WESTERN POWER DISTRIBUTION

Serving the Midlands, South West and Wales

G81 PART 1

FRAMEWORK APPENDIX

Housing Development design framework appendix to be read in conjunction with the latest version of:

ENA Engineering Recommendation G81 Part 1 "Framework for design and planning, materials specification and installation and record for low voltage housing development installations and associated, new, HV/LV distribution substations" – Part 1 Design and Planning.

WESTERN POWER DISTRIBUTION

HOUSING DEVELOPMENT DESIGN FRAMEWORK DLH SPECIFIC APPENDIX

1.0 INTRODUCTION

1.1 This G81 Framework Annex specifies Western Power Distribution's requirements for design and planning of low voltage housing developments. This document shall be read in conjunction with:

- The National Framework Documents
- The Adoption Agreement
- Western Power Distribution (WPD) Housing Development Framework Appendices relating to installation and materials
- WPD Framework Appendix on cable recording techniques
- WPD Standard Technique ST:SD5A/1: the design of LV domestic connections
- WPD Standard Technique ST:SD5R/3: earth fault loop impedances and phase to neutral loop impedances at LV installations
- WPD Standard Technique ST:TP21D: 11kV, 6.6kV and LV system earthing
- WPD Standard Technique ST:SD8B Part 1: LV cable ratings

1.2 Implementation requirements are given in Annex 1

1.3 The change history for this document (since issue B) is included in Annex 2.

1.4 **In the event of query please speak to the WPD Planner acting as the focal point of contact for the scheme**.

2.0 INFORMATION REQUIRED FROM APPLICANT

The following information shall be provided by the applicant with the design:

2.1 **For each feeder –**

- Number of customers and connections on each phase
- Maximum imported feeder demand in Amperes
- Maximum exported feeder demand in Amperes
- Fuse selected and maximum clearance time – ph to earth fault at cut out
- Maximum voltage regulation (% of nominal voltage) at cut out positions, at the connection point and at the end of each section of mains (i.e.at each mains tee). Values shall be given for maximum for voltage drop and also maximum voltage rise, where this applies
- Maximum earth fault loop resistance (ohms), at end of each mains tee and at each cut-out position
- Maximum voltage unbalance (%)
- Diversity (%)
- Maximum length of cable in duct
- Maximum number of services from one mains joint

2.2 **Demand assumptions**

- A listing of demand profile classes and ADMDs/ annual consumption used for each category of service

2.3 **Information (as required in Distribution Code - DPC 5.2.1), on**

- Individual maximum power requirements kVA or kW
- Type and electrical loading of equipment to be connected, e.g. number and size of motors, cookers, showers, generators, heat pumps, space and water heating arrangements including details of equipment which is subject to switching by the Supplier

2.4 **Economic Rating Criteria**

The criteria that has been used to assess the capitalised cost of transformer losses for the purposes of selecting transformer types and sizes:

- Capitalised cost of variable (copper) losses (£/Watt), based on maximum copper losses when the transformer operates at its nameplate rating.
- Capitalised cost of fixed (iron) losses(£/Watt)

2.5 **Maximum design PSCCs at connection of service to main (kA)**

- 1ph 230V
- 3ph 230/400V
- 2ph 230/460V

2.6 **Design PSCC at LV busbars of HV/LV transformer (kA)**

2.7 **Unmetered supplies**

Classes and maximum demands (in accordance with the Unmetered Supplies Operational Information published by Elexon).

2.8 **Confirmation that cable ratings employed are as WPD ratings** (defined in ST:SD8B Part 1).

2.9 **A layout plan**, typically to scale 500/1, (the as laid plan shall be no smaller scale than 500/1) showing the proposed route and types of all cables, identifiable by feeder, locations of points of supply, link boxes, substation positions etc.

2.10 **Tenure** - Means by which cable routes and substation sites are to be secured, e.g. public highway, easement etc.

3.0 WPD DESIGN REQUIREMENTS

3.1 WPDs design requirements are specified in Standard Technique (ST):SD5A

3.2 **Maximum PSCCs at connection of service to main**

- 1ph 230V 16 kA
- 3ph 230/400V 25 kA
- 2ph 230/460V 25 kA

3.3 **Cost of Losses**

WPD apply the following transformer loss evaluation when assessing the lifetime costs of transformers:

- Capitalised value of variable (i.e. copper) losses = £0.243/Watt (based on maximum copper losses when operating at name plate rating).
- Capitalised value of fixed (i.e. iron) losses = £1.791/Watt.

In addition to the above, transformer losses shall not exceed the maximum values defined in EE SPEC:5.

3.4 **Underground cable ratings - criteria for underground cables**

Underground cable ratings specified in ST:SD8B Part1 and Part 2 shall be used. The choice of spring, summer, autumn or winter ratings and the use of continuous or cyclic ratings is determined by the nature and the time of year of the load. Typically autumn cyclic ratings are applicable to housing estate designs.

Distribution ratings shall not be used for design purposes.

A duct up to 15m in length can be used without de-rating the cable. Two or more duct lengths can be used on a section, provided that there is no more than 30m of duct in a particular 250m cable section and that there is a minimum of 10m separation between each duct length. The duct rating shall be used if 15m or more of continuous duct is installed on a particular 250m cable section.

ANNEX 1

A1 IMPLEMENTATION

For a period of 3 calendar months from the date of issue of this document ICPs may either comply with the previous issue (Issue B) or this version (Issue C).

This document shall be implemented in full 3 calendar months after the date of issue.

A2 CHANGE HISTORY

A summary of the changes included since Issue B of this document are included below:

Clause / Paragraph	Description
Issue C changes (April 2012)	
1.1	References to the following documents added: • WPD ST:SD5A • WPD ST:SD5R • WPD ST:TP21D • WPD ST:SD8B Part 1
1.2	New clause referring to Annex 1 (Implementation) added.
1.3	New clause referring to Annex 2 (Change History) added.
1.4	Existing clause 1.2 re-numbered as 1.4.
2.1, 2nd bullet	Changed to maximum imported demand.
2.1, 3rd bullet	Maximum exported demand added.
2.1, 5th bullet	Voltage regulation wording clarified.
2.1, 6th bullet	Earth fault loop impedance at cut-out positions added.
2.3, 2nd bullet	Generators and heat pumps added.
2.7	Reference to "BSCP 520" replaced with reference to "Unmetered Supplies Operation Information published by Elexon".
2.8	Reference to ST:SD8B Part 1 added.
3.0	The following clauses (from Issue B) have been removed and replaced by the reference to ST:SD5A: 3.1 Voltage Regulation 3.2 Maximum earth loop impedance 3.5 LV Generation connections 3.6 Services 3.7 Demands 3.8 Voltage unbalance 3.10 HV/LV transformer ratings 3.11 HV/LV substations 3.12 LV protection 3.13 Provision for connecting LV generation to LV fuse boards / cabinets / pillars.
3.1	Clause referring to ST:SD5A added.
3.2	Existing clause 3.3 re-numbered as 3.2.
3.3	Existing losses clause 3.4 amended and re-numbered as 3.3
3.4	Existing clause 3.9 on LV cable ratings is replaced by clause 3.4. The new requirements refer to ST:SD8B Part 1.
Annex 1	New implementation Annex added.
Annex 2	New change history Annex added.