switches or multi-way distribution fuseboards. This includes any related trunking. In designing the layout for metering at a group metering position, account shall be taken of the need for access to the meters, the space required for the meters and switch-fuses to be installed, including for any additional Customers to be added in the future. See the example layout illustrated in [Appendix B, Figure B1](#).

The BNO shall provide a means of fusing and isolation of each metered circuit immediately adjacent to the meter position.

Customers shall have access to their meters. This access shall be provided by the Landlord and shall take account of the need to make provision for disabled persons.

Electricity North West will seal the cut-out in which the incoming cable is terminated. The BNO shall seal or otherwise secure his switch/fusegear at the Intake Position, the multi-way distribution fuseboards and the trunking containing the meter tails.

Responsibilities for equipment at the Intake Position shall be clearly marked by labelling. In particular Electricity North West's cut-out(s) shall bear the name "Electricity North West Limited" (A suitable label is illustrated in ES212, subsection 4.16.1.) and the BNO's switchgear, immediately downstream of the cut-out shall bear the name of the BNO.

5.3.3 Distributed Metering

An example of this arrangement is illustrated in [Appendix A, Figure A6](#).

This type of connection arrangement may be used for any number of floors and Customers.

Boundary metering (for DUoS purposes) is not required. Electricity North West will install, in the Intake Position, a cut-out, to which the BNO's switch/fusegear, controlling his multi-way distribution fuseboard and/or rising and lateral sub-mains shall be connected. For a 3-core 35mm² SAC incoming service cable, the number of Customers to be connected shall not exceed three (single-phase), with an additional single-phase connection for a landlord's service. A 200A distribution board fed via a 3-core 95mm² SAC incoming service cable may be used to feed more than 3 customers, up to 6 customers.

The BNO shall be responsible for all equipment that is beyond the Electricity North West cut-out.

The BNO's sub-services and sub-mains shall be installed in positions where they are secure from interference and segregated from other infrastructure.

Meters shall be installed in suitable positions, taking account of Customers' needs of access to them, including provision for disabled persons. Meters shall not be installed in bathrooms, toilets, airing cupboards, kitchens, above doors or under stairs.

The BNO shall arrange for the fitting and connection of the appropriate means of isolation, and the meters at the various sub-service terminations.

Electricity North West will seal the cut-out in which the incoming cable is terminated. The BNO shall seal all multi-way distribution fuseboards, switch/fusegear, controlling rising and lateral sub-mains and the isolators or cut-outs at the sub-service terminations.

Responsibilities for equipment at the Intake Position shall be clearly marked by labelling. In particular Electricity North West's cut-out(s) shall bear the name "Electricity North West Limited" (A suitable label is illustrated in ES212, subsection 4.16.1.) and the BNO's switchgear, immediately downstream of the cut-out shall bear the name of the BNO.

6 Second Connection for Emergency Purposes

The request for a second connection for emergency fire fighting lifts and equipment and pressurised escape routes shall be refused even if the developer claims that this is necessary, in order to satisfy the requirements of BS 7671 "Requirements for Electrical Installations" also known as the "IEE Wiring Regulations".

The preferred option is for the developer to install automatically started generation (in accordance with BS 9999) for the following reasons:

There are adverse safety implications (inadvertent re-energisation, stray earth and return currents etc) from having two connections. It is not prudent to introduce a safety risk in order to mitigate another.

It cannot be assumed that the second connection will always be available during 11/6.6kV (or higher voltage) faults. Even if a second connection were to be derived from a separate source, Electricity North West could not guarantee that this separation would be maintained.

It may be necessary to de-energise substations or feeders for fault location or maintenance work. It follows that Electricity North West cannot guarantee 100% availability of the second connection.

To be of practical use, the integrity of the second connection would need to be continuously monitored. Electricity North West cannot undertake this responsibility.

The applicant shall be made aware that, although a second connection might appear to be the cheapest option, it would not produce the desired level of safety and might engender an unwarranted sense of security.

Distributors are absolved from the obligation to provide a quotation on demand for a connection where it would not be reasonable in all the circumstances (s17(1)(c) of the Electricity Act 1989 (as amended)). The issues listed above mean that it is not reasonable to provide a second connection, where a safer and more reliable option is for the customer to install on-site generation.

7 Earthing

7.1 Separate Services Originating outside the Building

Where services are to be installed in accordance with [subsection 5.2](#) in low-rise domestic and commercial (retail or offices) premises of conventional construction (brick, stone, concrete), interconnection of the neutral cores of the separate services, either within the building or through the fabric of the building, is unlikely. PME connections, via CNE service cables, shall normally be used.

In steel-framed or steel-clad buildings (e.g. industrial units), interconnection of the neutral cores of separate service cables, through the fabric of the building, shall be avoided. Where it is not practicable to establish a single Intake Position, with an incoming PME connection and internal SNE sub-services provided by the Landlord, BNO or Customers, the service connections to the separate units shall be SNE. These may be derived directly from the LV Network or via a feeder pillar, with an incoming CNE connection.

Where Premises in a steel-framed or metal-clad building with an existing CNE connection are to be divided into separate Premises and where it is not practicable to establish a single Intake Position, the existing service shall be disconnected and removed and each of the newly divided Premises connected externally, using SNE cables. Any other existing CNE connections in the same building, not affected by the division of Premises, may remain as they are, unless problems caused by the diversion of neutral currents are reported.

7.2 Single Intake Position

Where there is to be only one incoming CNE service cable, or more than one arranged as described in [subsection 4](#), an earth electrode shall be installed for each service cable, in accordance with ESQCR, Regulation 9. These electrodes shall be located as close as is reasonably practicable to the entry into the building of the incoming service cables. The connections from these electrodes to the neutral/earth terminals at the terminations of the incoming cables shall, as far as is reasonably practicable, be short and protected from damage, interference and theft. See [Appendix A, Figure A3](#).

Where there are to be more than one incoming service cable (including one or more CNE cables), arranged as described in [subsection 4](#), earth electrodes are not necessary, provided that the neutral conductors of the incoming cables are bonded together at the Intake Position. Such bonding connections, referred to as PEN conductors, may be applied only if the current carrying capacity of the smallest incoming neutral is at least half of the current carrying capacity of the largest incoming phase core. Each PEN conductor shall have a

current carrying capacity of at least that of the smallest of any neutral conductors which it connects and shall be marked with both blue and green/yellow markings. (E.g., a band of blue tape may be applied at each end of a green/yellow insulated conductor.) See [Appendix A, Figure A4](#).

Equipotential bonding shall be applied to all incoming services and exposed metalwork in accordance with BS 7671.

Internal sub-mains and sub-services shall use SNE cables.

7.3 Multiple Intake Positions

Where the use of CNE services in multiple Intake Positions would result in their neutral conductors being bonded together within the building, consideration shall be given to the alternative use of SNE service cables. This is in order to avoid the possibility that neutral current might be diverted through the frame of the building or through other services within the building, resulting in out-of-balance currents in cables causing interference with electronic equipment, or nuisance tripping of Customers' RCDs.

Where CNE incoming services are used, equipotential bonding shall be applied to all incoming services and exposed metalwork in accordance with BS 7671.

Regardless of whether incoming service cables are CNE or SNE, internal sub-mains and sub-services shall use SNE cables.

8 Issue of MPANs

Where the BNO is a licensed distributor (DNO or IDNO), it shall be responsible for the issue and management of MPANs.

Otherwise, Electricity North West MPANs shall be issued.

9 Connection of Aerial Masts and Similar Equipment

9.1 General

Because of the bonding requirements of lightning systems, as described in BS 6651: 1999, externally mounted metallic aerials, floodlights and similar structures shall be provided with connections only in accordance with this [section 9](#). This will minimize risks of neutral current diversion and possible touch and step potentials.

9.2 Second supply

The Electricity North West preference is that the connection be treated as another customer within the multiple occupancy premises.

Any connection shall normally be derived from an existing Intake Position, bearing in mind the provisions of [subsection 4](#).

A second supply for the mast may only be provided when either of the following conditions can be met:

1. The earthing system of the second supply can be kept separate from the building's earth, for example the mast is mounted externally on a brick-built building.
2. Where the second supply earth must be bonded to the existing building earth:
 - The requirements of subsection 7 can be met for buildings with existing LV supplies
 - If the building has a HV supply, the HV and LV earth systems are already bonded together.

The second supply shall be provided by a pillar adjacent to the building, with private wiring to the mast installation routed externally to the building. The location of the second supply shall not be inside the building in any circumstance. Warning notices shall be fixed at both exit points to advise the presence of a second supply.

10 Documents Referenced

DOCUMENTS REFERENCED	
The Electricity Act 1989 (as amended)	
Electricity Safety, Quality and Continuity Regulations 2002	
The Distribution Code	
BS 6651	Code of Practice for the Protection of Structures against Lightning
BS 7671	Requirements for Electrical Installations
BS 9999	Code of Practice for Fire Safety in the Design, Management and Use of Buildings
ENA ER G87	Guidelines for the Provision of Low Voltage Connections to Multiple Occupancy Buildings
EPD332	Customer Installation Earthing
ES212	New Whole-current Metered Connections up to 60kVA
ES214	New LV Connections of up to 300kVA Capacity

ES225

Connections for Embedded Distribution Networks

ES502

Multi-way Service Distribution Boards

11 Keywords

Connection, Earthing, ESQCR, Licence, LV, Meter, Neutral

Appendix A – Examples of Connection Arrangements

Figure A1 – Building Network Derived Directly from a Substation

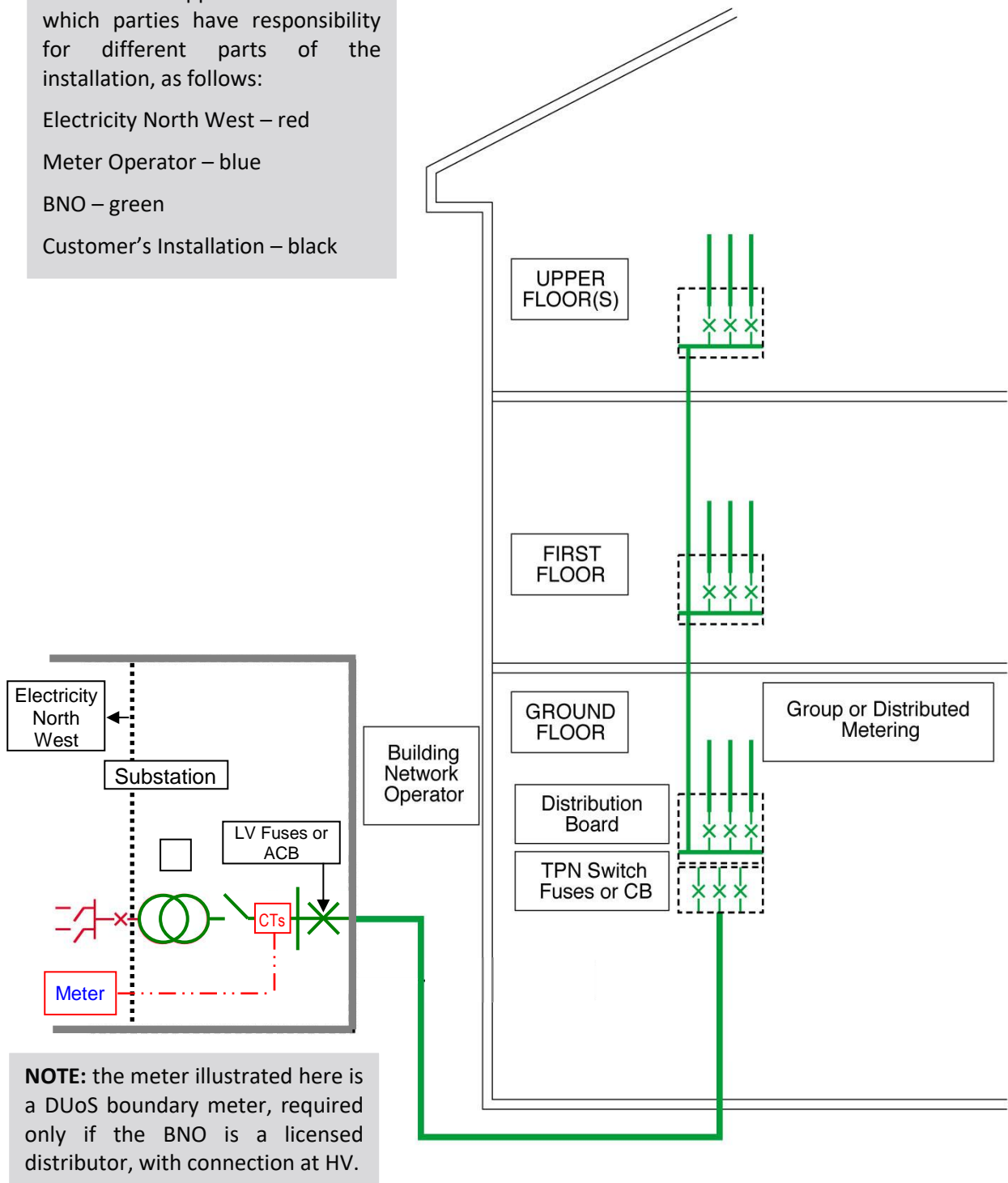
NOTE: that colour-coding has been used in this Appendix to indicate which parties have responsibility for different parts of the installation, as follows:

Electricity North West – red

Meter Operator – blue

BNO – green

Customer's Installation – black



NOTE: the meter illustrated here is a DUoS boundary meter, required only if the BNO is a licensed distributor, with connection at HV.

Figure A2 – Group Metering at Intake Position (small number of Customers. See 5.3)

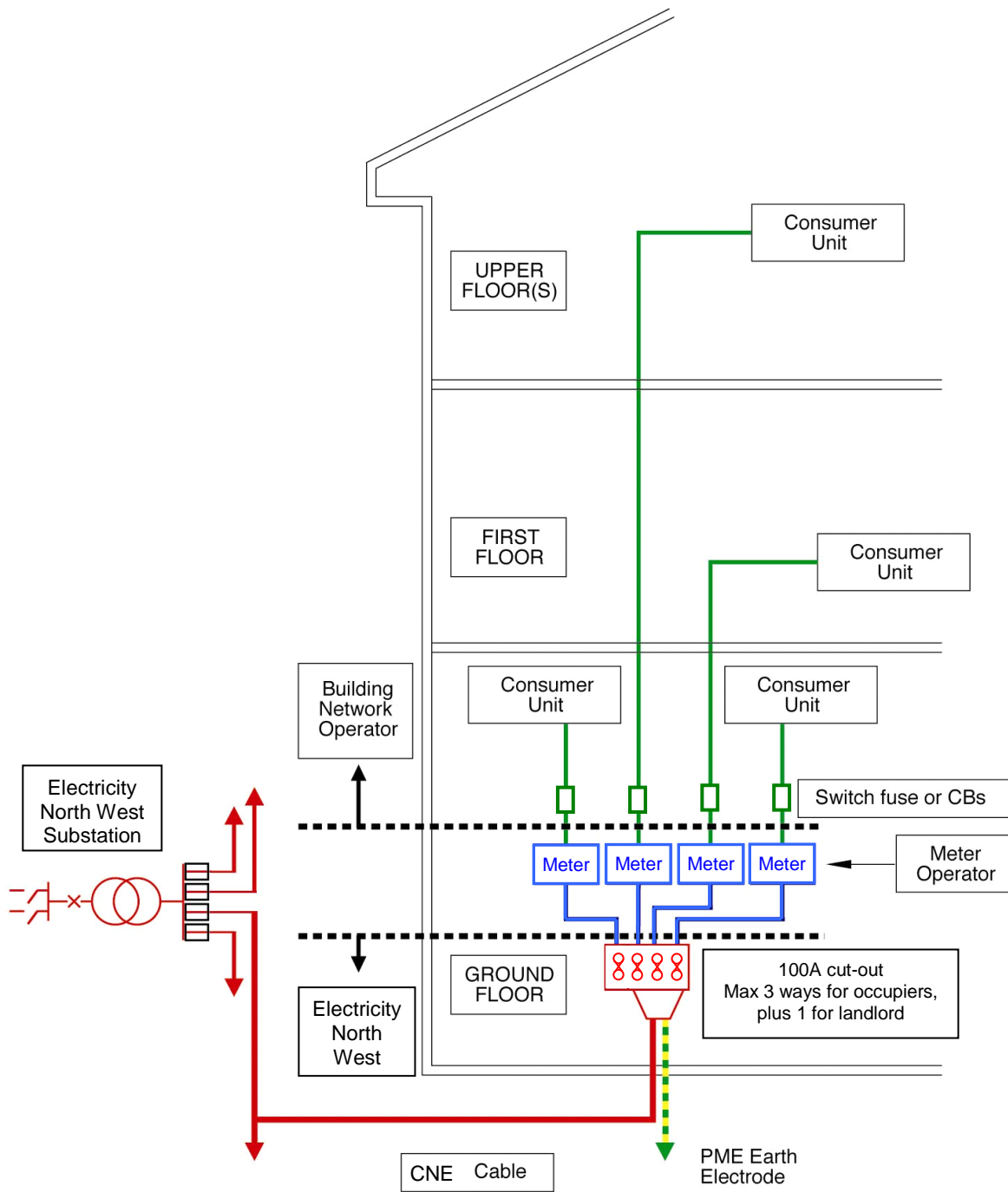


Figure A3 – Group Metering for Larger Numbers of Customers – Single Incoming Service from LV Network

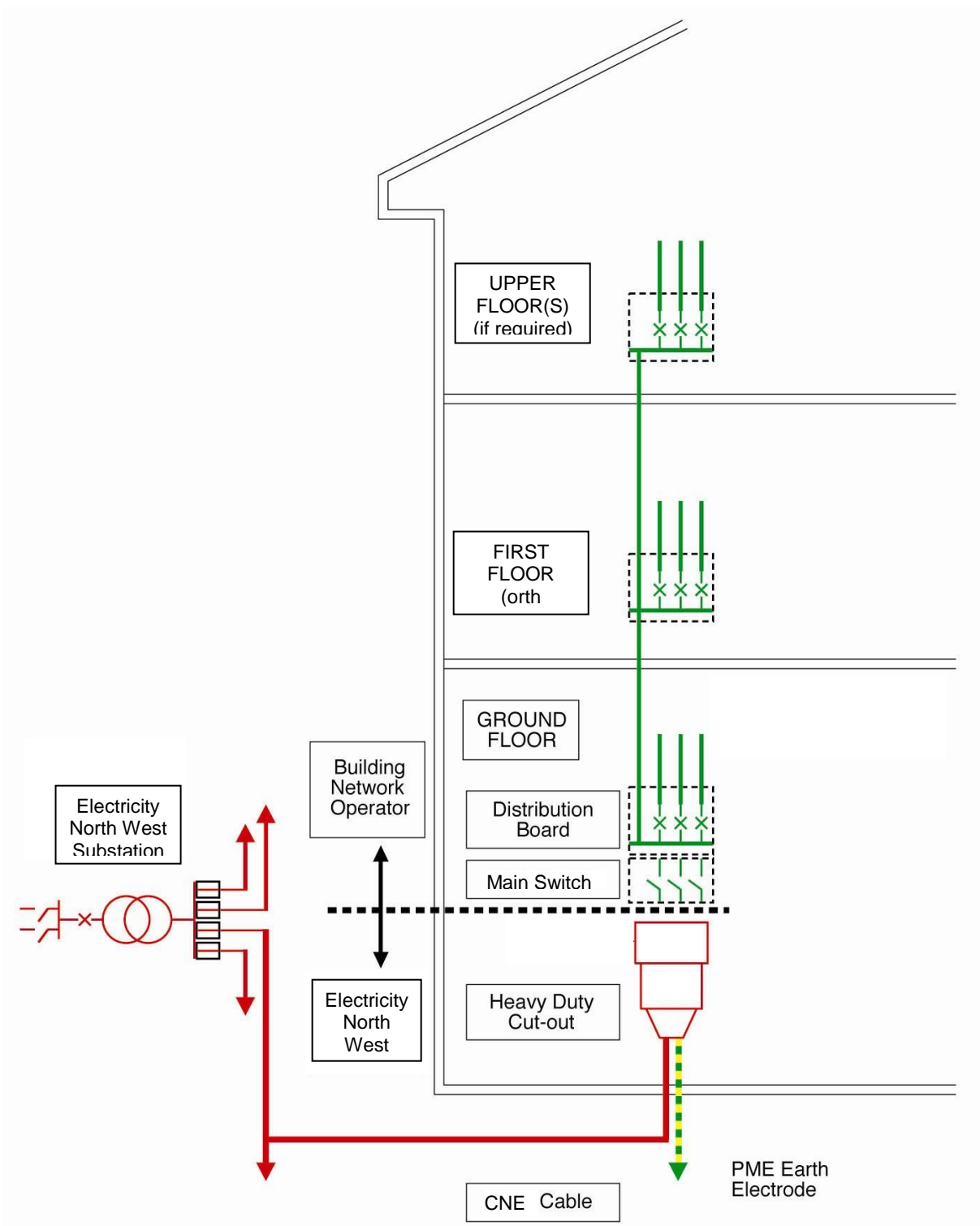


Figure A4 – Group Metering Remote from Intake Position – Multiple Incoming Services Directly from Substation

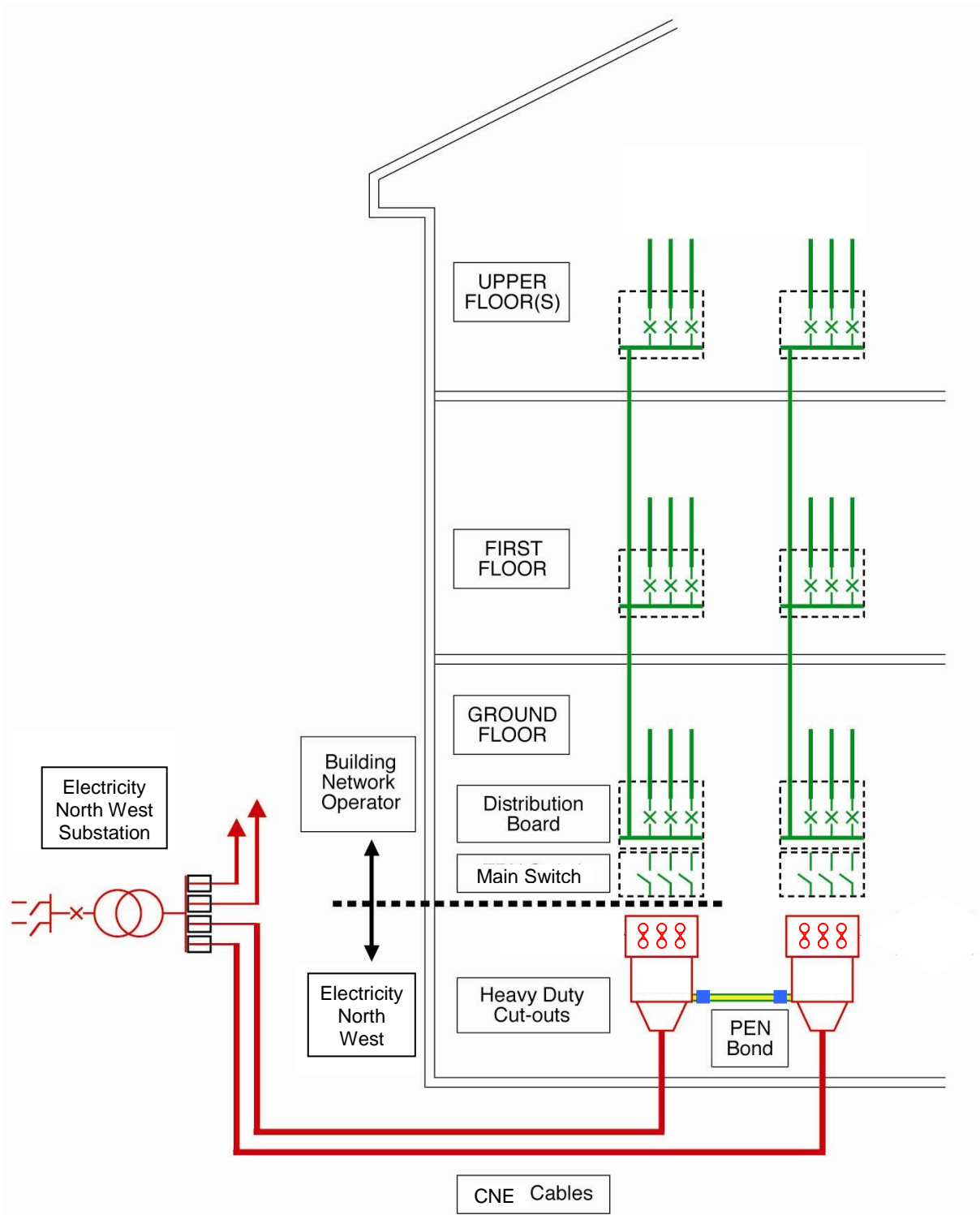


Figure A5 – Group Metering Remote from Intake Position – BNO Network

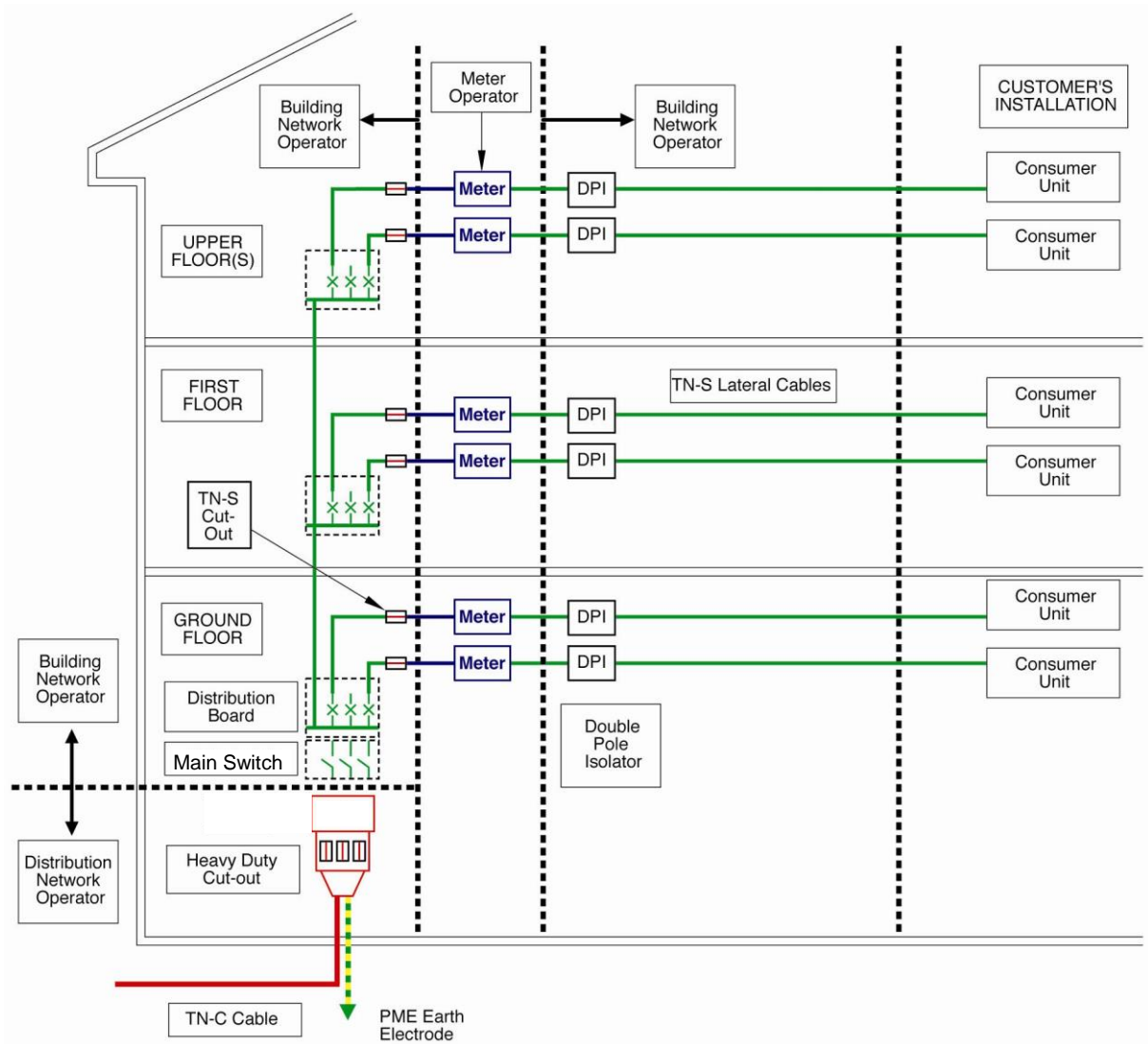
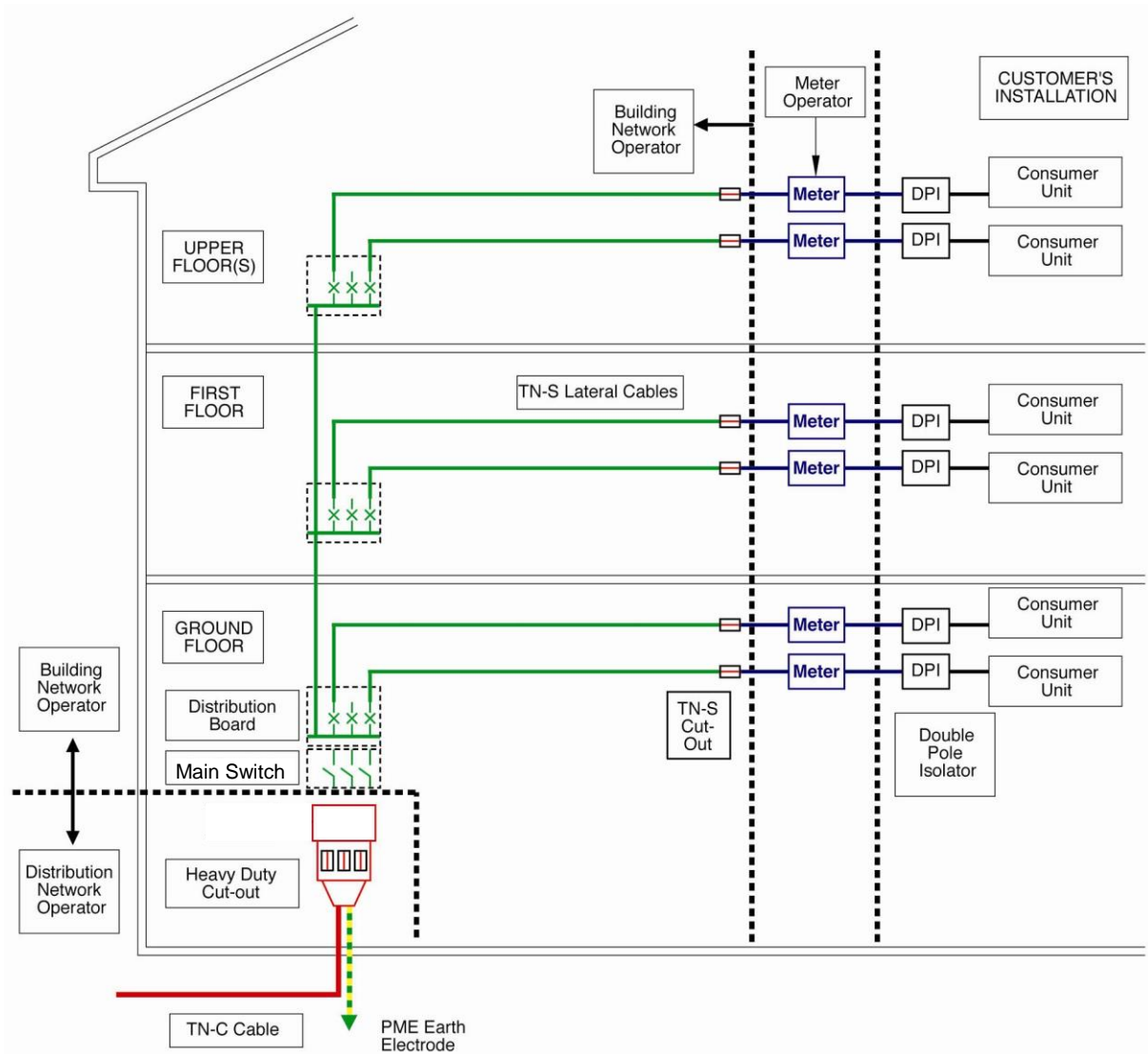


Figure A6 – Distributed Metering – BNO Network



Appendix B

Figure B1 – Typical Distribution Board Installation

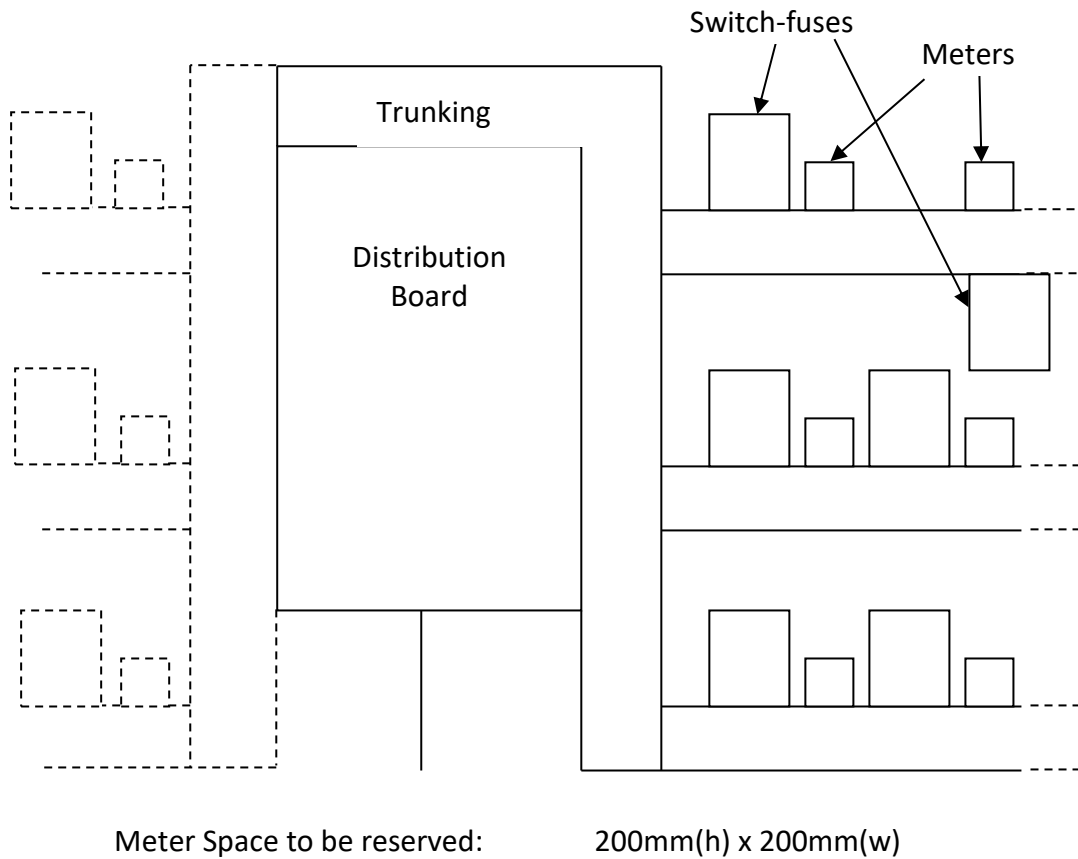


Figure B2 – Typical Layout with both CT Metering and Whole Current Metering

