# Facilities Study Report

# For

# Physical Interconnection of

# PJM Generation Interconnection Request
# Project ID AH1-542

# "Crissinger-Kirby 138kV"

## Introduction

This Facilities Study has been prepared in accordance with the PJM Open Access Transmission Tariff, as well as the Application and Studies Agreement between the Project Developer and PJM Interconnection, LLC (PJM or Transmission Provider (TP)). The Transmission Owner (TO) is American Transmission Systems, Inc. (ATSI), a FirstEnergy company.

This Facility Study was performed to satisfy the Phase 2 Facility Study requirement of the PJM Tariff. The Facility Study is intended to provide scope, cost and schedule estimates for the project as currently defined and approved for Phase 2 study. In the event project changes are made during DP2 that impact this report, updates will be provided as part of the Phase 3 report. Following execution of the project's final agreement, this report will not be updated to account for other changes made as part of the agreements modification clause and instead the scope change process will be followed.

## A. Transmission Owner Facilities Study Summary

### 1. PROJECT DESCRIPTION

The Project Developer has proposed a solar and storage Generating Facility located in Marion County, Ohio. The installed facilities for AH1-542 will have a total Maximum Facility Output (MFO) of 110 MW with 22 MW of this output being recognized by PJM as Capacity.

### 2. POINT OF INTERCONNECTION (POI)

The Generating Facility will interconnect with the ATSI transmission system via a newly constructed 138 kV three (3) breaker ring bus substation, tapping the Crissinger - Kirby 138 kV line, Line Code 2104-1, approximately 4.47 miles from Crissinger substation.

The construction of the new interconnection substation will result in the splitting of the existing Crissinger - Kirby 138 kV line, Line Code 2104-1, into two lines on the transmission system. New line designations are to be determined.

The proposed generation interconnection is shown on the single line diagram in Attachment #1.

### 3. POINT OF CHANGE IN OWNERSHIP (PCO)

The Point of Change in Ownership (PCO) will be located at the first dead-end structure outside the new three (3) breaker ring bus interconnection substation fence line.

### 4. SCOPE OF PROJECT DEVELOPER 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:

- Circuit breakers and associated equipment located between the high side of the GSU 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, and Supervisory Control and Data Acquisition (SCADA) and telecommunications equipment to comply with the TO's Applicable Technical Requirements and Standards.
- The easements and associated rights of way for the TO owned substation along with the 138 kV line taps to the substation will be acquired by the Project Developer and transferred to the TO at no cost. Site preparation for the TO owned substation, including clearing, grading and an access road, as necessary, is assumed to be by the Project Developer. The access road design must be approved by FirstEnergy to ensure it provides adequate access to the substation to support construction and maintenance activities. Route selection, line design, and right-of-way acquisition for the Project Developer's facilities are not included in this report and are the responsibility of the Project Developer.

## B. Transmission Owner Facilities Study Results

The following is a description of Transmission Owner facilities for physical interconnection of the proposed AH1-542 project to ATSI transmission system. These facilities shall be designed according to FirstEnergy Applicable Technical Requirements and Standards. Once built, ATSI will own, operate, and maintain these Facilities.

### 1. TRANSMISSION OWNER INTERCONNECTION FACILITIES (TOIF)

1.1 New Interconnection Substation Line Terminal

Install line terminal equipment within the AH1-542 interconnection substation. Install up to 0.1 miles of conductor from AH1-542 interconnection substation to the Project Developer-owned dead-end structure outside of interconnection substation fence.

- Structures Installed
    - 0.1 miles of conductor 795 kcmil 26/7 ACSR conductor, shielded by (1) 7#8 Alumoweld.
    - Substation line exit facilities, including dead end structures and disconnect switches, described in the AH1-542 Interconnection substation scope.
- Sitting and Permitting
    - Full application will be required.
- Scope of work Assumptions
    - Location of PCO assumed
    - Location of generator substation assumed
    - A ground survey will be required for design and as-built.
    - Cost of mobilization/demobilization shared with line Loop scope of work.
    - Assume minimal social and ecological impacts.

- Assume no local opposition to the project.

- Ancillary Scope of Work
  - Project Management
    - Provide project management, coordination, administration, scheduling, material management and project development if required.

1.2 Energize and integrate interconnection facilities to the transmission system.

- Relay and Controls Scope of Work
  - Integrate interconnection facilities protection and controls to the transmission system.
  - Revise Relay Settings.
- Ancillary Scope of Work
  - Project Management
    - Provide project management, coordination, administration, scheduling, material management and project development as required.
  - Testing and Commissioning
    - Test and commission of new relay settings and metering equipment.

**2. STAND ALONE NETWORK UPGRADES**

2.1 New Interconnection Substation

A new three (3) breaker ring bus substation will be constructed along the Crissinger – Kirby 138 kV transmission line to interconnect AH1-542 with the ATSI transmission system.

The new substation will be located approximately 4.47 miles from Crissinger Substation. The Project Developer will be responsible for acquiring all easements, properties, and permits that may be required to construct both the new interconnection switching station and the associated facilities. The Project Developer will also be responsible for the rough grade of the property and an access road to the proposed three-breaker ring bus site.

- Below Grade Scope of Work:
  - Installation of ground grid, cable trench, foundations, and control cables.
- Above Grade Scope of Work:
  - (1) Medium control house including relaying, RTU, and battery system
  - (3) 138kV circuit breakers
  - (6) 138kV disconnect switches
  - (3) 138kV MOAB disconnect switches
  - (3) Sets of 138kV CVTs, (9) 138kV surge arresters
  - (3) 138kV dead end structures

- (1) SSVTs
- Security fence and camera system

- Relay & Control Scope of Work
  - Each new breaker shall have a dedicated SEL-451 relay for breaker failure protection with associated hand-reset lockout auxiliary schemes.
  - Primary and backup line protective relays are required on the Crissinger, Kirby and AH1-542 generation facility line 138 kV exits.
  - For the AH1-542 generator station exit, the primary and backup relays shall be SEL-411Ls.
  - For both the Crissinger & Kirby 138 kV line exits, the primary and backup relays shall be SEL-411s.
  - Installation of RTU in control house.
- Scope of work Assumptions
  - Developer is providing access roads and rough graded site.
  - 125 VDC battery system.
  - Assume 40kA CB.
  - CBs come with bushing CTs.
  - All switches are motor operated.
- Ancillary Scope of Work
  - Project Management
    - Provide project management, coordination, administration, scheduling, material management and project development as required.
  - Forestry
    - None
  - Real Estate & Right-Of-Way
    - RE/ROW will be needed for new substation. Developer to provide leased land to FE to build new substation.
    - Real estate estimate has been included for:
      - Internal support including document review, project planning meetings, subcontractor oversight and assistance with transfer of assets if required.
      - External support for general project support, and minimal construction support and damage settlements/releases.
      - Direct damage payments not included in estimate.
      - Kept GIS / R&R for installation of structures.
  - Environmental
    - No wetland/stream crossings

        - Road Bonds are required.
        - Environmental Filming (Documentation of Existing roads are required.
        - Environmental Access and Road Crossing Permit Fees is required.
        - Environmental Development of Permit Binder is required.
        - Environmental Cultural Resource Consultation is required.
        - Environmental Construction walk down is required.
        - RTE consulatation letters are required.
        - Wetland delineations and WDR are required.
        - Stormwater permits and local approvals are assumed.
        - Internal environmental engineering and external project management costs are included.
    - Revenue Metering
        - None
    - Information Technology
        - Network equipment and scopes are described in sections 2.2, 2.3 and 2.4.
        - SCADA work at AH1-542 Substation to support security cameras, breaker, relays, RTU, meters, MOAB, GOAB, battery charger, battery monitor, disconnect switch, installation.
    - Distribution
        - Distribution allowance to bring in back-up station service power.
    - Testing and Commissioning
        - Testing and commissioning of all new substation equipment.
- Standard Design References:
    - FirstEnergy's *Requirements for Transmission Connected Facilities*: www.pjm.com/planning/design-engineering/to-tech-standards.aspx.
    - PJM Protection Standard (PJM Manual 7): https://pjm.com/-/media/documents/manuals/m07.ashx
- ATSI Protection Specification:
    - Refer to *Attachment 4* of this document.
- Material List and Equipment Ratings:
    - Refer to *Attachment 3*.

2.2 ADSS Fiber Installation

- Install/Test approximately 5.01 miles of new 96F/SM ADSS cable from the AH1-542 substation control

house to a new splice point on the "OPGW FRP Roberts to Marysville" fiber cable near STR RAYLS # 12030 (206110020).

- Underground ADSS will be utilized for approximately 0.37 miles from the substation control building to the riser pole 102FS-52.
- Aerial ADSS Fiber will be utilized for approximately 4.60 miles from riser pole 102FS-52 to the distribution structure 101FN4-39.
- Underground ADSS will be utilized for approximately 0.04 miles from the structure 101FN4-39 to the designated splice point on the "OPGW FRP Roberts to Marysville" fiber cable near STR RAYLS # 12030 (206110020).

2.3 MPLS Equipment

- Design, installation, and testing/commissioning for MPLS equipment for SCADA transport at AH1-542 Substation. Assumed SCADA work is included in this cost.
- SCADA work at AH1-542 Substation to support MPLS and Crossbow installation.
- Crossbow engineering and materials at AH1-542 Substation.

2.4 In-Sub Fiber

- Estimated (2) in-sub fiber builds for relaying protection from AH1-542 substation control house to the Crissinger – Kirby 138kV Line with existing OPGW.

2.5 New Interconnection Substation – FE Option to Build Scope

FirstEnergy work at new Interconnection Substation

- Above Grade
  - Install (1) security system and camera system.
  - Install (1) indoor security AC cabinet.
- Relay and Control Scope of Work
  - Install (1) network fiber termination rack.
  - Programming of SCADA RTU.
- Scope of Work Assumptions
  - Assumed developer will install camera foundations and conduits to FirstEnergy standards.
  - Assumed 2 weeks of testing and commissioning for testing to Transmission Control Centers.
  - Assumed Project Developer will install fiber from generator station to OTB station and bring fiber into control house.
  - FirstEnergy will be responsible for network fiber.
- Ancillary Scope of Work
  - Project Management
    - Provide project management, coordination, administration, scheduling, material management and project development as required.

- Information Technology
  - Refer to section 2.2, 2.3 & 2.4 for SCADA backhaul connection and MPLS installation
- Testing and Commissioning
  - Testing of new site to Transmission Control Center; perform functional testing as required.

## 3. NETWORK UPGRADES

3.1 Crissinger – Kirby 138 kV, Line Number 2104-1

The Crissinger – Kirby 138 kV, Line Number 2104-1, will be cut and looped into the new interconnection substation at a point approximately 4.47 miles from Crissinger substation, around structure 11631.

- Existing Conditions
  - Per TAMI the existing line is constructed on single circuit, monopole, wood structures. Existing conductor is 795 kcmil 26/7 ACSR shielded by (1) 3#6 Alumoweld.
  - Per GIS View, there does appear to be distribution under-build along the length of the project area on the Crissinger - Kirby 138kV Line.
- Structures Installed
  - (2) single circuit steel monopole dead-end structures on concrete foundations.
  - 0.2 miles of conductor 795 kcmil 26/7 ACSR shielded by (1) 7#8 Alumoweld (1) OPGW.
  - Transfer existing conductor and shield wire to new dead-end structures.
- Structures Removed
  - (1) single circuit wood structure (Exist. Str. 11631)
  - Approximately 0.02 miles of 795 kcmil 26/7 ACSR conductor and (1) 3#6 Alumoweld shield wire.
- Permitting
  - Full Application will be required.
- Scope of Work Assumptions
  - A ground survey will be required for design and as-built.
  - It is assumed the existing conductor and shield wire are in adequate condition and can be transferred. An engineering analysis during project development will be required.
  - It is assumed the adjacent structures are in adequate condition and can handle the new loading. An engineering analysis during project development will be required.
  - The loop cut-in and substation location were not provided in detail. A general area was provided. Specific substation location and layout will be required during project development and execution.
  - Assume minimal social and ecological impacts.

- Assume no local opposition to the project.

- Ancillary Scope of Work
  - Project Management
    - Provide project management, coordination, administration, scheduling, material management and project development if required
  - Forestry
    - Some clearing is required.
  - Real Estate & Right-Of-Way
    - Rights & restrictions review on existing line
    - New ROW will be required
    - Real estate estimate has been included for:
      - Internal support including document review, project planning meetings, subcontractor oversight and assistance with transfer of assets if required.
      - External support for general project support, and minimal construction support and damage settlements/releases.
      - Direct damage payments are not included in estimate.
      - Kept GIS / R&R for installation of structures.
  - Environmental
    - No wetland/stream crossings
    - Road Bonds are required
    - Environmental Filming (Documentation of Existing roads are required
    - Environmental Access and Road Crossing Permit Fees is required
    - Environmental Development of Permit Binder is required
    - Environmental Cultural Resource Consultation is required
    - Environmental Construction walk down is required
    - RTE consultation letters are required
    - Wetland Delineations and WDR are required
    - Stormwater permits and local approvals are assumed
    - Internal environmental engineering and external project management costs are included
  - Revenue Metering
    - None
  - Information Technology
    - None

- Access Road Construction
  - Access roads will be required, terrain is flat (approximately 0.1 miles).
- Distribution
  - None

3.2 Crissinger Substation

Install new relays and revise relay settings at Crissinger.

- Below Grade Scope of Work:
  - None
- Above Grade Scope of Work:
  - Replacement of 2 relay panels in existing control house
- Relay & Control Scope of Work
  - Standard line current diff panel with (2) SEL-411L
  - Revise relay settings.
- Scope of Work Assumptions:
  - Panel will fit in existing panel location per print O-608-12-31
  - Reusing existing cables
- Ancillary Scope of Work
  - Project Management
    - Provide project management, coordination, administration, scheduling, material management and project development if required.
  - Information Technology
    - SCADA work at Crissinger Substation to support relays and meters installation
  - Testing and Commissioning
    - Testing and Commissioning to support new relays and revision of relay settings.

3.3 Kirby Substation

Install new relays and revise relay settings at Kirby.

- Below Grade Scope of Work:
  - None
- Above Grade Scope of Work:
  - Replacement of 2 relay panels in existing control house
- Relay & Control Scope of Work

    - Standard line current diff panel with (2) SEL-411L
    - Revise relay settings.
- Scope of Work Assumptions:
    - Panel will fit in existing panel location per print O-646-30-01
    - Reusing existing cables
- Ancillary Scope of Work
    - Project Management
        - Provide project management, coordination, administration, scheduling, material management and project development if required.
    - Information Technology
        - SCADA work at Kirby Substation to support relays and meters installation
    - Testing and Commissioning
        - Testing and Commissioning to support new relays and revision of relay settings.

3.4 Tangy Substation

Review and Update Relay Settings

- Below Grade Scope of Work:
    - None
- Above Grade Scope of Work:
    - None
- Relay & Control Scope of Work
    - Review and revise relay settings
- Scope of Work Assumptions:
    - None
- Ancillary Scope of Work
    - Project Management
        - Provide project management, coordination, administration, scheduling, material management and project development if required.
    - Testing and Commissioning
        - Testing and commissioning to support the revision of relay settings.

3.5 Roberts Substation

Review and Update Relay Settings

- Below Grade Scope of Work:
    - None
- Above Grade Scope of Work:
    - None
- Relay & Control Scope of Work
    - Review and revise relay settings
- Scope of Work Assumptions:
    - None
- Ancillary Scope of Work
    - Project Management
        - Provide project management, coordination, administration, scheduling, material management and project development if required.
    - Testing and Commissioning
        - Testing and commissioning to support the revision of relay settings.

## 4. Other Scope of Work

4.1 Revenue metering.

Provide revenue metering panel within new AH1-542 Control House. Integrate revenue metering to Interconnection Substation. Provide new 3-phase 138 kV Free-standing CT/VT Combo Units.

- Below Grade Scope of Work:
    - (1) Lot of excavation, conduit, backfill, grounding, and wiring between Free Standing CT/VT Combo units to revenue metering.
    - (1) Lot of foundations for Free-standing CT/VT 138 kV Combo Unit.
- Above Grade Scope of Work:
    - (1) set of 3-phase Free Standing CT/VT Combo Unit 138 kV.
- Relay & Control Scope of Work
    - (1) New Revenue Metering Panel with test switches. The material for the Revenue Meter is to be included in revenue metering support estimate.
- Scope of Work Assumptions:
    - It is assumed current and voltage signals will be pulled from new 3-phase free standing CT/VT Combo Units. Costs for these combo units are included in the AH1-542 Interconnection substation scope.

- Assumes enough room in AH1-542 Control house to support a new revenue metering panel.
- Assumes enough room in AH1-542 substation to add in free standing CT/VT Combo Units.
- Assumes the same crew that is constructing the OTB FE Work scope will be adding the revenue metering panel and freestanding CT/VT combo units.
- Temp construction facilities and general construction conditions (Scope Capture) are included in AH1-542 Interconnection substation scope.

- Ancillary Scope of Work
  - Project Management
    - Provide project management, coordination, administration, scheduling, material management and project development if required.
  - Revenue Metering
    - Provide high end revenue meter and engineering support for revenue metering at new Interconnection Substation AH1-542.
  - Testing and Commissioning
    - Testing and commissioning services as required.

### 4.2 Option to Build Oversight

FirstEnergy oversight of developer design and construction of new interconnection substation on a relatively low risk location from preliminary civil desktop study review.

- Below Grade
  - Must meet FirstEnergy standards - Option to Build.
- Above Grade
  - Must meet FirstEnergy standards - Option to Build.
- Relay and Controls Scope of Work
  - Must meet FirstEnergy standards - Option to Build.
- Scope of Work Assumptions
  - Engineering oversight for review/comment of OTB site design for meeting FirstEnergy Standards.
  - Geotechnical/site/civil oversight for review/comment of OTB site grading design for meeting FirstEnergy standards.
  - Construction Oversight assumed for 6 months (note: potential for additional oversight for Geotech/site/civil site construction for challenging projects).
  - Developer responsible for apparatus-testing of devices and supplying results to FirstEnergy
  - FirstEnergy commissioning oversight is assumed for duration of construction.
  - Developer responsible for providing final 3D As-builts per FirstEnergy direction, oversight, and approval.

- Ancillary Scope of Work
    - Project Management
        - Coordinate with developer and provide project management, coordination, administration, scheduling, material management and project development for FirstEnergy scope of work.
        - Provide construction oversight for project construction duration.
    - Forestry
        - Completed by Developer.
    - Real Estate and Right-of-Way
        - Support as required for transfer of property to FirstEnergy upon construction completion
        - Internal support including document review, project planning meetings, assistance with transfer of assets as required.
    - Environmental
        - Environmental review of proposed site.
    - Testing and Commissioning
        - Commissioning review of developer supplied information and witness of critical testing

## 5. MILESTONE SCHEDULE FOR COMPLETION OF ATSI WORK

Facilities outlined in this report are estimated to take 42 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 |
|---|---|---|
| Preliminary Engineering | 1 | 2 |
| Detailed Engineering | 3 | 31 |
| Siting, Permitting & Real Estate | 5 | 31 |
| Equipment Delivery | 33 | 33 |
| Construction | 34 | 40 |
| Testing and Commissioning | 38 | 42 |

## 6. ASSUMPTIONS IN DEVELOPING SCOPE/COST/SCHEDULE

6.1 Scope Assumptions:

- Project Developer will coordinate design and alignment of proposed 138 kV generator lead line with the Transmission Owner for review of any clearance, right-of-way or right-of-way encroachment issues with TO owned facilities.
- Project Developer will coordinate design and construction of proposed 138 kV lead line. For these areas, the Project Developer shall provide TO with proposed drawings prior to construction and as-built drawings, confirmed by as-built survey data post-construction.
- Transmission Owner's preference would be to limit interference and avoid transmission line crossings with new 138 kV terminal positions. As a minimum, Project Developer facilities should not encroach within 100 feet of TO centerline at blowout conditions. If Project Developer's line design does not comply with this requirement, TO would need to review this area as a special exception.
- Additional costs will be incurred by the Project Developer, if final alignment of the 138 kV generator lead line causes encroachments, changes, or modifications to any existing or relocated TO facilities.
- Project Developer is responsible for making all arrangements for electric distribution service (if required) for its generation station. No costs or schedule are included herein.
- All new generator only and new generator plus load facilities must be isolated from the ATSI Transmission System by a Power Transformer with a winding configuration meeting the requirements in FirstEnergy's "Requirements for Transmission Connected Facilities" document.

6.2 Cost Estimate Assumptions:

- The cost estimates provided in this report were developed as of March 5, 2026, based upon current market conditions. Hence, they are subject to significant changes in the event that project implementation is delayed. Notwithstanding the cost estimates from this report being used in the Generator Interconnection Agreement for the related project, ATSI reserves the right to re-evaluate and provide a more accurate cost estimate during the implementation phase of the project. In accordance with section 217 of the Open Access Transmission Tariff, the Project Developer will be responsible for 100 percent of the actual costs of the facilities required to accommodate its Interconnection Request.
- ATSI reserves the right to charge the Project Developer operation and maintenance expenses to maintain the Project Developer attachment facilities, including metering facilities, owned by ATSI. These costs will be specified in the Generator Interconnection Agreement.

6.3 Schedule Assumptions:

- This schedule assumes that all issues covered by the "Environmental, Real Estate and Permitting Issues" section of this document are resolved. Construction cannot begin until after all applicable permits and/or easements have been obtained.
- ATSI's ability to support this schedule also depends on the feasibility of taking the required outages to support construction. Outages that are determined to negatively impact system reliability or cause congestion may be delayed or denied, at any time, even if they are submitted on time based on the Outage Submittal Rules in section 4.2.1 of PJM Manual 03. This includes, but is not limited to, outages requested between the months of June and September, as well as January and March, which typically

get denied due to summer and winter peak conditions. Therefore, the construction schedule will be adjusted as needed to accommodate any outage restrictions that have been identified by ATSI or the Transmission Provider.

## 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 AH1-542 GIA, and in PJM Manuals M01 and M14D. The details of applicable revenue metering requirements are given in the "Requirements for Transmission Connected Facilities" posted on PJM website.

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

The revenue metering system (particularly the revenue metering current transformers) shall be designed to accurately meter the light loads that will occur when the facility is not generating power and only back-feeding station service from the Transmission Owner. This may require the use of high accuracy extended range current transformers.

Transmission Owner will obtain real-time, site-specific, generation data from PJM, via the required communication link from Project Developer to PJM. Transmission Owner will work with PJM and Project Developer to ensure the generation data provided to PJM meets Transmission Owner's requirements.

These requirements are in addition to any metering required by PJM.

## 8. LAND REQUIREMENTS FOR INTERCONNECTION SUBSTATION

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

- Requirements for Transmission Connected Facilities
- Geotechnical Design Requirements

The appropriate land requirements for a new Interconnection Substation are dependent on several electrical and physical factors/attributes. FirstEnergy will ultimately have to evaluate every property individually to assess the feasibility of construction, as well as any additional requirements that may be needed to support geotechnical and environmental concerns.

As a preliminary guide for site selection, FirstEnergy has provided a list of specifications for the substation size, Siting and Geotechnical standards, and Environmental requirements. It is important to note that these specifications are general, and as such, no construction activities should be performed on a selected site without prior approval from FirstEnergy.

### 8.1 Site Dimensions and Layout:

The typical new interconnection substation is a three-breaker-ring bus tapping an existing transmission line. The standard layout and dimensions of the substation are based on the voltage level of the interconnection system.

Below is a table summary of the typical substation dimensions for AH1-542. The standard requirement for a parking area has been included. However, Environmental, Geotechnical, and other factors may significantly

increase the area required. For example, sites that require stormwater detention facilities will require area in addition to the typical dimensions provided in the table.

| 3 breaker Ring Bus Voltage | Dimension Size (ft) | Dimension Acres | Dimension size w/ 100ft buffer (ft) | Acre size w/ 100ft buffer | Parking (15 cars) 230ftx60ft | Total Acres (Buffer + Parking) |
|---|---|---|---|---|---|---|
| 138 kV | 228x228 | 1.35 | 328x328 | 2.7 | 0.5 | 3.2 |

8.2 Real Estate Transfer

The preferred method for conveying a property to the TO is by "fee simple" transfer. If there are subdivisions or other conditions that hinder the ability for the Project Developer to convey the property by "fee simple" transfer, the TO may allow the use of an exclusive easement. These conditions should be discussed with the TO, and the accepted method of transfer should be confirmed early in the Interconnection process.

The Project Developer is required to obtain the following documents in the sequence listed below:

- Acquire the Interconnection Facilities property in fee from the property owner.
- Acquire an easement from the property owner for the Interconnection Facilities to the TO's T-Line (using the TO's template), if the size of property acquired doesn't sufficiently bi-sect the TO's existing right of way. If the property acquired by the Project Developer sufficiently overlaps the TO's existing right of way, this Interconnection Facilities easement is not needed.
- Provide access agreements to the TO from the property owners and Project Developer (this may be required if an exclusive easement is being used instead of conveying property to the TO in "fee simple".
- Provide an assignment of appropriate easement rights to the TO upon project completion. (Note: assignment must include all of TO's language in order to safely, operate and maintain facilities. It's critical that TO's easement templates are used when Project Developer is acquiring easements intended to be assigned to the TO.
- Provide deed conveyance of "fee simple" property for the Interconnection Facilities to the TO upon project completion and prior to transfer of title to personal property.

Document Exhibits:

Project Developer shall provide a survey and legal description detailing the location of the substation (preferably located adjacent to an existing transmission line right of way), ingress-egress to the substation from a dedicated public roadway, and easement for distribution and communication facilities and/or transmission facilities if necessary. This drawing shall be prepared by a licensed and registered surveyor and include at a minimum (ingress-egress, distribution and communication facilities locations may not need to be shown on the survey if property being conveyed is by "fee simple"):

- Legal description and survey of fee property being conveyed, including all lot split requirements
    - When property is conveyed to the TO by fee simple, the Project Developer is required to submit a completed Phase I Environmental Site Assessment (ESA) to the TO in accordance with all the requirements outlined in ASTM E 1527-05 prior to the start of construction of a substation property that will be transferred to the TO. Furthermore, if the Phase I ESA completed for the

property documents the presence of any recognized environmental conditions (RECs), the Project Developer shall bear the cost and responsibility to complete a Phase II ESA in accordance with ASTM Standard E 1903-97 (Guide for Environmental Site Assessments: Phase II Environmental Site Assessment Process), however, final approval and property conveyance shall be at the sole discretion of the TO.

- Legal description for new transmission right of way (if "fee simple" conveyance is not used)
- Legal description for new distribution right of way (if "fee simple" conveyance is not used)
- Legal description for any other energy-related facilities that may be required (if "fee simple" conveyance is not used)
- Legal description for ingress-egress to a dedicated public roadway (if fee simple conveyance is not used)
- Survey drawing that shows:
    - New right of way along with the location of existing easements
    - Other existing facilities on the property
    - Names of adjoining property owners
    - Basic drawing features: title block, north arrow, legend, graphic scale

8.3 Geotechnical and Siting Requirements:

Project Developer shall refer to Geotechnical Design Requirements provided on PJM's website. In addition, below are a list of standard siting guideline to account for when selecting a property for the interconnection substation:

- Slopes steeper than 2:1 and/or taller than 10' shall have slope stability performed.
- Factor of Safety (FS) shall be 1.5 for permanent condition.
- Minimum road width shall be 16'. AutoTurn Analysis shall be performed to accommodate the design vehicle needed inside the substation curve widening to be provided as necessary.
- Longitudinal slope for main access road to substation shall be 0.5%-10%. This is a mandatory design specification.
- Slope across the substation pad shall be 0.5%-2%.
- Every 20' vertical slope shall require a bench.

Site Grading and Preparation Responsibility:

It is the responsibility of the Project Developer to properly vet a proposed substation location. The proposed location should be reviewed by a Civil Engineer to determine the site's suitability for construction and operation as a substation (refer to Attachment 5 to FE's preliminary Geotechnical summary report). This should include a review of available information regarding the specific site location that should be considered when estimating constructability, risk, cost, and schedule. The substation is considered the substation and all associated FirstEnergy Facilities needed to operate and maintain the site such as, access roads, stormwater management facilities, walls/structures, and utilities. This review should include, but is not limited to:

- Geologic Hazards

    - Karst
    - Geologic formation/group
        - Hard bedrock (shallow bedrock difficult to excavate)
        - Weak bedrock
    - Landslide susceptibility and topography
    - Surficial soils survey
    - Coal resource mapping
- Environmental Hazards
    - Flood mapping
    - Wetland Mapping
    - Any pollution information that could affect construction.
    - Corrosivity
- Past development
    - Mining activity
    - Previously reclaimed site

## 9. APPLICABLE TECHNICAL REQUIREMENTS AND STANDARDS

The Requirements for Transmission Connected Facilities, Revision 7, dated January 27, 2026, shall apply.

The Geotechnical Design Requirements, dated July 20, 2022, shall apply.

The FirstEnergy Approved Vendor List, dated February 6, 2026, shall apply.

The TPP-REF-003 Transmission Planning Criteria, Revision 10, dated December 19, 2023, shall apply.

## 10. ENVIRONMENTAL AND PERMITING

The following are possible environmental, real estate and permitting issues:

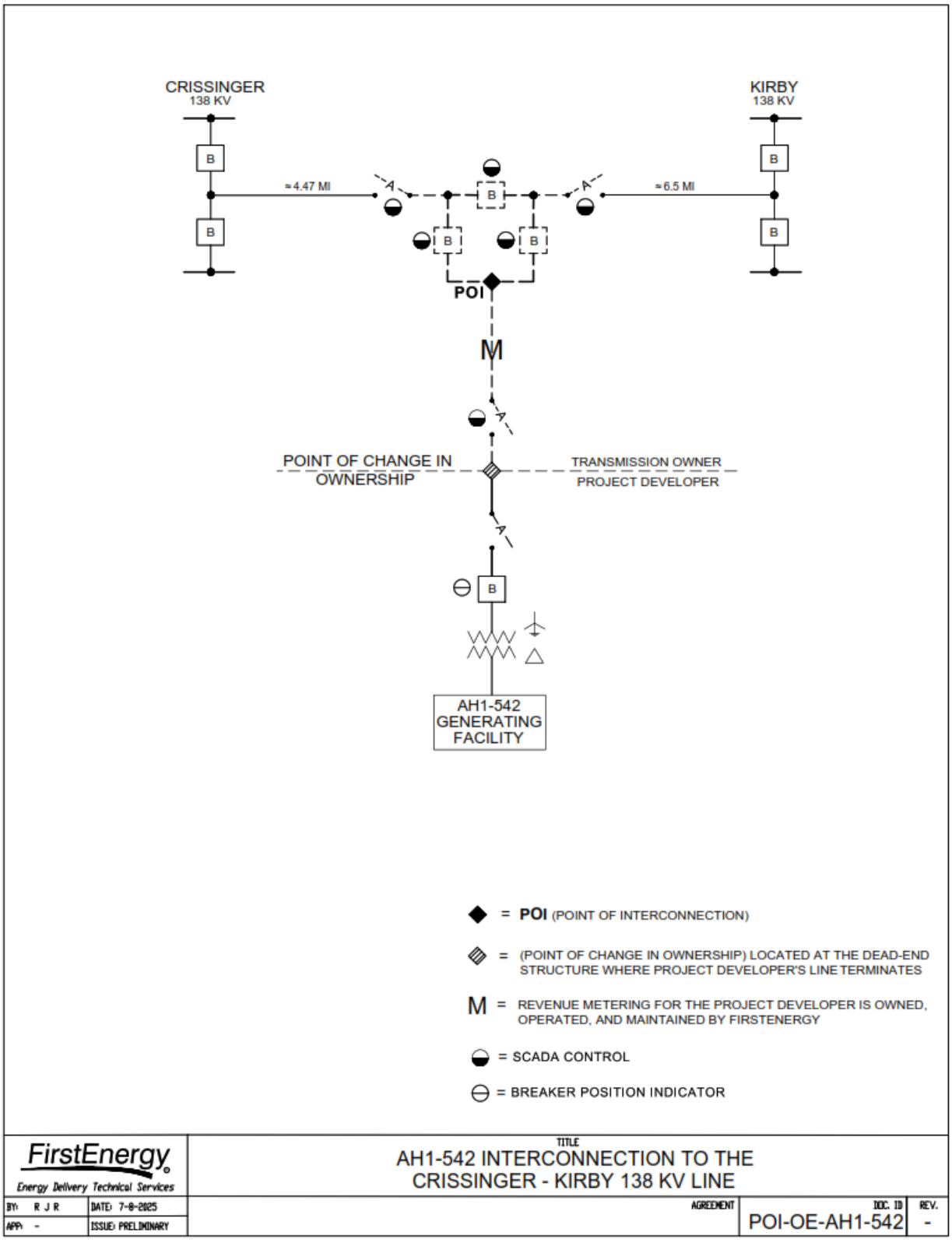
- Environmental permitting, Real Estate acquisition, and notifications to the state's Public Utilities Commission (PUC) vary, some up to twelve (12) months after preliminary engineering is completed to secure the required approvals.
- Prior to agreement by Project Developer to purchase the property, a Phase 1 Environmental Assessment should be conducted for the entire site to avoid assumption of environmental liabilities by Project Developer or Transmission Owner.
- The Transmission Owner interconnection substation may involve environmental surveys, permits, approvals and plans with federal, state, and/or local agencies.
- Assumed Project Developer is to provide all access rights, easements, ROW and permits necessary to complete the Project to the satisfaction of Transmission Owner. Environmental permitting shall encompass all federal, state and local requirements, consultations and agency coordination. Confirmation of meeting all permitting requirements shall be provided to Transmission Owner, prior to start of construction. Following construction and energization, confirmation of permit closeout shall be provided to the satisfaction of Transmission Owner, prior to transfer of ownership. If any of these elements are not included in the final agreement between Transmission Owner and Project Developer, twelve (12) to eighteen (18) months should be added to the Project Schedule to secure necessary permits, and additional costs would apply.
- Project Developer will provide copies of all the relative environmental permits and other necessary approvals to Transmission Owner before Transmission Owner accepts the interconnection facilities.

- Project Developer is required to install an access road from the new interconnection substation to the nearest public road (must be approved by Transmission Owner) and obtain access rights for Transmission Owner. Project Developer is responsible for maintaining access road and ensure unimpeded access for Transmission Owner at all times.
- Project Developer is responsible for all property acquisition (including easements/rights-of-way (ROW)) for transmission, distribution and communication facilities needed for the generator interconnection.
- If Project Developer owns the project property, in fee title, Transmission Owner will require a fee property transfer for the interconnection substation site which may require subdivision approval, together with permanent access rights to and from the substation, as well as a perpetual easement for any transmission lines to the substation. Project Developer is responsible for all costs, including but not limited to subdivision, associated with the property transfer.
- If Project Developer leases the project property, the Project Developer will be required to obtain fee property from the underlying fee property owner, on behalf of Transmission Owner, for the interconnection substation site, together with permanent access rights to and from the substation, as well as a perpetual easement for any transmission lines to the substation.
- All property rights must be surveyed and metes and bounds descriptions prepared for incorporation into Transmission Owner's document forms, for transfer of title.
- The Transmission Owner interconnection substation and transmission line loop will involve PUC notification/approval.
- All work occurs within an existing transmission line right-of-way or on Project Developer's property with access to all existing structures possible via that property and the right-of-way following established access routes that do not cross wetlands or streams.
- Project Developer will develop, and secure regulatory approval for, all necessary Erosion and Sediment Control (E&SC) plans and National Pollutant Discharge Elimination System (NPDES) permits.
- Project Developer will obtain all necessary permits.
- Project Developer will conduct all necessary wetlands and waterways studies and permits.
- Project Developer will conduct all necessary historical and archaeological studies.
- If the Project Developer plans to cross the transmission line right-of-way with facilities or access roads, please refer to the Transmission Rights-of-Way Restrictions information located at:

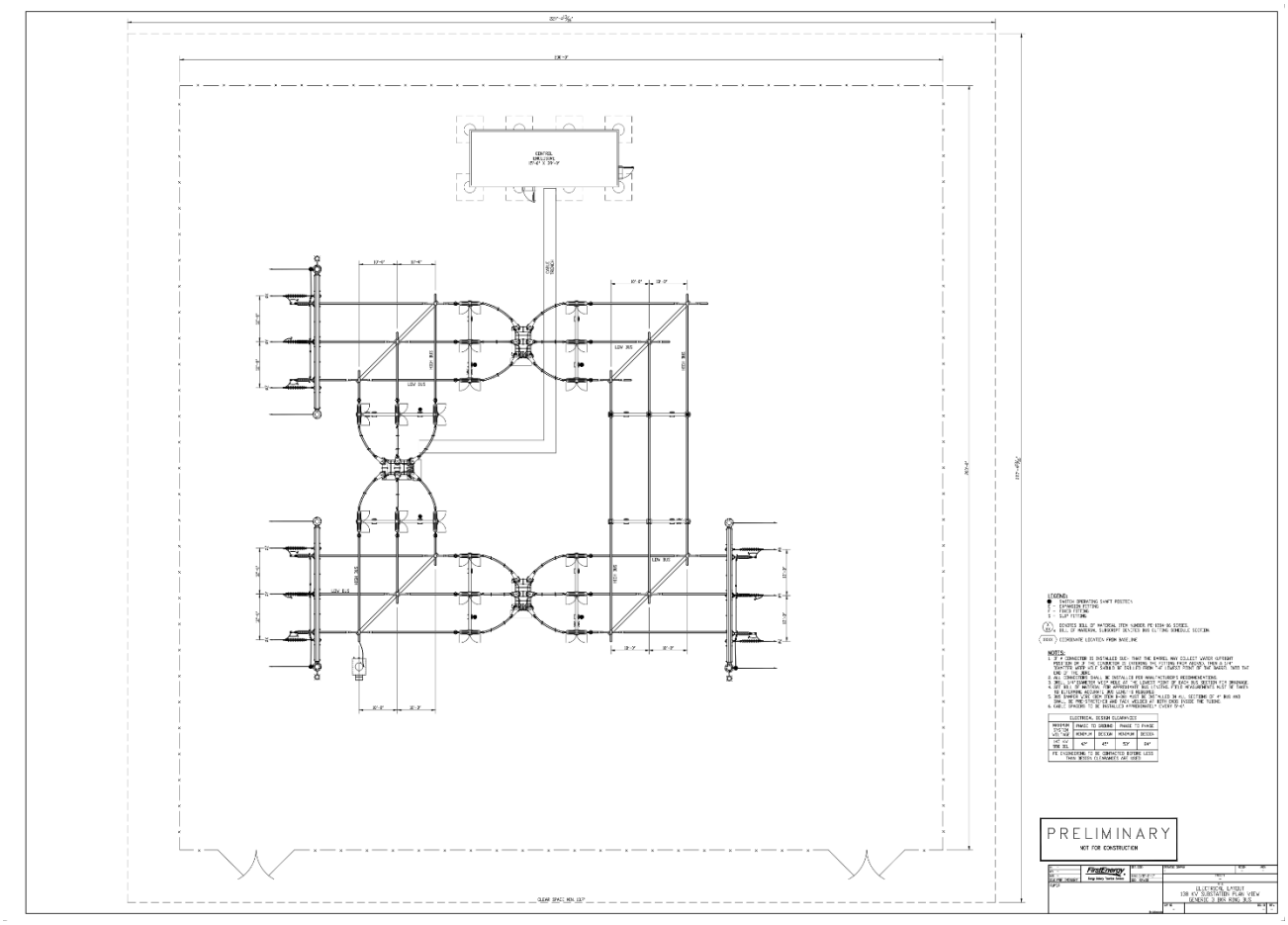
  https://www.firstenergycorp.com/help/safety/real-estate-power-lines/transmission-right-of-way.html#ROWform

# C. APPENDICES

**ATTACHMENT #1: SINGLE LINE DIAGRAM FOR THE PHYSICAL INTERCONNECTION**



**ATTACHMENT #2: SUBSTATION GENERAL ARRANGEMENT**



**ATTACHMENT #3: MATERIAL LIST AND EQUIPMENT RATINGS**

| Material/Equipment | Quantity |
|---|---|
| Cable Trench (lf) | 125 |
| Battery Charger (ea) | 1 |
| Remote Terminal Unit (RTU) (ea) | 2 |
| Insulator - Line - Polymer (ea) | 6 |
| Insulator - Line - Porcelain/Glass (ea) | 252 |
| Engineered Steel Poles (ea) | 3 |
| Steel Support Structure (ea) | 37 |
| Hard Bus - 1.5 inch (ft) | 2400 |
| Hard Bus - 4 inch (ft) | 820 |
| Battery Monitor (ea) | 1 |
| Package Control Enclosure - Prefabricated (ea) | 1 |
| Relay - Individual (ea) | 13 |
| Relay Panel (ea) | 11 |
| Circuit Breaker - 145 kV 40 kA (ea) | 3 |
| Anchor Bolt - Substation (ea) | 288 |
| Battery - 48V (ea) | 1 |
| Insulator - Substation - 138 kV (ea) | 18 |
| Surge Arrester - 138 kV (ea) | 9 |
| Capacitor Coupled Voltage Transformer (CCVT) - 138 kV (ea) | 9 |
| Current Transformer - Freestanding (CT) - 138 kV (ea) | 3 |
| Potential Transformer (PT) - 138 kV (ea) | 3 |
| Station Service Voltage Transformer (SSVT) - 138 kV (ea) | 1 |
| Security - Camera (ea) | 26 |
| Security - Physical Access Control (Badge Reader) (ea) | 2 |
| Battery - 125V (ea) | 2 |
| AC/DC Panelboard (ea) | 2 |
| Disconnect Switch - Substation - 138 kV (ea) | 9 |
| Switch - Motor Operator - Substation (ea) | 9 |
| Cable - Control/Communication (lf) | 22570 |
| Conductor - AAC (ft) | 1240 |
| Conductor - ACSR (ft) | 5227.2 |
| Conduit - Rigid (lf) | 1743 |
| Wire - Fiber - ADSS (ft) | 74333.685 |
| Wire - Fiber - Underground (ft) | 2358.75 |
| Wire - Shield - OHGW (lf) | 3044 |

**ATTACHMENT #4: PROTECTION SCOPE**

**General Connection Requirements:**

All proposed generation interconnection points and load-serving delivery points must comply with the technical requirements detailed in Transmission Owner's "Requirements for Transmission Connected Facilities" document. Procedures for gaining access to these standards can be found at the link below.

www.pjm.com/planning/design-engineering/to-tech-standards.aspx

The AH1-542 delivery point substation (DPS) is a new 138 kV three-breaker ring bus on the Crissinger - Kirby 138 kV line.

Line protection between Crissinger and AH1-542 and between Kirby and AH1-542 shall consist of two independent SEL-411L line current differential schemes with pilot communication over fiber optic cable for each 138kV line, at each terminal.

At the AH1-542 DPS, each 138 kV breaker shall have breaker failure-to-trip protection.

Protection of the 138 kV Generator Lead Line of approximately 0.1 miles shall consist of two SEL-411L line current differential schemes with pilot communication over fiber optic cable, at each terminal.

**Detailed Protection Requirements**

**Short Circuit Analysis**

Short Circuit Values

The 138 kV fault values for the AH1-542 interconnection location with all new generation out of service are:

Three phase = 10.0kA
Single line to ground = 8.2kA
Z1= (0.972+ j 4.05) %
Z0= (1.79 + j 6.59) %

Impedances are given on 100 MVA and 138 kV bases.

The faults provided are bolted, symmetrical values for normal system conditions. Future increases in fault currents are possible, and it is the customer's responsibility to upgrade their equipment and/or protective equipment coordination when necessary.

**Fiber Optic Communication Channels**

Connecting Party will design, install, own and maintain fiber optic communications between the AH1-542 generating substation and the new 138 kV ring bus substation to be used for line protection, direct transfer trip (DTT) and other communication.

AH1-542 Connecting Party Generator Owner fiber requirements:

New 138 kV Ring Bus (FE) – AH1-542 Generating Station 138 kV – fiber provided by Connecting Party generator owner

- Eight (8) fibers (4 pairs) total [minimum number required for protection purposes only]
- Two (2) independent (diverse route) cables (4 pairs per cable) [i.e. one (1) cable for primary path and one (1) cable for backup path to cover schemes for both lines]

Connecting party will design, provide, install, own and maintain fiber optic communication channels between the new interconnection substation and the AH1-542 generation substation. Connecting party is responsible for obtaining and maintaining all associated Rights-of-Way (ROW), Easements, and Permits for its fiber cable.

**Fiber Optic Communication Channels**

Transmission Owner requirements:

Crissinger-New 138 kV Ring Bus:

- Primary relay: SEL-411L relay with line current differential protection over fiber
- Backup relay: SEL-411L relay with line current differential protection over fiber

Kirby-New 138 kV Ring Bus:

- Primary relay: SEL-411L relay with line current differential protection over fiber
- Backup relay: SEL-411L relay with line current differential protection over fiber

**Connecting party AH1-542 Generator & Substation Protection Requirements**

The requirements listed below are the minimum requirements to protect Transmission Owner's transmission system.

The proposed generating interconnection substation will have one GSUs and a dedicated 138 kV high side breaker associated with GSU. Also required for GSU is a low-side breaker.

The transformer windings for each GSU shall be wye ground–delta (HV-LV).

For each GSU, the minimum protective relaying requirements for this installation include primary and backup transformer differential (87T) relays, a transformer neutral time overcurrent relay (51G), and a breaker failure relay for the dedicated high side breaker. Acceptable relay models for each of the schemes are identified below, the use of any other relays will require prior approval from Transmission Owner.

SEL-587, SEL-387 and/or SEL-487E relays are acceptable for both applications of the required 87T functions. The 87T schemes shall trip the high side GSU transformer breaker and the transformer low side breakers to remove the transformer from service. A separate tripping path energizing separate breaker trip coils is required for primary and backup relaying.

The AC current source for the 87T relays shall be CTs on the bus or line side of the high side GSU circuit breakers and CTs from the low side GSU breakers. The low side CTs can be from either the GSU transformer or transformer breaker(s), depending on Connecting party's protection philosophy (see bus protection requirements below).

An SEL351 or SEL451 relay is acceptable for the 51G function(s). The 51G scheme shall trip the transformer breaker and the transformer low side breakers to remove the transformer from service with a dedicated tripping path.

A breaker failure relay (SEL-451) shall be utilized on the high side 138 circuit breaker. Any protective trip of these breakers shall initiate the failure to trip scheme. The re-trip feature for the BFT scheme shall be utilized and trip the high side breaker it protects. The high side breaker failure scheme shall initiate trip & block close of all adjacent breakers. The line breaker at each station will also initiate direct transfer trip via line relaying to the corresponding remote ring bus substation. Local tripping shall be accomplished via hand-reset lockout relays.

For the 138 kV line exit to the new 138 kV ring bus, primary and backup line protection relays are required. The primary and backup relays shall be SEL-411Ls (two (2) relays) (usage of this particular model is required). Specific style numbers shall be provided by Transmission Owner at a later date. AC sources for these schemes shall be CTs on the 138kV breaker, located on the bus side of the breaker, and CCVTs or PTs on the line side of the 138 kV line breaker. A separate tripping path energizing separate breaker trip coils is required for primary and backup relaying. The line relays shall communicate via dedicated multi-fiber, fiber optic communication channels with the new ring bus terminal line relays. The line relays will send/receive DTT and receive an anti-islanding trip from the new ring bus station. The primary & backup schemes must utilize independent (diverse) fiber routes. Transmission Owner shall provide relay settings for these line relays at the cost of Connecting party.

The relaying systems shall have a reliable source of DC power independent from the AC system or immune to AC system disturbance or loss (for example - DC battery and charger) to assure proper operation of the protection scheme.

The Connecting Party shall provide utility-grade relays for protection of the FE Transmission System, including time delay and auxiliary relays. Relay operation for any of the listed functions that are required shall initiate immediate separation of the parallel generation from the FE Transmission System:

| **Relay** | **Function** |
|---|---|
| Frequency | To detect underfrequency and overfrequency operation. |
| Overvoltage | To detect overvoltage operation. |
| Undervoltage | To detect undervoltage operation. |
| Ground Fault Detector | To detect a circuit ground on the FE Transmission System. |
| Phase Fault Detector | To detect phase to phase faults on the FE Transmission System. |
| Transfer Trip Receiver | To provide tripping logic to the generation owner for isolation of the generation upon opening of the FE supply circuits. |

| | |
|---|---|
| Directional Power | To detect, under all system conditions, a loss of FE primary source. The relay shall be sensitive enough to detect transformer magnetizing current supplied by the generation |
| Breaker Failure | To detect a stuck breaker condition at the generation substation and 1-send a trip signal to the remote ends of the connected line via transfer trip or 2-to trip a high-speed ground switch. |

The connecting party will be required to comply with all FE Generation Protection Requirements for Generation Interconnection Customers. The Generation Protection Requirements may be found with the "FirstEnergy Requirements for Transmission Connected Facilities" document located at the following links:

www.firstenergycorp.com/feconnect

www.pjm.com/planning/design-engineering/to-tech-standards.aspx

All relays, relay schemes and relay settings that include bulk electric system 138 kV voltages or currents, or trip any 138 kV circuit breakers shall require the review and approval of Transmission Owner. It is required that Transmission Owner review and approve all one-line diagrams and AC and DC schematics showing these relays and their respective inputs, outputs and tripping paths. It is required that these documents be sent electronically to Transmission Owner at least ninety (90) days prior to the planned in-service date.

Transmission Owner will complete detailed relay coordination studies to identify off-site relay setting changes required due to this generation interconnection. This may result in additional individual relay replacements being required (most likely an electromechanical ground relay due to a range issue). These relay replacements will be done at the cost of Connecting party.

Connecting party is solely responsible for protecting its own equipment in such a manner that electrical faults or other disturbances on the Transmission Owner system do not damage its equipment.

**FE System Modifications**

**New 138 kV Ring Bus Substation**

For this project, the existing Crissinger-Kirby 138 kV line is to be sectionalized by a new substation in a ring bus configuration.

The new ring bus substation shall consist of three (3) 138 kV breakers with four (4) sets of CT's per breaker (12 total) and three (3) line side 138 kV MOABs [one located on each line exit].

Three sets (3) of three 138 kV line side CCVTs (one on each phase) are to be installed on the three new line exits on the new ring bus.

Each new breaker shall have a dedicated SEL-451 relay for breaker failure protection with associated hand-reset lockout auxiliary schemes.

Primary and backup line protective relays are required on the Crissinger, Kirby and AH1-542 generation facility line 138 kV exits.

For the AH1-542 generator station exit, the primary and backup relays shall be SEL-411Ls.

For both the Crissinger & Kirby 138 kV line exits, the primary and backup relays shall be SEL-411s

**Crissinger Substation**

**138kV Transmission Line Protection**

AH1-542 Interconnecting Station line exit Primary Relaying

- Primary relay: New SEL-411L relay with line current differential protection over fiber
- Backup relay: New SEL-411L relay with line current differential protection over fiber

**Kirby Substation**

**138kV Transmission Line Protection**

AH1-542 Interconnecting Station line exit Primary Relaying

- Primary relay: New SEL-411L relay with line current differential protection over fiber
- Backup relay: New SEL-411L relay with line current differential protection over fiber

**Relay Setting changes**
Relay setting changes will potentially be required at remote stations affected by the project. Tangy, Roberts and possibly others.

**Metering and SCADA Requirements**

A revenue metering installation is required for this installation. Requirements are outlined in Transmission Owner's "Requirements for Transmission Connected Facilities" document.

Operational metering is also required for both generation connections. These requirements are also outlined in Transmission Owner's "Requirements for Transmission Connected Facilities" document.

These requirements are in addition to any metering required by PJM.

Refer to following links:
www.firstenergycorp.com/feconnect
www.pjm.com/planning/design-engineering/to-tech-standards.aspx

## ATTACHMENT #5: PRELIMINARY GEOTECHNICAL SUMMARY

**Observation & Concern Table:**

| Category | Source | Risk | Comment |
|---|---|---|---|
| Surficial Soil Survey | USDA Soil Survey | Moderate | Clayey end moraine soils, potential plastic soils, high water table |
| Geologic Formation/Group | OH/USGS Geologic Survey | Low | This site is part of the Salina formation. |
| Karst | USGS | Low to Moderate | Dolomite bedrock, but no recorded karst features in vicinity |
| Landslide Susceptibility | GIS/Google Earth/FEMA Risk Map | Low | Located in low-risk area |
| Coal Mining and Oil and Gas Wells | OH Geologic Survey, TAMI 2 | Low | No Coal in the area. Oil and gas wells are in this area. |
| Environmental Hazard | US Wetland Maps/FEMA | Low | Low risk of flooding |
| Past Development | TAMI/GIS MAP/Historic Aerials/ GeoDigital | Low | Undeveloped except for existing T-Line, old farm road/path |

**Site Background / Geologic Hazards Potential**

FE conducted this review to determine potential geologic hazards and risks at the proposed generator developer location (AH1-542). The reviewed location is in Green Camp, Marion County, Ohio. This includes a proposed substation located along the Crissinger – Kirby 138kV transmission line. The substation would be located between existing wood pole structures 11631 and 11632 and located in a wooded area between Centerville Creen Camp Road to the east and a farm field to the west. The existing transmission line operated by Ohio Edison was installed in 1951. The proposed substation would consist of (3) breaker 138kV ring bus with SCADA control. This location was reviewed for surficial soils survey, geologic formation/group, karst, landslide susceptibility, coal mining and oil and gas well resource mapping, environmental hazards, and past development. The review was performed to identify any geologic risks that could affect the project's budget, constructability, and/or schedule.

**Surficial Soil Survey**

The United States Department of Agriculture Web Soil Survey indicates that the site is currently mapped to be underlain by the Glynwood clay loam, end moraine (Gwe5B2). The Glynwood clay loam soils are generally clayey (CL or CH) soils. The soils are moderately well drained soils with a depth to water table typically between 12 to 24 inches. The site is currently mapped as Hydrologic Soil Group (HSG) D classification, indicating the soils generally have a slow infiltration rate. High plastic soils (CH) are very sensitive to moisture and can present foundation related construction difficulties.

The Ohio Department of Natural Resources Division of Geological Survey further identifies the soil as end moraine of the late Wisconsinan to Late Woodfordian ice deposits. End moraines are defined as unsorted glacial debris (glacial till materials, sand, clay, and gravel) that were deposited upon the glacier receding.

**Geologic Formation/Group**

The site is located in the Central Ohio Clayey Till Plain section of the Central Lowland physiographic province which is described as a vast mostly flat rolling region. The Ohio Department of Natural Resources Division of Geological Survey maps the site to be underlain by the Salina Undifferentiated of the Silurian age. The Salina Formation is composed primarily of dolomite and shale, interbedded with anhydrite, gypsum, and salt.

**Karst**

The site is underlain by the Salina Undifferentiated Formation as described previously. The Salina is primarily dolomite rock which is considered a carbonate bedrock and can therefore have potential for karst features to be located within the site limits. The karst interactive map of Ohio was reviewed further, and it does not appear that there are any prior karst related features (sinkholes, depressions, etc.) within the Green Camp area. Transmission Asset Mapping Interface 2 (TAMI 2) also contains a karst feature layer and was reviewed, which confirms that a karst risk is present. A determination of karst risk should be discussed in the sites geotechnical report to better understand the risk. Based on available mapping there is low to moderate risk of karst.

**Landslide Susceptibility**

The State of Ohio Enhanced Hazard Mitigation Plan identifies Marion County to be located in a moderate susceptibility, low incidence risk area (zone 1) for landslides. The FEMA national risk index rates the area as a very low risk to landslides. Transmission Asset Mapping Interface (TAMI) was utilized to generate elevation profiles for the potential site area. The ground surface is relatively level in a north to south direction and generally slopes from Centerville Green Camp Road down several feet towards the farmland to the east. Given the relatively level site conditions, the likely occurrence of a landslide is estimated to be very low.

**Resource mapping**

Coal resource mapping was reviewed to determine if coal mining has occurred at the subject site. The site is not located in a known geologic formation that contains coal and the nearest mined site (sand and gravel) is located approximately 2.4 miles to the southeast.

In addition, The Ohio Department of Natural Resources also has a tool to search for oil and natural gas wells located in Ohio. There are active and inactive gas and oil wells located in the Marion County area with the most located over three miles east of the site where there is an oil and gas field.

**Environmental Hazards**

Based on FEMA and U.S. Fish and Wildlife Service maps there are no wetlands or features that would cause an increased risk of flooding. An environmental study should still be performed to confirm this prior to construction.

**Past Development**

The past development assessment of the site was based on aerial photography. Based on aerial photography dating back to 1957 this site has only been developed for the transmission line and farming. A potential farm road/path appears to have run parallel to Centerville Green Camp Road through the proposed development area.

**Recommendations & Geotechnical Opinion**

List of Observations/Concerns Interconnection Facilities – Crissinger-Kirby AH1-542:

1. This site is part of the Salina Undifferentiated formation
2. Low potential for karst
3. Low risk for landslide
4. Low environmental impact risk
5. No mining activity recorded in the area.
6. Active and inactive natural gas and oil wells in the area but not at the site

**Preliminary Geotechnical Opinion**

The geotechnical conditions of this site seem to conclude that it is relatively low risk location to develop a substation. The developer should plan a subsurface investigation and associated geotechnical report commenting on each risk before the site is designed and developed. All findings need to be confirmed with field data. Based on the desktop geologic study and a determination of the site being at lower risk of most geo-hazards, there are no excess anticipated budget, constructability, or schedule issues. All findings should be confirmed by the developer prior to construction.