

## DESCRIPTION AND LOCATION OF FACILITY

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### General Project Description

Cricket Valley Energy Center, LLC ("Certificate Holder") is proposing to: (1) develop a new approximately 14.6-mile 345 kV transmission line parallel to the existing Consolidated Edison Company of New York, Inc.'s ("Con Edison") 345 kV Transmission Line 398 ("Line 398") from the planned Cricket Valley Switching Station ("Cricket Valley Switching Station") in the Town of Dover, New York to Con Edison's Pleasant Valley Substation in the Town of Pleasant Valley, New York (the "Transmission Line"); and (2) re-conductor an approximately 3.4-mile segment of the existing 345 kV Transmission Line 398 in the Town of Dover between the Cricket Valley Switching Station and the New York-Connecticut state line (the "Reconductoring Segment") (collectively the "Project").

The Project will also include improvements to Con Edison's Pleasant Valley Substation. New protection and communication system upgrades will be required within the existing Pleasant Valley Substation and control buildings at the Pleasant Valley Substation, and a new 345 kV breaker and 345 kV feeder disconnect switch will be installed at the substation.

Con Edison will acquire ownership and operational control of the Project pursuant to the Open Access Transmission Tariff ("OATT") filed by the New York Independent System Operator and approved by the Federal Energy Regulatory Commission ((NYISO Tariffs - New York Independent System Operator, Inc. (2013)). While the Certificate Holder will construct the Project pursuant to the OATT, ownership, operational control and maintenance responsibilities for the project will subsequently transferred to Con Edison. The Certificate Holder will petition the Commission for approval of the transfer to Con Edison of the Project and the certificate that may be issued in this proceeding.

Section 5.2 (8), (9) and (10) of the OATT, which allow Certificate Holder to construct the facilities provides that:

(8) Developer shall transfer control of Connecting Transmission Owner's Attachment Facilities and Stand Alone System Upgrade Facilities to the Connecting Transmission Owner;

(9) Unless the Developer and Connecting Transmission Owner otherwise agree, Developer shall transfer ownership of Connecting Transmission Owner's Attachment Facilities and Stand Alone System Upgrade Facilities to Connecting Transmission Owner;

(10) Connecting Transmission Owner shall approve and accept for operation and maintenance the Connecting Transmission Owner's Attachment Facilities and Stand Alone System Upgrade Facilities to the extent engineered, procured, and constructed in accordance with this Article 5.2;

The Certificate Holder has not made any contrary agreements with Con Edison pursuant to Section 5.2 (9). Therefore, upon completion of construction, the Project Certificate Holder will transfer ownership and control of the Project to Con Edison pursuant to the above cited sections of the OATT.

In addition, the Certificate Holder intends to negotiate a Large Generator Interconnection Agreement ("LGIA") pursuant to the OATT with Con Edison and NYISO. The LGIA defines the "Point of Change of Ownership" as "the point, as set forth in Appendix A to this Agreement, where the Developer's Attachment Facilities connect to the Connecting Transmission Owner's Attachment Facilities." The Project has been classified as System Upgrade Facilities by the NYISO. These facilities will be located on Con Edison's side of the Point of Change of Ownership. Therefore, ownership of the Project will be transferred to Con Edison pursuant to the LGIA which has the force and effect of law as it is a part of the Federal Energy Regulatory Commission (FERC) approved NYISO OATT.

### **Description of Facility Location**

The Project will be located entirely within the existing Con Edison Line 398 right-of-way. Additional information regarding the Project location is included herein.

#### ***Cricket Valley Switching Station to the Pleasant Valley Substation***

The Transmission Line will connect the planned Cricket Valley Switching Station in the Town of Dover, New York to the existing Pleasant Valley Substation in the Town of Pleasant Valley, New York. The Transmission Line will be located within the existing Line 398 right-of-way. The existing Line 398 right-of-way is generally 250 feet wide and traverses (from east to west) the towns of Dover, Union Vale, LaGrange and Pleasant Valley, all in Dutchess County. No additional right-of-way is required to accommodate the new Transmission Line. The Transmission Line centerline will generally be offset 50 feet south of the existing Line 398 right-of-way centerline, or 100 feet south of the Line 398 centerline. The Transmission Line is, therefore, generally located within the southern 125 feet of the existing 250-foot wide Line 398 right-of-way.

The length of the proposed Transmission Line is approximately 14.6 miles. The length of Reconductored Segment is approximately 3.4 miles. Included in the aforementioned distances are 2 leads from the Cricket Valley switchyard. One pole line will accommodate both the PV-CV and CV-LM leads. The second pole line will accommodate the new transmission line lead to PV. Both leads are part of the proposed Project.

The Transmission Line will cross and be located near several notable geographic features. From the Cricket Valley Switching Station in the Town of Dover, NY, the proposed Transmission Line heads northwest to the north of the Great Swamp Critical Environmental Area and then heads west over West Mountain. The Transmission Line continues in a northwesterly direction into the Town of Union Vale. The total distance in the Town of Dover is approximately 3.5 miles. The Transmission Line continues in a generally westerly direction through the Town of Union Vale and passes to the north of the Sky Acres Airport. The total distance in the Town of Union Vale is approximately 5.7 miles. The Transmission Line continues in a west-northwesterly direction through the Town of LaGrange crossing State Route 82, several local roads and the Taconic State Parkway. The total distance in the Town of LaGrange is approximately 2.7 miles. In the Town of Pleasant Valley, the Transmission Line will cross Wappinger Creek and Main Street (U.S. Route 44) before interconnecting at the Pleasant Valley Substation. The total distance in the Town of Pleasant Valley is approximately 2.7 miles.

#### ***Cricket Valley Switching Station to the New York-Connecticut State Line***

The Project will also include reconductoring of the approximately 3.4-mile segment of Line 398 that runs east from the planned Cricket Valley Switching Station to the New York-Connecticut state line. The Reconductoring Segment is entirely within the existing Line 398 right-of-way, generally located within the northern 125 feet of the existing 250-foot wide Line 398 right-of-way. The Reconductoring Segment is located entirely within the Town of Dover. No additional right-of-way is required for the Reconductoring Segment.

From the planned new Cricket Valley Switching Station, this 3.4-mile Reconductoring Segment of Line 398 crosses New York State Route 22, County Route 6, Ten Mile River, and Lake Weil before reaching the New York-Connecticut state line.

#### **Design of Facilities**

The design of proposed transmission facilities is described herein.

### ***Design Voltage and Voltage of Initial Operation***

The design voltage of the Transmission Line is 345 kV; the initial operating voltage will also be 345 kV.

### ***Type and Size of Transmission Structures***

The proposed Transmission Line will consist primarily of galvanized steel monopole structures with conductors arranged in a delta configuration for most of the structures. However, to reduce potential visual impacts, the first three structures near the Pleasant Valley substation will be lower galvanized steel H-frames with conductors arranged in a horizontal configuration. In addition, most of the monopoles will be reduced in height to the maximum extent practicable (given other constraints such as EMF, safety, clearance and other applicable requirements) from the heights proposed in the Article VII Application. Collectively, the structures will average approximately 120 feet in height, down from an average of 140 feet as originally proposed. Specifically, the three H-frames, CV-01, CV-02 and CV-03, will average 120 feet in height, down 43 feet from the original monopoles. The attached Table entitled "Reduction in Structure Height and Elevation Summary" provides the revised, approximate heights for all of the structures compared to the originally proposed heights.

### ***Type, Size, Number and Materials of Conductors***

The selected conductor for both the new Transmission Line and the Reconductoring Segment will be bundled "Mallard" 795 Aluminum Conductor Steel Supported (ACSS). As discussed in Exhibit 3, Alternatives, the conductor was selected to meet line rating requirements with consideration of construction costs as well as costs associated with line losses and line performance (EMF, corona). For the Reconductoring Segment from the new Cricket Valley Switching Station to NY-CT border, the bundled "Mallard" ACSS conductor also meets NERC phase to ground clearance requirements with only minimal tower reinforcement. The conductor is sized for a summer normal rating of 1323 MVA; a maximum operating temperature (MOT) of 180°C; and to minimize the combined of construction, operational and maintenance costs over its expected life. The line ratings for bundled Mallard 795 ACSS conductor are:

- Summer Normal: 2214 Amps at 95°C.
- Winter Normal: 2695 Amps at 95°C.
- Summer 15 minute emergency: 3717 Amps at 180°C.
- Winter 15 minute emergency: 3979 Amps at 180°C.

The shield wire will be 7#5 Alumoweld, the same shield wire used on the existing Line 398 with compatible sags. The selected optical ground wire (OPGW) is AFL AlumaCore OPGW AC-102/691 with 72 fibers, compatible with strength and sags from the shield wire.

Aeolian vibration of the conductor, shield wire and OPGW will be controlled by use dampers. Dampers for vibration will be designed based upon Preformed Line Products (PLP) Vortex damper placement program. Control of galloping will be considered in the design of structures (arm spacing) and line design.

There is a transition from the bundled Mallard conductor of the Reconductoring Segment in New York to the NU-proposed single Bluebird conductor at Tower L-76, immediately west of the NY-CT border. While both conductor types have similar emergency ratings, the Mallard conductor tends to operate at a cooler temperature than the Bluebird under normal summer conditions. The resulting temperature gradient across the connection fittings will be addressed by using a jumper loop or similar transition where the terminal connectors are under compression (rather than tension) and the strength of the fittings will not be affected by the temperature gradient.

### ***Insulator Design***

The proposed Transmission Line is designed for energized maintenance with sufficient clearance to work "bare hand." As designed, the proposed Transmission Line will utilize V-string or dead-end insulator assemblies (see Figure 5-4), with an insulation level equivalent to 27 standard porcelain insulators. The Reconductoring Segment is designed to utilize the existing structures with a V-string insulator assembly for the middle phase and I-string insulator assemblies on the outer phases. The insulation level of 18 standard porcelain insulators matches existing conditions. Standard gray porcelain insulators will be used for all transmission work.

### ***Construction Materials of the Towers***

With the exception of the three structures near the Pleasant Valley Substation, the proposed Transmission Line will consist of galvanized steel monopole structures, designed in accordance with ASCE 48-11. Structures CV-01, CV-02 and CV-03 will be galvanized steel H-frames with conductors arranged in a horizontal configuration.

Configurations of the steel monopole structures will include the following:

- Suspension (0 to 5° angle).
- Strain (dead-end insulators from 0 to 45° angle).

- Dead-End (>45° angle and terminal).

The majority of the steel monopoles will have a delta arrangement of insulators. The pole configuration was designed to permit energized work practice – bare hand or hot-stick maintenance methods with access from the structure. The clearances will be governed by the National Electrical Safety Code (NESC), latest edition. The NESC provides minimum clearances to ground, adjacent transmission lines, railroads, buildings, and a host of other facilities. Clearances greater than minimum provide additional safety during extreme weather events or accidents. For the proposed Transmission Line, the vertical clearance to ground will be 30 feet, which includes the NESC required clearance of 24.7 feet plus a 5 foot buffer. Vertical and horizontal clearances to objects will meet the NESC requirements plus a minimum of 3-foot buffer. The final design will be presented in the EM&CP. Conductor clearance to surface structures will meet the NESC requirements plus additional space for working space, climbing space and for energized work practices. The Minimum Approach Distance (MAD) of 10.5 ft will be utilized for clearances to workers based upon OSHA Part 1910.269 and Part 1926 Subpart V revised in 2015.

Pole and davit arm sizes vary depending upon loads and required height. Strain poles are included periodically on tangent or low angle structures to provide periodic stronger poles to prevent cascade type events and adjacent to long spans where significant unbalanced loads are likely due to icing events.

Structures on the proposed Transmission Line are essentially a one-to-one match with the existing Line 398 but are offset by 100 feet. Structure locations were adjusted in-line for local terrain conditions (e.g., locations on hilltop are preferred over locations on a slope) and the need to minimize structure heights near the Sky Acres Airport.

For the preliminary foundation design, based on the anticipated shallow depth to rock throughout the right-of-way, it was assumed that rock anchor or rock micropile foundations would be used. A rock anchor foundation functions similarly to a pile group foundation (individual anchors in either tension or compression) except capacity is largely achieved through rock to grout bond. Rock micropile foundations have pretensioned anchor rods, and a steel casing in the upper, non-loaded section (in this case soils). Due to expected access difficulties, an elevated anchor cap assembly will be used instead of a concrete foundation (similar to a pile cap).

The Reconductoring Segment will utilize Line 398 lattice steel towers with conductors, shield wire, and insulator assemblies replaced. One structure, L-65 requires reinforcement to meet the current NESC and the current Con Edison Standards for strength.

### ***Design Standards***

The design of the proposed Project will be in accordance with all applicable federal and state requirements, and local codes and industry standards, unless stated otherwise. The industry codes and standards shall include, but shall not be limited to, the following:

- The National Electric Safety Code (NESC C2).
- ASCE 48-11, Design of Steel Transmission Pole Structures.
- ASCE 74, Guidelines for Electrical Transmission Lines Structural Loads.
- ASCE 10-97, Design of Latticed Steel Transmission Structures.

### ***Structural Loading***

The structural loading design criteria for both the proposed Transmission Line and Reconductoring Segment will be in accordance with Con Edison specification CE-SS-2006, including, but not limited to, the following:

- Case 1A, - NESC 250B Loads & Load Factors for Heavy Ice District, Grade B Construction.
- Case 1B -NESC 250C, Loads & Load Factors for Extreme Winds in Area, Exposure Category C. Details provided in NESC Code.
- Case 1C -NESC 250D, Loads & Load Factors for Extreme Ice with Concurrent Wind. Use  $\frac{3}{4}$  inch ice and 50 mph wind.
- Case 2A -100 year ice loading, 1 inch ice and 8 psf wind pressure on wires and steel poles.
- Case 2B -100 year wind, 1.2 times the basic wind pressure from NESC 250C. Wind pressure adjusted for height (SAPS Wind).
- Case 3A -Unbalanced Ice,  $\frac{1}{2}$  inch radial ice applied to front or back spans, 4 psf wind on wires and steel poles.
- Case 3B -Longitudinal broken wire condition, 1 broken shield wire or 1 broken conductor (all wires in bundle), no wind condition.
- Case 4A -Stringing condition, dead-end structures - Dead-end loading, all wires dead-ended, 2 psf wind, nominal stringing tension and a 1.3 load factor.
- Case 4A - Stringing condition, strain structures - Dead-end loading, one conductor bundle or one shield wire dead-ended, 2 psf wind, nominal stringing tension and a 1.3 load factor.
- Case 4B -Stringing condition, strain or dead-end structure - One conductor bundle or one shield wire @ 60° Vector loading.

Longitudinal unbalanced load and vertical load increase, 2 psf wind, nominal stringing tension and a 1.3 load factor.

- Case 4B –Stringing condition, suspension structure - one conductor bundle or one shield wire @ 30° Vector loading. Longitudinal unbalanced load and vertical load increase, 2 psf wind, nominal stringing tension and a 1.3 load factor.
- All loads for intact load cases (Cases 1 & 2) are increased by the transverse loads associated with a 2 degree line angle.