Facilities Study Report

For

Physical Interconnection of

PJM Generation Interconnection Request

Project ID AF1-296

“Garden Plain 138 kV”

December 2024

Introduction

This Facilities Study has been prepared in accordance with the PJM Open Access Transmission Tariff. The Transmission Owner (TO) is ComEd.

A. Transmission Owner Facilities Study Summary

1. PROJECT DESCRIPTION

The Project Developer (PD) has proposed a wind Generating Facility located in, Whiteside County, Illinois with a designated PJM Project ID of AF1-296. The installed facilities will have a total Maximum Facility Output (MFO) of 212.1 MW with 37.3 MW of this output being recognized by PJM as Capacity.

2. POINT OF INTERCONNECTION (POI)

The Generating Facility will interconnect with the ComEd transmission system via a direct connection into the TSS 132 Garden Plain 138 kV substation.

The proposed generation interconnection is shown on the planning sketch in Attachment #1.

3. POINT OF CHANGE IN OWNERSHIP

The Point in Change of Ownership will be located at the first dead-end structure inside the 138 kV interconnection substation fence line.

4. SCOPE OF PROJECT DEVELOPER INTERCONNECTION FACILITIES

Project Developer will design, build, own, operate and maintain the Project Developer Interconnection Facilities on Project Developer's side of the Point of Change in Ownership (PCO). This includes, but is not limited to:

- Main Power Transformer (s) (MPT), Generation step-up (GSU) transformer(s) or final transformation, as applicable.
- Circuit breakers and associated equipment located between the high side of the MPT(s) or GSU(s) and the Point of Change in Ownership
- Generator lead line from the Generating Facility to the Point of Change in Ownership
- Relay and protective equipment, telecommunications equipment, and Supervisory Control and Data Acquisition (SCADA) to comply with the TO's Applicable Technical Requirements and Standards
    - Two physically diverse 48 count single mode fiber to run the length of new 138kV L13201. Project Developer fiber demarcation will be the FDP within the TSS 132 Garden Plain control

building

B. Transmission Owner Facilities Study Results

The following is a description of the planned Transmission Owner facilities for the physical interconnection of the proposed AF1-296 project to ComEd's transmission system. These facilities shall be designed according to ComEd Applicable Technical Requirements and Standards. Once built, ComEd will own, operate, and maintain these Facilities.

1. TRANSMISSION OWNER INTERCONNECTION FACILITIES:

- A 138 kV dead-end structure and foundation within the fence of the Interconnection Substation, to terminate at the Project Developer's generator lead line.
- Line conductor from the dead-end structure to the bus position in the switchyard of the interconnection substation.
- A 138 kV line motor operated disconnect (MOD), and a set of revenue-metering.

2. STAND ALONE NETWORK UPGRADES

N/A

3. NETWORK UPGRADES

TSS 132 Garden Plain Upgrade

- The existing substation, TSS 132 Garden Plain 138 kV, will be expanded/upgraded to interconnect the project with the ComEd transmission system.
- Install two new 138kV circuit breakers with a minimum nameplate capability 3126/3366/4023/4806 A(747/805/962/1149 MVA)SN/SLTE/SSTE/SLD continuous, and interrupting capability of 63kA at -40°F. Circuit breakers to be equipped with a motor operated disconnect switch (MOD) on both sides of the breaker. All equipment associated with the breaker termination should meet or exceed the thermal capability of the breaker including CB disconnects, leads, CTs, metering, relays.
- Install one motor operated disconnect switch having a minimum thermal capability of 3126/3366/4023/4806 A (747/805/962/1149 MVA) SN/SLTE/SSTE/SLD for L13201.
- Expand 138 kV bus work, foundations and grading.
- For 138kV Project Developer line L13201, install standard ComEd 138kV GIC interface relaying consisting of a Primary 87L-1/SEL-411L (with standard 1300nm 87L port) current differential scheme and a Secondary 87L-2/SEL-311L-1 current differential scheme.

- 138kV Bus 8 will have 3-phase 1200:1, 138kV CCVT's with two winding outputs to be used for Primary and Secondary relay protection.
- Retain Bus 3 & 6 Bus Differential relaying.
- Review and reset relay settings on 138kV line L13219 and L13306, including remote terminals.
- Install new SEL-3350 RTAC dedicated to transmission relays.
- Install RST-2228 dual aux switch architecture for new relays.
- Replace SEL-2407 GPS Clock with SEL-2488.
- Install SEL-3350 RTAC for Project Developer data. Install one pair of serial fiber connections for each Project Developer RTU data exchange.
- Connect ComEd-owned revenue meter to new IP switch architecture.

4. OTHER SCOPE OF WORK

N/A

5. MILESTONE SCHEDULE FOR COMPLETION OF COMED WORK

Facilities outlined in this report are estimated to take 36 months to construct, from the time the Generation Interconnection Agreement is fully executed. This schedule may be impacted by the timeline for procurement and installation of long lead items, the ability to obtain outages to construct and test the proposed facilities.

Description	Start month	Finish month
Detailed Design	1	5
Permitting	5	8
Construction	8	36

6. ASSUMPTIONS IN DEVELOPING SCOPE/COST/SCHEDULE

- This study is based on the Phase 1 Facilities study Report for PJM Generation Interconnection New Service Request Project AF1-296 dated March 2022. The steady-state voltage study for stability analysis will be performed by PJM during the Facility Phase. The PJM study could identify upgrades to the ComEd system that would become part of this project's scope of work.
- The PD will be responsible to request and bear the cost for relocation of existing transmission or distribution lines (including structures and other facilities) that may be required for transmission line crossings, the transport of any large equipment, such as turbines, rotors, turbine structures, cranes, etc. Formal submittal of this request to ComEd's TSO for ultimate review by PJM can be made 7 months prior to back feed request date.
- All upgrades to facilities included in this document will be required to meet latest ComEd standards.
- Upgrades are subject to change based on detailed design development.
- It is assumed that ComEd facilities included in this document will not require a sound study or flood mitigation.
- This study assumes that there will be no additional right-of-way and/or easement work required.
- This Facilities Study is time dependent. If the project is not into construction within one year of the issuance, the study will be void and the project re-studied, requiring the completion of a new Facilities Study.
- Transmission line outages for construction have not been identified, but generally are available from September to May. These outages are controlled by PJM.
- POI assumes completion of ComEd P.D. 0P260003, TSS 133 Rockfalls & TSS 132 Garden Plain station hardening, L15518 reconductoring and wood to steel replacement.
- This cost estimates assume that work will be performed during normal weekdays and with no overtime. Transmission line outages for construction have not been identified, but generally are available from September to May. These outages are controlled by PJM.
- Costs are based on 2024 rates and do not reflect a potential increase in Labor or Material costs after 2024.
- ComEd cost estimate is valid for six (6) months after Facilities Study release by PJM.
- The Project Developer will be responsible to request and bear the cost for relocation of existing transmission or distribution lines (including structures and other facilities) that may be required for transmission line crossings, the transport of any large equipment, such as turbines, rotors, turbine structures, cranes, etc. Formal submittal of this request to ComEd's TSO for ultimate review by PJM can be made 7 months prior to back feed request date.
- Foundation design assumes typical soil conditions at locations and will be subject to change after soil boring tests.
- All upgrades to facilities included in this document will be required to meet latest ComEd standards.
- Upgrades are subject to change based on detailed design development.

- ComEd will complete pre-design and post construction survey for the transmission and substation upgrades, as required. This includes, but is not limited to, the LIDAR survey and video imaging for transmission lines. Costs associated with this are at the expense of the Project Developer. Pre-design survey must be completed prior to detailed engineering.
- This study assumes that any additional right-of-way and/or easement work required will bat the expense of the Project Developer.
- It is assumed that all associated network upgrades, as listed in the Phase 1 study, are complete prior to this New Service Request Project being placed in service.

7. REVENUE METERING REQUIREMENTS

All revenue metering needed for this interconnection project must meet the metering requirements stated in Appendix 2, section 8 of the AF1-296 GIA, and in PJM Manuals M01 and M14D. The details of applicable revenue metering requirements are given in the ComEd Interconnection Guidelines posted on PJM website.

The revenue metering will be installed on the Transmission Owner side of the Point of Change in Ownership will be installed, owned and maintained by Transmission Owner.

- REVENUE METERING FOR PJM AND COMED
  - The revenue meter measures the wholesale energy output (Hourly compensated net MWH and Hourly compensated net MVARH) of the Generating Facility.
  - The metering equipment, including revenue meter and CT/PT shall be installed, at Project Developer's expense, at the interconnection substation on ComEd side of the Point of Change in Ownership.
  - ComEd shall own, operate, maintain, inspect, and test all the metering equipment as set forth in 'Testing of Metering Equipment' section of the PJM Tariff, at the Project Developer's expense.
- REAL-TIME METERING FOR PJM
  - The Project Developer shall install, own, operate, maintain, inspect, and test real-time metering equipment to measure and transmit directly to PJM the real time MW, MVAR, voltage and status of electrical equipment such as circuit breakers and Motor Operated Disconnect switches, in conformance with the requirements listed in PJM Manuals M-01 and M-14D, at the Project Developer's expense.
- RETAIL METERING FOR COMED
  - The AMI Meter measures the energy consumption by the Project Developer at transmission level and hence shall be designed to measure low MW flow.
  - The metering equipment including AMI Meter and CT/PT shall be installed at the interconnection substation on ComEd side of the POI, at the Project Developer's expense.
  - ComEd shall own, operate, maintain, inspect, and test all the metering equipment as set forth in the 'ComEd Interconnection Guidelines'.

8. LAND REQUIREMENTS FOR INTERCONNECTION SUBSTATION

- The site should be expanded approx. 75’ to the north.

Land requirements for the Interconnection Substation needed for this interconnection project must meet the requirements in the ComEd Interconnection Guidelines posted on PJM website.

- For a 138kV substation bisecting one transmission line, the site shall be at least 500’ x 400’ excluding the stormwater detention facility. The site should be expandable to 500’ x 800’ without any restriction.
- For a 138kV substation bisecting two transmission lines, the site shall be at least 500’ x 800’ excluding the stormwater detention facility.
- The site should be accessible from at least two sides to bring in future transmission lines. This means that there should be no river, another transmission line, hills, forest, or wetland on at least two sides of the site.
- There should be no legal agreements or other impediment to interconnect additional generator lead lines to this site from other generators in the future.
- The site should not encroach into ComEd transmission or distribution corridors.
- If the Project Developer owns the land surrounding the substation site, the Project Developer must provide open easement to ComEd to bring in future transmission lines into the substation.
- The Project Developer is responsible to build an access road meeting ComEd requirements to the substation site from the nearest public road.
- The Project Developer is responsible to acquire land to install tie-lines integrating the substation with the ComEd transmission system.
- The Project Developer is responsible to acquire land for the stormwater detention facility meeting all applicable ComEd Environmental requirements and all applicable municipal, county, and state requirements for stormwater management.

Upon completion of the construction and installation of the interconnection substation, the tie-line, access road, stormwater detention facility and related improvements and facilities, and the satisfactory completion of testing of the interconnection substation acceptable to ComEd, the Project Developer shall transfer all the Property Rights and Permits to ComEd, at no cost or expense to ComEd, pursuant to documentation that is acceptable to ComEd, including (without limitation) the Property Transfer Documents in fee simple.
All real property conveyed in fee to ComEd must be remediated to and all real property to which real property rights are transferred to ComEd (as determined in ComEd’s discretion) must be remediated to IEPA’s Tiered Approach to Corrective Action Objectives (TACO) Tier 1 residential remediation standards.

9. ENVIRONMENTAL AND PERMITING

- Project Developer will be responsible to obtain all environmental approvals and permitting required for the construction of 138kV L13201.
- ComEd will be responsible for all environmental approvals and permitting required for L13201 work. This includes any endangered species studies and monitoring, as required. Costs associated with this permitting are at the expense of the Project Developer.
- Project Developer will be responsible for site restoration required for substation and

transmission upgrades. This includes, but is not limited to road restoration/improvements, wetland restoration, and farm field restoration/crop damage. Costs associated with this are at the expense of the Project Developer.

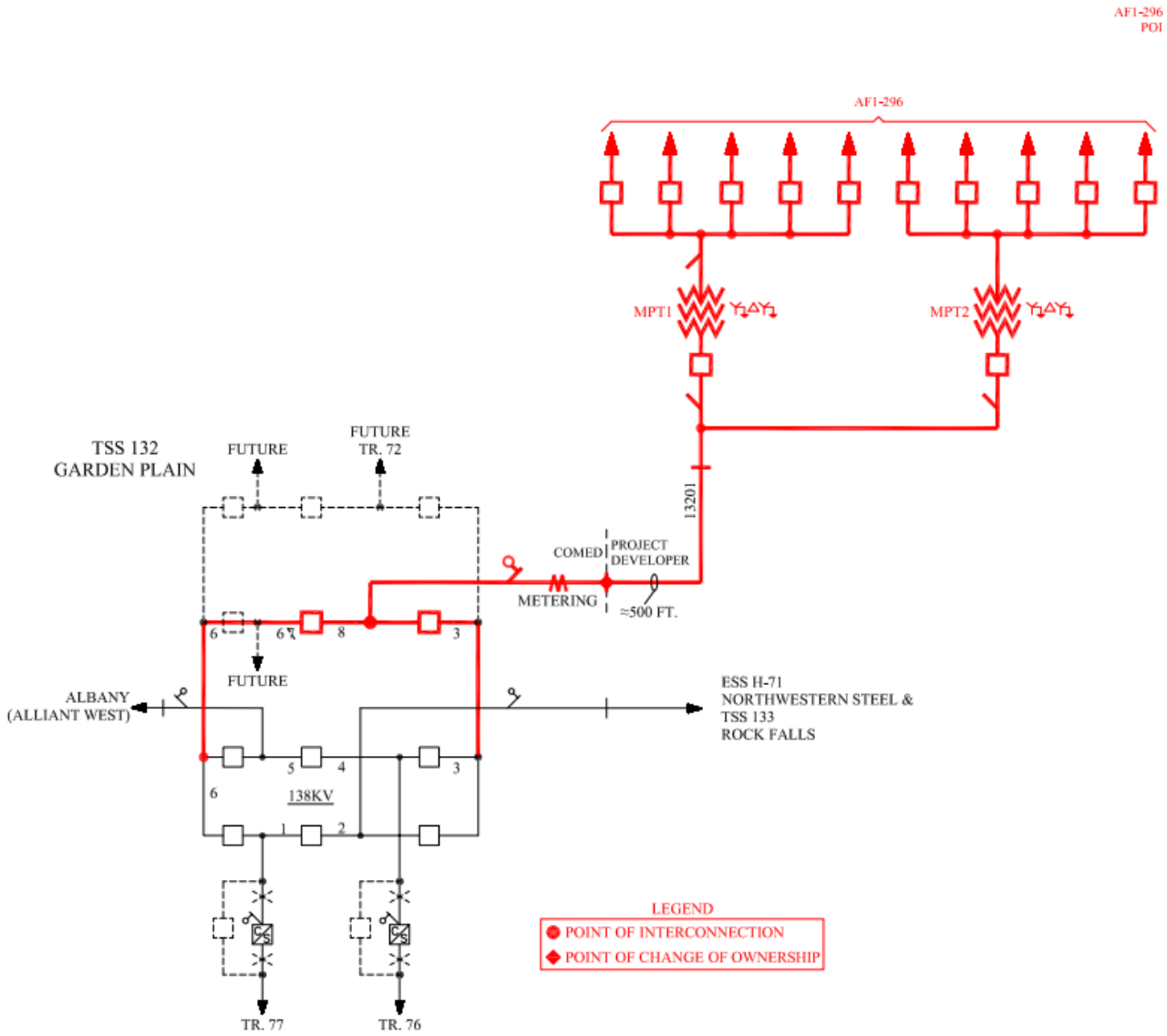
- The Project Developer will be responsible for the cost to purchase real estate or obtain the necessary right-of-way easement for all upgrades associated with this project. These associated upgrades are not included in the costs listed in this study.
- Project Developer will be responsible for remediation costs for locations found to have environmental contaminations and remediation. This may require contaminated soil disposal as well as lead paint removal for existing structure work.
- It is assumed that all necessary permits will be obtained in a timely manner to allow engineering and construction to proceed according to the Milestone Schedule.
- It is assumed that conveyance of property and rights will be obtained to support the PJM Transmission Outage Schedule.
- It is assumed that the required Environmental Study will yield no impediments to the development of the site.

C. APPENDICES

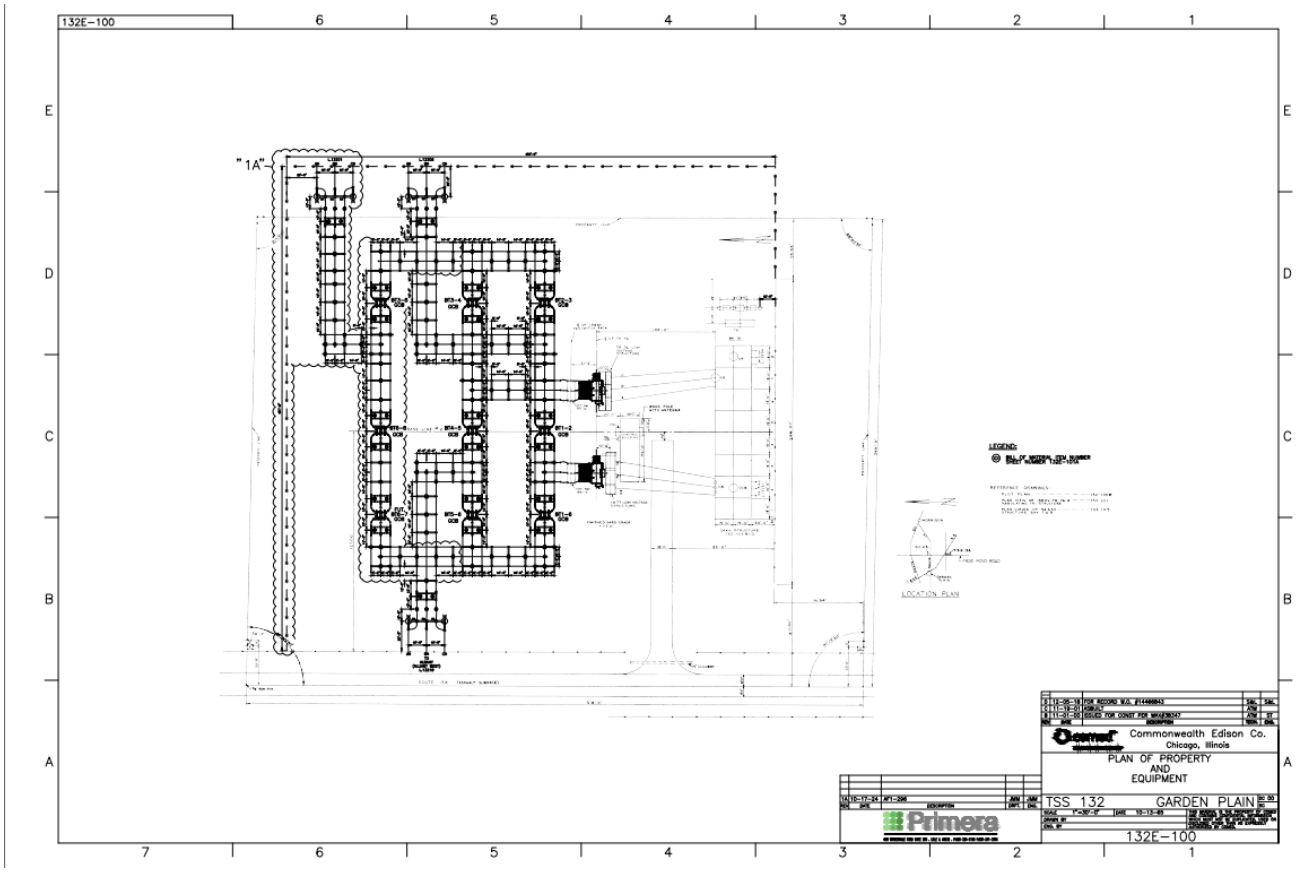
Attachment #1: Single line Diagram for the Physical Interconnection

Attachment #2: Substation General Arrangement

Attachment #1: Single line Diagram for the Physical Interconnection



Attachment #2: Substation General Arrangement


132E-100
"1A"
LEGEND:
LOCATION PLAN
Commonwealth Edison Co.
Chicago, Illinois
PLAN OF PROPERTY
AND
EQUIPMENT
TSS 132 GARDEN PLAIN
132E-100