Generation Interconnection

Impact Study Report

for

Queue Project AE2-171

MAKAHOY 138 KV

30 MW Capacity / 30 MW Energy

June, 2020

Table of Contents

1 Preface

The intent of the System Impact Study is to determine a plan, with approximate cost and construction time estimates, to connect the subject generation interconnection project to the PJM network at a location specified by the Interconnection Customer. As a requirement for interconnection, the Interconnection Customer may be responsible for the cost of constructing: Network Upgrades, which are facility additions, or upgrades to existing facilities, that are needed to maintain the reliability of the PJM system. All facilities required for interconnection of a generation interconnection project must be designed to meet the technical specifications (on PJM web site) for the appropriate transmission owner.

In some instances, a generator interconnection may not be responsible for 100% of the identified network upgrade cost because other transmission network uses, e.g. another generation interconnection, may also contribute to the need for the same network reinforcement. Cost allocation rules for network upgrades can be found in PJM Manual 14A, Attachment B. The possibility of sharing the reinforcement costs with other projects may be identified in the feasibility study, but the actual allocation will be deferred until the impact study is performed.

The System Impact Study estimates do not include the feasibility, cost, or time required to obtain property rights and permits for construction of the required facilities. The project developer is responsible for the right of way, real estate, and construction permit issues. For properties currently owned by Transmission Owners, the costs may be included in the study.

The Interconnection Customer seeking to interconnect a wind or solar generation facility shall maintain meteorological data facilities as well as provide that meteorological data which is required per Schedule H to the Interconnection Service Agreement and Section 8 of Manual 14D.

An Interconnection Customer with a proposed new Customer Facility that has a Maximum Facility Output equal to or greater than 100 MW shall install and maintain, at its expense, phasor measurement units (PMUs). See Section 8.5.3 of Appendix 2 to the Interconnection Service Agreement as well as section 4.3 of PJM Manual 14D for additional information.

2 General

Invenergy Solar Project Development LLC, has proposed an uprate (Storage generating facility) to an existing Solar generating facility (AD1-043) located in Madison County, Indiana. This projects requests an increase to the install capability of 30 of uprate MW with 30 of uprate MW of this output being recognized by PJM as Capacity. The installed facilities will have a total capability of 150 MW with 75.6 MW of this output being recognized by PJM as Capacity.

The proposed in-service date for this project is December 31, 2022. This study does not imply AEP's commitment to this in-service date.

The objective of this System Impact Study is to determine budgetary cost estimates and approximate construction timelines for identified transmission facilities required to connect the proposed generating facilities to the AEP transmission system. These reinforcements include the Attachment Facilities, Local Upgrades, and Network Upgrades required for maintaining the reliability of the AEP transmission system.

Queue Number	**AE2-171**
Project Name	MAKAHOY 138 KV
Interconnection Customer	Invenergy Solar Project Development LLC
State	Indiana
County	Madison
Transmission Owner	AEP
MFO	150
MWE	30
MWC	30
Fuel	Storage
Basecase Study Year	2022

2.1 Point of Interconnection

AE2-171 will interconnect with the AEP transmission system at the Makahoy 138 kV substation.

2.2 Cost Summary

This project will be responsible for the following costs:

Description	Total Cost
Attachment Facilities	$0
Direct Connection Network Upgrade	$0
Non Direct Connection Network Upgrades	$0
Allocation for New System Upgrades	$0
Contribution for Previously Identified Upgrades	$0
Total Costs	$0

3 Transmission Owner Scope of Work

4 Attachment Facilities

The total preliminary cost estimate for the Attachment work is given in the table below. These costs do not include CIAC Tax Gross-up.

Description	Total Cost
Total Attachment Facility Costs	$0

5 Direct Connection Cost Estimate

The total preliminary cost estimate for the Direct Connection work is given in the table below. These costs do not include CIAC Tax Gross-up.

Description	Total Cost
Total Direct Connection Facility Costs	$0

6 Non-Direct Connection Cost Estimate

The total preliminary cost estimate for the Non-Direct Connection work is given in the table below. These costs do not include CIAC Tax Gross-up.

Description	Total Cost
Total Non-Direct Connection Facility Costs	$0

7 Incremental Capacity Transfer Rights (ICTRs)

None

8 Schedule

It is anticipated that the time between receipt of executed Agreements and Commercial Operation may range from 12 to 18 months if no line work is required. If line work is required, construction time would generally be between 24 to 36 months after signing Agreement execution.

9 Interconnection Customer Requirements

It is understood that Invenergy Solar Project Development LLC is responsible for all costs associated with this interconnection. The costs above are reimbursable to AEP. The cost of the Invenergy Solar Project Development LLC's generating plant and the costs for the line connecting the generating plant to the AEP Transmission circuit are not included in this report; these are assumed to be Invenergy Solar Project Development LLC's responsibility.

The Generation Interconnection Agreement does not in or by itself establish a requirement for American Electric Power to provide power for consumption at the developer's facilities. A separate agreement may be reached with the local utility that provides service in the area to ensure that infrastructure is in place to meet this demand and proper metering equipment is installed. It is the responsibility of the developer to contact the local service provider to determine if a local service agreement is required.

Requirement from the PJM Open Access Transmission Tariff:

1. An Interconnection Customer entering the New Services Queue on or after October 1, 2012 with a proposed new Customer Facility that has a Maximum Facility Output equal to or greater than 100 MW shall install and maintain, at its expense, phasor measurement units (PMUs). See Section 8.5.3 of Appendix 2 to the Interconnection Service Agreement as well as section 4.3 of PJM Manual 14D for additional information.
2. The Interconnection Customer may be required to install and/or pay for metering as necessary to properly track real time output of the facility as well as installing metering which shall be used for billing purposes. See Section 8 of Appendix 2 to the Interconnection Service Agreement as well as Section 4 of PJM Manual 14D for additional information.

10 Revenue Metering and SCADA Requirements

10.1 PJM Requirements

The Interconnection Customer will be required to install equipment necessary to provide Revenue Metering (KWH, KVARH) and real time data (KW, KVAR) for IC's generating Resource. See PJM Manuals M-01 and M-14D, and PJM Tariff Section 8 of Attachment O.

10.2 AEP Requirements

The Interconnection Customer will be required to comply with all AEP Revenue Metering Requirements for Generation Interconnection Customers. The Revenue Metering Requirements may be found within the "Requirements for Connection of New Facilities or Changes to Existing Facilities Connected to the AEP Transmission System" document located at the following link:

http://www.pjm.com/~/media/planning/plan-standards/private-aep/aep-interconnection-requirements.ashx

11 Network Impacts

The Queue Project AE2-171 was evaluated as a 30.0 MW (Capacity 30.0 MW) injection into the Makahoy 138 kV substation in the AEP area. Project AE2-171 was evaluated for compliance with applicable reliability planning criteria (PJM, NERC, NERC Regional Reliability Councils, and Transmission Owners). Project AE2-171 was studied with a commercial probability of 100%. Potential network impacts were as follows:

Summer Peak Load Flow

12 Generation Deliverability

(Single or N-1 contingencies for the Capacity portion only of the interconnection)

None

13 Multiple Facility Contingency

(Double Circuit Tower Line, Fault with a Stuck Breaker, and Bus Fault contingencies for the full energy output)

None

14 Contribution to Previously Identified Overloads

(This project contributes to the following contingency overloads, i.e. "Network Impacts", identified for earlier generation or transmission interconnection projects in the PJM Queue)

ID	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
1574672	243311	05HOGAN	138.0	AEP	243275	05DELAWR	138.0	AEP	1	AEP_P4_#2965_05DESOTO 345_A2	breaker	231.0	115.12	117.74	AC	6.33
1574567	246763	05PIPECK	138.0	AEP	243303	05GRNTTA	138.0	AEP	1	AEP_P4_#8781_05HOGAN 138_B	breaker	205.0	115.46	121.69	AC	12.94
1574569	246763	05PIPECK	138.0	AEP	243303	05GRNTTA	138.0	AEP	1	AEP_P4_#6959_05HOGAN 138_A	breaker	205.0	109.59	115.82	AC	12.94
1574546	936560	AD2-071 TAP	138.0	AEP	246763	05PIPECK	138.0	AEP	1	AEP_P4_#8781_05HOGAN 138_B	breaker	205.0	117.2	123.43	AC	12.94
1574548	936560	AD2-071 TAP	138.0	AEP	246763	05PIPECK	138.0	AEP	1	AEP_P4_#6959_05HOGAN 138_A	breaker	205.0	111.33	117.56	AC	12.94

15 Potential Congestion due to Local Energy Deliverability

PJM also studied the delivery of the energy portion of this interconnection request. Any problems identified below are likely to result in operational restrictions to the project under study. The developer can proceed with network upgrades to eliminate the operational restriction at their discretion by submitting a Merchant Transmission Interconnection request.

Note: Only the most severely overloaded conditions are listed below. There is no guarantee of full delivery of energy for this project by fixing only the conditions listed in this section. With a Transmission Interconnection Request, a subsequent analysis will be performed which shall study all overload conditions associated with the overloaded element(s) identified.

ID	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
1575465	243311	05HOGAN	138.0	AEP	243275	05DELAWR	138.0	AEP	1	AEP_P1-2_#673-A	operation	231.0	114.05	116.73	AC	6.48

ID	FROM BUS#	FROM BUS	kV	FROM BUS AREA	TO BUS#	TO BUS	kV	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
1575466	243311	05HOGAN	138.0	AEP	243275	05DELAWR	138.0	AEP	1	Base Case	operation	167.0	113.24	116.92	AC	6.26
1575414	246763	05PIPECK	138.0	AEP	243303	05GRNTTA	138.0	AEP	1	AEP_SUBT_P1-3_#844_05HOGAN 138_1	operation	205.0	109.12	115.35	AC	12.94
1575382	936560	AD2-071 TAP	138.0	AEP	246763	05PIPECK	138.0	AEP	1	AEP_SUBT_P1-3_#844_05HOGAN 138_1	operation	205.0	110.85	117.09	AC	12.94

16 Steady-State Voltage Requirements

(Summary of the VAR requirements based upon the results of the steady-state voltage studies)

To be evaluated during the Facilities Study Phase

17 Stability and Reactive Power Requirements for Low Voltage Ride Through

(Summary of the VAR requirements based upon the results of the dynamic studies)

To be evaluated during the Facilities Study Phase

18 Light Load Analysis

Light Load Studies (applicable to wind, coal, nuclear, and pumped storage projects).

No problems identified

19 System Reinforcements

ID	Index	Facility	Upgrade Description	Cost	Cost Allocated to AE2-171	Upgrade Number
1574672	2	**05HOGAN 138.0 kV - 05DELAWR 138.0 kV Ckt 1**	PJM Supplemental projects S0738 (Upgrade the Delaware - Hogan 138 kV risers) and S1498 - projected in-service date is December 2021. New SE rating expected to be 284 MVA SE with S0738 and S1498 complete. The new expected SE rating should be confirmed in the Facilities Study. If the new expected SE rating is not sufficient, the additional upgrade would be to to replace the Hogan riser at an estimated cost of $100K to raise the SE rating to 299 MVA. AE2-171 may have cost responsibility for this upgrade. An interim study will be required if AE2-171 comes into service prior to completion of PJM supplemental projects S0738 and S1498.	$0	$0	S0738 S1498
1574546,1574548	4	**AD2-071 TAP 138.0 kV - 05PIPECK 138.0 kV Ckt 1**	A Sag Study will be required on the 8.2 miles of ACSR ~ 556.5 ~ 26/7 ~ DOVE - Conductor Section 1 to determine any mitigations required for the overload. The cost of this upgrade is expected to be 32,800 (No remediations required, just sag study) and $ 12.3M (complete Line Reconductor/rebuild). New ratings after the sag study: S/N: 205 MVA S/E: 284 MVA. An approximate time for the sag study is 6 to 12 months after signing an interconnection agreement. PJM Network Upgrade N6330. Depending on the results of the sag study, an alternate upgrade to consider would be to resolve the stuck breaker contingency at Strawton which is causing the overload. This can be evaluated in the Facilities Study at the completion of the sag study. This overload is presently driven by a prior queue cycle and therefore AE2-171 presently does not receive a cost allocation to this upgrade. Note 1: As changes to the interconnection process occur, such as prior queued projects withdrawing from the queue, reducing in size, etc, Queue Project AE2-171 could receive cost allocation. Note 2: Although Queue Project AE2-171 may not have cost responsibility for this upgrade, Queue Project AE2-171 may need this upgrade in-service to be deliverable to the PJM system. If Queue Project AE2-171 come into service prior to completion of the upgrade, Queue Project AE2-171 will need an interim study.	$32,800	$0	N6330

ID	Index	Facility	Upgrade Description	Cost	Cost Allocated to AE2-171	Upgrade Number
1574569,1574567	3	**05PIPECK 138.0 kV - 05GRNTTA 138.0 kV Ckt 1**	A Sag Study will be required on the 1.9 miles of ACSR ~ 556.5 ~ 26/7 ~ DOVE - Conductor Section 1 to determine any mitigations required for the overload. The cost for this upgrade is expected to be between $20,000 (no remediations required, just sag study) and $2.85 million (complete line reconductor/rebuild required). An approximate time for the sag study is 6 to 12 months after signing an interconnection agreement. New expected SE rating to be 284 MVA. PJM Network Upgrade N6329. Depending on the results of the sag study, an alternate upgrade to consider would be to resolve the stuck breaker contingency at Strawton which is causing the overload. This can be evaluated in the Facilities Study at the completion of the sag study. This overload is presently driven by a prior queue cycle and therefore AE2-171 presently does not receive a cost allocation to this upgrade. Note 1: As changes to the interconnection process occur, such as prior queued projects withdrawing from the queue, reducing in size, etc, Queue Project AE2-171 could receive cost allocation. Note 2: Although Queue Project AE2-171 may not have cost responsibility for this upgrade, Queue Project AE2-171 may need this upgrade in-service to be deliverable to the PJM system. If Queue Project AE2-171 come into service prior to completion of the upgrade, Queue Project AE2-171 will need an interim study.	$20,000	$0	N6329
			Total Cost		**$0**	

20 Flow Gate Details

The following appendices contain additional information about each flowgate presented in the body of the report. For each appendix, a description of the flowgate and its contingency was included for convenience. However, the intent of the appendix section is to provide more information on which projects/generators have contributions to the flowgate in question. Although this information is not used "as is" for cost allocation purposes, it can be used to gage other generators impact.It should be noted the generator contributions presented in the appendices sections are full contributions, whereas in the body of the report, those contributions take into consideration the commercial probability of each project.

20.1 Index 1

None

20.2 Index 2

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
1574672	243311	05HOGAN	AEP	243275	05DELAWR	AEP	1	AEP_P4_#2965_05DESOTO 345_A2	breaker	231.0	115.12	117.74	AC	6.33

Bus #	Bus	MW Impact
246991	05WLD G1 C	0.3847
247255	05WLD G2 C	0.4039
247914	05WLD G1 E	19.4533
247958	05WLD G2 E	20.4101
247968	Z2-115 E	0.1180
920501	AA2-148 C O1	2.3558
920502	AA2-148 E O1	15.7655
923881	AB2-028 C	1.4213
923882	AB2-028 E	9.5114
934161	AD1-043 C O1	9.6284
934162	AD1-043 E O1	15.7096
936561	AD2-071 C	12.5551
936562	AD2-071 E	6.1839
941692	AE2-169 BAT	7.7104
941711	AE2-171	6.3345
942791	AE2-297 C O1	9.8390
942792	AE2-297 E O1	6.5593
965461	J1031 C	1.8245
965462	J1031 E	9.8710
LGEE	LGEE	0.5128
CIN	CIN	5.0666
CPLE	CPLE	0.1025
IPL	IPL	4.1312
G-007	G-007	0.0798
CBM-W2	CBM-W2	22.6604
CBM-W1	CBM-W1	1.4012
WEC	WEC	0.2527
O-066	O-066	0.5182
CBM-S2	CBM-S2	0.3542
CARR	CARR	0.0327
CBM-S1	CBM-S1	1.9256
MEC	MEC	2.6519
RENSSELAER	RENSSELAER	0.0256

20.3 Index 3

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
1574567	246763	05PIPECK	AEP	243303	05GRNTTA	AEP	1	AEP_P4_#8781_05HOGAN 138_B	breaker	205.0	115.46	121.69	AC	12.94

Bus #	Bus	MW Impact
246991	05WLD G1 C	0.8559
247255	05WLD G2 C	0.8986
247914	05WLD G1 E	43.2788
247958	05WLD G2 E	45.4073
920501	AA2-148 C O1	1.2637
920502	AA2-148 E O1	8.4571
934161	AD1-043 C O1	19.6737
934162	AD1-043 E O1	32.0991
936561	AD2-071 C	39.8576
936562	AD2-071 E	19.6314
941711	AE2-171	12.9432
942791	AE2-297 C O1	5.2226
942792	AE2-297 E O1	3.4817
965461	J1031 C	1.2266
965462	J1031 E	6.6364
DUCKCREEK	DUCKCREEK	0.2338
LGEE	LGEE	0.3035
CIN	CIN	1.6219
CPLE	CPLE	0.0536
IPL	IPL	1.6207
G-007A	G-007A	0.0623
VFT	VFT	0.1677
CBM-W2	CBM-W2	4.8811
CBM-S2	CBM-S2	0.1542
EDWARDS	EDWARDS	0.1260
CBM-S1	CBM-S1	0.6826
CBM-N	CBM-N	0.0167
FARMERCITY	FARMERCITY	0.0301
NYISO	NYISO	0.0725

20.4 Index 4

ID	FROM BUS#	FROM BUS	FROM BUS AREA	TO BUS#	TO BUS	TO BUS AREA	CKT ID	CONT NAME	Type	Rating MVA	PRE PROJECT LOADING %	POST PROJECT LOADING %	AC|DC	MW IMPACT
1574546	936560	AD2-071 TAP	AEP	246763	05PIPECK	AEP	1	AEP_P4_#8781_05HOGAN 138_B	breaker	205.0	117.2	123.43	AC	12.94

Bus #	Bus	MW Impact
246991	05WLD G1 C	0.8559
247255	05WLD G2 C	0.8986
247914	05WLD G1 E	43.2788
247958	05WLD G2 E	45.4073
920501	AA2-148 C O1	1.2637
920502	AA2-148 E O1	8.4571
934161	AD1-043 C O1	19.6737
934162	AD1-043 E O1	32.0991
936561	AD2-071 C	39.8576
936562	AD2-071 E	19.6314
941711	AE2-171	12.9432
942791	AE2-297 C O1	5.2226
942792	AE2-297 E O1	3.4817
965461	J1031 C	1.2266
965462	J1031 E	6.6364
DUCKCREEK	DUCKCREEK	0.2338
LGEE	LGEE	0.3035
CIN	CIN	1.6219
CPLE	CPLE	0.0536
IPL	IPL	1.6207
G-007A	G-007A	0.0623
VFT	VFT	0.1677
CBM-W2	CBM-W2	4.8811
CBM-S2	CBM-S2	0.1542
EDWARDS	EDWARDS	0.1260
CBM-S1	CBM-S1	0.6826
CBM-N	CBM-N	0.0167
FARMERCITY	FARMERCITY	0.0301
NYISO	NYISO	0.0725

Affected Systems

21 Affected Systems

21.1 LG&E

None

21.2 MISO

None

21.3 TVA

None

21.4 Duke Energy Progress

None

22 Contingency Descriptions:

Contingency Name	Contingency Definition
AEP_P4_#6959_05HOGAN 138_A	CONTINGENCY 'AEP_P4_#6959_05HOGAN 138_A' OPEN BRANCH FROM BUS 247420 TO BUS 243311 CKT 1 / 247420 05CROSS ST Z 138 243311 05HOGAN 138 1 OPEN BRANCH FROM BUS 247420 TO BUS 243333 CKT 1 / 247420 05CROSS ST Z 138 243333 05MADISO 138 1 OPEN BRANCH FROM BUS 243275 TO BUS 243311 CKT 1 / 243275 05DELAWR 138 243311 05HOGAN 138 1 OPEN BRANCH FROM BUS 243311 TO BUS 246913 CKT 1 / 243311 05HOGAN 138 246913 05JONES 138 1 OPEN BRANCH FROM BUS 243311 TO BUS 246046 CKT 1 / 243311 05HOGAN 138 246046 05HOGAN 34.5 1 OPEN BRANCH FROM BUS 243311 TO BUS 246047 CKT 1 / 243311 05HOGAN 138 246047 05HOGAN L 12.0 1 END
AEP_SUBT_P1-3_#844_05HOGAN 138_1	CONTINGENCY 'AEP_SUBT_P1-3_#844_05HOGAN 138_1' OPEN BRANCH FROM BUS 247420 TO BUS 243311 CKT 1 / 247420 05CROSS ST Z 138 243311 05HOGAN 138 1 OPEN BRANCH FROM BUS 243275 TO BUS 243311 CKT 1 / 243275 05DELAWR 138 243311 05HOGAN 138 1 OPEN BRANCH FROM BUS 243311 TO BUS 246913 CKT 1 / 243311 05HOGAN 138 246913 05JONES 138 1 OPEN BRANCH FROM BUS 243311 TO BUS 246046 CKT 1 / 243311 05HOGAN 138 246046 05HOGAN 34.5 1 OPEN BRANCH FROM BUS 243311 TO BUS 246047 CKT 1 / 243311 05HOGAN 138 246047 05HOGAN L 12.0 1 END
AEP_P1-2_#673-A	CONTINGENCY 'AEP_P1-2_#673-A' OPEN BRANCH FROM BUS 243218 TO BUS 923880 CKT 1 / 243218 05DESOTO 345 923880 AB2-028 TAP 345 1 END
AEP_P4_#2965_05DESOTO 345_A2	CONTINGENCY 'AEP_P4_#2965_05DESOTO 345_A2' OPEN BRANCH FROM BUS 243218 TO BUS 923880 CKT 1 / 243218 05DESOTO 345 923880 AB2-028 TAP 345 1 /* CONTINGENCY LINE ADDED FOR AE1 BUILD OPEN BRANCH FROM BUS 243218 TO BUS 243278 CKT 1 / 243218 05DESOTO 345 243278 05DESOTO 138 1 END
Base Case	
AEP_P7-1_#11019	CONTINGENCY 'AEP_P7-1_#11019' OPEN BRANCH FROM BUS 243218 TO BUS 243232 CKT 2 / 243218 05DESOTO 345 243232 05SORENS 345 2 OPEN BRANCH FROM BUS 243225 TO BUS 243232 CKT 1 / 243225 05KEYSTN 345 243232 05SORENS 345 1 END

Contingency Name	Contingency Definition
AEP_P4_#8781_05HOGAN 138_B	CONTINGENCY 'AEP_P4_#8781_05HOGAN 138_B' OPEN BRANCH FROM BUS 247116 TO BUS 246913 CKT 1 / 247116 05ALADDIN 138 246913 05JONES 138 1 OPEN BRANCH FROM BUS 247116 TO BUS 246988 CKT 1 / 247116 05ALADDIN 138 246988 05STRWTN 138 1 OPEN BRANCH FROM BUS 247420 TO BUS 243311 CKT 1 / 247420 05CROSS ST Z 138 243311 05HOGAN 138 1 OPEN BRANCH FROM BUS 243275 TO BUS 243311 CKT 1 / 243275 05DELAWR 138 243311 05HOGAN 138 1 OPEN BRANCH FROM BUS 243311 TO BUS 246913 CKT 1 / 243311 05HOGAN 138 246913 05JONES 138 1 OPEN BRANCH FROM BUS 243311 TO BUS 246046 CKT 1 / 243311 05HOGAN 138 246046 05HOGAN 34.5 1 OPEN BRANCH FROM BUS 243311 TO BUS 246047 CKT 1 / 243311 05HOGAN 138 246047 05HOGAN L 12.0 1 END

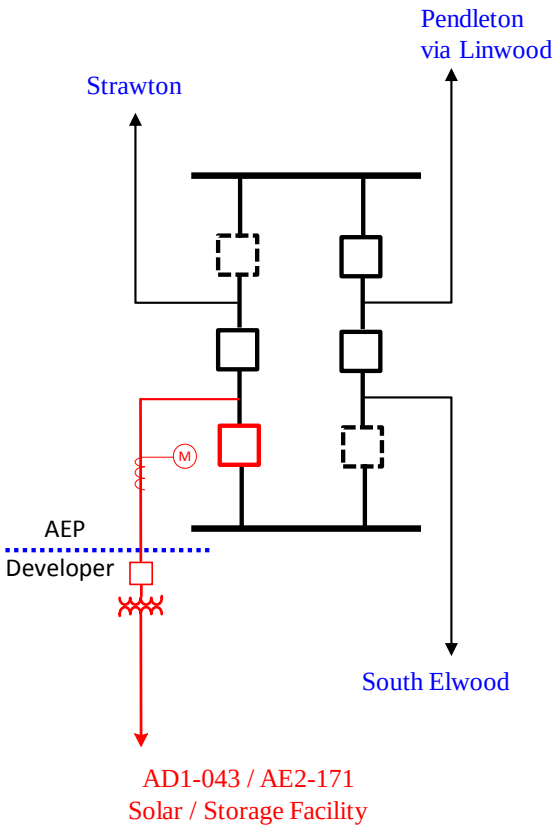
Short Circuit

23 Short Circuit

The following Breakers are overduty

None.

24 Single Line Diagram



Legend

Existing

To be constructed for AD1-043/AE2-171