

The logo for Electricity North West, featuring the word "electricity" in a bold, dark blue font and "north west" in a smaller, green font below it. The logo is contained within a large white cloud shape that is suspended by two thin white lines.

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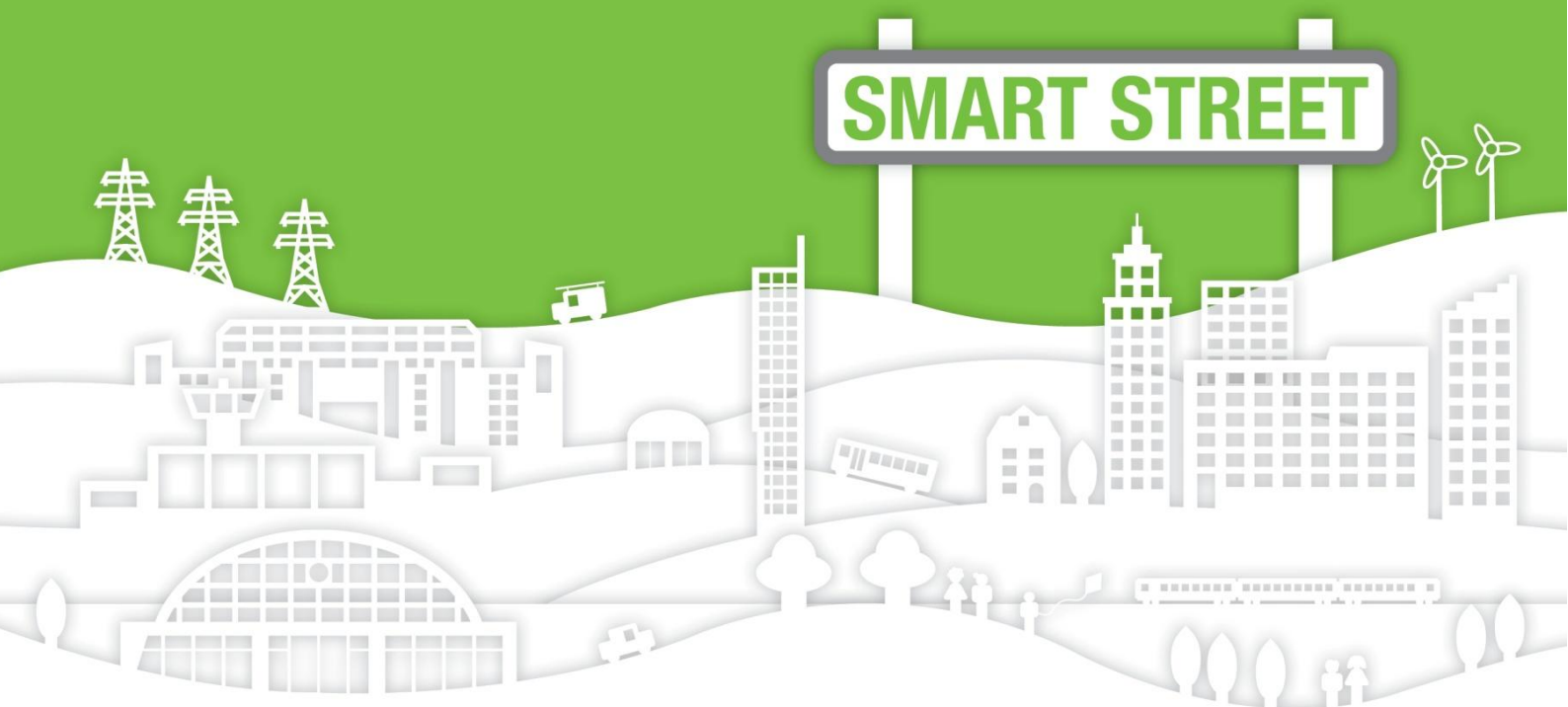


# Smart Street Network Design Methodology

31 July 2014

A rectangular sign with a white background and a dark grey border, mounted on two white posts. The sign contains the text "SMART STREET" in bold, green, sans-serif capital letters.

**SMART STREET**



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# VERSION HISTORY

Version	Date	Author	Status	Comments
V1.0	31 July 14	Dan Harber	Final Draft	

# 1 EXECUTIVE SUMMARY

The purpose of this network design methodology document is to achieve one of the associated deliverables related to the following Smart Street **SDRC 9.1.1 – Publish on the website a report detailing the site selection methodology, and a map of the Trial areas by July 2014:**

Smart Street aims to apply voltage management on HV networks to reduce network losses and conservation voltage reduction (CVR) on LV networks to reduce energy demand. LV meshed networks will be applied with the aim to release additional network capacity. Capacitor banks on the HV network are being considered to help manage network losses. On the LV network, a mix of capacitor banks and controlled meshing of networks will be integrated to flatten the voltage profile and improve energy efficiency. This report describes the methodology that will be utilised for designing the Smart Street Trial circuits in relation to:

- Suitability of circuits for the Trials
- Positioning and sizing of the LV capacitors banks
- Positioning and sizing of the HV capacitors banks
- Meshing of the LV networks.

The methodology was designed to utilise detailed network modelling using IPSA to create a rules based design methodology. This simplified rules based method was then applied to the short list of possible Trial areas to finalise the selection and optimise the Trial networks. It was decided to model the HV capacitors using DINIS due to the more accurate network representation available as opposed to IPSA.

Combinations of operational scenarios were modelled in IPSA to establish the impact of capacitor size and placement on a small selection of Trial circuits. A script was then developed to apply a range of PV penetrations under both maximum and minimum demand scenarios to output a set of voltage profiles at specific nodes on the circuits. Variations of the following scenarios were modelled:

- No intervention
- LV interconnection
- LV capacitors position
- LV capacitors size
- HV capacitor position
- HV capacitor size
- HV ring open and closed
- Distribution transformer tap settings

From the recorded results, an optimal solution for the capacitor size and placement was achieved by recording any voltage or thermal violations while assessing the circuit losses. The circuit losses were shown to increase when positioning the capacitors two thirds of the way down the feeder length rather than at the feeder midpoint. This was for an assumed unity power factor for all capacitor banks. The magnitude of voltage rise at the LV bus bars as a result of installing a capacitor is dependent on the transformer size. This is because the

voltage rise is dependent on the impedance of the upstream distribution network and the size of the capacitor bank that is installed.

The simplified rules based methodology was then developed by assessing the tables of results.

- Radials with the highest volt-drop should be targeted for a capacitor installation. Should more than one radial have similar percentage volt-drops then the one with the most customers should be chosen.
- For small length radials (0m - 449m) install the capacitor as close to 50% of the circuit length as possible. (This is to minimise circuit losses).
- For longer length radials (450m or more) install the capacitor as close to 67% of the circuit length as possible. (This is to minimise volt-drop at end nodes).
- For radials with a volt-drop of 0% - 5% or a length of up to 499m install a 100kVAr capacitor bank.
- For radials with a volt-drop of more than 5% and over 500m in length - install a 150kVAr capacitor bank.
- If the PV penetration is higher than 50% on the feeder, install a 100kVAr capacitor. This is due to the potential voltage rise during peak generation times.
- Capacitor placement on the HV Trial ring is to be calculated by modelling the circuit in DINIS and simulating a shunt capacitance at each distribution substation. The optimal capacitor positions will be calculated based on radial configurations due to the larger corresponding voltage drop under these scenarios. It is also assumed that the network will run under HV open scenarios for longer periods. DINIS studies will however confirm both open and closed HV ring scenarios.

This design methodology will act as a live document which can be updated as the Trial develops to incorporate any modifications that may be required as a result unforeseen issues and onsite findings

## **2 LIST OF ACRONYMS**

C<sub>2</sub>C – Capacity to Customers

CLASS – Customer Load Active System Services

COP – Codes of Practice

CRMS – Control Room Management System

DG – Distributed Generation

DINIS – Distribution Network Information System

EPD – Electricity Policy Document

ES – Electrical Specification

ESCAR – Electronic Scanned Asset Records

GIS – Geographic Information System

GROND – Geographical Representation of Network Data

HV – High Voltage (11kV / 6.6kV)

IPSA - Interactive Power System Analysis

LV – Low Voltage (430V / 240V)

LV.AFFIRM – Low Voltage Approved Fusing, Flicker, Impedance & Regulation Model

MAMS – Master Asset Management System

NEDO - New Energy and Industrial Technology Development Organization

OLTCs – On Load Tap Changers

## **3 DESIGN ASSUMPTIONS**

This design methodology has made the assumption that the LV Trial network is a balanced three phased system. This is due to the fact that IPSA is a single line modelling tool and the Electricity North West cable records are not reliable enough to assess load unbalance. However, the proposed Trials will model the effects of unbalanced loads on the LV network in detail. TNEI are currently developing a 4-line add-on to the IPSA software for improved LV modelling in the future.

Individual loads were not modelled due to the limited number of nodes that can be utilised in IPSA. The loads were therefore combined for subsections of the LV network. These subsections were created by assessing where the cable types and sizes altered and where the network divides into radial feeders.

PV penetration was uniformly populated over LV circuits due to the way that the scripting tool was developed. This may not accurately represent some of the Trial circuits which have more of a clustered distribution of PV. It was however deemed adequate enough for the purpose of producing the network design rules. More detailed modelling of low carbon technologies will be carried out during the research phase of the Project.

The operation of the primary substation tap settings were not considered when carrying out the circuit modelling. This is due to the fact that the control of this equipment will be optimised as part of the Siemens Spectrum software. This design methodology solely considers the installation of new plant specifically required for the Smart Street Trials

## **4 INTRODUCTION**

In November 2013 Electricity North West won their bid to gain funding from the Low Carbon Networks Fund for their Tier Two Project, Smart Street. Smart Street will utilise the most advanced technology developed today for LV network management with the aim of challenging existing operational practices and demonstrating how to optimise HV and LV networks in real time. The Smart Street Trials aim to investigate how a distribution network operator can increase network capacity and voltage headroom, reduce network losses, and reduce overall energy consumption.

This document highlights the principles and practices that shall be adopted for the design of the Smart Street Trial circuits.

## **5 BACKGROUND**

### **5.1 Overview of Smart Street**

The Smart Street Project combines the concepts of interconnection of networks, developed within our Capacity to Customers (C<sub>2</sub>C) Project, and voltage control, developed within our CLASS Project. These previous projects focused on EHV and HV networks; Smart Street extends these technologies and their benefits down the voltage levels to encompass HV and LV networks. Smart Street will utilise advanced real time optimisation software to simultaneously manage all HV and LV network assets to respond to customers' changing demands in the most efficient manner. The three key incremental steps in the Smart Street method are the application of:

- Co-ordinated voltage control, using on-load tap changing transformers and capacitors, across HV and LV networks
- Interconnecting traditionally radial HV and LV circuits and assuming control of these networks within the control room
- Real-time co-ordinated configuration and voltage optimisation of HV and LV networks.

### **5.2 Smart Street Hypotheses**

The Smart Street Trials will test the following hypotheses:

- The Smart Street Method will deliver a reduction in customers' energy consumption
- Customers within the Smart Street Trial area will not perceive any changes in their electricity supply
- The Smart Street Method will have no adverse effects on customers' internal installation or appliances
- The Smart Street Method is faster to apply than traditional reinforcement, supports accelerated low carbon technology (LCT) connection and reduces network reinforcement costs
- The Smart Street Method facilitates the prioritisation of the range of solutions across differing LCT adoption scenarios based on a cost benefit analysis to accommodate customers' uptake of LCTs

- The Smart Street Method will deliver a reduction in overall losses through network configuration and voltage optimisation
- The Smart Street Method facilitates real time control of a portfolio of LV network solutions, using retrofit technologies with their application combined or in isolation.

### **5.3 Proposed Trial outcomes**

Smart Street will quantify the benefits of the new design and operating arrangements of HV and LV networks and determine the following:

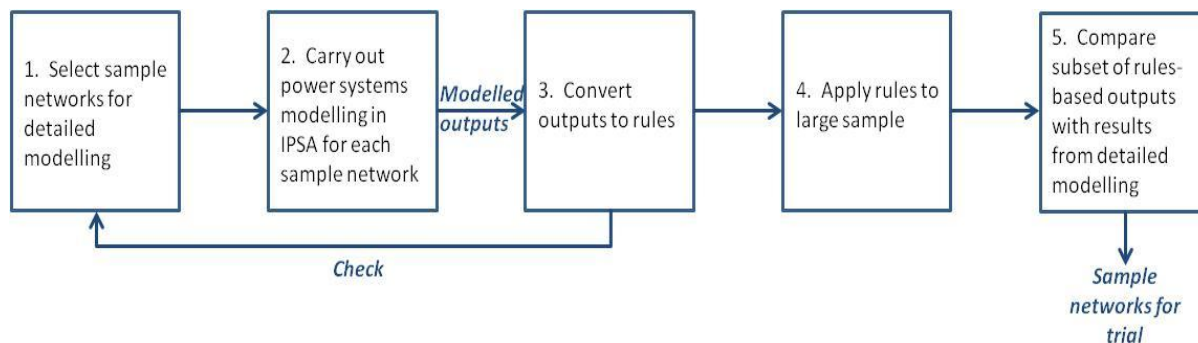
- Capacity and voltage headroom released and the quantities of new LCTs that could be connected
- Economic justification and carbon benefits
- Optimisation algorithm settings to deliver loss reduction and energy reduction from Conservation Voltage Reduction
- Quantify customers' energy reduction, from application of Conservation Voltage Reduction methodology, and understand the variation of the consumption reduction between times of day, days of week and seasons
- Effect on customers' power quality, internal electrical installations (ie wiring and fusing) or appliances
- HV and LV losses reduction
- Confirm settings required to manage cold load pick-up
- Interruption Incentive Scheme benefits
- Safety benefit of removing the need for manual operation of live LV network equipment offered by the WEEZAP and LYNX
- Fault response cost reductions arising from the in-built fault detection and localisation capabilities of the WEEZAP.



## 6 OVERVIEW OF MODELLING METHODOLOGY

An overview of the high level modelling methodology that was created to select the Smart Street Trial circuits is given in Figure 6.1.

Figure 6.1: Overview of Smart Street methodology



This methodology was adopted to utilise detailed network modelling using IPSA software to create a rules based design methodology. This rules based method was then applied to the short list of possible Trial areas to finalise the selection of remaining Trial circuits.

### 6.1 Selection of sample networks for detailed modelling

A number of sample networks were selected for detailed modelling based on the following factors:

- If the distribution substation has already been used for other Second Tier projects (C<sub>2</sub>C or CLASS) and a transformer with on load tap changer was already available
- If there was space available to enable the required equipment to be installed, eg capacitors at distribution substation and along HV feeders
- Areas with high levels of PV and electric heat pumps were targeted (specifically sites where heat pump research has been proposed by the Japanese organisation NEDO)
- A range of 6.6kV and 11kV circuits were selected across dense urban, urban and rural areas.

The preliminary selected Trial circuits chosen based on these criteria are shown in Figure 6.2.

Figure 6.2: Overview of Smart Street methodology

Primary Substation	Voltage (kV)	CLASS	C <sub>2</sub> C	Category	Modelled LV Sub	TX Size (kVA)
Green Street (200410)	6.6	No	Yes	Urban	Caunce Road (212512)	750
Hindley Green (200416)	11	No	Yes	Urban	Walmer Road (212734)	500
Denton East (100110)	6.6	Yes	Yes	Dense Urban	Pendle Road (172187)	1000
Fallowfield (100114)	6.6	Yes	No	Dense Urban	Lindleywood Road (172044)	1000
Wigton (609618)	11	No	Yes	Rural	Western Bank (636033)	315

\* Please note that the above sites were chosen as the initial Trial circuits. It is likely that some of these sites will change before the construction phase of the Project begins once they have been scoped thoroughly.

## 6.2 Power system modelling in IPSA

The five proposed Trial circuits were modelled in IPSA by gathering the relevant information from Electricity North West planning software, databases, and codes of practice.

A number of scenarios were applied to each circuit to replicate the possible configurations on the network while modifying the demand profile.

These scenarios studied a variety of Smart Street interventions over a wide variety of demand and generation levels including:

- Running the HV loops open and closed
- Interconnecting LV feeders
- Installing differing sizes of HV and LV capacitors at various positions within the network
- Employing on-load tap changers at distribution substations

### **6.3 Conversion of results into rules based methodology**

The outputs of the modelling process and engineering considerations were used to determine the rules based methodology for:

- Sizing the capacitors to be installed on the HV and LV circuits;
- Positioning of the capacitors to be installed on the HV and LV circuits;
- The likely switching arrangements (e.g. switched in/out when circuits connected as a ring, under different scenarios of demand and generation).

### **6.4 Application of rules based methodology**

The rules derived in paragraph 6.3 were then applied to the large sample of networks to determine those networks suitable for the Trial and provide the size and position of capacitors.

### **6.5 Comparison of rules based outputs with detailed modelling**

Subsets of networks were then modelled as an additional check that the rules-based approach was valid. If issues were determined, the rules were modified and steps 4 and 5 were repeated.

## **7 DESCRIPTION OF DETAILED MODELLING METHODOLOGY**

Smart Street will integrate the use of OLTCs and switched capacitors while meshing the LV network and closing the corresponding HV ring. Capacity release for distributed generation will primarily be achieved by either:

- Reduction of LV substation voltage (via OLTC set points), or
- Through meshing LV networks (hence reduction of voltage rise between DG installations and substations).

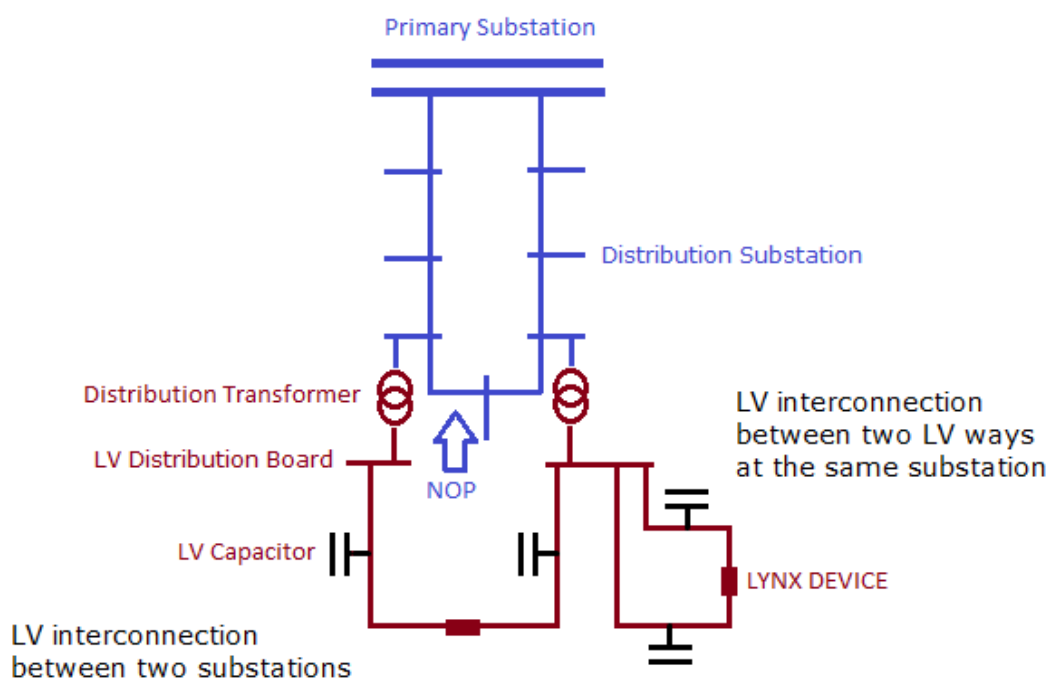
Installation of capacitors will help to facilitate scenario 1 by reducing and flattening the voltage profile. CVR benefits can be gained from capacitors when applied to scenario 2.

Combinations of operational scenarios were therefore modelled to establish the impact of capacitor size and placement on these Trial circuits to optimise their design. In addition, PV penetration levels were modelled to access design considerations for circuits with increased voltage levels at times of maximum generation. The following steps were carried out:

- Each of the selected Trial circuits were modelled from the primary substation down to the LV feeder using IPSA. The models were manually built by extracting data from Grond and Escar (standard Electricity North West geographical planning tools). All cable and transformer input data was taken from Electricity North West codes of practice.
- A script was developed to apply a range of PV penetrations under both maximum and minimum demand scenarios. These were then assessed over a variety of running arrangements as outlined below. A distributed generation database was used to calculate the average size of PV installation and the overall existing PV penetration on the LV circuit. It was assumed that all PV installations had a unity power factor while power factors of domestic loads were set at 0.98.
- The script was used to output a set of voltage profiles at specific nodes on the circuit. Circuit losses were also calculated to access the circuit efficiency.

- A number of operational scenarios were applied to each circuit including:
  - No intervention (base values).
  - LV interconnection between two substations.
  - LV interconnection between two LV ways out of the same substation.
  - LV capacitors at 1/2 the length of the LV feeder.
  - LV capacitors at 2/3 the length of the LV feeder.
  - 100kVAr, 150kVAr and 200kVAr capacitors.
  - HV ring open and closed.
  - Minimum, mid and maximum distribution transformer tap settings.

Figure 7.1: Schematic of typical sample network



From the results, an optimal solution for the capacitor size and placement was achieved by recording any voltage or thermal violations while assessing the overall benefits of that scenario.

HV capacitor sizing and placement was then modelled using DINIS for a more accurate representation.

## 8 IPSA MODELLING RESULTS

### 8.1 Green Street / Counce Road

For the following, please refer to the Green Street IPSA diagram in Appendix A and the tables of results in Appendix B.

This circuit has a PV penetration of around 40% (91 customers of the total 226 customers currently have PV installed). On average these installations are rated at 2.28kW. The capacitors were positioned on the PW feeder (as shown in the IPSA diagram in appendix A) due to the interconnection between substations and the calculated volt-drop on this feeder. The total length of this feeder is 321m to the end node.

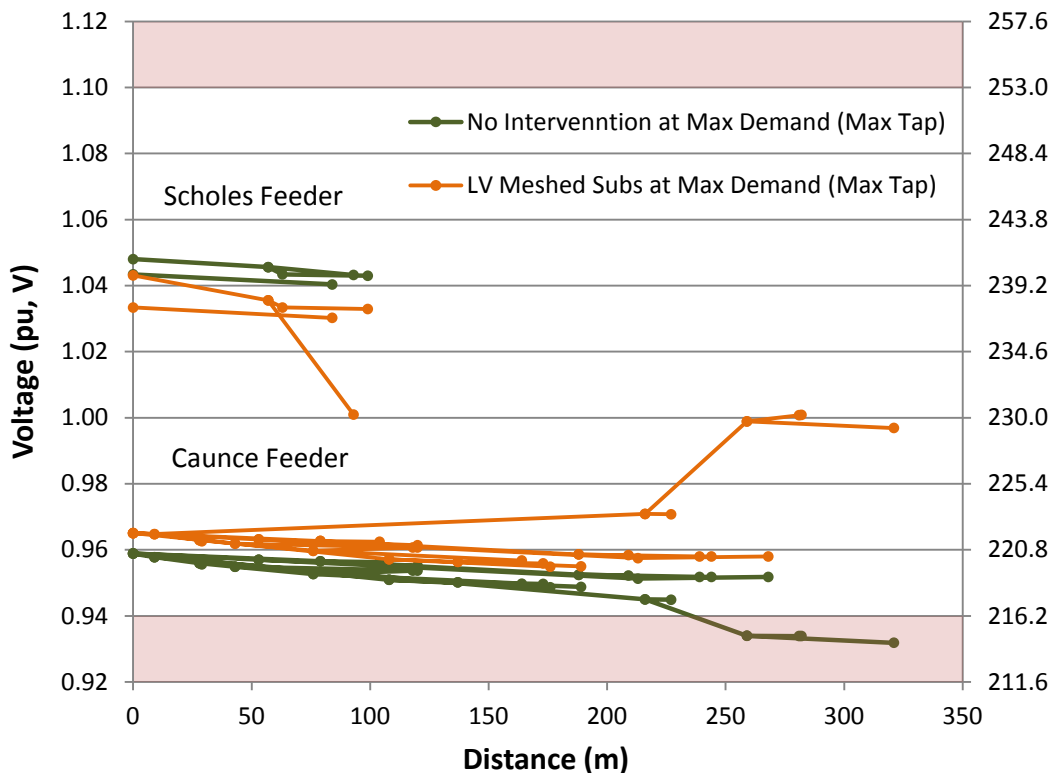
Node PW5 shows the largest volt-drop which falls slightly out of the statutory limits (214.33 volts) when the transformer taps are set at +5% during maximum demand with no PV penetration. This voltage drops to 213.96 volts under the same conditions when the HV ring is closed. This is due to a slight imbalance of impedances and loads between the two HV circuits. All other measured nodes stay within limits under these conditions.

PW5 is the only node which rises slightly out of the statutory limits (254.19 volts) when the transformer taps are set at -5% during minimum demand with maximum PV penetration. This voltage drops to 253.92 volts under the same conditions when the HV ring is closed.

In both instances, interconnecting the LV network in parallel with the adjacent substation brings the voltage back within limits. (The adjacent substation taps were set at 0%). Meshing two ways from the LV board shows very little difference in the voltage profile at all measured nodes. This is due to the fact that both radials are evenly loaded with around 30 customers each with an even number of PV installations. The circuits also have similar impedances.

Figure 8.1 shows the comparison of the voltage profiles on the PW feeder for the no intervention scenario (green) against meshing the Counce Road and Scholes substations (yellow). The results show that meshing the two substations flattens the overall voltage profile while keeping the circuit within statutory limits. The two feeders see a voltage balance of around 230 volts at the point of interconnection.

Figure 8.1: No intervention / meshing substations



The addition of a 100kVAr capacitor halfway down the PW feeder shows an increase of around 3 to 3.5 volts at the PW5 end node depending on transformer tap position (the higher the tap position, the lower the voltage increase). A further increase of up to 1 volt can be gained by moving the capacitor to two thirds of the way down the LV feeder (again depending on the tap position).

The results show that the midpoint 150kVAr and 200kVAr capacitors produce a voltage rise of around 4.5 to 5 volts and 5.5 to 6 volts respectively. Again, a further increase of up to 1 volt can be gained by moving the capacitor to two thirds of the way down the feeder.

The total circuit losses are greater when the capacitor is placed 2/3 down the feeder rather than at the midpoint.

Comparing the voltage profiles and the voltage losses in the results tables in Appendix B, a 100kVAr capacitor positioned halfway down the PW feeder appears to be the optimum scenario. This is considering that the end node voltage will only see an additional 1 volt rise when installing a 150kVAr capacitor in the same position.

## 8.2 Hindley Green / Walmer Road

For the following, please refer to the Hindley Green IPSA diagram in Appendix A and the tables of results in Appendix C.

This circuit has a PV penetration of around 20% (45 customers of 255 customers currently have PV installed). On average these installations are rated at 2.35kW. The capacitors were positioned on the YW feeder due to the calculated volt-drop on this feeder. The total length of this feeder is 543m to the end node.

Node YW12 shows the largest volt-drop which falls to 201.00 volts when the transformer taps are set at +5% during maximum demand with no PV penetration. This voltage drops to 199.09 volts under the same conditions when the HV ring is closed. This is due to a slight imbalance of impedances and loads between the two HV circuits where the feeder circuit is more heavily loaded. Node BW4 also falls below statutory limits, with a value of 214.37 volts under the same conditions.

Node YW12 rises to 254.33 volts when the transformer taps are set at -5% during minimum demand with maximum PV penetration. This voltage drops to 254.18 volts under the same conditions when the HV ring is closed.

Interconnecting the LV network in parallel with the adjacent substation has minimal effect on nodes YW12 and BW4 as interconnection occurs on a separate LV Way (GW).

Meshing two ways from the LV board shows very little difference in the voltage profile at all measured nodes. This is again due to the fact that both circuits have similar impedances with an evenly matched load. This is however unlikely to occur in practice.

The addition of a 100kVAr capacitor halfway down the YW feeder shows an increase of around 4.8 volts to 5.2 volts at the YW end node depending on transformer tap position (the higher the tap position, the lower the voltage increase due to an increase in impedance). A further increase of up to 0.8 volts can be gained by moving the capacitor to two thirds of the way down the LV feeder (again depending on the tap position). An increase of around 2 volts can be seen at BW4 for both capacitor positions.

The results show that the midpoint 150kVAr and 200kVAr capacitors produce a voltage rise of around 7 to 8 volts and 9 to 11 volts respectively. Again, a further increase of up to 1 volt can be gained by moving the capacitor to two thirds of the way down the feeder from the feeder midpoint.

Figure 8.2: Capacitor profiles - Walmer Road YW feeder

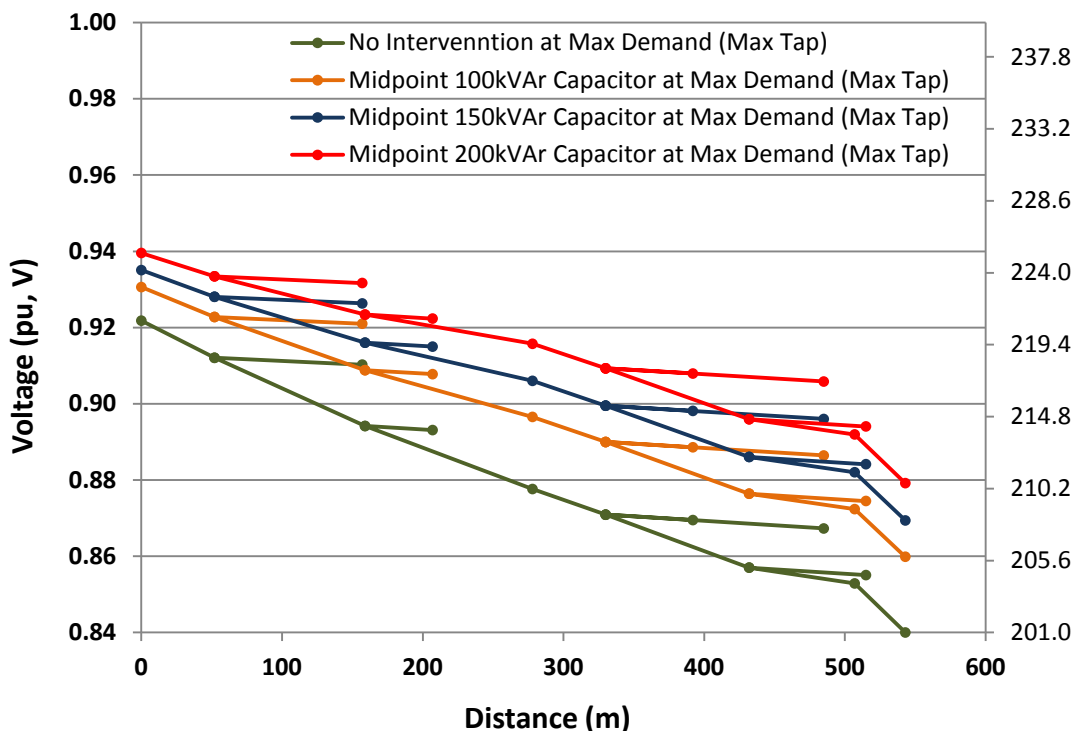


Figure 8.2 shows the voltage profiles for the range of midpoint capacitor sizes on the YW Feeder. The results show that the increase in voltage at a specific node is greater the further away from the substation. Nodes at the far end of the feeder see a voltage rise of more than double the voltage at the substation LV bus bars. This suggests that the voltage profile can be gradually flattened out by increasing the capacitor size.

The total circuit losses are greater when the capacitor is placed 2/3 down the feeder rather than at the midpoint.

Comparing the voltage profiles and the voltage losses – a 150kVAr capacitor positioned 2/3 down the YW feeder appears to be the optimum scenario. This is considering that the end node voltage will see an additional 3 volt rise when installing a 150kVAr capacitor over the 100kVAr capacitor in the same position.

### 8.3 Denton East / Pendle Road

For the following, please refer to the Denton East IPSA diagram in Appendix A and the tables of results in Appendix D.

This circuit has a PV penetration of around 10% with an average installation of 2.4kW. The capacitors were positioned on the YW feeder due to the interconnection between substations, the existing back-feed from the GW feeder and a further possible back-feed from the PW feeder. The total length of this feeder is 513m to the end node.

Node PW5 shows the largest volt-drop which falls slightly out of the statutory limits (213.94 volts) when the transformer taps are set at +5% during maximum demand with no PV penetration. This voltage rises to 214.90 volts under the same conditions when the HV ring is closed. This is due to a slight imbalance of impedances and loads between the two HV circuits where the feeder circuit is less heavily loaded. All other nodes stay within limits under these conditions.



None of the measured nodes rise above the statutory limits when the transformer taps are set at -5% during minimum demand with maximum PV penetration. This is both the case for HV open and HV closed no intervention scenarios.

Interconnecting the LV network in parallel with the adjacent substation sees a voltage rise at YW9 of 5 volts at minimum demand and 7 volts at maximum demand scenarios.

Meshing two ways from the LV board at maximum demand shows a voltage rise of up to 3 volts at YW9 and around a 1 volt drop at GW3. At minimum demand the voltage profiles are mainly unchanged.

Figure 8.3: No intervention / meshing substations

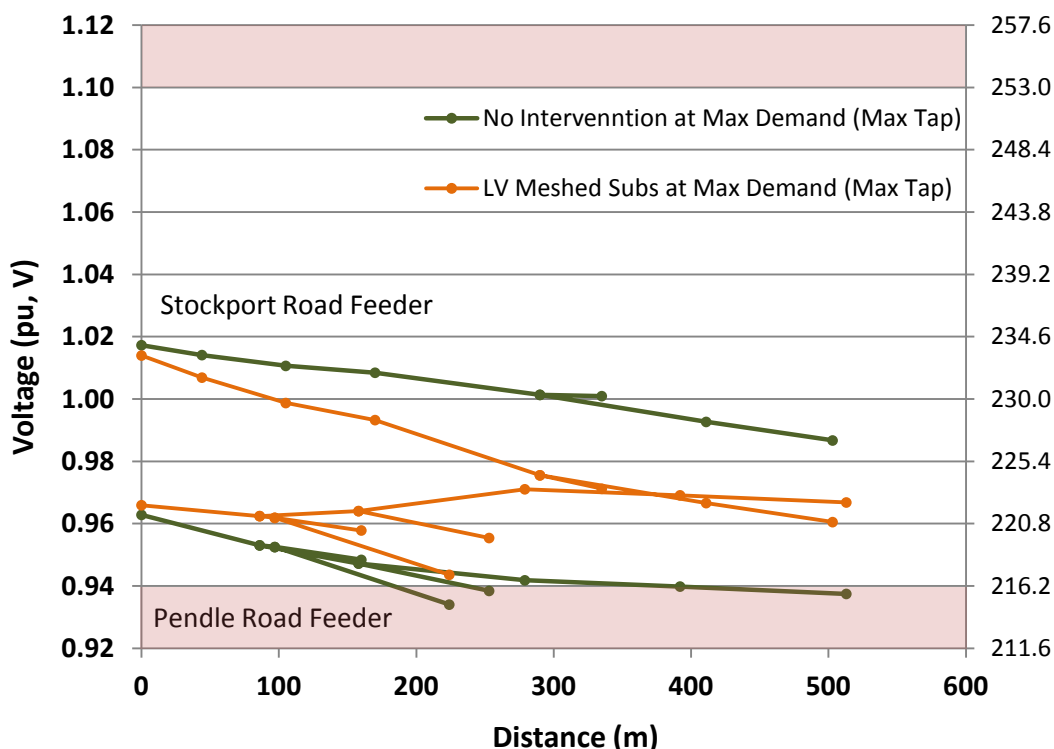


Figure 8.3 shows the comparison of the voltage profiles on the FW feeder for the no intervention scenario (green) against meshing the Pendle Road and Stockport Road 350 substations (yellow). The results show that meshing the two substations flattens the overall voltage profile while keeping the circuit within statutory limits.

The addition of a 100kVAr capacitor halfway down the YW feeder shows an increase of around 1.5 volts at the PW5 end node. No relevant change in voltage can be seen when moving the capacitor to two thirds of the way down the LV feeder. This is understandable as the capacitor has been placed on a different LV feeder.

The results show that the midpoint 150kVAr and 200kVAr capacitors produce a voltage rise of around 2 volts and 3 volts respectively. There is very little increase at the end node by moving the capacitor to two thirds of the way down the feeder.

The total circuit losses are greater when the capacitor is placed 2/3 down the feeder rather than at the midpoint.

Comparing the voltage profiles and the voltage losses – a 100kVAr capacitor positioned halfway down the PW feeder appears to be a better scenario than installing the capacitor on the YW feeder. This is considering that the end node voltage will see less than an additional 1 volt rise when installing a 150kVAr capacitor in the same position.

## 8.4 Fallowfield / Lindleywood Road

For the following, please refer to the Fallowfield IPSA diagram in Appendix A and the tables of results in Appendix E.

This circuit has no PV penetration. The capacitors were positioned on the YW feeder due to the calculated volt-drop on this feeder. The total length of this feeder is 437m to the end node.

Node YW15 shows the largest volt-drop which falls severely out of statutory limits (190.97 volts) when the transformer taps are set at +5% during maximum demand with no PV penetration. This voltage rises to 192.26 volts under the same conditions when the HV ring is closed. This is due to a slight imbalance of impedances and loads between the two HV circuits where the feeder circuit is less loaded than the interconnected circuit. All other nodes drop below statutory limits under these conditions.

None of the measured nodes rise above the statutory limits when the transformer taps are set at -5% during minimum demand with no PV penetration. This is both the case for HV open and HV closed no intervention scenarios.

Interconnecting the LV network in parallel with the adjacent substation sees minimal changes to the voltage profile at minimum demand. Only the two nearest nodes see any change when at maximum demand. This is due to the fact that both circuits are evenly loaded with similar impedances.

There was not a suitable backfeed available at this location to interconnect two LV ways from the LV board.

The addition of a 100kVAr capacitor halfway down the YW feeder shows an increase of around 2.5 volts to 3 volts at the YW15 end node depending on transformer tap position. Less than half a volt increase can be seen when moving the capacitor to two thirds of the way down the LV feeder.

The results show that the midpoint 150kVAr and 200kVAr capacitors produce a voltage rise of around 2 volts and 3 volts respectively. There is very little increase at the end node by moving the capacitor to two thirds of the way down the feeder.

Figure 8.4: Capacitor profiles – Lindleywood Road YW feeder

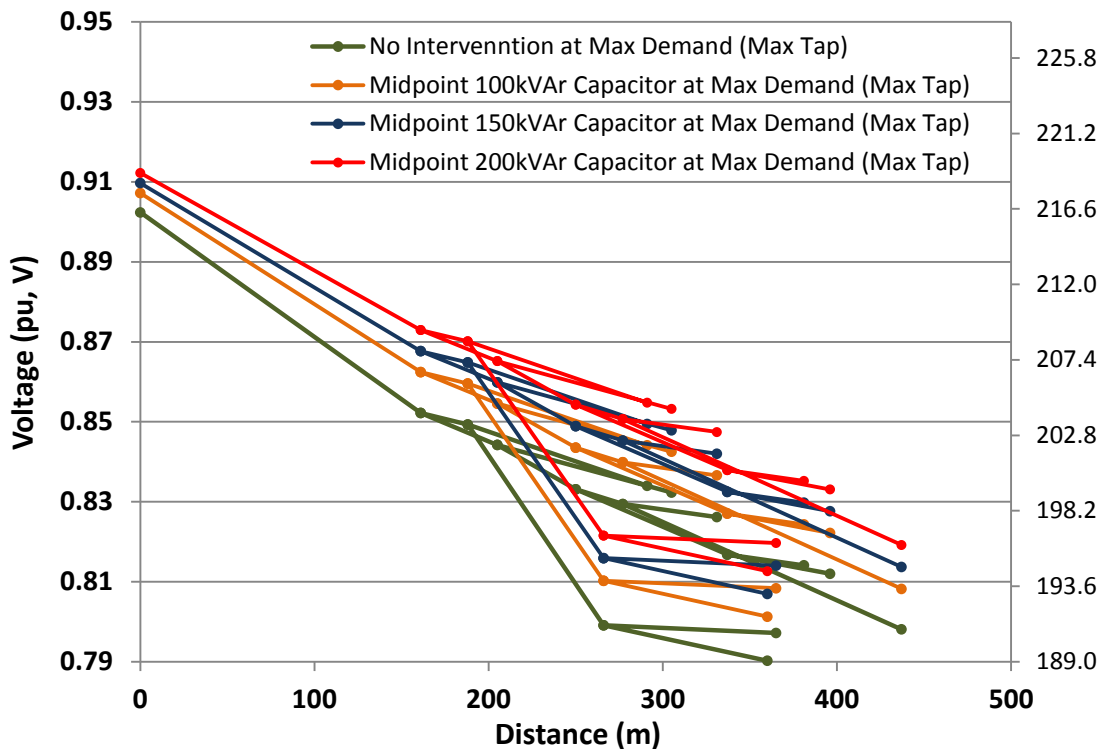


Figure 8.4 shows the voltage profiles for the range of midpoint capacitor sizes on the YW Feeder. The results show that the increase in voltage at a specific node is greater the further away from the substation. Nodes at the far end of the feeder see a voltage rise double that of the voltage at the substation LV bus bars.

The total circuit losses are greater when the capacitor is placed 2/3 down the feeder rather than at the midpoint.

Comparing the voltage profiles and the voltage losses – a 100kVAr capacitor positioned halfway down the YW feeder appears to be the optimum scenario. It would also be worthwhile installing a 100kVAr capacitor on the BW feeder due to the excessive volt drop. This is considering that the end node voltage will see less than an additional 1 volt rise when installing a 150kVAr capacitor in the same position.

### 8.5 Wigton / Western Bank

For the following, please refer to the Wigton IPSA diagram in Appendix A and the tables of results in Appendix F.

This circuit has a PV penetration of less than 10% with an average installation of 3.08kW. The capacitors were positioned on the YW feeder due to the calculated volt drop. The total length of this feeder is 422m to the end node.

Node YW5 shows the largest volt-drop which falls to 190.97 volts when the transformer taps are set at +5% during maximum demand with no PV penetration. All other nodes feed from Western Bank drop below statutory limits under these conditions. DINIS studies have highlighted that it is ill advised to close the HV ring on this circuit due to large amounts of generation on the network.

None of the measured nodes rise above the statutory limits when the transformer taps are set at -5% during minimum demand with no PV penetration.

Interconnecting the LV network in parallel with the adjacent substation sees up to 8 volt increase at BW3 during minimum demand. The same node sees a 10 volt increase at maximum demand. All other nodes see a change of around 1 to 2 volts under the same scenarios.

Meshing two ways from the LV board at maximum demand shows a voltage rise of up to 6 volts at YW5. At minimum demand the voltage increases by only 0.7 volts.

The addition of a 100kVAr capacitor halfway down the YW feeder shows an increase of around 4.8 volts to 6.3 volts at the YW5 end node depending on transformer tap position. For the majority of scenarios, less than a 1 volt increase can be seen when moving the capacitor to two thirds of the way down the LV feeder. Interestingly, there is a 2.6 volt rise when moving the capacitor to the 2/3 position at minimum demand (+5%) tap position. Additionally there is a 0.8 volts loss at maximum demand (+5%) tap position.

The results show that the midpoint 150kVAr and 200kVAr capacitors produce a voltage rise of around 3 volts and 5 volts respectively. The 0.06 cable appears to overload when moving these capacitors to the 2/3 position when the LV ways are not meshed.

The total circuit losses are greater when the capacitor is placed 2/3 down the feeder rather than at the midpoint.

Comparing the voltage profiles and the voltage losses – a 100kVAr capacitor positioned halfway down the PW feeder appears to be the optimum scenario. This is considering that the end node voltage will only see an additional 2 to 3 volt rise when installing a 150kVAr capacitor in the same position.

## **8.6 Addition of multiple capacitors**

The addition of capacitors to the LV network understandably increases the measured voltage at the distribution substation bus bars. Each Trial circuit was therefore modelled to simulate the effects of placing a number of 100kVAr capacitors on different LV ways. PV penetration was ignored for this section of tests to allow for direct comparison of each circuit. The results are shown in Figure 8.5 below.

Figure 8.5: Results of multiple capacitor scenarios

<u>Green Street</u>	Min Demand			Max Demand		
<b>LV Busbar (750kVA)</b>	<b>Min Tap</b>	<b>Mid Tap</b>	<b>Max Tap</b>	<b>Min Tap</b>	<b>Mid Tap</b>	<b>Max Tap</b>
No Intervention	227.23	238.64	251.20	220.55	231.75	244.13
100kVAr Capacitor 1/2 Only	228.92	240.44	253.14	222.16	233.51	246.03
2x 100kVAr Capacitor 1/2 Only	230.70	242.28	255.15	223.82	235.30	247.95
3x 100kVAr Capacitor 1/2 Only	232.46	244.16	257.17	225.56	237.13	249.92
<u>Hindley Green</u>	Min Demand			Max Demand		
<b>LV Busbar (500kVA)</b>	<b>Min Tap</b>	<b>Mid Tap</b>	<b>Max Tap</b>	<b>Min Tap</b>	<b>Mid Tap</b>	<b>Max Tap</b>
No Intervention	227.93	239.36	252.01	220.94	232.51	245.26
100kVAr Capacitor 1/2 Only	230.27	241.84	254.64	223.09	234.81	247.73
2x 100kVAr Capacitor 1/2 Only	232.65	244.37	257.38	225.35	237.23	250.33
3x 100kVAr Capacitor 1/2 Only	235.12	247.01	260.16	227.71	239.75	253.02
<u>Denton East</u>	Min Demand			Max Demand		
<b>LV Busbar (1000kVA)</b>	<b>Min Tap</b>	<b>Mid Tap</b>	<b>Max Tap</b>	<b>Min Tap</b>	<b>Mid Tap</b>	<b>Max Tap</b>
No Intervention	227.86	239.27	251.86	221.45	232.75	245.26
100kVAr Capacitor 1/2 Only	229.21	240.70	253.42	222.72	234.12	246.71
2x 100kVAr Capacitor 1/2 Only	230.56	242.14	254.99	224.02	235.52	248.22
3x 100kVAr Capacitor 1/2 Only	231.92	243.60	256.58	225.34	236.92	249.76
<u>Fallowfield</u>	Min Demand			Max Demand		
<b>LV Busbar (1000kVA)</b>	<b>Min Tap</b>	<b>Mid Tap</b>	<b>Max Tap</b>	<b>Min Tap</b>	<b>Mid Tap</b>	<b>Max Tap</b>
No Intervention	226.68	238.12	250.76	216.36	228.00	240.78
100kVAr Capacitor 1/2 Only	228.02	239.54	252.28	217.57	229.31	242.20
2x 100kVAr Capacitor 1/2 Only	229.34	240.96	253.82	218.80	230.64	243.66
3x 100kVAr Capacitor 1/2 Only	230.69	242.42	255.40	220.11	232.05	245.18
<u>Wigton</u>	Min Demand			Max Demand		
<b>LV Busbar (315kVA)</b>	<b>Min Tap</b>	<b>Mid Tap</b>	<b>Max Tap</b>	<b>Min Tap</b>	<b>Mid Tap</b>	<b>Max Tap</b>
No Intervention	226.28	239.21	251.83	214.67	225.84	238.15
100kVAr Capacitor 1/2 Only	231.41	243.06	255.89	217.89	229.26	241.88
2x 100kVAr Capacitor 1/2 Only	235.17	247.00	260.13	221.42	233.02	245.90
3x 100kVAr Capacitor 1/2 Only	239.05	251.11	264.54	225.10	237.00	250.09

No intervention = no capacitor banks have been installed.

100kVAr capacitor ½ only = one 100kVAr capacitor bank installed halfway down a LV feeder.

2x 100kVAr Capacitor ½ only = two 100kVAr capacitor banks installed halfway down two LV feeders.

3x 100kVAr Capacitor ½ only = three 100kVAr capacitor banks installed halfway down three LV feeders.

These results show that the magnitude of voltage rise is dependent on the transformer impedance and hence the size of distribution transformer. For each 100kVAr capacitor added to the network, the average voltage rise at the distribution bus bars increased as shown in Figure 8.6.

Figure 8.6: Voltage rise comparisons at LV busbars

Transformer size	Average voltage rise
300kVA/315kVA	4.0 volts
500kVA	2.5 volts
750kVA/800kVA	1.8 volts
1000kVA	1.4 volts

## 9 SUMMARY OF MODELLING RESULTS

On all of the modelled Trial circuits, the LV circuit losses and the total circuit losses increase when positioning the capacitors at the 2/3 position rather than the 1/2 position.

The majority of these Trial circuits see little difference in voltage rise at the end node when comparing the 1/2 and 2/3 capacitor positions. This is because the variances in impedance are mainly quite small. It is therefore recommended to install the capacitors at the halfway positions to minimise losses. It may however be necessary to install capacitors at the 2/3 positions for longer radials where the voltage difference at the end node is more substantial.

After assessing the Denton East results it would appear that the optimal position for the capacitor placement would be 1/2 way down the PW feeder. Initially it was thought by placing the capacitors on the YW feeder, the voltage boost from the capacitor could be more evenly distributed. In fact it seems more effective to place the capacitor on the feeder with the largest volt-drop (PW) as a smaller capacitor can be used. Using a smaller capacitor will reduce equipment costs.

The Fallowfield Trial circuit showed signs of large volt-drops on every feeder out of the substation leading to the conclusion that the calculated maximum demand profile was overestimated. The circuit appeared to still be non-compliant even when the demand was reduced from 1.5kW to 1kW average loads (which probably better reflects the demand for the terrace housing on this circuit). This could be down to a number of factors. The cable records could be incorrect in terms of running arrangements and service positions. The cable types could also be incorrect. Live measurements will be able to confirm the actual loading on this circuit should more accurate modelling be required.

The Wigton Trial circuit would not converge for a number of scenarios involving the 150kVAr and 200kVAr capacitors when positioned at the 2/3 position. This is believed to be because the upstream 0.06 cable was overloading. It should be noted that the load flow converged when the 0.06 cable was overlaid with 0.1. As a result it is important to consider small section cables when choosing the position of the capacitors.

It is recommended that 200kVAr capacitors are not used on the LV network for these Trials due to the associated voltage rise at the distribution substation bus bars. This is due to the number of capacitors that will be installed over the Trial networks.

The worst case scenarios of minimum demand/maximum PV penetration and maximum demand/no PV penetration are highly unlikely in practise. It is almost certain that PV installations are never going to produce 100% output of their name plant rating due to a number of factors.

The comparison of results between open and closed HV ring scenarios produced less of a voltage change on the LV networks than was expected. This is due to the way that the scripting tool applies an average load across each distribution substation on the HV ring. In practice these loads will vary. However, the control of the HV open points will be optimised

by the Siemens Spectrum software. DINIS studies were carried out on the HV ring to prove their operation as part of the Smart Street site selection methodology.

The Siemens optimisation software will need to be switched out and the network should return to normal running during any fault conditions. The fault is to be isolated until it can be repaired and only then should the optimisation software be reapplied. The optimisation software is expected to switch out the capacitors under heavy PV penetrations at times of maximum generation with minimum demand.

It will be necessary to consider the distribution transformer size when assessing how many capacitors can be added to an LV network. The number of capacitors will need to be limited on networks fed by 315kVA transformers or smaller due to the associated voltage rise at the substation. Figure 9.1 shows suggested capacitor limitations for corresponding transformer sizes.

Figure 9.1: Capacitor bank limitations

Transformer Size	Capacitor Bank Limit
300kVA / 315kVA	2
500kVA	3
750kVA / 800kVA	4
1000kVA	4

It has been decided that all HV capacitor placements shall be installed on the HV ring rather than the HV radial with the largest voltage drop. This is to minimise the size of Trial area. DINIS studies shall be carried out to calculate the optimum size and position for the HV capacitor installations.

## 10 APPLICATION OF RULES BASED METHODOLOGY

These rules are to be applied to the full set of sample circuits that have been identified as part of the site selection methodology. The rules are to confirm if the site is suitable for the Trials as well as the optimal capacitor size and placement. It is recommended that the detailed methodology is reapplied to a small number of circuits to prove the method.

### Suitability of LV circuit

- Confirm that the distribution substation does not have an operation restriction that will affect the Trial. (ie access restrictions, switching restrictions, etc).
  - If the substation does have a problematic operational restriction, can the restriction be removed before the Trial begins? If so, organise work associated with its removal.
- Confirm LV ways are suitable for 400A WEEZAP installation. If the existing fuse sizes are above 400A:
  - Confirm if the fuses can be reduced while still protecting the circuit.=
  - Confirm if some of the load can be picked up by another circuit during the Trial.=
  - Confirm if a specialist Kelvatec 630A LV board can be installed at this location. The specialist board will have inbuilt WEEZAP units which will be fully rated to 630A.

- Confirm the type of LV board and if it is suitable for WEEZAP installation. (Check information on MAMs. Carry out a site visit where adequate information is not available).
- If the LV board is deemed not suitable. Check if it is highlighted on the asset replacement scheme. If it is highlighted, then accelerate the board replacement to coincide with the Smart Street Trial.

### **LV capacitor installation**

- All capacitors shall be installed on their optimal radial position as opposed to possible LV ring positions. This is due to the fact that radials are considered to be normal running arrangements. It also provides the best voltage regulation in terms of volt-drop.
- Calculate the volt-drop on each radial way out of the proposed distribution substation using LV Affirm. Radials with the highest volt-drop should be targeted for a capacitor installation. Should more than one radial have similar percentage volt-drops then the one with the most customers should be chosen.
  - Confirm transformer size. (Use MAMs).
  - Confirm cable types and lengths of each LV feeder. (Use Escar).
  - Confirm customer numbers on each LV feeder. (Use CRMs or Escar)
  - Confirm maximum volt-drop on each feeder. (Use LV Affirm).
- Confirm PV penetration on the chosen feeder. (Use DG database).
  - Calculate the number of properties on the feeder that have PV installations as a percentage of the total number of customers on that feeder.
  - Calculate the average size of PV installation on the feeder in kW.
- Calculate optimal capacitor placement based on the following rules:
  - For small length radials (0m - 449m) install the capacitor as close to 50% of the circuit length as possible.
  - For longer length radials (450m or more) install the capacitor as close to 67% of the circuit length as possible.
- Calculate optimal capacitor size based on the following rules:
  - For radials with a volt-drop of 0% - 5% or a length of up to 499m install a 100kVAr capacitor bank.
  - For radials with a volt-drop of more than 5% and over 500m in length - install a 150kVAr capacitor bank.
  - If the PV penetration is higher than 50% on the feeder, install a 100kVAr capacitor. This is due to the potential voltage rise during peak generation times.
- A maximum of two capacitor banks are to be installed on an LV network that is fed by a transformer that is smaller than 500kVA.
- Confirm space is available at proposed location. (Use GIS, Google Maps).
- Check other utilities in area. (Use utility records and line search).



## Interconnection of LV circuits

- Confirm that the two LV circuits to be meshed are fed from the same HV ring to avoid circulating currents. (Use HV Operations diagrams or CRMS).
- Confirm there are no operational restrictions such as non standard phase rotations. (Use GIS to look for unusual items).
- Check customer numbers. (Use CRMS and Escar).
- Confirm transformer sizes. (Use MAMs).
- Calculate combined circuit impedance and volt-drop for each LV feeder. (Use LV Affirm).
- Compare the two circuits to check if they are suitable to interconnect. (Compare circuit loads and impedances on LV Affirm).
- If a new Link Box is required to be installed to fit the LYNX device, carry out volt-drop calculation for the new configuration. (Use LV Affirm).
- Newly installed parts of interconnectors shall not be tapered and shall have a minimum cross-section of 185mm<sup>2</sup> SAC underground or 95mm<sup>2</sup> ABC overhead. (As per COP 226 - 4.7.3.3).

## HV capacitor placement

- Capacitor placement on the HV Trial ring is to be optimised by modelling the circuit in DINIS. Results can be compared with the IPSA models (should the preliminary circuits be chosen in the final circuit selection process). All optimal capacitor positions will be calculated based on radial configurations due to the larger corresponding voltage drop under these scenarios. It is also assumed that the network will run under HV open scenarios for longer periods. DINIS studies will however confirm both open and closed HV ring scenarios.
- For overhead capacitor installations it is recommended that a site visit is carried out to assess any possible Wayleave issues.
- For ground mounted capacitor installations it may be possible to confirm space is available at proposed location (existing substation). (Use GIS, Google Maps).
- Check other utilities in area. (Use utility records and line search).

## Protection check

- Check distribution substations for translay and directional protection schemes.
- Check distribution substations for sensitive earth fault.
- Check primary substations for line drop compensation schemes.
- Check HV circuits for midpoint circuit breakers.
- Confirm with a protection engineer if any proposals are affected by one of the above.

## 11 NEXT STEPS

One of the deliverables of Smart Street is a study on the retrofit design and operation of interconnected LV networks. This study will therefore expand the design methodology described in this document as the Trial develops. This investigation will not only produce an in-depth design policy, but it will lead to the production of an operational policy where management of both modified and newly designed LV circuits will be considered.

As the existing LV records are not completely reliable it will be necessary for the construction team to prove the actual running arrangement of the LV circuits when installing the Trial equipment. The LV records will need to be updated so that the network can be modelled as closely as possible for both optimisation and research purposes.

This design methodology will act as a live document which can be updated as the Trial develops to incorporate any modifications that may be required as a result unforeseen issues and onsite findings.

## 12 REFERENCES & GLOSSARY

COP226 – Low Voltage Network Design

COP227 – LV.AFFIRM Network Design

EPD279 - Distribution System Design - General Requirements.

EPD282 - Distribution System Design - 11/6.6kV Network.

EPD283 - Distribution System Design - LV Network.

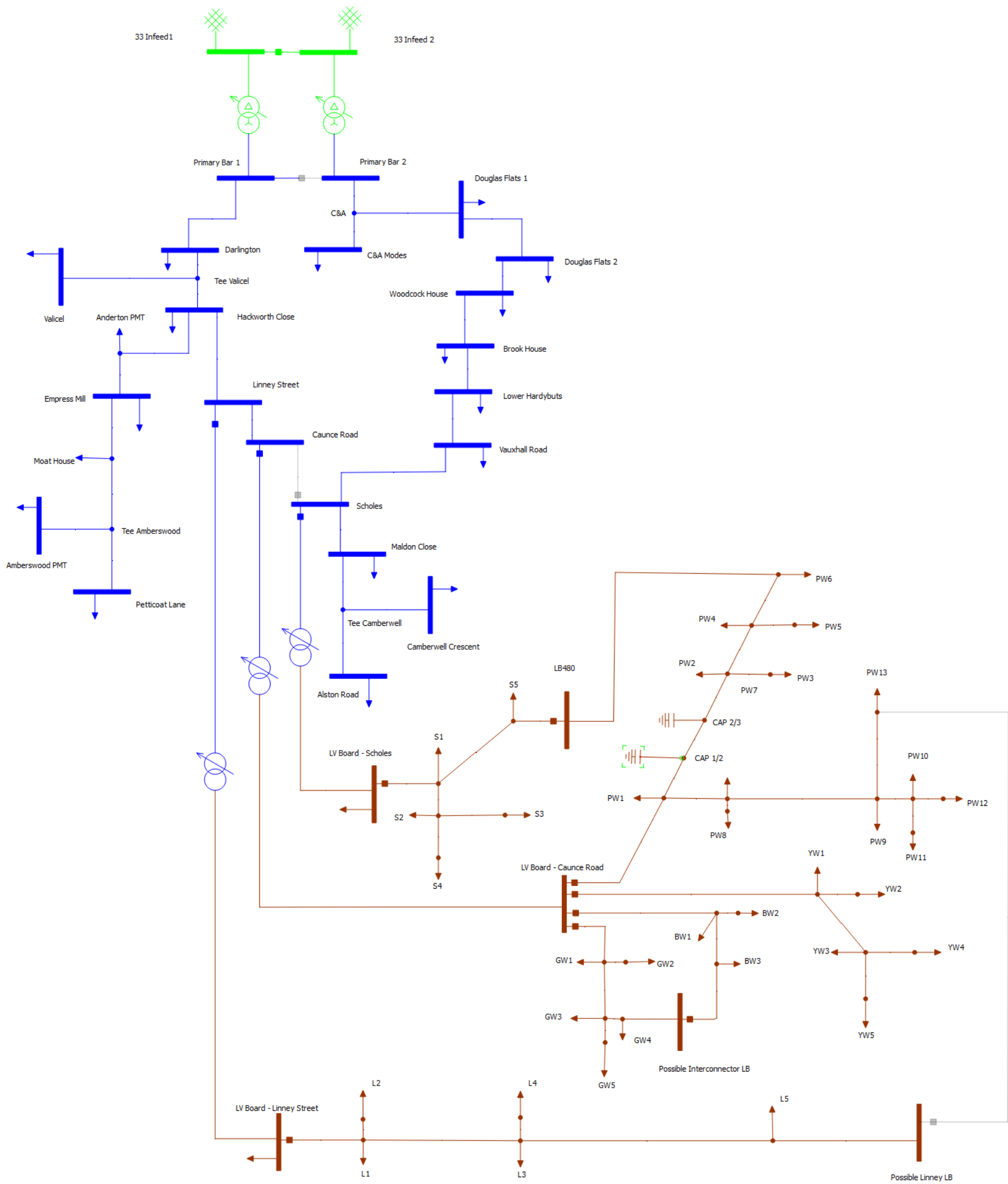
COP331 - Protection of LV Underground and Overhead Distributors and HV Protection of Distribution Transformers.

*eta* – HV Capacitor Placement Study v1.0 16/08/13 (Parsons Brinckerhoff)

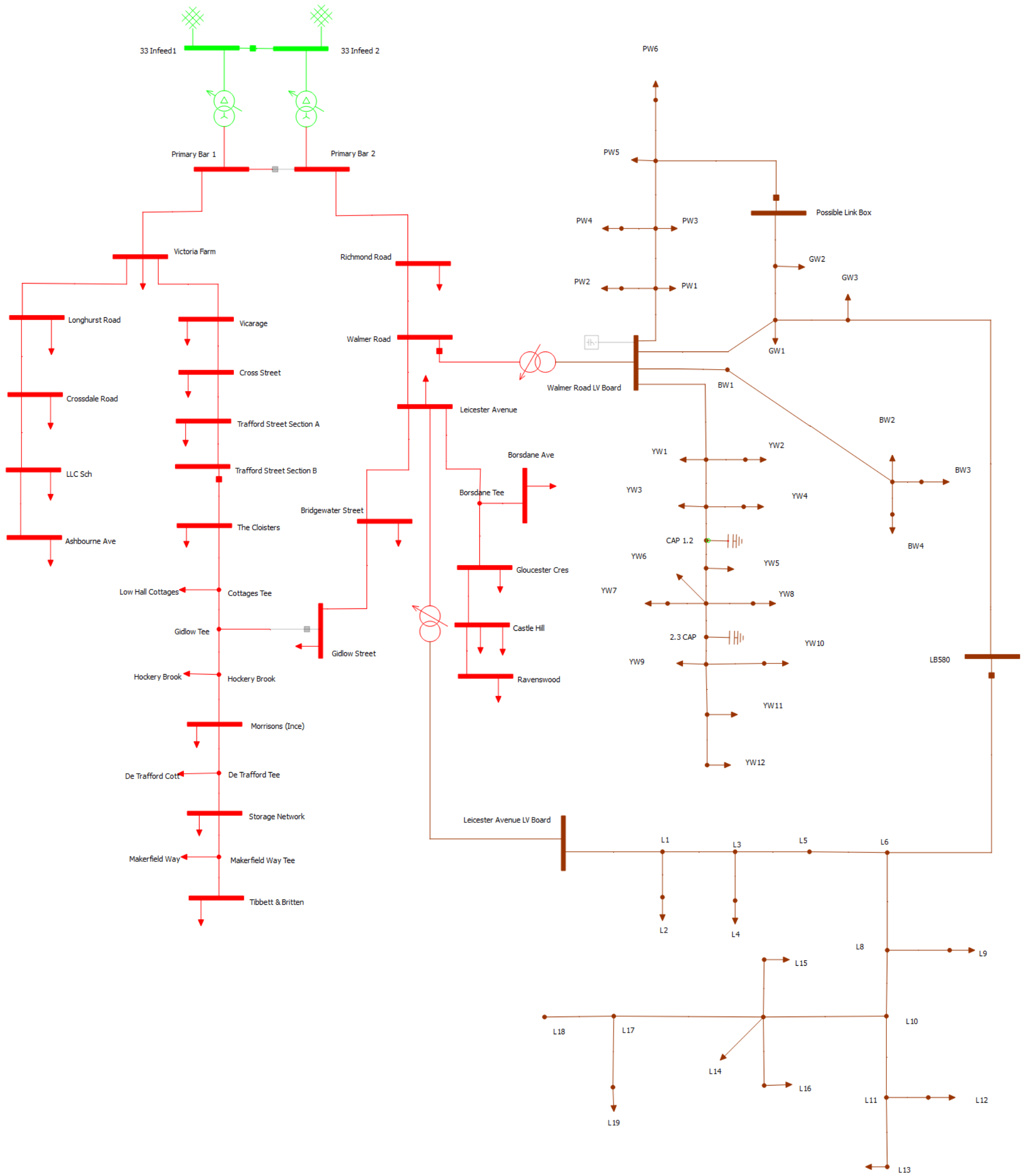
*eta* – LV Capacitor Placement Study v1.0 16/08/13 (Parsons Brinckerhoff)

# APPENDIX A - IPSA MODEL SCHEMATICS

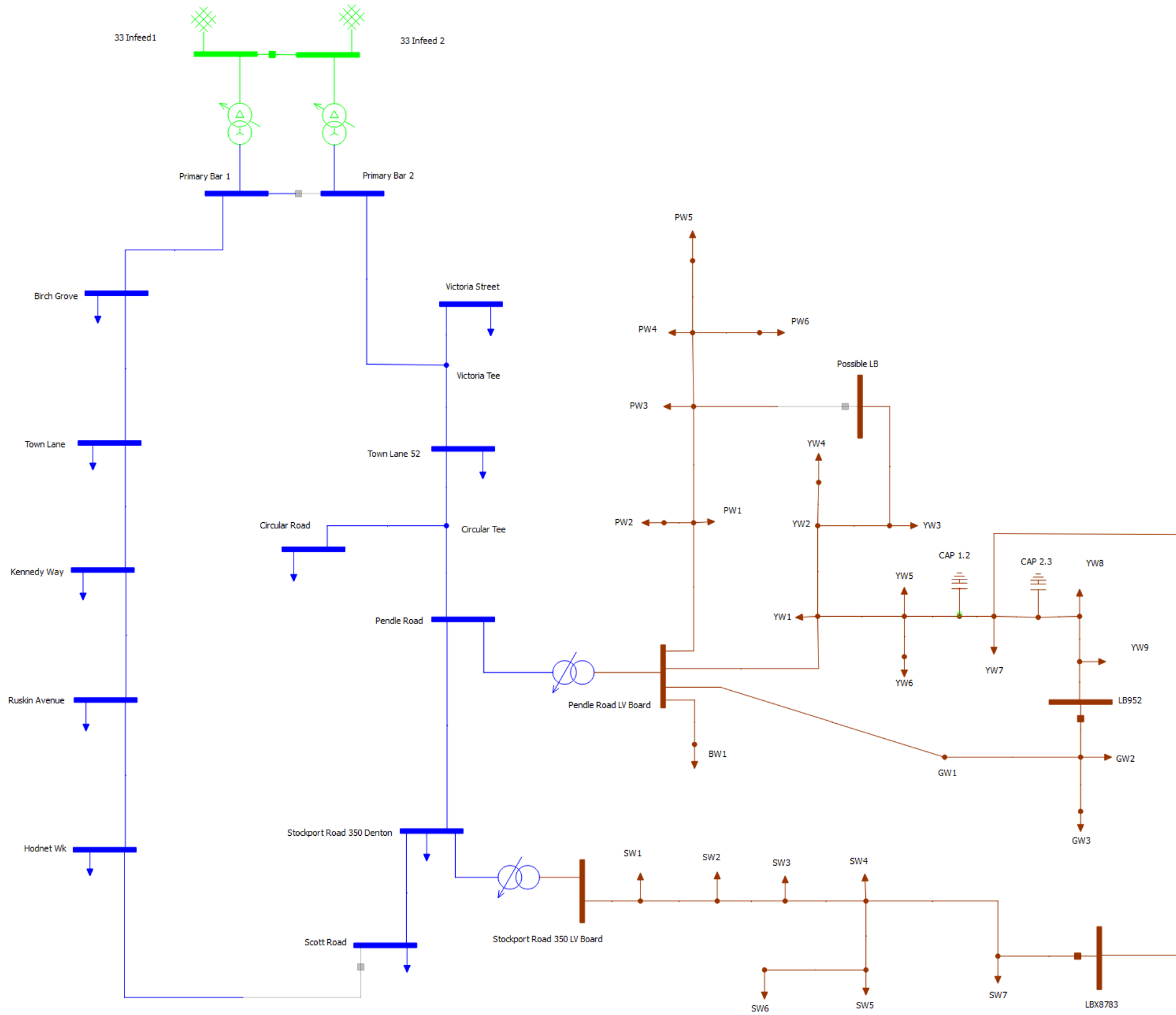
## Green Street IPSA Model



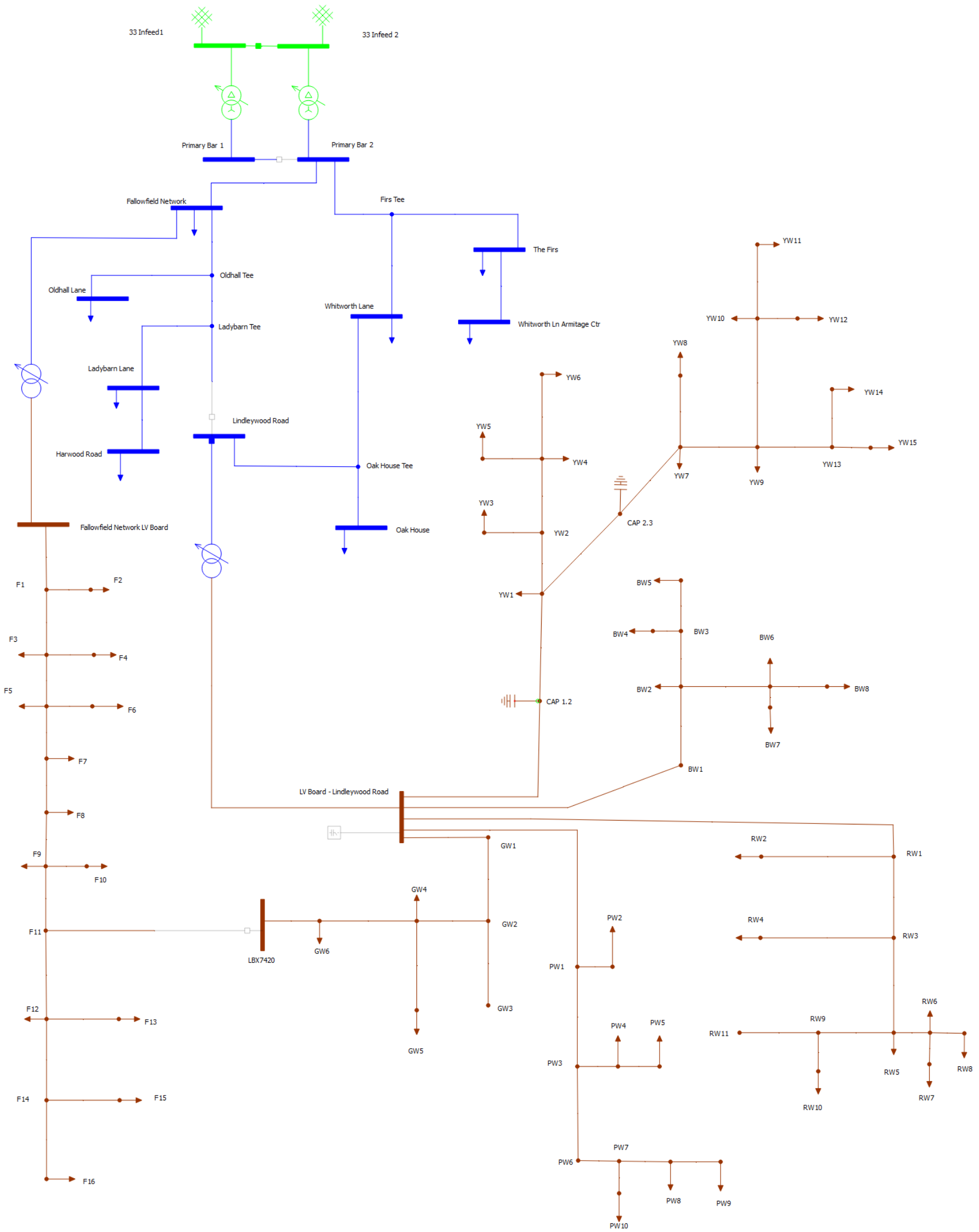
# Hindley Green IPSA Model



Denton East IPSA Model

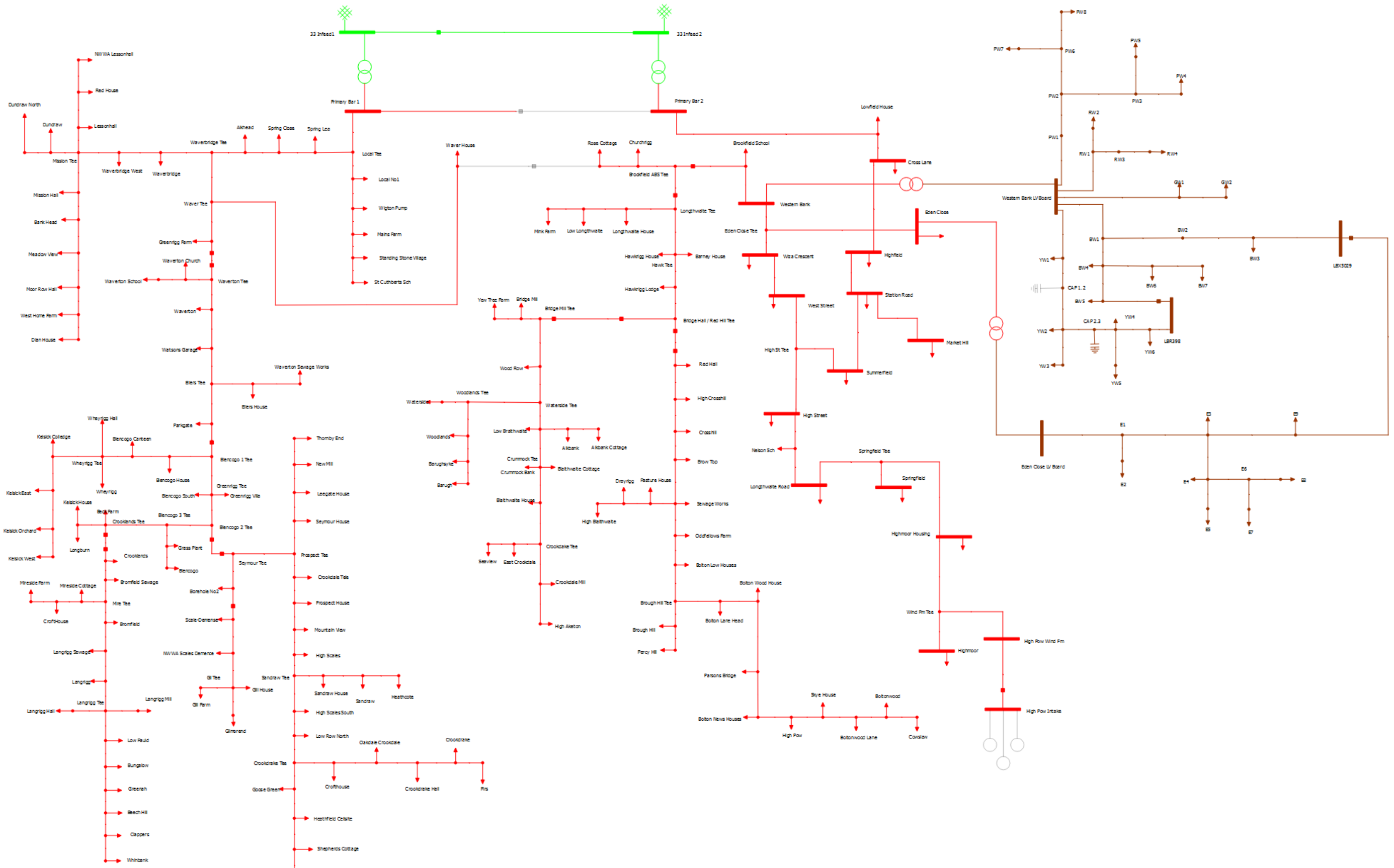


Fallowfield IPSA Model



# SMART STREET – NETWORK DESIGN METHODOLOGY

## Wigton IPSA Circuit



## APPENDIX B - GREEN STREET RESULTS

Min Demand of 0.2kW _ (2.28kW PV average installation)			Voltage Level at 0% PV Penetration					Voltage Level at 40% PV Penetration				
HV RING	OLTC Tap Position	Scenario	PW5	PW12	BW3	GW5	YW4	PW5	PW12	BW3	GW5	YW4
HV Ring Open	Top Tap (5%)	1. No Intervention	226.46	226.98	227.02	227.05	226.95	230.54	229.16	228.94	228.87	229.16
HV Ring Open	Top Tap (5%)	2. LV Meshed Subs Only	238.57	228.27	228.16	228.19	228.09	240.74	230.49	230.14	230.08	230.37
HV Ring Open	Top Tap (5%)	3. LV Meshed Ways Only	226.48	226.99	227.65	227.06	226.97	230.54	229.16	228.93	228.88	229.16
HV Ring Open	Top Tap (5%)	4. LV Meshed Subs & Ways Only	238.41	228.22	228.14	228.16	228.07	240.74	230.49	230.14	230.08	230.37
HV Ring Open	Top Tap (5%)	5. 100kVAr Capacitor 1/2 Only	229.46	228.78	228.74	228.77	228.67	233.51	230.96	230.66	230.60	230.88
HV Ring Open	Top Tap (5%)	6. 100kVAr Capacitor 2/3 Only	229.89	228.78	228.74	228.77	228.67	233.92	230.96	230.66	230.60	230.89
HV Ring Open	Top Tap (5%)	7. 150kVAr Capacitor 1/2 Only	230.98	229.68	229.61	229.63	229.53	234.99	231.86	231.53	231.47	231.75
HV Ring Open	Top Tap (5%)	8. 150kVAr Capacitor 2/3 Only	231.62	229.68	229.61	229.64	229.53	235.59	231.87	231.53	231.47	231.76
HV Ring Open	Top Tap (5%)	9. 200kVAr Capacitor 1/2 Only	232.49	230.59	230.48	230.50	230.40	236.47	232.77	232.40	232.34	232.62
HV Ring Open	Top Tap (5%)	10. 200kVAr Capacitor 2/3 Only	233.38	230.60	230.48	230.51	230.41	237.26	232.78	232.41	232.35	232.63
HV Ring Open	Top Tap (5%)	11. LV Meshed Subs 100kVAr Capacitor 1/2	233.91	229.28	229.19	229.22	229.12	236.15	231.44	231.12	231.05	231.34
HV Ring Open	Top Tap (5%)	12. LV Meshed Ways 100kVAr Capacitor 1/2	229.47	228.78	228.75	228.76	228.67	234.78	231.49	231.14	231.06	231.34
HV Ring Open	Top Tap (5%)	13. LV Meshed Subs & Ways 100kVAr Capacitor 1/2	233.91	229.28	229.19	229.21	229.12	236.15	231.44	231.11	231.06	231.34
HV Ring Open	Top Tap (5%)	14. LV Meshed Subs 100kVAr Capacitor 2/3	234.08	229.21	229.12	229.15	229.05	236.33	231.38	231.05	230.99	231.28
HV Ring Open	Top Tap (5%)	15. LV Meshed Ways 100kVAr Capacitor 2/3	229.89	228.78	228.75	228.76	228.67	233.92	230.96	230.66	230.61	230.89
HV Ring Open	Top Tap (5%)	16. LV Meshed Subs & Ways 100kVAr Capacitor 2/3	234.08	229.21	229.13	229.14	229.05	236.33	231.38	231.05	231.00	231.28
HV Ring Open	Top Tap (5%)	17. LV Meshed Subs 150kVAr Capacitor 1/2	234.54	230.01	229.89	229.92	229.82	236.78	232.18	231.83	231.77	232.05
HV Ring Open	Top Tap (5%)	18. LV Meshed Ways 150kVAr Capacitor 1/2	230.98	229.68	229.61	229.63	229.53	234.99	231.86	231.52	231.47	231.75
HV Ring Open	Top Tap (5%)	19. LV Meshed Subs & Ways 150kVAr Capacitor 1/2	234.54	230.01	229.90	229.92	229.82	236.78	232.18	231.82	231.77	232.05
HV Ring Open	Top Tap (5%)	20. LV Meshed Subs 150kVAr Capacitor 2/3	234.78	229.91	229.79	229.82	229.72	237.04	232.09	231.74	231.67	231.96
HV Ring Open	Top Tap (5%)	21. LV Meshed Ways 150kVAr Capacitor 2/3	231.62	229.68	229.61	229.63	229.53	235.59	231.87	231.53	231.48	231.76
HV Ring Open	Top Tap (5%)	22. LV Meshed Subs & Ways 150kVAr Capacitor 2/3	234.78	229.91	229.80	229.81	229.72	237.04	232.09	231.73	231.68	231.96
HV Ring Open	Top Tap (5%)	23. LV Meshed Subs 200kVAr Capacitor 1/2	235.16	230.74	230.60	230.63	230.53	237.40	232.93	232.54	232.48	232.77
HV Ring Open	Top Tap (5%)	24. LV Meshed Ways 200kVAr Capacitor 1/2	232.39	230.56	230.45	230.47	230.37	236.47	232.77	232.40	232.34	232.62
HV Ring Open	Top Tap (5%)	25. LV Meshed Subs & Ways 200kVAr Capacitor 1/2	235.15	230.72	230.58	230.60	230.50	237.39	232.90	232.52	232.46	232.74
HV Ring Open	Top Tap (5%)	26. LV Meshed Subs 200kVAr Capacitor 2/3	235.50	230.60	230.46	230.49	230.39	237.74	232.79	232.42	232.36	232.64
HV Ring Open	Top Tap (5%)	27. LV Meshed Ways 200kVAr Capacitor 2/3	233.18	230.55	230.45	230.46	230.37	237.26	232.78	232.40	232.35	232.63
HV Ring Open	Top Tap (5%)	28. LV Meshed Subs & Ways 200kVAr Capacitor 2/3	235.50	230.60	230.47	230.48	230.39	237.74	232.79	232.41	232.36	232.64
HV Ring Open	Mid Tap (0%)	1. No Intervention	237.89	238.38	238.42	238.45	238.35	241.77	240.46	240.26	240.20	240.47
HV Ring Open	Mid Tap (0%)	2. LV Meshed Subs Only	243.22	239.09	239.06	239.09	238.99	245.37	241.18	240.94	240.88	241.15
HV Ring Open	Mid Tap (0%)	3. LV Meshed Ways Only	237.89	238.38	238.43	238.44	238.35	241.77	240.46	240.25	240.20	240.47
HV Ring Open	Mid Tap (0%)	4. LV Meshed Subs & Ways Only	243.26	239.10	239.08	239.10	239.01	245.37	241.18	240.93	240.88	241.15
HV Ring Open	Mid Tap (0%)	5. 100kVAr Capacitor 1/2 Only	241.06	240.28	240.24	240.27	240.17	244.92	242.39	242.10	242.04	242.31
HV Ring Open	Mid Tap (0%)	6. 100kVAr Capacitor 2/3 Only	241.50	240.28	240.24	240.27	240.17	245.35	242.39	242.11	242.05	242.31
HV Ring Open	Mid Tap (0%)	7. 150kVAr Capacitor 1/2 Only	242.65	241.25	241.16	241.19	241.10	246.49	243.35	243.03	242.97	243.24
HV Ring Open	Mid Tap (0%)	8. 150kVAr Capacitor 2/3 Only	243.32	241.25	241.17	241.19	241.10	247.12	243.36	243.04	242.98	243.24
HV Ring Open	Mid Tap (0%)	9. 200kVAr Capacitor 1/2 Only	244.26	242.23	242.10	242.12	242.03	248.06	244.32	243.96	243.90	244.17
HV Ring Open	Mid Tap (0%)	10. 200kVAr Capacitor 2/3 Only	245.17	242.24	242.11	242.13	242.04	248.88	244.33	243.97	243.91	244.18
HV Ring Open	Mid Tap (0%)	11. LV Meshed Subs 100kVAr Capacitor 1/2	238.64	240.14	240.13	240.16	240.06	240.84	242.23	242.01	241.95	242.21
HV Ring Open	Mid Tap (0%)	12. LV Meshed Ways 100kVAr Capacitor 1/2	241.06	240.28	240.25	240.26	240.17	244.92	242.39	242.10	242.05	242.31
HV Ring Open	Mid Tap (0%)	13. LV Meshed Subs & Ways 100kVAr Capacitor 1/2	238.64	240.14	240.14	240.15	240.06	240.84	242.23	242.00	241.95	242.21
HV Ring Open	Mid Tap (0%)	14. LV Meshed Subs 100kVAr Capacitor 2/3	238.81	240.06	240.06	240.09	239.99	241.02	242.16	241.94	241.88	242.15
HV Ring Open	Mid Tap (0%)	15. LV Meshed Ways 100kVAr Capacitor 2/3	241.50	240.28	240.25	240.26	240.17	245.35	242.39	242.10	242.05	242.31
HV Ring Open	Mid Tap (0%)	16. LV Meshed Subs & Ways 100kVAr Capacitor 2/3	238.81	240.06	240.06	240.08	239.99	241.02	242.16	241.93	241.88	242.15
HV Ring Open	Mid Tap (0%)	17. LV Meshed Subs 150kVAr Capacitor 1/2	239.30	240.91	240.88	240.90	240.81	241.49	243.02	242.76	242.70	242.97
HV Ring Open	Mid Tap (0%)	18. LV Meshed Ways 150kVAr Capacitor 1/2	242.65	241.25	241.17	241.19	241.10	246.49	243.35	243.02	242.98	243.24
HV Ring Open	Mid Tap (0%)	19. LV Meshed Subs & Ways 150kVAr Capacitor 1/2	239.30	240.91	240.88	240.90	240.81	241.49	243.02	242.76	242.71	242.97
HV Ring Open	Mid Tap (0%)	20. LV Meshed Subs 150kVAr Capacitor 2/3	239.53	240.80	240.77	240.79	240.70	241.76	242.91	242.66	242.60	242.87
HV Ring Open	Mid Tap (0%)	21. LV Meshed Ways 150kVAr Capacitor 2/3	243.32	241.25	241.17	241.19	241.10	247.12	243.36	243.03	242.98	243.24
HV Ring Open	Mid Tap (0%)	22. LV Meshed Subs & Ways 150kVAr Capacitor 2/3	239.53	240.80	240.77	240.79	240.70	241.76	242.91	242.65	242.60	242.87
HV Ring Open	Mid Tap (0%)	23. LV Meshed Subs 200kVAr Capacitor 1/2	239.94	241.69	241.63	241.65	241.56	242.14	243.80	243.52	243.46	243.73
HV Ring Open	Mid Tap (0%)	24. LV Meshed Ways 200kVAr Capacitor 1/2	244.18	242.19	242.08	242.10	242.01	248.06	244.32	243.96	243.91	244.17
HV Ring Open	Mid Tap (0%)	25. LV Meshed Subs & Ways 200kVAr Capacitor 1/2	239.93	241.66	241.61	241.62	241.53	242.13	243.78	243.49	243.44	243.70
HV Ring Open	Mid Tap (0%)	26. LV Meshed Subs 200kVAr Capacitor 2/3	240.30	241.55	241.49	241.51	241.42	242.49	243.66	243.38	243.32	243.59
HV Ring Open	Mid Tap (0%)	27. LV Meshed Ways 200kVAr Capacitor 2/3	245.01	242.19	242.08	242.09	242.00	248.88	244.33	243.96	243.92	244.18
HV Ring Open	Mid Tap (0%)	28. LV Meshed Subs & Ways 200kVAr Capacitor 2/3	240.30	241.55	241.49	241.51	241.42	242.49	243.66	243.37	243.33	243.59
HV Ring Open	Bottom Tap (-5%)	1. No Intervention	250.49	250.96	251.00	251.02	250.93	254.19	252.96	252.78	252.72	252.97
HV Ring Open	Bottom Tap (-5%)	2. LV Meshed Subs Only	248.37	250.99	251.07	251.09	251.00	250.48	253.00	252.86	252.81	253.06
HV Ring Open	Bottom Tap (-5%)	3. LV Meshed Ways Only	250.49	250.96	251.01	251.02	250.94	254.19	252.96	252.77	252.73	252.97
HV Ring Open	Bottom Tap (-5%)	4. LV Meshed Subs & Ways Only	248.41	251.02	251.09	251.10	251.02	250.49	253.02	252.88	252.84	253.08
HV Ring Open	Bottom Tap (-5%)	5. 100kVAr Capacitor 1/2 Only	254.00	252.98	252.95	252.97	252.88	257.54	255.03	254.76	254.70	254.95
HV Ring Open	Bottom Tap (-5%)	6. 100kVAr Capacitor 2/3 Only	254.33	253.00	252.95	252.98	252.88	257.99	255.03	254.76	254.71	254.95
HV Ring Open	Bottom Tap (-5%)	7. 150kVAr Capacitor 1/2 Only	255.56	254.04	253.94	253.97	253.88	259.21	256.06	255.75	255.70	255.94
HV Ring Open	Bottom Tap (-5%)	8. 150kVAr Capacitor 2/3 Only	256.25	254.05	253.95	253.97	253.88	259.87	256.07	255.76	255.71	255.95
HV Ring Open	Bottom Tap (-5%)	9. 200kVAr Capacitor 1/2 Only	257.25	255.10	254.95	254.97	254.88	260.88	257.11	256.75	256.70	256.95
HV Ring Open	Bottom Tap (-5%)	10. 200kVAr Capacitor 2/3 Only	258.06	255.05	254.93	254.96	254.87	261.74	257.11	256.76	256.71	256.95
HV Ring Open	Bottom Tap (-5%)	11. LV Meshed Subs 100kVAr Capacitor 1/2	243.85	252.11	252.20	252.22	252.13	246.01	254.14	254.02	253.97	254.21
HV Ring Open	Bottom Tap (-5%)	12. LV Meshed Ways 100kVAr Capacitor 1/2	254.00	252.98	252.95	252.97	252.88	257.54	255.03	254.75	254.71	254.95
HV Ring Open	Bottom Tap (-5%)	13. LV Meshed Subs & Ways 100kVAr Capacitor 1/2	243.85	252.11	252.20	252.22	252.13	246.01	254.14	254.01	253.97	254.21
HV Ring Open	Bottom Tap (-5%)	14. LV Meshed Subs 100kVAr Capacitor 2/3	244.03	252.03	252.12	252.14	252.05	246.19	254.06	253.94	253.89	254.14
HV Ring Open	Bottom Tap (-5%)	15. LV Meshed Ways 100kVAr Capacitor 2/3	254.33	253.00	252.96	252.97	252.88	257.99	255.03	254.75	254.71	254.95



Min Demand of 0.2kW _ (2.28kW PV average installation)			Voltage Level at 0% PV Penetration					Voltage Level at 40% PV Penetration				
HV RING	OLTC Tap Position	Scenario	PW5	PW12	BW3	GW5	YW4	PW5	PW12	BW3	GW5	YW4
HV Ring Closed	Top Tap (5%)	1. No Intervention	226.39	226.91	226.95	226.98	226.88	230.30	228.92	228.69	228.63	228.92
HV Ring Closed	Top Tap (5%)	2. LV Meshed Subs Only	238.62	227.98	227.86	227.89	227.79	240.81	229.97	229.62	229.56	229.84
HV Ring Closed	Top Tap (5%)	3. LV Meshed Ways Only	226.39	226.91	226.96	226.98	226.88	230.30	228.92	228.69	228.64	228.92
HV Ring Closed	Top Tap (5%)	4. LV Meshed Subs & Ways Only	238.61	227.98	227.87	227.89	227.79	240.81	229.97	229.61	229.56	229.84
HV Ring Closed	Top Tap (5%)	5. 100kVAr Capacitor 1/2 Only	229.23	228.54	228.50	228.53	228.43	233.11	230.56	230.26	230.19	230.48
HV Ring Closed	Top Tap (5%)	6. 100kVAr Capacitor 2/3 Only	229.64	228.54	228.50	228.53	228.43	233.52	230.56	230.26	230.20	230.49
HV Ring Closed	Top Tap (5%)	7. 150kVAr Capacitor 1/2 Only	230.64	229.36	229.29	229.31	229.21	234.51	231.38	231.05	230.98	231.27
HV Ring Closed	Top Tap (5%)	8. 150kVAr Capacitor 2/3 Only	231.25	229.36	229.29	229.31	229.21	235.12	231.39	231.05	230.99	231.28
HV Ring Closed	Top Tap (5%)	9. 200kVAr Capacitor 1/2 Only	232.06	230.18	230.07	230.10	230.00	235.91	232.21	231.84	231.78	232.06
HV Ring Closed	Top Tap (5%)	10. 200kVAr Capacitor 2/3 Only	232.87	230.18	230.07	230.10	230.00	236.71	232.22	231.85	231.78	232.07
HV Ring Closed	Top Tap (5%)	11. LV Meshed Subs 100kVAr Capacitor 1/2	233.96	228.95	228.85	228.88	228.78	236.20	230.95	230.62	230.55	230.84
HV Ring Closed	Top Tap (5%)	12. LV Meshed Ways 100kVAr Capacitor 1/2	229.23	228.54	228.51	228.53	228.43	233.11	230.56	230.25	230.20	230.48
HV Ring Closed	Top Tap (5%)	13. LV Meshed Subs & Ways 100kVAr Capacitor 1/2	233.96	228.95	228.86	228.87	228.78	236.20	230.95	230.61	230.56	230.84
HV Ring Closed	Top Tap (5%)	14. LV Meshed Subs 100kVAr Capacitor 2/3	234.13	228.89	228.80	228.82	228.72	236.38	230.90	230.56	230.50	230.79
HV Ring Closed	Top Tap (5%)	15. LV Meshed Ways 100kVAr Capacitor 2/3	229.64	228.54	228.51	228.53	228.43	233.52	230.56	230.26	230.20	230.49
HV Ring Closed	Top Tap (5%)	16. LV Meshed Subs & Ways 100kVAr Capacitor 2/3	234.13	228.89	228.80	228.82	228.72	236.38	230.90	230.56	230.51	230.79
HV Ring Closed	Top Tap (5%)	17. LV Meshed Subs 150kVAr Capacitor 1/2	234.59	229.64	229.52	229.54	229.44	236.84	231.65	231.29	231.22	231.51
HV Ring Closed	Top Tap (5%)	18. LV Meshed Ways 150kVAr Capacitor 1/2	230.64	229.36	229.29	229.31	229.21	234.51	231.38	231.04	230.99	231.27
HV Ring Closed	Top Tap (5%)	19. LV Meshed Subs & Ways 150kVAr Capacitor 1/2	234.59	229.64	229.52	229.54	229.44	236.84	231.65	231.28	231.22	231.51
HV Ring Closed	Top Tap (5%)	20. LV Meshed Subs 150kVAr Capacitor 2/3	234.85	229.56	229.44	229.46	229.36	237.09	231.57	231.21	231.14	231.43
HV Ring Closed	Top Tap (5%)	21. LV Meshed Ways 150kVAr Capacitor 2/3	231.25	229.36	229.29	229.31	229.21	235.12	231.39	231.05	230.99	231.28
HV Ring Closed	Top Tap (5%)	22. LV Meshed Subs & Ways 150kVAr Capacitor 2/3	234.85	229.56	229.44	229.46	229.36	237.09	231.57	231.20	231.15	231.43
HV Ring Closed	Top Tap (5%)	23. LV Meshed Subs 200kVAr Capacitor 1/2	235.22	230.34	230.19	230.21	230.11	237.47	232.35	231.96	231.89	232.18
HV Ring Closed	Top Tap (5%)	24. LV Meshed Ways 200kVAr Capacitor 1/2	232.07	230.19	230.08	230.10	230.00	235.91	232.21	231.83	231.78	232.06
HV Ring Closed	Top Tap (5%)	25. LV Meshed Subs & Ways 200kVAr Capacitor 1/2	235.16	230.74	230.61	230.62	230.53	237.40	232.93	232.54	232.49	232.77
HV Ring Closed	Top Tap (5%)	26. LV Meshed Subs 200kVAr Capacitor 2/3	235.56	230.23	230.08	230.11	230.01	237.80	232.24	231.85	231.79	232.07
HV Ring Closed	Top Tap (5%)	27. LV Meshed Ways 200kVAr Capacitor 2/3	232.87	230.18	230.08	230.10	230.00	236.71	232.22	231.84	231.79	232.07
HV Ring Closed	Top Tap (5%)	28. LV Meshed Subs & Ways 200kVAr Capacitor 2/3	235.56	230.23	230.08	230.10	230.01	237.80	232.24	231.85	231.80	232.07
HV Ring Closed	Mid Tap (0%)	1. No Intervention	237.79	238.29	238.33	238.36	238.26	241.51	240.20	240.00	239.94	240.21
HV Ring Closed	Mid Tap (0%)	2. LV Meshed Subs Only	243.26	238.87	238.84	238.87	238.77	245.41	240.78	240.53	240.47	240.74
HV Ring Closed	Mid Tap (0%)	3. LV Meshed Ways Only	237.79	238.29	238.33	238.35	238.26	241.51	240.20	240.00	239.95	240.21
HV Ring Closed	Mid Tap (0%)	4. LV Meshed Subs & Ways Only	243.26	238.87	238.85	238.86	238.77	245.41	240.78	240.53	240.48	240.74
HV Ring Closed	Mid Tap (0%)	5. 100kVAr Capacitor 1/2 Only	240.79	240.01	239.97	240.00	239.90	244.48	241.94	241.66	241.60	241.87
HV Ring Closed	Mid Tap (0%)	6. 100kVAr Capacitor 2/3 Only	241.22	240.01	239.97	240.00	239.90	244.91	241.95	241.66	241.60	241.87
HV Ring Closed	Mid Tap (0%)	7. 150kVAr Capacitor 1/2 Only	242.28	240.88	240.80	240.83	240.73	245.96	242.82	242.49	242.44	242.70
HV Ring Closed	Mid Tap (0%)	8. 150kVAr Capacitor 2/3 Only	242.93	240.88	240.80	240.83	240.73	246.59	242.82	242.50	242.44	242.71
HV Ring Closed	Mid Tap (0%)	9. 200kVAr Capacitor 1/2 Only	243.78	241.76	241.64	241.66	241.57	247.44	243.70	243.33	243.28	243.54
HV Ring Closed	Mid Tap (0%)	10. 200kVAr Capacitor 2/3 Only	244.64	241.75	241.63	241.66	241.57	248.26	243.70	243.34	243.28	243.55
HV Ring Closed	Mid Tap (0%)	11. LV Meshed Subs 100kVAr Capacitor 1/2	238.66	239.91	239.89	239.92	239.82	240.87	241.83	241.59	241.54	241.80
HV Ring Closed	Mid Tap (0%)	12. LV Meshed Ways 100kVAr Capacitor 1/2	240.79	240.01	239.98	239.99	239.90	244.48	241.94	241.65	241.60	241.87
HV Ring Closed	Mid Tap (0%)	13. LV Meshed Subs & Ways 100kVAr Capacitor 1/2	238.66	239.91	239.90	239.91	239.82	240.87	241.83	241.59	241.54	241.80
HV Ring Closed	Mid Tap (0%)	14. LV Meshed Subs 100kVAr Capacitor 2/3	238.84	239.84	239.83	239.86	239.77	241.05	241.77	241.54	241.48	241.75
HV Ring Closed	Mid Tap (0%)	15. LV Meshed Ways 100kVAr Capacitor 2/3	241.22	240.01	239.98	239.99	239.90	244.91	241.95	241.66	241.61	241.87
HV Ring Closed	Mid Tap (0%)	16. LV Meshed Subs & Ways 100kVAr Capacitor 2/3	238.84	239.84	239.84	239.86	239.77	241.05	241.77	241.53	241.48	241.75
HV Ring Closed	Mid Tap (0%)	17. LV Meshed Subs 150kVAr Capacitor 1/2	239.33	240.64	240.60	240.62	240.53	241.53	242.56	242.30	242.24	242.51
HV Ring Closed	Mid Tap (0%)	18. LV Meshed Ways 150kVAr Capacitor 1/2	242.28	240.88	240.81	240.82	240.73	245.96	242.82	242.49	242.44	242.70
HV Ring Closed	Mid Tap (0%)	19. LV Meshed Subs & Ways 150kVAr Capacitor 1/2	239.33	240.64	240.60	240.62	240.53	241.53	242.56	242.29	242.25	242.51
HV Ring Closed	Mid Tap (0%)	20. LV Meshed Subs 150kVAr Capacitor 2/3	239.60	240.55	240.51	240.53	240.44	241.79	242.47	242.21	242.16	242.42
HV Ring Closed	Mid Tap (0%)	21. LV Meshed Ways 150kVAr Capacitor 2/3	242.93	240.88	240.81	240.82	240.73	246.59	242.82	242.50	242.45	242.71
HV Ring Closed	Mid Tap (0%)	22. LV Meshed Subs & Ways 150kVAr Capacitor 2/3	239.60	240.55	240.51	240.53	240.44	241.79	242.47	242.21	242.16	242.42
HV Ring Closed	Mid Tap (0%)	23. LV Meshed Subs 200kVAr Capacitor 1/2	239.99	241.38	241.30	241.33	241.23	242.19	243.30	243.01	242.95	243.22
HV Ring Closed	Mid Tap (0%)	24. LV Meshed Ways 200kVAr Capacitor 1/2	243.79	241.76	241.64	241.66	241.57	247.44	243.70	243.33	243.28	243.54
HV Ring Closed	Mid Tap (0%)	25. LV Meshed Subs & Ways 200kVAr Capacitor 1/2	239.99	241.38	241.31	241.32	241.23	242.19	243.30	243.00	242.95	243.22
HV Ring Closed	Mid Tap (0%)	26. LV Meshed Subs 200kVAr Capacitor 2/3	240.33	241.25	241.18	241.21	241.11	242.53	243.18	242.89	242.83	243.10
HV Ring Closed	Mid Tap (0%)	27. LV Meshed Ways 200kVAr Capacitor 2/3	244.63	241.76	241.64	241.66	241.57	248.26	243.70	243.34	243.29	243.55
HV Ring Closed	Mid Tap (0%)	28. LV Meshed Subs & Ways 200kVAr Capacitor 2/3	240.33	241.25	241.19	241.20	241.11	242.53	243.18	242.89	242.84	243.10
HV Ring Closed	Bottom Tap (-5%)	1. No Intervention	250.39	250.86	250.90	250.92	250.83	253.92	252.69	252.50	252.45	252.70
HV Ring Closed	Bottom Tap (-5%)	2. LV Meshed Subs Only	248.39	250.90	250.97	250.99	250.90	250.50	252.73	252.59	252.54	252.79
HV Ring Closed	Bottom Tap (-5%)	3. LV Meshed Ways Only	250.39	250.86	250.90	250.92	250.83	253.92	252.69	252.50	252.45	252.70
HV Ring Closed	Bottom Tap (-5%)	4. LV Meshed Subs & Ways Only	248.39	250.90	250.97	250.99	250.90	250.50	252.73	252.59	252.54	252.79
HV Ring Closed	Bottom Tap (-5%)	5. 100kVAr Capacitor 1/2 Only	253.56	252.70	252.65	252.67	252.58	257.18	254.58	254.29	254.23	254.49
HV Ring Closed	Bottom Tap (-5%)	6. 100kVAr Capacitor 2/3 Only	254.01	252.70	252.65	252.67	252.58	257.65	254.58	254.29	254.23	254.49
HV Ring Closed	Bottom Tap (-5%)	7. 150kVAr Capacitor 1/2 Only	255.15	253.62	253.53	253.56	253.47	258.62	255.47	255.15	255.10	255.35
HV Ring Closed	Bottom Tap (-5%)	8. 150kVAr Capacitor 2/3 Only	255.83	253.62	253.53	253.56	253.47	259.28	255.47	255.16	255.11	255.35
HV Ring Closed	Bottom Tap (-5%)	9. 200kVAr Capacitor 1/2 Only	256.73	254.55	254.42	254.45	254.36	260.18	256.40	256.05	256.00	256.24
HV Ring Closed	Bottom Tap (-5%)	10. 200kVAr Capacitor 2/3 Only	257.65	254.55	254.42	254.44	254.35	261.04	256.40	256.06	256.00	256.25
HV Ring Closed	Bottom Tap (-5%)	11. LV Meshed Subs 100kVAr Capacitor 1/2	243.85	252.01	252.09	252.12	252.03	246.02	253.85	253.73	253.67	253.92
HV Ring Closed	Bottom Tap (-5%)	12. LV Meshed Ways 100kVAr Capacitor 1/2	253.56	252.70	252.65	252.67	252.58	257.18	254.58	254.28	254.23	254.49
HV Ring Closed	Bottom Tap (-5%)	13. LV Meshed Subs & Ways 100kVAr Capacitor 1/2	243.85	252.01	252.10	252.11	252.03	246.02	253.85	253.72	253.68	253.92
HV Ring Closed	Bottom Tap (-5%)	14. LV Meshed Subs 100kVAr Capacitor 2/3	244.04	251.95	252.03	252.05	251.96	246.20	253.78	253.66	253.61	253.86
HV Ring Closed	Bottom Tap (-5%)	15. LV Meshed Ways 100kVAr Capacitor 2/3	254.01	252.70	252.65	252.67	252.58	257.65	254.58	254.28	254.24	254.49
HV Ring Closed	Bottom Tap (-5%)	16. LV Meshed Subs & Ways 100kVAr Capacitor 2/3	244.04	251.95	252.03	252.05	251.96	246.20	253.78	253.66	253.61	253.86
HV Ring Closed	Bottom Tap (-5%)	17. LV Meshed Subs 150kVAr Capacitor 1/2	244.55	252.79	252.84	252.86	252.77	246.72	254.63	254.47	254.42	254.67
HV Ring Closed	Bottom Tap (-5%)	18. LV Meshed Ways 150kVAr Capacitor 1/2	255.15	253.62	253.54	253.55	253.47	258.62	255.47	255.15	255.10	255.35
HV Ring Closed	Bottom Tap (-5%)	19. LV Meshed Subs & Ways 150kVAr Capacitor 1/2	244.55	252.79	252.84	252.86	252.77	246.72	254.63	254.47	254.42	254.67
HV Ring Closed	Bottom Tap (-5%)	20. LV Meshed Subs 150kVAr Capacitor 2/3	244.83	252.69	252.74	252.76	252.67	246.98	254.53	254.38	254.32	254.57
HV Ring Closed	Bottom Tap (-5%)	21. LV Meshed Ways 150kVAr Capacitor 2/3	255.83	253.62	253.54	253.55	253.47	259.28	255.47	255.16	255.11	255.35
HV Ring Closed	Bottom Tap (-5%)	22. LV Meshed Subs & Ways 150kVAr Capacitor 2/3	244.83	252.69	252.74	252.76	252.67	246.98	25			

Max Demand of 1.5kW _ (2.28kW PV average installation)			Voltage Level at 0% PV Penetration					Voltage Level at 40% PV Penetration				
HV RING	OLTC Tap Position	Scenario	PW5	PW12	BW3	GW5	YW4	PW5	PW12	BW3	GW5	YW4
HV Ring Open	Top Tap (5%)	1. No Intervention	214.33	218.44	218.79	219.01	218.22	218.82	220.83	220.89	221.01	220.64
HV Ring Open	Top Tap (5%)	2. LV Meshed Subs Only	229.28	220.04	220.19	220.41	219.62	231.60	222.39	222.29	222.41	222.04
HV Ring Open	Top Tap (5%)	3. LV Meshed Ways Only	214.33	218.43	218.84	218.96	218.21	218.82	220.83	220.93	220.98	220.64
HV Ring Open	Top Tap (5%)	4. LV Meshed Subs & Ways Only	229.33	220.04	220.25	220.37	219.63	231.60	222.39	222.33	222.38	222.04
HV Ring Open	Top Tap (5%)	5. 100kVAr Capacitor 1/2 Only	217.28	220.15	220.44	220.65	219.87	221.75	222.58	222.56	222.68	222.31
HV Ring Open	Top Tap (5%)	6. 100kVAr Capacitor 2/3 Only	217.63	220.13	220.42	220.64	219.85	222.14	222.57	222.56	222.68	222.31
HV Ring Open	Top Tap (5%)	7. 150kVAr Capacitor 1/2 Only	218.76	221.04	221.28	221.49	220.71	223.21	223.46	223.41	223.52	223.16
HV Ring Open	Top Tap (5%)	8. 150kVAr Capacitor 2/3 Only	219.36	221.02	221.27	221.48	220.70	223.78	223.45	223.40	223.52	223.15
HV Ring Open	Top Tap (5%)	9. 200kVAr Capacitor 1/2 Only	220.25	221.92	222.12	222.33	221.55	224.67	224.34	224.25	224.37	224.00
HV Ring Open	Top Tap (5%)	10. 200kVAr Capacitor 2/3 Only	221.10	221.90	222.10	222.32	221.54	225.42	224.33	224.25	224.36	224.00
HV Ring Open	Top Tap (5%)	11. LV Meshed Subs 100kVAr Capacitor 1/2	224.68	220.97	221.14	221.36	220.57	227.06	223.32	223.24	223.36	222.99
HV Ring Open	Top Tap (5%)	12. LV Meshed Ways 100kVAr Capacitor 1/2	217.28	220.15	220.49	220.61	219.87	221.75	222.58	222.60	222.65	222.31
HV Ring Open	Top Tap (5%)	13. LV Meshed Subs & Ways 100kVAr Capacitor 1/2	224.68	220.97	221.19	221.32	220.57	227.06	223.32	223.28	223.33	222.99
HV Ring Open	Top Tap (5%)	14. LV Meshed Subs 100kVAr Capacitor 2/3	224.84	220.90	221.08	221.29	220.51	227.23	223.25	223.18	223.30	222.93
HV Ring Open	Top Tap (5%)	15. LV Meshed Ways 100kVAr Capacitor 2/3	217.63	220.13	220.48	220.60	219.85	222.14	222.57	222.60	222.65	222.31
HV Ring Open	Top Tap (5%)	16. LV Meshed Subs & Ways 100kVAr Capacitor 2/3	224.84	220.90	221.13	221.25	220.51	227.23	223.25	223.22	223.27	222.93
HV Ring Open	Top Tap (5%)	17. LV Meshed Subs 150kVAr Capacitor 1/2	225.30	221.69	221.83	222.05	221.27	227.68	224.04	223.94	224.06	223.69
HV Ring Open	Top Tap (5%)	18. LV Meshed Ways 150kVAr Capacitor 1/2	218.76	221.04	221.33	221.45	220.71	223.21	223.46	223.44	223.49	223.16
HV Ring Open	Top Tap (5%)	19. LV Meshed Subs & Ways 150kVAr Capacitor 1/2	225.30	221.69	221.88	222.00	221.27	227.68	224.04	223.98	224.03	223.69
HV Ring Open	Top Tap (5%)	20. LV Meshed Subs 150kVAr Capacitor 2/3	225.52	221.58	221.73	221.95	221.16	227.93	223.94	223.84	223.96	223.59
HV Ring Open	Top Tap (5%)	21. LV Meshed Ways 150kVAr Capacitor 2/3	219.36	221.02	221.32	221.44	220.70	223.78	223.45	223.44	223.49	223.15
HV Ring Open	Top Tap (5%)	22. LV Meshed Subs & Ways 150kVAr Capacitor 2/3	225.52	221.58	221.78	221.90	221.16	227.93	223.94	223.88	223.93	223.59
HV Ring Open	Top Tap (5%)	23. LV Meshed Subs 200kVAr Capacitor 1/2	225.90	222.41	222.52	222.74	221.96	228.29	224.77	224.64	224.75	224.39
HV Ring Open	Top Tap (5%)	24. LV Meshed Ways 200kVAr Capacitor 1/2	220.17	221.91	222.15	222.28	221.54	224.67	224.34	224.29	224.34	224.00
HV Ring Open	Top Tap (5%)	25. LV Meshed Subs & Ways 200kVAr Capacitor 1/2	225.90	222.41	222.57	222.69	221.96	228.29	224.77	224.67	224.72	224.39
HV Ring Open	Top Tap (5%)	26. LV Meshed Subs 200kVAr Capacitor 2/3	226.20	222.25	222.38	222.59	221.81	228.62	224.63	224.51	224.62	224.26
HV Ring Open	Top Tap (5%)	27. LV Meshed Ways 200kVAr Capacitor 2/3	220.91	221.89	222.14	222.26	221.52	225.42	224.33	224.28	224.33	224.00
HV Ring Open	Top Tap (5%)	28. LV Meshed Subs & Ways 200kVAr Capacitor 2/3	226.19	222.23	222.41	222.53	221.79	228.61	224.61	224.52	224.57	224.23
HV Ring Open	Mid Tap (0%)	1. No Intervention	225.85	229.75	230.09	230.29	229.54	230.14	232.05	232.12	232.23	231.87
HV Ring Open	Mid Tap (0%)	2. LV Meshed Subs Only	233.93	230.74	230.98	231.18	230.43	236.22	233.01	233.01	233.12	232.76
HV Ring Open	Mid Tap (0%)	3. LV Meshed Ways Only	225.87	229.76	230.14	230.26	229.55	230.14	232.05	232.15	232.20	231.87
HV Ring Open	Mid Tap (0%)	4. LV Meshed Subs & Ways Only	234.00	230.75	231.03	231.15	230.44	236.22	233.01	233.04	233.09	232.76
HV Ring Open	Mid Tap (0%)	5. 100kVAr Capacitor 1/2 Only	228.98	231.58	231.85	232.06	231.31	233.24	233.92	233.91	234.02	233.66
HV Ring Open	Mid Tap (0%)	6. 100kVAr Capacitor 2/3 Only	229.36	231.56	231.84	232.04	231.30	233.65	233.92	233.90	234.02	233.66
HV Ring Open	Mid Tap (0%)	7. 150kVAr Capacitor 1/2 Only	230.56	232.54	232.75	232.95	232.21	234.79	234.86	234.81	234.92	234.57
HV Ring Open	Mid Tap (0%)	8. 150kVAr Capacitor 2/3 Only	231.20	232.53	232.74	232.94	232.20	235.39	234.85	234.80	234.92	234.56
HV Ring Open	Mid Tap (0%)	9. 200kVAr Capacitor 1/2 Only	232.15	233.48	233.65	233.85	233.11	236.33	235.80	235.71	235.83	235.47
HV Ring Open	Mid Tap (0%)	10. 200kVAr Capacitor 2/3 Only	233.04	233.47	233.64	233.84	233.10	237.13	235.79	235.71	235.82	235.47
HV Ring Open	Mid Tap (0%)	11. LV Meshed Subs 100kVAr Capacitor 1/2	229.39	231.75	231.99	232.20	231.45	231.74	234.02	234.03	234.14	233.79
HV Ring Open	Mid Tap (0%)	12. LV Meshed Ways 100kVAr Capacitor 1/2	228.98	231.58	231.90	232.02	231.31	233.24	233.92	233.94	233.99	233.66
HV Ring Open	Mid Tap (0%)	13. LV Meshed Subs & Ways 100kVAr Capacitor 1/2	229.39	231.75	232.04	232.16	231.45	231.74	234.02	234.06	234.11	233.79
HV Ring Open	Mid Tap (0%)	14. LV Meshed Subs 100kVAr Capacitor 2/3	229.55	231.67	231.92	232.13	231.38	231.91	233.94	233.96	234.07	233.72
HV Ring Open	Mid Tap (0%)	15. LV Meshed Ways 100kVAr Capacitor 2/3	229.36	231.56	231.89	232.00	231.30	233.65	233.92	233.94	233.99	233.66
HV Ring Open	Mid Tap (0%)	16. LV Meshed Subs & Ways 100kVAr Capacitor 2/3	229.55	231.67	231.97	232.09	231.38	231.91	233.94	233.99	234.04	233.72
HV Ring Open	Mid Tap (0%)	17. LV Meshed Subs 150kVAr Capacitor 1/2	230.03	232.51	232.73	232.93	232.19	232.38	234.78	234.76	234.88	234.52
HV Ring Open	Mid Tap (0%)	18. LV Meshed Ways 150kVAr Capacitor 1/2	230.56	232.54	232.80	232.91	232.21	234.79	234.86	234.84	234.89	234.57
HV Ring Open	Mid Tap (0%)	19. LV Meshed Subs & Ways 150kVAr Capacitor 1/2	230.03	232.51	232.77	232.89	232.19	232.38	234.78	234.80	234.85	234.52
HV Ring Open	Mid Tap (0%)	20. LV Meshed Subs 150kVAr Capacitor 2/3	230.26	232.39	232.61	232.82	232.07	232.64	234.67	234.66	234.77	234.42
HV Ring Open	Mid Tap (0%)	21. LV Meshed Ways 150kVAr Capacitor 2/3	231.20	232.53	232.79	232.90	232.20	235.39	234.85	234.84	234.89	234.56
HV Ring Open	Mid Tap (0%)	22. LV Meshed Subs & Ways 150kVAr Capacitor 2/3	230.26	232.39	232.66	232.78	232.07	232.64	234.67	234.69	234.74	234.42
HV Ring Open	Mid Tap (0%)	23. LV Meshed Subs 200kVAr Capacitor 1/2	230.66	233.27	233.45	233.66	232.92	233.02	235.55	235.50	235.62	235.26
HV Ring Open	Mid Tap (0%)	24. LV Meshed Ways 200kVAr Capacitor 1/2	232.07	233.47	233.69	233.81	233.11	236.33	235.80	235.75	235.80	235.47
HV Ring Open	Mid Tap (0%)	25. LV Meshed Subs & Ways 200kVAr Capacitor 1/2	230.66	233.27	233.50	233.62	232.92	233.02	235.55	235.54	235.59	235.26
HV Ring Open	Mid Tap (0%)	26. LV Meshed Subs 200kVAr Capacitor 2/3	231.00	233.11	233.30	233.51	232.77	233.36	235.40	235.36	235.47	235.12
HV Ring Open	Mid Tap (0%)	27. LV Meshed Ways 200kVAr Capacitor 2/3	232.85	233.45	233.68	233.79	233.09	237.13	235.79	235.74	235.79	235.47
HV Ring Open	Mid Tap (0%)	28. LV Meshed Subs & Ways 200kVAr Capacitor 2/3	230.99	233.09	233.33	233.45	232.74	233.35	235.38	235.37	235.42	235.10
HV Ring Open	Bottom Tap (-5%)	1. No Intervention	238.58	242.26	242.56	242.76	242.05	242.62	244.44	244.51	244.62	244.28
HV Ring Open	Bottom Tap (-5%)	2. LV Meshed Subs Only	239.07	242.53	242.84	243.04	242.33	241.31	244.71	244.80	244.92	244.57
HV Ring Open	Bottom Tap (-5%)	3. LV Meshed Ways Only	238.58	242.25	242.61	242.73	242.05	242.62	244.44	244.55	244.59	244.28
HV Ring Open	Bottom Tap (-5%)	4. LV Meshed Subs & Ways Only	239.14	242.54	242.89	243.00	242.33	241.31	244.71	244.84	244.89	244.57
HV Ring Open	Bottom Tap (-5%)	5. 100kVAr Capacitor 1/2 Only	241.88	244.22	244.45	244.65	243.94	245.92	246.45	246.43	246.55	246.20
HV Ring Open	Bottom Tap (-5%)	6. 100kVAr Capacitor 2/3 Only	242.33	244.21	244.44	244.64	243.93	246.35	246.44	246.43	246.54	246.20
HV Ring Open	Bottom Tap (-5%)	7. 150kVAr Capacitor 1/2 Only	243.56	245.23	245.41	245.61	244.90	247.57	247.46	247.40	247.51	247.17
HV Ring Open	Bottom Tap (-5%)	8. 150kVAr Capacitor 2/3 Only	244.24	245.22	245.40	245.60	244.89	248.20	247.45	247.40	247.51	247.17
HV Ring Open	Bottom Tap (-5%)	9. 200kVAr Capacitor 1/2 Only	245.25	246.25	246.38	246.58	245.87	249.21	248.47	248.38	248.49	248.15
HV Ring Open	Bottom Tap (-5%)	10. 200kVAr Capacitor 2/3 Only	246.20	246.24	246.37	246.57	245.86	250.04	248.46	248.37	248.48	248.14
HV Ring Open	Bottom Tap (-5%)	11. LV Meshed Subs 100kVAr Capacitor 1/2	234.58	243.62	243.94	244.14	243.43	236.89	245.81	245.91	246.02	245.68
HV Ring Open	Bottom Tap (-5%)	12. LV Meshed Ways 100kVAr Capacitor 1/2	241.88	244.22	244.50	244.61	243.94	245.92	246.45	246.47	246.52	246.20
HV Ring Open	Bottom Tap (-5%)	13. LV Meshed Subs & Ways 100kVAr Capacitor 1/2	234.58	243.62	243.99	244.10	243.43	236.89	245.81	245.95	245.99	245.68
HV Ring Open	Bottom Tap (-5%)	14. LV Meshed Subs 100kVAr Capacitor 2/3	234.74	243.53	243.86	244.06	243.35	237.06	245.72	245.83	245.94	245.60
HV Ring Open	Bottom Tap (-5%)	15. LV Meshed Ways 100kVAr Capacitor 2/3	242.33	244.21	244.49	244.60	243.93	246.35	246.44	246.47	246.51	246.20
HV Ring Open	Bottom Tap (-5%)	16. LV Meshed Subs & Ways 100										

Max Demand of 1.5kW _ (2.28kW PV average installation)			Voltage Level at 0% PV Penetration					Voltage Level at 40% PV Penetration				
HV RING	OLTC Tap Position	Scenario	PW5	PW12	BW3	GW5	YW4	PW5	PW12	BW3	GW5	YW4
HV Ring Closed	Top Tap (5%)	1. No Intervention	213.96	218.08	218.43	218.65	217.86	218.27	220.29	220.35	220.47	220.10
HV Ring Closed	Top Tap (5%)	2. LV Meshed Subs Only	229.29	219.26	219.41	219.63	218.84	231.67	221.43	221.33	221.44	221.07
HV Ring Closed	Top Tap (5%)	3. LV Meshed Ways Only	213.96	218.08	218.49	218.61	217.86	218.27	220.29	220.39	220.44	220.10
HV Ring Closed	Top Tap (5%)	4. LV Meshed Subs & Ways Only	229.30	219.26	219.46	219.58	218.84	231.67	221.43	221.36	221.41	221.07
HV Ring Closed	Top Tap (5%)	5. 100kVAr Capacitor 1/2 Only	216.75	219.66	219.93	220.15	219.36	221.04	221.88	221.86	221.98	221.61
HV Ring Closed	Top Tap (5%)	6. 100kVAr Capacitor 2/3 Only	217.14	219.65	219.92	220.14	219.35	221.43	221.87	221.86	221.98	221.61
HV Ring Closed	Top Tap (5%)	7. 150kVAr Capacitor 1/2 Only	218.14	220.45	220.69	220.91	220.12	222.42	222.68	222.63	222.74	222.38
HV Ring Closed	Top Tap (5%)	8. 150kVAr Capacitor 2/3 Only	218.72	220.44	220.68	220.89	220.11	223.00	222.67	222.62	222.74	222.37
HV Ring Closed	Top Tap (5%)	9. 200kVAr Capacitor 1/2 Only	219.54	221.25	221.45	221.66	220.88	223.80	223.48	223.39	223.51	223.14
HV Ring Closed	Top Tap (5%)	10. 200kVAr Capacitor 2/3 Only	220.30	221.23	221.43	221.65	220.86	224.56	223.47	223.39	223.51	223.14
HV Ring Closed	Top Tap (5%)	11. LV Meshed Subs 100kVAr Capacitor 1/2	224.66	220.19	220.36	220.58	219.79	227.09	222.38	222.28	222.40	222.03
HV Ring Closed	Top Tap (5%)	12. LV Meshed Ways 100kVAr Capacitor 1/2	216.75	219.66	219.98	220.11	219.36	221.04	221.88	221.90	221.95	221.61
HV Ring Closed	Top Tap (5%)	13. LV Meshed Subs & Ways 100kVAr Capacitor 1/2	224.66	220.19	220.41	220.53	219.79	227.09	222.38	222.32	222.37	222.03
HV Ring Closed	Top Tap (5%)	14. LV Meshed Subs 100kVAr Capacitor 2/3	224.82	220.13	220.30	220.52	219.73	227.26	222.32	222.23	222.35	221.98
HV Ring Closed	Top Tap (5%)	15. LV Meshed Ways 100kVAr Capacitor 2/3	217.14	219.65	219.98	220.10	219.35	221.43	221.87	221.90	221.95	221.61
HV Ring Closed	Top Tap (5%)	16. LV Meshed Subs & Ways 100kVAr Capacitor 2/3	224.82	220.13	220.35	220.48	219.73	227.26	222.32	222.27	222.32	221.98
HV Ring Closed	Top Tap (5%)	17. LV Meshed Subs 150kVAr Capacitor 1/2	225.28	220.87	221.01	221.22	220.44	227.71	223.06	222.94	223.05	222.69
HV Ring Closed	Top Tap (5%)	18. LV Meshed Ways 150kVAr Capacitor 1/2	218.14	220.45	220.74	220.86	220.12	222.42	222.68	222.66	222.71	222.38
HV Ring Closed	Top Tap (5%)	19. LV Meshed Subs & Ways 150kVAr Capacitor 1/2	225.28	220.87	221.06	221.18	220.44	227.71	223.06	222.97	223.02	222.69
HV Ring Closed	Top Tap (5%)	20. LV Meshed Subs 150kVAr Capacitor 2/3	225.52	220.78	220.92	221.14	220.35	227.95	222.97	222.86	222.97	222.61
HV Ring Closed	Top Tap (5%)	21. LV Meshed Ways 150kVAr Capacitor 2/3	218.72	220.44	220.73	220.85	220.11	223.00	222.67	222.66	222.71	222.37
HV Ring Closed	Top Tap (5%)	22. LV Meshed Subs & Ways 150kVAr Capacitor 2/3	225.52	220.78	220.98	221.10	220.35	227.95	222.97	222.89	222.94	222.61
HV Ring Closed	Top Tap (5%)	23. LV Meshed Subs 200kVAr Capacitor 1/2	225.89	221.55	221.66	221.87	221.09	228.32	223.74	223.59	223.71	223.34
HV Ring Closed	Top Tap (5%)	24. LV Meshed Ways 200kVAr Capacitor 1/2	219.51	221.25	221.49	221.62	220.88	223.80	223.48	223.43	223.48	223.14
HV Ring Closed	Top Tap (5%)	25. LV Meshed Subs & Ways 200kVAr Capacitor 1/2	225.89	221.55	221.71	221.83	221.09	228.32	223.74	223.63	223.68	223.34
HV Ring Closed	Top Tap (5%)	26. LV Meshed Subs 200kVAr Capacitor 2/3	226.21	221.43	221.55	221.76	220.98	228.64	223.62	223.48	223.60	223.23
HV Ring Closed	Top Tap (5%)	27. LV Meshed Ways 200kVAr Capacitor 2/3	220.26	221.23	221.48	221.60	220.86	224.56	223.47	223.43	223.48	223.14
HV Ring Closed	Top Tap (5%)	28. LV Meshed Subs & Ways 200kVAr Capacitor 2/3	226.21	221.43	221.60	221.72	220.98	228.64	223.62	223.52	223.57	223.23
HV Ring Closed	Mid Tap (0%)	1. No Intervention	225.47	229.37	229.71	229.92	229.16	229.56	231.48	231.55	231.66	231.30
HV Ring Closed	Mid Tap (0%)	2. LV Meshed Subs Only	233.93	230.06	230.28	230.49	229.74	236.25	232.14	232.12	232.24	231.88
HV Ring Closed	Mid Tap (0%)	3. LV Meshed Ways Only	225.47	229.37	229.76	229.88	229.16	229.56	231.48	231.58	231.63	231.30
HV Ring Closed	Mid Tap (0%)	4. LV Meshed Subs & Ways Only	233.93	230.06	230.33	230.45	229.74	236.25	232.14	232.16	232.21	231.88
HV Ring Closed	Mid Tap (0%)	5. 100kVAr Capacitor 1/2 Only	228.41	231.05	231.30	231.51	230.76	232.45	233.13	233.13	233.25	232.88
HV Ring Closed	Mid Tap (0%)	6. 100kVAr Capacitor 2/3 Only	228.82	231.04	231.29	231.50	230.75	232.88	233.13	233.13	233.24	232.88
HV Ring Closed	Mid Tap (0%)	7. 150kVAr Capacitor 1/2 Only	229.88	231.89	232.10	232.31	231.56	233.93	234.01	233.96	234.07	233.72
HV Ring Closed	Mid Tap (0%)	8. 150kVAr Capacitor 2/3 Only	230.49	231.88	232.09	232.30	231.55	234.54	234.01	233.96	234.07	233.72
HV Ring Closed	Mid Tap (0%)	9. 200kVAr Capacitor 1/2 Only	231.35	232.74	232.91	233.12	232.37	235.41	234.84	234.75	234.87	234.51
HV Ring Closed	Mid Tap (0%)	10. 200kVAr Capacitor 2/3 Only	232.16	232.72	232.90	233.10	232.36	236.25	234.83	234.75	234.86	234.50
HV Ring Closed	Mid Tap (0%)	11. LV Meshed Subs 100kVAr Capacitor 1/2	229.35	231.06	231.30	231.50	230.75	231.71	233.11	233.11	233.23	232.87
HV Ring Closed	Mid Tap (0%)	12. LV Meshed Ways 100kVAr Capacitor 1/2	228.41	231.05	231.35	231.47	230.76	232.45	233.13	233.17	233.22	232.88
HV Ring Closed	Mid Tap (0%)	13. LV Meshed Subs & Ways 100kVAr Capacitor 1/2	229.35	231.06	231.35	231.46	230.75	231.71	233.11	233.15	233.20	232.87
HV Ring Closed	Mid Tap (0%)	14. LV Meshed Subs 100kVAr Capacitor 2/3	229.52	230.99	231.24	231.44	230.69	231.89	233.05	233.05	233.17	232.81
HV Ring Closed	Mid Tap (0%)	15. LV Meshed Ways 100kVAr Capacitor 2/3	228.82	231.04	231.34	231.46	230.75	232.88	233.13	233.16	233.21	232.88
HV Ring Closed	Mid Tap (0%)	16. LV Meshed Subs & Ways 100kVAr Capacitor 2/3	229.52	230.99	231.29	231.40	230.69	231.89	233.05	233.09	233.14	232.81
HV Ring Closed	Mid Tap (0%)	17. LV Meshed Subs 150kVAr Capacitor 1/2	230.00	231.77	231.98	232.19	231.44	232.38	233.87	233.83	233.95	233.59
HV Ring Closed	Mid Tap (0%)	18. LV Meshed Ways 150kVAr Capacitor 1/2	229.88	231.89	232.15	232.27	231.56	233.93	234.01	234.00	234.04	233.72
HV Ring Closed	Mid Tap (0%)	19. LV Meshed Subs & Ways 150kVAr Capacitor 1/2	230.00	231.77	232.03	232.15	231.44	232.38	233.87	233.87	233.92	233.59
HV Ring Closed	Mid Tap (0%)	20. LV Meshed Subs 150kVAr Capacitor 2/3	230.26	231.68	231.89	232.10	231.35	232.63	233.77	233.75	233.86	233.50
HV Ring Closed	Mid Tap (0%)	21. LV Meshed Ways 150kVAr Capacitor 2/3	230.49	231.88	232.14	232.26	231.55	234.54	234.01	233.99	234.04	233.72
HV Ring Closed	Mid Tap (0%)	22. LV Meshed Subs & Ways 150kVAr Capacitor 2/3	230.26	231.68	231.94	232.06	231.35	232.63	233.77	233.78	233.83	233.50
HV Ring Closed	Mid Tap (0%)	23. LV Meshed Subs 200kVAr Capacitor 1/2	230.65	232.49	232.67	232.87	232.13	233.03	234.58	234.52	234.64	234.28
HV Ring Closed	Mid Tap (0%)	24. LV Meshed Ways 200kVAr Capacitor 1/2	231.33	232.74	232.96	233.08	232.37	235.41	234.84	234.79	234.84	234.51
HV Ring Closed	Mid Tap (0%)	25. LV Meshed Subs & Ways 200kVAr Capacitor 1/2	230.65	232.49	232.72	232.83	232.13	233.03	234.58	234.56	234.61	234.28
HV Ring Closed	Mid Tap (0%)	26. LV Meshed Subs 200kVAr Capacitor 2/3	230.97	232.36	232.55	232.75	232.01	233.35	234.46	234.41	234.52	234.16
HV Ring Closed	Mid Tap (0%)	27. LV Meshed Ways 200kVAr Capacitor 2/3	232.13	232.72	232.94	233.06	232.36	236.25	234.83	234.78	234.83	234.50
HV Ring Closed	Mid Tap (0%)	28. LV Meshed Subs & Ways 200kVAr Capacitor 2/3	230.97	232.36	232.59	232.71	232.01	233.35	234.46	234.44	234.49	234.16
HV Ring Closed	Bottom Tap (-5%)	1. No Intervention	238.14	241.83	242.15	242.35	241.63	242.01	243.83	243.91	244.02	243.67
HV Ring Closed	Bottom Tap (-5%)	2. LV Meshed Subs Only	239.04	241.97	242.28	242.48	241.76	241.31	243.96	244.04	244.15	243.81
HV Ring Closed	Bottom Tap (-5%)	3. LV Meshed Ways Only	238.14	241.83	242.20	242.31	241.63	242.01	243.83	243.94	243.99	243.67
HV Ring Closed	Bottom Tap (-5%)	4. LV Meshed Subs & Ways Only	239.04	241.97	242.33	242.44	241.76	241.31	243.96	244.08	244.12	243.81
HV Ring Closed	Bottom Tap (-5%)	5. 100kVAr Capacitor 1/2 Only	241.25	243.62	243.85	244.04	243.33	245.13	245.63	245.61	245.72	245.38
HV Ring Closed	Bottom Tap (-5%)	6. 100kVAr Capacitor 2/3 Only	241.68	243.61	243.84	244.04	243.33	245.58	245.63	245.61	245.72	245.38
HV Ring Closed	Bottom Tap (-5%)	7. 150kVAr Capacitor 1/2 Only	242.81	244.52	244.71	244.90	244.19	246.63	246.53	246.48	246.59	246.25
HV Ring Closed	Bottom Tap (-5%)	8. 150kVAr Capacitor 2/3 Only	243.45	244.51	244.69	244.89	244.18	247.27	246.53	246.48	246.59	246.24
HV Ring Closed	Bottom Tap (-5%)	9. 200kVAr Capacitor 1/2 Only	244.37	245.42	245.57	245.76	245.05	248.26	247.45	247.35	247.46	247.12
HV Ring Closed	Bottom Tap (-5%)	10. 200kVAr Capacitor 2/3 Only	245.23	245.40	245.55	245.75	245.04	249.13	247.45	247.34	247.45	247.11
HV Ring Closed	Bottom Tap (-5%)	11. LV Meshed Subs 100kVAr Capacitor 1/2	234.53	243.04	243.36	243.56	242.85	236.83	245.04	245.13	245.24	244.89
HV Ring Closed	Bottom Tap (-5%)	12. LV Meshed Ways 100kVAr Capacitor 1/2	241.25	243.62	243.90	244.01	243.33	245.13	245.63	245.65	245.69	245.38
HV Ring Closed	Bottom Tap (-5%)	13. LV Meshed Subs & Ways 100kVAr Capacitor 1/2	234.53	243.04	243.41	243.52	242.85	236.83	245.04	245.16	245.21	244.89
HV Ring Closed	Bottom Tap (-5%)	14. LV Meshed Subs 100kVAr Capacitor 2/3	234.70	242.98	243.30	243.49	242.78	237.01	244.97	245.06	245.17	244.83
HV Ring Closed	Bottom Tap (-5%)	15. LV Meshed Ways 100kVAr Capacitor 2/3	241.68	243.61	243.89	244.00	243.33	245.58	245.63	245.65	245.69	245.38
HV Ring Closed	Bottom Tap (-5%)	16. LV Meshed Subs & Ways 100kVAr Capacitor 2/3	234.70	242.98	243.34	243.46	242.78	237.01	244.97	245.10	245.14	244.83
HV Ring Closed	Bottom Tap (-5%)	17. LV Meshed Subs 150kVAr Capacitor 1/2	235.21	243.80	244.09	244.28	243.57	237.54	245.80	245.86	245.97	245.63
HV Ring Closed	Bottom Tap (-5%)	18. LV Meshed Ways 150kVAr Capacitor 1/2	242.81	244.52	244.75	244.86	244.19	246.63	246.53	246.51	246.56	246.25
HV Ring Closed	Bottom Tap (-5%)	19. LV Meshed Subs & Ways 150kVAr Capacitor 1/2	235.21	243.80	244.13	244.24	243.57	237.54	245.80	245.90	245.95	245.63
HV Ring Closed	Bottom Tap (-5%)	20. LV Meshed Subs 150kVAr Capacitor 2/3	235.47	243.70	243.99	244.18	243.47	237.80	245.70	245.77	245.88	245.53
HV Ring Closed	Bottom Tap (-5%)	21. LV Meshed Ways 150kVAr Capacitor 2/3	243.45	244.51	244.74	244.85	244.18	247.27	246.53	246.51	246.56	246.24
HV Ring Closed	Bottom Tap (-5%)	22. LV Meshed Subs & Ways 150kVAr Capacitor 2/3	235.47	243.70	244.03	244.14	243.47	237.80	245.70	245.80	245.85	

Max Demand of 1.5kW			Circuit Losses				
HV RING	OLTC Tap Position	Scenario	Primary Tx Losses (kW)	HV Losses (kW)	HV/LV Losses (kW)	LV Losses (kW)	Total Losses (kW)
HV Ring Open	Top Tap (5%)	1. No Intervention	17.252	121.948	7.875	2.808	149.881
HV Ring Open	Top Tap (5%)	2. LV Meshed Subs Only	17.355	121.328	8.387	9.773	156.842
HV Ring Open	Top Tap (5%)	3. LV Meshed Ways Only	17.251	121.941	7.873	2.802	149.867
HV Ring Open	Top Tap (5%)	4. LV Meshed Subs & Ways Only	17.356	121.253	8.389	9.755	156.753
HV Ring Open	Top Tap (5%)	5. 100kVAr Capacitor 1/2 Only	17.159	121.373	8.202	3.894	150.628
HV Ring Open	Top Tap (5%)	6. 100kVAr Capacitor 2/3 Only	17.161	121.469	8.206	4.271	151.106
HV Ring Open	Top Tap (5%)	7. 150kVAr Capacitor 1/2 Only	17.120	120.892	8.384	5.354	151.750
HV Ring Open	Top Tap (5%)	8. 150kVAr Capacitor 2/3 Only	17.124	120.919	8.392	6.198	152.633
HV Ring Open	Top Tap (5%)	9. 200kVAr Capacitor 1/2 Only	17.083	120.599	8.637	7.445	153.764
HV Ring Open	Top Tap (5%)	10. 200kVAr Capacitor 2/3 Only	17.089	120.625	8.651	9.029	155.395
HV Ring Open	Top Tap (5%)	11. LV Meshed Subs 100kVAr Capacitor 1/2	17.214	120.798	8.538	5.989	152.540
HV Ring Open	Top Tap (5%)	12. LV Meshed Ways 100kVAr Capacitor 1/2	17.159	121.372	8.202	3.892	150.626
HV Ring Open	Top Tap (5%)	13. LV Meshed Subs & Ways 100kVAr Capacitor 1/2	17.214	120.798	8.538	5.988	152.538
HV Ring Open	Top Tap (5%)	14. LV Meshed Subs 100kVAr Capacitor 2/3	17.219	120.842	8.525	6.316	152.901
HV Ring Open	Top Tap (5%)	15. LV Meshed Ways 100kVAr Capacitor 2/3	17.161	121.468	8.205	4.269	151.104
HV Ring Open	Top Tap (5%)	16. LV Meshed Subs & Ways 100kVAr Capacitor 2/3	17.219	120.842	8.525	6.314	152.900
HV Ring Open	Top Tap (5%)	17. LV Meshed Subs 150kVAr Capacitor 1/2	17.176	120.540	8.702	7.057	153.476
HV Ring Open	Top Tap (5%)	18. LV Meshed Ways 150kVAr Capacitor 1/2	17.120	120.892	8.384	5.352	151.748
HV Ring Open	Top Tap (5%)	19. LV Meshed Subs & Ways 150kVAr Capacitor 1/2	17.176	120.540	8.702	7.056	153.474
HV Ring Open	Top Tap (5%)	20. LV Meshed Subs 200kVAr Capacitor 2/3	17.184	120.615	8.682	7.715	154.196
HV Ring Open	Top Tap (5%)	21. LV Meshed Ways 150kVAr Capacitor 2/3	17.124	120.919	8.392	6.197	152.632
HV Ring Open	Top Tap (5%)	22. LV Meshed Subs & Ways 150kVAr Capacitor 2/3	17.184	120.615	8.682	7.714	154.195
HV Ring Open	Top Tap (5%)	23. LV Meshed Subs 200kVAr Capacitor 1/2	17.142	120.334	8.928	8.653	155.058
HV Ring Open	Top Tap (5%)	24. LV Meshed Ways 200kVAr Capacitor 1/2	17.082	120.677	8.631	7.428	153.819
HV Ring Open	Top Tap (5%)	25. LV Meshed Subs & Ways 200kVAr Capacitor 1/2	17.142	120.334	8.928	8.652	155.056
HV Ring Open	Top Tap (5%)	26. LV Meshed Subs 200kVAr Capacitor 2/3	17.152	120.468	8.890	9.857	156.367
HV Ring Open	Top Tap (5%)	27. LV Meshed Ways 200kVAr Capacitor 2/3	17.088	120.746	8.644	8.967	155.446
HV Ring Open	Top Tap (5%)	28. LV Meshed Subs & Ways 200kVAr Capacitor 2/3	17.149	120.515	8.891	9.854	156.408
HV Ring Open	Mid Tap (0%)	1. No Intervention	17.250	121.951	7.750	2.586	149.537
HV Ring Open	Mid Tap (0%)	2. LV Meshed Subs Only	17.289	121.406	8.009	4.892	151.595
HV Ring Open	Mid Tap (0%)	3. LV Meshed Ways Only	17.251	121.993	7.751	2.580	149.575
HV Ring Open	Mid Tap (0%)	4. LV Meshed Subs & Ways Only	17.291	121.347	8.011	4.871	151.520
HV Ring Open	Mid Tap (0%)	5. 100kVAr Capacitor 1/2 Only	17.149	121.652	8.109	3.778	150.687
HV Ring Open	Mid Tap (0%)	6. 100kVAr Capacitor 2/3 Only	17.152	121.131	8.103	4.228	150.613
HV Ring Open	Mid Tap (0%)	7. 150kVAr Capacitor 1/2 Only	17.106	120.755	8.297	5.421	151.579
HV Ring Open	Mid Tap (0%)	8. 150kVAr Capacitor 2/3 Only	17.110	120.783	8.305	6.360	152.558
HV Ring Open	Mid Tap (0%)	9. 200kVAr Capacitor 1/2 Only	17.066	120.445	8.579	7.739	153.828
HV Ring Open	Mid Tap (0%)	10. 200kVAr Capacitor 2/3 Only	17.072	120.474	8.594	9.503	155.643
HV Ring Open	Mid Tap (0%)	11. LV Meshed Subs 100kVAr Capacitor 1/2	17.153	120.922	8.181	4.128	150.383
HV Ring Open	Mid Tap (0%)	12. LV Meshed Ways 100kVAr Capacitor 1/2	17.149	121.652	8.109	3.776	150.686
HV Ring Open	Mid Tap (0%)	13. LV Meshed Subs & Ways 100kVAr Capacitor 1/2	17.153	120.922	8.181	4.126	150.382
HV Ring Open	Mid Tap (0%)	14. LV Meshed Subs 100kVAr Capacitor 2/3	17.158	120.971	8.170	4.438	150.737
HV Ring Open	Mid Tap (0%)	15. LV Meshed Ways 100kVAr Capacitor 2/3	17.152	121.131	8.103	4.227	150.612
HV Ring Open	Mid Tap (0%)	16. LV Meshed Subs & Ways 100kVAr Capacitor 2/3	17.158	120.971	8.170	4.437	150.735
HV Ring Open	Mid Tap (0%)	17. LV Meshed Subs 150kVAr Capacitor 1/2	17.112	120.649	8.343	5.473	151.576
HV Ring Open	Mid Tap (0%)	18. LV Meshed Ways 150kVAr Capacitor 1/2	17.106	120.755	8.297	5.420	151.578
HV Ring Open	Mid Tap (0%)	19. LV Meshed Subs & Ways 150kVAr Capacitor 1/2	17.112	120.648	8.343	5.472	151.575
HV Ring Open	Mid Tap (0%)	20. LV Meshed Subs 200kVAr Capacitor 2/3	17.120	120.734	8.324	6.117	152.296
HV Ring Open	Mid Tap (0%)	21. LV Meshed Ways 150kVAr Capacitor 2/3	17.110	120.783	8.305	6.359	152.556
HV Ring Open	Mid Tap (0%)	22. LV Meshed Subs & Ways 150kVAr Capacitor 2/3	17.120	120.734	8.324	6.116	152.294
HV Ring Open	Mid Tap (0%)	23. LV Meshed Subs 200kVAr Capacitor 1/2	17.075	120.437	8.572	7.394	153.477
HV Ring Open	Mid Tap (0%)	24. LV Meshed Ways 200kVAr Capacitor 1/2	17.065	120.530	8.576	7.711	153.882
HV Ring Open	Mid Tap (0%)	25. LV Meshed Subs & Ways 200kVAr Capacitor 1/2	17.075	120.437	8.572	7.392	153.476
HV Ring Open	Mid Tap (0%)	26. LV Meshed Subs 200kVAr Capacitor 2/3	17.086	120.586	8.538	8.610	154.820
HV Ring Open	Mid Tap (0%)	27. LV Meshed Ways 200kVAr Capacitor 2/3	17.071	120.605	8.590	9.419	155.685
HV Ring Open	Mid Tap (0%)	28. LV Meshed Subs & Ways 200kVAr Capacitor 2/3	17.086	120.431	8.534	8.588	154.639
HV Ring Open	Bottom Tap (-5%)	1. No Intervention	17.248	121.895	7.638	2.371	149.152
HV Ring Open	Bottom Tap (-5%)	2. LV Meshed Subs Only	17.232	121.651	7.676	2.931	149.490
HV Ring Open	Bottom Tap (-5%)	3. LV Meshed Ways Only	17.248	122.039	7.634	2.361	149.283
HV Ring Open	Bottom Tap (-5%)	4. LV Meshed Subs & Ways Only	17.234	121.620	7.677	2.912	149.442
HV Ring Open	Bottom Tap (-5%)	5. 100kVAr Capacitor 1/2 Only	17.137	121.013	8.006	3.751	149.908
HV Ring Open	Bottom Tap (-5%)	6. 100kVAr Capacitor 2/3 Only	17.139	121.034	8.010	4.207	150.391
HV Ring Open	Bottom Tap (-5%)	7. 150kVAr Capacitor 1/2 Only	17.089	120.638	8.225	5.539	151.492
HV Ring Open	Bottom Tap (-5%)	8. 150kVAr Capacitor 2/3 Only	17.093	120.670	8.227	6.621	152.611
HV Ring Open	Bottom Tap (-5%)	9. 200kVAr Capacitor 1/2 Only	17.046	120.322	8.537	8.123	154.027
HV Ring Open	Bottom Tap (-5%)	10. 200kVAr Capacitor 2/3 Only	17.053	120.362	8.552	10.095	156.062
HV Ring Open	Bottom Tap (-5%)	11. LV Meshed Subs 100kVAr Capacitor 1/2	17.103	121.271	7.868	5.557	151.799
HV Ring Open	Bottom Tap (-5%)	12. LV Meshed Ways 100kVAr Capacitor 1/2	17.137	121.013	8.006	3.750	149.907
HV Ring Open	Bottom Tap (-5%)	13. LV Meshed Subs & Ways 100kVAr Capacitor 1/2	17.103	121.271	7.868	5.556	151.797
HV Ring Open	Bottom Tap (-5%)	14. LV Meshed Subs 100kVAr Capacitor 2/3	17.109	121.326	7.859	5.845	152.139
HV Ring Open	Bottom Tap (-5%)	15. LV Meshed Ways 100kVAr Capacitor 2/3	17.139	121.034	8.010	4.206	150.389
HV Ring Open	Bottom Tap (-5%)	16. LV Meshed Subs & Ways 100kVAr Capacitor 2/3	17.109	121.326	7.859	5.844	152.138
HV Ring Open	Bottom Tap (-5%)	17. LV Meshed Subs 150kVAr Capacitor 1/2	17.058	120.980	8.028	7.217	153.284
HV Ring Open	Bottom Tap (-5%)	18. LV Meshed Ways 150kVAr Capacitor 1/2	17.089	120.638	8.225	5.538	151.491
HV Ring Open	Bottom Tap (-5%)	19. LV Meshed Subs & Ways 150kVAr Capacitor 1/2	17.058	120.980	8.028	7.216	153.283
HV Ring Open	Bottom Tap (-5%)	20. LV Meshed Subs 200kVAr Capacitor 2/3	17.068	121.077	8.010	7.867	154.022
HV Ring Open	Bottom Tap (-5%)	21. LV Meshed Ways 150kVAr Capacitor 2/3	17.093	120.670	8.227	6.620	152.609
HV Ring Open	Bottom Tap (-5%)	22. LV Meshed Subs & Ways 150kVAr Capacitor 2/3	17.068	121.077	8.010	7.866	154.021
HV Ring Open	Bottom Tap (-5%)	23. LV Meshed Subs 200kVAr Capacitor 1/2	17.019	120.762	8.257	9.560	155.597
HV Ring Open	Bottom Tap (-5%)	24. LV Meshed Ways 200kVAr Capacitor 1/2	17.045	120.391	8.539	8.089	154.064
HV Ring Open	Bottom Tap (-5%)	25. LV Meshed Subs & Ways 200kVAr Capacitor 1/2	17.019	120.762	8.257	9.558	155.596
HV Ring Open	Bottom Tap (-5%)	26. LV Meshed Subs 200kVAr Capacitor 2/3	17.031	120.932	8.229	10.779	156.971
HV Ring Open	Bottom Tap (-5%)	27. LV Meshed Ways 200kVAr Capacitor 2/3	17.052	120.473	8.553	9.996	156.074
HV Ring Open	Bottom Tap (-5%)	28. LV Meshed Subs & Ways 200kVAr Capacitor 2/3	17.031	120.932	8.229	10.778	156.970

Max Demand of 1.5kW			Circuit Losses				
HV RING	OLTC Tap Position	Scenario	Primary Tx Losses (kW)	HV Losses (kW)	HV/LV Losses (kW)	LV Losses (kW)	Total Losses (kW)
HV Ring Closed	Top Tap (5%)	1. No Intervention	16.638	127.145	7.855	2.766	154.405
HV Ring Closed	Top Tap (5%)	2. LV Meshed Subs Only	16.663	127.354	8.300	7.641	159.958
HV Ring Closed	Top Tap (5%)	3. LV Meshed Ways Only	16.643	127.279	7.855	2.768	154.545
HV Ring Closed	Top Tap (5%)	4. LV Meshed Subs & Ways Only	16.667	127.367	8.310	7.615	159.959
HV Ring Closed	Top Tap (5%)	5. 100kVAr Capacitor 1/2 Only	16.593	126.886	8.196	3.906	155.581
HV Ring Closed	Top Tap (5%)	6. 100kVAr Capacitor 2/3 Only	16.595	126.901	8.199	4.283	155.978
HV Ring Closed	Top Tap (5%)	7. 150kVAr Capacitor 1/2 Only	16.574	126.739	8.375	5.375	157.062
HV Ring Closed	Top Tap (5%)	8. 150kVAr Capacitor 2/3 Only	16.578	126.773	8.382	6.239	157.972
HV Ring Closed	Top Tap (5%)	9. 200kVAr Capacitor 1/2 Only	16.558	126.632	8.635	7.472	159.297
HV Ring Closed	Top Tap (5%)	10. 200kVAr Capacitor 2/3 Only	16.565	126.693	8.648	9.036	160.943
HV Ring Closed	Top Tap (5%)	11. LV Meshed Subs 100kVAr Capacitor 1/2	16.600	126.951	8.441	4.644	156.636
HV Ring Closed	Top Tap (5%)	12. LV Meshed Ways 100kVAr Capacitor 1/2	16.593	126.886	8.196	3.905	155.579
HV Ring Closed	Top Tap (5%)	13. LV Meshed Subs & Ways 100kVAr Capacitor 1/2	16.600	126.951	8.441	4.642	156.634
HV Ring Closed	Top Tap (5%)	14. LV Meshed Subs 100kVAr Capacitor 2/3	16.602	126.961	8.431	4.942	156.936
HV Ring Closed	Top Tap (5%)	15. LV Meshed Ways 100kVAr Capacitor 2/3	16.595	126.901	8.199	4.281	155.976
HV Ring Closed	Top Tap (5%)	16. LV Meshed Subs & Ways 100kVAr Capacitor 2/3	16.601	126.961	8.431	4.941	156.935
HV Ring Closed	Top Tap (5%)	17. LV Meshed Subs 150kVAr Capacitor 1/2	16.578	126.789	8.589	5.817	157.773
HV Ring Closed	Top Tap (5%)	18. LV Meshed Ways 150kVAr Capacitor 1/2	16.574	126.739	8.375	5.373	157.061
HV Ring Closed	Top Tap (5%)	19. LV Meshed Subs & Ways 150kVAr Capacitor 1/2	16.578	126.789	8.589	5.816	157.772
HV Ring Closed	Top Tap (5%)	20. LV Meshed Subs 150kVAr Capacitor 2/3	16.581	126.809	8.571	6.475	158.436
HV Ring Closed	Top Tap (5%)	21. LV Meshed Ways 150kVAr Capacitor 2/3	16.578	126.773	8.382	6.238	157.970
HV Ring Closed	Top Tap (5%)	22. LV Meshed Subs & Ways 150kVAr Capacitor 2/3	16.581	126.809	8.571	6.474	158.435
HV Ring Closed	Top Tap (5%)	23. LV Meshed Subs 200kVAr Capacitor 1/2	16.560	126.658	8.798	7.545	159.562
HV Ring Closed	Top Tap (5%)	24. LV Meshed Ways 200kVAr Capacitor 1/2	16.555	126.723	8.632	7.465	159.375
HV Ring Closed	Top Tap (5%)	25. LV Meshed Subs & Ways 200kVAr Capacitor 1/2	16.560	126.658	8.798	7.544	159.560
HV Ring Closed	Top Tap (5%)	26. LV Meshed Subs 200kVAr Capacitor 2/3	16.563	126.783	8.766	8.720	160.832
HV Ring Closed	Top Tap (5%)	27. LV Meshed Ways 200kVAr Capacitor 2/3	16.563	126.784	8.645	9.028	161.019
HV Ring Closed	Top Tap (5%)	28. LV Meshed Subs & Ways 200kVAr Capacitor 2/3	16.563	126.783	8.766	8.719	160.830
HV Ring Closed	Mid Tap (0%)	1. No Intervention	16.637	127.136	7.735	2.549	154.057
HV Ring Closed	Mid Tap (0%)	2. LV Meshed Subs Only	16.641	127.163	7.936	3.384	155.124
HV Ring Closed	Mid Tap (0%)	3. LV Meshed Ways Only	16.641	127.263	7.736	2.547	154.188
HV Ring Closed	Mid Tap (0%)	4. LV Meshed Subs & Ways Only	16.647	127.583	7.947	3.509	155.687
HV Ring Closed	Mid Tap (0%)	5. 100kVAr Capacitor 1/2 Only	16.587	126.832	8.092	3.813	155.325
HV Ring Closed	Mid Tap (0%)	6. 100kVAr Capacitor 2/3 Only	16.589	126.849	8.095	4.231	155.764
HV Ring Closed	Mid Tap (0%)	7. 150kVAr Capacitor 1/2 Only	16.565	126.676	8.291	5.442	156.974
HV Ring Closed	Mid Tap (0%)	8. 150kVAr Capacitor 2/3 Only	16.569	126.714	8.298	6.399	157.980
HV Ring Closed	Mid Tap (0%)	9. 200kVAr Capacitor 1/2 Only	16.548	126.565	8.579	7.765	159.457
HV Ring Closed	Mid Tap (0%)	10. 200kVAr Capacitor 2/3 Only	16.556	126.632	8.593	9.497	161.278
HV Ring Closed	Mid Tap (0%)	11. LV Meshed Subs 100kVAr Capacitor 1/2	16.586	126.842	8.096	3.528	155.052
HV Ring Closed	Mid Tap (0%)	12. LV Meshed Ways 100kVAr Capacitor 1/2	16.587	126.832	8.092	3.812	155.323
HV Ring Closed	Mid Tap (0%)	13. LV Meshed Subs & Ways 100kVAr Capacitor 1/2	16.586	126.842	8.096	3.527	155.050
HV Ring Closed	Mid Tap (0%)	14. LV Meshed Subs 100kVAr Capacitor 2/3	16.588	126.854	8.088	3.816	155.346
HV Ring Closed	Mid Tap (0%)	15. LV Meshed Ways 100kVAr Capacitor 2/3	16.589	126.849	8.095	4.230	155.763
HV Ring Closed	Mid Tap (0%)	16. LV Meshed Subs & Ways 100kVAr Capacitor 2/3	16.588	126.854	8.088	3.814	155.344
HV Ring Closed	Mid Tap (0%)	17. LV Meshed Subs 150kVAr Capacitor 1/2	16.564	126.675	8.241	4.964	156.443
HV Ring Closed	Mid Tap (0%)	18. LV Meshed Ways 150kVAr Capacitor 1/2	16.565	126.676	8.291	5.440	156.972
HV Ring Closed	Mid Tap (0%)	19. LV Meshed Subs & Ways 150kVAr Capacitor 1/2	16.564	126.675	8.241	4.963	156.442
HV Ring Closed	Mid Tap (0%)	20. LV Meshed Subs 150kVAr Capacitor 2/3	16.567	126.699	8.225	5.620	157.110
HV Ring Closed	Mid Tap (0%)	21. LV Meshed Ways 150kVAr Capacitor 2/3	16.569	126.713	8.298	6.398	157.979
HV Ring Closed	Mid Tap (0%)	22. LV Meshed Subs & Ways 150kVAr Capacitor 2/3	16.567	126.699	8.225	5.619	157.109
HV Ring Closed	Mid Tap (0%)	23. LV Meshed Subs 200kVAr Capacitor 1/2	16.545	126.545	8.452	7.005	158.546
HV Ring Closed	Mid Tap (0%)	24. LV Meshed Ways 200kVAr Capacitor 1/2	16.545	126.652	8.578	7.757	159.533
HV Ring Closed	Mid Tap (0%)	25. LV Meshed Subs & Ways 200kVAr Capacitor 1/2	16.545	126.545	8.452	7.003	158.545
HV Ring Closed	Mid Tap (0%)	26. LV Meshed Subs 200kVAr Capacitor 2/3	16.548	126.671	8.423	8.201	159.843
HV Ring Closed	Mid Tap (0%)	27. LV Meshed Ways 200kVAr Capacitor 2/3	16.553	126.719	8.591	9.493	161.356
HV Ring Closed	Mid Tap (0%)	28. LV Meshed Subs & Ways 200kVAr Capacitor 2/3	16.548	126.671	8.423	8.200	159.841
HV Ring Closed	Bottom Tap (-5%)	1. No Intervention	16.634	127.225	7.621	2.331	153.811
HV Ring Closed	Bottom Tap (-5%)	2. LV Meshed Subs Only	16.634	127.140	7.623	2.346	153.744
HV Ring Closed	Bottom Tap (-5%)	3. LV Meshed Ways Only	16.640	127.250	7.623	2.339	153.851
HV Ring Closed	Bottom Tap (-5%)	4. LV Meshed Subs & Ways Only	16.639	127.642	7.629	2.397	154.308
HV Ring Closed	Bottom Tap (-5%)	5. 100kVAr Capacitor 1/2 Only	16.579	126.776	7.997	3.753	155.105
HV Ring Closed	Bottom Tap (-5%)	6. 100kVAr Capacitor 2/3 Only	16.581	126.794	8.000	4.218	155.594
HV Ring Closed	Bottom Tap (-5%)	7. 150kVAr Capacitor 1/2 Only	16.555	126.609	8.219	5.566	156.949
HV Ring Closed	Bottom Tap (-5%)	8. 150kVAr Capacitor 2/3 Only	16.560	126.650	8.226	6.632	158.068
HV Ring Closed	Bottom Tap (-5%)	9. 200kVAr Capacitor 1/2 Only	16.537	126.495	8.539	8.152	159.723
HV Ring Closed	Bottom Tap (-5%)	10. 200kVAr Capacitor 2/3 Only	16.546	126.569	8.553	10.079	161.746
HV Ring Closed	Bottom Tap (-5%)	11. LV Meshed Subs 100kVAr Capacitor 1/2	16.588	126.870	7.798	5.980	157.237
HV Ring Closed	Bottom Tap (-5%)	12. LV Meshed Ways 100kVAr Capacitor 1/2	16.579	126.776	7.997	3.751	155.103
HV Ring Closed	Bottom Tap (-5%)	13. LV Meshed Subs & Ways 100kVAr Capacitor 1/2	16.588	126.870	7.798	5.979	157.236
HV Ring Closed	Bottom Tap (-5%)	14. LV Meshed Subs 100kVAr Capacitor 2/3	16.590	126.885	7.793	6.253	157.521
HV Ring Closed	Bottom Tap (-5%)	15. LV Meshed Ways 100kVAr Capacitor 2/3	16.581	126.794	8.000	4.217	155.592
HV Ring Closed	Bottom Tap (-5%)	16. LV Meshed Subs & Ways 100kVAr Capacitor 2/3	16.590	126.885	7.793	6.252	157.520
HV Ring Closed	Bottom Tap (-5%)	17. LV Meshed Subs 150kVAr Capacitor 1/2	16.565	126.698	7.939	7.730	158.932
HV Ring Closed	Bottom Tap (-5%)	18. LV Meshed Ways 150kVAr Capacitor 1/2	16.555	126.609	8.219	5.565	156.948
HV Ring Closed	Bottom Tap (-5%)	19. LV Meshed Subs & Ways 150kVAr Capacitor 1/2	16.565	126.698	7.939	7.729	158.931
HV Ring Closed	Bottom Tap (-5%)	20. LV Meshed Subs 150kVAr Capacitor 2/3	16.568	126.725	7.926	8.380	159.599
HV Ring Closed	Bottom Tap (-5%)	21. LV Meshed Ways 150kVAr Capacitor 2/3	16.560	126.650	8.226	6.631	158.067
HV Ring Closed	Bottom Tap (-5%)	22. LV Meshed Subs & Ways 150kVAr Capacitor 2/3	16.568	126.725	7.926	8.379	159.598
HV Ring Closed	Bottom Tap (-5%)	23. LV Meshed Subs 200kVAr Capacitor 1/2	16.546	126.568	8.151	10.142	161.407
HV Ring Closed	Bottom Tap (-5%)	24. LV Meshed Ways 200kVAr Capacitor 1/2	16.534	126.585	8.540	8.144	159.804
HV Ring Closed	Bottom Tap (-5%)	25. LV Meshed Subs & Ways 200kVAr Capacitor 1/2	16.546	126.568	8.151	10.140	161.405
HV Ring Closed	Bottom Tap (-5%)	26. LV Meshed Subs 200kVAr Capacitor 2/3	16.549	126.701	8.128	11.358	162.737
HV Ring Closed	Bottom Tap (-5%)	27. LV Meshed Ways 200kVAr Capacitor 2/3	16.543	126.659	8.554	10.082	161.838
HV Ring Closed	Bottom Tap (-5%)	28. LV Meshed Subs & Ways 200kVAr Capacitor 2/3	16.549	126.701	8.128	11.357	162.735

# APPENDIX C – HINDLEY GREEN RESULTS

Min Demand of 0.2kW _ (2.35kW PV average installation)			Voltage Level at 0% PV Penetration					Voltage Level at 20% PV Penetration				
HV RING	OLTC Tap Position	Scenario	YW12	PW6	GW3	BW4	L19	YW12	PW6	GW3	BW4	L19
HV Ring Open	Top Tap (5%)	1. No Intervention	225.50	227.49	227.71	227.09	238.23	230.55	229.26	229.00	229.70	241.88
HV Ring Open	Top Tap (5%)	2. LV Meshed Subs Only	227.32	229.29	233.95	228.90	233.20	232.60	231.30	235.52	231.74	236.73
HV Ring Open	Top Tap (5%)	3. LV Meshed Ways Only	225.50	227.64	227.70	227.10	238.21	230.55	229.16	229.03	229.70	241.88
HV Ring Open	Top Tap (5%)	4. LV Meshed Subs & Ways Only	227.41	230.61	233.79	229.00	233.03	232.66	232.41	235.36	231.81	236.58
HV Ring Open	Top Tap (5%)	5. 100kVAr Capacitor 1/2 Only	230.34	229.83	230.06	229.44	238.47	235.35	231.65	231.40	232.09	242.15
HV Ring Open	Top Tap (5%)	6. 100kVAr Capacitor 2/3 Only	230.66	229.81	230.04	229.42	238.47	236.05	231.66	231.41	232.10	242.15
HV Ring Open	Top Tap (5%)	7. 150kVAr Capacitor 1/2 Only	232.72	231.01	231.23	230.62	238.60	237.73	232.87	232.62	233.30	242.29
HV Ring Open	Top Tap (5%)	8. 150kVAr Capacitor 2/3 Only	234.23	231.02	231.24	230.63	238.61	239.03	232.87	232.63	233.29	242.29
HV Ring Open	Top Tap (5%)	9. 200kVAr Capacitor 1/2 Only	235.35	232.24	232.46	231.85	238.74	240.30	234.09	233.85	234.51	242.43
HV Ring Open	Top Tap (5%)	10. 200kVAr Capacitor 2/3 Only	236.74	232.20	232.42	231.81	238.74	241.14	234.10	233.85	234.53	242.43
HV Ring Open	Top Tap (5%)	11. LV Meshed Subs 100kVAr Capacitor 1/2	231.83	231.27	235.18	230.88	234.40	236.99	233.29	236.76	233.72	237.95
HV Ring Open	Top Tap (5%)	12. LV Meshed Ways 100kVAr Capacitor 1/2	230.42	229.82	230.00	229.44	238.47	235.35	231.56	231.43	232.09	242.15
HV Ring Open	Top Tap (5%)	13. LV Meshed Subs & Ways 100kVAr Capacitor 1/2	231.86	232.30	235.04	230.91	234.26	237.04	234.18	236.62	233.77	237.81
HV Ring Open	Top Tap (5%)	14. LV Meshed Subs 100kVAr Capacitor 2/3	232.66	231.25	235.17	230.86	234.39	237.86	233.27	236.75	233.69	237.93
HV Ring Open	Top Tap (5%)	15. LV Meshed Ways 100kVAr Capacitor 2/3	230.82	229.80	229.98	229.42	238.47	236.01	231.57	231.44	232.10	242.15
HV Ring Open	Top Tap (5%)	16. LV Meshed Subs & Ways 100kVAr Capacitor 2/3	232.69	232.28	235.03	230.90	234.26	237.91	234.15	236.62	233.74	237.80
HV Ring Open	Top Tap (5%)	17. LV Meshed Subs 150kVAr Capacitor 1/2	234.11	232.24	235.79	231.86	235.00	239.28	234.27	237.37	234.68	238.54
HV Ring Open	Top Tap (5%)	18. LV Meshed Ways 150kVAr Capacitor 1/2	232.87	231.02	231.17	230.62	238.61	237.72	232.77	232.65	233.30	242.29
HV Ring Open	Top Tap (5%)	19. LV Meshed Subs & Ways 150kVAr Capacitor 1/2	234.13	233.18	235.67	231.89	234.88	239.32	235.05	237.26	234.73	238.43
HV Ring Open	Top Tap (5%)	20. LV Meshed Subs 150kVAr Capacitor 2/3	235.04	232.26	235.78	231.87	235.00	240.46	234.27	237.38	234.69	238.54
HV Ring Open	Top Tap (5%)	21. LV Meshed Ways 150kVAr Capacitor 2/3	234.20	231.11	231.21	230.63	238.61	239.03	232.77	232.66	233.29	242.29
HV Ring Open	Top Tap (5%)	22. LV Meshed Subs & Ways 150kVAr Capacitor 2/3	235.07	233.21	235.64	231.91	234.87	240.50	235.05	237.26	234.73	238.43
HV Ring Open	Top Tap (5%)	23. LV Meshed Subs 200kVAr Capacitor 1/2	236.48	233.22	236.40	232.84	235.61	241.50	235.27	238.01	235.69	239.16
HV Ring Open	Top Tap (5%)	24. LV Meshed Ways 200kVAr Capacitor 1/2	235.33	232.33	232.43	231.86	238.74	240.30	233.99	233.88	234.51	242.43
HV Ring Open	Top Tap (5%)	25. LV Meshed Subs & Ways 200kVAr Capacitor 1/2	236.48	234.06	236.30	232.86	235.51	241.54	235.95	237.91	235.72	239.06
HV Ring Open	Top Tap (5%)	26. LV Meshed Subs 200kVAr Capacitor 2/3	237.70	233.21	236.38	232.83	235.60	243.03	235.27	238.01	235.68	239.17
HV Ring Open	Top Tap (5%)	27. LV Meshed Ways 200kVAr Capacitor 2/3	236.77	232.29	232.39	231.81	238.74	241.14	234.00	233.88	234.53	242.43
HV Ring Open	Top Tap (5%)	28. LV Meshed Subs & Ways 200kVAr Capacitor 2/3	237.76	234.07	236.26	232.87	235.48	243.07	235.94	237.91	235.72	239.07
HV Ring Open	Mid Tap (0%)	1. No Intervention	237.07	238.95	239.16	238.58	238.23	241.85	240.62	240.39	241.03	241.89
HV Ring Open	Mid Tap (0%)	2. LV Meshed Subs Only	236.95	238.85	239.09	238.48	238.26	241.97	240.74	240.63	241.15	241.71
HV Ring Open	Mid Tap (0%)	3. LV Meshed Ways Only	237.05	239.03	239.13	238.58	238.21	241.85	240.53	240.42	241.03	241.89
HV Ring Open	Mid Tap (0%)	4. LV Meshed Subs & Ways Only	236.98	238.97	239.09	238.51	238.26	241.98	240.70	240.64	241.16	241.72
HV Ring Open	Mid Tap (0%)	5. 100kVAr Capacitor 1/2 Only	242.25	241.43	241.64	241.06	238.50	246.89	243.16	242.93	243.56	242.18
HV Ring Open	Mid Tap (0%)	6. 100kVAr Capacitor 2/3 Only	243.05	241.44	241.64	241.06	238.50	247.58	243.17	242.94	243.57	242.18
HV Ring Open	Mid Tap (0%)	7. 150kVAr Capacitor 1/2 Only	244.78	242.71	242.92	242.34	238.65	249.58	244.46	244.23	244.86	242.33
HV Ring Open	Mid Tap (0%)	8. 150kVAr Capacitor 2/3 Only	246.29	242.71	242.92	242.34	238.65	250.45	244.46	244.23	244.86	242.33
HV Ring Open	Mid Tap (0%)	9. 200kVAr Capacitor 1/2 Only	247.44	244.00	244.21	243.64	238.80	251.90	245.75	245.53	246.14	242.48
HV Ring Open	Mid Tap (0%)	10. 200kVAr Capacitor 2/3 Only	248.76	243.97	244.18	243.60	238.80	253.76	245.77	245.54	246.17	242.49
HV Ring Open	Mid Tap (0%)	11. LV Meshed Subs 100kVAr Capacitor 1/2	241.69	240.92	240.37	240.55	239.50	246.56	242.83	241.93	243.23	242.99
HV Ring Open	Mid Tap (0%)	12. LV Meshed Ways 100kVAr Capacitor 1/2	242.34	241.58	241.62	241.06	238.50	246.89	243.07	242.96	243.56	242.18
HV Ring Open	Mid Tap (0%)	13. LV Meshed Subs & Ways 100kVAr Capacitor 1/2	241.66	240.80	240.40	240.52	239.53	246.55	242.56	241.97	243.22	243.02
HV Ring Open	Mid Tap (0%)	14. LV Meshed Subs 100kVAr Capacitor 2/3	242.61	240.91	240.36	240.54	239.50	247.25	242.83	241.93	243.23	242.99
HV Ring Open	Mid Tap (0%)	15. LV Meshed Ways 100kVAr Capacitor 2/3	243.04	241.53	241.62	241.07	238.50	247.85	243.08	242.97	243.58	242.18
HV Ring Open	Mid Tap (0%)	16. LV Meshed Subs & Ways 100kVAr Capacitor 2/3	242.57	240.79	240.39	240.51	239.53	247.24	242.56	241.97	243.22	243.03
HV Ring Open	Mid Tap (0%)	17. LV Meshed Subs 150kVAr Capacitor 1/2	244.10	241.95	241.01	241.58	240.14	248.82	243.88	242.59	244.28	243.63
HV Ring Open	Mid Tap (0%)	18. LV Meshed Ways 150kVAr Capacitor 1/2	244.77	242.80	242.90	242.35	238.65	249.58	244.37	244.26	244.86	242.33
HV Ring Open	Mid Tap (0%)	19. LV Meshed Subs & Ways 150kVAr Capacitor 1/2	244.05	241.73	241.06	241.55	240.19	248.80	243.50	242.65	244.25	243.69
HV Ring Open	Mid Tap (0%)	20. LV Meshed Subs 150kVAr Capacitor 2/3	245.75	241.93	241.00	241.56	240.13	249.77	243.88	242.60	244.28	243.64
HV Ring Open	Mid Tap (0%)	21. LV Meshed Ways 150kVAr Capacitor 2/3	246.24	242.80	242.89	242.34	238.65	250.46	244.37	244.26	244.86	242.33
HV Ring Open	Mid Tap (0%)	22. LV Meshed Subs & Ways 150kVAr Capacitor 2/3	245.67	241.71	241.05	241.53	240.18	249.82	243.50	242.65	244.25	243.69
HV Ring Open	Mid Tap (0%)	23. LV Meshed Subs 200kVAr Capacitor 1/2	246.59	242.99	241.66	242.62	240.78	251.08	244.93	243.25	245.33	244.28
HV Ring Open	Mid Tap (0%)	24. LV Meshed Ways 200kVAr Capacitor 1/2	247.40	244.10	244.19	243.64	238.80	251.91	245.66	245.56	246.14	242.48
HV Ring Open	Mid Tap (0%)	25. LV Meshed Subs & Ways 200kVAr Capacitor 1/2	246.52	242.66	241.72	242.58	240.85	251.05	244.45	243.33	245.30	244.35
HV Ring Open	Mid Tap (0%)	26. LV Meshed Subs 200kVAr Capacitor 2/3	247.80	242.97	241.66	242.60	240.81	252.90	244.92	243.26	245.33	244.29
HV Ring Open	Mid Tap (0%)	27. LV Meshed Ways 200kVAr Capacitor 2/3	248.75	244.06	244.15	243.60	238.80	253.76	245.68	245.57	246.17	242.49
HV Ring Open	Mid Tap (0%)	28. LV Meshed Subs & Ways 200kVAr Capacitor 2/3	247.75	242.63	241.72	242.57	240.86	252.87	244.43	243.33	245.29	244.36
HV Ring Open	Bottom Tap (-5%)	1. No Intervention	249.81	251.61	251.81	251.25	238.23	254.33	253.19	252.98	253.55	241.89
HV Ring Open	Bottom Tap (-5%)	2. LV Meshed Subs Only	247.56	249.37	244.75	249.01	243.83	252.32	251.16	246.25	251.53	247.18
HV Ring Open	Bottom Tap (-5%)	3. LV Meshed Ways Only	249.80	251.70	251.78	251.25	238.20	254.32	253.10	253.00	253.55	241.89
HV Ring Open	Bottom Tap (-5%)	4. LV Meshed Subs & Ways Only	247.51	248.20	244.93	248.98	244.00	252.25	249.84	246.45	251.47	247.38
HV Ring Open	Bottom Tap (-5%)	5. 100kVAr Capacitor 1/2 Only	255.48	254.26	254.45	253.91	238.53	259.65	255.89	255.68	256.25	242.21
HV Ring Open	Bottom Tap (-5%)	6. 100kVAr Capacitor 2/3 Only	256.14	254.26	254.46	253.91	238.53	260.32	255.90	255.69	256.25	242.21
HV Ring Open	Bottom Tap (-5%)	7. 150kVAr Capacitor 1/2 Only	257.95	255.63	255.83	255.28	238.70	262.26	257.26	257.06	257.62	242.38
HV Ring Open	Bottom Tap (-5%)	8. 150kVAr Capacitor 2/3 Only	258.87	255.60	255.80	255.25	238.69	263.88	257.30	257.08	257.68	242.38
HV Ring Open	Bottom Tap (-5%)	9. 200kVAr Capacitor 1/2 Only	260.54	256.97	257.17	256.62	238.86	264.81	258.64	258.44	258.99	242.55
HV Ring Open	Bottom Tap (-5%)	10. 200kVAr Capacitor 2/3 Only	262.06	256.97	257.16	256.62	238.86	266.03	258.64	258.44	259.00	242.55
HV Ring Open	Bottom Tap (-5%)	11. LV Meshed Subs 100kVAr Capacitor 1/2	252.55	251.56	246.09	251.21	245.13	257.11	253.36	247.63	253.73	248.53
HV Ring Open	Bottom Tap (-5%)	12. LV Meshed Ways 100kVAr Capacitor 1/2	255.21	254.34	254.44	253.92	238.53	259.83	255.83	255.72	256.30	242.21
HV Ring Open	Bottom Tap (-5%)	13. LV Meshed Subs & Ways 100kVAr Capacitor 1/2	252.44	250.16	246.30	251.11	245.34	257.02	251.81	247.85	253.64	248.75
HV Ring Open	Bottom Tap (-5%)	14. LV Meshed Subs 100kVAr Capacitor 2/3	253.54	251.55	246.08	251.19	245.12	257.83	253.36	247.63	253.73	248.53
HV Ring Open	Bottom Tap (-5%)	15. LV Meshed Ways 100kVAr Capacitor 2/3	256.11	254.33	254.43	253.91	238.53	260.38	255.82	255.72	256.26	242.21
HV Ring Open	Bottom Tap (-5%)	16. LV Meshed Subs & Ways 100kVAr Capacitor 2/3	253.42	250.15	246.30	251.10	245.34	257.74	251.81	247.86	253.64	248.76
HV Ring Open	Bottom Tap (-5%)	17. LV Meshed Subs 150kVAr Capacitor 1/2	255.07	252.66	246.77	252.30	245.80	259.48	254.47	248.32	254.83	249.21
HV Ring Open	Bottom Tap (-5%)	18. LV Meshed Ways 150kVAr Capacitor 1/2	257.91	255.70	255.80	255.28	238.70	262.27	257.18	257.09	257.62	242.38
HV Ring Open	Bottom Tap (-5%)	19. LV Meshed Subs & Ways 150kVAr Capacitor 1/2	254.95	251.15	247.00	252.20	246.04	259.38	252.80	248.57	254.73	249.45
HV Ring Open	Bottom Tap (-5%)	20. LV Meshed Subs 150kVAr Capacitor 2/3	255.80	252.63	246.79	252.27	245.85	261.01	254.48	248.33	254.87	249.25
HV Ring Open	Bottom Tap (-5%)	21. LV Meshed Ways 150kVAr Capacitor 2/3	258.87	255.68	255.77	255.25	238.69	263.88	257.21	257.11	257.68	242.38
HV Ring Open	Bottom Tap (-5%)	22. LV Meshed Subs & Ways 150kVAr Capacitor 2/3	255.70	251.08								

Min Demand of 0.2kW _ (2.35kW PV average installation)			Voltage Level at 0% PV Penetration					Voltage Level at 20% PV Penetration				
HV RING	OLTC Tap Position	Scenario	YW12	PW6	GW3	BW4	L19	YW12	PW6	GW3	BW4	L19
HV Ring Closed	Top Tap (5%)	1. No Intervention	225.30	227.30	227.53	226.91	237.99	230.36	229.08	228.84	229.51	241.70
HV Ring Closed	Top Tap (5%)	2. LV Meshed Subs Only	227.18	229.16	233.76	228.77	233.00	232.39	231.12	235.34	231.55	236.54
HV Ring Closed	Top Tap (5%)	3. LV Meshed Ways Only	225.30	227.40	227.50	226.91	237.99	230.36	228.99	228.87	229.51	241.70
HV Ring Closed	Top Tap (5%)	4. LV Meshed Subs & Ways Only	227.25	230.42	233.57	228.84	232.82	232.46	232.21	235.17	231.61	236.38
HV Ring Closed	Top Tap (5%)	5. 100kVAr Capacitor 1/2 Only	230.05	229.55	229.77	229.16	238.15	235.15	231.38	231.14	231.80	241.86
HV Ring Closed	Top Tap (5%)	6. 100kVAr Capacitor 2/3 Only	230.82	229.54	229.76	229.15	238.15	235.96	231.39	231.15	231.81	241.86
HV Ring Closed	Top Tap (5%)	7. 150kVAr Capacitor 1/2 Only	232.42	230.69	230.91	230.30	238.23	237.54	232.55	232.31	232.97	241.94
HV Ring Closed	Top Tap (5%)	8. 150kVAr Capacitor 2/3 Only	233.54	230.67	230.89	230.28	238.23	238.72	232.55	232.31	232.98	241.94
HV Ring Closed	Top Tap (5%)	9. 200kVAr Capacitor 1/2 Only	234.80	231.84	232.05	231.45	238.31	239.93	233.72	233.48	234.14	242.03
HV Ring Closed	Top Tap (5%)	10. 200kVAr Capacitor 2/3 Only	236.32	231.80	232.02	231.42	238.31	241.46	233.73	233.49	234.14	242.03
HV Ring Closed	Top Tap (5%)	11. LV Meshed Subs 100kVAr Capacitor 1/2	231.54	231.01	234.87	230.62	234.10	236.78	233.01	236.47	233.43	237.65
HV Ring Closed	Top Tap (5%)	12. LV Meshed Ways 100kVAr Capacitor 1/2	230.05	229.64	229.74	229.16	238.15	235.15	231.29	231.17	231.80	241.86
HV Ring Closed	Top Tap (5%)	13. LV Meshed Subs & Ways 100kVAr Capacitor 1/2	231.59	232.06	234.71	230.67	233.95	236.83	233.89	236.34	233.48	237.52
HV Ring Closed	Top Tap (5%)	14. LV Meshed Subs 100kVAr Capacitor 2/3	232.30	231.00	234.86	230.61	234.09	237.59	233.01	236.48	233.43	237.65
HV Ring Closed	Top Tap (5%)	15. LV Meshed Ways 100kVAr Capacitor 2/3	230.82	229.63	229.73	229.15	238.15	235.96	231.29	231.18	231.81	241.86
HV Ring Closed	Top Tap (5%)	16. LV Meshed Subs & Ways 100kVAr Capacitor 2/3	232.36	232.05	234.71	230.66	233.94	237.65	233.89	236.34	233.48	237.52
HV Ring Closed	Top Tap (5%)	17. LV Meshed Subs 150kVAr Capacitor 1/2	233.68	231.92	235.42	231.54	234.64	238.96	233.95	237.05	234.37	238.21
HV Ring Closed	Top Tap (5%)	18. LV Meshed Ways 150kVAr Capacitor 1/2	232.43	230.78	230.88	230.30	238.23	237.54	232.45	232.33	232.97	241.94
HV Ring Closed	Top Tap (5%)	19. LV Meshed Subs & Ways 150kVAr Capacitor 1/2	233.74	232.88	235.29	231.59	234.52	239.00	234.73	236.93	234.42	238.10
HV Ring Closed	Top Tap (5%)	20. LV Meshed Subs 150kVAr Capacitor 2/3	234.69	231.91	235.42	231.53	234.64	240.14	233.95	237.05	234.37	238.22
HV Ring Closed	Top Tap (5%)	21. LV Meshed Ways 150kVAr Capacitor 2/3	233.55	230.76	230.86	230.28	238.23	238.72	232.46	232.34	232.98	241.94
HV Ring Closed	Top Tap (5%)	22. LV Meshed Subs & Ways 150kVAr Capacitor 2/3	234.84	232.86	235.28	231.57	234.51	240.18	234.73	236.94	234.42	238.10
HV Ring Closed	Top Tap (5%)	23. LV Meshed Subs 200kVAr Capacitor 1/2	235.78	232.86	235.99	232.47	235.20	241.13	234.90	237.62	235.32	238.78
HV Ring Closed	Top Tap (5%)	24. LV Meshed Ways 200kVAr Capacitor 1/2	234.80	231.93	232.02	231.45	238.31	239.93	233.63	233.51	234.14	242.03
HV Ring Closed	Top Tap (5%)	25. LV Meshed Subs & Ways 200kVAr Capacitor 1/2	235.81	233.69	235.87	232.50	235.09	241.16	235.58	237.52	235.35	238.68
HV Ring Closed	Top Tap (5%)	26. LV Meshed Subs 200kVAr Capacitor 2/3	237.28	232.82	235.97	232.43	235.19	242.65	234.89	237.62	235.31	238.78
HV Ring Closed	Top Tap (5%)	27. LV Meshed Ways 200kVAr Capacitor 2/3	236.35	231.89	231.99	231.42	238.31	241.46	233.63	233.51	234.14	242.03
HV Ring Closed	Top Tap (5%)	28. LV Meshed Subs & Ways 200kVAr Capacitor 2/3	237.34	233.67	235.85	232.47	235.07	242.69	235.57	237.53	235.35	238.68
HV Ring Closed	Mid Tap (0%)	1. No Intervention	236.85	238.75	238.96	238.37	237.99	241.67	240.46	240.22	240.86	241.70
HV Ring Closed	Mid Tap (0%)	2. LV Meshed Subs Only	236.77	238.67	238.88	238.30	238.05	241.78	240.57	240.44	240.97	241.52
HV Ring Closed	Mid Tap (0%)	3. LV Meshed Ways Only	236.85	238.84	238.93	238.37	237.99	241.67	240.36	240.25	240.86	241.70
HV Ring Closed	Mid Tap (0%)	4. LV Meshed Subs & Ways Only	236.77	238.76	238.88	238.30	238.04	241.78	240.50	240.45	240.97	241.53
HV Ring Closed	Mid Tap (0%)	5. 100kVAr Capacitor 1/2 Only	241.85	241.13	241.34	240.76	238.17	246.71	242.88	242.65	243.29	241.88
HV Ring Closed	Mid Tap (0%)	6. 100kVAr Capacitor 2/3 Only	242.66	241.12	241.33	240.75	238.17	247.57	242.89	242.66	243.29	241.88
HV Ring Closed	Mid Tap (0%)	7. 150kVAr Capacitor 1/2 Only	244.36	242.33	242.54	241.96	238.26	249.24	244.11	243.88	244.52	241.97
HV Ring Closed	Mid Tap (0%)	8. 150kVAr Capacitor 2/3 Only	245.57	242.32	242.53	241.95	238.25	250.48	244.12	243.89	244.52	241.97
HV Ring Closed	Mid Tap (0%)	9. 200kVAr Capacitor 1/2 Only	246.87	243.55	243.75	243.18	238.35	251.76	245.35	245.13	245.75	242.06
HV Ring Closed	Mid Tap (0%)	10. 200kVAr Capacitor 2/3 Only	248.32	243.54	243.74	243.17	238.35	253.38	245.36	245.13	245.76	242.06
HV Ring Closed	Mid Tap (0%)	11. LV Meshed Subs 100kVAr Capacitor 1/2	241.32	240.60	240.05	240.23	239.20	246.36	242.54	241.63	242.94	242.69
HV Ring Closed	Mid Tap (0%)	12. LV Meshed Ways 100kVAr Capacitor 1/2	241.85	241.21	241.31	240.76	238.17	246.71	242.79	242.68	243.29	241.88
HV Ring Closed	Mid Tap (0%)	13. LV Meshed Subs & Ways 100kVAr Capacitor 1/2	241.31	240.48	240.07	240.22	239.23	246.35	242.25	241.67	242.93	242.73
HV Ring Closed	Mid Tap (0%)	14. LV Meshed Subs 100kVAr Capacitor 2/3	242.10	240.60	240.04	240.22	239.20	247.21	242.54	241.63	242.94	242.69
HV Ring Closed	Mid Tap (0%)	15. LV Meshed Ways 100kVAr Capacitor 2/3	242.67	241.21	241.30	240.75	238.17	247.57	242.80	242.69	243.29	241.88
HV Ring Closed	Mid Tap (0%)	16. LV Meshed Subs & Ways 100kVAr Capacitor 2/3	242.11	240.47	240.07	240.21	239.22	247.20	242.26	241.67	242.93	242.73
HV Ring Closed	Mid Tap (0%)	17. LV Meshed Subs 150kVAr Capacitor 1/2	243.55	241.58	240.64	241.21	239.78	248.64	243.53	242.23	243.93	243.28
HV Ring Closed	Mid Tap (0%)	18. LV Meshed Ways 150kVAr Capacitor 1/2	244.36	242.42	242.51	241.96	238.26	249.24	244.02	243.91	244.52	241.97
HV Ring Closed	Mid Tap (0%)	19. LV Meshed Subs & Ways 150kVAr Capacitor 1/2	243.52	241.34	240.67	241.18	239.82	248.62	243.14	242.29	243.91	243.33
HV Ring Closed	Mid Tap (0%)	20. LV Meshed Subs 150kVAr Capacitor 2/3	244.53	241.56	240.63	241.19	239.78	249.88	243.53	242.23	243.93	243.28
HV Ring Closed	Mid Tap (0%)	21. LV Meshed Ways 150kVAr Capacitor 2/3	245.58	242.40	242.50	241.95	238.25	250.48	244.03	243.92	244.52	241.97
HV Ring Closed	Mid Tap (0%)	22. LV Meshed Subs & Ways 150kVAr Capacitor 2/3	244.50	241.33	240.67	241.17	239.81	249.85	243.14	242.29	243.91	243.34
HV Ring Closed	Mid Tap (0%)	23. LV Meshed Subs 200kVAr Capacitor 1/2	245.73	242.55	241.23	242.18	240.37	250.91	244.52	242.83	244.92	243.87
HV Ring Closed	Mid Tap (0%)	24. LV Meshed Ways 200kVAr Capacitor 1/2	246.87	243.63	243.73	243.18	238.35	251.76	245.26	245.15	245.75	242.06
HV Ring Closed	Mid Tap (0%)	25. LV Meshed Subs & Ways 200kVAr Capacitor 1/2	245.69	242.21	241.28	242.15	240.42	250.87	244.02	242.91	244.89	243.94
HV Ring Closed	Mid Tap (0%)	26. LV Meshed Subs 200kVAr Capacitor 2/3	247.35	242.53	241.22	242.16	240.36	252.51	244.51	242.83	244.91	243.87
HV Ring Closed	Mid Tap (0%)	27. LV Meshed Ways 200kVAr Capacitor 2/3	248.30	243.62	243.71	243.17	238.35	253.38	245.27	245.16	245.76	242.06
HV Ring Closed	Mid Tap (0%)	28. LV Meshed Subs & Ways 200kVAr Capacitor 2/3	247.30	242.19	241.28	242.13	240.42	252.47	244.01	242.91	244.88	243.94
HV Ring Closed	Bottom Tap (-5%)	1. No Intervention	249.59	251.39	251.59	251.04	237.99	254.18	253.03	252.81	253.42	241.70
HV Ring Closed	Bottom Tap (-5%)	2. LV Meshed Subs Only	247.34	249.16	244.53	248.80	243.61	252.16	250.99	246.06	251.38	247.01
HV Ring Closed	Bottom Tap (-5%)	3. LV Meshed Ways Only	249.59	251.48	251.57	251.04	237.99	254.18	252.94	252.83	253.42	241.70
HV Ring Closed	Bottom Tap (-5%)	4. LV Meshed Subs & Ways Only	247.27	247.96	244.71	248.74	243.79	252.08	249.65	246.26	251.31	247.20
HV Ring Closed	Bottom Tap (-5%)	5. 100kVAr Capacitor 1/2 Only	254.88	253.92	254.12	253.57	238.19	259.51	255.60	255.38	255.99	241.90
HV Ring Closed	Bottom Tap (-5%)	6. 100kVAr Capacitor 2/3 Only	255.75	253.92	254.11	253.56	238.19	260.42	255.61	255.39	255.99	241.90
HV Ring Closed	Bottom Tap (-5%)	7. 150kVAr Capacitor 1/2 Only	257.53	255.20	255.40	254.85	238.29	262.18	256.91	256.69	257.29	242.00
HV Ring Closed	Bottom Tap (-5%)	8. 150kVAr Capacitor 2/3 Only	258.88	255.19	255.39	254.84	238.28	263.51	256.91	256.70	257.30	242.00
HV Ring Closed	Bottom Tap (-5%)	9. 200kVAr Capacitor 1/2 Only	260.21	256.49	256.69	256.14	238.39	264.85	258.22	258.00	258.60	242.10
HV Ring Closed	Bottom Tap (-5%)	10. 200kVAr Capacitor 2/3 Only	261.57	256.48	256.68	256.13	238.39	266.58	258.22	258.01	258.60	242.10
HV Ring Closed	Bottom Tap (-5%)	11. LV Meshed Subs 100kVAr Capacitor 1/2	252.10	251.20	245.76	250.85	244.83	256.95	253.06	247.31	253.45	248.24
HV Ring Closed	Bottom Tap (-5%)	12. LV Meshed Ways 100kVAr Capacitor 1/2	254.88	254.00	254.09	253.57	238.19	259.51	255.52	255.41	255.99	241.90
HV Ring Closed	Bottom Tap (-5%)	13. LV Meshed Subs & Ways 100kVAr Capacitor 1/2	252.01	249.77	245.98	250.76	245.04	256.86	251.49	247.54	253.36	248.46
HV Ring Closed	Bottom Tap (-5%)	14. LV Meshed Subs 100kVAr Capacitor 2/3	252.91	251.20	245.76	250.84	244.83	257.84	253.06	247.31	253.45	248.24
HV Ring Closed	Bottom Tap (-5%)	15. LV Meshed Ways 100kVAr Capacitor 2/3	255.75	254.00	254.09	253.56	238.19	260.42	255.52	255.42	255.99	241.90
HV Ring Closed	Bottom Tap (-5%)	16. LV Meshed Subs & Ways 100kVAr Capacitor 2/3	252.81	249.77	245.97	250.75	245.04	257.75	251.49	247.54	253.36	248.47
HV Ring Closed	Bottom Tap (-5%)	17. LV Meshed Subs 150kVAr Capacitor 1/2	254.44	252.23	246.38	251.87	245.44	259.34	254.10	247.94	254.49	248.86
HV Ring Closed	Bottom Tap (-5%)	18. LV Meshed Ways 150kVAr Capacitor 1/2	257.54	255.28	255.37	254.85	238.29	262.18	256.82	256.71	257.29	242.00
HV Ring Closed	Bottom Tap (-5%)	19. LV Meshed Subs & Ways 150kVAr Capacitor 1/2	254.33	250.68	246.61	251.77	245.67	259.24	252.42	248.19	254.39	249.10
HV Ring Closed	Bottom Tap (-5%)	20. LV Meshed Subs 150kVAr Capacitor 2/3	255.38	252.21	246.38	251.86	245.44	260.64	254.10	247.94	254.49	248.86
HV Ring Closed	Bottom Tap (-5%)	21. LV Meshed Ways 150kVAr Capacitor 2/3	258.89	255.27	255.36	254.84	238.28	263.51	256.83	256.72	257.30	242.00
HV Ring Closed	Bottom Tap (-5%)	22. LV Meshed Subs & Ways 150kVAr Capacitor 2/3	255.27	250.67	246.61	251.76	245.67	260.54	252.42	248.19	254.39	

Max Demand of 1.5kW _ (2.35kW PV average installation)			Voltage Level at 0% PV Penetration					Voltage Level at 20% PV Penetration				
HV RING	OLTC Tap Position	Scenario	YW12	PW6	GW3	BW4	L19	YW12	PW6	GW3	BW4	L19
HV Ring Open	Top Tap (5%)	1. No Intervention	201.00	217.54	219.29	214.37	223.47	207.10	219.68	220.92	217.44	227.60
HV Ring Open	Top Tap (5%)	2. LV Meshed Subs Only	202.50	218.90	225.23	215.74	218.55	208.81	221.28	227.09	219.06	222.57
HV Ring Open	Top Tap (5%)	3. LV Meshed Ways Only	201.08	218.39	219.08	214.38	223.48	207.11	220.20	220.75	217.44	227.60
HV Ring Open	Top Tap (5%)	4. LV Meshed Subs & Ways Only	202.68	220.96	224.96	215.87	218.28	208.90	223.03	226.84	219.14	222.32
HV Ring Open	Top Tap (5%)	5. 100kVAr Capacitor 1/2 Only	205.84	219.72	221.45	216.58	223.70	211.94	221.91	223.14	219.70	227.86
HV Ring Open	Top Tap (5%)	6. 100kVAr Capacitor 2/3 Only	206.24	219.66	221.39	216.52	223.69	212.63	221.88	223.11	219.66	227.85
HV Ring Open	Top Tap (5%)	7. 150kVAr Capacitor 1/2 Only	208.16	220.83	222.55	217.70	223.83	214.35	223.05	224.27	220.84	227.99
HV Ring Open	Top Tap (5%)	8. 150kVAr Capacitor 2/3 Only	208.89	220.72	222.44	217.59	223.82	215.34	222.99	224.22	220.79	227.98
HV Ring Open	Top Tap (5%)	9. 200kVAr Capacitor 1/2 Only	210.55	221.94	223.65	218.83	223.96	216.76	224.19	225.41	222.00	228.12
HV Ring Open	Top Tap (5%)	10. 200kVAr Capacitor 2/3 Only	211.65	221.84	223.56	218.73	223.93	218.02	224.11	225.33	221.92	228.11
HV Ring Open	Top Tap (5%)	11. LV Meshed Subs 100kVAr Capacitor 1/2	206.98	220.75	226.42	217.63	219.76	213.25	223.13	228.24	220.93	223.73
HV Ring Open	Top Tap (5%)	12. LV Meshed Ways 100kVAr Capacitor 1/2	205.84	220.44	221.21	216.58	223.70	211.94	222.43	222.97	219.70	227.86
HV Ring Open	Top Tap (5%)	13. LV Meshed Subs & Ways 100kVAr Capacitor 1/2	207.03	222.48	226.20	217.68	219.53	213.32	224.68	228.02	221.00	223.51
HV Ring Open	Top Tap (5%)	14. LV Meshed Subs 100kVAr Capacitor 2/3	207.33	220.69	226.39	217.57	219.72	213.94	223.10	228.22	220.90	223.71
HV Ring Open	Top Tap (5%)	15. LV Meshed Ways 100kVAr Capacitor 2/3	206.25	220.38	221.15	216.52	223.70	212.63	222.40	222.93	219.66	227.85
HV Ring Open	Top Tap (5%)	16. LV Meshed Subs & Ways 100kVAr Capacitor 2/3	207.40	222.43	226.16	217.62	219.50	214.02	224.66	228.00	220.97	223.49
HV Ring Open	Top Tap (5%)	17. LV Meshed Subs 150kVAr Capacitor 1/2	209.05	221.65	226.98	218.54	220.32	215.45	224.06	228.82	221.87	224.31
HV Ring Open	Top Tap (5%)	18. LV Meshed Ways 150kVAr Capacitor 1/2	208.18	221.54	222.31	217.70	223.83	214.36	223.56	224.10	220.84	227.99
HV Ring Open	Top Tap (5%)	19. LV Meshed Subs & Ways 150kVAr Capacitor 1/2	209.11	223.29	226.77	218.59	220.11	215.52	225.52	228.62	221.93	224.11
HV Ring Open	Top Tap (5%)	20. LV Meshed Subs 150kVAr Capacitor 2/3	210.07	221.61	226.86	218.50	220.15	216.45	224.02	228.79	221.82	224.28
HV Ring Open	Top Tap (5%)	21. LV Meshed Ways 150kVAr Capacitor 2/3	208.93	221.44	222.21	217.60	223.82	215.34	223.51	224.04	220.79	227.98
HV Ring Open	Top Tap (5%)	22. LV Meshed Subs & Ways 150kVAr Capacitor 2/3	209.79	223.20	226.71	218.48	220.04	216.52	225.47	228.59	221.88	224.08
HV Ring Open	Top Tap (5%)	23. LV Meshed Subs 200kVAr Capacitor 1/2	211.17	222.55	227.53	219.45	220.88	217.63	225.00	229.40	222.81	224.90
HV Ring Open	Top Tap (5%)	24. LV Meshed Ways 200kVAr Capacitor 1/2	210.58	222.65	223.42	218.84	223.96	216.76	224.70	225.24	222.00	228.12
HV Ring Open	Top Tap (5%)	25. LV Meshed Subs & Ways 200kVAr Capacitor 1/2	211.24	224.10	227.34	219.50	220.68	217.70	226.35	229.22	222.87	224.72
HV Ring Open	Top Tap (5%)	26. LV Meshed Subs 200kVAr Capacitor 2/3	212.54	222.51	227.42	219.41	220.72	218.90	224.93	229.36	222.74	224.86
HV Ring Open	Top Tap (5%)	27. LV Meshed Ways 200kVAr Capacitor 2/3	211.60	222.56	223.32	218.73	223.93	218.02	224.62	225.16	221.92	228.11
HV Ring Open	Top Tap (5%)	28. LV Meshed Subs & Ways 200kVAr Capacitor 2/3	212.57	224.07	227.21	219.46	220.51	218.96	226.29	229.17	222.80	224.67
HV Ring Open	Mid Tap (0%)	1. No Intervention	213.72	229.29	230.95	226.29	223.48	219.51	231.32	232.49	229.22	227.71
HV Ring Open	Mid Tap (0%)	2. LV Meshed Subs Only	213.10	228.70	230.47	225.69	223.86	219.03	230.94	232.29	228.81	227.78
HV Ring Open	Mid Tap (0%)	3. LV Meshed Ways Only	213.78	229.98	230.72	226.29	223.48	219.49	231.81	232.32	229.22	227.71
HV Ring Open	Mid Tap (0%)	4. LV Meshed Subs & Ways Only	213.20	229.46	230.37	225.74	223.76	219.04	231.49	232.22	228.83	227.71
HV Ring Open	Mid Tap (0%)	5. 100kVAr Capacitor 1/2 Only	218.83	231.62	233.26	228.65	223.74	224.55	233.70	234.86	231.62	227.99
HV Ring Open	Mid Tap (0%)	6. 100kVAr Capacitor 2/3 Only	219.33	231.56	233.20	228.59	223.73	225.24	233.67	234.83	231.59	227.99
HV Ring Open	Mid Tap (0%)	7. 150kVAr Capacitor 1/2 Only	221.32	232.80	234.43	229.85	223.88	227.07	234.91	236.06	232.84	228.14
HV Ring Open	Mid Tap (0%)	8. 150kVAr Capacitor 2/3 Only	222.30	232.70	234.33	229.75	223.87	227.95	234.86	236.01	232.79	228.13
HV Ring Open	Mid Tap (0%)	9. 200kVAr Capacitor 1/2 Only	223.91	233.99	235.62	231.06	224.03	229.55	236.13	237.27	234.07	228.29
HV Ring Open	Mid Tap (0%)	10. 200kVAr Capacitor 2/3 Only	224.97	233.87	235.49	230.93	223.99	230.53	236.05	237.19	233.99	228.30
HV Ring Open	Mid Tap (0%)	11. LV Meshed Subs 100kVAr Capacitor 1/2	217.78	230.65	231.69	227.67	225.06	223.66	232.89	233.50	230.78	229.00
HV Ring Open	Mid Tap (0%)	12. LV Meshed Ways 100kVAr Capacitor 1/2	218.83	232.32	233.04	228.65	223.74	224.55	234.19	234.69	231.62	227.99
HV Ring Open	Mid Tap (0%)	13. LV Meshed Subs & Ways 100kVAr Capacitor 1/2	217.77	231.17	231.64	227.66	225.01	223.66	233.23	233.46	230.78	228.96
HV Ring Open	Mid Tap (0%)	14. LV Meshed Subs 100kVAr Capacitor 2/3	218.24	230.59	231.66	227.61	225.02	224.40	232.86	233.49	230.75	228.99
HV Ring Open	Mid Tap (0%)	15. LV Meshed Ways 100kVAr Capacitor 2/3	219.35	232.26	232.98	228.59	223.73	225.24	234.16	234.66	231.59	227.99
HV Ring Open	Mid Tap (0%)	16. LV Meshed Subs & Ways 100kVAr Capacitor 2/3	218.24	231.12	231.61	227.60	224.97	224.40	233.21	233.45	230.75	228.95
HV Ring Open	Mid Tap (0%)	17. LV Meshed Subs 150kVAr Capacitor 1/2	220.00	231.61	232.28	228.64	225.65	225.97	233.88	234.12	231.78	229.62
HV Ring Open	Mid Tap (0%)	18. LV Meshed Ways 150kVAr Capacitor 1/2	221.33	233.50	234.21	229.85	223.88	227.07	235.39	235.90	232.84	228.14
HV Ring Open	Mid Tap (0%)	19. LV Meshed Subs & Ways 150kVAr Capacitor 1/2	219.98	232.03	232.25	228.62	225.62	225.96	234.11	234.10	231.77	229.60
HV Ring Open	Mid Tap (0%)	20. LV Meshed Subs 150kVAr Capacitor 2/3	221.00	231.55	232.22	228.57	225.57	227.02	233.83	234.09	231.73	229.60
HV Ring Open	Mid Tap (0%)	21. LV Meshed Ways 150kVAr Capacitor 2/3	222.33	233.40	234.12	229.75	223.87	227.96	235.34	235.84	232.79	228.13
HV Ring Open	Mid Tap (0%)	22. LV Meshed Subs & Ways 150kVAr Capacitor 2/3	220.91	231.94	232.19	228.52	225.56	227.02	234.07	234.07	231.72	229.57
HV Ring Open	Mid Tap (0%)	23. LV Meshed Subs 200kVAr Capacitor 1/2	222.30	232.56	232.87	229.60	226.25	228.26	234.86	234.74	232.77	230.25
HV Ring Open	Mid Tap (0%)	24. LV Meshed Ways 200kVAr Capacitor 1/2	223.93	234.69	235.40	231.06	224.03	229.55	236.61	237.11	234.07	228.29
HV Ring Open	Mid Tap (0%)	25. LV Meshed Subs & Ways 200kVAr Capacitor 1/2	222.29	232.89	232.85	229.58	226.23	228.24	235.00	234.73	232.76	230.24
HV Ring Open	Mid Tap (0%)	26. LV Meshed Subs 200kVAr Capacitor 2/3	223.34	232.46	232.80	229.50	226.20	229.60	234.79	234.70	232.70	230.21
HV Ring Open	Mid Tap (0%)	27. LV Meshed Ways 200kVAr Capacitor 2/3	224.98	234.55	235.27	230.93	223.99	230.53	236.53	237.03	233.99	228.30
HV Ring Open	Mid Tap (0%)	28. LV Meshed Subs & Ways 200kVAr Capacitor 2/3	223.34	232.79	232.77	229.49	226.17	229.58	234.93	234.69	232.69	230.20
HV Ring Open	Bottom Tap (-5%)	1. No Intervention	227.55	242.21	243.78	239.37	223.49	232.98	244.11	245.22	242.11	227.71
HV Ring Open	Bottom Tap (-5%)	2. LV Meshed Subs Only	224.62	239.46	236.24	236.59	229.68	230.32	241.57	238.02	239.55	233.57
HV Ring Open	Bottom Tap (-5%)	3. LV Meshed Ways Only	227.59	242.81	243.55	239.38	223.49	232.97	244.58	245.06	242.11	227.71
HV Ring Open	Bottom Tap (-5%)	4. LV Meshed Subs & Ways Only	224.63	238.83	236.32	236.56	229.76	230.24	240.81	238.14	239.50	233.69
HV Ring Open	Bottom Tap (-5%)	5. 100kVAr Capacitor 1/2 Only	232.97	244.71	246.26	241.91	223.78	238.30	246.66	247.76	244.67	228.03
HV Ring Open	Bottom Tap (-5%)	6. 100kVAr Capacitor 2/3 Only	233.62	244.65	246.21	241.85	223.78	238.99	246.62	247.73	244.64	228.03
HV Ring Open	Bottom Tap (-5%)	7. 150kVAr Capacitor 1/2 Only	235.66	245.98	247.53	243.19	223.94	240.95	247.95	249.05	245.97	228.19
HV Ring Open	Bottom Tap (-5%)	8. 150kVAr Capacitor 2/3 Only	236.90	245.89	247.44	243.10	223.93	241.87	247.90	249.00	245.92	228.19
HV Ring Open	Bottom Tap (-5%)	9. 200kVAr Capacitor 1/2 Only	238.46	247.27	248.81	244.50	224.11	243.58	249.25	250.35	247.29	228.36
HV Ring Open	Bottom Tap (-5%)	10. 200kVAr Capacitor 2/3 Only	239.65	247.13	248.67	244.36	224.06	245.10	249.18	250.27	247.21	228.25
HV Ring Open	Bottom Tap (-5%)	11. LV Meshed Subs 100kVAr Capacitor 1/2	229.54	241.52	237.49	238.68	230.88	235.11	243.64	239.31	241.64	234.87
HV Ring Open	Bottom Tap (-5%)	12. LV Meshed Ways 100kVAr Capacitor 1/2	232.97	245.37	246.05	241.91	223.78	238.30	247.12	247.60	244.67	228.03
HV Ring Open	Bottom Tap (-5%)	13. LV Meshed Subs & Ways 100kVAr Capacitor 1/2	229.45	240.72	237.63	238.59	231.03	235.03	242.66	239.46	241.56	235.02
HV Ring Open	Bottom Tap (-5%)	14. LV Meshed Subs 100kVAr Capacitor 2/3	230.14	241.46	237.46	238.62	230.85	235.80	243.62	239.29	241.61	234.85
HV Ring Open	Bottom Tap (-5%)	15. LV Meshed Ways 100kVAr Capacitor 2/3	233.63	245.32	246.00	241.85	223.78	238.99	247.09	247.57	244.64	228.03
HV Ring Open	Bottom Tap (-5%)	16. LV Meshed Subs & Ways 100kVAr Capacitor 2/3	230.06	240.67	237.60	238.54	230.99	235.72	242.64	239.45	241.54	235.01
HV Ring Open	Bottom Tap (-5%)	17. LV Meshed Subs 150kVAr Capacitor 1/2	231.93	242.53	238.12	239.71	231.52	237.48	244.69	239.96	242.69	235.53
HV Ring Open	Bottom Tap (-5%)	18. LV Meshed Ways 150kVAr Capacitor 1/2	235.67	246.64	247.32	243.20	223.94	240.95	248.41	248.89	245.97	228.19
HV Ring Open	Bottom Tap (-5%)	19. LV Meshed Subs & Ways 150kVAr Capacitor 1/2	231.84	241.63	238.28	239.62	231.68	237.39	243.60	240.13	242.61	235.70
HV Ring Open	Bottom Tap (-5%)	20. LV Meshed Subs 150kVAr Capacitor 2/3	233.11	242.44	238.06	239.61	231.45	238.38	244.64	239.94	242.64	235.51
HV Ring Open	Bottom Tap (-5%)	21. LV Meshed Ways 150kVAr Capacitor 2/3	236.92	246.56	247.24	243.11	223.93	241.88	248.36	248.84	245.92	228.19
HV Ring Open	Bottom Tap (-5%)	22. LV Meshed Subs & Ways 150kVAr Capacitor 2/3	233.03	241.54	238.22	239.52	231.62	238.29	243.55	240.11	242.56	



Max Demand of 1.5kW _ (2.35kW PV average installation)			Voltage Level at 0% PV Penetration					Voltage Level at 20% PV Penetration				
HV RING	OLTC Tap Position	Scenario	YW12	PW6	GW3	BW4	L19	YW12	PW6	GW3	BW4	L19
HV Ring Closed	Top Tap (5%)	1. No Intervention	199.09	215.93	217.69	212.73	221.57	205.43	218.10	219.35	215.84	225.80
HV Ring Closed	Top Tap (5%)	2. LV Meshed Subs Only	200.62	217.32	223.52	214.14	216.76	207.10	219.67	225.42	217.43	220.86
HV Ring Closed	Top Tap (5%)	3. LV Meshed Ways Only	199.09	216.66	217.45	212.73	221.57	205.43	218.63	219.17	215.84	225.80
HV Ring Closed	Top Tap (5%)	4. LV Meshed Subs & Ways Only	200.72	219.26	223.25	214.24	216.48	207.19	221.41	225.17	217.52	220.61
HV Ring Closed	Top Tap (5%)	5. 100kVAr Capacitor 1/2 Only	203.79	218.00	219.74	214.83	221.73	210.13	220.23	221.47	217.99	225.96
HV Ring Closed	Top Tap (5%)	6. 100kVAr Capacitor 2/3 Only	204.45	217.95	219.69	214.78	221.72	210.81	220.19	221.43	217.96	225.95
HV Ring Closed	Top Tap (5%)	7. 150kVAr Capacitor 1/2 Only	206.14	219.05	220.79	215.90	221.81	212.48	221.30	222.54	219.08	226.03
HV Ring Closed	Top Tap (5%)	8. 150kVAr Capacitor 2/3 Only	207.06	218.97	220.71	215.82	221.80	213.46	221.25	222.48	219.03	226.03
HV Ring Closed	Top Tap (5%)	9. 200kVAr Capacitor 1/2 Only	208.47	220.11	221.83	216.97	221.88	214.82	222.39	223.62	220.18	226.11
HV Ring Closed	Top Tap (5%)	10. 200kVAr Capacitor 2/3 Only	209.55	219.99	221.72	216.85	221.87	216.06	222.31	223.54	220.10	226.11
HV Ring Closed	Top Tap (5%)	11. LV Meshed Subs 100kVAr Capacitor 1/2	204.95	219.02	224.53	215.86	217.75	211.41	221.41	226.46	219.19	221.91
HV Ring Closed	Top Tap (5%)	12. LV Meshed Ways 100kVAr Capacitor 1/2	203.79	218.73	219.50	214.83	221.73	210.13	220.75	221.29	217.99	225.96
HV Ring Closed	Top Tap (5%)	13. LV Meshed Subs & Ways 100kVAr Capacitor 1/2	205.02	220.75	224.29	215.93	217.52	211.48	222.95	226.24	219.26	221.69
HV Ring Closed	Top Tap (5%)	14. LV Meshed Subs 100kVAr Capacitor 2/3	205.60	218.97	224.50	215.82	217.72	212.10	221.39	226.44	219.16	221.89
HV Ring Closed	Top Tap (5%)	15. LV Meshed Ways 100kVAr Capacitor 2/3	204.45	218.68	219.45	214.78	221.72	210.82	220.71	221.26	217.96	225.95
HV Ring Closed	Top Tap (5%)	16. LV Meshed Subs & Ways 100kVAr Capacitor 2/3	205.67	220.71	224.27	215.89	217.49	212.17	222.93	226.23	219.23	221.68
HV Ring Closed	Top Tap (5%)	17. LV Meshed Subs 150kVAr Capacitor 1/2	207.07	219.87	225.04	216.73	218.27	213.54	222.29	226.98	220.08	222.44
HV Ring Closed	Top Tap (5%)	18. LV Meshed Ways 150kVAr Capacitor 1/2	206.14	219.77	220.54	215.90	221.80	212.48	221.82	222.36	219.08	226.03
HV Ring Closed	Top Tap (5%)	19. LV Meshed Subs & Ways 150kVAr Capacitor 1/2	207.13	221.51	224.82	216.79	218.05	213.61	223.73	226.78	220.14	222.24
HV Ring Closed	Top Tap (5%)	20. LV Meshed Subs 150kVAr Capacitor 2/3	208.07	219.80	225.00	216.66	218.23	214.53	222.24	226.96	220.03	222.41
HV Ring Closed	Top Tap (5%)	21. LV Meshed Ways 150kVAr Capacitor 2/3	207.06	219.69	220.47	215.82	221.80	213.46	221.77	222.31	219.03	226.03
HV Ring Closed	Top Tap (5%)	22. LV Meshed Subs & Ways 150kVAr Capacitor 2/3	208.12	221.45	224.78	216.72	218.01	214.60	223.69	226.76	220.09	222.21
HV Ring Closed	Top Tap (5%)	23. LV Meshed Subs 200kVAr Capacitor 1/2	209.19	220.73	225.55	217.60	218.80	215.66	223.17	227.51	220.96	222.97
HV Ring Closed	Top Tap (5%)	24. LV Meshed Ways 200kVAr Capacitor 1/2	208.47	220.83	221.59	216.97	221.88	214.82	222.91	223.44	220.18	226.11
HV Ring Closed	Top Tap (5%)	25. LV Meshed Subs & Ways 200kVAr Capacitor 1/2	209.24	222.27	225.35	217.65	218.59	215.72	224.51	227.33	221.02	222.79
HV Ring Closed	Top Tap (5%)	26. LV Meshed Subs 200kVAr Capacitor 2/3	210.49	220.65	225.51	217.52	218.75	216.91	223.10	227.47	220.89	222.93
HV Ring Closed	Top Tap (5%)	27. LV Meshed Ways 200kVAr Capacitor 2/3	209.56	220.71	221.48	216.85	221.87	216.06	222.83	223.36	220.10	226.11
HV Ring Closed	Top Tap (5%)	28. LV Meshed Subs & Ways 200kVAr Capacitor 2/3	210.51	222.19	225.30	217.57	218.54	216.97	224.44	227.29	220.95	222.75
HV Ring Closed	Mid Tap (0%)	1. No Intervention	211.75	227.59	229.27	224.57	221.58	217.66	229.65	230.83	227.51	225.80
HV Ring Closed	Mid Tap (0%)	2. LV Meshed Subs Only	211.12	227.02	228.73	223.98	222.03	217.25	229.26	230.57	227.12	226.03
HV Ring Closed	Mid Tap (0%)	3. LV Meshed Ways Only	211.75	228.29	229.03	224.57	221.58	217.66	230.15	230.67	227.51	225.80
HV Ring Closed	Mid Tap (0%)	4. LV Meshed Subs & Ways Only	211.15	227.74	228.64	224.00	221.94	217.27	229.80	230.50	227.13	225.96
HV Ring Closed	Mid Tap (0%)	5. 100kVAr Capacitor 1/2 Only	216.69	229.80	231.46	226.81	221.75	222.61	231.90	233.08	229.79	225.98
HV Ring Closed	Mid Tap (0%)	6. 100kVAr Capacitor 2/3 Only	217.39	229.76	231.41	226.76	221.75	223.34	231.87	233.05	229.75	225.97
HV Ring Closed	Mid Tap (0%)	7. 150kVAr Capacitor 1/2 Only	219.16	230.92	232.57	227.94	221.84	225.08	233.05	234.22	230.94	226.06
HV Ring Closed	Mid Tap (0%)	8. 150kVAr Capacitor 2/3 Only	220.14	230.85	232.49	227.86	221.83	226.13	233.00	234.17	230.89	226.06
HV Ring Closed	Mid Tap (0%)	9. 200kVAr Capacitor 1/2 Only	221.61	232.05	233.69	229.08	221.93	227.54	234.20	235.37	232.10	226.15
HV Ring Closed	Mid Tap (0%)	10. 200kVAr Capacitor 2/3 Only	222.82	231.93	233.57	228.96	221.91	228.88	234.12	235.29	232.03	226.14
HV Ring Closed	Mid Tap (0%)	11. LV Meshed Subs 100kVAr Capacitor 1/2	215.64	228.81	229.80	225.80	223.09	221.75	231.09	231.67	228.97	227.14
HV Ring Closed	Mid Tap (0%)	12. LV Meshed Ways 100kVAr Capacitor 1/2	216.69	230.49	231.23	226.81	221.75	222.61	232.40	232.91	229.79	225.98
HV Ring Closed	Mid Tap (0%)	13. LV Meshed Subs & Ways 100kVAr Capacitor 1/2	215.64	229.33	229.74	225.80	223.03	221.75	231.43	231.63	228.97	227.10
HV Ring Closed	Mid Tap (0%)	14. LV Meshed Subs 100kVAr Capacitor 2/3	216.36	228.77	229.77	225.76	223.06	222.48	231.06	231.66	228.94	227.12
HV Ring Closed	Mid Tap (0%)	15. LV Meshed Ways 100kVAr Capacitor 2/3	217.39	230.44	231.18	226.76	221.75	223.34	232.37	232.88	229.75	225.97
HV Ring Closed	Mid Tap (0%)	16. LV Meshed Subs & Ways 100kVAr Capacitor 2/3	216.35	229.29	229.71	225.76	223.00	222.48	231.40	231.62	228.94	227.08
HV Ring Closed	Mid Tap (0%)	17. LV Meshed Subs 150kVAr Capacitor 1/2	217.87	229.71	230.34	226.72	223.64	223.97	232.01	232.23	229.90	227.69
HV Ring Closed	Mid Tap (0%)	18. LV Meshed Ways 150kVAr Capacitor 1/2	219.16	231.61	232.34	227.94	221.84	225.08	233.54	234.05	230.94	226.06
HV Ring Closed	Mid Tap (0%)	19. LV Meshed Subs & Ways 150kVAr Capacitor 1/2	217.85	230.13	230.30	226.71	223.60	223.97	232.24	232.21	229.89	227.67
HV Ring Closed	Mid Tap (0%)	20. LV Meshed Subs 150kVAr Capacitor 2/3	218.93	229.65	230.30	226.65	223.60	225.02	231.97	232.20	229.85	227.67
HV Ring Closed	Mid Tap (0%)	21. LV Meshed Ways 150kVAr Capacitor 2/3	220.15	231.53	232.26	227.86	221.83	226.13	233.49	234.00	230.89	226.06
HV Ring Closed	Mid Tap (0%)	22. LV Meshed Subs & Ways 150kVAr Capacitor 2/3	218.90	230.07	230.26	226.64	223.56	225.01	232.20	232.18	229.84	227.65
HV Ring Closed	Mid Tap (0%)	23. LV Meshed Subs 200kVAr Capacitor 1/2	220.08	230.62	230.89	227.63	224.19	226.18	232.94	232.79	230.83	228.25
HV Ring Closed	Mid Tap (0%)	24. LV Meshed Ways 200kVAr Capacitor 1/2	221.62	232.73	233.46	229.08	221.92	227.55	234.69	235.20	232.10	226.15
HV Ring Closed	Mid Tap (0%)	25. LV Meshed Subs & Ways 200kVAr Capacitor 1/2	220.05	230.93	230.86	227.62	224.17	226.17	233.06	232.78	230.81	228.25
HV Ring Closed	Mid Tap (0%)	26. LV Meshed Subs 200kVAr Capacitor 2/3	221.18	230.51	230.83	227.52	224.17	227.51	232.86	232.75	230.76	228.22
HV Ring Closed	Mid Tap (0%)	27. LV Meshed Ways 200kVAr Capacitor 2/3	222.83	232.61	233.34	228.96	221.91	228.88	234.62	235.12	232.03	226.14
HV Ring Closed	Mid Tap (0%)	28. LV Meshed Subs & Ways 200kVAr Capacitor 2/3	221.18	230.83	230.80	227.51	224.14	227.50	233.00	232.74	230.74	228.21
HV Ring Closed	Bottom Tap (-5%)	1. No Intervention	225.54	240.43	242.01	237.57	221.58	231.05	242.37	243.49	240.34	225.80
HV Ring Closed	Bottom Tap (-5%)	2. LV Meshed Subs Only	222.58	237.67	234.45	234.78	227.83	228.37	239.81	236.25	237.77	231.71
HV Ring Closed	Bottom Tap (-5%)	3. LV Meshed Ways Only	225.54	241.09	241.79	237.58	221.58	231.05	242.84	243.33	240.34	225.80
HV Ring Closed	Bottom Tap (-5%)	4. LV Meshed Subs & Ways Only	222.53	237.06	234.56	234.73	227.93	228.31	239.04	236.37	237.71	231.83
HV Ring Closed	Bottom Tap (-5%)	5. 100kVAr Capacitor 1/2 Only	230.76	242.79	244.36	239.96	221.78	236.28	244.77	245.89	242.77	226.00
HV Ring Closed	Bottom Tap (-5%)	6. 100kVAr Capacitor 2/3 Only	231.51	242.75	244.31	239.92	221.77	237.06	244.74	245.86	242.74	226.00
HV Ring Closed	Bottom Tap (-5%)	7. 150kVAr Capacitor 1/2 Only	233.36	243.99	245.54	241.17	221.88	238.89	245.99	247.10	244.00	226.10
HV Ring Closed	Bottom Tap (-5%)	8. 150kVAr Capacitor 2/3 Only	234.43	243.91	245.47	241.10	221.87	240.02	245.94	247.05	243.95	226.09
HV Ring Closed	Bottom Tap (-5%)	9. 200kVAr Capacitor 1/2 Only	235.89	245.19	246.74	242.39	221.97	241.50	247.22	248.32	245.24	226.19
HV Ring Closed	Bottom Tap (-5%)	10. 200kVAr Capacitor 2/3 Only	237.37	245.07	246.62	242.27	221.96	242.94	247.15	248.25	245.16	226.19
HV Ring Closed	Bottom Tap (-5%)	11. LV Meshed Subs 100kVAr Capacitor 1/2	227.30	239.58	235.59	236.71	228.95	233.07	241.75	237.41	239.72	232.88
HV Ring Closed	Bottom Tap (-5%)	12. LV Meshed Ways 100kVAr Capacitor 1/2	230.76	243.44	244.14	239.96	221.78	236.28	245.24	245.73	242.77	226.00
HV Ring Closed	Bottom Tap (-5%)	13. LV Meshed Subs & Ways 100kVAr Capacitor 1/2	227.22	238.76	235.73	236.64	229.09	232.99	240.76	237.56	239.64	233.03
HV Ring Closed	Bottom Tap (-5%)	14. LV Meshed Subs 100kVAr Capacitor 2/3	228.08	239.54	235.57	236.67	228.93	233.84	241.72	237.39	239.69	232.86
HV Ring Closed	Bottom Tap (-5%)	15. LV Meshed Ways 100kVAr Capacitor 2/3	231.51	243.40	244.09	239.92	221.77	237.06	245.21	245.70	242.74	226.00
HV Ring Closed	Bottom Tap (-5%)	16. LV Meshed Subs & Ways 100kVAr Capacitor 2/3	227.99	238.72	235.70	236.60	229.06	233.77	240.73	237.55	239.61	233.02
HV Ring Closed	Bottom Tap (-5%)	17. LV Meshed Subs 150kVAr Capacitor 1/2	229.77	240.55	236.15	237.69	229.51	235.41	242.72	238.00	240.70	233.47
HV Ring Closed	Bottom Tap (-5%)	18. LV Meshed Ways 150kVAr Capacitor 1/2	233.36	244.63	245.33	241.17	221.88	238.89	246.46	246.94	244.00	226.10
HV Ring Closed	Bottom Tap (-5%)	19. LV Meshed Subs & Ways 150kVAr Capacitor 1/2	229.54	239.60	236.32	237.59	229.69	235.32	241.62	238.17	240.61	233.64
HV Ring Closed	Bottom Tap (-5%)	20. LV Meshed Subs 150kVAr Capacitor 2/3	230.72	240.48	236.14	237.62	229.50	236.52	242.67	237.97	240.65	233.44
HV Ring Closed	Bottom Tap (-5%)	21. LV Meshed Ways 150kVAr Capacitor 2/3	234.44	244.56	245.25	241.10	221.87	240.02	246.41	246.89	243.95	226.09
HV Ring Closed	Bottom Tap (-5%)	22. LV Meshed Subs & Ways 150kVAr Capacitor 2/3	230.61	239.55	236.29	237.53	229.65	236.43	241.58	238.14	240.57	

Max Demand of 1.5kW			Circuit Losses				
HV RING	OLTC Tap Position	Scenario	Primary Tx Losses (kW)	HV Losses (kW)	HV/LV Losses (kW)	LV Losses (kW)	Total Losses (kW)
HV Ring Open	Top Tap (5%)	1. No Intervention	12.054	71.987	9.421	23.891	117.353
HV Ring Open	Top Tap (5%)	2. LV Meshed Subs Only	12.069	72.329	6.975	31.504	122.876
HV Ring Open	Top Tap (5%)	3. LV Meshed Ways Only	12.039	71.972	9.265	19.488	112.764
HV Ring Open	Top Tap (5%)	4. LV Meshed Subs & Ways Only	12.054	72.342	6.612	26.519	117.526
HV Ring Open	Top Tap (5%)	5. 100kVAr Capacitor 1/2 Only	12.058	72.026	9.457	25.241	118.782
HV Ring Open	Top Tap (5%)	6. 100kVAr Capacitor 2/3 Only	12.062	72.038	9.494	26.088	119.683
HV Ring Open	Top Tap (5%)	7. 150kVAr Capacitor 1/2 Only	12.069	72.045	9.689	27.391	121.194
HV Ring Open	Top Tap (5%)	8. 150kVAr Capacitor 2/3 Only	12.075	72.060	9.740	29.312	123.187
HV Ring Open	Top Tap (5%)	9. 200kVAr Capacitor 1/2 Only	12.086	72.079	10.074	30.754	124.993
HV Ring Open	Top Tap (5%)	10. 200kVAr Capacitor 2/3 Only	12.099	72.140	10.189	34.457	128.885
HV Ring Open	Top Tap (5%)	11. LV Meshed Subs 100kVAr Capacitor 1/2	12.073	72.344	7.095	31.681	123.193
HV Ring Open	Top Tap (5%)	12. LV Meshed Ways 100kVAr Capacitor 1/2	12.045	71.966	9.325	21.170	114.506
HV Ring Open	Top Tap (5%)	13. LV Meshed Subs & Ways 100kVAr Capacitor 1/2	12.057	72.338	6.799	27.143	118.337
HV Ring Open	Top Tap (5%)	14. LV Meshed Subs 100kVAr Capacitor 2/3	12.075	72.359	7.110	32.576	124.122
HV Ring Open	Top Tap (5%)	15. LV Meshed Ways 100kVAr Capacitor 2/3	12.049	71.978	9.361	22.016	115.402
HV Ring Open	Top Tap (5%)	16. LV Meshed Subs & Ways 100kVAr Capacitor 2/3	12.060	72.352	6.813	28.042	119.268
HV Ring Open	Top Tap (5%)	17. LV Meshed Subs 150kVAr Capacitor 1/2	12.083	72.361	7.338	33.534	125.316
HV Ring Open	Top Tap (5%)	18. LV Meshed Ways 150kVAr Capacitor 1/2	12.056	71.985	9.561	23.376	116.978
HV Ring Open	Top Tap (5%)	19. LV Meshed Subs & Ways 150kVAr Capacitor 1/2	12.068	72.354	7.046	29.051	120.519
HV Ring Open	Top Tap (5%)	20. LV Meshed Subs 200kVAr Capacitor 2/3	12.088	72.343	7.368	35.803	127.602
HV Ring Open	Top Tap (5%)	21. LV Meshed Ways 150kVAr Capacitor 2/3	12.062	72.005	9.612	25.306	118.985
HV Ring Open	Top Tap (5%)	22. LV Meshed Subs & Ways 150kVAr Capacitor 2/3	12.074	72.341	7.077	31.340	122.831
HV Ring Open	Top Tap (5%)	23. LV Meshed Subs 200kVAr Capacitor 1/2	12.099	72.390	7.692	36.597	128.779
HV Ring Open	Top Tap (5%)	24. LV Meshed Ways 200kVAr Capacitor 1/2	12.073	72.026	9.954	26.803	120.856
HV Ring Open	Top Tap (5%)	25. LV Meshed Subs & Ways 200kVAr Capacitor 1/2	12.084	72.383	7.402	32.176	124.044
HV Ring Open	Top Tap (5%)	26. LV Meshed Subs 200kVAr Capacitor 2/3	12.112	72.446	7.773	40.612	132.943
HV Ring Open	Top Tap (5%)	27. LV Meshed Ways 200kVAr Capacitor 2/3	12.087	72.100	10.066	30.443	124.695
HV Ring Open	Top Tap (5%)	28. LV Meshed Subs & Ways 200kVAr Capacitor 2/3	12.098	72.442	7.479	36.170	128.188
HV Ring Open	Mid Tap (0%)	1. No Intervention	12.043	71.950	8.474	21.721	114.188
HV Ring Open	Mid Tap (0%)	2. LV Meshed Subs Only	12.049	72.101	7.489	24.327	115.967
HV Ring Open	Mid Tap (0%)	3. LV Meshed Ways Only	12.031	71.949	8.355	17.817	110.152
HV Ring Open	Mid Tap (0%)	4. LV Meshed Subs & Ways Only	12.034	72.123	7.045	20.154	111.357
HV Ring Open	Mid Tap (0%)	5. 100kVAr Capacitor 1/2 Only	12.050	71.986	8.551	23.236	115.822
HV Ring Open	Mid Tap (0%)	6. 100kVAr Capacitor 2/3 Only	12.054	71.997	8.584	24.144	116.779
HV Ring Open	Mid Tap (0%)	7. 150kVAr Capacitor 1/2 Only	12.063	72.008	8.824	25.739	118.634
HV Ring Open	Mid Tap (0%)	8. 150kVAr Capacitor 2/3 Only	12.070	72.027	8.884	27.897	120.877
HV Ring Open	Mid Tap (0%)	9. 200kVAr Capacitor 1/2 Only	12.083	72.055	9.285	29.612	123.035
HV Ring Open	Mid Tap (0%)	10. 200kVAr Capacitor 2/3 Only	12.098	72.130	9.398	33.533	127.160
HV Ring Open	Mid Tap (0%)	11. LV Meshed Subs 100kVAr Capacitor 1/2	12.055	72.144	7.515	25.777	117.491
HV Ring Open	Mid Tap (0%)	12. LV Meshed Ways 100kVAr Capacitor 1/2	12.038	71.934	8.439	19.614	112.025
HV Ring Open	Mid Tap (0%)	13. LV Meshed Subs & Ways 100kVAr Capacitor 1/2	12.042	72.135	7.130	21.835	113.142
HV Ring Open	Mid Tap (0%)	14. LV Meshed Subs 100kVAr Capacitor 2/3	12.058	72.158	7.537	26.696	118.450
HV Ring Open	Mid Tap (0%)	15. LV Meshed Ways 100kVAr Capacitor 2/3	12.042	71.944	8.471	20.523	112.980
HV Ring Open	Mid Tap (0%)	16. LV Meshed Subs & Ways 100kVAr Capacitor 2/3	12.045	72.149	7.150	22.757	114.101
HV Ring Open	Mid Tap (0%)	17. LV Meshed Subs 150kVAr Capacitor 1/2	12.083	72.361	7.338	33.534	125.316
HV Ring Open	Mid Tap (0%)	18. LV Meshed Ways 150kVAr Capacitor 1/2	12.051	71.956	8.715	22.174	114.896
HV Ring Open	Mid Tap (0%)	19. LV Meshed Subs & Ways 150kVAr Capacitor 1/2	12.056	72.159	7.342	24.538	116.095
HV Ring Open	Mid Tap (0%)	20. LV Meshed Subs 150kVAr Capacitor 2/3	12.075	72.143	7.759	30.990	122.968
HV Ring Open	Mid Tap (0%)	21. LV Meshed Ways 150kVAr Capacitor 2/3	12.058	71.979	8.784	24.340	117.162
HV Ring Open	Mid Tap (0%)	22. LV Meshed Subs & Ways 150kVAr Capacitor 2/3	12.062	72.139	7.374	27.169	118.744
HV Ring Open	Mid Tap (0%)	23. LV Meshed Subs 200kVAr Capacitor 1/2	12.089	72.209	8.057	32.408	124.762
HV Ring Open	Mid Tap (0%)	24. LV Meshed Ways 200kVAr Capacitor 1/2	12.072	72.008	9.192	26.102	119.374
HV Ring Open	Mid Tap (0%)	25. LV Meshed Subs & Ways 200kVAr Capacitor 1/2	12.076	72.175	7.675	28.961	120.887
HV Ring Open	Mid Tap (0%)	26. LV Meshed Subs 200kVAr Capacitor 2/3	12.104	72.257	8.169	36.642	129.171
HV Ring Open	Mid Tap (0%)	27. LV Meshed Ways 200kVAr Capacitor 2/3	12.087	72.095	9.301	29.972	123.455
HV Ring Open	Mid Tap (0%)	28. LV Meshed Subs & Ways 200kVAr Capacitor 2/3	12.091	72.251	7.779	32.849	124.970
HV Ring Open	Bottom Tap (-5%)	1. No Intervention	12.034	71.935	7.596	19.565	111.129
HV Ring Open	Bottom Tap (-5%)	2. LV Meshed Subs Only	12.052	71.963	9.158	23.721	116.893
HV Ring Open	Bottom Tap (-5%)	3. LV Meshed Ways Only	12.023	71.928	7.503	16.178	107.632
HV Ring Open	Bottom Tap (-5%)	4. LV Meshed Subs & Ways Only	12.040	71.978	8.720	20.395	113.134
HV Ring Open	Bottom Tap (-5%)	5. 100kVAr Capacitor 1/2 Only	12.042	71.946	7.712	21.466	113.166
HV Ring Open	Bottom Tap (-5%)	6. 100kVAr Capacitor 2/3 Only	12.047	71.957	7.739	22.461	114.204
HV Ring Open	Bottom Tap (-5%)	7. 150kVAr Capacitor 1/2 Only	12.058	71.974	8.027	24.395	116.455
HV Ring Open	Bottom Tap (-5%)	8. 150kVAr Capacitor 2/3 Only	12.066	72.028	8.113	27.173	119.380
HV Ring Open	Bottom Tap (-5%)	9. 200kVAr Capacitor 1/2 Only	12.083	72.081	8.584	28.891	121.639
HV Ring Open	Bottom Tap (-5%)	10. 200kVAr Capacitor 2/3 Only	12.097	72.101	8.662	33.370	126.231
HV Ring Open	Bottom Tap (-5%)	11. LV Meshed Subs 100kVAr Capacitor 1/2	12.063	72.018	9.076	26.688	119.844
HV Ring Open	Bottom Tap (-5%)	12. LV Meshed Ways 100kVAr Capacitor 1/2	12.032	71.901	7.616	18.283	109.832
HV Ring Open	Bottom Tap (-5%)	13. LV Meshed Subs & Ways 100kVAr Capacitor 1/2	12.052	72.009	8.677	23.473	116.210
HV Ring Open	Bottom Tap (-5%)	14. LV Meshed Subs 100kVAr Capacitor 2/3	12.066	72.033	9.104	27.652	120.854
HV Ring Open	Bottom Tap (-5%)	15. LV Meshed Ways 100kVAr Capacitor 2/3	12.035	71.924	7.671	19.309	110.939
HV Ring Open	Bottom Tap (-5%)	16. LV Meshed Subs & Ways 100kVAr Capacitor 2/3	12.055	72.023	8.704	24.440	117.221
HV Ring Open	Bottom Tap (-5%)	17. LV Meshed Subs 150kVAr Capacitor 1/2	12.079	72.053	9.242	30.280	123.655
HV Ring Open	Bottom Tap (-5%)	18. LV Meshed Ways 150kVAr Capacitor 1/2	12.048	71.947	7.987	21.270	113.253
HV Ring Open	Bottom Tap (-5%)	19. LV Meshed Subs & Ways 150kVAr Capacitor 1/2	12.069	71.994	8.853	27.430	120.346
HV Ring Open	Bottom Tap (-5%)	20. LV Meshed Subs 150kVAr Capacitor 2/3	12.086	72.014	9.302	33.098	126.500
HV Ring Open	Bottom Tap (-5%)	21. LV Meshed Ways 150kVAr Capacitor 2/3	12.056	72.002	8.038	24.029	116.124
HV Ring Open	Bottom Tap (-5%)	22. LV Meshed Subs & Ways 150kVAr Capacitor 2/3	12.076	72.009	8.903	30.043	123.030
HV Ring Open	Bottom Tap (-5%)	23. LV Meshed Subs 200kVAr Capacitor 1/2	12.104	72.061	9.559	35.642	129.366
HV Ring Open	Bottom Tap (-5%)	24. LV Meshed Ways 200kVAr Capacitor 1/2	12.073	72.055	8.514	25.775	118.416
HV Ring Open	Bottom Tap (-5%)	25. LV Meshed Subs & Ways 200kVAr Capacitor 1/2	12.094	72.056	9.164	32.649	125.963
HV Ring Open	Bottom Tap (-5%)	26. LV Meshed Subs 200kVAr Capacitor 2/3	12.119	72.105	9.684	39.889	133.797
HV Ring Open	Bottom Tap (-5%)	27. LV Meshed Ways 200kVAr Capacitor 2/3	12.087	72.072	8.587	30.267	123.012
HV Ring Open	Bottom Tap (-5%)	28. LV Meshed Subs & Ways 200kVAr Capacitor 2/3	12.109	72.099	9.280	36.905	130.393

Max Demand of 1.5kW			Circuit Losses				
HV RING	OLTC Tap Position	Scenario	Primary Tx Losses (kW)	HV Losses (kW)	HV/LV Losses (kW)	LV Losses (kW)	Total Losses (kW)
HV Ring Closed	Top Tap (5%)	1. No Intervention	11.948	60.471	9.516	24.163	106.098
HV Ring Closed	Top Tap (5%)	2. LV Meshed Subs Only	11.965	60.928	7.017	31.641	111.551
HV Ring Closed	Top Tap (5%)	3. LV Meshed Ways Only	11.929	60.314	9.352	19.684	101.279
HV Ring Closed	Top Tap (5%)	4. LV Meshed Subs & Ways Only	11.944	60.815	6.682	26.652	106.092
HV Ring Closed	Top Tap (5%)	5. 100kVAr Capacitor 1/2 Only	11.947	60.372	9.551	25.485	107.354
HV Ring Closed	Top Tap (5%)	6. 100kVAr Capacitor 2/3 Only	11.949	60.495	9.584	26.818	108.847
HV Ring Closed	Top Tap (5%)	7. 150kVAr Capacitor 1/2 Only	11.956	60.570	9.829	27.521	109.876
HV Ring Closed	Top Tap (5%)	8. 150kVAr Capacitor 2/3 Only	11.962	60.434	9.833	29.493	111.722
HV Ring Closed	Top Tap (5%)	9. 200kVAr Capacitor 1/2 Only	11.968	60.416	10.164	30.911	113.460
HV Ring Closed	Top Tap (5%)	10. 200kVAr Capacitor 2/3 Only	11.985	60.585	10.279	34.597	117.446
HV Ring Closed	Top Tap (5%)	11. LV Meshed Subs 100kVAr Capacitor 1/2	11.959	60.665	7.171	31.914	111.710
HV Ring Closed	Top Tap (5%)	12. LV Meshed Ways 100kVAr Capacitor 1/2	11.931	60.296	9.418	21.350	102.995
HV Ring Closed	Top Tap (5%)	13. LV Meshed Subs & Ways 100kVAr Capacitor 1/2	11.941	60.649	6.871	27.335	106.796
HV Ring Closed	Top Tap (5%)	14. LV Meshed Subs 100kVAr Capacitor 2/3	11.963	60.676	7.185	32.800	112.624
HV Ring Closed	Top Tap (5%)	15. LV Meshed Ways 100kVAr Capacitor 2/3	11.936	60.331	9.454	22.191	103.912
HV Ring Closed	Top Tap (5%)	16. LV Meshed Subs & Ways 100kVAr Capacitor 2/3	11.944	60.661	6.883	28.225	107.714
HV Ring Closed	Top Tap (5%)	17. LV Meshed Subs 150kVAr Capacitor 1/2	11.966	60.673	7.415	33.846	113.900
HV Ring Closed	Top Tap (5%)	18. LV Meshed Ways 150kVAr Capacitor 1/2	11.939	60.299	9.653	23.530	105.421
HV Ring Closed	Top Tap (5%)	19. LV Meshed Subs & Ways 150kVAr Capacitor 1/2	11.948	60.659	7.119	29.319	109.045
HV Ring Closed	Top Tap (5%)	20. LV Meshed Subs 150kVAr Capacitor 2/3	11.973	60.695	7.444	35.940	116.053
HV Ring Closed	Top Tap (5%)	21. LV Meshed Ways 150kVAr Capacitor 2/3	11.946	60.358	9.702	25.442	107.448
HV Ring Closed	Top Tap (5%)	22. LV Meshed Subs & Ways 150kVAr Capacitor 2/3	11.955	60.683	7.146	31.426	111.210
HV Ring Closed	Top Tap (5%)	23. LV Meshed Subs 200kVAr Capacitor 1/2	11.979	60.713	7.770	36.992	117.453
HV Ring Closed	Top Tap (5%)	24. LV Meshed Ways 200kVAr Capacitor 1/2	11.953	60.341	10.041	26.915	109.250
HV Ring Closed	Top Tap (5%)	25. LV Meshed Subs & Ways 200kVAr Capacitor 1/2	11.961	60.702	7.476	32.520	112.659
HV Ring Closed	Top Tap (5%)	26. LV Meshed Subs 200kVAr Capacitor 2/3	11.997	60.940	7.847	40.722	121.507
HV Ring Closed	Top Tap (5%)	27. LV Meshed Ways 200kVAr Capacitor 2/3	11.969	60.517	10.153	30.535	113.175
HV Ring Closed	Top Tap (5%)	28. LV Meshed Subs & Ways 200kVAr Capacitor 2/3	11.979	60.917	7.546	36.227	116.669
HV Ring Closed	Mid Tap (0%)	1. No Intervention	11.936	60.443	8.556	21.848	102.782
HV Ring Closed	Mid Tap (0%)	2. LV Meshed Subs Only	11.942	60.636	7.554	24.533	104.665
HV Ring Closed	Mid Tap (0%)	3. LV Meshed Ways Only	11.919	60.296	8.433	17.999	98.647
HV Ring Closed	Mid Tap (0%)	4. LV Meshed Subs & Ways Only	11.923	60.526	7.121	20.340	99.910
HV Ring Closed	Mid Tap (0%)	5. 100kVAr Capacitor 1/2 Only	11.935	60.325	8.640	23.391	104.292
HV Ring Closed	Mid Tap (0%)	6. 100kVAr Capacitor 2/3 Only	11.940	60.322	8.669	24.336	105.268
HV Ring Closed	Mid Tap (0%)	7. 150kVAr Capacitor 1/2 Only	11.944	60.398	8.911	25.812	107.065
HV Ring Closed	Mid Tap (0%)	8. 150kVAr Capacitor 2/3 Only	11.953	60.353	8.966	28.042	109.313
HV Ring Closed	Mid Tap (0%)	9. 200kVAr Capacitor 1/2 Only	11.961	60.340	9.364	29.734	111.399
HV Ring Closed	Mid Tap (0%)	10. 200kVAr Capacitor 2/3 Only	11.980	60.557	9.478	33.637	115.651
HV Ring Closed	Mid Tap (0%)	11. LV Meshed Subs 100kVAr Capacitor 1/2	11.939	60.352	7.596	26.124	106.011
HV Ring Closed	Mid Tap (0%)	12. LV Meshed Ways 100kVAr Capacitor 1/2	11.922	60.386	8.535	19.657	100.500
HV Ring Closed	Mid Tap (0%)	13. LV Meshed Subs & Ways 100kVAr Capacitor 1/2	11.923	60.336	7.203	22.193	101.655
HV Ring Closed	Mid Tap (0%)	14. LV Meshed Subs 100kVAr Capacitor 2/3	11.943	60.366	7.615	27.082	107.004
HV Ring Closed	Mid Tap (0%)	15. LV Meshed Ways 100kVAr Capacitor 2/3	11.927	60.262	8.554	20.675	101.418
HV Ring Closed	Mid Tap (0%)	16. LV Meshed Subs & Ways 100kVAr Capacitor 2/3	11.926	60.350	7.221	23.154	102.651
HV Ring Closed	Mid Tap (0%)	17. LV Meshed Subs 150kVAr Capacitor 1/2	11.949	60.373	7.805	28.831	108.958
HV Ring Closed	Mid Tap (0%)	18. LV Meshed Ways 150kVAr Capacitor 1/2	11.931	60.228	8.797	22.301	103.257
HV Ring Closed	Mid Tap (0%)	19. LV Meshed Subs & Ways 150kVAr Capacitor 1/2	11.933	60.360	7.416	24.956	104.665
HV Ring Closed	Mid Tap (0%)	20. LV Meshed Subs 150kVAr Capacitor 2/3	11.957	60.403	7.843	31.143	111.346
HV Ring Closed	Mid Tap (0%)	21. LV Meshed Ways 150kVAr Capacitor 2/3	11.939	60.292	8.864	24.443	105.538
HV Ring Closed	Mid Tap (0%)	22. LV Meshed Subs & Ways 150kVAr Capacitor 2/3	11.941	60.392	7.453	27.278	107.063
HV Ring Closed	Mid Tap (0%)	23. LV Meshed Subs 200kVAr Capacitor 1/2	11.965	60.434	8.137	32.873	113.409
HV Ring Closed	Mid Tap (0%)	24. LV Meshed Ways 200kVAr Capacitor 1/2	11.947	60.281	9.269	26.181	107.678
HV Ring Closed	Mid Tap (0%)	25. LV Meshed Subs & Ways 200kVAr Capacitor 1/2	11.950	60.424	7.751	29.057	109.182
HV Ring Closed	Mid Tap (0%)	26. LV Meshed Subs 200kVAr Capacitor 2/3	11.985	60.668	8.252	36.762	117.666
HV Ring Closed	Mid Tap (0%)	27. LV Meshed Ways 200kVAr Capacitor 2/3	11.966	60.499	9.379	30.032	111.876
HV Ring Closed	Mid Tap (0%)	28. LV Meshed Subs & Ways 200kVAr Capacitor 2/3	11.969	60.646	7.856	32.924	113.395
HV Ring Closed	Bottom Tap (-5%)	1. No Intervention	11.924	60.379	7.666	19.695	99.665
HV Ring Closed	Bottom Tap (-5%)	2. LV Meshed Subs Only	11.947	60.447	9.247	23.914	105.556
HV Ring Closed	Bottom Tap (-5%)	3. LV Meshed Ways Only	11.909	60.243	7.573	16.345	96.070
HV Ring Closed	Bottom Tap (-5%)	4. LV Meshed Subs & Ways Only	11.930	60.344	8.793	20.582	101.650
HV Ring Closed	Bottom Tap (-5%)	5. 100kVAr Capacitor 1/2 Only	11.923	60.220	7.793	21.340	101.276
HV Ring Closed	Bottom Tap (-5%)	6. 100kVAr Capacitor 2/3 Only	11.929	60.176	7.814	22.623	102.542
HV Ring Closed	Bottom Tap (-5%)	7. 150kVAr Capacitor 1/2 Only	11.934	60.141	8.101	24.529	104.705
HV Ring Closed	Bottom Tap (-5%)	8. 150kVAr Capacitor 2/3 Only	11.944	60.331	8.185	27.281	107.742
HV Ring Closed	Bottom Tap (-5%)	9. 200kVAr Capacitor 1/2 Only	11.955	60.381	8.652	28.985	109.973
HV Ring Closed	Bottom Tap (-5%)	10. 200kVAr Capacitor 2/3 Only	11.973	60.490	8.732	33.403	114.598
HV Ring Closed	Bottom Tap (-5%)	11. LV Meshed Subs 100kVAr Capacitor 1/2	11.947	60.143	9.167	27.010	108.267
HV Ring Closed	Bottom Tap (-5%)	12. LV Meshed Ways 100kVAr Capacitor 1/2	11.911	60.099	7.690	18.415	98.115
HV Ring Closed	Bottom Tap (-5%)	13. LV Meshed Subs & Ways 100kVAr Capacitor 1/2	11.934	60.131	8.759	23.849	104.673
HV Ring Closed	Bottom Tap (-5%)	14. LV Meshed Subs 100kVAr Capacitor 2/3	11.951	60.159	9.190	28.059	109.360
HV Ring Closed	Bottom Tap (-5%)	15. LV Meshed Ways 100kVAr Capacitor 2/3	11.915	60.153	7.743	19.432	99.244
HV Ring Closed	Bottom Tap (-5%)	16. LV Meshed Subs & Ways 100kVAr Capacitor 2/3	11.938	60.148	8.782	24.900	105.767
HV Ring Closed	Bottom Tap (-5%)	17. LV Meshed Subs 150kVAr Capacitor 1/2	11.960	60.178	9.333	30.634	112.106
HV Ring Closed	Bottom Tap (-5%)	18. LV Meshed Ways 150kVAr Capacitor 1/2	11.923	60.133	8.058	21.370	101.484
HV Ring Closed	Bottom Tap (-5%)	19. LV Meshed Subs & Ways 150kVAr Capacitor 1/2	11.948	60.169	8.930	27.537	108.584
HV Ring Closed	Bottom Tap (-5%)	20. LV Meshed Subs 150kVAr Capacitor 2/3	11.969	60.216	9.383	33.208	114.776
HV Ring Closed	Bottom Tap (-5%)	21. LV Meshed Ways 150kVAr Capacitor 2/3	11.932	60.298	8.108	24.102	104.440
HV Ring Closed	Bottom Tap (-5%)	22. LV Meshed Subs & Ways 150kVAr Capacitor 2/3	11.956	60.210	8.979	30.115	111.260
HV Ring Closed	Bottom Tap (-5%)	23. LV Meshed Subs 200kVAr Capacitor 1/2	11.981	60.260	9.639	35.731	117.611
HV Ring Closed	Bottom Tap (-5%)	24. LV Meshed Ways 200kVAr Capacitor 1/2	11.943	60.349	8.580	25.832	106.704
HV Ring Closed	Bottom Tap (-5%)	25. LV Meshed Subs & Ways 200kVAr Capacitor 1/2	11.968	60.255	9.239	32.698	114.161
HV Ring Closed	Bottom Tap (-5%)	26. LV Meshed Subs 200kVAr Capacitor 2/3	12.002	60.498	9.767	39.933	122.200
HV Ring Closed	Bottom Tap (-5%)	27. LV Meshed Ways 200kVAr Capacitor 2/3	11.961	60.438	8.654	30.260	111.314
HV Ring Closed	Bottom Tap (-5%)	28. LV Meshed Subs & Ways 200kVAr Capacitor 2/3	11.989	60.477	9.358	36.908	118.732

# APPENDIX D – DENTON EAST RESULTS

Min Demand of 0.2kW _ (2.4kW PV average installation)			Voltage Level at 0% PV Penetration					Voltage Level at 10% PV Penetration				
HV RING	OLTC Tap Position	Scenario	PW5	YW9	BW1	GW3	SW7	PW5	YW9	BW1	GW3	SW7
HV Ring Open	Top Tap (5%)	1. No Intervention	226.89	227.10	227.23	227.30	238.93	228.19	228.31	228.17	228.23	239.65
HV Ring Open	Top Tap (5%)	2. LV Meshed Subs Only	227.64	232.87	227.98	228.04	233.02	228.96	233.87	228.92	228.98	233.84
HV Ring Open	Top Tap (5%)	3. LV Meshed Ways Only	226.90	227.42	227.23	227.18	238.93	228.21	228.21	228.18	228.27	239.64
HV Ring Open	Top Tap (5%)	4. LV Meshed Subs & Ways Only	227.82	229.84	228.16	229.60	231.80	229.15	230.61	229.12	230.64	232.52
HV Ring Open	Top Tap (5%)	5. 100kVAr Capacitor 1/2 Only	228.31	230.92	228.62	228.69	239.24	229.56	231.92	229.53	229.58	239.94
HV Ring Open	Top Tap (5%)	6. 100kVAr Capacitor 2/3 Only	228.26	231.48	228.59	228.66	239.23	229.56	232.71	229.53	229.58	239.94
HV Ring Open	Top Tap (5%)	7. 150kVAr Capacitor 1/2 Only	228.92	232.56	229.26	229.32	239.37	230.24	233.68	230.20	230.26	240.09
HV Ring Open	Top Tap (5%)	8. 150kVAr Capacitor 2/3 Only	228.91	233.64	229.25	229.32	239.36	230.22	234.97	230.20	230.26	240.10
HV Ring Open	Top Tap (5%)	9. 200kVAr Capacitor 1/2 Only	229.63	234.43	229.96	230.03	239.53	230.92	235.50	230.89	230.94	240.24
HV Ring Open	Top Tap (5%)	10. 200kVAr Capacitor 2/3 Only	229.63	236.08	229.97	230.03	239.54	230.92	237.08	230.89	230.95	240.24
HV Ring Open	Top Tap (5%)	11. LV Meshed Subs 100kVAr Capacitor 1/2	228.53	235.00	228.87	228.94	235.15	229.82	236.04	229.80	229.86	236.00
HV Ring Open	Top Tap (5%)	12. LV Meshed Ways 100kVAr Capacitor 1/2	228.26	229.33	228.59	229.09	239.23	229.56	230.09	229.53	230.14	239.94
HV Ring Open	Top Tap (5%)	13. LV Meshed Subs & Ways 100kVAr Capacitor 1/2	228.81	231.14	229.14	230.89	233.61	230.11	231.93	230.09	231.95	234.35
HV Ring Open	Top Tap (5%)	14. LV Meshed Subs 100kVAr Capacitor 2/3	228.49	235.88	228.82	228.89	235.33	229.81	236.81	229.77	229.83	236.11
HV Ring Open	Top Tap (5%)	15. LV Meshed Ways 100kVAr Capacitor 2/3	228.26	229.52	228.59	229.28	239.23	229.56	230.28	229.53	230.33	239.94
HV Ring Open	Top Tap (5%)	16. LV Meshed Subs & Ways 100kVAr Capacitor 2/3	228.82	231.37	229.16	231.11	233.52	230.13	232.15	230.11	232.18	234.27
HV Ring Open	Top Tap (5%)	17. LV Meshed Subs 150kVAr Capacitor 1/2	228.98	236.09	229.32	229.39	236.23	230.27	237.12	230.25	230.31	237.08
HV Ring Open	Top Tap (5%)	18. LV Meshed Ways 150kVAr Capacitor 1/2	228.94	230.28	229.27	230.03	239.38	230.23	231.03	230.20	231.07	240.09
HV Ring Open	Top Tap (5%)	19. LV Meshed Subs & Ways 150kVAr Capacitor 1/2	229.31	231.80	229.64	231.55	234.52	230.61	232.59	230.59	232.61	235.27
HV Ring Open	Top Tap (5%)	20. LV Meshed Subs 150kVAr Capacitor 2/3	228.93	237.21	229.27	229.34	236.40	230.22	238.24	230.20	230.26	237.24
HV Ring Open	Top Tap (5%)	21. LV Meshed Ways 150kVAr Capacitor 2/3	228.93	230.56	229.27	230.32	239.38	230.24	231.31	230.20	231.35	240.09
HV Ring Open	Top Tap (5%)	22. LV Meshed Subs & Ways 150kVAr Capacitor 2/3	229.33	232.14	229.67	231.88	234.39	230.64	232.93	230.62	232.95	235.14
HV Ring Open	Top Tap (5%)	23. LV Meshed Subs 200kVAr Capacitor 1/2	229.44	237.18	229.77	229.84	237.31	230.72	238.20	230.70	230.76	238.16
HV Ring Open	Top Tap (5%)	24. LV Meshed Ways 200kVAr Capacitor 1/2	229.62	231.23	229.95	230.98	239.53	230.91	231.97	230.88	232.00	240.24
HV Ring Open	Top Tap (5%)	25. LV Meshed Subs & Ways 200kVAr Capacitor 1/2	229.81	232.47	230.14	232.21	235.45	231.11	233.25	231.09	233.27	236.19
HV Ring Open	Top Tap (5%)	26. LV Meshed Subs 200kVAr Capacitor 2/3	229.37	238.68	229.71	229.77	237.55	230.66	239.69	230.64	230.69	238.37
HV Ring Open	Top Tap (5%)	27. LV Meshed Ways 200kVAr Capacitor 2/3	229.62	231.61	229.95	231.36	239.53	230.92	232.34	230.88	232.38	240.24
HV Ring Open	Top Tap (5%)	28. LV Meshed Subs & Ways 200kVAr Capacitor 2/3	229.84	232.92	230.18	232.66	235.27	231.15	233.70	231.13	233.72	236.01
HV Ring Open	Mid Tap (0%)	1. No Intervention	238.37	238.56	238.68	238.75	238.93	239.59	239.70	239.57	239.63	239.65
HV Ring Open	Mid Tap (0%)	2. LV Meshed Subs Only	238.35	238.70	238.67	238.74	238.82	239.60	239.70	239.58	239.63	239.64
HV Ring Open	Mid Tap (0%)	3. LV Meshed Ways Only	238.36	238.87	238.68	238.64	238.94	239.59	239.61	239.57	239.66	239.65
HV Ring Open	Mid Tap (0%)	4. LV Meshed Subs & Ways Only	238.34	238.87	238.66	238.65	238.89	239.60	239.62	239.58	239.67	239.61
HV Ring Open	Mid Tap (0%)	5. 100kVAr Capacitor 1/2 Only	239.80	242.44	240.12	240.18	239.26	241.03	243.50	241.01	241.07	239.98
HV Ring Open	Mid Tap (0%)	6. 100kVAr Capacitor 2/3 Only	239.80	243.22	240.12	240.18	239.26	241.04	244.33	241.02	241.07	239.98
HV Ring Open	Mid Tap (0%)	7. 150kVAr Capacitor 1/2 Only	240.51	244.41	240.83	240.89	239.41	241.75	245.47	241.73	241.78	240.13
HV Ring Open	Mid Tap (0%)	8. 150kVAr Capacitor 2/3 Only	240.50	245.59	240.81	240.88	239.40	241.77	246.76	241.75	241.80	240.15
HV Ring Open	Mid Tap (0%)	9. 200kVAr Capacitor 1/2 Only	241.27	246.29	241.59	241.65	239.60	242.49	247.31	242.47	242.53	240.31
HV Ring Open	Mid Tap (0%)	10. 200kVAr Capacitor 2/3 Only	241.28	248.02	241.60	241.66	239.60	242.51	249.09	242.49	242.54	240.32
HV Ring Open	Mid Tap (0%)	11. LV Meshed Subs 100kVAr Capacitor 1/2	239.30	240.93	239.62	239.68	241.04	240.54	241.92	240.52	240.57	241.85
HV Ring Open	Mid Tap (0%)	12. LV Meshed Ways 100kVAr Capacitor 1/2	239.80	240.87	240.12	240.65	239.26	241.03	241.61	241.01	241.65	239.98
HV Ring Open	Mid Tap (0%)	13. LV Meshed Subs & Ways 100kVAr Capacitor 1/2	239.39	240.25	239.71	240.03	240.79	240.65	241.00	240.63	241.04	241.50
HV Ring Open	Mid Tap (0%)	14. LV Meshed Subs 100kVAr Capacitor 2/3	239.26	241.69	239.58	239.64	241.16	240.50	242.67	240.48	240.54	241.96
HV Ring Open	Mid Tap (0%)	15. LV Meshed Ways 100kVAr Capacitor 2/3	239.80	241.08	240.12	240.84	239.26	241.03	241.81	241.01	241.84	239.98
HV Ring Open	Mid Tap (0%)	16. LV Meshed Subs & Ways 100kVAr Capacitor 2/3	239.41	240.49	239.73	240.26	240.70	240.67	241.23	240.65	241.27	241.41
HV Ring Open	Mid Tap (0%)	17. LV Meshed Subs 150kVAr Capacitor 1/2	239.77	242.06	240.09	240.15	242.16	241.01	243.03	240.99	241.05	242.96
HV Ring Open	Mid Tap (0%)	18. LV Meshed Ways 150kVAr Capacitor 1/2	240.53	241.89	240.85	241.65	239.43	241.76	242.61	241.74	242.64	240.15
HV Ring Open	Mid Tap (0%)	19. LV Meshed Subs & Ways 150kVAr Capacitor 1/2	239.92	240.95	240.23	240.72	241.75	241.17	241.69	241.15	241.73	242.46
HV Ring Open	Mid Tap (0%)	20. LV Meshed Subs 150kVAr Capacitor 2/3	239.71	243.20	240.03	240.10	242.33	240.96	244.15	240.94	240.99	243.12
HV Ring Open	Mid Tap (0%)	21. LV Meshed Ways 150kVAr Capacitor 2/3	240.53	242.19	240.85	241.95	239.43	241.76	242.91	241.74	242.94	240.15
HV Ring Open	Mid Tap (0%)	22. LV Meshed Subs & Ways 150kVAr Capacitor 2/3	239.94	241.30	240.26	241.07	241.62	241.20	242.04	241.18	242.07	242.32
HV Ring Open	Mid Tap (0%)	23. LV Meshed Subs 200kVAr Capacitor 1/2	240.25	243.19	240.56	240.63	243.29	241.49	244.15	241.47	241.52	244.08
HV Ring Open	Mid Tap (0%)	24. LV Meshed Ways 200kVAr Capacitor 1/2	241.26	242.90	241.58	242.67	239.59	242.49	243.61	242.47	243.64	240.31
HV Ring Open	Mid Tap (0%)	25. LV Meshed Subs & Ways 200kVAr Capacitor 1/2	240.44	241.65	240.76	241.42	242.71	241.70	242.39	241.68	242.42	243.41
HV Ring Open	Mid Tap (0%)	26. LV Meshed Subs 200kVAr Capacitor 2/3	240.17	244.71	240.49	240.56	243.51	241.42	245.66	241.40	241.45	244.30
HV Ring Open	Mid Tap (0%)	27. LV Meshed Ways 200kVAr Capacitor 2/3	241.26	243.31	241.58	243.07	239.59	242.49	244.01	242.47	244.03	240.31
HV Ring Open	Mid Tap (0%)	28. LV Meshed Subs & Ways 200kVAr Capacitor 2/3	240.48	242.12	240.80	241.88	242.53	241.74	242.86	241.72	242.88	243.23
HV Ring Open	Bottom Tap (-5%)	1. No Intervention	251.02	251.20	251.32	251.38	238.92	252.15	252.26	252.15	252.20	239.65
HV Ring Open	Bottom Tap (-5%)	2. LV Meshed Subs Only	250.16	245.12	250.46	250.52	245.21	251.33	246.11	251.32	251.38	246.03
HV Ring Open	Bottom Tap (-5%)	3. LV Meshed Ways Only	251.01	251.49	251.31	251.28	238.94	252.16	252.20	252.16	252.24	239.67
HV Ring Open	Bottom Tap (-5%)	4. LV Meshed Subs & Ways Only	249.93	248.82	250.23	248.62	246.69	251.11	249.55	251.11	249.60	247.41
HV Ring Open	Bottom Tap (-5%)	5. 100kVAr Capacitor 1/2 Only	252.56	255.30	252.87	252.93	239.31	253.75	256.40	253.73	253.78	240.02
HV Ring Open	Bottom Tap (-5%)	6. 100kVAr Capacitor 2/3 Only	252.57	256.19	252.87	252.93	239.30	253.75	257.28	253.73	253.78	240.02
HV Ring Open	Bottom Tap (-5%)	7. 150kVAr Capacitor 1/2 Only	253.35	257.35	253.65	253.72	239.49	254.53	258.44	254.52	254.57	240.20
HV Ring Open	Bottom Tap (-5%)	8. 150kVAr Capacitor 2/3 Only	253.36	258.70	253.66	253.72	239.49	254.54	259.76	254.52	254.57	240.20
HV Ring Open	Bottom Tap (-5%)	9. 200kVAr Capacitor 1/2 Only	254.15	259.42	254.45	254.51	239.67	255.32	260.47	255.31	255.36	240.38
HV Ring Open	Bottom Tap (-5%)	10. 200kVAr Capacitor 2/3 Only	254.16	261.21	254.46	254.52	239.68	255.33	262.22	255.31	255.37	240.38
HV Ring Open	Bottom Tap (-5%)	11. LV Meshed Subs 100kVAr Capacitor 1/2	251.15	247.45	251.45	251.51	247.53	252.32	248.42	252.32	252.37	248.32
HV Ring Open	Bottom Tap (-5%)	12. LV Meshed Ways 100kVAr Capacitor 1/2	252.56	253.64	252.86	253.42	239.30	253.72	254.34	253.71	254.37	240.03
HV Ring Open	Bottom Tap (-5%)	13. LV Meshed Subs & Ways 100kVAr Capacitor 1/2	251.03	250.28	251.34	250.08	248.69	252.22	251.01	252.21	251.05	249.39
HV Ring Open	Bottom Tap (-5%)	14. LV Meshed Subs 100kVAr Capacitor 2/3	251.11	248.22	251.41	251.47	247.64	252.28	249.18	252.28	252.33	248.43
HV Ring Open	Bottom Tap (-5%)	15. LV Meshed Ways 100kVAr Capacitor 2/3	252.56	253.86	252.86	253.64	239.30	253.72	254.55	253.71	254.57	240.03
HV Ring Open	Bottom Tap (-5%)	16. LV Meshed Subs & Ways 100kVAr Capacitor 2/3	251.05	250.52	251.36	250.32	248.60	252.24	251.25	252.23	251.29	249.30
HV Ring Open	Bottom Tap (-5%)	17. LV Meshed Subs 150kVAr Capacitor 1/2	251.65	248.62	251.95	252.01	248.69	252.82	249.57	252.82	252.87	249.48
HV Ring Open	Bottom Tap (-5%)	18. LV Meshed Ways 150kVAr Capacitor 1/2	253.35	254.73	253.65	254.50	239.48	254.50	255.42	254.49	255.43	240.21
HV Ring Open	Bottom Tap (-5%)	19. LV Meshed Subs & Ways 150kVAr Capacitor 1/2	251.59	251.01	251.89	250.81	249.69	252.78	251.74	252.77	251.78	250.39
HV Ring Open	Bottom Tap (-5%)	20. LV Meshed Subs 150kVAr Capacitor 2/3	251.59	249.77	251.89	251.95	248.85	252.76	250.72	252.76	252.81	249.63
HV Ring Open	Bottom Tap (-5%)	21. LV Meshed Ways 150kVAr Capacitor 2/3	253.35	255.05	253.65	254.82	239.48	254.50	255.73	254.49	255.74	240.21
HV Ring Open	Bottom Tap (-5%)	22. LV Meshed Subs & Ways 150kVAr Capacitor 2/3	251.62	251.38	2							

Min Demand of 0.2kW _ (2.4kW PV average installation)			Voltage Level at 0% PV Penetration					Voltage Level at 10% PV Penetration				
HV RING	OLTC Tap Position	Scenario	PW5	YW9	BW1	GW3	SW7	PW5	YW9	BW1	GW3	SW7
HV Ring Closed	Top Tap (5%)	1. No Intervention	227.02	227.23	227.36	227.43	239.06	228.28	228.39	228.24	228.30	239.71
HV Ring Closed	Top Tap (5%)	2. LV Meshed Subs Only	227.78	232.97	228.11	228.18	233.13	229.04	233.94	229.00	229.06	233.91
HV Ring Closed	Top Tap (5%)	3. LV Meshed Ways Only	227.02	227.55	227.36	227.32	239.06	228.28	228.28	228.24	228.34	239.71
HV Ring Closed	Top Tap (5%)	4. LV Meshed Subs & Ways Only	227.95	229.98	228.29	229.73	231.94	229.24	230.69	229.20	230.73	232.61
HV Ring Closed	Top Tap (5%)	5. 100kVAr Capacitor 1/2 Only	228.24	230.74	228.58	228.65	239.22	229.50	231.86	229.46	229.52	239.87
HV Ring Closed	Top Tap (5%)	6. 100kVAr Capacitor 2/3 Only	228.24	231.54	228.58	228.65	239.22	229.50	232.65	229.47	229.52	239.87
HV Ring Closed	Top Tap (5%)	7. 150kVAr Capacitor 1/2 Only	228.86	232.51	229.19	229.26	239.30	230.11	233.59	230.08	230.14	239.95
HV Ring Closed	Top Tap (5%)	8. 150kVAr Capacitor 2/3 Only	228.86	233.71	229.20	229.26	239.30	230.12	234.77	230.08	230.14	239.95
HV Ring Closed	Top Tap (5%)	9. 200kVAr Capacitor 1/2 Only	229.48	234.29	229.81	229.88	239.38	230.73	235.32	230.70	230.75	240.03
HV Ring Closed	Top Tap (5%)	10. 200kVAr Capacitor 2/3 Only	229.48	235.75	229.81	229.88	239.38	230.74	236.84	230.71	230.76	240.03
HV Ring Closed	Top Tap (5%)	11. LV Meshed Subs 100kVAr Capacitor 1/2	228.53	235.00	228.86	228.93	235.15	229.77	235.98	229.75	229.80	235.94
HV Ring Closed	Top Tap (5%)	12. LV Meshed Ways 100kVAr Capacitor 1/2	228.24	229.32	228.58	229.08	239.22	229.50	230.03	229.46	230.08	239.87
HV Ring Closed	Top Tap (5%)	13. LV Meshed Subs & Ways 100kVAr Capacitor 1/2	228.81	231.15	229.15	230.90	233.62	230.06	231.88	230.05	231.90	234.30
HV Ring Closed	Top Tap (5%)	14. LV Meshed Subs 100kVAr Capacitor 2/3	228.50	235.75	228.83	228.90	235.26	229.73	236.72	229.71	229.77	236.05
HV Ring Closed	Top Tap (5%)	15. LV Meshed Ways 100kVAr Capacitor 2/3	228.24	229.51	228.58	229.27	239.22	229.50	230.22	229.46	230.27	239.87
HV Ring Closed	Top Tap (5%)	16. LV Meshed Subs & Ways 100kVAr Capacitor 2/3	228.83	231.38	229.17	231.12	233.53	230.08	232.10	230.06	232.13	234.22
HV Ring Closed	Top Tap (5%)	17. LV Meshed Subs 150kVAr Capacitor 1/2	228.91	236.02	229.25	229.31	236.16	230.15	236.99	230.13	230.19	236.95
HV Ring Closed	Top Tap (5%)	18. LV Meshed Ways 150kVAr Capacitor 1/2	228.86	230.20	229.19	229.96	239.30	230.11	230.91	230.08	230.95	239.95
HV Ring Closed	Top Tap (5%)	19. LV Meshed Subs & Ways 150kVAr Capacitor 1/2	229.24	231.74	229.58	231.49	234.47	230.50	232.47	230.48	232.49	235.15
HV Ring Closed	Top Tap (5%)	20. LV Meshed Subs 150kVAr Capacitor 2/3	228.86	237.14	229.20	229.26	236.33	230.10	238.11	230.08	230.14	237.11
HV Ring Closed	Top Tap (5%)	21. LV Meshed Ways 150kVAr Capacitor 2/3	228.86	230.49	229.19	230.24	239.30	230.11	231.19	230.08	231.23	239.95
HV Ring Closed	Top Tap (5%)	22. LV Meshed Subs & Ways 150kVAr Capacitor 2/3	229.27	232.08	229.61	231.83	234.33	230.52	232.81	230.51	232.83	235.02
HV Ring Closed	Top Tap (5%)	23. LV Meshed Subs 200kVAr Capacitor 1/2	229.30	237.04	229.63	229.70	237.17	230.53	238.00	230.51	230.57	237.96
HV Ring Closed	Top Tap (5%)	24. LV Meshed Ways 200kVAr Capacitor 1/2	229.48	231.08	229.81	230.84	239.38	230.73	231.78	230.69	231.82	240.03
HV Ring Closed	Top Tap (5%)	25. LV Meshed Subs & Ways 200kVAr Capacitor 1/2	229.68	232.34	230.01	232.08	235.32	230.93	233.06	230.91	233.08	236.00
HV Ring Closed	Top Tap (5%)	26. LV Meshed Subs 200kVAr Capacitor 2/3	229.23	238.54	229.56	229.63	237.40	230.46	239.49	230.44	230.50	238.17
HV Ring Closed	Top Tap (5%)	27. LV Meshed Ways 200kVAr Capacitor 2/3	229.48	231.47	229.81	231.22	239.38	230.73	232.16	230.70	232.19	240.03
HV Ring Closed	Top Tap (5%)	28. LV Meshed Subs & Ways 200kVAr Capacitor 2/3	229.71	232.79	230.05	232.53	235.14	230.97	233.52	230.95	233.53	235.82
HV Ring Closed	Mid Tap (0%)	1. No Intervention	238.47	238.67	238.79	238.86	239.06	239.65	239.76	239.63	239.69	239.72
HV Ring Closed	Mid Tap (0%)	2. LV Meshed Subs Only	238.47	238.80	238.80	238.86	238.92	239.66	239.76	239.64	239.69	239.70
HV Ring Closed	Mid Tap (0%)	3. LV Meshed Ways Only	238.47	238.98	238.79	238.76	239.06	239.65	239.67	239.63	239.72	239.72
HV Ring Closed	Mid Tap (0%)	4. LV Meshed Subs & Ways Only	238.46	238.99	238.78	238.77	239.01	239.66	239.68	239.64	239.73	239.67
HV Ring Closed	Mid Tap (0%)	5. 100kVAr Capacitor 1/2 Only	239.77	242.38	240.09	240.16	239.24	240.95	243.43	240.93	240.99	239.89
HV Ring Closed	Mid Tap (0%)	6. 100kVAr Capacitor 2/3 Only	239.77	243.22	240.09	240.16	239.24	240.95	244.25	240.93	240.99	239.89
HV Ring Closed	Mid Tap (0%)	7. 150kVAr Capacitor 1/2 Only	240.43	244.24	240.75	240.81	239.33	241.61	245.25	241.59	241.64	239.98
HV Ring Closed	Mid Tap (0%)	8. 150kVAr Capacitor 2/3 Only	240.43	245.51	240.75	240.82	239.33	241.61	246.49	241.59	241.64	239.98
HV Ring Closed	Mid Tap (0%)	9. 200kVAr Capacitor 1/2 Only	241.09	246.02	241.40	241.47	239.41	242.26	247.04	242.24	242.30	240.07
HV Ring Closed	Mid Tap (0%)	10. 200kVAr Capacitor 2/3 Only	241.09	247.63	241.41	241.47	239.41	242.27	248.65	242.25	242.30	240.07
HV Ring Closed	Mid Tap (0%)	11. LV Meshed Subs 100kVAr Capacitor 1/2	239.26	240.90	239.58	239.65	241.01	240.45	241.83	240.43	240.49	241.76
HV Ring Closed	Mid Tap (0%)	12. LV Meshed Ways 100kVAr Capacitor 1/2	239.77	240.84	240.09	240.61	239.24	240.95	241.53	240.93	241.56	239.89
HV Ring Closed	Mid Tap (0%)	13. LV Meshed Subs & Ways 100kVAr Capacitor 1/2	239.36	240.22	239.68	239.99	240.76	240.56	240.91	240.54	240.95	241.42
HV Ring Closed	Mid Tap (0%)	14. LV Meshed Subs 100kVAr Capacitor 2/3	239.22	241.66	239.54	239.61	241.13	240.42	242.58	240.40	240.45	241.87
HV Ring Closed	Mid Tap (0%)	15. LV Meshed Ways 100kVAr Capacitor 2/3	239.77	241.05	240.09	240.81	239.24	240.95	241.73	240.93	241.76	239.89
HV Ring Closed	Mid Tap (0%)	16. LV Meshed Subs & Ways 100kVAr Capacitor 2/3	239.37	240.46	239.69	240.23	240.67	240.58	241.15	240.56	241.18	241.33
HV Ring Closed	Mid Tap (0%)	17. LV Meshed Subs 150kVAr Capacitor 1/2	239.66	241.95	239.98	240.04	242.06	240.85	242.86	240.83	240.88	242.79
HV Ring Closed	Mid Tap (0%)	18. LV Meshed Ways 150kVAr Capacitor 1/2	240.43	241.78	240.75	241.55	239.33	241.60	242.46	241.58	242.49	239.98
HV Ring Closed	Mid Tap (0%)	19. LV Meshed Subs & Ways 150kVAr Capacitor 1/2	239.81	240.84	240.13	240.61	241.64	241.01	241.53	240.99	241.57	242.29
HV Ring Closed	Mid Tap (0%)	20. LV Meshed Subs 150kVAr Capacitor 2/3	239.60	243.09	239.92	239.99	242.22	240.80	243.99	240.78	240.83	242.96
HV Ring Closed	Mid Tap (0%)	21. LV Meshed Ways 150kVAr Capacitor 2/3	240.43	242.09	240.75	241.85	239.33	241.60	242.76	241.58	242.78	239.98
HV Ring Closed	Mid Tap (0%)	22. LV Meshed Subs & Ways 150kVAr Capacitor 2/3	239.84	241.19	240.16	240.96	241.51	241.04	241.88	241.02	241.91	242.16
HV Ring Closed	Mid Tap (0%)	23. LV Meshed Subs 200kVAr Capacitor 1/2	240.06	243.00	240.38	240.44	243.10	241.25	243.91	241.23	241.28	243.84
HV Ring Closed	Mid Tap (0%)	24. LV Meshed Ways 200kVAr Capacitor 1/2	241.09	242.72	241.40	242.49	239.42	242.26	243.38	242.24	243.41	240.07
HV Ring Closed	Mid Tap (0%)	25. LV Meshed Subs & Ways 200kVAr Capacitor 1/2	240.26	241.46	240.58	241.23	242.53	241.46	242.15	241.44	242.18	243.17
HV Ring Closed	Mid Tap (0%)	26. LV Meshed Subs 200kVAr Capacitor 2/3	239.99	244.52	240.31	240.37	243.33	241.18	245.40	241.16	241.21	244.04
HV Ring Closed	Mid Tap (0%)	27. LV Meshed Ways 200kVAr Capacitor 2/3	241.09	243.13	241.41	242.89	239.42	242.26	243.78	242.24	243.80	240.07
HV Ring Closed	Mid Tap (0%)	28. LV Meshed Subs & Ways 200kVAr Capacitor 2/3	240.30	241.94	240.62	241.70	242.35	241.50	242.62	241.48	242.65	242.99
HV Ring Closed	Bottom Tap (-5%)	1. No Intervention	251.12	251.31	251.43	251.49	239.06	252.22	252.33	252.22	252.27	239.72
HV Ring Closed	Bottom Tap (-5%)	2. LV Meshed Subs Only	250.27	245.23	250.57	250.63	245.31	251.38	246.15	251.37	251.43	246.07
HV Ring Closed	Bottom Tap (-5%)	3. LV Meshed Ways Only	251.12	251.60	251.43	251.39	239.06	252.22	252.26	252.22	252.29	239.72
HV Ring Closed	Bottom Tap (-5%)	4. LV Meshed Subs & Ways Only	250.03	248.93	250.34	248.73	246.80	251.16	249.60	251.15	249.65	247.45
HV Ring Closed	Bottom Tap (-5%)	5. 100kVAr Capacitor 1/2 Only	252.51	255.24	252.82	252.88	239.26	253.61	256.21	253.61	253.66	239.92
HV Ring Closed	Bottom Tap (-5%)	6. 100kVAr Capacitor 2/3 Only	252.52	256.13	252.82	252.88	239.26	253.61	257.09	253.61	253.66	239.92
HV Ring Closed	Bottom Tap (-5%)	7. 150kVAr Capacitor 1/2 Only	253.22	257.20	253.52	253.58	239.36	254.35	258.25	254.33	254.38	240.01
HV Ring Closed	Bottom Tap (-5%)	8. 150kVAr Capacitor 2/3 Only	253.22	258.54	253.52	253.58	239.36	254.35	259.57	254.33	254.38	240.01
HV Ring Closed	Bottom Tap (-5%)	9. 200kVAr Capacitor 1/2 Only	253.93	259.17	254.23	254.29	239.46	255.05	260.19	255.03	255.08	240.11
HV Ring Closed	Bottom Tap (-5%)	10. 200kVAr Capacitor 2/3 Only	253.92	260.78	254.22	254.28	239.45	255.02	261.69	255.01	255.07	240.11
HV Ring Closed	Bottom Tap (-5%)	11. LV Meshed Subs 100kVAr Capacitor 1/2	251.09	247.40	251.40	251.46	247.48	252.21	248.30	252.20	252.26	248.21
HV Ring Closed	Bottom Tap (-5%)	12. LV Meshed Ways 100kVAr Capacitor 1/2	252.51	253.59	252.82	253.38	239.26	253.61	254.24	253.60	254.26	239.92
HV Ring Closed	Bottom Tap (-5%)	13. LV Meshed Subs & Ways 100kVAr Capacitor 1/2	250.97	250.22	251.28	250.02	248.63	252.10	250.89	252.09	250.93	249.27
HV Ring Closed	Bottom Tap (-5%)	14. LV Meshed Subs 100kVAr Capacitor 2/3	251.05	248.17	251.36	251.42	247.59	252.17	249.07	252.16	252.22	248.32
HV Ring Closed	Bottom Tap (-5%)	15. LV Meshed Ways 100kVAr Capacitor 2/3	252.51	253.81	252.82	253.59	239.26	253.61	254.45	253.60	254.47	239.92
HV Ring Closed	Bottom Tap (-5%)	16. LV Meshed Subs & Ways 100kVAr Capacitor 2/3	250.99	250.47	251.30	250.26	248.54	252.12	251.13	252.12	251.17	249.18
HV Ring Closed	Bottom Tap (-5%)	17. LV Meshed Subs 150kVAr Capacitor 1/2	251.51	248.48	251.81	251.88	248.55	252.62	249.38	252.62	252.67	249.28
HV Ring Closed	Bottom Tap (-5%)	18. LV Meshed Ways 150kVAr Capacitor 1/2	253.21	254.59	253.52	254.37	239.36	254.31	255.23	254.30	255.24	240.02
HV Ring Closed	Bottom Tap (-5%)	19. LV Meshed Subs & Ways 150kVAr Capacitor 1/2	251.45	250.87	251.75	250.67	249.55	252.57	251.54	252.57	251.58	250.19
HV Ring Closed	Bottom Tap (-5%)	20. LV Meshed Subs 150kVAr Capacitor 2/3	251.45	249.63	251.75	251.82	248.72	252.57	250.52	252.56	252.61	249.44
HV Ring Closed	Bottom Tap (-5%)	21. LV Meshed Ways 150kVAr Capacitor 2/3	253.21	254.91	253.52	254.69	239.36	254.31	255.54	254.30	255.55	240.02
HV Ring Closed	Bottom Tap (-5%)	22. LV Meshed Subs & Ways 150kVAr Capacitor 2/3	251.48	251.24	251.78	251.03	249.41	252.61	251.90	252.60	251.94	25

Max Demand of 1.5kW _ (2.4kW PV average installation)			Voltage Level at 0% PV Penetration					Voltage Level at 10% PV Penetration				
HV RING	OLTC Tap Position	Scenario	PW5	YW9	BW1	GW3	SW7	PW5	YW9	BW1	GW3	SW7
HV Ring Open	Top Tap (5%)	1. No Intervention	213.94	215.61	216.64	217.20	230.21	215.38	216.95	217.68	218.22	231.00
HV Ring Open	Top Tap (5%)	2. LV Meshed Subs Only	214.68	222.37	217.37	217.92	223.37	216.11	223.52	218.41	218.94	224.33
HV Ring Open	Top Tap (5%)	3. LV Meshed Ways Only	213.94	218.18	216.65	216.34	230.22	215.38	219.06	217.68	217.51	231.01
HV Ring Open	Top Tap (5%)	4. LV Meshed Subs & Ways Only	214.78	220.67	217.47	218.83	222.73	216.24	221.52	218.53	219.98	223.52
HV Ring Open	Top Tap (5%)	5. 100kVAr Capacitor 1/2 Only	215.26	219.12	217.94	218.49	230.50	216.70	220.47	218.99	219.52	231.30
HV Ring Open	Top Tap (5%)	6. 100kVAr Capacitor 2/3 Only	215.25	219.87	217.94	218.49	230.50	216.70	221.23	218.99	219.52	231.29
HV Ring Open	Top Tap (5%)	7. 150kVAr Capacitor 1/2 Only	215.92	220.88	218.60	219.15	230.65	217.36	222.23	219.65	220.18	231.44
HV Ring Open	Top Tap (5%)	8. 150kVAr Capacitor 2/3 Only	215.91	222.01	218.59	219.14	230.64	217.36	223.37	219.64	220.18	231.44
HV Ring Open	Top Tap (5%)	9. 200kVAr Capacitor 1/2 Only	216.59	222.67	219.26	219.80	230.79	218.03	223.98	220.31	220.84	231.58
HV Ring Open	Top Tap (5%)	10. 200kVAr Capacitor 2/3 Only	216.58	224.20	219.25	219.80	230.79	218.03	225.49	220.30	220.84	231.58
HV Ring Open	Top Tap (5%)	11. LV Meshed Subs 100kVAr Capacitor 1/2	215.54	224.48	218.23	218.78	225.46	217.00	225.63	219.28	219.82	226.42
HV Ring Open	Top Tap (5%)	12. LV Meshed Ways 100kVAr Capacitor 1/2	215.26	220.02	217.95	218.19	230.50	216.71	220.89	219.00	219.35	231.30
HV Ring Open	Top Tap (5%)	13. LV Meshed Subs & Ways 100kVAr Capacitor 1/2	215.74	221.93	218.43	220.10	224.45	217.22	222.81	219.51	221.27	225.30
HV Ring Open	Top Tap (5%)	14. LV Meshed Subs 100kVAr Capacitor 2/3	215.50	225.19	218.19	218.74	225.57	216.96	226.34	219.25	219.78	226.53
HV Ring Open	Top Tap (5%)	15. LV Meshed Ways 100kVAr Capacitor 2/3	215.26	220.20	217.95	218.37	230.50	216.71	221.07	219.00	219.53	231.30
HV Ring Open	Top Tap (5%)	16. LV Meshed Subs & Ways 100kVAr Capacitor 2/3	215.76	222.14	218.45	220.32	224.36	217.24	223.02	219.52	221.49	225.21
HV Ring Open	Top Tap (5%)	17. LV Meshed Subs 150kVAr Capacitor 1/2	215.98	225.53	218.67	219.22	226.51	217.44	226.68	219.72	220.26	227.47
HV Ring Open	Top Tap (5%)	18. LV Meshed Ways 150kVAr Capacitor 1/2	215.93	220.94	218.62	219.11	230.64	217.38	221.80	219.66	220.27	231.45
HV Ring Open	Top Tap (5%)	19. LV Meshed Subs & Ways 150kVAr Capacitor 1/2	216.24	222.57	218.92	220.74	225.34	217.72	223.45	220.00	221.92	226.18
HV Ring Open	Top Tap (5%)	20. LV Meshed Subs 150kVAr Capacitor 2/3	215.93	226.61	218.61	219.16	226.67	217.39	227.75	219.67	220.20	227.62
HV Ring Open	Top Tap (5%)	21. LV Meshed Ways 150kVAr Capacitor 2/3	215.93	221.21	218.61	219.38	230.64	217.38	222.08	219.66	220.54	231.45
HV Ring Open	Top Tap (5%)	22. LV Meshed Subs & Ways 150kVAr Capacitor 2/3	216.26	222.89	218.94	221.06	225.20	217.74	223.78	220.02	222.24	226.06
HV Ring Open	Top Tap (5%)	23. LV Meshed Subs 200kVAr Capacitor 1/2	216.43	226.59	219.11	219.66	227.56	217.89	227.73	220.17	220.70	228.51
HV Ring Open	Top Tap (5%)	24. LV Meshed Ways 200kVAr Capacitor 1/2	216.61	221.85	219.28	220.03	230.79	218.06	222.72	220.33	221.19	231.59
HV Ring Open	Top Tap (5%)	25. LV Meshed Subs & Ways 200kVAr Capacitor 1/2	216.73	223.21	219.41	221.39	226.23	218.21	224.10	220.49	222.56	227.07
HV Ring Open	Top Tap (5%)	26. LV Meshed Subs 200kVAr Capacitor 2/3	216.36	228.04	219.04	219.59	227.78	217.82	229.16	220.10	220.63	228.71
HV Ring Open	Top Tap (5%)	27. LV Meshed Ways 200kVAr Capacitor 2/3	216.60	222.22	219.28	220.39	230.79	218.06	223.09	220.33	221.55	231.59
HV Ring Open	Top Tap (5%)	28. LV Meshed Subs & Ways 200kVAr Capacitor 2/3	216.76	223.64	219.44	221.82	226.05	218.25	224.53	220.52	222.99	226.90
HV Ring Open	Mid Tap (0%)	1. No Intervention	225.63	227.21	228.19	228.71	230.22	227.06	228.52	229.21	229.72	231.03
HV Ring Open	Mid Tap (0%)	2. LV Meshed Subs Only	225.60	228.27	228.16	228.69	229.23	227.04	229.43	229.19	229.69	230.19
HV Ring Open	Mid Tap (0%)	3. LV Meshed Ways Only	225.63	229.65	228.19	227.90	230.22	227.06	230.51	229.21	229.05	231.03
HV Ring Open	Mid Tap (0%)	4. LV Meshed Subs & Ways Only	225.51	229.71	228.07	227.96	229.83	226.98	230.56	229.12	229.11	230.65
HV Ring Open	Mid Tap (0%)	5. 100kVAr Capacitor 1/2 Only	227.04	230.94	229.59	230.11	230.54	228.47	232.21	230.61	231.11	231.35
HV Ring Open	Mid Tap (0%)	6. 100kVAr Capacitor 2/3 Only	227.04	231.73	229.58	230.10	230.54	228.47	233.00	230.61	231.11	231.35
HV Ring Open	Mid Tap (0%)	7. 150kVAr Capacitor 1/2 Only	227.77	232.72	230.28	230.80	230.70	229.18	234.03	231.32	231.82	231.50
HV Ring Open	Mid Tap (0%)	8. 150kVAr Capacitor 2/3 Only	227.75	233.75	230.27	230.78	230.69	229.18	235.18	231.31	231.81	231.50
HV Ring Open	Mid Tap (0%)	9. 200kVAr Capacitor 1/2 Only	228.47	234.71	231.00	231.51	230.86	229.90	235.88	232.03	232.52	231.67
HV Ring Open	Mid Tap (0%)	10. 200kVAr Capacitor 2/3 Only	228.46	236.34	230.99	231.51	230.86	229.90	237.45	232.02	232.52	231.66
HV Ring Open	Mid Tap (0%)	11. LV Meshed Subs 100kVAr Capacitor 1/2	226.50	230.46	229.06	229.59	231.39	227.97	231.59	230.11	230.61	232.33
HV Ring Open	Mid Tap (0%)	12. LV Meshed Ways 100kVAr Capacitor 1/2	227.04	231.59	229.59	229.85	230.54	228.49	232.45	230.63	231.00	231.35
HV Ring Open	Mid Tap (0%)	13. LV Meshed Subs & Ways 100kVAr Capacitor 1/2	226.53	231.03	229.08	229.29	231.65	227.94	231.90	230.12	230.44	232.48
HV Ring Open	Mid Tap (0%)	14. LV Meshed Subs 100kVAr Capacitor 2/3	226.46	231.19	229.02	229.55	231.50	227.93	232.31	230.07	230.57	232.44
HV Ring Open	Mid Tap (0%)	15. LV Meshed Ways 100kVAr Capacitor 2/3	227.04	231.78	229.59	230.04	230.54	228.49	232.64	230.63	231.19	231.35
HV Ring Open	Mid Tap (0%)	16. LV Meshed Subs & Ways 100kVAr Capacitor 2/3	226.54	231.26	229.10	229.51	231.56	227.96	232.13	230.14	230.66	232.40
HV Ring Open	Mid Tap (0%)	17. LV Meshed Subs 150kVAr Capacitor 1/2	226.97	231.56	229.52	230.05	232.48	228.37	232.68	230.54	231.05	233.42
HV Ring Open	Mid Tap (0%)	18. LV Meshed Ways 150kVAr Capacitor 1/2	227.76	232.57	230.30	230.83	230.70	229.20	233.42	231.34	231.97	231.51
HV Ring Open	Mid Tap (0%)	19. LV Meshed Subs & Ways 150kVAr Capacitor 1/2	227.04	231.70	229.60	229.96	232.58	228.47	232.58	230.64	231.12	233.41
HV Ring Open	Mid Tap (0%)	20. LV Meshed Subs 150kVAr Capacitor 2/3	226.91	232.66	229.47	229.99	232.64	228.32	233.77	230.49	230.99	233.57
HV Ring Open	Mid Tap (0%)	21. LV Meshed Ways 150kVAr Capacitor 2/3	227.76	232.86	230.30	231.12	230.70	229.20	233.70	231.34	232.26	231.51
HV Ring Open	Mid Tap (0%)	22. LV Meshed Subs & Ways 150kVAr Capacitor 2/3	227.07	232.04	229.62	230.30	232.45	228.49	232.92	230.67	231.46	233.28
HV Ring Open	Mid Tap (0%)	23. LV Meshed Subs 200kVAr Capacitor 1/2	227.44	232.66	229.99	230.51	233.57	228.84	233.77	231.01	231.51	234.50
HV Ring Open	Mid Tap (0%)	24. LV Meshed Ways 200kVAr Capacitor 1/2	228.48	233.55	231.02	231.82	230.86	229.92	234.39	232.05	232.94	231.67
HV Ring Open	Mid Tap (0%)	25. LV Meshed Subs & Ways 200kVAr Capacitor 1/2	227.57	232.38	230.11	230.64	233.52	228.99	233.25	231.15	231.80	234.34
HV Ring Open	Mid Tap (0%)	26. LV Meshed Subs 200kVAr Capacitor 2/3	227.36	234.13	229.91	230.43	233.78	228.77	235.22	230.93	231.44	234.70
HV Ring Open	Mid Tap (0%)	27. LV Meshed Ways 200kVAr Capacitor 2/3	228.48	233.94	231.01	232.20	230.86	229.92	234.77	232.05	233.32	231.67
HV Ring Open	Mid Tap (0%)	28. LV Meshed Subs & Ways 200kVAr Capacitor 2/3	227.60	232.83	230.15	231.09	233.34	229.03	233.71	231.19	232.25	234.17
HV Ring Open	Bottom Tap (-5%)	1. No Intervention	238.55	240.01	240.93	241.42	230.23	239.86	241.22	241.88	242.35	231.04
HV Ring Open	Bottom Tap (-5%)	2. LV Meshed Subs Only	237.58	234.76	240.02	240.51	235.66	238.94	235.89	240.99	241.47	236.59
HV Ring Open	Bottom Tap (-5%)	3. LV Meshed Ways Only	238.55	242.31	240.94	240.65	230.23	239.86	243.11	241.88	241.72	231.04
HV Ring Open	Bottom Tap (-5%)	4. LV Meshed Subs & Ways Only	237.28	239.65	239.71	237.99	237.64	238.66	240.48	240.71	239.10	238.45
HV Ring Open	Bottom Tap (-5%)	5. 100kVAr Capacitor 1/2 Only	240.01	243.96	242.41	242.91	230.59	241.35	245.13	243.38	243.86	231.40
HV Ring Open	Bottom Tap (-5%)	6. 100kVAr Capacitor 2/3 Only	240.00	244.80	242.41	242.90	230.59	241.35	245.96	243.38	243.86	231.40
HV Ring Open	Bottom Tap (-5%)	7. 150kVAr Capacitor 1/2 Only	240.77	245.96	243.17	243.66	230.77	242.12	247.12	244.15	244.62	231.58
HV Ring Open	Bottom Tap (-5%)	8. 150kVAr Capacitor 2/3 Only	240.77	247.24	243.17	243.66	230.76	242.12	248.39	244.15	244.62	231.58
HV Ring Open	Bottom Tap (-5%)	9. 200kVAr Capacitor 1/2 Only	241.54	247.99	243.94	244.43	230.94	242.89	249.13	244.92	245.39	231.76
HV Ring Open	Bottom Tap (-5%)	10. 200kVAr Capacitor 2/3 Only	241.54	249.73	243.93	244.42	230.94	242.89	250.90	244.91	245.39	231.76
HV Ring Open	Bottom Tap (-5%)	11. LV Meshed Subs 100kVAr Capacitor 1/2	238.54	237.03	240.97	241.46	237.91	239.92	238.14	241.97	242.44	238.83
HV Ring Open	Bottom Tap (-5%)	12. LV Meshed Ways 100kVAr Capacitor 1/2	240.01	244.37	242.42	242.71	230.58	241.36	245.19	243.40	243.80	231.40
HV Ring Open	Bottom Tap (-5%)	13. LV Meshed Subs & Ways 100kVAr Capacitor 1/2	238.35	241.04	240.78	239.39	239.56	239.71	241.90	241.78	240.51	240.37
HV Ring Open	Bottom Tap (-5%)	14. LV Meshed Subs 100kVAr Capacitor 2/3	238.49	237.78	240.92	241.42	238.01	239.88	238.87	241.92	242.40	238.93
HV Ring Open	Bottom Tap (-5%)	15. LV Meshed Ways 100kVAr Capacitor 2/3	240.00	244.57	242.42	242.92	230.58	241.36	245.39	243.40	244.00	231.40
HV Ring Open	Bottom Tap (-5%)	16. LV Meshed Subs & Ways 100kVAr										

Max Demand of 1.5kW _ (2.4kW PV average installation)			Voltage Level at 0% PV Penetration					Voltage Level at 10% PV Penetration				
HV RING	OLTC Tap Position	Scenario	PW5	YW9	BW1	GW3	SW7	PW5	YW9	BW1	GW3	SW7
HV Ring Closed	Top Tap (5%)	1. No Intervention	214.90	216.56	217.59	218.14	231.33	216.26	217.83	218.56	219.09	232.03
HV Ring Closed	Top Tap (5%)	2. LV Meshed Subs Only	215.66	223.43	218.35	218.90	224.43	217.03	224.50	219.32	219.85	225.31
HV Ring Closed	Top Tap (5%)	3. LV Meshed Ways Only	214.90	219.12	217.59	217.28	231.33	216.27	219.93	218.56	218.39	232.03
HV Ring Closed	Top Tap (5%)	4. LV Meshed Subs & Ways Only	215.77	221.65	218.46	219.82	223.72	217.16	222.45	219.45	220.91	224.48
HV Ring Closed	Top Tap (5%)	5. 100kVAr Capacitor 1/2 Only	216.09	219.97	218.77	219.32	231.48	217.47	221.24	219.75	220.28	232.19
HV Ring Closed	Top Tap (5%)	6. 100kVAr Capacitor 2/3 Only	216.09	220.73	218.77	219.32	231.48	217.46	222.01	219.75	220.28	232.19
HV Ring Closed	Top Tap (5%)	7. 150kVAr Capacitor 1/2 Only	216.69	221.67	219.37	219.92	231.56	218.07	222.95	220.35	220.88	232.27
HV Ring Closed	Top Tap (5%)	8. 150kVAr Capacitor 2/3 Only	216.69	222.79	219.36	219.91	231.56	218.07	224.08	220.35	220.88	232.27
HV Ring Closed	Top Tap (5%)	9. 200kVAr Capacitor 1/2 Only	217.30	223.35	219.97	220.51	231.64	218.68	224.64	220.95	221.48	232.35
HV Ring Closed	Top Tap (5%)	10. 200kVAr Capacitor 2/3 Only	217.30	224.83	219.96	220.51	231.63	218.68	226.15	220.95	221.48	232.34
HV Ring Closed	Top Tap (5%)	11. LV Meshed Subs 100kVAr Capacitor 1/2	216.40	225.40	219.08	219.63	226.39	217.79	226.48	220.07	220.60	227.27
HV Ring Closed	Top Tap (5%)	12. LV Meshed Ways 100kVAr Capacitor 1/2	216.10	220.85	218.79	219.02	231.48	217.48	221.64	219.76	220.11	232.19
HV Ring Closed	Top Tap (5%)	13. LV Meshed Subs & Ways 100kVAr Capacitor 1/2	216.62	222.81	219.30	220.99	225.36	218.02	223.61	220.29	222.08	226.13
HV Ring Closed	Top Tap (5%)	14. LV Meshed Subs 100kVAr Capacitor 2/3	216.37	226.13	219.05	219.59	226.49	217.75	227.19	220.03	220.56	227.37
HV Ring Closed	Top Tap (5%)	15. LV Meshed Ways 100kVAr Capacitor 2/3	216.10	221.03	218.78	219.20	231.48	217.48	221.83	219.76	220.29	232.19
HV Ring Closed	Top Tap (5%)	16. LV Meshed Subs & Ways 100kVAr Capacitor 2/3	216.64	223.02	219.31	221.20	225.27	218.04	223.83	220.31	222.29	226.04
HV Ring Closed	Top Tap (5%)	17. LV Meshed Subs 150kVAr Capacitor 1/2	216.78	226.39	219.46	220.00	227.37	218.16	227.46	220.44	220.97	228.25
HV Ring Closed	Top Tap (5%)	18. LV Meshed Ways 150kVAr Capacitor 1/2	216.71	221.70	219.39	219.88	231.56	218.09	222.50	220.36	220.97	232.27
HV Ring Closed	Top Tap (5%)	19. LV Meshed Subs & Ways 150kVAr Capacitor 1/2	217.05	223.38	219.72	221.56	226.18	218.45	224.19	220.72	222.66	226.95
HV Ring Closed	Top Tap (5%)	20. LV Meshed Subs 150kVAr Capacitor 2/3	216.73	227.48	219.40	219.95	227.53	218.11	228.53	220.39	220.92	228.40
HV Ring Closed	Top Tap (5%)	21. LV Meshed Ways 150kVAr Capacitor 2/3	216.71	221.97	219.39	220.15	231.56	218.09	222.78	220.36	221.24	232.27
HV Ring Closed	Top Tap (5%)	22. LV Meshed Subs & Ways 150kVAr Capacitor 2/3	217.07	223.71	219.74	221.89	226.05	218.47	224.52	220.75	222.98	226.82
HV Ring Closed	Top Tap (5%)	23. LV Meshed Subs 200kVAr Capacitor 1/2	217.16	227.39	219.83	220.38	228.35	218.54	228.45	220.81	221.34	229.22
HV Ring Closed	Top Tap (5%)	24. LV Meshed Ways 200kVAr Capacitor 1/2	217.33	222.56	219.99	220.74	231.64	218.70	223.35	220.97	221.83	232.35
HV Ring Closed	Top Tap (5%)	25. LV Meshed Subs & Ways 200kVAr Capacitor 1/2	217.48	223.96	220.14	222.14	227.01	218.88	224.77	221.14	223.24	227.77
HV Ring Closed	Top Tap (5%)	26. LV Meshed Subs 200kVAr Capacitor 2/3	217.09	228.84	219.76	220.31	228.57	218.47	229.87	220.74	221.27	229.43
HV Ring Closed	Top Tap (5%)	27. LV Meshed Ways 200kVAr Capacitor 2/3	217.32	222.92	219.99	221.11	231.64	218.70	223.72	220.97	222.19	232.35
HV Ring Closed	Top Tap (5%)	28. LV Meshed Subs & Ways 200kVAr Capacitor 2/3	217.51	224.39	220.18	222.57	226.83	218.91	225.20	221.18	223.67	227.60
HV Ring Closed	Mid Tap (0%)	1. No Intervention	226.62	228.20	229.17	229.69	231.33	227.99	229.44	230.13	230.63	232.05
HV Ring Closed	Mid Tap (0%)	2. LV Meshed Subs Only	226.61	229.33	229.16	229.68	230.28	227.98	230.40	230.12	230.62	231.15
HV Ring Closed	Mid Tap (0%)	3. LV Meshed Ways Only	226.63	230.63	229.18	228.88	231.33	227.99	231.42	230.13	229.97	232.05
HV Ring Closed	Mid Tap (0%)	4. LV Meshed Subs & Ways Only	226.51	230.71	229.07	228.97	230.85	227.84	231.49	230.02	230.03	231.59
HV Ring Closed	Mid Tap (0%)	5. 100kVAr Capacitor 1/2 Only	227.89	231.80	230.43	230.95	231.50	229.26	233.00	231.39	231.89	232.22
HV Ring Closed	Mid Tap (0%)	6. 100kVAr Capacitor 2/3 Only	227.89	232.60	230.43	230.95	231.50	229.26	233.79	231.39	231.89	232.22
HV Ring Closed	Mid Tap (0%)	7. 150kVAr Capacitor 1/2 Only	228.54	233.59	231.07	231.59	231.59	229.90	234.77	232.03	232.53	232.31
HV Ring Closed	Mid Tap (0%)	8. 150kVAr Capacitor 2/3 Only	228.53	234.78	231.07	231.58	231.59	229.90	235.94	232.03	232.52	232.31
HV Ring Closed	Mid Tap (0%)	9. 200kVAr Capacitor 1/2 Only	229.18	235.36	231.71	232.23	231.67	230.55	236.52	232.67	233.16	232.40
HV Ring Closed	Mid Tap (0%)	10. 200kVAr Capacitor 2/3 Only	229.18	236.91	231.71	232.22	231.67	230.54	238.07	232.66	233.16	232.39
HV Ring Closed	Mid Tap (0%)	11. LV Meshed Subs 100kVAr Capacitor 1/2	227.37	231.38	229.92	230.44	232.31	228.75	232.43	230.89	231.39	233.16
HV Ring Closed	Mid Tap (0%)	12. LV Meshed Ways 100kVAr Capacitor 1/2	227.90	232.43	230.44	230.70	231.50	229.27	233.22	231.40	231.78	232.23
HV Ring Closed	Mid Tap (0%)	13. LV Meshed Subs & Ways 100kVAr Capacitor 1/2	227.40	231.90	229.95	230.17	232.55	228.74	232.70	230.90	231.24	233.30
HV Ring Closed	Mid Tap (0%)	14. LV Meshed Subs 100kVAr Capacitor 2/3	227.33	232.11	229.88	230.40	232.41	228.72	233.15	230.85	231.35	233.27
HV Ring Closed	Mid Tap (0%)	15. LV Meshed Ways 100kVAr Capacitor 2/3	227.90	232.63	230.44	230.89	231.50	229.27	233.42	231.40	231.97	232.23
HV Ring Closed	Mid Tap (0%)	16. LV Meshed Subs & Ways 100kVAr Capacitor 2/3	227.42	232.13	229.96	230.39	232.46	228.76	232.92	230.92	231.46	233.21
HV Ring Closed	Mid Tap (0%)	17. LV Meshed Subs 150kVAr Capacitor 1/2	227.77	232.40	230.31	230.83	233.32	229.15	233.43	231.28	231.78	234.16
HV Ring Closed	Mid Tap (0%)	18. LV Meshed Ways 150kVAr Capacitor 1/2	228.55	233.35	231.09	231.61	231.59	229.92	234.13	232.04	232.68	232.31
HV Ring Closed	Mid Tap (0%)	19. LV Meshed Subs & Ways 150kVAr Capacitor 1/2	227.85	232.51	230.39	230.77	233.40	229.18	233.30	231.35	231.84	234.15
HV Ring Closed	Mid Tap (0%)	20. LV Meshed Subs 150kVAr Capacitor 2/3	227.71	233.50	230.25	230.77	233.48	229.09	234.52	231.22	231.72	234.32
HV Ring Closed	Mid Tap (0%)	21. LV Meshed Ways 150kVAr Capacitor 2/3	228.55	233.64	231.08	231.90	231.59	229.92	234.41	232.04	232.97	232.31
HV Ring Closed	Mid Tap (0%)	22. LV Meshed Subs & Ways 150kVAr Capacitor 2/3	227.87	232.85	230.42	231.11	233.27	229.21	233.64	231.38	232.18	234.03
HV Ring Closed	Mid Tap (0%)	23. LV Meshed Subs 200kVAr Capacitor 1/2	228.16	233.43	230.70	231.22	234.34	229.54	234.44	231.67	232.17	235.17
HV Ring Closed	Mid Tap (0%)	24. LV Meshed Ways 200kVAr Capacitor 1/2	229.20	234.26	231.73	232.53	231.67	230.56	235.03	232.69	233.58	232.40
HV Ring Closed	Mid Tap (0%)	25. LV Meshed Subs & Ways 200kVAr Capacitor 1/2	228.29	233.11	230.83	231.38	234.27	229.63	233.90	231.79	232.45	235.01
HV Ring Closed	Mid Tap (0%)	26. LV Meshed Subs 200kVAr Capacitor 2/3	228.09	234.90	230.63	231.15	234.55	229.47	235.89	231.60	232.10	235.36
HV Ring Closed	Mid Tap (0%)	27. LV Meshed Ways 200kVAr Capacitor 2/3	229.20	234.65	231.73	232.92	231.67	230.56	235.41	232.69	233.97	232.40
HV Ring Closed	Mid Tap (0%)	28. LV Meshed Subs & Ways 200kVAr Capacitor 2/3	228.33	233.57	230.87	231.83	234.09	229.67	234.36	231.83	232.90	234.84
HV Ring Closed	Bottom Tap (-5%)	1. No Intervention	239.52	241.02	241.93	242.43	231.34	240.78	242.17	242.82	243.30	232.06
HV Ring Closed	Bottom Tap (-5%)	2. LV Meshed Subs Only	238.62	235.83	241.05	241.54	236.72	239.90	236.87	241.95	242.42	237.57
HV Ring Closed	Bottom Tap (-5%)	3. LV Meshed Ways Only	239.52	243.31	241.94	241.66	231.34	240.79	244.05	242.83	242.67	232.06
HV Ring Closed	Bottom Tap (-5%)	4. LV Meshed Subs & Ways Only	238.31	240.68	240.73	239.02	238.69	239.61	241.43	241.66	240.05	239.41
HV Ring Closed	Bottom Tap (-5%)	5. 100kVAr Capacitor 1/2 Only	240.88	244.83	243.28	243.77	231.52	242.15	245.94	244.18	244.65	232.25
HV Ring Closed	Bottom Tap (-5%)	6. 100kVAr Capacitor 2/3 Only	240.88	245.68	243.28	243.77	231.52	242.15	246.77	244.18	244.65	232.25
HV Ring Closed	Bottom Tap (-5%)	7. 150kVAr Capacitor 1/2 Only	241.57	246.72	243.96	244.45	231.62	242.83	247.81	244.86	245.33	232.35
HV Ring Closed	Bottom Tap (-5%)	8. 150kVAr Capacitor 2/3 Only	241.57	247.97	243.96	244.45	231.62	242.83	249.05	244.86	245.33	232.35
HV Ring Closed	Bottom Tap (-5%)	9. 200kVAr Capacitor 1/2 Only	242.26	248.59	244.65	245.14	231.71	243.52	249.66	245.54	246.02	232.44
HV Ring Closed	Bottom Tap (-5%)	10. 200kVAr Capacitor 2/3 Only	242.26	250.21	244.64	245.13	231.71	243.52	251.28	245.54	246.01	232.44
HV Ring Closed	Bottom Tap (-5%)	11. LV Meshed Subs 100kVAr Capacitor 1/2	239.43	237.95	241.84	242.34	238.82	240.72	238.96	242.76	243.23	239.65
HV Ring Closed	Bottom Tap (-5%)	12. LV Meshed Ways 100kVAr Capacitor 1/2	240.89	245.24	243.29	243.59	231.52	242.16	245.98	244.19	244.60	232.25
HV Ring Closed	Bottom Tap (-5%)	13. LV Meshed Subs & Ways 100kVAr Capacitor 1/2	239.23	241.93	241.65	240.28	240.46	240.54	242.69	242.58	241.31	241.18
HV Ring Closed	Bottom Tap (-5%)	14. LV Meshed Subs 100kVAr Capacitor 2/3	239.38	238.70	241.80	242.30	238.93	240.68	239.70	242.72	243.19	239.75
HV Ring Closed	Bottom Tap (-5%)	15. LV Meshed Ways 100kVAr Capacitor 2/3	240.89	245.44	243.29	243.79	231.52	242.16	246.18	244.19	244.80	232.25
HV Ring Closed	Bottom Tap (-5%)	16. LV Meshed Subs & Ways 100kVAr Capacitor 2/3	239.25	242.17	241.68	240.51	240.37	240.56	242.92	242.60	241.54	241.09
HV Ring Closed	Bottom Tap (-5%)	17. LV Meshed Subs 150kVAr Capacitor 1/2	239.84	239.01	242.25	242.74	239.87	241.13	240.01	243.17	243.64	240.69
HV Ring Closed	Bottom Tap (-5%)	18. LV Meshed Ways 150kVAr Capacitor 1/2	241.58	246.21	243.98	244.57	231.62	242.85	246.94	244.87	245.56	232.35
HV Ring Closed	Bottom Tap (-5%)	19. LV Meshed Subs & Ways 150kVAr Capacitor 1/2	239.70	242.56	242.12	240.91	241.35	241.01	243.32	243.05	241.94	242.07
HV Ring Closed	Bottom Tap (-5%)	20. LV Meshed Subs 150kVAr Capacitor 2/3	239.78	240.13	242.19	242.68	240.03	241.07	241.12	243.11	243.58	240.84
HV Ring Closed	Bottom Tap (-5%)	21. LV Meshed Ways 150kVAr Capacitor 2/3	241.58	246.52	243.98	244.87	231.62	242.85	247.24	244.87	245.86	232.35
HV Ring Closed	Bottom Tap (-5%)	22. LV Meshed Subs & Ways 150kVAr Capacitor 2/3	239.73	242.92	242.15	241.27	241.22	241.02	243.69	243.08	242.30	24

Max Demand of 1.5kW			Circuit Losses				
HV RING	OLTC Tap Position	Scenario	Primary Tx Losses (kW)	HV Losses (kW)	HV/LV Losses (kW)	LV Losses (kW)	Total Losses (kW)
HV Ring Open	Top Tap (5%)	1. No Intervention	3.864	40.941	2.348	9.683	56.837
HV Ring Open	Top Tap (5%)	2. LV Meshed Subs Only	3.872	41.357	1.789	13.102	60.120
HV Ring Open	Top Tap (5%)	3. LV Meshed Ways Only	3.864	40.929	2.346	9.475	56.614
HV Ring Open	Top Tap (5%)	4. LV Meshed Subs & Ways Only	3.872	41.435	1.784	13.524	60.615
HV Ring Open	Top Tap (5%)	5. 100kVAr Capacitor 1/2 Only	3.872	40.977	2.427	11.291	58.566
HV Ring Open	Top Tap (5%)	6. 100kVAr Capacitor 2/3 Only	3.873	41.051	2.434	11.842	59.199
HV Ring Open	Top Tap (5%)	7. 150kVAr Capacitor 1/2 Only	3.882	41.185	2.564	13.457	61.087
HV Ring Open	Top Tap (5%)	8. 150kVAr Capacitor 2/3 Only	3.884	41.357	2.583	14.729	62.553
HV Ring Open	Top Tap (5%)	9. 200kVAr Capacitor 1/2 Only	3.896	41.262	2.754	16.538	64.449
HV Ring Open	Top Tap (5%)	10. 200kVAr Capacitor 2/3 Only	3.900	41.314	2.779	18.769	66.762
HV Ring Open	Top Tap (5%)	11. LV Meshed Subs 100kVAr Capacitor 1/2	3.877	41.493	1.833	14.095	61.298
HV Ring Open	Top Tap (5%)	12. LV Meshed Ways 100kVAr Capacitor 1/2	3.870	41.008	2.418	10.368	57.664
HV Ring Open	Top Tap (5%)	13. LV Meshed Subs & Ways 100kVAr Capacitor 1/2	3.878	41.583	1.851	14.086	61.397
HV Ring Open	Top Tap (5%)	14. LV Meshed Subs 100kVAr Capacitor 2/3	3.878	41.513	1.828	14.533	61.752
HV Ring Open	Top Tap (5%)	15. LV Meshed Ways 100kVAr Capacitor 2/3	3.870	41.017	2.418	10.417	57.723
HV Ring Open	Top Tap (5%)	16. LV Meshed Subs & Ways 100kVAr Capacitor 2/3	3.878	41.599	1.855	14.185	61.517
HV Ring Open	Top Tap (5%)	17. LV Meshed Subs 150kVAr Capacitor 1/2	3.885	41.592	1.895	15.337	62.710
HV Ring Open	Top Tap (5%)	18. LV Meshed Ways 150kVAr Capacitor 1/2	3.877	41.112	2.540	11.650	59.180
HV Ring Open	Top Tap (5%)	19. LV Meshed Subs & Ways 150kVAr Capacitor 1/2	3.885	41.681	1.931	14.930	62.427
HV Ring Open	Top Tap (5%)	20. LV Meshed Subs 200kVAr Capacitor 2/3	3.888	41.629	1.888	16.287	63.691
HV Ring Open	Top Tap (5%)	21. LV Meshed Ways 150kVAr Capacitor 2/3	3.878	41.127	2.541	11.759	59.305
HV Ring Open	Top Tap (5%)	22. LV Meshed Subs & Ways 150kVAr Capacitor 2/3	3.885	41.707	1.938	15.141	62.671
HV Ring Open	Top Tap (5%)	23. LV Meshed Subs 200kVAr Capacitor 1/2	3.897	41.748	1.988	17.090	64.723
HV Ring Open	Top Tap (5%)	24. LV Meshed Ways 200kVAr Capacitor 1/2	3.889	41.261	2.721	13.498	61.368
HV Ring Open	Top Tap (5%)	25. LV Meshed Subs & Ways 200kVAr Capacitor 1/2	3.895	41.819	2.043	16.164	63.920
HV Ring Open	Top Tap (5%)	26. LV Meshed Subs 200kVAr Capacitor 2/3	3.900	41.806	1.983	18.754	66.443
HV Ring Open	Top Tap (5%)	27. LV Meshed Ways 200kVAr Capacitor 2/3	3.889	41.280	2.724	13.694	61.587
HV Ring Open	Top Tap (5%)	28. LV Meshed Subs & Ways 200kVAr Capacitor 2/3	3.895	41.856	2.055	16.530	64.336
HV Ring Open	Mid Tap (0%)	1. No Intervention	3.862	40.865	2.126	8.882	55.734
HV Ring Open	Mid Tap (0%)	2. LV Meshed Subs Only	3.863	40.954	1.971	9.093	55.880
HV Ring Open	Mid Tap (0%)	3. LV Meshed Ways Only	3.862	40.863	2.124	8.690	55.538
HV Ring Open	Mid Tap (0%)	4. LV Meshed Subs & Ways Only	3.862	40.961	2.021	8.948	55.793
HV Ring Open	Mid Tap (0%)	5. 100kVAr Capacitor 1/2 Only	3.871	40.990	2.219	10.669	57.748
HV Ring Open	Mid Tap (0%)	6. 100kVAr Capacitor 2/3 Only	3.872	41.056	2.225	11.247	58.400
HV Ring Open	Mid Tap (0%)	7. 150kVAr Capacitor 1/2 Only	3.882	41.324	2.364	13.077	60.647
HV Ring Open	Mid Tap (0%)	8. 150kVAr Capacitor 2/3 Only	3.885	41.111	2.380	14.372	61.748
HV Ring Open	Mid Tap (0%)	9. 200kVAr Capacitor 1/2 Only	3.899	41.261	2.581	16.509	64.250
HV Ring Open	Mid Tap (0%)	10. 200kVAr Capacitor 2/3 Only	3.903	41.329	2.609	18.982	66.824
HV Ring Open	Mid Tap (0%)	11. LV Meshed Subs 100kVAr Capacitor 1/2	3.869	41.046	2.008	10.013	56.936
HV Ring Open	Mid Tap (0%)	12. LV Meshed Ways 100kVAr Capacitor 1/2	3.869	40.976	2.211	9.703	56.758
HV Ring Open	Mid Tap (0%)	13. LV Meshed Subs & Ways 100kVAr Capacitor 1/2	3.868	41.062	2.055	9.639	56.625
HV Ring Open	Mid Tap (0%)	14. LV Meshed Subs 100kVAr Capacitor 2/3	3.870	41.065	2.008	10.391	57.333
HV Ring Open	Mid Tap (0%)	15. LV Meshed Ways 100kVAr Capacitor 2/3	3.869	40.986	2.212	9.754	56.821
HV Ring Open	Mid Tap (0%)	16. LV Meshed Subs & Ways 100kVAr Capacitor 2/3	3.868	41.081	2.055	9.730	56.734
HV Ring Open	Mid Tap (0%)	17. LV Meshed Subs 150kVAr Capacitor 1/2	3.878	41.170	2.068	11.262	58.378
HV Ring Open	Mid Tap (0%)	18. LV Meshed Ways 150kVAr Capacitor 1/2	3.878	41.101	2.349	11.117	58.445
HV Ring Open	Mid Tap (0%)	19. LV Meshed Subs & Ways 150kVAr Capacitor 1/2	3.876	41.168	2.119	10.605	57.768
HV Ring Open	Mid Tap (0%)	20. LV Meshed Subs 150kVAr Capacitor 2/3	3.880	41.205	2.069	12.127	59.280
HV Ring Open	Mid Tap (0%)	21. LV Meshed Ways 150kVAr Capacitor 2/3	3.878	41.117	2.351	11.233	58.579
HV Ring Open	Mid Tap (0%)	22. LV Meshed Subs & Ways 150kVAr Capacitor 2/3	3.877	41.192	2.119	10.808	57.996
HV Ring Open	Mid Tap (0%)	23. LV Meshed Subs 200kVAr Capacitor 1/2	3.890	41.347	2.159	13.055	60.451
HV Ring Open	Mid Tap (0%)	24. LV Meshed Ways 200kVAr Capacitor 1/2	3.891	41.278	2.551	13.152	60.872
HV Ring Open	Mid Tap (0%)	25. LV Meshed Subs & Ways 200kVAr Capacitor 1/2	3.888	41.331	2.218	11.976	59.414
HV Ring Open	Mid Tap (0%)	26. LV Meshed Subs 200kVAr Capacitor 2/3	3.893	41.403	2.163	14.621	62.080
HV Ring Open	Mid Tap (0%)	27. LV Meshed Ways 200kVAr Capacitor 2/3	3.892	41.298	2.554	13.361	61.105
HV Ring Open	Mid Tap (0%)	28. LV Meshed Subs & Ways 200kVAr Capacitor 2/3	3.889	41.367	2.220	12.339	59.814
HV Ring Open	Bottom Tap (-5%)	1. No Intervention	3.860	41.018	1.917	8.106	54.901
HV Ring Open	Bottom Tap (-5%)	2. LV Meshed Subs Only	3.869	40.755	2.530	11.654	58.807
HV Ring Open	Bottom Tap (-5%)	3. LV Meshed Ways Only	3.860	41.031	1.915	7.930	54.736
HV Ring Open	Bottom Tap (-5%)	4. LV Meshed Subs & Ways Only	3.869	40.724	2.800	11.977	59.370
HV Ring Open	Bottom Tap (-5%)	5. 100kVAr Capacitor 1/2 Only	3.870	40.859	2.032	10.114	56.876
HV Ring Open	Bottom Tap (-5%)	6. 100kVAr Capacitor 2/3 Only	3.872	40.898	2.032	10.755	57.557
HV Ring Open	Bottom Tap (-5%)	7. 150kVAr Capacitor 1/2 Only	3.884	41.052	2.190	12.813	59.939
HV Ring Open	Bottom Tap (-5%)	8. 150kVAr Capacitor 2/3 Only	3.887	41.091	2.204	14.274	61.456
HV Ring Open	Bottom Tap (-5%)	9. 200kVAr Capacitor 1/2 Only	3.903	41.292	2.431	16.699	64.325
HV Ring Open	Bottom Tap (-5%)	10. 200kVAr Capacitor 2/3 Only	3.909	41.350	2.458	19.394	67.111
HV Ring Open	Bottom Tap (-5%)	11. LV Meshed Subs 100kVAr Capacitor 1/2	3.875	40.876	2.549	12.528	59.828
HV Ring Open	Bottom Tap (-5%)	12. LV Meshed Ways 100kVAr Capacitor 1/2	3.868	40.978	2.021	9.104	55.972
HV Ring Open	Bottom Tap (-5%)	13. LV Meshed Subs & Ways 100kVAr Capacitor 1/2	3.877	40.865	2.793	12.887	60.421
HV Ring Open	Bottom Tap (-5%)	14. LV Meshed Subs 100kVAr Capacitor 2/3	3.876	40.894	2.554	12.831	60.155
HV Ring Open	Bottom Tap (-5%)	15. LV Meshed Ways 100kVAr Capacitor 2/3	3.868	40.988	2.021	9.160	56.038
HV Ring Open	Bottom Tap (-5%)	16. LV Meshed Subs & Ways 100kVAr Capacitor 2/3	3.877	40.880	2.785	12.968	60.510
HV Ring Open	Bottom Tap (-5%)	17. LV Meshed Subs 150kVAr Capacitor 1/2	3.885	41.013	2.604	13.796	61.298
HV Ring Open	Bottom Tap (-5%)	18. LV Meshed Ways 150kVAr Capacitor 1/2	3.879	41.131	2.175	10.687	57.872
HV Ring Open	Bottom Tap (-5%)	19. LV Meshed Subs & Ways 150kVAr Capacitor 1/2	3.885	41.000	2.842	13.981	61.707
HV Ring Open	Bottom Tap (-5%)	20. LV Meshed Subs 150kVAr Capacitor 2/3	3.886	41.046	2.614	14.560	62.106
HV Ring Open	Bottom Tap (-5%)	21. LV Meshed Ways 150kVAr Capacitor 2/3	3.880	41.145	2.177	10.814	58.016
HV Ring Open	Bottom Tap (-5%)	22. LV Meshed Subs & Ways 150kVAr Capacitor 2/3	3.886	41.024	2.832	14.175	61.917
HV Ring Open	Bottom Tap (-5%)	23. LV Meshed Subs 200kVAr Capacitor 1/2	3.898	41.208	2.694	15.639	63.439
HV Ring Open	Bottom Tap (-5%)	24. LV Meshed Ways 200kVAr Capacitor 1/2	3.895	41.346	2.401	12.961	60.603
HV Ring Open	Bottom Tap (-5%)	25. LV Meshed Subs & Ways 200kVAr Capacitor 1/2	3.898	41.188	2.927	15.521	63.533
HV Ring Open	Bottom Tap (-5%)	26. LV Meshed Subs 200kVAr Capacitor 2/3	3.901	41.262	2.708	17.086	64.957
HV Ring Open	Bottom Tap (-5%)	27. LV Meshed Ways 200kVAr Capacitor 2/3	3.896	41.366	2.403	13.192	60.857
HV Ring Open	Bottom Tap (-5%)	28. LV Meshed Subs & Ways 200kVAr Capacitor 2/3	3.899	41.223	2.916	15.881	63.919



Max Demand of 1.5kW			Circuit Losses				
HV RING	OLTC Tap Position	Scenario	Primary Tx Losses (kW)	HV Losses (kW)	HV/LV Losses (kW)	LV Losses (kW)	Total Losses (kW)
HV Ring Closed	Top Tap (5%)	1. No Intervention	3.859	38.026	2.330	9.617	53.832
HV Ring Closed	Top Tap (5%)	2. LV Meshed Subs Only	3.867	38.375	1.775	13.141	57.158
HV Ring Closed	Top Tap (5%)	3. LV Meshed Ways Only	3.859	38.021	2.327	9.407	53.614
HV Ring Closed	Top Tap (5%)	4. LV Meshed Subs & Ways Only	3.868	38.421	1.768	13.607	57.664
HV Ring Closed	Top Tap (5%)	5. 100kVAr Capacitor 1/2 Only	3.866	38.106	2.413	11.241	55.627
HV Ring Closed	Top Tap (5%)	6. 100kVAr Capacitor 2/3 Only	3.867	38.117	2.419	11.756	56.158
HV Ring Closed	Top Tap (5%)	7. 150kVAr Capacitor 1/2 Only	3.874	38.217	2.546	13.418	58.054
HV Ring Closed	Top Tap (5%)	8. 150kVAr Capacitor 2/3 Only	3.876	38.242	2.560	14.610	59.287
HV Ring Closed	Top Tap (5%)	9. 200kVAr Capacitor 1/2 Only	3.884	38.375	2.743	16.554	61.556
HV Ring Closed	Top Tap (5%)	10. 200kVAr Capacitor 2/3 Only	3.889	38.424	2.769	18.733	63.814
HV Ring Closed	Top Tap (5%)	11. LV Meshed Subs 100kVAr Capacitor 1/2	3.872	38.484	1.819	14.133	58.308
HV Ring Closed	Top Tap (5%)	12. LV Meshed Ways 100kVAr Capacitor 1/2	3.865	38.135	2.404	10.321	54.726
HV Ring Closed	Top Tap (5%)	13. LV Meshed Subs & Ways 100kVAr Capacitor 1/2	3.873	38.559	1.837	14.139	58.407
HV Ring Closed	Top Tap (5%)	14. LV Meshed Subs 100kVAr Capacitor 2/3	3.873	38.499	1.813	14.575	58.761
HV Ring Closed	Top Tap (5%)	15. LV Meshed Ways 100kVAr Capacitor 2/3	3.865	38.143	2.405	10.371	54.783
HV Ring Closed	Top Tap (5%)	16. LV Meshed Subs & Ways 100kVAr Capacitor 2/3	3.873	38.571	1.841	14.239	58.524
HV Ring Closed	Top Tap (5%)	17. LV Meshed Subs 150kVAr Capacitor 1/2	3.879	38.571	1.883	15.376	59.709
HV Ring Closed	Top Tap (5%)	18. LV Meshed Ways 150kVAr Capacitor 1/2	3.871	38.223	2.529	11.615	56.238
HV Ring Closed	Top Tap (5%)	19. LV Meshed Subs & Ways 150kVAr Capacitor 1/2	3.877	38.653	1.920	14.972	59.423
HV Ring Closed	Top Tap (5%)	20. LV Meshed Subs 150kVAr Capacitor 2/3	3.881	38.598	1.877	16.325	60.681
HV Ring Closed	Top Tap (5%)	21. LV Meshed Ways 150kVAr Capacitor 2/3	3.871	38.234	2.530	11.725	56.360
HV Ring Closed	Top Tap (5%)	22. LV Meshed Subs & Ways 150kVAr Capacitor 2/3	3.878	38.676	1.928	15.184	59.666
HV Ring Closed	Top Tap (5%)	23. LV Meshed Subs 200kVAr Capacitor 1/2	3.887	38.688	1.979	17.129	61.682
HV Ring Closed	Top Tap (5%)	24. LV Meshed Ways 200kVAr Capacitor 1/2	3.879	38.343	2.712	13.476	58.410
HV Ring Closed	Top Tap (5%)	25. LV Meshed Subs & Ways 200kVAr Capacitor 1/2	3.885	38.762	2.033	16.203	60.883
HV Ring Closed	Top Tap (5%)	26. LV Meshed Subs 200kVAr Capacitor 2/3	3.890	38.730	1.972	18.788	63.381
HV Ring Closed	Top Tap (5%)	27. LV Meshed Ways 200kVAr Capacitor 2/3	3.879	38.358	2.714	13.674	58.625
HV Ring Closed	Top Tap (5%)	28. LV Meshed Subs & Ways 200kVAr Capacitor 2/3	3.886	38.795	2.046	16.570	61.296
HV Ring Closed	Mid Tap (0%)	1. No Intervention	3.857	37.999	2.110	8.816	52.783
HV Ring Closed	Mid Tap (0%)	2. LV Meshed Subs Only	3.858	38.069	1.960	9.035	52.921
HV Ring Closed	Mid Tap (0%)	3. LV Meshed Ways Only	3.857	37.995	2.108	8.627	52.587
HV Ring Closed	Mid Tap (0%)	4. LV Meshed Subs & Ways Only	3.858	38.052	1.998	8.920	52.827
HV Ring Closed	Mid Tap (0%)	5. 100kVAr Capacitor 1/2 Only	3.865	38.099	2.208	10.637	54.809
HV Ring Closed	Mid Tap (0%)	6. 100kVAr Capacitor 2/3 Only	3.866	38.111	2.213	11.207	55.397
HV Ring Closed	Mid Tap (0%)	7. 150kVAr Capacitor 1/2 Only	3.874	38.230	2.356	13.059	57.519
HV Ring Closed	Mid Tap (0%)	8. 150kVAr Capacitor 2/3 Only	3.876	38.259	2.370	14.379	58.884
HV Ring Closed	Mid Tap (0%)	9. 200kVAr Capacitor 1/2 Only	3.886	38.419	2.574	16.543	61.423
HV Ring Closed	Mid Tap (0%)	10. 200kVAr Capacitor 2/3 Only	3.891	38.476	2.601	18.957	63.924
HV Ring Closed	Mid Tap (0%)	11. LV Meshed Subs 100kVAr Capacitor 1/2	3.864	38.155	1.993	9.973	53.984
HV Ring Closed	Mid Tap (0%)	12. LV Meshed Ways 100kVAr Capacitor 1/2	3.863	38.108	2.200	9.665	53.836
HV Ring Closed	Mid Tap (0%)	13. LV Meshed Subs & Ways 100kVAr Capacitor 1/2	3.863	38.168	2.037	9.610	53.678
HV Ring Closed	Mid Tap (0%)	14. LV Meshed Subs 100kVAr Capacitor 2/3	3.865	38.169	1.992	10.352	54.378
HV Ring Closed	Mid Tap (0%)	15. LV Meshed Ways 100kVAr Capacitor 2/3	3.863	38.116	2.201	9.716	53.897
HV Ring Closed	Mid Tap (0%)	16. LV Meshed Subs & Ways 100kVAr Capacitor 2/3	3.863	38.182	2.036	9.702	53.784
HV Ring Closed	Mid Tap (0%)	17. LV Meshed Subs 150kVAr Capacitor 1/2	3.870	38.251	2.054	11.229	55.404
HV Ring Closed	Mid Tap (0%)	18. LV Meshed Ways 150kVAr Capacitor 1/2	3.870	38.213	2.339	11.092	55.514
HV Ring Closed	Mid Tap (0%)	19. LV Meshed Subs & Ways 150kVAr Capacitor 1/2	3.869	38.262	2.104	10.570	54.804
HV Ring Closed	Mid Tap (0%)	20. LV Meshed Subs 150kVAr Capacitor 2/3	3.872	38.277	2.054	12.095	56.298
HV Ring Closed	Mid Tap (0%)	21. LV Meshed Ways 150kVAr Capacitor 2/3	3.870	38.225	2.341	11.209	55.645
HV Ring Closed	Mid Tap (0%)	22. LV Meshed Subs & Ways 150kVAr Capacitor 2/3	3.869	38.284	2.105	10.775	55.033
HV Ring Closed	Mid Tap (0%)	23. LV Meshed Subs 200kVAr Capacitor 1/2	3.879	38.379	2.147	13.024	57.429
HV Ring Closed	Mid Tap (0%)	24. LV Meshed Ways 200kVAr Capacitor 1/2	3.880	38.353	2.543	13.141	57.918
HV Ring Closed	Mid Tap (0%)	25. LV Meshed Subs & Ways 200kVAr Capacitor 1/2	3.877	38.385	2.205	11.941	56.408
HV Ring Closed	Mid Tap (0%)	26. LV Meshed Subs 200kVAr Capacitor 2/3	3.883	38.420	2.150	14.588	59.040
HV Ring Closed	Mid Tap (0%)	27. LV Meshed Ways 200kVAr Capacitor 2/3	3.880	38.369	2.546	13.352	58.148
HV Ring Closed	Mid Tap (0%)	28. LV Meshed Subs & Ways 200kVAr Capacitor 2/3	3.878	38.417	2.208	12.307	56.809
HV Ring Closed	Bottom Tap (-5%)	1. No Intervention	3.856	37.981	1.903	8.062	51.802
HV Ring Closed	Bottom Tap (-5%)	2. LV Meshed Subs Only	3.862	37.947	2.511	11.563	55.883
HV Ring Closed	Bottom Tap (-5%)	3. LV Meshed Ways Only	3.855	37.977	1.902	7.893	51.627
HV Ring Closed	Bottom Tap (-5%)	4. LV Meshed Subs & Ways Only	3.863	37.911	2.774	11.910	56.459
HV Ring Closed	Bottom Tap (-5%)	5. 100kVAr Capacitor 1/2 Only	3.864	38.104	2.016	10.110	54.094
HV Ring Closed	Bottom Tap (-5%)	6. 100kVAr Capacitor 2/3 Only	3.866	38.117	2.022	10.744	54.749
HV Ring Closed	Bottom Tap (-5%)	7. 150kVAr Capacitor 1/2 Only	3.875	38.259	2.182	12.816	57.132
HV Ring Closed	Bottom Tap (-5%)	8. 150kVAr Capacitor 2/3 Only	3.878	38.292	2.196	14.285	58.651
HV Ring Closed	Bottom Tap (-5%)	9. 200kVAr Capacitor 1/2 Only	3.889	38.483	2.425	16.704	61.501
HV Ring Closed	Bottom Tap (-5%)	10. 200kVAr Capacitor 2/3 Only	3.895	38.550	2.452	19.389	64.286
HV Ring Closed	Bottom Tap (-5%)	11. LV Meshed Subs 100kVAr Capacitor 1/2	3.869	38.031	2.530	12.445	56.875
HV Ring Closed	Bottom Tap (-5%)	12. LV Meshed Ways 100kVAr Capacitor 1/2	3.862	38.108	2.010	9.073	53.054
HV Ring Closed	Bottom Tap (-5%)	13. LV Meshed Subs & Ways 100kVAr Capacitor 1/2	3.870	38.028	2.771	12.808	57.477
HV Ring Closed	Bottom Tap (-5%)	14. LV Meshed Subs 100kVAr Capacitor 2/3	3.869	38.044	2.536	12.750	57.200
HV Ring Closed	Bottom Tap (-5%)	15. LV Meshed Ways 100kVAr Capacitor 2/3	3.863	38.116	2.011	9.129	53.118
HV Ring Closed	Bottom Tap (-5%)	16. LV Meshed Subs & Ways 100kVAr Capacitor 2/3	3.870	38.040	2.763	12.890	57.562
HV Ring Closed	Bottom Tap (-5%)	17. LV Meshed Subs 150kVAr Capacitor 1/2	3.876	38.133	2.588	13.720	58.316
HV Ring Closed	Bottom Tap (-5%)	18. LV Meshed Ways 150kVAr Capacitor 1/2	3.871	38.233	2.166	10.669	54.939
HV Ring Closed	Bottom Tap (-5%)	19. LV Meshed Subs & Ways 150kVAr Capacitor 1/2	3.876	38.130	2.821	13.915	58.742
HV Ring Closed	Bottom Tap (-5%)	20. LV Meshed Subs 150kVAr Capacitor 2/3	3.877	38.159	2.597	14.487	59.120
HV Ring Closed	Bottom Tap (-5%)	21. LV Meshed Ways 150kVAr Capacitor 2/3	3.871	38.244	2.168	10.797	55.081
HV Ring Closed	Bottom Tap (-5%)	22. LV Meshed Subs & Ways 150kVAr Capacitor 2/3	3.876	38.148	2.812	14.111	58.948
HV Ring Closed	Bottom Tap (-5%)	23. LV Meshed Subs 200kVAr Capacitor 1/2	3.885	38.281	2.678	15.591	60.435
HV Ring Closed	Bottom Tap (-5%)	24. LV Meshed Ways 200kVAr Capacitor 1/2	3.882	38.403	2.394	12.958	57.637
HV Ring Closed	Bottom Tap (-5%)	25. LV Meshed Subs & Ways 200kVAr Capacitor 1/2	3.885	38.267	2.908	15.468	60.528
HV Ring Closed	Bottom Tap (-5%)	26. LV Meshed Subs 200kVAr Capacitor 2/3	3.888	38.313	2.693	17.016	61.910
HV Ring Closed	Bottom Tap (-5%)	27. LV Meshed Ways 200kVAr Capacitor 2/3	3.883	38.418	2.397	13.190	57.887
HV Ring Closed	Bottom Tap (-5%)	28. LV Meshed Subs & Ways 200kVAr Capacitor 2/3	3.886	38.294	2.898	15.830	60.907

# APPENDIX E – FALLOWFIELD RESULTS

Min Demand of 0.2kW _ (2.4kW PV average installation)			Voltage Level at 0% PV Penetration						Voltage Level at 10% PV Penetration					
HV RING	OLTC Tap Position	Scenario	GW6	PW10	RW8	B5	YW15	F15	GW6	PW10	RW8	B5	YW15	F15
HV Ring Open	Top Tap (5%)	1. No Intervention	226.08	224.84	226.10	223.66	222.30	235.21	227.77	228.15	227.79	227.95	228.26	239.90
HV Ring Open	Top Tap (5%)	2. LV Meshed Subs Only	229.84	225.33	226.60	224.12	222.77	229.21	232.45	228.80	228.44	228.60	228.91	232.47
HV Ring Open	Top Tap (5%)	3. LV Meshed Ways Only	--	--	--	--	--	--	--	--	--	--	--	--
HV Ring Open	Top Tap (5%)	4. LV Meshed Subs & Ways Only	--	--	--	--	--	--	--	--	--	--	--	--
HV Ring Open	Top Tap (5%)	5. 100kVAr Capacitor 1/2 Only	227.41	226.15	227.43	224.95	224.95	235.43	229.08	229.38	229.09	229.17	230.74	240.05
HV Ring Open	Top Tap (5%)	6. 100kVAr Capacitor 2/3 Only	227.40	226.15	227.42	224.94	225.38	235.43	229.12	229.51	229.13	229.34	231.46	240.18
HV Ring Open	Top Tap (5%)	7. 150kVAr Capacitor 1/2 Only	228.07	226.82	228.09	225.62	226.30	235.55	229.79	230.19	229.81	230.01	232.36	240.30
HV Ring Open	Top Tap (5%)	8. 150kVAr Capacitor 2/3 Only	228.07	226.82	228.09	225.62	226.96	235.55	229.80	230.19	229.81	230.02	233.04	240.30
HV Ring Open	Top Tap (5%)	9. 200kVAr Capacitor 1/2 Only	228.74	227.50	228.76	226.30	227.66	235.68	230.48	230.87	230.49	230.70	233.73	240.42
HV Ring Open	Top Tap (5%)	10. 200kVAr Capacitor 2/3 Only	228.74	227.49	228.76	226.29	228.54	235.68	230.49	230.88	230.50	230.70	234.63	240.43
HV Ring Open	Top Tap (5%)	11. LV Meshed Subs 100kVAr Capacitor 1/2	230.62	226.56	227.83	225.35	225.36	229.99	233.31	230.09	229.70	229.91	231.59	233.34
HV Ring Open	Top Tap (5%)	12. LV Meshed Ways 100kVAr Capacitor 1/2	--	--	--	--	--	--	--	--	--	--	--	--
HV Ring Open	Top Tap (5%)	13. LV Meshed Subs & Ways 100kVAr Capacitor 1/2	--	--	--	--	--	--	--	--	--	--	--	--
HV Ring Open	Top Tap (5%)	14. LV Meshed Subs 100kVAr Capacitor 2/3	230.62	226.55	227.82	225.35	225.79	229.99	233.31	230.09	229.70	229.91	232.03	233.34
HV Ring Open	Top Tap (5%)	15. LV Meshed Ways 100kVAr Capacitor 2/3	--	--	--	--	--	--	--	--	--	--	--	--
HV Ring Open	Top Tap (5%)	16. LV Meshed Subs & Ways 100kVAr Capacitor 2/3	--	--	--	--	--	--	--	--	--	--	--	--
HV Ring Open	Top Tap (5%)	17. LV Meshed Subs 150kVAr Capacitor 1/2	231.08	227.19	228.45	225.99	226.67	230.44	233.77	230.73	230.34	230.55	232.90	233.80
HV Ring Open	Top Tap (5%)	18. LV Meshed Ways 150kVAr Capacitor 1/2	--	--	--	--	--	--	--	--	--	--	--	--
HV Ring Open	Top Tap (5%)	19. LV Meshed Subs & Ways 150kVAr Capacitor 1/2	--	--	--	--	--	--	--	--	--	--	--	--
HV Ring Open	Top Tap (5%)	20. LV Meshed Subs 150kVAr Capacitor 2/3	231.07	227.18	228.45	225.98	227.33	230.44	233.77	230.73	230.35	230.56	233.58	233.80
HV Ring Open	Top Tap (5%)	21. LV Meshed Ways 150kVAr Capacitor 2/3	--	--	--	--	--	--	--	--	--	--	--	--
HV Ring Open	Top Tap (5%)	22. LV Meshed Subs & Ways 150kVAr Capacitor 2/3	--	--	--	--	--	--	--	--	--	--	--	--
HV Ring Open	Top Tap (5%)	23. LV Meshed Subs 200kVAr Capacitor 1/2	231.53	227.82	229.09	226.62	227.99	230.89	234.23	231.37	230.99	231.19	234.23	234.26
HV Ring Open	Top Tap (5%)	24. LV Meshed Ways 200kVAr Capacitor 1/2	--	--	--	--	--	--	--	--	--	--	--	--
HV Ring Open	Top Tap (5%)	25. LV Meshed Subs & Ways 200kVAr Capacitor 1/2	--	--	--	--	--	--	--	--	--	--	--	--
HV Ring Open	Top Tap (5%)	26. LV Meshed Subs 200kVAr Capacitor 2/3	231.53	227.82	229.08	226.62	228.87	230.89	234.24	231.38	231.00	231.20	235.14	234.26
HV Ring Open	Top Tap (5%)	27. LV Meshed Ways 200kVAr Capacitor 2/3	--	--	--	--	--	--	--	--	--	--	--	--
HV Ring Open	Top Tap (5%)	28. LV Meshed Subs & Ways 200kVAr Capacitor 2/3	--	--	--	--	--	--	--	--	--	--	--	--
HV Ring Open	Mid Tap (0%)	1. No Intervention	237.55	236.37	237.57	235.25	233.96	235.21	239.17	239.60	239.19	239.48	239.83	239.99
HV Ring Open	Mid Tap (0%)	2. LV Meshed Subs Only	236.90	236.21	237.43	235.06	233.78	236.27	239.44	239.58	239.21	239.42	239.73	239.45
HV Ring Open	Mid Tap (0%)	3. LV Meshed Ways Only	--	--	--	--	--	--	--	--	--	--	--	--
HV Ring Open	Mid Tap (0%)	4. LV Meshed Subs & Ways Only	--	--	--	--	--	--	--	--	--	--	--	--
HV Ring Open	Mid Tap (0%)	5. 100kVAr Capacitor 1/2 Only	238.96	237.78	238.98	236.63	236.77	235.46	240.62	241.00	240.63	240.84	242.57	240.20
HV Ring Open	Mid Tap (0%)	6. 100kVAr Capacitor 2/3 Only	238.96	237.77	238.98	236.63	237.23	235.46	240.62	241.00	240.63	240.84	243.04	240.21
HV Ring Open	Mid Tap (0%)	7. 150kVAr Capacitor 1/2 Only	239.68	238.50	239.70	237.35	238.21	235.59	241.35	241.73	241.36	241.56	244.01	240.34
HV Ring Open	Mid Tap (0%)	8. 150kVAr Capacitor 2/3 Only	239.68	238.49	239.70	237.35	238.90	235.59	241.35	241.73	241.36	241.57	244.72	240.34
HV Ring Open	Mid Tap (0%)	9. 200kVAr Capacitor 1/2 Only	240.40	239.22	240.42	238.08	239.65	235.73	242.08	242.46	242.09	242.29	245.46	240.47
HV Ring Open	Mid Tap (0%)	10. 200kVAr Capacitor 2/3 Only	240.40	239.22	240.42	238.08	240.58	235.73	242.09	242.47	242.10	242.30	246.41	240.48
HV Ring Open	Mid Tap (0%)	11. LV Meshed Subs 100kVAr Capacitor 1/2	237.80	237.54	238.74	236.39	236.53	237.16	240.42	240.94	240.57	240.77	242.51	240.43
HV Ring Open	Mid Tap (0%)	12. LV Meshed Ways 100kVAr Capacitor 1/2	--	--	--	--	--	--	--	--	--	--	--	--
HV Ring Open	Mid Tap (0%)	13. LV Meshed Subs & Ways 100kVAr Capacitor 1/2	--	--	--	--	--	--	--	--	--	--	--	--
HV Ring Open	Mid Tap (0%)	14. LV Meshed Subs 100kVAr Capacitor 2/3	237.80	237.53	238.74	236.39	236.98	237.16	240.43	240.94	240.57	240.78	242.98	240.43
HV Ring Open	Mid Tap (0%)	15. LV Meshed Ways 100kVAr Capacitor 2/3	--	--	--	--	--	--	--	--	--	--	--	--
HV Ring Open	Mid Tap (0%)	16. LV Meshed Subs & Ways 100kVAr Capacitor 2/3	--	--	--	--	--	--	--	--	--	--	--	--
HV Ring Open	Mid Tap (0%)	17. LV Meshed Subs 150kVAr Capacitor 1/2	238.29	238.21	239.42	237.07	237.92	237.65	240.91	241.62	241.25	241.46	243.91	240.92
HV Ring Open	Mid Tap (0%)	18. LV Meshed Ways 150kVAr Capacitor 1/2	--	--	--	--	--	--	--	--	--	--	--	--
HV Ring Open	Mid Tap (0%)	19. LV Meshed Subs & Ways 150kVAr Capacitor 1/2	--	--	--	--	--	--	--	--	--	--	--	--
HV Ring Open	Mid Tap (0%)	20. LV Meshed Subs 150kVAr Capacitor 2/3	238.28	238.21	239.41	237.06	238.61	237.64	240.92	241.63	241.26	241.46	244.61	240.92
HV Ring Open	Mid Tap (0%)	21. LV Meshed Ways 150kVAr Capacitor 2/3	--	--	--	--	--	--	--	--	--	--	--	--
HV Ring Open	Mid Tap (0%)	22. LV Meshed Subs & Ways 150kVAr Capacitor 2/3	--	--	--	--	--	--	--	--	--	--	--	--
HV Ring Open	Mid Tap (0%)	23. LV Meshed Subs 200kVAr Capacitor 1/2	238.77	238.89	240.09	237.75	239.32	238.13	241.41	242.31	241.94	242.15	245.31	241.41
HV Ring Open	Mid Tap (0%)	24. LV Meshed Ways 200kVAr Capacitor 1/2	--	--	--	--	--	--	--	--	--	--	--	--
HV Ring Open	Mid Tap (0%)	25. LV Meshed Subs & Ways 200kVAr Capacitor 1/2	--	--	--	--	--	--	--	--	--	--	--	--
HV Ring Open	Mid Tap (0%)	26. LV Meshed Subs 200kVAr Capacitor 2/3	238.77	238.89	240.09	237.75	240.24	238.13	241.41	242.32	241.95	242.15	246.26	241.41
HV Ring Open	Mid Tap (0%)	27. LV Meshed Ways 200kVAr Capacitor 2/3	--	--	--	--	--	--	--	--	--	--	--	--
HV Ring Open	Mid Tap (0%)	28. LV Meshed Subs & Ways 200kVAr Capacitor 2/3	--	--	--	--	--	--	--	--	--	--	--	--
HV Ring Open	Bottom Tap (-5%)	1. No Intervention	250.21	249.09	250.23	248.03	246.82	235.21	251.78	252.14	251.79	251.98	252.28	239.94
HV Ring Open	Bottom Tap (-5%)	2. LV Meshed Subs Only	244.69	248.20	249.36	247.10	245.89	244.04	247.19	251.44	251.09	251.28	251.58	247.17
HV Ring Open	Bottom Tap (-5%)	3. LV Meshed Ways Only	--	--	--	--	--	--	--	--	--	--	--	--
HV Ring Open	Bottom Tap (-5%)	4. LV Meshed Subs & Ways Only	--	--	--	--	--	--	--	--	--	--	--	--
HV Ring Open	Bottom Tap (-5%)	5. 100kVAr Capacitor 1/2 Only	251.73	250.61	251.75	249.52	249.81	235.49	253.33	253.70	253.34	253.55	255.35	240.23
HV Ring Open	Bottom Tap (-5%)	6. 100kVAr Capacitor 2/3 Only	251.73	250.61	251.75	249.52	250.29	235.49	253.33	253.71	253.35	253.55	255.84	240.23
HV Ring Open	Bottom Tap (-5%)	7. 150kVAr Capacitor 1/2 Only	252.50	251.38	252.52	250.30	251.34	235.64	254.12	254.49	254.13	254.33	256.88	240.38
HV Ring Open	Bottom Tap (-5%)	8. 150kVAr Capacitor 2/3 Only	252.50	251.38	252.52	250.30	252.06	235.64	254.12	254.49	254.13	254.34	257.62	240.38
HV Ring Open	Bottom Tap (-5%)	9. 200kVAr Capacitor 1/2 Only	253.28	252.16	253.30	251.08	252.88	235.79	254.91	255.28	254.92	255.12	258.43	240.53
HV Ring Open	Bottom Tap (-5%)	10. 200kVAr Capacitor 2/3 Only	253.28	252.16	253.30	251.08	253.84	235.79	254.92	255.28	254.93	255.13	259.41	240.53
HV Ring Open	Bottom Tap (-5%)	11. LV Meshed Subs 100kVAr Capacitor 1/2	245.70	249.63	250.78	248.54	248.82	245.05	248.25	252.91	252.55	252.75	254.55	248.23
HV Ring Open	Bottom Tap (-5%)	12. LV Meshed Ways 100kVAr Capacitor 1/2	--	--	--	--	--	--	--	--	--	--	--	--
HV Ring Open	Bottom Tap (-5%)	13. LV Meshed Subs & Ways 100kVAr Capacitor 1/2	--	--	--	--	--	--	--	--	--	--	--	--
HV Ring Open	Bottom Tap (-5%)	14. LV Meshed Subs 100kVAr Capacitor 2/3	245.70	249.63	250.77	248.53	249.29	245.05	248.25	252.91	252.55	252.75	255.04	248.23
HV Ring Open	Bottom Tap (-5%)	15. LV Meshed Ways 100kVAr Capacitor 2/3	--	--	--	--	--	--	--	--	--	--	--	--
HV Ring Open	Bottom Tap (-5%)	16. LV Meshed Subs & Ways 100kVAr Capacitor 2/3	--	--	--	--	--	--	--	--	--	--	--	--
HV Ring Open	Bottom Tap (-5%)	17. LV Meshed Subs 150kVAr Capacitor 1/2	246.22	250.35	251.50	249.27	250.30	245.57	248.78	253.64	253.28	253.48	256.03	248.76
HV Ring Open	Bottom Tap (-5%)	18. LV Meshed Ways 150kVAr Capacitor 1/2	--	--	--	--	--	--	--	--	--	--	--	--
HV Ring Open	Bottom Tap (-5%)	19. LV Meshed Subs & Ways 150kVAr Capacitor 1/2	--	--	--	--	--	--	--	--	--	--	--	--
HV Ring Open	Bottom Tap (-5%)	20. LV Meshed Subs 150kVAr Capacitor 2/3	246.22	250.35	251.50	249.26	251.01	245.57	248.78	253.65	253.29	253.49	256.77	248.76
HV Ring Open	Bottom Tap (-5%)	21. LV Meshed Ways 150kVAr Capacitor 2/3	--	--	--	--	--	--	--	--	--	--	--	--
HV Ring Open	Bottom Tap (-5%)	22. LV Meshed Subs & Ways 150kVAr Capacitor 2/3	--	--	--	--	--	--	--	--	--	--	--	--
HV Ring Open	Bottom Tap (-5%)	23. LV Meshed Subs 200kVAr Capacitor 1/2	246.74	251.08	252.22	250.00	251.78	246.10	249.31	254.38	254.02	254.22	257.52	249.29
HV Ring Open	Bottom Tap (-5%)	24. LV Meshed Ways 200kVAr Capacitor 1/2	--	--	--	--	--	--	--	--	--	--	--	--
HV Ring Open	Bottom Tap (-5%)	25. LV Meshed Subs & Ways 200kVAr Capacitor 1/2	--	--	--	--	--	--	--	--	--	--	--	--
HV Ring Open	Bottom Tap (-5%)	26. LV Meshed Subs 200kVAr Capacitor 2/3	246.74	251.08	252.22	250.00	252.74	246.10	249.32	254.39	254.03	254.23	258.51	249.29
HV Ring Open	Bottom Tap (-5%)	27. LV Meshed Ways 200kVAr Capacitor 2/3	--	--	--	--	--	--	--	--	--	--	--	--
HV Ring Open	Bottom Tap (-5%)	28. LV Meshed Subs & Ways 200kVAr Capacitor 2/3	--	--	--	--	--	--	--	--	--	--	--	--

Min Demand of 0.2kW (2.4kW PV average installation)			Voltage Level at 0% PV Penetration						Voltage Level at 10% PV Penetration					
HV RING	OLTC Tap Position	Scenario	GW6	PW10	RW8	B5	YW15	F15	GW6	PW10	RW8	B5	YW15	F15
HV Ring Closed	Top Tap (5%)	1. No Intervention	226.28	225.04	226.30	223.86	222.50	235.21	227.79	228.17	227.80	227.97	228.27	239.90
HV Ring Closed	Top Tap (5%)	2. LV Meshed Subs Only	229.94	225.47	226.74	224.27	222.92	229.31	232.43	228.76	228.40	228.56	228.87	232.45
HV Ring Closed	Top Tap (5%)	3. LV Meshed Ways Only	-	-	-	-	-	-	-	-	-	-	-	-
HV Ring Closed	Top Tap (5%)	4. LV Meshed Subs & Ways Only	-	-	-	-	-	-	-	-	-	-	-	-
HV Ring Closed	Top Tap (5%)	5. 100kVAr Capacitor 1/2 Only	227.57	226.32	227.59	225.11	225.11	235.43	229.10	229.49	229.11	229.32	230.99	240.18
HV Ring Closed	Top Tap (5%)	6. 100kVAr Capacitor 2/3 Only	227.57	226.32	227.59	225.11	225.55	235.43	229.10	229.50	229.11	229.32	231.44	240.18
HV Ring Closed	Top Tap (5%)	7. 150kVAr Capacitor 1/2 Only	228.22	226.97	228.24	225.77	226.45	235.55	229.76	230.15	229.77	229.98	232.33	240.30
HV Ring Closed	Top Tap (5%)	8. 150kVAr Capacitor 2/3 Only	228.22	226.97	228.24	225.76	227.10	235.55	229.76	230.16	229.78	229.98	233.00	240.30
HV Ring Closed	Top Tap (5%)	9. 200kVAr Capacitor 1/2 Only	228.87	227.63	228.89	226.43	227.79	235.67	230.42	230.82	230.44	230.64	233.67	240.43
HV Ring Closed	Top Tap (5%)	10. 200kVAr Capacitor 2/3 Only	228.87	227.62	228.89	226.42	228.67	235.67	230.43	230.83	230.45	230.65	234.57	240.43
HV Ring Closed	Top Tap (5%)	11. LV Meshed Subs 100kVAr Capacitor 1/2	230.70	226.68	227.95	225.47	225.48	230.07	233.27	230.02	230.64	229.85	231.52	233.30
HV Ring Closed	Top Tap (5%)	12. LV Meshed Ways 100kVAr Capacitor 1/2	-	-	-	-	-	-	-	-	-	-	-	-
HV Ring Closed	Top Tap (5%)	13. LV Meshed Subs & Ways 100kVAr Capacitor 1/2	-	-	-	-	-	-	-	-	-	-	-	-
HV Ring Closed	Top Tap (5%)	14. LV Meshed Subs 100kVAr Capacitor 2/3	230.70	226.67	227.94	225.47	225.91	230.07	233.27	230.02	229.64	229.85	231.97	233.30
HV Ring Closed	Top Tap (5%)	15. LV Meshed Ways 100kVAr Capacitor 2/3	-	-	-	-	-	-	-	-	-	-	-	-
HV Ring Closed	Top Tap (5%)	16. LV Meshed Subs & Ways 100kVAr Capacitor 2/3	-	-	-	-	-	-	-	-	-	-	-	-
HV Ring Closed	Top Tap (5%)	17. LV Meshed Subs 150kVAr Capacitor 1/2	231.15	227.30	228.56	226.10	226.78	230.51	233.72	230.65	230.26	230.47	232.82	233.75
HV Ring Closed	Top Tap (5%)	18. LV Meshed Ways 150kVAr Capacitor 1/2	-	-	-	-	-	-	-	-	-	-	-	-
HV Ring Closed	Top Tap (5%)	19. LV Meshed Subs & Ways 150kVAr Capacitor 1/2	-	-	-	-	-	-	-	-	-	-	-	-
HV Ring Closed	Top Tap (5%)	20. LV Meshed Subs 150kVAr Capacitor 2/3	231.14	227.29	228.56	226.09	227.43	230.51	233.72	230.65	230.27	230.48	233.50	233.75
HV Ring Closed	Top Tap (5%)	21. LV Meshed Ways 150kVAr Capacitor 2/3	-	-	-	-	-	-	-	-	-	-	-	-
HV Ring Closed	Top Tap (5%)	22. LV Meshed Subs & Ways 150kVAr Capacitor 2/3	-	-	-	-	-	-	-	-	-	-	-	-
HV Ring Closed	Top Tap (5%)	23. LV Meshed Subs 200kVAr Capacitor 1/2	231.59	227.92	229.18	226.72	228.09	230.96	234.17	231.28	230.90	231.10	234.13	234.20
HV Ring Closed	Top Tap (5%)	24. LV Meshed Ways 200kVAr Capacitor 1/2	-	-	-	-	-	-	-	-	-	-	-	-
HV Ring Closed	Top Tap (5%)	25. LV Meshed Subs & Ways 200kVAr Capacitor 1/2	-	-	-	-	-	-	-	-	-	-	-	-
HV Ring Closed	Top Tap (5%)	26. LV Meshed Subs 200kVAr Capacitor 2/3	231.59	227.91	229.18	226.72	228.97	230.96	234.18	231.29	230.90	231.11	235.04	234.20
HV Ring Closed	Top Tap (5%)	27. LV Meshed Ways 200kVAr Capacitor 2/3	-	-	-	-	-	-	-	-	-	-	-	-
HV Ring Closed	Top Tap (5%)	28. LV Meshed Subs & Ways 200kVAr Capacitor 2/3	-	-	-	-	-	-	-	-	-	-	-	-
HV Ring Closed	Mid Tap (0%)	1. No Intervention	237.75	236.57	237.77	235.45	234.17	235.21	239.20	239.63	239.21	239.53	239.87	240.00
HV Ring Closed	Mid Tap (0%)	2. LV Meshed Subs Only	237.04	236.42	237.63	235.27	233.99	236.40	239.45	239.59	239.22	239.43	239.74	239.45
HV Ring Closed	Mid Tap (0%)	3. LV Meshed Ways Only	-	-	-	-	-	-	-	-	-	-	-	-
HV Ring Closed	Mid Tap (0%)	4. LV Meshed Subs & Ways Only	-	-	-	-	-	-	-	-	-	-	-	-
HV Ring Closed	Mid Tap (0%)	5. 100kVAr Capacitor 1/2 Only	239.13	237.94	239.15	236.80	236.94	235.46	240.59	240.98	240.61	240.81	242.54	240.20
HV Ring Closed	Mid Tap (0%)	6. 100kVAr Capacitor 2/3 Only	239.13	237.94	239.15	236.80	237.40	235.46	240.60	240.98	240.61	240.81	243.01	240.21
HV Ring Closed	Mid Tap (0%)	7. 150kVAr Capacitor 1/2 Only	239.83	238.64	239.85	237.50	238.36	235.59	241.30	241.68	241.31	241.52	243.97	240.34
HV Ring Closed	Mid Tap (0%)	8. 150kVAr Capacitor 2/3 Only	239.83	238.64	239.84	237.50	239.05	235.59	241.31	241.69	241.32	241.52	244.67	240.34
HV Ring Closed	Mid Tap (0%)	9. 200kVAr Capacitor 1/2 Only	240.53	239.35	240.55	238.21	239.79	235.73	242.02	242.40	242.03	242.23	245.39	240.48
HV Ring Closed	Mid Tap (0%)	10. 200kVAr Capacitor 2/3 Only	240.53	239.35	240.55	238.21	240.71	235.73	242.02	242.40	242.04	242.24	246.34	240.48
HV Ring Closed	Mid Tap (0%)	11. LV Meshed Subs 100kVAr Capacitor 1/2	237.92	237.71	238.92	236.57	236.71	237.28	240.41	240.92	240.55	240.75	242.49	240.41
HV Ring Closed	Mid Tap (0%)	12. LV Meshed Ways 100kVAr Capacitor 1/2	-	-	-	-	-	-	-	-	-	-	-	-
HV Ring Closed	Mid Tap (0%)	13. LV Meshed Subs & Ways 100kVAr Capacitor 1/2	-	-	-	-	-	-	-	-	-	-	-	-
HV Ring Closed	Mid Tap (0%)	14. LV Meshed Subs 100kVAr Capacitor 2/3	237.92	237.71	238.92	236.56	237.16	237.28	240.41	240.92	240.55	240.76	242.96	240.42
HV Ring Closed	Mid Tap (0%)	15. LV Meshed Ways 100kVAr Capacitor 2/3	-	-	-	-	-	-	-	-	-	-	-	-
HV Ring Closed	Mid Tap (0%)	16. LV Meshed Subs & Ways 100kVAr Capacitor 2/3	-	-	-	-	-	-	-	-	-	-	-	-
HV Ring Closed	Mid Tap (0%)	17. LV Meshed Subs 150kVAr Capacitor 1/2	238.39	238.38	239.58	237.23	238.09	237.75	240.89	241.59	241.22	241.42	243.87	240.90
HV Ring Closed	Mid Tap (0%)	18. LV Meshed Ways 150kVAr Capacitor 1/2	-	-	-	-	-	-	-	-	-	-	-	-
HV Ring Closed	Mid Tap (0%)	19. LV Meshed Subs & Ways 150kVAr Capacitor 1/2	-	-	-	-	-	-	-	-	-	-	-	-
HV Ring Closed	Mid Tap (0%)	20. LV Meshed Subs 150kVAr Capacitor 2/3	238.39	238.37	239.58	237.23	238.77	237.75	240.90	241.59	241.23	241.43	244.58	240.90
HV Ring Closed	Mid Tap (0%)	21. LV Meshed Ways 150kVAr Capacitor 2/3	-	-	-	-	-	-	-	-	-	-	-	-
HV Ring Closed	Mid Tap (0%)	22. LV Meshed Subs & Ways 150kVAr Capacitor 2/3	-	-	-	-	-	-	-	-	-	-	-	-
HV Ring Closed	Mid Tap (0%)	23. LV Meshed Subs 200kVAr Capacitor 1/2	238.87	239.04	240.24	237.90	239.47	238.23	241.38	242.26	241.90	242.10	245.26	241.38
HV Ring Closed	Mid Tap (0%)	24. LV Meshed Ways 200kVAr Capacitor 1/2	-	-	-	-	-	-	-	-	-	-	-	-
HV Ring Closed	Mid Tap (0%)	25. LV Meshed Subs & Ways 200kVAr Capacitor 1/2	-	-	-	-	-	-	-	-	-	-	-	-
HV Ring Closed	Mid Tap (0%)	26. LV Meshed Subs 200kVAr Capacitor 2/3	238.87	239.04	240.24	237.90	240.40	238.23	241.38	242.27	241.90	242.10	246.21	241.38
HV Ring Closed	Mid Tap (0%)	27. LV Meshed Ways 200kVAr Capacitor 2/3	-	-	-	-	-	-	-	-	-	-	-	-
HV Ring Closed	Mid Tap (0%)	28. LV Meshed Subs & Ways 200kVAr Capacitor 2/3	-	-	-	-	-	-	-	-	-	-	-	-
HV Ring Closed	Bottom Tap (-5%)	1. No Intervention	250.42	249.29	250.44	248.23	247.02	235.21	251.79	252.13	251.81	251.94	252.22	239.90
HV Ring Closed	Bottom Tap (-5%)	2. LV Meshed Subs Only	244.87	248.49	249.64	247.39	246.17	244.22	247.27	251.49	251.17	251.30	251.58	247.24
HV Ring Closed	Bottom Tap (-5%)	3. LV Meshed Ways Only	-	-	-	-	-	-	-	-	-	-	-	-
HV Ring Closed	Bottom Tap (-5%)	4. LV Meshed Subs & Ways Only	-	-	-	-	-	-	-	-	-	-	-	-
HV Ring Closed	Bottom Tap (-5%)	5. 100kVAr Capacitor 1/2 Only	251.90	250.78	251.92	249.70	249.99	235.49	253.30	253.67	253.32	253.52	255.32	240.23
HV Ring Closed	Bottom Tap (-5%)	6. 100kVAr Capacitor 2/3 Only	251.90	250.78	251.92	249.69	250.47	235.49	253.31	253.68	253.32	253.52	255.81	240.23
HV Ring Closed	Bottom Tap (-5%)	7. 150kVAr Capacitor 1/2 Only	252.65	251.54	252.67	250.45	251.50	235.63	254.06	254.44	254.08	254.28	256.83	240.38
HV Ring Closed	Bottom Tap (-5%)	8. 150kVAr Capacitor 2/3 Only	252.65	251.53	252.67	250.45	252.22	235.63	254.07	254.44	254.08	254.28	257.57	240.38
HV Ring Closed	Bottom Tap (-5%)	9. 200kVAr Capacitor 1/2 Only	253.28	252.16	253.30	251.08	252.88	235.79	254.91	255.28	254.92	255.12	258.43	240.53
HV Ring Closed	Bottom Tap (-5%)	10. 200kVAr Capacitor 2/3 Only	253.41	252.29	253.43	251.22	253.98	235.79	254.84	255.21	254.86	255.05	259.34	240.54
HV Ring Closed	Bottom Tap (-5%)	11. LV Meshed Subs 100kVAr Capacitor 1/2	245.87	249.88	251.03	248.79	249.08	245.22	248.28	252.95	252.60	252.80	254.59	248.26
HV Ring Closed	Bottom Tap (-5%)	12. LV Meshed Ways 100kVAr Capacitor 1/2	-	-	-	-	-	-	-	-	-	-	-	-
HV Ring Closed	Bottom Tap (-5%)	13. LV Meshed Subs & Ways 100kVAr Capacitor 1/2	-	-	-	-	-	-	-	-	-	-	-	-
HV Ring Closed	Bottom Tap (-5%)	14. LV Meshed Subs 100kVAr Capacitor 2/3	245.86	249.88	251.03	248.79	249.55	245.22	248.29	252.96	252.60	252.80	255.08	248.26
HV Ring Closed	Bottom Tap (-5%)	15. LV Meshed Ways 100kVAr Capacitor 2/3	-	-	-	-	-	-	-	-	-	-	-	-
HV Ring Closed	Bottom Tap (-5%)	16. LV Meshed Subs & Ways 100kVAr Capacitor 2/3	-	-	-	-	-	-	-	-	-	-	-	-
HV Ring Closed	Bottom Tap (-5%)	17. LV Meshed Subs 150kVAr Capacitor 1/2	246.38	250.59	251.74	249.51	250.54	245.73	248.80	253.67	253.31	253.51	256.06	248.78
HV Ring Closed	Bottom Tap (-5%)	18. LV Meshed Ways 150kVAr Capacitor 1/2	-	-	-	-	-	-	-	-	-	-	-	-
HV Ring Closed	Bottom Tap (-5%)	19. LV Meshed Subs & Ways 150kVAr Capacitor 1/2	-	-	-	-	-	-	-	-	-	-	-	-
HV Ring Closed	Bottom Tap (-5%)	20. LV Meshed Subs 150kVAr Capacitor 2/3	246.37	250.59	251.74	249.51	251.26	245.73</						

Max Demand of 1.5kW _ (2.4kW PV average installation)			Voltage Level at 0% PV Penetration						Voltage Level at 10% PV Penetration					
HV RING	OLTC Tap Position	Scenario	GW6	PW10	RW8	B5	YW15	F15	GW6	PW10	RW8	B5	YW15	F15
HV Ring Open	Top Tap (5%)	1. No Intervention	213.13	206.24	213.18	199.31	190.97	212.25	215.58	210.67	215.65	205.17	199.36	218.16
HV Ring Open	Top Tap (5%)	2. LV Meshed Subs Only	213.75	206.02	212.96	199.09	190.73	210.19	217.24	210.67	215.64	205.17	199.36	214.47
HV Ring Open	Top Tap (5%)	3. LV Meshed Ways Only	-	-	-	-	-	-	-	-	-	-	-	-
HV Ring Open	Top Tap (5%)	4. LV Meshed Subs & Ways Only	-	-	-	-	-	-	-	-	-	-	-	-
HV Ring Open	Top Tap (5%)	5. 100kVAr Capacitor 1/2 Only	214.33	207.45	214.38	200.59	193.43	212.49	216.82	211.89	216.89	206.47	201.76	218.37
HV Ring Open	Top Tap (5%)	6. 100kVAr Capacitor 2/3 Only	214.31	207.42	214.35	200.56	193.79	212.49	216.80	211.87	216.87	206.45	202.13	218.36
HV Ring Open	Top Tap (5%)	7. 150kVAr Capacitor 1/2 Only	214.95	208.08	215.00	201.25	194.77	212.62	217.45	212.53	217.52	207.13	203.07	218.49
HV Ring Open	Top Tap (5%)	8. 150kVAr Capacitor 2/3 Only	214.92	208.05	214.96	201.21	195.30	212.61	217.42	212.50	217.49	207.10	203.63	218.48
HV Ring Open	Top Tap (5%)	9. 200kVAr Capacitor 1/2 Only	215.58	208.73	215.62	201.91	196.11	212.74	218.08	213.17	218.15	207.78	204.38	218.61
HV Ring Open	Top Tap (5%)	10. 200kVAr Capacitor 2/3 Only	215.53	208.67	215.57	201.86	196.83	212.73	218.05	213.14	218.12	207.74	205.13	218.60
HV Ring Open	Top Tap (5%)	11. LV Meshed Subs 100kVAr Capacitor 1/2	214.52	207.14	214.08	200.27	193.09	210.96	218.07	211.81	216.80	206.39	201.67	215.30
HV Ring Open	Top Tap (5%)	12. LV Meshed Ways 100kVAr Capacitor 1/2	-	-	-	-	-	-	-	-	-	-	-	-
HV Ring Open	Top Tap (5%)	13. LV Meshed Subs & Ways 100kVAr Capacitor 1/2	-	-	-	-	-	-	-	-	-	-	-	-
HV Ring Open	Top Tap (5%)	14. LV Meshed Subs 100kVAr Capacitor 2/3	214.50	207.11	214.06	200.24	193.45	210.95	218.06	211.79	216.79	206.37	202.04	215.28
HV Ring Open	Top Tap (5%)	15. LV Meshed Ways 100kVAr Capacitor 2/3	-	-	-	-	-	-	-	-	-	-	-	-
HV Ring Open	Top Tap (5%)	16. LV Meshed Subs & Ways 100kVAr Capacitor 2/3	-	-	-	-	-	-	-	-	-	-	-	-
HV Ring Open	Top Tap (5%)	17. LV Meshed Subs 150kVAr Capacitor 1/2	214.95	207.74	214.66	200.89	194.39	211.40	218.51	212.41	217.40	207.00	202.94	215.73
HV Ring Open	Top Tap (5%)	18. LV Meshed Ways 150kVAr Capacitor 1/2	-	-	-	-	-	-	-	-	-	-	-	-
HV Ring Open	Top Tap (5%)	19. LV Meshed Subs & Ways 150kVAr Capacitor 1/2	-	-	-	-	-	-	-	-	-	-	-	-
HV Ring Open	Top Tap (5%)	20. LV Meshed Subs 150kVAr Capacitor 2/3	214.92	207.70	214.63	200.85	194.92	211.37	218.49	212.38	217.38	206.98	203.50	215.71
HV Ring Open	Top Tap (5%)	21. LV Meshed Ways 150kVAr Capacitor 2/3	-	-	-	-	-	-	-	-	-	-	-	-
HV Ring Open	Top Tap (5%)	22. LV Meshed Subs & Ways 150kVAr Capacitor 2/3	-	-	-	-	-	-	-	-	-	-	-	-
HV Ring Open	Top Tap (5%)	23. LV Meshed Subs 200kVAr Capacitor 1/2	215.38	208.34	215.25	201.51	195.69	211.83	218.94	213.02	218.00	207.62	204.21	216.17
HV Ring Open	Top Tap (5%)	24. LV Meshed Ways 200kVAr Capacitor 1/2	-	-	-	-	-	-	-	-	-	-	-	-
HV Ring Open	Top Tap (5%)	25. LV Meshed Subs & Ways 200kVAr Capacitor 1/2	-	-	-	-	-	-	-	-	-	-	-	-
HV Ring Open	Top Tap (5%)	26. LV Meshed Subs 200kVAr Capacitor 2/3	215.34	208.29	215.21	201.46	196.40	211.80	218.92	212.98	217.96	207.58	204.96	216.14
HV Ring Open	Top Tap (5%)	27. LV Meshed Ways 200kVAr Capacitor 2/3	-	-	-	-	-	-	-	-	-	-	-	-
HV Ring Open	Top Tap (5%)	28. LV Meshed Subs & Ways 200kVAr Capacitor 2/3	-	-	-	-	-	-	-	-	-	-	-	-
HV Ring Open	Mid Tap (0%)	1. No Intervention	224.93	218.42	224.98	211.88	204.19	212.29	227.23	222.58	227.31	217.38	211.94	218.18
HV Ring Open	Mid Tap (0%)	2. LV Meshed Subs Only	221.23	217.54	224.12	210.97	203.23	217.76	224.58	221.92	226.66	216.71	211.25	221.88
HV Ring Open	Mid Tap (0%)	3. LV Meshed Ways Only	-	-	-	-	-	-	-	-	-	-	-	-
HV Ring Open	Mid Tap (0%)	4. LV Meshed Subs & Ways Only	-	-	-	-	-	-	-	-	-	-	-	-
HV Ring Open	Mid Tap (0%)	5. 100kVAr Capacitor 1/2 Only	226.24	219.76	226.29	213.35	206.92	212.56	228.57	223.91	228.64	218.80	214.60	218.41
HV Ring Open	Mid Tap (0%)	6. 100kVAr Capacitor 2/3 Only	226.22	219.74	226.27	213.32	207.30	212.55	228.55	223.90	228.62	218.78	215.00	218.41
HV Ring Open	Mid Tap (0%)	7. 150kVAr Capacitor 1/2 Only	226.91	220.44	226.96	214.05	208.33	212.69	229.25	224.60	229.32	219.50	216.00	218.54
HV Ring Open	Mid Tap (0%)	8. 150kVAr Capacitor 2/3 Only	226.87	220.41	226.92	214.01	208.91	212.69	229.23	224.58	229.29	219.47	216.60	218.54
HV Ring Open	Mid Tap (0%)	9. 200kVAr Capacitor 1/2 Only	227.58	221.13	227.63	214.76	209.75	212.83	229.93	225.29	230.00	220.20	217.40	218.68
HV Ring Open	Mid Tap (0%)	10. 200kVAr Capacitor 2/3 Only	227.54	221.08	227.59	214.70	210.53	212.82	229.90	225.26	229.97	220.16	218.22	218.67
HV Ring Open	Mid Tap (0%)	11. LV Meshed Subs 100kVAr Capacitor 1/2	222.11	218.78	225.34	212.33	205.85	218.65	225.50	223.17	227.91	218.03	213.81	222.79
HV Ring Open	Mid Tap (0%)	12. LV Meshed Ways 100kVAr Capacitor 1/2	-	-	-	-	-	-	-	-	-	-	-	-
HV Ring Open	Mid Tap (0%)	13. LV Meshed Subs & Ways 100kVAr Capacitor 1/2	-	-	-	-	-	-	-	-	-	-	-	-
HV Ring Open	Mid Tap (0%)	14. LV Meshed Subs 100kVAr Capacitor 2/3	222.09	218.75	225.32	212.30	206.23	218.64	225.49	223.15	227.89	218.02	214.21	222.78
HV Ring Open	Mid Tap (0%)	15. LV Meshed Ways 100kVAr Capacitor 2/3	-	-	-	-	-	-	-	-	-	-	-	-
HV Ring Open	Mid Tap (0%)	16. LV Meshed Subs & Ways 100kVAr Capacitor 2/3	-	-	-	-	-	-	-	-	-	-	-	-
HV Ring Open	Mid Tap (0%)	17. LV Meshed Subs 150kVAr Capacitor 1/2	222.57	219.42	225.97	212.99	207.21	219.12	225.96	223.81	228.55	218.69	215.16	223.26
HV Ring Open	Mid Tap (0%)	18. LV Meshed Ways 150kVAr Capacitor 1/2	-	-	-	-	-	-	-	-	-	-	-	-
HV Ring Open	Mid Tap (0%)	19. LV Meshed Subs & Ways 150kVAr Capacitor 1/2	-	-	-	-	-	-	-	-	-	-	-	-
HV Ring Open	Mid Tap (0%)	20. LV Meshed Subs 150kVAr Capacitor 2/3	222.54	219.38	225.93	212.95	207.79	219.09	225.94	223.79	228.53	218.66	215.76	223.24
HV Ring Open	Mid Tap (0%)	21. LV Meshed Ways 150kVAr Capacitor 2/3	-	-	-	-	-	-	-	-	-	-	-	-
HV Ring Open	Mid Tap (0%)	22. LV Meshed Subs & Ways 150kVAr Capacitor 2/3	-	-	-	-	-	-	-	-	-	-	-	-
HV Ring Open	Mid Tap (0%)	23. LV Meshed Subs 200kVAr Capacitor 1/2	223.03	220.06	226.60	213.65	208.58	219.58	226.43	224.46	229.19	219.35	216.51	223.73
HV Ring Open	Mid Tap (0%)	24. LV Meshed Ways 200kVAr Capacitor 1/2	-	-	-	-	-	-	-	-	-	-	-	-
HV Ring Open	Mid Tap (0%)	25. LV Meshed Subs & Ways 200kVAr Capacitor 1/2	-	-	-	-	-	-	-	-	-	-	-	-
HV Ring Open	Mid Tap (0%)	26. LV Meshed Subs 200kVAr Capacitor 2/3	223.00	220.02	226.55	213.60	209.36	219.55	226.40	224.43	229.16	219.31	217.33	223.70
HV Ring Open	Mid Tap (0%)	27. LV Meshed Ways 200kVAr Capacitor 2/3	-	-	-	-	-	-	-	-	-	-	-	-
HV Ring Open	Mid Tap (0%)	28. LV Meshed Subs & Ways 200kVAr Capacitor 2/3	-	-	-	-	-	-	-	-	-	-	-	-
HV Ring Open	Bottom Tap (-5%)	1. No Intervention	237.88	231.74	237.94	225.58	218.45	212.32	240.05	235.64	240.12	230.74	225.65	218.20
HV Ring Open	Bottom Tap (-5%)	2. LV Meshed Subs Only	229.58	230.25	236.39	224.31	217.03	226.26	232.62	234.24	238.74	229.32	224.18	229.98
HV Ring Open	Bottom Tap (-5%)	3. LV Meshed Ways Only	-	-	-	-	-	-	-	-	-	-	-	-
HV Ring Open	Bottom Tap (-5%)	4. LV Meshed Subs & Ways Only	-	-	-	-	-	-	-	-	-	-	-	-
HV Ring Open	Bottom Tap (-5%)	5. 100kVAr Capacitor 1/2 Only	239.30	233.20	239.36	227.18	221.45	212.63	241.50	237.09	241.56	232.25	228.56	218.46
HV Ring Open	Bottom Tap (-5%)	6. 100kVAr Capacitor 2/3 Only	239.28	233.18	239.34	227.16	221.87	212.62	241.48	237.08	241.55	232.23	228.99	218.46
HV Ring Open	Bottom Tap (-5%)	7. 150kVAr Capacitor 1/2 Only	240.03	233.94	240.08	227.94	222.96	212.78	242.23	237.84	242.30	233.00	230.06	218.61
HV Ring Open	Bottom Tap (-5%)	8. 150kVAr Capacitor 2/3 Only	240.00	233.91	240.05	227.90	223.59	212.77	242.21	237.81	242.28	232.97	230.72	218.61
HV Ring Open	Bottom Tap (-5%)	9. 200kVAr Capacitor 1/2 Only	240.76	234.68	240.81	228.70	224.49	212.93	242.97	238.59	243.04	233.76	231.58	218.76
HV Ring Open	Bottom Tap (-5%)	10. 200kVAr Capacitor 2/3 Only	240.72	234.64	240.77	228.65	225.34	212.92	242.94	238.55	243.01	233.72	232.47	218.75
HV Ring Open	Bottom Tap (-5%)	11. LV Meshed Subs 100kVAr Capacitor 1/2	230.38	231.45	237.66	225.38	219.58	227.03	233.62	235.59	240.09	230.71	226.97	230.98
HV Ring Open	Bottom Tap (-5%)	12. LV Meshed Ways 100kVAr Capacitor 1/2	-	-	-	-	-	-	-	-	-	-	-	-
HV Ring Open	Bottom Tap (-5%)	13. LV Meshed Subs & Ways 100kVAr Capacitor 1/2	-	-	-	-	-	-	-	-	-	-	-	-
HV Ring Open	Bottom Tap (-5%)	14. LV Meshed Subs 100kVAr Capacitor 2/3	230.37	231.43	237.64	225.36	219.99	227.01	233.61	235.57	240.08	230.69	227.40	230.97
HV Ring Open	Bottom Tap (-5%)	15. LV Meshed Ways 100kVAr Capacitor 2/3	-	-	-	-	-	-	-	-	-	-	-	-
HV Ring Open	Bottom Tap (-5%)	16. LV Meshed Subs & Ways 100kVAr Capacitor 2/3	-	-	-	-	-	-	-	-	-	-	-	-
HV Ring Open	Bottom Tap (-5%)	17. LV Meshed Subs 150kVAr Capacitor 1/2	230.88	232.15	238.34	226.09	221.03	227.53	234.12	236.29	240.78	231.41	228.42	231.48
HV Ring Open	Bottom Tap (-5%)	18. LV Meshed Ways 150kVAr Capacitor 1/2	-	-	-	-	-	-	-	-	-	-	-	-
HV Ring Open	Bottom Tap (-5%)	19. LV Meshed Subs & Ways 150kVAr Capacitor 1/2	-	-	-	-	-	-	-	-	-	-	-	-
HV Ring Open	Bottom Tap (-5%)	20. LV Meshed Subs 150kVAr Capacitor 2/3	230.85	232.11	238.31	226.05	221.66	227.51						

Max Demand of 1.5kW _ (2.4kW PV average installation)			Voltage Level at 0% PV Penetration						Voltage Level at 10% PV Penetration					
HV RING	OLTC Tap Position	Scenario	GW6	PW10	RW8	B5	YW15	F15	GW6	PW10	RW8	B5	YW15	F15
HV Ring Closed	Top Tap (5%)	1. No Intervention	214.27	207.42	214.32	200.53	192.26	212.24	216.46	211.57	216.53	206.09	200.31	218.15
HV Ring Closed	Top Tap (5%)	2. LV Meshed Subs Only	213.13	206.24	213.18	199.31	190.97	212.25	215.58	210.67	215.65	205.17	199.36	218.16
HV Ring Closed	Top Tap (5%)	3. LV Meshed Ways Only	--	--	--	--	--	--	--	--	--	--	--	--
HV Ring Closed	Top Tap (5%)	4. LV Meshed Subs & Ways Only	--	--	--	--	--	--	--	--	--	--	--	--
HV Ring Closed	Top Tap (5%)	5. 100kVAr Capacitor 1/2 Only	215.45	208.61	215.49	201.80	194.71	212.49	217.67	212.76	217.74	207.37	202.70	218.36
HV Ring Closed	Top Tap (5%)	6. 100kVAr Capacitor 2/3 Only	215.43	208.58	215.47	201.77	195.07	212.48	217.65	212.75	217.72	207.35	203.07	218.35
HV Ring Closed	Top Tap (5%)	7. 150kVAr Capacitor 1/2 Only	216.06	209.23	216.10	202.44	196.04	212.61	218.29	213.39	218.36	208.01	204.00	218.48
HV Ring Closed	Top Tap (5%)	8. 150kVAr Capacitor 2/3 Only	216.02	209.19	216.07	202.41	196.57	212.60	218.26	213.37	218.33	207.99	204.56	218.47
HV Ring Closed	Top Tap (5%)	9. 200kVAr Capacitor 1/2 Only	216.67	209.86	216.71	203.09	197.36	212.73	218.91	214.02	218.98	208.66	205.30	218.60
HV Ring Closed	Top Tap (5%)	10. 200kVAr Capacitor 2/3 Only	216.62	209.81	216.67	203.04	198.08	212.72	218.88	213.99	218.94	208.62	206.05	218.59
HV Ring Closed	Top Tap (5%)	11. LV Meshed Subs 100kVAr Capacitor 1/2	214.50	207.11	214.06	200.24	193.45	210.95	218.06	211.79	216.79	206.37	202.04	215.28
HV Ring Closed	Top Tap (5%)	12. LV Meshed Ways 100kVAr Capacitor 1/2	--	--	--	--	--	--	--	--	--	--	--	--
HV Ring Closed	Top Tap (5%)	13. LV Meshed Subs & Ways 100kVAr Capacitor 1/2	--	--	--	--	--	--	--	--	--	--	--	--
HV Ring Closed	Top Tap (5%)	14. LV Meshed Subs 100kVAr Capacitor 2/3	215.22	208.22	215.12	201.39	194.67	211.68	218.59	212.61	217.59	207.21	202.92	215.82
HV Ring Closed	Top Tap (5%)	15. LV Meshed Ways 100kVAr Capacitor 2/3	--	--	--	--	--	--	--	--	--	--	--	--
HV Ring Closed	Top Tap (5%)	16. LV Meshed Subs & Ways 100kVAr Capacitor 2/3	--	--	--	--	--	--	--	--	--	--	--	--
HV Ring Closed	Top Tap (5%)	17. LV Meshed Subs 150kVAr Capacitor 1/2	215.66	208.83	215.72	202.03	195.60	212.12	219.03	213.22	218.19	207.84	203.81	216.26
HV Ring Closed	Top Tap (5%)	18. LV Meshed Ways 150kVAr Capacitor 1/2	--	--	--	--	--	--	--	--	--	--	--	--
HV Ring Closed	Top Tap (5%)	19. LV Meshed Subs & Ways 150kVAr Capacitor 1/2	--	--	--	--	--	--	--	--	--	--	--	--
HV Ring Closed	Top Tap (5%)	20. LV Meshed Subs 150kVAr Capacitor 2/3	215.64	208.80	215.69	201.99	196.14	212.10	219.02	213.19	218.16	207.81	204.37	216.25
HV Ring Closed	Top Tap (5%)	21. LV Meshed Ways 150kVAr Capacitor 2/3	--	--	--	--	--	--	--	--	--	--	--	--
HV Ring Closed	Top Tap (5%)	22. LV Meshed Subs & Ways 150kVAr Capacitor 2/3	--	--	--	--	--	--	--	--	--	--	--	--
HV Ring Closed	Top Tap (5%)	23. LV Meshed Subs 200kVAr Capacitor 1/2	216.09	209.43	216.30	202.64	196.89	212.55	219.46	213.82	218.77	208.45	205.07	216.70
HV Ring Closed	Top Tap (5%)	24. LV Meshed Ways 200kVAr Capacitor 1/2	--	--	--	--	--	--	--	--	--	--	--	--
HV Ring Closed	Top Tap (5%)	25. LV Meshed Subs & Ways 200kVAr Capacitor 1/2	--	--	--	--	--	--	--	--	--	--	--	--
HV Ring Closed	Top Tap (5%)	26. LV Meshed Subs 200kVAr Capacitor 2/3	216.05	209.38	216.25	202.59	197.61	212.52	219.44	213.78	218.74	208.41	205.83	216.67
HV Ring Closed	Top Tap (5%)	27. LV Meshed Ways 200kVAr Capacitor 2/3	--	--	--	--	--	--	--	--	--	--	--	--
HV Ring Closed	Top Tap (5%)	28. LV Meshed Subs & Ways 200kVAr Capacitor 2/3	--	--	--	--	--	--	--	--	--	--	--	--
HV Ring Closed	Mid Tap (0%)	1. No Intervention	226.11	219.63	226.16	213.13	205.49	212.28	228.15	223.51	228.22	218.33	212.92	218.17
HV Ring Closed	Mid Tap (0%)	2. LV Meshed Subs Only	222.02	218.74	225.30	212.22	204.53	218.56	225.18	222.84	227.56	217.65	212.22	222.48
HV Ring Closed	Mid Tap (0%)	3. LV Meshed Ways Only	--	--	--	--	--	--	--	--	--	--	--	--
HV Ring Closed	Mid Tap (0%)	4. LV Meshed Subs & Ways Only	--	--	--	--	--	--	--	--	--	--	--	--
HV Ring Closed	Mid Tap (0%)	5. 100kVAr Capacitor 1/2 Only	227.39	220.94	227.44	214.57	208.21	212.55	229.45	224.81	229.52	219.72	215.56	218.40
HV Ring Closed	Mid Tap (0%)	6. 100kVAr Capacitor 2/3 Only	227.37	220.92	227.42	214.55	208.59	212.55	229.44	224.80	229.50	219.70	215.96	218.40
HV Ring Closed	Mid Tap (0%)	7. 150kVAr Capacitor 1/2 Only	228.04	221.61	228.09	215.26	209.61	212.69	230.12	225.49	230.18	220.40	216.94	218.54
HV Ring Closed	Mid Tap (0%)	8. 150kVAr Capacitor 2/3 Only	228.01	221.58	228.06	215.22	210.19	212.68	230.09	225.46	230.16	220.38	217.55	218.53
HV Ring Closed	Mid Tap (0%)	9. 200kVAr Capacitor 1/2 Only	228.70	222.29	228.75	215.95	211.01	212.83	230.78	226.16	230.85	221.09	218.33	218.67
HV Ring Closed	Mid Tap (0%)	10. 200kVAr Capacitor 2/3 Only	228.66	222.24	228.71	215.90	211.80	212.82	230.75	226.13	230.82	221.06	219.15	218.67
HV Ring Closed	Mid Tap (0%)	11. LV Meshed Subs 100kVAr Capacitor 1/2	222.89	219.97	226.50	213.56	207.15	219.44	226.09	224.07	228.79	218.95	214.77	223.38
HV Ring Closed	Mid Tap (0%)	12. LV Meshed Ways 100kVAr Capacitor 1/2	--	--	--	--	--	--	--	--	--	--	--	--
HV Ring Closed	Mid Tap (0%)	13. LV Meshed Subs & Ways 100kVAr Capacitor 1/2	--	--	--	--	--	--	--	--	--	--	--	--
HV Ring Closed	Mid Tap (0%)	14. LV Meshed Subs 100kVAr Capacitor 2/3	222.87	219.95	226.48	213.54	207.53	219.43	226.07	224.05	228.78	218.94	215.17	223.37
HV Ring Closed	Mid Tap (0%)	15. LV Meshed Ways 100kVAr Capacitor 2/3	--	--	--	--	--	--	--	--	--	--	--	--
HV Ring Closed	Mid Tap (0%)	16. LV Meshed Subs & Ways 100kVAr Capacitor 2/3	--	--	--	--	--	--	--	--	--	--	--	--
HV Ring Closed	Mid Tap (0%)	17. LV Meshed Subs 150kVAr Capacitor 1/2	223.34	220.60	227.11	214.21	208.51	219.90	226.54	224.70	229.42	219.60	216.11	223.84
HV Ring Closed	Mid Tap (0%)	18. LV Meshed Ways 150kVAr Capacitor 1/2	--	--	--	--	--	--	--	--	--	--	--	--
HV Ring Closed	Mid Tap (0%)	19. LV Meshed Subs & Ways 150kVAr Capacitor 1/2	--	--	--	--	--	--	--	--	--	--	--	--
HV Ring Closed	Mid Tap (0%)	20. LV Meshed Subs 150kVAr Capacitor 2/3	223.32	220.57	227.08	214.17	209.09	219.88	226.53	224.68	229.40	219.57	216.72	223.83
HV Ring Closed	Mid Tap (0%)	21. LV Meshed Ways 150kVAr Capacitor 2/3	--	--	--	--	--	--	--	--	--	--	--	--
HV Ring Closed	Mid Tap (0%)	22. LV Meshed Subs & Ways 150kVAr Capacitor 2/3	--	--	--	--	--	--	--	--	--	--	--	--
HV Ring Closed	Mid Tap (0%)	23. LV Meshed Subs 200kVAr Capacitor 1/2	223.79	221.23	227.73	214.86	209.87	220.36	227.00	225.34	230.05	220.25	217.46	224.31
HV Ring Closed	Mid Tap (0%)	24. LV Meshed Ways 200kVAr Capacitor 1/2	--	--	--	--	--	--	--	--	--	--	--	--
HV Ring Closed	Mid Tap (0%)	25. LV Meshed Subs & Ways 200kVAr Capacitor 1/2	--	--	--	--	--	--	--	--	--	--	--	--
HV Ring Closed	Mid Tap (0%)	26. LV Meshed Subs 200kVAr Capacitor 2/3	223.76	221.19	227.69	214.81	210.65	220.33	226.98	225.31	230.02	220.21	218.28	224.29
HV Ring Closed	Mid Tap (0%)	27. LV Meshed Ways 200kVAr Capacitor 2/3	--	--	--	--	--	--	--	--	--	--	--	--
HV Ring Closed	Mid Tap (0%)	28. LV Meshed Subs & Ways 200kVAr Capacitor 2/3	--	--	--	--	--	--	--	--	--	--	--	--
HV Ring Closed	Bottom Tap (-5%)	1. No Intervention	239.11	233.07	239.17	227.18	220.07	212.40	241.00	236.61	241.07	231.72	226.65	218.19
HV Ring Closed	Bottom Tap (-5%)	2. LV Meshed Subs Only	230.41	231.54	237.67	225.61	218.40	227.10	233.28	235.27	239.75	230.36	225.25	230.66
HV Ring Closed	Bottom Tap (-5%)	3. LV Meshed Ways Only	--	--	--	--	--	--	--	--	--	--	--	--
HV Ring Closed	Bottom Tap (-5%)	4. LV Meshed Subs & Ways Only	--	--	--	--	--	--	--	--	--	--	--	--
HV Ring Closed	Bottom Tap (-5%)	5. 100kVAr Capacitor 1/2 Only	240.49	234.42	240.54	228.43	222.77	212.62	242.41	238.02	242.48	233.20	229.54	218.45
HV Ring Closed	Bottom Tap (-5%)	6. 100kVAr Capacitor 2/3 Only	240.47	234.40	240.52	228.41	223.18	212.62	242.40	238.01	242.46	233.18	229.98	218.45
HV Ring Closed	Bottom Tap (-5%)	7. 150kVAr Capacitor 1/2 Only	241.20	235.14	241.25	229.17	224.26	212.77	243.13	238.75	243.20	233.93	231.03	218.60
HV Ring Closed	Bottom Tap (-5%)	8. 150kVAr Capacitor 2/3 Only	241.17	235.11	241.22	229.14	224.90	212.77	243.11	238.73	243.17	233.91	231.69	218.60
HV Ring Closed	Bottom Tap (-5%)	9. 200kVAr Capacitor 1/2 Only	241.91	235.87	241.96	229.91	225.76	212.93	243.85	239.48	243.92	234.67	232.53	218.75
HV Ring Closed	Bottom Tap (-5%)	10. 200kVAr Capacitor 2/3 Only	241.87	235.82	241.92	229.87	226.63	212.92	243.82	239.45	243.89	234.64	233.43	218.75
HV Ring Closed	Bottom Tap (-5%)	11. LV Meshed Subs 100kVAr Capacitor 1/2	231.24	232.76	238.94	226.72	220.99	227.89	234.28	236.60	241.09	231.74	228.04	231.64
HV Ring Closed	Bottom Tap (-5%)	12. LV Meshed Ways 100kVAr Capacitor 1/2	--	--	--	--	--	--	--	--	--	--	--	--
HV Ring Closed	Bottom Tap (-5%)	13. LV Meshed Subs & Ways 100kVAr Capacitor 1/2	--	--	--	--	--	--	--	--	--	--	--	--
HV Ring Closed	Bottom Tap (-5%)	14. LV Meshed Subs 100kVAr Capacitor 2/3	231.22	232.74	238.92	226.70	221.40	227.88	234.27	236.58	241.07	231.72	228.48	231.63
HV Ring Closed	Bottom Tap (-5%)	15. LV Meshed Ways 100kVAr Capacitor 2/3	--	--	--	--	--	--	--	--	--	--	--	--
HV Ring Closed	Bottom Tap (-5%)	16. LV Meshed Subs & Ways 100kVAr Capacitor 2/3	--	--	--	--	--	--	--	--	--	--	--	--
HV Ring Closed	Bottom Tap (-5%)	17. LV Meshed Subs 150kVAr Capacitor 1/2	231.73	233.44	239.60	227.42	222.43	228.39	234.77	237.28	241.76	232.43	229.48	232.14
HV Ring Closed	Bottom Tap (-5%)	18. LV Meshed Ways 150kVAr Capacitor 1/2	--	--	--	--	--	--	--	--	--	--	--	--
HV Ring Closed	Bottom Tap (-5%)	19. LV Meshed Subs & Ways 150kVAr Capacitor 1/2	--	--	--	--	--	--	--	--	--	--	--	--
HV Ring Closed	Bottom Tap (-5%)	20. LV Meshed Subs 150kVAr Capacitor 2/3	231.70	233.41	239.57	227.39	223.07	228.37						

Max Demand of 1.5kW			Circuit Losses				
HV RING	OLTC Tap Position	Scenario	Primary Tx Losses (kW)	HV Losses (kW)	HV/LV Losses (kW)	LV Losses (kW)	Total Losses (kW)
HV Ring Open	Top Tap (5%)	1. No Intervention	13.027	19.830	16.525	85.606	134.989
HV Ring Open	Top Tap (5%)	2. LV Meshed Subs Only	13.038	19.714	16.284	87.385	136.420
HV Ring Open	Top Tap (5%)	3. LV Meshed Ways Only	-	-	-	-	-
HV Ring Open	Top Tap (5%)	4. LV Meshed Subs & Ways Only	-	-	-	-	-
HV Ring Open	Top Tap (5%)	5. 100kVAr Capacitor 1/2 Only	12.999	19.783	16.347	83.513	132.641
HV Ring Open	Top Tap (5%)	6. 100kVAr Capacitor 2/3 Only	13.000	19.787	16.354	83.726	132.867
HV Ring Open	Top Tap (5%)	7. 150kVAr Capacitor 1/2 Only	12.993	19.775	16.359	83.901	133.028
HV Ring Open	Top Tap (5%)	8. 150kVAr Capacitor 2/3 Only	12.996	19.783	16.373	84.431	133.583
HV Ring Open	Top Tap (5%)	9. 200kVAr Capacitor 1/2 Only	12.991	19.788	16.431	84.756	133.966
HV Ring Open	Top Tap (5%)	10. 200kVAr Capacitor 2/3 Only	12.997	19.798	16.455	85.753	135.004
HV Ring Open	Top Tap (5%)	11. LV Meshed Subs 100kVAr Capacitor 1/2	13.007	19.676	16.153	85.266	134.102
HV Ring Open	Top Tap (5%)	12. LV Meshed Ways 100kVAr Capacitor 1/2	-	-	-	-	-
HV Ring Open	Top Tap (5%)	13. LV Meshed Subs & Ways 100kVAr Capacitor 1/2	-	-	-	-	-
HV Ring Open	Top Tap (5%)	14. LV Meshed Subs 100kVAr Capacitor 2/3	13.008	19.680	16.159	85.490	134.337
HV Ring Open	Top Tap (5%)	15. LV Meshed Ways 100kVAr Capacitor 2/3	-	-	-	-	-
HV Ring Open	Top Tap (5%)	16. LV Meshed Subs & Ways 100kVAr Capacitor 2/3	-	-	-	-	-
HV Ring Open	Top Tap (5%)	17. LV Meshed Subs 150kVAr Capacitor 1/2	13.000	19.686	16.181	85.427	134.294
HV Ring Open	Top Tap (5%)	18. LV Meshed Ways 150kVAr Capacitor 1/2	-	-	-	-	-
HV Ring Open	Top Tap (5%)	19. LV Meshed Subs & Ways 150kVAr Capacitor 1/2	-	-	-	-	-
HV Ring Open	Top Tap (5%)	20. LV Meshed Subs 150kVAr Capacitor 2/3	13.003	19.692	16.194	85.973	134.863
HV Ring Open	Top Tap (5%)	21. LV Meshed Ways 150kVAr Capacitor 2/3	-	-	-	-	-
HV Ring Open	Top Tap (5%)	22. LV Meshed Subs & Ways 150kVAr Capacitor 2/3	-	-	-	-	-
HV Ring Open	Top Tap (5%)	23. LV Meshed Subs 200kVAr Capacitor 1/2	12.997	19.713	16.265	86.066	135.042
HV Ring Open	Top Tap (5%)	24. LV Meshed Ways 200kVAr Capacitor 1/2	-	-	-	-	-
HV Ring Open	Top Tap (5%)	25. LV Meshed Subs & Ways 200kVAr Capacitor 1/2	-	-	-	-	-
HV Ring Open	Top Tap (5%)	26. LV Meshed Subs 200kVAr Capacitor 2/3	13.003	19.722	16.287	87.086	136.099
HV Ring Open	Top Tap (5%)	27. LV Meshed Ways 200kVAr Capacitor 2/3	-	-	-	-	-
HV Ring Open	Top Tap (5%)	28. LV Meshed Subs & Ways 200kVAr Capacitor 2/3	-	-	-	-	-
HV Ring Open	Mid Tap (0%)	1. No Intervention	12.978	19.749	14.791	78.273	125.791
HV Ring Open	Mid Tap (0%)	2. LV Meshed Subs Only	12.966	20.440	15.987	73.952	123.346
HV Ring Open	Mid Tap (0%)	3. LV Meshed Ways Only	-	-	-	-	-
HV Ring Open	Mid Tap (0%)	4. LV Meshed Subs & Ways Only	-	-	-	-	-
HV Ring Open	Mid Tap (0%)	5. 100kVAr Capacitor 1/2 Only	12.948	19.644	14.650	77.023	124.266
HV Ring Open	Mid Tap (0%)	6. 100kVAr Capacitor 2/3 Only	12.950	19.648	14.656	77.276	124.530
HV Ring Open	Mid Tap (0%)	7. 150kVAr Capacitor 1/2 Only	12.944	19.647	14.689	77.620	124.899
HV Ring Open	Mid Tap (0%)	8. 150kVAr Capacitor 2/3 Only	12.948	19.654	14.703	78.234	125.539
HV Ring Open	Mid Tap (0%)	9. 200kVAr Capacitor 1/2 Only	12.945	19.674	14.793	78.737	126.150
HV Ring Open	Mid Tap (0%)	10. 200kVAr Capacitor 2/3 Only	12.951	19.684	14.818	79.885	127.338
HV Ring Open	Mid Tap (0%)	11. LV Meshed Subs 100kVAr Capacitor 1/2	12.939	20.390	15.858	73.057	122.245
HV Ring Open	Mid Tap (0%)	12. LV Meshed Ways 100kVAr Capacitor 1/2	-	-	-	-	-
HV Ring Open	Mid Tap (0%)	13. LV Meshed Subs & Ways 100kVAr Capacitor 1/2	-	-	-	-	-
HV Ring Open	Mid Tap (0%)	14. LV Meshed Subs 100kVAr Capacitor 2/3	12.940	20.394	15.865	73.310	122.509
HV Ring Open	Mid Tap (0%)	15. LV Meshed Ways 100kVAr Capacitor 2/3	-	-	-	-	-
HV Ring Open	Mid Tap (0%)	16. LV Meshed Subs & Ways 100kVAr Capacitor 2/3	-	-	-	-	-
HV Ring Open	Mid Tap (0%)	17. LV Meshed Subs 150kVAr Capacitor 1/2	12.934	20.399	15.882	73.646	122.860
HV Ring Open	Mid Tap (0%)	18. LV Meshed Ways 150kVAr Capacitor 1/2	-	-	-	-	-
HV Ring Open	Mid Tap (0%)	19. LV Meshed Subs & Ways 150kVAr Capacitor 1/2	-	-	-	-	-
HV Ring Open	Mid Tap (0%)	20. LV Meshed Subs 150kVAr Capacitor 2/3	12.938	20.405	15.896	74.260	123.499
HV Ring Open	Mid Tap (0%)	21. LV Meshed Ways 150kVAr Capacitor 2/3	-	-	-	-	-
HV Ring Open	Mid Tap (0%)	22. LV Meshed Subs & Ways 150kVAr Capacitor 2/3	-	-	-	-	-
HV Ring Open	Mid Tap (0%)	23. LV Meshed Subs 200kVAr Capacitor 1/2	12.935	20.428	15.964	74.768	124.096
HV Ring Open	Mid Tap (0%)	24. LV Meshed Ways 200kVAr Capacitor 1/2	-	-	-	-	-
HV Ring Open	Mid Tap (0%)	25. LV Meshed Subs & Ways 200kVAr Capacitor 1/2	-	-	-	-	-
HV Ring Open	Mid Tap (0%)	26. LV Meshed Subs 200kVAr Capacitor 2/3	12.941	20.438	15.990	75.913	125.282
HV Ring Open	Mid Tap (0%)	27. LV Meshed Ways 200kVAr Capacitor 2/3	-	-	-	-	-
HV Ring Open	Mid Tap (0%)	28. LV Meshed Subs & Ways 200kVAr Capacitor 2/3	-	-	-	-	-
HV Ring Open	Bottom Tap (-5%)	1. No Intervention	12.931	19.537	13.175	71.233	116.875
HV Ring Open	Bottom Tap (-5%)	2. LV Meshed Subs Only	12.930	21.374	15.976	66.627	116.907
HV Ring Open	Bottom Tap (-5%)	3. LV Meshed Ways Only	-	-	-	-	-
HV Ring Open	Bottom Tap (-5%)	4. LV Meshed Subs & Ways Only	-	-	-	-	-
HV Ring Open	Bottom Tap (-5%)	5. 100kVAr Capacitor 1/2 Only	12.902	19.533	13.089	70.931	116.456
HV Ring Open	Bottom Tap (-5%)	6. 100kVAr Capacitor 2/3 Only	12.904	19.537	13.096	71.228	116.765
HV Ring Open	Bottom Tap (-5%)	7. 150kVAr Capacitor 1/2 Only	12.900	19.550	13.157	71.756	117.362
HV Ring Open	Bottom Tap (-5%)	8. 150kVAr Capacitor 2/3 Only	12.904	19.557	13.171	72.470	118.101
HV Ring Open	Bottom Tap (-5%)	9. 200kVAr Capacitor 1/2 Only	12.903	19.598	13.297	73.168	118.965
HV Ring Open	Bottom Tap (-5%)	10. 200kVAr Capacitor 2/3 Only	12.910	19.608	13.321	74.492	120.332
HV Ring Open	Bottom Tap (-5%)	11. LV Meshed Subs 100kVAr Capacitor 1/2	12.907	21.343	15.820	66.939	117.009
HV Ring Open	Bottom Tap (-5%)	12. LV Meshed Ways 100kVAr Capacitor 1/2	-	-	-	-	-
HV Ring Open	Bottom Tap (-5%)	13. LV Meshed Subs & Ways 100kVAr Capacitor 1/2	-	-	-	-	-
HV Ring Open	Bottom Tap (-5%)	14. LV Meshed Subs 100kVAr Capacitor 2/3	12.909	21.347	15.829	67.225	117.310
HV Ring Open	Bottom Tap (-5%)	15. LV Meshed Ways 100kVAr Capacitor 2/3	-	-	-	-	-
HV Ring Open	Bottom Tap (-5%)	16. LV Meshed Subs & Ways 100kVAr Capacitor 2/3	-	-	-	-	-
HV Ring Open	Bottom Tap (-5%)	17. LV Meshed Subs 150kVAr Capacitor 1/2	12.905	21.349	15.833	68.035	118.122
HV Ring Open	Bottom Tap (-5%)	18. LV Meshed Ways 150kVAr Capacitor 1/2	-	-	-	-	-
HV Ring Open	Bottom Tap (-5%)	19. LV Meshed Subs & Ways 150kVAr Capacitor 1/2	-	-	-	-	-
HV Ring Open	Bottom Tap (-5%)	20. LV Meshed Subs 150kVAr Capacitor 2/3	12.909	21.357	15.850	68.730	118.845
HV Ring Open	Bottom Tap (-5%)	21. LV Meshed Ways 150kVAr Capacitor 2/3	-	-	-	-	-
HV Ring Open	Bottom Tap (-5%)	22. LV Meshed Subs & Ways 150kVAr Capacitor 2/3	-	-	-	-	-
HV Ring Open	Bottom Tap (-5%)	23. LV Meshed Subs 200kVAr Capacitor 1/2	12.909	21.382	15.911	69.730	119.932
HV Ring Open	Bottom Tap (-5%)	24. LV Meshed Ways 200kVAr Capacitor 1/2	-	-	-	-	-
HV Ring Open	Bottom Tap (-5%)	25. LV Meshed Subs & Ways 200kVAr Capacitor 1/2	-	-	-	-	-
HV Ring Open	Bottom Tap (-5%)	26. LV Meshed Subs 200kVAr Capacitor 2/3	12.916	21.393	15.940	71.026	121.275
HV Ring Open	Bottom Tap (-5%)	27. LV Meshed Ways 200kVAr Capacitor 2/3	-	-	-	-	-
HV Ring Open	Bottom Tap (-5%)	28. LV Meshed Subs & Ways 200kVAr Capacitor 2/3	-	-	-	-	-

Max Demand of 1.5kW			Circuit Losses				
HV RING	OLTC Tap Position	Scenario	Primary Tx Losses (kW)	HV Losses (kW)	HV/LV Losses (kW)	LV Losses (kW)	Total Losses (kW)
HV Ring Closed	Top Tap (5%)	1. No Intervention	12.993	14.913	16.340	83.633	127.879
HV Ring Closed	Top Tap (5%)	2. LV Meshed Subs Only	13.002	14.895	16.276	85.739	129.912
HV Ring Closed	Top Tap (5%)	3. LV Meshed Ways Only	-	-	-	-	-
HV Ring Closed	Top Tap (5%)	4. LV Meshed Subs & Ways Only	-	-	-	-	-
HV Ring Closed	Top Tap (5%)	5. 100kVAr Capacitor 1/2 Only	12.968	14.889	16.200	83.017	127.073
HV Ring Closed	Top Tap (5%)	6. 100kVAr Capacitor 2/3 Only	12.969	14.891	16.207	83.234	127.300
HV Ring Closed	Top Tap (5%)	7. 150kVAr Capacitor 1/2 Only	12.962	14.884	16.216	83.434	127.497
HV Ring Closed	Top Tap (5%)	8. 150kVAr Capacitor 2/3 Only	12.965	14.887	16.231	83.972	128.056
HV Ring Closed	Top Tap (5%)	9. 200kVAr Capacitor 1/2 Only	12.961	14.886	16.293	84.321	128.461
HV Ring Closed	Top Tap (5%)	10. 200kVAr Capacitor 2/3 Only	12.967	14.891	16.318	85.331	129.507
HV Ring Closed	Top Tap (5%)	11. LV Meshed Subs 100kVAr Capacitor 1/2	12.972	14.875	16.154	83.781	127.782
HV Ring Closed	Top Tap (5%)	12. LV Meshed Ways 100kVAr Capacitor 1/2	-	-	-	-	-
HV Ring Closed	Top Tap (5%)	13. LV Meshed Subs & Ways 100kVAr Capacitor 1/2	-	-	-	-	-
HV Ring Closed	Top Tap (5%)	14. LV Meshed Subs 100kVAr Capacitor 2/3	12.974	14.877	16.160	84.009	128.018
HV Ring Closed	Top Tap (5%)	15. LV Meshed Ways 100kVAr Capacitor 2/3	-	-	-	-	-
HV Ring Closed	Top Tap (5%)	16. LV Meshed Subs & Ways 100kVAr Capacitor 2/3	-	-	-	-	-
HV Ring Closed	Top Tap (5%)	17. LV Meshed Subs 150kVAr Capacitor 1/2	12.965	14.879	16.187	83.975	128.007
HV Ring Closed	Top Tap (5%)	18. LV Meshed Ways 150kVAr Capacitor 1/2	-	-	-	-	-
HV Ring Closed	Top Tap (5%)	19. LV Meshed Subs & Ways 150kVAr Capacitor 1/2	-	-	-	-	-
HV Ring Closed	Top Tap (5%)	20. LV Meshed Subs 150kVAr Capacitor 2/3	12.969	14.882	16.200	84.529	128.579
HV Ring Closed	Top Tap (5%)	21. LV Meshed Ways 150kVAr Capacitor 2/3	-	-	-	-	-
HV Ring Closed	Top Tap (5%)	22. LV Meshed Subs & Ways 150kVAr Capacitor 2/3	-	-	-	-	-
HV Ring Closed	Top Tap (5%)	23. LV Meshed Subs 200kVAr Capacitor 1/2	12.963	14.889	16.276	84.650	128.777
HV Ring Closed	Top Tap (5%)	24. LV Meshed Ways 200kVAr Capacitor 1/2	-	-	-	-	-
HV Ring Closed	Top Tap (5%)	25. LV Meshed Subs & Ways 200kVAr Capacitor 1/2	-	-	-	-	-
HV Ring Closed	Top Tap (5%)	26. LV Meshed Subs 200kVAr Capacitor 2/3	12.969	14.893	16.298	85.681	129.841
HV Ring Closed	Top Tap (5%)	27. LV Meshed Ways 200kVAr Capacitor 2/3	-	-	-	-	-
HV Ring Closed	Top Tap (5%)	28. LV Meshed Subs & Ways 200kVAr Capacitor 2/3	-	-	-	-	-
HV Ring Closed	Mid Tap (0%)	1. No Intervention	12.947	14.877	14.653	77.682	120.160
HV Ring Closed	Mid Tap (0%)	2. LV Meshed Subs Only	12.931	15.199	16.001	72.802	116.932
HV Ring Closed	Mid Tap (0%)	3. LV Meshed Ways Only	-	-	-	-	-
HV Ring Closed	Mid Tap (0%)	4. LV Meshed Subs & Ways Only	-	-	-	-	-
HV Ring Closed	Mid Tap (0%)	5. 100kVAr Capacitor 1/2 Only	12.919	14.828	14.521	76.526	118.794
HV Ring Closed	Mid Tap (0%)	6. 100kVAr Capacitor 2/3 Only	12.920	14.830	14.528	76.781	119.060
HV Ring Closed	Mid Tap (0%)	7. 150kVAr Capacitor 1/2 Only	12.914	14.826	14.565	77.152	119.457
HV Ring Closed	Mid Tap (0%)	8. 150kVAr Capacitor 2/3 Only	12.918	14.830	14.579	77.774	120.100
HV Ring Closed	Mid Tap (0%)	9. 200kVAr Capacitor 1/2 Only	12.916	14.832	14.675	78.302	120.724
HV Ring Closed	Mid Tap (0%)	10. 200kVAr Capacitor 2/3 Only	12.922	14.838	14.699	79.462	121.920
HV Ring Closed	Mid Tap (0%)	11. LV Meshed Subs 100kVAr Capacitor 1/2	12.904	15.179	15.877	71.971	115.931
HV Ring Closed	Mid Tap (0%)	12. LV Meshed Ways 100kVAr Capacitor 1/2	-	-	-	-	-
HV Ring Closed	Mid Tap (0%)	13. LV Meshed Subs & Ways 100kVAr Capacitor 1/2	-	-	-	-	-
HV Ring Closed	Mid Tap (0%)	14. LV Meshed Subs 100kVAr Capacitor 2/3	12.906	15.180	15.884	72.227	116.197
HV Ring Closed	Mid Tap (0%)	15. LV Meshed Ways 100kVAr Capacitor 2/3	-	-	-	-	-
HV Ring Closed	Mid Tap (0%)	16. LV Meshed Subs & Ways 100kVAr Capacitor 2/3	-	-	-	-	-
HV Ring Closed	Mid Tap (0%)	17. LV Meshed Subs 150kVAr Capacitor 1/2	12.900	15.183	15.904	72.590	116.578
HV Ring Closed	Mid Tap (0%)	18. LV Meshed Ways 150kVAr Capacitor 1/2	-	-	-	-	-
HV Ring Closed	Mid Tap (0%)	19. LV Meshed Subs & Ways 150kVAr Capacitor 1/2	-	-	-	-	-
HV Ring Closed	Mid Tap (0%)	20. LV Meshed Subs 150kVAr Capacitor 2/3	12.904	15.186	15.919	73.211	117.220
HV Ring Closed	Mid Tap (0%)	21. LV Meshed Ways 150kVAr Capacitor 2/3	-	-	-	-	-
HV Ring Closed	Mid Tap (0%)	22. LV Meshed Subs & Ways 150kVAr Capacitor 2/3	-	-	-	-	-
HV Ring Closed	Mid Tap (0%)	23. LV Meshed Subs 200kVAr Capacitor 1/2	12.901	15.195	15.992	73.745	117.833
HV Ring Closed	Mid Tap (0%)	24. LV Meshed Ways 200kVAr Capacitor 1/2	-	-	-	-	-
HV Ring Closed	Mid Tap (0%)	25. LV Meshed Subs & Ways 200kVAr Capacitor 1/2	-	-	-	-	-
HV Ring Closed	Mid Tap (0%)	26. LV Meshed Subs 200kVAr Capacitor 2/3	12.907	15.200	16.018	74.902	119.027
HV Ring Closed	Mid Tap (0%)	27. LV Meshed Ways 200kVAr Capacitor 2/3	-	-	-	-	-
HV Ring Closed	Mid Tap (0%)	28. LV Meshed Subs & Ways 200kVAr Capacitor 2/3	-	-	-	-	-
HV Ring Closed	Bottom Tap (-5%)	1. No Intervention	12.901	14.786	13.047	70.798	111.532
HV Ring Closed	Bottom Tap (-5%)	2. LV Meshed Subs Only	12.896	15.589	16.016	66.142	110.642
HV Ring Closed	Bottom Tap (-5%)	3. LV Meshed Ways Only	-	-	-	-	-
HV Ring Closed	Bottom Tap (-5%)	4. LV Meshed Subs & Ways Only	-	-	-	-	-
HV Ring Closed	Bottom Tap (-5%)	5. 100kVAr Capacitor 1/2 Only	12.873	14.776	12.979	70.502	111.130
HV Ring Closed	Bottom Tap (-5%)	6. 100kVAr Capacitor 2/3 Only	12.875	14.778	12.986	70.803	111.441
HV Ring Closed	Bottom Tap (-5%)	7. 150kVAr Capacitor 1/2 Only	12.871	14.778	13.052	71.357	112.058
HV Ring Closed	Bottom Tap (-5%)	8. 150kVAr Capacitor 2/3 Only	12.875	14.782	13.066	72.079	112.801
HV Ring Closed	Bottom Tap (-5%)	9. 200kVAr Capacitor 1/2 Only	12.875	14.790	13.197	72.803	113.665
HV Ring Closed	Bottom Tap (-5%)	10. 200kVAr Capacitor 2/3 Only	12.882	14.796	13.222	74.141	115.040
HV Ring Closed	Bottom Tap (-5%)	11. LV Meshed Subs 100kVAr Capacitor 1/2	12.873	15.578	15.862	66.473	110.786
HV Ring Closed	Bottom Tap (-5%)	12. LV Meshed Ways 100kVAr Capacitor 1/2	-	-	-	-	-
HV Ring Closed	Bottom Tap (-5%)	13. LV Meshed Subs & Ways 100kVAr Capacitor 1/2	-	-	-	-	-
HV Ring Closed	Bottom Tap (-5%)	14. LV Meshed Subs 100kVAr Capacitor 2/3	12.875	15.580	15.870	66.763	111.088
HV Ring Closed	Bottom Tap (-5%)	15. LV Meshed Ways 100kVAr Capacitor 2/3	-	-	-	-	-
HV Ring Closed	Bottom Tap (-5%)	16. LV Meshed Subs & Ways 100kVAr Capacitor 2/3	-	-	-	-	-
HV Ring Closed	Bottom Tap (-5%)	17. LV Meshed Subs 150kVAr Capacitor 1/2	12.871	15.584	15.878	67.597	111.930
HV Ring Closed	Bottom Tap (-5%)	18. LV Meshed Ways 150kVAr Capacitor 1/2	-	-	-	-	-
HV Ring Closed	Bottom Tap (-5%)	19. LV Meshed Subs & Ways 150kVAr Capacitor 1/2	-	-	-	-	-
HV Ring Closed	Bottom Tap (-5%)	20. LV Meshed Subs 150kVAr Capacitor 2/3	12.875	15.587	15.895	68.300	112.658
HV Ring Closed	Bottom Tap (-5%)	21. LV Meshed Ways 150kVAr Capacitor 2/3	-	-	-	-	-
HV Ring Closed	Bottom Tap (-5%)	22. LV Meshed Subs & Ways 150kVAr Capacitor 2/3	-	-	-	-	-
HV Ring Closed	Bottom Tap (-5%)	23. LV Meshed Subs 200kVAr Capacitor 1/2	12.876	15.598	15.962	69.322	113.757
HV Ring Closed	Bottom Tap (-5%)	24. LV Meshed Ways 200kVAr Capacitor 1/2	-	-	-	-	-
HV Ring Closed	Bottom Tap (-5%)	25. LV Meshed Subs & Ways 200kVAr Capacitor 1/2	-	-	-	-	-
HV Ring Closed	Bottom Tap (-5%)	26. LV Meshed Subs 200kVAr Capacitor 2/3	12.883	15.604	15.991	70.632	115.110
HV Ring Closed	Bottom Tap (-5%)	27. LV Meshed Ways 200kVAr Capacitor 2/3	-	-	-	-	-
HV Ring Closed	Bottom Tap (-5%)	28. LV Meshed Subs & Ways 200kVAr Capacitor 2/3	-	-	-	-	-

# APPENDIX F – WIGTON RESULTS

Min Demand of 0.2kW (3.08kW PV average installation)			Voltage Level at 0% PV Penetration						Voltage Level at 10% PV Penetration					
HV RING	OLTC Tap Position	Scenario	YW5	BW3	GW2	RW4	PW8	E8	YW5	BW3	GW2	RW4	PW8	E8
HV Ring Open	Top Tap (5%)	1. No Intervention	226.28	227.48	227.07	227.27	227.27	239.22	228.99	228.39	228.88	228.93	228.66	239.75
HV Ring Open	Top Tap (5%)	2. LV Meshed Subs Only	227.72	235.41	228.52	228.71	228.72	235.92	230.55	235.79	230.44	230.49	230.23	236.32
HV Ring Open	Top Tap (5%)	3. LV Meshed Ways Only	227.08	227.46	227.07	227.27	227.27	239.22	228.60	228.41	228.93	228.98	228.70	239.75
HV Ring Open	Top Tap (5%)	4. LV Meshed Subs & Ways Only	228.63	235.40	228.52	228.71	228.72	235.92	230.20	235.79	230.44	230.49	230.23	236.32
HV Ring Open	Top Tap (5%)	5. 100kVAr Capacitor 1/2 Only	231.76	231.11	230.71	230.90	230.91	239.58	234.54	232.03	232.52	232.57	232.30	240.12
HV Ring Open	Top Tap (5%)	6. 100kVAr Capacitor 2/3 Only	234.42	231.10	230.70	230.89	230.90	239.59	235.34	232.03	232.51	232.56	232.30	240.12
HV Ring Open	Top Tap (5%)	7. 150kVAr Capacitor 1/2 Only	234.20	232.92	232.52	232.71	232.72	239.76	237.30	233.85	234.33	234.38	234.12	240.30
HV Ring Open	Top Tap (5%)	8. 150kVAr Capacitor 2/3 Only	236.63	232.89	232.49	232.68	232.69	239.76	237.60	233.81	234.32	234.36	234.10	240.28
HV Ring Open	Top Tap (5%)	9. 200kVAr Capacitor 1/2 Only	237.66	234.73	234.33	234.53	234.53	239.94	239.29	235.70	236.17	236.22	235.96	240.48
HV Ring Open	Top Tap (5%)	10. 200kVAr Capacitor 2/3 Only	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
HV Ring Open	Top Tap (5%)	11. LV Meshed Subs 100kVAr Capacitor 1/2	232.72	236.83	231.68	231.87	231.88	237.20	235.82	237.35	233.54	233.59	233.33	237.73
HV Ring Open	Top Tap (5%)	12. LV Meshed Ways 100kVAr Capacitor 1/2	231.75	231.16	230.74	230.93	230.94	239.59	233.02	232.07	232.53	232.58	232.31	240.12
HV Ring Open	Top Tap (5%)	13. LV Meshed Subs & Ways 100kVAr Capacitor 1/2	232.65	237.11	231.58	231.77	231.78	237.45	234.05	237.49	233.50	233.55	233.29	237.84
HV Ring Open	Top Tap (5%)	14. LV Meshed Subs 100kVAr Capacitor 2/3	235.41	236.80	231.69	231.88	231.89	237.17	236.30	237.42	233.51	233.57	233.30	237.78
HV Ring Open	Top Tap (5%)	15. LV Meshed Ways 100kVAr Capacitor 2/3	232.00	231.15	230.73	230.92	230.93	239.59	233.32	232.09	232.53	232.58	232.32	240.12
HV Ring Open	Top Tap (5%)	16. LV Meshed Subs & Ways 100kVAr Capacitor 2/3	232.90	237.10	231.57	231.77	231.77	237.44	234.44	237.39	233.54	233.59	233.33	237.76
HV Ring Open	Top Tap (5%)	17. LV Meshed Subs 150kVAr Capacitor 1/2	234.91	237.60	233.21	233.40	233.41	237.90	237.95	238.25	235.02	235.07	234.81	238.53
HV Ring Open	Top Tap (5%)	18. LV Meshed Ways 150kVAr Capacitor 1/2	233.76	232.97	232.55	232.74	232.75	239.76	235.35	233.94	234.37	234.42	234.17	240.31
HV Ring Open	Top Tap (5%)	19. LV Meshed Subs & Ways 150kVAr Capacitor 1/2	234.46	237.71	233.19	233.38	233.39	237.99	235.79	238.24	235.08	235.13	234.86	238.52
HV Ring Open	Top Tap (5%)	20. LV Meshed Subs 150kVAr Capacitor 2/3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
HV Ring Open	Top Tap (5%)	21. LV Meshed Ways 150kVAr Capacitor 2/3	234.86	233.06	232.61	232.80	232.81	239.78	235.72	233.97	234.39	234.44	234.18	240.31
HV Ring Open	Top Tap (5%)	22. LV Meshed Subs & Ways 150kVAr Capacitor 2/3	234.61	237.77	233.19	233.38	233.39	238.05	236.23	238.26	235.09	235.14	234.87	238.54
HV Ring Open	Top Tap (5%)	23. LV Meshed Subs 200kVAr Capacitor 1/2	237.29	238.44	234.69	234.88	234.89	238.65	239.95	239.09	236.56	236.61	236.35	239.28
HV Ring Open	Top Tap (5%)	24. LV Meshed Ways 200kVAr Capacitor 1/2	235.80	234.83	234.40	234.59	234.60	239.94	237.43	235.80	236.22	236.27	236.01	240.49
HV Ring Open	Top Tap (5%)	25. LV Meshed Subs & Ways 200kVAr Capacitor 1/2	236.19	238.51	234.75	234.94	234.94	238.71	237.83	239.16	236.58	236.63	236.37	239.34
HV Ring Open	Top Tap (5%)	26. LV Meshed Subs 200kVAr Capacitor 2/3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
HV Ring Open	Top Tap (5%)	27. LV Meshed Ways 200kVAr Capacitor 2/3	236.66	234.90	234.45	234.65	234.65	239.95	238.09	235.84	236.25	236.30	236.04	240.49
HV Ring Open	Top Tap (5%)	28. LV Meshed Subs & Ways 200kVAr Capacitor 2/3	237.03	238.55	234.78	234.97	234.98	238.75	238.24	239.12	236.62	236.67	236.41	239.32
HV Ring Open	Mid Tap (0%)	1. No Intervention	237.78	238.92	238.53	238.72	238.73	239.22	240.38	239.79	240.26	240.31	240.05	239.75
HV Ring Open	Mid Tap (0%)	2. LV Meshed Subs Only	237.79	239.21	238.54	238.73	238.74	239.14	240.38	239.85	240.27	240.32	240.06	239.76
HV Ring Open	Mid Tap (0%)	3. LV Meshed Ways Only	238.55	238.91	238.53	238.72	238.73	239.22	239.97	239.80	240.26	240.31	240.06	239.76
HV Ring Open	Mid Tap (0%)	4. LV Meshed Subs & Ways Only	238.56	239.21	238.54	238.73	238.74	239.14	239.99	239.80	240.29	240.34	240.08	239.72
HV Ring Open	Mid Tap (0%)	5. 100kVAr Capacitor 1/2 Only	243.28	242.77	242.39	242.57	242.58	239.62	245.27	243.65	244.10	244.15	243.90	240.16
HV Ring Open	Mid Tap (0%)	6. 100kVAr Capacitor 2/3 Only	243.58	242.74	242.36	242.54	242.55	239.61	244.48	243.62	244.06	244.12	243.87	240.15
HV Ring Open	Mid Tap (0%)	7. 150kVAr Capacitor 1/2 Only	246.59	244.64	244.26	244.44	244.45	239.80	248.90	245.61	246.07	246.11	245.86	240.36
HV Ring Open	Mid Tap (0%)	8. 150kVAr Capacitor 2/3 Only	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
HV Ring Open	Mid Tap (0%)	9. 200kVAr Capacitor 1/2 Only	249.68	246.62	246.24	246.43	246.43	240.01	250.36	247.47	247.89	247.95	247.71	240.54
HV Ring Open	Mid Tap (0%)	10. 200kVAr Capacitor 2/3 Only	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
HV Ring Open	Mid Tap (0%)	11. LV Meshed Subs 100kVAr Capacitor 1/2	242.65	240.97	241.75	241.94	241.94	240.71	244.71	241.57	243.48	243.53	243.28	241.31
HV Ring Open	Mid Tap (0%)	12. LV Meshed Ways 100kVAr Capacitor 1/2	243.57	242.83	242.43	242.61	242.62	239.63	244.68	243.70	244.13	244.17	243.92	240.16
HV Ring Open	Mid Tap (0%)	13. LV Meshed Subs & Ways 100kVAr Capacitor 1/2	242.99	240.82	241.87	242.05	242.06	240.59	244.02	241.63	243.50	243.55	243.29	241.35
HV Ring Open	Mid Tap (0%)	14. LV Meshed Subs 100kVAr Capacitor 2/3	242.96	240.98	241.71	241.89	241.90	240.72	244.00	241.56	243.44	243.50	243.25	241.30
HV Ring Open	Mid Tap (0%)	15. LV Meshed Ways 100kVAr Capacitor 2/3	243.76	242.82	242.41	242.60	242.60	239.62	245.02	243.71	244.13	244.17	243.93	240.16
HV Ring Open	Mid Tap (0%)	16. LV Meshed Subs & Ways 100kVAr Capacitor 2/3	243.19	240.81	241.85	242.04	242.05	240.58	244.37	241.59	243.51	243.55	243.30	241.33
HV Ring Open	Mid Tap (0%)	17. LV Meshed Subs 150kVAr Capacitor 1/2	245.57	241.85	243.27	243.45	243.46	241.51	248.54	242.51	245.06	245.11	244.86	242.15
HV Ring Open	Mid Tap (0%)	18. LV Meshed Ways 150kVAr Capacitor 1/2	245.66	244.77	244.37	244.55	244.56	239.82	246.88	245.66	246.06	246.11	245.86	240.36
HV Ring Open	Mid Tap (0%)	19. LV Meshed Subs & Ways 150kVAr Capacitor 1/2	244.65	241.87	243.39	243.57	243.58	241.52	246.00	242.54	245.10	245.15	244.90	242.17
HV Ring Open	Mid Tap (0%)	20. LV Meshed Subs 150kVAr Capacitor 2/3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
HV Ring Open	Mid Tap (0%)	21. LV Meshed Ways 150kVAr Capacitor 2/3	245.69	244.77	244.36	244.54	244.55	239.82	247.51	245.69	246.09	246.14	245.89	240.36
HV Ring Open	Mid Tap (0%)	22. LV Meshed Subs & Ways 150kVAr Capacitor 2/3	244.74	241.76	243.43	243.61	243.62	241.43	246.59	242.50	245.12	245.17	244.92	242.14
HV Ring Open	Mid Tap (0%)	23. LV Meshed Subs 200kVAr Capacitor 1/2	248.16	242.76	244.88	245.06	245.07	242.33	249.97	243.39	246.66	246.71	246.46	242.94
HV Ring Open	Mid Tap (0%)	24. LV Meshed Ways 200kVAr Capacitor 1/2	247.74	246.69	246.29	246.47	246.48	240.01	249.37	247.64	248.05	248.09	247.85	240.56
HV Ring Open	Mid Tap (0%)	25. LV Meshed Subs & Ways 200kVAr Capacitor 1/2	246.35	242.78	244.94	245.12	245.13	242.34	247.97	243.45	246.70	246.75	246.51	242.99
HV Ring Open	Mid Tap (0%)	26. LV Meshed Subs 200kVAr Capacitor 2/3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
HV Ring Open	Mid Tap (0%)	27. LV Meshed Ways 200kVAr Capacitor 2/3	248.60	246.79	246.36	246.54	246.55	240.03	250.04	247.69	248.07	248.12	247.88	240.57
HV Ring Open	Mid Tap (0%)	28. LV Meshed Subs & Ways 200kVAr Capacitor 2/3	247.22	242.79	245.01	245.20	245.20	242.35	248.63	243.47	246.73	246.77	246.53	243.01
HV Ring Open	Bottom Tap (-5%)	1. No Intervention	250.47	251.56	251.19	251.37	251.37	239.21	252.85	252.37	252.77	252.83	252.60	239.76
HV Ring Open	Bottom Tap (-5%)	2. LV Meshed Subs Only	248.83	243.48	249.55	249.73	249.74	242.74	251.14	244.33	251.06	251.12	250.88	243.55
HV Ring Open	Bottom Tap (-5%)	3. LV Meshed Ways Only	251.22	251.55	251.19	251.37	251.37	239.21	252.53	252.38	252.77	252.83	252.60	239.76
HV Ring Open	Bottom Tap (-5%)	4. LV Meshed Subs & Ways Only	249.51	243.48	249.55	249.73	249.74	242.74	250.73	244.33	251.06	251.11	250.88	243.56
HV Ring Open	Bottom Tap (-5%)	5. 100kVAr Capacitor 1/2 Only	256.83	255.61	255.25	255.43	255.43	239.65	257.66	256.47	256.85	256.90	256.68	240.20
HV Ring Open	Bottom Tap (-5%)	6. 100kVAr Capacitor 2/3 Only	257.23	255.62	255.25	255.43	255.44	239.66	259.94	256.48	256.92	256.96	256.73	240.20
HV Ring Open	Bottom Tap (-5%)	7. 150kVAr Capacitor 1/2 Only	259.56	257.65	257.29	257.46	257.47	239.87	261.87	258.58	259.02	259.06	258.83	240.42
HV Ring Open	Bottom Tap (-5%)	8. 150kVAr Capacitor 2/3 Only	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
HV Ring Open	Bottom Tap (-5%)	9. 200kVAr Capacitor 1/2 Only	262.93	259.73	259.37	259.55	259							



Max Demand of 1.5kW (3.08kW PV average installation)			Voltage Level at 0% PV Penetration						Voltage Level at 10% PV Penetration					
HV RING	OLTC Tap Position	Scenario	YW5	BW3	GW2	RW4	PW8	E8	YW5	BW3	GW2	RW4	PW8	E8
HV Ring Open	Top Tap (5%)	1. No Intervention	202.27	212.22	208.89	210.53	210.58	226.07	205.15	213.24	210.84	213.24	212.08	226.64
HV Ring Open	Top Tap (5%)	2. LV Meshed Subs Only	203.75	222.41	210.32	211.95	212.00	222.35	207.23	222.80	212.60	214.01	213.78	222.76
HV Ring Open	Top Tap (5%)	3. LV Meshed Ways Only	209.22	212.18	208.94	210.58	210.63	226.07	210.79	213.20	210.87	212.30	212.11	226.64
HV Ring Open	Top Tap (5%)	4. LV Meshed Subs & Ways Only	210.76	222.40	210.38	212.01	212.06	222.34	212.48	222.78	212.46	213.88	213.69	222.74
HV Ring Open	Top Tap (5%)	5. 100kVAr Capacitor 1/2 Only	207.06	215.47	212.16	213.74	213.84	226.39	209.92	216.61	214.36	215.75	215.53	226.99
HV Ring Open	Top Tap (5%)	6. 100kVAr Capacitor 2/3 Only	206.21	215.42	212.12	213.70	213.79	226.38	210.32	216.48	214.12	215.53	215.34	226.96
HV Ring Open	Top Tap (5%)	7. 150kVAr Capacitor 1/2 Only	209.96	217.16	213.88	215.45	215.54	226.56	212.14	218.26	216.02	217.41	217.19	227.15
HV Ring Open	Top Tap (5%)	8. 150kVAr Capacitor 2/3 Only	212.05	217.03	213.74	215.31	215.41	226.55	214.12	218.10	215.75	217.15	216.97	227.12
HV Ring Open	Top Tap (5%)	9. 200kVAr Capacitor 1/2 Only	213.03	218.80	215.55	217.10	217.20	226.72	213.59	219.87	217.64	219.02	218.80	227.30
HV Ring Open	Top Tap (5%)	10. 200kVAr Capacitor 2/3 Only	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
HV Ring Open	Top Tap (5%)	11. LV Meshed Subs 100kVAr Capacitor 1/2	208.17	223.58	213.22	214.79	214.88	223.40	211.44	224.28	215.26	216.66	216.47	224.09
HV Ring Open	Top Tap (5%)	12. LV Meshed Ways 100kVAr Capacitor 1/2	213.38	215.60	212.39	213.99	214.05	226.42	215.06	216.66	214.33	215.74	215.56	226.99
HV Ring Open	Top Tap (5%)	13. LV Meshed Subs & Ways 100kVAr Capacitor 1/2	214.48	223.71	213.39	214.99	215.05	223.52	216.15	224.35	215.39	216.79	216.61	224.15
HV Ring Open	Top Tap (5%)	14. LV Meshed Subs 100kVAr Capacitor 2/3	207.27	223.53	213.19	214.76	214.86	223.36	211.42	224.24	215.19	216.59	216.40	224.05
HV Ring Open	Top Tap (5%)	15. LV Meshed Ways 100kVAr Capacitor 2/3	213.69	215.60	212.38	213.98	214.04	226.41	215.30	216.67	214.35	215.76	215.57	226.99
HV Ring Open	Top Tap (5%)	16. LV Meshed Subs & Ways 100kVAr Capacitor 2/3	214.79	223.70	213.39	214.98	215.04	223.51	216.42	224.35	215.38	216.78	216.59	224.15
HV Ring Open	Top Tap (5%)	17. LV Meshed Subs 150kVAr Capacitor 1/2	210.76	224.31	214.67	216.23	216.33	224.07	213.61	225.03	216.65	218.05	217.86	224.77
HV Ring Open	Top Tap (5%)	18. LV Meshed Ways 150kVAr Capacitor 1/2	215.46	217.35	214.14	215.70	215.79	226.59	217.14	218.42	216.12	217.52	217.33	227.17
HV Ring Open	Top Tap (5%)	19. LV Meshed Subs & Ways 150kVAr Capacitor 1/2	216.30	224.41	214.89	216.45	216.54	224.16	217.96	225.13	216.86	218.25	218.07	224.86
HV Ring Open	Top Tap (5%)	20. LV Meshed Subs 150kVAr Capacitor 2/3	209.14	224.20	214.45	216.01	216.10	223.97	212.72	224.89	216.51	217.91	217.73	224.64
HV Ring Open	Top Tap (5%)	21. LV Meshed Ways 150kVAr Capacitor 2/3	215.88	217.37	214.14	215.71	215.80	226.59	217.53	218.46	216.25	217.63	217.41	227.18
HV Ring Open	Top Tap (5%)	22. LV Meshed Subs & Ways 150kVAr Capacitor 2/3	216.71	224.42	214.90	216.46	216.55	224.16	218.37	225.13	216.85	218.24	218.06	224.86
HV Ring Open	Top Tap (5%)	23. LV Meshed Subs 200kVAr Capacitor 1/2	213.28	225.06	216.05	217.60	217.70	224.74	214.42	225.77	218.13	219.50	219.29	225.45
HV Ring Open	Top Tap (5%)	24. LV Meshed Ways 200kVAr Capacitor 1/2	217.86	219.15	215.94	217.49	217.59	226.77	219.21	220.21	218.02	219.39	219.18	227.35
HV Ring Open	Top Tap (5%)	25. LV Meshed Subs & Ways 200kVAr Capacitor 1/2	218.38	225.22	216.39	217.94	218.03	224.89	219.75	225.94	218.32	219.71	219.52	225.58
HV Ring Open	Top Tap (5%)	26. LV Meshed Subs 200kVAr Capacitor 2/3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
HV Ring Open	Top Tap (5%)	27. LV Meshed Ways 200kVAr Capacitor 2/3	218.06	219.07	215.87	217.42	217.51	226.75	219.49	220.21	218.01	219.39	219.17	227.35
HV Ring Open	Top Tap (5%)	28. LV Meshed Subs & Ways 200kVAr Capacitor 2/3	218.60	225.18	216.32	217.87	217.97	224.85	220.30	225.93	218.31	219.69	219.51	225.58
HV Ring Open	Mid Tap (0%)	1. No Intervention	214.11	223.52	220.36	221.91	221.96	226.07	217.23	224.52	222.35	223.70	223.48	226.66
HV Ring Open	Mid Tap (0%)	2. LV Meshed Subs Only	214.20	225.91	220.46	222.00	222.05	225.31	217.24	226.72	222.37	223.72	223.50	226.11
HV Ring Open	Mid Tap (0%)	3. LV Meshed Ways Only	220.67	223.48	220.40	221.95	222.00	226.08	222.27	224.48	222.37	223.73	223.50	226.67
HV Ring Open	Mid Tap (0%)	4. LV Meshed Subs & Ways Only	220.81	225.89	220.51	222.05	222.11	225.29	222.32	226.71	222.40	223.76	223.54	226.09
HV Ring Open	Mid Tap (0%)	5. 100kVAr Capacitor 1/2 Only	219.40	226.96	223.84	225.33	225.42	226.43	221.60	228.05	225.89	227.22	227.02	227.03
HV Ring Open	Mid Tap (0%)	6. 100kVAr Capacitor 2/3 Only	219.98	226.94	223.81	225.31	225.39	226.43	222.65	227.94	225.70	227.04	226.86	227.00
HV Ring Open	Mid Tap (0%)	7. 150kVAr Capacitor 1/2 Only	221.67	228.72	225.62	227.11	227.19	226.61	224.87	229.78	227.55	228.88	228.70	227.19
HV Ring Open	Mid Tap (0%)	8. 150kVAr Capacitor 2/3 Only	223.80	228.64	225.54	227.02	227.11	226.61	226.01	229.66	227.43	228.76	228.58	227.18
HV Ring Open	Mid Tap (0%)	9. 200kVAr Capacitor 1/2 Only	224.86	230.55	227.47	228.94	229.03	226.80	226.05	231.55	229.41	230.72	230.52	227.39
HV Ring Open	Mid Tap (0%)	10. 200kVAr Capacitor 2/3 Only	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
HV Ring Open	Mid Tap (0%)	11. LV Meshed Subs 100kVAr Capacitor 1/2	218.87	227.53	223.32	224.82	224.91	226.76	221.07	228.34	225.33	226.66	226.45	227.56
HV Ring Open	Mid Tap (0%)	12. LV Meshed Ways 100kVAr Capacitor 1/2	225.19	227.12	224.06	225.57	225.64	226.46	226.67	228.16	226.04	227.36	227.16	227.05
HV Ring Open	Mid Tap (0%)	13. LV Meshed Subs & Ways 100kVAr Capacitor 1/2	224.65	227.51	223.58	225.08	225.17	226.75	226.12	228.39	225.46	226.80	226.59	227.60
HV Ring Open	Mid Tap (0%)	14. LV Meshed Subs 100kVAr Capacitor 2/3	220.27	227.58	223.18	224.68	224.77	226.81	222.41	228.32	225.12	226.47	226.29	227.53
HV Ring Open	Mid Tap (0%)	15. LV Meshed Ways 100kVAr Capacitor 2/3	225.47	227.11	224.05	225.56	225.62	226.46	226.92	228.15	226.03	227.35	227.15	227.05
HV Ring Open	Mid Tap (0%)	16. LV Meshed Subs & Ways 100kVAr Capacitor 2/3	224.92	227.50	223.56	225.06	225.15	226.74	226.35	228.39	225.45	226.79	226.58	227.60
HV Ring Open	Mid Tap (0%)	17. LV Meshed Subs 150kVAr Capacitor 1/2	221.00	228.43	224.73	226.22	226.31	227.58	224.13	229.16	226.66	227.99	227.81	228.29
HV Ring Open	Mid Tap (0%)	18. LV Meshed Ways 150kVAr Capacitor 1/2	227.30	228.96	225.91	227.39	227.48	226.65	228.88	229.98	227.80	229.12	228.95	227.23
HV Ring Open	Mid Tap (0%)	19. LV Meshed Subs & Ways 150kVAr Capacitor 1/2	226.45	228.41	225.06	226.54	226.63	227.56	227.86	229.24	226.99	228.31	228.11	228.37
HV Ring Open	Mid Tap (0%)	20. LV Meshed Subs 150kVAr Capacitor 2/3	219.65	228.36	224.54	226.03	226.12	227.51	226.83	229.08	226.62	227.96	227.78	228.21
HV Ring Open	Mid Tap (0%)	21. LV Meshed Ways 150kVAr Capacitor 2/3	228.28	228.96	225.89	227.39	227.46	226.65	229.36	229.99	227.79	229.12	228.94	227.23
HV Ring Open	Mid Tap (0%)	22. LV Meshed Subs & Ways 150kVAr Capacitor 2/3	226.86	228.31	225.13	226.62	226.71	227.47	228.34	229.24	226.99	228.31	228.11	228.36
HV Ring Open	Mid Tap (0%)	23. LV Meshed Subs 200kVAr Capacitor 1/2	224.29	229.27	226.22	227.71	227.79	228.33	226.63	229.97	228.11	229.44	229.26	229.02
HV Ring Open	Mid Tap (0%)	24. LV Meshed Ways 200kVAr Capacitor 1/2	229.85	230.89	227.85	229.32	229.41	226.85	231.12	231.88	229.77	231.07	230.88	227.44
HV Ring Open	Mid Tap (0%)	25. LV Meshed Subs & Ways 200kVAr Capacitor 1/2	228.60	229.35	226.62	228.10	228.18	228.40	229.86	230.10	228.51	229.83	229.63	229.14
HV Ring Open	Mid Tap (0%)	26. LV Meshed Subs 200kVAr Capacitor 2/3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
HV Ring Open	Mid Tap (0%)	27. LV Meshed Ways 200kVAr Capacitor 2/3	230.14	230.79	227.75	229.22	229.30	226.83	231.29	231.87	229.75	231.06	230.86	227.43
HV Ring Open	Mid Tap (0%)	28. LV Meshed Subs & Ways 200kVAr Capacitor 2/3	228.95	229.23	226.57	228.04	228.13	228.30	230.43	230.09	228.41	229.73	229.55	229.12
HV Ring Open	Bottom Tap (-5%)	1. No Intervention	227.04	235.95	232.96	234.42	234.47	226.08	229.96	236.90	234.80	236.09	235.89	226.67
HV Ring Open	Bottom Tap (-5%)	2. LV Meshed Subs Only	225.18	230.27	231.28	232.72	232.81	229.00	228.10	231.13	233.07	234.36	234.17	229.84
HV Ring Open	Bottom Tap (-5%)	3. LV Meshed Ways Only	233.25	235.91	233.00	234.45	234.51	226.08	234.66	236.82	234.73	236.02	235.85	226.65
HV Ring Open	Bottom Tap (-5%)	4. LV Meshed Subs & Ways Only	231.54	230.25	231.33	232.77	232.86	228.99	232.97	231.11	233.10	234.39	234.20	229.83
HV Ring Open	Bottom Tap (-5%)	5. 100kVAr Capacitor 1/2 Only	232.94	239.70	236.74	238.16	238.24	226.49	235.08	240.67	238.59	239.85	239.67	227.08
HV Ring Open	Bottom Tap (-5%)	6. 100kVAr Capacitor 2/3 Only	233.03	239.56	236.61	238.02	238.10	226.47	232.79	240.57	238.49	239.75	239.57	227.07
HV Ring Open	Bottom Tap (-5%)	7. 150kVAr Capacitor 1/2 Only	235.53	241.58	238.65	240.05	240.13	226.69	236.87	242.55	240.47	241.73	241.55	227.28
HV Ring Open	Bottom Tap (-5%)	8. 150kVAr Capacitor 2/3 Only	233.97	241.35	238.41	239.82	239.90	226.65	240.56	242				

Max Demand of 1.5kW			Circuit Losses				
HV RING	OLTC Tap Position	Scenario	Primary Tx Losses (kW)	HV Losses (kW)	HV/LV Losses (kW)	LV Losses (kW)	Total Losses (kW)
HV Ring Open	Top Tap (5%)	1. No Intervention	13.907	253.404	2.350	5.799	275.460
HV Ring Open	Top Tap (5%)	2. LV Meshed Subs Only	13.915	253.545	1.829	8.590	277.879
HV Ring Open	Top Tap (5%)	3. LV Meshed Ways Only	13.898	253.284	2.310	4.023	273.515
HV Ring Open	Top Tap (5%)	4. LV Meshed Subs & Ways Only	13.906	253.423	1.802	6.766	275.897
HV Ring Open	Top Tap (5%)	5. 100kVAr Capacitor 1/2 Only	13.926	253.505	2.714	9.118	279.263
HV Ring Open	Top Tap (5%)	6. 100kVAr Capacitor 2/3 Only	13.930	253.578	2.722	10.898	281.129
HV Ring Open	Top Tap (5%)	7. 150kVAr Capacitor 1/2 Only	13.957	254.133	3.264	13.595	284.949
HV Ring Open	Top Tap (5%)	8. 150kVAr Capacitor 2/3 Only	13.969	253.955	3.288	16.516	287.729
HV Ring Open	Top Tap (5%)	9. 200kVAr Capacitor 1/2 Only	13.997	254.646	4.040	21.005	293.689
HV Ring Open	Top Tap (5%)	10. 200kVAr Capacitor 2/3 Only	?	?	?	?	?
HV Ring Open	Top Tap (5%)	11. LV Meshed Subs 100kVAr Capacitor 1/2	13.933	253.618	2.209	10.997	280.757
HV Ring Open	Top Tap (5%)	12. LV Meshed Ways 100kVAr Capacitor 1/2	13.912	253.323	2.680	5.808	275.723
HV Ring Open	Top Tap (5%)	13. LV Meshed Subs & Ways 100kVAr Capacitor 1/2	13.918	253.427	2.191	7.633	277.169
HV Ring Open	Top Tap (5%)	14. LV Meshed Subs 100kVAr Capacitor 2/3	13.937	253.702	2.211	12.832	282.682
HV Ring Open	Top Tap (5%)	15. LV Meshed Ways 100kVAr Capacitor 2/3	13.910	253.387	2.669	5.600	275.566
HV Ring Open	Top Tap (5%)	16. LV Meshed Subs & Ways 100kVAr Capacitor 2/3	13.916	253.492	2.181	7.430	277.019
HV Ring Open	Top Tap (5%)	17. LV Meshed Subs 150kVAr Capacitor 1/2	13.962	254.213	2.678	15.170	286.023
HV Ring Open	Top Tap (5%)	18. LV Meshed Ways 150kVAr Capacitor 1/2	13.930	253.739	3.211	8.412	279.291
HV Ring Open	Top Tap (5%)	19. LV Meshed Subs & Ways 150kVAr Capacitor 1/2	13.935	253.821	2.653	9.931	280.339
HV Ring Open	Top Tap (5%)	20. LV Meshed Subs 150kVAr Capacitor 2/3	13.977	254.538	2.688	19.011	290.214
HV Ring Open	Top Tap (5%)	21. LV Meshed Ways 150kVAr Capacitor 2/3	13.925	253.416	3.190	7.846	278.376
HV Ring Open	Top Tap (5%)	22. LV Meshed Subs & Ways 150kVAr Capacitor 2/3	13.930	253.507	2.636	9.363	279.436
HV Ring Open	Top Tap (5%)	23. LV Meshed Subs 200kVAr Capacitor 1/2	14.000	254.443	3.333	21.626	293.402
HV Ring Open	Top Tap (5%)	24. LV Meshed Ways 200kVAr Capacitor 1/2	13.957	253.763	3.989	11.947	283.655
HV Ring Open	Top Tap (5%)	25. LV Meshed Subs & Ways 200kVAr Capacitor 1/2	13.960	253.834	3.306	13.247	284.347
HV Ring Open	Top Tap (5%)	26. LV Meshed Subs 200kVAr Capacitor 2/3	?	?	?	?	?
HV Ring Open	Top Tap (5%)	27. LV Meshed Ways 200kVAr Capacitor 2/3	13.954	254.123	3.955	11.178	283.211
HV Ring Open	Top Tap (5%)	28. LV Meshed Subs & Ways 200kVAr Capacitor 2/3	13.958	254.183	3.271	12.486	283.897
HV Ring Open	Mid Tap (0%)	1. No Intervention	13.903	253.345	2.132	5.373	274.752
HV Ring Open	Mid Tap (0%)	2. LV Meshed Subs Only	13.903	253.352	1.865	5.556	274.677
HV Ring Open	Mid Tap (0%)	3. LV Meshed Ways Only	13.895	253.240	2.099	3.668	272.902
HV Ring Open	Mid Tap (0%)	4. LV Meshed Subs & Ways Only	13.895	253.247	1.837	3.942	272.920
HV Ring Open	Mid Tap (0%)	5. 100kVAr Capacitor 1/2 Only	13.925	253.475	2.545	9.077	279.021
HV Ring Open	Mid Tap (0%)	6. 100kVAr Capacitor 2/3 Only	13.935	253.850	2.578	10.364	280.727
HV Ring Open	Mid Tap (0%)	7. 150kVAr Capacitor 1/2 Only	13.957	253.885	3.149	14.166	285.157
HV Ring Open	Mid Tap (0%)	8. 150kVAr Capacitor 2/3 Only	13.975	254.490	3.188	18.196	289.849
HV Ring Open	Mid Tap (0%)	9. 200kVAr Capacitor 1/2 Only	14.006	254.789	4.031	21.409	294.235
HV Ring Open	Mid Tap (0%)	10. 200kVAr Capacitor 2/3 Only	?	?	?	?	?
HV Ring Open	Mid Tap (0%)	11. LV Meshed Subs 100kVAr Capacitor 1/2	13.925	253.495	2.248	9.490	279.159
HV Ring Open	Mid Tap (0%)	12. LV Meshed Ways 100kVAr Capacitor 1/2	13.912	253.283	2.518	5.630	275.343
HV Ring Open	Mid Tap (0%)	13. LV Meshed Subs & Ways 100kVAr Capacitor 1/2	13.908	253.453	2.189	6.211	275.762
HV Ring Open	Mid Tap (0%)	14. LV Meshed Subs 100kVAr Capacitor 2/3	13.936	253.858	2.288	10.784	280.865
HV Ring Open	Mid Tap (0%)	15. LV Meshed Ways 100kVAr Capacitor 2/3	13.909	253.349	2.509	5.430	275.197
HV Ring Open	Mid Tap (0%)	16. LV Meshed Subs & Ways 100kVAr Capacitor 2/3	13.908	253.429	2.179	5.976	275.491
HV Ring Open	Mid Tap (0%)	17. LV Meshed Subs 150kVAr Capacitor 1/2	13.958	253.905	2.748	14.714	285.326
HV Ring Open	Mid Tap (0%)	18. LV Meshed Ways 150kVAr Capacitor 1/2	13.932	253.756	3.112	8.524	279.324
HV Ring Open	Mid Tap (0%)	19. LV Meshed Subs & Ways 150kVAr Capacitor 1/2	13.932	253.778	2.679	9.133	279.523
HV Ring Open	Mid Tap (0%)	20. LV Meshed Subs 150kVAr Capacitor 2/3	?	?	?	?	?
HV Ring Open	Mid Tap (0%)	21. LV Meshed Ways 150kVAr Capacitor 2/3	13.926	253.705	3.091	8.219	278.942
HV Ring Open	Mid Tap (0%)	22. LV Meshed Subs & Ways 150kVAr Capacitor 2/3	13.926	253.728	2.638	8.817	279.110
HV Ring Open	Mid Tap (0%)	23. LV Meshed Subs 200kVAr Capacitor 1/2	14.006	254.825	3.456	22.421	294.708
HV Ring Open	Mid Tap (0%)	24. LV Meshed Ways 200kVAr Capacitor 1/2	13.962	254.227	3.977	12.619	284.785
HV Ring Open	Mid Tap (0%)	25. LV Meshed Subs & Ways 200kVAr Capacitor 1/2	13.963	254.241	3.380	13.494	285.077
HV Ring Open	Mid Tap (0%)	26. LV Meshed Subs 200kVAr Capacitor 2/3	N/A	N/A	N/A	N/A	N/A
HV Ring Open	Mid Tap (0%)	27. LV Meshed Ways 200kVAr Capacitor 2/3	13.958	253.911	3.938	11.646	283.452
HV Ring Open	Mid Tap (0%)	28. LV Meshed Subs & Ways 200kVAr Capacitor 2/3	13.959	253.940	3.334	12.513	283.746
HV Ring Open	Bottom Tap (-5%)	1. No Intervention	13.900	253.460	1.928	4.732	274.020
HV Ring Open	Bottom Tap (-5%)	2. LV Meshed Subs Only	13.911	253.475	2.571	6.829	276.787
HV Ring Open	Bottom Tap (-5%)	3. LV Meshed Ways Only	13.893	253.372	1.902	3.309	272.475
HV Ring Open	Bottom Tap (-5%)	4. LV Meshed Subs & Ways Only	13.904	253.379	2.535	5.376	275.194
HV Ring Open	Bottom Tap (-5%)	5. 100kVAr Capacitor 1/2 Only	13.925	253.678	2.412	9.012	279.027
HV Ring Open	Bottom Tap (-5%)	6. 100kVAr Capacitor 2/3 Only	13.934	253.814	2.427	10.893	281.069
HV Ring Open	Bottom Tap (-5%)	7. 150kVAr Capacitor 1/2 Only	13.963	254.001	3.077	14.574	285.615
HV Ring Open	Bottom Tap (-5%)	8. 150kVAr Capacitor 2/3 Only	?	?	?	?	?
HV Ring Open	Bottom Tap (-5%)	9. 200kVAr Capacitor 1/2 Only	14.018	254.613	4.061	22.639	295.331
HV Ring Open	Bottom Tap (-5%)	10. 200kVAr Capacitor 2/3 Only	?	?	?	?	?
HV Ring Open	Bottom Tap (-5%)	11. LV Meshed Subs 100kVAr Capacitor 1/2	13.944	253.911	2.961	12.344	283.159
HV Ring Open	Bottom Tap (-5%)	12. LV Meshed Ways 100kVAr Capacitor 1/2	13.908	253.443	2.378	5.750	275.479
HV Ring Open	Bottom Tap (-5%)	13. LV Meshed Subs & Ways 100kVAr Capacitor 1/2	13.926	253.663	2.827	9.102	279.518
HV Ring Open	Bottom Tap (-5%)	14. LV Meshed Subs 100kVAr Capacitor 2/3	13.952	254.032	3.015	14.144	285.144
HV Ring Open	Bottom Tap (-5%)	15. LV Meshed Ways 100kVAr Capacitor 2/3	13.907	253.321	2.370	5.370	274.968
HV Ring Open	Bottom Tap (-5%)	16. LV Meshed Subs & Ways 100kVAr Capacitor 2/3	13.924	253.641	2.816	8.852	279.233
HV Ring Open	Bottom Tap (-5%)	17. LV Meshed Subs 150kVAr Capacitor 1/2	13.985	254.467	3.508	18.586	290.546
HV Ring Open	Bottom Tap (-5%)	18. LV Meshed Ways 150kVAr Capacitor 1/2	13.934	253.649	3.038	8.771	279.393
HV Ring Open	Bottom Tap (-5%)	19. LV Meshed Subs & Ways 150kVAr Capacitor 1/2	13.954	253.927	3.357	12.975	284.213
HV Ring Open	Bottom Tap (-5%)	20. LV Meshed Subs 150kVAr Capacitor 2/3	?	?	?	?	?
HV Ring Open	Bottom Tap (-5%)	21. LV Meshed Ways 150kVAr Capacitor 2/3	13.929	253.770	3.024	8.480	279.203
HV Ring Open	Bottom Tap (-5%)	22. LV Meshed Subs & Ways 150kVAr Capacitor 2/3	13.950	254.021	3.290	12.407	283.668
HV Ring Open	Bottom Tap (-5%)	23. LV Meshed Subs 200kVAr Capacitor 1/2	14.041	255.214	4.268	27.510	301.033
HV Ring Open	Bottom Tap (-5%)	24. LV Meshed Ways 200kVAr Capacitor 1/2	13.970	254.378	4.006	13.328	285.682
HV Ring Open	Bottom Tap (-5%)	25. LV Meshed Subs & Ways 200kVAr Capacitor 1/2	13.993	254.667	4.117	18.350	291.128
HV Ring Open	Bottom Tap (-5%)	26. LV Meshed Subs 200kVAr Capacitor 2/3	?	?	?	?	?
HV Ring Open	Bottom Tap (-5%)	27. LV Meshed Ways 200kVAr Capacitor 2/3	13.965	253.997	3.967	12.315	284.245
HV Ring Open	Bottom Tap (-5%)	28. LV Meshed Subs & Ways 200kVAr Capacitor 2/3	13.987	254.310	4.038	17.355	289.691