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Technical Memorandum

To:	Project Files
From:	Stephen James Holley, Vice President
Date:	July 12, 2010
Re:	Town of Babylon, Wyandanch Intermodal Transit Facility Project - FTA EA, Supplemental Information and Analysis Methodologies
cc:	Vanessa Pugh, Town of Babylon

A. INTRODUCTION

This technical memorandum has been prepared to document supplemental baseline information related to the study area for the referenced project, and to provide additional details related to the analysis methodologies employed in analyses prepared for the Environmental Assessment (EA) for this project, and documented in the "Wyandanch Intermodal Transit Facility Environmental Assessment," prepared for the Federal Transit Administration (FTA).

Supplemental information is provided for the following analysis areas: Historic Resources; Urban Design and Visual Resources; Air Quality; Infrastructure; Natural Resources; and Indirect and Cumulative Effects. In addition, more detailed descriptions of the specific methodology(ies) used in the following analyses are also provided in this memorandum: Historic Resources; Transportation; Air Quality; Noise; Indirect and Cumulative Effects; and Environmental Justice..

B. HISTORIC RESOURCES

This section corresponds to Chapter 4 of the EA, and provides additional information concerning the regulatory context for analyses of historic resources for transportation projects, and the methodologies used to conduct these analyses.

REGULATORY CONTEXT

Section 106 of the National Historic Preservation Act (NHPA) of 1966, as implemented by federal regulations at 36 CFR Part 800, requires that federal agencies consider the effect of their actions on any properties listed on or determined eligible for listing on the National Register of Historic Places. Properties on the National Register may include historic structures, sites, and districts as well as buried archaeological sites. Federal agencies, in consultation with the SHPO, must determine whether a proposed action would have any effects on the characteristics of a site that qualify it for the State and National Registers of Historic Places (S/NR). The review under Section 106 can be conducted in coordination with

NEPA. Section 106 also requires the federal agencies to consult with the Advisory Council on Historic Preservation if potential adverse effects on historic properties would occur. NHPA also requires the opportunity for public comment on the project's effects on historic resources.

In addition, historic properties are also protected from adverse effects by Section 4(f) of the Department of Transportation Act of 1966, which prohibits actions by the Secretary of Transportation that require the "use" of a historic property that is listed in or eligible for inclusion in the S/NR, unless a determination is made that there is no feasible and prudent alternative to such use, and all possible planning has been undertaken to minimize harm to the 4(f) property.

The New York State Historic Preservation Act of 1980 (SHPA), which closely resembles NHPA, requires State agencies to consider the effect of their actions on properties listed on or determined eligible for listing on the State Register of Historic Places. Compliance with Section 106 satisfies the requirements of SHPA, set forth in Section 14.09 of the New York State Parks Recreation and Historic Preservation Law.

METHODOLOGY

Historic resources include both archaeological resources and historic resources (architectural resources). The methodology followed was consistent with the procedures set forth under Section 106, and included the following:

- Establish the Area of Potential Effect (APE) to be evaluated for historic resources and for archaeological resources.
- Identify archaeological resources and historic structures within the APEs. These include National Historic Landmarks (NHLs), properties listed on the State and National Registers of Historic Places (S/NR) or determined eligible for such listing, and Town of Babylon preservation districts and individual landmarks. They also include other sites or properties in the APE that appear to meet the criteria for listing on the S/NR.
- For potential archaeological resources and architectural resources identified, evaluate the potential effect of the project alternatives on those resources, in consultation with the SHPO.
- For potential adverse effects, identify measures to avoid or minimize those effects.

Conduct consultation with the SHPO and parties interested in the resources identified (referred to as Consulting Parties) regarding effects on and measures to avoid adverse effects on archaeological and architectural resources.

C. URBAN DESIGN AND VISUAL RESOURCES

This section corresponds to Chapter 5 of the EA, which evaluated the Project's potential impact upon the urban design character and visual resources of the Project Site and immediate area. For this analysis, urban design components and visual resources include the physical appearance, including the size and shape of buildings and their arrangement on blocks, streetscape elements and street pattern, and any noteworthy views that give the area a distinctive character.

The study area for this urban design and visual resources analysis includes the area within 1,000 feet of the Project—including where the new street network would be created and the portions of Straight Path where off-site improvements are proposed—from which the Project may be seen, and therefore the farthest distance in which the Project has the potential to affect the surrounding visual context. This 1,000-foot study area includes the existing LIRR Wyandanch station and tracks, commercial facilities on Straight Path and Merritt Avenue, and nearby residences. These areas would be greatly enhanced from their current state.

URBAN DESIGN

The evaluation of urban design considers, design elements as building characteristics, pedestrian and bicycle infrastructure elements, including the design of sidewalks, crosswalks, traffic signals, and bicycle

facilities; and overall visual character, including scale, the presence of open space, amenities, and signage of the Project Site and study area.

BUILDING CHARACTERISTICS

The study area is a conglomerate of buildings of various shapes, sizes, and materials with some vacant land and open uses, including parking lots and a drainage basin. In general, the buildings in the study area are predominantly masonry with a variety of textures and patterns.

The Project Site includes one of the largest buildings in the study area, Huntington Honda, a one-story building on Acorn Street east of Straight Path that is in disrepair. It also includes a one-story, L-shaped shopping center at the northeast corner of Straight Path and Acorn Street (see **Figure 5-1a**). This shopping center is typical of suburban-style development, with asphalt parking in the front of the building catering to automobiles and weakening the downtown streetscape. At-grade parking lots on the Project Site front on both Straight Path and Acorn Street (See **Figure 5-1b**); the study area also includes a number of vacant parcels (see **Figure 5-2a**).

There are also a number of community facilities in the area, including the large (approximately 100,000 square feet) Town of Babylon Youth Center, which fronts on Washington Avenue (see **Figure 5-2b**). Across from the Youth Center on the east side of Andrews Avenue are two small churches that appear to be converted residences, interspersed with vacant land. South of the Youth Center on Andrews Avenue, a vacant, boarded up, and rusted building and two vacant residences with boarded windows and damaged facades contribute to an appearance of disrepair. Along the west side of Straight Path in the area where street improvements are proposed, the mix of uses and building types include a gas station, two-story residence, drainage basin, and auto repair shop.

Just south of the Project Site, the Metropolitan Transportation Authority (MTA) LIRR Main Line/Ronkonkoma Branch tracks pass through the study area, with surface parking lots (including those on the Project Site) serving commuters. Close to the Wyandanch train station, a retail strip of one- and two-story buildings approximately 35 feet in height fronts on Merritt Avenue (see **Figure 5-3a**). The LIRR Wyandanch station is a small, modern structure (see **Figure 5-3b**) that because of its purpose acts as a focal point in the community. It does not contribute a strong sense of place due to the large area of surface parking that surrounds it.

In general, many of the buildings in the study area are not architecturally distinguished, with a mix of storefronts that do not relate visually to upper façade areas. Several of the retail facilities on Straight Path and Merritt Avenue are vacant (see **Figure 5-4a**).

INFRASTRUCTURE ELEMENTS

This section discusses the existing bicycle and pedestrian infrastructure at the Project Site. Design plans highlighting the location of bicycle and pedestrian amenities have been included in one of the EA's Appendices.

The downtown corridor (i.e., Straight Path) currently lacks bicycle transportation facilities and provides minimal pedestrian accommodations. Sidewalks, streetlights, and landscaping along the corridor are inconsistent in design, and street crossings are inconveniently located and/or not oriented for pedestrians. There are few bicycle parking racks in downtown Wyandanch and no striped or signed on-street bicycle lanes or off-street paths, resulting in generally unsafe conditions for cyclists. However, notwithstanding the lack of dedicated cycling lanes, cyclists are routinely seen riding on sidewalks and against traffic on Straight Path, which increases the potential for bicycle/pedestrian and bicycle/vehicle conflicts (see **Figure 5-4b)**.

The less than optimal conditions faced by cyclists and pedestrians in downtown Wyandanch are largely the result of the high truck volumes and irregular traffic patterns on Straight Path and Acorn Street, which isolates the southern downtown corridor from the railroad tracks. A detailed summary of existing pedestrian and bicycle conditions is described below.

Figure 5-1a

Figure 5-1b

Wyandanch Intermodal Transit Facility

Figure 5-1
Area Photographs

Figure 5-2a

Figure 5-2b

Figure 5-3a

Figure 5-3b

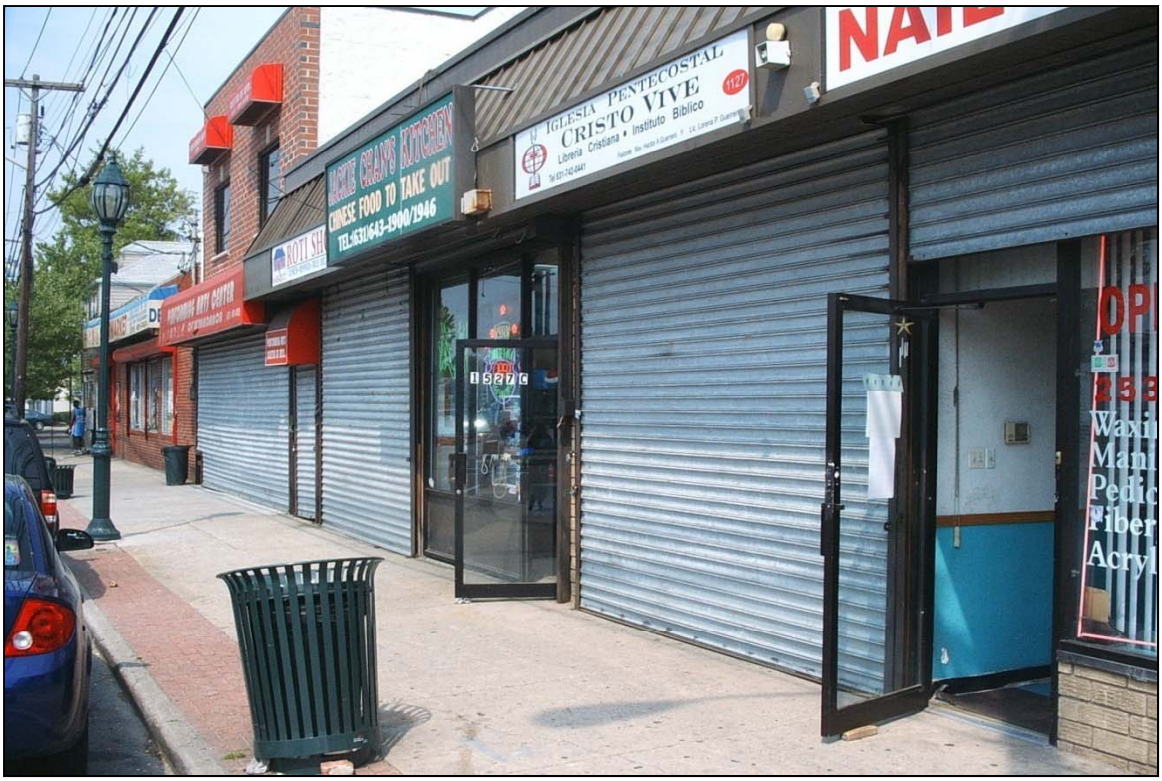


Figure 5-4a

Figure 5-4b

Sidewalks

Approximately half of the existing sidewalks in downtown were recently constructed and are in good condition. The remainder of the infrastructure is in poor condition, including cracked sidewalks and curbs. The broken sidewalks create tripping hazards and impede travel for pedestrians.

Although recent sidewalk construction in some parts of downtown provides space for pedestrians, sidewalks are often too narrow to meet minimum Americans with Disability Act (ADA) requirements or are obstructed by lampposts, utility poles, or vehicles (see **Figure 5-5a**).

Sidewalk treatments throughout downtown vary in materials between concrete and brick, or a combination of a concrete walkway and decorative colored/imprinted concrete strip. There is no unifying pattern designating downtown (see **Figure 5-5b**).

Sidewalks are not installed on every downtown street. The taxi facility at the intersection of Long Island Avenue and Grand Boulevard, which is directly adjacent to the train station, provides no sidewalk space for pedestrians (see **Figure 5-6a**). In areas with heavy vehicular traffic, sidewalks are necessary to separate pedestrians from automobiles and encourage walking. The existing sidewalks in downtown Wyandanch are in close proximity to moving traffic, creating uncomfortable situations for pedestrians, particularly on Straight Path. Pedestrians are generally safer with a buffer between the sidewalk and vehicle travel lanes, such as street trees, furniture, or a parking lane.

In general, the existing roadway alignment downtown allows motorists to see pedestrians on sidewalks and in crosswalks. There are no significant vertical grade changes. The horizontal alignment of streets vary on either side of Straight Path; to the northwest, the streets are oriented to a traditional grid plan, while those to the southeast tend to follow a street hierarchy with several arterial streets and intersecting local streets. Typically, smaller blocks and connected street patterns, similar to the grid plan, are safer for pedestrians in terms of visibility.

Crosswalks

Crosswalks that are clearly marked are most effective for motorists and pedestrians. The majority of crosswalks in downtown Wyandanch are newly striped and in good condition. However, in locations where traffic is heavy, several of the crosswalks have faded and are not successful in defining pedestrian space.

At several locations the crossing distance for pedestrians is extremely long and may be difficult for the elderly, children, or anyone who needs additional time to cross. The connection across the LIRR tracks from the southern side of Straight Path to the LIRR Wyandanch station is not marked clearly and is confusing for pedestrians (see **Figure 5-6b**). The sidewalk ends on either side of the railroad tracks and transitions into asphalt, where the pedestrian is forced to cross the railroad tracks in unmarked paving adjacent to a vehicle lane. A pedestrian bridge over the railroad tracks exists east of the eastern end of the train platform (see **Figure 5-7a**). However, it does not connect directly to the train platform and is poorly connected to the surrounding streets, and is therefore infrequently utilized.

Curb ramps are generally constructed at intersections and medians to provide critical access between the sidewalk and street for people with mobility impairments. The majority of crossings in the study area have sufficient curb ramps. The newly constructed sidewalks provide regulation curb ramps. Ramps should be located at each designated crossing to facilitate pedestrian movement straight through the crosswalk.

Signals and Timing

The existing signal timing favors vehicles over pedestrians. In general, shorter cycle lengths and longer walk intervals provide better service to pedestrians and encourage better signal compliance. Downtown Wyandanch, as it exists today, is not very pedestrian-friendly, and many pedestrians will simply choose to ignore the signal and cross if and when there is a gap in traffic, negating the potential safety benefits of the exclusive signal.

Figure 5-5a

Figure 5-5b

Wyandanch Intermodal Transit Facility

Figure 5-5
Area Photographs

Figure 5-6a

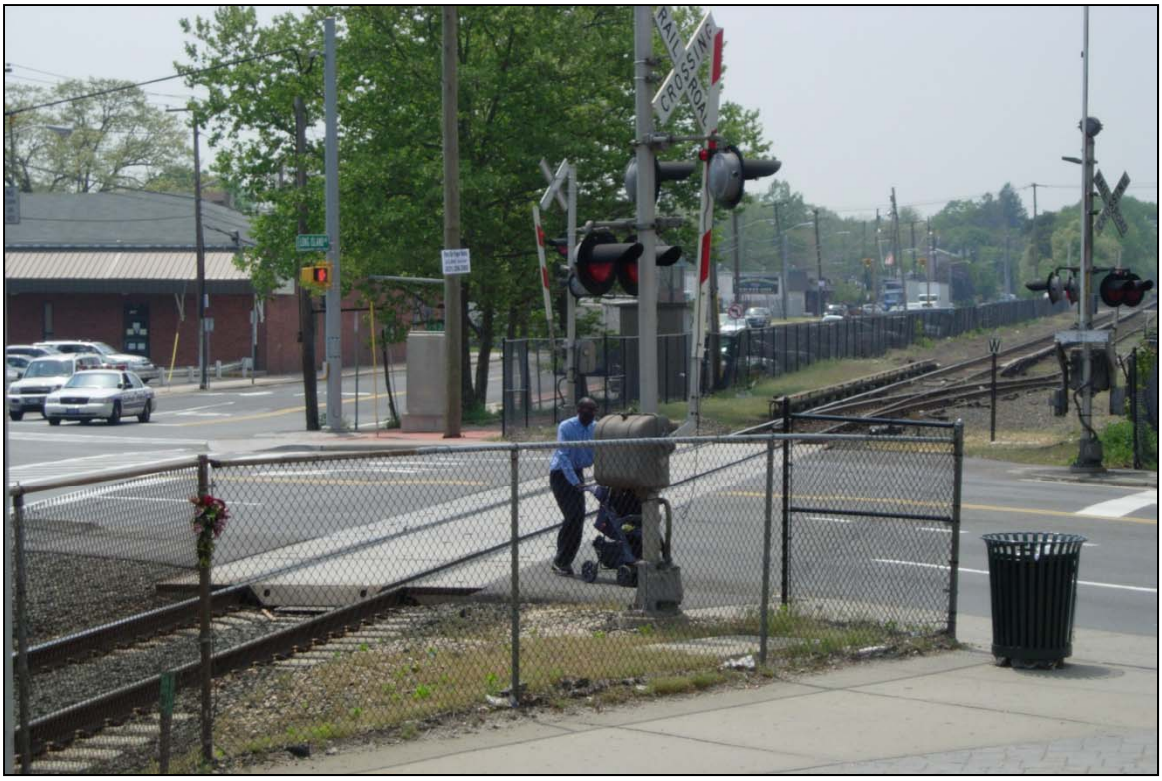


Figure 5-6b

Figure 5-7a

Figure 5-7b

Wyandanch Intermodal Transit Facility

Figure 5-7
Area Photographs

Most intersections in the downtown area do not have signals for pedestrians to cross. Where the few signal heads have been installed, they are often obstructed by utility poles or overgrown trees, or are installed in locations that are difficult for pedestrians to detect.

At heavily utilized intersections in downtown Wyandanch, pushbuttons are installed for pedestrians to request a signal change to cross. The signals in downtown Wyandanch are accompanied with instructional signage for pedestrians. The placement of the pushbutton signals is often not directly adjacent to the intersection and may be confusing to people who are trying to cross. In order for pushbuttons to be effective, they should be within reach for pedestrians in wheelchairs, be conveniently placed, and trigger a quick response.

Bicycle Facilities

Suffolk County bicycle maps created by the New York State Department of Transportation indicate that a designated Class III "On-Road Bikeway" (Shared Roadway) is located on Grand Boulevard and continues west on Long Island Avenue through downtown Wyandanch. However, there are currently no striped bicycle lanes. "Bike Route" signage, which conforms to the national Manual on Uniform Traffic Control Devices (MUTCD), is provided along the bikeway in downtown Wyandanch. Several cyclists were observed riding downtown, although they did not follow required traffic rules for cyclists—cyclists were observed riding against traffic in the shoulder on Straight Path and on sidewalks. The shoulder on Straight Path generally functions as a bike lane, although vehicles often park in the shoulder and force bicycles into moving traffic.

Bicycle parking facilities are available in select locations downtown (see **Figure 5-7b**), although placement is sporadic and not conducive for commuters wishing to bike to the LIRR Wyandanch station. Field observations indicated that cycling is a common mode of transportation throughout downtown Wyandanch and adequate facilities are not provided (see **Figure 5-8**). Bicycle parking should be visible, accessible, easy to use, and convenient.

VISUAL CHARACTER

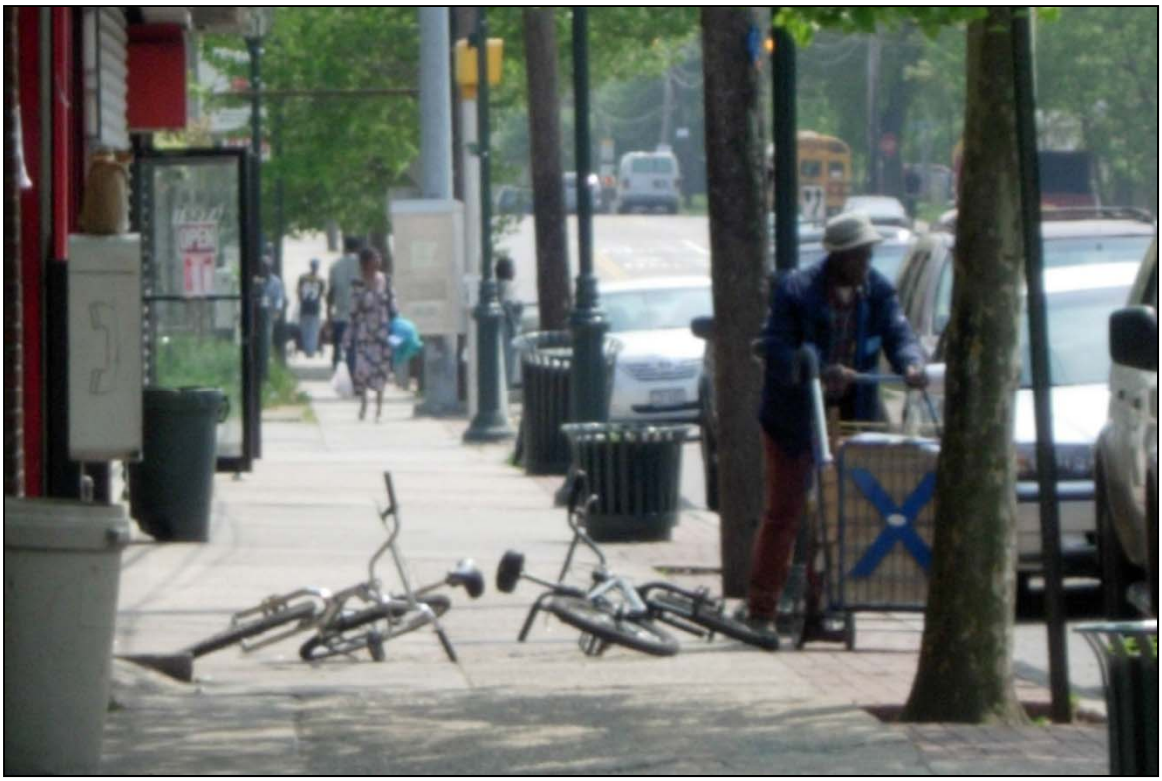
Scale

The existing scale of downtown Wyandanch is not conducive to pedestrian uses. Straight Path, which serves as the area's "main street," is a wide thoroughfare with heavy vehicular traffic that does not create an environment that is inviting to pedestrians, particularly the portion of Straight Path included as part of the Project Site. The streetwall (the vertical face of the buildings adjacent to and fronting the sidewalk) in downtown Wyandanch is inconsistent, with sporadic locations of buildings of varying height and setbacks from the street.

A pleasant downtown walking experience is often characterized by densely spaced buildings of a human scale with comfortable places to stand and sit. The benefit of a tight streetwall is the appearance of framing the street and narrowing the driver's field of vision, which draws the motorists' attention to pedestrians in or near the roadway. Currently, downtown Wyandanch does not generally exhibit these characteristics.

Open Space

Currently, the only public open space in downtown is the small Veteran's Plaza on Straight Path near the intersection of Commonwealth Drive (see **Figure 5-9**). Geiger Memorial Park, consisting of several sports fields, is located approximately ½ mile east of Straight Path at the intersection of Long Island Avenue and Elk Street. Geiger Park is an active recreational facility rather than a passive downtown amenity. Streets themselves present the greatest opportunity to provide a public open space amenity in a downtown environment. By providing outdoor seating and opportunities for people to gather, streets become active and pedestrians generally feel safer with other people nearby. Street trees also reduce the urban heat island effect.



Wyandanch Intermodal Transit Facility

Figure 5-8
Area Photographs

Wyandanch Intermodal Transit Facility

Figure 5-9
Area Photographs

Amenities

Streetscape amenities, such as landscaping, street furniture, and unifying materials can help make a neighborhood feel safe and inviting. Downtown Wyandanch incorporates some traditional streetscape elements, although they are not consistent in treatment or placement.

Along Straight Path south of Long Island Avenue, new decorative pedestrian-scale streetlights have been installed. The parking lot adjacent to the LIRR Wyandanch station, however, is lit only with utilitarian overhead street lights, which do not create an inviting environment for pedestrians. There is no street furniture, such as benches, trash receptacles, or bus shelters provided downtown. Field observations revealed the need for seating areas for pedestrians.

Similarly, street trees are present on Straight Path south of Long Island Avenue, but very few are planted elsewhere downtown. Street trees shade the sidewalk, clean the air, create a more pleasant environment, and reduce the urban heat island effect. They also provide separation between motorists and pedestrians and reduce storm water runoff.

Newspaper boxes, fire hydrants, and other encroachments obstruct the existing sidewalks, hindering mobility and creating visual clutter. Trash receptacles are located in the southern downtown area, although they are generally in poor condition and not properly maintained.

Signage

Wayfinding signage exists downtown, although the graphic content and quality is similar to that of the existing street signs and may be confusing to motorists and pedestrians (see **Figure 5-10**).

There is no existing gateway to notify visitors that they are entering the center of Wyandanch from the north along Straight Path. A "Welcome to Wyandanch" sign is present at the northwest corner of S. 21st Street and Straight Path as one heads north into the downtown area along Straight Path. Street lamps and planters are also present along Straight Path from Mount Avenue on the south to Long Island Avenue on the north. Additional gateway signage and other changes to the surrounding environment, such as paving treatments or physical landmarks, can create a unique image for the area, and can be used to notify vehicles that they have reached a specific place and to reduce speeds.

Traffic Calming

One notable issue in downtown Wyandanch, particularly along the portion of Straight Path included as part of the Project Site, is heavy traffic and truck volumes that often are moving above the posted speed limit. This condition creates an uncomfortable pedestrian environment, and can contribute to higher accident rates. To help address this issue, recent traffic calming improvements have been made along portions of Straight Path. Medians that were installed south of Long Island Avenue channel vehicular traffic and provide refuge for pedestrians, although the medians are not well maintained and do not provide adequate connections to crosswalks (see **Figure 5-11a**). Motorists may see pedestrians in the median, but without designated crossings, the motorist does not know where or when the pedestrian may try to cross. At present, there are no similar traffic calming measures in place along the Straight Path corridor, north of the LIRR tracks (i.e., the Project Site).

Street Use

The downtown area is currently dominated by automobiles, particularly heavy truck traffic (see **Figure 5-11b**). With four travel lanes dedicated to vehicles on Straight Path south of Long Island Avenue, congestion and speeding in the heart of downtown may be intimidating to pedestrians. Gas stations, parking lots, and other auto-related facilities nearby contribute to the overwhelming volume of vehicles in the area.

Access

Several commercial establishments currently face Straight Path and have driveways for vehicular access from Straight Path. Driveways interrupt the continuity of the sidewalk, and may cause safety concerns for

Figure 5-10
Area Photographs

Figure 5-11a

Figure 5-11b

pedestrians if the sloped pavement ramp extends through the sidewalk area. Wide curb cuts with large turning radii can create unpredictable vehicular movements in and out of driveways that cross sidewalks and high vehicle speeds. Other establishments allow pull-up parking in poorly defined lots in front of the store that compromise the integrity of the sidewalk and endanger passing pedestrians.

VISUAL RESOURCES

For purposes of this assessment, visual resources are places visited by or viewed by the public for the purpose of enjoying their beauty. Such a resource may be designated by a locality, a state agency, or a federal agency and is an important factor in assessing potential visual impacts. Visual resources can include the following:

- Properties listed on or eligible for the National or State Register of Historic Places;
- State and urban cultural parks, forest preserves and nature and historic preserve areas;
- National parks, natural landmarks, and wildlife refuges;
- Rivers that are designated as national or state wild, scenic, or recreational rivers;
- Areas designated by New York State as scenic areas of statewide significance;
- State or federally designated trails;
- Exceptional scenic beauty or open space bond act properties; and
- Transportation corridors as historic resources.

The 1,000-foot study area does not include any existing visual resources.

D. TRANSPORTATION

This section corresponds to Chpater 6 of the EA, and provides additional information concerning the methodologies and specific values that define level of service in the traffic analyses.

METHODOLOGY

CAPACITY ANALYSIS

Methodologies and Measures of Effectiveness

To evaluate existing traffic operations, capacity analyses were conducted using Synchro 7 traffic signal coordination software. The typical measures of effectiveness for intersection capacity analyses are volume-to-capacity ratio, delay, and level-of-service. Due to the close proximities of Project Site and extended study area intersections, queue lengths in the area were also examined.

Volume-to-Capacity Ratio
Volume-to-capacity ratio (v/c) is an indicator of the amount of congestion that occurs at a particular location. A v/c equal to or greater than 1 indicates traffic operations at or above capacity (high levels of congestion); a v/c less than 1 indicates traffic operations below capacity (lower levels of congestion).

Delay
Delay is an indicator of how much travel time, in addition to that which would be incurred for base conditions, is experienced on a transportation facility. Total delay, measured in seconds per vehicle (sec/veh), comprises control delay and queue delay. Control delay is additional time experienced due to downstream signalized or unsignalized traffic control, while queue delay is additional time incurred on short links and turn bays due to spillback, starvation, and storage blocking.

Level-of-Service
Level-of-service (LOS), defined in terms of control delay, is an indicator of how efficient traffic operations are at a particular location. LOS designations range from excellent LOS A (conditions with extremely favorable traffic signal progression and/or short cycle lengths such that most vehicles arrive on green) to failing LOS F (possibly oversaturated conditions with poor signal progression and/or long cycle lengths such that most vehicles arrive on red). The LOS thresholds for signalized and unsignalized intersections are provided in **Table 1**.

Table 1
LOS Designations for Signalized and Unsignalized Intersection Analysis

Signalized

LOS	Delay (sec/veh)
A	<10
B	>10 to 20
C	>20 to 35
D	>35 to 55
E	>55 to 80
F	>80

Unsignalized

LOS	Delay (sec/veh)
A	<10
B	>10 to 15
C	>15 to 25
D	>25 to 35
E	>35 to 50
F	>50

Queue Length
Queue length, dependent on arrival patterns and service times, is an indicator of congestion at a particular location. Extensive queues may result from high traffic volumes, inadequate traffic control, and/or insufficient lane or roadway capacities. Queues that exceed available storage at a location may block other movements at the location and may interfere with traffic operations at upstream locations. Since the 95th-percentile queue (i.e., the maximum back of queue in feet for 95th-percentile traffic volumes) is the only percentile queue in Synchro that accounts for the metered effects of upstream signals, it is this queue that was examined in analyses.

Data inputs for the Synchro models included:

- Link distances;
- Posted speed limits;
- Balanced peak-hour traffic volumes;
- Peak-hour pedestrian and transit volumes; and
- Traffic signal timings and phasings.

E. AIR QUALITY

This section corresponds to Chapter 7 of the EA. There are a number of pollutants that are of interest when conducting environmental analyses for a proposed project. These are described in detail below. In addition, state and national ambient air quality standards (NAAQS) are described along with information related to New York State's status with respect to attainment of the NAAQS and the New York State implementation plan for attaining these standards. This is followed by a description of how the significance of an air quality impact is determined, and a discussion of transportation conformity. Lastly, this section provides a detailed description of the methodologies used for the CO and parking screening analysis, with a summary of the existing and future conditions (with the proposal project) relative to air quality for the study area.

POLLUTANTS FOR ANALYSIS

CARBON MONOXIDE

CO, a colorless and odorless gas, is produced in the urban environment primarily by the incomplete combustion of gasoline and other fossil fuels. In urban areas, approximately 80 to 90 percent of CO emissions are from motor vehicles. Since CO is a reactive gas which does not persist in the atmosphere, CO concentrations can vary greatly over relatively short distances; elevated concentrations are usually

limited to locations near crowded intersections, heavily traveled and congested roadways, parking lots, and garages. Consequently, CO concentrations must be predicted on a local, or microscale, basis.

NITROGEN OXIDES, VOCS, AND OZONE

NO_x are of principal concern because of their role, together with VOCs, as precursors in the formation of ozone. Ozone is formed through a series of reactions that take place in the atmosphere in the presence of sunlight. Because the reactions are slow, and occur as the pollutants are advected downwind, elevated ozone levels are often found many miles from sources of the precursor pollutants. The effects of NO_x and VOC emissions from all sources are therefore generally examined on a regional basis. The contribution of any action or project to regional emissions of these pollutants would include any added stationary or mobile source emissions; the change in regional mobile source emissions of these pollutants would be related to the total vehicle miles traveled added or subtracted on various roadway types throughout the New York metropolitan area, which is designated as a moderate non-attainment area for ozone by the U.S. Environmental Protection Agency (EPA).

In addition to being a precursor to the formation of ozone, NO_2 (one component of NO_x) is also a regulated pollutant. Since NO_2 is formed predominantly from the transformation of NO in the atmosphere, it has mostly been of concern downwind from large stationary point sources, and not a local concern from mobile sources. However, with the promulgation of the 2010 1-hour average standard for NO_2, local sources such as mobile may become of greater concern for this pollutant.

LEAD

Airborne lead emissions are principally associated with industrial sources and motor vehicles that use gasoline containing lead additives. Effective January 1, 1996, the Clean Air Act (CAA) banned the sale of the small amount of leaded fuel that was still available in some parts of the country for use in on-road vehicles, concluding the 25-year effort to phase out lead in gasoline. Even at locations in the New York City area where traffic volumes are very high, atmospheric lead concentrations are far below the 3-month average national standard of 0.15 micrograms per cubic meter ($\mu g/m^3$).

RESPIRABLE PARTICULATE MATTER—PM_{10} AND $PM_{2.5}$

PM is a broad class of air pollutants that includes discrete particles of a wide range of sizes and chemical compositions, as either liquid droplets (aerosols) or solids suspended in the atmosphere. The constituents of PM are both numerous and varied, and they are emitted from a wide variety of sources (both natural and anthropogenic). Natural sources include the condensed and reacted forms of naturally occurring VOC; salt particles resulting from the evaporation of sea spray; wind-borne pollen, fungi, molds, algae, yeasts, rusts, bacteria, and material from live and decaying plant and animal life; particles eroded from beaches, soil, and rock; and particles emitted from volcanic and geothermal eruptions and from forest fires. Naturally occurring PM is generally greater than 2.5 micrometers in diameter. Major anthropogenic sources include the combustion of fossil fuels (e.g., vehicular exhaust, power generation, boilers, engines, and home heating), chemical and manufacturing processes, all types of construction, agricultural activities, as well as wood-burning stoves and fireplaces. PM also acts as a substrate for the adsorption of other pollutants, often toxic and some likely carcinogenic compounds.

As described below, PM is regulated in two size categories: particles with an aerodynamic diameter of less than or equal to 2.5 micrometers ($PM_{2.5}$), and particles with an aerodynamic diameter of less than or equal to 10 micrometers (PM_{10}, which includes $PM_{2.5}$). $PM_{2.5}$ has the ability to reach the lower regions of the respiratory tract, delivering with it other compounds that adsorb to the surfaces of the particles, and is also extremely persistent in the atmosphere. $PM_{2.5}$ is mainly derived from combustion material that has volatilized and then condensed to form primary PM (often soon after the release from an exhaust pipe or stack) or from precursor gases reacting in the atmosphere to form secondary PM.

SULFUR DIOXIDE

SO_2 emissions are primarily associated with the combustion of sulfur-containing fuels (oil and coal). Monitored SO_2 concentrations in Long Island are lower than the national standards. Due to the federal restrictions on the sulfur content in diesel fuel for on-road vehicles, no significant quantities are emitted from vehicular sources. Vehicular sources of SO_2 are not significant and therefore, an analysis of SO_2 from mobile sources was not warranted.

NATIONAL AND STATE AIR QUALITY STANDARDS

The NAAQS are presented in **Table 2.**

Table 2
National Ambient Air Quality Standards (NAAQS)

Pollutant	Primary		Secondary	
	Ppm	µg/m^3	ppm	µg/m^3
Carbon Monoxide (CO)				
8-Hour Average (1)	9	10,000	None	
1-Hour Average (1)	35	40,000		
Lead				
Rolling 3-Month Average (2)	NA	0.15	NA	0.15
Nitrogen Dioxide (NO_2)				
1-Hour Average (3)	0.100	188	None	
Annual Average	0.053	100	0.053	100
Ozone (O_3)				
8-Hour Average (4,5)	0.075	150	0.075	150
Respirable Particulate Matter (PM_{10})				
24-Hour Average (1)	NA	150	NA	150
Fine Respirable Particulate Matter ($PM_{2.5}$)				
Annual Mean	NA	15	NA	15
24-Hour Average (6,7)	NA	35	NA	35
Sulfur Dioxide (SO_2)				
Annual Arithmetic Mean (8)	0.03	80	NA	NA
Maximum 24-Hour Average (1,8)	0.14	365	NA	NA
Maximum 3-Hour Average (1)	NA	NA	0.50	1,300

Notes:
ppm – parts per million
µg/m^3 – micrograms per cubic meter
NA – not applicable
All annual periods refer to calendar year.
PM concentrations (including lead) are in µg/m^3 since ppm is a measure for gas concentrations. Concentrations of all gaseous pollutants are defined in ppm and approximately equivalent concentrations in µg/m^3 are presented.

(1) Not to be exceeded more than once a year.
(2) EPA has lowered the NAAQS down from 1.5 µg/m^3, effective January 12, 2009.
(3) 3-year average of the annual 98th percentile daily maximum 1-hr average concentration. Effective April 12, 2010.
(4) 3-year average of the annual fourth highest daily maximum 8-hr average concentration.
(5) EPA has proposed lowering this standard further to within the range 0.060-0.070 ppm.
(6) Not to be exceeded by the annual 98th percentile when averaged over 3 years.
(7) EPA has lowered the NAAQS down from 65 µg/m^3, effective December 18, 2006.
(8) EPA has proposed replacing the 24-hour and annual primary standards with a 1-hour average standard in the range of 0.050-0.100 ppm.

Source: 40 CFR Part 50: National Primary and Secondary Ambient Air Quality Standards.

EPA has revised the NAAQS for PM, effective December 18, 2006. The revision included lowering the level of the 24-hour $PM_{2.5}$ standard from 65 $\mu g/m^3$ to 35 $\mu g/m^3$ and retaining the level of the annual standard at 15 $\mu g/m^3$. The PM_{10} 24-hour average standard was retained and the annual average PM_{10} standard was revoked. EPA has also revised the 8-hour ozone standard, lowering it from 0.08 to 0.075 parts per million (ppm), effective in May 2008.

EPA lowered the primary and secondary standards for lead to 0.15 $\mu g/m^3$, effective January 12, 2009. EPA revised the averaging time to a calendar month and the form of the standard to the second-highest monthly average across a 3-year span. The current lead NAAQS will remain in place for one year following the effective date of attainment designations for any new or revised NAAQS before being revoked, except in current non-attainment areas, where the existing NAAQS will not be revoked until the affected area submits, and EPA approves, an attainment demonstration for the revised lead NAAQS.

On January 22, 2010, EPA established a new 1-hour average NO_2 standard of 0.100 ppm, in addition to the current annual standard. The statistical form is the 3-year average of the 98th percentile of daily maximum 1-hour average concentration in a year.

On November 16, 2009, EPA proposed to establish a new 1-hour average SO_2 standard at a level between 0.050-0.100 ppm, replacing the current 24-hour and annual primary standards. The statistical form proposed is the 3-year average of the 4th highest daily maximum 1-hour average concentration in a year (the 4th highest daily maximum corresponds approximately to 99th percentile for a year.) EPA intends to issue a final decision on the SO_2 standard by June 2, 2010.

On January 6, 2010, EPA proposed a change in the 2008 ozone NAAQS, lowering the primary NAAQS from the current 0.075 ppm level to within the range of 0.060-0.070 ppm. EPA is also proposing a secondary standard, measured as a cumulative concentration within the range of 7-15 ppm-hours aimed mainly at protecting sensitive vegetation.

NAAQS ATTAINMENT STATUS AND STATE IMPLEMENTATION PLANS

The CAA, as amended in 1990, defines non-attainment areas (NAA) as geographic regions that have been designated as not meeting one or more of the NAAQS. When an area is designated as non-attainment by EPA, the state is required to develop and implement a State Implementation Plan (SIP), which delineates how a state plans to achieve air quality that meets the NAAQS under the deadlines established by the CAA.

In 2002, EPA re-designated New York City as in attainment for CO. The CAA requires that a maintenance plan ensure continued compliance with the CO NAAQS for former non-attainment areas. New York City is also committed to implementing site-specific control measures throughout the city to reduce CO levels, should unanticipated localized growth result in elevated CO levels during the maintenance period.

Manhattan has been designated as a moderate NAA for PM_{10}. On December 17, 2004, EPA took final action designating the five New York City counties, Nassau, Suffolk, Rockland, Westchester, and Orange counties as a $PM_{2.5}$ non-attainment area under the CAA due to exceedance of the annual average standard. New York State has submitted a draft SIP to EPA, dated April 2008, designed to meet the annual average standard by April 8, 2010, which will be finalized after public review.

As described above, EPA has revised the 24-hour average $PM_{2.5}$ standard. In October 2009 EPA finalized the designation of the New York City Metropolitan Area as nonattainment with the 2006 24-hour $PM_{2.5}$ NAAQS, effective in November 2009. The nonattainment area includes the same 10-county area EPA designated as nonattainment with the 1997 annual $PM_{2.5}$ NAAQS. By November 2012 New York will be required to submit a SIP demonstrating attainment with the 2006 24-hour standard by November 2014 (EPA may grant attainment date extensions for up to five additional years).

Nassau, Rockland, Suffolk, Westchester, Lower Orange County Metropolitan Area (LOCMA), and the five New York City counties had been designated as a severe non-attainment area for ozone 1-hour

standard. In November 1998, New York State submitted its *Phase II Alternative Attainment Demonstration for Ozone*, which was finalized and approved by EPA effective March 6, 2002, addressing attainment of the 1-hour ozone NAAQS by 2007. These SIP revisions included additional emission reductions that EPA requested to demonstrate attainment of the standard, and an update of the SIP estimates using the latest versions of the mobile source emissions model, MOBILE6.2, and the nonroad emissions model, NONROAD—which have been updated to reflect current knowledge of engine emissions and the latest mobile and nonroad engine emissions regulations.

On April 15, 2004, EPA designated these same counties as moderate non-attainment for the 8-hour ozone standard which became effective as of June 15, 2004 (LOCMA was moved to the Poughkeepsie moderate non-attainment area for 8-hour ozone). EPA revoked the 1-hour standard on June 15, 2005; however, the specific control measures for the 1-hour standard included in the SIP are required to stay in place until the 8-hour standard is attained. The discretionary emissions reductions in the SIP would also remain but could be revised or dropped based on modeling. On February 8, 2008, NYSDEC submitted final revisions to a new SIP for ozone to EPA. NYSDEC has determined that achieving attainment for ozone before 2012 is unlikely, and has therefore made a request for a voluntary reclassification of the New York nonattainment area as "serious".

In March 2008 EPA strengthened the 8–hour ozone standards. SIPs would be due three years after the final designations are made. On March 12, 2009, NYSDEC recommended that the counties of Suffolk, Nassau, Bronx, Kings, New York, Queens, Richmond, Rockland, and Westchester be designated as a non-attainment area for the 2008 ozone NAAQS (the NYMA MSA nonattainment area). The EPA has proposed to determine that the Poughkeepsie non-attainment area (Dutchess, Orange, Ulster, and Putnam Counties) has attained the 2008 one-hour and eight-hour National Ambient Air Quality Standards for ozone. It is unclear at this time what the attainment status of these areas will be under the newly proposed standard due to the range of concentrations proposed.

Suffolk County is currently in attainment of the annual-average NO_2 standard. EPA has promulgated a new 1-hour standard, but it is unclear at this time what the county's attainment status will be due to the need for additional near road monitoring required for the new standard. The existing monitoring data indicates background concentrations below the standard. It is likely that Suffolk County will be designated as "unclassifiable" at first (January 2012), and then classified once three years of monitoring data are available (2016 or 2017).

Suffolk County is currently in attainment of the SO_2 standards. EPA has proposed to replace the current standards with a new 1-hour standard. Bronx, Chautauqua, and Suffolk Counties are the only counties in New York State currently within the proposed range of the standard and the status of these areas will be determined based on the level established in the final standard.

DETERMINING THE SIGNIFICANCE OF AIR QUALITY IMPACTS

The State Environmental Quality Review Act (SEQRA) regulations state that the significance of a likely consequence (i.e., whether it is material, substantial, large or important) should be assessed in connection with its setting (e.g., urban or rural), its probability of occurrence, its duration, its irreversibility, its geographic scope, its magnitude, and the number of people affected.[1] In terms of the magnitude of air quality impacts, any action predicted to increase the concentration of a criteria air pollutant to a level that would exceed the concentrations defined by the NAAQS (see **Table 2**, above) would be deemed to have a potential significant adverse impact. In addition, in order to maintain concentrations lower than the NAAQS in attainment areas, or to ensure that concentrations will not be significantly increased in non-attainment areas, threshold levels have been defined for certain pollutants; any action predicted to increase the concentrations of these pollutants above the thresholds would be deemed to have a potential significant adverse impact, even in cases where violations of the NAAQS are not predicted.

[1] State Environmental Quality Review Act § 617.7

TRANSPORTATION CONFORMITY

The conformity requirements of the CAA and regulations promulgated thereunder (conformity requirements) limit the ability of federal agencies to assist, fund, permit, and approve transportation projects in non-attainment areas that do not conform to the applicable SIP. An area's Metropolitan Planning Organization (MPO), which is an entity responsible for transportation planning, together with the State, are responsible for demonstrating conformity with respect to the SIP on metropolitan long-range transportation plans and Transportation Improvement Programs (TIPs). The Federal Transit Administration (FTA) and the Federal Highway Administration (FHWA) jointly make a conformity determination regarding TIP projects. To meet conformity requirements, regionally significant highway and transit projects must either be promulgated pursuant to a conforming TIP and Long-Range Transportation Plan (Plan), have been included in a regional emissions analysis supporting the conforming TIP and Plan, or be included in a newly performed regional emissions analysis. The conformity determination must demonstrate that the plan or program conforms to an applicable SIP for air quality and that those plans or programs, based on detailed analysis of potential air quality impacts, will improve the region's air quality. TIP conformity guidelines require that a quantitative air quality analysis be undertaken for each pollutant that exceeds the standards. Furthermore, "non-exempt" projects, as defined by the CAA, must be evaluated for their potential commutative impacts on air quality.

AIR QUALITY SCREENING METHODOLOGIES

MOBILE SOURCE AIR QUALITY SCREENING CRITERIA

CO Screening Criteria

Screening criteria described in the *EPM* were employed to determine whether the Project requires a detailed air quality analysis at the intersections in the study area. Before undertaking a detailed microscale modeling analysis of CO concentrations at the study area intersections, the screening criteria first determines whether the information from the traffic capacity analysis demonstrates that there is the potential for either significant adverse impacts from incremental traffic or from elevated air quality concentrations. The following multi-step procedure is suggested in the *EPM* to determine if there is the potential for CO impacts from the Project:

- Level-of-Service (LOS) Screening: If the LOS is A, B, or C under the Preferred Alternative, no air quality analysis is required. For intersections operating at LOS D or worse, proceed to Capture Criteria.
- Capture Criteria: If the Preferred Alternative LOS is at D, E, or F, then the following Capture Criteria should be applied at each intersection or corridor to determine if an air quality analysis may be warranted:
  - A 10 percent or more reduction in the source-to-receptor distance (e.g., street or highway widening); or
  - A 10 percent or more increase in traffic volume on affected roadways for the Build year; or
  - A 10 percent or more increase in vehicle emissions for the future analysis year using emission factors provided in the *EPM*; or
  - Any increase in the number of queued lanes for the future analysis year (this applies to intersections). It is not expected that intersections in the Preferred Alternative controlled by stop signs would require an air quality analysis; or
  - A 20 percent reduction in speed when average speeds in the Preferred Alternative are below 30 miles per hour (mph).

If the Project does not meet any of the above criteria, a microscale analysis is not required. Should any one of the above Capture Criteria be met in addition to the LOS screening, then a Volume Threshold Screening is performed, using traffic volume and emission factor data to compare with specific volume thresholds established in the *EPM*.

Both the above Capture Criteria and Volume Threshold Screening were developed by the NYSDOT to be very conservative air quality estimates based on worst-case assumptions. The *EPM* states that if the project-related traffic volumes are below the volume threshold criteria, then a microscale air quality analysis is unnecessary even if the other Capture Criteria are met for a LOS D or worse location, since a violation of the NAAQS would be extremely unlikely.

PARKING GARAGE ANALYSIS

To determine pollutant levels from each level of the parking facility, the analysis was based on a correction factor for an elevated point source using the methodology in EPA's *Workbook of Atmospheric Dispersion Estimates, AP-26*. This methodology estimates CO concentrations by determining the appropriate height correction factor for each level, based on the difference between pedestrian height and the respective parking level elevation. Total ambient levels at each receptor location are then calculated by adding together contributions from each level of the facility and ambient background levels.

The CO concentrations were determined for the time periods when overall garage usage would be the greatest, considering the hours when the greatest number of vehicles would exit the facility. Departing vehicles were assumed to be operating in a "cold-start" mode, emitting higher levels of CO than arriving "hot-stabilized" vehicles. Maximum emissions would result in the highest CO levels and the greatest potential impacts. Traffic data for the parking garage analysis were derived from the trip generation analysis described in the transportation chapter of this environmental assessment.

The emissions from the proposed parking garage were modeled to directly discharge to the new roadway along the east side of the parking facility extending from Acorn Street to Straight Path, and "near" and "far" receptors were placed along the sidewalks at a pedestrian height of 6 feet and at a distance 6 feet and 56 feet, respectively, from the parking garage. A persistence factor of 0.7 was used to convert the calculated 1-hour average maximum concentrations to 8-hour averages, accounting for meteorological variability over the average 8-hour period.

Background and on-street CO concentrations were added to the modeling results to obtain the total ambient levels. The on-street CO concentration was determined utilizing traffic volumes from the traffic survey conducted in the study area.

EXISTING CONDITIONS

Monitored ambient concentrations of SO_2, CO, NO_2, particulate matter (PM_{10} and $PM_{2.5}$), ozone, and lead for the area are shown in **Table 3**. These values represent the most recent monitored data available that have been published by New York State Department of Environmental Conservation (NYSDEC) for these locations. Values of CO, $PM_{2.5}$ and ozone were monitored in Suffolk County while SO_2 and NO_2 were monitored in Nassau County. No PM_{10} and lead monitoring is performed in the area; the nearest monitoring stations are at IS 52 in the Bronx (PM_{10}) and JHS 126 (lead) located in Brooklyn.

Except for the 8-hour ozone standard, there were no monitored violations of the NAAQS for the pollutants at these sites in 2008.

Table 3
Representative Monitored Ambient Air Quality Data

Pollutants	Location	Units	Period	Concentrations			Number of Exceedances of Federal Standard	
				Mean	Highest	Second Highest	Primary	Secondary
CO	Holtsville, Suffolk County	ppm	8-hour	-	1.2	0.9	0	-
			1-hour	-	1.8	1.8	0	
SO_2	Eisenhower Park, Nassau County	ppm	Annual	0.005	-	-	0	-
			24-hour	-	0.017	0.017	0	-
			3-hour	-	0.046	0.045	-	0
Respirable Particulates (PM_{10})	IS 52, Bronx	$\mu g/m^3$	24-hour	-	60	45	0	0
Respirable Particulates ($PM_{2.5}$)	Babylon, Suffolk County	$\mu g/m^3$	Annual	10.1	-	-	0	0
			24-hour	-	33.1	29.4	0	0
NO_2	Eisenhower Park, Nassau County	ppm	Annual	0.015	-	-	0	0
Lead	JHS 126, Brooklyn	$\mu g/m^3$	3-month	-	0.014	0.013	0	0
O_3	Holtsville, Suffolk County	ppm	8-hour	-	0.101	0.095	13	13
			1-hour	-	0.122	0.101	0	0

PREFERRED ALTERNATIVE

MOBILE SOURCES

The area roadway intersections were reviewed based on NYSDOT's *EPM* criteria for determining locations that may warrant a CO microscale air quality analysis. The screening analysis examined the LOS and projected volume increases by intersection approach. As described below, the results of the screening analysis show that none of the signalized intersections considered would require a detailed microscale air quality analysis.

LOS Screening Analysis

Results of the traffic capacity analysis performed for the 2012 future analysis year were reviewed at each of the intersections in the study area for the AM and PM peak periods to determine the potential need for a microscale air quality analysis. The LOS screening criteria were first applied to identify those signalized intersections with approach LOS D or worse. Based on the review of the signalized intersections analyzed, the following intersections were projected to operate at a LOS D or worse on approaches during any of the peak traffic periods analyzed:

- Nicolls Road and Straight Path
- Washington Avenue and Straight Path
- Acorn Street/N. 13th Street and Straight Path
- Long Island Avenue and Straight Path
- Mount Avenue and Straight Path
- Deer Park Avenue and Seaman Neck Road
- Deer Park Avenue and Acorn Street
- Deer Park Avenue and Long Island Avenue

Capture Criteria Screening Analysis

Additional screening on the intersections identified in the LOS Screening Analysis was conducted using the Capture Criteria outlined above. For the Preferred Alternative, this Capture Criteria screening analysis indicated that at least one of the listed Capture Criteria would be met in the future analysis year at four of the intersections identified. Therefore, a volume threshold screening analysis was performed for each of these intersections. The intersections at which the Capture Criteria were met are as follows:

An increase in the number of queued lanes would occur at:

- Washington Avenue and Straight Path
- Acorn Street/N. 13th Street and Straight Path

A 10 percent or more reduction in source-receptor distance would occur at:

- Mount Avenue and Straight Path
- Long Island Avenue and Straight Path

Volume Threshold Screening Analysis

Since at least one of the Capture Criteria would be met for the intersections identified above, a Volume Threshold Screening analysis was conducted to further assess the need for a microscale air quality analysis. Project area-specific emissions data were used to determine corresponding vehicle volume thresholds provided in the *EPM*. This screening indicated that Project-related traffic volumes for each approach at the intersections identified in the Capture Criteria Screening Analysis would be below the volume threshold criteria. Therefore, a detailed CO microscale air quality analysis was not warranted at these intersections.

F. NOISE

This section, corresponding to Chapter 8 of the EA, provides a detailed description of noise fundamentals, standards, and impact criteria, to enable a more complete understanding of the way noise analyses are undertaken and interpreted.

NOISE FUNDAMENTALS

Quantitative information on the effects of airborne noise on people is well documented. If sufficiently loud, noise may adversely affect people in several ways. For example, noise may interfere with human activities, such as sleep, speech communication, and tasks requiring concentration or coordination. It may also cause annoyance, hearing damage, and other physiological problems. Several noise scales and rating methods are used to quantify the effects of noise on people. These scales and methods consider such factors as loudness, duration, time of occurrence, and changes in noise level with time. However, all the stated effects of noise on people are subjective and depend on the individual.

Sound is a fluctuation in air pressure. Sound pressure levels are measured in units called "decibels" (dB). The particular character of the noise that we hear (a whistle compared with a French horn, for example) is determined by the speed, or "frequency," at which the air pressure fluctuates, or "oscillates." Frequency defines the oscillation of sound pressure in terms of cycles per second. One cycle per second is known as 1 Hertz (Hz). People can hear over a relatively limited range of sound frequencies, generally between 20 Hz and 20,000 Hz, and the human ear does not perceive all frequencies equally well. High frequencies (the whistle, for example) are more easily discerned and therefore more intrusive than many of the lower frequencies (the lower notes on the French horn, for example).

"A"-WEIGHTED SOUND LEVEL (DBA)

To bring a uniform noise measurement that simulates people's perception of loudness and annoyance, the decibel measurement is weighted to account for those frequencies most audible to the human ear. This is known as the A-weighted sound level, or "dBA," and it is the most often used descriptor of noise levels

where community noise is the issue. As shown in **Table 4**, the threshold of human hearing is defined as 0 dBA; very quiet conditions (as in a library, for example) are approximately 40 dBA; levels between 50 dBA and 70 dBA define the range of acceptable daily activity; levels above 70 dBA would be considered noisy, and then loud, intrusive, and deafening as the scale approaches 130 dBA. In considering these values, it is important to note that the dBA scale is logarithmic, meaning that each increase of 10 dBA actually describes a doubling of sound pressure. Thus, the background noise in an office, at 50 dBA, is perceived as twice as loud as a library at 40 dBA. For most people to perceive an increase in noise, it must be at least 3 dBA. At 5 dBA, the change will be readily noticeable.*

Table 4
Common Noise Levels

Sound Source	(dBA)
Military jet, air raid siren	130
Amplified rock music	110
Jet takeoff at 330 feet, on platform by passing subway train	100
Freight train at 100 feet	95
Train horn at 100 feet	90
Heavy truck at 50 feet, lawn mower at 50 feet	
Busy city street, loud shout	80
Busy traffic intersection	
Highway traffic at 50 feet, train	70
Predominantly industrial area	60
Light car traffic at 50 feet, city or commercial areas or residential areas close to industry	
Background noise in an office	50
Suburban areas with medium density transportation	
Public library	40
Soft whisper at 16 feet	30
Threshold of hearing	0

Note: A 10 dBA increase in level appears to double the loudness, and a 10 dBA decrease halves the apparent loudness.

Sources:
Cowan, James P. *Handbook of Environmental Acoustics*. Van Nostrand Reinhold, New York, 1994.
Egan, M. David. *Architectural Acoustics*. McGraw-Hill Book Company, 1988.

It is also important to understand that combinations of different noise sources are not added in an arithmetic manner, because of the dBA scale's logarithmic nature. For example, two noise sources—a vacuum cleaner operating at approximately 72 dBA and a telephone ringing at approximately 58 dBA—do not combine to create a noise level of 130 dBA, the equivalent of a jet airplane or air raid siren (see **Table 4**, above). In fact, the noise produced by the telephone ringing may be masked by the noise of the vacuum cleaner and not be heard. The combination of these two noise sources would yield a noise level of 72.2 dBA. Noise levels are combined on a logarithmic scale (an increase of 0.2 dBA would be an imperceptible change in noise level).

EFFECTS OF DISTANCE ON NOISE

Noise varies with distance. For example, highway traffic 50 feet away from a receptor (such as a person listening to the noise) typically produces sound levels of approximately 70 dBA. The same highway noise

* Average ability to perceive changes in noise levels from Bolt, Beranek and Newman, Inc., *Fundamentals and Abatement of Highway Traffic Noise, Report No. PB-222-703*. Prepared for the Federal Highway Administration, June 1973.

measures 66 dBA at a distance of 100 feet, assuming soft ground conditions. This decrease is known as "drop-off." The outdoor drop-off rate for line sources, such as traffic, is a decrease of approximately 4.5 dBA (for soft ground) for every doubling of distance between the noise source and receiver (for hard ground the outdoor drop-off rate is 3 dBA for line sources). Assuming soft ground, for point sources, such as amplified rock music, the outdoor drop-off rate is a decrease of approximately 7.5 dBA for every doubling of distance between the noise source and receiver (for hard ground the outdoor drop-off rate is 6 dBA for point sources).

NOISE DESCRIPTORS USED IN IMPACT ASSESSMENT

Because very few noises are constant and the sound-pressure level unit of dBA describes a noise level at just one moment, other ways of describing noise over more extended periods have been developed. One way of describing fluctuating sound is to describe the fluctuating noise heard over a specific period as if it were a steady, unchanging sound (i.e., as if it were averaged for that time period). For this condition, a descriptor called the "equivalent sound level," L_{eq}, can be computed. L_{eq} is the constant sound level that, in a given situation and period (e.g., 1 hour, denoted by $L_{eq(1)}$, or 24 hours, denoted as $L_{eq(24)}$), conveys the same sound energy as the actual time-varying sound. Statistical sound level descriptors, such as L_1, L_{10}, L_{50}, L_{90}, and $L_{x,}$ are sometimes used to indicate noise levels that are exceeded 1, 10, 50, 90, and x percent of the time, respectively. Discrete event peak levels are given as L_{01} levels.

For impact analyses where noise levels are predicted to exceed a given impact criterion, the relationship between L_{eq} and level of exceedance is worth noting. Because L_{eq} is defined in energy rather than straight numerical terms, it is not simply related to the level of exceedance. If the noise fluctuates very little, L_{eq} will approximate L_{50}, or the median level. If the noise fluctuates broadly, the L_{eq} will be approximately equal to the L_{10} value. If extreme fluctuations are present, the L_{eq} will exceed L_{90} or the background level by 10 or more decibels. Thus, the relationship between L_{eq} and the levels of exceedance will depend on the character of the noise. In community noise measurements, it has been observed that the L_{eq} is generally between L_{10} and L_{50}. The relationship between L_{eq} and exceedance levels is used to characterize the noise sources and to determine the nature and extent of their impact at all receptor locations.

A descriptor for cumulative 24-hour exposure is the day-night sound level, abbreviated as L_{dn}. This is a 24-hour measure that accounts for the moment-to-moment fluctuations in A-weighted noise levels due to all sound sources during 24 hours, combined. Mathematically, the L_{dn} noise level is the energy average of all $L_{eq(1)}$ noise levels over a 24-hour period, where nighttime noise levels (10 PM to 7 AM) are increased by 10 dBA before averaging.

The Federal Transit Administration (FTA) uses the maximum 1-hour equivalent sound level ($L_{eq(1)}$) or the day-night sound level (L_{dn}) for impact assessment, depending on the adjacent land use.

NOISE STANDARDS AND CRITERIA

In May 2006, FTA issued its report *Transit Noise and Vibration Impact Assessment* as a guideline for the evaluation of noise and vibration levels resulting from mass transit projects, and the assessment of impacts that result. The noise analysis methodology in the FTA report determines operational noise impacts that result from mass transit projects based on peak-hour $L_{eq(1)}$ and 24-hour L_{dn} noise levels, depending on the land use category of the affected areas near mass transit projects. As described in **Table 5**, Categories 1 and 3, which include land uses that are noise sensitive but where people do not sleep, require examination of a one-hour L_{eq} for the noisiest peak hour. For Category 2, which includes residences, hospitals, and other locations where nighttime sensitivity to noise is very important, use of L_{dn} is required.

Table 5
FTA's Land Use Category and Metrics for Transit Noise Impact Criteria

Land Use Category	Noise Metric (dBA)	Description of Land Use Category
1	Outdoor $L_{eq(h)}$ [1]	Tracts of land in which quiet is an essential element in the intended purpose. This category includes lands set aside for serenity and quiet, and such land uses as outdoor amphitheaters and concert pavilions, as well as National Historic Landmarks with significant outdoor use. Also included are recording studios and concert halls.
2	Outdoor $L_{dn(h)}$	Residences and buildings where people normally sleep. This category includes homes, hospitals, and hotels, where a nighttime sensitivity to noise is assumed to be of utmost importance.
3	Outdoor $L_{eq(h)}$	Institutional land uses with primarily daytime and evening use. This category includes schools, libraries, theaters, and churches where it is important to avoid interference with such activities as speech, meditation, and concentration on reading material. Places for meditation or study associated with cemeteries, monuments, museums, campgrounds and recreational facilities can also be considered to be in this category. Certain historical sites and parks are also included.

Note: [1] L_{eq} for the noisiest hour of transit-related activity during hours of noise sensitivity. The (h) subscript represents the duration of time of measurement. For this analysis the duration of time of measure is the one-hour measurement, represented as $L_{eq(1)}$.

Source: *Transit Noise and Vibration Impact Assessment,* FTA, May 2006.

Figure 8-1 shows FTA's noise impact criteria for transit projects. The FTA impact criteria are keyed to the noise level generated by the project (called "project noise exposure") in locations of varying existing noise levels. Two types of impacts—moderate and severe—are defined for each land use category, depending on existing noise levels. Thus, where existing noise levels are 40 dBA, for land use categories 1 and 2, the respective L_{eq} and L_{dn} noise exposure from the project would create moderate impacts if they were above approximately 50 dBA, and would create severe impacts if they were above approximately 55 dBA. For Category 3, a project noise exposure level above approximately 55 dBA would be considered a moderate impact, and above approximately 60 dBA would be considered a severe impact. The difference between "severe impact" and "moderate impact" is that a severe impact occurs when a change in noise level occurs that a significant percentage of people would find annoying, while a moderate impact occurs when a change in noise level occurs that is noticeable to most people but not necessarily sufficient to result in strong adverse reactions from the community.

G. INFRASTRUCTURE

This section, which corresponds to Chapter 9 of the EA, provides more in-depth information concerning the existing conditions related to infrastructure (i.e., water supply, sanitary sewer, solid waste, and energy services) on the Project Site and in the surrounding area.

WATER SUPPLY

Downtown Wyandanch, including the Project Site, is served by the Suffolk County Water Authority (SCWA) water distribution system. SCWA is the largest groundwater purveyor in the nation. SCWA has about 521 active wells that feed 62 water storage tanks. The system also includes approximately 5,600 miles of water mains. SCWA has divided the system into 41 pressure zones to provide reasonable water pressure to every customer. Each pressure zone is made up of pump stations, storage tanks, and/or booster stations, which are designed to provide adequate water pressure to the elevations they serve. These facilities are connected by underground water pipes of various sizes, which collectively constitute the distribution system.

SCWA has 23 distribution areas, which are made up of several pressure zones. The Project Site is served by Distribution Area 12 (93 active wells). Water production for the system currently exceeds 73 billion

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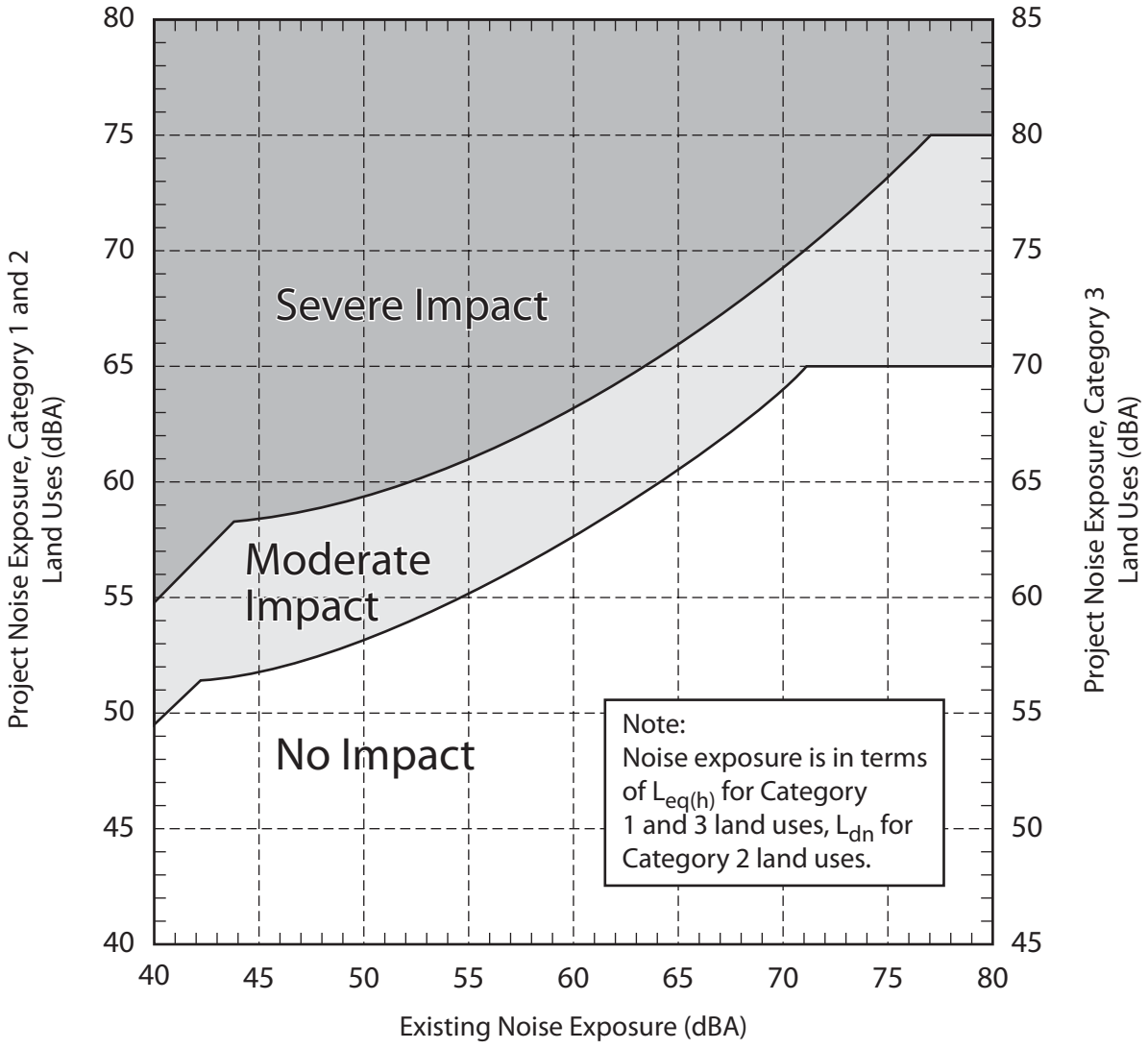

Source: Transit Noise and Vibration Impact Assessment, May 2006

Figure 8-1
FTA Noise Impact Criteria for Transit Projects

gallons per year with peak daily production in excess of 460 million gallons and peak monthly production in excess of 12 billion gallons. The SCWA's average annual withdrawal is approximately 164 million gallons per day (mgd).

SANITARY SEWER

Wyandanch is not connected to a public sewer system, a critical factor in the lack of a commercially viable downtown and the reason for the recently completed sewer feasibility study. Installation of a new sewer system is scheduled to begin in 2010 as part of a separate initiative.

Currently, the community depends on independent on-site wastewater treatment, which is a major issue due to potential groundwater contamination and the fact that on-site wastewater treatment systems can be cost-prohibitive to potential developers and a disincentive for capital investment in Wyandanch. On-site wastewater treatment also requires compliance with Suffolk County Department of Health Services regulatory requirements, which limit the opportunity to provide the density necessary for economic development. According to the Wyandanch Hamlet Plan (*Wyandanch Rising*), 95 percent of the housing units in Wyandanch use on-site systems composed of a septic tank with either a leach field or cesspool to provide wastewater treatment. Many small businesses also use septic systems to treat wastewater. According to the U.S. Environmental Protection Agency (EPA), the functioning life of septic systems is typically 20 years or less. Eighty-five percent of the homes in Wyandanch were built before 1980, with over 2,000 housing units in Wyandanch potentially using sewage treatment systems that have outlived their useful life. Many of the original septic systems and cesspools are likely to require rehabilitation or replacement. Failing septic systems are a common source of water pollution and a potential public health issue. To avoid pollution, allow greater density, and stimulate economic development, the provision of public sewer service along the Straight Path corridor or the installation of modern, efficient on-site wastewater treatment systems will be necessary. It is noted that connecting to a public sewer system is likely to be the least costly option for new construction.

The nearest public sewer system is the Suffolk County Southwest Sewer District #3, operated by the Suffolk County Department of Public Works (SCDPW). The Southwest Sewer District generally includes the area south of the Southern State Parkway and east of the County line to Heckscher Spur Parkway in the Town of Islip. The mainland portion of the Town of Babylon south of Southern State Parkway[2] is located within the Southwest Sewer District #3 and sanitary wastewater is conveyed to the Bergen Point Sewage Treatment Plant (STP) located in West Babylon, just south of the Bergen Point Golf Course. This plant has a permitted capacity of 30.5 mgd of wastewater influent. According to the Wyandanch Hamlet Plan, the plant is at or near capacity. Therefore, sewer line extension to Wyandanch would have to be coupled with aggressive measures to reduce inflow and infiltration to the sewer system and/or create water conservation programs.

According to the Town of Babylon's Empire Zone application, as sourced in Sustainable Long Island's *Wyandanch Blight Conditions Study* (2004), $273 million has been invested in the Southwest Sewer District to prepare for the sewage district expansion to Wyandanch. Provision of public sewers in Wyandanch would facilitate redevelopment of the area and reduce the potential for groundwater contamination from existing septic tank-serviced areas. The Town Board, in coordination with EPA, has been awarded funds for assessing the feasibility of extending the local sewer district infrastructure to Wyandanch, and is currently completing the design for sewers along Straight Path, with construction scheduled to begin in the summer of 2010.

[2] Segments of the Southwest Sewer District in Babylon include two areas north of Southern State Parkway. One segment runs north along NYS Route 110 into the Town of Huntington for the purpose of serving a major business corridor. The other location is a small area just north of the Southern State Parkway along NYS Route 231 at North Babylon.

SOLID WASTE

Solid waste services in the Project area are managed by the Town of Babylon Sanitation Department, located within the Department of Environmental Control. The Sanitation Department is responsible for overseeing operations with the Town's contracted private carters for both the Residential and Commercial Waste Districts. The Sanitation Department is instrumental in working daily with these entities as well as the Resource Recovery Facility, and solid waste flow in general.

West of the approximate hamlet boundary between Patton and Edison Avenues is the Town's solid waste management complex, which includes a capped landfill and an active ash monofill. The Town of Babylon Recycling Center is also located in this vicinity. In addition, this area includes the Covanta waste-to-energy facility located on approximately 9.9 acres on Gleam Street. The Covanta facility began commercial operation in 1989 and serves the Town of Babylon. The facility processes approximately 750 tons per day of solid waste and generates up to 17 MW of energy. The Covanta facility has one exhaust stack approximately 170 feet above grade. Additionally, the facility has several buildings, two cooling tower cells, and a transmission line that interconnects with the Long Island Power Authority (LIPA) Pinelawn Substation.

ENERGY

LIPA and National Grid[3] provide energy to Long Island, including the Project Site. National Grid is the largest electric generator in New York State, with approximately 6,600 megawatts of generating capacity that provides power to LIPA's 1.1 million customers on Long Island. National Grid also operates LIPA's transmission and distribution system under contract to LIPA. In addition, National Grid provides natural gas service to 2.6 million customers in New York City, Long Island, and New England, and operates more than 21,000 miles of gas main in its service territory.[4] LIPA's Western Suffolk Division, which includes the Project Site, delivers electricity to approximately 315,000 customers and encompasses 305 square miles of service territory. The service territory includes 2,689 miles of overhead wire, 1,905 miles of underground cable, and 152,644 utility poles.[5]

H. NATURAL RESOURCES

This section, which corresponds to Chapter 11 of the EA, provides more in-depth information concerning the existing conditions related to natural resources in the vicinity of the Project.

WATER RESOURCES

GROUNDWATER CONDITIONS

In 1978, the aquifers of Long Island were designated by the United States Environmental Protection Agency (EPA) as a Sole Source Aquifer (Federal Register, 43, June 21, 1978), with the finding that the system is the "principal source of drinking water" to the people of Long Island and "if contaminated, would create a significant hazard to public health." The three main aquifers supply both Nassau and Suffolk Counties with potable water.

Prepared under the direction of the Long Island Regional Planning Board (LIRPB) and released in 1992, the Long Island Comprehensive Special Groundwater Protection Area Plan identifies nine SGPAs in the Nassau and Suffolk County regions.

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[3] As of May 1, 2008, KeySpan Energy Delivery changed its name to National Grid.

[4] National Grid website at http://www.nationalgrid.com/corporate/about+us/.

[5] LIPA website at http://www.lipower.org/company/stats.html.

Groundwater Supply

The only source of water supply for the Project Site and immediate area is groundwater. Elevation of the water table is generally equivalent to sea level at the north and south shorelines of Long Island and, following the topography, rises in elevation towards the center of the Island. The dividing line for northward or southward flow roughly follows New York State Route 25. The Project Site is located south of the regional east-west groundwater divide. The groundwater flow at the Project Site and in the surrounding area is therefore southerly.

The depth to groundwater on Long Island ranges from a few feet along the shorelines and stream/lake margins to more than 200 feet in the center of the Island, depending on the surface topography. Based on a review of the 1997 Suffolk County Water Table Elevation Map, the top of the Upper Glacial aquifer in the vicinity of the Project Site occurs at approximately 60 feet above mean sea level (MSL). Therefore, the approximate depth to groundwater at the Project Site and in the immediate area is 10 feet. This shallow depth to groundwater creates problems with flooding and failed septic systems in certain areas, and demonstrates a strong need for sewers.

Groundwater Quality

Groundwater for all of Long Island is recharged solely through precipitation and surface water seepage. The seepage of recharge through surface soils, and any present dissolved contaminants, will ultimately reach the water table and therefore affect the quality of groundwater. As groundwater is the only potable water source for the area, the protection of this resource is essential to Long Island. The Source Water Assessment Program (SWAP) for Long Island was completed by the New York State Department of Health (NYSDOH) and the Suffolk County Department of Health Services (SCDHS) in 2003. Results of the 2003 assessment showed that almost 60 percent of drinking water supply wells in Suffolk County have a low susceptibility to contamination by microbials including protozoa, enteric bacteria, and enteric viruses, while over 20 percent of the wells have a medium to high susceptibility. Specifically, shallow wells are more vulnerable to the presence of microbial source in unsewered areas that have relatively short travel times from the water table to the well, particularly in central and eastern parts of the County. Further, almost 70 percent of the public wells in Suffolk County rated medium to high for nitrate susceptibility.

The high susceptibility rating is likely due to the slow degradation of nitrates in groundwater. About 10 percent of Suffolk County wells were rated as medium to high for susceptibility to pesticides and almost 65 percent of wells in the County were also rated medium to high for volatile organic compounds. According to the Suffolk County Water Authority's *2009 Annual Drinking Water Quality Report*[6], local water is naturally well-purified and is of high quality. Local well water is characteristically acidic and requires some chemical "buffering" to prevent damage to piping. Also, certain wells have higher naturally occurring iron levels that require the addition of polyphosphates. Overall, the water is of high quality and is subject to testing to ensure that it satisfies all local, County, State, and Federal guidelines and standards for potable water.

GEOLOGY, SOILS, AND TOPOGRAPHY

REGIONAL GEOLOGIC CONDITIONS

Most of Long Island's geology is defined by two terminal moraines—low, hill-like formations that are remnants of the advances of glaciers during the last ice age (the Pleistocene epoch). The two morainal ridges—the Harbor Hill Moraine and Ronkonkoma Moraine—run the length of Long Island and diverge to the east to form the North Fork and South Fork, respectively. The moraines are made of poorly sorted glacial till deposited at the glacial terminus. South of the moraines are outwash plain deposits of sands and gravel. The Project Site lies south of the Ronkonkoma Moraine in an area made up of outwash sand

[6] http://www.scwa.com/SCWA_AWQR.pdf

and gravel. Long Island is composed of many layers of sand, clay, and gravel, with southeasterly sloping bedrock below. These layers of subsurface geologic deposits are important in defining the groundwater aquifers that underlie Long Island. The interrelationships of the various geologic deposits dictate how the aquifer is recharged by rainfall, and also determine how activities on the land surface might affect the quantity and quality of the groundwater.

SOILS

The soil types of the Project Site and the area of new roadway network were reviewed based on the Soil Survey of Suffolk County, New York (United States Department of Agriculture Soil Conservation Service, April 1975). Soil types are characterized by their composition (i.e., sands, clays, etc.), slope, erodability, permeability, and typical depth to groundwater. Based on this characterization, the soil survey provides a three part measure of constraints on development divided into Slight, Moderate, or Severe for different potential site uses (paved surfaces, home construction, and septic disposal). Moderate and Severe limitations do not in themselves create significant adverse environmental impacts but reflect the likelihood of additional site preparation and site engineering, ongoing maintenance requirements, and costs necessary to utilize the land for an intended purpose.

The Project Site and the area of new roadway network comprise soils of various soil series, including Haven, Riverhead, and Urban Land. Urban Land makes up almost the entire Project Site. Urban Land comprises areas that are more than 80 percent covered by buildings and pavements. Examination and identification of the soils in these areas are impractical. The soils are relatively evenly distributed throughout the rest of the Project Site. The soils mapped on the Project Site are indicated in **Table 6** and **Figure 11-1**.

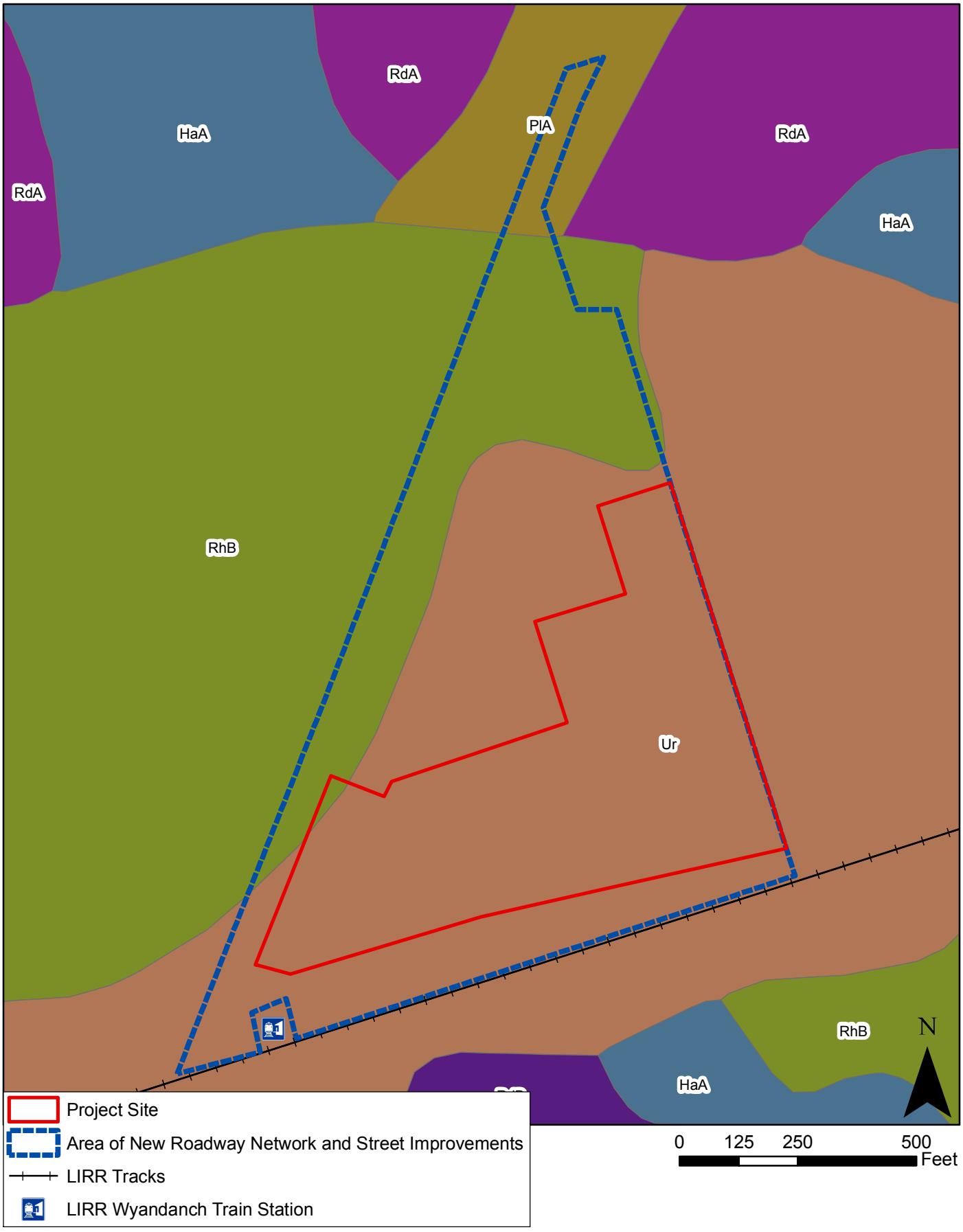
Table 6
Project Site Soil Types

Mapping Unit	Soil Name and Gradient	Erosion Hazard	Permeability (Depth1 — Rate2)	Depth (ft) to Seasonal High Water Table	Limitations of Soils		
					Streets and Parking Lots	Homesites (3 stories or less)	Sewage Disposal Fields
RhB	Riverhead and Haven soils, graded, 0 to 8 percent slopes	N/A	N/A	N/A	Moderate slopes	Slight	Slight*
Ur	Urban land	N/A	N/A	N/A	Variable	Variable	Variable
Note:	* Possible pollution hazard to lakes, springs, or shallow wells in these rapidly permeable soils						
Source:	USDA Soil Conservation Service, Soil Survey of Suffolk County, New York, April 1975						

The Project Site consists of one soil association type—Haven-Riverhead, which includes deep, nearly level to gently sloping, well-drained, medium textured, and moderately coarse textured soils on outwash plains. The Haven-Riverhead Association mostly comprises Haven soils (40 percent) and Riverhead soils (30 percent). Minor soils, including steeper Carver and Plymouth soils on the sides of drainage ways and kettle holes, make up the remaining 30 percent. Haven soils are deep, well drained, and medium textured. Their surface layer is loam, and their subsoil is loam or silt loam. The substratum is sand and gravel. Riverhead soils are deep, well drained, and moderately coarse textured. Their surface layer and subsoil are sandy loam and the substratum is sand and gravel. Because of their moderate to high available moisture capacities and good drainage properties, soils in the Haven-Riverhead Association are well suited for housing developments and similar uses, especially where septic systems are necessary because they are well drained.

TOPOGRAPHY

The overall topography for the Project Site and the immediate area, including the area where new roadways are proposed, is generally flat with an approximate elevation of about 60-65 feet above mean sea level (MSL).



Wyandanch Intermodal Transit Facility

Figure 11-1
Soils

VEGETATION AND WILDLIFE

Reptiles and Amphibians

A list of reptiles and amphibians known to occur in Wyandanch, but not expected at the Project Site or immediate area, is provided in **Table 7**. This list was compiled based on NYSDEC's Amphibian and Reptile Atlas Project, a 10-year survey (1990-1999) that documents the geographic distribution of New York State's amphibians and reptiles. This survey divided the State into large blocks, and used volunteers to survey those blocks for amphibians and reptiles. Various water habitats, including the Great South Bay, Carlls River, Southards Pond, and Belmont Lake, and vast preserved lands, are also present within these quadrangles and are the likely habitats for these species. Of the 70 species of amphibians and reptiles identified by the survey, 15 (or 21 percent) are expected to utilize the area of western Suffolk County that surrounds the Project Site. Of those, two are listed as threatened, endangered, or special concern species.

Table 7
Reptiles and Amphibians Known to Occur in the Project Vicinity

Common Name	Scientific Name	Status
Salamanders		
Spotted Salamander	*Ambystoma maculatum*	
Frogs and Toads		
Fowler's Toad	*Bufo fowleri*	
Gray Treefrog	*Hyla versicolor*	
Northern Spring Peeper	*Pseudacris c. crucifer*	
Bullfrog	*Rana catesbeiana*	
Green Frog	*Rana clamitans melanota*	
Turtles		
Common Snapping Turtle	*Chelydra s. serpentine*	
Spotted Turtle	*Clemmys guttata*	Special Concern
Eastern Box Turtle	*Terrapene c. carolina*	Special Concern
Red-Eared Slider	*Trachemys scripta elegans*	
Painted Turtle	*Chrysemys picta*	
Snakes		
Northern Water Snake	*Nerodia s. sipedon*	
Northern Brown Snake	*Storeria d. dekayi*	
Common Garter Snake	*Thamnophis sirtalis*	
Eastern Milk Snake	*Lampropeltis t. triangulum*	

Sources: New York State Amphibian and Reptile Atlas (1990 – 1999).
Amphibians and Reptiles of Long Island, Staten Island and Manhattan, Hofstra University, Department of Biology
(http://people.hofstra.edu/faculty/Russell_L_Burke/HerpKey/list_regional-species.htm).

Those species of reptiles and amphibians requiring wetlands and aquatic resources for a large percentage of their life cycle are not likely to occur within the Project Site since it comprises a built environment with scarce natural features. While these species would not likely occur within the boundaries of the Project Site, they could occur on the County-owned wetlands in the vicinity of the Carlls River, about ¼-mile to the east of the Project Site.

Avian Habitat and Species

The *New York State Breeding Bird Atlas* is a comprehensive, statewide survey that will show the current distribution of breeding birds in New York, broken into 5-kilometer-square blocks. The current Atlas is the second generation of *Breeding Bird Atlases* in New York, and will be based on methodologies for the earlier (2000) atlas. Currently, interim data for the new atlas has been posted to the NYSDEC website.

Based on the data collected between 2000 and 2005, a total of 66 possible, probable, or confirmed breeders are in block 6351C, which includes the Project Site, including 36 confirmed, 20 probable, and 10 possible breeders.

Endangered and Threatened Species and Other Species of Concern

According to Steve Papa, a Senior Fish and Wildlife Biologist in the U.S. Department of Interior, Fish and Wildlife Service, there are 11 endangered and threatened species in Suffolk County. A published list, entitled "Federally Listed Endangered and Threatened Species and Candidate Species in New York (by County)," provides a current list of all such species found in each county in New York State. Those species found in Suffolk County are provided in **Table 8**, below.

Table 8
Endangered and Threatened Species in Suffolk County, NY

Common Name	Scientific Name	Status
Kemp's ridley turtle	*Lepidochelys kempi*	Endangered
Green turtle	*Chelonia mydas*	Threatened
Hawksbill turtle	*Eretmochelys imbricate*	Endangered
Leatherback turtle	*Dermochelys coriacea*	Endangered
Loggerhead turtle	*Caretta caretta*	Threatened
Piping plover	*Charadrius melodus*	Threatened
Roseate tern	*Sterna dougallii dougallii*	Endangered
Sandplain gerardia	*Agalinis acuta*	Endangered
Seabeach amaranth	*Amaranthus pumilus*	Threatened
Shortnose sturgeon	*Acipenser brevirostrum*	Endangered
Small whorled pogonia	*Isotria medeoloides*	Threatened

Source: "Federally Listed Endangered and Threatened Species and Candidate Species in New York (by County)" last revised on January 31, 2007. U.S. Department of Interior, Fish and Wildlife Service. http://www.fws.gov/northeast/nyfo/es/ColistCurrent.pdf).

A review was undertaken of the U.S. Fish and Wildlife Service (USFWS) listing of threatened and endangered plant and animal species for Suffolk County. It was determined that most of the species identified in **Table 8** likely do not occur in the Hamlet of Wyandanch or on the Project site, because of the Project Site and area are highly developed (built and/or paved), the lack of saltwater or coastal water bodies, is not located at or near the shoreline, and does not possess other required habitat features that would support the listed species[7]. Additionally, none of the species listed will be impacted as none have found to be present during any of the general observation site visits conducted for the Project.

On March 26, 2007, a letter of correspondence was sent on behalf of the Town of Babylon to the Informational Services division of the New York State Natural Heritage Program (NHP), to request information regarding the presence of any rare species and their habitats on the project area for the *Wyandanch Downtown Revitalization Plan*, which includes the Project Site. The response from NHP dated April 9, 2007 indicated that several rare species and ecological communities are known to occur in the vicinity of the Project Site. While these species of flora and fauna can be expected to be found in the

[7] *In the case of the plant species, seabeach amaranth is a coastal beach species and sandplain gerardia is a plant of fields growing in association with grasses. Such habitats are lacking on-site. While small whorled pogonia is known historically for the region, there has not been confirmation of its continued presence in recent decades, and it is presumed extirpated from this region of Long Island. Small whorled pagonia inhabits semi-open, mesic forests and is known to grow in association with ferns, club mosses, low-lying evergreen forbs, witch hazel, and frequently a canopy of paper birch, none of which are found on the Project Site. The five turtle species mentioned are all marine species and are therefore unable to use the Project Site. Shortnose sturgeon is a fish that frequents the Hudson River, and would not be present on the Project Site. The piping plover and roseate tern are shore birds and would not frequent the inland, impervious Project Site.*

Town of Babylon, because of the developed nature of the Project Site and the types of habitat required, these species are highly unlikely to be found, as is further explained in the footnote on the previous page.

I. INDIRECT AND CUMALTIVE EFFECTS

This section, which corresponds to Chapter 14 of the EA, provides more in-depth description of what is considered for and analysis of indirect and cumulative effects of a proposed project.

INTRODUCTION

Indirect impacts are those that are "caused by an action and are later in time or farther removed in distance, but are still reasonably foreseeable" (40 CFR 1508.8). Generally, these impacts are induced by a proposed project. Examples of indirect effects can include growth-inducing effects and other effects related to induced changes in land use patterns, population density, and growth rates, and related effects on air and water and other natural systems.

Cumulative effects result from the incremental consequences of an action (the project) when added to other past and reasonably foreseeable future actions (40 CFR 1508.7). The cumulative effects of an action may be undetectable when viewed in the individual context of direct and even indirect impacts, but nevertheless when added to other actions can eventually lead to a measurable environmental change. Cumulative effects are the net result of both a project and the other reasonably foreseeable projects in the vicinity of the project site.

LONG-TERM INDIRECT EFFECTS

The Project is part of a long-term strategy developed through an extensive planning process, beginning in 2002 with the hamlet's comprehensive plan, *Wyandanch Rising*, and continuing in the development of the *Wyandanch Downtown Revitalization Plan* (Revitalization Plan), which was adopted by the Town of Babylon Town Board in May 2009. The Revitalization Plan recommended development of a larger Wyandanch Urban Renewal Area (which includes the Project Site) with a new intermodal facility near the Wyandanch train station and with a mix of housing units, retail space, office space, and community facility space. According to the Revitalization Plan, the full build-out anticipated in the Wyandanch Urban Renewal Area may include over 1,300 new housing units, up to approximately 100,000 square feet of retail, 150,000 square feet of office space, and up to approximately 56,000 square feet of community facility space.

The implementation strategy recommended in the Revitalization Plan divided the Urban Renewal Area into seven separate zones, referred to as "strategic sites," and made specific recommendations for each of those zones. The Plan recommended initial investment on the site identified as "Strategic Site A," which extended along the east side of Straight Path from Acorn Street to approximately Nicolls Road (including the area that is now the Project Site for the Wyandanch Intermodal Transit Facility).

Strategic Site A was identified as the initial catalyst that would set the stage for the other goals identified in the Revitalization Plan. The Revitalization Plan identified a recommended implementation plan for Strategic Site A that included construction of an intermodal transit center near the Wyandanch station, and creation of a new street grid across Site A to create parcels with a shape and size conducive for development. Ultimately, the Revitalization Plan identified redevelopment on Site A with transit-oriented development, potentially including new apartments, retail space catering to commuter and office populations, and commercial office space.

As identified in the Revitalization Plan, therefore, the Preferred Alternative is the critical first step in the development sought by the Revitalization Plan. First, the new parking garage will meet the need for parking near the Wyandanch train station while freeing up land currently being used for surface parking for other uses. Second, introduction of the new roadway network will create development parcels with a shape and size conducive for development, allowing the redevelopment of the area north of the Project Site as envisioned in the Revitalization Plan. Third, the new roadway network and other street improvements to Straight Path will improve traffic and pedestrian safety, making the area more conducive

to future development. As noted in the Revitalization Plan, Strategic Site A—which includes the Project Site and the area to its north where the new roadway network is proposed—was identified as a "northern gateway" to Wyandanch's central business district and therefore as crucial to recasting the image of the core and creating a more vibrant, successful downtown.

J. ENVIRONMENTAL JUSTICE

This section, which corresponds to Chapter 15 of the EA, provides more in-depth description of the regulations that apply and the analysis methodology employed to examine the potential for environmental justice impacts on a given community from a proposed project.

ENVIRONMENTAL JUSTICE METHODOLOGY

CEQ GUIDANCE

The federal Council on Environmental Quality (CEQ), which has oversight of the federal government's compliance with Executive Order 12898 and the National Environmental Policy Act (NEPA), developed its guidance to assist federal agencies with their NEPA procedures so that environmental justice concerns are effectively identified and addressed. Federal agencies are permitted to supplement this guidance with more specific procedures tailored to their particular programs or activities, as the U.S. Department of Transportation (USDOT) has done.

The CEQ methodology involves collecting demographic information on the area where the project may cause adverse impacts; identifying low-income and minority populations in that area using census data; and identifying whether the project would result in disproportionately high and adverse impacts on minority or low-income populations. Disproportionately high and adverse impacts are those that are significant, affect minority or low-income communities, and that appreciably exceed those on the general population or non-minority and non-low-income populations. Mitigation measures should be developed and implemented for any disproportionately high and adverse significant impacts. Under NEPA, the potential for disproportionately high and adverse impacts on minority and/or low-income populations should then be one of the factors the federal agency considers in making its finding on a project.

USDOT'S FINAL ORDER ON ENVIRONMENTAL JUSTICE

USDOT's *Final Order on Environmental Justice* establishes the procedures for USDOT to use in complying with Executive Order 12898. The order applies to all of USDOT's operating administrations, including the Federal Transit Administration. Following the procedures set forth in the order, the consideration of environmental justice begins with a determination of whether the project would have an adverse impact on minority and low-income populations and whether that adverse impact would be disproportionately high. Disproportionately high and adverse impacts on minority and low-income populations are adverse impacts that are predominantly borne by a minority population and/or low-income population or that are appreciably more severe or greater in magnitude than the adverse impacts that will be suffered by the non-minority or non-low-income population. In making determinations regarding disproportionately high and adverse impacts, mitigation and enhancement measures that will be taken and all offsetting benefits to the affected minority and low-income populations may be taken into account, as well as the design, comparative impacts, and relevant number of similar existing system elements in non-minority and non-low-income areas.

Federal agencies must ensure that a project that will have a disproportionately high and adverse impact on minority populations or low-income populations will only be carried out if: (1) further mitigation measures or alternatives that would avoid or reduce the disproportionately high and adverse impact are not practicable; and (2) a substantial need for the program, policy, or activity exists, based on the overall public interest, and alternatives that would have fewer adverse impacts on protected populations that would still satisfy that need would either have other adverse social, economic, environmental, or human health impacts that would be more severe, or would involve increased costs of extraordinary magnitude.

IDENTIFICATION OF DISPROPORTIONATELY HIGH AND ADVERSE IMPACTS

Following CEQ's guidance, a project's effects are disproportionately high and adverse if (1) they are significant and adverse and affect a minority population and/or low-income population; and (2) they will be suffered by minority and/or low-income populations and appreciably exceed those that will be suffered by non-minority or non-low-income populations. When making this determination, agencies should also consider whether the affected minority or low-income populations already or will suffer from cumulative or multiple adverse exposures from environmental hazards. Consistent with USDOT's guidelines for evaluating environmental justice, the determination of disproportionately high and adverse impacts to minority and/or low-income communities involved consideration of mitigation and enhancement measures and offsetting benefits to the affected minority and low-income communities; and the design, comparative impacts, and relevant number of similar system elements in non-minority and non-low-income neighborhoods. ✷