Community Solar Project Interconnection

Community Solar Project System Impact Study Report

Completed for

("Applicant")

OCS103

Proposed Point of Interconnection

Circuit 5L45 out of Hornet substation at 12 kV

February 5, 2025

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1.0 DESCRIPTION OF THE COMMUNITY SOLAR PROJECT

("Applicant") proposed interconnecting 0.332 MW of new generation to PacifiCorp's ("Public Utility") circuit 5L45 out of Hornet substation at 12 kV located in Klamath County, Oregon. The ("Project") will consist of two (2) Solectria XGI 1500-166/166 UL for a total requested output of 0.332 MW. The requested commercial operation date is July 31, 2025.

The Public Utility has assigned the Project "OCS103."

2.0 APPROVAL CRITERIA FOR TIER 4 INTERCONNECTION REVIEW

Pursuant to the Section I(1) of the Public Utility's CSP Interconnection Procedures, a Public Utility must use the Tier 4 review procedures for an application to interconnect a Community Solar Project that meets the following requirements:

(a) The Community Solar Project does not qualify for or failed to meet Tier 2 review requirements; and
(b) The Community Solar Project must have a nameplate capacity of three (3) megawatts or less.

3.0 SCOPE OF THE STUDY

Pursuant to Section I(6)(g) of the CPS Interconnection Procedures, the System Impact Study Report shall consist of: (1) the underlying assumptions of the study; (2) a short circuit analysis; (2) a stability analysis; (3) a power flow analysis; (4) voltage drop and flicker studies; (5) protection and set point coordination studies; (6) grounding reviews; (7) the results of the analyses; and (8) any potential impediments to providing the requested Interconnection Service, including a non-binding informational NRIS portion that addresses the additions, modifications, and upgrades to the Public Utility's Transmission System that would be required at or beyond the point at which the Interconnection Facilities connect to the Public Utility's Transmission System to accommodate the interconnection of the CSP Project In addition, the System Impact Study shall provide a list of facilities that are required as a result of the Community Solar Project request and non-binding good faith estimates of cost responsibility and time to construct.

The information contained in this study report is based on preliminary information and not to be used for construction.

4.0 PROPOSED POINT OF INTERCONNECTION

The Applicant's proposed Community Solar Project is to be interconnected to the Public Utility's distribution circuit 5L45 Crystal Springs out of Hornet substation via a 12 kV primary meter. The proposed Point of Interconnection will be located at approximately 01439009.0250800, located in Klamath County, Oregon. Figure 1 below is a one line diagram that illustrates the interconnection of the proposed generating facility to the Public Utility's system.

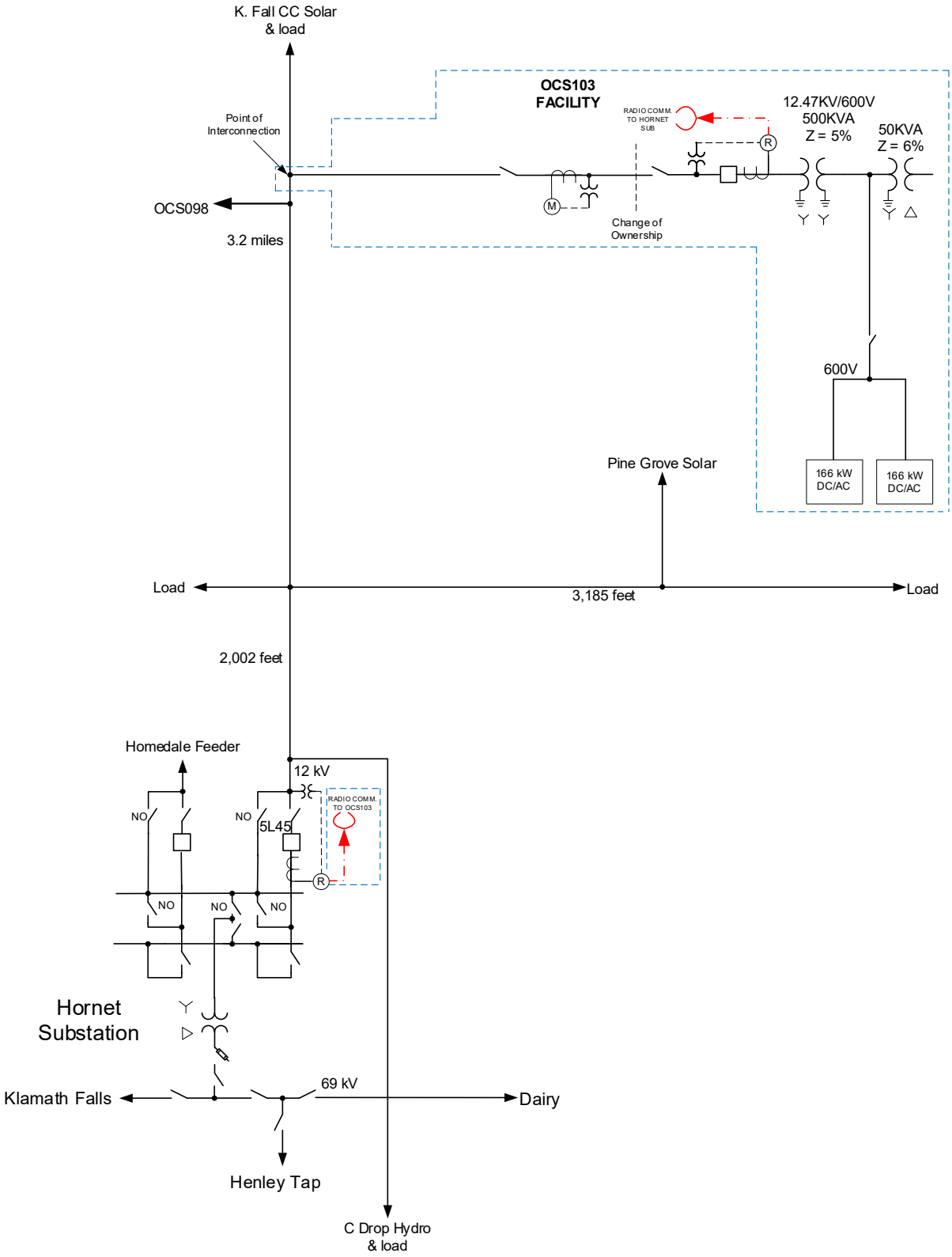

Figure 1: System One Line Diagram

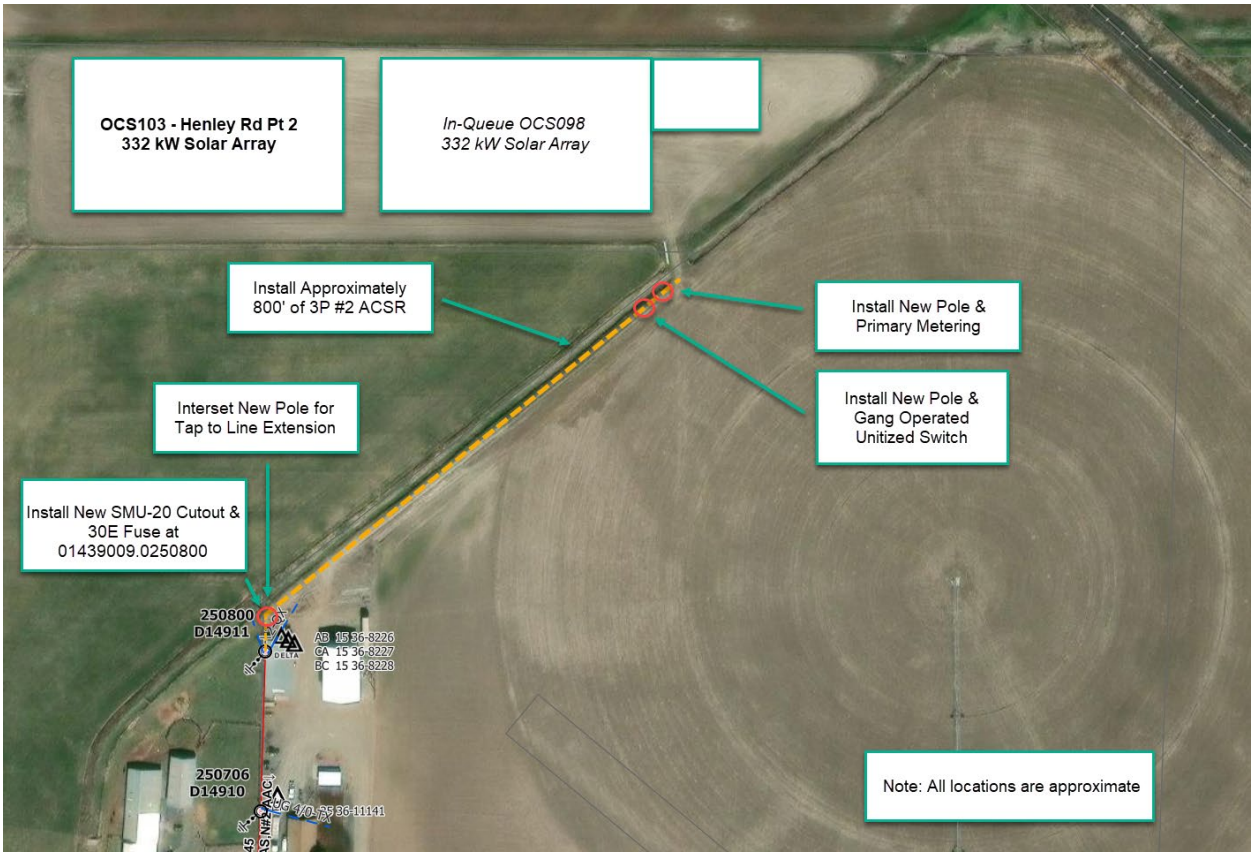

Figure 2: Local System Work Diagram

5.0 STUDY ASSUMPTIONS

- All active higher-priority requests for transmission service and/or generator interconnection service (including requests in the traditional interconnection queue and other requests in the Community Solar queue) in the local area of the requested POI will be considered in this study and are listed in Appendix 1. If any of these requests are withdrawn, the Public Utility reserves the right to restudy this request, as the results and conclusions contained within this study could significantly change.
- The Applicant's request for interconnection service in and of itself does not convey transmission service.
- This study assumes the Project will be integrated into Public Utility's system at the agreed upon and/or proposed Point of Interconnection.
- The Applicant will construct and own any facilities required between the Point of Interconnection and the Project unless specifically identified by the Public Utility.
- Line reconductor or fiber underbuild required on existing poles will be assumed to follow the most direct path on the Public Utility's system. If during detailed design the path must be modified it may result in additional cost and timing delays for the Applicant's project.
- Generator tripping may be required for certain outages.
- All facilities will meet or exceed the minimum Western Electricity Coordinating

Council ("WECC"), North American Electric Reliability Corporation ("NERC"), and Public Utility performance and design standards.

- The Public Utility's distribution facility point closest to the point of interconnection is 01439009.0-0250800.
- Distribution load flows were performed at peak and light load and full and no generation with summer and winter loading conditions.
- Minimum Daytime Load (MDL) on 5L45 assumed to be 1456 kW on 09/14/2024
- Annual Peak Load on 5L45 assumed to be 6785.2 kW on 07/09/2024
- Total Aggregate circuit DER fault current contribution is 5.06%
- Total Aggregate circuit DER load percentage of Annual Peak is 34.69%
- CB5L45 has a SEL-751 that includes directional overcurrent relaying, zone sequence coordination for downstream reclosers, and block reclose for hot line tag.
- Study assumes the in-service operation of OCS098 (332 kW).
- This report is based on information available at the time of the study. It is the Applicant's responsibility to check the Public Utility's web site regularly for transmission system updates (https://www.oasis.oati.com/ppw).

6.0 REQUIREMENTS

6.1 COMMUNITY SOLAR PROJECT REQUIREMENTS

The Community Solar Project and Interconnection Equipment owned by the Applicant are required to operate under constant power factor mode with a unity power factor setting unless specifically requested otherwise by the Public Utility. The Community Solar Project is expressly forbidden from actively participating in voltage regulation of the Public Utilities system without written request or authorization from the Public Utility. The Community Solar Project shall have sufficient reactive capacity to enable the delivery of 100 percent of the plant output to the POI at unity power factor measured at 1.0 per unit voltage under steady state conditions.

Generators shall be capable of operating under Voltage-reactive power mode, Active power-reactive power mode, and Constant reactive power mode as per IEEE Std. 1547-2018. This project shall be capable of activating each of these modes one at a time. The Public Utility reserves the right to specify any mode and settings within the limits of IEEE Std 1547-2018 needed before or after the Community Solar Project enters service. The Applicant shall be responsible for implementing settings modifications and mode selections as requested by the Public Utility within an acceptable timeframe. The reactive compensation must be designed such that the discreet switching of the reactive device (if required by the Applicant) does not cause step voltage changes greater than +/-3% on the Public Utility's system. In all cases the minimum power quality requirements in Public Utility's Engineering Handbook section 1C shall be met and are available at https://www.pacificpower.net/about/power-quality-standards.html. Requirements specified in the System Impact Study that exceed requirements in the Engineering Handbook section 1C power quality standards shall apply.

All generators must meet applicable WECC low voltage ride-through requirements as specified in the interconnection agreement.

The Applicant will be required to install a transformer that will hold the phase to neutral voltages within limits when the Community Solar Project is isolated with the Public Utility's local system until the generation disconnects. The circuit that the Project is connecting to is a four wire multi-grounded circuit with line to neutral connected load. Figure 1 shows the addition of a wye – delta grounding transformer of adequate power size and impedance that will meet the requirement. The grounding transformer will need to be a 50 kVA transformer with 6 % impedance.

6.2 TRANSMISSION SYSTEM MODIFICATIONS

The proposed interconnection of new generation is not expected to result in reverse power flow through the Hornet substation 69-12.0 kV transformer.

No transmission system modifications are required to accommodate the proposed Project.

6.3 DISTRIBUTION/TRANSMISSION LINE MODIFICATIONS

Upon the completion of OCS098, extend #2 ACSR three phase and neutral from the facility point near the end of the line extension, to the change of ownership with OCS103. The line extension includes two poles for primary metering and a 600 amp group operated switch.

6.4 EXISTING BREAKER MODIFICATIONS – SHORT-CIRCUIT

The increase in the fault duty on the system as the result of the addition of the Community Solar Project with photovoltaic arrays fed through 2 – 166 kW inverters and fed through 1 – 500 kVA 12kV – 600 V transformer with 5% impedance will not push the fault duty above the interrupting rating of any of the existing fault interrupting equipment

6.5 PROTECTION REQUIREMENTS

The OCS103 generating facility will need to disconnect from the network in a high speed manner for faults on the 12 kV line on circuit 5L45, out of Hornet substation. The minimum daytime load on the circuit is 1456 kW. The potential power output from the proposed OCS103 generating facility and existing generation connected to the 12 kV circuit 5L45 is 3815.69 kW. This shows that the minimum daytime load on the circuit is less than 50% of the potential power output from the proposed OCS103 generating facility and the existing generation connected to the 12 kV circuit. For this reason the imbalance condition of the load and generation cannot be relied upon to cause the high speed disconnection of the generating facility for faults on the distribution system. A transfer trip circuit will be installed to cause the disconnection of the OCS103 generating facility for the opening of 5L45 at Hornet substation. An SEL-3031 spread-spectrum radio link will be installed between Hornet substation and the OCS103 POI recloser to carry the transfer trip signal.

The 5L45 breaker relay circuitry is already equipped with dead line checking control circuitry to delay the automatic reclose if the generation on the circuit is not disconnected due to any failure at the timing for the reclose operation. Also, directional overcurrent elements are enabled for 5L45 relay to avoid operation for fault on the other 12 kV circuit.

The 12 kV circuit recloser planned to be installed at the proposed OCS103 project will need to be equipped with Schweitzer Engineering Laboratories (SEL) 651R relay/controller and voltage instrument transformers mounted on the utility side of the circuit recloser. The 651R will perform the following protection functions:

1. Detect faults on the 12 kV equipment at the solar-electric generation facility
2. Detect faults on the 12 kV line to Hornet substation
3. Monitor the voltage and react to under or over frequency, and /or magnitude of the voltage
4. Receive transfer trip from Hornet substation

6.6 Data Requirements (RTU)

There are no SCADA requirements for this site.

6.7 Communication Requirements

Install SEL-2812s at the recloser's SEL-651 relay comm port, and at the second port of the existing SEL-3031 radio. Connect with a fiber jumper cable.

At Hornet substation, install SEL-2812s with fiber jumper cable between the existing SEL-3031 radio's second port and an SEL-751 relay communication port.

6.8 Substation Requirements

No substation requirements have been identified.

6.9 Metering Requirements

Interchange Metering

The metering will be located on the high side of the Applicant generator step up transformer at the Point of Interconnection. The metering will be installed overhead on a pole per distribution DM construction standards. The Public Utility will procure, install, test, and own all revenue metering equipment. The metering will be bi-directional to measure KWH and KVARH quantities for both generation received, and back feed retail load delivered. There will be no additional station service metering for supplying generation load. The metering generation and billing data will be remotely interrogated via the Public Utility's MV90 data acquisition system.

Station Service/Construction Power

Prior to construction, Applicant must arrange construction power with the Public Utility as holding the certificated service territory rights for the area in which the load is physically located. Station service and temporary construction power metering shall conform to the Six State Electric Service Requirements manual.

Please note, prior to back feed, Applicant must arrange distribution voltage retail meter service for electricity consumed by the Project and arrange back up station service for power that will be drawn from the distribution line when the Project is not generating. Applicant must call the

PCCC Solution Center 1-800-640-2212 to arrange this service. Approval for back feed is contingent upon obtaining station service.

7.0 COST ESTIMATE

The following estimate represents only scopes of work that will be performed by the Public Utility. Costs for any work being performed by the Applicant are not included.

Distribution System *Line extension and poles*	$59,000
Protection and Control *Relay settings review*	$10,000
Project Management *Project manager, project control specialist*	$8,800
Communication *Radio and fiber jumper cable*	$25,200
Other *Capital surcharge, contingency, administrative support*	$22,600
Total	**$126,000**

*Any distribution line modifications identified in this report will require a field visit analysis in order to obtain a more thorough understanding of the specific requirements. The estimate provided above for this work could change substantially based on the results of this analysis. Until this field analysis is performed the Public Utility must develop the Project schedule using conservative assumptions. The Applicant may request that the Public Utility perform this field analysis, at the Applicant's expense, prior to the execution of an Interconnection Agreement in order to obtain more cost and schedule certainty.

Note: Costs for any excavation, duct installation and easements shall be borne by the Applicant and are not included in this estimate. This estimate is as accurate as possibly given the level of detailed study that has been completed to date and approximates the costs incurred by Public Utility to interconnect this Community Solar Project to Public Utility's electrical distribution or transmission system. An estimate, based on finer detail, will be calculated during the Facilities Study. The Applicant will be responsible for all actual costs, regardless of the estimated costs communicated to or approved by the Applicant.

8.0 SCHEDULE

The Public Utility estimates it will require approximately 18 months to design, procure and construct the facilities described in this report following the execution of an Interconnection Agreement. The schedule will be further developed and optimized during the Facilities Study.

Please note, the time required to perform the scope of work identified in this report appears to result in a timeframe that does not support the Applicant's requested commercial operation date of July 31, 2025.

9.0 PARTICIPATION BY AFFECTED SYSTEMS

Public Utility has identified the following Affected Systems: None

10.0 APPENDICES

Appendix 1: Higher Priority Requests
Appendix 3: Property Requirements
Appendix 4: Transmission/Distribution Study Results

10.1 APPENDIX 1: HIGHER PRIORITY REQUESTS

All active higher priority transmission service and/or generator interconnection and Community Solar Project requests will be considered in this study and are identified below. If any of these requests are withdrawn, the Public Utility reserves the right to restudy this request, as the results and conclusions contained within this study could significantly change.

Transmission/Generation Interconnection/Community Solar Queue Requests considered:
OCS098

10.2 APPENDIX 3: PROPERTY REQUIREMENTS

Requirements for rights of way easements

Rights of way easements will be acquired by the Applicant in the Public Utility's name for the construction, reconstruction, operation, maintenance, repair, replacement, and removal of Public Utility's Interconnection Facilities that will be owned and operated by Public Utility. Applicant will acquire all necessary permits for the project and will obtain rights of way easements for the project on Public Utility's easement form.

Real Property Requirements for Point of Interconnection Substation

Real property for a point of interconnection substation will be acquired by an Applicant to accommodate the Applicant's project. The real property must be acceptable to Public Utility. Applicant will acquire fee ownership for interconnection substation unless Public Utility determines that other than fee ownership is acceptable; however, the form and instrument of such rights will be at Public Utility's sole discretion. Any land rights that Applicant is planning to retain as part of a fee property conveyance will be identified in advance to Public Utility and are subject to the Public Utility's approval.

The Applicant must obtain all permits required by all relevant jurisdictions for the planned use including but not limited to conditional use permits, Certificates of Public Convenience and Necessity, California Environmental Quality Act, as well as all construction permits for the project.

Applicant will not be reimbursed through network upgrades for more than the market value of the property.

As a minimum, real property must be environmentally, physically, and operationally acceptable to Public Utility. The real property shall be a permitted or able to be permitted use in all zoning districts. The Applicant shall provide Public Utility with a title report and shall transfer property without any material defects of title or other encumbrances that are not acceptable to Public Utility. Property lines shall be surveyed and show all encumbrances, encroachments, and roads.

Examples of potentially unacceptable environmental, physical, or operational conditions could include but are not limited to:

- Environmental: known contamination of site; evidence of environmental contamination by any dangerous, hazardous or toxic materials as defined by any governmental agency; violation of building, health, safety, environmental, fire, land use, zoning or other such regulation; violation of ordinances or statutes of any governmental entities having jurisdiction over the property; underground or above ground storage tanks in area; known remediation sites on property; ongoing mitigation activities or monitoring activities; asbestos; lead-based paint, etc. A phase I environmental study is required for land being acquired in fee by the Public Utility unless waived by Public Utility.

- Physical: inadequate site drainage; proximity to flood zone; erosion issues; wetland overlays; threatened and endangered species; archeological or culturally sensitive areas; inadequate sub-surface elements, etc. Public Utility may require Applicant to procure various studies and surveys as determined necessary by Public Utility.

- Operational: inadequate access for Public Utility's equipment and vehicles; existing structures on land that require removal prior to building of substation; ongoing maintenance for landscaping or extensive landscape requirements; ongoing homeowner's or other requirements or restrictions (e.g., Covenants, Codes and Restrictions, deed restrictions, etc.) on property which are not acceptable to the Public Utility.

10.3 APPENDIX 4: TRANSMISSION/DISTRIBUTION STUDY RESULTS

- The modeled power flow on Hornet substation Breaker 5L45 is 800 kW forward power flow during light load and full generation (20% of Hornet substation transformer MDL)
- The modeled power flow on the Hornet substation transformer Bank is 2.67 MW forward power flow during light load and full generation.
- No overloaded equipment or voltage issues were identified on the distribution system.