ENGINEERING STANDARD

GE-CIC-ES-0068

G81-PART 3 and 6: INSTALLATION AND RECORDS

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Part 3 and 6: Installation and Records **Framework for new low voltage housing development installations & industrial and commercial underground connections**	**GE-CIC-ES-0068**
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3	Document reviewed, no changes required so revision number retained

Full Document History is available at the end of this document

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1 INTRODUCTION

This document forms Appendix to Energy Networks Association (ENA) Engineering Recommendation (EREC) G81-Part 3 & Part 6: Installation and Records, “Framework **for new low voltage housing development installations & industrial and commercial underground connections** " and should be read in conjunction with these documents.

This document provides the information, specific to GTC, required by Appendix of Part 3 & Part 6 of ENA EREC G81.

2. SCOPE

This is an appendix to ENA EREC G81 Part 3 & Part 6 and covers the Installation and records for new low voltage housing installations and industrial / commercial development connections to the electricity distribution network of GTC comprised of licenses Energy Network Company (ENC) and Independent Power Network Company (IPNL).

3. GENERAL

For all new connections work the approved installer (ICP – Independent Connection Provider) shall comply with GTC’s requirements for installation and provide GTC with accurate records and test results for all plant and equipment installed that is to be adopted by GTC.

The detailed information is required in order for GTC to comply with their statutory and regulatory requirements.

4. INSTALLATION

This information shall be provided to GTC as part of the design approval process.

4.1 General

- The installation of all plant and equipment to be adopted by GTC shall meet the requirements of the listed references, all applicable legislation and the details in this section.
- It shall be noted that cable, plant and equipment ratings will be influenced by the installation arrangement and reference shall be made to;
    - G81 Part 1 - GE-CIC-ES-0063 Design and Planning requirements framework for New Housing Installations.
    - G81 Part 4 - GE-CIC-ES-0066 Design and Planning requirements framework for New Industrial / Commercial Connections.
- All plant and equipment installed shall comply with the requirements of;
    - G81 Part 2 – GE-CIC-ES-0064 Material Specification framework for New Housing Installations
    - G81 Part 5 -GE-CIC-ES-0067 Materials Specification Framework for New Industrial / Commercial Connections

4.2 Underground Cables

- There shall be no material change to routes (to the extent that it affects design criteria) detailed in previously submitted and approved plans, unless otherwise agreed in writing with GTC and any other interested parties.

- Earth conductors and rods shall be laid in accordance with the previously submitted plans. Note should be taken of the requirements of ESQCR 9 (2) (a) and ENA ER G12-4 on the need for earths at the remote end of the main, during each stage of the energisation program.
- The installation of LV cables shall be such as to permit future live working.
- Jointing materials shall comply with GTC's specifications. Jointing practice shall be in accordance with GTC's LV Jointing Guidance Document GE-CIC-ES-0003.
- Cable terminations shall be made with correct phase connections.
- Service connections shall be made to the correct phase as shown on the approved design drawings. The numbers of services taken from a single joint shall not exceed the number specified in G81 Part 1 (GE-CIC-ES-0063) & Part 4 – (GE-CIC-ES-0066) - Design and Planning requirements.
- The Applicant shall provide a written / electronic record, including for each joint; the location, the name of the jointer and the date the joint was made. These will be kept in the GTC construction file, as well as being recorded on the appropriate network record.

4.3 Substation

There shall be no material change to the design or location of any substation to that detailed in previously submitted and approved plans unless otherwise agreed in writing with GTC and any other interested parties. Particular concern shall be made to the legal consents agreed as part of the design approval.

Substation installation shall be in accordance with GTC's specification GE-CIC-ES-0118

Substation plant and materials shall comply with GTC's specifications.

Substation small wiring shall be in accordance with GTC's Substation drawings.

Substation housings shall be in accordance with one of GTC's Substation drawings.

Substation earthing design shall be in accordance with GTC's relevant Substation Earthing Design Specification.

A method statement outlining how the applicant will install the substation plant and equipment shall be provided prior to the commencement of work.

4.4 Multiple Occupancy Building

There shall be no change to the design for multiple occupancy buildings to that detailed in previously submitted and approved plans unless otherwise agreed in writing with GTC and any other interested parties. Particular attention shall be paid to the legal consents agreed as part of the design approval. The design and installation for multiple occupancy buildings shall be in accordance with ENA EREC G87- Guidelines for Provision of Low Voltage Connections to Multiple Occupancy Buildings.

5. COMMISSIONING AND RECORDS

5.1 Format and scales

Records for newly laid underground cables are acceptable currently in two formats;

1. An electronic copy of the current 1:500 site record (file format .dwg), with all the measurements and comments clearly annotated (accuracy guaranteed to be ±100mm). The information specified shall be provided on separate layers (e.g. HV Cables on layer 1, LV Cables on layer 2 etc). – preferred format.
2. A hand-drawn sketch of the cable route marked on an existing 1:500 paper map of the area concerned, including the necessary measurements and comments (all of which must be clear and legible).

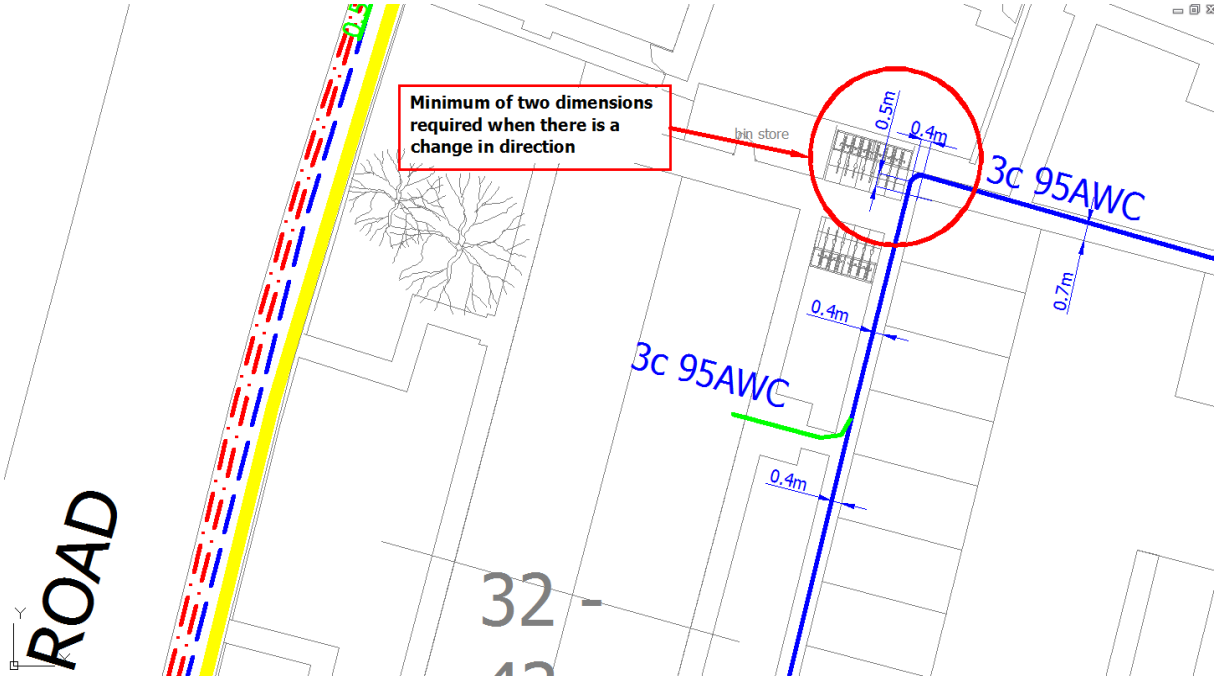
The detailed requirements for information relating to underground cables are given in sub-section 5.5.

5.2 Topography

Where non-Ordnance Survey background topographic data is used as reference sources, appropriate points at the site periphery shall be established and referenced to physical features, which are shown on the existing Ordnance Survey map. For example developers' plans or highway scheme drawings may be used and points along the boundary of the new housing development or industrial site or along the route of a new road identified as references. This is to enable GTC to update its GIS maps so that the new background can be merged into the existing records as accurately as possible. Where no reference is available, modern GEO/GPS system can also be used to establish easting and northing which can be used with zero referencing.

5.3 Method of Taking Site Measurements

The preferred method for recording assets in GTC is the offset method. The offset method entails taking two measurements approximately at right angles to each other from fixed points to the asset to accurately locate its position.



5.4 Connectivity

Connectivity shall be recorded on the as-laid record, such that the complete route of a cable or series of connected cables (feeder circuit) can be traced from the start connection point to the end point or points.

5.5 Detailed Requirements

To ensure that GTC's Asset Data Records are accurate, the following shall always be taken into account when producing as-constructed / as-laid drawings returned from site;

- All drawings shall be clear and legible.
- All drawings shall include the exact location of work, grid reference, title, type of job, and dates of actual work. Streets shall be correctly named. Wherever house numbers are available these must be shown in preference to plot numbers.
- Measurements shall always be taken from any permanent features, which are shown on an Ordnance Survey map, such as buildings (gable ends) kerb lines, walls, bridges etc.
- Must not measure dimensions from point(s) not shown on the drawing.
- Dimensions must NOT be measured from trees, gate posts, sheds, bay windows, letter boxes, lamp posts, manhole covers, gullies etc.
- The phase connection of each single-phase service shall be clearly indicated.
- All drawings shall be to a suitable scale - (1:500).
- All drawings shall show a north arrow.
- All details of any non-standard work undertaken must be provided.
- All measurements must be in metres or millimetres, as appropriate.
- The type of each joint shall be indicated: cable cross-sectional area, conductor material, insulating material, cable type, operating voltage, number of cores, and number of phases and where less than 3 phases are being used.
- Terminology of joints like 300/95mm^2 must be included on all joints to show what cables are jointed.
- Tails/Feeders from Substation must be counted left to right.
- Earth cables and earth mats must be recorded when they are installed. The position and cross sectional area of the cable must be included.
- Each joint must be located with two dimensions at right angles, from at least two permanent features e.g. from the kerb and from the end wall of a building, as detailed in section 5.3.
- The type and manufacturer of all LV link boxes shall be recorded, including serial number (if available), the number of ways and, where known, the normal open points.
- The position of LV link boxes shall be recorded with measurements, from at least two permanent features, as detailed in section 5.3. The inclusion of What3Words is also advisable.

- Sufficient measurements shall be made to show the route of each cable accurately, including additional measurements as necessary to show any deviation from straight lines.
- Measurements shall be taken at intervals not exceeding 30m and at all points where the cable changes direction, minimum two dimensions along with size or type must be shown.
- The size and type of all ducting installed shall be indicated, showing which ducts are in use. The positions of the ends of ducting, including any breaks in the run of ducting, shall be shown with measurements, from at least two permanent features. Where more than one duct has been laid in the same trench, a cross section drawing shall be included.
- Where cable tiles / marker tape is used above a cable this shall be recorded: the depth, the clearance above the cable and the length of cable covered must be clearly shown.
- Depths of cables must be recorded
- Depths shall be recorded to an accuracy of ± 0.05m.
- Depths shall be marked on maps at the points at which they were measured.
- For a small excavation or opening, the depth of the apparatus uncovered at that point shall be recorded.
- The dates, when the depths are measured, shall be recorded.
- All symbols used/sketched/drawn are to be consistent with the standard symbols legend as shown on the CAD templates/border sheets.

5.6 Data to be Recorded on site

- Site location / address
- Recorded by (name and contractor) and date
- Cable sizes
- Depth of plant below final ground level
- Size, type and manufacturer of jointing chambers
- Cable drum number and manufacturer
- Cable length
- Duct sizes. (Sections to be shown where multiple ducts are laid)
- Cable laid by and when
- Map number or reference and scale: minimum scale 1/500 for underground cable recording
- LV Link box manufacturer, type, rating and (if present) serial number
- LV Fuse cabinet / board / pillar / MSDB make, type, serial number and number of outgoing ways
- HV/LV transformer, type (eg Ground Mounted/Package Substation/Padmounted), make, rating, serial number, tapping range, fixed and variable losses (from test certificate)
- HV ring main unit / tee circuit breaker – make, type, ratings normal and short circuit current and serial number
- Make and type of substation housing with serial number (if present), including What3Words

5.7 Tests to be undertaken on the Network

- The schedule as defined in GE-CIC-ES-0121 defines the tests that are to be considered as the minimum for each item of plant that is to be installed on GTC's network. Additional tests may be required and will be communicated by GTC to the contractor.

6. DOCUMENT HISTORY

1	March 2016	Issued
1	May 2018	Document reviewed, no changes required so revision number retained
2	April 2022	Sec 4.2 Underground Cables updated Sec 5.5 Detailed Requirements updated Sec 5.6 Data to be recorded on site updated Sec 5.7 Tests to be undertaken on the Network updated
3	July 2023	Sec 4.2 Underground Cables updated
3	July 2024	Document reviewed, no changes required so revision number retained