Marcy to New Scotland

Upgrade Project

Revised

Exhibit 4

Environmental Impacts

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EXHIBIT 4 ENVIRONMENTAL IMPACT

This Exhibit addresses the requirements of 16 NYCRR § 86.5.

4.1 Introduction

LS Power Grid New York, LLC and LS Power Grid New York Corporation I (together, "LS Power Grid New York") and the Power Authority of the State of New York, doing business as the New York Power Authority (NYPA) (LS Power Grid New York and NYPA, collectively, the "Applicant") are seeking a Certificate of Environmental Compatibility and Public Need for the Marcy to New Scotland Upgrade Project (the "Project"). The Project, which is anticipated to be constructed predominantly within approximately 93 miles of existing utility-owned transmission line corridor, includes the following components:

(1) upgrades to the Marcy and Edic substations;

(2) reconductoring, involving the replacement of two circuits of 230 kV transmission line with two circuits of 345 kV transmission line on existing structures, extending for approximately 13 miles from the Edic substation;

(3) removal of two existing single circuit 230 kV transmission lines on H-frame structures, and replacement with a new 345 kV double circuit transmission line on steel monopoles, extending for approximately 55 miles (with the exception of up to two segments where the double circuit lines may split into single circuits);

(4) construction of a new 345 kV substation in the Town of Princetown;

(5) removal of two existing single circuit 230 kV transmission lines on H-frame structures, and replacement with two new single circuit 345 kV transmission lines on steel monopoles between the new Princetown substation and Rotterdam substation, extending for approximately 5 miles, one of which will connect to the new Princetown substation and the other will loop in the Edic portion of the existing Edic to New Scotland 345 kV line;

(6) construction of a new 345/230/115 kV substation adjacent to the existing Rotterdam substation yard and upgrades at the existing Rotterdam substation;

(7) construction of a new double circuit 345 kV transmission line on steel monopoles between the new Princetown substation and the New Scotland substation, extending for approximately 20 miles, rebuild of an existing single circuit 345 kV transmission line on new steel monopoles starting at the new Princetown substation and extending approximately 6 miles southward in that same corridor, and partial removal and/or removal from service of the existing Rotterdam to New Scotland 115 kV line in a portion of that same corridor; and

(8) upgrades to the existing New Scotland substation.

Approximately 1,250 existing H-frame structures will be removed, and approximately 675 new structures, predominantly monopole, will be installed as part of the Project.

The Project's route will extend from the Edic substation in Marcy, New York through the Towns of Deerfield and Marcy in Oneida County; the Towns of Schuyler, Frankfort, German Flatts, Little Falls, Stark, Danube, and the Village of Ilion in Herkimer County; the Towns of Minden, Canajoharie, Root, Charleston, Glen, and Florida in Montgomery County; the Towns of Duanesburg, Princetown, and Rotterdam in Schenectady County; and the Towns of Guilderland and New Scotland in Albany County.

Extensive field investigations, literature reviews, and agency consultations were conducted to identify and assess existing environmental conditions within the Project area. This Exhibit summarizes the results of environmental impact studies prepared by the Applicant under the following categories:

- Land Use
- Visual Resources
- Cultural Resources
- Terrestrial Ecology
- Wetlands and Water Resources
- Topography, Geology and Soils
- Noise
- Electromagnetic Fields (EMF)

For each environmental impact study undertaken by the Applicant, this Exhibit describes the existing conditions pertinent to the resource studied, the methodologies used in the investigation, the anticipated environmental effects, if any, of the Project facilities and, where appropriate, mitigation measures designed to avoid or minimize any adverse impacts.

4.2 Project Description

The proposed Project involves removing existing transmission lines, installing new lines within approximately 93 miles of existing transmission corridor, constructing two new substations and upgrading other substations. An overview of the Project scope is illustrated in Figure 4.1-2. Descriptions of the various components of the Project and proposed construction methods are provided below. Detailed descriptions of the proposed transmission structures and figures illustrating proposed structure and foundation types are included in Exhibit 5 and Exhibit E-1. Detailed descriptions and illustrations of the Project substations and terminal facilities are included in Exhibit E-2. Complete plan and profile drawings will be included as part of the Environmental Management and Construction Plan (EM&CP). The Project components discussed below provide the factual background for the environmental analyses presented later in this Exhibit.

4.2.1 Removal of Existing Lines and Structures

The following existing transmission line segments will be removed as part of the Project:

- Approximately 72 miles of the two National Grid-owned 230 kV lines (#30 and #31 lines) between the Porter substation and the Rotterdam substation. These removals will include the following:
    - Removing the existing 230 kV shield wire, conductors, insulators, and associated hardware from the outer arms of the two sets of adjacent double circuit structures owned in part by NYPA for approximately 13 miles eastward starting at the Porter substation in the town of Marcy, Oneida County. The two existing 345 kV circuits on the inner arms of the two sets of structures will remain in place.
    - Removing the existing 230 kV lines supported primarily by H-frame structures from just east of State Route 171 in the Town of Frankfort, Herkimer County for approximately 60 miles to the Rotterdam substation in Schenectady County. The H-frame structures will also be removed.
- Approximately six miles of National Grid-owned 345 kV line (Edic to New Scotland #14 line) supported primarily by lattice towers from the proposed Princetown substation heading south will be removed. The lattice towers will also be removed. This will accommodate installation of the 345 kV double circuit structures to be constructed as part of the Project.
- A segment of a National Grid-owned 115 kV line (Rotterdam-New Scotland #13 line) will be removed from service and may be dismantled from the location where it joins the Project corridor just south of I-88 in the Town of Princetown to a point approximately 4.3 miles south in the Town of Guilderland. To accommodate the Project, a portion of this 115 kV line along with its supporting H-frame structures, will be removed from a point just north of State Route 146 in the Town of Guilderland, continuing south for approximately 2.7 miles. The remaining six miles of this 115-kV line into the New Scotland substation area will be removed from service and may be dismantled.

4.2.2 Installation of New 345 kV Lines

The Project includes the construction, operation, and maintenance of new 345 kV transmission circuits within approximately 93 miles of existing transmission corridors. All proposed new transmission structures will be tubular steel with a galvanized finish. Representative profile drawings for each proposed structure type are provided in Exhibit 5. The Project includes installation of the following new infrastructure:

- Constructing two new 345 kV lines approximately 2,000 feet in length from the Edic substation to the existing transmission corridor adjacent to Porter substation.
- Approximately 13 miles of reconductoring the outer arms of the two sets of adjacent double circuit structures owned in part by NYPA starting in the Project corridor adjacent to the

Porter substation and continuing toward the southeast. The reconductoring will include new insulator assemblies, new hardware, shield wire replaced with new optical ground wire (OPGW), and new double bundle 345 kV conductors.

- Constructing approximately 55 miles of two 345 kV transmission circuits within the Project corridor from just east of State Route 171 in the Town of Frankfort, continuing eastward to the proposed new Princetown substation. The new 345 kV lines will be supported primarily by new double circuit monopole transmission structures. Single circuit monopoles are proposed as the primary structure type in segments where the Project corridor diverges into two separate corridors. These segments comprise approximately 5 miles within the Towns of Frankfort and German Flatts, and approximately 4 miles within the Towns of Charleston and Glen. Three-pole or two-pole structures may be used instead of monopoles for dead end structures.

- Constructing approximately 5 miles of two 345 kV transmission circuits within the Project corridor between the proposed Princetown substation and the Rotterdam substation. Each of the two circuits will be supported primarily by its own set of single circuit monopole transmission structures. Three-pole or two-pole structures may be used instead of monopoles for dead end structures. The Project also includes a new 345/230/115 kV substation within the property of the existing Rotterdam substation. The western terminations of these two new 345 kV lines will be as follows: one line will be connected to the new Princetown substation, and the other line will be connected to the existing Edic to New Scotland #14 345 kV line, which will be broken to create a new Edic to Rotterdam 345 kV transmission path.

- Constructing approximately 20 miles of two new 345 kV transmission circuits within the Project corridor between the new Princetown substation and the New Scotland substation. The new circuits will be supported primarily by double circuit monopole transmission structures. Three-pole or two pole structures may be used instead of monopoles for dead end structures. Additionally, the Project includes reconstructing approximately 6 miles of a National Grid-owned 345 kV line (Edic to New Scotland #14 line) primarily on single circuit monopole structures starting at Princetown and heading south, in order to provide the space required to accommodate the Project's 345 kV double circuit monopole structures.

4.2.3 Substations

This section provides a description of the substation work associated with the Project. Additional technical details regarding the substation equipment and line terminations are provided in Exhibit E-2 (Other Facilities).

4.2.3.1 Princetown Substation

The new Princetown substation will be a 345 kV gas-insulated switchyard in a breaker-and-a-half configuration with six positions located off Reynolds Road in the Town of Princetown,northwest

of and adjacent to the junction of the existing 230 kV #30 and #31 Edic to Rotterdam lines and the existing 345 kV #14 and #18 Edic and Marcy to New Scotland Lines.

The gas-insulated switchgear (GIS) equipment will be housed in an enclosure approximately 40 feet in height that will occupy up to approximately 6,300 square feet of surface area. The site will also include a control building that will be up to approximately 20 feet in height that will occupy up to approximately 2,000 square feet of surface area. The dimensions of the GIS enclosure and control buildings presented here are indicative of the approximate high ends of the ranges offered by the various equipment manufacturers; refined details will be provided in the EM&CP after final design and equipment selection.

The new Princetown substation will not contain any transformers or other sources of continuous noise expected to be audible offsite. The substation area will be graded and covered in gravel. For security purposes, a chain link fence topped with barbed wire will surround the substation. Nighttime lighting and other security measures will also be installed. Lighting will be restricted to the minimum amount of lighting needed for safety and security purposes. Exterior lighting will be directed downward to prevent impacts to the surrounding areas. Access to the site will be provided via the existing driveway off Reynolds Road.

4.2.3.2 New Rotterdam Substation

The new Rotterdam substation will be a 345 kV gas-insulated substation in a breaker-and-a-half configuration with five positions, a new 345/230 kV transformer, and two new 345/115 kV transformers within the existing Rotterdam substation property boundary. Noise specifications for the new transformers are provided in Section 4.9 below.

Areas containing substation equipment will be graded and covered in gravel. For security purposes, a chain link fence topped with barbed wire will surround these new substation areas. Nighttime lighting and other security measures will also be installed. Lighting will be restricted to the minimum amount of lighting needed for safety and security purposes. Exterior lighting will be directed downward to prevent impacts to the surrounding areas. Access to the new substation areas will be provided via new gravel access paths constructed within previously cleared areas of the Rotterdam substation site.

The new 345/230 kV and 345/115 kV transformers will contain dielectric fluid (e.g., oil) to provide electrical insulation and cooling.

Table 4.2-1 specifies the typical oil containment volume for each transformer based on vendor data. Secondary containment will be provided beneath the transformers to prevent any release of dielectric fluid to the environment. Secondary containment will be designed in accordance with Institute of Electrical and Electronics Engineers (IEEE) 980, Guide for Containment, or applicable state and federal standards.

Table 4.2-1. Typical Transformer Dielectric Fluid Volumes

Equipment	Dielectric Fluid Containment Per Single Phase Transformer (gallons)	Total Number of Transformers	Total Dielectric Fluid Containment (gallons)
345/230 kV Transformer	13,427	7	93,989
345/115 kV Transformer	15,293	4	61,172

Due to the oil storage of the above mentioned transformers, the new Rotterdam substation will be subject to 40 CFR Part 112, or the Spill Prevention, Control, and Countermeasure (SPCC) Regulation. The regulation requires non-transportation facilities with above-ground oil storage in excess of 1,320 gallons in containers 55 gallons or larger to write and implement a SPCC Plan. Within 6 months of the start of operation of the transformers, a SPCC plan will be written and implemented, as required in accordance with Federal regulations.

Oil-filled equipment at Rotterdam substation will be separated from other equipment and buildings to prevent potential fire hazards that may impede restoring or maintaining electric service. Minimum separations will be designed per Institute of Electrical and Electronics Engineers (IEEE) 979 and National Fire Protection Administration 850 or applicable state and federal standards.

4.2.3.3 Other Connections and Modifications

Connections and modifications for the Project are anticipated at the existing Marcy, Edic, Porter, New Scotland, Rotterdam, and Eastover substations. Additional details and graphics are provided in Exhibit E-2 (Other Facilities).

Marcy Substation

Circuit breakers, strain bus, the protection and control systems, and associated equipment will be upgraded at NYPA's Marcy substation for the Project. The upgraded equipment will replace the existing equipment in like-kind. No new lines will terminate at Marcy substation as a result of the Project. The existing substation footprint will not need to be altered as a result of this project. The Marcy substation modifications will not include any new transformers or other new sources of noise expected to be audible offsite.

Edic Substation

National Grid's Edic substation will be reconfigured and upgraded to interconnect the two new Edic to Princetown 345 kV lines and to reconfigure the connection of the existing Edic – New Scotland 345 kV #14 line. Three existing lines will be relocated to different bays at the Edic substation to allow the two new Edic to Princetown 345 kV lines to terminate at the Edic substation most efficiently. An existing spare bay will be utilized and a new breaker-and-a-half bay will be constructed on the north side of the existing Edic substation. The new bay will require the substation fence line to be expanded by approximately 0.8 acres on land owned by National Grid, almost all of which has been previously disturbed. No new property will need to be acquired to accommodate this expansion. The new substation area will be graded and covered in gravel.

Substation lighting will be expanded to include the new substation area. Circuit breakers, switches, dead end structures, protection and control systems, and associated equipment will be installed or modified at the Edic substation for the Project. The Edic substation modifications will not include any new transformers or other new sources of noise expected to be audible offsite.

Porter Substation

Due to the retirement of National Grid's Porter to Rotterdam 230 kV #30 and #31 lines, their terminus points at National Grid's Porter substation will also need to be retired. Strain bus, the protection and control systems, and associated equipment will be upgraded to accommodate the retirements. No new lines will terminate at Porter substation as a result of the Project. The existing substation footprint will not need to be altered as a result of this project. The Porter substation modifications will not include any new transformers or other new sources of noise expected to be audible offsite.

New Scotland Substation

National Grid's New Scotland substation will be reconfigured and upgraded to interconnect the two new Princetown to New Scotland 345 kV lines, reconfigure the connection of the existing Edic – New Scotland 345 kV #14 line, and retire the existing Rotterdam to New Scotland 115 kV line. National Grid's existing New Scotland to Alps 345 kV #2 line entrance will be relocated further south to accommodate the new interconnection. Circuit breakers, switches, dead end structures, protection and control systems, and associated equipment will be installed or modified at the New Scotland substation for the Project. No expansion of the existing fence line is anticipated. The New Scotland substation modifications will not include any new transformers or other new sources of noise expected to be audible offsite.

Existing Rotterdam Substation

National Grid's existing Rotterdam substation will be modified and upgraded to interconnect the new Rotterdam substation. The existing 230 kV yard and associated connections will be retired following the energization of the new Rotterdam substation. Three existing 230/115 kV transformers that currently generate continuous audible noise will be retired as part of the 230 kV yard retirement. The retired equipment will be removed or abandoned in place. Two of the existing transmission ties from the 230 kV yard to the 115 kV yard will be modified to terminate at the new Rotterdam substation. The third transmission tie will be retired. In addition, the existing Eastover to Rotterdam 230 kV #38 transmission line termination will be relocated from the existing 230 kV yard to the new Rotterdam substation.[1] Circuit breakers, the protection and control systems, and associated equipment will be upgraded at the existing Rotterdam 115 kV yards to accommodate the Project. The existing substation footprint will not need to be altered as a result of this Project.

[1] Minor modifications to equipment, potentially including relocation or replacement of relays and modification or replacement of telecommunications packages, may be required at the existing Eastover substation, but no new facilities will be required at that location.

The existing Rotterdam substation modifications will not include any new transformers or other new sources of noise expected to be audible offsite.

4.2.4 Transmission Structures

Detailed descriptions of the proposed transmission structures and figures illustrating proposed structure and foundation types are included in Exhibit 5 and Exhibit E-1.

4.2.5 Access Roads

Because the Project will be constructed within existing transmission corridors, access to those transmission corridors will be provided by existing roads to the maximum extent practicable. The Project will improve existing access roads and construct new roads where sufficient access does not exist. Additional specifications and best management practices (BMPs) for Project roads are provided in Appendix H (EM&CP Procedures (BMPs)).

4.2.6 Transmission Line Construction

Design and construction of the proposed transmission line will conform to the National Electrical Safety Code (NESC), American National Standards Institute (ANSI) Standards, and other codes and standards applicable to such installations. General construction procedures and sequencing are described in the following sections; specific construction methods, tree clearing procedures, access road specifications, and environmental protection measures are included in Appendix H (EM&CP Procedures (BMPs)).

4.2.6.1 Clearing and Corridor Preparation

As the Project will be constructed within existing transmission corridors that have already been cleared and are maintained by the incumbent transmission owners, only minimal vegetative clearing will be needed to maintain electrical clearances and support access and work pads. Low growing vegetation may be removed as necessary prior to construction with mechanical methods such as brush hogging and mowing.

The estimated total area of tree clearing for construction is approximately 5.9 acres. Trees may be cleared using a combination of hand and mechanized clearing techniques. Merchantable timber from tree clearing may be sold and removed from the corridor or may be stacked and left in place along the edge of the corridor in upland areas for use by landowners or others. Remaining vegetation may be mulched and spread on the uncultivated upland portions of the transmission corridor. For any tree clearing within wetland areas, hand clearing methods will be used and no stump grinding will occur. All vegetation cut in wetland areas will be removed from wetlands and placed in upland areas.

4.2.6.2 Access Roads

Vehicular access will be installed prior to construction consistent with the descriptions provided in Appendix H (EM&CP Procedures (BMPs)). Construction access roads will provide access for equipment and materials to the ROW from local, state and public roadways or from land adjacent

to the ROW. The specific location and type of access road will be identified on the plan and profile drawings to be provided as part of the EM&CP.

4.2.6.3 Reconductoring

Approximately 13 miles of the corridor east of the Edic substation will be reconductored, replacing the existing 230 kV circuits with new 345 kV circuits. The existing insulator and hardware assemblies will be replaced with new assemblies and stringing blocks will be installed utilizing bucket lifts. The existing wires may be utilized to pull in the new conductors and OPGW. A typical 75 foot by 75 foot work pad will be established around each existing structure site to accommodate reconductoring activities. Some work pads may need to be larger or smaller, depending on site-specific considerations, such as topography or environmental resources.

4.2.6.4 Centerline and Work Area Surveys

Ground survey, staking, and geotechnical investigations will be performed prior to construction of new structures to design and locate transmission line centerlines, structure locations, new access roads, spur roads to structure sites, overland access, and temporary work areas. Flagging will be maintained as required until final cleanup and/or restoration is completed, after which it will be removed.

4.2.6.5 Removal of Existing Structures

Removal of existing structures will take place in four stages: removal of the conductors and shield wires, removal of the structures, removal of the foundations, and site restoration. The conductors will be removed utilizing cranes, bucket lifts, and other land-based vehicles and equipment. The removed conductors will be taken offsite for recycling or disposal. After the conductors are removed, the existing structures will be disassembled, which may include cutting off sections of the existing structures and lowering them to the ground via crane. Once disassembled, the structures will be removed from the transmission line corridor for recycling or disposal.

Once the existing structures are removed, the structure foundations will be removed to 48 inches below grade in agricultural areas and below grade elsewhere. A typical 200-foot by 200-foot work pad will be established around each existing structure site to accommodate structure removal activities. Certain structure locations may dictate smaller or larger work areas due to site-specific factors, such as topography and the presence of environmental resources.

4.2.6.6 Transmission Line Installation

After the existing structures are removed, the new transmission line structures will be erected. The erection of the structures generally takes place in a two-step process. First, structure foundations are completed; then the structures are erected atop the foundations. After the structures are installed, stringing of the conductors, shield wire, and OPGW will proceed.

Foundations

Project plans include four options for structure foundations to be implemented as appropriate based on site-specific geotechnical conditions and other design considerations: direct embedment, drilled pier, helical pile, and micropile/rock anchor.

Direct Embedment. Direct embedment starts by drilling a hole typically 18 inches larger than the pole base diameter. This results in the generation of several cubic yards of spoils that may be spread at the site, recycled as structural fill, or properly disposed. If the excavation becomes unstable, the hole is kept open by either inserting a permanent or temporary steel casing or filling the hole with a polymer slurry. The pole is then lowered into the drilled hole via crane and backfilled with grout, concrete, or aggregate.

Drilled Pier. Construction of a drilled pier foundation begins with drilling or excavating a hole into the soil to a specified depth and diameter. This results in the generation of a larger volume of spoils relative to direct embedded foundations. Spoils may be spread at the site, recycled as structural fill, or properly disposed. If the excavation becomes unstable, the hole is kept open by either inserting a permanent or temporary steel casing or filling the hole with a polymer slurry. Next, a reinforcing steel cage and anchor bolt cage is lowered into the hole via crane, and concrete forms are placed at the surface to allow for the final desired pier height above ground level. Concrete is then poured into the hole and forms. Any slurry exiting the hole is collected, treated, discharged, and solids retained for disposal. After the concrete cures, the transmission structure can then be secured to the anchor bolts embedded into the finished foundation.

Helical Pile. A helical pile foundation for a transmission structure consists of multiple piles rotated into the soil supporting a base plate or concrete cap attachment point. The piles are equipped with helix-shaped plates attached to the bottom of the pile that allow the pile to function as a screw as it is rotated into the soil during installation. After the piles are rotated into the soil to a prescribed torque or depth, a steel grillage is welded or bolted to the piles. The transmission structure is then bolted to the steel grillage. Alternatively, the piles may be attached to a reinforced concrete cap with an anchor bolt cage for securing the above ground structure. Helical pile installation does not generate subsoil spoils, although earthwork associated with concrete caps may generate small volumes of spoils.

Helical pile foundations are compatible with helicopter, low surface pressure vehicle (i.e., “marsh buggy”), and conventional ground-based construction methods. Helical pile installation is not feasible in rocky soils that would prohibit sufficient penetration of the piles.

Micropile/Rock Anchor. A micropile foundation consists of multiple micropiles, typically five to twelve inches in diameter, drilled into the soil supporting a base plate or concrete cap attachment point. Micropile foundation construction begins by drilling to a specified depth below grade inside a steel casing. Next, a steel reinforcing bar is inserted into the hole, and grout is pumped in to secure the reinforcing bar. The steel casing may be removed after the grout is added. A base plate is welded or bolted to the steel rods to allow the transmission structure to be bolted to the base

plate. Alternatively, the rods may be attached to a reinforced concrete cap or concrete pedestal with an anchor bolt cage for securing the above ground structure.

Rock anchor foundations are substantially similar to micropile foundations in configuration and installation; however, rock anchors are typically smaller in diameter relative to micropiles, and rock anchors are typically loaded under tension instead of tension and compression.

Micropile and rock anchor foundations are compatible with both helicopter and conventional ground-based construction methods. Micropile and rock anchor foundations are well-suited to a wide range of geotechnical conditions, including rocky soils.

Structure Assembly and Erection

Structures will either be fully assembled on the ground and lifted onto the foundations or assembled in sections in the air. For direct-embed foundations, the entire structure can be lifted utilizing cranes and set into the excavation. The excavation is then backfilled with crushed rock or concrete. Alternatively, the structure base section can be set into the excavation and backfilled, followed by securing the top part of structure to the base section. For drilled pile, helical pile, and micropile/rock anchor foundations, the structures are placed and secured to the foundations utilizing bolts.

Stringing

After the structures are erected, the conductor, shield wire, and OPGW will be strung between the structures using helicopters, land-based vehicles and equipment, or a combination thereof.

Insulators, hardware, and stringing sheaves will be delivered to each structure site. The structures will be rigged with suspension assemblies and stringing blocks at each shield wire, OPGW and conductor position. For protection of the public during wire installation, guard structures will be erected over crossings such as highways, railroads, and electric lines. Guard structures may consist of H-frame wood poles placed on either side of the crossing or by using boom trucks raising a guard cross beam. These structures prevent shield wire, OPGW, or conductors from encroaching on obstacles below. Guard structures may not be required for minor or agricultural roads. In such cases, other safety measures such as barriers, flagging crews, or other traffic control devices will be used. Following stringing, tensioning, and securing the wires to the structures (i.e. clipping) the guard structures will be removed and the area restored.

Stringing proceeds as follows: pilot lines will be pulled (strung) from structure to structure by a helicopter, land operated equipment, or a combination thereof, and threaded through the stringing blocks at each structure. The pilot lines will be used to pull in a stronger, larger diameter line (i.e., pulling line), which can then be used to pull the wires onto the structures. This process is repeated until the shield wire, OPGW, and conductors are pulled through all sheaves on a given segment.

Shield wire, OPGW, and conductors will be tensioned using powered pulling equipment at one end and powered braking or tensioning equipment at the other end of a pulling segment. Sites for tensioning equipment and pulling equipment will be located at heavy angle structures and approximately every 2 to 4 miles along straight sections of the transmission line. The tensioner, in

concert with the puller, will maintain tension on the wires while they are fastened to the structures. Splicing will be conducted in upland areas within the existing transmission corridor for straight-line segments of the route that exceed approximately 10,000 feet so that separate reels of conductor and shield wire can be joined to form a continuous pull. The EM&CP will show the locations of all splicing sites. Splicing may be conducted with implosive sleeves or with conventional compression sleeves.

OPGW reels cannot be spliced together; however, reel lengths for OPGW are typically around twice the amount for conductor. Additional pull sites to accommodate the OPGW may be required. At each end of an OPGW pull, the OPGW will be trained down the structure to a splice box located approximately 15 feet above ground.

4.2.6.7 Laydown Yards

During construction, the Project will use a number of laydown yards, typically 5 to 10 acres in size, to provide space for material storage, staging, assembly, and other activities supporting construction. Laydown yards may be secured with chain link fence topped with barbed wire. The locations of the laydown yards will be determined in coordination with property owners prior to the start of construction and shown in the EM&CP. Only upland areas will be used for laydown space, and preference will be given to previously disturbed areas that do not require grading or recontouring, particularly areas that are already paved or graveled. To the extent that additional graveling at laydown yards is necessary, graveled areas will be underlain with geotextile fabric to facilitate removal of the gravel after construction.

4.2.7 Substation Construction

Design and construction of the all substation improvements will conform to the NESC, ANSI Standards, and other codes and standards applicable to such facilities. Substation foundations will be site-specific designs based on in situ geotechnical conditions and loading associated with each of the many types of structures comprising the facility. Construction activities are expected to take up to approximately 18 months to complete for Princetown and Rotterdam substations. The other miscellaneous construction activities at Marcy, Edic, Porter, and New Scotland substations will require shorter durations, and the applicable steps for construction at these substations are generally addressed within the descriptions that follow. Most major construction activities are expected to occur during daylight hours.

In siting the substation components, environmentally sensitive areas such as wetlands will be avoided to the maximum extent practicable. After construction, the substation areas will be enclosed with chain link fence topped with barbed wire, and other measures such as cameras and sensors may be installed to secure the sites.

Substation construction crews will employ standard construction means and methods that will include, but will not be limited to the following:

- Site access preparation, including access road construction, clearing, earthwork, and grading as required for access;

- Installation of appropriate construction erosion control and drainage systems;
- Site grading;
- Grounding systems and underground utilities installation;
- Construction of foundations and structures, including equipment and control buildings;
- Laying gravel within the fenceline areas;
- Installation of breakers, bus work, instrumentation and controls, security systems, and other electrical components and connections (transformers will also be installed at the Rotterdam substation);
- Site restoration; and
- Testing and commissioning.

4.2.8 Restoration (16 NYCRR § 86.5(b)(9))

After construction is completed, the temporarily disturbed areas of the transmission line corridor and Princetown and Rotterdam substation areas will be restored. Restoration will include decompacting any areas of compacted soil, grading the transmission line corridor and substation fringe areas back to original grade where practicable or otherwise providing appropriate, stabilized conditions, and sowing appropriate seed mixes. Additional details regarding clean up and restoration are provided in Appendix H (EM&CP Procedures (BMPs)).

4.2.9 Local Control Center

The New York Independent System Operator (NYISO) will operate the Project via NYPA's existing local control center.

4.3 Land Use and Development

This section of Exhibit 4 describes existing land use along the Project ROW and evaluates potential impacts to these land uses resulting from the construction and operation of the Project. The land use information provided in this section is based on desktop review of online GIS data sources, aerial imagery and local comprehensive plans.

The land use and land cover "affected ROW" in this section is defined as the existing Edic to New Scotland transmission line corridor, including the existing corridor from the Project's substation in Princetown to the existing Rotterdam substation. Along these existing transmission line corridors, the ROW width varies from 100 feet to nearly 600 feet.

4.3.1 Existing Land Use (16 NYCRR § 86.5(a))

An analysis of land cover classes relating to the Project ROW was performed to calculate distances (measured in miles) of land cover classes crossed by the ROW; areas (measured in acres) of land cover classes within the ROW; and areas (measured in acres) of land cover classes within 500 feet

of the Project ROW. Table 4.3-1 details land cover type classification based on the United States Geological Survey (USGS) National Land Cover Database 2016 (NLCD 2016) mapping for the Project. The data displayed in Table 4.3-1 shows total calculations for the entire Project, as well as the three Project segments: Edic to Princetown; Princetown to Rotterdam; and Princetown to New Scotland.

The Project will be constructed within an existing transmission line ROW that has been subjected to vegetation management for several decades. Accordingly, pasture/hay is the predominant cover type accounting for approximately 57 percent of the Project length and approximately 52 percent of the total Project ROW area. The second most prevalent land cover type according to the NLCD mapping is deciduous forest, accounting for approximately 20 percent of the Project length and approximately 22 percent of the total Project ROW area. The relatively high percentage of deciduous forest within a maintained electric transmission line ROW warrants further explanation: The analysis reflects the accuracy and resolution of the most current NLCD mapping and much of the classified deciduous forest within the ROW would more precisely be classified as shrub/scrub or pasture/hay at a higher resolution or with more accurate interpretation of the aerial imagery. All other NLCD land cover types are present in smaller percentages, with total distances and acreages for each not exceeding 5 percent of the total Project length and area.

Table 4.3-1. Land Cover Types within the Project ROW and Adjacent Area

Land Cover Type (NLCD 2016)	Project Segment									Project Total					
	Edic to Princetown			Princetown to Rotterdam			Princetown to New Scotland			Distance Crossed		Area in Affected ROW		Area Within 500 feet of ROW	
	Distance Crossed (miles)	Area in Affected ROW (acres)	Area Within 500 feet of ROW (acres)	Distance Crossed (miles)	Area in Affected ROW (acres)	Area Within 500 feet of ROW (acres)	Distance Crossed (miles)	Area in Affected ROW (acres)	Area Within 500 feet of ROW (acres)	Miles	Percent of ROW	Acres	Percent of ROW	Acres	Percent of ROW
Water															
Open Water (11)	0.11	14.24	39.02	0.00	0.00	1.33	0.00	0.00	4.50	0.11	0.11%	14.24	0.40%	44.85	0.28%
Developed															
Open Space (21)	2.84	81.35	450.00	0.20	3.23	26.77	0.67	45.27	182.96	3.71	3.63%	129.85	3.69%	659.73	4.16%
Low Intensity (22)	0.77	28.58	164.99	0.02	1.46	10.26	0.21	16.49	79.93	1.00	0.98%	46.53	1.32%	255.18	1.61%
Medium Intensity (23)	0.02	7.57	40.05	0.02	1.40	8.16	0.03	3.13	15.36	0.07	0.07%	12.10	0.34%	63.57	0.40%
High Intensity (24)	0.00	1.45	8.71	0.00	0.00	0.45	0.03	0.94	6.80	0.03	0.03%	2.39	0.07%	15.96	0.10%
Barren															
Barren Land (Rock/Sand/Clay) (31)	0.04	0.68	11.57	0.00	0.67	1.11	0.00	0.00	5.07	0.04	0.04%	1.35	0.04%	17.75	0.11%
Forest															
Deciduous (41)	16.89	548.57	3274.72	1.88	53.68	185.78	2.40	170.28	396.03	21.17	20.72%	772.53	21.96%	3,856.53	24.32%
Evergreen (42)	0.73	41.27	571.09	0.34	13.93	146.29	0.00	7.07	200.48	1.07	1.05%	62.27	1.77%	917.86	5.79%
Mixed (43)	1.87	75.06	1112.61	0.25	15.01	223.28	0.49	49.36	605.11	2.61	2.56%	139.43	3.96%	1,941.00	12.24%
Shrubland															
Shrub/Scrub (52)	1.84	44.34	115.95	0.12	3.97	4.89	0.02	6.92	8.52	1.98	1.94%	55.23	1.57%	129.36	0.82%
Herbaceous															
Grassland/Herbaceous (71)	1.43	44.86	159.08	0.12	4.02	5.12	0.51	20.62	54.95	2.06	2.02%	69.50	1.98%	219.15	1.38%
Planted/Cultivated															
Pasture/Hay (81)	43.76	1080.12	4366.59	1.76	44.44	128.40	12.97	708.94	1442.12	58.49	57.26%	1,833.50	52.13%	5,937.11	37.43%
Cultivated Crops (82)	4.38	116.88	587.47	0.00	0.00	0.00	0.46	36.05	97.40	4.84	4.74%	152.93	4.35%	684.87	4.32%
Wetlands															
Woody Wetlands (90)	1.03	35.27	429.66	0.04	3.79	31.12	0.79	75.42	428.52	1.86	1.82%	114.48	3.25%	889.30	5.61%
Emergent Herbaceous Wetlands (95)	0.97	20.66	53.46	0.28	5.76	12.61	1.29	84.46	159.10	2.54	2.49%	110.88	3.15%	225.17	1.42%
Project Totals												3,517.21	100.00%	15,857.39	99.98%

Source: National Land Cover Database, https://www.mrlc.gov/data/nlcd-2016-land-cover-conus

The area immediately adjacent to the Project ROW (within 500 feet) has similar characteristics regarding land cover types with a few notable distinctions. Within the Project ROW, the forest cover types (deciduous, evergreen and mixed) comprise a total of nearly 28 percent of the total ROW area while more than 42 percent of the adjacent area within 500 feet is classified as forest. This reflects the vegetation management practices within the existing electric transmission corridor. Herbaceous and cultivated (pasture/hay) cover types also show a contrast between the Project ROW (more than 58 percent of the total area) and the adjacent area within 500 feet (approximately 43 percent), again reflecting the ROW maintenance activities that tend to favor herbaceous cover types over time. The rural nature of the Project area is illustrated by the relatively low percentage of developed cover types – approximately 2 percent of the nearly 16,000 acres that comprise the area within 500 feet of the Project ROW.

4.3.1.1 Local Land Use Planning and Policies

Local land use planning and policies are created by counties and towns to help regulate changes in the local economy, community, and environmental landscape. The region the Project traverses shows similar land use policies from town to town, such as maintaining agricultural districts and the rural landscape. Since the Project will be situated within an existing transmission corridor, the Project is not expected to have any material impacts on local land use planning or policies. The discussions below address the land use plans and policies applicable along the Project ROW. Municipalities crossed by the Project ROW but not addressed below do not have applicable land use plans in place. Additional details on the Project's compliance with local requirements is provided in Exhibit 7.

Erie Canalway National Heritage Corridor Commission

A portion of the Project ROW is located within the Erie Canal-East region of the Erie Canalway National Heritage Corridor (ECNHC). The Erie Canal-East Region extends from Albany to Rome and is characterized by agriculture, forests, and historic small towns and cities that developed around the Mohawk River. The ECNHC Commission and the Erie Canalway Heritage Fund, in partnership with the National Parks Service and the U.S. Department of the Interior, work to preserve the heritage of the Erie Canalway, promote the Corridor as a tourism destination, and foster vibrant communities connected by the waterway.

The Erie Canalway National Heritage Corridor Commission Preservation and Management Plan (October 2006) provides guidance to the ECHNC Commission and its partners – federal and state agencies, individual communities, non-profit and private organizations – to achieve the full potential of the corridor through measures including:

- Protecting and preserving its historic, natural, cultural and recreational resources;
- Interpreting and educating the public about the story of the canals;
- Fostering and promoting recreational opportunities;
- Helping perpetuate canal-related music, art, literature, and folkway traditions;

- Helping market the Corridor;
- Stimulating economic development and community revitalization; and
- Fostering cooperative partnerships.

A segment of the Project that involves reconductoring the existing structures crosses the Erie Canal in the Town of Schuyler, Herkimer County, and other portions of the Project ROW between Edic Substation and New Scotland substation cross in and out of the boundaries of the ECNHC, farther removed from the Erie Canal and Mohawk River. The Project will not interfere with the land use or economic development plans outlined in the ECNHC Preservation and Management Plan.

Oneida County

Town of Marcy

In 2009, the Town of Marcy adopted its current Master Plan, a comprehensive document featuring an examination of existing natural, economic, and social conditions, public opinions, and a series of reasonable assumptions with regard to emerging development opportunities. The Town of Marcy Master Plan Update (adopted February 25, 2016) describes the expectations of planning and development within the township. The plan discusses financial growth, housing and commercial development, infrastructure maintenance, and upgrades for Character Areas (areas with similar physical characteristics). The Project ROW along with Edic substation are located in the Tech Campus Character Area. According to the Master Plan Update, the "aesthetic environment of the Tech Campus is largely defined by open space (agricultural and wooded properties) and the footprint of transmission corridors connecting to and from utility structures in the area. The Project is consistent with the recognized aesthetic environment of the Tech Campus Character Area and will not conflict with the Town's Master Plan.

Herkimer County

Herkimer County adopted an Agriculture and Farmland Protection Plan in 2000 and is currently in the process of updating that Plan. The Plan establishes four goals:

Goal 1. Farms and agri-businesses in Herkimer County will be profitable and economically dynamic

Goal 2. A critical mass of farmland will be protected and available for active agricultural operations.

Goal 3. Local and county government decision-makers and the general public will understand agriculture and the many important roles it plays in the County. These decision-makers will be active partners in preserving and nurturing farming. A positive attitude towards farming by farmers, other business people, and the general public will develop.

Goal 4. Agriculture in Herkimer County will be diversified and include a wide variety of farm types and sizes.

As the Project will be located entirely within existing utility ROW in Herkimer County, construction and operation of the Project is not expected to have any adverse impacts on any of these land use goals.

Town of Stark

The Town of Stark has a Comprehensive Plan that was adopted in 2002.The Comprehensive Plan provides a regional and historic background and describes the natural features of the Town. The major goal of the Comprehensive Plan is the "protection and improvement of the rural qualities of the Town…" Another major proposal is to "conserve the important scenic views that significantly contribute to the special character of Stark." The Project is consistent with the Comprehensive Plan since it will make use of an existing utility corridor without the need for additional land or extensive vegetation clearing; existing agricultural use within the ROW will also be allowed to continue.

Montgomery County

Montgomery County has developed an Agricultural and Farmland Protection Plan. Along with analyzing the County's farmland current and future conditions in terms of quality, economy, and preservation, this plan discusses some affects that transmission lines may have on farms within certain distances. For instance, the plan indicated that any farm within one mile of an electrical transmission line may have the opportunity to connect to three-phase power (a modernized system to transmit and receive power). However, this plan component is not applicable to the project since the 345 kV Project voltage is not compatible with connections to individual farms – those individual connections would be made at distribution level voltage by the local electrical utility. The Project is consistent with Montgomery County's Agricultural and Farmland Protection Plan.

Town of Minden

The Town of Minden has developed a Comprehensive Plan that discusses an array of topics relating to overall township development and the Town's goals of: 1) protecting and maintaining agricultural industry and land; and 2) maintaining and enhancing the aesthetics of the Town. The Project is consistent with the Town of Minden Comprehensive Plan since the Project will utilize an existing electric transmission corridor with limited additional clearing and agricultural use within the ROW will continue.

Town of Florida

The Town of Florida Comprehensive Plan is more than 20 years old but two of the primary goals – preserve farming and preserve the Town's rural character and open spaces – presumably remain valid today. The Project, which utilizes an existing transmission corridor, is consistent with the Town's Comprehensive Plan.

Schenectady County

Town of Duanesburg

The Town of Duanesburg Comprehensive Plan establishes goals and objectives pertaining to land use, housing, commerce, community development and natural resources. Rural preservation was

cited as the most important issue facing the Town and is presented as the primary land use goal. The Project supports the primary land use goal through use of an existing utility corridor and continued agricultural use within the ROW.

Town of Princetown

The Town of Princetown Comprehensive Plan is dated October 29, 2013. According to the Plan, residential property accounts for 56 percent of the land acreage in the Town, followed by vacant property at 31 percent and agriculture/forest lands at 5 percent.

A resident survey conducted as part of the preparation of the Comprehensive Plan indicated that 87 percent of the participants felt strongly that maintaining rural character in Princetown was an important objective. In addition, there was great support for Town-sponsored conservation actions that would result in the permanent protection of open space, scenic views, active farmland, historic structures, and critical environmental areas.

All Project facilities in the Town of Princetown, with the exception of the new Princetown substation, will be built within the existing utility corridor. The Project, which makes maximum use of an existing ROW, is consistent with the planning objectives described in the Town of Princetown Comprehensive Plan.

Town of Rotterdam

The Town of Rotterdam Comprehensive Plan that was adopted by the Rotterdam Town Board on December 5, 2001. The Plan includes a number of generic goals such as "Provide an effective stewardship of the environment to protect critical and sensitive areas…" and "Encourage changes that promote a healthy environment in which to live by encouraging responsible development…" The Plan acknowledges development limitations in sensitive areas due to topography and soil characteristics and emphasizes aquifer protection and control of erosion and sedimentation. The Plan goals and objectives regarding resource protection, housing and development are implemented by the Zoning Ordinance.

The Project is consistent with the general goals and objectives in the Town of Rotterdam Comprehensive Plan through the use of an existing electric transmission corridor, existing substation property, and the implementation of Project-specific measures during construction to manage steep topography and erosion.

Albany County

The Albany County Agricultural and Farmland Protection Plan addresses ways to protect, promote, and grow the agricultural industry within Albany County. Project facilities in Albany County will be located in the north central portion of the County, where predominant land use is agricultural. Existing agricultural uses within the Project ROW will be allowed to continue and agricultural operations may benefit from removal of existing electric transmission structures within the utility corridor. Based on the foregoing, the Project is consistent with the Albany County Agricultural and Farmland Protection Plan.

Town of Guilderland

The Town of Guilderland Comprehensive Plan includes: 1) an inventory and analysis of Town features and resources; 2) a community vision statement with goals and objectives; and 3) recommendations for managing growth, protecting the Town's resources, and addressing the needs of the community. The Rural Guilderland: Open Space and Farmland Protection Plan was prepared in 2005 to specifically address the agricultural and natural resources in the rural western part of the Town where the Project ROW is located. Project activities in the Town of Guilderland include construction of new double circuit 345 kV transmission lines on steel monopoles within the existing utility corridor and partial removal and/or removal from service of the existing Rotterdam to New Scotland 115 kV line in the same corridor (within the *Rural Guilderland Corridor*). Thus, the Project will not alter existing land use patterns and will not conflict with either plan.

Town of New Scotland

The 2018 Town of New Scotland Comprehensive Plan Update serves as an update to the Town's original Comprehensive Plan. The stated vision for the Town of New Scotland includes: 1) retaining the rural, agricultural and open-space character of the Town; and 2) protect and restoring natural resources and scenic vistas throughout the Town.

The Black Creek Marsh and Vly Creek wetland, which are both traversed by the Project ROW, are specifically mentioned as important natural areas to be protected. These natural areas were specifically considered during preliminary engineering to optimize structure locations to minimize wetland impacts. Use of an existing electric transmission corridor and the implementation of an EM&CP, that includes site-specific measures, during construction will further ensure conformance of the Project to the Town of New Scotland Comprehensive Plan.

4.3.1.2 Floodplains

Floodplain and floodway mapping data was acquired through the Federal Emergency Management Agency (FEMA) Flood Map Service Center. Table 4.3-2 provides the results of an analysis of floodways and 100-year floodplains within the Project ROW. According to this analysis, the Project ROW traverses approximately 3.4 miles of land that FEMA has determined to be in 100-year floodplains and 0.4 miles determined to be floodways. Approximately 192 acres of 100-year floodplains and 14.8 acres of floodways are within the Project ROW.

Table 4.3-2. 100-Year Floodplains and Floodways within the Project ROW

	Project Segment						Project Totals			
	Edic to Princetown		Princetown to Rotterdam		Princetown to New Scotland		Distance Crossed		Area in Affected ROW	
Floodplain Type	Distance Crossed (miles)	Area in Affected ROW (acres)	Distance Crossed (miles)	Area in Affected ROW (acres)	Distance Crossed (miles)	Area in Affected ROW (acres)	Miles	Percent of ROW	Acres	Percent of ROW
100-Year Floodplain	1.4	50.7	-	0.4	2.0	141.0	3.4	3.4	192.0	5.5
Floodways	0.3	12.4	-	-	0.1	2.4	0.4	0.3	14.8	0.4

Source:***https://msc.fema.gov/portal/availabilitySearch?addcommunity=360497&communityName=NEW%20YORK,%20CITY%20OF#searchresultsanchor***

4.3.1.3 Agricultural Districts

Article 25-AA of the Agricultural and Markets Law authorizes the creation of local agricultural districts pursuant to landowner initiative, preliminary county review, state certification, and county adaptation. These designations encourage improvements of agricultural land and the continued use of agricultural land to produce food and other agricultural products. An important benefit of the Agricultural Districts Program is the opportunity provided to farmland owners to receive real property assessments based on the value of their land for agricultural production rather than on its development value. The Agricultural Districts Law and the Agricultural and Farmland Protection programs have had a significant influence over municipal comprehensive plans and zoning regulations. County agricultural and farmland protection boards may develop protective plans in collaboration with the county soils and water conservation districts. The Agricultural Districts Law protects farmers against local laws that unreasonably restrict farm operations located within an agricultural district.

Portions of the Project ROW are located in Agricultural Districts. Table 4.3-3 identifies these Agricultural Districts and the corresponding towns and counties.

Table 4.3-3. Agricultural Districts Traversed by the Project ROW

Oneida County	
ONEI007	Towns of Marcy and Deerfield
Herkimer County	
HERK001	Towns of Schuyler and Frankfort
HERK002	Town of German Flatts
HERK003	Towns of German Flatts, Stark and Little Falls
HERK004	Town of Stark
Montgomery County	
MONT001	Towns of Minden and Canajoharie
MONT003	Towns of Glen, Root, Charleston and Florida
Schenectady County	
SCHE001	Towns of Duanesburg, Princetown and Rotterdam
Albany County	
ALBA003	Towns of Guilderland and New Scotland

Source: *https://cugir.library.cornell.edu/?q=agricultural+districts+iris*

Table 4.3-4 presents an analysis of agricultural land use (i.e., cultivated cropland, hayland/pasture) and agricultural resources (i.e., Agricultural Districts, prime soils and soils of statewide significance) along the Project ROW. These categories were obtained from different GIS databases and are not mutually exclusive so the categories should be evaluated individually and cannot be totaled. On a project basis, hayland /cropland is the predominant agricultural land use, comprising approximately 52 percent of the total Project ROW (although an uncertain portion of this may be mischaracterized through the development of the NLCD database, as described previously). Soils of statewide significance underlie approximately 30 percent of the Project ROW and prime soils are found within approximately 11 percent of the Project ROW.

Table 4.3-4. Agricultural Land Use and Resources within the Project ROW

Agricultural Land Category	Project Segment						Project Totals			
	Edic to Princetown		Princetown to Rotterdam		Princetown to New Scotland		Distance Crossed		Area in Project ROW	
	Distance Crossed (miles)	Area in Project ROW (acres)	Distance Crossed (miles)	Area in Project ROW (acres)	Distance Crossed (miles)	Area in Project ROW (acres)	(miles)	Percent of ROW	Acres	Percent of ROW
Cultivated Cropland	4.4	116.9	0.0	0.0	0.5	36.1	4.8	4.7	152.9	4.4
Hayland / Pasture	43.8	1,080.1	1.8	44.4	13.0	708.9	58.5	57.3	1,833.5	52.1
Agricultural District	6.3	272.0	0.0	3.9	0.0	16.5	6.3	6.2	292.4	8.3
Prime Soils	6.7	184.5	0.0	1.0	3.4	211.3	10.1	9.9	396.8	11.3
Soils of Statewide Significance	22.7	564.5	2.9	89.8	6.0	383.7	31.6	31.0	1,037.9	29.5

Source:

https://www.mrlc.gov/data/nlcd-2016-land-cover-conus

https://cugir.library.cornell.edu/?q=agricultural+districts+iris

https://datagateway.nrcs.usda.gov/GDGOrder.aspx

4.3.2 Project Effects and Mitigation (16 NYCRR § 86.5(b)(2)(iv), (b)(9))

Due to its proposed siting within existing transmission corridors, the Project's ROW preserves the natural landscape and minimizes conflict with any present or future planned land use. To the extent that the Project ROW affects land use, impacts will be addressed through the impact avoidance and minimization measures described below.

4.3.2.1 Construction

The Project will occur predominantly within the existing ROW and will remove approximately two wooden H-frame structures for each new steel monopole structure installed. Accordingly, the Project is not anticipated to result in material impacts upon or changes to land use conditions. Nearby residences will experience temporary disturbance and inconvenience associated with construction activities. This will primarily occur at locations where the existing ROW crosses roadways that will be used by construction vehicles to access the construction ROW. These impacts will be temporary and short-term as the construction progresses along the ROW. To minimize potential construction impacts to adjacent landowners, the Applicant will provide timely information to adjacent property owners and/or tenants regarding the planned construction activities and schedule, and will coordinate with NYSDOT, affected counties, and local police departments, as applicable, to develop and implement traffic control measures to ensure safe and adequate traffic operations along roadways to be used by construction vehicles. Any existing encroachments within the ROW will be identified during preparation of the EM&CP and will be appropriately addressed. Adjacent landowners will be afforded the opportunity to remove any encroaching structures or uses prior to the start of construction.

As there will be no permanent change in topography within the designated floodplains, no impacts to the floodplains or to other upstream/downstream properties are expected from the construction and operation of the transmission facilities. To the extent practicable, the locations of designated floodplains and floodways will be considered during the design process to avoid placing structures in these areas.

4.3.2.2 Operation and Maintenance

The new Princetown substation site is the only area where the Project will result in a permanent change in land use. The site for the new Princetown substation is located within the northwest quadrant of the junction of the two existing electric transmission corridors that constitute the Project ROW. This Princetown substation site, on Reynolds Road in the Town of Princetown, is currently occupied by trailers, outbuildings, and other items that will be removed to accommodate the development of the new substation. Construction support for the Princetown substation will also require removal of a residence and outbuildings in the southwest quadrant where the two existing electric transmission corridors intersect. Existing wetlands and wooded areas located on the site will be retained to the maximum extent practicable to provide screening and vegetated buffers for the adjacent and nearby properties.

During Project operations, the ROW will be subject to periodic vegetation management in accordance with a PSC or NYPA-approved vegetation management plan.

4.3.2.3 Environmental Protection Measures

The Project ROW crosses active agricultural lands and designated New York Agricultural Districts. The applicant will allow for the co-existence of active farmland and transmission lines within the Project ROW. During construction, agricultural operations may be disrupted within the ROW; however, the BMPs provided in Appendix H present impact avoidance and minimization measures to be implemented during construction to reduce impacts to agricultural operations. Protection measures such as rigid matting to prevent soil compaction and restoration measures such as removal of all construction debris will be implemented in active agricultural areas as indicated in Appendix H, and as required by the Project's Article VII Certificate.

Since the Project will involve the replacement of existing single-circuit wood-pole H-frame structures with double-circuit steel monopole structures with greater span lengths between structures, the total number of structures within the Project ROW will be significantly reduced and the Project footprint will be considerably less compared to existing conditions, benefiting agricultural operations. Following construction and restoration, farm operators should realize a net increase in land available for cultivation and easier operation of farm equipment within the ROW with fewer structures to navigate.

4.4 Aesthetics and Visual Resources

As required by 16 NYCRR §§ 86.3(a)(1)(iii) and 86.5(b)(2)(i), this section presents an assessment of potential impacts to aesthetic and visual resources resulting from the construction and operation of the proposed Project. The study examines the existing landscape qualities and the existing visual resources within a 3-mile radius of the Project to determine whether the proposed line "avoids scenic, recreational and historic areas," and whether the ROW has been, "routed to minimize its visibility from areas of public view." The studies conducted as part of this assessment included an inventory of visual resources, field surveys during April 2019 to assess landscape quality and visibility of the existing electric transmission facilities, and a viewshed analysis to identify the areas of potential visibility and the incremental viewshed (i.e., areas of potential new visibility based on locations and heights of existing and proposed transmission line structures).

Visual quality is most frequently the result of the relationship of all the components of a landscape, rather than the presence of a single feature. Therefore, the landscape's visual features must be objectively identified and their character and quality assessed. In addition, the assessment must also identify the importance to people ("viewer groups"), or sensitivity of the views of visual resources in the landscape. Significant aesthetic impacts are those that may diminish public enjoyment and appreciation of an inventoried resource, or those that impair the character or quality of such a place (NYSDEC 2000). The potential visual impact of the Project is mitigated by the use of and existing electric transmission corridor when compared to the impacts associated with siting new facilities in pristine rural settings. In addition, "good housekeeping" would be implemented to maintain the Project area free of debris, trash, and waste during construction. Finally, when

construction is complete, areas disturbed during the construction process would be restored. In general, the overall visual character and visual quality of the Project corridor would not be substantially altered for any viewer group.

4.4.1 Existing Landscape Quality (16 NYCRR § 86.5(a))

The Project facilities will be located entirely within an existing electric transmission corridor that traverses 20 municipalities located in 5 counties. The Project is located within the Mohawk Valley Region which is characterized by the Mohawk River, tributaries of the river, associated floodplains, and rolling terrain. The existing landscape setting includes a mix of urban, suburban, rural, and industrial areas in and along the Mohawk Valley. Denser settlement and industrial areas are located along the Mohawk River and Erie Canal with woodlands and agricultural areas located in the uplands. The Project ROW begins at the Edic Substation, located in the Town of Marcy in Oneida County at the edge of the densely settled City of Utica, and runs along the boundary between gridded suburban development and undeveloped woodland in the Town of Deerfield, before turning south in the Town of Schuyler in Herkimer County to cross the Erie Canal and enter the mixed rural and woodland landscape south of the Mohawk River in the Town of Frankfort. It remains within this landscape while skirting the adjacent, densely settled industrial villages of Frankfort and Ilion. The line remains in woodland, with occasional sections running through open fields, through the Herkimer County towns of German Flats and Stark. Just west of the Montgomery County line, more of the land is under cultivation, and the line traverses open fields for most of the route through the towns of Minden, Canajoharie, Root, Glen, to just north of Rural Grove in Charlestown, where woodlands become more prevalent. The Project ROW continues through Montgomery County, crossing the towns of Charleston and Florida. The line enters Schenectady County in the town of Duanesburg and continues through mixed woodlands and open space to the proposed site of the new Princetown substation. The new Princetown substation will be located adjacent to the existing transmission corridor. As the line turns south, to the east of Mariaville Lake, settlement becomes denser, although the mix of woodlands and open space continues. The segment connecting the new Princetown substation to the new Rotterdam Substation runs through dense woods. The new Rotterdam substation will be located adjacent to the existing Rotterdam substation. The Princetown to New Scotland segment runs through a mix of woodland and open fields, dotted with small pockets of denser settlement.

4.4.1.1 Visual Resource Inventory

The NYSDEC Policy DEP-00-2: *Assessing and Mitigating Visual Impacts* provides guidance for the evaluation of visual impacts of proposed projects. Per this policy, scenic and aesthetic resources of statewide significance may be derived from one of the following 13 categories:

- National Register of Historic Properties - listed or eligible (278)[2]

[2] The number of resources found for the category within the 3-mile buffer is shown within parentheses, with the exception of the SASS, which were researched within 5 miles of the Project.

- State parks (1)
- Urban cultural parks (1)
- State forest preserve lands (0)
- National wildlife refuges, state game refuges and state wildlife management areas (2)
- National natural landmarks (0)
- National Parks (1)
- Designated wild, scenic or recreational rivers (4)
- Designated scenic areas and highways (0)
- Scenic Areas of Statewide Significance (0)
- State or federally designated trails (8)
- State nature and historic preserve areas (0)
- Certain Bond Act Properties (0)

Table 4.4-1 lists the visual and aesthetic resources within 3 miles of the Project, except NRHP listed and determined eligible properties, which are listed in Table 4.5-2 and Table 4.5-3, respectively. The locations of these resources are shown on the Figure 2-1 maps in Exhibit 2. No designated Scenic Areas of Statewide Significance (SASS) were identified within 5 miles of the Project. A total of 45 local parks and other resources were also inventoried as visual resources although they are not listed as an aesthetic resource of statewide significance by NYSDEC.

4.4.2 Project Effects and Mitigation (16 NYCRR § 86.5(b)(2)(i) and (ii), (b)(8))

Due to its proposed siting within existing transmission corridors, the Project's ROW avoids and minimizes effects to scenic, recreational, and historic areas and minimizes the Project's visibility from areas of public view. The Project further avoids and minimizes effects to these areas by minimizing structure heights subject to considerations such as electrical clearances, EMF levels, and impacts to other resources such as wetlands and agricultural areas. To the extent that the Project ROW affects visual or cultural resources, impacts will be addressed through the impact avoidance and minimization measures described below and in Section 4.5.3

The Project involves the upgrade and replacement of 230 kV circuits with 345 kV circuits within an existing electric transmission corridor between Edic substation and Rotterdam substation, and the reconstruction and installation of 345 kV circuits within an existing electric transmission corridor between the new Princetown substation and New Scotland substation. The major visual change will result from the replacement of approximately 1,250 existing 230 kV single-circuit wood-pole H-frame structures that are typically 75 feet tall, with approximately 675 new double-circuit and single-circuit galvanized steel monopole structures that typically average from 110 feet to 135 feet tall. Design drawings provided in Exhibit 5 illustrate the various proposed structure

types and where they are proposed to be used along the Project ROW. These drawings also illustrate the size and scale of the proposed structures relative to the existing structures to be removed as well as other existing structures that will remain within the electric transmission corridor.

To evaluate potential Project visibility, a viewshed analysis was conducted for the Project, including existing and proposed transmission structures within the Project ROW. Information on the location and height of the proposed structures was based on preliminary engineering design. A vegetated viewshed map was developed using National Land Cover Database (NLCD) land cover data and National Elevation Dataset 10-meter resolution digital elevation model (DEM) to identify areas within the 3-mile buffer where potential screening may be provided by forest vegetation. The NLCD data were used to map the location of forested areas using the NLCD Deciduous Forest, Evergreen Forest, and Mixed Forest classifications. An average height of 60 feet was added to the DEM. Project effects were evaluated based on the viewshed, selective field reconnaissance to visit visual resources identified as having visibility, photo simulations and contrast ratings.

Table 4.4-1 includes the visual and aesthetic resources identified within the 3-mile buffer and indicates visibility of the existing transmission line and the potential visibility of the Project facilities based on the results of the viewshed analysis. The locations of the resources listed in Table 4.4-1 are shown on the Figure 2-1 maps in Exhibit 2. As noted in Table 4.4-1, the majority of the identified visual and aesthetic resources in the vicinity of the Project will have no change in visibility between the existing transmission facilities and the proposed Project. Of the 69 visual resources that were evaluated, 38 resources do not have a view of the existing transmission facilities and will not have a view of the proposed Project. Three properties are located in the viewshed of the reconductored line, where the visual change is related solely to the larger, bundled 345 kV conductors and new insulators to be installed on the existing structures. A total of 31 identified visual resources are located within both the existing and proposed viewsheds, i.e., these resources have a view of the existing lines and will have a view of the new lines after Project construction. None of the identified visual resources are located in an area where the existing lines are not visible but the Project's lines will be visible.

4.4.2.1 Construction

Construction of the proposed transmission lines includes four primary activities: clearing, reconductoring, removal of existing structures, and installation of new transmission lines. As the Project will be constructed within existing transmission line corridors that are already cleared and subject to periodic vegetation management by the incumbent transmission owners, only minimal vegetative clearing will be needed to maintain electrical clearances and support access and work pads. Short-term visual effects would occur during construction of the Project and would result from construction activities and the presence of construction equipment and work crews.

It is anticipated that visual contrast will be introduced temporarily during Project construction, primarily for viewers associated with residences along the ROW and in those areas where roads cross it. In those places, the presence of construction equipment, materials, and crews may be dominant in the foreground. However, these visual effects will be temporary because construction

equipment and crews will be removed once construction is complete. Views of Project construction from areas not immediately adjacent to the existing transmission line right-of-way will be mostly screened by vegetation and/or topography. Visual effects to these viewers will be mostly limited to the presence of construction traffic on local roads.

Construction activities associated with the new substations will have a longer duration but similar visual effects resulting from construction equipment and workers. The relatively remote location of the new Rotterdam substation and the proximity of the existing Rotterdam substation will limit potential visibility and resulting impacts from construction activities at that location. The new Princetown substation site is located on Reynolds Road in Princetown at the junction of two major transmission line corridors. Preliminary design and site layout indicate that the substation will be set back more than 400 feet from the road, and tree clearing along Reynolds Road will be kept to a minimum. Construction activities at this location will be mostly shielded from nearby residences with only intermittent views for travelers along Reynolds Road.

4.4.2.2 Operation and Maintenance

Long-term visual effects during operation of the Project would result from the visibility of the above-ground components associated with the Project (i.e., transmission line structures and new substations). Based on the results of the viewshed analysis, some areas without any identified visual or historic resources within the 3-mile buffer identified as having no visibility of the existing transmission line are indicated as having visibility of the proposed transmission line. The change in visibility is most likely the result of the taller proposed structures extending above the tops of the trees and/or buildings where the existing structures might not. The results of the viewshed were verified during the field visit and depicted in photographic simulations created for the Project. This increased visibility should be understood in the context of the Project being a replacement of existing structures within an existing ROW.

The increased height of the proposed structures may appear more noticeable in long range views, especially where the taller structures will extend above forested vegetation. Short-range views (e.g., where public roads pass underneath the transmission line) will also be changed, with the cluttered appearance of the H-frame structures being replaced by the cleaner look of a lesser number of steel monopoles. This will be particularly noticeable in the eastern portion of Herkimer County and most of Montgomery County where adjacent wood-pole H-frame structures will be replaced with a lesser number of single steel monopole structures.

Visual impact will be limited along two particular segments of the Project related to existing structures that will remain in the transmission line corridor. Immediately east of Edic substation for a distance of approximately 13 miles, the 230 kV circuits will be reconductored with new 345 kV circuits on the existing double-circuit monopole structures. Associated hardware and insulators will also be replaced but after construction, the resulting visual change will likely go unnoticed by most viewers in this area. Similarly, along the approximately 20-mile segment between the new Princetown substation and New Scotland substation, the electric transmission corridor is shared with the Marcy-New Scotland #18 345 kV transmission line, which was built to 765 kV standards with steel pole H-frame structures with a typical height of 170 feet. These existing structures will

remain dominant features of this landscape, noticeably taller than the average 135-foot double-circuit monopole structures proposed along this segment.

The proposed design will result in a qualitative change from the existing structures that will be replaced or removed from the existing electric transmission corridor, but for most of the Project length, the new design will result in fewer structures within the existing ROW through removal and selected replacement of existing structures. Accordingly, this proposed design is likely to result in no significant change in the overall visual impact of the existing transmission lines being upgraded.

The new Princetown substation and the new Rotterdam substation will result in new visual elements with the potential to create visual impacts, but the setting and site characteristics of both substations effectively limit potential visibility of these new facilities. The new Princetown substation will be developed at a site in the northwest quadrant where the two existing electric transmission corridors intersect, which is currently occupied by trailers, outbuildings, and other items which will be removed. Construction support for the Princetown substation will also require removal of a residence and outbuildings in the southwest quadrant where the two existing electric transmission corridors intersect. Site clearing will be necessary but clearing along Reynolds Road will be minimized; the setback from Reynolds Road, remaining vegetation, and wide electric transmission corridors bordering the site to the north and east will effectively limit potential views of the new substation from public locations. Similarly, the new Rotterdam substation is located adjacent to the existing Rotterdam substation and is fairly isolated from public areas, separated from the nearest public road by more than 2,000 feet. Most local residents and travelers in the area will be unaware of the new Rotterdam substation.

4.4.2.3 Photosimulations

Photographic simulations were created to depict the proposed Project components and their potential changes to the existing landscape. The simulations were used to determine the level of contrast between the existing landscape and the expected landscape after the proposed Project is constructed. Simulations depict actual weather conditions at the time photography was taken during the field visit. The simulations were created using ArcGIS software, Autodesk 3D Studio Max®, and rendering software, such as Adobe Photoshop and InDesign.

To create the simulations, the location data captured by the GPS device were transferred to ArcMap, where it was combined with GIS data of the preliminary Project layout. A map showing the data was exported at true scale and imported into 3D Studio Max®. Using this scaled map as a base, 3D models of the Project (i.e., structures, conductors, shield wires, etc.) were created to scale. These 3D models of the proposed Project, previously modeled to scale in 3D Studio Max®, were added in their appropriate locations and elevations. The views from the existing photographs were then matched in the 3D model using virtual cameras with the same focal length and field of view as the cameras used to capture photography during the field visits. After date- and time-specific lighting was added to the 3D model, renderings from the virtual cameras were created. These renderings were then blended into the existing conditions photographs in Adobe Photoshop software. Any necessary modifications to the existing landscape were completed in Photoshop as well. This process of creating a 3D model at true scale and rendering images using the same

specifications used by the camera ensures that the spatial relationships of the landscape, Project features, and viewer perspective are accurate and match the existing site photographs.

Three photo locations were identified to depict representative Project conditions: 1) looking along the ROW from an elevated viewpoint along State Highway 80 to the east of Hallsville (Town of Minden, Montgomery County); 2) looking along Levey Road to where the Project is located along a ridgetop above the historic Lasher House (Town of Duanesburg, Schenectady County); and 3) looking up the ROW where it crosses State Highway146 adjacent to the historic McNiven Farm Complex (Town of Guilderland, Albany County). Photosimulations of these three locations are provided as Figure 4.4-1a through 4.4-1c.

Route 80 E of Hallsville

This viewpoint (Figure 4.4-1a) is located along State Route 80 in the town of Minden, Montgomery County, approximately 0.4 miles north of the Project ROW. Looking south, this elevated viewpoint has partially screened views of the open pasture and woodlands with existing transmission structures visible in the middleground, though partially screened by topography and vegetation. The existing pairs of 230 kV single-circuit wood-pole H-Frame structures, approximately 70 feet tall, will be replaced with a lesser number of double-circuit 345 kV steel monopole structures approximately 120 feet tall. The resulting contrast was rated as low as a result of the visibility of the existing structures, the screening capability of the vegetation in this area, and the replacement of the two structures with the single, visually cleaner structure. The incremental visual impacts at this viewpoint were rated as low.

Levey Road – Lasher House

This viewpoint (Figure 4.4-1b) is located approximately 0.6 miles south of the existing ROW along Levey Road in the town of Duanesburg, Schenectady County. The historic George Lasher House sits between the viewpoint and the Project ROW. From this location views are available along Levey Road toward the ROW as it runs along a ridgetop to the south of Amsterdam. Currently, partially screened views of the existing transmission line are possible, with the upper portion of structures visible above the trees in places and the conductor visible where it crosses the road. Views such as this are fairly common in the surrounding region. Based on the photosimulation, contrast for the Project will be slightly higher than existing levels because the upper portion of the taller structures may now appear above the trees. However, because of the dense vegetation in many places, the structures would frequently appear as a subordinate feature in the landscape setting. As such, the Project would result in weak contrast. The incremental visual impacts at this viewpoint were rated as low.

McNiven Farm Complex

This viewpoint (Figure 4.4-1c) is adjacent to the McNiven Farm Complex and is located within the existing ROW where it crosses State Route 146, which runs between the Village of Altamont and the Town of Guilderland in Albany County. This viewpoint has framed views of the existing cleared ROW which draws the view along the ROW. While Project structures would be visible from this location, the level of contrast was rated as low to moderate as a result of the larger structures from the Marcy-New Scotland #18 line remaining in the ROW and because the wooden H-frame structures will be replaced

by a lesser number of visually cleaner monopole structures. Based on the photosimulation prepared for this viewpoint the incremental visual impacts at this location were rated as low.

Table 4.4-1. Visual Resources Within Three Miles of the Project ROW and Projected Visibility

Map ID[1]	Resource Name	Category	County	Municipality	EXISTING Viewshed Visibility	NEW Viewshed Visibility
L01	Toby Road Park and Pavilion	Municipal Park	Oneida	Town of Marcy	No	No
L02	Wilderness Park	Municipal Park	Oneida	Town of Deerfield	No	No
L03	Eagle Hills	Local Recreational Area	Oneida	Town of Deerfield	No	No
L04	F T Proctor Park	Municipal Park	Oneida	City of Utica	No	No
L05	Proctor Park	Municipal Park	Oneida	City of Utica	No	No
L06	Pine Hills Golf Course	Municipal Park	Herkimer	Town of Frankfort	No	No
L07	Doty's Golf Course	Municipal Park	Herkimer	Village of Ilion	No	No
L08	Russell Park	Municipal Park	Herkimer	Town of German Flatts and Village of Ilion	Yes	Yes
L09	Maple Crest Golf Course	Municipal Park	Herkimer	Town of Litchfield	No	No
L10	Shu-Maker Mountain Climbers	Local Recreational Area	Herkimer	Town of Danube	No	No
L11	Wiles Park	Municipal Park	Montgomery	Village of Fort Plain	No	No
L12	Canajoharie Country Club	Municipal Park	Montgomery	Town of Canajoharie	No	No
L13	Rotterdam Kiwanis Park	Municipal Park	Schenectady	Town of Rotterdam	No	No
L14	Maalwyck Park	Municipal Park	Schenectady	Town of Glenville	No	No
L15	Scotia Island Preserve	Local Recreational Area	Schenectady	Village of Scotia	No	No
L16	Quinlan Park	Municipal Park	Schenectady	Village of Scotia	Yes	Yes
L17	Old Maids Woods City Preserve	Local Recreational Area	Schenectady	Town of Rotterdam	No	No
L18	Freedom Park	Municipal Park	Schenectady	Town of Glenville and Village of Scotia	Yes	Yes
L19	Collins Park	Municipal Park	Schenectady	Village of Scotia	Yes	Yes
L20	Maple Ski Ridge	Local Recreational Area	Schenectady	Town of Rotterdam	No	No
L21	Front Street Park	Municipal Park	Schenectady	City of Schenectady	No	No

Table 4.4-1. Visual Resources Within Three Miles of the Project ROW and Projected Visibility (continued)

Map ID[1]	Resource Name	Category	County	Municipality	EXISTING Viewshed Visibility	NEW Viewshed Visibility
L22	Riverside Park	Municipal Park	Schenectady	City of Schenectady	Yes	Yes
L23	Gateway Landing Park	Municipal Park	Schenectady	Town of Rotterdam	No	No
L24	Gateway Landing Park	Municipal Park	Schenectady	Town of Rotterdam	No	No
L25	Liberty Park	Municipal Park	Schenectady	City of Schenectady	No	No
L26	Schenectady Parks & Recreation	Local Recreational Area	Schenectady	City of Schenectady	No	No
L27	Schenectady County Forest	County Forest	Schenectady	Town of Duanesburg	No	No
L28	Hillhurst Park	Municipal Park	Schenectady	City of Schenectady	Yes	Yes
L29	Poutre Park	Municipal Park	Schenectady	Town of Rotterdam	Yes	Yes
L30	Briar Creek Golf Course	Municipal Park	Schenectady	Town of Princetown	No	No
L31	Whispering Pines Golf Club	Municipal Park	Schenectady	Town of Rotterdam	No	No
L32	Hillcrest Golf Course	Municipal Park	Schenectady	Town of Princetown	No	No
L33	Orchard Creek Golf Club	Municipal Park	Albany	Town of Guilderland	No	No
L34	French's Hollow Fairways	Municipal Park	Albany	Town of Guilderland	No	No
L35	Bozenkill Park	Municipal Park	Albany	Village of Altamont	No	No
L36	Keenholts Park	Municipal Park	Albany	Town of Guilderland	No	No
L37	Tawasentha Park	Municipal Park	Albany	Town of Guilderland	No	No
L38	Western Turnpike Golf Course	Municipal Park	Albany	Town of Guilderland	No	No
L39	Albany Country Club	Municipal Park	Albany	Town of Guilderland	No	No
L40	Waitecliff Preserve	Municipal Park	Albany	Town of Guilderland	No	No
L41	Colonie Golf and Country Club	Municipal Park	Albany	Town of New Scotland	No	No
L42	New Scotland Town Park	Municipal Park	Albany	Town of New Scotland	No	No
L43	Feura Bush Town Park	Municipal Park	Albany	Town of New Scotland	No	No
L44	Plotter Kill Preserve	Plotter Kill Preserve	Schenectady	Town of Rotterdam	Yes	Yes
L45	Five Rivers Environmental Education Center	Environmental Education Center	Albany	Town of New Scotland	Yes	Yes

Table 4.4-1. Visual Resources Within Three Miles of the Project ROW and Projected Visibility (continued)

Map ID[1]	Resource Name	Category	County	Municipality	EXISTING Viewshed Visibility	NEW Viewshed Visibility
N01	Mohawk River[2]	National Wild River	Oneida	City of Rome, Towns of Floyd and Marcy, Village of Oriskany	Yes	Yes
N02	Erie Canal	National Park System	Oneida, Herkimer, Montgomery, Schenectady	Towns of Marcy; Whitestown; Schuyler; Frankfort; German Flatts; Herkimer; Minden; Palatine; Canajoharie; Root; Mohawk Rotterdam; and Glenville; Cities of Utica; and Schenectady	Yes	Yes
N03	Schoharie Creek	National Wild River	Montgomery	Towns of Charleston, Duanesburg, Esperance, Florida, Glen and the Village of Esperance	Yes	Yes
N04	Schenectady - Mohawk Towpath	National Recreational Trail	Schenectady	City of Schenectady and the Town of Niskayuna	Yes	Yes
N05	Hunger Kill	National Scenic River	Albany	Town of Guilderland, Bethlehem, and New Scotland	No	No
N06	Normans Kill	National Scenic River	Albany	Town of Guilderland	Yes	Yes
S01	Revolutionary Trail	State Multi-Use Trail	Oneida, Herkimer, Montgomery, Schenectady	Towns of Marcy; Schuyler; Herkimer; Palatine; Mohawk; Glenville; and Rotterdam; Cities of Utica; and Schenectady	Yes	Yes
S02	Bike Trail[2]	State Multi-Use Trail	Oneida	Town of Marcy; Town of Whitestown; City of Utica	Yes	Yes

Table 4.4-1. Visual Resources Within Three Miles of the Project ROW and Projected Visibility (continued)

Map ID[1]	Resource Name	Category	County	Municipality	EXISTING Viewshed Visibility	NEW Viewshed Visibility
S03	Utica Marsh State Wildlife Management Area[2]	State Wildlife Management Area	Oneida	Town of Marcy; City of Utica	Yes	Yes
S04	Bike Trail	State Multi-Use Trail	Herkimer	Village of Mohawk	Yes	Yes
S05	Southern Adirondack Trail	State Multi-Use Trail	Herkimer	Towns of Herkimer and German Flatts	Yes	Yes
S06	Ohisa State Forest	State Forest	Herkimer	Town of Stark	Yes	Yes
S07	Otsquago State Forest	State Forest	Herkimer	Town of Stark	Yes	Yes
S08	Bike Trail	State Multi-Use Trail	Montgomery	Towns of Minden; and Canajoharie	No	No
S09	Yatesville Falls State Forest	State Forest	Montgomery	Town of Root	Yes	Yes
S10	Rural Grove State Forest	State Forest	Montgomery	Town of Charleston	Yes	Yes
S11	Charleston State Forest	State Forest	Montgomery	Town of Charleston	Yes	Yes
S12	Lost Valley State Forest	State Forest	Montgomery	Town of Charleston	Yes	Yes
S13	Featherstonhaugh State Forest	State Forest	Schenectady	Town of Duanesburg	Yes	Yes
S14	Bike Trail	State Multi-Use Trail	Schenectady	Towns of Minden; and Canajoharie	Yes	Yes
S15	Schenectady - Urban Heritage Area	State Urban Cultural Heritage Area	Schenectady	Town of Rotterdam; City of Schenectady	Yes	Yes
S16	Bike Trail	State Multi-Use Trail	Schenectady	Town of Glenville, Village of Scotia	Yes	Yes
S17	John Boyd Thacher State Park	State Park	Albany	Towns of Knox; Guilderland; Bern; and New Scotland	Yes	Yes
S18	Black Creek Marsh State Wildlife Management Area	State Wildlife Management Area	Albany	Towns of Guilderland; and New Scotland	Yes	Yes

Notes: 1) Map ID refers to the resource location as shown on Figure 2-1 maps (1:24000 scale maps) in Exhibit 2
2) Reconductoring of existing structures (initial 12 miles in Oneida and Herkimer counties)

4.5 Cultural Resources

Pursuant to Public Service Law §122(1)(c) and 16 NYCRR §§86.3(a)(1)(iii) and 86.5(b)(2)(i), this section presents an assessment of potential impacts to cultural resources from Project construction and operation. Cultural resources include archaeological sites, historic buildings, structures, objects, or districts, and traditional cultural properties that illustrate or represent important aspects of prehistory or history or that have important and long-standing cultural associations with established communities or social groups. Significant archaeological and architectural properties are generally defined by the eligibility criteria for listing on the National Register of Historic Places (NRHP).

4.5.1 Existing Setting (16 NYCRR § 86.5(a))

The Marcy to New Scotland Upgrade Project will be located almost entirely within an existing electric transmission corridor. The Project will involve the reconductoring of certain existing structures, the removal of other existing structures, the installation of new structures that may be in different locations than the existing structures within the transmission line corridor, the construction of new substations either in existing transmission line corridor or on land adjacent to such corridor and the upgrades of existing substations on existing utility property.

To address the potential impacts to historic and archaeological resources, a review of the New York State Office of Parks, Recreation and Historic Preservation (OPRHP) online Cultural Resource Information System (CRIS) was conducted for the area within a 1-mile radius of the Project for archaeological resources and within a 3-mile radius from the Project for historic architectural resources.

4.5.1.1 Documented Archaeological Sites

A review of the online CRIS database identified 166 documented archaeological sites within 1 mile of the Project centerline (the "Archaeological Study Area"). A total of 88 sites were identified within the Marcy to Princetown segment; 35 sites within the Princetown to Rotterdam segment; and 43 sites within the Princetown to New Scotland segment. The Archaeological Study Area contains no archaeological sites listed on the National Register of Historic Places (NRHP); 12 sites have been determined to be NRHP-eligible; 21 sites have been determined to be not eligible for the NRHP; and 133 sites have had no NRHP determinations to date.

Table 4.5-1 presents information relating to the archaeological sites identified in the Archaeological Study Area.

Table 4.5-1. Recorded Archaeological Sites within One Mile of Project

OPRHP Site No.	Name/ Description	Period	NRHP Status	In APE
Marcy to Princetown Segment				
04304.000014	Alb-70 (NYSM 1943)/ lithic scatter	Precontact	Undetermined	No
04304.000017	Stream Control System (2-9-13a)	19th century	Undetermined	Yes
04304.000018	Erie Canal 2-9-5	19th century	Undetermined	Yes
04304.000047	Pumpkin Patch Precontact Site/ lithic scatter	Precontact	Undetermined	No
04304.000048	Brookside Drive Historical Site/ domestic scatter	19th century	Undetermined	No
04305.000009	Retaining Wall (5-21-6)	Historic	Undetermined	No
04305.000010	Barn Foundation (5-22-4)	19th century	Undetermined	No
04305.000011	Lithic Scatter (5-22-7)	Precontact	Undetermined	No
04305.000016	Unnamed Site (NYSM 3426)	No data	Undetermined	No
04307.000001	Site of Avery Homestead	19th century	Undetermined	No
04308.000013	Dam (5-23-8)	c. 1900	Undetermined	No
04315.000002	Goodwin Homestead	18th-20th century	Undetermined	No
04315.000003	Williams Site (NYSM 6345)/ lithic scatter	Late Archaic (Brewerton)	Undetermined	No
04316.000003	Cemetery (6-26-18)	19th century	Undetermined	No
04316.000020	D.E. Ward Historic Site (NYSM 11476)	19th-20th century	Undetermined	No
04340.000387	Morgan Precontact And Historic Site (NYSM 11778)	Precontact/ Historic	Eligible	No
04340.000388	Day Tripper Precontact and Historic Site (NYSM 11779)	Precontact/ Historic	Undetermined	No
05702.000150	Nestle Lithic Scatter 1	Precontact	Undetermined	No
05702.000167	E3.01 Pre-Contact Isolate	Precontact	Undetermined	No
05702.000170	A3-002 Pre-Contact Lithic Scatter	Precontact	Not Eligible	No
05702.000171	A3-003 Pre-Contact Lithic Scatter	Precontact	Not Eligible	No
05702.000172	A4-001 Pre-Contact Lithic Scatter	Precontact	Not Eligible	No
05702.000173	A4-002 Pre-Contact Lithic Scatter	Precontact	Not Eligible	No
05702.000174	A4-003 Pre-Contact Lithic Scatter	Precontact	Not Eligible	No
05702.000175	A9-001 Pre-Contact Lithic Scatter	Precontact	Undetermined	No
05702.000176	A11-001 Pre-Contact Lithic Scatter	Precontact	Undetermined	No
05702.000177	A11-002 Pre-Contact Lithic Scatter	Precontact	Not Eligible	No
05702.000178	A11-003 Pre-Contact Lithic Scatter	Precontact	Undetermined	No

Table 4.5-1. Recorded Archaeological Sites within One Mile of Project (continued)

OPRHP Site No.	Name/ Description	Period	NRHP Status	In APE
05702.000179	A11-004 Pre-Contact Lithic Scatter	Precontact	Undetermined	No
05702.000180	A11-005 Pre-Contact Lithic Scatter	Precontact	Undetermined	No
05702.000181	A11-006 Pre-Contact Lithic Scatter	Precontact	Undetermined	No
05702.000182	A12-001 Pre-Contact Pottery Scatter	Precontact	Undetermined	No
05702.000183	A17-001 Pre-Contact Lithic Scatter	Precontact	Not Eligible	No
05702.000184	A18-001 Pre-Contact Lithic Scatter	Precontact	Undetermined	No
05702.000185	A18-002 Pre-Contact Lithic and Ceramic Scatter	Precontact	Undetermined	No
05702.000187	E8-001 Multi-Component Site	Precontact	Undetermined	No
05702.000188	F2-001 Pre-Contact Lithic Scatter	Precontact	Not Eligible	No
05702.000190	G1-003 Pre-Contact Lithic Scatter	Precontact	Undetermined	No
05702.000191	H1-002 Pre-Contact Lithic Scatter	Precontact	Not Eligible	No
05704.000098	Unnamed Site (NYSM 5778)	No data	Undetermined	No
05704.000106	No Information/ isolated find	Precontact	Undetermined	No
05705.000021	Van Horne Site (NYSM 1004)	No data	Undetermined	No
05706.000037	Otstungo Site (NYSM 1156)/ human remains	Precontact	Undetermined	No
05706.000071	IGTS 135a-2-1/ lithic scatter	Precontact	Not Eligible	No
05706.000072	IGTS 136-1-1/ lithic scatter	Precontact	Undetermined	No
05706.000073	IGTS 137-1-1/ foundation and domestic scatter	19th century	Undetermined	No
05706.000074	IGTS 137-2-1/ lithic scatter	Precontact	Not Eligible	No
05706.000075	IGTS 137a-1-1/ lithic scatter	Precontact	Undetermined	No
05706.000076	IGTS 136b-2-1/ lithic scatter	Precontact	Undetermined	No
05706.000077	IGTS 136a-1-1/ isolated Spanish coin	18th-19th century	Undetermined	No
05706.000078	IGTS 137b-1-1/ isolated flake	Precontact	Undetermined	Yes
05706.000079	IGTS 137b-3-1/ lithic scatter	Late Archaic (?)	Undetermined	No
05706.000080	IGTS 138-5-1/ lithic scatter, feature	Precontact	Undetermined	No
05706.000088	Darlin Stock Farm Site	19th century	Undetermined	No
05706.000161	Otstungo 2 (NYSM 1155) Site/ human remains	Precontact	Undetermined	No
05706.000175	B2.02 Pre-Contact Isolate	Precontact	Undetermined	Yes
05706.000176	B4.03 Pre-Contact Isolate	Precontact	Undetermined	No
05706.000180	A5-006 Pre-Contact Lithic Scatter	Precontact	Not Eligible	No

Table 4.5-1. Recorded Archaeological Sites within One Mile of Project (continued)

OPRHP Site No.	Name/ Description	Period	NRHP Status	In APE
05706.000181	A5-007 Historic-Period Farmstead	Precontact	Undetermined	No
05706.000183	A6-006 Pre-Contact Lithic Scatter	Precontact	Not Eligible	No
05706.000184	A8-001 Pre-Contact Lithic Scatter	Precontact	Not Eligible	No
05706.000185	A8-003 Pre-Contact Lithic Scatter	Precontact	Undetermined	No
05706.000186	A8-005 Pre-Contact Lithic and Ceramic Scatter	Precontact	Undetermined	No
05706.000187	A8-006 Pre-Contact Lithic Scatter	Precontact	Not Eligible	No
05706.000188	B6-002 Pre-Contact Lithic Scatter	Precontact	Not Eligible	No
05706.000189	B7-001 Pre-Contact Lithic Scatter	Precontact	Not Eligible	No
06513.000029	Glass Factory Site	19th century	Undetermined	No
06540.000833	Durham Project 177	Historic	Undetermined	No
06540.000834	Durham Project 176	Historic	Undetermined	No
06540.001083	Burton Historic Site	19th century	Undetermined	No
06540.001365	J. Weaver Historic Site (Subi-2628)	19th-20th century	Undetermined	No
09301.000159	Swamp Ridge Site (NYSM 1547)	No data	Undetermined	No
09301.000175	Silas Marsh/James Lasher Historic Site	19th century	Undetermined	No
09301.000176	J. Conner Historic Site	19th century	Undetermined	No
09301.000177	Sawmill Historic Site	19th century	Undetermined	No
09301.000178	Blacksmith Historic Site	19th century	Undetermined	No
09301.000179	Frost House Prehistoric and Historic Site/ lithic scatter	Precontact	Eligible	No
09304.000101	Clark Site/ stone foundation	19th century	Undetermined	No
NYSM 3992	Indian Hill (?)	No data	Undetermined	No
NYSM 4019	Unnamed	No data	Undetermined	Possible
NYSM 4020	Unnamed/ traces	No data	Undetermined	Possible
NYSM 7658	Unnamed	No data	Undetermined	No
NYSM 8219	Unnamed	No data	Undetermined	Possible
NYSM 8266	Digristina	Late Archaic	Undetermined	No
NYSM 8267	Millard Knapp/ no information	No data	Undetermined	No
NYSM 8268	James Knapp/ lithic scatter	Precontact	Undetermined	No
NYSM 8629	Williams	Late Archaic (Brewerton)	Undetermined	No
NYSM 8996	Unnamed/ trail	No data	Undetermined	No

Table 4.5-1. Recorded Archaeological Sites within One Mile of Project (continued)

OPRHP Site No.	Name/ Description	Period	NRHP Status	In APE
NYSM 9215	Unnamed/ trail	No data	Undetermined	Possible
NYSM 9267	Unnamed	No data	Undetermined	No
Princetown to Rotterdam Segment				
09102.000077	Historic Foundation 1 Site	Historic	Undetermined	No
09302.000031	McMichaels Precontact Site (NYSM 955)	No data	Eligible	No
09302.000075	Unnamed Site (NYSM 6259)	No data	Undetermined	No
09302.000076	Unnamed Site (NYSM 6260)	No data	Undetermined	No
09302.000077	Unnamed Site (NYSM 6261)	No data	Undetermined	No
09302.000078	Unnamed Site (NYSM 6262)	No data	Undetermined	No
09302.000079	Unnamed Site (NYSM 6263)	No data	Undetermined	No
09302.000105	Durham Project 73/ no information	Historic	Undetermined	No
09302.000106	Durham Project 211/ no information	Historic	Undetermined	No
09302.000132	Riverstone Manor Site 1/ lithic scatter	Late Archaic (?)	Eligible	No
09302.000133	Riverstone Manor Site 2/ lithic scatter	Late Archaic (?)	Eligible	No
09302.000138	Route 5 Terrace Prehistoric Site/ lithic scatter	Late Woodland (?)	Undetermined	No
09305.000055	Old Mariaville Rd Bridge	19th century	Undetermined	No
09305.000058	Alb – 61/ cellar hole	19th century	Undetermined	No
09305.000118	Unnamed Site (NYSM 6258)	No data	Undetermined	No
09305.000119	Unnamed Site (NYSM 6264)	No data	Undetermined	No
09305.000120	Unnamed Site (NYSM 6265)	No data	Undetermined	No
09305.000123	Unnamed Site (NYSM 6268)	No data	Undetermined	No
09305.000132	Unnamed Site (NYSM 6277)	No data	Undetermined	No
09305.000133	Unnamed Site (NYSM 6278)	No data	Undetermined	No
09305.000134	Unnamed Site (NYSM 6279)	No data	Undetermined	No
09305.000136	Unnamed Site (NYSM 6288)	No data	Undetermined	No
09305.000162	Rotterdam Well Field Site/ lithic scatter and cellar hole	Precontact/ historic	Not Eligible	No
09305.000168	Unnamed Site (NYSM 1941)	No data	Undetermined	No
09305.000246	Durham Project 219/ no information	Historic	Undetermined	No
09305.000247	Durham Project 102/ no information	Historic	Undetermined	No
09305.000252	Durham Project 103/ no information	Historic	Undetermined	No
09305.000256	MDS Van Patten Historic Foundations/ no information	Historic	Undetermined	No
09305.000257	Gep Locus 1/ lithic scatter	Precontact	Undetermined	No
09305.000258	Gep Locus 2/ lithic scatter	Precontact	Undetermined	No

Table 4.5-1. Recorded Archaeological Sites within One Mile of Project (continued)

OPRHP Site No.	Name/ Description	Period	NRHP Status	In APE
09305.000259	Gep Locus 3/ lithic scatter	Precontact	Undetermined	No
09305.000262	Burl Prehistoric Site/ lithic scatter	Precontact	Undetermined	Yes
09305.000326	Erie Canal Old Lock 24	19th century	Undetermined	No
NYSM 6479	Unnamed	No data	Undetermined	Possible
NYSM 6931	Unnamed	No data	Undetermined	No
Princetown to New Scotland Segment				
00102.000414	Five Rivers Prehistoric Site 1/ lithic scatter	Precontact	Eligible	No
00102.000755	Bratt/Slingerland/Fisher Historic Site and Fisher Cemetery	18th-20th century	Undetermined	No
00102.000867	Tate Precontact Site P-2/ isolated find	Precontact	Undetermined	No
00106.000012	Western Turnpike	19th century	Undetermined	No
00106.000171	Historic Foundation	19th century	Undetermined	No
00106.000322	Waggoner Dump Historic Site	19th-20th century	Undetermined	No
00106.000334	Ogsbury Historic Farm Complex (H-1)	18th-20th century	Undetermined	No
00106.000335	Ogsbury Historic Cemetery (H-2)	18th-20th century	Undetermined	No
00106.000336	Mat Farms Precontact Site #1/ lithic scatter	Precontact	Eligible	No
00106.000337	Mat Farms Precontact Site #2/ lithic scatter	Precontact	Eligible	No
00106.000338	Mat Farms Precontact Site #3/ lithic scatter	Precontact	Eligible	No
00106.000339	Mat Farms Precontact Site #4/ lithic scatter	Precontact	Eligible	No
00106.000340	Mat Farms Precontact Site #5/ lithic scatter	Precontact	Eligible	No
00106.000341	Mat Farms Precontact Site #6/ lithic scatter	Precontact	Eligible	No
00106.000370	J. Sharp Farmstead Site 1 Historic Site/ cellar hole and domestic scatter	19th-20th century	Undetermined	No
00106.000555	Jacobson Historic Archaeological Site/ foundation	19th-20th century	Not Eligible	No
00108.000065	Moreau I Site/ lithic scatter	Precontact	Not Eligible	No
00108.000147	Two Loci of Prehistoric Activity/ lithic scatter	Precontact	Undetermined	No
00108.000191	Tel/Alb 2/ camp	Precontact	Undetermined	No
00108.000197	Five Rivers Prehistoric Site 2/ lithic scatter	Precontact	Undetermined	No
09304.000068	Alb 68/ stone foundation	Historic	Undetermined	No
09304.000098	Presbyterian Church & Cemetery Site	18th-19th century	Undetermined	No

Table 4.5-1. Recorded Archaeological Sites within One Mile of Project (continued)

OPRHP Site No.	Name/ Description	Period	NRHP Status	In APE
09304.000099	Princetown Academy Site	19th century	Undetermined	No
09305.000055	Old Mariaville Rd Bridge	19th century	Undetermined	No
09305.000094	Larned & Sons Prehistoric Site/ lithic scatter	Precontact	Undetermined	No
09305.000096	Sunrise Estates Locus 2/ camp	Late Archaic	Undetermined	No
09305.000107	Skunk Hollow Site (NYSM 1549)	Precontact	Undetermined	No
09305.000108	Shell Heap Site/ no information	Precontact	Undetermined	No
09305.000109	Beckers Brook Site (NYSM 1551)	Precontact	Undetermined	No
09305.000110	Sand Hill #2 Site (NYSM 1552)	Precontact	Undetermined	No
09305.000111	Kesebergs Flats Site (NYSM 1553)	Precontact	Undetermined	No
09305.000112	Upper Spring Site (NYSM 1554)	Precontact	Undetermined	No
09305.000236	Valk Farm Complex Historic Site and Cemetery	19th-20th century	Undetermined	No
09305.000237	Viscussi Giffords Prehistoric Site 1/ camp	Late Archaic (Brewerton, Meadowood)	Not Eligible	No
09305.000238	Viscussi Giffords Prehistoric Site 2/ lithic scatter	Precontact	Undetermined	No
09305.000239	Viscussi Giffords Prehistoric Site 3/ lithic scatter	Precontact	Undetermined	No
09305.000321	Upper Spring 2 Site	Precontact	Undetermined	No
NYSM 5301	Unnamed	No data	Undetermined	No
NYSM 5302	Unnamed	No data	Undetermined	No
NYSM 5303	Unnamed	No data	Undetermined	Possible
NYSM 5304	Unnamed/ traces	No data	Undetermined	Possible
NYSM7408	Hatch	No data	Undetermined	No
NYSM 8908	Unnamed	No data	Undetermined	No

Source: Cultural Resource Information System (CRIS). Available online at https://parks.ny.gov/shpo/online-tools/ , Accessed June 18, 2019.

4.5.1.2 Archaeological Sensitivity

Archaeological sensitivity is defined as the potential of a locale to contain previously undocumented archaeological resources, usually scaled as some increment between low and high. Sensitivity for precontact resources is based on an assessment of documented regional site patterns, results of previous archaeological surveys undertaken in the vicinity, and key environmental factors that may have influenced the selection of site locations. Assessments for historic period sensitivity would employ similar sources of evidence, in addition to reviews of historic maps, aerial imagery, photographs, and documents.

The goal of sensitivity assessment, in general, is to identify areas within a Project Area of Potential Effects (APE) with a high potential for possessing undocumented archaeological resources. The

CRIS file review revealed a high density of precontact and historic period archaeological sites on terrain near the Mohawk River and its tributaries. These drainages were principal habitats for the animals and plants on which precontact period Native Americans relied for food and material resources, and they served as transportation corridors for people and goods from the Atlantic seaboard to the interior and the lower Great Lakes.

Precontact archaeological sites in the Mohawk Valley are attributable to all periods from Paleoindian (circa 11,000 to 8000 BC) to Late Woodland (AD 1000 to 1600). Colonial Euro-American settlement in central New York also clustered along the Mohawk River, with Schenectady settled in 1661, Amsterdam in 1710, and Utica around 1773. Early settlement focused on extractive industries served by water-powered mills and subsistence-level farming. With the completion of the Erie Canal in 1825 and rail connections from Albany to Buffalo by the early 1840s, development of the region boomed as manufacturers and farmers took advantage of these links to establish and expand operations, some of which are represented by documented archaeological sites. Site occurrence and density also reflects the number of archaeological surveys undertaken in the Project vicinity. Large-scale surveys for infrastructure projects have identified clusters of precontact and historic period sites in the Towns of Canajoharie and Minden in Montgomery County. Numerous precontact sites were identified through New York State Museum-sponsored surveys in the early twentieth century, although many of these sites have vague or ambiguous locational data.

The Marcy to Princetown segment of the Project crosses the Mohawk River east of Utica and traverses an upland route parallel to and south of the river. Major stream crossings include, Steele Creek, Ohisa Creek, Otsquago Creek, Canajoharie Creek, Schoharie Creek, and Chuctununda Creek. The Mohawk River crossing includes an approximately 3,500-foot wide floodplain with the potential to contain deeply buried archaeological deposits. The Digristina Site (NYSM 8266) is situated on the floodplain about 2,000 feet west of the Project centerline and has yielded Late Archaic projectile points. Two Late Archaic – Brewerton tradition sites (NYSM 8269 and NYSM 6345) occur on a mid-Holocene terrace on the north bank, and an undated precontact site (Alb-70) is present on a low terrace or levee feature on the south bank of the river. The Mohawk floodplain and terraces crossed by the Project are considered to exhibit high sensitivity for the presence of undocumented precontact archaeological resources.

Elements of the Erie Canal, including a prism section (04304.000017) and a stream control system (04304.000018), have been identified within the Project APE south of the Mohawk River. The Project APE near these sites is considered sensitive for the presence of canal-related features. Archaeological surveys for the Iroquois Gas Pipeline in 1990 identified a cluster of 11 precontact and 2 historic period sites in the Otsquago Creek and Otstungo Creek drainages, in the Town of Minden and located within the Project Study Area. In 2016, a Phase I survey for the proposed Mohawk Solar project identified 32 precontact sites in the Towns of Minden and Canajoharie, also within the Project Study Area. These sites, mostly characterized as short-term hunting or processing camps, were located on uplands overlooking wetlands and low-order streams. Upland flats and saddles, and wetland margins within the Project corridor are considered sensitive for the presence of precontact archaeological resources. Areas of sensitivity for historic period resources

along the southern tier of the Mohawk Valley would be at Project crossings of roads leading to the towns of Frankfort, Ilion, Herkimer and Little Falls in Herkimer County, and the towns of Fort Plain, Canajoharie, and Fort Hunter in Montgomery County.

The Archaeological Study Area for the Princetown to Rotterdam segment encompasses both banks of the Mohawk River near Amsterdam where numerous precontact and historic period archaeological sites are recorded in floodplain or terrace contexts. In contrast, the direct effects APE is a mosaic of uplands, incised drainages, and wetlands and contains no recorded archaeological sites. The upland terrain ranges in elevation from around 1,350 feet above mean sea level (AMSL) at Princetown to 460 feet AMSL at Rotterdam Substation. No archaeological surveys have previously been conducted within the direct effects APE of this segment. Wetlands margins and upland flats near water, which are common in the western half of the segment, are considered to possess moderate sensitivity for the presence of precontact sites. Systematic surveys are likely to reveal the presence of small precontact sites near strategic resource locales. The segment's eastern half contains the deeply incised Plotter Kill ravine and steep slopes near the New York State Thruway. This terrain, often exceeding 20 percent slopes, is considered to exhibit low archaeological sensitivity for precontact period resources. The Princetown to Rotterdam segment is considered to exhibit moderate sensitivity for historic period archaeological resources near colonial-era or nineteenth century roads, such as Pattersonville Road and Gregg Road in the towns of Princetown and Rotterdam, respectively.

The terrain of the Princetown to New Scotland segment is a narrow, undulating upland situated between the steep slopes of the Helderberg Escarpment to the west and the Hudson-Mohawk Lowlands to the east. Numerous streams bisect this upland section and include, Normans Kill, Plotter Kill, Bonny Brook, Indian House Creek, Bozen Kill, Black Creek and its associated wetlands, and, Vly Creek. Clusters of precontact lithic scatters were identified in the Study Area near waterbodies by surveys undertaken for the Watervliet Reservoir Expansion Project in 2008 and a residential development project in 2008, both located in Albany County. Datable components of these sites comprise Early Archaic to Late Woodland periods. Site NYSM 8908, located about 0.5 miles west of the Project near Vly Creek, contained artifacts attributable to the Brewerton, River, Kipp Island, and Levanna phases of the Late Archaic, Early Woodland, and Late Woodland periods. At present, there are no well documented archaeological sites within the direct effects APE of the Princetown to New Scotland segment. Sites NYSM 5303 and NYSM 5304 are depicted on CRIS as large polygons that overlap the Project APE near Voorheesville. Typical of many archaeological sites recorded by the New York State Museum during the early twentieth century, these two sites lack precise locational data and are meant to represent approximate site locales.

4.5.1.3 Documented Historic Architectural Resources

A review of the OPRHP online CRIS database within a 3-mile radius of the Project centerline (the "Architectural Study Area") identified 278 individual properties and historic districts listed in or determined eligible for the NRHP. Table 4.5-2 lists NRHP-listed properties and Table 4.5-3 lists NRHP-eligible properties identified in the Architectural Study Area.

4.5.1.4 Tribal Interests

No Native American reservation lands are traversed by the Project corridor.

For any Federal undertaking associated with the Project, such as U.S. Army Corps of Engineers (USACE) permitting, Native American consultation is conducted by the lead federal agency on a government-to-government basis. Native American consultations may result in the identification of traditional cultural properties. In its capacity as review agency under Section 14.09 of the NYS Historic Preservation Law, OPRHP encourages lead agencies to consult with Native American nations about undertakings that might affect properties of long-standing interest to them.

Several nations have historic affiliation with the areas where the Project is located, and any of them may have interest in commenting on the Project. The U.S. Department of Housing and Urban Development Tribal Directory Assessment Tool lists the following nations with historic affiliation to individual counties within the Project area (HUD 2019):

- Delaware Tribe of Indians (Albany and Schenectady counties)
- Oneida Nation of New York (Herkimer and Oneida counties)
- Onondaga Nation (Oneida County)
- Saint Regis Mohawk Tribe (Albany, Herkimer, Montgomery and Schenectady counties)
- Seneca-Cayuga Nation (Oneida County)
- Stockbridge Munsee Community, Wisconsin (Albany and Schenectady counties)

Table 4.5-2. NRHP-Listed Properties within 3 Miles of the Project

Map ID	Name	USN/NR Ref.	Address	County	Municipality
H001	Neck Canal of 1730, the	95NR00816	Mohawk Street, between Mohawk River and New York State Barge Canal	Oneida	Town of Marcy and Town of Whitestown
H002	St. Joseph's Church	90NR02059	704--708 Columbia St.	Oneida	City of Utica
H003	Downtown Genesee Street Historic District	82001209	Roughly bounded by Genesee, Liberty, Seneca, and Whitesboro Streets. (both sides)	Oneida	City of Utica
H004	Grace Church	97000419	193 Genesee St.	Oneida	City of Utica
H005	Lower Genesee Street Historic District	82001209	Roughly bounded by Genesee, Liberty, Seneca, and Whitesboro Streets (both sides)	Oneida	City of Utica
H006	Hieber, John C. & Co., Building	06NR05690	311 Main Street	Oneida	City of Utica
H007	Union Station	75001215	Main St. between John and 1st Streets	Oneida	City of Utica
H008	Utica Daily Press Building	93000501	310--312 Main St.	Oneida	City of Utica
H009	Doyle Hardware Building	93000498	330--334 Main St.	Oneida	City of Utica
H010	Hurd & Fitzgerald Building	93000500	400 Main St.	Oneida	City of Utica

Table 4.5-2. NRHP-Listed Properties within 3 Miles of the Project (continued)

Map ID	Name	USN/NR Ref.	Address	County	Municipality
H011	Bagg's Square East Historic District	100001362	Broad, Catherine, 1st, John, Main, Oriskany, Railroad & 2nd Streets	Oneida	City of Utica
H012	Byington Mill (Frisbie & Stansfield Knitting Company)	93000458	421--423 Broad St.	Oneida	City of Utica
H013	Whiffen--Ribyat Building	16000037	327-331 Bleecker St.	Oneida	City of Utica
H014	Rutger-Steuben Park Historic District	90NR02056	Roughly bounded by Taylor and Howard Aves. including both sides of Rutger Ave. and Steuben Park	Oneida	City of Utica
H015	First Baptist Church of Deerfield	85001497	Herkimer Rd.	Oneida	City of Utica
H016	Weaver, Gen. John G., House	89002093	711 Herkimer Rd.	Oneida	City of Utica
H017	Memorial Church of the Holy Cross	00000823	841 Bleecker St.	Oneida	City of Utica
H018	Utica Armory	95NR00770	1700 Parkway	Oneida	City of Utica
H019	Utica Parks and Parkway Historic District	08NR05839	Parkway and South Park Drive	Oneida	Town of New Hartford and City of Utica
H020	Frankfort Hill District No. 10 School	11NR06211	Albany Rd., Frankfort, NY 13340	Herkimer	Town of Frankfort

Table 4.5-2. NRHP-Listed Properties within 3 Miles of the Project (continued)

Map ID	Name	USN/NR Ref.	Address	County	Municipality
H021	Balloon Farm	98000391	128 Cemetery Rd.	Herkimer	Town of Litchfield
H022	Balloon Farm	96NR00965	128 Cemetery Street	Herkimer	Village of Frankfort
H023	Frankfort Town Hall	99001486	140 S. Litchfield St.	Herkimer	Village of Frankfort
H024	US Post Office--Frankfort	88002512	E. Main St.	Herkimer	Village of Frankfort
H025	Remington House	97000942	1279 Upper Barringer Rd.	Herkimer	Town of Frankfort
H026	Richardson, Thomas, House	84002400	317 W. Main St.	Herkimer	Village of Ilion
H027	Palatine German Frame House	04000282	4217 NY 5	Herkimer	Town of Herkimer
H028	US Post Office--Ilion	88002513	48 First St.	Herkimer	Village of Ilion
H029	First United Methodist Church	03000601	36 Second St.	Herkimer	Village of Ilion
H030	Remington Stables	76001222	1 Remington Ave.	Herkimer	Village of Ilion
H031	Oak Hill Cemetery	13NR06460	W. German St., Herkimer, NY 13350	Herkimer	Town of Herkimer
H032	Holy Trinity Monastery	08NR05959	1907 Robinson Road, Jordanville NY 13361	Herkimer	Town of Warren
H033	Zoller-Frasier Round Barn	84002401	Fords Bush Rd.	Herkimer	Town of Danube
H034	John Smith Farm	11NR06276	1059 State Highway 80, Minden, NY 13339	Montgomery	Town of Minden
H035	Site of Fort Plain Fort	79001591	Address Restricted	Montgomery	Village of Fort Plain
H036	Fort Plain Historic District	12NR06342	Multiple	Montgomery	Village of Fort Plain
H037	US Post Office--Fort Plain	88002510	41 River St.	Montgomery	Town of Minden
H038	Otsquago Creek Aqueduct	12000510	Roughly area around Canal & Main Sts.	Montgomery	Village of Fort Plain

Table 4.5-2. NRHP-Listed Properties within 3 Miles of the Project (continued)

Map ID	Name	USN/NR Ref.	Address	County	Municipality
H039	Nelliston Historic District	90NR01557	Prospect, River, Railroad and Berthoud Streets	Montgomery	Village of Fort Plain and Village of Nelliston
H040	Lasher-Davis House	80002656	U.S. 5	Montgomery	Village of Nelliston
H041	Nelliston School	02001645	Stone Arabia St.	Montgomery	Village of Nelliston
H042	Nellis, Jacob, Farmhouse	90NR01556	Nellis St.	Montgomery	Village of Nelliston
H043	Ehle House Site	82004780	Address Restricted	Montgomery	Village of Nelliston
H044	Ehle, Peter, House	80002655	E. Main St.	Montgomery	Village of Nelliston
H045	Frey House	02001644	NY 5	Montgomery	Village of Palatine Bridge
H046	Wagner, Webster, House	73001210	E. Grand St.	Montgomery	Village of Palatine Bridge
H047	Palatine Bridge Freight House	73001208	E of Palatine Bridge on NY 5	Montgomery	Village of Palatine Bridge
H048	US Post Office--Canajoharie	88002464	50 W. Main St.	Montgomery	Town of Canajoharie
H049	West Hill School	02000359	3 Otsego St.	Montgomery	Town of Canajoharie
H050	Bragdon--Lipe House	05001123	17 Otsego St.	Montgomery	Town of Canajoharie
H051	Van Alstyne House	83001711	Moyer St.	Montgomery	Town of Canajoharie
H052	Canajoharie Historic District (2014)	14NR06580	Canajoharie	Montgomery	Town of Canajoharie
H053	Ames Academy Building	01001496	611 Latimer Hill Rd.	Montgomery	Village of Ames
H054	Daniel G. Van Wie Farmstead	10NR06181	269 Brower Rd., Palatine Bridge, NY 13428	Montgomery	Town of Palatine
H055	Montgomery County Farm	90NR01534	NY 5	Montgomery	Town of Palatine

Table 4.5-2. NRHP-Listed Properties within 3 Miles of the Project (continued)

Map ID	Name	USN/NR Ref.	Address	County	Municipality
H056	Glen Historic District	01000844	NY 30A, NY 161 and Logtown Rd.	Montgomery	Town of Glen
H057	First Baptist Church	93001546	Polin Rd.	Montgomery	Town of Charleston
H058	Eatons Corners Historic District	84003196	Eatons Corners Rd.	Schenectady	Town of Duanesburg
H059	Chapman Farmhouse	90NR02620	Miller's Corners Rd.	Schenectady	Town of Duanesburg
H060	Braman, Joseph, House	87000917	Braman's Corners	Schenectady	Town of Duanesburg
H061	Duanesburg-Florida Baptist Church	84003185	NY 30	Schenectady	Town of Duanesburg
H062	Abrahams Farmhouse	84003092	Hardin Rd.	Schenectady	Town of Duanesburg
H063	Green, Joseph, Farmhouse	90NR02625	NY 159	Schenectady	Town of Duanesburg
H064	Lasher, George, House	90NR02632	Levey Rd.	Schenectady	Town of Duanesburg
H065	Mariaville Historic District	84003267	NY 159	Schenectady	Town of Duanesburg
H066	Liddle, Robert, Farmhouse	90NR02634	Little Dale Farm Rd.	Schenectady	Town of Duanesburg
H067	Vought Farmhouse	91NR00256	Suits Road; North side	Schenectady	Towns of Duanesburg and Princetown
H068	Mabee House	78001907	S of Rotterdam Junction on NY 5S	Schenectady	Town of Rotterdam
H069	Enlarged Double Lock No. 23, Old Erie Canal	07NR05814	Rice Road	Schenectady	Town of Rotterdam
H070	US Post Office--Scotia Station	88002430	224 Mohawk Ave.	Schenectady	Village of Scotia
H071	Glen, Abraham, House	04000708	Mohawk Ave.	Schenectady	Village of Scotia

Table 4.5-2. NRHP-Listed Properties within 3 Miles of the Project (continued)

Map ID	Name	USN/NR Ref.	Address	County	Municipality
H072	Stockade Historic District	90NR02654	Roughly bounded by Mohawk River, RR Tracks, and Union St.	Schenectady	City of Schenectady
H073	Site of Queen Anne's Fort	9340.000021	Near intersection of Front St. and Green St.	Schenectady	City of Schenectady
H074	Schenectady Stockade	73001267	Roughly bounded by Mohawk River, RR tracks, and Union St.	Schenectady	City of Schenectady
H075	Abraham Yates House	100003396	133 Maple Ave.	Schenectady	City of Schenectady
H076	Schenectady Young Men's Christian Association	15000854	9-13 State St.	Schenectady	City of Schenectady
H077	Stockade Historic District (Boundary Increase)	84002963	16, 18, and 20 S. Church St.	Schenectady	City of Schenectady
H078	Hotel Van Curler	85002277	78 Washington Ave.	Schenectady	City of Schenectady
H079	Barney, H. S., Building	84002965	217-229 State St.	Schenectady	City of Schenectady
H080	Central Fire Station	85000729	Erie Blvd.	Schenectady	City of Schenectady
H081	Schenectady Armory	95000087	125 Washington Ave.	Schenectady	City of Schenectady
H082	General Electric Research Laboratory	75001227	General Electric main plant	Schenectady	City of Schenectady
H083	Mica Insulator Company	11NR06254	797-845 Broadway, Schenectady, NY 12305	Schenectady	City of Schenectady
H084	Dellemont-Wemple Farm	90NR02651	W of Schenectady on Wemple Rd.	Schenectady	Town of Rotterdam
H085	Veeder Farmhouse No.2	82001088	3858 Western Tpk.	Albany	Town of Guilderland
H086	Veeder Farmhouse No.1	82001087	3770 Western Tpk.	Albany	Town of Guilderland
H087	Gifford Grange Hall	82001065	Western Tpk.	Albany	Town of Guilderland

Table 4.5-2. NRHP-Listed Properties within 3 Miles of the Project (continued)

Map ID	Name	USN/NR Ref.	Address	County	Municipality
H088	Parker, Charles, House	90NR01663	2273 Old State	Albany	Town of Guilderland
H089	Pangburn, Stephen, House	82001076	2357 Old State	Albany	Town of Guilderland
H090	Sharp Farmhouse	82001084	4379 Western Tpk.	Albany	Town of Guilderland
H091	Sharp Brothers House	82001083	4382 Western Tpk.	Albany	Town of Guilderland
H092	Vanderpool Farm Complex	90NR01635	3647 Settles Hill Rd.	Albany	Town of Guilderland
H093	Lainhart Farm and Dutch Barn	01NR01786	6755 Lainhart Road	Albany	Town of Guilderland
H094	Van Patten Barn Complex	90NR01668	4773 Western Tpk.	Albany	Town of Guilderland
H095	Fuller's Tavern	90NR01681	6861 Western Tpk.	Albany	Town of Guilderland
H096	Gillespie House	82001066	2554 Western Tpk	Albany	Town of Guilderland
H097	Guilderland Cemetery Vault	82001067	In Guilderland Cemetery, NY 158	Albany	Town of Guilderland
H098	Apple Tavern	90NR01679	4450 Altamont Rd.	Albany	Town of Guilderland
H099	McNiven Farm Complex	90NR01682	4178 Altamont Rd.	Albany	Town of Guilderland
H100	Crouse, Jacob, Inn	90NR01628	3933 Altamont Rd.	Albany	Town of Guilderland
H101	Knower House	90NR01661	3921 Altamont Rd.	Albany	Town of Guilderland
H102	Freeman House	90NR01655	136 Main St.	Albany	Town of Guilderland
H103	Helderberg Reformed Dutch Church	90NR01688	140 Main St.	Albany	Town of Guilderland
H104	Mynderse-Frederick House	90NR01632	152 Main St.	Albany	Town of Guilderland
H105	Altamont Historic District	89NR00005	Main St. between Thacher Dr. and the RR station	Albany	Village of Altamont

Table 4.5-2. NRHP-Listed Properties within 3 Miles of the Project (continued)

Map ID	Name	USN/NR Ref.	Address	County	Municipality
H106	Griggs, Hiram, House	09NR06052	111 Prospect terr., Altamont, NY 12009	Albany	Village of Altamont
H107	Schoolhouse No.6	82001082	206 Main St.	Albany	Village of Altamont
H108	Delaware and Hudson Railroad Passenger Station	90NR01677	Main St. and the Delaware and Hudson RR	Albany	Village of Altamont
H109	Hayes House	90NR01676	104 Fairview Ave.	Albany	Village of Altamont
H110	Fine Arts and Flower Building, Altamont Fairgrounds	03NR05078	Altamont Fairgrounds, Grand Street vicinity	Albany	Village of Altamont
H111	St. Mark's Lutheran Church	90NR01634	Main St.	Albany	Town of Guilderland
H112	Schoolhouse #6	90NR01665	206 Main St.	Albany	Town of Guilderland
H113	Helderberg Reformed Dutch Church	90NR01688	140 Main St.	Albany	Town of Guilderland
H114	Mynderse-Frederick House	82001075	152 Main St.	Albany	Town of Guilderland
H115	Freeman House	90NR01655	136 Main St.	Albany	Town of Guilderland
H116	Houck Farmhouse	90NR01660	6156 Ostrander Rd.	Albany	Town of Guilderland
H117	Hilton, Adam, House	90NR01631	6073 Leesome Lane	Albany	Town of Guilderland
H118	Coppola House	90NR01654	Leesome Lane	Albany	Town of Guilderland
H119	Aumic House	90NR01652	Leesome Lane	Albany	Town of Guilderland

Table 4.5-2. NRHP-Listed Properties within 3 Miles of the Project (continued)

Map ID	Name	USN/NR Ref.	Address	County	Municipality
H120	Crouse, Frederick, House	90NR01680	3960 Altamont-Voorheesville Rd.	Albany	Town of Guilderland
H121	Crouse, John and Henry, Farm Complex	90NR01629	3970 Altamont-Voorheesville Rd.	Albany	Town of Guilderland
H122	Gardner House	90NR01656	5661 Gardner Rd.	Albany	Town of Guilderland
H123	LaGrange Farmstead	05001384	122 Puley Ln.	Albany	Town of New Scotland
H124	New Scotland Church & Cemetery	09NR05983	2010 & 2029 New Scotland Rd. Slingerlands, NY 12159	Albany	Town of New Scotland
H125	Slingerlands Historic District	11NR06251	New Scotland Rd., Bridgest, Mullen Rd.	Albany	Town of Bethlehem
H126	House at 698 Kenwood Avenue	11NR06286	698 Kenwood Ave., Delmar, NY 12054	Albany	Town of Bethlehem
H127	Slingerlands, Albert, Farmhouse	97NR01137	36 Bridge Street	Albany	Town of Bethlehem
H128	Vanderheyden House	01NR01787	823 Delaware Turnpike	Albany	Town of Bethlehem
H129	Onesquethaw Valley Historic District	90NR02802	About 10 mi. SW of Albany off NY 43	Albany	Towns of Bethlehem, Coeymans, and New Scotland
H130	Clarksville Elementary School	08NR05851	58 Verda Lane	Albany	Town of New Scotland
H131	Vale Cemetery and Vale Park	04001053	907 State St., Nott Terrace	Schenectady	City of Schenectady
H132	Gaige Homestead	84003202	Weaver Rd.	Schenectady	Town of Duanesburg

Source: NRHP Data Store. Accessed July 2019 at: https://irma.nps.gov/DataStore/Reference/Profile/2210280 and Cultural Resource Information System (CRIS). Available online at https://parks.ny.gov/shpo/online-tools/ , Accessed June 18, 2019.

Table 4.5-3. NRHP-Eligible Properties within 3 Miles of the Project

Name	USN/NR Ref.	Address	County	Municipality
Sweetman Property	04301.000084	808 Elizabethtown Rd	Herkimer	Town of Columbia
Masonic Home: Tompkins Memorial Chapel	04304.000042	2150 Bleecker St	Oneida	City of Utica
2571 Higby Rd	04304.000046	2571 Higby Rd	Herkimer	Town of Frankfort
Ilion Free Public Library	04340.000001	78 West Street 13357	Herkimer	Village of Ilion
Residence	04340.000106	33-35 West North St	Herkimer	Village of Ilion
45-48 Clark St	04340.000174	45-48 Clark St	Herkimer	Village of Ilion
190 East Main St	04340.000238	190 East Main St	Herkimer	Village of Ilion
17 South Division St	04340.000339	17 South Division St	Herkimer	Village of Ilion
120-122 East Main St	04340.000364	120-122 East Main St	Herkimer	Village of Ilion
91-97 East Clark St	04340.000365	91-97 East Clark St	Herkimer	Village of Ilion
51-53 East Clark St	04340.000366	51-53 East Clark St	Herkimer	Village of Ilion
55-57 East Clark St	04340.000367	55-57 East Clark St	Herkimer	Village of Ilion
First Baptist Church	04340.000378	8 Second St	Herkimer	Village of Ilion
Capital Theater	04340.000379	54-68 Otsego St.	Herkimer	Village of Ilion
Masonic Temple	04340.000381	118 Morgan St.	Herkimer	Village of Ilion
119 East Main St	04343.000053	119 East Main St	Herkimer	Village of Frankfort
Former Union Tools Manufacturing Facility	04343.000214	253 Main St.	Herkimer	Village of Frankfort
Moyer Creek Aqueduct	04343.000223		Herkimer	Village of Frankfort
Salem Church and Cemetery	06513.000165		Oneida	Town of Marcy
6018 Morris Road	06513.000166	6018 Morris Road	Oneida	Town of Marcy
Evergreen Cemetery	06513.000167		Oneida	Town of Marcy
Henry Edic Farmstead	06513.000168	5519 Edic Road	Oneida	Town of Marcy
Sharyn's Diner	06513.000169	9580 River Road	Oneida	Town of Marcy
Former Utica & Mohawk Valley Railway Car Barn/Electric Express/Girrard Chevrolet Service Garage -	06540.000101	300 Lafayette St.	Oneida	City of Utica
Mohawk Valley Cotton Mills (General Electric)	06540.000106	869-901 Broad St	Oneida	City of Utica
Oneida Knitting Company Office	06540.000107	851 Broad St	Oneida	City of Utica
Wild & Devereux Oneida Knitting	06540.000108	831 Broad St	Oneida	City of Utica
Foster Bros. Manufacturing Company	06540.000110	807-811 Broad St	Oneida	City of Utica

Table 4.5-3. NRHP-Eligible Properties within 3 Miles of the Project (continued)

Name	USN/NR Ref.	Address	County	Municipality
Charlestown Outlet/Former Savage Arms	06540.000128	311 Turner St	Oneida	City of Utica
Residence	06540.000178	902 John St	Oneida	City of Utica
Richilieu Knitting Co. (A. Vitagliano & Co.)	06540.000551	729 Broad St	Oneida	City of Utica
Dl & W Engine Roundhouse -	06540.000575	50 Harbor Point Rd	Oneida	City of Utica
Girls Dormitory & Boys Dormitory	06540.000583	Bleecker St	Oneida	City of Utica
Masonic Home: Masonic Soldiers & Sailors Memorial Building	06540.000586	2150 Bleecker Street 13501	Oneida	City of Utica
Masonic Home: Wiley Hall -	06540.000587	2150 Bleecker St	Oneida	City of Utica
Masonic Home: Knight Templar Education Building	06540.000588	2150 Bleecker St	Oneida	City of Utica
Bleecker School	06540.000665	310 Bleecker St	Oneida	City of Utica
Auert House	06540.000703	813 Herkimer Rd	Oneida	City of Utica
Utica Police Building	06540.000767	413 Oriskany Street West	Oneida	City of Utica
Brick Italianate Style Residence	06540.000768	812 John St	Oneida	City of Utica
Barge Canal: Utica Section Office	06540.000804	Genesee St	Oneida	City of Utica
163 Wilber St	06540.001392	163 Wilber St	Oneida	City of Utica
c1845 Nelbach House	06540.001488	740 Lafayette St	Oneida	City of Utica
C. & AJ Eichmeyer House	06540.001489	444 Lafayette St.	Oneida	City of Utica
S Isele House	06540.001490	442 Lafayette St.	Oneida	City of Utica
L Snyder House	06540.001491	440 Lafayette St.	Oneida	City of Utica
Utica Turn Hall/Utica Turn Verein	06540.001555	509 Lafayette St	Oneida	City of Utica
Utica Memorial Auditorium	06540.001857	400 Oriskany Street West	Oneida	City of Utica
705-711 Bleecker St	06540.001885	705-711 Bleecker St	Oneida	City of Utica
701-703 Bleecker St	06540.001886	701-703 Bleecker St	Oneida	City of Utica
713-717 Bleecker St	06540.001887	713-717 Bleecker St	Oneida	City of Utica
662 Bleecker Street 13501	06540.001987	662 Bleecker Street	Oneida	City of Utica
East Utica Little Italy Historic District	06540.001988		Oneida	City of Utica
Haberer Building	06540.002095	326-334 Columbia St	Oneida	City of Utica

Table 4.5-3. NRHP-Eligible Properties within 3 Miles of the Project (continued)

Name	USN/NR Ref.	Address	County	Municipality
Jones Building - 336 Columbia St	06540.002096		Oneida	City of Utica
Witzenberger Building -	06540.002107	460-464 Columbia St	Oneida	City of Utica
Childs Building -	06540.002114	333 Lafayette St	Oneida	City of Utica
437 Lafayette St	06540.002119	437 Lafayette St	Oneida	City of Utica
Rathbun Building	06540.000546	310 Broad Street 13501	Oneida	City of Utica
Giblin & Company (American Hardwall)	06540.000550	701 Broad St	Oneida	City of Utica
Mapletown Cemetery	05702.000052	Mapletown Road & Blaine Road	Montgomery	Town of Canajoharie
122 G Bowerman Rd	05702.000152	122 G Bowerman Rd	Montgomery	Town of Canajoharie
462 Dygert Rd.	05702.000154	462 Dygert Road	Montgomery	Town of Canajoharie
2055 Sprout Brook Road	05702.000155	2055 Sprout Brook Road	Montgomery	Town of Canajoharie
Old Baptist Church Cemetery -	05702.000156	Old Sharon Rd	Montgomery	Town of Canajoharie
Otsquago Grange	05706.000087	809 State Highway 80	Montgomery	Town of Minden
Moyer Road bridge	05706.000155	Moyer Road	Montgomery	Town of Minden
Brookman Corners Road Bridge	05706.000156	Brookmans Corners Road	Montgomery	Town of Minden
Freysbush United Methodist Church and Cemetery	05706.000159	620 Freysbush Road	Montgomery	Town of Minden
Movable Dam 10/Lock E-14 - Spring St	05708.000231		Montgomery	Village of Palatine Bridge
Carr Farmhouse	05709.000150	118 Lynk Street	Montgomery	Town of Root
Carr Farm Hay Barn	05709.000151	118 Lynk Street	Montgomery	Town of Root
Rappa Road Cemetery	05709.000152	Rappa Road	Montgomery	Town of Root
Residence	05742.000277	99 Reid St	Montgomery	Village of Fort Plain
Cut Limestone Retaining Wall and Bridge Abutment	05749.000063	NY 10	Montgomery	Village of Palatine Bridge
Canajoharie Historic District	05741.000582	37 Schultze St	Montgomery	Village of Canajoharie
27 Cherry Ave	00102.000063	27 Cherry Ave	Albany	Town of Bethlehem
Fisher Farmhouse	00102.000068	65 Fisher Blvd	Albany	Town of Bethlehem
127 Font Grove Rd	00102.000078	127 Font Grove Rd	Albany	Town of Bethlehem
563 Kenwood Ave	00102.000261	563 Kenwood Ave	Albany	Town of Bethlehem

Table 4.5-3. NRHP-Eligible Properties within 3 Miles of the Project (continued)

Name	USN/NR Ref.	Address	County	Municipality
75 Elm Ave	00102.000516	75 Elm Ave	Albany	Town of Bethlehem
249 Meads Ln	00102.000712	249 Meads Ln	Albany	Town of Bethlehem
140 Meads Ln	00102.000713	140 Meads Ln	Albany	Town of Bethlehem
1719 New Scotland Rd	00102.000797	1719 New Scotland Rd	Albany	Town of Bethlehem
Rosenblum Property	00106.000145	4268 Frederick Rd	Albany	Town of New Scotland
French's Mill Road Bridge	00106.000296		Albany	Town of Guilderland
van Patten House	00106.000327	6154 Depot Rd	Albany	Town of Guilderland
Ogsbury House	00106.000331	100 James Ln	Albany	Town of Guilderland
1167 Meadowvale Rd	00106.000333	1167 Meadowvale Rd	Albany	Town of Guilderland
Spawn Farmstead, ca. 1900 frame farmhouse	00106.000422	West Old State Rd	Albany	Town of Guilderland
Structure K2	00108.000110	NY 32	Albany	Town of New Scotland
Goose Lodge (Building 2); former CCC shop	00108.000216	56 Game Farm Rd	Albany	Town of New Scotland
Hilton Barn	00108.000220	171 NY 85A	Albany	Town of New Scotland
Delmar Experimental Game Farm Historic District	00108.000226		Albany	Town of New Scotland
Maintenance Shop (Building 3); former CCC garage	00108.000227	56 Game Farm Road	Albany	Town of New Scotland
Jones Barn (building 3a)	00108.000228	56 Game Farm Road	Albany	Town of New Scotland
The Spruces (Building 4)	00108.000229	56 Game Farm Road	Albany	Town of New Scotland
Annex (Building 4a)	00108.000230	56 Game Farm Road	Albany	Town of New Scotland
Powerhouse (Building 4b)	00108.000231	56 Game Farm Road	Albany	Town of New Scotland
Administration Building (Building 5)	00108.000232	56 Game Farm Road	Albany	Town of New Scotland
Warehouse Building (Building 6)	00108.000233	56 Game Farm Road	Albany	Town of New Scotland
Visitor Center (Building 7)	00108.000234	56 Game Farm Road	Albany	Town of New Scotland
Bear Pen (Building 7b)	00108.000235	56 Game Farm Road	Albany	Town of New Scotland
Gardener Shed (Building 7c)	00108.000236	56 Game Farm Road	Albany	Town of New Scotland
Residence (Building 8)	00108.000237	56 Game Farm Road	Albany	Town of New Scotland
Radley Barn (Building 8a)	00108.000238	56 Game Farm Road	Albany	Town of New Scotland
Guided School Program Building	00108.000239	56 Game Farm Road	Albany	Town of New Scotland
Wildlife Research Center	00108.000240	56 Game Farm Road	Albany	Town of New Scotland
Lower Dam over Vlomankill Creek	00108.000243	56 Game Farm Road	Albany	Town of New Scotland

Table 4.5-3. NRHP-Eligible Properties within 3 Miles of the Project (continued)

Name	USN/NR Ref.	Address	County	Municipality
Maintenance Shop (Building 10)	00108.000252	56 Game Farm Road	Albany	Town of New Scotland
First United Methodist Church	00148.000010	68-70 Maple Ave	Albany	Village of Voorheesville
Odd Fellows Hall (American Legion)	00148.000012	31 Voorheesville Ave	Albany	Village of Voorheesville
2 Prospect St	00148.000048	2 Prospect St	Albany	Village of Voorheesville
1 South Main St	00148.000049	1 South Main St	Albany	Village of Voorheesville
37 South Main St	00148.000050	37 South Main St	Albany	Village of Voorheesville
Voorheesville Elementary School	00148.000051	129 Maple Ave	Albany	Village of Voorheesville
CP rail bridge over Vly Creek	00148.000055		Albany	Village of Voorheesville
CP rail bridge over Rt 155	00148.000056		Albany	Town of New Scotland
Methodist Church Cemetery -	00148.000064	Altamont Road	Albany	Village of Voorheesville
86 Maple Ave, Voorheesville -	00148.000067	86 Maple Ave	Albany	Village of Voorheesville
88 Maple Ave, Voorheesville	00148.000068	88 Maple Ave	Albany	Village of Voorheesville
94 Maple Ave, Voorheesville	00148.000069	94 Maple Ave	Albany	Village of Voorheesville
100 Maple, Voorheesville	00148.000070	100 Maple	Albany	Village of Voorheesville
Voorheesville Village Historic District	00148.000075		Albany	Village of Voorheesville
Newberry House	09305.000035	11 South Westcott Rd	Schenectady	Town of Rotterdam
Former Schoolhouse No. 11	09305.000068	701 Old Duanesburg Rd	Schenectady	Town of Rotterdam
Supply Depot Housing (?) -	09305.000243	North Westcott Rd	Schenectady	Town of Rotterdam
Former Schenectady General Reserve Depot	09305.000276	401 Duanesburg Rd	Schenectady	Town of Rotterdam
Rotterdam Area Maintenance Support Activity #8	09305.000324	101 Remsen St	Schenectady	Town of Rotterdam
John D Wood House; La Bier Residence	09301.000129	1618 US 20	Schenectady	Town of Duanesburg
Kelleys Station Turnpike Tavern	09304.000022	3523 NY 7	Schenectady	Town of Princetown
Delaware & Hudson Rr Culvert and Tunnel	09304.000023	331T - Kelleys Station Rd	Schenectady	Town of Princetown
Moveable Dam 4 - Lock E-8 -	09302.000092		Schenectady	Town of Glenville
William Dalton House (1911)	09302.000127	7 Spring Rd	Schenectady	Town of Glenville
Five-bay Frame Farmhouse, Barn Complex	09302.000129	1329 Main St	Schenectady	Town of Rotterdam
Frame Farmhouse and Barn -	09302.000130	1370 Main St	Schenectady	Town of Rotterdam
Beukendaal School, 1914	09302.000131	500 Sacandaga Rd (NY 147)	Schenectady	Town of Glenville

Table 4.5-3. NRHP-Eligible Properties within 3 Miles of the Project (continued)

Name	USN/NR Ref.	Address	County	Municipality
Sacandaga Elementary School	09302.000168	300 Wren St.	Schenectady	Village of Scotia
House 1 Swaggerton Rd	09302.000179	1 Swaggerton Rd	Schenectady	Town of Glenville
Van Slyke House	09305.000001	NY 5S	Schenectady	Town of Rotterdam
Van Wormer farm	09305.000073	17 Old River Road	Schenectady	Town of Rotterdam
Aaron Bradt House/Keepers of the Circle	09305.000078	1180 Main Street	Schenectady	Town of Rotterdam
Moveable Dam 5 & Lock E-9	09305.000166		Schenectady	Town of Rotterdam
Lock E-8 and Movable Dam 4	09305.000240		Schenectady	Town of Rotterdam
Enlarged Erie Canal Lock 25 - Canal St	09305.000344		Schenectady	Town of Rotterdam
Old Carley Residence & Business	09340.000146	102 State Street	Schenectady	City of Schenectady
Brock Apartments	09340.000154	3 State St	Schenectady	City of Schenectady
Alexandra Apartment Hotel	09340.000818	1-3 State Street	Schenectady	City of Schenectady
Ruby's Silver Diner	09340.001334	167 Erie Blvd	Schenectady	City of Schenectady
Erie Crossings, only 19th c Edison building extant	09340.001336	112 Erie Blvd	Schenectady	City of Schenectady
Wolfe Safe & Locke	09340.001337	140 Erie Blvd	Schenectady	City of Schenectady
General Electric	09340.001470	Building 40 - 1 River Rd	Schenectady	City of Schenectady
Schermerhorn House	09305.000002	34 Schermerhorn Road	Schenectady	Town of Rotterdam
The Arent Samuelse Bradt House	09305.000003	22 Schermerhorn Road	Schenectady	Town of Rotterdam
Gifford House	09305.000033	132 Pattersonville-Rynex Corners Rd	Schenectady	Town of Rotterdam
Rotterdam Fire District No. 7	09305.000287	112 Gordon Rd	Schenectady	Town of Rotterdam

Source: Cultural Resource Information System (CRIS). Available online at https://parks.ny.gov/shpo/online-tools/ , Accessed June 18, 2019.

The "Indian Nation Areas of Interest" map assembled by OPRHP (2018) indicates the following nations as having interests in the cultural resources of the Project area: Delaware Tribe, Mohican Nation, Mohawk Nation, and Oneida Nation. However, the map advises that if "a project is located near a boundary line [between adjoining areas of interest] please consult the adjacent Indian Nation(s)." Per this guidance, it may also be appropriate to consult with the Tuscarora Nation and the Onondaga Nation.

4.5.2 Area of Potential Effects

The Project's APE is "…the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist" (36 CFR 800.16(d)). The APE is defined based on the potential for effect, which will differ for above ground resources (historic structures and landscapes) and below ground resources (i.e., archaeological sites). The APE for archeology would include all ground disturbances due to the construction of new substations, transmission towers, and other Project elements. Construction activities resulting in potential ground disturbances include, tree clearing and grubbing, grading, excavating, trenching, and installation of transmission structures and foundations. The APE for historic architectural resources would supplement the APE for archeology, where direct effects to historic architectural resources will be assessed, with additional areas where indirect effects to historic architectural resources will be assessed.

4.5.2.1 Archaeological Resources

For previous Article VII projects that have involved existing electric transmission rights-of-way, the OPRHP has applied a standard approach regarding the definition of the archaeological APE and the requirements for assessing potential impacts to archaeological resources. The OPRHP expects documentation of previous disturbance and requires testing to be conducted within a construction work zone (i.e., the area within which work can proceed without the potential to impact resources) where no or limited disturbance has occurred previously. Accordingly, the APE for the Project for archaeological resources would include construction access roads where grading is required, transmission structure removal and new structure construction sites, laydown areas, and storage yards. The archaeological APE for the Project is not yet final as the Applicant is still in the process of optimizing the transmission line design. Additionally, the designs of other temporary and permanent disturbance areas, such as access roads and laydown yards, have not yet been completed. Archaeological investigations of the various ground disturbing impact areas will be addressed in the EM&CP phase after final engineering designs are completed. For purposes of the initial studies, the archaeological APE is the same as the Archaeological Study Area, which is a 1-mile radius from the Project centerline.

4.5.2.2 Historic Architectural Resources

The APE for historic architectural resources is a subset of the Architectural Study Area, which encompasses a 3-mile radius around the Project centerline. There are two types of effects that can potentially arise from the construction of the proposed project: direct (physical) and indirect (contextual) effects. Direct effects could include demolition, partial destruction, or alteration of a

historic resource. Indirect effects could include the introduction of new visual, audible, or atmospheric elements into the setting of a historic resource. For the purposes of this Project, audible and atmospheric introductions to the setting of historic architectural resources (e.g., temporary effects during construction) are anticipated to be transient and minimally intrusive, so they are not a concern. The architectural APE for indirect effects focuses on the visual impact of the Project on historic architectural resources.

The architectural APE for direct effects includes those areas where construction will take place with the potential to physically alter existing historic resources. This is coterminous with the direct effects APE for archeology.

The Architectural Study Area was refined in several steps to create the architectural APE for indirect effects. The first step identified those areas where the proposed Project will be visible. Those areas where the transmission lines and structures will not be seen due to intervening terrain and vegetation can be excluded from the architectural APE for indirect effects, since such areas will not be subject to indirect visual effects. To evaluate potential Project visibility, a viewshed model was created for the existing and proposed transmission line structures along the Project centerline. Information on the locations and heights of the proposed structures was based on preliminary design. The viewshed accounts for the potential screening effects of vegetation by incorporating the areas of forest cover based on the NLCD 2016 data. Since the introduction of the proposed Project into areas where the existing transmission lines are visible is not likely to constitute a significant change in the setting of a resources, the architectural APE for indirect effects was further refined by identifying those areas where the existing transmission lines are currently visible. These areas were removed from the architectural APE for indirect effects.

Because the Project involves the upgrading and/or replacement of existing transmission lines, there are areas where the new construction will not change the character of the existing line. For the initial 12 miles of the Edic-Princetown segment, the only upgrade will be the reconductoring of the existing structures. This will not change their appearance in a meaningful way, and thus, the proposed Project will not have an effect on those historic properties with a view of the Project. Because the proposed reconductoring will not introduce a new visual effect, these areas are also excluded from the architectural APE for indirect effects. The result of refining the Architectural Study Area is an architectural APE for indirect effects that includes those areas within 3 miles of the Project where the introduction of the Project will lead to new views.

4.5.3 Impact Assessment and Environmental Protection Measures (16 NYCRR § 86.5(b)(2)(i))

4.5.3.1 Archaeological Resources

Five archaeological sites of undetermined NRHP status occur within the Project's archaeological APE. In conjunction with the preparation of the EM&CP, the Applicant will conduct a Phase IB archaeological survey of the direct effects APE to identify potential impacts on archaeological resources due to proposed Project activities. The survey will delineate specific areas of archaeological sensitivity, determine the presence of resources within the direct effects APE, and

recommend further archaeological investigations (Phase II) for sites identified as potentially eligible for listing in the NRHP. Adverse effects to NRHP-eligible sites could be mitigated by Project avoidance, or if not avoidable, by Phase III data recovery investigations. Further consultation with the OPRHP regarding the results of the archaeological investigations will occur during the preparation of the EM&CP. Site-specific mitigation recommendations and/or avoidance measures will be developed at that time to address the OPRHP's determinations of Project effects on archaeological resources.

4.5.3.2 Historic Architectural Resources

No historic architectural resources exist at the Princetown substation site located in the northwest quadrant where the two existing transmission corridors intersect. Construction support for the new Princetown substation will require the removal of a house and two outbuildings in the southwest quadrant where the two existing electric transmission corridors intersect. According to the owner of the property, the house and one of the outbuildings were constructed in 1904; the second outbuilding was added to the property in 2004. This information is generally consistent with the information provided by the Schenectady County Real Property Tax Service Agency. While the house and shed are more than fifty years old, photographs show that the buildings no longer retain sufficient integrity and/or significance to be recommended as potentially eligible to the NRHP. Both buildings have been re-sided, and the windows of the house have been replaced with modern ones. The front door has been replaced with a modern, double door, and a modern oriel window has been added to the façade. The vernacular building lacks sufficient significance to be considered under NRHP Criterion C, while no known association with important events or figures of the past is known. Eligibility under Criterion D would be investigated during the archaeological investigations, if recommended by the OPRHP. Based on desktop review and site photographs provided for review, these buildings are not considered eligible for the NRHP. Therefore, demolition of these structures will not result in significant impacts to historic resources.

The architectural APE for indirect effects includes all or part of 14 properties. However, the existing lines are visible from at least part of 12 of these resources. Increasing the area from which the Project will be visible (in comparison to the area from which the existing lines can be seen) is unlikely to adversely affect those properties. For the other two historic architectural resources, Holy Trinity Monastery and the Enlarged Double Lock No. 23 of the Old Erie Canal, the Project has the potential to introduce a view of the line where no view previously existed. Holy Trinity Monastery is located approximately 1.55 miles from the nearest Project element, while Double Lock No. 23 is located approximately 0.76 miles from the nearest Project element. Based on these distances, it is unlikely that the Project will adversely affect either of these properties.

4.6 Terrestrial Ecology

In accordance with PSL § 122(1)(c) and 16 NYCRR § 86.5(a) and (b), this section describes: 1) the studies that were undertaken to evaluate the Project's impacts, if any, on vegetation and wildlife; and 2) the results of such studies. Where a potential impact has been identified, this section describes the minimization or mitigation measures that have been adopted during the siting

and design process to avoid such impact(s), or where avoidance is not possible, to mitigate the impact to the maximum extent practicable.

4.6.1 Existing Conditions (16 NYCRR § 86.5(a))

4.6.1.1 Vegetation

Field delineations of wetland areas identified approximately 711 acres of wetlands within the Project corridor (see Section 4.7). These palustrine habitats were limited to depressional areas within the Project ROW and along the floodplains of riverine systems crossed by the ROW. Wetlands within the Project area were identified as mainly non-forested, consisting of scrub-shrub swamps and shallow emergent marshes generally located on mineral soils. Approximately 687 acres (97 percent) of the wetlands delineated within the Project area were identified as emergent or scrub shrub, with the remaining acreage identified as forested communities, due to the presence of greater than 30 percent tree canopy cover. Details regarding observed vegetation within the delineated wetland communities are provided below in Section 4.7 and in the associated *Wetland Delineation Report - Edic to Princetown Junction and Rotterdam Segment*, dated October 2014 and Updated August 2016, and the *Wetland Delineation Report – Princetown Junction to New Scotland Segment*, also dated October 2014 and Updated August 2016, which are provided as Appendix D, and hereafter referred to as the Delineation Reports.

As identified in the Delineation Reports, the most frequent vegetation cover type encountered within the Project area during the wetland delineation field surveys "was brushy cleared land within existing maintained electric transmission corridors, consisting of vegetative communities of various successional stages corresponding to the time since the most recent maintenance activities (e.g., clearing or mowing). As anticipated, agricultural land consisting of row/field crops and pastureland was also prevalent followed by successional old fields and successional shrublands located either in fallow or abandoned agriculture land, or along hedgerows within actively cultivated land. There were few forested communities within the Project ROW, given the historic clearing activities associated with maintaining the existing electric transmission corridor. Areas adjacent to the Project ROW consisted of highly fragmented upland forested communities that often occurred as isolated stands, which are typical for the region. Some edge habitats with shrubby growth occupy the transition between agriculture fields and forested areas; however, an abrupt transition between cover types is more common."

As set forth in the Delineation Reports, successional fields associated with the Project area were "dominated by forbs, grasses, and shrubs including goldenrod species, spotted knapweed (*Centaurea stoebe*), Kentucky bluegrass (*Poa pratensis*), timothy (*Phleum pratense*), gray dogwood (*Cornus racemosa*), common buckthorn (*Rhamnus cathartica*), honeysuckles (*Lonicera* spp.), and arrowwood (*Viburnum recognitum*)." Forested uplands associated with the Project area were "characterized by red maple (*Acer rubrum*), yellow birch (*Betula alleghaniensis*), American beech (*Fagus grandifolia*), American elm (*Ulmus americana*), shagbark hickory (*Carya ovata*), and American hornbeam (*Carpinus caroliniana*)."

Dominant vegetation communities observed within the Project ROW are described below according to the classification system presented in Ecological Communities of New York State, Second Edition (Edinger et al. 2014). These included both Upland and Palustrine Communities.

Upland Communities

- Successional Shrubland: sites that have been cleared (farming, development, logging, etc.) or otherwise disturbed and comprised of at least 50 percent shrub cover. Shrub species that dominate this area include gray dogwood (*Cornus racemosa*), honeysuckle species, hawthorne (*Crataegus* sp.), multiflora rose (*Rosa multiflora*), nanny-berry (*Viburnum lentago*), and arrowwood (*Viburnum recognitum*).

- Successional Old Field: Meadow dominated by forbs and grasses that occur on sites that have been cleared and then abandoned. Shrubs may be present, but collectively provide less than 50 percent cover in the community. Characteristic forbs include goldenrod species (*Solidago* spp. and *Euthamia* spp.), bluegrass species (*Poa* spp.), timothy (*Phleum pratense*), orchard grass (*Dactylis glomerata*), old field cinquefoil (*Potentilla simplex*), aster species (*Aster* spp.), wild strawberry (*Frageria virginiana*), Queen-Anne's-lace (*Daucus carota*), and dandelion (*Taraxicum officinale*). Shrub species include dogwood species (*Cornus* spp.), viburnum species (*Viburnum* spp.), and raspberry species (*Rubus* spp.).

- Cropland/Field Crop: agricultural field planted in field crops such as alfalfa, wheat, and timothy, including fields that are rotated to pasture.

- Pastureland: agricultural land permanently maintained, or recently abandoned, as a pasture area for livestock.

- Mowed roadside/pathway: a narrow strip of mowed vegetation along the side of a road, or a mowed pathway through taller vegetation (*e.g.,* meadows, old fields, woodlands, forests), or along utility right-of-way corridors (*e.g.,* power lines, telephone lines, gas pipelines). The vegetation in these mowed strips and paths may be dominated by grasses, sedges, and rushes; or it may be dominated by forbs, vines, and low shrubs that can tolerate infrequent mowing.

- Herbicide-sprayed roadside/pathway: a narrow strip of low-growing vegetation along the side of a road, or along utility right-of-way corridors (e.g., power lines, telephone lines, gas pipelines) that is maintained by spraying herbicides.

- Hemlock-northern hardwood forest: a mixed forest that typically occurs on middle to lower slopes of ravines; on cool, mid-elevation slopes; and on moist, well-drained sites at the margins of swamps.

Palustrine Communities

- Deep Emergent Marsh: marsh community that occurs on mineral soils or fine-grained organic soils such as muck or well-decomposed peat. The substrate is flooded by waters.

The most abundant emergent aquatic plants are cattails (*Typha angustifolia, T. latifolia*), wild rice (*Zizania aquatica*), bur-weeds (*Sparganium eurycarpum, S. androcladum*), pickerel weed (*Pontederia cordata*), bulrushes (*Scirpus tabernaemontani, S. fluviatilis, S. heterochaetus., S. acutus, S. pungens, S. americanus*), arrowhead (*Sagittaria latifolia*), arrowleaf (*Peltandra virginica*), rice cutgrass (*Leersia oryzoides*), bayonet rush (*Juncus militaris*), water horsetail (*Equisetum fluviatile*) and bluejoint grass (*Calamagrostis canadensis*).

- Shallow Emergent Marsh: marsh meadow that occurs on mineral or deep muck soils (rather than true peat) that are permanently saturated and seasonally flooded. Water depths may range from 6 inches to 3.3 feet during flood stages, but the water level usually drops by mid- to late-summer. Most abundant herbaceous plants include bluejoint grass, cattails, sedges, marsh fern (*Thelypteris palustris*), manna grasses (*Glyceria pallida, G. canadensis*), spikerushes (*Eleocharis smalliana, E. obtusa*), bulrushes, threeway sedge (*Dulichium arundinaceum*), sweetflag (*Acorus americanus*), tall meadow-rue (*Thalictrum pubescens*), marsh St. John's-wort (*Triadenum virginicum*), arrowhead, goldenrods (*Solidago rugosa, S. gigantea*), eupatoriums (*Eupatorium maculatum, E. perfoliatum*), smartweeds (*Polygonum coccineum, P. amphibium, P. hydropiperoides*), marsh bedstraw (*Galium palustre*), jewelweed (*Impatiens capensis*), loosestrifes (*Lysimachia thyrsiflora, L. terrestris, L. ciliata*). Degraded wetland communities are sometimes dominated by invasive species, including reed canary grass (*Phalaris arundinacea*) and/or purple loosestrife (*Lythrum salicaria*).

- Shrub Swamp: inland wetland dominated by tall shrubs that occur along the shore of a lake or river, in a wet depression, or valley not associated with lakes. Shrub swamps may occur as a transition zone between a marsh, fen, bog, swamp, or upland community. The substrate is usually mineral soil or muck. This is a broadly defined community type that is very common and quite variable. Shrub swamps may be co-dominated by a mixture of species or have a single dominant shrub species. Shrub swamps dominated by alder (*Alnus incana* ssp. *rugosa*) are sometimes called alder thickets. A swamp dominated by red osier dogwood (*Cornus sericea*), silky dogwood (*C. amomum*), and willows (*Salix* spp.) may be called a shrub-carr. Along the shores of some lakes and ponds there is a distinct zone dominated by water-willows (*Decodon verticillatus*) and/or butonbush (*Cephalanthus occidentalis*) which can sometimes fill a shallow basin. Characteristic shrubs that are common in these and other types of shrub swamps include meadow-sweet (*Spiraea alba* var. *latifolia*), steeple-bush (*Spiraea tomentosa*), gray dogwood (*Cornus foemina* ssp. *racemosa*), swamp azalea (*Rhododendron viscosum*), highbush blueberry (*Vaccinium corymbosum*), maleberry (*Lyonia ligustrina*), smooth alder (*Alnus serrulata*), spicebush (*Lindera benzoin*), willows (*Salix bebbiana, S. discolor, S. lucida, S. petiolaris*), wild raisin (*Viburnum cassinoides*), and arrowwood (*Viburnum recognitum*).

4.6.1.2 Invasive Species

Title 6, Department of Environmental Conservation, Chapter V, Resource Management Services, Subchapter C, Invasive Species, Part 575, Prohibited and Regulated Invasive Species of the New York Codes, Rules and Regulations (6 NYCRR Part 575), lists 69 prohibited and six regulated plant species (75 species total). Prohibited species are those that cannot be sold, imported, purchased, transported, introduced or propagated in New York. Regulated species can be possessed, sold, purchased, propagated and transported, but cannot be introduced into a free-living state (i.e., unconfined and outside the control of a person)

Invasive species occurrences within the Project ROW will be addressed through consultation with the NYSDEC and the Commission and will require additional desktop analysis and field surveys to ascertain the presence and extent of invasive species within the Project ROW.

Certain invasive species listed as prohibited or regulated in 6 NYCRR Part 575 were identified during the wetland delineation effort. Species identified as occurring within the Project area consisted principally of those with a preference for disturbed, open, or partially shaded habitats commonly found on maintained transmission line corridors, including: spotted knapweed (*Centaurea stoebe*), purple loosestrife (*Lythrum salicaria*), common reed (*Phragmites australis*), Japanese knotweed (*Fallopia japonica*), Canada thistle (*Cirsium arvense*), Tartarian honeysuckle (*Lonicera tatarica*), and Morrow's honeysuckle (*Lonicera morrowii*).

4.6.1.3 Wildlife

The Project ROW currently provides habitat for an array of typical wildlife species found in forested, scrub-shrub, and meadow habitat in urban, suburban, rural, and agricultural areas. Many species likely to occur are those that have adapted to interactions with humans and in some instances thrive in disturbed environments such as maintained ROWs. Some locations along the Project ROW, such as agricultural fields and adjacent undeveloped lands, are somewhat inaccessible to the public and offer habitat for less disturbance-tolerant species or those requiring more natural conditions.

Ubiquitous mammal species along the Project ROW may include Virginia opossum (*Didelphis virginiana*), eastern cottontail (*Sylvilagus floridanus*), eastern chipmunk (*Tamias striatus*), woodchuck (*Marmota monax*), gray squirrel (*Scirus carolinensis*), meadow vole (*Microtus pennsylvanicus*), Norway rat (*Rattus norvegicus*), house mouse (*Mus musculus*) raccoon (*Procyon lotor*), striped skunk (*Mephitis mephitis*), American black bear (*Ursus americanus*), fox (*Vulpes* sp.) and white-tailed deer (*Odocoileus virginianus*). Bird species likely to utilize the predominant habitat communities include grasshopper sparrow (*Ammodramus savannarum*), vesper sparrow (*Pooecetes gramineus*), field sparrow (*Spizella pusilla*), American goldfinch (*Carduelis tristis*), vireos (*Vireo spp*.), gray catbird (*Dumetella carolinensis*), black-capped chickadee (*Parus atricapillus*), and others, including neotropical migrants (e.g., warblers).

4.6.1.4 Threatened and Endangered Species

Section 7 of the Endangered Species Act (ESA) outlines the procedures for Federal interagency cooperation to protect federally listed endangered and threatened species and designated critical habitats. Consultation with the U.S. Fish and Wildlife Service (FWS) included a Project-specific review of the FWS Information for Planning and Consultation (IPaC) online system, conducted on May 18, 2018, which identified threatened and endangered species that may be affected by the Project, which included the Indiana Bat (*Myotis sodalis*) and Northern Long-eared Bat (*Myotis septentrionalis*) (see Appendix C).

Additionally, a request was submitted to the NYSDEC Natural Heritage Program (NYNHP) for information regarding the presence of state-listed rare species, significant natural communities and other significant habitats in the vicinity of the proposed Project. The response (dated August 2, 2019), identified one state-listed mammal species, nine state listed bird species, and two state listed plant species in the vicinity of the proposed Project. This response is provided in Appendix A with each documented species listed below in Table 4.6-1.

Table 4.6-1. State Listed Threatened and Endangered Species

Common Name	Scientific Name	Year of Last Observation	Status
Mammals			
Indiana Bat*	*Myotis sodalis*	1980	Endangered
Northern Long-Eared Bat	*Myotis septentrionalis*	1980	Threatened
Birds			
Least Bittern	*Ixobrychus exilis*	1980	Threatened
Pied-billed Grebe	*Podilymbus podiceps*	1980	Threatened
Sedge Wren	*Cistothorus platensis*	1980	Threatened
King Rail	*Rallus elegans*	1980	Threatened
Henslow's Sparrow	*Ammodramus henslowii*	1980	Threatened
Upland Sandpiper	*Bartramia longicauda*	1980	Threatened
Bald Eagle	*Haliaeetus leucocephalus*	1980	Threatened
Short-eared Owl	*Asio flammeus*	1980	Endangered
Northern Harrier	*Circus cyaneus*	1980	Threatened
Plants			
Side-oats Grama	*Bouteloua curtipendula*	1980	Endangered
Brown Bog Sedge	*Carex buxbaumii*	1980	Threatened

Source: IPaC and NYSDEC Natural Heritage Program 2019.

* Indiana Bat identified through IPaC review only.

Brief summaries of the types of habitats where each species is likely be found within the Project area are provided below. Appendix C, Habitat Assessment Report, provides a detailed summary of the regulatory protections offered to each species along with recommendations for additional surveys and proposed mitigation strategies.

Indiana Bat - IPaC review revealed that this species is documented as occurring in Albany County; however, NYNHP consultation did not indicate documented occurrences of this species in the vicinity of the Project. Individuals are known to fly 2.5 miles or more from documented locations. These bats show a strong preference for woodland and wooded riparian habitat over cropland. Most Indiana bats migrate seasonally between traditional winter and summer roost sites. Hibernation sites include both natural caves and mines. Summer foraging habitat consists of wooded or semi-wooded areas and may be along streams or lakes where they forage along forest edges and close to the treetops. Maternity colonies are generally in hollow trees or under loose bark of living or dead trees that are often exposed to direct sunlight (NYSDEC, n.d.).

Northern Long-Eared Bat - IPaC review indicated that this species could potentially occur in all counties crossed by the Project; however, consultation with NYNHP indicated documented occurrences in only the Towns of Guilderland and New Scotland in Albany County and the Town of Root in Montgomery County. Individuals are known to fly five miles or more from documented locations. This species uses caves and abandoned mines for hibernation in winter and is found in dense forest stands using trees with exfoliating bark or cavities for maternity roosts in the summer. The species is known to forage at forest edges, at tree clearings, and over ponds (BCI, 2019). Suitable summer habitat for the northern long-eared bat consists of a wide variety of forested and wooded habitats where they roost, forage, and travel (Foster and Kurta, 1999) and may also include some adjacent and interspersed non-forested habitats (Yates and Muzika, 2006).

Least Bittern – NYNHP indicated that this species is documented as occurring in the vicinity of Guilderland in Albany County. In New York, Least Bitterns tend to breed in shallow or deep emergent marshes (NYNHP 2019a). They prefer stands of cattails or bulrush with bur-reed, sedges, or common reed. Stands of cattails are often interspersed with pools of open water or slow-moving channels and some woody vegetation. Large marshes are important breeding areas for this species. Open habitats such as mats of emergent vegetation are rarely used. Least Bitterns spend nearly all their time in dense, grass-like vegetation.

Pied-billed Grebe - NYNHP indicated that this species is documented as occurring in the Town of Guilderland in Albany County and the Town of Root in Montgomery County. Pied-billed grebes inhabit quiet marshes, marshy shorelines of ponds, shallow lakes, or marshy bays and slow-moving streams with sedgy banks or adjacent marshes; rarely in brackish marshes with limited tidal fluctuation. Grebes set up breeding territories more commonly in wetlands impounded by beavers or humans than in those of glacial origin, and individual pairs appear to favor wetlands of intermediate size (0.6 - 7.0 ha) over very large or small wetlands (NYNHP, 2019b).

Sedge Wren - NYNHP indicated that this species is documented as occurring in the vicinity of Guilderland in Albany County. This species occurs in moist shortgrass and sedge marshes and meadows with scattered low bushes, grass and sedge bogs as well as coastal brackish marshes (Cornell Lab of Ornithology 2009b). This species also uses the upland margins of ponds. Winter habitat includes grassy marshes and dry grass fields.

King Rail - NYNHP indicated that this species is documented as occurring in the vicinity of Guilderland in Albany County. During the breeding season, the King Rail inhabits fresh and

brackish marshes in the southwestern and southeastern portions of the state that are fairly shallow (0-25 cm of water) and have well developed areas of emergent vegetation.

Henslow's Sparrow - NYNHP indicated that this species is documented as occurring in the vicinity of Guilderland in Albany County. This species inhabits relatively large fields consisting of tall, dense grass, a well-developed litter layer, standing dead vegetation, and sparse or no woody vegetation. The habitat is dominated by grasses and has scattered forbs for singing perches (Herkert et al., 2002). Winter habitat is generally similar to breeding habitats (Herkert et al., 2002).

Upland Sandpiper - NYNHP indicated that this species is documented as occurring in the Town of Guilderland in Albany and the Towns of Root and Canajoharie in Montgomery County. The Upland Sandpiper breeds in open, level expanses of short grass fields and farmlands, usually near wet sites (Baicich and Harrison, 1997). Nests are in tall herbage and birds often nest in loose colonies (Baicich and Harrison, 1997).

Bald Eagle - NYNHP indicated that this species is documented as occurring in the vicinity of the Town of New Scotland in Albany County. The Bald Eagle is a recently federally delisted species; its status in New York has also been changed from endangered to threatened. It is commonly found close to bays, rivers, lakes, or other bodies of water that reflect the general availability of their primary food sources – fish and waterfowl. Bald eagles tend to avoid areas with nearby human activity (boat traffic, pedestrians) and development (buildings). Perch sites are typically in deciduous and coniferous trees. Large stick nests are usually built in tall trees near water (typically within 400 kilometers [km]). Nest trees include pines, spruce, firs, cottonwoods, oaks, poplars, and beech. Winter roost sites vary in their proximity to food resources (up to 33 km) and may be determined to some extent by a preference for a warmer microclimate at these sites. Most commonly, wintering areas are associated with open water.

Short-eared Owl - NYNHP indicated that this species is documented as occurring near the Town of Minden in in Montgomery County. The Short-eared Owl can be found in open habitats such as fields, marshes, meadows, prairies, and agricultural areas in the late afternoon and early evening hours (Audubon, 2007, Cornell Laboratory of Ornithology, 2007). Breeding territories are relatively small, ranging from 37 to 494 acres (Johnsgard, 1988). Except for a few large marshes, most of the nest sites recorded in recent years have been found on farms, typically in active hayfields or pastures. Short-eared owl populations occur erratically because they are nomadic and irruptive in nature, with numbers and distribution fluctuating with and following prey populations (Bird Studies Canada-Atlantic Region, 2005). Short-eared owls can be found foraging in fallow agricultural lands during winter and are partially nomadic during this season (Audubon, 2007).

Northern Harrier - NYNHP indicated that this species is documented as occurring near the Town of Minden in Montgomery County. In summer, the Northern Harrier breeds in open wetlands and marshes; wet, lightly grazed pastures; old fields; and dry uplands, including upland prairies, grasslands, drained marshlands, croplands, and riparian woodland. The densest populations are typically associated with large tracts of undisturbed habitats dominated by thick vegetation growth (Macwhirter and Bildstein, 1996). Wintering habitat includes a variety of open habitats dominated by herbaceous cover, such as pasturelands, croplands, upland and lowland grasslands, old fields,

open-habitat flood plains, and freshwater marshes. Most concentrated populations are restricted to areas with low vegetation.

Side-oats Grama - NYNHP indicated that this species is documented as occurring in Schenectady County. In New York this species is strongly associated with dry limestone-derived soils, as well as open habitats associated with natural and man-made disturbance. It occurs at riverside bluffs, shale cliffs and barrens, cedar glades, and limestone pavements as well as abandoned sandpits and pastures, railroads, and powerlines (NYNHP, 2019c).

Brown Bog Sedge - NYNHP indicated that this species is documented as occurring in near Rotterdam in Schenectady County. This species occurs in a variety of wet habitats but prefers calcareous sites. It grows in fens, swamps, wet meadows, vernal ponds, marshes, peat-bogs, and other wet places. (NYNHP, 2019d).

4.6.1.5 Special Management Areas

The Project ROW bisects Black Creek Marsh Wildlife Management Area (WMA) for approximately 3,800 linear feet. This area, located in the Towns of Guilderland and New Scotland, Albany County, is both a NYSDEC WMA and a NYSDEC Bird Conservation Area and Audubon Important Bird Area. This WMA consists of about 450 acres of wetland and upland habitat and is primarily a freshwater wetland community; approximately 150 acres of the WMA are uplands. Wetland types include cattail marsh, open-water marsh, and flooded red maple swamp (NYSDEC, 2019). To minimize the Project's impacts on the Marsh, the Project has been preliminarily designed so that only one structure will be placed within wetlands associated with the Marsh.

The Project ROW also bisects the Plotter Kill Preserve for approximately 3,260 linear feet. Located in the Town of Rotterdam in Schenectady County, the Preserve generally encompasses a gorge eroded by Plotter Kill. Plotter Kill Preserve is managed by Schenectady County and includes 632 acres of hardwood and coniferous forest that supports a relatively diverse plant community.

The following State Forests are within approximately 0.5 miles of the Project ROW: Lost Valley State Forest, Montgomery County (0.27 miles); Charleston State Forest, Montgomery County (intersected); Rural Grove State Forest, Montgomery County (intersected); Yatesville Falls State Forest, Montgomery County (abutting); and Ohisa State Forest, Herkimer County (0.5 miles).

4.6.2 Project Effects and Mitigation (16 NYCRR § 86.5(b)(3), (4), (5), (6), (7) and (9))

Due to its proposed siting within existing transmission corridors, the Project's ROW reduces ROW clearing to the maximum extent practicable. The small amount of ROW clearing required for the project represents the minimum clearing necessary to prevent interference of vegetation with the proposed facility, subject to design considerations such as structure height and span length in accordance with good utility practice. Adjacent resources will be protected during clearing by staking/flagging the extents of clearing to ensure construction crews clear only the minimum extents required for Project clearances. Additional protections for topsoil are addressed in the agricultural BMPs in Appendix H. To the extent that the Project ROW requires clearing or affects

wildlife, impacts will be addressed through the use of BMPs and impact avoidance and minimization measures as described below. Seasonal restriction schedules intended to minimize impacts associated with clearing and other construction activities are provided in Appendix C.

4.6.2.1 Construction

Vegetation and wildlife communities within the maintained ROW will be temporarily disturbed by construction activities and equipment access. However, construction-related impacts to terrestrial ecology are anticipated to be limited considering that the Project ROW has been subject to periodic vegetation management for decades in accordance with a PSC-approved vegetation management program.

In some areas, selective clearing of undesirable woody species will be necessary to provide work areas for new structures and provide required clearance for the 345 kV lines.[3] Preliminary identification of these areas along the Project's transmission line ROW indicates a total of approximately 3.4 acres of required clearing, including approximately 1.4 acres near and adjacent to the New Scotland substation. Clearing and slash disposal procedures that will be used are described in the EM&CP BMPs manual provided in Appendix H. In areas where tree clearing is required, stumps will be cut as close to ground level as practicable and the stumps treated with the appropriate herbicide where necessary to prevent re-sprouting ("cut and treat" method). As required by 16 NYCRR §86.5(b)(7), the types of herbicide that will be used during tree clearing and the mixing rates are identified in Appendix H; the anticipated volume of herbicide will be minimal given the limited areas of clearing.

Development of the Princetown substation will require clearing of approximately 2.5 acres of deciduous woodland adjacent to the Project ROW and along Reynolds Road. The preliminary layout of the substation has been sited to minimize impacts to identified wetlands on the parcel to be acquired for the substation.

Where it is necessary, areas of vegetation clearing including the specified clearing type and corresponding slash disposal technique will be shown on the plan and profile drawings to be provided as part of the EM&CP.

Temporary construction-related effects on vegetation and wildlife may include those such as:

- General clearing (and/or mowing) at work areas for structure installation;
- Noise from construction vehicles and equipment;
- Displacement of wildlife to similar habitats adjacent to the Project ROW; and
- Installation of temporary erosion and sediment control devices (e.g., silt fence).

Permanent construction-related effects may include:

[3] All areas preliminarily identified for tree clearing are shown in Figure 2-3 of Exhibit 2.

- Loss or alteration of vegetation and associated habitat from the development of the new Princetown and Rotterdam substations;
- Loss or alteration of vegetation associated with the installation of permanent access roads, where necessary. Existing access roads will be utilized where feasible; and
- Removal of trees in areas of limited clearing along the Project ROW.

4.6.2.2 Operation and Maintenance

Permanent impacts to terrestrial ecology as described above in Section 4.6.2.1 are anticipated to remain during operation of the Project. Continued ROW maintenance activities in conformance with a Project-specific vegetation management program will ensure stable vegetation communities similar to those that currently exist.

4.6.2.3 Environmental Protection Measures

Avoidance and minimization measures will be implemented during design and construction to the extent practicable to address short-term and temporary disturbances as well as long-term and permanent effects to vegetation and wildlife. The Project is predominantly located within an existing maintained electric transmission ROW, and the current cover types and habitats will likely persist. Vegetation clearing associated with Project may include limited clearing along ROW edges and select areas required for construction access, removal of vegetation that exceeds allowable electrical clearance heights, and clearing of vegetation adjacent to substations to allow transmission line connections. A site-by-site analysis will be conducted prior to clearing activities to determine a methodology that will avoid or minimize potential impact to the maximum extent practicable. Tree and shrub species that do not have the potential to exceed the minimum required clearances will be retained when practicable.

Soil disturbance associated with construction could potentially cause soil erosion, siltation, and sedimentation to down-gradient areas both within and adjacent to the Project area. However, these impacts will be avoided to the maximum extent practicable and unavoidable impacts will be minimized through the implementation of site-specific construction and restoration BMPs provided in Appendix H. The Applicant's implementation of these BMPs will also protect fish and other aquatic life from harm due to pollutants in or near streams and other bodies of water. Although rock blasting in proximity to streams or other bodies of water is not anticipated, if such blasting is required, the blasting plan included with the EM&CP will address protection of sensitive fish and aquatic life.

During site restoration, disturbed areas will be appropriately seeded with an appropriate native seed mix in compliance with the applicable Invasive Species Control Procedures to prevent the introduction of invasive plant species. A pre-construction inventory will be conducted to determine the presence and relative abundance of the Invasive Species of Concern that are present within Jurisdictional Areas on the ROW. The results of this pre-construction inventory will be documented in the EM&CP. Based upon the pre-construction inventory results, the spread of

invasive species to previously uncolonized areas will be mitigated by implementing control procedures described in Appendix H.

Herbicide application during construction and periodic ROW vegetation management will follow BMPs described in Appendix H to protect native vegetation, wetlands and wildlife.

Aside from incidental injury and mortality, impacts to wildlife are anticipated to correlate to impacts to plant communities. Vegetation that will be temporarily disturbed is predominantly located within or adjacent to a maintained ROW; therefore, areas affected by additional vegetation alterations will become consistent with the existing environment within the adjacent ROW. Those wildlife species utilizing any areas of scrub shrub or woodlands where clearing is proposed may be adversely affected by the loss of woody species for food, shelter and nesting. However, wooded areas located in proximity to the proposed route will be unaffected and will continue to provide this habitat component. Wildlife species that utilize these cover types will continue to have a significant amount of suitable habitat available within and around the Project ROW. Proposed avoidance and minimization of effects on threatened and endangered species are discussed in the Habitat Assessment Report (Appendix C); strategies include measures such as relocating or minimizing construction access in areas of identified populations and time of year restrictions during breeding, nesting, and roosting seasons.

4.7 Wetlands and Water Resources

This section provides a summary characterization of the wetland and surface water resources within the Project area and the potential impacts to these habitats resulting from Project construction and operation as well as avoidance and mitigation strategies that will be implemented to minimize these impacts.

Existing wetland and surface water resources within the existing electric transmission corridor that includes the Project ROW were assessed as part of an intensive wetland delineation field effort conducted by Tetra Tech (Applicant's environmental consultant who prepared this Exhibit 4) in 2013-2014 under contract with National Grid. The results of this wetland delineation effort were submitted to the USACE Buffalo District (LRB) and New York District (NAN) in 2016 for review as part of an application for a preliminary jurisdictional determination (PJD). Per the USACE Regulatory Guidance Letter No. 08-02, dated June 26, 2008, "…a permit decision made on the basis of a preliminary JD will treat all waters and wetlands that would be affected in any way by the permitted activity on the site as if they are jurisdictional waters of the U.S."

The referenced PJD was approved by the Buffalo District (File Number: LRB-2016-00589) and the New York District (File Number NAN-2016-00800-USH) on February 21, 2017 and August 10, 2017, respectively. In 2019, LS Power Grid New York submitted a request to the USACE, pursuant to the Freedom of Information Act (FOIA), 5 U.S.C. § 552. requesting that the USACE release to LS Power Grid New York all reports and data supporting the 2016 PJD applications submitted by National Grid. In response to this FOIA request, the USACE released a copy of the *Wetland Delineation Report - Edic to Princetown Junction and Rotterdam Segment*, dated October 2014 and updated in August 2016, and the *Wetland Delineation Report – Princetown Junction to*

New Scotland Segment, also dated October 2014 and updated in August 2016, which are provided as Appendix D and hereafter referred to as the Delineation Reports.

Tetra Tech also completed a field delineation of wetlands and surface waters present at the proposed Princetown substation site in May 2019. Preparation of a PJD request to the USACE New York District to verify these findings is currently in-process.

4.7.1 Affected Environment (16 NYCRR § 86.5(a), (b)(4), (b)(8))

This section presents a discussion of the existing wetland and waterbody resources identified within the Project ROW, as presented in the above-referenced Delineation Reports. It includes a quantitative summary of wetland and waterbodies identified within the Project ROW, and a characterization of the vegetation composition and functional potential of the identified wetlands.

4.7.1.1 Wetlands

Field delineations supporting the Delineation Reports were conducted within the Project ROW using the Routine Onsite Determination Method as described in the Corps of Engineers Wetlands Delineation Manual (USACE, Environmental Laboratory, 1987) for USACE jurisdictional wetlands and the Routine Delineation Procedure as described in the 1995 New York State Freshwater Wetlands Delineation Manual (Browne et al., 1995) for NYSDEC jurisdictional wetlands. The Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region, Version 2.0 (January 2012), was also employed. Cover classes for wetlands were based on the National Wetland Inventory classification hierarchy (Cowardin et al., 1979). Cover classes were assigned by determining the most abundant vegetation cover class in the wetland. Wetland boundaries were recorded using Trimble© Geo XH and XT handheld Global Positioning System (GPS) units. These units generally provide sub-meter accuracy.

Concurrent with the field delineation effort, an assessment of wetland functions and values was conducted for the wetlands that were identified within the Project ROW using the USACE New England District Highway Methodology, Supplement Wetland Functions and Values Descriptive Approach (USACE, 1999). Each wetland was evaluated considering the presence or absence of the eight wetland functions, including:

- groundwater recharge/discharge
- fish and shellfish habitat
- flood flow alteration
- sediment/toxicant/pathogen retention
- nutrient removal/retention/transformation
- production export
- sediment/shoreline stabilization, and

- wildlife habitat

And five wetland values, including:

- recreation
- educational/scientific value
- uniqueness/heritage
- visual quality/aesthetics, and
- threatened or endangered species habitat

A total of 383 wetland polygons comprising 711.3 acres were delineated within the Project ROW. Table 5-1 of the Delineation Reports provides the assigned Cowardin Class, corresponding town, and the acreage of each wetland feature delineated within the Project ROW. Delineated wetland locations are depicted in the Delineation Reports (Appendix D) on Figure 5, Delineated Wetlands and Surface Waterbodies.

Wetlands within the Project ROW were identified as mainly non-forested, consisting of scrub-shrub swamps and shallow emergent marshes generally located on mineral soils. Approximately 687 acres (97 percent) of the wetlands delineated within the Project ROW were identified as emergent or scrub shrub. The remaining delineated wetlands were identified as forested communities, due to the presence of greater than 30 percent tree canopy cover. These forested wetlands were encountered where adjacent forested vegetation partially encroached into the existing electric transmission corridor, at the bottom of ravines spanned by the existing transmission line, and in the vicinity of Princetown substation. Covertype acres of the delineated wetlands, identified within the Project ROW during the delineation effort, are provided in the Delineation Reports (Appendix D) as Table 5.2, Delineated Wetland Covertypes.

A large proportion of wetlands in the Project ROW, particularly scrub-shrub swamps, were associated with isolated geomorphic depressions within the maintained ROW fed by hillside seeps or defined stream drainages. Emergent marshes were commonly associated with NYSDEC mapped stream channels that serve to drain active agriculture fields as well as fragmented forested parcels. Fallow and abandoned agricultural fields and hedgerows separating actively cultivated areas supported both emergent and scrub-shrub wetlands. Plant species common within emergent and scrub-shrub wetlands in the Project ROW are detailed in the Delineation Reports provided in Appendix D.

As identified in the Delineation Reports, delineated wetlands that were located within the boundaries of NYSDEC mapped freshwater wetlands were designated as NYSDEC wetlands. A 100-foot adjacent area was generated for each wetland identified as a NYSDEC wetland. Adjacent areas from more than one wetland were joined to prevent an over estimate of adjacent areas acreage. Thirty (30) of the 383 wetlands that are intersected by the Project ROW were identified as NYSDEC wetlands (209.5 acres total). State regulated delineated wetlands and the associated acreages within the Project ROW are identified by an asterisk (*) and bold text in Table 5-1 of the

Delineation Reports, provided as Appendix D. These features are also displayed in Figure 4.7-1, Delineated Wetlands in Proximity to NYSDEC Wetlands.

According to the Delineation Reports, 61.6 acres of NYSDEC adjacent area occurs within the Project ROW. The acreages of the state regulated adjacent areas that occur within the Project ROW, and their wetland associations, are provided in Table 5-3 of the Delineation Reports (Appendix D). It was noted in Section 5.2 of the Delineation Reports that, since delineation efforts were limited to the transmission line corridor and utility-owned substation parcels, state regulated wetlands located entirely outside of the Project ROW may not have been accounted for; therefore, the total acreage of NYSDEC adjacent area may have been underestimated.

Groundwater recharge/discharge, flood flow alteration, and wildlife habitat were the most prevalent wetland functions associated with the wetlands delineated within the Project ROW. Recreation and visual quality/aesthetics were the predominant wetland values. Groundwater recharge/discharge, flood flow alteration, and wildlife habitat were also identified to be the dominant primary indicators, while groundwater recharge/discharge, sediment/toxicant/pathogen retention, and wildlife habitat were the foremost secondary indicators.

The Delineation Reports identified five delineated wetlands as supporting habitat preferred by threatened and endangered species. These five wetlands comprised habitat potentially suitable for bog turtles (*Clemmys muhlenbergii*); however, it was reported that based on consultations with NYSDEC and USFWS, there have been no recent known occurrences of bog turtles in the vicinity of the Princetown substation to New Scotland segment. Two of the five wetlands identified as potentially supporting threatened and endangered species are associated with the Black Creek Marsh Wildlife Management Area at the border of New Scotland and Guilderland, which may provide habitat for wetland-dependent avian species such as the pied-billed grebe (*Podilymbus podiceps*), the king rail (*Rallus elegans*), and the least bittern (*Ixobrychus exilis*).

The results of the function and values assessment for the wetlands within the Project ROW are provided in the Delineation Reports at Table 5-5, Wetland Functions and Values Assessment (see Appendix D).

The delineation of wetlands in the area of the proposed Princetown substation site and its associated connections identified approximately 3.5 acres of wetlands present within the approximately 12-acre survey area.

4.7.1.2 Surface Water Resources

Surface waterbodies, including ponds and linear surface water conveyance systems with a discrete channel, were delineated within the Project area during the field delineation effort. As part of this effort, streams exhibiting a bank width greater than 5 feet were delineated along both banks and streams less than 5 feet in width were delineated along the centerline of the water course. Characteristic attributes recorded for surface waterbodies included bank width, water depth, substrate, and bankside vegetation. As identified above for wetlands, stream banks or centerlines were recorded using Trimble© Geo XH and XT handheld GPS units.

A total of 350 surface waterbodies were identified within the Project ROW during the field delineation surveys. The surface waterbodies consisted of 299 streams (132 perennial, 126 intermittent, and 41 ephemeral); six ponds; 13 ditches; 16 agricultural ditches; one railroad ditch; and 15 roadside ditches. Table 5-4 of the Delineation Reports lists each surface waterbody identified in the Project ROW along with the corresponding NYSDEC Surface Waterbody Classification and feature-specific attributes, including: flow regime, bank dimensions, and substrate composition. Surface waterbodies are depicted in the Delineation Reports (Appendix D) as Figure 5, Delineated Wetlands and Surface Waterbodies.

At Princetown substation, the delineation identified two perennial and three ephemeral streams within the approximately 12-acre survey area, all located within the parcel in the southwest quadrant where the two existing electric transmission corridors intersect. Generally, the streams either bisect the parcel northeast to southwest (one of which is an excavated swale) or occur along the southern parcel boundary.

4.7.1.3 Groundwater Resources

Approximately 10 percent of New York State is underlain by highly productive unconsolidated aquifers which provide, or which have the potential to provide, water for large populations (NYSDEC, 1990). The NYSDEC categorizes these aquifers into two classifications, Primary aquifers and Principle aquifers, based on intensity of utilization as a public water supply. Primary aquifers are defined as highly productive aquifers presently utilized as sources of water by major municipal water supply systems. Principal aquifers are defined as those that are either known to be highly productive or those where the geology suggests an abundant potential water source. Principal aquifers, however, are not intensively used as sources of water supply by major municipal systems at the present time.

The USGS has partnered with the NYSDEC to develop a plan to compile spatial datasets of the aquifer maps published by the USGS Detailed Aquifer Mapping Program (USGS, 2008). This dataset contains over 30 Primary and Principal Aquifer locations mapped by the USGS in upstate New York. Primary and Principal Aquifer data were reviewed to determine the extent of these features within the Project ROW. This review revealed that a total of approximately 1.2 miles of the Project ROW (approximately 57 acres) are situated over two Primary aquifers in Schenectady County. A total of 23 Principle aquifers are crossed by the Project ROW, comprising approximately 32.2 miles (approximately 1,117 acres). The location of Primary and Principal Aquifers in relation to the Project ROW are shown on Figure 4.7-2, Groundwater Resources.

4.7.2 Project Effects and Mitigation (16 NYCRR § 86.5(b)(1), (b)(9))

Direct or indirect effects to wetland and water resources have the potential to occur during Project construction and operation. Impacts to these resources have been avoided or minimized through use of an existing ROW and through avoidance efforts by the Applicant's design engineers during preliminary design work. This section outlines potential impacts associated with construction and operation along with the associated avoidance and minimization strategies that have been

incorporated as part of Project design as detailed in the Project-specific BMPs provided in Appendix H.

4.7.2.1 Construction

Permanent impacts associated with Project construction may include:

- Fill associated with structure placement
- Fill of wetlands and NYSDEC adjacent areas associated with the improvement of existing access roads

Anticipated temporary impacts associated with Project construction may include:

- Temporary loss of wetland functions for construction access routes and structure construction workspace locations where wetland avoidance is not practicable
- Installation of temporary bridges and culverts to provide construction access across waterways
- Limited dewatering of surface or subsurface waters in select work areas.

The results of the wetland delineation have been incorporated by the design engineers in the preliminary design to avoid wetlands where practicable and minimize potential wetland impacts. Based on preliminary engineering and design, the removal of the existing lines will result in a total of 387 structures being removed from delineated wetlands, with an estimated 93 new structures being constructed within delineated wetlands, resulting in an estimated net decrease of 294 structures located within wetlands. Of the 93 structures preliminarily identified as being located within wetlands, an estimated 25 of these structures would be located within NYSDEC-regulated wetlands. All laydown areas and storage equipment areas will be located a minimum of 100 feet from NYSDEC-regulated wetlands. Final design details including new access roads, access roads to be improved, and final structure locations will be shown on the plan and profile drawings to be provided as part of the EM&CP for the Project.

Applicant's design engineer for Princetown substation has avoided wetlands and streams at the site to the maximum extent practicable in preliminary design efforts. Based on the initial plans reflected in Exhibit E-2, the proposed Princetown substation will impact approximately 0.08 acres of wetlands on the proposed substation site and will avoid impacts to surface waters.

Direct temporary impacts to wetlands will primarily occur as a result of construction access, structure construction work areas adjacent to structure locations, and temporary work spaces. Soil disturbance associated with construction in these areas will be avoided to the maximum extent practicable, and any unavoidable impacts will be mitigated through the implementation of site-specific construction and restoration BMPs as documented in Appendix H.

As the Project is primarily situated within an existing electric transmission line corridor, permanent alterations to wetland vegetation are generally not anticipated. Where the Project extends beyond

the existing ROW wetlands, streams, and regulated adjacent areas will be avoided to the maximum extent practicable.

While the Project design does not include a significant increase in impervious surface and impacts to groundwater resources are not anticipated, limited dewatering may be required to remove surface or subsurface water from construction work areas. This dewatering will be temporary and is not anticipated to degrade the groundwater recharge/discharge functionality of wetlands or streams or the water quality of nearby aquifers, if present.

4.7.2.2 Operations

Operations and maintenance activities would be expected to utilize access roads identified in the EM&CP and utilized during construction. Therefore, there would be no additional effects of the Project on wetland and water resources during operations.

4.7.2.3 Environmental Protection Measures

The Applicant's design engineers will continue to prioritize wetland and surface water impact avoidance and minimization throughout the Project design process. Impact minimization strategies will be implemented to address long-term and permanent impacts as well as short-term and temporary impacts to wetland and water resources during construction. The BMPs and protection measures identified in the EM&CP will be implemented to minimize unavoidable disturbances to these resources. Implementation of these measures will ensure that the Project does not significantly impact the physical or biological processes of plant life or wildlife through any permanent or significant temporary change in the hydrology of the Project area.

The Project will likely require a wetland and/or stream disturbance permit from USACE in accordance with Section 404 of the Clean Water Act. Compensatory mitigation, required as a result of permanent impacts in excess of applicable thresholds, would be performed as a part of Project construction activities. Wetlands temporarily disturbed during construction would be restored to their original grade and allowed to reestablish naturally following construction.

4.8 Topography and Soils

This section of Exhibit 4 addresses the requirements of 16 NYCRR § 86.5(b)(1) and specifically evaluates "what changes, if any, the construction and operation of the proposed facility might induce in the physical or biological processes of plant life or wildlife through any permanent or significant temporary change in the… topography or soil of the area…" The topography, geology, and soils along the ROW are described below, along with an analysis of Project impacts resulting from changes to topography and soils in the Project area. Information regarding topography, geology, and soils was acquired from published open access sources, field observations, and aerial photography; elevation values presented in this section are based on the United States Geological Survey (USGS) topographic maps and are reported as elevations AMSL.

4.8.1 Existing Conditions (16 NYCRR § 86.5(a))

4.8.1.1 Topography

The Project ROW traverses three physiographic regions of New York State: the Tug Hill Plateau, the Hudson-Mohawk Lowlands, and the Alleghany Plateau (Isachen et al., 1991; NYSDOT, 2013; USGS, 2019a). The approximate location of the physiographic provinces in relation to the Project ROW are shown in Figure 4.8-1.

Approximately 7 miles of the western-most portion of the Project ROW falls within the southeastern margin of the Tug Hill Plateau off the Plateau itself. The plateau reaches a maximum elevation of nearly 2,000 feet AMSL; however, elevations at Edic Substation are approximately 780 feet AMSL and fall to approximately 390 feet AMSL where the Project ROW crosses the Erie Canal. Relief along the ROW within the Tug Hill Plateau is minimal with exceptions near the Utica Reservoir. An area of steep relief is located in the immediate vicinity of the Utica Reservoir where the ROW crosses Reall Creek and crosses slopes of greater than 25% where elevations drop from 670 feet to 545 feet AMSL.

From the Tug Hill Plateau, the ROW enters the Hudson-Mohawk Lowlands province. Approximately 51 miles of ROW span the Hudson-Mohawk Lowlands province, although along this length the ROW crosses several times into and out of the Alleghany Plateau province. The Hudson-Mohawk Lowlands province follows the drainage valleys of the Mohawk and Hudson Rivers and is bordered by the Tug Hill Plateau, Allegheny Plateau, Adirondack Mountains, Catskills, and Taconic Mountains. The relief along the western portion of the Project ROW, between the City of Utica and the Town of Canajoharie, follows the characteristic rolling hills and wide valleys associated with the province. Elevations range from over 1,200 feet AMSL to below 500 feet AMSL. Areas of steep relief are limited to ROW crossings of major drainages including the Frankfort Gorge and Ilion Gorge, which are characterized by steep side walls with elevations dropping from approximately 900 feet AMSL to 600 and 500 feet AMSL, respectively. A portion of the Project ROW re-enters the Hudson-Mohawk Lowlands Province west of Rotterdam and south of the proposed Princetown Substation where the relief and elevations become more subdued, ranging from about 590 feet AMSL to 270 feet AMSL. The portion of the ROW between the proposed Princetown Substation and the Rotterdam Substation crosses areas of greater relief as the ROW approaches the Rotterdam Substation. Elevations in this area range from 1,350 feet to 420 feet AMSL.

Approximately 39 miles of ROW runs through the northeastern margin of the Allegheny Plateau. This portion of the Allegheny Plateau is also characterized by rolling hills and limited areas of high relief. Elevations along the Project ROW within the Allegheny Plateau generally range from 425 feet to 1,350 feet AMSL. Localized areas of greater relief are observed where the Project ROW crosses drainage carved valleys such as the Schoharie Creek, where the elevation drops from 1,100 feet AMSL to 420 feet AMSL.

4.8.1.2 Geology

Bedrock Geology. The bedrock along the Project ROW, shown on Figure 4.8-1, is primarily Silurian to Ordovician (485-419 million years ago) sedimentary lithologies such as shales, siltstones, and sandstones and metamorphosed sedimentary rocks, like slate (Fisher et al., 1970; USGS 2019b). Other minor bedrock units include limestone, dolostone, shale, chert, slate, argillite, mélange, and alluvium. Table 4.8-1 describes the bedrock geologic formations crossed by the Project ROW as well as the physiographic province, their age, lithology, and identifying characteristics.

Table 4.8-1. Bedrock Geologic Units

Geologic Formation	Physiographic Province Crossed by ROW	Age	Lithology	Characteristic(s)
Utica Shale	Tug Hill Plateau, Hudson-Mohawk Lowlands, Alleghany Plateau	Ordovician	Shale	Black-organic rich, fossiliferous
Clinton Group	Hudson-Mohawk Lowlands, Alleghany Plateau	Lower Silurian	Shale and Mudstone, some conglomerate, sandstone, dolostone	Blue-gray mudstone
Frankfort Formation (Upper Utica)	Hudson-Mohawk Lowlands, Allegheny Plateau	Upper Ordovician	Shale and Siltstone	Gray shale – cross-laminated fine sandstones
Normanskill Shale	Hudson-Mohawk Lowlands	Middle Ordovician	Shale, mudstone, sand	Gray to black shale
Schenectady Formation	Hudson-Mohawk Lowlands, Allegheny Plateau, Catskills	Upper Ordovician	Graywacke, shale, siltstone	Buff-weathered unit, dark gray to black shale
Beekmantown Group	Allegheny Plateau	Middle Ordovician	Dolostone, limestone, chert, shale	Dark to light gray
Canajoharie Shale	Hudson-Mohawk Lowlands, Allegheny Plateau	Middle Ordovician	Shale	Black color

Source: Fisher et al., 1970. *Geologic Map of New York.*

Dolostone and limestone units present the potential to generate karst geologic features (sinkholes, caves). Geotechnical investigations along the Project ROW within these calcareous units, which primarily occur in the northeastern margin of the Allegheny Plateau and the southern portion of the Hudson-Mohawk Lowlands, will evaluate the presence of these karst features and the potential implications for Project design.

Seismic hazard along the Project ROW varies from low to moderate based on the 2014 USGS National Seismic Hazard Map (USGS, 2014). Along the ROW, the peak ground accelerations,

expressed as a fraction of standard gravity (g), with a 2% probability of being exceeded in the next 50 years range from 0.1 to 0.14. A zero indicates the lowest hazard probability and 0.8+ representing the greatest hazard. Since 2018, 10 earthquakes have been measured in New York State, ranging in magnitude from 1.5-3.0, which are often felt but produce limited to no damage. Historically, the most recent, significant earthquake to occur within the Project area was a magnitude 5.2 earthquake that occurred near Peru, NY in April 2002. However, no strong earthquake epicenter has been located in New York in the last 50 Years.

Surficial Geology. The primary surficial geologic deposit in the Project area is glacial till (Cadwell 1987). Figure 4.8-3 shows the surficial geology near the Project corridor. Along the hills and elevated areas of the Project ROW, glacial till is often the only soil type present, as most overburden was removed by glacial scouring. The tills along the Project ROW are primarily derived from the native underlying bedrock, which consists largely of shales and sandstones. The lowlands of the region and ROW are blanketed by glacio-fluvial sand and gravel, glaciolacustrine silt and clay, and glacio-deltaic silt and sand deposits. Some surficial deposits crossed by the ROW within the Hudson-Mohawk-Lowlands and Allegheny Plateau Provinces include lacustrine and fluvial sediments along the inner valleys and stony silts with some clay on valley side walls.

Economic Geological Resources. Based upon a review of NYSDEC data, a total of 62 mines and gravel pits, 21 of which are active, are located within 3 miles of the Project ROW (USGS 2019c). These resources are listed in Table 4.8-2 and identified on Figures 2-1a through 2-1p.

Table 4.8-2. Geologic Resources with 3 Miles of the Project ROW

ID	County	Name	Commodity
G01	Oneida	Route 49 Site	Sand and Gravel
G02	Oneida	Unspecified Gravel Pit	Sand and Gravel
G03	Oneida	Paul Becker Road Bank	Sand and Gravel
G04	Oneida	Unspecified Gravel Pit	Sand and Gravel
G05	Oneida	Unspecified Gravel Pit	Sand and Gravel
G06	Herkimer	Lee Valley Rd. Pit	Sand and Gravel
G07	Oneida	Unspecified Mine (Oneida Materials, Inc.)	Shale
G08	Herkimer	Wolanin Albany Road Site	Clay
G09	Herkimer	Leitz Albany Road	Clay
G10	Herkimer	Leitz Clay Pit	Clay
G11	Herkimer	Leitz Gravel Pit*	Sand and Gravel
G12	Herkimer	Leitz Gulf Road	Clay
G13	Herkimer	Schuyler Resource Recovery Center*	Sand and Gravel
G14	Herkimer	Ferguson Excavation Site	Clay
G15	Herkimer	Mohawk Valley Landfill Pit	Clay
G16	Oneida	Unspecified Gravel Pit	Sand and Gravel
G17	Herkimer	Unspecified Gravel Pit	Sand and Gravel
G18	Herkimer	Unspecified Gravel Pit	Sand and Gravel
G19	Herkimer	Ilion Gorge Pit*	Sand and Gravel
G20	Herkimer	Unspecified Mine	Sand and Gravel
G21	Herkimer	Beckwith Sand & Gravel Pit*	Sand and Gravel

ID	County	Name	Commodity
G22	Herkimer	Bono Pit	Sand and Gravel
G23	Herkimer	Nicastro Gravel Pit	Sand and Gravel
G24	Herkimer	Moss Road Pit*	Topsoil
G25	Herkimer	Unspecified Gravel Pit	Sand and Gravel
G26	Herkimer	Unspecified Gravel Pit (Rubino Rock Products)	Sand and Gravel
G27	Herkimer	Unspecified Gravel Pit (Tioga Construction Co.)	Sand and Gravel
G28	Herkimer	Mohawk Pit	Sand and Gravel
G29	Herkimer	Gilbert Mine	Sand and Gravel
G30	Herkimer	Jordanville Quarry*	Limestone

Table 4.8-2. Geologic Resources with 3 Miles of the Project ROW (continued)

ID	County	Name	Commodity
G31	Herkimer	Unspecified Gravel Pit	Sand and Gravel
G32	Schenectady	Mott Pit	Sand and Gravel
G33	Schenectady	Mariaville Peat Mine*	Peat
G34	Schenectady	Fox Farm Bank*	Sand and Gravel
G35	Schenectady	Rte 5s Pit	Sand and Gravel
G36	Schenectady	Rt. 5 Glenville Site	Sand and Gravel
G37	Schenectady	Van Buren Bank*	Sand and Gravel
G38	Schenectady	Vley Road Site*	Sand and Gravel
G39	Schenectady	Plant 5*	Sand and Gravel
G40	Schenectady	Ski Slope Shale Pit	Shale
G41	Schenectady	Fessenden Shale Mine (aka Fessenden Pit)*	Shale
G42	Schenectady	Iovinella/Larned Feuz Rd. Subdivision*	Sand and Gravel
G43	Schenectady	Feuz Rd. Pit	Sand and Gravel
G44	Schenectady	Wemple Rd./Engvold Pit	Sand and Gravel
G45	Albany	Charles Desch Pit*	Sand and Gravel
G46	Albany	Kings Rd Sand Mine	Sand and Gravel
G47	Albany	Stitt Road Pit*	Sand and Gravel
G48	Albany	Oliver Karmo Pit	Sand and Gravel
G49	Albany	Unspecified Gravel Pit	Sand and Gravel
G50	Albany	Unspecified Gravel Pit (Harrison & Burrows Bridge Constructors, Inc.)	Sand and Gravel
G51	Albany	Voorheesville Sand & Stone	Sand and Gravel
G52	Albany	Frueh Mine Site*	Limestone
G53	Albany	Rupert Road Pit*	Sand and Gravel
G54	Albany	Rupert Road Pit*	Sand and Gravel
G55	Albany	Rupert Road Pit*	Sand and Gravel
G56	Albany	Rupert Road Pit	Sand and Gravel
G57	Albany	South Bethlehem Quarry*	Limestone
G58	Albany	Unspecified Gravel Pit	Sand and Gravel
G59	Albany	Ravena Quarry*	Limestone
G60	Albany	Rowe Farm Clay Pit*	Clay
G61	Albany	Unspecified Pit	Topsoil
G62	Albany	Coeymans Clay Mine	Clay

Note: *active

Sources: USGS 2019c; NYSDEC Division of Mineral Resources 2019

4.8.1.3 Soils

The USDA Natural Resources Conservation Services provides detailed county-level soil survey information. Using the USDA Web Soil Survey (USDA 2019a, 2019b), a comprehensive summary of the soil types was developed for the Project route.

Soil slopes along the Project ROW vary but are generally shallow. Approximately 68 percent of the areal extent of soil crossed is classified as having slopes of 8% or less, 13 percent of the ROW has soil slopes are between 8% and 15%, 9 percent of slopes are between 15% and 25%, and approximately 10 percent of slopes are greater than 25%. The soil is primarily characterized as silty, sandy, or gravelly loam (~83%); stony soil (9%), exposed bedrock (4%), alluvial soil (1%), and lacustrine deposits (1%) make up most of the remaining surficial exposures.

Certain soil characteristics can increase sensitivities to disturbances or make the soil less suitable for construction. Soils classified as prime farmland, of statewide importance, hydric (containing plenty of moisture; very wet), thin (shallow bedrock of fewer than 6.5 feet below ground surface), high water table or shallow groundwater (less than 6.5 feet below ground surface), or corrosive to concrete all present challenges for construction. Table 4.8-3 provides the areal percentages of soils with these characteristics along the ROW of the existing transmission line. These conditions are not mutually exclusive, and some areas may have multiple limitations.

Table 4.8-3. Soil Limitations Summary

Soil Limitation	Percentage of ROW
Prime Farmland	12.0
Prime Farmland If Drained	32.4
Farmland of Statewide Importance	30.1
Shallow Bedrock (<6.5 Feet Below Ground Surface)	19.2
Shallow Groundwater (<6.5 Feet Below Ground Surface)	66.8
Very Limited for Shallow Excavation	86.9
High Risk of Corrosion of Concrete	16.1
Hydric Soils	12.3

Source: USDA NRCS 2019b

4.8.2 Project Effects (16 NYCRR § 86.5(b)(1), (b)(2)(iii), (b)(9))

Due to its proposed siting within existing transmission corridors, the Project's ROW avoids heavily timbered areas and avoids constructing any new transmission corridor across high points, ridge lines and steep slopes. To the extent that the Project ROW affects topographic features or soils, impacts will be addressed through the use of BMPs and impact avoidance and minimization measures as described below.

4.8.2.1 Construction

Project construction is not expected to result in significant topographic alterations and thus not significantly change stormwater runoff patterns or volumes. BMPs consistent with the NYSDEC *New York Standards and Specifications for Erosion and Sediment Control* are outlined in Appendix H and will be implemented during construction to minimize and mitigate potential erosion and sedimentation. Site specific erosion and sediment control measures will be provided

as part of the EM&CP. As such, the Project is not expected to impact surface water or groundwater quality.

The construction and use of work areas, access roads, and substation areas may result in minor topographic changes as the areas are graded and compacted. Post-construction restoration will include decompacting areas of compacted soil, grading the transmission line corridor and substation fringe areas back to original grade where practicable or otherwise providing appropriate, stabilized conditions, and sowing appropriate seed mixes. Special construction measures such as rigid construction matting will be implemented on agricultural lands, as provided in the BMPs included in Appendix H. As such, the Project is not expected to result in any significant impacts to plant life or wildlife associated with soil compaction.

The Project will be designed, constructed, operated and maintained to be compatible with geological conditions. Geotechnical investigations conducted prior to construction to support final Project design will be used to select foundation types, finalize structure design, and address potential soil or geologic limitations. Mechanical rock removal or blasting may be required at structure locations with shallow bedrock. Should blasting be required, it will be conducted in accordance with the blasting plan submitted with the EM&CP.

The Project is not expected to impact or be impacted by the mineral extraction operations in the Project area as it will utilize an existing ROW.

4.8.2.2 Operation and Maintenance

Project operation and maintenance are not expected to create any significant changes to the topography and soils of the Project area.

4.9 Noise

In accordance with PSL §122(1)(C) and 16 NYCRR §§86.5(a) and 86.5(b)(8), this section includes an analysis of the potential noise impacts resulting from the construction and operation of the Project. Studies undertaken to complete this analysis include a characterization of the local noise environment along the Project ROW, along with ambient monitoring and noise modeling for the new Rotterdam substation.

Localized and temporary noise impacts will occur during construction of the Project. Operational noise sources include corona noise from 345 kV transmission lines mainly during foul weather conditions (e.g., rain, fog, and high humidity), and noise-generating equipment (i.e., transformers) at the new Rotterdam substation. Other substation work associated with the Project will not include any new transformers or any other noise sources expected to be audible beyond utility property boundaries; thus, it was not necessary to evaluate operations phase noise levels associated with any Project substation except for the new Rotterdam substation. Noise generated during routine maintenance and periodic vegetation management of the Project ROW is considered to be minor.

The overall study objectives were to: 1) identify Project sound sources and estimate sound propagation characteristics; 2) model sound levels resulting from the Project using internationally

accepted calculation standards; and 3) compare the Project's acoustic performance versus applicable guidance levels and regulatory standards.

4.9.1 Acoustic Terminology

This section outlines some of the fundamental concepts in acoustics to help the public understand the modeling assessment and results as presented in this report.

Sound is described as a rapid fluctuation or oscillation of air pressure above and below atmospheric pressure creating a sound wave. Sound energy is characterized by the properties of sound waves, which include frequency, wave length, period, amplitude, and velocity. A sound source is defined by a sound power level ("L_W"), which is independent of any external factors. By definition, sound power is the rate at which acoustical energy is radiated outward and is expressed in units of watts. Sound energy propagates through a medium where it is sensed and then interpreted by a receiver. A sound pressure level ("L_P") is a measure of this fluctuation at a given receiver location and can be obtained through the use of a microphone or calculated from information about the source sound power level and the surrounding environment. Sound power, however, cannot be measured directly. It is calculated from measurements of sound intensity or sound pressure at a given distance from the source.

While the concept of sound is defined by the laws of physics, the term 'noise' has further qualities of being unwanted, excessive, or loud. The perception of sound as noise is influenced by several technical factors as intensity, sound quality, tonality, duration, and the existing background levels. Sound levels are presented on a logarithmic scale to account for the large range of acoustic pressures that the human ear is exposed to and is expressed in units of decibels (dB). A decibel is defined as the ratio between a measured value and a reference value usually corresponding to the lower threshold of human hearing, defined as 20 micropascals. Conversely, sound power is referenced to 1 picowatt.

Broadband sound includes sound energy summed across the frequency spectrum. In addition to broadband sound pressure levels, analysis of the various frequency components of the sound spectrum is completed to determine tonal characteristics. The unit of frequency is Hertz ("Hz"), measuring the cycles per second of the sound pressure waves, and typically the frequency analysis examines 11 octave bands ranging from 16 Hz (low) to 16,000 Hz (high), encompassing the entire human audible frequency range. Since the human ear does not perceive every frequency with equal loudness, spectrally varying sounds are often adjusted with a weighting filter. The A-weighted filter is applied to compensate for the frequency response of the human auditory system and sound exposure in acoustic assessments is designated in A-weighted decibels ("dBA"). Unweighted sound levels are referred to as linear. Linear decibels ("dBL") are used to determine a sound's tonality and to engineer solutions to reduce or control noise as techniques are different for low and high frequency noise.

To take into account sound fluctuations, environmental noise is commonly described in terms of equivalent sound level ("L_{eq}"). The average L_{eq} value, conventionally expressed in dBA, is the energy-averaged, A-weighted sound level over a given measurement period. It is further defined

as the steady, continuous sound level, over a specified time, which has the same acoustic energy as the actual varying sound levels over that same time. Another metric used to define the 24-hour average sound level at a given location is the day-night sound level (L_{dn}). The L_{dn} is calculated by averaging the 24-hour hourly L_{eq} levels at a given location after adding 10 dB to the nighttime period (10:00 p.m. - 7:00 a.m.) to account for the increased sensitivity of people to noises that occur at night.

Levels of many sounds change from moment to moment. Some sharp impulses last one second or less, while others rise and fall over much longer periods of time. There are various measures of sound pressure designed for different purposes. To describe the background ambient sound level, the L_{90} percentile metric represents the quietest 10 percent of any time period. Conversely, the L_{10} is the noise level exceeded 10 percent of the time and is a measurement of intrusive noises, such as car and truck traffic or aircraft overflights. Typical sound pressure levels associated with various activities and environments are presented in Table 4.9-1.

Table 4.9-1. Sound Pressure Levels (L_P) and Relative Loudness

Noise Source or Activity	Sound Level (dBA)	Subjective Impression	Relative Loudness (Perception of Different Sound Levels)
Jet aircraft takeoff from carrier (50 ft.)	140	Threshold of pain	64 times as loud
50-hp siren (100 ft.)	130		32 times as loud
Loud rock concert near stage Jet takeoff (200 ft.)	120	Uncomfortably loud	16 times as loud
Float plane takeoff (100 ft.)	110		8 times as loud
Jet takeoff (2,000 ft.)	100	Very loud	4 times as loud
Heavy truck or motorcycle (25 ft.)	90		2 times as loud
Garbage disposal Food blender (2 ft.) Pneumatic drill (50 ft.)	80	Loud	Reference loudness
Vacuum cleaner (10 ft.)	70	Moderate	1/2 as loud
Passenger car at 65 mph (25 ft.)	65		
Large store air-conditioning unit (20 ft.)	60		1/4 as loud
Light auto traffic (100 ft.)	50	Quiet	1/8 as loud
Quiet rural residential area with no activity	45		
Bedroom or quiet living room Bird calls	40	Faint	1/16 as loud
Typical wilderness area	35		

Table 4.9-1. Sound Pressure Levels (L_P) and Relative Loudness (continued)

Noise Source or Activity	Sound Level (dBA)	Subjective Impression	Relative Loudness (Perception of Different Sound Levels)
Quiet library, soft whisper (15 ft.)	30	Very quiet	1/32 as loud
Wilderness with no wind or animal activity	25	Extremely quiet	
High-quality recording studio	20		1/64 as loud
Acoustic test chamber	10	Just audible	
	0	Threshold of hearing	

Adapted from: Bolt, Beranek and Newman, Inc., 1988 and EPA, 1971.

4.9.2 Applicable Noise Standards

Tetra Tech reviewed Federal, state, and local level noise regulations applicable to the Project. At the Federal level, there are no noise regulations specific to transmission lines. At the state level, the NYSDEC has issued guidelines under the State Environmental Quality Review Act (SEQRA), which are defined as an allowable incremental increase, relative to existing acoustic conditions. The NYSDEC criterion is a suggested guideline for determining the threshold for the onset of potential of adverse noise impacts. There are no other State of New York noise standards applicable to the Project. The Project would traverse 5 counties, 19 towns, and one village between Marcy and New Scotland. As such, there are a number of local noise ordinances that by virtue of their general nature may also apply to transmission lines.

4.9.2.1 NYSDEC Noise Guidelines

In 2001, NYSDEC published a program policy titled *Assessing and Mitigating Noise Impacts*, which was intended to describe an approach for the evaluation of the potential community impacts from new sound sources. The NYSDEC method is based on the perceptibility of a new sound source and recommends limits relative to the existing acoustic environment at noise sensitive receptors (i.e., residences, schools, churches, etc.). In areas that are clearly not sensitive to noise, (i.e., undeveloped areas), the application of the NYSDEC criteria may not be necessary. Section V B(7)(c) of the policy states:

> *Increases ranging from 0-3 dB should have no appreciable effect on receptors. Increases from 3-6 dB may have potential for adverse noise impact only in cases where the most sensitive receptors are present. Sound pressure increases of more than 6 dB may require closer analysis of impact potential depending on existing sound pressure levels and the character of surrounding land use and receptors.*

Based on these guidelines, an increase of 6 dBA over the existing ambient background level is identified as the threshold for when adverse noise impacts may begin to occur. Incremental increases of less than 6 dBA have a lower likelihood of disturbance depending in part on individual sensitivities. For potential exceedances of the 6 dBA threshold, the program policy suggests a

Second Level Noise Impact Evaluation to assess potential exceedance conditions in more detail. However, further information or guidance on this second level evaluation is not included in the guidelines.

4.9.2.2 County Ordinances

None of the five counties (Albany, Oneida, Montgomery, Herkimer, and Schenectady) crossed by the Project have established noise ordinances, laws, or regulations that are applicable to the Project.

4.9.2.3 Town/Village Ordinances

A regulatory review of each municipality along the proposed transmission line was performed, as set forth in more detail in Exhibit 7 to the Application, regarding local laws. Of the 19 Towns crossed by the Project ROW, 9 have established noise ordinances, and the Village of Ilion has a noise ordinance.

The towns of Deerfield and Marcy within Oneida County are traversed by the Project ROW. Noise Level Standards (Local Law No.1 (2002) and Local Law No.2, (2008), respectively) for Deerfield and Marcy define unlawful noise as "any noise exceeding the ambient noise level at the property line of any property in such a manner plainly audible to involuntary listeners as to disturb the peace, quiet, and comfort of any reasonable person of normal sensitivities residing in the area." Construction noise generated during daytime hours (7:00 a.m. to 10:00 p.m.) is exempt.

Three of the six towns and the Village of Ilion within Herkimer County traversed by the Project ROW have established noise ordinances. The Towns of Schuyler and Little Flats and the Village of Ilion have nuisance-type ordinances with no prescribed numerical decibel limits. The Town of Danube does not include numerical decibel limits either, but Article III, Section 305, Uses Requiring Site Plan Approval, specifically says that all new developments that will produce operating noise exceeding local ambient levels require a "site plan review and approval before being undertaken, except those specifically exempted in Article III, Section 305 B."

None of the six towns within Montgomery County traversed by the Project ROW have established noise ordinances.

Two of three towns within Schenectady County traversed by the Project ROW have an established noise regulation. The Town of Duanesburg has a zoning ordinance, and in Section 14.6.3 it specifies a 70 dBA limit applicable at individual property lines. The Town of Rotterdam has general qualitative noise nuisance regulations.

Both of the towns within Albany County traversed by the Project ROW have established noise regulations. The guidance provided by the Town of New Scotland is mainly qualitative; however, New Scotland's Local Law No. 6 indicates that construction is prohibited outside the hours of 7:00 a.m. and 9:00 p.m., and the Town of Guilderland gives more comprehensive guidance.

The Town of Guilderland includes noise requirements in Local Law No. 6-2003, which are summarized in Table 4.9-2, below. In addition, the law says that a sound plainly audible at a distance of 50 feet from its source is considered a disturbance.

Table 4.9-2. Town of Guilderland Noise Limits

Receiving Property	Originating Property	Daytime Limit (7:00 a.m. – 10:00 p.m.), dBA	Nighttime Limit (10:00 p.m. – 7:00 a.m.), dBA
Residential	Residential	55	50
	Commercial, Industrial, or Public Property	75	50
Multi-dwelling Unit Building	Multi-dwelling Unit Building	50	45
Commercial or Industrial	Any Property	75	75

Table 4.9-3 provides a summary of the local noise regulations that may be applicable to the Project.

Table 4.9-3. Summary of Local Noise Requirements

Municipality	County	Noise Limit	Construction Exempt? (Yes/No)	Noise Ordinance Referenced
Town of Marcy	Oneida County	Exceeding Ambient	Yes (Daytime)	Local Law No.2
Town of Deerfield	Oneida County	Exceeding Ambient	Yes (Daytime)	Local Law No.1
Town of Schuyler	Herkimer County	Creating Adverse Effects	No	Article 14.21
Town of Frankfort	Herkimer County	Ambient + 6 dBA	No	NYSDEC
Village of Ilion	Herkimer County	Unreasonable Noise	No	Municipal Code §159-2
Town of German Flatts	Herkimer County	Ambient + 6 dBA	No	NYSDEC
Town of Little Falls	Herkimer County	Unreasonable Noise	No	Local Law No.1
Town of Stark	Herkimer County	Ambient + 6 dBA	No	NYSDEC
Town of Danube	Herkimer County	Exceeding Ambient (Requires Site Plan Approval)	No	Article III, Section 305
Town of Minden	Montgomery County	Ambient + 6 dBA	No	NYSDEC
Town of Canajoharie	Montgomery County	Ambient + 6 dBA	No	NYSDEC
Town of Root	Montgomery County	Ambient + 6 dBA	No	NYSDEC
Town of Glen	Montgomery County	Ambient + 6 dBA	No	NYSDEC
Town of Charleston	Montgomery County	Ambient + 6 dBA	No	NYSDEC
Town of Florida	Montgomery County	Ambient + 6 dBA	No	NYSDEC
Town of Duanesburg	Schenectady County	70 dBA	No	Zoning Ordinance Section 14.6.3

Table 4.9-3. Summary of Local Noise Requirements (continued)

Municipality	County	Noise Limit	Construction Exempt? (Yes/No)	Noise Ordinance Referenced
Town of Princetown	Schenectady County	Ambient + 6 dBA	No	NYSDEC
Town of Rotterdam	Schenectady County	Excessive, unnecessary or unusually loud noises	No	Town Code, Chapter 188
Town of Guilderland	Albany County	**Daytime**: Residential Property: • 55 dBA (from a Residential) • 75 dBA (from a Commercial, Industrial, or Public Property) Multi-level Property: • 50 dBA (from a Multi-level) Commercial/Industrial: • 75 dBA (from any Property) **Nighttime:** Residential Property: • 50 dBA (from any Property) Multi-level Property: • 45 dBA (from a Multi-level) Commercial/Industrial: • 75 dBA (from any Property)	No	Local Law No. 6-2003, Chapter 205-7
Town of New Scotland	Albany County	Unreasonably Loud	Yes (Daytime: 7:00 AM – 9:00 PM)	Local Law No. 6

4.9.3 Existing Conditions

Variations in acoustic environments are due in part to existing land uses, population density, proximity to transportation corridors, and existing recreational, commercial, and industrial sound sources. The Project noise analysis area consists of a wide range of land use types, including undeveloped natural areas, industrial and commercial land use, and mixed residential land use ranging from low density to medium densities. Diurnal effects result in sound levels that are typically quieter during the night than during the daytime, except during periods when evening and nighttime insect noise dominates in warmer seasons.

Ambient sound levels along the Project transmission line route vary due to the relatively long distance that the line would cover, encompassing settings with different acoustic characteristics. As a result, ambient sound levels associated with the transmission line were estimated using population density data from the US Census Block Group American Community Survey (US Census 2012) data and applying the matching ambient sound levels to published levels by the Federal Transit Administration (FTA) in its Transit Noise and Vibration Impact Assessment (FTA, 2006). Additionally, to more accurately characterize ambient sound levels near the Rotterdam Project substation a field reconnaissance and baseline sound survey was performed at noise-sensitive areas (NSAs) located near the substation. Therefore, ambient sound levels are broken into two sections for those areas along the transmission line and those areas near the Rotterdam substation. For other substations besides the Rotterdam substation, ambient noise levels may conservatively be assumed to be equivalent to those present in the nearby transmission line ROW. The ambient sound levels can then be used as the basis for determining the incremental increase in sound level produced by the Project, if any.

4.9.3.1 Project ROW Ambient Sound Levels

The existing acoustic environment along the Project ROW was estimated using the FTA general assessment of existing noise exposure based on population density per square mile. Population densities were obtained for US Census block groups intersecting the analysis area using the 2012 American Community Survey data. The densities range from 3,673 people/square mile in the most populated areas to 26 people/square mile in the least populated areas. Based on these population densities, the analysis area ranges from 36 dBA L_{dn} to 58 dBA L_{dn} according to FTA. Average sound levels in the analysis area range from 35 to 55 dBA L_{eq} during the day and 25 to 45 dBA L_{eq} at night. As indicated, ambient sound levels are variable across the Project area.

4.9.3.2 Rotterdam Substation Ambient Sound Levels

The Project includes upgrades to existing substations and a new Rotterdam substation and a new Princetown substation. Besides the Rotterdam substation area, baseline sound levels were not monitored at the existing substations that will receive upgrades since there will not be any changes to the operational noise footprint. Similarly, the new Princetown substation will be a 345 kV gas-insulated switchyard, which will not include any noise sources expected to be audible outside of utility property.

To provide a baseline for acoustic noise modeling for the new Rotterdam substation, ambient sound levels were monitored during April 2019. The monitoring locations, measurement methodology, and results of the baseline sound survey are summarized below; a detailed analysis of the operational noise performance of the new Rotterdam substation is provided in Appendix E.

The baseline sound survey for the new Rotterdam substation was conducted during April 9-16, 2019. Long term measurements were conducted at four monitoring positions continuously during the daytime (7:00 a.m. to 10:00 p.m.) and nighttime (10:00 p.m. to 7:00 a.m.) periods. Meteorological conditions during the measurement program were adequate for accurate data collection. A weather station was deployed at two of the noise monitor locations, LT-1 and LT-4, in order to capture the meteorological conditions during the monitoring period. The noise monitor stations and their monitoring results are described below.

- **LT-1**: This monitoring location on Gordon Road was situated approximately 2,700 feet south of the proposed substation location. Continuous daytime and nighttime measurements were taken from approximately 4:00 p.m. on April 9, 2019 to 4:00 p.m. on April 16, 2019. Observed sound sources included low level power line noise, periodic local roadway traffic from Gordon road, and natural sounds such as leaves rustling, wind, insects, and birds. The daytime and nighttime L_{90} ambient sound level corresponded to 40 dBA.

- **LT-2**: This monitoring location was approximately 1,300 feet north of Gordon Road and situated approximately 1,400 feet southwest of the proposed substation site. Continuous daytime and nighttime measurements were taken from approximately 5:00 p.m. on April 9, 2019 to 5:00 p.m. on April 16, 2019. Observed daytime sound sources included distant periodic local roadway traffic, and natural sounds such as leaves rustling, wind, and birds. Background ambient L_{90} levels ranged from 41 dBA to 52 dBA. The daytime L_{90} ambient sound level corresponded to 43 dBA while the nighttime L_{90} ambient sound level corresponded to 41 dBA.

- **LT-3**: This monitoring location was located in a lightly forested area outside the current Rotterdam substation approximately 800 feet east of the proposed substation site. The monitoring location is also 100 feet west of two railroad tracks, and 800 feet west of highway 890. Continuous daytime and nighttime measurements were taken from approximately 6:00 p.m. on April 9, 2019 to 10:00 a.m. on April 17, 2019. Observed daytime sound sources included highway traffic, frequent train noise, and natural sounds such as leaves rustling, wind, and birds. The daytime L_{90} ambient sound level corresponded to 59 dBA while the nighttime L_{90} ambient sound level corresponded to 57 dBA.

- **LT-4:** This long-term monitoring location was located at the eastern fence line of the current Rotterdam station, approximately 900 feet east of the proposed substation site. The monitoring location is also 100 feet west of two railroad tracks, and 600 feet west of highway 890. Continuous daytime and nighttime measurements were taken from approximately 4:00 p.m. on April 10, 2019 to 9:00 a.m. on April 17, 2019. Observed

daytime sound sources included highway traffic, frequent train noise, and natural sounds such as leaves rustling, wind, and birds. The daytime L_{90} ambient sound level corresponded to 63 dBA while the nighttime L_{90} ambient sound level corresponded to 61 dBA.

4.9.4 Project Effects and Mitigation (16 NYCRR § 86.5(b)(8))

4.9.4.1 Construction Noise

Transmission Line

Overhead transmission line construction is typically completed in the following stages, but various construction activities may overlap, with multiple construction crews operating simultaneously:

- Site access and preparation;
- Installation of structure foundations;
- Erecting of support structures; and
- Stringing of conductors, shield wire, and optical ground wire.

Work activities in proximity of any single NSA will occur periodically and will likely last no more than a total of a few weeks of activities, as construction moves along the corridor. Therefore, no one NSA will be exposed to significant noise levels for an extended period.

Construction of the Project will require the use of heavy equipment that will be periodically audible outside the immediate Project ROW. Construction may generate noise levels that exceed the ambient levels and have the potential to cause temporary and short-term noise impacts. The Applicant will make reasonable efforts to minimize the impact of noise resulting from construction activities.

Noise levels from overhead transmission line construction were evaluated using a screening-level analysis approach. The calculation methodology requires the input of the number and type of construction equipment by phase as well as typical noise source levels associated with that equipment. The results of this evaluation are estimated composite sound levels at 50 feet and 1,000 feet. Table 4.9-4 summarizes results for the five conceptual construction phases based on typical construction equipment lists. The composite noise levels consider the estimated time that equipment is in operation. The noise levels listed in the table are also conservatively representative of noise during removal of the existing transmission lines to be completed as part of the Project.

Due to the temporary nature of the transmission line construction, NSAs along the Project ROW will only be affected for a total of a few days up to a few weeks. Construction activities on the Project will generally be scheduled to occur during daylight hours six days per week (Monday through Saturday). However, construction activities could infrequently be scheduled outside of these hours to avoid or reduce schedule delays, to accommodate the schedule for system outages, or to address emergencies.

Table 4.9-4. Construction Phase Noise Levels for Overhead Line Construction

Phase No.	Construction Phase	Example Construction Equipment	Equipment Noise Level at 50 feet, dBA	Composite Noise Level at 50 feet, dBA	Composite Leq Noise Level at 1000 feet, dBA
1	Site Access and Preparation	Bulldozer Grader Roller – Compactor Loader Water Truck Dump Truck	86 82 73 78 80 80	85	51
2	Installation of Structure Foundations	Bulldozer Loader Backhoe-Loader Fork Lift Mobile Crane (2) Auger Rig Drill Rig Compressor Pump Portable Mixer Jackhammer Cement Mixer Truck Dump Truck Slurry Truck Specialty Truck Water Truck	86 78 80 80 82 85 87 81 83 82 90 80 80 80 75 80	91	56
3	Erecting of Support Structures	Forklift Mobile Crane Compressor Flatbed Truck (2) Water Truck Heavy Lift Helicopter	80 82 81 75 75 80 95	95	60
4	Stringing of Conductors, Shield Wire and Fiber Optic Ground Wire	Tracked Dozer Backhoe-Loader Compressor Line Puller Mixed Trucks Specialty Truck Specialty Truck Water Truck Light Helicopter	86 80 81 81 80 75 75 80 92	93	58

Data compiled in part from the following sources: FHWA, 1992, 2006; Bolt, Beranek and Newman, Inc., 1977.

Note: Data is provided for illustrative purposes only and may not be representative of final equipment used during Project construction.

Blasting

The 345 kV transmission monopole foundations will normally be installed using direct embedment, drilled pier, helical pier, and micropile/rock anchor; however, if hard rock is encountered within the planned drilling depth, blasting may be required to loosen or fracture the rock to reach the required depth to install the structure foundations. Locations where blasting may be required will be identified during the geotechnical engineering study. Blasting creates a sudden and intense airborne noise potential as well as local ground vibration. The ground vibration and airblast overpressures that cause concern or annoyance to residents are generally lower than relevant building damage threshold limits. Modern blasting techniques include electronically controlled ignition of multiple small explosive charges in an area of rock. The detonations are timed so that the energy from individual detonations destructively interferes with each other, which is called wave canceling. Impulse (instantaneous) noise from blasts could reach up to 140 dBA at the blast location attenuating to approximately 90 dBA at a distance of 500 feet from the blast.

Blasting is a short duration event as compared to rock removal methods such as using track rig drills, rock breakers, jack hammers, rotary percussion drills, core barrels, and/or rotary rock drills. If blasting is required, a blasting plan demonstrating compliance with all applicable state and local blasting regulations, including the use of properly licensed personnel and obtaining all necessary authorizations will be submitted for review and approval as part of the EM&CP for the Project.

Helicopters

Helicopters are planned for use during conductor, shield wire, and optical ground wire stringing operations during transmission line construction and may be used in areas where access is limited or where there are environmental constraints to accessing the site with standard construction vehicles and equipment. Helicopters generally fly at low altitudes, which would result in temporary increases to ambient sound levels in the area where the helicopter is operating as well as along its flight path. Sound exposure levels vary according to helicopter model and gross weight. When in flight at 200 feet, helicopters may generate noise levels of 89 dBA to 99 dBA at ground level receptors. Helicopter operations would occur for short periods during daytime hours.

Substations

Construction activities at the Project substations will generate noise that could temporarily affect offsite NSAs. Construction activities are expected to take up to approximately 18 months to complete at Rotterdam substation, with construction activities concluding more quickly at the other Project substations. Construction activities will typically be limited to daylight hours. Typical procedures for new substation construction are described below and are applicable to the new Rotterdam and Princetown substations. Work at other Project substation sites will be less extensive and is conservatively represented by the noise impact analysis that follows.

New substation construction will require creation of permanent access roads, clearing of vegetation, and grading the site until it is essentially flat. Secure fencing and a grounding system would typically be in place prior to the foundation installation. The substation equipment such as

the transformers and circuit breakers can then be mounted directly to the foundations. The control building is constructed, and high voltage bus work and conductors are installed.

Construction work for new substations would generally occur in one or more of the following general phases depending on the extent of site work required:

1. **Site clearing**: Prior to construction of the substation, the area is cleared of vegetation.
2. **Site grading and compaction**: The site is then graded and compacted in preparation for foundation installation.
3. **Trenching and foundations**: Trenches for cables running to the substation are constructed and the foundations are poured.
4. **Equipment pads**: Gravel and concrete equipment pads are installed prior to installation of the substation equipment; and
5. **Equipment installation**: Substation equipment (as applicable) such as switching equipment, reactors, and transformers is installed.

Equipment utilized for construction would differ from one phase to another. In general, heavy equipment (bulldozers, dump trucks, etc.) would be used during excavation and concrete pouring activities. Average estimated site sound levels for each phase of construction, which take into account the anticipated equipment operating time, are presented in Table 4.9-5 below.

Construction at the Project substations will be temporary in nature and is not expected to have any significant impact to the ambient noise environment at NSAs. In the event of unforeseen construction noise impacts, best management practices such as requiring mufflers on equipment with combustion engines and limiting simultaneous operation of noise generating equipment will be used to comply with applicable noise regulations.

Table 4.9-5. Construction Phase Noise Levels for Substation Construction

Phase No.	Construction Phase	Example Construction Equipment	Equipment Noise Level at 50 feet, dBA	Composite Noise Level at 50 feet, dBA	Composite Leq Noise Level at 1000 feet, dBA
1	Site Clearing	Brush Cutters Tracked Dozer Wheeled Tractor Wheeled Loader Wood Chipper Water Truck	81 88 80 80 91 80	91	56
2	Site Grading and Compaction	Scraper Tracked Dozer Grader Roller-Compactor Wheeled Loader Backhoe-Loader Water Truck	85 88 82 75 80 80 80	88	53
3	Trenching and Foundations	Excavator Backhoe-Loader Skid-Steer Loader Wheeled Loader Auger Rig Tracked Dozer Cement Mixer Truck Water Truck	80 80 70 80 85 88 80 80	87	53
4	Equipment Pads	Wheeled Loader Mobile Crane Forklift Flatbed Truck Dump Truck Cement Mixer Truck Water Truck	80 82 80 75 80 80 80	84	49
5	Equipment Installation	Compressor Mobile Crane Forklift Wheeled Loader Dump Truck Specialty Truck Water Truck	81 82 80 80 80 75 80	84	49

Data compiled in part from the following sources: FHWA, 1992, 2006; Bolt, Beranek and Newman, Inc., 1977.
Note: Table of results is subject to revision. Data is provided for illustrative purposes only and may not be representative of final equipment used during Project construction.

4.9.4.2 Operation and Maintenance Noise

Noise generated during Project operation will include sound sources associated with both transmission line and substation operation. Transmission line sound sources will primarily consist of corona noise in addition to Aeolian noise, and noise associated with maintenance activities. Operation of the transmission lines is not expected to cause any significant impact to the ambient environment. Ambient noise levels may rise during times of poor weather but are expected to remain compliant with applicable noise regulations.

Corona Noise

Corona noise is caused by the partial electrical breakdown of the insulating properties of air around the electrical conductors. Audible noise generated by corona on transmission lines has two major components. The higher frequencies of the broadband component distinguish it from more common outdoor environmental noise. The random phase relationship of the pressure waves generated by each corona source along a transmission line results in a characteristic sound commonly described as crackling, frying, or hissing. The second component is a lower-frequency sound that is superimposed over the broadband noise. The corona discharges produce positive and negative ions that, under the influence of the alternating electric field around alternating current conductors, are alternately attracted to and repelled from the conductors. This motion can establish a sound-pressure wave having a frequency twice that of the voltage; i.e., 120 hertz (Hz) for a 60-Hz system. Higher harmonics (e.g., 240 Hz) may also be present, but they are generally of lower significance (EPRI 2005). Corona activity increases with increasing altitude, and with increasing voltage in the line, but is generally not affected by system loading. The relative magnitude of hum and broadband noise may be different depending on weather conditions at the line. According to the Electric Power Research Institute (EPRI), when the line is wet (such as during rainy weather conditions), the broadband component typically dominates; however, under icing conditions the lower frequency components may be more prevalent.

Corona noise levels during precipitation may vary over a wide range. During the initial stages, when the conductors are not thoroughly wet, there may be considerable fluctuation in the noise level as the precipitation intensity varies. When the conductors are thoroughly wet, the noise fluctuations will often be less significant, since even as the intensity of precipitation diminishes, the conductors will still be saturated, which can result in corona discharge. The variation in noise levels during rain depends greatly on the condition of the conductor surface and on the voltage gradient at which the conductors are operating. At high operating gradients, the audible noise is less sensitive to rain rate than at low gradients. Consequently, the variation in noise levels is less for the higher gradients. In different weather conditions, the relative magnitudes of random noise and hum may be different. Noise levels in fog and snow usually do not attain the same magnitude as compared to rain, and elevated noise levels during fog and snow are usually for a shorter duration in proportion to the event (EPRI, 1982).

During fair weather conditions, corona occurs only at scratches or other imperfections in the conductor surface or where dust has settled on the line. These limited sources are such that the corona activity is minimal, and the audible noise generated is very low. Generally, the fair-weather

audible noise of transmission lines cannot be distinguished from ambient noise at the edge of the right-of-way.

Corona noise is not generally an issue at substations. The presence of equipment such as circuit breakers, switches, and measuring devices reduces the electromagnetic field gradient on the buses to a great extent. In addition, the distance from most of the buses to the perimeter of the substation may be considerable. Consequently, low levels of corona noise would likely not be readily detectable immediately outside the substation fence line (EPRI, 1982).

Aeolian Noise

In addition to corona noise, wind blowing across power lines and power poles can generate noise when airflow is non-laminar or turbulent. Aeolian, or wind noise is produced when a steady flow of wind interacts with a solid object, such as a tower. The interaction produces oscillating forces on the object which in turn can radiate sound as a dipole source at a given frequency.

The occurrence of Aeolian noise is dependent on several factors and is difficult to predict. Wind noise from a stationary source requires perfect conditions: the wind must blow in a specific direction at a specific speed, and for a enough time to produce any sound; a slight deviation in either the direction or intensity would disrupt the conditions necessary to produce noise. Wind can create a variety of sounds, ranging from a low hum to a snapping sound to a high whistle. Aeolian noise is not considered a significant contributor to noise disturbance and has not been considered further in the acoustic analysis.

Vegetation Management and Maintenance Activities

Vegetation management and routine maintenance activities will occur periodically but are not expected to result in significant noise generation. Traffic noise generated during Project maintenance will be of short duration and is not expected to result in adverse noise impacts. General maintenance would include on-site component repair or replacement.

Substations

The primary ongoing noise sources at substations are the transformers, which generate sound generally described as a low humming. There are three main sound sources associated with a transformer: core noise, load noise, and noise generated by the operation of the cooling equipment. The core vibrational noise is the principal noise source and does not vary significantly with electrical load.

Transformer noise varies with transformer dimensions, voltage rating, and design, and attenuates with distance. The noise produced by substation transformers is primarily caused by the load current in the transformer's conducting coils (or windings) and consequently the main frequency of this sound is twice the supply frequency (60 Hz). The characteristic humming sound consists of tonal components generated at harmonics of 120 Hz. Most of the acoustical energy resides in the fundamental tone (120 Hz) and the first 3 or 4 harmonics (240, 360, 480, 600 Hz).

Circuit-breaker operations may also cause audible noise, particularly the operation of air-blast breakers, which is characterized as an impulsive sound event of very short duration and expected to occur no more than a few times throughout the year. Because of its short duration and infrequent occurrence, circuit breaker noise was not considered in this analysis.

The only substation expected to produce operational noise as result of the Project will be the proposed Rotterdam Substation, which was sited to minimize noise impacts by locating the equipment adjacent to the existing Rotterdam and distant from any NSAs. This substation will include three 345-230 kV single phase transformers and six 345-115 kV single phase transformers. A detailed assessment of noise associated with the operation of the new Rotterdam Substation is provided in the *Acoustic Assessment for the Rotterdam Substation (July 2019)* included in Appendix E to this application, and the results of that assessment are summarized in Table 4.9-6 below.

Table 4.9-6. Acoustic Modeling Results: New Rotterdam Substation Operations

Monitoring Location	Nighttime Ambient L_{90}, dBA	Project Sound Level, dBA	Total Sound Level (Ambient + Project), dBA	Net Increase in Sound Level, dBA
LT-1	40	35	41	1
LT-2	41	43	45	4
LT-3	57	47	57	<1
LT-4	61	49	61	<1

As shown in Table 4.9-6, the proposed new Rotterdam substation is expected to result in an increase of 4 dBA relative to the existing nighttime ambient L_{90} background noise value at the monitoring location of maximum impact, an increase that is not considered to create an adverse noise impact based on NYSDEC guidance. The Applicant notes that the 4 dBA increase relative to the L_{90} background value presents an extremely conservative estimate of Project noise increases since it is based on the quietest 10% of nighttime hours. Sound level increases created by the new Rotterdam substation are not expected to be noticeable at the noise monitoring station locations compared to the average monitored noise levels (L_{eq}) since the maximum estimated increase would be 2 dBA or less. The report in Appendix E evaluates in detail the estimated operational noise levels associated with the new Rotterdam substation and demonstrates that the substation will comply with applicable noise regulations and NYSDEC guidance.

The proposed upgrades to existing substations are not expected to cause appreciable changes to the ambient noise environment. The new Princetown Substation does not include any noise generating equipment expected to be audible beyond the utility property boundary; thus, operations will not impact the ambient noise environment.

4.10 Electric and Magnetic Fields (16 NYCRR § 86.5(a), (b)(8))

A study has been performed which, through the use of computer models, assesses the expected electric and magnetic field (EMF) levels using Winter Normal Conductor ratings and clearances

as required by the New York State Public Service Commission. In general, the EMF levels at the right-of-way (ROW) edges are calculated to decrease as a result of the Project and all magnetic-field levels at the ROW edge are calculated to be below the magnetic-field standard of 200 milligauss (mG) for line loadings equal to the winter normal conductor ratings established by the Commission in its Statement of Interim Policy on Magnetic Fields of Major Electric Transmission Facilities.[4] Electric-field levels at the ROW edge are calculated to be below the electric-field standard of 1.6 kilovolts per meter (kV/m) established by the Commission in its Opinion No. 78-13[5] in all but two sections of the proposed route where existing electric-field levels are calculated to already exceed this standard and are not calculated to appreciably change as part of the Project. Project-related changes to the transmission-line configuration result in a reduction of existing magnetic-field levels below 200 mG in five sections of the route and a reduction of the existing electric-field levels below 1.6 kV/m in nine sections of the route. A detailed summary of the study and its results are included as Appendix F of this Application.

4.11 References

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[4] Case 26529, *Proceeding on Motion of the Commission as to Regulations Regarding Electric and Magnetic Field Standards for Transmission Lines*, Statement of Interim Policy on Magnetic Fields of Major Electric Transmission Facilities (issued and effective September 11, 1990).

[5] Case 26529, *Common Record Hearings on Health and Safety of Extra-High Voltage Transmission Lines*, Opinion and Order Determining Health and Safety Issues, Imposing Operating Conditions and Authorizing, in Case 26529, Operation Pursuant to Those Conditions (issued June 19, 1976).

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FIGURES

Figure 4.1-1. Project Overview Map

Figure 4.1-2. Project Scope Overview

Figure 4.4-1a. Visual Simulation, Route 80 East of Hallsville, Town of Minden, Montgomery County

Figure 4.4-1b. Visual Simulation, Lasher House – Levy Road, Town of Duanesburg, Schenectady County

Figure 4.4-1c. Visual Simulation, McNiven Farm, Town of Guilderland, Albany County

Figure 4.7-1. Delineated Wetlands in Proximity to NYSDEC Wetlands.

Figure 4.7-2. Groundwater Resources

Figure 4.8-1. Physiographic Provinces Near the Project Corridor

Figure 4.8-2. Bedrock Geology Near the Project Corridor

Figure 4.8-3. Surficial Geology Near the Project Corridor

Figure 4.8-4. Economic Geologic Resources Within 3 Miles of the Project Corridor