in this category, and most closely resembles the Mowed Roadside/Pathway community described by Reschke (1990). This community is dominated by grasses and forbs such as orchard grass, perennial rye grass, red clover and dandelion. This community is maintained through regular mowing along the Thruway. Other maintenance and transportation activities along the Thruway (e.g. snow removal, accidents, roadway repair) also result in periodic disturbance to this community. Outside of the Thruway ROW, other land uses grouped in this category include residential developments, commercial and industrial facilities, parking lots, storage yards and roads.

Agricultural Land

This community includes the Cropland/Row Crops, Cropland/Field Crops, Pastureland and Orchard communities described by Reschke (1990). Along the Thruway ROW, active agricultural land includes cornfields, hayfields, apple orchards and pasture land. This community occurs most commonly along the central (south of New Baltimore-north of Ramapo) portion of the Thruway ROW. Plant species in these areas are highly variable, and can include corn, alfalfa, clover, apple trees, timothy, orchard grass and other grasses. Like the previously described community, agricultural land receives regular disturbance in the form of mowing, plowing, pesticide application, grazing and/or harvesting.

Successional Old Field

Many open fields adjacent to the northern portion of the Thruway ROW (north of New Paltz) are abandoned agricultural fields/pastures in the early stages of secondary succession. An area of old field also occurs on the Upstate Converter Circuit 1 site. Areas defined as old field are dominated by grasses and forbs, with occasional scattered shrubs and tree saplings. Differences in plant species within this community often relate to past agricultural practices and the amount of time that has elapsed since farming operations ceased. Dominant grass species include bluegrass, orchard grass, and timothy, while the dominant broad-leaved herbaceous species include Queen Anne's lace, Canada goldenrod, red clover, heath aster, and teasel. Common tree saplings and shrubs that occur in these areas include honeysuckle, hawthorn, buckthorn, and gray dogwood.

Successional Shrubland

A significant portion of the Upstate Converter Circuit 2 site (approximately 75%), the Upstate Converter Circuit 1 site (approximately 30%) and numerous areas along the Thruway ROW are

characterized as successional shrubland. This community is quite variable in age and species composition, but is typically dominated by shrubs with some tree saplings and herbaceous plants. Dominant shrub species include multiflora rose, staghorn sumac, gray dogwood, and honeysuckle. Many of the younger shrub-dominated areas contain a relatively high proportion of herbaceous plants. Dominant herbaceous species in this community include timothy, orchard grass, wild strawberry, Queen Anne's lace, teasel, New England aster, heath aster, field thistle and red clover. In older shrubland, tree saplings, including white ash, sugar maple, black cherry, and box elder, also make up a significant component of the plant community.

Deciduous Forest

The most common ecological community adjacent to the Thruway ROW is deciduous forest. This community also makes up a significant component of the Upstate Converter Circuit sites. As with successional shrubland, this community is quite variable in age and species composition. This variability results from a number of environmental variables including past land use practices, slope aspect, soil type, and hydrologic regime. The forest community also varies geographically from the north to the south end of the Project. Within the study area, this community includes the Oak-Tulip Tree Forest,. Hemlock-Northern Hardwood Forest, and various Oak-Hickory Forest communities described by Reschke (1990). The forests along the Thruway ROW range from former hedgerows and early successional stands to relatively mature second growth forests. Early successional forest is found on the Upstate Converter Circuit 2 site. This site retains shrub and herbaceous species in the understory, while other young forest stands along the Thruway ROW are essentially devoid of understory vegetation. The shrub layer tends to vary based on the amount of available sunlight that comes through the tree overstory. Early successional forests are dominated by a variety of tree species, including red oak, sugar maple, white ash, shagbark hickory, red maple, and American beech. Where present, understory shrub and vine species include hawthorn, multiflora rose, apple, gray dogwood, staghorn sumac, wild grape and raspberries.

More mature deciduous forest occurs on the Upstate Converter Circuit 1 site and adjacent to the Thruway ROW in the more mountainous central portion of the study area. These stands tend to be dominated by sugar maple, red maple, red oak, basswood, beech, and white ash. Other species present in the lesser amounts or found in more restricted areas include American elm, shagbark hickory, black walnut, black cherry, black locust, white oak, and black oak. As in the early successional forests, the sapling and shrub layers in mature forest stands tend to be quite variable in species composition and density. Common saplings and shrubs include ash, sugar

maple, red maple, beech, hop hornbeam, and ironwood. The herbaceous layer includes species such as avens, sensitive fern, Virginia creeper, poison ivy, wood fern, mayapple and cinnamon fern.

Mixed Forest

Mixed deciduous/coniferous forests, as well as some pine and spruce plantations, occur along some portions of the Thruway ROW. Mixed forests are similar to the Appalachian Oak-Pine Forest, Hemlock-Northern Hardwood Forest and Pine-Northern Hardwood Forest communities described by Reschke (1990) and are typically dominated by eastern hemlock and eastern white pine. These areas occur primarily in the central and southern portion of the study area. Scattered conifer plantations also occur along the ROW. Most of these areas are in the range of 20-60 years old, and many are intermixed with deciduous tree and shrub species (although a few areas consist of solid strands of coniferous trees). Dominant species in the plantations include Scotch pine, Austrian pine, Norway spruce and red pine.

Freshwater Wetlands

Several areas of wetland occur on and adjacent to the Thruway ROW. All NYSDEC regulated Freshwater Wetlands are listed in Section 4.3.4.2. Wetlands along the Thruway ROW include wet meadow, emergent marsh, scrub-shrub wetland, and forested wetland community types. The various wetland community types found within the study area are described in general terms below.

Open water areas occur as small excavated ponds, lakes, reservoirs, rivers and streams. These water bodies range from small unnamed trout streams to the 3 mile wide Hudson River estuary.

Herbaceous wetlands include wet meadows and shallow and deep emergent marshes. These areas are dominated by herbaceous species including cattail, sensitive fern, sedges, rushes, rice cutgrass, purple loosestrife, and common reed.

Scrub-shrub wetland is found on the Upstate Converter Circuit 1 site and elsewhere along the Thruway ROW. These areas are characterized by low woody shrubs and occasional young trees/saplings. The dominant species in these areas include green ash, red-osier dogwood, and silky dogwood.

Forested wetland is found on the Upstate Converter Circuit 1 site and elsewhere along the Thruway ROW. This community is dominated by mature trees, with a lesser component of

shrub and herbaceous species. As with the upland forested areas, the forested wetlands vary in species composition, age, and plant density. The dominant tree species include red maple, silver maple, green ash, pin oak and American elm. Species occurring in the sapling and shrub layer include red maple, green ash, American elm, spicebush, buckthorn, and highbush cranberry. Although most had died back at the time of the field review, common herbaceous species likely include jumpseed, false nettle, Joe pye-weed, jewelweed, ostrich fern, swamp buttercup, and sensitive fern.

Wildlife Survey

Information concerning wildlife species and habitat within the study area was collected by reviewing published and unpublished data, and through a reconnaissance-level field survey. Published information concerning wildlife included the *New York State Breeding Bird Atlas* (Andrle and Carroll 1987), *Important Bird Areas in New York State* (Wells, 1998) and *Where to Find Birds in New York State* (Drennan, 1981). Other sources of data included NYSDEC freshwater wetland mapping, color infrared aerial photos, unpublished 2000-2003 Breeding Bird Atlas data, and NYSDEC Herp Atlas data. Responses to inquires to the NYSDEC and USFWS regarding possible listed threatened and endangered wildlife species occurrence have yet to be received.

The field survey was the primary means of identifying species of birds, mammals, reptiles, and amphibians found within the study area. Birds and mammals were documented through direct observation (visual as well as auditory) of species and/or their sign (nests, feathers, tracks, droppings, bones, etc.). Reptiles and amphibians were surveyed through systematic searches of wooded areas and wetlands. In searching for snakes and salamanders, rocks, logs, and other debris were turned over and examined.

Wildlife habitat areas were identified based on the 2000-2001 aerial photographs and field reconnaissance. In the course of field work, vegetative cover (overstory, understory, and ground cover) was broadly categorized in terms of species composition and structural character. The presence or absence of specific habitat elements was also noted. Similar habitat units were lumped into larger categories for descriptive purposes in this report.

Wildlife Species

Twenty-one different wildlife species were observed during the field survey. However, a total of almost 250 species could occur within the study area based on existing data, species range and

habitat conditions. A list of these species (common and scientific names), including those documented during the 2003 field survey, is presented in the Exhibit 4, Appendix C, Appendix A.

Birds

New York State Breeding Bird Atlas (BBA) data for the Project Route was drawn from 69 separate sampling blocks. These blocks are each five (5) km^2 in size, and include substantial areas of land well outside the study area. BBA data is thus not completely representative of the breeding bird population found within and adjacent to the Thruway ROW. However, it does indicate that over 150 species nest in the general region (Anderle and Carroll, 1987 and NYSDEC, Unpubl.). Field review during October 2003 documented the presence of 14 bird species. A list of all bird species documented by the BBA and observed in the field is included in Exhibit 4, Appendix C, Appendix A.

Bird species documented by the BBA include forest interior species (e.g. pileated wood pecker, scarlet tanager, wood thrush), grassland species (e.g. eastern meadowlark, savannah sparrow, bobolink), water birds (e.g. great blue heron, mallard, Canada goose), and brush/forest edge species (e.g. blue jay, gray catbird, yellow warbler). The vast majority of all species documented as occurring within or adjacent to the Thruway ROW are common forest edge, shrubland and open country bird species. Because of the timing and duration of the 2003 field survey, the observed species are primarily winter residents, plus a few fall migrants.

Several of the breeding and migrant/transient species known to occur in the area are currently considered rare in New York State, and are discussed below.

Mammals

Although birds have received the most documentation, mammals are also an important component of the area's wildlife population. However, little published or unpublished data was available concerning mammal occurrence within the study area. Approximately 40 mammal species are considered likely to occur in the area based on species range and habitat requirements. These include raccoon, eastern cottontail, red fox, beaver and whitetail deer. The actual occurrence of mammalian species within the study area was documented entirely through the October 2003 field survey, which included an assessment of habitat suitability. The survey indicated the likely occurrence of at least 15 mammal species within and adjacent to the ROW and Upstate Converter sites, of which six were observed during the 2003 field survey. Observed

species included whitetail deer, gray squirrel, meadow vole and eastern chipmunk. Because they are primarily nocturnal, migratory, and/or hibernating, bats were not identified during this survey. Relatively common bats such as eastern pipestrelle, little brown bat, big brown bat, red bat, hoary bat and silver-haired bat are all likely to occur in the area at some time. Similarly, widely distributed species of mice, moles and shrews, along with flying squirrels and weasels, also probably occur within the study area, although not documented in this survey.

No rare or unusual mammal species were observed, and based on existing habitat conditions, are considered unlikely to occur at the Upstate Converter sites or along the Project Route.

Reptiles and Amphibians

Other than the NYS Herp Atlas database, no data were available concerning herpetofauna. Herp Atlas data indicated that there are probably at least 45 species of reptiles and amphibians that occur within the area, of which only one was identified during the 2003 field survey. Common species of reptile and amphibian in the area likely include bull frog, green frog, American toad, red-backed salamander and northern leopard frog. Typically common, easily observable species such as spring peeper, snapping turtle, and northern water snake were not observed during this survey despite fairly thorough searching. This is probably due to the timing and duration of the survey, and should not be taken to mean that the species are absent.

Several state-listed threatened and special concern species have been documented as occurring in the general area. These species are described in the Threatened and Endangered Species portion of this section.

Fish

No existing fisheries or fish survey data were reviewed and no field sampling of water bodies along the Thruway ROW was conducted. However, based on the physical characteristics of the lakes, rivers and streams on or adjacent to the Thruway ROW, the fish species that reside there likely include cold water species (e.g. brook trout, brown trout, slimy sculpin), warm water species (e.g. largemouth bass, smallmouth bass, sunfish) and saltwater/estuarine species (e.g. American shad, striped bass, banded killifish).

Wildlife Habitat

A basic principle of wildlife ecology is that the distribution and abundance of any wildlife species is directly dependent upon the quality and quantity of available habitat. Habitat is

defined as the sum total of environmental factors (including food, cover, and water) that a given species of animal needs to survive and reproduce in a given area (Trefethen, 1964). The Thruway ROW is dominated by mowed grass, however, the surrounding area includes significant areas of early successional habitat (old field/shrubland), wetlands, and areas of mature deciduous forest. Each of these habitat types has particular elements that make it valuable to different species of wildlife.

Old Field Habitat

Old field habitat, including the mowed grass areas within the Thruway ROW is the dominant habitat within the study area and the one that will receive the most impact from Project construction. Outside of the Thruway ROW, these areas are typically former agricultural fields. Some of this habitat is characterized by grass-dominated fields, while other areas are dominated by broad leaved herbaceous species. Open grassland is becoming increasingly rare in New York State. Changes in land use and agricultural practices, as well as natural succession, continue to reduce this habitat type across the state. Large unmowed fields of grass and low herbaceous vegetation are essential habitat for open country bird species such as meadowlark, bobolink, killdeer, horned lark and several species of sparrow (vesper, savannah, and grasshopper). Open fields provide food (seeds) and nestling cover for many of these species. These open areas also harbor abundant insect populations. They therefore represent important foraging sites for many breeding birds. Isolated trees (alive and dead) and hedgerows in these areas provide singing and foraging perches for various songbirds and raptors. Old fields also provide habitat for eastern cottontail, woodchuck and numerous species of small mammal. These species provide a prey base for predators such as hawks, owls, fox and coyote. The old field/mowed grass areas within the Thruway ROW are limited in value to many of these species due to their small size and the disturbance created by ongoing Thruway ROW maintenance (mowing) and adjacent vehicle traffic.

Hedgerow/Shrub Habitat

Many areas outside of the maintained Thruway ROW, as well as significant portions of the Upstate Converter sites, are shrub-dominated communities. This habitat type is perhaps the most common, abundant land use in the state (NYSDEC, 1989). However, it is ephemeral (10-20 years in duration), representing an intermediate successional stage between old field and deciduous forest. Certain bird species, such as cuckoos, gray catbird, brown thrasher, eastern kingbird, American goldfinch, indigo bunting, common yellowthroat and blue-winged warbler, specifically require low bushy vegetation for nesting and escape cover. Shrub species such as

highbush cranberry, gray dogwood, wild grape, honeysuckle, sumac, brambles, hawthorn, and apple, are common in these areas. These shrubs produce fruit that are highly palatable to mammals such as raccoon, skunk and opossum, and birds such as robin, flicker, cardinal, blue jay, cedar waxwing and ruffed grouse. The fruits also attract insects, which in turn provide food for a variety of insectivorous birds that reside in or migrate through the area (e.g. flycatchers, vireos and wood warblers). Successional shrubland also provide food and cover for mammals such as whitetail deer, red fox and eastern cottontail. Hedgerows, along with providing food and cover, provide singing and foraging perches for songbirds and raptors, and travel corridors for deer and other larger mammals.

Deciduous Forest Habitat

The most common habitat type adjacent to the Thruway ROW, and a significant portion of the Upstate Converter Circuit 1 site, is deciduous forest. As mentioned previously, forested areas are variable in terms of species composition, canopy coverage and structural complexity. Many of the mature forested areas within the study area contain habitat elements that make them attractive to a variety of wildlife species. They include tree species that are important sources of food for wildlife, such as oaks, hickories, black cherry, and beech. These trees produce large quantities of nuts and berries which are eaten by squirrels, deer, wild turkey, songbirds and small mammals.

Another important feature of the mature forested areas on the Upstate Converter Circuit 1 site and in some areas adjacent to the Thruway ROW is the general abundance of deadwood. Dead trees, branches and logs all provide food and cover for various wildlife species. Standing deadwood is essential to some species, while others require deadwood that has fallen to the ground. The main function of fallen deadwood is to provide cover and a site for feeding and reproduction. Standing deadwood (trees and branches) provides foraging sites of insectivorous birds such as woodpeckers, nuthatches, brown creeper and black-and-white warbler. In addition, numerous birds nest and/or roost in dead or deteriorating trees. Mammals such as gray squirrel, flying squirrel and raccoon also use tree cavities for shelter and reproduction (utilizing both live and dead trees), while migratory bats are known to roost under loose bark.

Many of the forested areas within the study area display high foliage height diversity and structural complexity, characteristics typically associated with high bird species diversity (MacArthur et al. 1966). The contiguous forest canopy found in certain areas along the central portion of the Thruway ROW is important in attracting migrating songbirds to these areas, and provides habitat for woodland bird species. The size of the forested areas, particularly in the

Catskill region, is also important. Larger size provides solitude and protection from predators and nest parasitism by cowbirds (a species typical of forest edges). Large forested areas are thus suitable for forest interior species such as scarlet tanager, rose-breasted grosbeak, wood thrush, veery, red-eyed vireo, ovenbird, Canada warbler and black-and-white warbler. However, nowhere along the Thruway ROW do forest interior conditions exist. The entire route is exclusively forest edge due to the presence of the cleared Thruway ROW.

Mixed Forest Habitat

Occurring primarily in the central and southern portions of the study area are forests with a mix of deciduous trees and conifers (primarily white pine, eastern hemlock and red cedar). The area also includes some small blocks of planted conifers. Habitats with at least a sprinkling of conifers are preferred by many bird species (e.g. solitary vireo, mourning dove, red-breasted nuthatch, hermit thrush, golden-crowned kinglet, red crossbill, cedar waxwing and purple finch). Conifers provide food and/or nesting, escape and winter cover for these species. A mixed stand of conifers and deciduous trees will generally carry a greater diversity of forest-dwelling songbirds than a pure stand of either type alone (Hassinger et al., 1979). Conifers provide important thermal (winter) and escape cover for deer and provide a primary food source (seeds) for red squirrels. Large blocks of conifers that lack understory vegetation generally are limited in terms of their wildlife habitat value. However, smaller irregularly shaped patches of conifers located near brushy areas or herbaceous openings provide the most effective cover for a wide variety of species.

Water/Wetland Habitat

Water is one of the habitat elements all wildlife species require, and is important for a number of reasons. Along with being used for drinking and bathing, water bodies also provide food for numerous wildlife species. Open water within the study area occurs in the form of small ponds, rivers and streams. These areas provide habitat for waterfowl, wading birds, turtles and frogs. They also support populations of fish, frogs, insects and other invertebrates, which are the basic food items of many species of songbirds, wading birds, and bats. Major water bodies within the study area include the Hudson River, Catskill Creek, Esopus Creek, Rondout Creek, Wallkill River, Orange Lake, Chadwick Lake, Moodna Creek, Ramapo River, Mahwah River and DeForest Lake. These water features provide habitat for a variety of fish as well as aquatic and terrestrial wildlife species.

Wetlands and riparian zones are used by wildlife disproportionately more than other types of habitat. Wetlands that are dominated by trees and shrubs typically include varying amounts of standing and fallen dogwood. Standing deadwood provides important singing perches for breeding songbirds and foraging perches for aerial insectivores such as eastern kingbird, phoebe and swallows. It also provides a nesting substrate and foraging area for woodpeckers, wood duck and other cavity nesters. Thick wetland shrubs provide cover, perches, and feeding sites for numerous birds, including herons, flycatchers and red-winged blackbird.

Disturbed Habitat

The remaining habitat areas within the study area are referred to as disturbed. These areas are characterized by houses, commercial and industrial structures, paved parking areas, and roads, intermixed with regularly mowed grass and occasional trees and shrubs. These areas are all subject to disturbance from fairly intensive human activity. Mowed lawn and landscaped areas within disturbed/developed areas are used for foraging by certain birds (robin, starling, flicker, Canada goose) and mammals (eastern cottontail, voles, etc.) However, the habitat value of these areas is generally limited due to a lack of adequate cover and fairly intense human disturbance. These areas typically receive irregular use by a limited number of wildlife species. Although the Thruway ROW more closely resembles old field habitat in most places, it also includes many of the features typical of disturbed habitat, including the presence of built features and intense human activity (i.e., vehicular traffic).

Threatened and Endangered Species

The NYS Breeding Bird Atlas, the NYS Herp Atlas and observations of habitat conditions along the corridor indicate that up to 28 species listed as endangered, threatened or special concern in New York State could occur in the study area. These species include 19 birds, two mammals, and seven reptiles and amphibians. These species are listed in Table 4.3.11-2:

Table 4.3.11-2
Listed Endangered, Threatened and Special Concern Wildlife Species

Species	NYS Listing[1]	Federal Listing
Birds		
Common Nighthawk	SC	-
Northern Harrier	T	-
Sharp-shinned Hawk	SC	-
Northern Goshawk	SC	-
Whip-poor-will	SC	-

Species	NYS Listing[1]	Federal Listing
Vesper Sparrow	SC	-
Red-shouldered Hawk	SC	-
Cooper's Hawk	SC	-
Bald Eagle	T	T
Peregrine Falcon	E	-
Osprey	SC	-
Red-headed Woodpecker	SC	-
Least Bittern	T	-
American Bittern	SC	-
Grasshopper Sparrow	SC	-
Pied-billed Grebe	T	-
Upland Sandpiper	T	-
Horned Lark	SC	-
Golden-winged Warbler	SC	-
Mammals		
Allegheny Wood Rat[2]	E	-
Indiana Bat	E	E
Reptiles and Amphibians		
Timber Rattlesnake	T	-
Jefferson's Salamander	SC	-
Blue-spotted Salamander	SC	-
Marbled Salamander	SC	-
Spotted Turtle	SC	-
Eastern Box Turtle	SC	-
Eastern Hognose Snake	SC	-

[1]E = endangered, T = threatened, SC = special concern
[2]Believed to be extirpated from New York State

The species listed in this table inhabit a wide range of habitats, from grassland to forest to open water. Although the Project Route may pass in proximity to such habitat, the disturbed/early successional habitat that dominates the Thruway ROW and Converter sites represents potential habitat for few of these species. The golden-winged warbler could utilize shrub-dominated communities such as those that occur on the Upstate Converter Circuit 2 site. The forested wetlands on the Upstate Converter Circuit 1 site are suitable as seasonal breeding habitat for Jefferson's and blue-spotted salamander, but their presence on the site has not been documented. In addition, peregrine falcons have been reported as nesting on the Tappan Zee Bridge (NYSDEC, Unpubl.). None of the other species listed in above table are considered likely to

occur within the Project area due to a lack of suitable habitat and/or the presence of intensive human/vehicular activity.

Westchester County and New York City

This section characterizes the existing plant communities, and wildlife present along the Project Route within the proposed rights-of-way south of the Tappan Zee Bridge. This section also analyzes potential impacts, if any, to these communities as a result of the construction and operation of the Project. The Project Route does not contain unusual or unique ecological communities. The onsite vegetation species are primarily disturbance-tolerant and early successional grasses and forbs. There are no wetlands or aquatic resources directly within the Project Route. The few wildlife species that are present include species adapted to disturbed habitats and likely to use these ROW's. No threatened or endangered species are known to inhabit the Project Route, except for the peregrine falcon as discussed above. The construction and operation of the Project from the Tappan Zee Bridge to the Downstate Converters Circuit 1 and Consolidated Edison's Rainey 345 kilovolt AC Substation will not result in adverse effects to terrestrial ecology or wetland resources.

Flora, Fauna and Protected Species

Unlike the upland habitats of the segment north of the Tappan Zee Bridge, the south segment is quite different due to the linear isolation of the railroad right-of-way and the "urban ecology" of New York City. Information in this section is based on a review of existing publications and agency consultation. Construction, operation, and maintenance of the Project has the potential to have some, limited impact on habitat and associated wildlife. Cable routes and installation methods have been chosen to minimize or eliminate the potential for impacts on habitat and wildlife.

Flora

The highly disturbed nature of the rights-of-way greatly impacts the type, variety and number of species expected to be found in the vicinity of the Project. Based on conversations with Dr. Margaret B. Gargiullo, Ph.D., a plant ecologist with the New York City Parks Department, Table 4.3.11-3 provides a list of common plants of open sites and successional growth (mostly shade intolerant) in New York City. The habitats of these plants vary from dry sandy soil to wet ditches and swales. Not included are emergent wetland plants, except those found in ditches and weedy wetlands.

Table 4.3.11-3 Disturbed Area Plants – New York City and Vicinity[1]

- * = Non-native;
- (*)= Native to nearby regions of N. America (southeast, Midwest etc.).
- ! = Invasive

TREES

Genius & species	*Common Name*	Family	Origin	Invasive Status
Acer negundo	Boxelder	Aceraceae		
Acer rubrum	Red maple	Aceraceae		
Acer saccharinum	Silver maple	Aceraceae		
Ailanthus altissima	Tree of heaven	Simaroubaceae	*	!
Betula populifolia	Gray birch	Betulaceae		
Fraxinus pensylvanica	Green ash	Oleaceae		
Juglans nigra	Black walnut	Juglandaceae		
Juniperus virginiana	Red cedar	Cupressaceae		
Liquidambar styraciflua	Sweet gum	Hamamelidaceae		
Morus alba	White mulberry	Moraceae	*	!
Nyssa sylvatica	Black tupelo	Cornaceae		
Paulownia tomentosa	Princess tree	Bignoniaceae	*	!
Populus deltoids	Eastern Cottonwood	Salicaceae		
Populus grandidentata	Big-toothed aspen	Salicaceae		
Prunus serotina	Black cherry	Rosaceae		
Pyrus calleryana	Callery pear	Rosaceae	*	!
Pyrus malus	Apple, Crabapple	Rosaceae	*	
Quercus palustris	Pin oak	Fagaceae		
Robinia pseudoacacia	Black locust	Fabaceae	(*)	!
Salix fragilis	Crack willow	Salicaceae	*	!
Salix nigra	Black willow	Salicaceae		
Sassafras albidum	Sassafras	Lauraceae		
Ulmus Americana	American elm	Ulmaceae		
Ulmus rubra	Slippery elm	Ulmaceae		

SHRUBS

Genius & species	*Common Name*	Family	Origin	Invasive Status
Comptonia peregrina	Sweet fern	Myricaceae		
Cornus amomum (*C. obliqua*)	Silky dogwood	Cornaceae		
Cornus mas	Cornelian cherry	Cornaceae	*	
Cornus racemosa (*C.*	Gray dogwood / red-	Cornaceae	*	

SHRUBS

Genius & species	*Common Name*	Family	Origin	Invasive Status
foemina)	panicled dogwood			
Elaeagnus angustifolia	Russian Olive	Elaeagnaceae	*	!
Elaeagnus umbellate	Autumn Olive	Elaeagnaceae	*	!
Ligustrum vulgare	Common privet	Oleaceae	*	
Lonicera maackii	Amur honeysuckle	Caprifoliaceae	*	!
Lonicera morrowii	Fly honeysuckle	Caprifoliaceae	*	!
Lonicera tatarica	Tatarian honeysuckle	Caprifoliaceae	*	!
Myrica pensylvanica	Northern bayberry	Myricaceae		
Philadelphus coronaries	Mock-orange	Hydrangeaceae	*	
Rhamnus cathartica	Common buckthorn	Rhamnaceae	*	!
Rhus copallinum	Shining/winged sumac	Anacardiaceae		
Rhus glabra	Smooth sumac	Anacardiaceae		
Rhus typhina	Staghorn sumac	Anacardiaceae		
Rosa multiflora	Multiflora rose	Rosaceae	*	!
Rubus allegheniensis	Common blackberry	Rosaceae		
Rubus occidentalis	Black raspberry	Rosaceae		
Rubus phoenicolasius	Wineberry	Rosaceae	*	!
Salix discolor	Pussy willow	Salicaceae		
Sambucus Canadensis	Elderberry	Caprifoliaceae		
Vaccinium corymbosum	Highbush blueberry	Ericaceae		
Viburnum dentatum	Arrowwood	Caprifoliaceae		
Viburnum prunifolium	Blackhaw Viburnum	Caprifoliaceae		

WOODY VINES

Genius & species	*Common Name*	Family	Origin	Invasive Status
Ampelopsis brevipedunculata	Porcelain-berry	Vitaceae	*	!
Campsis radicans	Trumpet creeper	Bignoniaceae	(*)	
Celastrus orbiculatus	Oriental bittersweet	Celastraceae	*	!
Clematis terniflora	Yam-leaved Clematis	Ranunculaceae	*	
Clematis virginiana	Virgin's bower	Ranunculaceae		
Lonicera japonica	Japanese honeysuckle	Caprifoliaceae	*	!
Parthenocissus quinquefolia	Virginia creeper	Vitaceae		
Rubus flagellaris	Northern dewberry	Rosaceae		
Smilax glauca	Cat-briar	Smilacaceae		
Smilax rotundifolia	Greenbrier	Smilacaceae		
Solanum dulcamara	Bittersweet nightshade	Solanaceae	*	!

WOODY VINES

Genius & species	*Common Name*	Family	Origin	Invasive Status
Toxicodendron radicans (*Rhus r.*)	Poison ivy	Anacardiaceae		
Wisteria floribunda	Japanese wisteria	Fabaceae	*	!

HERBS, VINES & GRASSES

Genius & species	*Common Name*	Family	Origin	Invasive Status
Abutilon theophrasti	Velvet-leaf	Malvaceae		
Achillea millefolium	Yarrow	Asteraceae		
Agrostis gigantean (*A. alba*)	Redtop	Poaceae	*	
Agrostis stolonifera	Creeping bent-grass	Poaceae	*	
Allium vineale	Field garlic	Liliaceae	*	!
Amaranthus blitum (*A. lividus*)	Amaranth	Amaranthaceae	*	
Amaranthus hybridus	Smooth pigweed	Amaranthaceae	*	
Amaranthus retroflexus	Red pigweed	Amaranthaceae	*	
Ambrosia artemisiifolia	Common ragweed	Asteraceae		
Ambrosia trifida	Great ragweed	Asteraceae		
Andropogon virginicus	Broom sedge	Poaceae		
Anthoxanthum odoratum	Sweet vernal grass	Poaceae	*	
Apocynum cannabinum	Indian hemp	Apocynaceae		
Arctium minus	Common burdock	Asteraceae	*	
Artemisia vulgaris	Mugwort	Asteraceae	*	!
Aristida dichotoma	Churchmouse three-awn	Poaceae		
Asclepias incarnata	Swamp milkweed	Asclepiadaceae		
Asclepias syriaca	Common milkweed	Asclepiadaceae		
Aster ericoides	Many-flowered aster	Asteraceae		
Aster laevis	Smooth aster	Asteraceae		
Aster lanceolatus (*A. simplex*)	Lined aster	Asteraceae		
Aster novae-angliae	New England aster	Asteraceae		
Aster pilosus (*Symphyotrichum pilosum*)	Awl aster	Asteraceae		
Aster racemosus (*A. vimineus*)	Small white aster	Asteraceae		
Barbarea vulgaris	Yellow rocket/winter cress	Brassicaceae	*	
Bidens bipinnata	Spanish needles	Asteraceae		
Bidens frondosa	Beggar ticks	Asteraceae		

HERBS, VINES & GRASSES

Genius & species	*Common Name*	Family	Origin	Invasive Status
Bromus inermis	Smooth brome	Poaceae	*	
Bromus japonicus	Japanese chess	Poaceae	*	
Bromus sterilis	Barren brome	Poaceae	*	
Bromus tectorum	Junegrass Downy chess cheat	Poaceae	*	!
Calystegia sepium (*Convolvulus s.*)	Hedge-bindweed	Convolvulaceae	*	
Capsella bursa-pastoris	Shepherd's purse	Brassicaceae	*	
Carex crinita	Crinkled sedge	Cyperaceae		
Carex lurida	Shallow sedge	Cyperaceae		
Carex scoparia	Pointed broom	Cyperaceae		
Carex stipata	Sedge	Cyperaceae		
Carex vulpinoidea (*C. annectens*)	Fox sedge	Cyperaceae		
Centaurea maculosa	Spotted knapweed	Asteraceae	*	!
Cerastium vulgatum (*C. fontanum*)	Mouse-ear Chickweed	Caryophyllaceae	*	
Chamaecrista fasciculate (*Cassia f.*)	Partridge-pea	Caesalpiniaceae		
Chamaecrista nictitans (*Cassia n.*)	Wild sensitive plant	Caesalpiniaceae		
Chenopodium album	Lamb's quarters/ pigweed	Chenopodiaceae	*	
Chenopodium ambrosioides	Mexican tea / Wormseed	Chenopodiaceae	*	
Cichorium intybus	Chicory	Asteraceae	*	
Cirsium arvense	Canada thistle	Asteraceae	*	!
Cirsium vulgare	Bull thistle	Asteraceae	*	
Convolvulus arvensis	Field bindweed	Convolvulaceae	*	
Conyza Canadensis (*Erigeron c.*)	Horseweed	Asteraceae		
Corynephorus canescens	Gray hairgrass	Poaceae	*	
Cuscuta gronovii	Common dodder	Cuscutaceae		
Cycloloma atriplicifolium	Winged pigweed	Chenopodiaceae	(*)	
Cyperus esculentus	Yellow nutsedge/ Chufa	Cyperaceae		
Cyperus iria	Sedge	Cyperaceae	*	
Cyperus strigosus	False nutsedge	Cyperaceae		
Dactylis glomerata	Orchard grass	Poaceae	*	
Datura stramonium	Jimsonweed	Solanaceae	*	
Daucus carota	Queen Ann's lace	Apiaceae	*	
Desmodium paniculatum	Panicled tick trefoil	Fabaceae		

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Genius & species	*Common Name*	Family	Origin	Invasive Status
Dianthus armeria	Deptford pink	Caryophyllaceae	*	
Digitaria ischaemum	Smooth crab-grass	Poaceae	*	
Digitaria sanguinalis	Northern crab-grass	Poaceae	*	
Diodia teres	Poorjoe, buttonweed	Rubiaceae		
Echinochloa crusgalli var. *crusgalli*	Barnyard grass	Poaceae	*	
Echinochloa muricata	Barnyard grass	Poaceae		
Echinocystis lobata	Wild cucumber	Cucurbitaceae		
Eleocharis ovata (*E. obtusa*)	Blunt spikerush	Cyperaceae		
Eleocharis tenuis	Spike-rush	Cyperaceae		
Eleusine indica	Yard grass/ goose grass	Poaceae	*	
Elytrigia repens (*Agropyron r.*)	Quack/ witch grass	Poaceae	*	
Erechtites hieracifolia	Pilewort fireweed	Asteraceae		
Erigeron annuus	Daisy fleabane	Asteraceae		
Erigeron philadelphicus	Philadelphia fleabane	Asteraceae		
Equisetum arvense	Field Horsetail	Equisetaceae		
Eragrostis cilianensis	Stink-grass	Poaceae	*	
Eragrostis curvula	Weeping lovegrass	Poaceae	*	!
Eragrostis pectinacea	Carolina lovegrass	Poaceae		
Eragrostis spectabilis	Purple lovegrass	Poaceae		
Erigeron annuus	Daisy fleabane	Asteraceae		
Eupatorium fistulosum	Hollow-stemmed joe-pye weed	Asteraceae		
Eupatorium hyssopifolium	Hyssop-leaved boneset	Asteraceae		
Eupatorium maculatum	Spotted joe-pye weed	Asteraceae		
Eupatorium perfoliatum	Boneset	Asteraceae		
Euphorbia maculata (*Chamaesyce m.*)	Eyebane	Euphorbiaceae		
Euthamia graminifolia (*Solidago g.*)	Lance-leaved goldenrod	Asteraceae		
Euthamia tenuifolia (*Solidago t., E. minor*)	Flat-topped goldenrod	Asteraceae		
Festuca elatior (*F. arundinacea*)	Tall fescue	Poaceae	*	
Festuca pratensis	Meadow fescue	Poaceae	*	
Festuca rubra	Red fescue	Poaceae	*	
Galinsoga quadriradiata (*G. ciliata*)	Galinsoga quickweed	Asteraceae	*	

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Genius & species	*Common Name*	Family	Origin	Invasive Status
Galium aparine (including *G. spurium*)	Bedstraw cleavers	Rubiaceae		
Gnaphalium obtusifolium	Sweet everlasting	Asteraceae		
Hemerocallis fulva	Day lily	Liliaceae	*	!
Hibiscus Moscheutos (*H. palustris*)	Rose-mallow	Malvaceae		
Hieracium caespitosum (*H. pratense*)	Field hawkweed	Asteraceae	*	
Hieracium piloselloides (*H. florentinum*)	King-devil	Asteraceae	*	
Humulus japonicus	Japanese hops	Cannabaceae	*	!
Holcus lanatus	Velvet grass	Poaceae	*	
Hordeum jubatum	Squirreltail grass	Poaceae	(*)	
Hypericum perforatum	Common St. John's-wort/Klamath weed	Clusiaceae	*	
Hypochoeris radicata	Cat's ear	Asteraceae	*	
Impatiens capensis (*I. biflora*)	Jewelweed	Balsaminaceae		
Juncus acuminatus	Taper-tip rush	Juncaceae		
Juncus effuses	Soft rush	Juncaceae		
Juncus tenuis	Path rush	Juncaceae		
Lactuca Canadensis	Wild lettuce	Asteraceae		
Lolium perenne	Perennial ryegrass	Poaceae	*	
Lactuca serriola (*L. scariola*)	Prickly lettuce	Asteraceae	*	
Lamium purpureum	Red dead nettle	Lamiaceae	*	
Leonurus cardiaca	Motherwort	Lamiaceae	*	
Lepidium virginicum	Poor-man's pepper	Brassicaceae		
Lespedeza capitata	Round-headed bush-clover	Fabaceae		
Lespedeza cuneata	Chinese Lespedeza	Fabaceae	*	
Linaria Canadensis	Blue Toadflax	Scrophulariaceae		
Linaria vulgaris	Butter-and-eggs / yellow toadflax	Scrophulariaceae	*	
Lotus corniculatus	Bird's-foot trefoil	Fabaceae	*	
Lycopus americanus	Water horehound	Lamiaceae		
Lysimachia ciliata	Fringed loosestrife	Primulaceae		
Lythrum salicaria	Purple loosestrife	Lythraceae	*	!
Matricaria matricarioides (*M. discoidea*)	Pineapple-weed	Asteraceae	*	
Medicago lupulina	Black medick	Fabaceae	*	
Melilotus alba	Sweet white clover	Fabaceae	*	

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Genius & species	*Common Name*	Family	Origin	Invasive Status
Melilotus officinalis	Sweet yellow clover	Fabaceae	*	
Microstegium vimineum (*Eulalia v.*)	Japanese stilt grass	Poaceae	*	!
Oenothera biennis	Evening Primrose	Onagraceae		
Oxalis stricta	Common/European wood sorrel	Oxalidaceae		
Panicum clandestinum	Deer-tongue grass	Poaceae		
Panicum dichotomiflorum	Fall panic grass	Poaceae		
Panicum lanuginosum var. *fasciculatum*	Panic grass	Poaceae		
Panicum villosissimum	Panic grass	Poaceae		
Panicum virgatum	Switchgrass	Poaceae		
Pastinaca sativa	Wild parsnip	Apiaceae	*	!
Penthorum sedoides	Ditch stonecrop	Saxifragaceae		
Phleum pratense	Timothy	Poaceae	*	
Phragmites australis (*P. communis*)	Common reed	Poaceae	!	
Phytolacca americana	Pokeweed	Phytolaccaceae		
Plantago major	Common plantain	Plantaginaceae	*	
Poa annua	Low spear grass	Poaceae	*	
Plantago lanceolata	English plantain	Plantaginaceae	*	
Poa compressa	Canada bluegrass	Poaceae	*	
Poa pratensis	Kentucky bluegrass	Poaceae	*	
Polygonum arenastrum	Door weed	Polygonaceae	*	
Polygonum arifolium	Halberd-leaved tearthumb	Polygonaceae		
Polygonum aviculare	Prostrate knotweed	Polygonaceae	*	
Polygonum convolvulus	Black bindweed	Polygonaceae	*	
Polygonum cuspidatum (*Reynoutria japonica, Fallopia j.*)	Japanese knotweed	Polygonaceae	*	!
Polygonum hydropiper	Water pepper	Polygonaceae	*	
Polygonum hydropiperoides	False water-pepper	Polygonaceae		
Polygonum lapathifolium	Nodding smartweed	Polygonaceae		
Polygonum pensylvanicum	Pennsylvania smartweed	Polygonaceae		
Polygonum perfoliatum	Mile-a-minute vine	Polygonaceae(West chester)	*	!
Polygonum persicaria	Lady's thumb	Polygonaceae	*	
Polygonum sachalinense (*Reynoutria s.*)	Giant knotweed	Polygonaceae	*	!

Genius & species	*Common Name*	Family	Origin	Invasive Status
Polygonum scandens	Climbing false buckwheat	Polygonaceae		
Portulaca oleracea	Purslane	Portulacaceae	*	
Potentilla argentea	Silvery cinquefoil	Rosaceae	*	
Potentilla norvegica	Rough cinquefoil	Rosaceae	*	
Potentilla recta	Rough-fruited cinquefoil	Rosaceae	*	
Potentilla simplex	Common cinquefoil	Rosaceae		
Prunella vulgaris	Heal-all/self-heal	Lamiaceae	*	
Pueraria lobata	Kudzu-vine	Fabaceae	*	!
Ranunculus acris	Common buttercup	Ranunculaceae	*	
Ranunculus ficaria	Lesser celandine	Ranunculaceae	*	!
Ranunculus sceleratus	Cursed crowfoot	Ranunculaceae		
Rudbeckia hirta var. *pulcherrima*	Black-eyed Susan	Asteraceae	(*)	
Rumex acetosella	Sheep Sorrel	Polygonaceae	*	!
Rumex crispus	Curly dock	Polygonaceae	*	
Rumex obtusifolius	Bitter dock	Polygonaceae	*	
Rumex patientia	Patience dock	Polygonaceae	*	
Saponaria officinalis	Bouncing bet , soapwort	Caryophyllaceae	*	
Schizachyrium scoparium	(Andropogon s.) Little bluestem	Poaceae		
Scirpus atrovirens	Black bulrush	Cyperaceae		
Senecio vulgaris	Groundsel , ragwort	Asteraceae	*	
Setaria faberi	Giant Foxtail grass	Poaceae	*	
Setaria glauca (*S. lutescens*)	Yellow Foxtail-grass	Poaceae	*	
Setaria viridis	Green Foxtail-grass	Poaceae	*	
Sicyos angulatus	Bur cucumber	Cucurbitaceae		
Silene latifolia (*Lychnis alba, S. alba*)	White campion	Caryophyllaceae	*	
Sisyrinchium angustifolium	Blue-eyed grass	Iridaceae		
Solanum carolinense	Horse-nettle	Solanaceae		
Solanum nigrum (*S. americanum*)	Black nightshade	Solanaceae	*	
Solidago Canadensis	Canada goldenrod	Asteraceae		
Solidago gigantean	Smooth goldenrod	Asteraceae		
Solidago juncea	Early goldenrod	Asteraceae		
Solidago nemoralis	Gray goldenrod	Asteraceae		
Solidago rugosa	Rough-leaved	Asteraceae		

HERBS, VINES & GRASSES

Genius & species	*Common Name*	Family	Origin	Invasive Status
	goldenrod			
Sonchus arvensis	Perennial sow thistle	Asteraceae	*	
Sonchus asper	Spiny-leaved sow thistle	Asteraceae	*	
Sonchus oleraceus	Common sow thistle	Asteraceae	*	
Stellaria graminea	Common stitchwort	Caryophyllaceae	*	
Stellaria media	Common chickweed	Caryophyllaceae	*	
Strophostyles helvola	Trailing wild-bean / wooly bean	Fabaceae		
Taraxacum officinale	Common dandelion	Asteraceae	*	
Thalictrum pubescens (*T. polygamum*)	Tall meadow rue	Ranunculaceae		
Thlaspi arvense	Field penny-cress /stinkweed	Brassicaceae	*	
Tragopogon dubius	Goat's beard / alsify	Asteraceae	*	
Tridens flavus Triodia f.)	Purpletop	Poaceae		
Trifoliun arvense	Rabbit-foot clover	Fabaceae	*	
Trifolium hybridum	Alsike clover	Fabaceae	*	
Trifoliun pratense	Red clover	Fabaceae	*	
Trifolium repens	White clover	Fabaceae	*	
Typha angustifolia	Narrow-leaved cattail	Typhaceae		
Verbascum blatteria	Moth mullein	Scrophulariaceae	*	
Verbascum thapsus	Common mullein	Scrophulariaceae	*	
Verbena hastate	Blue vervain	Verbenaceae		
Verbena urticifolia	White vervain	Verbenaceae		
Vernonia noveboracensis	New York ironweed	Asteraceae		
Veronica arvensis	Corn speedwell	Scrophulariaceae	*	
Veronica officinalis	Common speedwell	Scrophulariaceae	*	
Vicia cracca	Cow /bird vetch	Fabaceae	*	
Vincetoxicum nigrum (*Cynanchum n.*)	Black swallow-wort	Asclepiadaceae	*	!
Viola sororia	Common violet	Violaceae		
Xanthium strumarium	Clotbur /Cocklebur	Asteraceae		

[1] Data provided by, Dr. Margaret B. Gargiullo, Ph.D., Plant ecologist with the New York City Parks Department, Sept. 2003

Wildlife

The highly disturbed nature of the railroad rights-of-way and the developed nature of the surrounding area very much limits availability of wildlife habitat. Few species of amphibians

and reptiles are likely to use the Project Route due to the highly disturbed or managed character of the habitat, and the fact that there are no waterbodies within the route. Therefore, those species that might be found are avian species and amphibians and reptiles that are not dependent on water for most of their life cycles.

Mammal species typical of developed urban areas are most likely to occur within the Project Route. Examples of urban wildlife include Norway rat (*Ratus norvegicus*), Eastern gray squirrel (*Sciurus carolinensis*), house mouse (*Mus musculus*), and rock dove (*Columba fasciata*). Based on the lack of suitable habitat, the potential for threatened and endangered species to occur within the Project Route is minimal.

In addition, a variety of wildlife typical of suburban areas is expected to make use of the parks, backyards and other buffer areas occurring along the Project Route to the north of the Harlem River and at other locations. Examples include gray squirrel, eastern cottontail (*Sylvilagus floridanus*), woodchuck (*Mamota monax*), Virginia opossum (*Didelphis virginiana)*, White-footed mouse (*Peromyscus leucopus)*, Meadow vole (*Microtus pennsylvanicus)*, Red fox (*Vulpes vulpes)*, Raccoon (*Procyon lotor)*, Striped skunk (*Mephitis mephitis)*, White-tailed deer (*Odocoileus virginianus)* as well as a variety of songbirds.

Species feeding in estuarine wetlands offer the potential for fly-over by individual animals that may be feeding in those areas.

The terrestrial portion of the Route is in proximity to potentially sensitive coastal habitats along much of the Route, therefore, a potential exists for transient threatened and/or endangered species to occur within the terrestrial portion of the Project Route.

Threatened and Endangered

Potential habitat for the peregrine falcon (*Falco peregrinus*), listed as endangered by the NYSDEC, exists within the Manhattan area and nesting boxes are provided high on the Tappan Zee Bridge. Peregrines are known to nest in tall buildings and bridges in urban areas, and will occasionally nest on cliffs or in hollow trees. Consultation with NYSDEC and the New York Natural Heritage Program indicates that historic nesting sites are located under several bridges in the Manhattan area and in some of the larger buildings in the Midtown Manhattan area. Areas adjacent to the Project Route would not provide preferential habitat due to the low height of buildings in the area. Impacts to falcons on the Tappan Zee Bridge should be avoided as the cables will transit under the bridge roadway away from any higher nexting boxes. Bald eagles

(*Hatiaeetus leucocephalus*) and immature golden eagles (*Aquila chrysaetos*) have, on rare occasions, been transient visitors in the Manhattan area. The golden eagle is currently considered extirpated in New York State and is listed as endangered (NYSDEC, 2001).

Other than potential transients, no federally listed or proposed threatened or endangered species occur within the Downstate Project Area. Also, no designated or proposed critical habitat, as defined by the Endangered Species Act, is located in the Downstate Project Area.

Sandplain gerardia (*Agalinis acuta*), a species listed as endangered by the State of New York and as a federally endangered species, is known to occur in the northeast portion of the USGS Freeport Topographic quadrangle portion of the Project, as well as at several other locations on Long Island (Stilwell 2001). Sandplain gerardia is an annual plant that is typically associated with grassland communities and requires periodic disturbance, such as mowing or grazing, to maintain the appropriate habitat. Discussions with the New York Natural Heritage Program indicated that, while there is a known population in the vicinity of the Downstate Project Route, it is located within the boundaries of a preserve (Young, 2002).

Table 4.3.11-4 provides a summary of threatened and endangered plant and bird species determined by the New York Natural Heritage Program to have the potential to occur within 1.5 miles of the onshore Project Area and assesses the potential for the Project to impact each.

Table 4.3.11-4 – Threatened and Endangered Species Indicated by the New York Natural Heritage Program

Species	Status		General Habitat	Potential Impact	Comments
	State	Federal			
Birds					
Least tern (*Sterna antillarum*)	T	*	Dredge spoil with scrubby vegetation and little open sand.	No	
Peregrine falcon (*Falco peregrinus*)	T	T	High perches	No	
Plant					
Atlantic white cedar (*Chamaecyparis thyoides*)	R	—	Red maple swamps	No	
Slender crabgrass (*Digitaiia filiformis*)	T	—	Dry sandy soil	No	
Hyssop-skulacap (*Scutellaria integrifolia*)	E	—	Fields, woods and thickets	No	
Crested fringed	E	—	Low moist meadows	No	

Table 4.3.11-4 – Threatened and Endangered Species Indicated by the New York Natural Heritage Program					
Species	Status		General Habitat	Potential Impact	Comments
	State	Federal			
orchis (*Platanthera cristata*)			and damp pine woods, especially along coastal plain		
Weak rush (*Juncus debilis*)	E	—	Wet places and sandy shores	No	
Yellow flatsedge (Cyperus.flavescens var flavascens)	E	—	In marshy ground	No	
Southern yellow flax (*Linum medium var texanum*)	E	—	Dry field	No	**
Few-flowered nutrush (*Scleria pauciflora var caroliniana*)	E	—	Dry soil on pine barren border	No	
Coastal goldenrod (*Solidago elliotti*)	E	—	In swamps, mainly near coast	No	
Collin's sedge (*Carex collinsii*)	E	—	Bogs, sphagnum woods	No	
Marsh straw sedge (*Carex honnathodes*)	T	—	In wet soil, mainly near coast	No	
Soapwort gentian (*Gentiana saponaria*)	E	—	Wet soil, damp meadows	No	
Swamp sunflower (*Helianthus angustifolius*)	T	—	Swamps, mainly near coast	No	
Velvety lesped (*Lespedeza stuevei*)	T	—	Dry upland woods in pine barrens	No	
Stiff cowbane (Oxypolis rigidior)	E	—	Swamps	No	
Prairie wedgegrass (*Sphenopholis obwata var obtusata*)	E	—	Damp meadow	No	
Swamp smartweed (Polygonum setaceum var intedectum)	E	—	Swamps	No	
Bead pinweed (*Lechea pulchelia*	E	—	Wet burned Long Island pine barrens	No	

Table 4.3.11-4 – Threatened and Endangered Species Indicated by the New York Natural Heritage Program					
	Status			Potential	
Species	State	Federal	General Habitat	Impact	Comments
var moniliformis)					
False China-root (*Smilax pseudochina*)		—	Dry/sandy thickets	No	

(Ref. Compiled from secondary sources.)

* The least tern is given partial federal status. It is considered endangered in the interior United States however it is not federally listed within the Project area.

** These species could potentially occur within the right-of-way. However, the right-of-way is maintained by periodic mowing; therefore, these species, if present, would not be expected to be found.

Key:

E = Endangered.

R = Rare

T = Threatened

4.3.11.2 Potential Impacts

Siting of the Project on and adjacent to the Thruway ROW will limit any adverse temporary and permanent impacts to vegetation and wildlife. The Thruway ROW itself is primarily a disturbed community that is dominated by common herbaceous plant species and receives use by a limited number of common wildlife species. Most of the potential impacts to ecological resources are associated with construction of the Project.

Construction Impacts

Construction impacts associated with the Project include both permanent loss and temporary disturbance of plant communities, wildlife species and wildlife habitat at the converter sites and along the Thruway ROW.

Impacts to Vegetation

Construction of the Empire Connection will result in temporary disturbance to the mowed grass community and open water/herbaceous wetland communities that occur within the Thruway ROW. In overhead portions of the line, these impacts will be limited, as wetland and open water areas will generally be spanned. In both the overhead and buried portions of the line, these

impacts will be temporary because the communities that currently exist there will be reestablished at the completion of construction. In places where the existing cleared Thruway ROW is too narrow to accommodate the line there could also be some clearing of adjacent communities (e.g., forest, forested wetland) to accommodate construction. This will represent a permanent change to these community types.

Most construction-related impacts will occur at the Converter sites. Development of the Project will result in permanent conversion of approximately 7 acres of successional shrubland and 2.5 acres of deciduous forest to built facilities at the Upstate Converter Circuit 2 site. Approximately 3 acres of deciduous forest, 2 acres of forested wetland, 3 acres of successional old filed/shrubland, and 0.5 acre of disturbed/developed habitat will be lost at the Upstate Converter Circuit 1 site.

Impacts to Wildlife

Construction of the Project could have the following impacts on wildlife:

- Direct loss of wildlife through incidental injury or mortality.
- Temporary disturbance of old field/mowed grass habitat on the Project Route.
- Permanent conversion of small areas of forested habitat (wetland and upland) along the Thruway ROW to herbaceous/early successional habitat.
- Permanent loss of habitat through conversion of natural plant communities to built facilities.

However, because of the location of the Project, impacts to wildlife and habitat along the transmission line Thruway ROW will be very minor, and for the most part, temporary. Species that utilize this area, such as meadow vole, red-tailed hawk and whitetail deer are all common species in New York State. Most are highly mobile and will avoid injury or mortality by vacating the area during construction. Because the early successional habitat that currently exists on the Thruway ROW will be restored following construction, these species are also anticipated to return once construction of the Project is complete. Any conversion of forest to early successional habitat along the Thruway ROW is anticipated to be minor and should have little impact on forest wildlife as the affected areas already represent edge habitat.

Impacts to wildlife will be somewhat greater at the Converter sites. Field surveys and habitat conditions suggest that the most common wildlife species found in the areas for Converter

construction include whitetail deer, gray squirrel, wild turkey, and various birds, small mammals, and amphibians. Most of these species will be affected to some extent by the loss of habitat on these sites. There could be some loss of nesting birds and/or small, less mobile species (small mammals, salamanders, frogs, etc.). These losses will result from clearing and earth-moving activities on the sites. In addition, approximately 10 acres of successional shrub habitat, 5.5 acres of deciduous forest, 0.5 acre of disturbed habitat and 2 acres of wetland habitat will be permanently lost through the conversion of these sites to built facilities. However, the area of impact (total = 18 acres) is relatively small and the affected species and habitat are common. In addition, the Project will disturb or eliminate only a small portion of the home range of various large and mid-sized mammals (e.g., whitetail deer, coyote, raccoon). These species will therefore shift their ranges and in all likelihood will continue to use adjacent undeveloped areas.

Other wildlife impacts typically associated with development projects, such as large-scale habitat conversion or loss, increased human/vehicular disturbance and forest fragmentation, will be minor or non-existent on this Project. This is due to the location of the facilities on or adjacent to the Thruway ROW. This is already a disturbed community that receives limited use from a relatively small number of common wildlife species.

Impacts to Fish

Impacts to fish could occur in areas where the Project Route crosses rivers and streams that traverse the Thruway ROW. Stream crossing impacts typically include filling, temporary dewatering, downstream siltation and/or bank erosion, all of which can directly affect fish survival, spawning success and aquatic habitat value. However, the overhead line (where necessary) will likely span streams and rivers, and the buried line will typically utilize bridge attachments, or directional boring. Impacts to fish and aquatic habitat are not anticipated to be significant.

Impacts on Threatened and Endangered Species

None of the listed forest bird species documented in the area by the BBA are likely to be affected by the Project, as impacts to forest habitat will be minimal. Consequently, species such as red-shouldered hawk, northern goshawk, Cooper's hawk, whip-poor-will and red-headed woodpecker are not anticipated. Listed species that utilize grassland habitat are also not likely to be impacted by the Project. The area of grassland being affected is a narrow corridor adjacent to intense human activity. It therefore is unlikely to receive significant use from grassland-dependent species such as northern harrier, vesper sparrow, horned lark, grasshopper sparrow or

upland sandpiper. Even if such species did use the existing grass ROW, impacts will be limited to temporary habitat disturbance during construction. Bird species that are typically associated with large waterbodies and wetlands, such as bald eagle, osprey, American bittern, least bittern and pied-billed grebe, should also not be affected, as such waterbodies will generally not be impacted by construction of the Project.

The only listed bird species that could possibly be impacted by the Project are golden-winged warbler, which utilizes shrub-dominated habitat similar to that found in places along the Thruway ROW and on the Upstate Converter Circuit 2 site, and the peregrine falcon, which in some years has nested on the Tappan Zee Bridge. In the case of the former, current BBA data does not indicate nesting by golden-winged warbler in the area of the Upstate Converter Circuit 2 or within BBA blocks along the majority of the ROW. Thus, significant impacts to this species are not anticipated. In the case of peregrine falcon, impacts would be associated with temporary disturbance of nesting falcons during installation of the transmission line cable on the bridge structure. The project should not alter the suitability of the bridge as nesting habitat over the long term. If nesting peregrines are utilizing the bridge, various mitigation measures can be used to avoid or minimize potential impacts.

A bat cave that could provide a hibernacula for Indiana bats occurs within a mile of the Thruway in Ulster County. However, this cave is well off the Thruway ROW and will not be disturbed by construction activities.

Impacts to listed reptiles and amphibians are limited to potential loss of breeding habitat for blue-spotted and Jefferson's salamander at the Upstate Converter Circuit 1 site. The forested wetlands on this site, in association with adjacent forested upland habitat, suggest that this site could be used by these species. Other listed reptile and amphibian species documented along the Thruway ROW corridor (e.g. timber rattlesnake, spotted turtle, eastern box turtle) are not likely to be impacted due to a lack of suitable habitat within the ROW and/or the temporary nature of any disturbance the Thruway ROW will receive.

Unless responses from the USFWS and the NYSDEC indicate the possible occurrence of other listed species, beyond those identified in this report, potential significant impacts to threatened and endangered species are not considered likely.

Operational Impacts

Operational impacts of the Project on ecological resources are anticipated to be minor. The Project Route ROW (both buried and above ground) will be maintained in grass and/or early successional vegetation through periodic mowing. With only a few possible exceptions, this community currently exists on the Thruway ROW and is already being maintained through mowing. At the Converter sites operational impacts on wildlife could include disturbance from noise and human activity, occasional mortality of small mammals, reptiles and amphibians from vehicular traffic, possible water quality impacts from site run-off and possible songbird mortality resulting from collision with taller built components of the converters. Collision mortality is not expected to be a significant impact. Most serious collision events documented in the literature have involved structures more than 500 feet in height. The relatively low height of the structures (maximum 125 feet) place them well below the height of most songbird migration. In addition, there will be no aviation warning lights or flood lighting of the equipment, and ground-level lighting that may emanate up from the facility will be limited. Therefore, collision with the Project's built facilities is not anticipated to be a significant source of songbird mortality. The overhead conductors on the transmission line should be easily visible to, and avoidable by, foraging raptors. Collision or electrocution impact to raptors are therefore not expected to be significant. Any human/vehicular activity and noise associated with operation and maintenance of the facilities will be insignificant relative to the existing level of disturbance associated with the adjacent Thruway.

No impacts on wildlife, threatened or endangered species or their habitat are expected to occur from installation or operation of the Project south of the Tappan Zee Bridge. The heavily developed urban setting in the downstate segment limits the types of species to those typically found in abundant numbers in urban areas. Urban wildlife, such as those listed above, are well adapted to the areas they inhabit and are expected to continue using the area without disturbance from construction operations. While the peregrine falcon is known to occur in Manhattan and the Thruway Authority maintains falcon nesting boxes high on the Tappan Zee Bridge, it is not specifically known to occur elsewhere in the Project Route, except for their reported presence on the Tappan Zee Bridge. Therefore, no impacts are expected to occur.

Construction impacts of the Project facilities to plant and animal resources will be extremely minor and temporary. Impacts to plants are negligible because the area is currently dominated by aggressive pioneering species and non-native species that can be readily replaced. During construction, the area will be temporarily lost for wildlife use. This minor temporary impact will

only include limited loss of use by wildlife and will not impact permanent nesting habitat for birds or amphibians. Restoration of the area will quickly replace the habitat and wildlife use opportunities.

No wetlands or aquatic resources were mapped directly on the Project Route south of the Tappan Zee Bridge. No wildlife species listed on federal or New York State Endangered, Threatened, or Special Concern lists are known to be present.

No species of bird listed as endangered, threatened, or of special concern is considered to be a potential breeder along the Project Route with the exception of the peregrine falcon which nests atop the Tappan Zee Bridge. Further, there are no listed species of mammals that are likely to inhabit the Project Route. There will be no operational impacts of the Project facilities on terrestrial, wetland or natural resources. Construction impacts on terrestrial ecology are minimal and temporary.

The use of herbicides during construction is not anticipated.

4.3.11.3 Avoidance and Mitigation

Impacts to ecological resources have already been reduced by siting the Project facilities on or adjacent to the existing Thruway ROW. This Thruway ROW is an already disturbed community dominated by common early successional vegetation. Both the plant communities and the wildlife species that use this area as habitat will be reestablished following construction. To further avoid, minimize and mitigate potential impacts on ecological resources, the following actions will be considered:

- Additional evaluation of threatened and endangered species occurrence, if necessary, based on responses from the USFWS and NYSDEC.
- Wetland delineations along the Project Route and on the Upstate Converter sites to determine the extent of wetland occurrence on these sites. Once the extent of wetland on these sites is determined, exploration of opportunities for avoidance and minimization of wetland impacts.
- Develop and implement an erosion and sediment control plan to minimize impacts to water resources and adjacent undisturbed habitat during construction.
- Utilize boring, directional drilling or bridge attachments for buried cable crossings of wetlands and streams to avoid impacts to fish and aquatic habitat.

- If open trenching of wetlands is required, limit the width of disturbance to the minimum necessary to install the buried line. Segregate wetland topsoil for final backfill, and reestablish original wetland contours at the completion of construction.

- If open trenching is required to cross streams, utilize temporary diversion or pumping to allow all work to occur "in the dry". Such actions should be in accordance with state and federal permit requirements to the extent practicable, and may include seasonal restrictions if fish spawning is a concern. Upon completion of the installation, stream bed and bank contours should be stabilized and restored to their pre-constuction condition.

- Any unavoidable loss of regulated wetlands associated with the development of the Converters will be mitigated in accordance with applicable state and federal requirements.

- Enclose construction areas with silt fence or other impassible barrier to keep reptiles, amphibians and small mammals from entering these sites.

- Implement a Spill Control and Countermeasure (SPCC) Plan to minimize the potential for the release of toxic chemicals to the environment (both during construction and operation) of the Project.

- Maintenance of the Project Route in accordance with approved ROW management plans, by the ROW owner/operator.

- Lighting at the Converter sites kept to a minimum to avoid potential bird collision impacts. Task lighting or motion detectors utilized to reduce unnecessary lighting.

- If it is determined that peregrine falcons are nesting on the Tappan Zee Bridge, bridge attachment should be reviewed to avoid or minimize potential impact to falcons during the nesting season.

Project facility construction will involve trench excavation for installation of the cables. Impacts on terrestrial and wildlife resources due to the installation of the transmission facility will be temporary and transient. Trench sizes and the amount of vegetation disturbed will be kept to the minimum necessary. Backfilling of trenches, soil stabilization, and surface restoration will follow immediately after Project installation. Disturbed areas will be returned to their original condition which may include seeding for grass or wildflowers, fertilization, and mulching. Where needed due to seasonal conditions or location, temporary grass covers and/or jute netting

(a coarse open mesh netting) may be applied directly atop the soil to protect exposed soils, new seeds, and mulch.

Impacts south of the Tappan Zee Bridge are minimized by the selection of a transmission route and converter sites that are fully disturbed and do not contain either quality terrestrial habitats or wetlands. No threatened or endangered species are expected to be impacted along the transmission route or at the Converter sites. Impacts to vegetation and wildlife due to construction are limited to a temporary removal of vegetation within the right-of-way. Wildlife species using the habitat of the Project Route and Converter sites are few in number and are common species. Any impacts to wildlife will be insignificant to the wildlife populations using the Project Route and Converter sites. Continued management of the right-of-way (i.e., mowing and vegetation removal along railroads) will maintain the corridor in its current condition as lawn, open space and disturbed habitat. Other measures important to minimizing and avoidance of impacts are discussed in 4.3.11.1.3, above.

4.3.12 Fish and Aquatic Life

4.3.12.1 Existing Conditions

The Project Route extends along the east shore of the Lower Hudson River from the Tappan Zee Bridge to Spuyten Duyvil. This reach of the Hudson River is approximately 14 miles long, and is 2.7 miles wide at the Tappan Zee Bridge, and about 1 mile wide at Spuyten Duyvil.

The Lower Hudson River is a tidal estuary, and saltwater intrusion extends north of the Tappan Zee Bridge during periods of low freshwater flux from the upper river. The navigation channel in this reach of the Hudson has an average depth of approximately 40 feet at mean low water (USACOE, 1999). In the vicinity of the Tappan Zee Bridge at Tarrytown the spring tide range is 3.7 feet and the maximum current velocity is 1.5 knots.

At Spuyten Duyvil the spring tide range is 4.7 feet and the maximum current velocity is 2.1 knots (Herzog, 2003). Maximum current velocities occur on the ebb tide due to the addition of the fresh water river flow to the tidal flow.

The reach of the River from the Tappan Zee Bridge down to the Bronx County line is designated by the NYSDEC as Class SB saline surface waters. The best usages of Class SB waters are primary and secondary contact recreation and fishing. These waters are suitable for fish propagation and survival. Below the Bronx County line to the Battery in lower Manhattan the Hudson River is designated as Class I saline surface waters. This reach includes the portion of

the River from Spuyten Duyvil upstream to the Bronx County line. The best usages of Class I waters are secondary contact recreation and fishing. Class I waters are also designated as suitable for fish propagation and survival (NYSDEC Water Quality Regulations, 6 NYCRR, Chapter X, parts 701.11 and 701.13).

The Lower Hudson River is a productive estuary that is an important nursery and wintering habitat for a number of anadromous, estuarine, and marine fish species including the striped bass (*Morone saxatilis*). Striped bass spawn in the Upper River and utilize nursery areas in Haverstraw Bay and the Tappan Zee before moving into the Lower River to overwinter. Significant numbers of juvenile winter flounder (*Pseudopleuronectes americanus*) are also present in the Lower Hudson River in the winter. Other species that utilize the Lower Hudson River in significant numbers are: white perch (*Morone americana*), bay anchovy (*Anchoa mitchilli*), American shad (*Alosa sapidissima*), Atlantic tomcod (*Microgadus tomcod*), and alewife (*Alosa pseudoharengus*). The Lower Hudson River also is important habitat for wintering waterfowl, including canvasback (*Aythya valisneria*), scaup (*Athya* spp.), mergansers (*Mergus* spp.), mallard (*Anas platyrhynchos*), and Canada goose (*Branta canadensis*) (USFWS, 1997).

4.3.12.2 Potential Impacts

The Lower Hudson River estuary could receive some sediment in construction runoff. This potential sedimentation would be localized to actual construction staging areas and to cable installation locations.

4.3.12.3 Avoidance and Mitigation

During construction, appropriate site and design specific measures to control spills and sedimentation will be employed and detailed in the EM&CP. These measures would be a combination of sedimentation control using hay bales, silt fences and quick restoration of excavated surfaces.

4.3.13 Marine Environment

4.3.13.1 Existing Conditions

The East River is part of the New York Harbor estuarine system. It is a tidal straight approximately 16 miles long which connects Long Island Sound to Upper New York Bay. The East River is divided into Upper and Lower segments by Hell Gate, a rock sill that separates

deeper water to the north and to the south. The Lower East River lies between the Battery and Hell Gate, and the Upper East River lies between Hell Gate and the Throgs Neck Bridge. The net water flow in the East River is from Long Island Sound to the Upper New York Bay (USACOE, 1999).

The Lower East River is relatively deep, with depths in the navigational channel ranging from approximately 40 to approximately 70 feet at mean lower low water (MLLW) (NOAA, 2000). The mean tidal range of the Lower East River is 4.5 feet at the Battery and 6.4 feet at Hell Gate. Tidal current velocities are high, particularly during the ebb tide, ranging from approximately 2 to 5 knots, with the highest velocities near Hell Gate. Due to the high current velocities, the bottom substrate is mostly rocky in the Lower East River (USACOE, 1999).

The Upper East River widens in the vicinity of Rikers Island. The navigational channel in this area has depths ranging from 35 to 70 feet, and the substrate in the channel is rocky (NOAA, 2000). Around Rikers Island, and at the mouths of the Bronx River, Flushing Creek and Westchester Creek, there are shallow flats with soft mud substrates (NOAA, 2000). Current velocities in the Upper East River are slower than in the Lower East River, with maximum speeds of less than 2 knots throughout the portion of the River west of Astoria (Herzog, 2003). The waterfront in the Upper East River is comprised of both developed areas with bulkheads and natural riverbank (USACOE, 1999).

Two anchorages are posted for the area on NOAA charts. Anchorage Area 11 resides approximately 1.75 – 2.0 miles to the east of Oak Point between Rikers Island and Hunts Point. Anchorage Area 14 is in Hallets Cove, an area between Astoria and the northern tip of Roosevelt Island (NOAA, 2000). Nautical charts also show that the Circuit 1 will have to cross a posted cable crossing between Stony Point and Lawrence Point.

The Upper East River in the Project Area is classified as I waters (6 NYCRR 935.6). These waters are described (6 NYCRR 701.13) as saline surface waters suitable for secondary contact recreation and fishing. The waters are suitable for fish propagation and survival according to the classification description.

4.3.13.1.1 Sediments

Due to the strong tidal currents in the Upper East River, the substrate in the main navigation channel is primarily rocky. However, unconsolidated sediment is present in shallow shoreline areas, around Rikers Island, South Brother Island, at the mouth of the Bronx River, and in

Flushing and Bowery Bays (NOAA, 2000). A limited amount of published information is available for sediments in the Upper East River. Sediment physical and chemical characteristics from several relevant studies are described below.

Physical Characteristics

South Brother Island Channel lies between South Brother Island and Rikers Island in the Upper East River. Sediment core samples were collected for a maintenance dredging project in South Brother Island Channel by the U.S. Army Corps of Engineers, New York District. The mean particle size distribution of 14 samples was: 9 percent sand, 39 percent silt and 51 percent clay, with a small amount of gravel present in 2 of the 14 samples. The mean total organic carbon (TOC) content of these samples was 4.7 percent. Eighteen sediment core samples were analyzed for a dredging project in the Bronx River and the channel entrance. The mean particle size of these samples was: 21 percent sand, 42 percent silt, 31 percent clay, and 6 percent gravel. The mean TOC of these samples was 5.85 percent (Battelle, 2003).

Between 1993 and 1994, four sediment samples were collected south of the Oak Point section of the Bronx, off Rikers Island, as part of the Environmental Monitoring and Assessment Program (EMAP). The EMAP is a long-term, interagency environmental monitoring and research program overseen by EPA's Office of Research and Development (ORD) (source: Sediment Quality of the NY/NJ Harbor System, March 1998, EPA/902-R-98-001).

For each sample, the percent silt-clay content was measured. The results are as follows:

- Location UH010 = 22.5 percent
- Location UH011 = 53.5 percent
- Location UH106 = 7.1 percent
- Location UH107 = 88 percent

The physical characteristics of these four sediment samples can generally be classified as fine grained soil. However, due to the nature of the currents along the Project Route, it is expected that sediment will be comprised of less fine grained soil. Currents along the alignment, especially at Hell Gate, are known to be strong. In this area, fine grained soils are more likely to remain in suspension versus becoming deposited on the river bottom as sediment. Soils comprised of sands and gravel are more likely to be encountered as bottom sediments.

Chemical Characteristics

The data for composited core samples from South Brother Island indicated that a variety of chemical constituents were detected, including PAHs, PCBs and pesticides (Battelle, 2003). Most PAHs were above the effects range low (ERL) guidance values developed by NOAA, and many PAHs were above effects range median (ERM) values (Long and Morgan, 1990; Long et al., 1995; Buchman, 1999). The ERL values indicate the concentration at which effects may begin to be observed in sensitive species; the ERM values are the median concentration of samples that exhibited a toxic effect (Buchman, 1999). Organochlorine pesticides in the South Brother Island composited core samples were present at concentrations above the ERL values but below the ERM values. Total PCBs in the South Brother Island sediment samples were above the ERM value. Data for chemical constituents were not available for the Bronx River sediment core samples described elsewhere. Data for metals, PAHs, PCBs, and pesticides in composited sediment core samples collected in Flushing Bay (Battelle, 2003) were also compared to the NOAA guidance values. All metals concentrations were above the ERL values, with copper, lead, nickel, silver, and zinc also above both ERM guidance values. With the exception of pyrene, all PAHs were above the ERL value but below the ERM value. Pyrene exceeded both guidance values in one of two composited samples. Organochlorine pesticides and total PCBs in the Flushing Bay sediment samples were present at concentrations above both the ERL and ERM values. The Flushing Bay samples were collected more than two miles east of Downstate Converter Circuit 1.

A survey of sediment toxicity was performed by the NOAA National Status and Trends Program (NS&T) for numerous areas throughout the Hudson-Raritan estuary and New York Harbor, including the Upper East River (NOAA, 1995). The investigation was performed in two phases, with samples collected in 1991 and 1993. East River samples were collected in 1991. Chemical analyses of the sediments are reported, as well as toxicity data for solid-phase survival tests with the amphipod *Ampelisca abdita*, liquid phase tests with embryos of the bivalve *Mulinia lateralis*, and microbial bioluminescence. Detected constituents in the Upper East River included metals, PAHs, PCBs and pesticides. The investigation found sediments that exhibited toxicity in the East River, as well as much of the remaining study area. Toxic areas included inner Sandy Hook Bay, an area not expected to be toxic based on distance from metropolitan New York City (NOAA, 1995).

Four sediment samples were collected south of the Oak Point section of the Bronx, off Rikers Island during 1993 - 1994. A summary of the analytical results are included within Table 4.3.13-1.

Table 4.3.13-1
Sediment Quality of the NY/NJ Harbor System

Analyte	Sample Location				Units
	UH010	UH011	UH106	UH107	
Latitude	40.791	40.785	40.796	40.796	
Longitude	-73.896	-73.874	-73.875	-73.895	
Date Collected	8/31/93	9/10/93	8/13/94	9/1/94	
Polyaromatic Hydrocarbons (PAHs)					
Acenaphthene	120.00	200.00	250.00	170.00	ppb
Acenaphthylene	450.00	350.00	980.00	450.00	ppb
Anthracene	1,500.00	1,100.00	1,300.00	900.00	ppb
Benzo(a)anthracene	2,300.00	2,200.00	3,400.00	4,300.00	ppb
Benzo(b,k)fluoranthene	3,360.00	2,920.00	3,400.00	4,400.00	ppb
Benzo(g,h,i)perylene	2,400.00	1.100.00	1,500.00	850.00	ppb
Benzo(a)pyrene	2,600.00	2,000.00	1,700.00	3,100.00	ppb
Benzo(e)pyrene	1,600.00	1,200.00	690.00	970.00	ppb
Biphenyl	42.00	72.00	90.00	100.00	ppb
Chrysene	2,300.00	2,100.00	3,900.00	4,400.00	ppb
Dibenz(a,b)anthracene	500.00	240.00	160.00	320.00	ppb
2,6-Dimthylnaphthalene	130.00	140.00	280.00	480.00	ppb
Fluoranthene	3,100.00	3,300.00	3,500.00	1,100.00	ppb
Fluorene	370.00	250.00	330.00	230.00	ppb
Indeno(1,2,30C,D)pyrene	470.00	1,100.00	1,500.00	340.00	ppb
1-Methylnaphthalene	87.00	140.00	180.00	200.00	ppb
2-Methylnaphthalene	160.00	210.00	300.00	430.00	ppb
1-Methylphenanthrene	710.00	780.00	2,500.00	830.00	ppb
Naphthalene	250.00	400.00	460.00	670.00	ppb
Perylene	500.00	650.00	2,900.00	4,500.00	ppb
Phenanthrene	2,000.00	1,500.00	1,700.00	980.00	ppb
Pyrene	4,400.00	3,900.00	4,400.00	1,400.00	ppb
2,3,5 Trimethylnaphthalene	92.00	93.00	250.00	0.00	ppb
DDT and its Metabolites					
o,p, DDD	10.19	0.87	1.99	3.21	ppb
o,p, DDE	0.20	0.13	0.07	0.38	ppb
o,p, DDT	0.14	0.00	0.00	0.00	ppb
p,p, DDD	22.15	1.90	2.48	15.04	ppb
p,p DDE	13.23	1.55	1.69	14.65	ppb
p,p, DDT	0.00	0.06	0.99	1.83	ppb
Total DDT	45.91	4.51	6.41	35.11	ppb
Chlorinated Pesticides other than DDT					
Aldrin	0.00	0.00	0.00	0.00	ppb
Alpha-chlordane	3.32	0.53	1.43	3.36	ppb
Trans-Nonachlor	2.25	0.35	0.60	3.24	ppb
Dieldrin	4.21	0.19	1.14	1.80	ppb
Endrin	0.00	0.00	0.00	0.00	ppb
Heptachlor	4.13	0.00	0.34	0.65	ppb

Analyte	Sample Location				Units
	UH010	UH011	UH106	UH107	
Heptachlor Epoxide	0.00	0.56	0.69	0.45	ppb
Hexachlorobenzene	0.38	0.05	0.00	0.16	ppb
Lindane-Gamma-BHC	0.00	0.00	0.00	0.00	ppb
Mirex	0.00	0.49	0.00	0.34	ppb
Total chlordane	20.89	2.81	5.28	14.20	ppb
Major Elements					
Aluminum	55,772.00	59,788.00	49,500.00	64,500.00	ppm
Aluminum partial	1,200.00	8,860.00	6,570.00	36,800.00	ppm
Iron	37,664.00	27,183.00	28,100.00	41,200.00	ppm
Iron partial	24,300.00	17,900.00	11,200.00	40,000.00	ppm
Manganese	923.00	646.00	795.00	1,420.00	ppm
Manganese partial	279.00	365.00	316.00	1,690.00	ppm
Silicon	327,761.00	267,134.00	372,000.00	258,000.00	ppm
Trace Elements					
Antimony	1.20	2.10	1.17	2.00	ppm
Antimony partial	0.00	0.00	0.00	1.60	ppm
Arsenic	8.02	17.63	5.30	14.80	ppm
Arsenic partial	6.40	13.40	3.00	10.00	ppm
Cadmium	1.67	0.60	0.37	1.26	ppm
Cadmium partial	1.57	0.41	0.57	1.24	ppm
Chromium	145.90	76.70	65.10	135.00	ppm
Chromium partial	106.00	24.00	32.00	150.00	ppm
Copper	140.60	1028.50	76.20	171.00	ppm
Copper partial	146.00	75.00	41.00	282.00	ppm
Lead	138.60	245.80	69.70	175.00	ppm
Lead partial	191.00	102.00	41.00	242.00	ppm
Mercury	1.59	1.10	0.98	1.55	ppm
Mercury partial	0.75	1.72	0.14	1.13	ppm
Nickel	41.00	21.68	28.50	42.30	ppm
Nickel partial	35.00	15.00	11.00	44.00	ppm
Selenium	0.80	0.66	5.60	12.20	ppm
Selenium partial	0.00	0.00	0.00	0.00	ppm
Silver	4.81	1.15	0.92	2.57	ppm
Silver Partial	5.30	2.90	2.00	10.00	ppm
Tin	9.27	72.74	0.32	1.02	ppm
Zinc	187.00	199.00	90.50	302.00	ppm
Zinc partial	206.00	140.00	65.00	306.00	ppm
PCB Congeners					
PCB Congener 101	20.68	2.80	1.27	16.92	ppb
PCB Congener 105	7.49	0.34	0.57	5.87	ppb
PCB Congener 110/77	50.83	7.83	5.59	57.02	ppb
PCB Congener 118	20.54	1.46	2.35	18.93	ppb
PCB Congener 126	20.60	5.08	7.14	33.82	ppb
PCB Congener 128	2.50	0.00	11.62	26.53	ppb
PCB Congener 138	23.81	1.56	2.26	19.25	ppb
PCB Congener 153	33.18	2.01	1.48	26.68	ppb
PCB Congener 179	15.92	2.93	3.11	100.73	ppb
PCB Congener 18	19.06	0.44	0.33	4.69	ppb
PCB Congener 180	17.52	1.95	0.42	18.84	ppb
PCB Congener 187	6.40	0.49	0.00	5.55	ppb

Analyte	Sample Location				Units
	UH010	UH011	UH106	UH107	
PCB Congener 195	1.88	0.34	0.14	2.05	ppb
PCB Congener 206	2.27	0.44	0.20	3.28	ppb
PCB Congener 209	0.81	1.29	0.35	4.71	ppb
PCB Congener 28	35.79	1.59	1.05	29.64	ppb
PCB Congener 44	18.64	0.86	0.57	7.35	ppb
PCB Congener 52	30.11	2.00	0.40	16.47	ppb
PCB Congener 66	39.83	0.91	4.64	31.39	ppb
PCB Congener 8	5.11	0.10	0.24	1.23	ppb
Other Measurements					
AVS	17.14	25.19	1.34	13.50	mmol
Clostridium	18,000.00	1,700.00	1,400.00	15,000.00	#/gm
Total Organic Carbon	23,300.00	9,080.00	38,900.00	47,800.00	ppm
Dibutyltin	18.00	2.00	3.20	82.20	ppb
Monobutyltin	3.00	1.00	0.00	22.80	ppb
Tributyltin	15.00	2.00	19.60	276.20	ppb
Tetrabutyltin	0.00	0.00	0.00	16.40	ppb

Source: Sediment Quality of the NY/NJ Harbor System, March 1998, EPA/902-R-98-001

4.3.13.1.2 East River Ecology

This section describes finfish that may be present in the East River Project Area. There is a paucity of fish survey data specific to the Upper East River (Steimle, 2003). However, the finfish and other aquatic life in the upper East River Project area are believed to be representative of those present in other parts of New York Harbor and in other estuaries in the region.

A Harborwide baseline biological survey recently conducted by the USACOE-NYD for the New York and New Jersey Harbor Navigation Study found a total of 40 species of fish at all stations surveyed. The survey found considerable seasonal variation in abundance, with bay anchovy (*Anchoa mitchilli*), white perch (*Morone americana*), striped bass (*Marone saxatilis*), and winter flounder (*Pseudopleuronectes americanus)* among the species collected in large numbers. During the winter months, catch per unit effort (CPUE) was lower at shoal stations compared to channel stations (USACOE, 1999). No sampling station location in the Upper East River was included in this survey.

The Upper East River Project area is within a habitat complex known as "The Narrows", which extends from Hell Gate to the westernmost section of Long Island Sound (USFWS, 1997). Habitat types within the Upper East River portion of the Project Area, include intertidal and shallow water mudflats, rocky intertidal areas and deep navigation channels. Finfish species common to this area include striped bass (*Morone saxatilis*), scup (*Stenotomus chrysops*), bluefish (*Pomatomus saltatrix*), Atlantic silverside (*Menidia menidia*), menhaden (*Brevoortia*

tyrannus), winter flounder (*Pseudopleuronectes americanus*), blackfish (*Tautoga onitis*), and black sea bass (*Centropristis striata*). Other species that present in the area include mummichog (*Fundulus heteroclitus*), striped killifish (*Fundulus majalis*), sheepshead minnow (*Cyprinodon variegatus*), bay anchovy (*Anchoa mitchilli*), three-spined stickleback (*Gasterosteus aculeatus*), and four-spined stickleback (*Apeltes quadracus*) and American eel (*Anguilla rostrata*) (USFWS, 1997; Reschke, 2002). Species that use the estuary primarily as a spawning and/or nursery area include winter flounder, tautog, black sea bass, striped bass, bluefish, and Atlantic menhaden. Comparatively few species spend their entire life cycle in the estuary. These resident species include Atlantic silverside, mummichog, striped killifish, sheepshead minnow, bay anchovy, and the stickleback species (USACOE, 1999).

The Shortnose Sturgeon (*Acipenser brevirostrum*) is listed as an endangered species by the Federal Government and by the State of New York. The species inhabits the Hudson River from Manhattan to the Troy Dam, but was not reported in an inventory of fish species collected in eight sampling programs conducted in the New York, New Jersey Harbor, or in the trawl surveys performed for the New York and New Jersey Harbor Navigation Study (USACOE, 1999). It is therefore considered unlikely that this species would be present in the Upper East River Project area or, that if present, they are found in small numbers.

Essential Fish Habitat (EFH) Species

The Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA) requires regional fishery management councils to describe and identify essential fish habitat (EFH) in their regions, to specify actions to conserve and enhance that EFH, and to minimize the adverse effects of fishing on EFH. Congress has defined EFH as "those waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity." A guide to EFH designations for the region is provided by NMFS/NOAA, at http://www.nero.noaa.gov/ro/doc/webintro.html (NOAA, 2003). This guide provides a method of ascertaining what species and lifestages have EFH in a specific geographic area. The information is presented as tabular summaries for selected 10' x 10' squares of latitude and longitude. The section that includes the Project Area lists 17 species with life stages that have EFH in the square that includes the Upper East River Project Area. These species include: pollock (*Pollachius virens*), red hake *(Urophycis chuss),* winter flounder *(Pseudopleuronectes americanus),* windowpane flounder *(Scopthalmus aquosus),* Atlantic sea herring *(Clupea harengus),* bluefish *(Pomatomus saltatrix),* Atlantic butterfish *(Peprilus triacanthus),* Atlantic mackerel *(Scomber scombrus),* summer flounder *(Paralicthys dentatus),* scup *(Stenotomus chrysops),* black sea bass *(Centropristus striata),* king

mackerel *(Scomberomorus cavalla),* Spanish mackerel *(Scomberomorus maculatus),* cobia *(Rachycentron canadum),* sand tiger shark *(Odontaspis taurus),* dusky shark *(Charcharinus obscurus), and* sandbar shark *(Charcharinus plumbeus).* Of these species, bluefish, scup and winter flounder are likely to be present in the Upper East River Project Area (USFWS, 1997; Reschke, 2002). The winter flounder is demersal, and may be present on bottom substrates in the Project Area. The species prefers sand, mud or gravel substrates (Bigelow and Schroeder, 1953; NOAA, 1999b), and is not likely to be present on the rocky substrates that dominate much of the Upper East River deep-water habitat. However, winter flounder may be present in the Project Area and winter flounder habitat may be disturbed during cable placement operations. These potential impacts would be of short duration and limited to the area of cable placement. Potential impacts to winter flounder and winter flounder habitat are considered to be negligible, and no long-term or cumulative impacts are expected to occur due to cable placement or operation.

Benthic Invertebrates

Benthic invertebrate habitats in the East River Project Area include rock substrates present throughout the navigation channel and fine sediment in shallow areas (NOAA, 2000). Benthic invertebrate survey data specific to the Upper East River are limited. A survey of benthic habitats in New York Harbor for a dredged material management plan included data from Bowery and Flushing Bays, both in the vicinity of the Project Area (Iocco, et al, 2000). In Bowery Bay, where all sampling stations consisted of fine sediment, the dominant invertebrate species included the polychaete worms *Capitella capitata* and *Streblospio benedicti*, Oligochaete worms, the bivalve *Mulinia lateralis,* and the gastropod *Rictaxis punctostriatus.* In Flushing Bay, the dominant taxa included *Streblospio benedicti*, *Leitoscoloplos fragilis* and *L. robustus* (also ploychaete worms), and *Mulinia lateralis.* Dominance by these pollution tolerant species indicates poor habitat quality in Bowery and Flushing Bays (Iocco et al; 2000). Commercially important bivalves such as the soft clam (*Mya arenaria*) and hard clam or northern quahog (*Mercenaria mercenaria*) may be present in the East River Project area. However, shellfish from the area are not safe for human consumption (USFWS, 1997), and the area is designated by the NYSDEC, Marine Resources Division as uncertified for the taking of shellfish for human consumption. Therefore, no harvesting of shellfish takes place in the Upper East River Project Area, and there will be no Project related impacts on recreational or commercial shellfish harvesting.

4.3.13.2 Potential Impacts

Potential impacts to the finfish community of the Upper East River are possible only during cable installation. The most likely impact is temporary displacement of demersal (bottom dwelling) species during cable placement activities. Cable installation activities will affect only a small percentage of the available habitat, and both demersal and pelagic (free swimming) species are expected to avoid the area of disturbance.

Cable placement through the shoreline could cause considerable bank erosional and localized sedimentation in the water column.

Disturbance of benthic invertebrate communities may occur during cable placement operations. However, the disturbance will be limited to the immediate area of cable placement. Disturbed habitat is expected to be rapidly re-colonized by larvae released by organisms in undisturbed habitat elsewhere in the estuary (USACOE, 1997; Hitchcock, et al., 2002). No cumulative or long-term impacts to benthic invertebrate communities or habitats will result from cable operation.

The cables contain a quantity of insulating dielectric fluid, Linear Alkylbenzene (LAB). It is possible that the cable could be punctured and some LAB would escape into the environment. Information on the product and protective measures is provided below.

The 345 kilovolt AC cables will become heated with the addition of electric loads.

4.3.13.3 Avoidance and Mitigation

There will be no adverse impacts to finfish during cable operation. The potential impacts from placement activities will be of short duration and will have no cumulative long-term effects on fish populations in the Upper East River or elsewhere in the New York Harbor/estuary. Potential short-term impacts are discussed below.

Suspended Sediment

Most of the substrate in the Upper East River Project area is rocky, and cable placement in this area is expected to result in little sediment re-suspension (NOAA, 2000). Sediment that is re-suspended in the water column will be quickly dispersed by the strong tidal currents, and the resultant turbidity increase will be of short duration. Investigations of dredging effects in the New York/New Jersey Harbor found that suspended sediments increased significantly 3 feet

above the bottom, but not in mid-depth or near surface waters (USACOE, 1999). Therefore, it is expected that elevated suspended sediment concentrations during cable placement will be limited to bottom waters, and would not affect fish higher in the water column. Estuarine species such as those inhabiting the Upper East River already experience elevated turbidity regularly during storm events. In addition, fish can avoid the areas of temporary elevated turbidity potentially caused by cable placement.

Horizontal directional drilling will be used to transition from the Converter to the marine cable installation. This type of operation precludes having to cut through the shore line and protects against shoreline erosion.

A pit will be excavated at both the Rainey 345 kilovolt AC Substation and Downstate Converter Circuit 1 locations for the horizontal directional drilling equipment. The pits will be excavated with conventional excavating equipment. Excavated material, if suitable for reuse, will be stockpiled onsite. Unsuitable material will be removed from the site and disposed of in accordance with New York State and New York City Regulations.

Two 30 inch diameter casings will be installed in the drilled holes. The exact drilling length and location will be determined based on geological information and field conditions. The 345 kilovolt AC cables will be pulled through the 30 inch steel sleeves from the waterside. Once the cables have been pulled and positioned in their final location, the sleeve will be grouted to protect the cables from movement. This construction technique avoids the shoreline cut, prevents shoreline erosion and mitigates sediment dispersal.

Explosives

The use of explosives during cable placement is not anticipated.

Pollutants

No impacts to fish populations are expected from pollutants resulting from the installation or operation of the cable. Contaminants associated with sediments are likely to be adsorbed to silt and clay particles and any increase in water column concentrations, if sediments are disturbed during cable placement, will be minimal and of short duration.

Linear Alkylbenzene Dielectric Fluid

The dielectric fluid used in the submarine cable is a low viscosity blend of linear alkylbenzene (LAB). The material is well protected in the armored cable. However, as discussed elsewhere, a puncture to the lead sheath of the cable could result in fluid leakage into the marine environment. LAB has been tested for environmental safety and has been found to exhibit low toxicity to aquatic organisms. A compilation of environmental fate and ecotoxicity data in the IUCLID data set included tests on various species of fish and other organisms. No mortality or toxic effects were observed in any of the tests on several species of fish. LAB toxicity test results on the water flea, *Daphnia magna*, indicate that no effects occur in 48 hours at the solubility concentration (0.010 to 0.013 mg/L), but that toxicity was observed at higher concentrations or longer exposure. An effect on 50 percent of the test organisms was found at a concentration of 1.1 mg/L, which is much higher than the solubility concentration. In tests where the exposure duration was increased to twice the test standard, a concentration of 0.83 mg/L resulted in an effect on 50 percent of the organisms. This concentration is also greater than the solubility concentration. No toxic effects were found on tests of aquatic algae (*Selanastrum capricornutum*) at concentrations exceeding the solubility limit.

An investigation of the aquatic environmental safety of LAB conducted by Gleghill et al., (1991) found that the compound is very insoluble in water and will tend to partition to particulates and sediment. Further, LAB was found to exhibit no toxicity in tests of several fish species as well as midge larvae (*Paratanytarsus* and *Chironomus*), amphipods (*Gammarus* sp.) and Mysid shrimp. Toxicity was only observed in tests of *Daphnia magna*. The study found that LAB undergoes rapid biodegradation in natural waters, and under aerobic conditions biodegradation will continue until complete mineralization occurs. The study concluded that LAB "...does not constitute a hazard to the safety and general well being of the aquatic environment." It should be noted that *Daphnia magna*, is a freshwater species and thus is not a component of the fauna of the East River. The mysid shrimp and amphipod are marine organisms, and no effects were noted on these species in LAB toxicity tests (Gledhill, et al, 1991). Therefore, due to low toxicity, rapid biodegradation, and rapid dispersion in strong river currents, LAB in quantities associated with the fluid filled, armored submarine cable does not represent a significant hazard to aquatic biota of the East River or adjacent estuarine habitats.

Cable Temperature

When buried, the cable will be below the river bottom surface, away from benthos and finfish, and therefore not have an adverse impact due to the thermal addition. Where the cable is laid on the river bottom surface, it will be covered by a protective, probably concrete, mat. The mat will assure that no species comes in direct contact with the cable surface. A small quantity of heat will escape the porous mat. In this case, mobile species will have the opportunity to avoid the excess heat. The excess heat may inhibit certain sessile species from colonizing the mat surface, while other species may be attracted to the mat.

4.3.14 Scenic, Recreational and Historic/Archaeological Resources

This section describes the study conducted of the Project's impact on scenic, recreational, and historic/archaeological resources located within 1 mile of the Project's Route. This section is divided into two subsections 4.3.14.1 (Scenic and Recreational Resources) and 4.3.14.2 (Historic and Archaeological Resources)

4.3.14.1 Scenic and Recreational Resources

This section describes the study conducted of the Project Route's impact on scenic and recreational resources.

The following federal and state databases together with additional resources were consulted to identify scenic and recreational areas within a 1 mile of the Project Route:

- Bureau of Land Management
- National Park Service
- Forest Service
- Fish and Wildlife Service
- Bureau of Indian Affairs for wild and scenic rivers.
- New York State Office of Parks, Recreation, and Historic Preservation
- New York State Department of Environmental Conservation – Wildlife Management
- New York State Department of Transportation

- New York States Parks, Recreation and Historic Preservation
- City of New York/ Parks and Recreation Department
- Westchester County parks and recreation information
- Village of Irvington Recreation and Parks Department
- The Dobbs Ferry Recreation Department
- Village of Hastings-on-Hudson Department of Parks and Recreation
- City of Yonkers information on parks, playgrounds, and other facilities.
- New York State Department of Environmental Conservation – Division of Lands and Forests – Public Lands
- Orange County Department of Parks and Recreation
- Albany County Offices
- Greene County Offices
- Ulster County Offices

4.3.14.1.1 Existing Conditions

Only one known scenic or natural area listed in National and State databases was identified within 1 mile of the Project Route. The Palisades Scree is located in Alpine Borough, Bergen County, New Jersey and contains bluffs and talus slopes along the Hudson River. It's biodiversity rank is considered of moderate significance.

Recreational areas identified within 1 mile of the Project Route are listed in Table 4.3.14-1. Those recreation areas and parks that border the Metro North Railroad/Amtrak railroad rights-of-way for Circuits No. 1 or 2 are indicated by a notation in the appropriate column.

Table 4.3.14-1
Summary of Parks and Recreation Areas

Name	Address or Location	Borders the ROW	Federal	State	Local
Catskill State Park	300,000 Acres Between Exits 18 And 21 In Parts Of Greene, Ulster, Sulivan And Deleware Counties			X	
Forsyth Park	Lucas Ave, Where Millers Lane Intersects It In Kingston				X
Chadwick Lake Park	Between Chadwick Lake And Mountain View Rd Near East Leptondale In The Town Of Newburgh				X
Monsey Glen County Park	Nyack Turnpike And Thruway Intersection In The Town Of Ramapo	X			X
Saddle River Park	Saddle River Road In The Town Of Ramapo				X
Viola Park	Maple Avenue, Town Of Ramapo				X
Dexter Park	Pascack In The Town Of Ramapo				X
Mountain View Park	East Of Interchange 12 And Abutting The Thruway In The Town Of Clarkestown	X			
Memorial Park	Depew Avenue In Nyack				X
Buttermil Falls Park	Between Schuyler And Greenbush Roads In The Town Of Orangetown				X
Blauvelt State Park	East Of The Village Of South Nyack In The Town Of Orangetown			X	
Clausland Mountain State Park	On Clausland Mountain Road In The Town Of Orangetown			X	
State Land	Orange Turnpike, Town Of Monroe			X	
State Land	Interstate 87 In The Town Of Esopus	X		X	
Great Vly Wma	Near Cementon, Partially In Green And Partially In Ulster Counties			X	
Rosendale Bat Cave	Town Of Rosendale Near Whiteport				X
State Land	Town Of Athens			X	
Columbia-Greene North	The Hudson River, And Lands On Both Sides, From Interchange 21a To The City Of Hudson			X	
Catskill - Olana	West Of Jefferson Heights In The Town Of Catskill			X	
Ulster- North	The Hudson River, And Lands On Both Sides, From The Green And Ulster County Borders South To Barrytown Unincrp.			X	
Mosher Park	Village Of Ravena, Town Of Coeymans				X
Algonquin Park	Powder Mill Road And County Road 52, Town Of Newburgh				X
Cronomer Hill Park	Powder Mill Road And Gardnertown Road, Town Of Newburgh				X
Knox Headquaters State Historic	Forge Hill Road, Town Of New Windsor			X	

Table 4.3.14-1
Summary of Parks and Recreation Areas

Name	Address or Location	Borders the ROW	Federal	State	Local
Site					
New Windsor Cantonment State Historic Site	Hill Road, Town Of New Windsor			X	
Schunnemunk State Park	Towns Of Cornwall And Woodbury	X		X	
Federal Land	Mineral Spring Road, Towns Of Cornwall And Woodbury		X		
Federal Land	Mombasha Road, Town Of Tuxedo		X		
Harriman State Park	Town Of Tuxedo	X		X	
Private Land	Albany Turnpike, Town Of Tuxedo				X
Smith Park	Lake & Park Avenues, Yonkers, Westchester, NY				X
Private Land – Appalachin Trail	Southfields Unincorporated, Town Of Tuxedo				X
Sterling Forest State Park	Town Of Tuxedo, Orange County, Near The Rockland County Border			X	
Airmont Town Park	Cragmere Road In Rockland County				X
Riverdale Park	Hudson River, W 254 St., Palisades Ave, W 232, Bronx, NY	X			X
Henry Hudson Parkway	Harlem River-Saw Mill River Parkway, Bronx , NY				X
Riverdale Park	Hudson River, W 254 St., Palisades Ave, W 232, Bronx, NY				X
Henry Hudson Parkway	Harlem River-Saw Mill River Parkway, Bronx , NY				X
Henry Hudson Park	Palisade Avenue, Kappock Street & Independence Avenue, Bronx, NY				X
Center Plots	Palisade Avenue & Independence Avenue, Bronx, NY				X
Van Cortlandt Park	Broadway, Jerome Avenue, City Line, Bronx, NY				X
Henry Hudson Parkway	Harlem River-Saw Mill River Parkway, Bronx, NY				X
Ewen Park	Johnson Avenue, W232 Street, Riverdale Avenue, Bronx, NY				X
Fort Independence Park	Sedgwick Avenue, Stevenson Place, Bronx, NY				X
Brust Square	W 242 Street, College Parkway, Manhattan & Waldo Avenues, Bronx, NY				X
Bell Tower Park	239th Street And Henry Hudson Parkway, Bronx, NY				X
St James Park	Parkview Terrace, E 193rd Street, E 190th Street,				X

Table 4.3.14-1
Summary of Parks and Recreation Areas

Name	Address or Location	Borders the ROW	Federal	State	Local
	Creston Avenue, Bronx, NY				
Roberto Clemente State Park	679 Riverside Drive, Bronx, NY			X	
Aqueduct Lands	Van Cortlandt Park South, Kingsbridge Road To W Fordham Road, Bronx, NY				X
University Malls	University Avenue, W Tremont Avenue, W 174th Street, Bronx, NY				X
Billingsley Terrace Playground	Billingsley Terrace, Phelan Place, Sedgwick Avenue, Bronx, NY				X
John Mullaly Park	Jerome Avenue, Mcclellan Street, River Avenue, E162nd Street, Bronx, NY				X
John Mullaly Park	Jerome Avenue, Mcclellan Street, River Avenue, E 162nd Street, Bronx, NY				X
Franz Sigel Park	Walton Avenue, E 158th Street, Grand Concourse, Bronx, NY				X
Macombs Dam Park	Harlem River, Jerome River Avenues, Ruppert Place, E 157th Street, Bronx, NY	X			X
Joyce Kilmer Park	Walton Avenue, E161th – E164th Streets, Grand Concourse, Bronx, NY				X
Bill Rainey Memorial Park	Dawson & Beck Street, Intervale & Longwood Avenues, Bronx, NY				X
Horeshoe Playground	E 165th Street, Hall Place, Rogers Place, Bronx, NY				X
Barretto Park	E Barretto Street, N Randall Avenue, Bronx, NY				
Church Square	E 177th Street, Castle Hill, Watson Avenues, Bronx, NY				X
Sound View Park	Bronx River, Lafayette & Metcalf & Bronx River Avenues, Bronx, NY				X
St Mary's Park	St Mary's Street, St Ann's Avenue, E149th Street, Jackson Avenue, Bronx, NY				X
Captain Riviera Playground	Forest Avenue, E156th Street, Bronx, NY				X
Inwood Hill Park	Dyckman Street, Hudson River, Harlem River Ship Canal, Manhattan, NY	X			X
Harlem River Driveway	W155th Street, 10th Avenue & Harlem River, Manhattan, NY				X
Sherman Creek Park	Sherman Creek, Harlem River Drive, 10th Avenue, Manhattan, NY				X
Dyckman Houses Playground	W204th Street Between 10th & Nagel Avenues, Manhattan, NY				X
Dyckman House Museum	Broadway & W 204th Street, Manhattan, NY				X
Lt William Tighe Triangle	Riverside Drive, Dyckman Street & Broadway, Manhattan, NY				X

Table 4.3.14-1
Summary of Parks and Recreation Areas

Name	Address or Location	Borders the ROW	Federal	State	Local
Fort Washington Park	Riverside Drive, Hudson River, W 155th – W 179th Street, Henry Hudson Parkway, Manhattan, NY	X			X
Highbridge Park	W 155th & Dyckman Street, Edgecombe & Amsterdam Avenues, Manhattan, NY				X
Fort Tryon Park	Riverside Drive To Broadway, W 192nd To Dyckman Street, Manhattan, NY				X
Raoul Wallenberg Park	W 190th Street, W 188th Street, E Of Amsterdam Avenue, Manhattan, NY				X
Isham Park	Broadway, Isham Street, Inwood Park, Manhattan, NY				X
J Hood Wright Park	Ft Washington & Haven Avenues, W 173rd Street, Manhattan, NY				X
Sherman Creek Park	Sherman Creek, Harlem River Drive, 10th Avenue, Mahattan, NY				X
Gorman Memorial Park	Broadway To Wadsworth Terrace, W 189th To W 190th Street, Manhattan, NY				X
Bennett Park	Ft Washington Avenue, W 183rd Street, Pinehurst Avenue, Manhattan, NY				X
Ps 128 Playground	Audubon Avenue, W 169th & W 170th Street, Manhattan, NY				X
General Grant National Memorial	W 122nd Street & Riverside Drive, Manhattan, NY		X		
Ps 156 Holcombe Rucker Playground	W 155th Street, 8th Avenue To Harlem River Drive, Manhattan, NY				X
Fredrick Johnson Park	7th Avenue, W 150th To W 151st Streets, Manhattan, NY				X
Roger Morris Park	Jumel Terrace To Edgecombe Avenue, W 160th To W 162nd Streets, Manhattan, NY				X
Colonel Charles Young Triangle	7th Avenue, Macombs Place At W153rd Street, Manhattan, NY				X
Mitchell Square	Broadway, St Nicholas Avenue, W 166th To W 168th Street, Manhattan, NY				X
Ps 28 Playground	St Nicholas Avenue & W 156th Street, Manhattan, NY				X
Carmansville Playground	Amsterdam Avenue, W 151st To W 152nd Street, Manhattan, NY				X
Mckenna Square	W 165th Street, Amsterdam To Audubon Avenues, Manhattan, NY				X
Donnellan Square	St Nicholas Avenue, W 150th Street To St Nicholas Place, Manhattan, NY				X
Riverbank State Park	West Tremont & Mattewson Road, Manhattan, NY	X		X	

Table 4.3.14-1
Summary of Parks and Recreation Areas

Name	Address or Location	Borders the ROW	Federal	State	Local
Riverside Park	Riverdale Drive To Hudson River, W 72nd Street To Clair Place, Manhattan, NY	X			X
Jacob Schiff Playground	W 136th Street And Amsterdam Avenue, Manhattan, NY				X
Ps 125 Playground	Morningside Avenue, W 123rd & W 124th Street, Manhattan, NY				X
Seventh Avenue Center Plots	7th Avenue, W 110 To W 152nd Streets, Manhattan, NY				X
Annunciation Park	Convent & Amsterdam Avenues, W 235th Street, Manhattan, NY				X
Broadway Center Plots	Broadway Center Plots, Broadway, W 156th To W 168th Streets, Manhattan, NY				X
Hamilton Place Playground	Hamilton Place, W 140th To W 141st Streets, Manhattan, NY				X
Montefiore Square	Broadway, Hamilton Place, W 138th Street, Manhattan, NY				X
St Nicholas Park	St Nicholas Avenue – Nicholas Terrace, W 128th – W 141st Street, Manhattan, NY				X
Marcus Garvey Memorial Park	Madison Avenue, E 120th To E 124th Streets, Manhattan, NY				X
Jackie Robinson Park	Bradhurst & Edgecombe Avenues, W 145th To W 155th Streets, Manhattan, NY				X
Colonel Charles Young Playground	W 145th To W 143rd Streets, Lenox Avenue, Harlem River Drive, Manhattan, NY				X
Ps 192 Playground	Amsterdam Avenue, W 136th Street, Manhattan, NY				X
Louis Cuvillier Park	E 125th Street, Fdr Drive, 1st Avenue, Manhattan, NY				X
Broadway Center Plots	Broadway, W 135th Street To W 156th Street, Manhattan, NY				X
Harlem Lane Park	Harlem River, W 151st To W 154th Streets, Manhattan, NY	X			X
Sheltering Arms Park	W 126th To W 129th Streets, Amsterdam Avenue To Old Broadway, Manhattan, NY				X
Ps 194 Playground	7th To 8th Avenues, W 143rd To W 144th Streets, Manhattan, NY				X
Riverside Park	Riverdale Drive To Hudson River, W 72nd Street To Clair Place, Manhattan, NY	X			X
Morningside Park	W 110th To W 123rd Street, Manhattan Avenue To Morningside Drive, Manhattan, NY				X
Broadway Center Plots	Broadway Center Plots, Broadway, W 156th To W 168th Streets, Manhattan, NY				X
Sakura Park	Riverside Drive, Claremont Avenue To W 122nd Street, Manhattan, NY				X
Frederick Douglas Houses	Amsterdam Avenue Between W 100th & W 102nd Streets, Manhattan, NY				X

Table 4.3.14-1
Summary of Parks and Recreation Areas

Name	Address or Location	Borders the ROW	Federal	State	Local
Playground					
Ps 163 Playground	W 97th Street And Amsterdam Avenue, Manhattan, NY				X
Martin Luther King Houses Playground	Lenox Avenue, W 113th To W 114th Streets, Manhattan, NY				X
Ps 45 Playground	Amsterdam Avenue, W104th & W 105th Streets, Manhattan, NY				X
W 104th Street Garden	W 104th Street, Manhattan Avenue, Central Park West, Manhattan, NY				X
Samuel Marx	7th Avenue, St Nicholas Avenue, W 115th Street, Manhattan, NY				X
Thomas Jefferson Park	1st Avenue To Fdr Drive, E 111th To E 114th Streets, Manhattan, NY				X
Ps 157 Playground	E 115th Street Between 3rd & Lexington Avenues, Manhattan, NY				X
Blake Hobbs Park	E 102nd To E 104th Streets & 2nd Avenue, Manhattan, NY				X
Martin Luther King Houses Park	Lenox Avenue, W 113th To W 114th Streets, Manhattan, NY				X
Abraham Lincoln Houses Playground	South East Corner 5th Avenue & E 135th Street, Manhattan, NY				X
Carver Houses Playground	E 104th Street, Madison & Park Avenues, Manhattan, NY				X
Ps 108 Playground	E 108th To E 109th Streets Between Park & Madison Avenues, Manhattan, NY				X
Ps 79 Playground	Park Avenue, E 120th To E 121st Streets, Manhattan, NY				X
Park Avenue Center Plots	E 34th Street To E 39th Street & Park Avenue, Manhattan, NY				X
Mcnair Park	Lexington Avenue Between E 122nd & E 123rd Streets, Manhattan, NY				X
Randall's Island	East & Harlem Rivers, Manhattan, NY	X			X
Ward's Island	East River & Hell Gate, Manhattan, NY	X			X
Triboro Bridge Park	1st To 2nd Avenues, E 124th To E 126th Streets, Manhattan, NY				X
Jhs 45, Wagner Houses Recreation Area	E 120th Street Between 1st And 2nd Avenue, Manhattan, NY				X
Is 117 & Ben Franklin Hs Playground	E 109th Street Between 2nd & 3rd Avenues, Manhattan, NY				X
Ps 146 Playground	Fdr Drive, E 106th To E 107th Streets, Manhattan, NY				X
George	99th To 100th Streets, 3rd Avenue, Manhattan, NY				X

Table 4.3.14-1
Summary of Parks and Recreation Areas

Name	Address or Location	Borders the ROW	Federal	State	Local
Washington Houses Playground					
Ps 155 Playground	E 117th To E 118th Streets, 1st To 2nd Avenues, Manhattan, NY				X
Wagner Houses Pool	E 124th Street Between 1st & 2nd Avenues, Manhattan, NY				X
Pleasant Village Community Garden	Pleasant Avenue, E 188th & E 119th Streets, Manhattan, NY				X
Riverside Park	Riverside Drive To Hudson River, W 72nd Street To Clair Place, Manhattan, NY	X			X
Joan Of Arc Park	Riverside Drive, W 91st To W 95th Streets, Manhattan, NY				X
Ps 84 Playground	Columbus Avenue, W 91st To W 92nd Streets, Central Park West, Manhattan, NY				X
Ps 87 Playground	W 78th Street & Amsterdam Avenue, Manhattan, NY				X
Ps 166 Playground	W 89th Street, Amsterdam & Columbus Avenues, Manhattan, NY				X
St Gregory's Park	W 90th Street Between Broadway & Amsterdam Avenue, Manhattan, NY				X
W 87th Street Garden	W 87th Street, Columbus Avenue, Central Park West, 88th Street, Manhattan, NY				X
Central Park	5th Avenue – Central Park W, 59th To 110th Streets, Manhattan, NY				X
Theodore Roosevelt Park	Central Park West, Columbus Avenue, W 77th To W 81st Streets, Manhattan, NY				X
Broadway Center Plots	Broadway, Columbus Circle To W 110th Streets, Manhattan, NY				X
Broadway Center Plots	Broadway, W 110th To W 122nd Streets, Manhattan, NY				X
Carl Schurz Park	East End Avenue To East River, E 84th To E 90th Streets, Manhattan, NY				X
Mill Rock Park	East River Opposite E 96th Street, Manhattan, NY				X
John Jay Park & Pool	Fdr Drive, E 76th Street To E 78th Streets, Manhattan, NY				X
Esplanade	E 96th To E 122nd Streets, Manhattan, NY				X
Asphalt Green	E 90th Street, York Avenue, Fdr Drive, Manhattan, NY				X
East River Esplanade	Fdr Drive, E 68th To E 96th Streets, Manhattan, NY				X
Manhattan Vocation Technical/ Technical Hs Playground	2nd Avenue, E 96th To E 97th Streets, Manhattan, NY				X

Table 4.3.14-1
Summary of Parks and Recreation Areas

Name	Address or Location	Borders the ROW	Federal	State	Local
Stanley M Isaacs Park	Fdr Drive, E 95th To E 97th Street, Manhattan, NY				X
Ruppert Park	2nd Avenue Between E 90th & E 91st Streets, Manhattan, NY				X
Judge Seabury Playground	Lexington Avenue, E 95th To E 96th Streets, Manhattan, NY				X
Riverside Park	Riverside Drive To Hudson River, W 72nd Street To Clair Place, Manhattan, NY				X
Damrosch Park	Amsterdam Avenue & W 62nd Street, Manhattan, NY				X
Anibal Aviles Playground Jhs 54	W 108th Street, Columbus & Amsterdam Avenues, Manhattan, NY				X
Ps 199 Playground	W 70th Street Between West End & Amsterdam Avenues, Manhattan, NY				X
Playground 70	W 70th Street Between West End & Amsterdam Avenues, Manhattan, NY				X
Samuel N Bennerson Park	W 64th Street, Amsterdam Avenue, Manhattan, NY				X
NY School Of Printing Recreation Area	W 49th Street, 9th & 10th Avenues, Manhattan, NY				X
Verdi Square	Broadway, Amsterdam Avenue & W 73rd Street, Manhattan, NY				X
Richard Tucker Park	Broadway To Columbus Avenue, W 66th Street, Manhattan, NY				X
Park Avenue Center Plots	E 34th Street To E 40th Street, E 46th Street To E 97th Street, Manhattan, NY				X
Lincoln Center Plaza	Columbus Avenue, W 63rd Street, Manhattan, NY				X
Grand Army Plaza	5th Avenue, W 58th To W 60th Streets, Manhattan, NY				X
Dante Park	Broadway, Columbus Avenue, W 63rd Street, Manhattan, NY				X
Sherman Square	Broadway & Amsterdam Avenue At W 70th Street, Manhattan, NY				X
Park Avenue Center Plots	E 34th Street To E 40th Street, E 46th Street To E 97th Street, Manhattan, NY				X
St Catherine's Park	1st Avenue, E 67th To E 68th Streets, Manhattan, NY				X
Five Parks (Fdr Drive)	E 53rd & E 54th Streets, Foot Of E 55th, E 56th, E 57th, E 58 Streets, Manhattan, NY				X
East River 60th Street Pavilion	E 60th Street, E 61st Street, York Avenue, Fdr Drive, East River Drive, Manhattan, NY				X
Sutton Place Park	East River Waterfront Between 56th And 57th Streets, Manhattan, NY				X
Gateway Plaza	E 59th Street, 1st & 2nd Avenues, Manhattan, NY				X

Table 4.3.14-1 Summary of Parks and Recreation Areas					
Name	**Address or Location**	**Borders the ROW**	**Federal**	**State**	**Local**
Dewitt Clinton Park	W 52nd To W 54th Streets, 11th To 12th Avenues, Manhattan, NY				X
Penn Station South Houses Playground	W 26th Street, 8th To 9th Avenues, Manhattan, NY				X
Ramon Aponte Park	47th Street Between 8th & 9th Avenues, Manhattan, NY				X
Bryant Park	Between 5th & 6th Avenues, W 40th & W 42nd Street, Manhattan, NY				X
Chelsea Park	9th To 10th Avenues, W 27th To W 28th Streets, Manhattan, NY				X
May Matthews Playground	W 45th Street Between 9th & 10th Avenues, Manhattan, NY				X
Mccaffrey Playground	W 43rd Street, 8th & 9th Avenues, Manhattan, NY				X
Clinton Community Garden	W 47th To W 48th Streets, 9th & 10th Avenues, Manhattan, NY				X
Greeley Square	Broadway, Avenue Of Americas, Between W 32nd & W 33rd Streets, Manhattan, NY				X
Duffy Square	Broadway, W 46th To W 47th Streets, 7th Avenues, Manhattan, NY				X
Worth Square	Broadway, 5th Avenue, W 24th To W 25th Streets, Manhattan, NY				X
Herald Square	Broadway, Avenue Of Americas, Between W34th & W 35th Streets, Manhattan, NY				X
St Vartan Park	1st To 2nd Avenue, E 35th To E 36th Streets, Manhattan, NY				X
Hmmarskjold Plaza	E 47th Street, 1st To 2nd Avenues, Manhattan, NY				X
Bellevue South Playground	E 26th To E 28th Streets, Maccarmen (Between 1st & 2nd Avenues)Manhattan, NY				X
Peter Detmold Park	E 49th To E 51st Streets, Fdr Drive, Manhattan, NY				X
Robert Moses Playground	1st Avenue, E 41st To E42nd Streets, Manhattan, NY				X
Esplanade	Fdr Drive Between E 36th & E 38th Streets, Manhattan, NY				X
Vincent F Albano Jr Playground	E 29th Street, 2nd Avenue, Manhattan, NY				X
General Douglas Macarthur Park	E 48th To E 49th Streets, Manhattan, NY				X
Ralph J Bunche Park	1st Avenue, E 42nd To E 43rd Streets, Manhattan, NY				X
Asser Levy	Asser Levy Place Between 23rd And 24th Streets,				X

Table 4.3.14-1 Summary of Parks and Recreation Areas					
Name	**Address or Location**	**Borders the ROW**	**Federal**	**State**	**Local**
Playground	Manhattan, NY				
Astoria Park	Astoria Park South, 21st Street, Hoyt Avenue, Ditmars Boulevard, East River, Queens, NY	X			X
Matthiessen Park	River Street & Hudson River, Village Of Irvington, Westchester, NY	X			X
Scenic Hudson Park	River Street & Hudson River, Village Of Irvington, Westchester, NY	X			X
Memorial/Station Road Park	Dows Lane Road & South Broadway, Village Of Irvington, Westchester, NY				X
Halsey Pond Park	Castle Road, Village Of Irvington, Westchester, NY				X
Gould Park	Ashford Avenue, Dobbs Ferry, Westchester, NY				X
Juhring Estate	Briary Road & Heather Way, Dobbs Ferry, Westchester, NY				X
Memorial Park	Palisade Street, Dobbs Ferry, Westchester, NY				X
Waterfront Park	High Street & Hudson River, Dobbs Ferry, Westchester, NY	X			X
Hillside Park	Hillside Avenue, Village Of Hasting-On-Hudson, Westchester, NY				X
Hillside Woods	Edgemont Avenue, Village Of Hasting-On-Hudson, Westchester, NY				X
Reynolds Field	Chauncey Lane Village Of Hasting-On-Hudson, Westchester, NY				X
Uniontown Park	Roe Street, Village Of Hasting-On-Hudson, Westchester, NY				X
Zinsser Park	North Broadway, Village Of Hasting-On-Hudson, Westchester, NY				X
Riverview Park	Warburton Avenue, Village Of Hasting-On-Hudson, Westchester, NY	X			X
Fulton Park	Maple Avenue, Village Of Hasting-On-Hudson, Westchester, NY				X
Draper Park	Washington Avenue, Village Of Hasting-On-Hudson, Westchester, NY				X
Macechron Waterfront Park	Hudson River, Village Of Hasting-On-Hudson, Westchester, NY				X
Senior Citizens Vest Pocket Park	Warburton Avenue North Of Pinecrest, Village Of Hasting-On-Hudson, Westchester, NY				X
Wagner Plaza	Village Of Hasting-On-Hudson, Westchester, NY				X
Untermeyer Park	North Broadway, Yonkers, Westchester, NY				X
Fitzpatrick Park	Valley & Bolmer Avenues, Yonkers, Westchester, NY				X
Kinsley Park & Playground	Park & Chase Avenues, Yonkers, Westchester, NY				X
Trevor Park & Playground	Ravine Avenue, Yonkers, Westchester, NY				X

Table 4.3.14-1 Summary of Parks and Recreation Areas					
Name	**Address or Location**	**Borders the ROW**	**Federal**	**State**	**Local**
Lennon Park & Playground	Lake & Park Avenues, Yonkers, Westchester, NY				X
Dunn Park & Playground	Glenwood & Vineyard Avenues, Yonkers, Westchester, NY				X
Grant Park & Playground	Park Avenue, Yonkers, Westchester, NY				X
Pitkin Park & Playground	87 Locust Hill Avenue, Yonkers, Westchester, NY				X
War Memorial Field	Copcutt Lane Off Nepperhan Avenue, Yonkers, Westchester, NY				X
Washington Park	South Broadway, Yonkers, Westchester, NY				X
Sullivan Oval Park & Playground	Van Cortlandt Park Avenue & Spruce Street, Yonkers, Westchester, NY				X
Cerrato Park	Riverdale Avenue, Yonkers, Westchester, NY				X
O'boyle Park & Playground	Hawthorne Avenue, Yonkers, Westchester, NY				X
Cedar Place Playground	20 Cedar Place, Yonkers, Westchester, NY				X
Culver Street Playground	Culver Street & Livingston Avenue, Yonkers, Westchester, NY				X
Sutherland Park	Park Hill Heights, Yonkers, Westchester, NY				X
Pelton Park & Playground	Mclean & Van Cortlandt Park Avenues, Yonkers, Westchester, NY				X
Fay Park & Playground	Abeel Street, Yonkers, Westchester, NY				X
Tallman Mountain State Park	Rockland County, NY			X	

4.3.14.1.2 Potential Impacts

Because the Project will at all times be either buried entirely within the Project Route except where engineering or environmental constraints dictate otherwise the scenic and recreational resources identified within the study area will not be impacted or otherwise adversely affected.

4.3.14.1.3 Avoidance and Mitigation

For those scenic or recreational areas identified within the study area, the following mitigation measures will be employed to assure avoidance and impact:

- To the extent practicable locate access roads and staging areas to avoid known scenic and recreational resources
- To the extent practicable limit construction equipment to known access roads
- Indicate on maps and specifications provided to contractors and subcontractors the location of any known scenic or recreational resource that could by impacted by the contractor's work.
- Where appropriate have a monitor on-site for any phase of the work adjacent to any known scenic or recreational resource that could by impacted.

4.3.14.2 Historic and Archeological Resources

This section describes the Project's impact on archaeological and historic resources.

Except where specifically noted, all cultural resources investigations for the Project were designed in accordance with the *Standards for Cultural Resources Investigations and the Curation of Archaeological Collections in New York State,* issued by the New York Archaeological Council (1994) (the *NYAC Standards*) and recommended for use by the New York State Office of Parks, Recreation and Historic Preservation (OPRHP). Information on previously recorded cultural resources along the Project Route and its vicinity was obtained from listings of properties on the State and National Registers of Historic Places, archeological site file data from OPRHP and the New York State Museum, and information from the New York City Landmarks Preservation Commission (LPC).

In addition to the research noted above, preliminary historic and archeological resources sensitivity assessments were prepared for each of the four Converters. These assessments included a review of literature relating to the history, prehistory, and geography of the vicinity of each proposed Converter. Special attention was given to a review of historic cartography including the extensive collections of the Map Division of the New York Public Library. In addition to the literature review, a Registered Professional Archeologist visited each of the Converter sites to collect information that can be used to determine the need for and required scope of archeological investigations that may be necessary to determine if previously unrecorded archeological resources may be present within the boundaries of each Converter site.

To obtain information on previously recorded and potential underwater archeological resources within one mile of the centerline of Circuit 1 within the East River, a number of databases and

sources in addition to the OPRHP files were consulted. Among the additional sources consulted were: *Encyclopedia of American Shipwrecks* (Berman, 1972); *Shipwrecks in the Americas* (Marx, 1971); *The Perils of the Port of New York, Maritime Disasters from Sandy Hook to Execution Rocks* (Rattray, 1973); *Shipwrecks of New York* (Gentile, 1996); *Shipwrecks in New York Waters* (Morris & Quinn, 1989), and the National Oceanographic and Atmospheric Administration's (NOAA) Automated Wreck and Obstruction Information System (AWOIS).

4.3.14.2.1 Existing Conditions

A total of 128 non-archeological properties listed on the State and/or National Registers of Historic Places are located within one mile of the approximate centerline of the Project Route and outside of Manhattan. These properties include buildings, sites, districts and objects. A complete listing is presented in Table 4.3.14-2. A total of 337 additional properties listed on the National/State Registers of Historic Places are located in Manhattan within one mile of the Project Route. A complete listing is presented in Table 4.3.14-3. Numerous additional properties which are not listed on the State or National Registers are designated New York City Landmarks and are located within one mile of the Project Route. However, only three are located within one mile of the Converter locations. These are the Henry Hudson and University Heights bridges and Public School 27.

Table 4.3.14-2
Non-archeological properties list on the State and/or National Registers of Historic Places that are within one mile of the Project Route

Site #	Site Name	Municipality	County	USGS Quad
1	Ten Eyck, Tobias, House & Cemeteries	Coeymans	Albany	Delmar
2	Mull House and Cemetery	Coeymans	Albany	Delmar
3	Coeymans Ariaanje House	Coeymans	Albany	Ravena
4	St. Patrick's Church Complex	Ravena	Albany	Ravena
5	Houghtaling, Abraham House	Coeymans	Albany	Ravena
6	Blaisdell, Fletcher Farm	Coeymans	Albany	Ravena
7	Coeymans-Bronck House	Coeymans	Albany	Ravena
8	New Baltimore Hamlet District	New Baltimore	Greene	Ravena
9	Houghtaling, Peter Farm & Lime Kiln	West Cocksackie	Greene	Ravena
10	Van Bergen House	New Baltimore	Greene	Ravena
11	Bronck, Peter House	Cocksackie	Greene	Hudson North
12	Bronck Farm 13 Sided Barn	Cocksackie	Greene	Hudson North
13	Susquehanna Turnpike	Leeds	Greene	Leeds
14	Leeds Dutch Reformed Church	Leeds	Greene	Leeds
15	Van Vechten, John House	Leeds	Greene	Leeds
16	District School #11	Jefferson Heights	Greene	Cementon
17	Trumphour Holmstead Farm	Saugerties	Ulster	Cementon
	Savage, Augusta House	Katsbaan	Ulster	Saugerties

Table 4.3.14-2
Non-archeological properties list on the State and/or National Registers of Historic Places that are within one mile of the Project Route

Site #	Site Name	Municipality	County	USGS Quad
19	Wynkoop House	Saugerties	Ulster	Saugerties
20	Dubois-Kierstede Stone House	Saugerties	Ulster	Saugerties
21	Main-Partition Streets District	Saugerties	Ulster	Saugerties
22	Senate House	Kingston	Ulster	Kingston West
23	Kingston Stockade District	Kingston	Ulster	Kingston West
24	Kirkland Hotel	Kingston	Ulster	Kingston West
25	Second Reformed Dutch Church	Kingston	Ulster	Kingston West
26	Old Dutch Church Parsonage	Kingston	Ulster	Kingston West
27	Hurley Historic District	Hurley	Ulster	Kingston West
28	All Saints' Chapel	Rosendale	Ulster	Rosendale
29	Perrine's Bridge	Rosendale/Esopus	Ulster	Rosendale
30	Stuart, Johannis House	Modena	Ulster	Clintondale
31	Hait, Thaddeus Farm	Modena	Ulster	Clintondale
32	Gardner, Silas House	Gardnertown	Orange	Newburgh
33	Orange Mill Historic District	Newburgh	Orange	Newburgh
34	Belknap Stone House	Newburgh	Orange	Newburgh
35	New Windsor Cantonment	New Windsor	Orange	Cornwall
36	Knox Headquarters	Vails Gate	Orange	Cornwall
37	Edmonston House	Vails Gate	Orange	Cornwall
38	Wooduff, B., House	Firthcliff Heights	Orange	Cornwall
39	Cocks, Isaac, House	Cornwall	Orange	Cornwall
40	Kellogg House	West Cornwall	Orange	Cornwall
41	Brooks, Samuel, House	Cornwall	Orange	Cornwall
42	Van-Duzer-Sayer, Mary, House	Cornwall	Orange	Cornwall
43	Wood, Wilford, House	Cornwall	Orange	Cornwall
44	Carney-Gatfield House	Cornwall	Orange	Cornwall
45	Hand, Walter, House	Mountainville	Orange	Cornwall
46	Mountainville Grange Hall	Mountainville	Orange	Cornwall
47	Smith Clove Meetinghouse	Highland Mills	Orange	Cornwall
48	Arden	Harriman	Orange	Monroe & Popolopen
49	Southfield Furnace Ruin	Monroe	Orange	Monroe
50	Tuxedo Park	Tuxedo Park	Orange	Sloatsburg
51	Tuxedo Park Railroad Station	Tuxedo Park	Orange	Sloatsburg
52	Sloat's Dam and Mill Pond	Sloatsburg	Rockland	Sloatsburg
53	Old Sloatsburg Cemetery	Sloatsburg	Rockland	Sloatsburg
54	Sloat House	Sloatsburg	Rockland	Sloatsburg
55	Torne Brook Farm	Ramapo	Rockland	Sloatsburg
56	US Post Office Suffern	Suffern	Rockland	Ramsey
57	Debaun, John A., Mill	Tallman	Rockland	Park Ridge NY/NJ
58	Palisades Interstate Parkway	Fort Lee/Bear Mountain	Orange/Rockland	Nyack/Yonkers/Central Park
59	Philadelphia Tobbogan Company	West Nyack	Rockland	Nyack
60	Methodist Episcopal Church	Upper Nyack	Rockland	Nyack
61	Upper Nyack Firehouse	Upper Nyack	Rockland	Nyack
62	Hopper, Edward, Birthplace	Nyack	Rockland	Nyack
63	Tappan Zee Plathouse	Nyack	Rockland	Nyack

Table 4.3.14-2
Non-archeological properties list on the State and/or National Registers of Historic Places that are within one mile of the Project Route

Site #	Site Name	Municipality	County	USGS Quad
64	US Post Office Nyack	Nyack	Rockland	Nyack
65	St. Paul's United Methodist Church	South Nyack	Rockland	Nyack
66	Ross-Hand Mansion	South Nyack	Rockland	Nyack
67	Wayside Chapel	Orangetown/Grandview-on-Hudson	Rockland	Nyack
68	Music Hall	Tarrytown	Westchester	White Plains
69	Foster Memorial A.M.E. Zion Church	Tarrytown	Westchester	White Plains
70	Patriot's Park	Tarrytown	Westchester	White Plains
71	Christ Episcopal Church	Tarrytown	Westchester	White Plains
72	North Grove Street Historic District 6	Tarrytown	Westchester	White Plains
73	First Babtist Church and Rectory	Tarrytown	Westchester	White Plains
74	Old Croton Aqueduct	Yonkers and New York	Westchester	White Plains
75	Lyndhurst	Tarrytown	Westchester	White Plains
76	Sunnyside	Tarrytown	Westchester	White Plains
77	Irvington, Washington Memorial	Irvington	Westchester	White Plains
78	Esterwood and Carriage House	Dobbs Ferry	Westchester	White Plains
79	Irvington, Washington, High School	Tarrytown	Westchester	White Plains
80	Villa Lewaro	Irvington	Westchester	White Plains
81	Irvington Town Hall	Irvington	Westchester	White Plains
82	Armour-Stiner House	Irvington	Westchester	White Plains
[illegible]	Nuits	Ardsley-on-Hudson	Westchester	White Plains
84	US Post Office Dobbs Ferry	Dobbs Ferry	Westchester	White Plains
85	Hyatt-Livingston House	Dobbs Ferry	Westchester	White Plains
86	Cropsey, Jasper F. House	Hasting-on-Hudson	Westchester	White Plains
87	Draper, John W. House	Hasting-on-Hudson	Westchester	White Plains
88	Thompson, W.B Mansion	Yonkers	Westchester	White Plains
89	Armstrong, Edwin H. House	Yonkers	Westchester	White Plains
90	Untermyer Park	Yonkers	Westchester	White Plains
91	Trevor, John Bond House	Yonkers	Westchester	White Plains
92	Halcyon Place Historic District	Yonkers	Westchester	White Plains
93	Flagg, Ethan, House	Yonkers	Westchester	White Plains
94	Public Bath House No. 2	Yonkers	Westchester	White Plains
95	Smith, Alexander, Carpet Mills Historic District	Yonkers	Westchester	White Plains
96	Bell Place-Locust Avenue Historic District	Yonkers	Westchester	White Plains
97	Philipes Manor Hall	Yonkers	Westchester	White Plains
98	US Post Office Yonkers	Yonkers	Westchester	White Plains
99	Copcutt, John Mansion	Yonkers	Westchester	White Plains
100	Public Bath House No. 3	Yonkers	Westchester	White Plains
101	Public Bath House No.4	Yonkers	Westchester	White Plains
102	Hastings Prototype House	Hastings-on-Hudson	Westchester	Mt. Vernon
103	Christ Church Complex	Bronx	Bronx	Yonkers
104	Edgehill Church of Spuyten Duyvil	Bronx	Bronx	Yonkers
105	Jerome Park Reservoir	Bronx	Bronx	Yonkers
106	Fonthill Castle	Bronx	Bronx	Yonkers
[illegible]	Administration of the College of Mt St.Vincent	Bronx	Bronx	Yonkers
[illegible]7	Robert Colgate House	Bronx	Bronx	Yonkers

Table 4.3.14-2
Non-archeological properties list on the State and/or National Registers of Historic Places that are within one mile of the Project Route

Site #	Site Name	Municipality	County	USGS Quad
108	Wave Hill	Bronx	Bronx	Yonkers
109	Henry F. Spaulding Coachmens House	Bronx	Bronx	Yonkers
110	Riverdale Presbyterian Church Complex	Bronx	Bronx	Yonkers
111	William E Dodge House	Bronx	Bronx	Yonkers
112	Eight Regiment Armory	Bronx	Bronx	Yonkers
113	Grand Concourse Historic District	Bronx	Bronx	Central Park
114	Hall of Fame Complex	Bronx	Bronx	Yonkers
115	Hertlein & Schlatter Silk Trimmings Factory	Bronx	Bronx	Central Park
116	Keepers House at Williamsbridge Resevoir	Bronx	Bronx	Central Park
117	Longwood Histroric District	Bronx	Bronx	Central Park
118	Casa Amadeo, antigua Casa Hernandz	Bronx	Bronx	Central Park
119	Poe Cottage	Bronx	Bronx	Central Park
120	Public School 11	Bronx	Bronx	Central Park
121	St. Ann's Church Complex	Bronx	Bronx	Central Park
122	St. James' Episcopal Church & Parish House	Bronx	Bronx	Central Park
123	Sunnyslope	Bronx	Bronx	Central Park
124	US Post Office -- Morrisiana	Bronx	Bronx	Central Park
125	Washington Bridge	Bronx	Bronx	Central Park
126	Mott Avenue Control House	Bronx	Bronx	Central Park
127	Mott Haven Historic District	Bronx	Bronx	Central Park
128	Park Plaza Apartments	Bronx	Bronx	Central Park

Table 4.3.14-3
Historical Sites Within 1 Mile Of The Project Route
National And State Register Of Historic Places
(Manhattan Only)

Historical Site	Location	Significance	Impact
Van Cortlandt, Frederick, House. 1 building used for recreation and culture	New York, NY	NRHP – architecture	None
Dyckman, William, House. 1 building used for recreation and culture	New York, NY	NRHP – architecture	None
US Post Office – Inwood Station. 1 building used for postal services	New York, NY	NRHP – architecture, politics, government	None
Fort Tryon Park and the Cloisters. 5 buildings used for recreation and culture, landscape	New York, NY	NRHP – art conservation, military, education, landscape architecture.	None
Jeffrey's Hook Lighthouse. Vacant	New York, NY	NRHP – engineering, transportation, commerce	None
Fort Washington Avenue Armory. 1 building, Defense	New York, NY	NRHP – event, architecture, engineering	None
Jumel Terrace Historic District. 49 buildings, domestic, landscape	New York, NY	NRHP – architecture	None
Morris-Jumel Mansion. 1 building used for recreation and culture, landscape	New York, NY	NRHP – military, architecture	None
Robeson, Paul, Home. 1 building, domestic	New York, NY	NRHP – social history, black, literature, performing arts	None
Chapel of the Intercession Complex and Trinity Cemetery. 2 bldgs. used for funerary and religious functions	New York, NY	NRHP – military, architecture, landscape architecture	None
Audubon Terrace Historic District. 4 buildings used for social, recreation and culture, religious functions	New York, NY	NRHP – architecture, education, community planning and development	None
Park Plaza Apartments. 1 building, domestic	New York, NY	NRHP – architecture	None
Lehigh Valley Railroad Barge No. 79. Work in Progress	Edgewater, NJ	NRHP – engineering, transportation, maritime history	None
Bailey House. 1 building, domestic, commerce/trade.	New York, NY	NRHP – architecture	None
Harlem River Houses. 3 buildings, domestic	New York, NY	NRHP – architecture, social history, black community	None

Table 4.3.14-3
Historical Sites Within 1 Mile Of The Project Route
National And State Register Of Historic Places
(Manhattan Only)

Historical Site	Location	Significance	Impact
		planning and development	
Ellington, Edward Kennedy "Duke", House. 1 building, domestic	New York, NY	NRHP – performing arts, black	None
New York Public Library, Hamilton Grange Branch. 1 building used for education purposes.	New York, NY	NRHP – architecture, education	None
Hamilton Heights Historic District. 192 buildings, domestic	New York, NY	NRHP – Architecture NYCLC – City Landmark	None
Our Lady of Lourdes Roman Catholic Church. 2 buildings used for religious functions.	New York, NY	NRHP – architecture	None
Hamilton Grange National Memorial. 1 building used for recreation and culture, government, landscape	New York, NY	NRHP – architecture	None
College of the City of New York. 6 buildings used for education purposes	New York, NY	NRHP – architecture	None
Dunbar Apartments. 6 buildings, domestic	New York, NY	NRHP – social history, community planning and development, architecture	None
Henson, Matthew, Residence. 1 building, domestic	New York, NY	NRHP – black, science, architecture	None
Croton Aqueduct Gate House. 1 building used for industry/processing, extraction	New York, NY	NRHP – architecture, engineering	None
Morris-Jumel Mansion. 1 building used for recreation and culture, landscape	New York, NY	NRHP – military, architecture	None
Mills, Florence, House. 1 building, domestic	New York, NY	NRHP – black, performing arts	None
St. Nicholas Historic District. 130 buildings, domestic	New York, NY	NRHP – architecture, community planning and development	None
Riverside Park and Drive, 1 Site used for recreation and culture, transportation, landscape	New York, NY	NRHP – landscape, architecture	None
New York Amsterdam News Building. 1	New York, NY	NRHP – communications, black	None

Table 4.3.14-3
Historical Sites Within 1 Mile Of The Project Route
National And State Register Of Historic Places
(Manhattan Only)

Historical Site	Location	Significance	Impact
building, domestic, commerce, trade			
Schomburg Center for Research in Black Culture. 1 building used for education, recreation and culture	New York, NY	NRHP – Black, education	None
Public School 157. 1 building, vacant, not in use	New York, NY	NRHP – architecture	None
General Grant National Memorial. 1 building used for recreation and culture, landscape	New York, NY	NRHP – military, architecture, politics, government	None
New York Presbyterian Church. 1 building used for religious functions	New York, NY	NRHP – architecture	None
Apollo Theater. 1 building used for recreation and culture, commerce, trade	New York, NY	NRHP – architecture, performing arts	None
Manhattan Avenue-West 120th-123rd Streets Historic District. 113 buildings, domestic	New York, NY	NRHP – architecture	None
Union Theological Seminary. 8 buildings used for education and religious functions	New York, NY	NRHP – architecture, religion	None
Pupin Physics Laboratories, Columbia University. 1 building used for education purposes	New York, NY	NRHP – Invention, science	None
BINGHAMTON (ferryboat). Commerce/trade	Edgewater, NJ	NRHP – engineering, transportation	None
*Mount Morris Park Historic District (Boundary Increase). 393 buildings, domestic	New York, NY	NRHP – community, planning and development, architecture	None
Public School 11. 1 building used for education purposes	New York, NY	NRHP – architecture	None
*Alcoa Edgewater Works. 1 building vacant, not in use	Edgewater, NJ	NRHP – engineering, architecture, Industry	None
Mount Morris Park Historic District. 255 buildings, domestic and religious functions	New York, NY	NRHP – architecture, black	None
St. Andrew's Episcopal Church. 2 buildings used for religious functions	New York, NY	NRHP – architecture	None
Low Memorial Library, Columbia University. 1 building used for education	New York, NY	NRHP – architecture	None

Table 4.3.14-3
Historical Sites Within 1 Mile Of The Project Route
National And State Register Of Historic Places
(Manhattan Only)

Historical Site	Location	Significance	Impact
Casa Italina. 1 building used for education	New York, NY	NRHP – architecture, education	None
Hughes, Langston, House. 1 building, domestic	New York, NY	NRHP – literature	None
Delta Psi, Alpha Chapter. 1 building used for education	New York, NY	NRHP – architecture	None
Minton's Playhouse. 1 building, vacant, not in use	New York, NY	NRHP – Performing arts	None
Church of Notre Dame and Rectory. 3 buildings used for religious purposes	New York, NY	NRHP – architecture	None
Harlem Fire Watchtower. 1 structure, landscape	New York, NY	NRHP – engineering, communications	None
New York Public Library, 115th Street Branch. 1 building used for education purposes	New York, NY	NRHP – architecture	None
Schinasi House. 1 building, commerce, trade	New York, NY	NRHP – architecture	None
Central Park. 56 structures, 8400 acres, landscape	New York, NY	NRHP – landscape, architecture	None
Ford Motor Company Edgewater Assembly Plant. 4 buildings, vacant, not in use, work in progress	Edgewater, NJ	NRHP – architecture, engineering, transportation, industry	None
Riverside-West 105th Street Historic District. 30 buildings, domestic	New York, NY	NRHP – architecture, community planning and development	None
New York Cancer Hospital. 3 buildings used for health care	New York, NY	NRHP – Health, medicine, architecture, science	None
Association Residence Nursing Home. 1 building, vacant, not in use.	New York, NY	NRHP – architecture, social history	None
St. Michael's Church. 3 buildings used for religious functions	New York, NY	NRHP – architecture, art	None
Pomander Walk District. 27 buildings, domestic	New York, NY	NRHP – architecture, community planning and development	None
Claremont Stables. 1 building used for recreation and culture	New York, NY	NRHP – architecture, transportation	None
Stables at 167, 169 and 171 West 89th Street. 3 buildings used for transportation, work in	New York, NY	NRHP – architecture	None

Table 4.3.14-3
Historical Sites Within 1 Mile Of The Project Route
National And State Register Of Historic Places
(Manhattan Only)

Historical Site	Location	Significance	Impact
progress			
Sunnyslope. 1 building used for religious functions	New York, NY	NRHP – Architecture	None
Longwood Historic District. 58 buildings, domestic	New York, NY	NRHP – architecture	None
Bronx Borough Courthouse. 1 building vacant, not in use	New York, NY	NRHP – Art, architecture	None
US Post Office – Morrisania. 1 building, used for government postal services	New York, NY	NRHP – politics, government, architecture	None
St. Ann's Church Complex. 1 building used for funerary, religious functions	New York, NY	NRHP – architecture, politics government	None
Mott Haven Historic District. 125 buildings, domestic	New York, NY	NRHP – architecture	None
Grand Concourse Historic District. 82 buildings, domestic	New York, NY	NRHP – architecture	None
48th Police Precinct Station. 1 building, vacant, not in use	New York, NY	NRHP – architecture	None
Bronx County Courthouse. 1 building used for government purposes	New York, NY	NRHP – art, architecture	None
Bronx Central Annex-U.S. Post Office. 1 building used for government postal services	New York, NY	NRHP – art architecture	None
Mott Avenue Control House. 1 building, vacant, not in use	New York, NY	NRHP – architecture, transportation	None
Lorillard Snuff Mill. 1 building, domestic, landscape	New York, NY	NRHP – industry	None
Vassar College Observatory. 1 building used for education purposes	Poughkeepskie, NY	NRHP – education, science	None
Steinway House. 1 building, domestic	New York, NY	NRHP – industry, architecture	None
Harlem Courthouse. 1 building used for government purposes	New York, NY	NRHP – architecture, politics, government	None
Mount Morris Bank. 1 building, vacant, not in use	New York, NY	NRHP – architecture	None
*Central Park. 8400 acres, landscape	New York, NY	NRHP – landscape, architecture	None

Table 4.3.14-3
Historical Sites Within 1 Mile Of The Project Route
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Historical Site	Location	Significance	Impact
St. Cecilia's Church and Convent. 1 building used for religious functions	New York, NY	NRHP – architecture	None
St. Nicholas Historic District. 130 buildings, domestic	New York, NY	NRHP – architecture, community planning and development	None
Manhattan Avenue-West 120th-123rd Streets Historic – 113 buildings, domestic	New York, NY	NRHP – architecture	None
*Dahlgren, Lucy Drexel, House. 1 building, work in progress	New York, NY	NRHP – architecture	None
Municipal Asphalt Plant. 1 building, vacant, not in use	New York, NY	NRHP – engineering, architecture	None
*Madison Avenue Façade of the Squadron A Armory. Work in progress	New York, NY	NRHP – military, architecture	None
*Baker, George F., Jr. and Sr., Houses. 1 building, domestic, religion	New York, NY	NRHP – architecture	None
*New York Cancer Hospital. 3 buildings used for health care	New York, NY	NRHP – health, medicine, architecture, science	None
*Church of Notre Dame and Rectory. 3 buildings used for religious functions	New York, NY	NRHP – architecture, engineering	None
*Vanderbilt, Mrs. Graham Fair, House. 1 building used for education purposes	New York, NY	NRHP – architecture	None
*Loew, William Goadby, House. 1 building used for health care	New York, NY	NRHP – architecture, performing arts	None
*Houses at 120 and 122 East 92nd Street. 2 buildings, domestic	New York, NY	NRHP – architecture	None
*Casa Italina. 1 building used for education purposes	New York, NY	NRHP – architecture, education	None
Gracie, Archibald, Mansion. 1 building, domestic	New York, NY	NRHP – architecture	None
*Warburg, Felix M., Mansion. 1 building used for recreation and culture	New York, NY	NRHP – architecture	None
Holy Trinity Church, St. Christopher House and Parsonage. 3 buildings used for religious functions	New York, NY	NRHP – architecture, engineering	None

Table 4.3.14-3
Historical Sites Within 1 Mile Of The Project Route
National And State Register Of Historic Places
(Manhattan Only)

Historical Site	Location	Significance	Impact
Metropolitan Museum of Art. 1 building used for recreation and culture	New York, NY	NRHP – art, architecture	None
*Houses at 146-156 East 89th Street. 6 buildings, domestic	New York, NY	NRHP – architecture	None
*Pupin Physics Laboratories, Columbia University. 1 building used for education	New York, NY	NRHP – invention, science	None
*Apartment at 1261 Madison Avenue. 1 building, domestic	New York, NY	NRHP – architecture	None
*Low Memorial Library, Columbia University. 1 building used for education	New York, NY	NRHP – architecture	None
Henderson Place Historic District. 21 buildings, domestic	New York, NY	NRHP – architecture	None
*Carnegie, Andrew, Mansion. 2 buildings used for recreation and culture	New York, NY	NRHP – industry, commerce	None
Hamilton Heights Historic District. 192 buildings, domestic	New York, NY	NRHP – architecture	None
Lighthouse. Vacant	New York, NY	NRHP – transportation, architecture, social history	None
Zion-St. Mark's Evangelical Lutheran Church. 1 building used for religious functions	New York, NY	NRHP – architecture, European	None
*Union Theological Seminary. 8 buildings used for education and religion	New York, NY	NRHP – architecture, religion	None
*Association Residence Nursing Home. 1 building, vacant, not in use	New York, NY	NRHP – architecture, social history	None
*General Grant National Memorial. 1 building used for recreation, culture, landscape	New York, NY	NRHP – military, architecture, politics government	None
*Riverside Park and Drive. 1 site, used for recreation culture, transportation, landscape	New York, NY	NRHP – landscape, architecture	None
*Delta Psi, Alpha Chapter. 1 building used for education	New York, NY	NRHP – architecture	None
*Morris, Lewis G., House. 1 building used for social functions	New York, NY	NRHP – architecture	None
*Church of St. Ignatius Loyola Complex. 4	New York, NY	NRHP – architecture, education	None

Table 4.3.14-3
Historical Sites Within 1 Mile Of The Project Route
National And State Register Of Historic Places
(Manhattan Only)

Historical Site	Location	Significance	Impact
buildings used for religious functions			
*St. Michael's Church. 3 buildings used for religious functions	New York, NY	NRHP – architecture, art.	None
*Riverside-West 105th Street Historic District. 30 buildings, domestic	New York, NY	NRHP – architecture, community planning and development	None
Octagon, The. 1 building, vacant, not in use	New York, NY	NRHP – architecture, social history	None
City and Suburban Homes Company's York Avenue Estate and Shively Sanitary Tenements Historic District. 18 buildings, domestic	New York, NY	NRHP – transportation, architecture	None
*Duke Residence. 1 building, domestic, commerce/trade	New York, NY	NRHP – architecture	None
New York Public Library. 1 building used for education	New York, NY	NHRP – architecture	None
*Upper East Side Historic District. 252 buildings, domestic, commerce, trade	New York, NY	NHRP - architecture	None
East 78th Street Houses. 4 buildings, domestic	New York, NY	NHRP – architecture	None
Houses at 208-218 East 78th Street – 6 buildings, domestic	New York, NY	NHRP – architecture, engineering	None
*Rogers, John S., House. 1 building used for education	New York, NY	NHRP – architecture	None
*Pomander Walk District. 27 buildings, domestic	New York, NY	NHRP – architecture, community planning and development	None
*Sinclair, Harry F., House. 1 building used for recreation and culture	New York, NY	NHRP – industry, politics, government	None
*Stables at 167, 169 and 171 West 89th Street. 3 buildings, transportation, work in progress	New York, NY	NHRP – architecture	None
*Duke, James B., Mansion. 1 building used for education	New York, NY	NHRP – architecture, commerce	None
*Claremont Stables. 1 building used for recreation and culture	New York, NY	NHRP – architecture, transportation	None
*Sidewalk Clock at 1501 3rd Avenue,	New York, NY	NHRP – art, commerce	None

Table 4.3.14-3
Historical Sites Within 1 Mile Of The Project Route
National And State Register Of Historic Places
(Manhattan Only)

Historical Site	Location	Significance	Impact
Manhattan. 1 object, landscape	New York, NY	NHRP – architecture, engineering	None
St. Jean Baptiste Church and Rectory. 2 buildings used for religious purposes	New York, NY	NHRP – education, science, architecture	None
*American Museum of Natural History. 1 building used for recreation and culture	New York, NY	NHRP – architecture, religion	None
*Congregation B'nai Jeshurun Synagogue and Community House. 2 buildings used for education and religion	New York, NY	NHRP – architecture	None
*Whitney Museum of American Art. 1 building used for recreation and culture.	New York, NY	NHRP – architecture	None
*Belnord Apartments. 1 building, domestic	New York, NY	NHRP – architecture	None
East 73rd Street Historic District. 15 buildings used for commerce/trade, domestic	New York, NY	NHRP – architecture	None
*United Methodist Church of St. Paul and St. Andrew Complex. 1 building used for religious functions	New York, NY	NHRP – architecture	None
*Schinasi House. 1 building used for commerce/trade	New York, NY	NHRP – architecture, social history	None
*Rice, Isaac L. Mansion. 1 building used for religious functions	New York, NY	NHRP – architecture, politics, government	None
US Post Office-Lenox Hill Station. 1 building used for postal services	New York, NY	NHRP – architecture	None
*Waldo, Gertrude Rhinelander, Mansion. 1 building, commerce/trade	New York, NY	NHRP – communications, performing arts.	None
Paramount Studios Complex. 6 buildings used for recreation and culture, industry, processing, extraction	New York, NY	NHRP – architecture	None
East 80th Street Houses. 4 buildings, domestic	Edgewater, NJ	NHRP – engineering, transportation	None
*BINGHAMTON (ferryboat), commerce trade	New York, NY	NHRP – architecture	None
Chapel of the Good Shepherd. 1 building , vacant, not in use	New York, NY	NHRP – architecture	None
*Mount Neboh Synagogue. 1 building,			

Table 4.3.14-3
Historical Sites Within 1 Mile Of The Project Route
National And State Register Of Historic Places
(Manhattan Only)

Historical Site	Location	Significance	Impact
vacant, not in use			
*Public School 9. 1 building used for education	New York, NY	NHRP – architecture	None
*Studio Apartments. 1 building, domestic	New York, NY	NHRP – architecture	None
*Red House. 1 building, domestic	New York, NY	NHRP – architecture	None
Founder's Hall, The Rockefeller University. 1 building used for education	New York, NY	NHRP – social history, science	None
*West 76th Street Historic District. 44 buildings, domestic	New York, NY	NHRP – architecture, community planning and development	None
*Apthorp Apartments. 1 building, domestic	New York, NY	NHRP – architecture	None
*West End Collegiate Church and Collegiate School. 1 building used for religious functions	New York, NY	NHRP- architecture	None
*Beacon Theater and Hotel. 1 building used for recreation and culture, domestic	New York, NY	NHRP – architecture, entertainment, recreation	None
*Level Club. 1 building domestic, work in progress	New York, NY	NHRP – architecture	None
*Ansonia Hotel. 1 building, domestic	New York, NY	NHRP – architecture, performing arts	None
*Central Savings Bank. 1 building used for commerce, trade	New York, NY	NHRP – architecture	None
*Ford Motor Company Edgewater Assembly Plant. 4 buildings vacant, work in progress, not in use	Edgewater, NJ	NHRP – architecture, engineering, transportation, industry	None
*Chatsworth Apartments and Annex. 2 buildings, domestic	New York, NY	NHRP – architecture	None
*Verdi, Giuseppe, Monument used for recreation and culture	New York, NY	NRHP – Art, European	None
*Mott Avenue Control House – 1 building vacant, not in use	New York, NY	NRHP – architecture, transportation	None
*Control House on 72nd Street – 1 building, transportation	New York, NY	NRHP – transportation	None
*Dorilton – 1 building, domestic	New York, NY	NRHP – architecture	None
*West 73rd-74th Street Historic District – 45	New York, NY	NRHP – architecture	None

Table 4.3.14-3
Historical Sites Within 1 Mile Of The Project Route
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Historical Site	Location	Significance	Impact
buildings, domestic			
*KESTREL (steam yacht) – vacant, not in use.	West New York, NJ	NRHP – transportation	None
*Dakota Apartments – 1 building, domestic	New York, NY	NRHP – architecture	None
*Plaza Hotel – 1 building, domestic, landscape	New York, NY	NRHP – commerce, art community planning and development, architecture	None
Houses at 146-156 East 89th Street – 6 buildings, domestic	New York, NY	NRHP – architecture	None
*Manhattan Avenue- West 120th – 123rd Streets, Historic, domestic	New York, NY	NRHP – architecture	None
*Sofia Warehouse – 1 building, vacant, not in use, work in progress	New York, NY	NRHP – architecture	None
*Church of St. Paul the Apostle – 2 buildings used for religious functions	New York, NY	NRHP – art, architecture	None
Building at 45 East 66th Street – 1 building, domestic	New York, NY	NRHP - architecture	None
Zion-St. Mark's Evangelical Lutheran Church – 1 building used for religious functions	New York, NY	NRHP – architecture, European	None
Alwyn Court Apartments – 1 building, domestic	New York, NY	NRHP – architecture	None
American Fine Arts Society – 1 building used for education	New York, NY	NRHP – art, architecture	None
Park Avenue Houses – 4 buildings used for education, recreation and culture, government	New York, NY	NRHP – architecture	None
Roosevelt, Sara Delano, Memorial House – 2 buildings used for social functions	New York, NY	NRHP – politics, governmenet	None
*Osbourne Apartments – 1 building, domestic	New York, NY	NRHP – architecture	None
West 67th Street Artists' Colony Historic District – 8 buildings, domestic	New York, NY	NRHP – art, architecture	None
Seventh Regiment Armory – 1 building, social, defense	New York, NY	NRHP – military, architecture	None
*Carnegie Hall – 1 building used for recreation	New York, NY	NRHP – performing arts	None

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Historical Sites Within 1 Mile Of The Project Route
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Historical Site	Location	Significance	Impact
and culture			
Mount Sinai Dispensary – 1 building used for religious functions	New York, NY	NRHP – architecture	None
Park East Synagogue, Congregation Zichron Ephraim – 1 building used for religious functions	New York, NY	NRHP – architecture	None
US Post Office – Old Chelsea Station – 1 building, government	New York, NY	NRHP – art, architecture, politics, government	None
St. Vincent Ferrer Church and Priory – 1 building used for religious functions	New York, NY	NRHP – architecture	None
Sidewalk Clock at 783 5th Avenue, Manhattan – landscape	New York, NY	NRHP – art, commerce	None
*Mecca Temple – 1 building used for recreation and culture	New York, NY	NRHP - architecture	None
*Sullivan, Ed, Theater – 1 building used for recreation and culture, commerce and trade	New York, NY	NRHP – architecture, entertainment, recreation	None
Rowhouses at 322-344 East 69th Street – 12 buildings, domestic	New York, NY	NRHP – architecture	None
Municipal Asphalt Plant – 1 building, vacant, not in use	New York, NY	NRHP – engineering, architecture	None
Hatch, Barbara Rutherford, House – 1 building, domestic	New York, NY	NRHP – architecture, social history, invention, performing arts	None
Building at 712 Fifth Ave. – 1 building vacant, not in use	New York, NY	NRHP – architecture	None
Coty Building – 1 building, vacant, not in use	New York, NY	NRHP – commerce, art, architecture	None
Residences at 5-15 West 54th Street – 5 buildings, domestic	New York, NY	NRHP – architecture	None
*Hotel Gerard – 1 building commerce, trade, domestic	New York, NY	NRHP – architecture	None
Macy, R.H., and Company Store, 1 building , commerce and trade	New York, NY	NRHP – commerce	None
University Club – 1 building used for social	New York, NY	NRHP – architecture	None

Table 4.3.14-3
Historical Sites Within 1 Mile Of The Project Route
National And State Register Of Historic Places
(Manhattan Only)

Historical Site	Location	Significance	Impact
events			
St. Thomas Church and Parish House – 1 building used for religious functions	New York, NY	NRHP – architecture	None
Rockefeller Center – 13 buildings used for recreation and culture, commerce and trade	New York, NY	NRHP – art, entertainment, recreation, landscape and architecture	None
Moore, William H. House – 1 building used for social events	New York, NY	NRHP – architecture	None
*U.S. General Post Office – 1 building used for government postal services	New York, NY	NHRP – architecture	None
*USS EDSON (DD-946) – 1 structure, used for recreation, culture	New York, NY	NRHP – architecture	None
*USS INTREPID (aircraft carrier) – 1 structure used for recreation, culture	New York, NY	NRHP – military	None
*Radio City Music Hall – 1 building used for recreation and culture	New York, NY	NRHP – entertainment, recreation, performing arts, architecture	None
Queensboro Bridge – 1 structure, vacant, not in use	New York, NY	NRHP – engineering, architecture	None
Houses at 647, 651-53 Fifth Avenue and 4 East 52nd Street – 3 buildings used for architecture, commerce	New York, NY	NRHP – architecture, commerce	None
Lever House – 1 building used for commerce and trade	New York, NY	NRHP – architecture	None
City and Suburban Homes Company's First Avenue Estate Historic District – 13 buildings, domestic	New York, NY	NRHP – social history, architecture	None
Central Synagogue – 1 building used for religious functions	New York, NY	NRHP – architecture, religion	None
St. Patrick's Cathedral – 4 buildings used for religious functions	New York, NY	NRHP – art, religion, architecture	None
*Film Center Building – 1 building used for commerce and trade	New York, NY	NRHP – architecture	None

Table 4.3.14-3
Historical Sites Within 1 Mile Of The Project Route
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Historical Site	Location	Significance	Impact
Racquet and Tennis Club Building – 1 building used for social, recreation and culture, commerce and trade	New York, NY	NRHP – architecture	None
Villard Houses – 5 buildings used for commerce and trade, domestic	New York, NY	NRHP – architecture, commerce	None
*Church of St. Mary the Virgin Complex – 4 buildings used for religious functions	New York, NY	NRHP – art, architecture, religion	None
Houses at 311 and 313 East 58th Street – 2 buildings, domestic, commerce and trade	New York, NY	NRHP – architecture	None
Scribner's Charles, Sons Building – 1 building used for commerce and trade	New York, NY	NRHP – architecture	None
Smith, Abigail Adams, Museum – 1 building used for social functions	New York, NY	NRHP – architecture	None
Times Square Hotel – 1 building, domestic	New York, NY	NRHP – architecture, entertainment, recreation	None
St. Bartholomew's Church and Community House – 1 building used for religious functions	New York, NY	NRHP – architecture, art	None
Sutton Place Historic District – 12 buildings, domestic, landscape	New York, NY	NRHP – architecture	None
Lamb's Club – 1 building used for religious functions	New York, NY	NRHP – architecture, performing arts	None
*Webster Hotel – 1 building vacant, not in use, work in progress	New York, NY	NRHP – architecture	None
McGraw-Hill Building – 1 building used for commerce and trade	New York, NY	NRHP – architecture	None
Town Hall – 1 building	New York, NY	NRHP – architecture, social history, education, performing arts, politics, government	None
*Candler Building – 1 building, vacant, not in use	New York, NY	NRHP – architecture, engineering	None
New York Yacht Club – 1 building used for social functions	New York, NY	NRHP – maritime history, architecture	None
New Amsterdam Theater – 1 building used for	New York, NY	NRHP – art, engineering,	None

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Historical Sites Within 1 Mile Of The Project Route
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Historical Site	Location	Significance	Impact
recreation and culture, commerce and trade		entertainment, recreation, architecture	
Harvard Club of New York City – 1 building used for social functions	New York, NY	NRHP – architecture	None
*Association of the Bar of the City of New York – 1 building used for commerce and trade	New York, NY	NRHP – architecture, education, law	None
*Knickerbocker Hotel – 1 building used for commerce and trade	New York, NY	NRHP – architecture	None
Century Association Building – 1 building used for social functions	New York, NY	NRHP – architecture	None
Blackwell House – 1 building , vacant, not in use	New York, NY	NRHP – architecture, engineering	None
Lescaze House – 1 building, domestic	New York, NY	NRHP – architecture	None
Turtle Bay Gardens Historic District – 1 building, domestic, landscape	New York, NY	NRHP – architecture, community planning and development, landscape	None
Public School 35 – 1 building used for social functions	New York, NY	NRHP – architecture	None
New York Public Library and Bryant Park – 2 buildings used for education, landscape	New York, NY	NRHP – architecture, education, landscape architecture	None
Grand Central Terminal – 1 building used for transportation, commerce and trade	New York, NY	NRHP – commerce, art, engineering, transportation, architecture	None
American Radiator Building – 1 building used for commerce and trade	New York, NY	NRHP – architecture	None
Knox Building – 1 building used for commerce and trade	New York, NY	NRHP – architecture, commerce	None
Chrysler Building – 1 building used for commerce and trade	New York, NY	NRHP – art, architecture, commerce	None
Chanin Building – 1 building used for commerce and trade	New York, NY	NRHP – architecture	None
City Hospital – 1 building, vacant, not in use	New York, NY	NRHP – architecture	None

Table 4.3.14-3
Historical Sites Within 1 Mile Of The Project Route
National And State Register Of Historic Places
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Historical Site	Location	Significance	Impact
Tiffany and Company Building – 1 building vacant, not in use	New York, NY	NRHP – architecture, commerce	None
Strecker Memorial Laboratory – 1 building used for education	New York, NY	NRHP – architecture, science	None
Smallpox Hospital – 1 building, vacant, not in use	New York, NY	NRHP – architecture, health and medicine	None
Daily News Building – 1 building used for commerce and trade	New York, NY	NHRP – architecture, communication NYCLC – City Landmark	None
Tudor City Historic District – 14 buildings, domestic	New York, NY	NHRP – community planning and development, architecture	None
New York Architectural Terra Cotta Company Office Building – 1 building, vacant, not in use	New York, NY	NHRP – industry and architecture	None
Douglas, Adelaide L.T., House – 1 building, government	New York, NY	NHRP – architecture	None
DeLamar Mansion – 1 building, government	New York, NY	NHRP – architecture	None
Sniffen Court Historic District – 10 buildings, commerce trade, domestic	New York, NY	NHRP – architecture	None
Morgan, Pierpont, Library – 1 building used for education	New York, NY	NHRP – economics, architecture, education, commerce	None
Lanier, James F.D., Residence – 1 building, domestic	New York, NY	NHRP – architecture	None
Church of the Incarnation and Parish House – 2 buildings used for religious functions	New York, NY	NHRP – art, architecture	None
Clarke, Thomas B., House – 1 building used social functions	New York, NY	NHRP – architecture	None
Civic Club – 1 building used for social functions	New York, NY	NHRP – architecture, social history	None
Empire State Building – 1 building used for commerce and trade	New York, NY	NHRP – architecture, literature	None
Old Grolier Club – 1 building used for commerce and trade	New York, NY	NHRP – architecture, literature	None
Hunters Point Historic District – 19 buildings,	New York, NY	NHRP – architecture	None

Table 4.3.14-3
Historical Sites Within 1 Mile Of The Project Route
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Historical Site	Location	Significance	Impact
domestic			
US Post Office – Long Island City – 1 building used for government postal services	New York, NY	NHRP – architecture, politics, government	None
Old Colony Club – 1 building used for education	New York, NY	NHRP – architecture, social history	None
New York School of Applied Design – 1 building used for education	New York, NY	NHRP – architecture, education	Non
House at 203 East 29 Street – 2 buildings, domestic, work in progress	New York, NY	NHRP – architecture	None
*Church of the Transfiguration and Rectory – 2 buildings used for religious functions	New York, NY	NHRP – architecture, performing arts	None
*Marble Collegiate Reformed Church – 1 building used for religious functions	New York, NY	NHRP – architecture	None
*Gilsey Hotel – 1 building, vacant, not in use	New York, NY	NHRP – architecture	None
Arthur, Chester A., House – 1 building, domestic, commerce and trade	New York, NY	NHRP – politics, government	None
R&S Building – 1 building, vacant, not in uses, work in progress	New York, NY	NHRP – architecture	None
Long Island City Courthouse Complex	New York, NY	NHRP – architecture, politics, government	None
New York Life Building – 1 building used for commerce and trade	New York, NY	NHRP - commerce	None
*Riverside Drive-West 80th-81st Streets Historic District – 35 buildings, domestic	New York, NY	NHRP – architecture	None
69th Regiment Armory – 1 building, defense	New York, NY	NHRP – military, architecture, art	None
*Racquet Court Club Building – 1 building, domestic, commerce and trade	New York, NY	NHRP – architecture	None
Appellate Division Courthouse of New York State – 1 building used for government purposes	New York, NY	NHRP – art, law, architecture	None
Metropolitan Life Home Office Complex – 1 building used for commerce and trade	New York, NY	NHRP – industry, architecture, commerce	None
*Trinity Chapel Complex – 2 buildings used	New York, NY	NHRP - architecture	None

Table 4.3.14-3
Historical Sites Within 1 Mile Of The Project Route
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Historical Site	Location	Significance	Impact
for religious functions			
Church of the Immaculate Conception and Clergy Houses – 3 buildings used for religious functions	New York, NY	NHRP – social history, architecture	None
Metropolitan Life Insurance Company – 1 building used for commerce and trade	New York, NY	NHRP – commerce	None
US Post Office – Madison Square Station – 1 building used for government postal services	New York, NY	NHRP – art, architecture, politics, government	None
*Church of the Holy Apostles – 1 building used for religious functions	New York, NY	NHRP – religion, architecture	None
*Sidewalk Clock at 200 5th Avenue, Manhattan – landscape	New York, NY	NHRP – art, commerce	None
United Charities Building Complex – 3 buildings us ed for social, domestic, commerce and trade	New York, NY	NHRP – social history, architecture, education	None
Church of Missions House – 1 building used for social and religious functions	New York, NY	NHRP – architecture, religion	None
*Hotel Chelsea – 1 building, domestic	New York, NY	NHRP – architecture, literature	None
Public Baths – 1 building, government	New York, NY	NHRP – architecture, social history	None
*Scribner Building – 1 building, commerce and trade	New York, NY	NHRP – architecture	None
Gramercy Park Historic District – 140 buildings, domestic, landscape, religion	New York, NY	NHRP – landscape, architecture, architecture	None
Tilden, Samuel J. House – 1 building used for social purposes	New York, NY	NHRP – art, architecture, politics and government	None
Players, The – 1 building used for social purposes, domestic	New York, NY	NHRP – performing arts	None
*Theodore Roosevelt Birthplace National Historic Site – 1 building used for recreation and culture	New York, NY	NHRP – social history, politics, government	None
*Chelsea Historic District (Boundary Increase) 274 buildings, domestic	New York, NY	NHRP – community planning and development, architecture	None

Table 4.3.14-3
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Historical Site	Location	Significance	Impact
*Church of the Holy Communion and Buildings – 4 buildings used for health care	New York, NY	NHRP – religion, architecture, social history	None
*Houses at 437-459 West 24th Street – 11 buildings, domestic	New York, NY	NHRP – architecture, community planning and development	None
Century Building – 1 building used for commerce/trade	New York, NY	NHRP – architecture, communications	None
Society for the Lying-in-Hospital – 1 building used for health care	New York, NY	NHRP – architecture, health, medicine, social history	None
Houses at 326, 328 and 330 East 18th Street – 3 buildings, domestic	New York, NY	NHRP – architecture, engineering	None
Salmagundi Club – 1 building used for social functions	New York, NY	NHRP – art, architecture	None
Union Square – 1 site used for recreation and culture	New York, NY	NHRP – social history	None
St. George's Episcopal Church – 1 building used for religious functions	New York, NY	NHRP – black, performing arts	None
*Sanger, Margaret, Clinic – 1 building, domestic	New York, NY	NHRP – health, medicine, politics government, social history	None
Stuyvesant Square Historic District – 58 buildings, domestic, landscape, commerce and trade	New York, NY	NHRP – architecture, community planning and development	None
Astral Apartments – 1 building, domestic	New York, NY	NHRP – architecture	None
Greenpoint Historic District – 363 buildings, domestic, commerce and trade	New York, NY	NHRP – architecture	None
Lincoln Building – 1 building, commerce and trade	New York, NY	NHRP – architecture	None
New York Marble Cemetery – 1 site – funerary	New York, NY	NHRP – architecture, community planning and development, exploration, settlement	None
*FRYING PAN SHOALS LIGHTSHIP NO. 115 (lightship) – 1 structure, recreation and culture	New York, NY	NHRP – maritime history	None
*Greenwich Village Historic District – 105	New York, NY	NHRP – art, architecture,	None

Table 4.3.14-3
Historical Sites Within 1 Mile Of The Project Route
National And State Register Of Historic Places
(Manhattan Only)

Historical Site	Location	Significance	Impact
buildings, domestic, commerce and trade		literature	
*Norwood, Andrew S., House – 1 building – domestic	New York, NY	NHRP – architecture, economics	None
St. Mark's Historic District – 6 buildings, domestic	New York, NY	NHRP – architecture, politics, government	None
*Merchants Refrigerating Company Warehouse – 1 building – commerce and trade	New York, NY	NHRP – architecture	None
Yiddish Art Theatre – 1 building used for recreation and culture	New York, NY	NHRP – architecture, performing arts	None
US Post Office – Cooper Station – 1 building used for government postal services	New York, NY	NHRP – architecture, politics, government	None
Grace Church and Dependencies – 2 buildings used for religious functions	New York, NY	NHRP – architecture	None
Saint Mark's Historic District (Boundary Increase) – 2 buildings, domestic	New York, NY	NHRP – architecture	None
St.-Marks-In-The-Bowery – 1 building used for religious functions	New York, NY	NHRP – religion, politics, government, architecture	None
*Church of the Ascension (Protestant Episcopal) – 1 building used for religious functions	New York, NY	NHRP – architecture	None
Fish, Hamilton, House – 1 building, domestic, work in progress	New York, NY	NHRP – politics, government	None
*US Post Office – Canal Street Station – 1 building used for government postal services	New York, NY	NHRP – art, architecture, politics, government	None
Ottendorfer Public Library and Stuyvesant Polyclinic – 2 buildings used for education and health care	New York, NY	NHRP – architecture, health, medicine, social history, education	None
*Hackensack Water Company Complex – 5 buildings, industry, processing, extraction	Weehawken, NJ	NHRP – engineering, architecture	None
Parker, Charlie, Residence – 1 building, domestic	New York, NY	NHRP – black, performing arts	None
LeRoy, Daniel, House – 1 building, domestic, commerce and trade	New York, NY	NHRP – architecture	None

Table 4.3.14-3
Historical Sites Within 1 Mile Of The Project Route
National And State Register Of Historic Places
(Manhattan Only)

Historical Site	Location	Significance	Impact
Cooper Union – 1 building used for education	New York, NY	NHRP – education	None
Christodora House – 1 building vacant, not in use, work in progress	New York, NY	NHRP – social history	None
*New York Studio School of Drawing, Painting and Sculpture – 8 buildings used for education, recreation and culture	New York, NY	NHRP – art, social history	None
Metropolitan Savings Bank – 1 building used for religious functions	New York, NY	NHRP – architecture	None
LaGrange Terrace – 4 buildings, domestic, recreation and culture, commerce and trade	New York, NY	NHRP – architecture	None
Hopper, Isaac T., House – 1 building, domestic	New York, NY	NHRP – social history, architecture	None
*Triangle Shirtwaist Factory – 1 building used for education	New York, NY	NHRP – industry, politics, government, social history	None
Judson Memorial Church, Campanile and Judson Hall – 2 buildings used for education and religion	New York, NY	NHRP – architecture	None
New York Shakespeare Festival Public Theater – 1 building used for recreation and culture	New York, NY	NHRP – architecture	None
Old Merchant's House – 1 building, domestic	New York, NY	NHRP – architecture	None
Bouwerie Lane Theater – 1 building used for recreation and culture	New York, NY	NHRP - architecture	None
Devinne Press Building – 1 building, commerce and trade	New York, NY	NHRP – architecture, commerce	None
House at 37 East 4th Street – 1 building domestic	New York, NY	NHRP – architecture	None
*Film Center Building – 1 building, commerce and trade	New York, NY	NHRP – architecture	None
Sidewalk Clock at 522 5th Avenue, Manhattan – landscape	New York, NY	NHRP – art, commerce	None
*Engine Company No. 2 – 1 building government	Hoboken, NJ	NHRP – architecture, politics, government	None

Table 4.3.14-3
Historical Sites Within 1 Mile Of The Project Route
National And State Register Of Historic Places
(Manhattan Only)

Historical Site	Location	Significance	Impact
Grand Central Terminal (Boundary Increase: Park Avenue Viaduct) 1 structure - transportation	New York, NY	NHRP – architecture, transportation	None
Church Missions House – 1 building used for social and religious functions	New York, NY	NHRP – architecture, religion	None
Sidewalk Clock at 519 3rd Avenue, Manhattan – landscape	New York, NY	NHRP – art, commerce	None

NRHP – The National Register of Historic Places
SHPO - New York State Parks, Recreation, and Historic Preservation

NYCLC - New York City's Landmark Commission

In addition to the historic properties listed in Table 4.3.14-3, a total of 432 previously recorded upland archeological sites and districts have been identified within one mile of the approximate centerline of the Project Route (Table 4.3.14-4). These sites include all sites listed and mapped in the consolidated site files of the OPRHP and the New York State Museum and include archeological sites associated with both the historic and prehistoric periods. Site file maps indicate the presence of one previously recorded prehistoric archeological site (A039.02.0050) within or near the limits of Upstate Converter Circuit 1. However, a check of the associated site form indicates that this site is, in fact, located several hundred feet away along the Iroquois Gas Pipeline right-of-way. There are no previously recorded archeological sites at the locations of Upstate Converter Circuit 2, Downstate Converter Circuit 1, or Downstate Converter Circuit 2.

Table 4.3.14-4
Previously Recorded Archeological Properties within One Mile of the Project (Outside of Manhattan)

Site #	Site #	Municipality	County	USGS Quad	Comments
NYSM 2773	1			Delmar	
NYSM 357	2			Delmar	
NYSM 7563	3			Delmar	
A001.03.000303	4			Delmar	
NYSM 5299	5			Ravena	3 loci (parker)
NYSM 375	6			Ravena	
NYSM 376	7			Ravena	
NYSM 379	8			Ravena	
NYSM 6655	9			Ravena	
A039.12.0005	10			Ravena	
A039.12.0003	11			Ravena	
A039.12.0004	12			Ravena	
NYSM 3381	13			Ravena	
A039.12.0007	14			Ravena	
A039.12.0008	15			Ravena	
A039.12.0006	16			Ravena	
A039.12.000116	17			Ravena	
A039.12.000115	18			Ravena	
NYSM 400	19			Ravena	
NYSM 401	20			Ravena	
A039.05.000154	21			Hudson North	
A039.05.000158	22			Hudson North	
A039.05.000157	23			Hudson North	
A039.05.000156	24			Hudson North	
A039.05.000160	25			Hudson North	
A039.05.000151	26			Hudson North	
A039.05.000141	27			Hudson North	
A039.05.000142	28			Hudson North	
A039.05.0040	29			Hudson North	

Table 4.3.14-4
Previously Recorded Archeological Properties within One Mile of the Project (Outside of Manhattan)

Site #	Site #	Municipality	County	USGS Quad	Comments
A039.05.000045	30			Hudson North	
A039.05.000143	31			Hudson North	
A039.05.000139	32			Hudson North	
NYSM 423	33			Hudson North	
NYSM 3404	34			Hudson North	
A039.05.0018	35			Hudson North	
A039.05.000144	36			Hudson North	
DOC5 R# 33344	37			Hudson North	
A039.05.000140	38			Hudson North	
A039.05.0016	39			Hudson North	
A039.05.0041	40			Hudson North	
NYSM 8272	41			Hudson North	
A039.05.0017, NYSM 399	42			Hudson North	
NYSM 424	43			Hudson North	
A039.05.000145	44			Hudson North	
A039.05.000146	45			Hudson North	
A039.05.007, NYSM 407	46			Hudson North	
A039.05.000147	47			Hudson North	
A039.02.000016	48			Hudson North	
A039.05.000148	49			Hudson North	
A039.05.000261	50			Hudson North	
NYSM 386	51			Leeds	
A039.02.00212	52			Leeds	
A039.02.000045	53			Leeds	
A039.02.000044	54			Leeds	
A039.02.000043	55			Leeds	
NYSM 385	56			Leeds	
A039.02.000041	57			Leeds	
A039.02.000042	58			Leeds	
A039.02.000064	59			Leeds	
A039.02.000050	60			Hudson North	
A039.02.000049	61			Hudson North	
A039.02.000047	62			Hudson North	
A039.02.000048	63			Hudson North	
NYSM 7106	64			Hudson North	
NYSM 7107	65			Hudson North	
A039.05.0008, NYSM 467	66			Hudson North	
NYSM 8268	67			Hudson North	
A039.02.0217, NYSM 409	68			Hudson North	
A039.02.000052	69			Hudson North	
NYSM 394	70			Leeds	
NYSM 456	71			Leeds	
NYSM 6749	72			Leeds	
A039.02.0009	73			Leeds	

Table 4.3.14-4
Previously Recorded Archeological Properties within One Mile of the Project (Outside of Manhattan)

Site #	Site #	Municipality	County	USGS Quad	Comments
NYSM 384	74			Leeds	
NYSM 457	75			Leeds	
A039.02.0008	76			Leeds	
NYSM 382	77			Leeds	
NYSM 458	78			Leeds	
A039.04.0020	79			Leeds	
A039.04.00009	80			Leeds	
A039.02.00067	81			Leeds	
A039.05.000051	82			Hudson North	
NYSM 395	83			Hudson North	
A039.05.000250	84			Hudson North	
A039.05.000252	85			Hudson North	
AA039.05.000257	86			Hudson North	
A039.05.000251	87			Hudson North	
NYSM 8317	88			Hudson North	
NYSM393	89			Hudson North	
NYSM 8318	90			Hudson North	
NYSM 3396	91			Cementon	
A039.04.0024	92			Cementon	
A039.04.0025	93			Cementon	
NYSM 3392	94			Cementon	
A039.04.0026	95			Cementon	
NYSM 9414	96			Cementon	
A039.04.0027	97			Cementon	
A039.04.0028	98			Cementon	
NYSM 9416	99			Cementon	
NYSM 9415	100			Cementon	
NYSM 9205	101			Cementon	
A039.04.0078	102			Cementon	
A039.04.0075	103			Cementon	
A039.04.0077	104			Cementon	
NYSM 474	105			Cementon	
A039.04.0035	106			Cementon	
A039.04.0073	107			Cementon	
A039.04.0074	108			Cementon	
NYSM 475	109			Cementon	
A039.04.0038	110			Cementon	
A039.04.0036	111			Cementon	
A039.04.0039	112			Cementon	
A039.04.0045	113			Cementon	
A039.04.0037	114			Cementon	
A039.04.0040	115			Cementon	
NYSM 489	116			Cementon	
A039.04.000095	117			Cementon	

Table 4.3.14-4
Previously Recorded Archeological Properties within One Mile of the Project (Outside of Manhattan)

Site #	Site #	Municipality	County	USGS Quad	Comments
A039.04.000093	118			Cementon	
A039.04.000094	119			Cementon	
A039.04.0042	120			Cementon	
NYSM 3402	121			Cementon	
A039.04.0022	122			Cementon	
NYSM 5714	123			Cementon	
NYSM 477	124			Cementon	
A039.04.0023	125			Cementon	
A039.04.0043	126			Cementon	
A039.04.0044	127			Cementon	
NYSM 483	128			Cementon	
A039.04.0045	129			Cementon	
A111.15.0007	130			Saugerties	
NYSM 509	131			Saugerties	
NYSM 510	132			Saugerties	
NYSM 8607	133			Saugerties	
A111.15.0036	134			Saugerties	
A111.15.0040	135			Saugerties	
A111.15.0033	136			Saugerties	
A111.15.0032	137			Saugerties	
A111.15.0061	138			Saugerties	
A111.15.0068	139			Saugerties	
A111.15.0062	140			Saugerties	
A111.15.0064	141			Saugerties	
A111.15.0030	142			Saugerties	
A111.15.0035	143			Saugerties	
A111.15.0065	144			Saugerties	
A111.15.0058	145			Saugerties	
A111.15.0057	146			Saugerties	
A111.15.0060	147			Saugerties	
NYSM 7329	148			Saugerties	
A111.15.0034	149			Saugerties	
A111.15.0029	150			Saugerties	
NYSM 511	151			Saugerties	
A111.15.0066	152			Saugerties	
A111.15.0041	153			Saugerties	
A111.15.0037	154			Saugerties	
A111.15.0028	155			Saugerties	
A111.15.0039	156			Saugerties	
A111.18.0013	157			Saugerties	
NYSM 10483 (HG)	158			Saugerties	
NYSM 8377	159			Saugerties	
A111.15.0017	160			Saugerties	
NYSM 8263	161			Saugerties	

Table 4.3.14-4
Previously Recorded Archeological Properties within One Mile of the Project (Outside of Manhattan)

Site #	Site #	Municipality	County	USGS Quad	Comments
NYSM 513	162			Saugerties	
NYSM 5041	163			Kingston West	
NYSM 782	164			Kingston West	
NYSM 7491	165			Kingston West	
NYSM 5041	166			Kingston West	
A111.18.000041, NYSM 755	167			Kingston West	
A111.18.000038, NYSM 9076	168			Kingston West	
A111.18.000039,NYSM 9075	169			Kingston West	
A111.18.000015, NYSM 7226	170			Kingston West	
A111.18.000016, NYSM 8873	171			Kingston West	
A111.18.000029	172			Kingston West	
A111.18.000034	173			Kingston West	
A111.18.000036	174			Kingston West	
A111.18.000035	175			Kingston West	
A111140.000620	176			Kingston West	
A111140.000621, NYSM 7229	177			Kingston West	
A111.18.000034	178			Kingston West	
NYSM 8875	179			Kingston West	
A111.18.000030	180			Kingston West	
NYSM 8869, 8870	181			Kingston West	
A111.18.000019	182			Kingston West	
A111.05.00040	183			Kingston West	
NYSM 7232	184			Kingston West	
NYSM 7236	185			Kingston West	
NYSM 7228	186			Kingston West	
A111.18.00031	187			Kingston West	
NYSM 8864, 7231	188			Kingston West	
NYSM 7234	189			Kingston West	
A111.18.0002	190			Kingston West	
A111.18.0009	191			Kingston West	
NYSM 5053	192			Rosendale	
NYSM 7825	193			Rosendale	
NYSM 791	194			Rosendale	
NYSM 5060	195			Rosendale	
NYSM 7824	196			Rosendale	
A111.14.0010	197			Rosendale	
A111.13.000074	198			Clintondale	
A111.13.000077	199			Clintondale	
A071.14.00269	200			Newburgh	
A071.14.0028	201			Newburgh	
A071.14.0025	202			Newburgh	
A071.14.0027	203			Newburgh	
A071.14.0021	204			Newburgh	
A071.14.0022	205			Newburgh	

Table 4.3.14-4
Previously Recorded Archeological Properties within One Mile of the Project (Outside of Manhattan)

Site #	Site #	Municipality	County	USGS Quad	Comments
A071.14.0023	206			Newburgh	
A071.14.00137	207			Newburgh	
A071.15.000119	208			Cornwall	
A071.15.000116	209			Cornwall	
8914.17.101	210			Cornwall	
A071.15.000113	211			Cornwall	
A071.15.000007	212			Cornwall	
NYSM 7700	213			Cornwall	
NYSM 567	214			Cornwall	
NYSM 566	215			Cornwall	
NYSM 7701	216			Cornwall	
NYSM 4388	217			Cornwall	
NYSM 7702	218			Cornwall	
A071.20.000201	219			Popolopen Lake	
A071.20.000209	220			Popolopen Lake	
A071.20.000120	221			Popolopen Lake	
A071.20.00009	222			Popolopen Lake	
A071.20.0010	223			Popolopen Lake	
A071.20.000207	224			Popolopen Lake	
A071.20.000219	225			Popolopen Lake	
A071.20.000221	226			Monroe	
A071.20.000220	227			Popolopen Lake	
PIN 8390.29	228			Monroe	
A071.20.00208	229			Popolopen Lake	
A071.20.00028	230			Monroe	
NYSM 8541	231			Monroe	
NYSM 8539	232			Monroe	
NYSM 8540	233			Monroe	
NYSM 8538	234			Monroe	
A071.16.000003	235			Monroe	
A071.16.000004	236			Monroe	
NYSM 7571	237			Sloatsburg	
A07116.000276	238			Sloatsburg	
A07116.000317	239			Sloatsburg	
A07116.000313	240			Sloatsburg	
NYSM 584	241			Sloatsburg	
NYSM 7578	242			Sloatsburg	
NYSM 7577	243			Sloatsburg	
NYSM 7573	244			Sloatsburg	
A08704.0026	245			Sloatsburg	
NYSM 4649	246			Sloatsburg	
A08704.0025, NYSM 7602	247			Sloatsburg	
NYSM 4396	248			Sloatsburg	
NYSM 4650	249			Sloatsburg	

Table 4.3.14-4
Previously Recorded Archeological Properties within One Mile of the Project (Outside of Manhattan)

Site #	Site #	Municipality	County	USGS Quad	Comments
NYSM 7603	250			Sloatsburg	
NYSM 7573	251			Sloatsburg	
NYSM 7576	252			Sloatsburg	
NYSM 7575	253			Sloatsburg	
A07116.000329	254			Sloatsburg	
A07116.000326	255			Sloatsburg	
A07116.000325	256			Sloatsburg	
A07116.000324	257			Sloatsburg	
A07116.000350	258			Sloatsburg	
A07116.000323	259			Sloatsburg	
A07116.000335	260			Sloatsburg	
A07116.000322	261			Sloatsburg	
A07116.000321	262			Sloatsburg	
A07116.000346	263			Sloatsburg	
A07116.000334	264			Sloatsburg	
A07116.000333	265			Sloatsburg	
A07166.000348	266			Sloatsburg	
A07166.000332	267			Sloatsburg	
A07116.000337	268			Sloatsburg	
A07116.000336	269			Sloatsburg	
A07116.000342	270			Sloatsburg	
A07166.000340	271			Sloatsburg	
A07166.000341	272			Sloatsburg	
A07166.000331	273			Sloatsburg	
A07166.000339	274			Sloatsburg	
A08747.000015	275			Sloatsburg	
A07166.000343	276			Sloatsburg	
A07116.000342	277			Sloatsburg	
A07166.000344	278			Sloatsburg	
A07166.000349	279			Sloatsburg	
A07166.000327	280			Sloatsburg	
A07166.000347	281			Sloatsburg	
A07166.000328	282			Sloatsburg	
A07166.000330	283			Sloatsburg	
A07116.000345	284			Sloatsburg	
A08747.000016	285			Sloatsburg	
A08474.000017	286			Sloatsburg	
NYSM 7604	287			Sloatsburg	
NYSM 7911	288			Sloatsburg	
NYSM 7605	289			Sloatsburg	
A08704.0015	290			Sloatsburg	
NYSM 7606	291			Sloatsburg	
NYSM 4648	292			Sloatsburg	
A08704.0018	293			Sloatsburg	

Table 4.3.14-4
Previously Recorded Archeological Properties within One Mile of the Project (Outside of Manhattan)

Site #	Site #	Municipality	County	USGS Quad	Comments
NYSM 586	294			Sloatsburg	
NYSM 7608	295			Sloatsburg	
NYSM 7607	296			Sloatsburg	
A08704.00063	297			Sloatsburg	
NYSM 7611	298			Sloatsburg	
NYSM 7610	299			Sloatsburg	
NYSM 7620	300			Ramsey	
A087.49.0001	301			Ramsey	
NYSM 6431	302			Ramsey	
NYSM 6432	303			Ramsey	
NYSM 6434	304			Ramsey	
NYSM 6433	305			Ramsey	
NYSM 7621	306			Ramsey	
NYSM 6437	307			Ramsey	
NYSM 7622	308			Ramsey	
NYSM 7623	309			Ramsey	
NYSM 6429	310			Park Ridge	
NYSM 7625	311			Park Ridge	
NYSM 7626	312			Park Ridge	
NYSM 596	313			Park Ridge	
NYSM 6426	314			Park Ridge	
NYSM 6427	315			Park Ridge	
NYSM 6428	316			Park Ridge	
NYSM 6407	317			Nyack	
NYSM 8889	318			Nyack	
NYSM 6410	319			Nyack	
PIN 8751.56	320			Nyack	
NYSM 6409	321			Nyack	
NYSM 6408	322			Nyack	
NYSM 8103	323			Nyack	
NYSM 6411	324			Nyack	
NYSM 4639	325			Nyack	
NYSM 6412	326			Nyack	
NYSM 6413	327			Nyack	
NYSM 6397	328			Nyack	
NYSM 6399	329			Nyack	
NYSM 6400	330			Nyack	
NYSM 6401	331			Nyack	
NYSM 4643	332			Nyack	
A08745.00003	333			Nyack	
NYSM 6402	334			Nyack	
NYSM 7828	335			White Plains	
NYSM 6870	336			White Plains	
NYSM 5186	337			White Plains	

Table 4.3.14-4
Previously Recorded Archeological Properties within One Mile of the Project (Outside of Manhattan)

Site #	Site #	Municipality	County	USGS Quad	Comments
NYSM 5234	338			White Plains	
NYSM 5229	339			White Plains	
NYSM 5191	340			White Plains	
NYSM 9250	341			White Plains	
NYSM 7827	342			White Plains	
NYSM 5196	343			Yonkers	
A11940.001073	344			Yonkers	
NYSM 6872	345			Yonkers	
NYSM 6872	346			Yonkers	
NYSM 5228	347			Yonkers	
NYSM 2218	348			Yonkers	
NYSM 6872	349			Yonkers	
NYSM 710	350			Yonkers	
NYSM 7729	351			Yonkers	
NYSM 4058	352			Yonkers	
A005.01.000791	353			Yonkers	
A005.01.00068	354			Yonkers	
A005.01.0067	355			Yonkers	
A00501.0069	356			Yonkers	
NYSM 8368	357			Yonkers	
A005.01.0065, .0071, .0072	358			Yonkers	
NYSM 5321	359			Yonkers	
NYSM 709	360			Yonkers	
NYSM 2838	361			Yonkers	
NYSM 9013,9015	362			Yonkers	
NYSM 4056	363			Yonkers	
NYSM 5326	364			Yonkers	
NYSM 5322	365			Central Park	
A061.01.0113	366			Central Park	
NYSM 4052	367			Central Park	
NYSM 4056	368			Central Park	
A061.01.0115	369			Central Park	
NYSM 4053	370			Central Park	
NYSM 4054	371			Central Park	
NYSM 4051	372			Central Park	
A061.01.0533	373			Central Park	
A061.01.0534	374			Central Park	
A061.01.0127	375			Central Park	
NYSM 2839	376			Central Park	
A061.01.0121	377			Central Park	
A061.01.0536	378			Central Park	
A061.01.0119	379			Central Park	
NYSM 711	380			Central Park	
NYSM 8367, 4055	381			Central Park	

Table 4.3.14-4
Previously Recorded Archeological Properties within One Mile of the Project (Outside of Manhattan)

Site #	Site #	Municipality	County	USGS Quad	Comments
NYSM 8371	382			Central Park	
A061.01.0114	383			Central Park	
A061.01.0123	384			Central Park	
NYSM 4068	385			Central Park	
NYSM 4069	386			Central Park	
A061.01.0111	387			Central Park	
A061.01.0112	388			Central Park	
A061.01.0125	389			Central Park	
A061.01.0016	390			Central Park	
NYSM 8370	391			Central Park	
A061.01.0120	392			Central Park	
A061.01.0122	393			Central Park	
A061.01.0118	394			Central Park	
NYSM 7250	395			Central Park	
NYSM 4067	396			Central Park	
A061.01.00117	397			Central Park	
A061.01.0126	398			Central Park	
NYSM 4066	399			Central Park	
A061.01.0027	400			Central Park	
NYSM 4065	401			Central Park	
NYSM 7249	402			Central Park	
NYSM 7248	403			Central Park	
NYSM 5475	404			Central Park	
NYSM 4064	405			Central Park	
A061.01541	406			Central Park	
NYSM 4062	407			Central Park	
A061.01.009531	408			Central Park	
NYSM 4063	409			Central Park	
A061.01.0542	410			Central Park	
A061.01.01237	411			Central Park	
A081.01.0099	412			Central Park	
A061.01.0146	413			Central Park	
NYSM 4535	414			Central Park	
NYSM 8217	415			Central Park	
A081.01.100	413			Central Park	
A081.01.0101	417			Central Park	
NYSM 4537	418			Central Park	
NYSM 4538	419			Central Park	
A00501.000014	420			Central Park	
A00501.000021	421			Central Park	
NYSM 5475	422			Central Park	
A00501.000030	423			Central Park	
NYSM 5474	424			Central Park	
A00501.000076	425			Central Park	

Table 4.3.14-4
Previously Recorded Archeological Properties within One Mile of the Project (Outside of Manhattan)

Site #	Site #	Municipality	County	USGS Quad	Comments
A00501.000075	426			Central Park	
A00501.000079	427			Central Park	
A00501.000077	428			Central Park	
A00501.000078	429			Central Park	
A00501.000074	430			Central Park	
A00501.000028	431			Central Park	
NYSM 4539	432			Central Park	

The files of OPRHP list five underwater archeological sites within the portion of the East River that will be traversed by Circuit 1. However, it is assumed that only a very small percentage of the vessel losses in the East River/Hell Gate area are referenced in the state sources consulted which deal primarily with nineteenth and twentieth century losses. Table 4.3.14-5 is a list of 19th and 20th century shipwreck losses in the East River/Hell Gate vicinity. Table 4.3.14-6 provides federal information on shipwrecks or obstructions listed in NOAA's AWOIS for the area bounded by 40° 45' 30 and 40° 48' North Latitude, and 73° 52' 30 and 73° 57' West Longitude. AWOIS entries were coordinated with "wreck" and "obstruction" notations listed on NOAA Charts 12300 and 12339. Within those parameters, 20 listings were recorded. Of the six entries within the Project Route: four were listed as "unknown," a category of unnamed wreck sites, typically modern, that have been reported but whose location is unconfirmed. One was classified as an "obstruction," a category of objects considered potentially hazardous to navigation. One site was listed by the name of the shipwreck.

Table 4.3.14-5
Shipwreck Losses in the East River/Hell Gate Vicinity

Date	Comments
1643	Pinnance, unk. Name, carrying ministers from Ct. to Virginia bilged on the rocks at Hell Gate & sank
1780	British ship Lexington sank in the East River off 138th Street in 66' of water
Nov. 3, 1780	British frigate Hussar (28 guns) struck a rock at Hell Gate and was a total loss. Reportedly carrying gold
Jan. 15, 1784	NJ ferryboat, name unk., damaged by ice and sank in the East River
Dec 17,1795	Ferry, unk., sank in the East River
Apr. 2, 1798	Ferry between Manhattan and Brooklyn sank in the East River
Feb. 15, 1799	Sloop, unk., foundered in the East River

May, 1801	Ferry from Fulton Market capsized in the East River on the way to Brooklyn
1827	Steamer Oliver Ellsworth exploded near the mouth of the East River
Dec. 27, 1853	Clipper ships Great republic and White Squall and packet ship Joseph Walker burned at piers in the East River
Dec. 8, 1864	Schooner William Penn, bound from New Haven to NYC capsized at Hell Gate
Aug 13, 1865	Sloop Planter was a total loss on Halletts Point at Hell Gate
Nov. 3, 1865	Schooner Chief was run into at Hell Gate and sank
Apr. 2, 1867	Schooner H.A. Barnes bound from NYC to New Bedford was run down in the East River and sank off Rikers Island.
Jun. 21, 1867	Schooner Reaper sank in the East River
Jul 23,1867	Sloop Vienna sank at Hell Gate
Jul 28,1867	Schooner L.R. Ogden sank at Hell Gate
May 15, 1868	Schooner E.C. Knight sank at Hell Gate
Sep 5, 1868	Schooner Washington sank at Hell Gate
Sep 24,1870	Schooner Monitor struck on point of North Brother Island
Jul 8, 1871	Schooner M.A. Longberry sank at Hell Gate
Jul 18, 1871	Schooner Oscar C. Acken run into by steamer Elm City at Hell Gate and sank
Jul 29, 1871	Sloop Thomas Ransen came ashore on Holmes Rock, Hell Gate
Aug 21, 1871	Schooner Juno struck at Gridiron, Hell Gate; burned and was a total loss
Sep 17,1871	Schooner, unk., collided with schooner Acklam at Hell Gate; Acklam was badly damaged
Nov, 1871	Brig Alfaretta came ashore on Gridiron, Hell Gate; filled with water
Jan 15, 1872	Sloop G.J. Demorest carrying bricks sank at Hell Gate
Apr 1, 1872	Schooner Belle came ashore at Gridiron, Hell Gate; filled with water
Apr 15, 1872	Schooner Abby Morton carrying coal came ashore at Hell Gate and filled
May 1, 1872	Schooner Henry Cole carrying coal came ashore at Hogs Back Rock, Hell Gate
May 2,1872	Schooner William R. Knapp was run into by the Steamer City of Hartford between Hell Gate and Astoria and sank
May 6, 1872	Schooner Trimmer carrying lumber struck at Hell Gate; filled and beached at Astoria
May 10, 1872	Schooner William Butman struck reef at Hell Gate and sank
Jul 20, 1872	Schooner Diadem carrying coal was run into by steamer Galatea at Hell Gate and sank off Wards Island Bluff
Aug 18,1872	Schooner Black Diamond carrying coal struck at Hell Gate and sank next to North Brother Island
Aug 21, 1872	Canal Steamer Cathcart carrying coal, collided with a gov't scow at Hallets Point, Hell Gate and went ashore at College Point
Aug 23, 1872	Sloop Brandywine collided with gov't scow at Hell Gate and sank on Pot Rock
Aug 25, 1872	Sloop Norma came ashore on Gridiron, Hell Gate; filled but later gotten off

Aug 28, 1872	Schooner C.L. Hulse collided at Hell Gate and sank
Sep 17, 1872	Schooner V.M. Barkalew carrying lumber, sank at Hell Gate; later raised
Sep 20, 1872	Schooner Flagg struck wreck of Diadem at Hell Gate and capsized
Sep 21. 1872	Schooner Justice collided with yacht Emily at Hell Gate
Sep 29, 1872	Schooner Alida came ashore on Hogs Back, Hell Gate and was later gotten off
Oct 15, 1872	Fall River liner Providence collided with drilling machine at Hell Gate and was badly damaged
Nov 14, 1872	Schooner Indiana carrying coal collided at Hallett's Point Rock, Hell Gate and filled
Dec 9, 1872	Schooner Abbie K. Bentley damaged at Hell Gate
Jan 25, 1873	Schooner Charles A. Grainer sank at Hell Gate
Apr 25, 1873	Schooner Alexandria struck rocks and sank; later raised
Apr 28, 1873	Sloop, unk., collided off Wards Island and was cut down to water's edge.
May 13, 1873	Steamer Hope, run into by Steamer Americus at Hell Gate and was cut in two.
May 15, 1873	Lighter Sea capsized at Hell Gate; later raised
May 26, 1873	Schooner Jacob Lorillard, hit by steam tug in the East River and sank; later raised
Jun 17, 1873	Schooner Tabitha and Hannah came ashore at Hell Gate and sank
Jun 23, 1873	Schooner was run into by an unk. schooner at Hell Gate
Jul 8, 1873	Schooner Patron came ashore at Little Mill Rock, Hell Gate, stove and filled
Aug 23, 1873	Schooner Alpha came ashore at Gridiron, Hell Gate and filled; later was gotten off and beached at Astoria
Sep 7, 1873	Steam tug Vixen was run into by steamship Granite State at Hell Gate and was cut in two and sank
Oct 25, 1873	Schooner Leon struck at Gridiron, Hell Gate and sank
Feb 18, 1874	Barge Joseph E. Dow came ashore at Gridiron, Hell Gate
Mar 19, 1874	Steam tug R.S. Carter was run into by the ferry Baltic in the East River and sank
Mar 20, 1874	Schooner Elizabeth B, came ashore at Hallets Point, Hell Gate and filled
Apr 3, 1874	Schooner Abby Weld, came ashore on rocks at Hell Gate and was damaged
May 1874	Schooner C.J. Erickson went aground at Gridiron, Hell Gate, and was later gotten off
Jun 13, 1874	Lighter Ohio carrying tobacco collided with ferry Winona in the East River and sank
Jul 13, 1874	Schooner China was run into in the East River and sank off Williamsburg
Aug 22, 1874	Schooner Martha Jane, struck rock in Hell Gate went ashore and filled
Nov 17, 1874	Steam tug Lilly blew up and sank at Hell Gate
Nov 29, 1874	Schooner Anthony Burton struck Flood Rock at Hell Gate in storm and went ashore at Cow Bay
Dec, 1874	Schooner Fanny Fern sank at Hell Gate, was raised and towed away back through Hell Gate when it struck a rock and sank again
1877	Schooner Jennie C. Ross carrying coal sank at Hell Gate

Nov 27, 1877	Steamer C.H. Northam burned to water's edge at East River pier
Jun 1, 1878	J.P. Whitbeck wrecked in the East River
Jun 23, 1878	Steamship City of New York burned and sank in the East River
Jun 28, 1878	Steamer Seawanhaka burned in the East River, total loss
Mar 2, 1881	Steam tug H.G. Lapham collided with steam tug Amos Barston in the East River and was cut in two and sank
Oct 21, 1882	Sloop Hannah Ann hit rocks at Hell Gate, total loss
Jul 12, 1889	Steamer Thomas S. Brennan rammed and sank a rowboat off Randalls Island
Dec 20, 1889	Schooner David Crowell capsized at Hell Gate
1897	Wooden steamer James B. Schuyler burned at East River dock
15-Jun-04	Wooden Steamer General Slocum caught fire and was run aground adjacent to North Brother Island in NYC's worst maritime disaster that claimed the lives of 1,031 people; steamer was later raised
Nov, 1904	Ferry Columbia rammed and sunk by the steamer City of Lowell in the East River
7-Aug-05	Motor vessel Delta burned in the East River
16-Dec-05	Steamer Alert wrecked at Hell Gate
4-Jul-06	Schooner Vinland wrecked off Rikers Island
11-Nov-07	Phoebe Ann wrecked in the East River
31-Mar-08	Schooner Deborah T. Hill wrecked in the East River
Dec, 1908	Steamer H. M. Whitney sank in the East River adjacent to Sunken Meadow; later was raised
14-Dec-10	Barges Port Royal and Frank Miller sank at Hell Gate
12-Apr-14	Barge Evening Star sank off Hell Gate
5-Jan-15	Barge Mathilde R sank off Hell Gate
7-Jul-17	Tug John E. McAllister sank in the East River
14-Jul-17	Launch Delivery sank in the East River after a collision with a lighter
1918	Tug Westchester towing a coal barge capsized coming out of Pot Cove, East River
17-Apr-18	Barge Cullen #180 sank in the East River
15-Aug-19	Barge Red Lion wrecked in the East River
6-Oct-19	Steamer Lexington rammed at Hell Gate by U.S. submarine O-7
10-Aug-21	Steamer Marion wrecked in the East River
8-Aug-22	Barge John T. Hughes wrecked at Hell Gate
28-May-23	Barge Frank Jenkins wrecked at Hell Gate
12-Jan-27	Steamer Leviathan wrecked in the East River
Aug-29	Tug Volunteer collided with steamer Chester W. Chapin at Hell Gate and sank
9-Jan-29	Brigantine Fairport wrecked at Little Hell Gate
30-Apr-29	Tug Mutual collided with ferry Youngstown and sank in the East River
3-Jan-30	Tug Thomas J. Howard sank after a crash in the East Rive
1-Apr-30	Barge North River rammed by a lighter and sank in the East River

17-Mar-31	Drill boat North River sank at Hell Gate; later removed

Table 4.3.14-6
Items List in the AWOIS as being in the Vicinity of Underwater Portions of the Project Route

Site #	AWOIS #	(Boat Name)	Comments
1	1530	obstruction	Listed at 40° 46'46.20" & 73° 55'.56.00"
2	1692	unknown	Listed at 40° 46'50.56" & 73° 53'.07.43"
3	1697	unknown	Listed at 40° 47'07.80" & 73° 52'.53.10"
4	1701	unknown	Listed at 40° 47'23.93" & 73° 53'.31.43"
5	1704	unknown	Listed at 40° 47'42.00" & 73° 52'.53.50"
6	1705	unknown	Listed at 40° 47'42.50" & 73° 52'.59.00"
7	1707	unknown	Listed at 40° 47'52.00" & 73° 53'.23.00"
8	1708	unknown	Listed at 40° 47'52.20" & 73° 53'.23.00"
9	4271	unknown	Listed at 40° 46'33.00" & 73° 56'.15.00"
10	4274	unknown	Listed at 40° 47'57.00" & 73° 53'.04.00" Small sailboat reported sunk at this location; divers found only scrap metal, old engines but no sign of sailboat, recommended to remove from chart
11	4275	unknown	Listed at 40° 47'54.92" & 73° 54'.19.46" 72' barge reported sunk at this location off 134th Street, wreck location confirmed with sonar
12	4276	unknown	Listed at 40° 47'54.49" & 73° 52'.37.30" 50' barge in 55 of water
13	11676	obstruction	Listed at 40° 47'26.28" & 73° 54'.41.72"
14	11677	unknown	Listed at 40° 47'27.51" & 73° 54'.42.56" wreck located in 60' of water
15	11678	unknown	Listed at 40° 47'41.68" & 73° 54'.25.14" wreck located in 49' of water
16	11679	obstruction	Listed at 40° 47'42.77" & 73° 54'.23.96" obstruction located in 56' of water
17	11680	unknown	Listed at 40° 47'54.92" & 73° 54'.19.46"
18	11684	unknown	Listed at 40° 47'54.50" & 73° 52'.37.30" wreck located in 55' of water
19	11685	unknown	Listed at 40° 47'57.42" & 73° 52'.17.58" wreck located in 29' of water
20	11686	obstruction	Listed at 40° 47'47.27" & 73° 52'.05.08" obstruction located in 37' of water

4.3.14.2.2 Potential Impacts

The construction right-of-way for the Project route north of the Village of Tarrytown will be located within the right-of-way of the Thruway. To evaluate the extent of prior ground disturbance associated with Thruway construction a extensive sample of construction as-built

drawings (DeLeuw and Brill, 1953; Edwards, Kelcey and Beck, 1953; Frederick C. Harris, Inc., 1953; Clarke and Rapuano 1953; Parsons, Brinckerhoff, Hall and MacDonald, 1953) were reviewed by a Registered Professional Archeologist. The review included an examination of plan and profile drawings showing the horizontal and vertical limits and extent of grading and filling associated with Thruway construction as well as drawings showing the location of new structures and the limits of paving activities. This review strongly indicates that virtually all of the Thruway right-of-way in immediate proximity to the existing edge of pavement, and in many areas to the limits of the right-of-way was extensively modified during original construction. Construction profiles showing the extent of cut and fill activities indicate that cutting and filling has resulted in changes in grade in excess of thirty feet in some areas. Based on the examination of the original construction drawings it appears highly unlikely that previously unknown and intact archeological resources will be affected by construction of the Project. However, there may be a limited number of cases where former structures were razed and covered with fill deposits less than five feet thick. Should the final Phase 1 archaeology survey indicate the presence of any such locations a limited subsurface investigation may be necessary to determine if associated archeological remains are present and to identify the limits of those remains so that the feasibility of a minor modification of the Project Route within the Thruway right-of-way can be evaluated.

From the Tappan Zee Bridge in Tarrytown, south to Downstate Converter Circuit 2, both circuits will be located within the Metro-North Railroad right-of-way along the east shore of the Hudson River. From that point Circuit 2 continues south within the present Amtrak right-of-way to 50th street in Manhattan, most of which is along the east shore of the Hudson River. The Metro-North Railroad right-of-way north of Spuyten Duyvil and the Amtrak right-of-way south of that point are the original route of the Hudson River Railroad that opened between New York City and Peekskill in 1849. Prior to the opening of the railroad the shoreline of the Hudson was characterized by numerous inlets, bays, coves and marshes. To accommodate the railroad many of these features were filled. Others were bridged by stone embankments. The result was a new, much more regular and linear shoreline. This extensive earth moving is likely to have destroyed the physical integrity of both prehistoric archeological sites, and historic period archeological sites that pre-date railroad construction, that might have existed within the Project's Area of Potential Effect (APE). However, it is possible that undisturbed archeological remains could exist within limited areas where less than five feet of fill above the original pre-railroad ground surface is present. Potential archeological site locations within areas where more than five feet of fill is present would not be affected if trenching for the Project does not extend more than four feet below present grade. Location-specific evaluations will be necessary at those locations

along the non-subterranean portions of the railroad right-of-way in close proximity to the reported locations of prehistoric archeological sites, and where historic maps indicate the former presence of structures, in lower Westchester County and northern Manhattan.

From Downstate Converter Circuit 2, Circuit 1 will be located within the Metro-North right-of-way along the east shore of the Harlem River and the south shore of the Bronx until it reaches the Downstate Converter Circuit 1. There are no previously recorded archeological sites along this section of the Project Route. Preliminary analysis of historic cartography indicates that the south Bronx waterfront has undergone extensive modification of its shoreline including the placement of large quantities of fill. As with Circuit 2, it is possible that undisturbed archeological remains could exist beneath fill placed above the original pre-railroad ground surface. Potential archeological site locations within areas where more than five feet of fill is present would not be affected if trenching for the Project does not extend more than four feet below present grade. Location-specific evaluations will be necessary at those locations where the non-subterranean portions of the railroad right-of-way is in close proximity to locations where historic maps indicate the former presence of structures.

Upstate Converter Circuit 1 is located on upland, rocky terrain east of the Thruway, and slopes gently upwards from the south to the north. High voltage electric transmission lines and an underground utility cross (east-west) the southern portion, and a driveway and trailer-home are present within the northern portion of the site. These two areas have been disturbed, and are the only portions of the Converter site that are cleared. Trees and brush cover most of the site. Approximately 40% of the site (most of the western half) was covered by standing water at the time of the site inspection. Approximately two acres within the site is judged to have a moderate to low sensitivity for both historic and prehistoric archeological sites. Nineteenth and early-twentieth century maps examined as part of the archeological sensitivity assessment did not indicate the presence of any structures on the property.

Upstate Converter Circuit 2 is located on upland flat terrain west of the Thruway, much of which has previously been plowed. The eastern portion (approximately 25%) is covered by trees and brush, the western portion (approximately 25%) is covered by a sumac thicket, and the remaining central portion is covered by grasses and small brush. The southern corner of the site infringes on unnamed drainage. One branch of this drainage system is located within the southern portion of the Converter Site and contains standing water. Foundations and charred remains of what appears to be two twentieth century structures, possibly a house and associated outbuilding, were observed immediately east of the Converter. Approximately 90% of the Converter Station is

judged to have a moderate to high sensitivity for prehistoric archeological sites, with the southern portion, near the drainage, being the most sensitive area. Nineteenth and early-twentieth century maps examined as part of the archeological sensitivity assessment did not indicate the presence of any structures on the property.

Downstate Converter Circuit 1 is located within an area that nineteenth century maps indicate was situated between Bunguay and Leggetts Creeks. Beers (1867) *Plans of Westchester, West Farms, Morisanna, Westchester County, New York and Parts of New York County* indicate that this area was occupied by a B.M. Whitlock and the estate of P. Dater. A number of unidentified structures and unpaved roads, some of which appear to be in or close to the Converter site are indicated. Robinson's (1876) map of *Part of the Twenty-third Ward, New York City* indicates that a grid of proposed, but unconstructed streets had been laid across what is now the area between the two creeks. Several large named estates with associated outbuildings are shown in the area. Bromley's (1882) *Atlas of the Twenty-third Ward of New York* identifies Oak Point by name and indicates it is a peninsula surrounded by wetlands and marsh. The Bromley (1923) *Atlas of the City of New York* shows the Oak Point Freight yards and clearly indicates that the shoreline has been extended to the south by fill, although it has not yet reached as far south as its present configuration. Downstate Converter Circuit 1 site is presently covered with large amounts of debris. Oak Point would have been a highly attractive location for aboriginal occupation. The extent to which intact prehistoric or historic archeological remains may have been disturbed by the considerable amount of 20th century land modification is unknown, but considerable disturbance is highly likely.

Downstate Converter Circuit 2 is located within triangle formed by the junction of the Amtrak and Metro North Railroad lines. The Beers (1867) *Plans of Westchester, West Farms, Morrisania, Westchester Co, NY* map shows the area after the construction of the Hudson River Railroad along the east shore of the Hudson, and before the construction of the junction and what is now the Metro-North Railroad along the Harlem River shoreline. Vieles' (1874) *Topographic Atlas of the City of New York* shows the junction and both rail lines. Most of the area within the triangular junction is shown as being in the water. Robinson's (1876) Beers *Map of the Twenty-third Ward, New York City* shows the triangle within the junction as land and what is now the Metro-North Railroad running east from the junction along a causeway. This suggests that the Converter site is made land created in the 1870's. The 1893 and 1897 Bromley maps indicate the presence of a freight station within the junction triangle at its northernmost point. Another unidentified structure is shown within the triangle near its southern tip. Except for the extreme northernmost portion of the triangular area within the railroad junction, the Converter Station site

would not have been available for prehistoric occupation. Remains of the presumably railroad-related structures may, however, be extant.

Phase IB archeological surveys will be undertaken at each Converter where prior ground disturbance cannot be documented or reasonably inferred. The need for Phase IB surveys at locations along the Thruway and railroad rights-of-way where documentary research indicates the possibility of intact, near surface, archeological resources will be determined in consultation with OPRHP and DPS staff.

In the event that any Phase IB investigation identifies the presence of previously unrecorded archeological resources within the Project's Area of Potential Effect (APE), Phase II investigations will be undertaken. Phase II investigations will be designed to evaluate the horizontal and vertical extent of the archeological resources within the limits of the APE, assess their integrity, and evaluate their significance in terms of State and National Register of Historic Places eligibility criteria.

In addition to above ground historic properties listed on the State and National Registers of Historic Places the OPRHP's Building-Structure Inventory includes structures within one mile of the Project Route that may be significant historic structures. As no comprehensive historic architectural survey has been completed for the Project Route it is also possible that additional previously unrecorded, but significant, structures could be present within the Project Route.

Because of the location of both proposed circuits within existing transportation rights-of-way no above ground historic property will incur any adverse physical impact. However, historic properties within the viewsheds associated with above ground portions of the transmission line and the four Converters may be visually affected. Architectural surveys of the viewsheds associated with each Converter are in the process of being completed to determine if historic properties will be visually affected. Architectural surveys of the viewsheds associated with any above ground installation of the transmission line required due to engineering or environmental constraints will be undertaken, if necessary, as part of the EM & CP process.

In the absence of mitigative measures, installation of the underwater portions of Circuit 1 does have the potential to affect archeological remains associated with shipwreck sites. Although Table 4.3.14-5 provides a sample of wrecks that may have occurred within the Projects APE, it does not take into account that many of these vessels would have been salvaged or otherwise removed, particularly as a result of dredging and channel maintenance activities of the Army Corps of Engineers. The latter has included the blasting and removal of submerged ledges and

dangerous surface rocks starting in 1851. In order to determine if shipwreck sites are present along the submarine route of Circuit 1, a marine archeologist will review the results of remote sensing surveys, including magnetometer and side-scan sonar surveys. Survey records will be examined for the presence of magnetic and acoustic anomalies with signatures suggesting they may be associated with shipwreck sites.

4.3.14.2.3 Avoidance and Mitigation

Along the portion of the Project Route within the Thruway right-of-way it is highly unlikely that potentially significant archeological resources will be identified either as a result of Phase IB investigations or during construction. However, the narrow area of ground disturbance associated with cable installation and the flexibility of the cable should make it possible to introduce minor changes in cable alignment that avoid any identified archeological remains. If avoidance is not feasible, Phase II investigations may be necessary to evaluate the significance of the identified remains. If significant archeological remains cannot be avoided a program of data recovery developed in consultation with OPRHP and DPS staff can be implemented.

While avoidance is the preferred mode of dealing with any significant archeological remains identified within the Project's APE within railroad rights-of-way, the nature of those rights-of-way makes avoidance more difficult. If significant archeological remains cannot be avoided a program of data recovery developed in consultation with OPRHP and DPS staff can be implemented.

If Phase II investigations at any of the Converters conclude that a significant archeological resource is present and will be adversely affected by Project construction, mitigation in the form of data recovery will be undertaken. Data recovery is considered the most reasonable and likely suitable form of mitigation at these locations.

As part of its EM & CP, Conjunction LLC will prepare and submit to the DPS and OPRHP an Unanticipated Discoveries Plan that describes the procedures that Conjunction, LLC will follow in the unlikely event that the previously unknown archeological resources and/or human remains are encountered during Project construction. The plan will include a provision for work stoppage in the event of such discoveries, and the examination of any discoveries by a Registered Professional Archeologist to confirm the nature of the discovery. The plan will also include provisions for evaluating, in consultation with OPRHP, the significance of any identified cultural resources and the development of appropriate mitigation measures including archeological data

recovery. All archeological investigations carried out pursuant to the Unanticipated Discoveries Plan will be conducted in accordance with the NYAC *Standards*.

Avoidance will also be the technique employed to insure that significant underwater archeological resources are not affected by Project construction. Considerable flexibility in cable placement is possible. This will permit the avoidance of the locations of remotely sensed anomalies with signatures indicative of the presence of submerged cultural resources

If it is determined that any of the above ground facilities associated with the Project will have an adverse visual effect on historically or architecturally significant properties, a number of mitigative measures can be applied. Site-specific mitigation is generally necessary and may include vegetative or other screening to reduce or eliminate the visual impact, reorientation of elements of the facility, the use of non-specular conductor to minimize glare and reflections, and/or the selection of pole materials.

4.3.15 Construction Activities

Construction activities are described in Exhibit 5, Appendix A, Construction Work Plan and in Exhibit E-3, Underground Construction.

4.3.16 Pesticide and Herbicide Use

4.3.16.1 Existing Conditions

New York State Thruway policies and procedures regarding the use of pesticides and herbicides on Thruway property are contained in a series of Maintenance Directives dated 1977 to 2002. The Thruway's initial pesticide and herbicide application procedure addressed the treatment of facilities and features including, but not necessarily limited to: guide rails, bridge piers and abutments; joints and pavement cracks; around trees and shrubs; and on wildflower areas.

In 1990, the Thruway established a system to assure the responsible use of pesticides on Thruway property. In 1995, the Thruway issued a Maintenance Directive entitled, "Procedure for Implementing Integrated Pest Management Program (412-0-05)". This document further defined how the Thruway should conduct its integrated pest management approach, and provided guidance as to how to address Thruway facilities in general. Section X of the document, entitled Pest Specific Control Strategies, by type of pest, addressed insects, birds and animals, but not vegetation. Subsequent directives deal with Pesticide/Herbicide Reporting Requirements (1998) and NYSDEC Requirements for Pesticide/Herbicide Applications (2002).

The Thruway's current policy regarding pesticide treatment is to treat areas where food may be present, such as at service areas and parking areas (where food scraps may be disposed of in trash barrels), and herbicide treatment around features and structures such as guide railing, sign post foundations, bridge piers and abutments and toll plaza areas.

Since the Converters will be located off Thruway property, they were independently evaluated. Upstate Converter Circuit 2 is located in a relatively isolated plot of rural land currently undergoing little to no activity. No pesticide or herbicide use is currently practiced at this site. Upstate Converter Circuit 1 is located on private property with an occupied residence on the site. It is possible that the resident has utilized common household pesticides and/or herbicides for pest control, grubs and weeds at this site.

4.3.16.2 Potential Impacts

The Project does not intend to utilize any pesticides or herbicides on the land occupied by its facilities during either construction or operation of the Project. It is possible that the Thruway will apply herbicides around the pole foundations following construction and during operation of the transmission line. As a result, the Project will not have any impact regarding pesticides or herbicides during construction and operation of the Project.

4.3.16.3 Avoidance and Mitigation

Since the Project will not entail the application of pesticides or herbicides during construction and operation of the transmission line, no avoidance or mitigation measures are planned or necessary.

4.3.17 Noise

4.3.17.1 Potential affected receptors

A noise impact assessment was performed to confirm that the Converters can be designed and constructed to meet Project specifications and relevant guidelines.

The analysis began by identifying noise sensitive receptors near the Converters, such as residences, schools, and churches, with the use of USGS Topographic maps. Sound levels from the Converters were then predicted at the Converter's property lines and at nearby receptors. The predicted levels were then compared with relevant noise guidelines and noise mitigation techniques applied, if necessary.

The distance from the center of the Converter Building to the nearest residential receptor varies from approximately 520 ft. to 1280 ft., depending on the site. The noise mitigation requirements therefore vary from Converter to Converter.

Relevant Noise Codes and Guidelines

Public Service Law, Article VII, part 86.5 dictates that the application discuss noise control plans for the Project. Although there are no directly applicable federal or state regulations regarding allowable noise levels from the Converters there are several available methodologies for assessing the sound levels of the Converters. For example, the NYS Public Service Commission (PSC) has guidelines for sound levels in quiet rural areas. NYSDEC has a guidance policy regarding noise impacts that generally addresses a range of allowable increases over ambient noise, and the PSC Composite Noise Rating (CNR) methodology quantifies human reaction to noise. The two Downstate Converters are expected to be exempt from the NYSPSC guidelines, but are located within the jurisdiction of New York City Noise Regulations.

The final noise control design of the Converters is not yet complete and the community sound level criterion of the Upstate Converters has not yet been finalized. This document, however, presents sound level predictions for the Upstate Converters with a noise criterion previously used by equipment vendors in the effective mitigation of Converter sound for similar facilities.

The New York City Noise Code, is administered by the NYC Department of Environmental Protection, as set forth in Subchapter 6, Section 24-243. Section 24-243T describes the ambient Noise Quality Zones and allowable sound levels for Residential, Commercial, and Manufacturing Zones, as summarized in Table 14.3.17-1. The allowable sound level varies from daytime to nighttime and with the Land Use Zone. The nighttime allowable levels were used in selecting the Converter sound level criterion.

Table 4.3.17-1
New York City Noise Code for Three Noise Quality Zones

Noise Quality Zone	Land Use Description	Land Use Zone	Daytime 7am-10pm	Nighttime 10pm- 7am
N-1	Low density residential, RL	R-1 to R-3	60*	50*
N-2	High density Residential, RH	R-4 to R-10	65*	55*
N-3	Commercial & Manufacturing	C-1 to C-8 M-1 to M-3	70*	70*

*Hourly Leq

New York City Zoning Resolution

The New York City Zoning Resolution, Article IV, Section 42-213 specifies maximum permitted decibels levels for noise originating in manufacturing districts. These allowable levels, summarized in Table 4.3.17-2, are as measured at or beyond the property line.

Table 4.3.17-2
NYC Zoning Resolution Allowable Sound Levels at the Property Line

Maximum Permitted Sound Pressure Levels in Decibels*			
	Source District		
Octave Band, cycles per second	**M1**	**M2**	**M3**
20 to 75	79	79	80
75 to 150	74	75	75
150 to 300	66	68	70
300 to 600	59	62	64
600 to 1200	53	56	58
1200 to 2400	47	51	53
2400 to 4800	41	47	49
Above 4800	39	44	46
*If the Manufacturing District adjoins a Residential District, the sound level at the district boundary, or within the Residential Zone, shall be 6 decibels lower than those given above.			

Anticipated Effect

Predicted Converter Sound Levels

Both the noise impact assessment and the future acoustical design of the Converters are facilitated with the aid of computer modeling. The model is used to predict the sound levels expected from the Converters and their associated equipment at residential receptors, as well as to select equipment design criterion for Converter noise mitigation.

The model takes into consideration the barrier effect of the Converter building, and any added noise mitigation such as sound barrier walls, acoustical louvers, etc. The model then predicts the far-field sound levels, correcting for distance (hemispherical spreading), and atmospheric absorption. It does not take credit for excess attenuation from topography, vegetation, ground absorption, or off-site noise barriers, such as buildings, trees, etc. The site layout varies somewhat from Converter to Converter so a different model arrangement was used for each site, but the noise sources remain the same. Also, there may be modifications to individual site layouts as designs progress.

The model takes into consideration the sound levels expected from the exterior power transformers, filter reactors, filter capacitors, smoothing reactors, Converter fin-fan coolers, cooling pumps, roll doors and building ventilation. The model also includes the Converters and the noise reduction expected from their enclosures. The Converter sound levels were predicted at the nearest noise sensitive receptors in the vicinity.

The noise source sound level information used in the model comes from a variety of sources. The electrical equipment sound data, such as for the filter reactors, filter capacitors, smoothing reactors and other electrical equipment came from vendors. The Converter transform data came from standard levels published by the National Electrical Manufactures Institute and correlative field data.

Acoustical performance for the Converter building components came from a variety of sources on file such as vendor data, handbook data, and field measurements. The sound from the fin-fan coolers is based on typical vendor quoted levels, the physical size of the coolers, and field data. The cooling pump and motor noise predictions are based on field experience. The spreadsheet model, which predicted the sound levels, has been used for the successful licensing and design of dozens of power, compressor pipeline, and industrial facilities.

Upstate Converter Circuit 1

Upstate Converter Circuit 1 is sited immediately adjacent to Interstate 87. Residential receptors approximately 600 ft. north and south of the Converter Building, as well as to the west, beyond Interstate 87. As indicated earlier, electrical equipment suppliers, have previously designed Converters which will achieve a property line sound level of 54 dBA. A Converter noise model was therefore prepared with sufficient noise control to achieve 54 dBA at the property line, and with lower levels at the nearest residential receptors.

The noise mitigation utilized in the model to achieve the 54 dBA property line criterion included an approximately 10 dBA reduction in filter capacitor, filter reactor and transformer sound levels. The cooling pump on the east was enclosed or put in the building, and the fin-fan coolers included quiet, low speed fans. The Converter building sound was further reduced with acoustical doors and louvers.

The predicted Converter sound levels at the nearest receptors are summarized in Table 4.3.17-3. The projections are exclusive of expressway and other ambient noise. The Projected level at the nearest residential neighbors is 47 and 49 dBA. The sound level at more distant residences

would be markedly lower. The model demonstrates that it is possible to reduce the sound levels to the 50 dBA range at the nearest residential neighbors.

Table 4.3.17-3
Predicted Upstate Converter Circuit 1 Sound Levels

Receptor	Receptor Location	Direction	Distance, ft.	Predicted Level, dBA
PL	Property Line	East	280	54
R-1	Nearest Residence	NNE	580	49
R-2	Nearest Residence	SSE	650	47
R-3	Nearest Residence	South	1655	39
R-4	Nearest Residence	WNW	1360	42

Upstate Converter Circuit 2

Upstate Converter Circuit 2 is also located immediately adjacent to Interstate 87. The nearest residential receptors to the Converter are east of the Converter, on the far side of Interstate 87. There are no nearby noise sensitive receptors in other directions.

The acoustical design of this Converter is similar to that as used for Upstate Converter Circuit 1, except that the mitigation of the electrical equipment was slightly less. The sound level predictions for the residences east of this Converter are shown in Table 4.3.17-4. These projections are for the Converter only, exclusive of expressway and other ambient noise.

Table 4.3.17-4
Predicted Upstate Converter Circuit 2 Sound Levels

Receptor	Receptor Location	Direction	Distance, ft.	Predicted Level, dBA
PL	Property Line	ENE	460	54
R-1	Nearest Residence	East	800	48
R-2	Residence, Route 44	ESE	1480	42
R-3	Residence	ESE	840	48
R-4	Residence	SE	1000	45

Downstate Converter Circuit 1

Downstate Converter Circuit 1 is within the jurisdiction of the NYC Noise Code and the Zoning Resolution octave band sound level requirements. The distances to the nearest residential receptor is so great that the noise model required no special noise mitigation to meet the noise codes.

Table 4.3.17-5 compares the predicted Converter octave band sound pressure levels with the NYC Noise Code for the nearest residential (Timpson Place) and industrial (Fence line west) locations. The predicted levels are less than the required levels at these locations, demonstrating that the Converter will meet the NYC Noise Code without noise mitigation.

Table 4.3.17-5
Comparison of Downstate Converter Circuit 1 Predicted Sound Levels with NYC Noise Code

No.	Receptor Location	Zoning	Distance, ft.	Direction	Predicted Level dBA	NYC Noise Code
1	Oak Point Ave	M3-1	1280	ENE	55	70
2	Tiffany St	R6	2880	ENE	47	55
3	Timpson Pl.	R7-1	2210	NW	49	55
4	Jackson Ave	R-6	3750	West	37	55
5	Converter Fence West	M3-1	404	West	62	70

This Converter also must meet the octave band sound pressure level limits of the Zoning Resolution shown in Table 4.3.17-6. The noise model predicts both the dBA and octave band levels. It can be seen from Table 4.3.17-6 that the Converter also meets the Zoning Resolution octave band limits without noise mitigation.

TABLE 4.3.17-6
Comparison of Downstate Converter Circuit 1 Predicted Octave Band Sound Levels with Zoning Resolution Criterion
Standard Equipment, no Mitigation

Location	Octave Band Center Frequency									
	31.5	63	125	250	500	1k	2k	4k	8k	dBA
3. Timpson Place	48	54	55	51	50	42	33	17	0	49
5. Fence line, west	59	64	64	63	61	55	50	43	33	62
Allowable Levels - District M3 Source & Residential Receptor		74	69	64	57	52	47	46	40	70
District M3 Source & District M3 Receptor		80	75	70	64	58	53	49	46	70
3. Timpson Place exceed.		-20	-14	-13	-8	-10	-14	-26	-44	-21
5. Fence line, west exceed.		-16	-11	-7	-3	-3	-3	-6	-13	-8

Downstate Converter Circuit 2

Downstate Converter Circuit 2 is located adjacent to the Hudson River and across the railroad tracks from several residential receptors. The sound level predictions for this Converter are

shown in Table 4.3.17-7. Note that the two locations in R1 and R2 zoning have a 50 dBA nighttime allowable sound level, while the R6 and R7 zones allow 55 dBA.

The noise model included an approximately 7-10 dBA reduction in filter capacitor, filter reactor and transformer sound levels from the vendors. The cooling pump on the east side requires a modest noise reduction from a quieter pump or barrier. The fin-fan coolers required a small reduction by using low speed fans. The Converter building sound was further reduced with an acoustical door on the east side.

Table 4.3.17-7
Comparison of the Downstate Converter Circuit 2 Levels with Noise Code

No.	Receptor Location	Distance, ft.	Direction	Zoning	Predicted Level dBA	NYC Noise Code
1	Johnson Ave	520	East	R6	53	55
2	229th St	1890	East	R2	39	50
3	Edsall Ave	1660	ESE	R1-2	43	50
4	Indian Rd.	2880	SSE	R7-2	38	55
5	Palisade Ave	700	NE	R6	49	55

Downstate Converter Circuit 2 is within the jurisdiction of the NYC Zoning Resolution sound level criterion. Table 4.3.17-8 compares the predicted octave band sound pressure levels with the required Zoning Resolution criterion for the nearest receptor with the highest sound levels. The predicted levels meet the Zoning Resolution requirements at Location 1, and are below the allowed limits at the further receptors. These octave band limits are the controlling noise criterion for this site.

Table 4.3.17-8
Comparison of Downstate Converter Circuit 2 sound levels with Zoning Resolution Criterion

	Octave Band Center Frequency									
	31.5	63	125	250	500	1000	2000	4000	8000	dBA
Location 1, Johnson Ave predicted levels	52	57	55	54	52	47	41	33	25	53
Source District M1 limits		73	68	60	53	47	41	35	33	
Code exceedence (none)	-	-16	-13	-6	-1	0	0	-2	-8	0

4.3.17.2 Proposed Mitigation

As indicated above, the predicted sound levels and noise mitigation incorporated into the model are based on the conceptual designs of the Converters. Three of the four Converters are expected to require noise reduction from standard levels to meet their site noise criterion.

The Converters will be contained within their own enclosures which will mitigate their sound levels. The enclosure wall materials will be selected to minimize noise transmission, and enclosure ventilation will be quieted as needed with the use of acoustic louvers and quiet fans as necessary. The large equipment access "roll doors" will utilize acoustically rated roll doors or other types of acoustic doors as necessary.

The Converter transformers are outdoors, but enclosed on three sides by firewalls. If further noise reduction is required a fourth wall can be added, or they can be purchased with built in noise control. The filter reactors can be mitigated as necessary with acoustic enclosures cooled with forced ventilation. The smoothing reactors and filter capacitors can be modified in a variety of ways by the supplier to reduce their sound levels if necessary.

The fin-fan coolers can be quieted as appropriate by installing units with low speed fans and increased surface area, or with the use of barrier walls. The cooler pumps can be purchased quieter, mitigated with the use of a barrier wall, or the pumps could be put inside the converter building.

The applicant will continue with the noise analysis and impact assessment in the detailed design phase of the Project to finalize the noise criterion of the Upstate Converters. As detailed information becomes available on the equipment being purchased, the specific mitigation requirements will be determined and incorporated into the Converter designs.

4.3.18 Project Cleanup and Restoration

Prior to construction of the Project, an inventory will be made of existing conditions at the sites being used for the four Converters and video film will be taken of the Thruway and railroad rights-of-way. This will ensure that a record exists of the existing conditions so that after the Project facilities are constructed, the site(s) can be restored and left in a condition similar to then existing conditions.

If any conductors are required to be on poles due to engineering or environmental constraints, disturbance at each foundation site will be kept to a minimum. Excess material will be removed

or spread nearby to improve slopes and back slopes. Once the poles are erected, the disturbed area will be regraded and seeded or stabilized to restore the site to approximate original conditions.

The cable trenches will be backfilled, compacted and seeded. Where the trenches are in rock the top of the trench will be left natural or seeded. Similar construction techniques will be used to minimize the disturbance on railroad property. Like the Thruway section, the railroad right-of-way will be restored to the type of conditions and material that existed before construction.

The Upstate Converter sites will both require some clearing and grubbing. Tree cutting will be kept to a minimum and the resulting materials will be removed from the sites in an approved manner. Some regrading will be necessary and any excess material will be spread in an approved manner or removed. Once completed, both Converter sites will continue to be buffered by stands of trees from both the Thruway and from other adjacent property owners. When completed, a security fence will surround the sites and disturbed areas will be regraded and revegetated with native species.

Similar construction techniques will be employed at Downstate Converter Circuit 2. Disturbed areas that can be revegetated will be seeded with grasses native to the area. Due to the urban location of the site design efforts will include selecting landscaping techniques and plantings appropriate to this area of the Bronx.

The site for the Downstate Converter Circuit 1 is presently the subject of a remediation order by NYSDEC to clean the site by the end of 2003. The first phase of construction of the Converter will be to remove and dispose of as much material as necessary to construct the Converter. Clean backfill will be imported, as necessary, to achieve the required grade for the Converter so that construction can proceed on a relatively clean site. In keeping with the surrounding commercial and industrial land uses, appropriate regrading, seeding, landscaping and plantings will be incorporated into the final site design and as part of the EM&CP.

EXHIBIT 4 – APPENDIX A

MAPS

This appendix is contained in Volume 5 of this Application

EXHIBIT 4 - APPENDIX B

VISIBILITY AND VISUAL IMPACT ANALYSIS

VISIBILITY AND VISUAL IMPACT ANALYSIS

Empire Connection Project

Albany County to Bronx County
New York

Prepared For: Spectra Environmental Group, Inc.
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Date: November 2003

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INTRODUCTION

Environmental Design & Research, P.C. (EDR) was retained by Spectra Environmental Group, Inc (Spectra) to undertake an analysis of the potential visibility and visual impact of the above-ground components of the proposed Empire Connection. This analysis was prepared in support of the Article VII Application for the project, which is being prepared by Spectra. The analysis performed by EDR is designed to address the following questions:

1. What is the visual/aesthetic character of the area?

2. From what locations could the proposed facilities potentially be seen?

3. What sensitive receptors might have views of the proposed facilities?

4. What will the proposed facilities look like?

5. What is the potential visual impact of the project?

The study undertaken by EDR addresses these questions through data review, viewshed analysis, field evaluation, and computer-assisted photo renderings.

PROJECT LOCATION/DESCRIPTION

The Empire Connection is a high voltage, direct current electric transmission line, linking existing upstate electric power sources to existing electric power distribution facilities in New York City (see Appendix A - Figure 1). The project developer, Conjunction LLC, proposes to construct the project almost entirely within existing New York State Thruway and railroad rights-of-way (ROW). The Project will consist of two circuits and will connect to existing alternating current power lines in the Town of Coeymans, Albany County and in the Town of Athens, Greene County, and will run within existing transportation corridors to its end points in New York City at an existing electric substation at West 49th Street in Manhattan and at the existing Rainey substation in Queens. Detailed descriptions of each circuit are presented below.

Coeymans - W. 49th Street Circuit

Empire Connection will draw alternating current from the existing National Grid (Niagara Mohawk) New Scotland - Alps transmission line. The Upstate Converter Circuit 2 will be built on a 9.5 acre site in Coeymans, immediately adjacent to the line and the New York State Thruway (see Figure 2). The site is currently characterized by a mix of undeveloped

successional shrubland and young deciduous forest. The converter facility will consist of the converter building, gas insulated switch gear and filter yard (see plans in Appendix B). It will convert the alternating current (AC) to direct current (DC). Two converter blocks will send 1,000 megawatts (MW) of 500 kilovolt (kV) DC power in a southerly direction within the New York State Thruway ROW.

While predominantly underground, at one or more locations the line may be aerial until transitioned back to a buried line. At each such location, a transition facility will be built within or adjacent to the Thruway ROW. The transition resembles a small switchyard arranged in a linear fashion. Above ground lines are anticipated for a portion of the transmission line route along the Thruway only where required by engineering or environmental considerations. The extent of the above-ground and underground portions of the line, and the exact locations of the transitions, will depend on engineering, design and environmental constraints and cannot be determined until a later stage in the design process. The line will cross the Hudson River within the existing structure of the Tappan Zee Bridge (on the side or beneath the roadway deck). At the east end of the bridge, the line will continue underground in the Metropolitan Transit Authority (MTA) Metro-North Railroad ROW, until it reaches Spuyten Duyvil.

The Downstate Converter Circuit 2 will be built within a 3.2 acre site at Spuyten Duyvil, immediately adjacent to the MTA right-of-way (Figure 2). This site is characterized by successional shrubland between two railroad trucks. The converter will consist of a converter building and gas insulated switchgear (see plans in Appendix B). Screening of this facility may be accomplished through an architectural treatment resembling a Dutch castle. The filter yard will be constructed remote from the converter. This converter will change Empire Connection's DC current back to AC current.

Two new 345 kV transmission lines will be installed underground within the railroad ROW to carry three phase AC power from the Downstate Converter Circuit 2 to the existing Consolidated Edison (ConEd) substation at West 49th Street.

Athens - Rainey Circuit

Empire Connection line will also draw alternating current from the existing New York Power Authority (NYPA) Gilboa - Leeds transmission line. The Upstate Converter Circuit 1 will be built on an 8.5 acre site immediately adjacent to the line in the Town of Athens (Figure 2). This site is dominated by forest (upland and wetland), but also includes areas of shrubland, old field and a house. The proposed Leeds converter will be similar to the one at Coeymans. It will

transmit 1,000 MW of 500 kV DC power through direct buried, underground cable within the Thruway ROW, south to the Tappan Zee Bridge.

After crossing the Hudson River within the existing bridge structure, this circuit will follow the Metro-North Railroad ROW to Spuyten Duyvil. From there, it will continue primarily along the Metro-North ROW to Oak Point, in the Bronx. The Downstate Converter Circuit 1 will be built at Oak Point within a 9.3 acre rail yard (Figure 2). It will be similar to the Downstate Converter Circuit 2, except that it will not be enclosed by a walled structure, and its filter yard will be adjacent to the converter building.

Two new 345 kV submarine transmission lines will be installed in the East River to carry three phase AC power approximately 4± miles from the Downstate Converter Circuit 1 to ConEd's Rainey substation, near 36th Street in the Long Island City neighborhood of Queens.

A detailed description of the Project is included in Exhibit E1 and E2 of the Article VII Application.

STUDY AREA

The visual study area for the Project covers 1 mile on either side of the NYS Thruway extending from the Upstate Converter Circuit 2 site to the Tappan Zee Bridge. Sensitive resources were also identified within a similar corridor extending from the bridge to Downstate Converter Circuit 1 but the aesthetic character of the landscape in this area (other than around the Downstate Converters was not evaluated, as all project components (other than the converters) will be either buried, underwater or enclosed within existing structures except in rare circumstances where engineering or environmental constraints dictate otherwise. Therefore, it is assumed that no significant visual change will occur following construction.

Source information used to identify sensitive resources included USGS topographic maps, the National Register of Historic Places (National Parks Service website), Albany County GIS database, Orange County GIS database, Scenic Areas of Statewide Significance mapping (NYS Dept. of State, 1993), MapInfo® Street Pro database, New York State Department of Environmental Conservation (NYSDEC) state land GIS database, Scenic Byways listings (NYSDOT, n.d.), and Wild, Scenic and Recreational Rivers listings (New York ECL, Article 15, Title 27).

The dominant/character-defining feature along the transmission line route from Upstate Converter Circuit 2 (Coeymans) to the Tappan Zee Bridge is the NYS Thruway (see Figure 3).

The Thruway corridor from Coeymans to Harriman consists of two northbound and two southbound lanes with paved shoulders and an adjacent corridor of mowed grass (of variable width) on each side. A median that includes natural vegetation (trees and brush) or mowed lawn or rock outcroppings, separates the northbound and southbound lanes in many places. This portion of the Thruway traverses the Hudson Valley physiographic regions of the state (Reschke, 1990). Landform ranges from level/rolling valley bottomland to steep background mountains and hillsides. Land use within the adjacent study area is a mix of forest, agricultural land, successional communities (old field and shrubs), wetlands and developed areas (residential, commercial and industrial). Major water features in this area include the Hudson River, Catskill Creek, Kaaterskill Creek, Esopus Creek, Rondout Creek, the Wallkill River and various small lakes and ponds. However, few of these are significant visual elements of the landscape in views from the Thruway itself.

From Harriman to the Tappan Zee Bridge the Thruway has three lanes in either direction and typically lacks a vegetated median. Surrounding land use in this area transitions from forest and successional communities to primarily suburban residential and commercial use as one proceeds from north to south. This portion of the Thruway goes through the Hudson Highlands physiographic regions, with landform that ranges from steep rocky ridges to gently rolling hills. Water features within this area include the Ramapo River, Mahwah River and Hackensack River. These features are generally not major components of views available from the Thruway.

The Tappan Zee Bridge itself is a 3.5± mile long span over the Hudson River between Nyack and Tarrytown. A portion of the bridge includes an overhead steel girder superstructure. Under clear conditions, long distance views of the river and surrounding shoreline are available from the bridge.

VISUAL SENSITIVE RESOURCES

Visually sensitive resources and areas of intensive land use within 1 mile of the proposed project are listed in Table 1. These resources include 25+ public parks, the Catskill Forest Preserve, 70+ historic sites, two designated scenic byways, a state wildlife management area, a designated recreational river, two designated Scenic Areas of Statewide Significance, over 20 population centers and several major transportation corridors. Many of these would be considered scenic resources of statewide significance as per NYSDEC visual policy (NYSDEC, 2000).

Table 1. Visually Sensitive Resources and Intensive Land Uses	
Site	**Location Relative to Proposed Project**[1]
Parks & Recreation Facilities	
Mosher Park	Town of Coeymans, .3 miles from line
Forsyth Park	Town of Kingston, 22 miles from line
Glenerie Lake Park	Town of Ulster, .75 miles from line
Chadwick Lake Park	Town of Newburgh, .09 miles from line
Cronomer Hill Park	Town of Newburgh, .88 miles from line
Algonquin Park	Town of Newburgh, .58 miles from line
New Windsor Cantonment State Historic Site	Town of New Windsor, .21 miles from line
Knox Headquarters State Historic Site	Towns of New Windsor, Cornwall, .69 miles from line
Schnunnemunk State Park	Towns of Cornwall, Woodbury, .08 miles from line
Harriman State Park	Town of Woodbury, Monroe, Tuxedo, Ramapo, .00 miles from line
Sterling Forest State Park	Town of Tuxedo, .37 miles from line
Airmount Town Park	Town of Ramapo, .72 miles from line
Monsey Glen County Park	Town of Ramapo, .00 miles from line
Saddle River Park	Town of Ramapo, .96 miles from line
Dexter Park	Town of Ramapo, .99 miles from line
Buttermilk Falls Park	Towns of Clarkstown, Orangetown, .66 miles from line
Mountainview Park	Town of Clarkstown, .00 miles from line
Blauvelt State Park	Town of Orangetown, .42 miles from line
Memorial Park	Town of Orangetown, .35 miles from line
Clausland Mountain State Park	Town of Orangetown .50 miles from line
Fort Tryon Park	City of New York, 1.3 miles from Spuyten Duyvil
Inwood Park	City of New York, .83 miles from Spuyten Duyvil
Baker Field	City of New York, .53 miles from Spuyten Duyvil
Isham Park	City of New York, .57 miles from Spuyten Duyvil
Wards/Randall's Island Park	City of New York, 1.25 miles from Oak Point
Tiffany Pier	City of New York, .46 miles from Oak Point

Scenic Areas of Statewide Significance	
Columbia - Greene North SASS	Towns of Coeymans, New Baltimore, .14 miles from line
Catskill - Olana SASS	Town of Catskill, .00 miles from line
State Forests/Wildlife Mgt. Areas	
Catskill Forest Preserve	Towns of Ulster, Kingston, .26 miles from line
Great Vly WMA	Towns of Saugerties, Catskill, .2 miles from line
Site	**Location Relative to Proposed Project**[1]
Designated Scenic Rivers	
Ramapo River	Town of Ramapo, .00 miles from line
Historic Sites	
See Section 4.3.1.4 of Article VII Application	
Scenic Roads/Byways/Trails	
Appalachian National Scenic Trial	.00 miles from line
Palisades Interstate Parkway	Town of Clarkson, .00 miles from line
Tappan Zee Bridge	Towns of Orangetown, Greenburgh, .00 miles from line
Villages & Cities	
Ravena	.00 miles from line
New Baltimore	.90 miles from line
Catskill	1.30 miles from line
Saugerties	.20 miles from line
Kingston	.00 miles from line
Tillson	.00 miles from line
New Paltz	.07 miles from line
Ohioville	.46 miles from line
Plattekill	.25 miles from line
Gardnertown	.00 miles from line
Newburgh	1.39 miles from line
Vails Gate	.00 miles from line
Mountainville	.14 miles from line
Harriman	.00 miles from line
Southfields	.23 miles from line
Tuxedo Park	.40 miles from line
Hilburn	.00 miles from line

Suffern	.00 miles from line
Spring Valley	.10 miles from line
Nyack	.00 miles from line
Tarrytown	.00 miles from line
Major Transportation Corridors	
NYS Thruway (I-87)	.00 miles from line
Interstate Route 84	.00 miles from line
Interstate Route 287	.00 miles from line
NYS Route 17	.00 miles from line
MTA Metro North Railroad	.00 miles from line
Interstate Route 287	.00 miles from line

[1]Closest location to NYS Thruway ROW or Converter sites.

As indicated in Table 1, all historic sites within the study area are listed in Section 4.3.14 of the Article VII Application. The National Park Service web site indicates that there are over 70 sites listed on the National Register of Historic Places within 1 mile of the Thruway ROW and the four converter sites. The majority of these sites occur in areas where the line will be installed underground. According to the project's cultural resources consultant, the most sensitive historic resource in the vicinity of proposed above-ground facilities may be the Cloisters in Fort Tryon Park (J. Klein, pers. comm.).

METHODS

Landscape Similarly Zones and Viewer Groups

Discrete landscape similarity zones were identified through field review and aerial photo interpretation. EDR identified landscape similarity zones based on distinctive combinations of landform, vegetation, water, land use and user activity. Based on field and data review, specific viewer groups within the study area were also identified. These groups were defined based on 1) the frequency and duration of exposure to views of the proposed facility, 2) viewer position in the landscape, and 3) the viewers' activity and sensitivity to alteration of the visual landscape.

Viewshed Analysis

To evaluate potential project visibility, EDR performed a viewshed analysis of the tallest proposed structure (generally the new transmission take-off structure) at each converter. Because specific pole heights and locations cannot be determined now, no viewshed analysis was performed for the overhead transmission line. Based on established methodology (NYSDEC, 1996) and site-specific topographic and land use conditions, the study area for the viewshed

analysis was defined as the area within a 2-mile radius of the proposed converter stations. Digital Elevation Model (DEM) data was obtained from the USGS (7.5 minute series). A computer program called MicroDEM+ (Version 7.0)® was then used to define the viewshed based on proposed facility height above the site elevation (as indicated on the USGS topographic maps) and a viewer height of 5.1 feet. The MicroDEM+® program defines the viewshed (based on topography only) by running IHS merge fans that provide total coverage of the study area. The resulting viewshed maps define the maximum area from which the tallest element of the completed facilities could potentially be seen within the study area. It should be noted that viewshed accuracy is directly related to the accuracy of the USGS DEM data used in the analysis. It should also be noted that this is a conservative analysis of potential visibility that does not consider the screening effect of structures, vegetation or unmapped changes in land form (e.g. road cuts and man-made berms).

Field Evaluation

To more accurately evaluate the potential visibility of the project, the area along the ROW on the NYS Thruway and around the converter sites was field reviewed. Views from representative/sensitive sites within this area were documented with photos and field notes (see Appendix C). Selected viewpoints typically offered the most open, unobstructed views of the proposed above-ground facilities. A total of 140 viewpoints were visited on October 8-9 and 29, 2003. Viewpoint locations are indicated in Figure 3 and Appendix C. The photos obtained during this field evaluation were used to document the visual/aesthetic character of the area, to determine where project components might realistically be visible, and to select viewpoints appropriate for use in the preparation of photo renderings.

Photo Renderings

The photos obtained during field evaluation were reviewed to determine which offered potentially unobstructed views of the proposed facilities. To show anticipated visual changes associated with the proposed project, high-resolution computer-enhanced image processing was used to create photographic renderings of the completed facilities from each of the selected viewpoints. Photo renderings were developed by creating three-dimensional models of the proposed above-ground facilities, based on architectural elevations and site plans provided by Spectra (see Appendix B). EDR used AutoCAD 2000® and 3D Studio Max (Version 6.0) ® software to create the computer models. The models were then superimposed on digitized photographs of the existing landscape using the location and angle of each camera view (determined using field mapping and GPS data collected during the field verification). A wire

frame model of the existing site was built using information gathered from USGS digital ortho quarter quadrangle (DOQQ) aerial photographs and USGS 7.5 minute series topographic maps. The model was then superimposed over the photos to further refine the camera alignments so that project elements are shown in proportion, perspective, and proper relation to the existing landscape elements which will remain. Consequently, the alignment, elevation, and location of the visible elements of the proposed project are true and accurate (based on the site and project information available). To the extent possible, surface color, texture, and shading of the modeled facilities were selected to replicate those proposed by the project engineers. Using 3D Studio Max (Version 6.0) ® software, lighting/shadowing conditions were rendered based on existing light conditions.

Line-of-Sight Cross Sections

Where field review suggested that the proposed facilities would not be visible (e.g. Downstate Converter Circuit 1 at Oak Point), line-of-sight cross sections were prepared to confirm the lack of visibility. The location and height of vegetation, structures and topography are based on USGS mapping, aerial photos and the proposed site plan. However, the vertical scale was exaggerated to improve the accuracy of the analysis.

RESULTS

Landscape Similarity Zones and Viewer Groups

Figure 3 illustrates visual character at selected locations along the NYS Thruway. Appendix C includes character photos from the areas surrounding each of the converter sites. However, within the 126 mile long, one-mile wide study area, landscape character is highly variable. The area includes a mix of forest land, farm land, large and small cities, villages, suburban and rural residential areas and areas of commercial and industrial development. Within this study area, two major character zones and 12 separate Landscape Similarity Zones were defined by EDR. These Landscape Similarity Zones, and their general landscape character, use, and potential views of the proposed project facilities are described below:

Thruway Corridor

1. *Undeveloped Forest*

   This zone is dominated by undeveloped deciduous and mixed deciduous/coniferous forest on hilly to mountainous terrain. The area is characterized by a mature forest canopy that is

generally only broken by roads and transmission line rights-of-way. It also includes areas of wooded wetland and forested riparian corridors. Where water resources are present, they are generally small streams and wetlands. This zone includes the substantial hills that occur primarily west of the NYS Thruway. The area immediately north of Kingston includes portions of the Catskill Forest Preserve and the area around Ramapo includes portions of Harriman State Park and Sterling Forest State Park. Elsewhere, land in this zone is primarily in private ownership. The dominant land use in this area is low-density residential development. The zone offers primarily short distance views along the roadways, which occasionally extend across adjacent yards and small open fields. Long distance views are available in only a few places, primarily along the Thruway itself. In most locations, views beyond the roads and homes are blocked or partially screened by foreground hills and trees. Other than the Thruway, roads in this zone are typically bounded on both sides by mature trees.

2. *Urban Village/Small City*

This zone consists of the downtown areas of the Village of Nyack, the Village of Saugerties, the Village of New Paltz and parts of the City of Kingston and the City of Suffern. It includes historic districts and historic structures, and is characterized by a mix of residential and commercial uses. This zone is dominated by built structures and streets. Buildings are typically 2-4 stories tall, and include brick commercial blocks and wood frame structures. These areas include some street trees, but they are generally not large. Buildings are a mix of older architecture interspersed with more modern styles. Some of the older buildings are very well maintained or restored, while others are in various states of disrepair or alteration. Views are generally short distance and focused along streets (which are typically arranged in grids/blocks). Views in the Urban Village/Small City zone are generally focused inward toward streets and adjacent buildings. Several of these areas front on the Hudson River, and the river is therefore a focal point upon which many outward views are oriented. Most outward views toward the project are blocked by adjacent structures, as well as background topography, and trees.

3. *Suburban Residential*

This zone includes moderate to higher density residential development, typically located on the outskirts of the Urban Village/Small City zones and in subdivisions off of major roads in more rural areas. This is also the primary zone that occurs along the project ROW once it enters Rockland County and continues south. Buildings generally consist of single-family

homes of more recent vintage than in the Urban Village/Small City areas. These homes are typically in good condition and well cared for. They are also set back relatively far from the roads and have well-defined front and side yards. Trees and landscaping are typically present in the yards, but tree size, species and age are highly variable. Occasional long distance views are available along the road axes or across open yards, but most views are limited due to the presence of adjacent structures and trees.

4. *Major Transportation Corridor*

This zone consists primarily of the NYS Thruway (Interstate 87) but also includes small sections of Interstate Routes 287 and 84 and NYS Route 17. This area is used primarily by drivers traveling at relatively high speed through the region. The roads are four-six lane divided highways with limited access. Roadside development is variable, but in no instance does this development front directly on the highways. Views from the roads are generally directed along the roadway. In some places views to the surrounding landscape are blocked by adjacent trees, rock cuts and hills, while in other locations open views from elevated viewpoints provide significant long distance views. The area of the corridor approaching and including the Tappan Zee Bridge offers panoramic views of the Hudson River. The Thruway offers other fleeting open views of the Hudson Valley (to the southeast) from a few elevated viewpoints along the ROW.

5. *Highway Commercial Corridor*

This zone occurs primarily along portions of the major state highways within the study area and along certain local roads on the edges of the Urban Village/Small City zone. These areas are dominated by various commercial enterprises including restaurants, automobile sales and repair, convenience stores, and shopping centers. The type and arrangement of land use in this zone is highly influenced by the automobile. Foreground views are typically dominated by cars and pavement. There is generally no consistency in building size, style or layout, and in places the businesses are not well maintained or are vacant. Views in these areas are primarily directed along the road corridor itself, with medium and distant views blocked by vegetation and frontage development. The presence of diverse signage systems, poorly maintained structures, traffic congestion, and/or the lack of consistent architectural style create visual clutter that detracts from the character of the surrounding landscape.

6. *Parkland*

The Parkland Landscape Similarity Zone includes smaller parks and recreation areas that provide an area for social interaction as well as recreational activity. The parks are generally organized into program areas (e.g. ballfields, playgrounds, walks) and accommodate a wide variety of users. Along with their recreational land use, the distinguishing characteristic of these areas is the presence of open lawn and/or landscaped grounds. Although views in many areas are screened by trees and adjacent buildings, the open character of the parks and/or their proximity to bodies of water, allow more long distance views than are generally available in the other zones within the study area. The abundance of trees in certain areas, along with screening views, also serves to insulate the parks somewhat from surrounding land use.

7. *Rural/Agricultural*

This zone includes homes, wetlands and wood lots, but is primarily characterized by active and reverting agricultural land, including crop fields, hayfields and apple orchards. These areas are primarily flat open fields, often bordered by hills and rolling terrain, especially near the Catskill foothills. Because of the agricultural nature of the zone, this area is characterized by scattered small farms and rural homes along local roads. There are occasional transmission lines traversing the zone, as well as railroads. Because of the open nature of the terrain, long distance views are available, but the presence of woodlots and hedgerows limits these views in many places.

<u>Metropolitan New York</u>

1. *Urban Residential*

This zone, which occurs primarily around the Downstate Converter Circuit 2 site (Spuyten Duyvil), consists of a mix of 2-4 story structures and high-rise residential apartment buildings that are a mix of architectural styles. Several of the apartment buildings and townhouses were built as complexes, resulting in a uniform appearance and streetscape along many of the blocks. The structures are typically of masonry construction and set back from the street. Some of the residences are separated from the street by sizeable street trees. These street trees soften the urban appearance of the neighborhood and limit long distance views down the streets. Views in this zone are generally oriented toward the street and residences across the street, with some views available across the Hudson, Harlem and East

Rivers. The Urban Residential Landscape Similarity Zone includes neighborhood parks, playgrounds, sitting areas and schools.

2. *Urban Industrial*

The Urban Industrial Landscape Similarity Zone consists primarily of the area surrounding the Downstate Converter Circuit 1 site. This area includes warehouses, auto repair shops and automobile-related uses, hauling companies, construction offices, fuel storage facilities, manufacturing facilities, and utility companies. This zone is characterized by a varied, haphazard mix of building types and materials. There is no uniform set-back, and little structure or order to the streetscape. Open space is generally limited to fenced storage yards, although street trees and volunteer vegetation are present in places. Views within this zone are generally focused along the axis of the streets.

3. *Urban Commercial*

The Urban Commercial Landscape Similarity Zone occurs primarily in the area surrounding the 49th Street substation. Secondary commercial areas are also located at the periphery of the study area surrounding the Downstate Converter Circuit 1 site. These areas are typically characterized by restaurants, shops, and businesses on the first floor of the buildings that line the street. The businesses within this zone include a variety of building façade treatments, architectural styles, awnings and sign/advertising designs. Front yards are lacking and both pedestrian and vehicular traffic is fairly heavy. The Commercial Zone is generally noisier, busier, includes fewer street trees, and is more visually "cluttered" than adjacent residential areas. Views within this zone are oriented toward store windows and the adjacent street. Views out of this zone are oriented along the road corridors, and are similar to those described for the Urban Residential Zone.

4. *Urban Parkland*

The Urban Parkland Landscape Similarity Zone includes Inwood Hill Park, Fort Tryon Park, Wards/Randall's Island Park and smaller parks within the New York City portion of the study area. The parks include both lightly used wooded areas and more open active recreation areas. These areas represent a highly valued and relatively rare open space resource within the urban study area. The parks are often organized into program areas (ballfields, playgrounds, walks, etc.) and accommodate a wide variety of users. Along with their recreational land use, the distinguishing characteristics of these areas include the dominance of relatively large areas of open lawn and/or mature trees. Inwood Hill Park in

particular includes a pedestrian walkway through a dense wooded area directly across the Harlem River from the Downstate Converter Circuit 2 site. The Pallisades Interstate Park in New Jersey is also characterized by dense forest vegetation. Wards/Randall's Island Park, near the Downstate Converter Circuit 1 site, on the other hand, has few trees and an abundance of open lawn. Although views in many areas are screened by trees and adjacent buildings, the parks' adjacency to open water often allows more long distance views than are generally available in the other zones within the study area. Small neighborhood parks and playgrounds are of a different character, and are considered more appropriate for inclusion in the Urban Residential Landscape Similarity Zone.

5. *Water/Waterfront*

The Water/Waterfront Landscape Similarity Zone includes the Hudson River crossing of the Tappan Zee Bridge and areas of the East River, Hudson River and Harlem River near the converter locations. This zone includes the shorelines of these water bodies, as well as the open water itself. The distinguishing characteristic of views from this zone is the dominance of open water in the foreground and midground areas. The water adds interest to views in this zone. The lack of foreground screening allows for wide panoramic views across the water. These views often include bridges, islands and/or boats in the foreground and midground. Background scenery in this zone are variable, ranging from the Manhattan skyline, to the industrial waterfronts of the Bronx, to wooded shoreline parks and residential areas.

Four categories of viewer/user groups were identified within the study area. These include the following:

1. Local Residents

These individuals may view the proposed project from homes, businesses and local roads. Except when involved in local travel, these viewers are likely to be stationary, and could have frequent and/or prolonged views of the project. They know the local landscape and may be sensitive to changes in particular views that are important to them. Views for members of this group will generally be limited due to the separation of the proposed facilities from residential areas, the underground location of certain facilities, and/or screening provided by structure vegetation and/or topography.

2. *Through Travelers*

These individuals may view the proposed facility components from sections of the Metro North Railroad, the NYS Thruway and other major roadways within the study area. On portions of the Thruway these individuals will have unobstructed foreground views of the proposed overhead transmission line and the two Upstate converters as they pass through the area in their automobiles. These viewers are typically moving rapidly and focusing on the road in front of them. For those drivers who are destination-oriented, sensitivity to visual quality and landscape character may be relatively low. Passengers and sight-seers traveling through the area are likely to be more sensitive to the surrounding scenery.

3. *Local Recreational Users*

This group generally includes local people involved in outdoor recreational activities at state, county and local parks, and at private recreational facilities. This group includes hikers, golfers, fishermen, swimmers, ball players, and those involved in more passive recreational activities (e.g. picnicking, walking, bird watching). Visual quality may or may not be an important part of the recreational experience that local recreational users are enjoying, depending on the activity they are involved in. Visibility by this group will be limited, as most park and recreational facilities within the study area are well separated from the project, and/or screened by vegetation, structures and topography. Boaters on the Hudson River or East River, as well as park users at Isham Park and the shoreline of Inwood Hill Park, could have open foreground views of certain project facilities.

4. *Tourists*

These individuals come to sites within the study area specifically to enjoy scenic and recreational resources. These resources are concentrated in Harriman State Park, the Catskill Forest Preserve and the Hudson Valley. This group includes day visitors as well as seasonal and weekend residents with vacation homes in the area. Most tourists and seasonal residents will have high sensitivity to visual quality and landscape character, regardless of the frequency or duration of their exposure to the Project. This group may see the project from foreground distances while driving on the NYS Thruway, and from mid-ground and background distances while visiting sites within the study area.

Viewshed Analysis

Viewshed mapping for the four converter sites suggest that project visibility will be highly variable. Discounting the screening effect of vegetation, viewshed analysis for the Upstate Converter Circuit 2 (Figure 4, Sheet 1) indicates that some portion of the tallest proposed structure (125 foot tall termination structure) would potentially be visible from the majority of the study area. The only areas significantly screened by topography include the Hudson River and Coeymans Creek and some of the steep ravines/shorelines associated with these water features. It should be noted that most of the structures within the converter will be significantly lower than 125 feet and will have much less potential visibility than indicated by the mapping in Figure 4. Trees in the area and/or distance from the converter station site would further reduce actual facility visibility.

Viewshed analysis for the Upstate Converter Circuit 1 (based on a maximum structure height of 103 feet) indicates that much of the study area will be screened by the steep north-south ridges that occur in this area (Figure 4, Sheet 2). The back side of these ridges, along with Hollister Lake, the majority of Greens Lake, and the majority of NYS Route 9W will not have views of the tallest structure in the converter. As mentioned above, most of the structures at this site will be less than 100 feet tall and thus present less potential visibility then indicated by viewshed mapping. Significant forest vegetation in this area (as indicated on the USGS maps and aerial photos) will reduce actual converter visibility quite significantly.

Steep slopes along both banks of the Hudson River will effectively screen the Downstate Converter Circuit 2 from most of the surrounding study area (Figure 4, Sheet 3). This analysis was based on a maximum structure height of 100 feet within this facility. Screened areas include Fort Tryon Park and the Cloisters, the majority of Inwood Hill Park and the majority of adjacent residential areas in the Bronx, Manhattan and New Jersey. The Hudson River and portions of the river shoreline in the Bronx and New Jersey are indicated as having potential views of the project. These areas include sensitive resources such as Isham Park, Baker Field, Inwood Hill Park and Palisades Interstate Park (in New Jersey). Although some potential visibility is indicated in the Inwood and University Heights residential areas, actual visibility of the converter from these areas will be much more limited than suggested by the viewshed analysis due to the significant screening provided by intervening buildings. Project visibility from the upper stories of high-rise buildings in the area may be greater than the ground-level visibility indicated by the viewshed map.

The Downstate Converter Circuit 1 viewshed map (Figure 4, Sheet 4) indicates that the tallest proposed structure (50 feet) will be potentially visible from the East River and land areas south of the site (e.g., North Brother Island, Rikers Island, Astoria). Potential visibility is also indicated for Wards/Randall's Island Park, St. Marys Park and commercial, industrial and residential areas of the adjacent South Bronx. As at the Downstate Converter Circuit 2 site, surrounding buildings in the area, (which were not considered in the viewshed analysis) will significantly screen the proposed facility, although views from upper stories may be greater than indicated by the viewshed map.

Field Evaluation

Field evaluation of potential Project visibility revealed that actual visibility of the Project is likely to be more limited than suggested by the viewshed analysis. Existing vegetation and structures are effective in screening all or part of the converter sites from many locations (see photos in Appendix C). The only viewpoints that offered open, expansive views of the Upstate Converter Circuit 2 site were from the NYS Thruway and the exit/entrance ramps at Exit 21A. Views of the Upstate Converter Circuit 1 site were available only from the Thruway and the area immediately adjacent to the site. Ground-level views of the Downstate Converter Circuit 2 site were very limited due to the steep topography, trees and tall buildings in the area. Views to this site were available from some adjacent open areas in the neighborhood and from across the river in New Jersey. Sensitive sites with views of the this site include the Hudson River, Isham Park, Baker Field and shoreline portions of Inwood Hill Park and the Palisades Interstate Park across the river in New Jersey. The Downstate Converter Circuit 1 site is the most well screened of the four. Although it is relatively flat, the site is surrounded by buildings/structures on three sides and the tallest Project element is under 50 feet tall. The only potential view (although not confirmed during field evaluation) appears to be from the East River.

The above-ground portions of the transmission line will be visible from the Thruway itself and possibly from some adjacent roads and residences. Sensitive sites from which the Project might be visible include the NYS Thruway, from which clear views of the overhead line and the Upstate converters will be available. Views of the transmission line may be available from some parks, Scenic Areas of Statewide Significance, state lands, historic sites and population centers that are adjacent to the above-ground sections of the line. However, visibility from outside the existing Thruway ROW was not extensively evaluated during the course of fieldwork.

Photo Renderings

A single photo rendering of each of the proposed converters (except Downstate Converter Circuit 1) and two renderings of the overhead transmission line were prepared from representative viewpoints. The selected viewpoints generally offered the closest views that showed the proposed facilities within the context of the surrounding landscape. In the case of the Upstate converters, this was somewhat difficult, since clear views of these sites were often not available until one was directly adjacent to the sites. Consequently, the photo renderings prepared to date illustrate only portions of these two facilities. No photo rendering of the Downstate Converter Circuit 1 was prepared, as fieldwork (and follow-up line-of-sight analysis described below) indicated that the proposed facilities on this site would not be visible from publicly accessible, on-shore locations. It should also be noted that the photo renderings are based on preliminary design and engineering data, and in the case of the Downstate Converter Circuit 2, a conceptual architectural plan designed to provide significant screening of the facility. Details such as pole locations and site grading were not available, and will not be until the detailed design phase of the Project. Consequently, the appearance of the facilities could change somewhat as the design is further developed.

Completed photo renderings of the transmission line and converters are presented in Figures 5-9. Project visibility and visual impact as suggested by these renderings are discussed below.

Transmission Line

Figures 5 and 6 illustrate what the proposed overhead transmission line could look like from two locations along the NYS Thruway. Viewpoint 21 (Figure 5) is near milepost 131, approximately 1 mile northwest of Coeymans. Viewpoint 106 (Figure 6) is near milepost 82, south of Tillson and north of the Thruway bridge crossing over the Wallkill River. Figure 7, from the exit 21A overpass, also shows the transmission line as it exits the Upstate Converter Circuit 2 site. For the purposes of this evaluation, a maximum pole height of 125 feet was used and poles were shown with both a galvanized and Corten steel finish.

Drivers on the NYS Thruway currently see transmission line crossings of the Thruway (from foreground and midground distances) in several locations. As the photo renderings illustrate, any necessary above-ground segments of the proposed line will add a major new longitudinal element to the view from the Thruway. When required due to engineering or environmental constraints, viewers on the Thruway will see aerial portions of the line from foreground distances. Because the line runs parallel to the road, significant portions of the line could be

visible in places, and the duration of views could be prolonged. The orientation of the line also places it within the viewers line-of-sight rather than peripheral to it. Because of their proximity, the poles present significant contrast with the existing landscape in terms of line, color, and scale. Because of their lighter color, contrast with the sky (which is the dominant background feature in most views) is reduced using a galvanized pole, as compared to Corten steel. However, the Corten poles blend better with background vegetation and hills. The contrast presented by the poles' texture and material is lessened somewhat by the presence of numerous automobiles within each view.

The significant advantage of placing the line within the existing ROW is that new clearing/changes in vegetation are minimal and the transmission line follows the line of the existing roadway and ROW edge. Although not apparent in the photo renderings prepared to date, the other significant advantage of the proposed siting is that from more distant viewpoints (i.e. off the Thruway) project visibility will be minimized through the utilization of the existing cleared ROW. It is anticipated that because of the narrow dimensions of the upper portions of the poles (which is generally the only portion that is unscreened by vegetation or landform), their visibility and visual impact will be very minor at distances over 1 mile.

Converters

The photo rendering of the Coeymans converter (Figure 7) is from the Exit 21A overpass on the Thruway. The rendering of the Upstate Converter Circuit 1 site (Figure 8) is from the Thruway at milepost 117. As indicated in these figures, the Upstate Converters will create significant changes in visual character when compared to existing conditions. Although existing overhead power lines occur next to each site, the general area appears wooded and undeveloped. With the facilities in place, new built/industrial components will be introduced to the landscape. Because of their proximity to the Thruway, views of these facilities will be from foreground distances, thus maximizing contrast in terms of land use, scale, color, line, form and texture. However, the advantage of this location is that drivers will pass by them quickly, thus keeping the duration of views limited. From more distant locations, intervening vegetation will significantly screen these facilities and proximity to the Thruway will reduce the level of contrast presented by the new converters.

A photo rendering of the view of the Downstate Converter Circuit 2 site from Isham Park is presented in Figure 9A. As illustrated in this rendering, the majority of the converter building and the upper portion of some associated equipment will be visible from this location. These features contrast in line, color and form with the existing water, vegetation and residential

structures in the view. The light green color of the converter building in particular does not blend well with the darker greens and browns that dominate the shoreline. The light green color was selected to illustrate sheet steel construction in a common utility industry color. In this presentation, the character of the new facilities is not inconsistent with the color and/or line of the adjacent railroad station and the overhead bridge. More open, unscreened views of the facility, and a clearer perception of its industrial character will likely be available from some of the adjacent high-rise residential structures shown in this view.

The Downstate Converter Circuit 2 may be enclosed within a walled structure resembling a Dutch castle. A conceptual design consistent with this theme was used to develop the photo rendering presented in Figure 9B. As this figure illustrates, to enclose all of the equipment proposed within this site, a large structure (i.e. having walls 520 feet long and 110 feet high) is required. Where this facility is visible, the photo rendering suggests that it will appear larger than the unscreened converter and will contrast significantly with existing conditions on and adjacent to the site. The Dutch castle façade and red brick material reflect some architectural characteristics of buildings in the surrounding area and prevent the facility from adding an industrial feel to the site. Because of its distinctive appearance, the facility will be perceived as a visual focal point in the area. For this reason, it is very important that final design of this facility creates a visual amenity rather than a visual liability.

Line-of-Sight Cross Sections

A line-of-sight cross section analysis was undertaken for Downstate Converter Circuit 1, which confirms the results of earlier analyses. This analysis showed that the proposed facilities would not be visible from surrounding locations, including Wards/Randall's Island Park and Tiffany Pier (see Appendix D).

CONCLUSIONS/RECOMMENDATIONS

The visual impact assessment performed for the proposed Empire Connection project allows the following conclusions to be made.

- Siting of the transmission line along the cleared NYS Thruway and Metro North Railroad ROWs, and burial of the majority of the line, significantly reduce project visibility and visual impact within the majority of the study area. This, along with the proximity of the converters to existing transmission and transportation facilities, minimize potential project visibility and visual impact from mid-ground and background locations, which include the majority of sensitive sites/land uses and viewer groups within the area.

- Location of the proposed facilities directly adjacent to the existing transportation corridors will maximize visibility and visual impact on the users of these corridors. In the case of the converters, this impact will be limited to the immediate vicinity of the sites. Travelers on these transportation corridors are likely to be less sensitive to visual change/impact than viewers living in surrounding residential areas or visiting park, recreational or historic sites in the area.

- The above-ground portions of the transmission line will have a visual impact on travelers on the NYS Thruway and some viewers immediately adjacent to the Thruway. However, burial of most of the transmission line will significantly reduce the project's visibility and visual impact.

- The "Dutch castle" façade at Downstate Converter Circuit 2 will effectively screen the industrial components of this facility. However, this benefit needs to be weighed against its larger size, relative to the unscreened converter.

- If the Downstate Converter Circuit 2 is to remain unscreened, a dark earth tone color is recommended for the converter building to help it blend with adjacent vegetation.

- Opportunities for screening (fencing or plantings) likely exist at the Upstate Converter sites. Due to the proximity of these facilities to the Thruway, even limited tree plantings could screen significant portions of the facility from passing viewers. Some provision for screening along the Thruway should be included in the final facility designs.

- Because the overhead transmission line will be most visible to travelers on the Thruway, and because these viewers will generally view the line against an open sky background, a galvanized or other light colored finish may be preferable. This should be further evaluated during final design of the line. A flat pole finish and nonspecular conductor should be utilized to minimize reflected glare.

- If project plans or specifications change significantly based on final design and engineering, supplemental or revised visual analysis (viewshed mapping, photo renderings, etc.) may be necessary.

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APPENDIX A

Figures

APPENDIX D

Downstate Converter Circuit 1 Line-of-Sight Analysis

EXHIBIT 4 - APPENDIX C

ECOLOGICAL SURVEY AND IMPACT ASSESSMENT

ECOLOGICAL SURVEY AND IMPACT ASSESSMENT

of

The Proposed Empire Connection Project
Right of Way and Upstate Converter Circuit Sites

Albany, Greene, Ulster, Orange and Rockland Counties
New York

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INTRODUCTION

In accordance with the requirements of Article VII of the Public Service Law, a vegetation and wildlife survey was undertaken to identify and assess the significance of ecological resources potentially impacted by the Empire Connection. Empire Connection is a high voltage, direct current electric transmission line project, linking existing upstate electric power sources to existing electric power distribution facilities in New York City. Conjunction LLC proposes to construct Empire Connection almost entirely within existing New York State (NYS) Thruway and railroad rights-of-way (ROW). The project will consist of two circuits and will connect to existing alternating current power lines in the Town of Coeymans, Albany County and in the Town of Athens, Greene County. It will run primarily underground within existing transportation corridors to its end points in New York City at an existing electric substation at West 49th Street in Manhattan and at the existing Rainey substation in Queens.

This survey evaluated ecological resources at the Upstate Converters and along the NYS Thruway ROW study area from Coeymans to the Tappan Zee Bridge. This report describes the methods and results of the survey, and discusses potential impacts associated with project construction and operation. It will be used to help guide final design of the Conjunction Empire Connection Project, and will be included as an appendix to the Article VII Application for the project.

METHODS

An reconnaissance-level vegetation and wildlife survey was performed during the fall of 2003 by EDR staff ecologists William Trembath and John D. Hecklau (Vitae are included in Appendix C).

Vegetation Survey

Plant species at the Upstate Converter sites and along the ROW between Coeymans and the Tappan Zee Bridge were determined primarily through a reconnaissance-level field survey conducted on October 28, 2003. Field survey methods involved visual observation, collection and identification of plant species. The most time and effort was devoted to searching the converter sites. Vegetation communities within the study area were identified using 1" = 500' scale color infrared aerial photographs (2000-2001) and verified during the field survey. These data were used to identify distinct plant communities and the approximate extent of their occurrence within the study area. During the on-site vegetation survey, information was

collected on the dominant plant species in each community. Ecological communities defined by the New York Natural Heritage Program (Reschke 1990) were combined into similar assemblages for ease of description. Inquiries regarding rare species occurrence were made of the New York State Department Environmental Conservation (NYSDEC) and U.S. Fish and Wildlife Service (USFWS), but no responses have yet been received.

Wildlife Survey

Information concerning wildlife species and habitat within the study area was collected by reviewing published and unpublished data, and through a reconnaissance-level field survey on October 28, 2003. Published information concerning wildlife included the *New York State Breeding Bird Atlas* (Andrle and Carroll 1987), *Important Bird Areas in New York State* (Wells, 1998) and *Where to Find Birds in New York State* (Drennan, 1981). Other sources of data included NYSDEC freshwater wetland mapping, color infrared aerial photos, unpublished 2000-2003 Breeding Bird Atlas data, and NYSDEC Herp Atlas data. Responses to inquires to the NYSDEC and USFWS regarding possible listed threatened and endangered wildlife species occurrence have yet to be received.

The field survey was the primary means of identifying species of birds, mammals, reptiles, and amphibians found within the study area. Birds and mammals were documented through direct observation (visual as well as auditory) of species and/or their sign (nests, feathers, tracks, droppings, bones, etc.). Reptiles and amphibians were surveyed through systematic searches of wooded areas and wetlands. In searching for snakes and salamanders, rocks, logs, and other debris were turned over and examined.

Wildlife habitat areas were identified based on the 2000-2001 aerial photographs and field reconnaissance. In the course of field work, vegetative cover (overstory, understory, and ground cover) was broadly categorized in terms of species composition and structural character. The presence of absence of specific habitat elements was also noted. Similar habitat units were lumped into larger categories for descriptive purposes in this report.

RESULTS

Vegetation Survey

Plant Species

During the fall of 2003 field survey, a total of 109 different plant species were documented along the transmission line route from the Upstate Converters to the Tappen Zee Bridge. A project-specific plant list (including scientific names) is presented in Appendix A. All of the species found during this survey are relatively common in New York State. No rare species were observed, and the majority of the study area appears unsuitable as habitat for rare plant species, due to various forms of disturbance (e.g. farming, earthmoving and/or mowing) that have occurred over the years. The majority of the Empire Connection ROW is mowed grass within the NYS Thruway ROW. Plant communities on and adjacent to the ROW and on the converter sites are dominated by common native and exotic species. Typical indicators of possible rare species occurrence (rich woodlands, prairie remnants, fens, limestone outcrops) are lacking.

As mentioned previously, NYSDEC review of the New York Natural Heritage Program data base has been requested, but to date has not been received. Based on the results of this inquiry, a more intensive field survey of the project area may be required to document the presence or absence of any rare plant species.

Plant Communities

Mowed grass dominates the ROW, however a total of eight separate vegetation associations or community types were identified on or adjacent to the ROW. Several of these community types occur primarily as a result of previous or on-going human activity (e.g. farming, ROW maintenance). The communities identified along the ROW and their approximate coverage within 250 feet of the ROW are presented by county in Table 1.

Table 1
Ecological Communities along the Empire Connection ROW[1]

Community	Approximate Percent Cover				
	Albany	Greene	Ulster	Orange	Rockland
Developed/Disturbed	20%	10%	20%	30%	80%
Agricultural Land	2%	7%	15%	5%	0
Successional Old Field	15%	5%	10%	10%	0
Successional Shrubland	10%	15%	10%	10%	5%
Deciduous Forest	50%	30%	20%	30%	10%
Mixed Forest	0	30%	20%	0	5%

Community	Approximate Percent Cover				
	Albany	Greene	Ulster	Orange	Rockland
Open Water/Wetland	3%	3%	5%	15%	5%

[1]Based on aerial photo interpretation, within 250 feet on either side of the NYS Thruway.

A description of each plant community, including mention of those species which are dominant or of particular interest, is presented below. No rare ecological communities (e.g. fens, prairie remnants, old growth forest) were observed along the ROW and at the converter sites within one mile of the ROW. However, no response to an inquiry regarding Natural Heritage Program documentation of such communities has yet been received from the NYSDEC.

Developed/Disturbed

This community is a combination of various ecological communities described by Reschke (1990), as "terrestrial cultural" communities. All of these communities are characterized by a high degree of human modification/disturbance. The majority of the ROW is included in this category, and most closely resembles the Mowed Roadside/Pathway community described by Reschke (1990). This community is dominated by grasses and forbs such as orchard grass, perennial rye grass, red clover and dandelion. This community is maintained through regular mowing along the NYS Thruway. Other maintenance and transportation activities along the Thruway (e.g. snow removal, accidents, roadway repair) also result in periodic disturbance to this community. Outside of the Thruway ROW, other land uses grouped in this category include residential developments, commercial and industrial facilities, parking lots, storage yards and roads.

Agricultural Land

This community includes the Cropland/Row Crops, Cropland/Field Crops, Pastureland and Orchard communities described by Reschke (1990). Along the ROW, active agricultural land includes cornfields, hayfields, apple orchards and pasture land. This community occurs most commonly along the central (south of New Baltimore-north of Ramapo) portion of the ROW. Plant species in these areas are highly variable, but can include corn, alfalfa, clover, apple trees, timothy, orchard grass and other grasses. Like the previously described community, agricultural land receives regular disturbance in the form of mowing, plowing, pesticide application, grazing and/or harvesting.

Successional Old Field

Many open fields adjacent to the northern portion of the ROW (north of New Paltz) are abandoned agricultural fields/pastures in the early stages of secondary succession. An area of old field also occurs on the Upstate Converter Circuit 1 site. Areas defined as old field are dominated by grasses and forbs, with occasional scattered shrubs and tree saplings. Differences in plant species within this community often relate to past agricultural practices and the amount of time that has elapsed since farming operations ceased. Dominant grass species include bluegrass, orchard grass, and timothy, while the dominant broad-leaved herbaceous species include Queen Anne's lace, Canada goldenrod, red clover, heath aster, and teasel. Common tree saplings and shrubs that occur in these areas include honeysuckle, hawthorn, buckthorn, and gray dogwood.

Successional Shrubland

A significant portion of the Upstate Converter Circuit 2 site (approximately 75%), the Upstate Converter Circuit 1 site (approximately 30%) and numerous areas along the ROW are characterized as successional shrubland. This community is quite variable in age and species composition, but is typically dominated by shrubs with some tree saplings and herbaceous plants. Dominant shrub species include multiflora rose, staghorn sumac, gray dogwood, and honeysuckle. Many of the younger shrub-dominated areas contain a relatively high proportion of herbaceous plants. Dominant herbaceous species in this community include timothy, orchard grass, wild strawberry, Queen Anne's lace, teasel, New England aster, heath aster, field thistle and red clover. In older shrubland, tree saplings, including white ash, sugar maple, black cherry, and box elder, also make up a significant component of the plant community.

Deciduous Forest

The most common ecological community adjacent to the ROW is deciduous forest. This community also makes up a significant component of the Upstate Converter Circuit sites. As with successional shrubland, this community is quite variable in age and species composition. This variability results from a number of environmental variables including past land use practices, slope aspect, soil type, and hydrologic regime. The forest community also varies geographically from the north to the south end of the project. Within the study area, this community includes the Oak-Tulip Tree Forest, Hemlock-Northern Hardwood Forest, and various Oak-Hickory Forest communities described by Reschke (1990). The forests along the ROW range from former hedgerows and early successional stands to relatively mature second

growth forests. Early successional forest is found on the Upstate Converter Circuit 2 site. This site retains shrub and herbaceous species in the understory, while other young forest stands along the ROW are essentially devoid of understory vegetation. The shrub layer tends to vary based on the amount of available sunlight that comes through the tree overstory. Early successional forests are dominated by a variety of tree species, including red oak, sugar maple, white ash, shagbark hickory, red maple, and American beech. Where present, understory shrub and vine species include hawthorn, multiflora rose, apple, gray dogwood, staghorn sumac, wild grape and raspberries.

More mature deciduous forest occurs on the Upstate Converter Circuit 1 site and adjacent to the ROW in the more mountainous central portion of the study area. These stands tend to be dominated by sugar maple, red maple, red oak, basswood, beech, and white ash. Other species present in the lesser amounts or found in more restricted areas include American elm, shagbark hickory, black walnut, black cherry, black locust, white oak, and black oak. As in the early successional forests, the sapling and shrub layers in mature forest stands tend to be quite variable in species composition and density. Common saplings and shrubs include ash, sugar maple, red maple, beech, hop hornbeam, and ironwood. The herbaceous layer includes species such as avens, sensitive fern, Virginia creeper, poison ivy, wood fern, mayapple and cinnamon fern.

Mixed Forest

Mixed deciduous/coniferous forests, as well as some pine and spruce plantations, occur along some portions of the ROW. Mixed forests are similar to the Appalachian Oak-Pine Forest, Hemlock-Northern Hardwood Forest and Pine-Northern Hardwood Forest communities described by Reschke (1990) and are typically dominated by eastern hemlock and eastern white pine. These areas occur primarily in the central and southern portion of the study area. Scattered conifer plantations also occur along the ROW. Most of these areas are in the range of 20-60 years old, and many are intermixed with deciduous tree and shrub species (although a few areas consist of solid strands of coniferous trees). Dominant species in the plantations include Scotch pine, Austrian pine, Norway spruce and red pine.

Freshwater Wetlands

Several areas of wetland occur on and adjacent to the ROW. All NYS regulated Freshwater Wetlands are listed in the Article VII Application (Section 4.3.4.2). Wetlands along the ROW include wet meadow, emergent marsh, scrub-shrub wetland, and forested wetland community

types. The various wetland community types found within the study area are described in general terms below:

Open water areas occur as small excavated ponds, lakes, reservoirs, rivers and streams. These water bodies range from small unnamed trout streams to the 3+ mile wide Hudson River estuary.

Herbaceous wetlands include wet meadows and shallow and deep emergent marshes. These areas are dominated by herbaceous species including cattail, sensitive fern, sedges, rushes, rice cutgrass, purple loosestrife, and common reed.

Scrub-shrub wetland is found on the Upstate Converter Circuit 1 site and elsewhere along the ROW. These areas are characterized low woody shrubs and occasional young trees/saplings. The dominant species in these areas include green ash, red-osier dogwood, and silky dogwood.

Forested wetland is found on the Upstate Converter Circuit 1 site and elsewhere along the ROW. This community is dominated by mature trees, with a lesser component of shrub and herbaceous species. As with the upland forested areas, the forested wetlands vary in species composition, age, and plant density. The dominant tree species include red maple, silver maple, green ash, pin oak and American elm. Species occurring in the sapling and shrub layer include red maple, green ash, American elm, spicebush, buckthorn, and highbush cranberry. Although most had died back at the time of the field review, common herbaceous species likely include jumpseed, false nettle, Joe pye-weed, jewelweed, ostrich fern, swamp buttercup, and sensitive fern.

Wildlife Survey

Wildlife Species

Twenty-one different wildlife species were observed during the field survey. However, a total of almost 250 species could occur within the study area based on existing data, species range and habitat conditions. A list of these species (common and scientific names), including those documented during the 2003 field survey, is presented in Appendix A.

Birds

New York State Breeding Bird Atlas (BBA) data for the transmission line/Thruway route was drawn from 69 separate sampling blocks. These blocks are each five (5) km^2 in size, and include substantial areas of land well outside the study area. BBA data is thus not completely representative of the breeding bird population found within and adjacent to the ROW. However, it does indicate that over 150 species nest in the general region (Anderle and Carroll, 1987 and

NYSDEC, Unpubl.). Field review during October 2003 documented the presence of 14 bird species. A list of all bird species documented by the BBA and observed in the field is included in Appendix A.

Bird species documented by the BBA include forest interior species (e.g. pileated wood pecker, scarlet tanager, wood thrush), grassland species (e.g. eastern meadowlark, savannah sparrow, bobolink), water birds (e.g. great blue heron, mallard, Canada goose), and brush/forest edge species (e.g. blue jay, gray catbird, yellow warbler). The vast majority of all species documented as occurring within or adjacent to the ROW are common forest edge, shrubland and open country bird species. Because of the timing and duration of the 2003 field survey, the observed species are primarily winter residents, plus a few fall migrants.

Several of the breeding and migrant/transient species known to occur in the area are currently considered rare in New York State, and are discussed below.

Mammals

Although birds have received the most documentation, mammals are also an important component of the area's wildlife population. However, little published or unpublished data was available concerning mammal occurrence within the study area. Approximately 40 mammal species are considered likely to occur in the area based on species range and habitat requirements. These include raccoon, eastern cottontail, red fox, beaver and whitetail deer. The actual occurrence of mammalian species within the study area was documented entirely through the October 2003 field survey, which included an assessment of habitat suitability. The survey indicated the likely occurrence of at least 15 mammal species within and adjacent to the ROW and upstate converter sites, of which six were observed during the 2003 field survey (see Appendix A). Observed species included whitetail deer, gray squirrel, meadow vole and eastern chipmunk. Because they are primarily nocturnal, migratory, and/or hibernating, bats were not identified during this survey. Relatively common bats such as eastern pipestrelle, little brown bat, big brown bat, red bat, hoary bat and silver-haired bat are all likely to occur in the area at some time. Similarly, widely distributed species of mice, moles and shrews, along with flying squirrels and weasels, also probably occur within the study area, although not documented in this survey.

No rare or unusual mammal species were observed, and based on existing habitat conditions, are considered unlikely to occur at the Upstate Converter sites or along the transmission line/Thruway route.

Reptiles and Amphibians

Other than the NYS Herp Atlas database, no data were available concerning herpetofauna. Herp Atlas data indicated that there are probably at least 45 species of reptiles and amphibians that occur within the area, of which only one was identified during the 2003 field survey (see Appendix A). Common species of reptile and amphibian in the area likely include bull frog, green frog, American toad, red-backed salamander and northern leopard frog. Typically common, easily observable species such as spring peeper, snapping turtle, and northern water snake were not observed during this survey despite fairly through searching. This is probably due to the timing and duration of the survey, and should not be taken to mean that the species are absent.

Several state-listed threatened and special concern species have been documented as occurring in the general area. These species are described in the Threatened and Endangered Species section of this report.

Fish

No existing fisheries or fish survey data were reviewed and no field sampling of water bodies along the ROW was conducted. However, based on the physical characteristics of the lakes, rivers and streams on or adjacent to the ROW, the fish species that reside there likely include cold water species (e.g. brook trout, brown trout, slimy sculpin), warm water species (e.g. largemouth bass, smallmouth bass, sunfish) and saltwater/estuarine species (e.g. American shad, striped bass, banded killifish).

Wildlife Habitat

A basic principle of wildlife ecology is that the distribution and abundance of any wildlife species is directly dependent upon the quality and quantity of available habitat. Habitat is defined as the sum total of environmental factors (including food, cover, and water) that a given species of animal needs to survive and reproduce in a given area (Trefethen 1964). The ROW is dominated by mowed grass, however, the surrounding area includes significant areas of early successional habitat (old field/shrubland), wetlands, and areas of mature deciduous forest. Each of these habitat types has particular elements that make it valuable to different species of wildlife. These habitat elements will be reviewed in the following section.

Old Field Habitat

Old field habitat, including the mowed grass areas within the ROW is the dominant habitat within the study area and the one that will receive the most impact from project construction. Outside of the Thruway ROW, these areas are typically former agricultural fields. Some of this habitat is characterized by grass-dominated fields, while other areas are dominated by broad leaved herbaceous species. Open grassland is becoming increasingly rare in New York State. Changes in land use and agricultural practices, as well as natural succession, continue to reduce this habitat type across the state. Large unmowed fields of grass and low herbaceous vegetation are essential habitat for open country bird species such as meadowlark, bobolink, killdeer, horned lark and several species of sparrow (vesper, savannah, and grasshopper). Open fields provide food (seeds) and nestling cover for many of these species. These open areas also harbor abundant insect populations. They therefore represent important foraging sites for many breeding birds. Isolated trees (alive and dead) and hedgerows in these areas provide singing and foraging perches for various songbirds and raptors. Old fields also provide habitat for eastern cottontail, woodchuck and numerous species of small mammal. These species provide a prey base for predators such as hawks, owls, fox and coyote. The old field/mowed grass areas within the ROW are limited in value to many of these species due to their small size and the disturbance created by ongoing ROW maintenance (mowing) and adjacent vehicle traffic.

Hedgerow/Shrub Habitat

Many areas outside of the maintained ROW, as well as significant portions of the Upstate Converter sites, are shrub-dominated communities. This habitat type is perhaps the most common, abundant land use in the state (NYSDEC 1989). However, it is ephemeral (10-20 years in duration), representing an intermediate successional stage between old field and deciduous forest. Certain bird species, such as cuckoos, gray catbird, brown thrasher, eastern kingbird, American goldfinch, indigo bunting, common yellowthroat and blue-winged warbler, specifically require low bushy vegetation for nesting and escape cover. Shrub species such as high bush cranberry, gray dogwood, wild grape, honeysuckle, sumac, brambles, hawthorn, and apple, are common in these areas. These shrubs produce fruit that are highly palatable to mammals such as raccoon, skunk and opossum, and birds such as robin, flicker, cardinal, blue jay, cedar waxwing and ruffed grouse. The fruits also attract insects, which in turn provide food for a variety of insectivorous birds that reside in or migrate through the area (e.g. flycatchers, vireos and wood warblers). Successional shrubland also provide food and cover for mammals such as whitetail deer, red fox and eastern cottontail. Hedgerows, along with providing food and

cover, provide singing and foraging perches for songbirds and raptors, and travel corridors for deer and other larger mammals.

Deciduous Forest Habitat

The most common habitat type adjacent to the ROW, and a significant portion of the Upstate Converter Circuit 1 site, is deciduous forest. As mentioned previously, forested areas are variable in terms of species composition, canopy coverage and structural complexity. Many of the mature forested areas within the study area contain habitat elements that make them attractive to a variety of wildlife species. They include tree species that are important sources of food for wildlife, such as oaks, hickories, black cherry, and beech. These trees produce large quantities of nuts and berries which are eaten by squirrels, deer, wild turkey, songbirds and small mammals.

Another important feature of the mature forested areas on the Upstate Converter Circuit 1 site and in some areas adjacent to the ROW is the general abundance of deadwood. Dead trees, branches and logs all provide food and cover for various wildlife species. Standing deadwood is essential to some species, while other require deadwood that has fallen to the ground. The main function of fallen deadwood is to provide cover and a site for feeding and reproduction. Standing deadwood (trees and branches) provides foraging sites of insectivorous birds such as woodpeckers, nuthatches, brown creeper and black-and-white warbler. In addition, numerous birds nest and/or roost in dead or deteriorating trees. Mammals such as gray squirrel, flying squirrel and raccoon also use tree cavities for shelter and reproduction (utilizing both live and dead trees), while migratory bats are known to roost under loose bark.

Many of the forested areas within the study area display high foliage height diversity and structural complexity, characteristics typically associated with high bird species diversity (MacArthur et. al. 1966). The contiguous forest canopy found in certain areas along the central portion of the ROW is important in attracting migrating songbirds to these areas, and provides habitat for woodland bird species. The size of the forested areas, particularly in the Catskill region, is also important. Larger size provides solitude and protection from predators and nest parasitism by cowbirds (a species typical of forest edges). Large forested areas are thus suitable for forest interior species such as scarlet tanager, rose-breasted grosbeak, wood thrush, veery, red-eyed vireo, ovenbird, Canada warbler and black-and-white warbler. However, nowhere along the ROW do forest interior conditions exist. The entire route is exclusively forest edge due to the presence of the cleared Thruway ROW.

Mixed Forest Habitat

Occurring primarily in the central and southern portions of the study area are forests with a mix of deciduous trees and conifers (primarily white pine, eastern hemlock and red cedar). The study area also includes some small blocks of planted conifers. Habitats with at least sprinkling of conifers are preferred by many bird species (e.g. solitary vireo, mourning dove, red-breasted nuthatch, hermit thrush, golden-crowned kinglet, red crossbill, cedar waxwing and purple finch). Conifers provide food and/or nesting, escape and winter cover for these species. A mixed stand of conifers and deciduous trees will generally carry a greater diversity of forest-dwelling songbirds than a pure stand of either type alone (Hassinger et al. 1979). Conifers provide important thermal (winter) and escape cover for deer and provide a primary food source (seeds) for red squirrels. Large blocks of conifers that lack understory vegetation generally are limited in terms of their wildlife habitat value. However, smaller irregularly shaped patches of conifers located near brushy areas or herbaceous openings provide the most effective cover for a wide variety of species.

Water/Wetland Habitat

Water is one of the habitat elements all wildlife species require, and is important for a number of reasons. Along with being used for drinking and bathing, water bodies also provide food for numerous wildlife species. Open water within the study area occurs in the form of small ponds, rivers and streams. These areas provide habitat for waterfowl, wading birds, turtles and frogs. They also support populations of fish, frogs, insects and other invertebrates, which are the basic food items of many species of songbirds, wading birds, and bats. Major water bodies within the study area include the Hudson River, Catskill Creek, Esopus Creek, Rondout Creek, Wallkill River, Orange Lake, Chadwick Lake, Moodna Creek, Ramapo River, Mahwah River and DeForest Lake. These water features provide habitat for a variety of fish as well as aquatic and terrestrial wildlife species.

Wetlands and riparian zones are used by wildlife disproportionately more than other types of habitat. Wetlands that are dominated by trees and shrubs typically include varying amounts of standing and fallen dogwood. Standing deadwood provides important singing perches for breeding songbirds and foraging perches for aerial insectivores such as eastern kingbird, phoebe and swallows. It also provides a nesting substrate and foraging area for woodpeckers, wood duck and other cavity nesters. Thick wetland shrubs provide cover, perches, and feeding sites for numerous birds, including herons, flycatchers and red-winged blackbird.

Disturbed Habitat

The remaining habitat areas within the study area are referred to as disturbed. These areas are characterized by houses, commercial and industrial structures, paved parking areas, and roads, intermixed with regularly mowed grass and occasional trees and shrubs. These areas are all subject to disturbance from fairly intensive human activity. Mowed lawn and landscaped areas within disturbed/developed areas are used for foraging by certain birds (robin, startling, flicker, Canada goose) and mammals (eastern cottontail, voles, etc.) However, the habitat value of these areas is generally limited due to a lack of adequate cover and fairly intense human disturbance. These areas typically receive irregular use by a limited number of wildlife species. Although the ROW more closely resembles old field habitat in most places, it also includes many of the features typical of disturbed habitat, including the presence of built features and intense human activity (i.e. vehicular traffic).

Threatened and Endangered Species

The NYS Breeding Bird Atlas, the NYS Herp Atlas and observations of habitat conditions along the corridor indicate that up to 28 species listed as endangered, threatened or special concern in New York State could occur in the area. These species include 19 birds, two mammals, and seven reptiles and amphibians. These species are listed in Table 2, below:

Table 2
Listed Endangered, Threatened and Special Concern Wildlife Species

Species	NYS Listing[1]	Federal Listing
Birds		
Common Nighthawk	SC	-
Northern Harrier	T	-
Sharp-shinned Hawk	SC	-
Northern Goshawk	SC	-
Whip-poor-will	SC	-
Vesper Sparrow	SC	-
Red-shouldered Hawk	SC	-
Cooper's Hawk	SC	-
Bald Eagle	T	T
Peregrine Falcon	E	-
Osprey	SC	-
Red-headed Woodpecker	SC	-
Least Bittern	T	-
American Bittern	SC	-
Grasshopper Sparrow	SC	-
Pied-billed Grebe	T	-
Upland Sandpiper	T	-

Species	NYS Listing[1]	Federal Listing
Horned Lark	SC	-
Golden-winged Warbler	SC	-
Mammals		
Allegheny Wood Rat[2]	E	-
Indiana Bat	E	E
Reptiles and Amphibians		-
Timber Rattlesnake	T	-
Jefferson's Salamander	SC	-
Blue-spotted Salamander	SC	-
Marbled Salamander	SC	-
Spotted Turtle	SC	-
Eastern Box Turtle	SC	-
Eastern Hognose Snake	SC	-

[1]E = endangered, T = threatened, SC = special concern
[2]Believed to be extirpated from New York State

The species listed in this table inhabit a wide range of habitats, from grassland to forest to open water. Although the project corridor may pass in proximity to such habitat, the disturbed/early successional habitat that dominates the ROW and converter sites represents potential habitat for few of these species. The golden-winged warbler could utilize shrub-dominated communities such as those that occur on the Upstate Converter Circuit 2 site. The forested wetlands on the Upstate Converter Circuit 1 site are suitable as seasonal breeding habitat for Jefferson's and blue-spotted salamander but their presence on the site has not been documented. In addition, peregrine falcons have been reported as nesting on the Tappan Zee Bridge (NYSDEC, Unpubl.). None of the other species listed in above table are considered likely to occur within the project area due to a lack of suitable habitat and/or the presence of intensive human/vehicular activity.

POTENTIAL IMPACTS

Siting of the project on and adjacent to the NYS Thruway ROW will limit any adverse temporary and permanent impacts to vegetation and wildlife. The ROW itself is primarily a disturbed community that is dominated by common herbaceous plant species and receives use by a limited number of common wildlife species. Most of the potential impacts to ecological resources are associated with construction of the project.

Construction Impacts

Construction impacts associated with the project include both permanent loss and temporary disturbance of plant communities, wildlife species and wildlife habitat at the converter sites and along the ROW.

Impacts to Vegetation

Construction of the Empire Connection will result in temporary disturbance to the mowed grass community and open water/herbaceous wetland communities that occur within the Thruway ROW. In overhead portions of the line, these impacts will be limited, as wetland and open water areas will generally be spanned. In both the overhead and buried portions of the line, these impacts will be temporary because the communities that currently exist there will be reestablished at the completion of construction. In places where the existing cleared ROW is too narrow to accommodate the line there could also be some clearing of adjacent communities (e.g., forest, forested wetland) to accommodate construction. This will represent a permanent change to these community types.

The most significant construction-related impacts will occur at the converter sites. Development of the project will result in permanent conversion of approximately 7 acres of successional shrubland and 2.5 acres of deciduous forest to built facilities at the Upstate Converter Circuit 2 site. Approximately 3 acres of deciduous forest, 2 acres of forested wetland, 3 acres of successional old filed/shrubland, and 0.5 acre of disturbed/developed habitat will be lost at the Upstate Converter Circuit 1 site.

Impacts to Wildlife

Construction of the project could have the following impacts on wildlife:

- Direct loss of wildlife through incidental injury or mortality.
- Temporary disturbance of old field/mowed grass habitat on the transmission line ROW.
- Permanent conversion of small areas of forested habitat (wetland and upland) along the ROW to herbaceous/early successional habitat.
- Permanent loss of habitat through conversion of natural plant communities to built facilities.

However, because of the location of the Project, impacts to wildlife and habitat along the transmission line ROW will be very minor, and for the most part, temporary. Species that utilize this area, such as meadow vole, red-tailed hawk and whitetail deer are all common species in New York State. Most are highly mobile and will avoid injury or mortality by vacating the area during construction. Because the early successional habitat that currently exists on the ROW will be restored following construction, these species are also anticipated to return once construction of the project is complete. Any conversion of forest to early successional habitat along the ROW is anticipated to be minor and should have little impact on forest wildlife as the affected areas already represent edge habitat.

Impacts to wildlife will be somewhat significant at the Converter sites. Field surveys and habitat conditions suggest that the most common wildlife species found in the areas for Converter construction include whitetail deer, gray squirrel, wild turkey, and various birds, small mammals, and amphibians. Most of these species will be affected to some extent by the loss of habitat on these sites. There could be some loss of nesting birds and/or small, less mobile species (small mammals, salamanders, frogs, etc.). These losses will result from clearing and earth-moving activities on the sites. In addition, approximately 10 acres of successional shrub habitat, 5.5 acres of deciduous forest, 0.5 acre of disturbed habitat and 2 acres of wetland habitat will be permanently lost through the conversion of these sites to built facilities. However, the area of impact (total = 18 acres) is relatively small and the affected species and habitat are common. In addition, the Project will disturb or eliminate only a small portion of the home range of various large and mid-sized mammals (e.g., whitetail deer, coyote, raccoon). These species will therefore shift their ranges and in all likelihood will continue to use adjacent undeveloped areas.

Other wildlife impacts typically associated with development projects, such as large-scale habitat conversion or loss, increased human/vehicular disturbance and forest fragmentation, will be minor or non-existent on this Project. This is due to the location of the facilities on or adjacent to the NYS Thruway ROW. This is already a disturbed community that receives limited use from a relatively small number of common wildlife species.

Impacts to Fish

Impacts to fish could occur in areas where the transmission line crosses rivers and streams that traverse the NYS Thruway ROW. Stream crossing impacts typically include filling, temporary dewatering, downstream siltation and/or bank erosion, all of which can directly affect fish survival, spawning success and aquatic habitat value. However, the overhead line will likely

span streams and rivers, and the buried line will typically utilize bridge attachments, or boring. Impacts to fish and aquatic habitat are not anticipated to be significant.

Impacts on Threatened and Endangered Species

None of the listed forest bird species documented in the area by the BBA are likely to be affected by the Project, as impacts to forest habitat will be minimal. Consequently, species such as red-shouldered hawk, northern goshawk, Cooper's hawk, whip-poor-will and red-headed woodpecker are not anticipated. Listed species that utilize grassland habitat are also not likely to be impacted by the project. The area of grassland being affected is a narrow corridor adjacent to intense human activity. It therefore is unlikely to receive significant use from grassland-dependent species such as northern harrier, vesper sparrow, horned lark, grasshopper sparrow or upland sandpiper. Even if such species did use the existing grass ROW, impacts will be limited to temporary habitat disturbance during construction. Bird species that are typically associated with large waterbodies and wetlands, such as bald eagle, osprey, American bittern, least bittern and pied-billed grebe, should also not be affected, as such waterbodies will generally not be impacted by construction of the project.

The only listed bird species that could possibly be impacted by the project are golden-winged warbler, which utilizes shrub-dominated habitat similar that found in places along the ROW and on the Upstate Converter Circuit 2 site, and the peregrine falcon, which in some years has nested on the Tappen Zee Bridge. In the case of the former, current BBA data does not indicate nesting by golden-winged warbler in the area of the Upstate Converter Circuit 2 or within BBA blocks along the majority of the ROW. Thus, significant impacts to this species are not anticipated. In the case of peregrine falcon, impacts would be associated with temporary disturbance of nesting falcons during installation of the transmission line cable on the bridge structure. The project should not alter the suitability of the bridge as nesting habitat over the long term. If nesting peregrines are utilizing the bridge, various mitigation measures can be used to avoid or minimize potential impacts (see Mitigation discussion).

A bat cave that could provide a hibernacula for Indiana bats occurs within a mile of the Thruway in Ulster County. However, this cave is well off the ROW and will not be disturbed by construction activities.

Impacts to listed reptiles and amphibians are limit to potential loss of breeding habitat for blue-spotted and Jefferson's salamander at the Upstate Converter Circuit 1 site. The forested wetlands on this site, in association with adjacent forested upland habitat, suggest that this site

could be used by these species. Other listed reptile and amphibian species documented along the ROW corridor (e.g. timber rattlesnake, spotted turtle, eastern box turtle) are not likely to be impacted due to a lack of suitable habitat within the ROW and/or the temporary nature of any disturbance the ROW will receive.

Unless responses from the USFWS and the NYSDEC indicate the possible occurrence of other listed species, beyond those identified in this report, potential significant impacts to threatened and endangered species are not considered likely.

Operational Impacts

Operational impacts of the project on ecological resources are anticipated to be minor. The transmission line ROW (both buried and above-ground) will be maintained in grass and/or early successional vegetation through periodic mowing. With only a few possible exceptions, this community currently exists on the ROW and is already being maintained through mowing. At the converter sites operational impacts on wildlife could include disturbance from noise and human activity, occasional mortality of small mammals, reptiles and amphibians from vehicular traffic, possible water quality impacts from site run-off and possible songbird mortality resulting from collision with taller built components of the converters. Collision mortality is not expected to be a significant impact. Most serious collision events documented in the literature have involved structures more than 500 feet in height. The relatively low height of the structures (maximum 125 feet) place them will below the height of most songbird migration. In addition, there will be no aviation warning lights or flood lighting of the equipment, and ground-level lighting that may emanate up from the facility will be limited. Therefore, collision with the project's built facilities is not anticipated to be a significant source of songbird mortality. The overhead conductors on the transmission line should be easily visible to, and avoidable by, foraging raptors. Collision or electrocution impact to raptors are therefore not expected to be significant. Any human/vehicular activity and noise associated with operation and maintenance of the facilities will be insignificant relative to the existing level of disturbance associated with the adjacent NYS Thruway.

PROPOSED MITIGATION

Impacts to ecological resources have already been reduced by siting the facilities on or adjacent to the existing NYS Thruway ROW. This ROW is an already disturbed community dominated by common early successional vegetation. Both the plant communities and the wildlife species that use this area as habitat will be reestablished following construction. To further avoid,

minimize and mitigate potential impacts on ecological resources, the following actions should be undertaken:

- Additional evaluation of threatened and endangered species occurrence, if necessary, based on responses from the USFWS and NYSDEC.

- Wetland delineations along the ROW and on the Upstate Converter sites to determine the extent of wetland occurrence on these sites. Once the extent of wetland on these sites is determined, exploration of opportunities for avoidance and minimization of wetland impacts.

- Develop and implement an erosion and sediment control plan to minimize impacts to water resources and adjacent undisturbed habitat during construction.

- Utilize boring, directional drilling or bridge attachments for buried cable crossings of wetlands and streams to avoid impacts to fish and aquatic habitat.

- If open trenching of wetlands is required, limit the width of disturbance to the minimum necessary to install the buried line. Segregate wetland topsoil for final backfill, and reestablish original wetland contours at the completion of construction.

- If open trenching is required to cross streams, utilize temporary diversion or pumping to allow all work to occur "in the dry". Such actions should be in accordance with state and federal permit requirements, and may include seasonal restrictions if fish spawning is a concern. Upon completion of the installation, stream bed and bank contours should be stabilized and restored to their preconstuction condition.

- Any unavoidable loss of regulated wetlands associated with the development of the converters should be mitigated in accordance with applicable state and federal requirements.

- Enclose construction areas with silt fence or other impassible barrier to keep reptiles, amphibians and small mammals from entering these sites.

- Implement a Spill Prevention Control and Countermeasure (SPCC) Plan to minimize the potential for the release of toxic chemicals to the environment (both during construction and operation) of the Project.

- Maintenance of the transmission line ROW should be in accordance with approved ROW management plans, and to the extent possible, be designed to protect wetland and water bodies from disturbance and maintain a diversity of wildlife food and cover on the ROW.

- Lighting at the converter sites kept to a minimum to avoid potential bird collision impacts. Task lighting or motion detectors utilized to reduce unnecessary lighting.

- If it is determined that peregrine falcons are nesting on the Tappen Zee Bridge, bridge attachment should be reviewed to avoid or minimize potential impact to falcons during the nesting season.

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APPENDIX A

Vegetation and Wildlife Lists

PLANT SPECIES LIST - Empire Connection Project

*Acer negundo**	Boxelder
*Acer pennsylvanica**	Striped maple
*Acer platanoides**	Norway maple
*Acer rubrum**	Red maple
*Acer saccarinum**	Silver maple
*Acer saccharum**	Sugar maple
Achillea millefolium	Yarrow
Acorus calamus	Sweetflag
Actaea alba	Doll's eyes
Actaea rubra	Red baneberry
Adiantum pedatum	Maidenhair fern
Agrimonia gryposepala	Agrimony
Agropyron repens	Quackgrass
Agrostis alba	Redtop
*Ailanthus altissima**	Tree-of-Heaven
Ajuga spp.	Ajuga
Alisma plantago-aquatica	Water-plantain
*Alliaria petiolata**	Garlic mustard
Allium canadense	Wild garlic
Alnus rugosa	Speckled alder
Amaranthus retroflexus	Pigweed
*Ambrosia artemisiifolia**	Ragweed
Amelanchier arborea	Downy serviceberry
Amelanchier canadensis	Shadbush
Amphicarpaea bracteata	Hog peanut
Andropogon gerardii	big bluestem
Anemone cylindrica	Thimbleweed
Angelica atropurpurea	Purple-stem angelica
Apocynum cannabinum	Indian hemp
Arabis glabra	Tower mustard
Aralia nudicaulis	Wild sarsaparilla
*Arctium minus**	Common burdock
Arisaema triphyllum	Jack-in-the-pulpit
Asarum canadense	Wild ginger
Asclepias incarnata	Swamp milkweed
*Asclepias syriaca**	Common milkweed
Asplenium platyneuron	Ebony Spleenwort
Aster divaricatus	White wood aster
Aster dumosus	Bushy aster
*Aster ericoides**	Heath aster
Aster lanceolatus	Tall white aster
Aster lateriflorus	Calico aster
*Aster novae-angliae**	New England aster
Aster novae-belgii	New York aster
Aster prenanthoides	Crooked-stem aster
Aster umbellatus	Flat-top white aster
*Aster vimineus**	Small white aster

PLANT SPECIES LIST - Empire Connection Project

Athryium filix-femina	Lady-fern
*Berberis thunbergii**	Japanese barberry
Berberis vulgaris	Barberry
*Betula alleghaniensis**	Yellow birch
*Betula lenta**	Sweet birch
*Betula papyrifera**	Paper birch
*Betula populifolia**	Gray birch
Bidens spp.	Beggar's-tick
Boehmeria cylindrica	False nettle
*Brassica rapa**	Field mustard
Bromus inermis	Smooth brome
Calamagrostis canadensis	Bluejoint grass
Caltha palustris	Marsh marigold
Calystegia sepium	Hedge-bindweed
Cardamine concatenata	Cut-leaf toothwort
Cardamine diphylla	Two-leaved toothwort
Carex bromoides	Sedge
Carex crinita	Sedge
Carex interior	Sedge
Carex lacustris	Lake sedge
Carex lurida	Sedge
Carex pennsylvanica	Pennsylvania sedge
Carex scopiaria	Sedge
*Carex spp.**	Sedge
Carex stricta	Sedge
Carex tribuloides	Sedge
Carex vulpinoidea	Sedge
*Carpinus caroliniana**	Ironwood
Carya cordiformis	Bitternut hickory
Carya glabira	Pignut
*Carya ovata**	Shagbark hickory
Catalpa ovata	Chinese catalpa
Caulophyllum thalictroides	Blue cohosh
Celastrus orbicalatus	Oriental bittersweet
*Celastrus scandens**	Bittersweet
Centaurea maculosa	Spotted knapweed
Chamaedaphne calyculata	Leather leaf
Chelidonium majus	Celandine
Chelone glabra	White turtlehead
Chenopodium album	Lamb's quarters
Chichorium intybus	Chickory
Chrysanthemum leucanthemum	Oxeye daisy
Circaea quadrisulcata	Enchanter's nightshade
Circium arvense	Canada thistle
*Cirsium discolor**	Field thistle
*Cirsium vulgare**	Bull-thistle
Clematis virginiana	Virgin's-bower
Comptonia peregrina	Sweet fern

PLANT SPECIES LIST - Empire Connection Project

Convallaria majalis	Lily-of-the-valley
Cornus americana	hazelnut
*Cornus amomum**	Silky dogwood
Cornus canadensis	Bunchberry
Cornus cornuta	hazelnut
Cornus florida	Flowering dogwood
*Cornus foemina**	Gray dogwood
Cornus sericea	dogwood
*Cornus stolonifera**	Redosier dogwood
*Coronilla varia**	Crown vetch
Corylus americana	Hazelnut
Corylus cornuta	Beaked filbert
*Crataegus spp.**	Hawthorn
Cynanchum nigrum	Black Swallow wort
Cynoglossum officinale	Hound's-tongue
*Dactylis glomerata**	Orchard grass
*Daucus carota**	Queen Anne's lace
Dianthus armeria	Deptford pink
*Dipsacus sylvestris**	Teasel
*Dryopteris spp.**	Wood fern
Dulichium arundinaceum	Three-way sedge
Echinocystis lobata	Wild cucumber
Epifagus virginiana	Beech-drops
Epilobium spp.	Willow-herb
*Equisetum arvense**	Field horsetail
Erigeron philadelphicus	Daisy fleabane
Erigeron pulchellus	Robin plantain
Erysimum cheiranthoides	Wormseed mustard
Erythronium americanum	Yellow troutlily
*Eupatorium maculatum**	Joe pye-weed
*Eupatorium perfoliatum**	Boneset
Eupatorium rugosum	White snakeroot
Euphorbia esula	Leafy spurge
*Euthamia graminifolia**	Flat-top goldenrod
*Fagus grandifolia**	American beech
*Fragaria virginiana**	Wild strawberry
*Fraxinus americana**	White ash
Fraxinus nigra	Black ash
*Fraxinus pennsylvanica**	Green ash
Galeopsis tetrahit	Hemp nettle
Galium spp.	Bedstraw
Gaylussacia baccata	Huckleberry
Geranium maculatum	Wild geranium
Geranium robertianum	Herb robert
Geum canadense	Avens
Glechoma hederacea	Ground ivy
Glyceria melicaria	Slender mannagrass
Hamamelis virginiana	Witch-hazel

PLANT SPECIES LIST - Empire Connection Project

Hedera helix	English ivy
Helianthus species	Sunflower
Helianthus tuberosus	Jerusalem artichoke
Hepatica nobilis	Hepatica
Heracleum lahatum	Cow parsnip
Hesperis matronalis	Dame's rocket
Hieracium pilosella	Mouse-ear hawkweed
Hydrophyllum virginianum	Virginia waterleaf
Hypericum mutilum	Dwarf St. Johnswort
Hypericum perforatum	St. John's-wort
Ilex verticillata	Winterberry
*Impatiens capensis**	Spotted jewelweed
Iris pseadoacorus	Yellow iris
Iris versicolor	Blue-flag iris
*Juglans nigra**	Black walnut
Juglans cinera	Butternut
*Juncus effusus**	Soft rush
Juncus tenuis	Slender rush
Juniperis spp.	Juniper
*Juniperus virginiana**	Eastern red cedar
*Kalmia latifolia**	Mountain laurel
Lamium amplexicaule	Henbit
*Leersia oryzoides**	Rice cutgrass
Lespedeza capitata	bush clover
Lespedeza hirta	bush clover
Lespedeza procumbens	bush clover
Ligustrum spp.	Privet
Linaria vulgaris	Butter-and-eggs
*Lindera benzoin**	Spicebush
*Liriodendron tulipifera**	Tuliptree
Lobelia inflata	Indian-tobacco
Lonicera japonica	Japanese honeysuckle
*Lonicera spp.**	Bush honeysuckles
Lonicera tatarica	Tartarian honeysuckle
Lotus corniculata	Bird's-foot trefoil
Lupinus perennis	Blue lupine
*Lycopodium spp.**	Clubmoss/groundpine
Lycopus americana	Water-horehounds
Lycopus uniflorus	Oneflower bugleweed
Lysimachia nummularia	Moneywort
Lysimachia terrestris	loosestrife
Lysimachia thrysiflora	loosestrife
*Lythrum salicaria**	Purple loosestrife
Maianthemum canadensis	Wild lily-of-the-valley
*Malus spp.**	Apple
Malaxis bayardii	Bayard's malaxis
Matteuccia struthiopteris	Ostrich fern
*Medicago sativa**	Alfalfa

PLANT SPECIES LIST - Empire Connection Project

Melilotus alba	White sweet clover
Melilotus offinalis	Yellow sweet clover
Mentha spicata	Spearmint
Monarda fistulosa	Wild bergamot
Morus spp.	Mulberry
Myosotis laxa	Forget-me-nots
Nasturtium officinale	Watercress
Nemophanthus mucronatus	Mountain holly
Nuphar luteum	Pond lily
Nymphaea odorata	Water lily
*Oenothera biennis**	Common evening primrose
*Onoclea sensibilis**	Sensitive fern
*Osmunda cinnamomea**	Cinnamon fern
Osmunda regalis	Royal fern
Ostrya virginiana	Hop hornbeam
Oxalis spp.	Yellow sorrel
*Parthenocisus quinquefolia**	Virginiana creeper
Pastinaca sativa	Wild parsnip
Penstamon digitalis	Beard tongue
*Phalaris arundinacea**	Reed canary grass
*Phleum pratense**	Timothy
*Phragmites australis**	Common reed
Phytolacca americana	Pokeweed
*Picea abies**	Norway spruce
Picea glauca	White spruce
Picea pungens	Colorado blue spruce
Pilea pumila	Clear weed
Pinus nigra	Austrian pine
*Pinus resinosa**	Red pine
*Pinus rigida**	Pitch Pine
*Pinus strobus**	White pine
Pinus sylvestris	Scotch pine
*Plantago lanceolata**	English plantain
*Plantago major**	Common plantain
Platanus occidentalis	Sycamore
Poa paludigina	
Poa palustris	Fowl bluegrass
Poa pratensis	Kentucky bluegrass
Poaceae	Grasses
*Podophyllum peltatum**	Mayapple
Polygonum cuspidatum	Japanese knotweed
Polygonum pennsylvanicum	Pennsylvania smartweed, Pinkweed
Polygonum persicaria	Lady's thumb
Polygonum sagittatum	Tearthumb
Polygonum virginianum	Jumpseed
Polypodium virginianum	Common polypody
Polystichum acrostichoides	Christmas fern
Populus balsamifera	Balsam poplar

PLANT SPECIES LIST - Empire Connection Project

*Populus deltoides**	Eastern cottonwood
Populus grandidentata	Bigtooth aspen
Populus tremuloides	Trembling aspen
*Potentilla simplex**	Old-field cinquefoil
Prunella vulgaris	Heal-all
Prunus pensylvanica	Pin cherry
*Prunus serotina**	Black cherry
*Prunus virginiana**	Choke cherry
Pteridium aquilinum	Bracken fern
Pyrus communis	Pear
*Quercus alba**	White oak
Quercus bicolor	Swamp white oak
Quercus coccinea	Scarlet oak
Quercus illicifolia	Scrub Oak
*Quercus palustris**	Pin oak
Quercus prinoids	Scrub Oak
*Quercus rubra**	Northern red oak
*Quercus velutina**	Black oak
Ranunculus acris	Tall buttercup
Ranunculus hispidus	Swamp buttercup
Ranunculus trichophyllus	White water buttercup
*Rhamnus cathartica**	Common buckthorn
*Rhus typhina**	Staghorn sumac
Ribes spp.	Gooseberry
*Robinia pseudo-acacia**	Black locust
Rosa eglanteria	Sweet briar
*Rosa multiflora**	Multiflora rose
Rubus allegheniensis	Allegheny blackberry
*Rubus alumnus**	Blackberry
Rubus flagellarus	Dewberry
*Rubus idaeus**	Red raspberry
*Rubus occidentalis**	Black raspberry
Rubus odoratus	Pink thimbleberry
Rubus pubescens	Dwarfed blackberry
Rudbeckia hirta	Black-eyed susan
Rumex crispus	Curly dock
Sagittaria latifolia	Common arrowhead
Salix babylonica	Weeping willow
Salix bebbiana	Bebb willow
*Salix nigra**	Black willow
*Salix species**	Willow
Sambucus canadensis	Common elder
Sanguinaria canadensis	Bloodroot
Sassafras albidum	Sassafras
Schyizachyrium scoparium	little bluestem
*Scirpus atrovirens**	Green bulrush
*Scirpus cyperinus**	Wool grass
Scirpus tabernaemontanii	bulrush

PLANT SPECIES LIST - Empire Connection Project

Scirpus validus	Soft-stemmed bulrush
*Secale spp.**	Perennial rye
Senecio aureus	Golden ragwort
Setaria spp.	Foxtail
Sisyrinchium montanum	Blue-eyed grass
Smilacina racemosa	False Solomon's seal
Solanum carolinense	Horse nettle
Solanum dulcamera	Bittersweet nightshade
Solidago altissima	Tall goldenrod
*Solidago canadensis**	Canada goldenrod
Solidago flexicaulis	Zigzag goldenrod
*Solidago gigantea**	Late goldenrod
Solidago juncea	Early goldenrod
Solidago rugosa	Wrinkled (rough-stemmed) goldenrod
Sorghastrum nutans	Indian grass
Sparganium americanum	Bur-reed
*Sphagnum fallax**	Sphaguum moss
Spiraea alba	Meadowsweet
Spiraea latifolia	Meadowsweet
Staphylea trifolia	American Bladdernut
Symplocarpus foetidus	Skunk cabbage
Syringa spp.	Lilac
*Taraxacum officinale**	Dandelion
Taxus spp.	Yew
Thalictrum polygamum	Tall meadowrue
Tiarella cordifolia	Foamflower
Tilia americana	Basswood
*Toxicodendron radicans**	Poison ivy
Trientalis borealis	Star flower
Trifolium aureum	Palmate hop-clover
*Trifolium pratense**	Red clover
*Trifolium repens**	White clover
Trillium erectum	Red trillium
Trillium grandiflorum	White trillium
Trillium underlatum	painted trillium
*Tsuga canadensis**	Hemlock
Tussilago farfara	Coltsfoot
*Typha angustifolia**	Narrow-leaf cattail
*Typha latifolia**	Broad-leaf cattail
*Ulmus americana**	American elm
Urtica doica	Stinging nettle
Urtica gracilis	Slender nettle
*Vaccinium angustifolium**	Lowbush blueberry
Vaccinium corymbosum	Highbush blueberry
Vaccinium pallidum	Blueberry
*Verbascum thapsus**	Mullein
*Verbena hastata**	Blue vervain
Verbena urticifolia	White vervain

PLANT SPECIES LIST - Empire Connection Project

*Viburnum acerifolium**	Mapleleaf viburnum
Viburnum cassanoides	Wild raisin
Viburnum lentago	Nannyberry
*Viburnum recognitum**	Arrowwood
Vicia angustifolia	Narrow-leaved vetch
Vicia cracca	Cow vetch
*Vicia sativa**	Common vetch
Vinca minor	Myrtle
Viola sororia	Marsh blue violet
*Vitis aestivalis**	Wild grape
Vitis riparia	Riverbank grape
Zanthoxylem americanum	Prickly ash
*Zea mays**	Corn
Zizania aquatica	Wild rice
Zizia aurea	Golden alexanders

*Observed during 2003 Field Survey

WILDLIFE SPECIES LIST - Empire Connection Project

Bird Species

Grebes	***Pedicipedidae***
pied-billed grebe	*Podilymbus podiceps*
Herons, Bitterns	***Ardeidae***
great blue heron	*Ardea herodias*
green heron (green-backed)	*Butorides striatus*
American bittern	*Botaurus lentiginosus*
black-crowned night heron	*Nycticorax nycticorax*
great egret	*Ardea alba*
least bitten	*Ixobrychus exilis*
double crested cormorant	*Phalacrocorax auritus*
Waterfowl	***Anatidae***
Canada goose	*Branta canadensis*
mallard	*Anas platyrhynchos*
American black duck	*Anas rubripes*
blue-winged teal	*Anas discors*
wood duck*	*Aix sponsa*
common merganser	*Mergus merganser*
American Vultures	***Cathartidae***
turkey vulture	*Cathartes aura*
black vulture	*Coragyps atratus*
Hawks	***Accipitridae***
Bald eagle	*Haliaeetus leucocephalus*
osprey	*Pandion haliaetus*
sharp-shinned hawk	*Accipiter striatus*
Cooper's hawk	*Accipiter cooperii*
red-tailed hawk*	*Buteo jamaicensis*
American kestrel	*Falco sparverius*
northern harrier	*Circus cyaneus*
northern goshawk	*Accipiter gentilis*
red-shouldered hawk	*Buteo lineatus*
broad-winged hawk	*Buteo platypterus*
peregrine falcon	*Falco peregrinus*
Grouse	***Tetraonidae***
ruffed grouse	*Bonasa umbellus*
Quail	***Phasianidae***
ring-necked pheasant	*Phasianus colchicus*
northern bobwhite	*Colinus virginianus*
Turkeys	***Meleagrididae***
wild turkey*	*Meleagris gallopavo*

WILDLIFE SPECIES LIST - Empire Connection Project

Rails	***Rallidae***
Virginia rail	*Rallus limicola*
sora rail	*Porzana carolina*
common moorhen	*Gallinula chloropus*
American coot	*Fulica americana*
Plovers	***Charadriidae***
killdeer	*Charadrius vociferus*
Sandpipers	***Scolopacidae***
spotted sandpiper	*Actitus macularia*
American woodcock	*Philohela minor*
common snipe	*Gallinago gallinago*
upland sandpiper	*Bartramia longicauda*
Gulls, Terns	***Laridae***
herring gull	*Larus argentatus*
ring-billed gull	*Larus delawarensis*
great black-backed gull	*Larus marinus*
Pigeons, Doves	***Columbidae***
rock dove*	*Columba livia*
mourning dove	*Zenaida macroura*
Cuckoos	***Cuculidae***
yellow-billed cuckoo	*Coccyzus americanus*
black-billed cuckoo	*Coccyzus erythropthalmus*
Typical Owls	***Strigidae***
eastern screech owl	*Otus asio*
great horned owl	*Bubo virginianus*
barred owl	*Strix varia*
Goat Suckers	***Caprimulgidae***
common nighthawk	*Chordeiles minor*
whip-poor-will	*Caprimulgus vociferus*
Swifts	***Apodidae***
chimney swift	*Chaetura pelagica*
Hummingbirds	***Trochilidae***
ruby-throated hummingbird	*Archilochus colubris*
Kingfishers	***Alcedinidae***
belted kingfisher	*Ceryle alcyon*
Woodpeckers	***Picidae***
northern flicker*	*Colaptes auratus*
pileated woodpecker	*Dryocopus pileatus*
red-bellied woodpecker	*Melanerpes carolinus*
red-headed woodpecker	*Melanerpes erythrocephalus*

WILDLIFE SPECIES LIST - Empire Connection Project

hairy woodpecker	*Picoides villosus*
downy woodpecker*	*Picoides pubescens*
yellow-bellied sapsucker	*Sphyrapicus varius*
Flycatchers	***Tyrannidae***
eastern kingbird	*Tyrannus tyrannus*
great crested flycatcher	*Myiarchus crinitus*
eastern phoebe	*Sayornis phoebe*
willow flycatcher	*Epidonax traillii*
least flycatcher	*Epidonax minimus*
Acadian flycatcher	*Epidonax virescens*
alder flycatcher	*Epidonax alnorum*
eastern wood-pewee	*Contopus virens*
Larks	***Alaudidae***
horned lark	*Eremophila alpestris*
Swallows	***Hirundinidae***
purple martin	*Progue subis*
bank swallow	*Riparia riparia*
tree swallow	*Tachycineta bicolor*
barn swallow	*Hirundo rustica*
northern rough-winged swallow	*Stelgidopteryx serripennis*
cliff swallow	*Hirundo pyrrhonotta*
Jays, Crows	***Corvidae***
blue jay*	*Cyanocitta cristata*
American crow*	*Corvus brachyrhynchos*
fish crow	*Corvus ossifragus*
common raven	*Corvus corax*
Titmice	***Paridae***
black-capped chickadee*	*Parus atricapillus*
tufted titmouse	*Parus bicolor*
Nuthatches	***Sittidae***
white-breasted nuthatch*	*Sitta carolinensis*
red-breasted nuthatch	*Sitta canadensis*
Creepers	***Certhiidae***
brown creeper	*Certhia americana*
Wrens	***Troglodytidae***
Carolina wren	*Thryothorus ludovicianus*
marsh wren	*Cistothorus palustris*
house wren	*Troglodytes aedon*
winter wren	*Troglodytes troglodytes*
Mimic Thrushes	***Mimidae***
northern mockingbird	*Mimus polyglottos*
gray catbird	*Dumetella carolinensis*

WILDLIFE SPECIES LIST - Empire Connection Project

brown thrasher	*Toxostoma rufum*
Thrushes	***Turdidae***
American robin	*Turdus migratorius*
wood thrush	*Hylocichla mustelina*
veery	*Catharus fuscescens*
hermit thrush	*Catharus guttatus*
eastern bluebird	*Sialia sialis*
Swainson's thrush	*Catharus ustulatus*
Kinglets	***Sylviidae***
blue-gray gnatcatcher	*Polioptila caerulea*
golden-crowned kinglet	*Regulus satrapa*
Waxwings	***Bombycillidae***
cedar waxwing	*Bombycilla cedrorum*
Starlings	***Sturnidae***
European starling*	*Sturnus vulgaris*
Vireos	***Vireonidae***
solitary vireo	*Vireo solitarius*
red-eyed vireo	*Vireo olivaceus*
yellow-throated vireo	*Vireo flavifrons*
warbling vireo	*Vireo gilvus*
white-eyed vireo	*Vireo griseus*
Wood Warblers	***Parulidae***
black and white warbler	*Mniotilta varia*
blue-winged warbler	*Vermivora pinus*
golden-winged warbler	*Vermivora chrysoptera*
Brewster's warbler	*Vermivora pinus x V. chrysoptera*
Lawrence's warbler	*Vermivora chrysoptera x V. pinus*
Nashville warbler	*Vermivora ruficapilla*
yellow warbler	*Dendroica petechia*
magnolia warbler	*Dendroica magnolia*
black-throated blue warbler	*Dendroica caerulescens*
chestnut-sided warbler	*Dendroica pensylvanica*
yellow-rumped warbler	*Dendroica coronata*
black-throated green warbler	*Dendroica virens*
blackburnian warbler	*Dendroica fusca*
pine warbler	*Dendroica pinus*
ovenbird	*Seiurus aurocapillus*
northern waterthrush	*Seiurus noveboracensis*
Louisiana waterthrush	*Seiurus motacilla*
common yellowthroat	*Geothlypis trichas*
Canada warbler	*Wilsonia canadensis*
yellow-breasted chat	*Icteria virens*
American redstart	*Setophaga ruticila*
prairie warbler	*Dendroica discolor*
nothern parula warbler	*Parula americana*

WILDLIFE SPECIES LIST - Empire Connection Project

hooded warbler	*Wilsona citrina*
cerulean warbler	*Dendroica cerulea*
worm-eating warbler	*Helmitheros vermivorus*
Weaver Finches	***Ploceidae***
house sparrow*	*Passer domesticus*
Blackbirds	***Icteridae***
bobolink	*Dolichonyx oryzivorus*
eastern meadowlark	*Sturnella magna*
western meadowlark	*Sturnella neglecta*
red-winged blackbird	*Agelaius phoeniceus*
orchard oriole	*Icterus spurius*
Baltimore oriole	*Icterus galbula*
common grackle*	*Quiscalus quiscula*
brown-headed cowbird	*Molothrus ater*
Tanagers	***Thraupidae***
scarlet tanager	*Piranga olivacea*
Finches	***Fringillidae***
northern cardinal*	*Cardinalis cardinalis*
rose-breasted grosbeak	*Pheucticus ludovicianus*
indigo bunting	*Passerina cyanea*
house finch	*Carpodacus mexicanus*
purple finch	*Carpodacus purpureus*
American goldfinch	*Carduelis tristis*
pine siskin	*Carduelis pinus*
rufous-sided towhee	*Pipilo erythrophthalmus*
savannah sparrow	*Passerculus sandwichensis*
grasshopper sparrow	*Ammodramus honslowii*
vesper sparrow	*Pooecetes gramineus*
dark-eyed junco	*Junco hyemalis*
snow bunting	*Plectrophenax nivalis*
chipping sparrow*	*Spizella passerina*
field sparrow	*Spizella pusilla*
swamp sparrow	*Melospiza georgiana*
song sparrow	*Melospiza melodia*
white-throated sparrow	*Zonotrichia albicollis*

Mammal Species

Opossums	***Didelphiidae***
opossum	*Didelphis virginiana*
Shrews	***Soricidae***
smoky shrew	*Sorex fumeus*
masked shrew	*Sorex cinereus*
shorttail shrew	*Blarina brevicauda*
least shrew	*Cryptotis parva*

WILDLIFE SPECIES LIST - Empire Connection Project

Moles	***Talpidae***
eastern mole	*Scalopus aquaticus*
starnose mole	*Condylura cristata*
hairytail mole	*Parascalops breweri*
Plainnose Bats	***Vespertilionidae***
eastern pipistrel	*Pipistrellus subflavus*
big brown bat	*Eptesicus fuscus*
hoary bat	*Lasiurus cinereus*
red bat	*Lasiurus borealis*
little brown myotis	*Myotis lucifugus*
Keen myotis	*Myotis keenii*
silver-haired bat	*Lasionycteris noctivagans*
Indiana bat	*Myotis sodalis*
Racoons	***Procyonidae***
raccoon	*Procyon lotor*
Weasels	***Mustelidae***
shorttail weasel	*Mustela erminea*
longtail weasel	*Mustela frenata*
mink	*Mustela vison*
striped skunk	*Mephitis mephitis*
Dogs, Wolves, Foxes	***Canidae***
coyote	*Canis latrans*
red fox	*Vulpes vulpes*
gray fox	*Urocyon cinereoargenteus*
Cats	***Felidae***
bobcat	*Felis rufus*
Squirrels	***Sciuridae***
woodchuck*	*Marmota monax*
eastern chipmunk*	*Tamias striatus*
eastern gray squirrel*	*Sciurus carolinensis*
red squirrel	*Tamiasciurus hudsonicus*
southern flying squirrel	*Glaucomys volans*
Beaver	***Castoridae***
beaver	*Castor canadensis*
Mice, Rats, Lemmings, Volves	***Cricetidae***
deer mouse	*Peromyscus maniculatus*
white-footed mouse	*Peromyscus leucopus*
meadow vole*	*Microtus pennsylvanicus*
muskrat	*Ondatra zibethicus*
Old World Rats & Mice	***Muridae***
Norway rat	*Rattus norvegicus*
house mouse	*Mus musculus*

WILDLIFE SPECIES LIST - Empire Connection Project

Jumping Mice	***Zapeoidae***
meadow jumping mouse	*Zapus hudsonicus*
woodland jumping mouse	*Napaeozapus insignis*
Hares, Rabbits	***Leporidae***
eastern cottontail*	*Sylvilagus floridanus*
Deer	***Cervidae***
whitetail deer*	*Odocoileus virginianus*
Bears	***Ursidae***
black bear	*Ursus americanus*

Reptile and Amphibian Species

Box and Water Turtles	***Emydidae***
painted turtle	*Chrysemys picta*
wood turtle	*Clemmys insculpta*
eastern box turtle	*Terapene c. carolina*
spotted turtle	*Clemmys guttata*
common map turtle	*Graptemys geographica*
red-eared slider	*Trachemys scripta elegans*
Snapping Turtles	***Chelydridae***
common snapping turtle	*Chelydra serpentina*
Musk and Mud Turtles	***Kinosternidae***
stinkpot	*Sternotherus odoratus*
Colubrids	***Colubridae***
northern water snake	*Natrix s. sipedon*
northern brown snake	*Storeria d. dekayi*
eastern garter snake	*Thamnophis sirtalis sirtalis*
northern red-bellied snake	*Storeria o. occipitomaculata*
eastern milk snake	*Lampropeltis t. triangulum*
eastern ribbon snake	*Thamnophis sauritus*
eastern hognose snake	*Heterodon platirhinos*
eastern worm snake	*Carphophis a. amoenus*
smooth green snake	*Liochlorophis vernalis*
black rat snake	*Elaphe obsoleta*
northern ringneck snake	*Diadophis punctatus edwardsi*
northern black racer	*Coluber c. constrictor*
Pit Vipers	***Viperidae***
timber rattlesnake	*Crotalus horridus*
northern copperhead	*Agkistrodon contortrix mokasen*

WILDLIFE SPECIES LIST - Empire Connection Project

Mole Salamanders	***Ambystomatidae***
blue-spotted salamander	*Ambystoma laterale*
Jefferson's salamander	*Ambystoma jeffersonianum*
spotted salamander	*Ambystoma maculatum*
marbled salamander	*Ambystoma opacum*
Skinks	***Scincidae***
Five-lined skink	*Eumeces fasciatus*
Newts	***Salamandridae***
red-spotted newt	*Notophthalmus viridescens*
Lungless Salamanders	***Plethodontidae***
red-backed salamander	*Plethodon c. cinereus*
northern two-lined salamander	*Eurycea b. bislineata*
slimy salamander	*Plethodon glutinosus*
northern dusky salamander	*Desmognathus fuscus*
Allegheny dusky salamander	*Desmognathus ochrophaeus*
four-toed salamander	*Hemidactylium scutatum*
northern spring salamander	*Gyrinophilus p. porphyriticus*
northern red salamander	*Pseudotriton r. ruber*
Toads	***Bufonidae***
American toad	*Bufo americanus*
Fowlers toad	*Bufo woodhousei fowleri*
Tree Frogs	***Hylidae***
spring peeper	*Pseudacris c. crucifer*
gray treefrog	*Hyla versicolor*
True Frogs	***Ranidae***
wood frog	*Rana sylvatica*
pickeral frog	*Rana palustris*
northern leopard frog	*Rana pipiens*
green frog*	*Rana clamitans melanota*
bull frog	*Rana catesbeiana*

*Observed during 2003 Field Survey

APPENDIX B

Site Photos

APPENDIX C

Vitae of Principal Investigators

John D. Hecklau, Principal

Mr. Hecklau is an Environmental Scientist experienced in resource management planning, environmental impact analysis, wildlife management, visual impact analysis and recreation planning.

EDUCATION:

- State University of New York, College of Environmental Science & Forestry, Syracuse, New York, *Master of Science in Environmental and Forest Biology,* Specializing in Wildlife Biology, 1982.
- Middlebury College, Middlebury, Vermont, *Bachelor of Arts in Biology*, 1979.

EMPLOYMENT HISTORY:

- *Principal/Senior Ecologist*, Environmental Design & Research, P.C., Syracuse, New York, 1995 to Present.
- *Ecologist*, Environmental Design & Research, P.C., Syracuse, New York, 1989 - 1994.
- *Self-Employed Environmental Consultant*, John D. Hecklau, Clinton, New York, 1988.
- *Resource Manager*, Environmental Programs Division, New York State Power Authority, Marcy, New York, 1984 - 1987.
- *Wildlife Biologist*, Connecticut Department of Environmental Protection, Burlington, Connecticut, 1983 - 1984.
- *Wildlife Consultant*, Central Park Conservancy, New York, New York, 1982 - 1983.

PROFESSIONAL AFFILIATIONS:

- *Member*, The Wildlife Society.
- *Certified Wildlife Biologist,* The Wildlife Society.
- *Planning Board Member/Chairman*, Town of Kirkland, New York.

PUBLICATIONS:

Lamanna, B. and J. Hecklau, 2002, "The Windmills of Madison County." New York State Conservationist. 56(5): 8-11.

Hecklau, J.D., C. Palmero, E.T. Liverman and J. deWall Malefyt. 1987. Reducing the environmental impacts of stream crossings on a 345kV transmission line in New York. In W.R. Byrnes and H.A. Holt, eds. Fourth Symp. on Environmental Concerns in Rights-of-Way Manage. Purdue Univ., West Lafayette, IN.

Liverman, E.T., J.D. Hecklau and C. Palmero. 1987. Minimization of soil erosion and siltation during construction of the Marcy-South 345kV transmission facilities. pp. 241-253. In Erosion Control: You're Gambling Without It. Proc. of Conf. XVII. International Erosion Control Assoc., Pinole, CA. 335pp.

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Hecklau, J.D. 1985. Wildlife in Central Park: The problems and opportunities associated with wildlife management in an urban park setting. Trans. Northeast. Fish and Wildl. Conf. 42: 126-137.

Hecklau, J.D., W.F. Porter, and W.M. Shields. 1982. Feasibility of transplanting wild turkeys into areas of restricted forest cover and high human density. Trans. Northeast. Fish and Wildl. Conf. 39: 96-104.

PROFESSIONAL EXPERIENCE:

Environmental Design & Research, P.C.

Mr. Hecklau, Director of Environmental Services, serves as the principal-in-charge on all of the firm's environmental inventory, management, and permitting projects. Significant projects have included the following:

Akzo-Nobel Hampton Corners Mine – Prepared comprehensive visual impact assessment for new rock salt mine in western New York. Project included background research, viewshed mapping, field evaluation (ballooning), computer-assisted visual simulations, and evaluation of impacts utilizing the U.S. Army Corps of Engineers (ACOE) Visual Resources Assessment Procedure (VRAP).

GROWS Landfill and Modern Landfill – Coordinated visual analysis of proposed horizontal and vertical expansion of two solid waste landfills for Waste Management of Pennsylvania. Both projects included viewshed analysis, field evaluation and preparation of simulations for internal decision-making purposes.

Tupper Lake Prison – Prepared visual impact assessment for a proposed New York State maximum-security prison in the Town of Altamont in the Adirondack Park. Project included viewshed mapping, field evaluation, line-of sight cross sections, simulations and visual impact assessment utilizing the ACOE VRAP. Major issue was night time (lighting) impacts on seasonal residents and recreational users.

Madison Wind Power Project – Coordinated all environmental studies and permitting for the first commercial wind power generating facility in New York State. Prepared visual impact analysis, agricultural protection measures and all State Environmental Quality Review (SEQR) documentation for PG&E National Energy Group.

Fenner Wind Power Project – Coordinated all environmental permitting for a 30 mW wind power generating facility in Central New York State. Prepared visual impact analysis, agricultural protection measures and all SEQR documentation for Atlantic Renewable Energy Corporation. This project, currently under construction, will be the largest wind power facility in the eastern United States.

Ramapo Energy Project – Coordinated preparation of comprehensive visual impact analysis for a proposed 1,100 mM gas-fired power plant in Rockland County, New York. Study involved background data collection, viewshed mapping, line-of-sight cross sections, field evaluation, visual simulations, evaluation of visual impacts using the ACOE VRAP methodology, and exploration of various visual mitigation measures. Wrote the Visual Impact Assessment report, assisted with preparation of the visual section of the state license (Article X) application and provided expert witness testimony. Also assisted with ecological investigations and preparation of application text and testimony dealing with wildlife issues.

Linfield Energy Project – Coordinated preparation of viewshed mapping, line-of-sight cross sections, field evaluation and preparation of computer-assisted visual simulations for a proposed gas-fired power plant in Limerick, Pennsylvania.

Towpath Environmental Recycling Center - Oversaw the preparation of a Draft Environmental Impact Statement (DEIS) for a proposed landfill and recycling center in the Town of Albion, New York. Responsible for specific studies including the visual impact analysis, vegetation and wildlife inventory, community services, land use and zoning, and economic analysis. Also presented results of studies at public meetings.

St. Regis Mohawk Reservation Wetland Protection Program - Identified and evaluated of wetlands on the 15,000-acre St. Regis Mohawk Indian Reservation (Akwasasne) in Franklin County, New York. Project involved refining wetland mapping, developing a quantitative system for the evaluation of wetland functions, and providing recommendations for implementation of a wetland protection plan on the Reservation.

Town of Pittsford Greenprint - Developed, field tested, and implemented a town-wide ecological inventory and evaluation procedure for the Town of Pittsford, New York. The procedure evaluated a site's ecological value based on the presence and quality of various features including wildlife habitat elements, botanical resources, and water resource features. Project involved field review and ranking of 94 separate properties totaling over 3,430 acres. Property rankings were then used to develop the Town of Pittsford "Greenprint", a comprehensive, town-wide resource protection program that was awarded a 1998 National Planning Award from the American Planning Association.

Black Creek Park - Assisted with the development of a master plan for a largely undeveloped 1,500 acre County park, one third of which is made up of wetlands. Responsible for comprehensive study of the park's ecological resources, including field inventory of all wildlife, wetlands, and natural communities within the park, and an evaluation of the ecological significance/sensitivity of various areas. Also oversaw wetland delineation and state and federal wetland permitting.

Athens Power Project - Evaluated visual resources and visual impacts associated with construction of a 1080 mW power plant. Also delineated state and federal wetlands and documented ecological conditions on the project site and along proposed off-site utility (gas, water, and electric transmission) corridors associated with the project. Assisted with field data collection, agency liaison, and preparation of a wetland delineation report and functional analysis. Oversaw preparation of the Ecological Resources and Visual Resources sections of the Article X application, and provided expert witness testimony.

City Center Drive DEIS – Prepared a Generic Environmental Impact Statement for a proposed industrial park on a 128-acre site in the City of Watertown, Jefferson County, New York. Also conducted a Phase I Environmental Site Assessment and state and federal wetland delineation on the project site.

Canal Ponds - Prepared portions of a Generic Environmental Impact Statement (GEIS) for a proposed 305-acre office park in the Town of Greece, Monroe County, New York. Also conducted a vegetation and wildlife inventory, an on-site wetland delineation, and assisted with preparation and submittal of permit applications and mitigation plans.

St. Lawrence Gas Franchise Permit Applications - Prepared Environmental Impact Assessment Reports for proposed natural gas distribution systems in Lewis County and St. Lawrence County, New York. Reports included an inventory of environmental resources within the proposed franchise areas, as well as assessment of anticipated impacts and proposed mitigation measures. Lewis County project involved wetland delineation and permitting, and assistance with preparation of construction drawings.

Comprehensive Environmental Plans – Developed comprehensive environmental protection and enhancement plans for the upper Hudson, Sacandaga and Raquette River corridors. These corridors include 29 hydroelectric developments, 22 of which are owned and\or operated by Niagara Mohawk Power Corporation. Reports were prepared to assist with utility planning and relicensing efforts involving several of these projects.

Clay Source Development - Evaluated environmental impacts of a proposed clay mining operation on a 570-acre site in the Towns of East Bloomfield and West Bloomfield, Ontario County, New York. Study involved a federal wetland delineation, a vegetation and wildlife inventory (including identification of endangered species/critical habitats), and preparation of the Terrestrial and Aquatic Ecology section of the Draft Environmental Impact Statement for the project.

Albany Pine Bush Preserve – Developed and updated a comprehensive management plan for a unique inland pine barrens community in Albany County, New York. Project involved extensive data collection, public participation, and close coordination with members of the Albany Pine Bush Preserve Commission. Plan included management recommendations, an implementation plan, and a Environmental Impact Statement that addressed the potential impacts of plan implementation, including land acquisition, fire management, and increased public use.

Avoca Natural Gas Storage Project - Evaluated the environmental impacts of a proposed natural gas storage project in Steuben and Schuyler Counties, New York. Project included wetland inventory and delineation, vegetation, fish and wildlife inventory (including identification of endangered species and critical habitats), viewshed/visibility analysis and preparation of ecological resource reports for the Federal Energy Regulatory Commission (FERC) license applications. Reports described ecological resources within study area, along with potential impacts to these resources resulting from construction and operation of the project, and proposed means of mitigating adverse impacts.

Mendon Ponds Park - Prepared ecological study of a County park in Rochester, New York. The park is a designated National Natural Landmark, well known for its variety of rare species and unique natural communities, including fens, bogs, oak openings, and prairie remnants. Study involved species inventory, analysis of ecological value of various areas of the park, and management recommendations for the protection and enhancement of the park's ecological resources.

Route 332 Environmental Studies – Prepared studies for the NYS Department of Transportation that examined the environmental impacts of the proposed widening of 7 miles of State Route 332 in Canandaigua, New York. Specific tasks included visual impact analysis, delineation of wetlands, quantitative evaluation of wetland functions and values, and inventory of vegetation and wildlife resources within the corridors. Environmental impact evaluation, agency liaison, and public presentations were also included as part of these projects.

Niagara Mohawk Hydro Relicensing - Provided assistance to Niagara Mohawk Power Corporation with FERC relicensing of various hydroelectric projects throughout New York State. Prepared a variety of plans, reports, position papers, studies, and responses to agency inquiries. Topics addressed have included land use and recreation, fisheries protection and enhancement, whitewater boating, open space conservation, aesthetic/visual impacts, and cultural resources management.

Have conducted numerous projects involving the delineation of wetlands in accordance with the procedures outlined in the 1989 *Federal Manual for Identifying and Delineating Jurisdictional Wetlands* and the 1987 *Corps of Engineers Wetlands Delineation Manual.* These projects have also typically involved state and federal wetland permitting, wetland mitigation, and/or wetland monitoring.

John D. Hecklau (self-employed)

Provided environmental/ecological consulting services to landscape architecture and planning firms Specific projects included preparation of 12 vegetation and wildlife inventories, four wetland studies, and three environmental damage assessments. Gathered ecological resource data for two regional land use plans, and wrote a Draft Environmental Impact Statement for a 28 lot residential subdivision in Dutchess County, New York.

New York State Power Authority

Provided environmental support and supervision during the planning, licensing and construction of a major 345kV transmission line. Specific duties included 1) conducting baseline environmental surveys and inventories, 2) reviewing and revising environmental/construction specifications, 3) providing liaison with state

regulatory agencies, and 4) monitoring compliance with environmental regulations and commitments during construction.

Assisted with ongoing right-of-way management program, including revision of existing vegetation management specifications and criteria, field evaluation of vegetation inventory and management techniques, and assistance with development of computerized right-of-way database. Other responsibilities included initiation of various wildlife management programs and studies. These included 1) programs to improve wildlife habitat on right-of-ways and at generating facilities, 2) studies to assess impacts of transmission line construction on wildlife, and 3) an endangered species survey for a proposed 200 mile-long transmission line.

Connecticut Department of Environmental Protection

Prepared a comprehensive development and operation plan for a newly acquired 450-acre wildlife management area and proposed educational facility. Project included coordination of a wildlife species survey, analysis of habitat improvement needs, and conducting of a nationwide survey of existing conservation education facilities and programs.

Central Park Conservancy

Prepared fish and wildlife section of a master plan for the restoration and management of Central Park in New York City. Project included conducting an inventory of species and significant habitat areas within the 830-acre park. Report of findings was prepared, which included analysis of habitat value and recommendations for preserving and enhancing park wildlife habitats.

Manomet Bird Observatory

Assisted Director of Environmental Education with preparation and teaching of field and classroom courses regarding ornithology and marine biology. Also assisted research personnel with studies investigating songbird territoriality and shorebird migration.

Minnesota Department of Natural Resources

Conducted research project involving trapping and transplanting of radio-tagged wild turkeys. Investigated mortality, dispersal, and reproduction of birds in three separate populations. Also assisted DNR biologists in wildlife research projects involving trapping and tagging of whitetail deer, and surveys of ruffed grouse and waterfowl.

William A. Trembath, Project Manager

Mr. Trembath has more than fourteen years of experience in environmental monitoring, natural resource management, environmental regulatory compliance, hazardous waste operations, industrial health & safety, emergency response, and wildlife damage management.

EDUCATION:

- State University of New York, College at Fredonia, Fredonia, New York, *Bachelor of Science in Biology,* Concentration in Ecological Studies, 1988.

EMPLOYMENT HISTORY:

- *Environmental Project Manager*, Environmental Design & Research, P.C., Rochester, New York, March 2002 to Present.
- *Project Environmental Scientist*, URS/Dames & Moore Group, Orchard Park, New York, 1999 - 2002.
- *Staff Environmental Scientist*, Dames & Moore Co., Inc., Ashford, New York, 1995-1999.
- *Assistant Environmental Scientist*, Dames & Moore Group, West Valley, New York, 1990-1995.
- *Heavy Equipment Operator*, Accent Strip Inc., Orchard Park, New York, 1989-1990.
- *Research Assistant*, SUNY Environmental Resources Center, Fredonia, New York, 1988-1989.

PROFESSIONAL AFFILIATIONS:

- *The Wildlife Society,* National Northeastern US & NY State Chapters.
- *The Wildlife Society*, Wildlife Damage Control Management Group
- *Society of Wetland Scientists*, National and Mid-Atlantic States Chapters
- *US Department of Energy,* Emergency Management Issues – Special Interest Group (EMI-SIG)
- *New York State Wetlands Forum*
- *Beta Beta Beta National Biological Honor Society*.

PRESENTATIONS/PUBLICATIONS:

Winter, J.D., R.B. Gillespie, S.E. Monteleone, W.A.Trembath and, T.A. Storch. 1989. *Report on characterizing the biomass and species composition of macrophytes, fish spawning and nursery areas. And sediments in Chautauqua Lake, New York in 1988 and 1989.* Final Report to the Chautauqua County Department of Planning and Development.

Storch, T.A., J.D. Winter, R.B. Gillespie, W.A. Trembath, and M.P. Wilson. 1990. *Investigation of lake chemistry, biology and basic hydraulics related to inflow and nutrient loading.* Final project report to the Town of Orchard Park, New York.

PROFESSIONAL EXPERIENCE:

Dames & Moore/URS Corp. West Valley, Ashford and Orchard Park, NY

Natural Resource Management:

Coordinated field and laboratory efforts of an aquatic ecology survey at the West Valley Demonstration Project (WVDP) in Cattaraugus County, NY. Technical contributions included field supervision of sampling and identification of fishes, aquatic vegetation, planktonic and macro-benthic organisms, and conducting physical and chemical analyses on designated sample locations.

Conducted endangered/protected plant surveys at the WVDP in 1995, 1999, 2000 and 2001. Extensive field identification, mapping, collection, keying, and cataloging of plants was performed.

Performed an ecological characterization of the Ramco Steel Co. superfund property in Lackawanna, NY. Technical contributions included field identification, mapping and cataloging of terrestrial and aquatic vegetation, birds, and mammals.

Conducted field delineation and mapping of wetlands at the WVDP in 1992, 1997, 1999, and 2000 as per the U.S. Army Corps of Engineers 1987 Wetlands Delineation Manual. Utilized the Munsell soil index for categorization of hydric soils, and conducted an extensive terrestrial vegetation follow-up study.

Performed field delineation and mapping of wetlands at the Li Tungsten Superfund site in the City of Glen Cove, Long Island NY (2001). Technical contributions included wetland delineation report, disturbance permit application, and preparation of a mitigation plan for the facility.

Conducted a rare & endangered species (Indiana bat) habitat assessment and wetland assessment for the proposed siting of a high-tension power line in Northeastern Ohio.

Supervised a team of seasonal interns conducting an amphibian, small mammal, and reptile threatened & endangered species survey and inventory at the WVDP.

Conducted a water quality study on the impacts of nitrite in wastewater effluents. The study includes an overview of the environmental fate, the ecotoxicity, and alternative treatment methods associated with the cold weather treatment of wastewater for the eradication of nitrogen during cold weather months.

Field Operations & Sampling:

Extensive involvement in many aspects of the effluent monitoring and environmental monitoring program at the West Valley Demonstration Project (WVDP). Technical contributions included collection and testing of environmental samples in accordance with federal and state regulations and permits.

Project Scientist responsible for meteorological data acquisition at the WVDP. Primarily responsibilities included calibration, maintenance, and troubleshooting of digital and analog data acquisition systems, strip chart recorders, and sensory systems.

Wildlife Management & Nuisance Wildlife Control:

As an active member of The Wildlife Society and as a New York State licensed Nuisance Wildlife Control Operator, had primary response and supervision responsibilities in the wildlife control program at the WVDP. This program included the field supervision and hands-on humane capture, handling, disposal and/or release of wildlife that was deemed a nuisance or presented a health & safety risk.

Conducted a small mammal and nuisance pigeon removal project for the WVDP; developed the management plan as the primary author, and implemented as the head field supervisor, a multi-phased whitetail deer removal program plan at the WVDP. The deer management program plan received a Westinghouse Corporate Management Award for its overall success and safe implementation.

Environmental Regulatory Compliance:

Developed, co-authored and edited numerous NEPA and SEQRA documents including environmental assessments, environmental checklists, and an Environmental Impact Statement Implementation Plan at the WVDP.

Primary environmental regulatory compliance analyst for day-to-day review of all proposed work at the WVDP (1997-2000).

Developed an environmental impacts analysis of the Buffalo & Pittsburgh Railroad's Ashford - Buffalo Rail Line proposed abandonment's effect upon the WVDP.

Co-authored a report on information relative to environmental justice issues for the WVDP. The study focused upon natural resource utilization and cultural resources of potentially affected populations within a fifty- (50) mile radius of the WVDP.

Research Assistant, SUNY Environmental Resources Center, Fredonia, New York

Supervised a group of ten scientists who performed a two-year field investigation and mapping exercise of aquatic vegetation, fish spawning and nursery areas, and sediments for an EIS on aquatic herbicide application and mechanical vegetation control on Chautauqua Lake, NY.

Conducted a water quality, nutrient loading, aquatic vegetation, and fishery age structure study on Green Lake in Orchard Park, NY. Primary chemist responsible for the examination of year-round variations of limnological parameters. Gave an oral presentation of findings to the Orchard Park, NY town-planning board.

Studied the effects of chemical lampricides on the population of adult sea lamprey and stream ecosystem structure in the Lake Erie tributaries: Cattaraugus Creek and Canadaway Creek, NY.

EXHIBIT 4 - APPENDIX D

DESKTOP INVESTIGATION EAST RIVER – OAK POINT TO THE RAINY SUBSTATION

DESKTOP INVESTIGATION

EAST RIVER – OAK POINT
TO THE RAINY SUBSTATION
THE BRONX TO QUEENS
NEW YORK CITY, NEW YORK

Prepared for: The Shaw Group, Inc.
3 Executive Campus
Cherry Hill, NJ 08002

Prepared by: Ocean Surveys, Inc.
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Old Saybrook, CT 06475

3 November 2003

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DESKTOP INVESTIGATION

EAST RIVER – OAK POINT
TO THE RAINY SUBSTATION
THE BRONX TO QUEENS
NEW YORK CITY, NEW YORK

1.0 INTRODUCTION

This report presents the results of a study of existing literature and other readily available information concerning the geological, oceanographic and other marine related conditions for an area along the East River between Oak Point (Bronx County) and the Rainey Substation (Queens County). Produced by Ocean Surveys, Inc. (OSI) under contract to the Shaw Group, Inc., this report is intended to aid the siting assessment for the proposed Empire Cable submarine electrical power cable connecting a terrestrial conduit system in the Hunts Point area with the power grid across the East River in Queens, New York.

1.1 Project Area Overview

The East River is a 14-mile long tidal strait that connects Long Island Sound with New York Harbor Upper Bay and separates the western end of Long Island from Island of Manhattan and the New York mainland (Figure 1.1). The Sound entrance is between Throgs Neck and Willets Point; the Upper Bay entrance is between The Battery and Governors Island. Hell Gate, about halfway between Throgs Neck and The Battery, is noted for its strong tidal currents and marks the location of the confluence with the Harlem River which extends northward from Hell Gate to the Hudson River.

The mean range of tide in East River is 7.1 feet at Willets Point, 5.1 feet at Hell Gate and 4.6 feet at The Battery. In the East River, the flood current sets north and eastward and the ebb sets south and westward. This is the direct opposite of conditions in Long Island Sound where the flood is generally westward and the ebb eastward. The average maximum current speed is 4 knots at Hell Gate, 3 knots at the Brooklyn Bridge and 1.5

shorefall lying between 35th and 36th Avenues in Queens. Figures 1.2 and 1.4 depict the route, with mileage markers and tenth mile ticks.

Along the first 2 miles, from Oak Point to the southern part of Wards Island, the route favors the western side of the East River. Leaving Oak Point, the route passes to the north of North Brother Island, then heads due southwest along the East River, staying within 0.1 mile of the Bronx and Wards Island shorelines until at Mile 2.5 it reaches the Triborough Bridge. As the route passes under the Triborough Bridge, it shifts to the center, then eastern side of the East River. The route courses through Hell Gate, passes the confluence of the Harlem River on the western bank, and enters the eastern channel of the East River between Roosevelt Island and Astoria/Queens at Mile 3.6. Finally, the route angles toward the Queens shoreline until it makes landfall 0.1 mile north of the 36th Avenue lift bridge to Roosevelt Island.

1.3 Route Profile

Figures 1.5 and 1.6 show water depth plotted along the entire submarine cable route. Only two sections of the route are shallower than 30 feet (MLW): the initial 400 feet from Oak Point to the East River channel and (2) the last 1,800 feet approaching the southern landfall.

Within 600 feet of Oak Point, the cable route reaches a depth of 65 feet. Depths then continue to increase to a maximum of 77 feet at Mile 0.45, northwest of North Brother Island.

From Mile 0.45 to Mile 0.95 offshore Stony Point, water depths decrease gradually to a minimum of 47 feet. The riverbed in this reach exhibits minor relief.

Between Mile 0.45 and Mile 1.8 south of Wards Island, the riverbed is highly irregular, varying between depths of 35 feet and 75 feet. Several of the peaks/ridges in the riverbed attain 35 feet in height on a grade of 15 percent.

From Mile 1.8 to Mile 2.5 at the Triborough Bridge, depths vary between 35 and 65 feet and exhibit minor relief. Immediately south of the Triborough Bridge, a significant depression in the riverbed is observed; in that area, depths increase by 50 feet in a lateral distance of 500 feet.

Proceeding south from the Triborough Bridge, the bottom is fairly level at a 35 ft depth to Mile 2.95 in the middle of Hell Gate. The riverbed then slopes downward to a depth of 75 feet at Mile 3.3 offshore Astoria.

From Mile 3.3 to the southern landfall at Mile 4.17, water depths gradually decrease and the riverbed shows only occasional relief.

1.4 Obstructions and Shipwrecks

Cable and pipeline areas occupy a significant portion of the first two miles of the route, from Oak Point to Stony Point at the confluence of the Bronx Kill and the East River. Within that zone, marked in Figure 1.3, lie numerous active as well as abandoned cables and pipelines. Detailed documentation/listings of individual utilities within the zone does not exist. However, it is known that myriad cables and pipelines have been installed during the past several decades to serve Rikers Island, North Brother Island and facilities located on Barreto Point, Stony Point and Lawrence Point.

Port Morris, located on the northwest side of the East River across from North Brother Island, has rail terminals to and from which car floats are taken through the East River. Lawrence Point, situated on the southeast side of the East River immediately west of Rikers Island, is occupied by an extensive gas and electric plant.

A much-used general anchorage is situated between the south side of the East River channel and the flats off the north side of Rikers Island (Figure 1.3). Anchorage depths are 21 to 30 feet.

East River Main Channel Lighted Buoy 3 has been established northeast of Rikers Island to assure that vessels do not penetrate air space in that portion of the East River which coincides with the glide path of the northeast-southwest runway of La Guardia Airport. Vessels with mast heights in excess of 125 feet must pass 100 yards to the north of Buoy 3 to avoid interference with the glide path.

Hell Gate is the section of the East River between Wards Island and Roosevelt Island. The crooked channel, strong tidal currents and heavy traffic in Hell Gate require extra caution on the part of the navigator to avoid accident or collision.

Other obvious obstructions include Hell Gate Bridge, Triborough Bridge and the 36th Avenue highway bridge. Hell Gate Bridge, a railroad bridge which crosses the East River at Wards Island, has a fixed span with a clearance of 134 feet. Triborough Bridge, which crosses the East River from Negro Point, the southernmost point of Wards Island, to Long Island has a highway suspension span with a clearance of 138 feet.

The 36th Avenue highway bridge crosses the eastern channel of the East River from Roosevelt Island to Long Island. It has a vertical-lift span with clearance of 40 feet when down and 99 feet when up.

Currents in both channels off Roosevelt Island are strong, and caution is advised when navigating these areas.

As part of this desktop investigation OSI has researched the National Oceanic and Atmospheric Administration (NOAA) Automated Wreck and Obstruction Information System (AWOIS) online database. This database highlights those wrecks and obstructions discovered during periodic NOAA hydrographic surveys. A total of 43 AWOIS items are located in the project area and have been plotted on Figures 1.3 and 1.4. Twelve AWOIS items located within 1000 feet of the proposed route were identified (Table 1.1) and details of those features are discussed below. It should be

AWOIS #	Distance & Direction From Proposed Cable	Mile Post	Item Description
11681NW	200'NW	0.48	Subm wrk., ld 62 ft, surveyed 1996
11681SE	790'SE	0.59	Subm wrk., ld 41 ft, surveyed 1996
11682	100'NW	0.43	Subm Wrk, ld 62 ft, surveyed 1996
11683	160'SE	0.40	Nondangerous subm wrk, ld 72', surveyed 1996
11680	415'SE	0.75	Subm wrk., ld 57', surveyed 1996
4275	415'SE	0.75	Same as above, sunken barge, ld 57'
11678	915'SE	1.10	Subm wrk, ld 49', surveyed 1996
11679	917'SE	1.00	Subm obs., ld 56', surveyed 1996
11677	750'SE	1.39	Subm wrk, ld 60', surveyed 1996
11676	890'SE	1.40	Unk obs. Ld 49', surveyed 1996
1530	240'N	2.78	Broken Rock Obs. LD 31', cleared to 34'
4271	462'SE	3.20	Dangerous subm wrk, charted in 1930

Table 1.1 - AWOIS Items Within 1,000 Feet Of The Proposed Route

noted that NOAA (though contractors) completed comprehensive side scan sonar and multibeam surveys of much of the study area in 1996 (H10625). Many of the AWOIS items were investigated as part of those surveys. It is recommended that all available data and reports for that survey be reviewed as part of a more detailed evaluation of the proposed project.

Shipwrecks may obstruct cable laying operations and plans may want to be made to avoid these as they may represent submerged cultural resources.

There are six AWOIS items within 1000 feet of the proposed route between Mile Posts 0.2 and 1.0. Items #11681NW, #11682 and #11683 are all within 200 feet on either side of the route near Mile Post 0.5. All three of these items are submerged wrecks surveyed in 1996. Item #11681SE, 790ft southeast of the proposed cable, is a submerged wreck with a least depth of 41 feet. The other two items may represent the same submerged wreck in 57 feet of water, 415 feet southeast of milepost 0.75. AWOIS items #11678 and #11679 are more than 900 feet southeast of the proposed cable route near Mile Post 1.0.

Only two AWOIS items are located between Mile Post 1.3 and 2.0. These are Items #11676, 890 feet southeast of the route, and is an unknown obstruction with least depth of 49 feet, and # 11677, 750 feet southeast of the route, that is a submerged wreck. Both of these were surveyed in 1996.

Between Mile Posts 2.0 and 3.0 there are two AWOIS items located within 1000 feet of the proposed route. Item #1530 is a broken rock obstruction 240 feet southeast of Mile Post 2.78 while Item #4271 is a dangerous submerged wreck (charted in 1930) located 460 feet southeast of Mile Post 3.2.

2.0 GEOLOGY OF THE PROJECT AREA

2.1 Onshore Geology (Manhattan, Queens and Bronx)

2.1.1 Bedrock Geology

The project site is located within the Atlantic Coastal Plain physiographic Province. The western edge of the Coastal Plain is the approximate location of Cameron's Line, which is a regional thrust fault that strikes northeast and dips east below Long Island (Figure 2.1).

To the west of Cameron's Line, bedrock consists of a sequence of schist, gneiss, and marble while to the east of Cameron's Line rocks are made up of Cambro-Ordovician amphibolite, light-gray gneiss, schist and granulite (Baskerville, 1982). Five bedrock formations lie between Manhattan and Queens across the East River. These are the Manhattan Schist, overlain by the Hartland Formation, the Ravenswood Granodiorite, the Fordham Gneiss, and the Inwood Marble, all of which are highly folded, faulted, and metamorphosed with the folded axes generally striking northeast and with the beds dipping generally northwest. (Figures 2.2 and 2.3) According to Fettke (1914), this is part of a series of anticlines and synclines that had been eroded.

The area around New York City was once situated above sea level. Erosion carved out an east and west channel along the marble belts beneath the East River, leaving behind a more resilient rock composed of the Fordham Gneiss that forms a mid-river reef separating the two channels. Most of the bedrock is sound beneath the floor of the river, but there are many zones in the upper parts of the bedrock which are crushed and disintegrated due to weathering and softening (Fluhr, 1957).

The Manhattan Schist is a series of highly metamorphosed sediments of muscovitic and biotitic schists with numerous pegmatitic and aplitic dike and vein intrusions. Thin beds of limestone are occasionally found within the schist. The Inwood Marble is a white, coarsely crystalline metamoprhosed dolomitic limestone that parallels and probably comforms with the Manhattan Schist and with the Fordham Gneiss. The Fordham Gneiss is a series of metamorphosed sediments, which forms a rock with black and white bands composed of quartz and felspar that alternate with bands of biotite and hornblende. Some areas in the gneiss are heavily granitized, and occasionally thin interbeds of limestone occur within it The Ravenswood Granodiorite is an igneous mass intruding the Fordham Gneiss. It underlies the left margin of the East River along the Queens shoreline (Figure 2.3) and crops out beneath the Queensboro Bridge. The Ravenswood Granodiorite is in reality a gneissic unit, massive and homogenous, medium-grained in texture, and pale pinkish to grayish in color, with darkness relating to the abundance of hornblende and biotite (Brock and Brock, 2001)

The Bronx side of the East River is a region of low, rolling elongate ridges and valleys underlain by metamorphic rocks of Proterozoic- and Early Paleozoic ages that have been folded. Fold axes plunge predominately toward the SW. Deep weathering and erosion of these folded layers have created the NE-SW-trending valley-and-ridge aspect of the western part of The Bronx. In the eastern Bronx, exposures of bedrock are rare. Parallel elongate topographic features are present, but the hills are composed not of resistant bedrock but of glacial deposits, and the direction of elongation is NNW-SSE. This topographic texture is exemplified by the trend of Throgs Neck and by the alignment of

2.1.2 Sedimentary Geology

Overlying the bedrock are unconsolidated Cretaceous, Pleistocene and Holocene deposits. The Cretaceous deposits are the Raritan Formation, which consists of the Lloyd Sand Member and the clay member, and the overlying Magothy Formation – Matawan Group Undifferentiated. These deposits are unconformably overlain by Pleistocene glacial till, moraine and outwash. New York was once covered by great sheets of ice during the Pleistocene ice age. Research by Sanders and Merguerian (1994) and Sanders et al. (1997) indicate that in New York City, glacial sediments were deposited by five major glacial events (Table 2.1).

As the ice from these five glaciers melted away, it left behind deposits of sand, clay, gravel and boulders. Compact and coarse glacial deposits fill the lows and valleys in the East River bottom practically to the top profile of the bedrock. Thus, the bedrock is covered by a blanket of not only material that had decayed in place, but also a mixture of residual soils, glacial till, modified glacial drift, glacial lake beds, recent river deposits, and artificial fill. Residual soil, which had decayed into a white clayey mass, can be found on top of the marble and limestone in the east channel of the East River. Glacial till, containing permeable sands and gravels with boulders, can be found on the bedrock near the Manhattan side. Artificial fill can also be found locally at the river margin infilling tidal marshes that were located along the East River shore. (Baskerville, 1982).

Age	Till No.	Ice-flow Direction	Description; remarks
Late Wisconsinan ("Woodfordian"?)	I	NNE to SSW	Gray-brown till in Westchester Co., Staten Is., Brooklyn, & Queens (but not present on rest of Long Island); Hamden Till in CT with terminal moraine lying along the S coast of CT; gray lake sediments at Croton Point Park, Westchester Co.
Mid-Wisconsinan (?)			Paleosol on Till II, SW Staten Island.
Early Wisconsinan(?)	II	NW to SE	Harbor Hill Terminal Moraine and associated outwash (Bellmore Fm. in Jones Beach subsurface); Lake Chamberlain Till in southern CT.
Sangamonian(?)			Wantagh Fm. (in Jones Beach subsurface).
	IIIA	NW to SE	Ronkonkoma Terminal Moraine and associated outwash (Merrick Fm. in Jones Beach subsurface).
Illinoian(?)	IIIB		Manhasset Fm. of Fuller (with middle Montauk Till Member; in lower member, coarse delta foresets (including debris flows) deposited in Proglacial Lake Long Island dammed in on S by pre-Ronkonkoma terminal moraine.
	IIIC		
Yarmouthian			Jacob Sand, Gardiners Clay.
Kansan(?)	IV	NNE to SSW	Gray till with decayed stones at Teller's Point (Croton Point Park, Westchester Co.); gray till with green metavolcanic stones, Target Rock, LI.
Aftonian(?)			No deposits; deep chemical decay of Till V.
Nebraskan (?)	V	NW to SE	Reddish-brown decayed-stone till and -outwash at AKR Co., Staten Island, and at Garvies Point, Long Island; Jameco Gravel fills subsurface valley in SW Queens.
			Pre-glacial (?) Mannetto Gravel fills subsurface valleys.

Table 2.1 - Classification of the Pleistocene deposits of New York City (from Sanders and Merguerian, 1994).

2.2 Offshore Geology (East River and Western Long Island Sound)

2.2.1 Bedrock Geology

Public domain information on the distribution of bedrock units underneath the East River along the proposed route between Hunts Point and the Rainey Substation is limited and rather scarce. Public reports associated with the construction of tunnels, bridges and pipelines across the East River are the main source of available information. Cross sectional data (Figure 2.2) derived from the construction of the Queens Midtown Tunnel (ENR, 1940) revealed significant variations in the geology along the tunnel line. Variable strata of hard rock, soft rock, soft and permeable soil, rock overlain with permeable soil, and variations in the bedrock topography were encountered. Construction for the approaches and land section of the tunnel on Manhattan Island was mostly in the Manhattan Schist. On the Queens side, the tunnel initially passed through soft ground but

then a westward advance beneath the East River channel brought the headings into glacial-lake sediments, modified glacial drift, sands and gravels, knobs of the Inwood Marble, and ended at the mid-reef of the Fordham gneiss. Then, near the Manhattan side, the tunnel encountered ground composed of hard schist with its upper part badly weathered, and above it permeable sands and gravels.

Coring and sub-bottom seismic profiling across the East River, from Brooklyn to Manhattan at approximately the Newtown River location, indicate that bedrock depth varies here from 4 to 79 ft deep. The deepest part occurs on the Manhattan side (46 to 79 ft); then bedrock rises in the middle of the river (4 to 8 ft), then deepens again towards the Brooklyn side (37 to 45 feet). In this area sediment thicknesses across the East River vary from a maximum of approximately 80 ft on the Manhattan side, to 0-10 ft in the middle of the river, to a maximum of 50 ft on the Brooklyn side of the river.

2.2.2 Sedimentary Geology

Limited public domain information is available on sediment types, sediment thickness, and sedimentary transport for areas adjacent to the zone of interest from Hunts Point to the Rainey Substation. Sediment physical and chemical characteristics from several studies are described below.

a) A report presented by the Iroquois Gas Transmission System to the Federal Energy Regulatory Commission indicates that in the western portion of the Long Island Sound, in the area where the Iroquois gas pipeline landfalls near Pelham Road, in Bronx County, about 70% of the sediment samples collected during the survey for the Iroquois Gas transmission pipeline consisted of more than 50% silt-clay (see Table 2.2 for sample locations and grain size analysis). Based on this report, the seafloor in the area of Hunts Point tends to be very irregular with numerous large mounds and depressions and apparent outcrops of bedrock. These mounds were interpreted to be rocky, either bedrock or glacial tills. The surface and shallow subsurface sediments sampled to the west of the

rocky mounds were basically soft clays. The presence of nearby rocky mounds and apparent outcrops suggested that rock may be shallow in some areas.

Sample	% Gravel	% Sand	% Silt	% Clay	Total (Silt+ Clay)	Latitude	Longitude
IPC3	40.8	34.1	11.8	13.3	25.1	40° 52.35'	73° 44.09'
IGIPE4	11.2	60.2	14.9	13.7	28.6	40° 49.32'	73° 46.57'
IGEB1	0.0	32.9	37.8	29.4	67.2	40° 49.18'	73° 46.45'
21	4.7	39.0	31.9	24.3	56.2	40° 54.17'	73° 43.78'
22	6.4	71.5	11.7	10.4	22.1	40° 53.80'	73° 44.43'
24	1.9	41.0	29.0	28.1	57.1	40° 52.87'	73° 44.80'
25	3.8	36.5	28.8	30.8	59.6	40° 52.45'	73° 45.15'
26	0.2	18.9	41.2	39.8	81.0	40° 52.20'	73° 45.66'
27	11.3	41.4	27.0	20.3	47.3	40° 52.19'	73° 46.67'

Table 2.2 - Coordinates and sediment grain-size for grab samples taken along the Iroquois gas pipeline route on western Long Island Sound.

Table 2.3 shows the location and grain size of three grab samples and two vibratory core samples collected in the East River west of Throgs Neck and closer to Hunts Point. Samples IG-ER1 and IG-ER2 were predominantly coarse grained with silt + clay fraction less than 8.5% of the sediment composition. On the other hand the silt+clay fraction at station WC was over 90%. The two vibracores samples were obtained in the East River at sites IGVS 20 and IGVS 21. Sediment cores were collected to a maximum depth of 7 ft.

Sample	%Gravel	%Sand	%Silt	%Clay	Lat.	Lon.
IG-ER1	0.1	91.6	4.8	3.6	40° 48.050'	73° 47.500'
IG-ER2	18.8	74.6	3.9	2.6	40° 48.483'	73° 49.016'
WC	0.0	1.3	77.4	21.2	40° 49.083	73° 47.500'
IGVS 20	4.3	40.2	31.9	23.6	40° 48.090'	73° 52.250'
IGVS 21	0.0	41.3	32.3	26.3	40° 48.050'	73° 52.570'

Table 2.3 - Sediment grain-size and location of grab and vibracore samples taken on the East River along the Iroquois gas pipeline route.

b) Studies on the concentrations and distribution of contaminants in sediments of the East River were carried out by the National Oceanic and Atmospheric Administration. A public domain report on the magnitude and extent of sediment toxicity in the Hudson-Raritan estuary (NOAA, 1995) indicates that 6 sediment samples were taken in the East River. Table 2.4 lists the coordinate locations of these samples.

Sample Number	Latitude (N)	Longitude (W)
Upper East River		
7	40° 47' 58"	73° 47' 13"
8	40° 48' 16"	73° 58' 01"
9	40° 47' 16"	73° 52' 42"
Lower East River		
10	40° 47' 58"	73° 54' 04"
11	40° 44' 39"	73° 57' 37"
12	40° 42' 31"	73° 58' 14"

Table 2.4 - Location of samples taken on the Upper and Lower East River (NOAA, 1995).

Samples from the lower East River (sites 10 and 12) had relatively high percent fine-grained materials (over 50%). Samples with relatively low percent fines were collected in the upper East River (site 7). The concentrations of total organic carbon (TOC) ranged from 3.6-4.8% (at sites 11 and 12) up to a maximum of 5.0% at site 9. Sample 7 had low percent fines (10.4%), but very high TOC content (4.4%). In most samples the TOC content ranged from 2% to 3% with very few samples having less than 1% TOC. Multiple samples from most sites had similar concentrations of TOC. However, the two samples from sites 7 and 10 had considerably different concentrations, reflecting within-site heterogeneity.

The concentrations of mercury in most samples ranged from 1.0 to 2.5 ug/g. Samples from sites 7, 9, and 10 had 4.7 to 5.0 ug/g Hg.

PCB concentrations were relatively high in a few samples, notably the sample from station 12 in the East River which had 1972.8 ng/g. The concentrations of total PCBs exceeded 450 ng/g in samples from stations 12. The relatively high PCB concentrations in the samples from the East River gradually decreased into the western Long Island Sound.

In most samples, the concentrations of total PAHs ranged from 4,000 ng/g to 20,000 ng/g. However, the samples from sites 7, 8, 9, 10, and 11 in the East River had concentrations that exceeded 20,000 ng/g total PAH. The concentration of total PAH in

sample 9 from the upper East River was 1,123,355 ng/g. The high concentrations of PAHs in the East River decreased considerably eastward into Long Island Sound.

c) The South Brother Island Channel lies in the Upper East River between Rikers Island and the South Brother Island. The U.S. Army Corps of Engineers (USACE), New York District, carried out a geological survey in 2001 to evaluate new maintenance dredging of the channel and the subsequent disposal of the dredge material. Eight core samples were taken in the proposed dredging area to a depth of 37 feet. The eight core samples were combined to yield one sediment composite which was analyzed for sediment grain size and chemical and biological content. Based upon an analysis of sediment samples, the grain characteristics of the proposed dredged material were 0.0% gravel, 4.0% sand, 47.3% silt, and 48.7% clay (USACE, 2001).

2.3 Geologic Route Description

The following paragraphs summarize the type of river bottom material most probable to be encountered along the proposed route. Data for this summary were obtained from NOAA (2000) and from USACE (2001). Mileposts are referenced to the proposed route centerline as illustrated in Figures 1.2 and 1.3.

1) MP 0.0 to MP 0.2

In the starting portion of the route, water depths range from above MLLW adjacent to the landfall to over 75 feet near MP 0.4. The bottom topography along the route is generally variable with an uneven bottom surface which reflects a predominantly rocky substrate. Nautical chart N° 12339 (NOAA, 2000) indicates rocky areas at MP 0.2.

2) MP 0.2 to MP 1.0

In this section the route turns, passing between North Brother Island and the Bronx with water depth varying between 65 to 75 feet MLLW. Available data from NOAA (2000) indicates that in this area the river bottom is probably made up of a hard substratum,

probably with numerous rocky outcrops of bedrock. Nautical chart N° 12339 (NOAA, 2000) indicates rocky areas at 0.7, MP 0.9, and MP 1.0.

3) MP 1.0 to MP 1.3

This section of the route crosses the mouth of the Bronx Kill River. Water depth here varies between 45 and 65 feet MLLW. Based on data available from NOAA plus the fact that this area is located just at the mouth of the Bronx Kill, where sediments are potentially discharged into the East River, it is possible that the bottom materials in this area might consist of sediments, mainly silts and clays, with scattered rocky mounds of shallow bedrock. Nautical chart N° 12339 (NOAA, 2000) shows a rocky area at MP 1.3.

4) MP 1.3 to MP 2.0

Variable water depths from 35 to 70 feet MLLW exist in this section of the route which extends between Wards Island and Queens. The only available data to characterize the river bottom geology in this section is provided by NOAA (2000) which indicates a rocky bottom with numerous shallow, scattered outcrops of bedrock. Nautical chart N° 12339 (NOAA, 2000) shows rocky areas at MP 1.8 and MP 1.95.

5) MP 2.0 to MP 3.4

This section of the route extends South across Hell Gate and into the northeast extreme of the channel that separates Roosevelt Island from Queens. Water depth varies between 65 and 85 feet MLLW between MP 2.0 and MP 2.7, it then slopes up towards a 35 feet MLLW deep shoal between MP 2.7 and MP 3.2, and then slopes down to approximately 70 feet MLLW between MP 3.2 and MP 3.4. Based on available NOAA information a rough bottom surface comprised of rocky mounds and scattered outcrops of bedrock with patchy distribution of fine sediments probably characterize this section of the route. Nautical chart N° 12339 (NOAA, 2000) shows rocky areas at MP 2.7, MP 2.9, MP 3.15, and MP 3.35.

6) MP 3.4 to MP 4.1

The route continues its course along the East River through the eastern channel between Roosevelt Island and Queens. Water depths start at approximately 60 feet MLLW at MP 3.4 shallowing up to 15 feet MLLW at MP 4.1. Sandy and muddy bottom sediments are indicated in this area in the Nautical chart N° 12339 (NOAA,2000) at MP 3.5 and 3.6 respectively, with some scattered rocky mounds shown close to MP 4.0.

3.0 PHYSICAL OCEANOGRAPHY

This section summarizes the tide and tidal current regime in the East River of New York, between Oak Point and the southern end of Roosevelt Island. While historical, real-time, and forecast data were reviewed, this section concentrates on NOAA predictions of tide height and tidal currents for 2003.

There are 58 documented historical NOAA tide stations in the East River along its total length between the Battery and Willets Point. Most of these stations were occupied for relatively short periods, and only a few have digital data provided online at the NOAA CO-OPS web site.

There is a real-time Physical Oceanographic Real Time System (PORTS) system for New York and New Jersey harbor. This system reports water heights, currents, conductivity/temperature, and meteorological parameters at a number of different locations. Unfortunately, the closest sensors to the study area are at The Battery and Kings Point. These particular stations measure water level and meteorological parameters, but not tidal currents.

The Port of New York and New Jersey also has a NOAA Operational Forecast System (NYOFS). This is a hydrodynamic model, supported by the PORTS sensors and other systems, that is run in both short range (Nowcast) and 30 hour modes. While the current forecast data is available on the worldwide web, there are no archive or benchmark runs of the model available for analysis.

There are 12 stations in the study area for which NOAA currently provides tide height predictions, and an additional 13 stations for which NOAA provides tidal current predictions. Tide height stations are normally located close to the shoreline or edges of the waterways; tidal current "stations" are normally considered to be at the center of the stream, channel or waterway. The current stations in this area are referenced to the Hell Gate station. The easternmost tide stations are referenced to Kings Point, while the western and southern stations are referenced to New York (The Battery).

3.1 Tides

Tides in the study area are semidiurnal, with a normal range of 4 feet to 7 feet. The range of spring tides is 5 to 8 feet, while the range of neap tides is 2 to 4 feet. The 6-minute (0.1 hour) 2003 tide predictions for the Hell Gate station are shown in Figure 3.1.

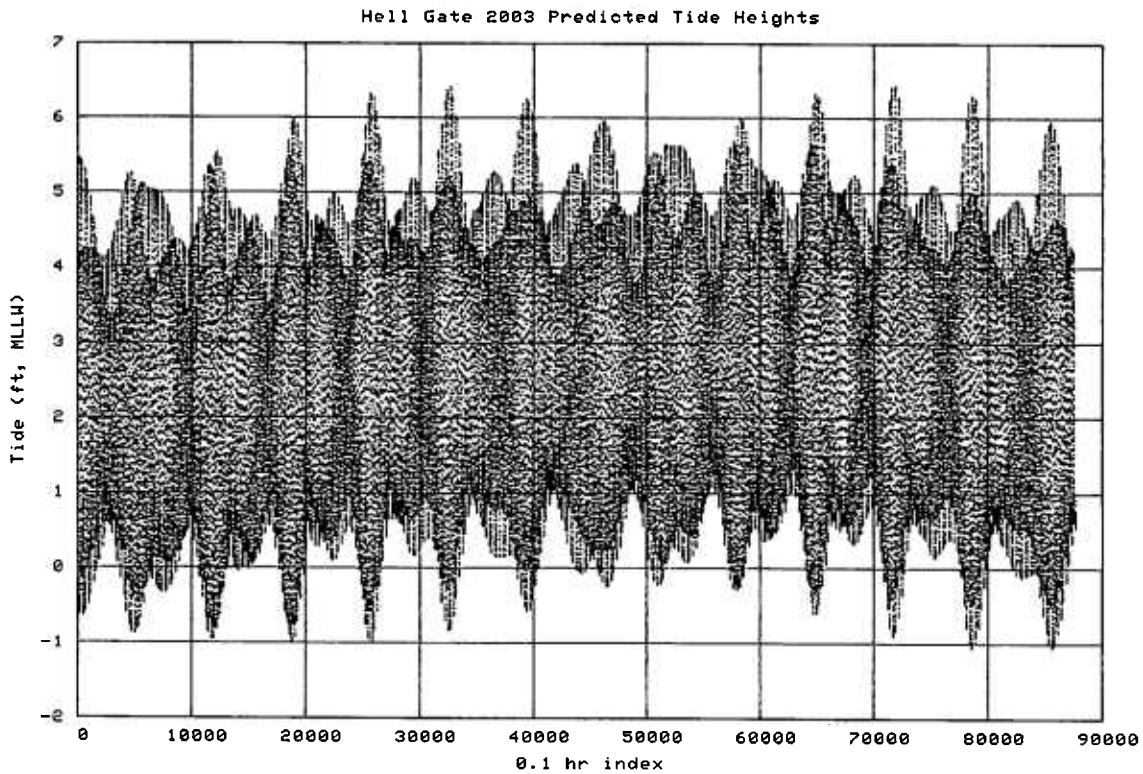


Figure 3.1 - 2003 Predicted Tide Heights at Hell Gate (8518668)

As shown in Table 3.1, the range of tides is least near the southern end of Roosevelt Island, and increases as one proceeds to the north and east towards Hunts Point.

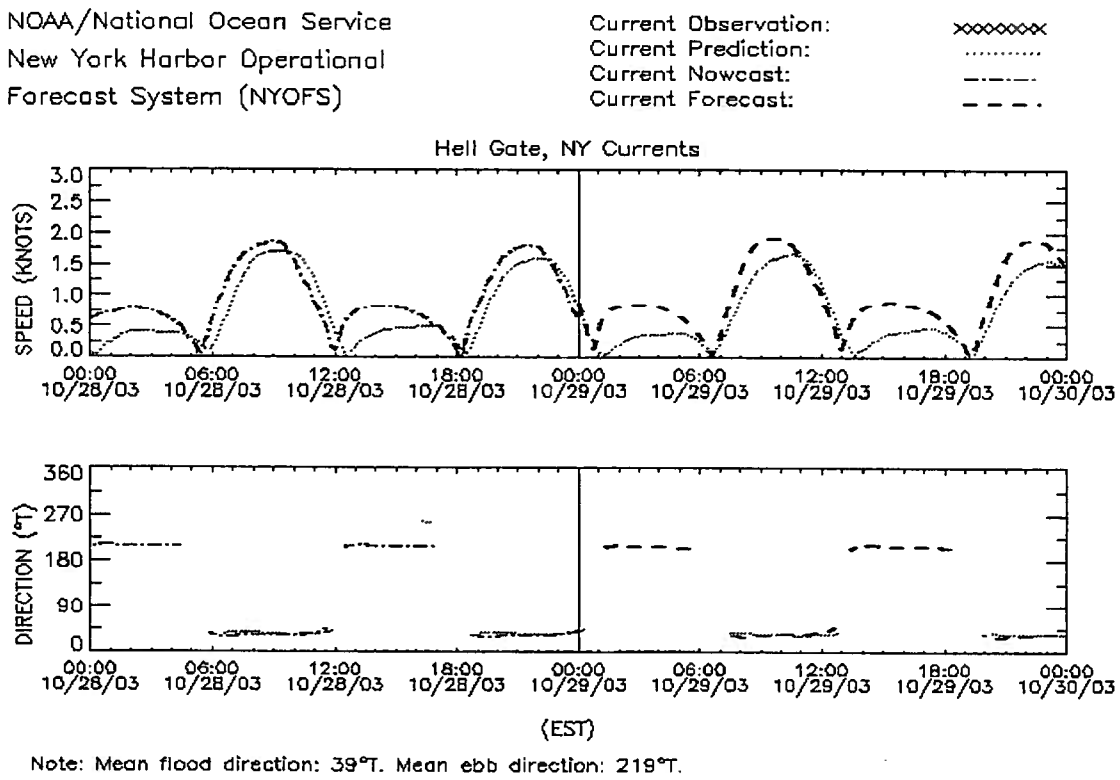
Station	Lat	Long	Mean Range (ft)	Spring Range (ft)	Neap Range (ft)
Hunts Point	40° 48'	73° 52'	6.9	8.1	3.8
North Brother Island	40° 48'	73° 54'	6.6	7.8	3.6
Port Morris (Stony Point)	40° 48'	73° 54'	6.3	7.4	3.4
Lawrence Point	40° 47'	73° 55'	6.4	7.6	3.5
Hell Gate, Wards Island	40° 47'	73° 55'	6.0	7.3	3.4
Hell Gate, Hallets Point	40° 47'	73° 56	5.1	6.1	2.7
Horns Hook, East 90th Street	40° 47'	73° 56'	4.7	5.7	2.6
Roosevelt Island, north end	40° 46'	73° 56'	4.8	5.8	2.6
37th Avenue, Long Island City	40° 46'	73° 57'	4.5	5.5	2.4
East 41st Street, New York City	40° 45'	73° 58'	4.3	5.2	2.4
Hunters Point, Newtown Creek	40° 44'	73° 57'	4.1	4.9	2.2
English Kills entrance, Newtown Creek	40° 43'	73° 55'	4.2	5.0	2.3
East 27th Street, Bellevue Hospital	40° 44'	73° 58'	4.2	5.0	2.3

Table 3.1 - Other East River Tide Prediction Stations

3.2 Tidal Currents

The Hell Gate area is legendary for its swift and treacherous tidal currents. There are no reporting real-time tidal current stations in the study area. The NYOFS does produce a Hell Gate tidal current nowcast and forecast, as shown in Figure 3.2. The magnitudes of the predicted and nowcast tidal current speeds differ significantly from the standard daily predictions tables. In the future, the NOAA Operational Forecast System should be a more valuable source. NOAA recognizes the requirement for archive runs for analysis

and study. The model grid varies from 50 meters to 150 meters horizontally, small enough to generate high temporal and spatial resolution current (and height) data to support engineering studies.



Note: Mean flood direction: 39°T. Mean ebb direction: 219°T.

Figure 3.2 - NYOFS Hell Gate Current Nowcast/Forecast

A recent current study of the portion of the East River that lies east of Roosevelt Island was conducted for Verdant Power. The company installed a prototype water turbine, and conducted ADCP current studies of the area. They are planning to install hundreds of the turbines in this section of the river for electrical power generation. It appears that the cable route for this study may pass through, or near, these turbines. Additional details of the proposed project are available at the web site cited in the references.

Daily current predictions are provided for Hell Gate, and the other stations are referenced to it. Almost all time differences are less than 0.5 hours, and the flood and ebb speed ratios are less than 1.0 except to the east of Roosevelt Island, where they are 1.1.

Figures 3.3 and 3.4 show the predicted variation in max flood and ebb speeds at Hell Gate. Similar variations should exist at the subordinate stations.

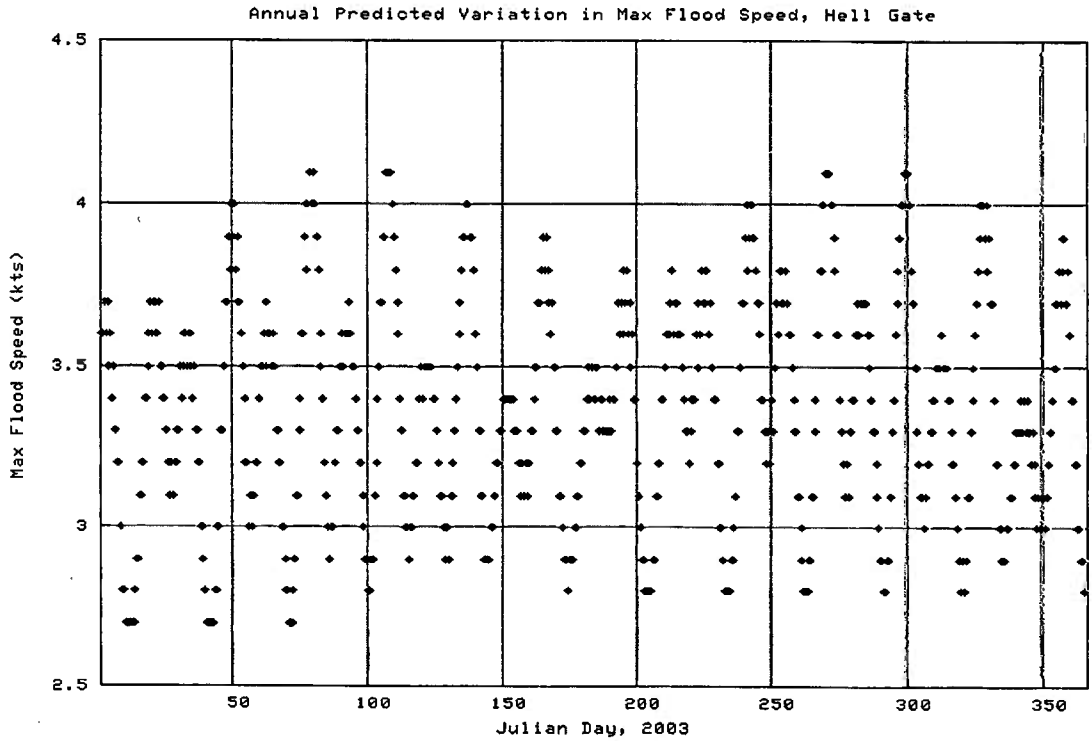


Figure 3.3 – Maximum Flood Variation (predicted)

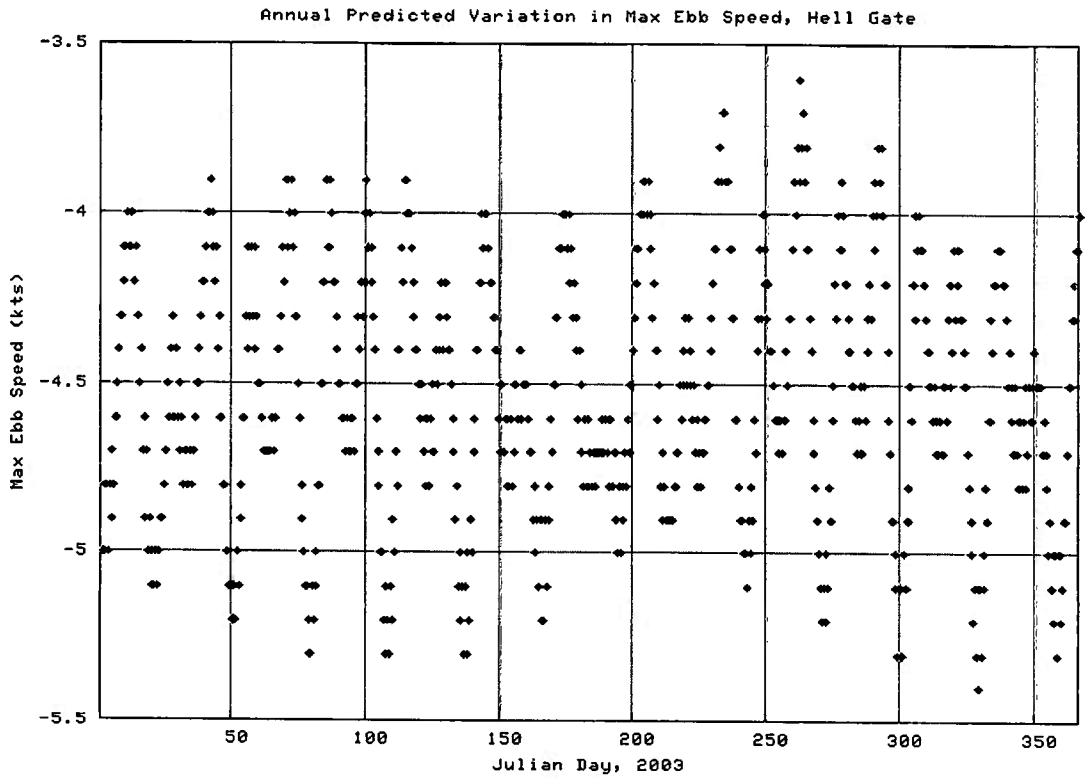


Figure 3.4 - Maximum Ebb Variation (predicted)

Normal tidal current predictions only include the times of slack water and the peak flood and ebb currents. In order to produce a time-synchronized set of currents, the Hell Gate daily prediction "compact form" was first translated to a non-uniform time series. A sinusoidal form to the velocity curves was then assumed (based on the NYOFS current predictions), and each phase of the current (slack to flood, flood to slack, slack to ebb, ebb to slack) was interpolated at 0.2 hour time steps using the reference station velocities and times modified by the subordinate station time differences, velocity ratios, and ebb/flood directions. Figure 3.5 shows the predicted tidal currents (positive = flood, negative = ebb) along the proposed cable route. Figure 3.6 shows a smaller section centered on day 300.25 that more clearly illustrates both the amplitude and phase shifts in the predicted currents.

Predictions for all stations over the entire year 2003 are included in digital form in Appendix 1.

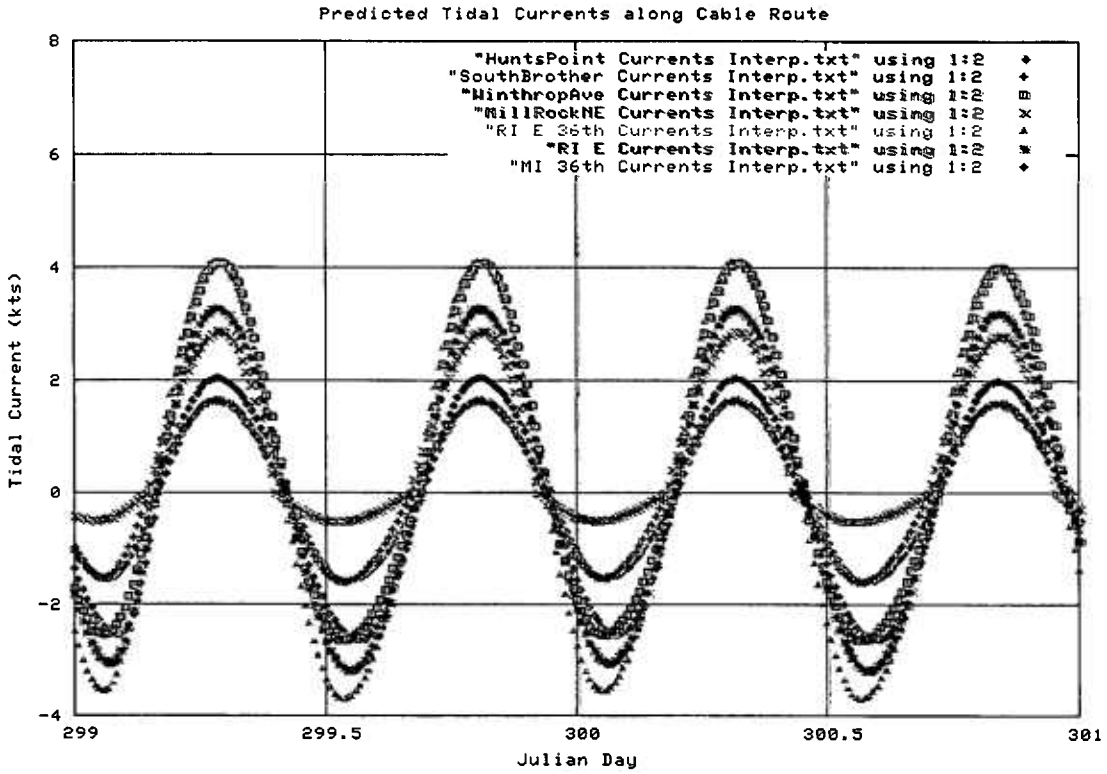


Figure 3.5 - Predicted Tidal Currents along East River Route

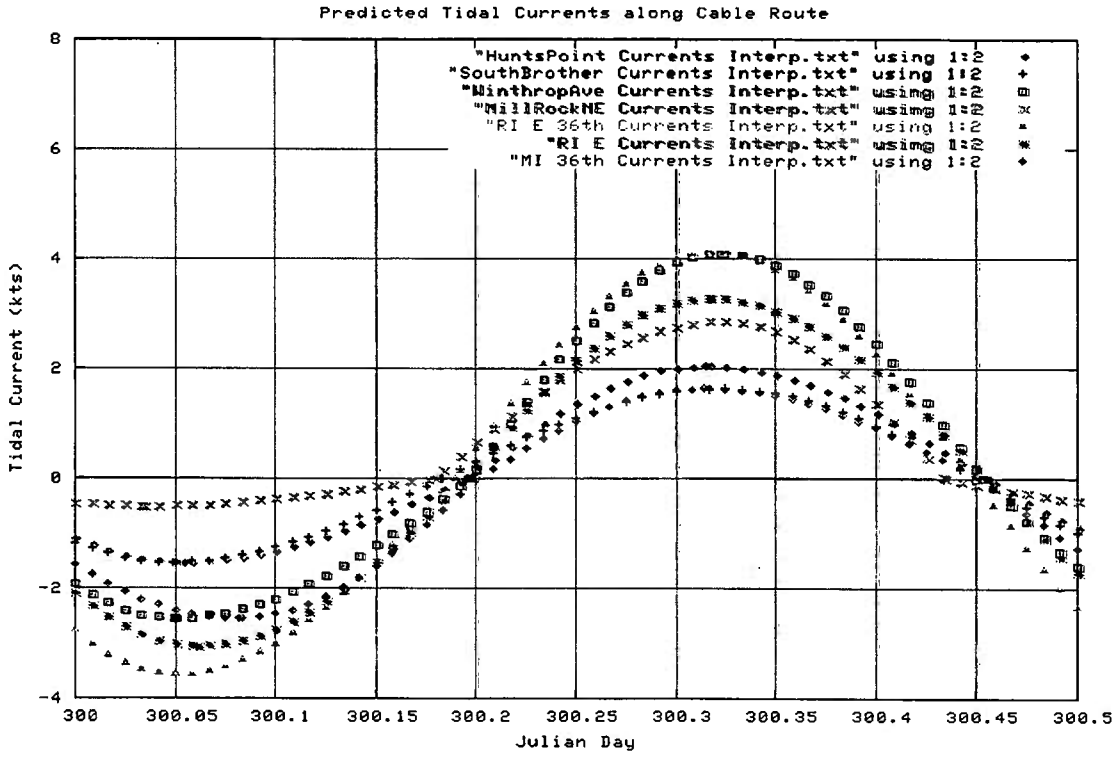


Figure 3.6 - Expanded View centered at Day 300.25.

3.3 Oceanographic Summary

The East River has semidiurnal tides with a normal range from 4 to 7 feet, increasing to 5 to 8 feet during spring tides. The tidal range decreases along the path from Oak Point toward the southern end of Roosevelt Island. Tidal currents in the area are strong, with peak speeds exceeding 5 knots.

4.0 ADDITIONAL MARINE CONSIDERATIONS

4.1 Commercial Vessel Traffic

The East River is highly utilized by commercial vessels. Over a one year period, from May 1998 to April 1999, over 8,000 tug and oil barges, 5,000 tugs and scows, and 3,300 tank ships transited the East River using the New York Vessel Traffic Services System. These represent the top three vessel types, although numerous other vessels transited the East River during the period. Since that time, vessel traffic has increased significantly (Personal communication, Lt. Mike Keane, USCG Senior Watch Officer, VTS 718.354.4319).

The East River is under the control of the New York Vessel Traffic Services System. The VTS is a mandatory system and applies to all vessels of 40 meters and over in length, all vessels certified to carry 50 or more passengers for hire and engaged in trade and all commercial vessels of 8 meters and over in length engaged in towing another vessel. All vessels of 20 meters and over in length and all dredges and floating plants, while not under the control of the New York VTS, must still maintain a constant VHF radio watch on the sector radio frequencies while within the VTS zone.

While in the New York VTS zone all applicable vessels must keep watch on designated sector radio frequencies (VHF Channels 11, 12, and 14), and adhere to VTS directions. VTS may mange traffic by specifying times of entry, movement, or departure to, from or within the New York VTS area.

4.2 Bridge Clearances

There are a total of twelve bridges and one tunnel section within the general area of the cable project. Table 4.1 highlights the specific clearances for each bridge. The single tunnel, the E 63rd Street Tunnel, has a maximum authorized depth 45 ft MLLW on the west side and 35 ft MLLW on the east side of Roosevelt Island.

Bridge	Horizontal Clearance (ft)	Vertical Clearance (ft)	Note
Brooklyn Bridge	1,350	127	Fixed, 110ft under moving platforms
Manhattan Bridge	1,200	134	Fixed
Willamsburg Bridge	1,536	133	Fixed
Queensboro Bridge	760	133	East span
Queensboro Bridge	900	131	West span
36th Ave Lift Bridge	403	40 down, 99 up	Lift
Negro Pt. - Triborough Bridge	Unlimited	138	Fixed
Conrail Bridge	830	134	Fixed
Foot Bridge	300	56 down, 136 up	Lift bridge south end of Wards Island to Manhattan
E125th St – Triborough Bridge	204	54 down, 136 up	Lift
Willis Ave Bridge	109	25	Swing
Rikers Island Bridge	125	52	Fixed

Table 4.1 – Bridge Clearances

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http://chartmaker.ncd.noaa.gov/hsd/awois/contus/NewYorkCity.htm

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Port of New York and New Jersey Operational Forecast System Web Site
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Port of New York and New Jersey PORTS Web Site
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APPENDIX 1

DIGITAL DATA FILES LISTING

DIGITAL DATA FILES LISTING

Historical Tide Stations: East_River_Historical_Tide_Stations.txt
Predicted Tide Stations: East_River_Predicted_Tide_Station.txt
Predicted Current Stations: East_River_Current_Diffs_Local.txt
Hell Gate Tide Predictions: 8518668_Jan03.htm
8518668_Feb03.htm
8518668_Mar03.htm
8518668_Apr03.htm
8518668_May03.htm
8518668_Jun03.htm
8518668_Jul03.htm
8518668_Aug03.htm
8518668_Sep03.htm
8518668_Oct03.htm
8518668_Nov03.htm
8518668_Dec03.htm
Hell Gate Tide Time Series: 8518668_2003.txt
Subordinate Tide Station Predictions (compact form):
Hunts Point - hunts_pt.pre
North Brother Island - nbrother_is.pre
Port Morris - port_morris-stony_pt.pre
Lawrence Point - lawrence_pt.pre
Hell Gate, Wards Is. - hellgate-wards_is.pre
Hell Gate, Hallets Pt. - hellgate-halltes_pt.pre
Hell Gate, Horns Hk - horns_hook-e90st.pre
Roosevelt Island N - roosevelt_is.pre
37th Avenue - 37th_ave.pre
East 41st Street - e41st.pre
Hunters Point - hunters_pt-newtown_creek.pre
English Kills - english_kills-newtown_creek.pre
East 27th Street - e27st-bellevue_hosp.pre
Hell Gate Current Predictions: Hell_Gate_Current_Predictions.txt
Hell Gate Current Time Series: HellGate_Currents_FES.txt
Interpolated (0.2 hr) Current Time Series:
Hell Gate - HellGate_Currents_Interp.txt
Hunts Point - HuntsPoint_Currents_Interp.txt
Manhattan, 36th St - MI_36th_Currents_Interp.txt
Mill Rock, NE - MillRockNE_Currents_Interp.txt
Mill Rock, West of - MillRockW_Currents_Interp.txt

Roosevelt Is,E36th Ave - RI_E_36th_Currents_Interp.txt
Roosevelt Island, East Side - RI_E_Currents_Interp.txt
Roosevelt Is, W63rd St. - RI_W_63rd_Currents_Interp.txt
Roosevelt Is, W67th St. - RI_W_67th_Currents_Interp.txt
Roosevelt Is, W75th St. - RI_W_75th_Currents_Interp.txt
South Brother Island - SouthBrother_Currents_Interp.txt
Winthrop Avenue - WinthropAve_Currents_Interp.txt

Ocean Surveys, Inc. AutoCAD Drawing Files