WESTERN POWER DISTRIBUTION

Serving the Midlands, South West and Wales

Company Directive

STANDARD TECHNIQUE: SD7A/9

Relating to the Data Sets Used with WinDebut Software

Summary
This document sets out the text in the background files used in the WinDebut LV network planning tool.

Author: Seth Treasure

Implementation Date: January 2020

Approved by:

Paul Jewell

DSO Development Manager

Date: 2 January 2020

Target Staff Group	**Planners working on the LV network**
Impact of Change	**Amber – Planners now have additional WINDEBUT profiles for LCTs available for their modelling**
Planned Assurance checks	**No specific checks as LV schemes are already checked as part of the sanction approval process**

IMPLEMENTATION PLAN

Introduction

This Standard Technique sets out the text in the background files used in the WinDebut LV network planning tool.

Main Changes

Following the Electric Nation NIA project, data has been used to create Battery Electric Vehicle (BEV) / Range Extender (REX) and Plug-in Hybrid Electric Vehicle (PHEV) load profiles. Appendices B, E and G amended accordingly.

Impact of Changes

This revision sets out the latest background files in use.

Implementation Actions

Team Managers shall advise Planners and other staff who use WinDebut software that this revision has been issued to accompany the roll-out of updated WinDebut background files.

Implementation Timetable

This change will be implemented with immediate effect.

REVISION HISTORY

Document Revision & Review Table		
Date	**Comments**	**Author**
January 2020	• Battery Electric Vehicle (BEV) / Range Extender (REX) and Plug-in Hybrid Electric Vehicle (PHEV) load profiles have been created, using data obtained from the Electric Nation NIA project	Matt Pope
July 2019	• The required impedance at the end of a main conductor has been amended from 190 to 135 m ohms	Seth Treasure
January 2018	• Appendix C and D have been updated (changes to loop resistance limits)	Andy Hood
January 2017	• Data set for Dbdata.txt updated. Appendix B.	Stephen Davies
August 2015	• The latest text for the following files has been updated in line with those provided by A Hood: Appendix B: - Dbdata.txt Appendix D: - Windebut .ini Appendix E: - dbdconsu.ini Appendix G: - Wdgroups.dat Appendix H: - Edgsetup.dat	Geoff Budd

INDEX

APPENDICES

1.0 INTRODUCTION

1.1 This standard technique will enable updating of the data set held within WinDebut.

1.2 The configuration and data files used by WinDebut are held in the default directory on C: drive and consist of the following:

- Dbdata.txt — This file holds all the raw data used by WinDebut on cables, Transformers and consumers.
- Dbdata.dta — A compiled version of dbdata.txt as processed by the debdat.exe file (See below).
- Windebut.ini — Contains global defaults for WinDebut (See 5.0 and appendix D)
- Trfrupd.ini — This files points WinDebut to where the Transformer search database file is held.
- Dbdconsu.ini — This files holds the consumer descriptions as used by WinDebut
- Wdgroups.dat — This is a data file holding information on consumer, transformer and cable groups.
- Debut_tf.mdb — This is a Microsoft Access version 2 database containing details of the distribution substations available for the transformer search function in WinDebut.

2.0 USING "DEBDAT.EXE" TO MODIFY THE DATA USED BY WinDebut

To change any of the data held within WinDebut follow this process:

2.1 Just to be safe copy the contents of DBDATA.TXT to DBDATA.OLD. This will enable disaster recovery should anything go wrong when doing the following.

2.2 Open the "DBDATA.TXT" file in a suitable editor (i.e. AMIPRO, Wordpro, Write, MS-Notepad or MS-Word).

2.3 Make the required changes to "DBDATA.TXT" and save it using the same file name "DBDATA.TXT".

2.4 Run DEBDAT.EXE. This will prompt the user for a file name (i.e. DBDATA.TXT).

2.5 Type in the file name; "DBDATA.TXT"; to be used and follow the instructions to overwrite the existing DBDATA.DTA file.

2.6 Upon successful completion the "DBDATA.TXT" file is converted to a "DBDATA.DTA" file. The user is told when this process has completed successfully.

2.7 Quit the "DEBDAT" program.

2.8 WinDebut can now be run with the new data (i.e. using the new "DBDATA.DTA" file).

3.0 PRIVILEGED USER PASSWORD

3.1 To modify WinDebut defaults used within the package there is a "Privileged User" button. The password for this is "ZWinDebut".

4.0 DEBUT USER GUIDE (from version 3.1)

4.1 This document is a comprehensive "DEBUT User Guide". The document is held by Design Policy, the 11kV Design team and Word Processing, Avonbank.

5.0 WINDEBUT.INI

5.1 This text file sets the global defaults for WinDebut as well as the more specific Urban Rural Defaults.

5.2 Urban and Rural Defaults can also be updated using the privileged user password within the package. This method is described in **ST: SD5K**.

6.0 LOAD ACCEPTANCE TOOL

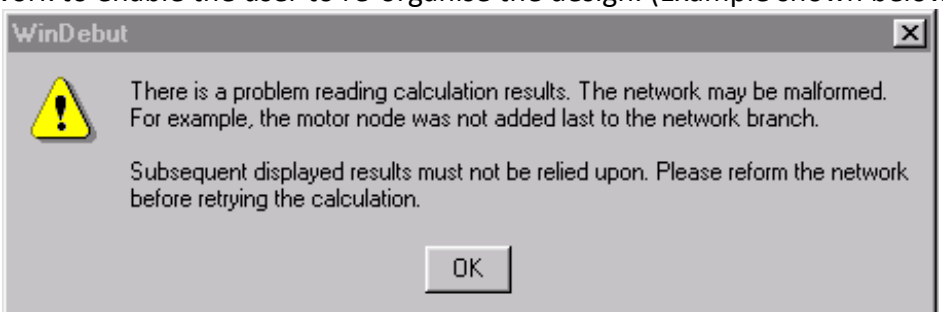
6.1 The load acceptance tool is an enhancement in version 2.4k onwards.

6.2 The load acceptance tool uses transformer impedance data from Engineering Recommendation P28. This data is 'hard-wired' into WinDebut and is slightly different from the impedance data in dbdata.txt because DBDATA takes into account the variation in impedance values of transformers of different ages.

6.3 This difference in data may lead to slight discrepancies in the results when using the load acceptance tool.

6.4 WinDebut Version 2.4.4 release 5 saw additional data added to the P28 data to enable South Wales planners to model three phase GMT transformers used in a split phase configuration. This data is additional to P28 Table D6 and is 'hard-wired' into WinDebut.

6.5 To avoid problems the motor/welder node should be the last item added to the network. WinDebut Version 2.4.4 release 5 saw a feature that brings up an error message if WinDebut is run and the motor/welder node is not the last added to the network to enable the user to re-organise the design. (Example shown below)



APPENDIX A

DBDATA.TXT FILE VARIABLES

Variable	Units	Values	Description
Design parameters			
Maximum volt drop Day	%	4.79	Equivalent to 5% of 230V
Maximum volt drop Night	%	4.79	Equivalent to 5% of 230V
Incremental length to use to taper	metres	50	
Capitalised cost of LV cable losses	£/kW MD	945	Indicative value
Decimal places			
Phase + Neutral voltage drop	none	2	The number of allowable decimal places for this variable.
Phase to Neutral loop resistance	none	2	The number of allowable decimal places for this variable.
Maximum fault current	none	2	The number of allowable decimal places for this variable.
Maximum current demand	none	2	The number of allowable decimal places for this variable.
Joint costs			
SERVJT	£	174.60	Indicative cost of MSB23 - 185 Wavecon main - 2 x 1ph + 1 x 3ph Sp/Conc services
CABLJT	£	183.52	Indicative cost of MS2 - 185 - 185 Wavecon straight joint
SUBSTJ	£	334.26	Indicative cost of MS2 - 185 Wavecon - indoor termination
TAPEJT	£	173.79	Indicative cost of MB2 - 185 Wavecon Main - 95 Wavecon branch
TEEJT	£	272.93	Indicative cost of MB3 - 300 Wavecon main to 185 Wavecon branch
TRANSX			
Name			GMT = 3 Phase Ground Mounted Transformer PMT = 3 Phase Pole Mounted Transformer PMTSIN = Single Phase Pole Mounted Transformer
COST	£		Indicative cost of a transformer
RATING	kVA		The name plate rating of the transformer
TRANSFORMER LV RESISTANCE	Ohms		LV winding resistance

Variable	Units	Values	Description
TRANSFORMER LV REACTANCE	Ohms		LV winding reactance
IRON LOSSES	Watts		The iron losses of the transformer
CU LOSSES	Watts		The copper losses of the transformer
FUSE RATING	Amps		The maximum fuse rating of the transformer
OUTTEM			
Day maximum	^{0}C	8	maximum day value
Night minimum	^{0}C	4	minimum night value
HOTSPO – transformer hotspot values (BS7735)			
Maximum temperature	^{0}C	140	
Normal ageing temperature	^{0}C	98	
Hotspot rise	^{0}C	78	
Hotspot to top oil gradient	^{0}C	23	
OIL – transformer oil temperature (BS7735)			
Maximum Top temperature	^{0}C	105	
Top oil rise	^{0}C	55	
Exponent constant	constant	0.8	
Time	hours	3	
Top of winding oil rise	^{0}C	55	
LOSSRA			
Pole mounted transformer loss ratio	ratio	8	Ratio of copper losses at nameplate rating to iron losses (copper losses divided by iron losses)
Ground mounted transformer loss ratio	ratio	8	
CCIRON			
fixed iron losses cost	£/W	2.97	Indicative Capitalised cost of transformer fixed iron and variable

Variable	Units	Values	Description
variable copper losses cost	£/W	0.596	copper losses
LOADIN			
Maximum cyclic mult	per unit	1.5	
Average enclosure air temperature rise at full load	^{0}C	15	In version 2.0k onwards this is replaced by -3, which has the effect of implementing formula: SQRT(rating/2)
POWERF		0.95	Load power factor
XREGUL		2	Substation excess regulation
CONSUMER DATA			All the consumer types that can be used within the package (see also **ST:SD5J**)
CABLES (Type)			
CU	metres		Copper underground cable
AL	metres		Aluminium underground cable
CS	metres		CONSAC cable
WC TR	Metres Metres		WAVECON cable 'Trydan' Cable
CO	metres		Copper overhead conductor
AO	metres		Aluminium overhead conductor
ABC	metres		Aerial Bundled Conductor
CC	metres		Copper concentric cable
HY	metres		Single phase HYBRID cable
SA	metres		SOLIDAL armoured cable
SU	metres		SOLIDAL unarmoured cable
CI	metres		Single core copper cable
AI	metres		Single aluminium copper cable
HYT	metres		Three phase HYBRID cable
CCT	metres		Three phase copper concentric cable

Variable	Units	Values	Description
SCC	metres		Split copper concentric single phase cable
CABLES			
SIZE	imperial (in^2) or metric (mm^2)		Cross sectional area of cable/conductor
COST	£		Indicative cost per metre
RATING	Amps		Sustained current rating of the cable as per National Eng. Rec. P28 (formally P13/1)&SD8B
OPERATING RESISTANCE PHASE + NEUTRAL	Ohms per 1000 metres		
FAULT RESISTANCE PHASE + NEUTRAL	Ohms per 1000 metres		
FAULT REACTANCE PHASE + NEUTRAL	Ohms per 1000 metres		
DEFAULTS			
GROUP 1 WC 95 WC 185 WC 300	metres		Selection GROUP 1. LV underground cable default values. All three phase mains cables.
GROUP 2 ABC 50 ABC 95	metres		Selection GROUP 2. LV overhead line default values. 4 core, Three phase plus Neutral
FUSE RATINGS			
100, 160, 200, 250, 315, 400, 500 and 630.	Amps		All fuse ratings are to BS88: Part 5
FAULT LEVELS			
MINIMUM FAULT LEVEL	Amps	Variable	Minimum acceptable fault level based on non-adiabatic cable ratings and adiabatic overhead conductor ratings
CONSUMER DATA			

Variable	Units	Values	Description
OFFER/OFGEM profiles created from the ELECTRICITY ASSOCIATION LOAD RESEARCH UNIT data 1998. q values modified to embrace previous SWEB/WPD profiles.			All the consumer load profiles for the differing consumer types that can be used within WinDebut. With the respective "P" followed by "Q" values. i.e. P,Q,P,Q,P,Q,P,Q.....etc.

DBDATA.TXT FILE:

```
! DBDATA.TXT,  Version 3.1.19  12/08/15
! Windebut version 3.1.19 data file

DESIGN PARAMETERS

!MAX V DROP     MAX LGTH        CAPITALIZED COST
!DAY    NIGHT   TAPERING
!(%)    (%)     (m)             (POUNDS/KW)

4.79    4.79    100     945.0

DECIMAL PLACES

!PH+N   PH+N    MAX     MAX     MAX
!Vd     RES     PH-N F. FAULT   DEMAND
!               CURRENT CURRENT CURRENT

2       2       2       2       2

JOINT COSTS

! MSB23 - Service joint 185 wavecon main 2 by 1 ph. & 1 by 3 ph.serv.
SERVJT          174.60
! MS2 - Straight Joint 185 to 185 3 core wavecon
CABLJT          183.52
!7.402 - Indoor termination 3 core 185 wavecon
SUBSJT          334.26
! MB2 - Branch Joint 3 core 185 uncut main 95 branch
TAPEJT          173.79
! MB3 - Branch Joint 3 core 300 uncut main 185 branch
TEEJT           272.93

TRANSX

! SOURCE OF THE DATA BELOW
! SouthWales TF TEST CERTIFICATES FOR LV RESISTANCE AND REACT. 23/04/02
! PROTECTION POLICY ST: TP4B FOR MAXIMUM FUSE RATING,
! EE SPEC 5: APPENDIX D FOR IRON AND CU LOSS
! WPD VALUES FOR GROUND MOUNTED TRANSFORMERS ARE BELOW
!                       TRANSFORMER     TRANSFORMER
!                                           PHASE GMT=1  GUARANTEED  MAXIMUM
!       T/F Phases              T/F Type
!       120 = Three Phase       GMT = 1
!       0     = Single Phase    PMT = 2
!       180 = Split Phase
```

```
!NAME    COST     RATING   LV RES    LV REA    PHASE    TYPE     Fe       CU       MAX
!                                                                Losses   Losses   Fuse
!        (£)      (A)      (OHMS)    (OHMS)                    (W)      (W)      (A)

GMT      7193.00  1000     0.00219   0.00863   120      1        650      8400     500
GMT      5578.00  800      0.00291   0.0107    120      1        510      5500     500
GMT      0.00     750      0.00313   0.0115    120      1        1000     6300     500
GMT      5182.00  500      0.00509   0.0171    120      1        360      3900     400
GMT      0.00     315      0.00901   0.0268    120      1        600      4146     315
GMT      0.00     300      0.00948   0.0281    120      1        520      3000     315
GMT      0.00     200      0.0158    0.0406    120      1        417      3091     250
PMTTRP   3696.00  315      0.0090    0.0268    120      2        520      3900     315
PMTTRP   3305.00  200      0.0158    0.0406    120      2        356      2750     315
PMTTRP   2868.00  100      0.0371    0.0810    120      2        145      1750     200
PMTTRP   2783.00  50       0.0876    0.144     120      2        90       1100     160
PMTTRP   0.00     25       0.208     0.266     120      2        70       636      100
PMTSIN   2346.00  100      0.01113   0.0255    0        2        174      1636     315
PMTSIN   1763.00  50       0.0266    0.0496    0        2        113      973      315
PMTSIN   1649.00  25       0.0612    0.0944    0        2        65       559      160
PMTSIN   0.00     16       0.108     0.139     0        2        48       405      100
PMTSIN   0.00     15       0.118     0.146     0        2        73       430      100
PMTSIN   0.00     10       0.191     0.206     0        2        57       310      100
PMTSIN   0.00     5        0.430     0.362     0        2        39       175      100
SPLT     0.00     1000     0.00220   0.0086    180      1        1283     7139     630
SPLT     0.00     800      0.00291   0.0107    180      1        1120     5913     500
SPLT     0.00     750      0.00313   0.0115    180      1        1000     4200     500
SPLT     0.00     500      0.00509   0.0171    180      1        755      4141     400
SPLT     0.00     315      0.00901   0.0268    180      1        600      2764     315
SPLT     0.00     300      0.00948   0.0281    180      1        520      2000     315
SPLT     0.00     200      0.0158    0.0406    180      1        417      2061     250
SPLT     1676.00  100      0.02225   0.051     180      2        243      1636     315
SPLT     1301.00  50       0.0532    0.0992    180      2        113      973      160
SPLT     0.00     25       0.1124    0.1888    180      2        65       559      100

!Outside temperature (deg C)
!        Day Max  Night Max
OUTTEM   8        4

!Hot spot values:

!        Max      Normal   Rise     Top Oil
!                                   Gradient
HOTSPO   140      98        78      23

!Oil values:
!        Max      Top      Exp      T.CONST  Top Winding
!        Top      Rise                       Rise
OIL      105      55       0.8      3        55

!Loss ratios:
!        PMT      GMT
LOSSRA   10       10

!Capitalised cost of transformer fixed iron & variable copper losses:
!        Fe(£)    CU(£)
CCIRON   2.97     0.596

!Loading parameters: Maximum Cyclic Average Enclosure
!        MAX      ENCLOSURE
!        CYCLIC   AIR TEMP RISE
!        MULT     FULL LOAD
!                 Negative means use sqrt(rating/2)
LOADIN   1.5      -3
```

```
!Load power factor
POWERF  0.95

!Winding exponent
WINDIN  1.6

!Substation excess regulation
XREGUL  2.0


CABLES
!       DEBUT CABLE TYPES
!       DEBUT
!       ABBREVIATION:   DESCRIPTION:
!       CU      COPPER UNDERGROUND CONDUCTOR
!       AL      ALUMINIUM UNDERGROUND CONDUCTOR
!       CS      CONSAC CONDUCTOR
!       WC      WAVECON CONDUCTOR
!       CO      COPPER OVERHEAD CONDUCTOR
!       AO      ALUMINIUM OVERHEAD CONDUCTOR
!       ABC     AERIAL BUNBLED CONDUCTOR
!       CC      COPPER CONCENTRIC CONDUCTOR
!       HY      HYBRID CONDUCTOR SINGLE PHASE
!       SA      SOLIDAL ARMOURED CONDUCTOR
!       SU      SOLIDAL UNARMOURED CONDUCTOR
!       CI      SINGLE CORE COPPER
!       AI      SINGLE CORE ALUMINIUM
!       HYT     HYBRID CONDUCTOR, THREE PHASE
!       CCT     COPPER CONCENTRIC CONDUCTOR, THREE PHASE
!       SCC     SPLIT CONCENTRIC COPPER CONCENTRIC SINGLE PHASE
!       TR      'TRYDAN' OR "ALPEX" CABLE
```

! TYPE	SIZE	COST	RATING (A)	OPERATING RESISTANCE OPERATING RES PHASE (OHMS / 1000M)	NEUTRAL	FAULT RESISTANCE FAULT RES PHASE (OHMS / 1000M)	NEUTRAL	FAULT REACTANCE FAULT REACT PHASE (OHMS / 1000M)	NEUTRAL
ABC	50	1.94	157	0.6410	0.6410	0.6410	0.6410	0.0840	0.0840
ABC	95	3.26	250	0.3200	0.3200	0.3200	0.3200	0.0770	0.0770
ABC	120	4.15	328	0.2530	0.2530	0.2530	0.2530	0.0680	0.0680
AL	0.007	0.00	52	6.5703	6.5703	6.5703	6.5703	0.1006	0.1006
AL	0.0145	0.00	76	3.1441	3.1441	3.1441	3.1441	0.0896	0.0896
AL	0.0225	0.00	84	2.0800	2.0800	2.0800	2.0800	0.0864	0.0864
AL	0.04	0.00	112	1.1600	1.1600	1.1600	1.1600	0.0787	0.0787
AL	0.06	0.00	162	0.7670	0.7670	0.7670	0.7670	0.0755	0.0755
AL	0.1	0.00	216	0.4560	0.4560	0.4560	0.4560	0.0733	0.0733
AL	0.15	0.00	246	0.3120	0.3120	0.3120	0.3120	0.0700	0.0700
AL	0.2	0.00	302	0.2340	0.2340	0.2340	0.2340	0.0689	0.0689
AL	0.25	0.00	319	0.1870	0.1870	0.1870	0.1870	0.0689	0.0689
AL	0.3	0.00	391	0.1520	0.1520	0.1520	0.1520	0.0678	0.0678
AL	0.4	0.00	428	0.1130	0.1130	0.1130	0.1130	0.0678	0.0678
AL	0.5	0.00	488	0.0923	0.0923	0.0923	0.0923	0.0667	0.0667
AL	25	0.00	112	1.2000	1.2000	1.2000	1.2000	0.0790	0.0790
AL	35	0.00	135	0.8680	0.8680	0.8680	0.8680	0.0745	0.0745
AL	50	0.34	162	0.8500	0.8500	0.8500	0.8500	0.0745	0.0745
AL	70	0.00	202	0.4430	0.4430	0.4430	0.4430	0.0710	0.0710
AL	95	3.73	262	0.3200	0.3200	0.3200	0.3200	0.0700	0.0700
AL	120	0.00	283	0.2530	0.2530	0.2530	0.2530	0.0680	0.0680
AL	185	6.95	391	0.1640	0.1640	0.1640	0.1640	0.0680	0.0680
AL	300	9.03	520	0.1000	0.1000	0.1000	0.1000	0.0670	0.0670
AO	0.025	0.00	152	1.0880	1.0880	1.0880	1.0880	0.3051	0.3105
AO	0.05	0.00	230	0.5420	0.5420	0.5420	0.5420	0.2970	0.2970
AO	0.06	0.00	165	0.4520	0.4520	0.4520	0.4520	0.2970	0.2970
AO	0.075	0.00	250	0.3600	0.3600	0.3600	0.3600	0.2970	0.2970
AO	0.1	0.00	351	0.2700	0.2700	0.2700	0.2700	0.2760	0.2760
AO	0.15	0.00	453	0.1826	0.1826	0.1826	0.1826	0.2600	0.2600
AO	25	0.27	152	1.0640	1.0640	1.0640	1.0640	0.3010	0.3010
AO	50	0.42	230	0.5420	0.5420	0.5420	0.5420	0.2970	0.2970
AO	100	0.66	349	0.2700	0.2700	0.2700	0.2700	0.2760	0.2760
AO	150	2.00	450	0.1830	0.1830	0.1830	0.1830	0.2600	0.2600

CC	16	1.85	134	1.1500	1.2000	1.1500	1.2000	0.0790	0.0790
CC	25	2.42	173	0.7270	0.7600	0.7270	0.7600	0.0780	0.0780
CC	35	3.21	212	0.4980	0.4650	0.4980	0.4650	0.0760	0.0780
CCT	16	4.31	118	1.1500	1.2000	1.1500	1.2000	0.0880	0.0880
CCT	25	5.45	154	0.7270	0.7600	0.7270	0.7600	0.0870	0.0870
CCT	35	8.00	205	0.5150	0.4890	0.5150	0.4890	0.0760	0.0780
CO	0.007	0.00	58	3.9700	3.9700	3.9700	3.9700	0.0996	0.0996
CO	0.0225	0.00	135	1.2309	1.2309	1.2309	1.2309	0.3287	0.3287
CO	0.025	0.00	147	1.0800	1.0800	1.0800	1.0800	0.3470	0.3470
CO	0.05	0.00	221	0.5410	0.5410	0.5410	0.5410	0.3250	0.3250
CO	0.058	0.00	217	0.4627	0.4627	0.4627	0.4627	0.2899	0.2899
CO	0.06	0.00	226	0.4627	0.4627	0.4627	0.4627	0.2899	0.2899
CO	0.1	0.00	330	0.2590	0.2590	0.2590	0.2590	0.2890	0.2890
CO	0.15	0.00	419	0.1760	0.1760	0.1760	0.1760	0.2780	0.2780
CO	16	0.85	145	1.0800	1.0800	1.0800	1.0800	0.3470	0.3470
CO	25	1.21	188	0.6836	0.6836	0.6836	0.6836	0.3105	0.3105
CO	32	1.54	199	0.5410	0.5410	0.5410	0.5410	0.3250	0.3250
CO	70	3.24	338	0.2588	0.2588	0.2588	0.2588	0.2890	0.2890
CO	100	5.10	434	0.1763	0.1763	0.1763	0.1763	0.2780	0.2780
CS	70	0.00	209	0.4430	0.3860	0.4430	0.3860	0.0705	0.0705
CS	95	0.00	259	0.3200	0.3100	0.3200	0.3100	0.0690	0.0690
CS	120	0.00	332	0.2530	0.2420	0.2530	0.2420	0.0685	0.0685
CS	150	0.00	344	0.2060	0.2060	0.2060	0.2060	0.0685	0.0685
CS	185	0.00	379	0.1640	0.1640	0.1640	0.1640	0.0685	0.0685
CS	240	0.00	491	0.1250	0.1250	0.1250	0.1250	0.0680	0.0680
CS	300	0.00	538	0.1000	0.1000	0.1000	0.1000	0.0675	0.0675
CU	0.007	0.00	58	3.9700	3.9700	3.9700	3.9700	0.0996	0.0996
CU	0.0145	0.00	87	1.9020	1.9020	1.9020	1.9020	0.0907	0.0907
CU	0.0225	0.00	111	1.2600	1.2600	1.2600	1.2600	0.0864	0.0864
CU	0.025	0.00	118	1.2600	1.2570	1.2600	1.2570	0.0860	0.0860
CU	0.04	0.00	156	0.7020	0.7020	0.7020	0.7020	0.0787	0.0787
CU	0.05	0.00	178	0.5830	0.5440	0.5830	0.5440	0.0760	0.0780
CU	0.06	0.00	228	0.4640	0.4640	0.4640	0.4640	0.0755	0.0755
CU	0.1	0.00	283	0.2760	0.2760	0.2760	0.2760	0.0733	0.0733
CU	0.15	0.00	344	0.1880	0.1880	0.1880	0.1880	0.0700	0.0700
CU	0.2	0.00	396	0.1420	0.1420	0.1420	0.1420	0.0689	0.0689
CU	0.25	0.00	447	0.1130	0.1130	0.1130	0.1130	0.0689	0.0689
CU	0.3	0.00	510	0.0920	0.0920	0.0920	0.0920	0.0678	0.0678
CU	0.4	0.00	593	0.0684	0.0684	0.0684	0.0684	0.0678	0.0678
CU	0.5	0.00	671	0.0558	0.0558	0.0558	0.0558	0.0667	0.0667
CU	0.6	0.00	712	0.0473	0.0473	0.0473	0.0473	0.0661	0.0661
CU	0.75	0.00	938	0.0397	0.0397	0.0397	0.0397	0.0656	0.0656
CU	16	0.71	111	1.1500	1.1500	1.1500	1.1500	0.0805	0.0805
CU	25	0.98	147	0.6730	0.6730	0.6730	0.6730	0.0790	0.0790
CU	35	1.29	178	0.5240	0.5240	0.5240	0.5240	0.0745	0.0745
CU	70	0.00	266	0.2680	0.2680	0.2680	0.2680	0.0710	0.0710
CU	95	0.00	344	0.1990	0.1990	0.1990	0.1990	0.0700	0.0700
CU	120	0.00	371	0.1530	0.1530	0.1530	0.1530	0.0680	0.0680
CU	185	0.00	510	0.0991	0.0991	0.0991	0.0991	0.0680	0.0680
CU	300	0.00	671	0.0601	0.0601	0.0601	0.0601	0.0670	0.0670
CU	400	0.00	712	0.0488	0.0488	0.0488	0.0488	0.0670	0.0670
HY	25	1.05	131	1.2000	1.2000	1.2000	1.2000	0.0790	0.0400
HY	35	1.55	158	0.8680	0.7600	0.8680	0.7600	0.0750	0.0330
HYT	25	2.11	117	1.2000	1.2000	1.2000	1.2000	0.0790	0.0860
HYT	35	2.59	141	0.8680	0.7600	0.8680	0.7600	0.0750	0.0750
SA	480	0.00	661	0.0633	0.0633	0.0633	0.0633	0.0835	0.0835
SA	600	8.35	672	0.0560	0.0560	0.0560	0.0560	0.0900	0.0900
SA	740	11.08	783	0.0460	0.0460	0.0460	0.0460	0.0900	0.0900
SA	960	0.00	969	0.0343	0.0343	0.0343	0.0343	0.0812	0.0812
SA	1200	0.00	1160	0.0280	0.0560	0.0280	0.0560	0.0450	0.0450
SA	1480	0.00	1260	0.0230	0.0460	0.0230	0.0460	0.0450	0.0900
SA	1800	0.00	1560	0.0187	0.0280	0.0187	0.0280	0.0300	0.0450
SA	2220	0.00	1680	0.0153	0.0230	0.0153	0.0230	0.0300	0.0450
SCC	16	3.07	138	1.1500	1.2000	1.1500	1.2000	0.0780	0.0780
SCC	25	3.50	178	0.7270	0.7600	0.7270	0.7600	0.0780	0.0780
SCC	35	2.39	212	0.5150	0.4890	0.5150	0.4890	0.0760	0.0780
SCCT	25	6.58	181	0.7270	0.7600	0.7270	0.7600	0.0780	0.0780
SCCT	35	2.39	205	0.5150	0.4890	0.5150	0.4890	0.0760	0.0780

TR	70	3.75	212	0.4430	0.4430	0.4430	0.4430	0.0755	0.0152
TR	95	0.00	254	0.3200	0.3200	0.3200	0.3200	0.0735	0.0155
TR	120	0.00	290	0.2530	0.2530	0.2530	0.2530	0.0730	0.0153
TR	150	0.00	344	0.2060	0.2060	0.2060	0.2060	0.0740	0.0150
TR	185	0.00	373	0.1640	0.1640	0.1640	0.1640	0.0740	0.0140
TR	240	0.00	460	0.1250	0.1640	0.1250	0.1640	0.0730	0.0123
TR	300	0.00	500	0.1000	0.1640	0.1000	0.1640	0.0725	0.0108
WC	35	0.00	141	0.9390	0.9390	0.9390	0.9390	0.0820	0.0820
WC	95	6.13	279	0.3200	0.3200	0.3200	0.3200	0.0735	0.0155
WC	185	11.38	407	0.1640	0.1640	0.1640	0.1640	0.0740	0.0140
WC	300	14.25	538	0.1000	0.1640	0.1000	0.1640	0.0725	0.0108

DEFAULTS
!LV UNDERGROUND CABLE

WC 185
WC 300

!LV OVERHEAD LINE

ABC 50
ABC 95
ABC 120
AO 50
AO 100

FUSE RATINGS 100 160 200 250 315 355 400 500 630

FAULT LEVELS

!BASED NON-ADIABTIC RATING OF CABLES AND ADIABATIC RATING OF OVERHEAD LINES:

!FUSE RATINGS:			100	160	200	250	315	355	400	500	630
!COND.	COND.	MAX	MINIMUM FAULT LEVEL:								
!TYPE	SIZE	FUSE	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)	(A)
ABC	50	500	298	517	719	1099	1710	2270	3164	6939	30000
ABC	95	630	298	517	661	848	1032	1437	1877	3132	5510
ABC	120	630	298	517	661	848	1032	1255	1577	2622	3416
AL	0.007	630	186	290	369	470	575	667	776	981	1244
AL	0.0145	630	186	290	369	470	575	667	776	981	1244
AL	0.0225	630	186	290	369	470	575	667	776	981	1244
AL	0.04	630	186	290	369	470	575	667	776	981	1244
AL	0.06	630	186	290	369	470	575	667	776	981	1244
AL	0.1	630	298	517	661	954	1416	1907	2539	4658	7870
AL	0.15	630	298	517	661	848	1032	1431	1871	3151	5570
AL	0.2	630	298	517	661	848	1032	1255	1526	2501	3461
AL	0.25	630	298	517	661	848	1032	1255	1454	2087	3358
AL	0.3	630	298	517	661	848	1032	1255	1454	1903	2901
AL	0.4	630	298	517	661	848	1032	1255	1454	1903	2446
AL	0.5	630	298	517	661	848	1032	1255	1454	1903	2446
AL	25	630	186	290	369	470	575	667	776	981	1244
AL	35	630	186	290	369	470	575	667	776	981	1244
AL	50	500	298	517	745	1117	1765	2354	3284	7214	30000
AL	70	630	298	517	661	909	1322	1806	2442	4330	7626
AL	95	630	298	517	661	848	1032	1454	1924	3229	5659
AL	120	630	298	517	661	848	1032	1255	1637	2683	3436
AL	185	630	298	517	661	848	1032	1255	1454	1903	3149
AL	300	630	298	517	661	848	1032	1255	1454	1903	2446
AO	0.025	400	298	638	944	1470	2342	3238	4450	30000	30000
AO	0.05	630	298	517	661	944	1357	1800	2388	4158	7406
AO	0.06	630	298	517	661	872	1180	1628	2090	3476	5976
AO	0.075	630	298	517	661	848	1032	1416	1814	2945	4625
AO	0.1	630	298	517	661	848	1032	1255	1511	2388	3484
AO	0.15	630	298	517	661	848	1032	1255	1454	1903	2748
AO	25	400	298	638	944	1470	2342	3238	4450	30000	30000
AO	50	630	298	517	661	944	1357	1800	2388	4158	7406
AO	100	630	298	517	661	848	1032	1255	1511	2388	3484
AO	150	630	298	517	661	848	1032	1255	1454	1903	2748
CC	16	630	186	290	369	470	575	667	776	981	1244
CC	25	630	186	290	369	470	575	667	776	981	1244
CC	35	630	186	290	369	470	575	667	776	981	1244
CCT	16	630	186	290	369	470	575	667	776	981	1244
CCT	25	630	186	290	369	470	575	667	776	981	1244
CCT	35	630	186	290	369	470	575	667	776	981	1244

CO	0.007	100	298	30000	30000	30000	30000	30000	30000	30000	30000
CO	0.0225	400	298	687	1014	1604	2596	3671	5016	30000	30000
CO	0.025	400	298	641	959	1478	2364	3254	4533	30000	30000
CO	0.05	630	298	517	661	965	1365	1824	2413	4180	7477
CO	0.058	630	298	517	661	863	1188	1638	2115	3492	5916
CO	0.06	630	298	517	661	863	1188	1638	2115	3492	5916
CO	0.1	630	298	517	661	848	1032	1255	1526	2394	3486
CO	0.15	630	298	517	661	848	1032	1255	1454	1903	2804
CO	16	400	298	647	964	1439	2405	3339	4572	30000	30000
CO	25	500	298	517	750	1100	1678	2224	3012	6092	30000
CO	32	630	298	517	661	960	1408	1852	2438	4295	7626
CO	70	630	298	517	661	848	1032	1255	1454	2286	3492
CO	100	630	298	517	661	848	1032	1255	1454	1903	2772
CS	70	630	298	517	661	906	1322	1806	2422	4330	7626
CS	95	630	298	517	661	848	1032	1454	1924	3229	5659
CS	120	630	298	517	661	848	1032	1255	1637	2683	3436
CS	150	630	298	517	661	848	1032	1255	1454	2188	3401
CS	185	630	298	517	661	848	1032	1255	1454	1903	3149
CS	240	630	298	517	661	848	1032	1255	1454	1903	2446
CS	300	630	298	517	661	848	1032	1255	1454	1903	2446
CU	0.007	630	186	290	369	470	575	667	776	981	1244
CU	0.0145	630	186	290	369	470	575	667	776	981	1244
CU	0.0225	630	186	290	369	470	575	667	776	981	1244
CU	0.025	630	186	290	369	470	575	667	776	981	1244
CU	0.04	630	186	290	369	470	575	667	776	981	1244
CU	0.05	630	186	290	369	470	575	667	776	981	1244
CU	0.06	630	298	517	661	1005	1532	2054	2774	5464	9426
CU	0.1	630	298	517	661	848	1032	1431	1874	3136	5529
CU	0.15	630	298	517	661	848	1032	1255	1454	2264	3505
CU	0.2	630	298	517	661	848	1032	1255	1454	1903	2882
CU	0.25	630	298	517	661	848	1032	1255	1454	1903	2446
CU	0.3	630	298	517	661	848	1032	1255	1454	1903	2446
CU	0.4	630	298	517	661	848	1032	1255	1454	1903	2446
CU	0.5	630	298	517	661	848	1032	1255	1454	1903	2446
CU	0.6	630	298	517	661	848	1032	1255	1454	1903	2446
CU	0.75	630	298	517	661	848	1032	1255	1454	1903	2446
CU	16	630	186	290	369	470	575	667	776	981	1244
CU	25	630	186	290	369	470	575	667	776	981	1244
CU	35	630	186	290	369	470	575	667	776	981	1244
CU	70	630	298	517	661	848	1032	1375	1772	2987	5049
CU	95	630	298	517	661	848	1032	1255	1454	2325	3497
CU	120	630	298	517	661	848	1032	1255	1454	1955	2446
CU	185	630	298	517	661	848	1032	1255	1454	1903	2446
CU	300	630	298	517	661	848	1032	1255	1454	1903	2446
CU	400	630	298	517	661	848	1032	1255	1454	1903	2446
HY	25	630	186	290	369	470	575	667	776	981	1244
HY	35	630	186	290	369	470	575	667	776	981	1244
HYT	25	630	186	290	369	470	575	667	776	981	1244
HYT	35	630	186	290	369	470	575	667	776	981	1244
SA	480	630	298	517	661	848	1032	1255	1454	1903	2446
SA	600	630	298	517	661	848	1032	1255	1454	1903	2446
SA	740	630	298	517	661	848	1032	1255	1454	1903	2446
SA	960	630	298	517	661	848	1032	1255	1454	1903	2446
SA	1200	630	298	517	661	848	1032	1255	1454	1903	2446
SA	1480	630	298	517	661	848	1032	1255	1454	1903	2446
SA	1800	630	298	517	661	848	1032	1255	1454	1903	2446
SA	2220	630	298	517	661	848	1032	1255	1454	1903	2446
SCC	16	630	186	290	369	470	575	667	776	981	1244
SCC	25	630	186	290	369	470	575	667	776	981	1244
SCC	35	630	186	290	369	470	575	667	776	981	1244
SCCT	25	630	186	290	369	470	575	667	776	981	1244
SCCT	35	630	186	290	369	470	575	667	776	981	1244
TR	70	630	298	517	661	848	1032	1405	1863	3203	5729
TR	95	630	298	517	661	848	1032	1255	1454	2474	3461
TR	120	630	298	517	661	848	1032	1255	1454	2921	3358
TR	150	630	298	517	661	848	1032	1255	1454	1903	2446
TR	185	630	298	517	661	848	1032	1255	1454	1903	2446
TR	240	630	298	517	661	848	1032	1255	1454	1903	2446
TR	300	630	298	517	661	848	1032	1255	1454	1903	2446
WC	35	630	186	290	369	470	575	667	776	981	1244
WC	95	630	298	517	661	848	1032	1255	1510	2587	3413
WC	185	630	298	517	661	848	1032	1255	1454	1903	2446
WC	300	630	298	517	661	848	1032	1255	1454	1903	2446

```
CONSUMERS

ONE
!Based on EATL Profile URMC

0.08    0.122   0.06    0.099   0.049   0.089   0.042   0.079   0.041   0.079
0.04    0.074   0.04    0.077   0.037   0.072   0.039   0.073   0.042   0.074
0.046   0.096   0.052   0.097   0.073   0.14    0.121   0.205   0.173   0.264
0.247   0.276   0.27    0.272   0.22    0.249   0.203   0.249   0.213   0.258
0.200   0.258   0.192   0.245   0.181   0.243   0.188   0.248   0.203   0.239
0.176   0.222   0.162   0.200   0.156   0.195   0.142   0.191   0.152   0.197
0.166   0.202   0.179   0.199   0.229   0.235   0.296   0.268   0.328   0.270
0.336   0.249   0.334   0.241   0.305   0.218   0.296   0.219   0.283   0.215
0.275   0.203   0.278   0.205   0.277   0.206   0.269   0.198   0.257   0.192
0.213   0.187   0.168   0.185   0.118   0.162   0.371   0.299   0.387   0.268
0.369   0.309   0.351   0.302   0.000   0.000   0.000   0.000   0.000   0.000
0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000

TWO
!Based on EATL Profile ELECAR

1.014   0.300   1.146   0.339   1.078   0.311   1.093   0.336   1.068   0.321
1.046   0.332   1.085   0.261   1.063   0.248   1.074   0.178   0.903   0.196
0.659   0.230   0.541   0.302   0.423   0.338   0.378   0.384   0.488   0.250
0.428   0.272   0.320   0.227   0.323   0.221   0.286   0.172   0.267   0.229
0.296   0.309   0.348   0.302   0.285   0.230   0.256   0.216   0.247   0.300
0.194   0.217   0.194   0.274   0.214   0.259   0.23    0.253   0.302   0.283
0.292   0.289   0.317   0.339   0.402   0.338   0.451   0.319   0.512   0.382
0.568   0.229   0.552   0.258   0.571   0.241   0.559   0.308   0.543   0.306
0.516   0.222   0.531   0.194   0.494   0.231   0.46    0.229   0.400   0.364
0.350   0.364   0.300   0.364   0.45    0.500   0.377   0.399   0.351   0.292
0.355   0.274   0.342   0.145   0.000   0.000   0.000   0.000   0.000   0.000
0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000

THREE
!Based on EATL Profile SSHOP

0.064   0.064   0.062   0.062   0.06    0.06    0.06    0.06    0.057   0.057
0.055   0.055   0.056   0.056   0.056   0.056   0.055   0.055   0.057   0.057
0.056   0.056   0.057   0.057   0.071   0.071   0.112   0.112   0.151   0.151
0.175   0.175   0.221   0.221   0.308   0.308   0.393   0.393   0.432   0.432
0.452   0.452   0.458   0.458   0.459   0.459   0.455   0.455   0.451   0.451
0.447   0.447   0.412   0.412   0.401   0.401   0.409   0.409   0.410   0.410
0.402   0.402   0.395   0.395   0.391   0.391   0.375   0.375   0.318   0.318
0.225   0.225   0.157   0.157   0.124   0.124   0.108   0.108   0.100   0.100
0.096   0.096   0.091   0.091   0.087   0.087   0.083   0.083   0.082   0.082
0.080   0.080   0.075   0.075   0.073   0.073   0.455   0.455   0.451   0.451
0.447   0.447   0.412   0.412   0.000   0.000   0.000   0.000   0.000   0.000
0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000


FOUR
!Based on EATL Profile NSHOP

0.922   0.536   1.080   0.567   1.112   0.526   1.121   0.501   1.113   0.481
1.072   0.452   1.012   0.451   0.944   0.454   0.873   0.453   0.795   0.421
0.727   0.410   0.666   0.498   0.609   0.467   0.493   0.846   0.178   0.178
0.206   0.206   0.260   0.260   0.363   0.363   0.463   0.463   0.509   0.509
0.533   0.533   0.539   0.539   0.541   0.541   0.535   0.535   0.531   0.531
0.526   0.526   0.485   0.485   0.472   0.472   0.481   0.481   0.483   0.483
0.473   0.473   0.465   0.465   0.460   0.460   0.442   0.442   0.374   0.374
0.265   0.265   0.185   0.185   0.146   0.146   0.127   0.127   0.117   0.117
0.113   0.114   0.107   0.107   0.103   0.103   0.098   0.098   0.096   0.096
0.094   0.094   0.088   0.088   0.086   0.086   0.535   0.535   0.531   0.531
0.526   0.526   0.485   0.485   0.000   0.000   0.000   0.000   0.000   0.000
0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000   0.000
```

FIVE
!ELEXON PROFILE 5 <20% Load Factor

0.072	0.174	0.069	0.181	0.069	0.317	0.067	0.320	0.069	0.318
0.071	0.251	0.076	0.121	0.073	0.127	0.071	0.110	0.072	0.130
0.072	0.174	0.082	0.197	0.110	0.179	0.125	0.387	0.169	0.429
0.242	0.472	0.348	0.151	0.437	0.151	0.490	0.550	0.505	0.653
0.492	0.651	0.504	0.586	0.513	0.467	0.513	0.351	0.487	0.306
0.468	0.199	0.449	0.134	0.433	0.134	0.442	0.219	0.437	0.253
0.417	0.248	0.395	0.241	0.369	0.255	0.318	0.329	0.250	0.271
0.174	0.273	0.112	0.233	0.093	0.195	0.085	0.302	0.074	0.326
0.068	0.333	0.069	0.315	0.059	0.271	0.058	0.206	0.059	0.203
0.063	0.217	0.062	0.152	0.066	0.188	0.072	0.559	0.068	0.519
0.066	0.425	0.064	0.411	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

SIX
!ELEXON PROFILE 6 20% to 30% Load Factor

0.073	0.061	0.071	0.057	0.073	0.060	0.072	0.059	0.074	0.061
0.076	0.063	0.078	0.064	0.078	0.067	0.080	0.066	0.080	0.060
0.081	0.062	0.085	0.058	0.105	0.087	0.125	0.221	0.159	0.230
0.192	0.241	0.242	0.088	0.301	0.081	0.347	0.098	0.357	0.119
0.365	0.103	0.363	0.103	0.364	0.087	0.361	0.085	0.359	0.089
0.355	0.096	0.351	0.092	0.346	0.096	0.344	0.105	0.343	0.103
0.337	0.114	0.327	0.132	0.315	0.141	0.296	0.132	0.269	0.139
0.220	0.141	0.176	0.141	0.145	0.116	0.130	0.143	0.119	0.116
0.108	0.136	0.101	0.143	0.094	0.152	0.089	0.159	0.087	0.134
0.083	0.087	0.075	0.083	0.074	0.074	0.123	0.264	0.124	0.145
0.125	0.112	0.124	0.125	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

SEVEN
!ELEXON PROFILE 7 30% to 40% Load Factor

0.103	0.046	0.102	0.044	0.103	0.041	0.102	0.041	0.100	0.042
0.100	0.043	0.102	0.042	0.101	0.041	0.102	0.043	0.102	0.044
0.105	0.045	0.108	0.044	0.124	0.046	0.138	0.056	0.152	0.075
0.174	0.078	0.203	0.079	0.228	0.057	0.240	0.058	0.251	0.054
0.255	0.053	0.256	0.048	0.256	0.045	0.257	0.047	0.255	0.047
0.255	0.049	0.256	0.049	0.250	0.053	0.247	0.052	0.244	0.054
0.241	0.058	0.240	0.056	0.235	0.057	0.227	0.055	0.213	0.054
0.203	0.088	0.192	0.095	0.178	0.127	0.169	0.093	0.162	0.076
0.152	0.066	0.149	0.066	0.144	0.078	0.131	0.088	0.126	0.089
0.119	0.068	0.114	0.052	0.109	0.047	0.156	0.126	0.148	0.143
0.147	0.092	0.149	0.078	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

EIGHT
!ELEXON PROFILE 8 >40% Load Factor

0.123	0.031	0.121	0.030	0.119	0.031	0.120	0.037	0.119	0.037
0.118	0.037	0.117	0.037	0.117	0.037	0.119	0.038	0.119	0.037
0.120	0.034	0.121	0.030	0.128	0.031	0.132	0.031	0.141	0.031
0.152	0.029	0.159	0.031	0.165	0.037	0.170	0.040	0.172	0.040
0.173	0.041	0.174	0.042	0.176	0.037	0.179	0.034	0.178	0.033
0.178	0.031	0.176	0.030	0.175	0.030	0.173	0.034	0.171	0.040
0.171	0.038	0.171	0.038	0.172	0.040	0.173	0.037	0.172	0.031
0.170	0.028	0.167	0.030	0.165	0.030	0.163	0.031	0.161	0.033
0.157	0.038	0.151	0.041	0.145	0.049	0.141	0.062	0.136	0.066
0.132	0.072	0.130	0.051	0.125	0.031	0.148	0.049	0.149	0.057
0.148	0.065	0.148	0.055	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

BEVREX
!Based on results from Electric Nation NIA project

0.441	5.212	0.363	4.403	0.295	5.362	0.239	4.893	0.186	5.003
0.139	3.438	0.104	2.351	0.079	1.838	0.062	1.489	0.051	1.238
0.043	1.243	0.035	1.093	0.030	1.113	0.028	1.187	0.037	1.085
0.048	0.906	0.060	1.274	0.069	1.916	0.087	1.951	0.099	2.059
0.105	1.498	0.111	1.885	0.114	2.001	0.117	1.797	0.119	2.346
0.119	2.062	0.123	1.807	0.126	1.849	0.133	2.443	0.141	2.610
0.156	2.353	0.184	2.627	0.218	3.043	0.271	3.617	0.359	2.883
0.487	4.083	0.595	4.440	0.672	3.510	0.714	5.507	0.740	6.260
0.741	4.786	0.725	4.085	0.715	4.616	0.701	5.078	0.674	5.167
0.637	5.622	0.585	5.349	0.533	5.179	0.120	3.905	0.103	3.486
0.079	3.165	0.065	3.063	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

PHEV
!Based on results from Electric Nation NIA project

0.096	1.071	0.063	1.475	0.037	1.271	0.020	1.133	0.011	0.902
0.004	0.463	0.003	0.289	0.002	0.155	0.001	0.166	0.002	0.163
0.002	0.163	0.002	0.158	0.003	0.317	0.006	0.390	0.011	0.554
0.014	0.519	0.020	0.657	0.038	0.623	0.056	1.166	0.056	1.010
0.051	0.679	0.052	0.697	0.057	0.869	0.068	1.081	0.078	1.124
0.091	1.317	0.099	1.394	0.105	1.324	0.111	2.104	0.111	1.423
0.114	1.401	0.153	1.260	0.202	2.047	0.251	1.638	0.309	1.739
0.411	2.707	0.463	2.604	0.498	2.526	0.507	2.432	0.494	1.944
0.437	3.163	0.383	2.427	0.323	2.396	0.277	2.010	0.245	2.200
0.215	1.476	0.181	1.499	0.144	1.268	0.016	0.618	0.009	0.452
0.004	0.312	0.002	0.312	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

HOTPUB
!Based on EATL Profiles HOTEL and PUBH

0.111	0.111	0.102	0.102	0.093	0.093	0.088	0.088	0.085	0.085
0.088	0.088	0.090	0.090	0.088	0.088	0.088	0.088	0.088	0.088
0.086	0.086	0.092	0.092	0.088	0.088	0.119	0.119	0.181	0.181
0.204	0.204	0.209	0.209	0.208	0.208	0.200	0.200	0.193	0.193
0.188	0.188	0.199	0.199	0.224	0.224	0.242	0.242	0.263	0.263
0.265	0.265	0.267	0.267	0.243	0.243	0.216	0.216	0.181	0.181
0.160	0.160	0.157	0.157	0.165	0.165	0.180	0.180	0.206	0.206
0.236	0.236	0.251	0.251	0.270	0.270	0.271	0.271	0.267	0.267
0.263	0.263	0.263	0.263	0.262	0.262	0.255	0.255	0.248	0.248
0.228	0.228	0.177	0.177	0.134	0.134	0.242	0.242	0.263	0.263
0.265	0.265	0.267	0.267	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

CHURCH
!Based on EATL Profile Church

0.027	0.027	0.025	0.025	0.025	0.025	0.025	0.025	0.026	0.026
0.026	0.026	0.024	0.024	0.025	0.025	0.024	0.024	0.026	0.026
0.026	0.026	0.025	0.025	0.027	0.027	0.029	0.029	0.05	0.050
0.057	0.057	0.077	0.077	0.086	0.086	0.299	0.299	0.412	0.412
0.416	0.416	0.396	0.396	0.349	0.349	0.318	0.318	0.171	0.171
0.133	0.133	0.144	0.144	0.181	0.181	0.204	0.204	0.209	0.209
0.207	0.207	0.179	0.179	0.115	0.155	0.11	0.11	0.123	0.123
0.134	0.134	0.242	0.242	0.418	0.418	0.633	0.633	0.651	0.651
0.647	0.647	0.562	0.562	0.422	0.422	0.28	0.28	0.162	0.162
0.062	0.062	0.041	0.041	0.038	0.038	2.159	2.159	1.365	1.365
0.692	0.692	0.654	0.654	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

ECOTEN
!Economy 10 profile e.g. electric flow boiler

0.254	0.254	0.203	0.203	0.658	0.658	0.655	0.655	0.654	0.654
0.682	0.682	0.683	0.683	0.697	0.697	0.710	0.710	0.710	0.710
0.154	0.154	0.155	0.155	0.199	0.199	0.271	0.271	0.365	0.365
0.447	0.477	0.410	0.410	0.356	0.356	0.348	0.348	0.344	0.344
0.347	0.347	0.342	0.342	0.348	0.348	0.367	0.367	0.383	0.383
0.801	0.801	0.751	0.751	0.714	0.714	0.706	0.706	0.658	0.658
0.649	0.649	0.450	0.450	0.450	0.450	0.481	0.481	0.532	0.532
0.541	0.541	0.543	0.543	0.550	0.550	0.600	0.600	0.788	0.788
0.750	0.750	0.708	0.708	0.672	0.672	0.429	0.429	0.401	0.401
0.372	0.372	0.336	0.336	0.318	0.318	0.367	0.367	0.383	0.383
0.801	0.801	0.751	0.751	0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

CONST
!Flat Profile Load Factor 100%

1	0	1	0	1	0	1	0	1	0
1	0	1	0	1	0	1	0	1	0
1	0	1	0	1	0	1	0	1	0
1	0	1	0	1	0	1	0	1	0
1	0	1	0	1	0	1	0	1	0
1	0	1	0	1	0	1	0	1	0
1	0	1	0	1	0	1	0	1	0
1	0	1	0	1	0	1	0	1	0
1	0	1	0	1	0	1	0	1	0
1	0	1	0	1	0	1	0	1	0
1	0	1	0	1	0	1	0	1	0
1	0	1	0	1	0	1	0	1	0

WELDER

1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

```
MOTOR

1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000
1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000
1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000
1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000
1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000
1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000
1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000
1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000
1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000
1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000
1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000
1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000

STOP
```

APPENDIX C

WINDEBUT.INI VARIABLES:

Comments -	Comment lines start with a semi-colon. These may be used to supply addition information to anyone likely to be editing the file
Section Heading	Different sections are given headings enclosed in square brackets
Variablename = Setting	Entries have this form.

The following Table describes the Variable Names Entries Used :

Phase_Angle=120	This is the default values used where the phase angle is required, this is linked to the number of phases
No_of_Phases=3	This is the default values used where the number of phases is required
PrintDefault=Yes	Determines if default values are shown in the output file
PrintConsumers=No	This outputs information about the number of consumers of each type present in the study plus the program data from the program data file
PrintColumn132=Yes	This defines the number of characters printed across the page on the printout
IECSIZE=Yes	Enables checking of transformer sizing against BS7735
FULLLOSS=Yes	If yes, this will carry out full loss calculations
XREG=Yes	This instructs WinDebut to calculate voltage regulation on all transformers
DMOT=8	Day Maximum outside temperature °C Used by the BS7735 calculation to calculate the expected oil temperature rise (using cyclic loading data) of the transformer.
NMOT=4	Night Minimum outside temperature °C Used by the BS7735 calculation to calculate the expected oil temperature rise (using cyclic loading data) of the transformer.
[Results]	
Show Cost=No	This enables cost information to be shown in results
[WinDebut]	
OutputDirectory=C:\WIN314	This is the default directory which appears when you request a debut analysis
NetworkDirectory=C:\WIN314\DESIGNS	This is the directory where all WinDebut files reside
PrivilegedUser=Yes	Yes means the user is a privileged user, No indicates a standard user

Maximised=Yes	This defines whether the screen is maximised on start up of WinDebut
ShowNodeEditor=Yes	This gives the user the option to disable the node options of voltage drop selection and fuse override
ShowDisclaimerScreen=Yes	This gives the user the option of seeing the disclaimer screen on WinDebut start up
OptionsEditableByPrivilegedUserOnly =No	If yes, this enables only privileged users to change options within WinDebut
OutputForEGD=No	This enables another output file (Debut.op) to be produced for use with other software not provided.
Can Load Different DBDATA Files?=No	This provides the facility to change the dbdata.dta file from within the application
DBDATA Path=C:\WIN314\dbdata.dta	This details the location of the dbdata.dta file
Alter INI File?=Yes	This enables the user to access and alter the configuration file from within the application

[Menu]	
PrintLarge=Yes	This defines whether the network is enlarged to fit the printed sheet
PrintKey=Yes	This defines whether the key for the network is displayed on the printed sheet
PrintColumn=Yes	This defines whether the results are displayed in a column on the left hand side of the sheet or as seen on the screen
VoltDropByNodes=Yes	This defines whether by default volt drops are shown by the nodes on the results screen
FullNodeDetails=Yes	This defines whether by default full node details are given with the results
VoltDropByNodesPrinter=Yes	This defines whether by default volt drops are shown by the nodes on the printed results sheet
ShowCableDataOnTheDiagram=Yes	This defines whether by default cable data is shown on the results diagram
ShowCableDataOnThePrinter=Yes	This defines whether by default cable data is shown on the printed results diagram
[Urban Defaults]	
Fuse_Flag=Yes	This defines whether the fuse flag is checked as default. If it is, then WinDebut checks whether there is a fusing override at the first node out from the substation
Fuse_val=1.05	This is the safety margin used fro fuse ratings
Volt_drop0=4.79	This is the maximum day volt drop in %
Volt_drop1=4.79	This is the maximum night volt drop in %
SRIGNOR=0	This option allows service cables to be discounted from Debut calculations. In the rural/urban defaults there are three ignore check boxes. If all three are to be taken into consideration, then none will be checked and SRIGNOR=0, If Voltage drop across services is to be ignored only then SRIGNOR=1 If Loop resistance of services is to be ignored only then SRIGNOR=2 If Fault resistance/reactance of services is to be ignored only then SRIGNOR=4 If Voltage drop across services and Loop resistance of services is to be ignored then SRIGNOR=3 If Voltage drop across services and Fault resistance/reactance of services is to be ignored then SRIGNOR=5 If Loop resistance of services and Fault resistance/reactance of services is to be ignored then SRIGNOR=6 If Voltage drop across services, Loop resistance of services and Fault resistance/reactance of services is to be ignored then SRIGNOR=7
Loop_Resistance_Flag=Yes	This defines whether the loop resistance flag is checked by default when ‘no services’ is selected

Loop_Resistance=135	This defines the default value for loop resistance when 'no services' is selected (As per ST:SD5K)
Loads_Only=No	This defines whether load only analysis takes place i.e. only transformer size and loads
DP0=4.79	Maximum day volt drop in %when no services are modelled (As per ST:SD5K)
DP1=4.79	Maximum night volt drop in %when no services are modelled (As per ST:SD5K)
DP2=5	This is the value at which the increments of tapering will be carried out i.e. tapering will be 70m or 75m
DP3=945	Cost of losses £/kW
RUC=10	The minimum economic % of cable used during tapering
RUL=50	This is the minimum length of cable (m) used during tapering
FaultLevelVoltage=250	This is the voltage used to calculate the fault levels
DesignVoltage=240	This is the nominal voltage used in the load flow studies
Loop_Resistance_Flag Service=Yes	This defines whether the loop resistance flag is checked by default when 'services' is selected
Loop_Resistance Service=220	This defines the default value for loop resistance when 'services' is selected (As per ST:SD5K)
DP0 Service=5.75	This is the maximum day volt drop in % when services are modelled (As per ST:SD5K)
DP1 Service=5.75	This is the maximum night volt drop in % when services are modelled (As per ST:SD5K)
[Rural Defaults]	
Fuse_Flag=Yes	This defines whether the fuse flag is checked as default. If it is, then WinDebut checks whether there is a fusing override at the first node out from the substation
Fuse_val=1.05	This is the safety margin used fro fuse ratings
Volt_drop0=4.79	This is the maximum day volt drop in %
Volt_drop1=4.79	This is the maximum night volt drop in %
SRIGNOR=0	This option allows service cables to be discounted from Debut calculations. In the rural/urban defaults there are three ignore check boxes. If all three are to be taken into consideration, then none will be checked and SRIGNOR=0, If Voltage drop across services is to be ignored only then SRIGNOR=1 If Loop resistance of services is to be ignored only then SRIGNOR=2 If Fault resistance/reactance of services is to be ignored only then SRIGNOR=4 If Voltage drop across services and Loop resistance of services is to be ignored then

	SRIGNOR=3 If Voltage drop across services and Fault resistance/reactance of services is to be ignored then SRIGNOR=5 If Loop resistance of services and Fault resistance/reactance of services is to be ignored then SRIGNOR=6 If Voltage drop across services, Loop resistance of services and Fault resistance/reactance of services is to be ignored then SRIGNOR=7
Loop_Resistance_Flag=Yes	This defines whether the loop resistance flag is checked by default when 'no services' is selected
Loop_Resistance=135	This defines the default value for loop resistance when 'no services' is selected (As per ST:SD5K)
Loads_Only=No	This defines whether load only analysis takes place i.e. only transformer size and loads
DP0=4.79	Maximum day volt drop in %when no services are modelled (As per ST:SD5K)
DP1=4.79	Maximum night volt drop in %when no services are modelled (As per ST:SD5K)
DP2=5	This is the value at which the increments of tapering will be carried out i.e. tapering will be 70m or 75m
DP3=945	Cost of losses £/kW
RUC=10	The minimum economic % of cable used during tapering
RUL=50	This is the minimum length of cable (m) used during tapering
FaultLevelVoltage=250	This is the voltage used to calculate the fault levels
DesignVoltage=240	This is the nominal voltage used in the load flow studies
Loop_Resistance_Flag Service=Yes	This defines whether the loop resistance flag is checked by default when 'services' is selected
Loop_Resistance Service=220	This defines the default value for loop resistance when 'services' is selected (As per ST:SD5K)
DP0 Service=5.75	This is the maximum day volt drop in % when services are modelled (As per ST:SD5K)
DP1 Service=5.75	This is the maximum night volt drop in % when services are modelled (As per ST:SD5K)
[Customise]	
LisaKerfordKey=No	IGNORE
AllowCopyToClipboard=Yes	This defines whether you can copy diagram and results for use in other applications
CopyToClipboardSizeInPercent=50	This defines the size of the copy to be made
Display_Interconnector_Cables=No	This defines if Inter-connector cables are displayed
ShowConsumerTypesDefBtn=No	Show the consumer types button on the consumer editor screen to load the consumer

	types specification screen
ShowCableTypesDefBtn=No	Show the cable types button on the cables editor screen to load the cable groups editor screen
[File Viewer Menu]	
Show Line Numbers=Yes	If yes, this will show line numbers on the output file
Print Landscape=Yes	This defines whether the output file is printed in landscape or portrait
[Debut]	
RUN_DEFUT_FILE_COPY=	
TIME_OUT_MS=20000	
TIME_OUT_INFINITE=No	

APPENDIX D

WINDEBUT.INI FILE:

```
;
;WinDebut.ini - setup file for windebut
;
[Information]
;
;paths should be left blank if relevant files are in the WinDebut
;directory, or a path may be given e.g. "c:\debut", "d:\windebut\datafile"
;NB no "\" at end.
;
DebutPath=
CablePath=
ConsumerPath=
TransformerPath=
WDGroupsPath=
;
; Above paths are for Debut and its data file, wdcable.dat, wdcnstyp.dat
; and wdxfrmr.dat respectively.
;
[Defaults]
;
; Global data defaults
;
Phase_Angle=120
No_of_Phases=3
PrintDefault=Yes
PrintConsumers=No
PrintColumn132=Yes
IECSIZE=Yes
FULLLOSS=Yes
XREG=Yes
DMOT=8
NMOT=4

[MotorStartCurrentMultipliers]
StarDelta = 3.5
AutoTransformer = 3.5
ElectSoftStart = 2.5
VariableSpeed = 2.5
SlipRingRR = 1.5
SinglePhCapStart = 4.5
SinglePhSeriesParallel = 2.5

[Results]
Show Cost=No
DR0Left=264
DR0Top=1035
DR1Left=46
DR1Top=192
DR2Left=18.8
DR2Top=283.9333
DR3Left=538
DR3Top=63
DR4Left=44
```

```
DR4Top=71
DR5Left=94.73333
DR5Top=18.86667
DR6Left=455.5333
DR6Top=45.4

[WinDebut]
OutputDirectory=Y:\POLICY\SD POLICY\SD5_LV_DESIGN\SD5B
NetworkDirectory=Y:\Policy\SD policy\SD5_LV_Design
PrivilegedUser=zYes
Maximised=Yes
MainLeft=91
MainTop=102
MainWidth=843
MainHeight=565
ShowNodeEditor=Yes
ShowDisclaimerScreen=Yes
Editor Font Size=10
OptionsEditableByPrivilegedUserOnly=YES
OutputForEGD=Yes
LoadOtherDBDataFiles=No
DBDATA Path=
SaveGlobalDefaults=No
SaveLocalDefaults=Yes
DefaultNodeSize=1
ShowCableDetails=YES
ShowNodeDetails=YES
UserSelectIcons=YES
ConsumerTypeComments=YES
ShowEGDGraphs=NO
ShowLoopImpedance =No
ShowVoltagePercent=Yes
ShowCableDistributed=No
UsePhasesForGeneration=No
ShowOneDistributedObject=Yes
LinkEGDVoltageToDesignVoltage=Yes
ShowResultsTable=Yes
ShowResultsTableEGD=Yes
ShowFactorForGenMinLoad=Yes
VoltDropAcrossTXForGen=Yes
ShowEGDLoadDefault=Yes



[GISImport]
CheckForGEOConsolidation=Yes

[UserSettings]
AllowCableGroupChanges=Yes
AllowServiceCableChanges=No
AllowTransformerSelectionChanges=No
AllowConsumerTypeChanges=Yes

[Menu]
PrintLarge=Yes
PrintKey=Yes
PrintColumn=Yes
```

VoltDropByNodes=Yes
FullNodeDetails=Yes
ShowCableDataOnTheDiagram=Yes
ShowDetailedConsumerToolTips=Yes
ComponentLabelSize=4

[Urban Settings]
Fuse_Flag=Yes
Fuse_val=1.05
Volt_drop0=4.79
Volt_drop1=4.79
SRIGNOR=0
Loop_Resistance_Flag=Yes
Loop_Resistance=135
Loads_Only=No
DP0=4.79
DP1=4.79
DP2=5
DP3=945
RUC=10
RUL=50
FaultLevelVoltage=250
DesignVoltage=240
Loop_Resistance_Flag Service=Yes
Loop_Resistance Service=220
DP0 Service=5.75
DP1 Service=5.75

[Rural Settings]
Fuse_Flag=Yes
Fuse_val=1.05
Volt_drop0=4.79
Volt_drop1=4.79
SRIGNOR=0
Loop_Resistance_Flag=Yes
Loop_Resistance=135
Loads_Only=No
DP0=4.79
DP1=4.79
DP2=5
DP3=945
RUC=10
RUL=50
FaultLevelVoltage=250
DesignVoltage=240
Loop_Resistance_Flag Service=Yes
Loop_Resistance Service=220
DP0 Service=5.75
DP1 Service=5.75

[Customise]
AllowCopyToClipboard=Yes
CopyToClipboardSizeInPercent=50
Display_Interconnector_Cables=No
ShowConsumerTypesDefBtn=No
ShowCableTypesDefBtn=No

```
[File Viewer Menu]
Show Line Numbers=Yes
Print Landscape=Yes

[Debut]
RUN_DEBUT_FILE_COPY=
TIME_OUT_MS=20000
TIME_OUT_INFINITE=No

[Transformer]
Path=
```

APPENDIX E

DBDCONSU.INI FILE:

!*ONE
ELEXON 1 Unrestricted Domestic
!*TWO
ELEXON 2 Domestic Economy Seven - for use when off peak electric heating is present
!*THREE
ELEXON 3 Unrestricted Non-Domestic
!*FOUR
ELEXON 4 Non-Domestic Economy 7 - for use when off peak electric heating is present
!*FIVE
ELEXON 5 Non-Domestic, MD - Load Factor<20%
!*SIX
ELEXON 6 Non-Domestic, MD - Load Factor 20-30%
!*SEVEN
ELEXON 7 Non-Domestic, MD - Load Factor 30-40%
!*EIGHT
ELEXON 8 Non-Domestic, MD - Load Factor >40%
!*BEVREX
Electric Nation 7kW Full Electric Vehicle or Range Extender
!*PHEV
Electric Nation 3.6kW Plug in Hybrid
!*HOTPUB
HOTEL or PUB
!*CHURCH
CHURCH with off peak electric heating

APPENDIX F

TRFRUPD.INI:

The Trfrupd.ini configuration file points WinDebut to where the Transformer search database file is held.

C:\PROGRAM FILES\WINDEBUT\DEBUT_TF.MDB

(Where Program Files\Windebut is the WinDebut default directory on C: drive)

APPENDIX G

WDGROUPS.DAT FILE:

```
100,1
"120 Degrees"
3
1
1.05
"<FaultLevel>250"
"<DesignVoltage>240"
4.79,4.79
0
1
135
#FALSE#
4.79,4.79,100,945
10
50
#FALSE#
#FALSE#
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
```

0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
0
"END OF GLOBAL DATA"
1
"ONE"
"<ConsumerName>ONE_3600_0"
""
"1._ONE_3600_0"
3600,0
0,0
0,0
0,0
0,0
0,0

```
2
"TWO"
"<ConsumerName>TWO_3500_8000"
""
"2.TWO_3600_8000"
3500,8000
0,0
0,0
0,0
0,0
0,0
3
"THREE"
"<ConsumerName>THREE_20000_0"
""
"3.THREE_20000_0"
20000,0
0,0
0,0
0,0
0,0
0,0
4
"FOUR"
"<ConsumerName>FOUR_20000_15000"
""
"4.FOUR_20000_15000"
20000,15000
0,0
0,0
0,0
0,0
0,0
5
"FIVE"
"<ConsumerName>FIVE_100_0"
"MDQ"
"5.FIVE_100_0"
100000,0
0,0
0,0
0,0
0,0
0,0
6
"SIX"
"<ConsumerName>SIX_100_0"
"MDQ"
"6.SIX_100_0"
100000,0
0,0
```

0,0
0,0
0,0
0,0
7
"SEVEN"
"<ConsumerName>SEVEN_100_0"
"MDQ"
"7.SEVEN_100_0"
100000,0
0,0
0,0
0,0
0,0
0,0
8
"EIGHT"
"<ConsumerName>EIGHT_100_0"
"MDQ"
"8.EIGHT_100_0"
100000,0
0,0
0,0
0,0
0,0
0,0
9
"BEVREX"
"<ConsumerName>BEV_REX"
"MXD"
"9.BEV_REX"
7000,7000
0,0
0,0
0,0
0,0
0,0
10
"PHEV"
"<ConsumerName>PHEV"
"MXD"
"10.PHEV"
3600,3600
0,0
0,0
0,0
0,0
0,0
11
"ONE"
"<ConsumerName>15kW_MD"

"MDQ"
"11.ONE_15_0"
15000,0
0,0
0,0
0,0
0,0
0,0
12
"HOTPUB"
"<ConsumerName>HOTEL_PUB_30000_0"
""
"12.HOTEL_PUB_30000_0"
30000,0
0,0
0,0
0,0
0,0
0,0
13
"CHURCH"
"<ConsumerName>CHURCH_10000_10000"
""
"13.CHURCH_10000_10000"
10000,10000
0,0
0,0
0,0
0,0
0,0
"END OF CONSUMER TYPES"
"Mains, 1"
"WC 185 FS"
"WC 300 FS"
"Service 3ph, 2"
"HYT 25 FS SRV"
"HYT 35 FS SRV"

"Service 1ph, 3"
"HY 35 FS SRV"
"HY 25 FS SRV"
"END OF CABLE SELECTIONS"
START OF THE TRANSFORMER GROUPS
  TOTAL TRANSFORMER GROUPS = 4
  MAX NO. OF TRANSFORMERS PER GROUP = 10
  GMT, 1 2 4 -32767 -32767 -32767 -32767 -32767 -32767 -32767
  PMT 3 PH, 8 9 10 11 -32767 -32767 -32767 -32767 -32767 -32767
  PMT 1 PH, 13 14 15 -32767 -32767 -32767 -32767 -32767 -32767 -32767
  SPLIT, 27 28 -32767 -32767 -32767 -32767 -32767 -32767 -32767 -32767
END OF THE TRANSFORMER GROUPS
START OF THE GLOBAL TRANSFORMER OPTIONS

IECSIZING = YES
FULLLOSS = YES
XREG = YES
DMOT = 8
NMOT = 4
END OF THE GLOBAL TRANSFORMER OPTIONS
WinDebut Version=WinDebut V 3.1
PrintColumn132=Yes
Network Type (0 Is Urban, 1 Is Rural)=1
Study Title=<Untitled Study>
START OF THE DEBDAT CABLES
Number of DEBDAT cables=112
DEBDAT cable 1=ABC 50, 2 0
DEBDAT cable 2=ABC 95, 2 0
DEBDAT cable 3=ABC 120, 2 0
DEBDAT cable 4=AL .007, 2 -1
DEBDAT cable 5=AL .0145, 2 -1
DEBDAT cable 6=AL .0225, 2 -1
DEBDAT cable 7=AL .04, 2 -1
DEBDAT cable 8=AL .06, 2 -1
DEBDAT cable 9=AL .1, 2 0
DEBDAT cable 10=AL .15, 2 0
DEBDAT cable 11=AL .2, 2 0
DEBDAT cable 12=AL .25, 2 0
DEBDAT cable 13=AL .3, 2 0
DEBDAT cable 14=AL .4, 2 0
DEBDAT cable 15=AL .5, 2 0
DEBDAT cable 16=AL 25, 2 -1
DEBDAT cable 17=AL 35, 2 -1
DEBDAT cable 18=AL 50, 2 0
DEBDAT cable 19=AL 70, 2 0
DEBDAT cable 20=AL 95, 2 0
DEBDAT cable 21=AL 120, 2 0
DEBDAT cable 22=AL 185, 2 0
DEBDAT cable 23=AL 300, 2 0
DEBDAT cable 24=AO .025, 2 0
DEBDAT cable 25=AO .05, 2 0
DEBDAT cable 26=AO .06, 2 0
DEBDAT cable 27=AO .075, 2 0
DEBDAT cable 28=AO .1, 2 0
DEBDAT cable 29=AO .15, 2 0
DEBDAT cable 30=AO 25, 2 0
DEBDAT cable 31=AO 50, 2 0
DEBDAT cable 32=AO 100, 2 0
DEBDAT cable 33=AO 150, 2 0
DEBDAT cable 34=CC 16, 2 -1
DEBDAT cable 35=CC 25, 2 -1
DEBDAT cable 36=CC 35, 2 -1
DEBDAT cable 37=CCT 16, 2 -1
DEBDAT cable 38=CCT 25, 2 -1
DEBDAT cable 39=CCT 35, 2 -1

DEBDAT cable 40=CO .007, 2 0
DEBDAT cable 41=CO .0225, 2 0
DEBDAT cable 42=CO .025, 2 0
DEBDAT cable 43=CO .05, 2 0
DEBDAT cable 44=CO .058, 2 0
DEBDAT cable 45=CO .06, 2 0
DEBDAT cable 46=CO .1, 2 0
DEBDAT cable 47=CO .15, 2 0
DEBDAT cable 48=CO 16, 2 0
DEBDAT cable 49=CO 25, 2 0
DEBDAT cable 50=CO 32, 2 0
DEBDAT cable 51=CO 70, 2 0
DEBDAT cable 52=CO 100, 2 0
DEBDAT cable 53=CS 70, 2 0
DEBDAT cable 54=CS 95, 2 0
DEBDAT cable 55=CS 120, 2 0
DEBDAT cable 56=CS 150, 2 0
DEBDAT cable 57=CS 185, 2 0
DEBDAT cable 58=CS 240, 2 0
DEBDAT cable 59=CS 300, 2 0
DEBDAT cable 60=CU .007, 2 -1
DEBDAT cable 61=CU .0145, 2 -1
DEBDAT cable 62=CU .0225, 2 -1
BEBDAT cable 63=CU .025, 2 -1
DEBDAT cable 64=CU .04, 2 -1
DEBDAT cable 65=CU .05, 2 -1
DEBDAT cable 66=CU .06, 2 0
DEBDAT cable 67=CU .1, 2 0
DEBDAT cable 68=CU .15, 2 0
DEBDAT cable 69=CU .2, 2 0
DEBDAT cable 70=CU .25, 2 0
DEBDAT cable 71=CU .3, 2 0
DEBDAT cable 72=CU .4, 2 0
DEBDAT cable 73=CU .5, 2 0
DEBDAT cable 74=CU .6, 2 0
DEBDAT cable 75=CU .75, 2 0
DEBDAT cable 76=CU 16, 2 -1
DEBDAT cable 77=CU 25, 2 -1
DEBDAT cable 78=CU 35, 2 -1
DEBDAT cable 79=CU 70, 2 0
DEBDAT cable 80=CU 95, 2 0
DEBDAT cable 81=CU 120, 2 0
DEBDAT cable 82=CU 185, 2 0
DEBDAT cable 83=CU 300, 2 0
DEBDAT cable 84=CU 400, 2 0
DEBDAT cable 85=HY 25, 2 -1
DEBDAT cable 86=HY 35, 2 -1
DEBDAT cable 87=HYT 25, 2 -1
DEBDAT cable 88=HYT 35, 2 -1
DEBDAT cable 89=SA 480, 2 0
DEBDAT cable 90=SA 600, 2 0

DEBDAT cable 91=SA 740, 2 0
DEBDAT cable 92=SA 960, 2 0
DEBDAT cable 93=SA 1200, 2 0
DEBDAT cable 94=SA 1480, 2 0
DEBDAT cable 95=SA 1800, 2 0
DEBDAT cable 96=SA 2220, 2 0
DEBDAT cable 97=SCC 16, 2 -1
DEBDAT cable 98=SCC 25, 2 -1
DEBDAT cable 99=SCC 35, 2 -1
DEBDAT cable 100=SCCT 25, 2 -1
DEBDAT cable 101=SCCT 35, 2 -1
DEBDAT cable 102=TR 70, 2 0
DEBDAT cable 103=TR 95, 2 0
DEBDAT cable 104=TR 120, 2 0
DEBDAT cable 105=TR 150, 2 0
DEBDAT cable 106=TR 185, 2 0
DEBDAT cable 107=TR 240, 2 0
DEBDAT cable 108=TR 300, 2 0
DEBDAT cable 109=WC 35, 2 -1
DEBDAT cable 110=WC 95, 2 0
DEBDAT cable 111=WC 185, 2 0
DEBDAT cable 112=WC 300, 2 0
END OF THE DEBDAT CABLES
Service cables, Use loop resistance=YES
Service cables, loop resistance=220
Service cables, max day volt drop=5.75
Service cables, max night volt drop=5.75
<ICONSIZE>1

APPENDIX H

EDGSETUP.DAT FILE:

```
CONSUMER_POWER_FACTORS 1
DEFAULT  0.97
GENERATOR_TYPES 5
Wind 3 0
1 1 1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1 1 1
0 0 0 0 0 0 0 0 0 0 0 0
Hydro 3 0
1 1 1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1 1 1
0 0 0 0 0 0 0 0 0 0 0 0
CHP 3 0
1 1 1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 1 1 1
0 0 0 0 0 0 0 0 0 0 0 0
PV 2.4 0
0 0 0 0 0 0 0 0 0 0.04 0.08 0.11
0.15 0.19 0.26 0.33 0.46 0.58 0.7 0.81 0.88 0.95 0.98 1
0.99 0.97 0.93 0.89 0.81 0.74 0.64 0.53 0.42 0.31 0.25 0.19
0.15 0.11 0.07 0.04 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0
PV(Domstc) 2.4 0
0 0 0 0 0 0 0 0 0 0.04 0.08 0.11
0.15 0.19 0.26 0.33 0.46 0.58 0.65 0.7 0.75 0.77 0.79 0.8
0.8 0.79 0.78 0.76 0.73 0.69 0.63 0.53 0.42 0.31 0.25 0.19
0.15 0.11 0.07 0.04 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0
VOLTAGE_DROP
3.45 3.45
System_Voltage
 240
GenLoadFactor
 0.4
```

APPENDIX I

SUPERSEDED DOCUMENTATION

This document supersedes ST: SD7A/8 dated July 2019 which has now been withdrawn.

APPENDIX J

RECORD OF COMMENT DURING CONSULTATION

Update of profile information only, no formal consultation undertaken.

APPENDIX K

ANCILLARY DOCUMENTS

ST: SD5A Design of Low Voltage Domestic Connections
SD: SD5K Use of WinDebut Software
ST: SD5N Relating the use of WinDebut Software for assessing Motor and Welder Voltage Disturbance (Flicker)
ST: SD5R Loop Impedances

EA Technology Report - DEBUT User Guide (for version 3.10) Report No: 4490 Project No: TT081 June 1998

APPENDIX L

KEY WORDS

Design, WinDebut, Non-domestic, Domestic, New Connection, New Development, Load Factor, Estimation, Electric Nation.