

Consolidated Edison Company of New York, Inc.

M29 Transmission Line Project

Exhibit E-1

Description of the Proposed Transmission Facilities

EXHIBIT E-1: DESCRIPTION OF THE PROPOSED TRANSMISSION FACILITIES

This Exhibit addresses the requirements of 16 NYCRR §88.1.

E-1.1 Underground Cable System

Con Edison is proposing to construct and operate an approximately 9.5 mile, 345 kV high-pressure fluid filled (HPFF pipe-type) transmission line, primarily underground, through portions of Westchester County, the Bronx, and upper Manhattan. The Project's transmission line will contain on feeder (designated M29) and will connect Con Edison's existing Sprain Brook Substation in the City of Yonkers with Con Edison's new Academy Substation in the Inwood section of upper Manhattan.

The underground HPFF pipe-type transmission line will consist of three 2,500 kcmil paper-insulated copper conductors. Each insulated cable weighs about 11.5 lbs/foot and has an approximate 3.25-inch outside diameter including the skid wires. Each conductor cable will consist of a stranded and segmented-type copper conductor; a semi-conducting conductor shield; layers of paper insulating tapes; an insulation screen; a moisture seal; and skid wires to facilitate cable pulling. Figure E-1.1a shows a typical cross section of the 2,500 kcmil copper conductors.

The cables for a three-phase circuit will be installed in a 10-inch diameter steel pipe filled with dielectric fluid that is kept under static pressure by pressurizing plants located at each of the two substations. A six-inch steel pipe will also be installed for future implementation of forced cooling in order to increase the cable transfer capability when needed to meet future growth. The steel cable pipe will be internally and externally coated to inhibit corrosion.

E-1.2 Insulator Design

Cable insulation consists of many layers of insulation tape. The insulation tape used in this application will be a laminated paper-polypropylene. The area between the cable conductor and pipe is filled with a high-quality dielectric fluid pressurized to increase unit dielectric strength and suppress ionization in the insulation. The feeder pressurization will be provided by the dielectric fluid that will be kept at a static pressure by the pressurizing plants located at each of the two substations. One of the pressurizing plants will be the prime plant and the other will operate as the back-up supply. The dielectric fluid will be a “low viscosity” alkyl benzene derivative. The fluid will not contain any benzene or polychlorinated biphenyls (PCBs).

The dielectric fluid pressurizing and associated hydraulic systems are included in the Project design to maintain transmission line insulation integrity by increasing the dielectric strength of the insulation system and suppress ionization within the insulation and to retard moisture ingress if there is a leak in the system. The pressurizing plants will be designed with dielectric storage capacity of approximately 20,000 gallons at the Sprain Brook Substation and 30,000 gallons at the Academy Substation. However during normal operation and maintenance of the system, only 60-70 percent of its total tank capacity will be utilized to account for thermal expansion and contraction of the dielectric fluid as the M29 transmission line is load cycled. A leak in the steel pipe would be detected by a low-pressure alarm in the hydraulic system or through the required daily monitoring of tank levels and pressure trends by substation operations personnel. Once a leak is detected, Con Edison would implement procedures to locate and repair the leak in an expeditious manor. Under certain emergency conditions, the cable would be de-energized and taken out of service, and placed on reduced pressure if determination is made that the cable is in imminent danger of damage or failure.

Installation methods, materials and surveillance practices aid in protecting underground feeders from leaks as well as assisting in leak detection. The following measures will be reflected in the design of the Project transmission line

- Cathodic protection of the pipe-type cable system will be provided to maintain the integrity of the pipe;
- Steel pipes will be internally and externally coated;
- Stainless steel pipes will be externally coated;

- All welds will be inspected by non-destructive testing methods which include radiography for steel pipes and Liquid Dye Penetrant inspection for stainless steel pipes;
- All install piping will be pressure tested in accordance with Company specifications to establish the pipe integrity and to detect small pinhole leaks in the system;
- External coating of piping will be “Spark Rested” to ensure the coating is free of defects prior to backfilling the trench;
- The spacing between the transmission line feeder pipe and other facilities will be carefully monitored during installation to prevent hard contacts and to reduce the risk of mechanical damage to the pipe or coating;
- Select backfill material will be use to minimize pipe coating damage during backfill and improve the feeders thermal heat transfer capability;
- Visual manhole inspections will be made routinely throughout the system to determine any signs of dielectric fluid leaks;
- Fluid levels in the storage tanks and pressure will be monitored on a regular basis to detect any discrepancies or trends that would indicate a leak in the system; and
- Full stop joints will be installed along the feeder pipe route to curtail the flow of dielectric fluid in case of a leak and to aid in locating and sectionalizing of the transmission line if a leak should develop. Full stop joints will be placed on both sides of the Harlem River crossing.

The systems will be designed to provide for future installation of forced-cooling equipment to increase the cable transfer capability when needed to meet future load growth.

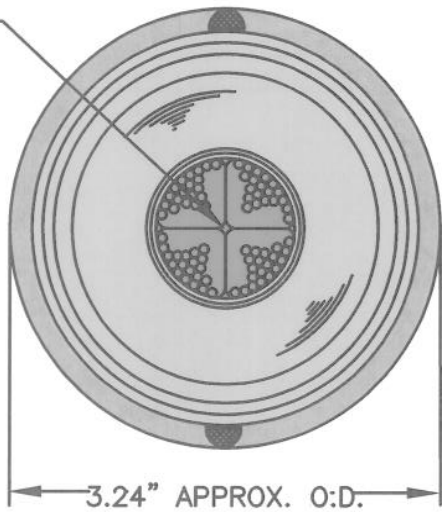
E-1.3 Length of Transmission Line

The Project will be installed primarily within the curb-to-curb portion of the rights-of-way of public roadways. The proposed route for the transmission line begins at Con Edison’s Sprain Brook Substation in Yonkers and proceeds west along Tuckahoe Road and then generally south along Nepperhan Avenue and Riverdale Avenue to the City of Yonkers/Bronx boundary. The total distance of the transmission line through Yonkers is approximately five miles. The proposed transmission line continues south on Riverdale Avenue, West 230th Street and Broadway to the **parking lot south of West 225th Street, for the proposed staging area for the tunneling activities** to cross the Harlem River. The total distance of the proposed route through the Bronx is approximately **2.7** miles. The **tunnel** crossing of the Harlem River will be approximately **750** feet in length. Upon entering Manhattan, the transmission line proceeds

generally south along Ninth Avenue, West 219th Street, Broadway, West 204th Street and Tenth Avenue to the Academy Substation. The total distance of the route through New York County, including the Harlem River crossing, is approximately 1.8 miles. The total distance of the Project transmission line is approximately 9.5 miles. The preferred route for the proposed transmission line is shown in Figure 2-1.

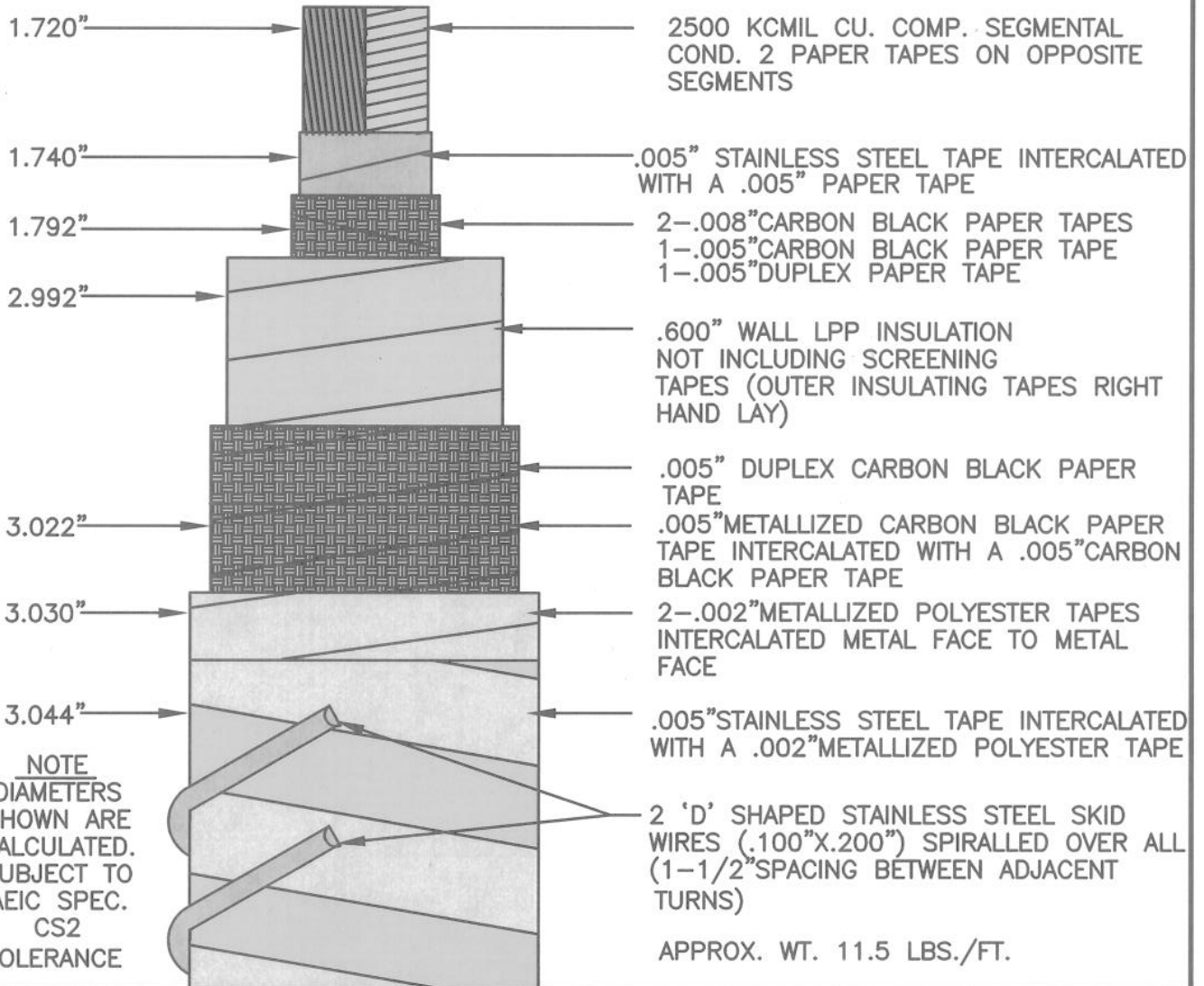
No overhead transmission towers or associated insulators, aside from the one “A” frame tower, and pothead stands at the Sprain Brook Substation, are proposed for these transmission facilities.

FILLER
IN CENTER,
0.120"



345KV RATING - 100% INS.LEVEL
PER: CON ED SPECIFICATIONS
EO-09 R12 AND EO 7909 AS APPLICABLE

CONSOLIDATED EDISON
PO #5506969
OKONITE NY 22-50231



2500 KCMIL CU. COMP. SEGMENTAL COND. .600" WALL LPP INSUL. PIPE TYPE CABLE

THE OKONITE COMPANY
RAMSEY, N.J. U.S.A.

DATE 7/27/05	SCALE NTS	REVISIONS
DR. JVF/ac	APP.	DRAWING NUMBER
DISK PIPE	EST. NUMBER 33742	OCS-D-1903

Figure E-1-1a: Typical 345 kV Pipe-type Cable Cross-Section

Consolidated Edison Company of New York, Inc.

M29 Transmission Line Project

Exhibit E-2

Other Facilities

EXHIBIT E-2: OTHER FACILITIES

This Exhibit addresses the provisions of 16 NYCRR §88.2.

Con Edison is proposing to construct an approximately 9.5-mile, 345 kV high-pressure, fluid filled (HPFF pipe-type) transmission line, primarily underground, connecting Con Edison's existing Sprain Brook Substation in the City of Yonkers, Westchester County, with a new transmission substation, the Academy Substation, to be located at the site of Con Edison's former Sherman Creek Generating Station in the Inwood section of upper Manhattan.

E-2.1 Sprain Brook Substation

The existing Sprain Brook Substation is located on approximately 38 acres northwest of the intersection of Tuckahoe Road and the Sprain Brook Parkway in the City of Yonkers, Westchester County, New York. The developed portion of the substation property comprises approximately 21 acres. Improvements required at the substation to accommodate the Project's transmission line include the installation of 345 kV circuit breakers, 345 kV disconnect switches, 345 kV pothead structures, "A" frame towers, related equipment, and a pressurizing plant with a tank that holds 20,000 gallons of dielectric fluid. The "A" Frame towers will be installed on a concrete pad, constructed on the southeastern side of the existing equipment area in an unused bay. The pressurizing plant will be housed in a skid-mounted trailer equipped with secondary containment and will be located on currently open land adjacent to the access road that enters the site from the south. All improvements to the substation will be integrated into the existing substation's appearance and design.

Figure E-2-1 (Drawing 164370-MP) provides an electrical one-line diagram for the Sprain Brook Substation High Tension connections. Figure E-2-2 provides an arrangement of the Sprain Brook 345 kV Equipment Plan (Drawing A164469-MP). Figure E-2-3 provides an arrangement of the Sprain Brook 345 kV Equipment Partial Bay 2 Plan and Sections (Drawing 351813-00).

E-2.2 Academy Substation

The new Academy Substation will be located at the site of Con Edison's former Sherman Creek Generating Station in the Inwood section of upper Manhattan. The site is bounded by West 201st Street, Academy Street, and the Harlem River. The Academy Substation is planned as an indoor, gas-insulated-type station ("GIS") to accommodate the M29 transmission line and other

anticipated Con Edison transmission facilities needed to serve near- and long-term electric load demand in Con Edison's service territory.¹ The major equipment that will be installed for the Project includes 345 kV circuit breakers, 345 kV disconnect switches, 345 kV pothead structures, 345 kV/138 kV autotransformers, and 138 kV phase angle regulators, and related equipment. The substation will contain a pressurization plant with two tanks for dielectric fluid. The total tank capacity will be 30,000 gallons, consisting of a 10,000-gallon tank and a 20,000-gallon tank. The Academy Substation will be connected to Con Edison's existing Sherman Creek Substation via two 138 kV feeders. The civil site work and masonry building associated with the Academy Substation is being undertaken as-of-right under the current zoning in accordance with building permits to be issued by New York City.

Figure E-2-4 (Drawing 350740-0) provides an electrical one-line diagram for the Academy Substation 345 kV/138 kV High Tension Connections. Figures E-2-5 and E-2-6 provide a general arrangement of the first and second floor plans of the Academy Substation, respectively (Drawings 351396-0 and 351398-0). Figure E-2-7 (Drawing 351399-0) provides a General Arrangement Drawing of Academy Substation Building Sections.

Figures E-2-1 through E-2-7 are considered protected critical infrastructure information. In accordance with Public Officers Law, Sections 89.5(a)(1)(1-a) and 87.2(f), and Section 6-1.3 of the Public Service Commission's regulations, Con Edison has requested that these drawings be exempted from public disclosure by the Commission.

¹ Con Edison has designed the Academy Substation as a gas-insulated-type substation to minimize the substation's footprint, as requested by the City of New York (the "City"). Also at the City's request, Con Edison has agreed to enclose the Academy Substation in a masonry building visually compatible with the City's plans for neighborhood redevelopment. The building will have interior space for three additional feeder connections. Con Edison is seeking approval for construction of the substation building from the City's Department of Buildings, outside the Article VII process for the M29 transmission line.

Consolidated Edison Company of New York, Inc.

M29 Transmission Line Project

Exhibit E-3

Underground Construction

EXHIBIT E-3: UNDERGROUND CONSTRUCTION

This Exhibit addresses the provisions of 16 NYCRR §88.3.

The Project's transmission line will incorporate a 345 kV high-pressure fluid filled (HPFF pipe-type) underground transmission feeder comprised of three 2,500 kcmil paper-insulated copper conductors. The transmission line will be installed primarily underground within existing Con Edison property and public roadway rights-of-way, with the exception of four bridge crossings where the transmission line will be mounted to the underside of bridges or installed within the bridge roadway. The four bridge crossings are:

- Old Nepperhan Avenue Bridge over the Saw Mill River
- Tuckahoe Road Bridge over the New York City New Croton Aqueduct and an abandoned railroad
- 252nd Street Bridge over the Henry Hudson Parkway
- Nepperhan Avenue Bridge over the Saw Mill River

For the Nepperhan Avenue Bridge crossing over the Saw Mill River, the route is presently designed such that the transmission line is installed in the bridge roadway, and not affixed underneath the bridge. Along most of the proposed route, the transmission line will be installed within an open-cut trench. Where the feeder crosses the Harlem River into Manhattan, the pipe-type cable will be installed **via a new tunnel**.

A Construction Stormwater Pollution Prevention ("CSWPP") Plan will be developed and implemented during transmission line installation. The CSWPP Plan includes the identification of best management practices to be implemented during construction and operation of the transmission facilities. The CSWPP will also identify monitoring and reporting requirements. A copy of the CSWPP Plan will be included as part of Con Edison's Environmental Management and Construction Plan ("EM&CP") for the Project.

E-3.1 Open Trench Construction

Along most of the proposed transmission line route, the general sequence of construction activities will include:

- Utility survey and mark-out;
- Pavement saw cutting;
- Trench excavation and spoil removal;
- Pipe installation and welding;
- Non-destructive testing of welds;
- Pipe coating testing;
- Backfill with select (thermal) material;
- Pavement restoration; and
- Pressure testing of installed facilities after backfill

In general, the trench would be excavated to a depth sufficient to provide a minimum of three feet of cover over the cable pipe. When less than two feet of cover over the cable pipe or fluid-circulating pipe is authorized because of special conditions, suitable guards such as one-inch thick steel plates would be placed over the pipes prior to backfilling. A greater depth of cover may be required for installations within roadways under New York State Department of Transportation (“NYSDOT”) jurisdiction. Typical trench width will be approximately 3 feet, however, this could be increased depending upon the configuration of pipes within the trench and whether other utilities must be crossed. Typical trench cross-sections are shown in Figure E-3-1.

Pipe installation will be carefully planned to ensure a minimum elapsed time between the start of trench excavation and the completion of resurfacing over the excavation. Pipe installation would follow trench excavation as rapidly as possible. Minimum clearances as per Company specifications will be specified and followed for placement of the new transmission line adjacent to liquid petroleum pipelines, gas lines, transmission facilities, and concrete structures. Select thermal backfill, to improve thermal conductivity, will be placed around the cable pipe.

E-3.2 Manhole Installation

Precast or field-constructed concrete manholes will be installed at specific locations to provide for cable pulling and splicing. Manholes will be spaced approximately, on average, every 2,100 feet, with the exact locations along the line and final number of manholes established in the final design and as shown on the plan and profile drawings to be included with the EM&CP. The manholes will be underground structures approximately 22 feet long by 9 feet wide, set flush to grade. Manhole placement will be based on the number and severity of bends in the route

verified by cable pulling tension and sidewall bearing pressure calculations, physical obstructions, topographic features, access requirements and cable pulling tension limitations. A cross-section of a typical manhole installation is shown on Figure E-3-2.

E-3.3 Tunnel Construction

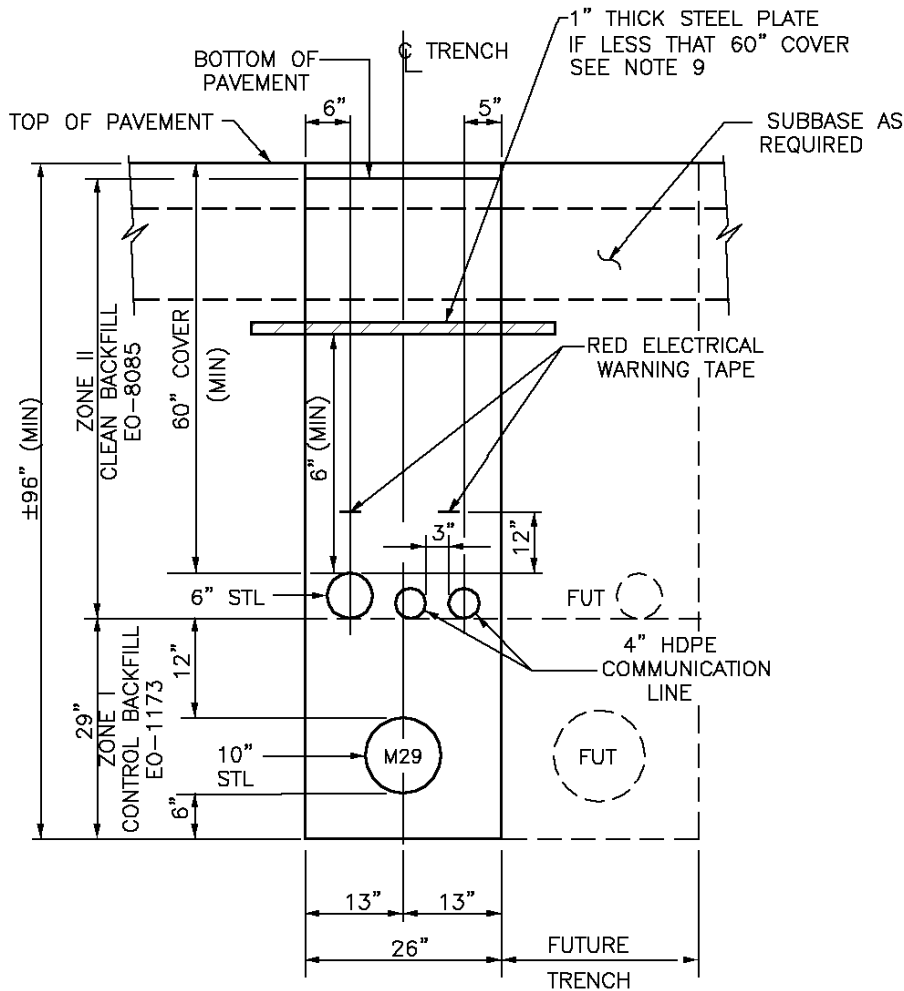
The M29 transmission line will cross the Harlem River via a new tunnel. The crossing location has been carefully selected with consideration of workspace requirements at the two shaft locations on the north and south sides of the river. The tunnel shaft and tunnel construction staging area on the south side of the Harlem River will be located in a parking lot that serves the New York Presbyterian Hospital (NYPH). On the north side of the Harlem River, the tunnel shaft and associated construction staging area will be located in a parking lot owned by Kingsbridge Associates. The crossing beneath the Harlem River is expected to be through bedrock, and a geotechnical boring program has been undertaken to confirm the substrate characteristics.

Tunnel construction will begin with excavation of the tunnel shaft on the south side of the Harlem River. The shaft staging area will incorporate approximately 20,000 square feet on the NYPH property. The planned bottom elevation of the Manhattan shaft is at 127 feet below mean sea level (approximately 145 feet below grade). The rock elevation near the Manhattan shaft is approximately 64 feet below grade. Shaft excavation will be accomplished through a combination of conventional techniques and blasting. The near surface portion of the shaft will be lined with steel sheeting with an inside diameter of 24 feet. Construction of the initial shaft will require approximately 2-4 months. A plan view of the Manhattan shaft is shown in Figure E-3-4.

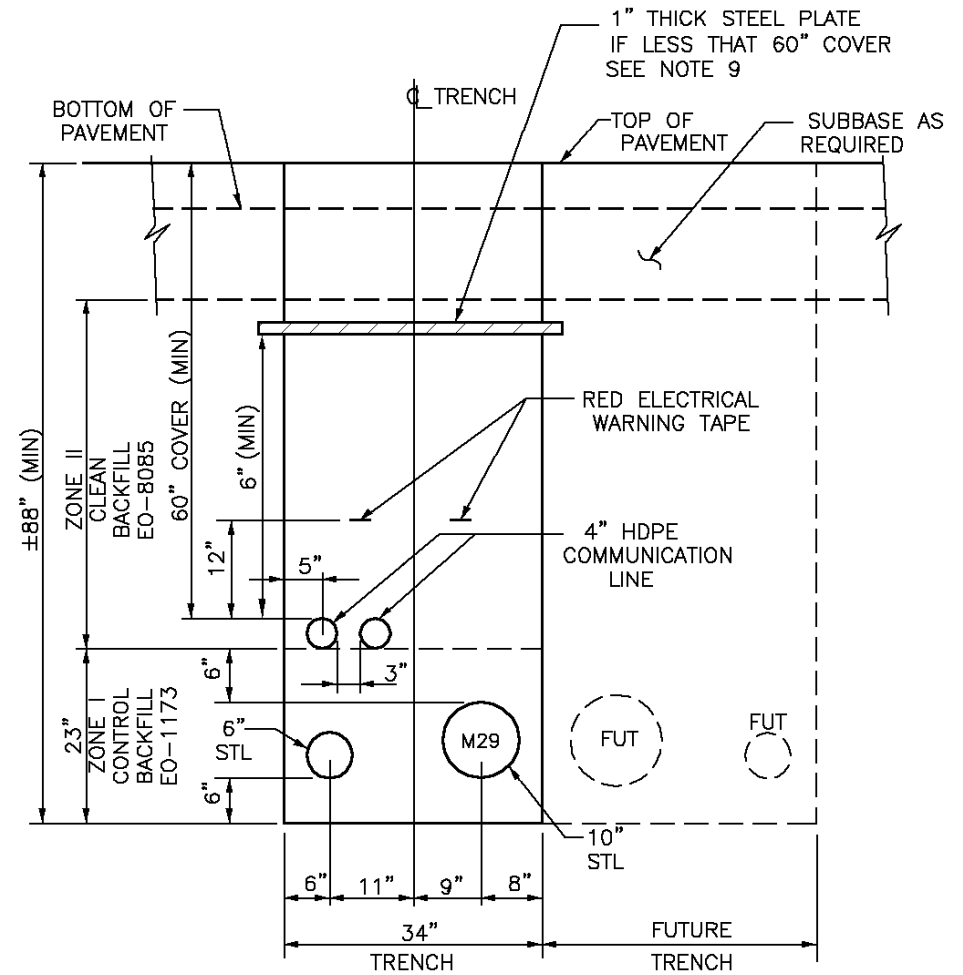
Once the initial shaft is completed to the required depth, a starter tunnel and tail tunnel is constructed through bedrock via drilling and blasting to provide sufficient length for staging of the road header machine and its trailing gear. During construction, the tail tunnel provides a space for equipment storage. Tunnel construction will proceed from the Manhattan shaft location north to the bottom of the Kingsbridge Associates property shaft at a 0.5% pitch. Mined rock will be removed via the Manhattan shaft. The total length of the tunnel crossing, which includes a subterranean crossing of the New York Presbyterian Hospital property, Kingsbridge Associates property, and the Metro North Railroad tracks on the Bronx side of the Harlem River, will be approximately 750 feet. Tunnel and shaft construction will require approximately one year. A

cross section of the proposed Harlem River Tunnel is shown in Figure E-3-5, which also shows where future feeders could be accommodated within the tunnel.

Following completion of the Manhattan shaft and the start of tunnel construction, excavation of the north shaft will begin. The shaft staging area will incorporate approximately 5,000 square feet on the Kingsbridge Associates property. The planned bottom elevation of the north shaft is at 124 feet below mean sea level (approximately 132 feet below grade). The rock elevation near the north shaft is approximately 64 feet below grade. Excavation and protection of the north shaft will be the same as the Manhattan shaft except that the inside diameter of the north shaft will be 15 feet. Construction of the north shaft will also require approximately 2-4 months. A plan view of the north shaft is shown in Figure E-3-6.

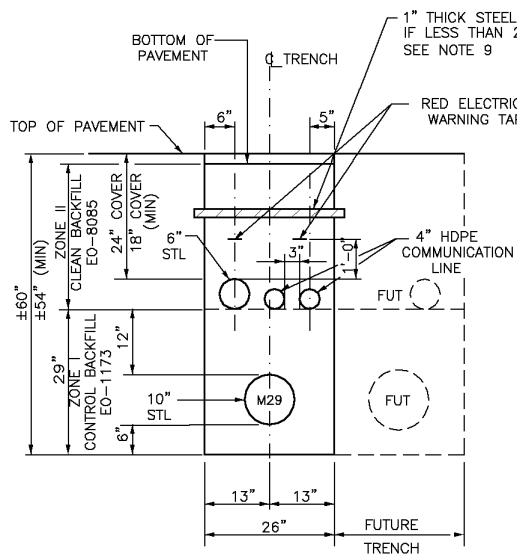


CONDUIT/TRENCH SECTION
FOR STATE ROADS
SCALE: 1/2"=1'-0"

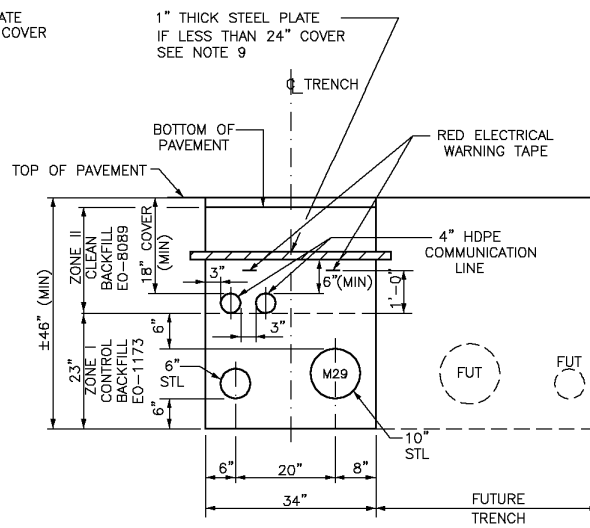


PIPE/TRENCH SECTION
FOR PASSING ABOVE
AND BELOW UTILITIES IN A
HORIZONTAL PIPE CONFIGURATION
FOR STATE ROADS
SCALE: 1/2"=1'-0"

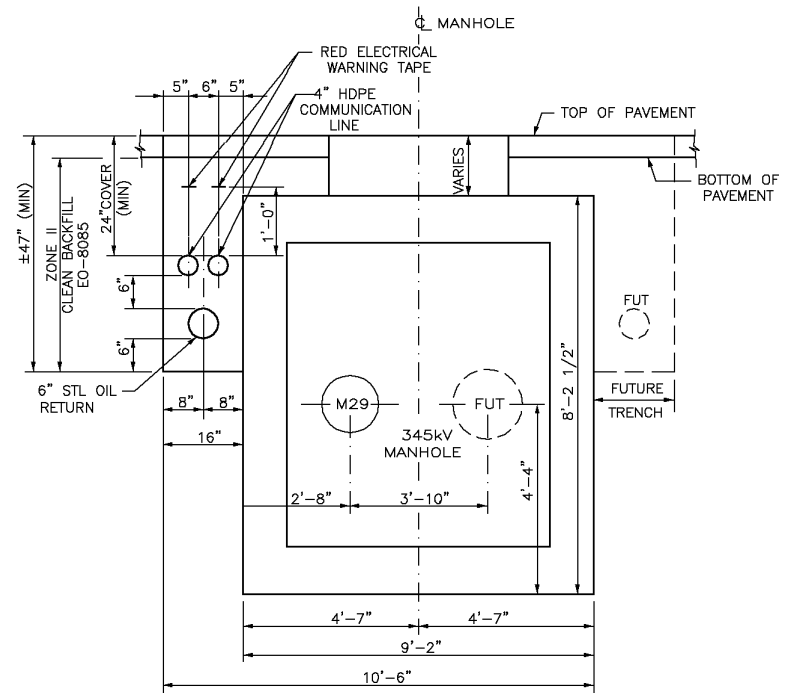
Figure E-3-1a
Cross-Section: Typical Pipe-Type Cable Trench Dimensions for City of Yonkers



CONDUIT/TRENCH SECTION
FOR NON-STATE ROADS
SCALE: 1/2"=1'-0"

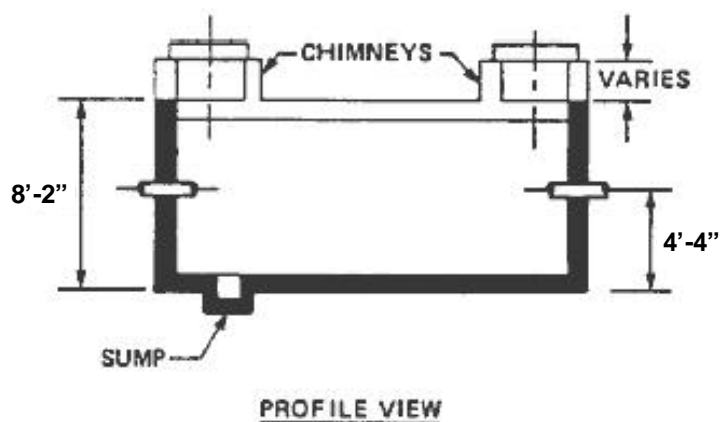
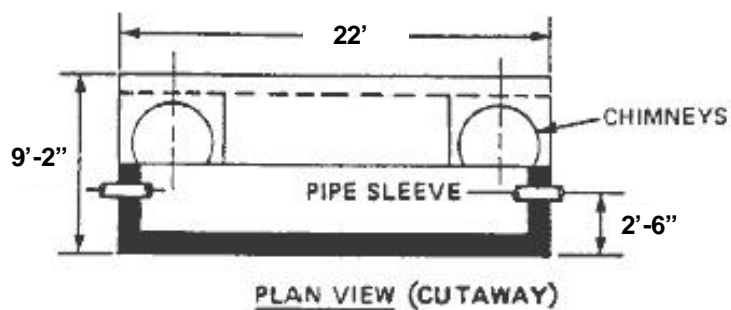


CONDUIT/TRENCH SECTION
FOR PASSING ABOVE
AND BELOW UTILITIES IN A
HORIZONTAL PIPE CONFIGURATION
FOR NON-STATE ROADS
SCALE: 1/2"=1'-0"



CONDUIT/TRENCH SECTION
FOR OIL RETURN & COMMUNICATION
PIPES PASSING ADJACENT TO
345kV MANHOLES
FOR NON-STATE ROADS
NTS

Figure E-3-1b
Cross-Section: Typical Pipe-Type Cable Trench Dimensions for City of New York



NOTE:

1. ALL DIMENSIONS ARE APPROXIMATE.

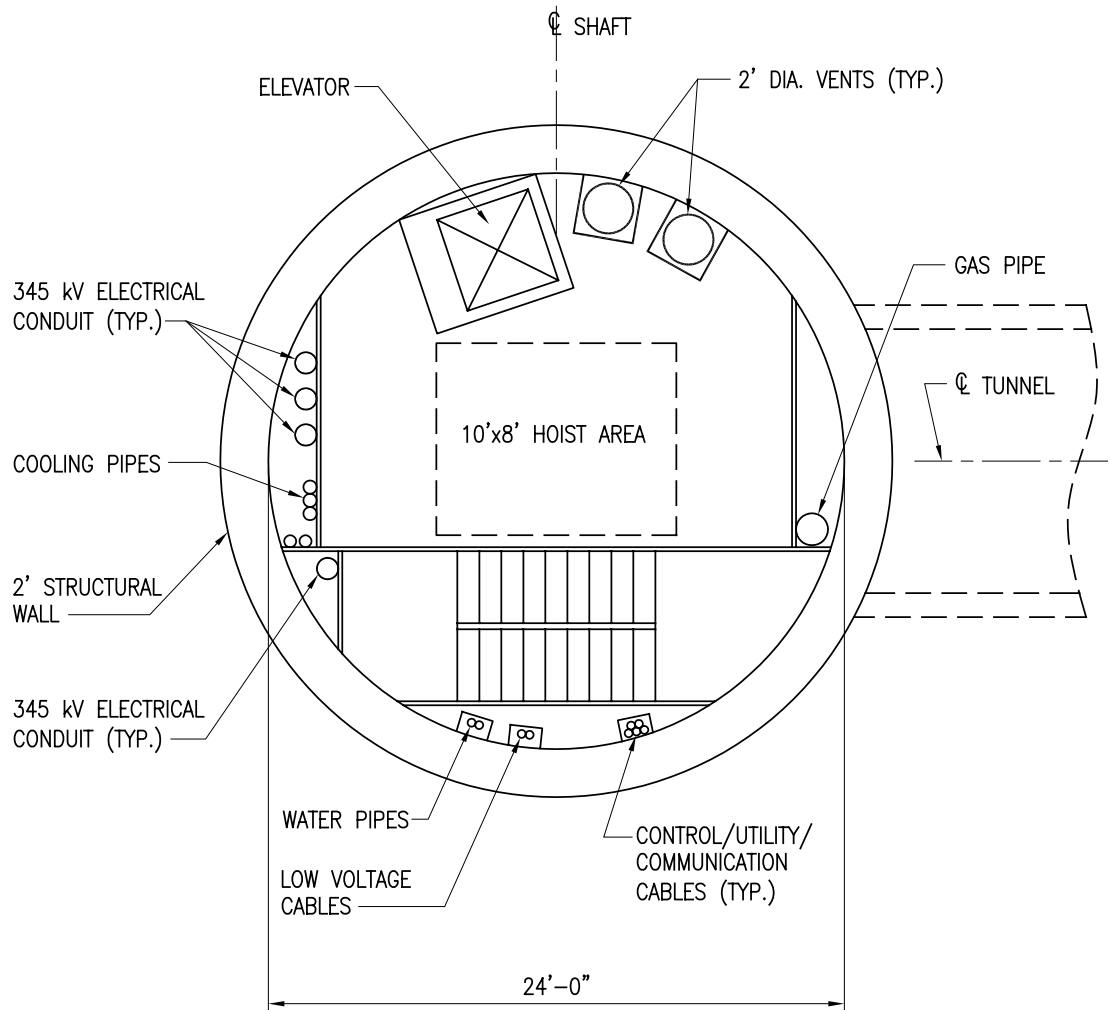
Consolidated Edison Company of New York, Inc.
M29 Transmission Line Project
Westchester, Bronx and New York Co., New York

Figure E-3-2 Typical 345 kV Pipe-Type Cable
Land Manhole Plan and Section

Source: Consolidated Edison Company, Inc. 2006

Sep. 05, 2006 at 2:36pm

G:\DWG5\104\10431D\Turnel\SHS-1.dwg

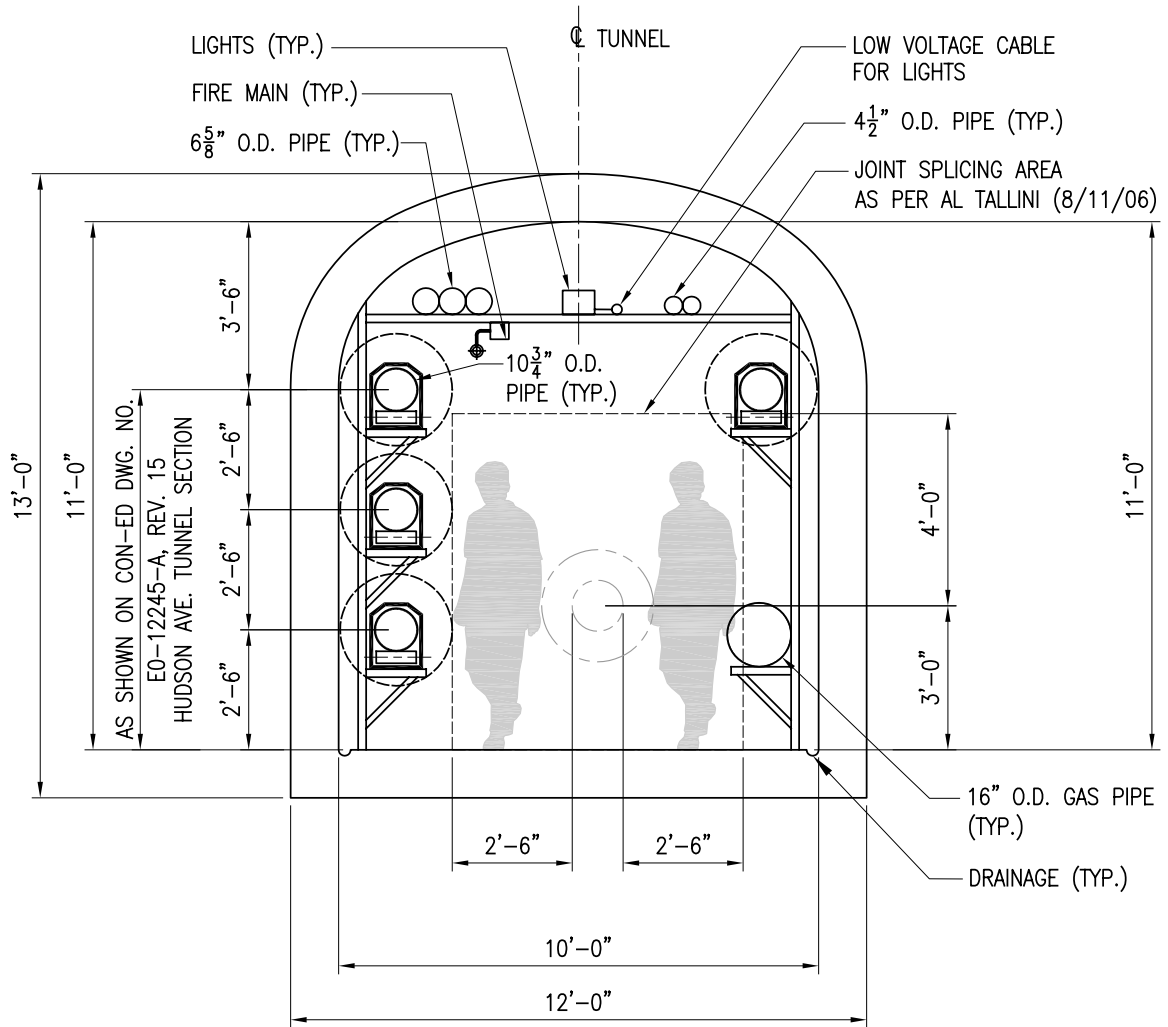


TYPICAL SECTION

NEW 345KV FEEDER M-29 HARLEM RIVER CROSSING	
NEW YORK	NEW YORK
CONSOLIDATED EDISON OF NEW YORK CITY	
NEW YORK	NEW YORK
MUESER RUTLEDGE CONSULTING ENGINEERS	
14 PENN PLAZA - 225 W. 34TH STREET, NY, NY 10122	
FIGURE E-3-4	
SHAFT SOUTH OF THE HARLEM	
RIVER	

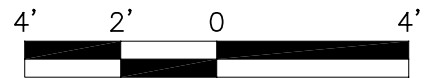
Sep. 05, 2006 at 2:38pm

G:\DWG5\104\10431D\Tunnel\TS-2.dwg



TYPICAL SECTION

GRAPHIC SCALE



NEW 345KV FEEDER M-29
HARLEM RIVER CROSSING

NEW YORK

NEW YORK

CONSOLIDATED EDISON OF
NEW YORK CITY

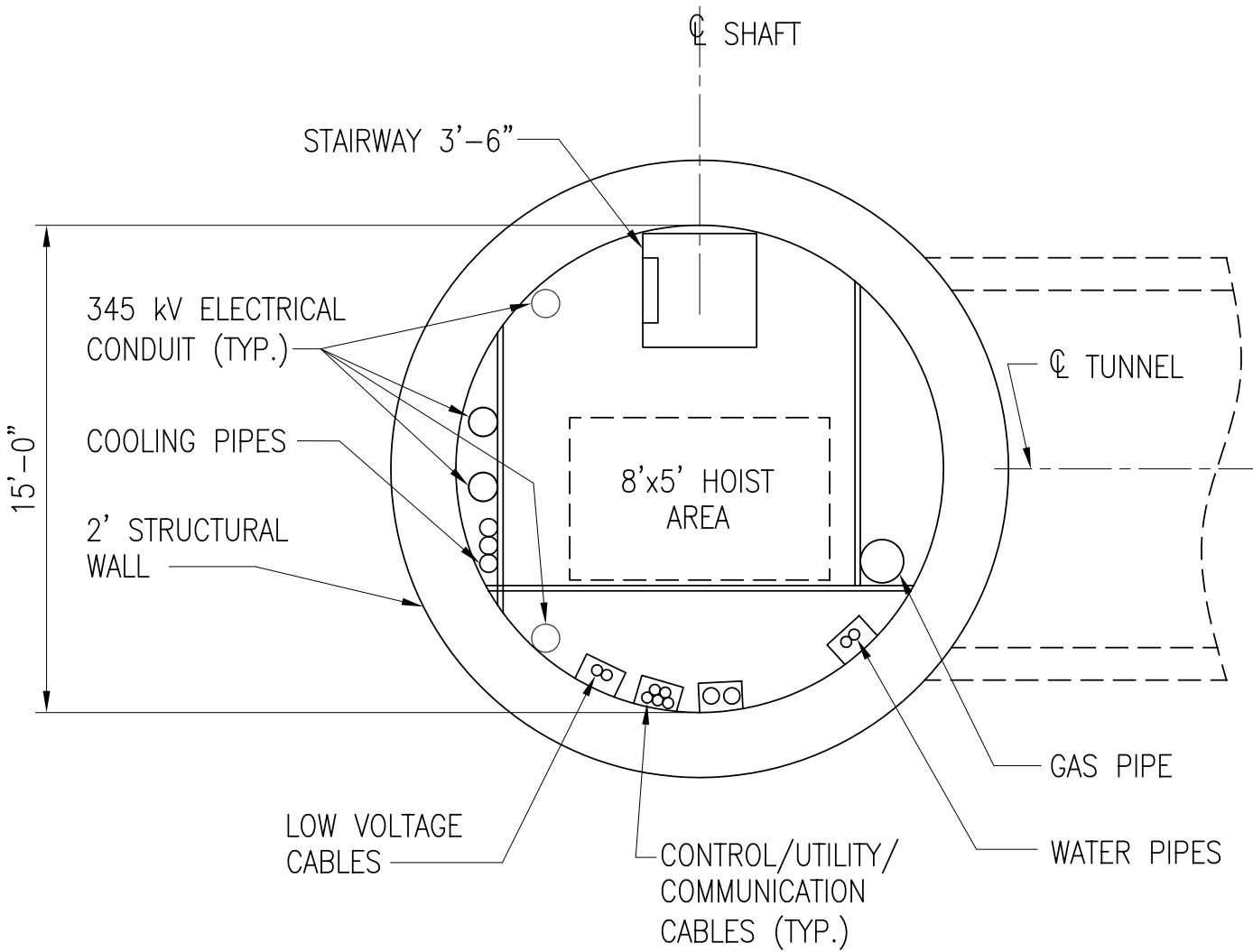
NEW YORK

NEW YORK

MUESER RUTLEDGE CONSULTING ENGINEERS

14 PENN PLAZA - 225 W. 34TH STREET, NY, NY 10122

FIGURE E-3-5
HARLEM RIVER TUNNEL CROSS SECTION



TYPICAL SECTION

Sep. 05, 2006 at 2:37pm

G:\DWG5\104\10431D\Turnel\SHS-2.dwg

NEW 345KV FEEDER M-29 HARLEM RIVER CROSSING	
NEW YORK	NEW YORK
CONSOLIDATED EDISON OF NEW YORK CITY	
NEW YORK	NEW YORK
MUESER RUTLEDGE CONSULTING ENGINEERS 14 PENN PLAZA - 225 W. 34TH STREET, NY, NY 10122	
FIGURE E-3-6	
SHAFT NORTH OF THE HARLEM	
RIVER	

Consolidated Edison Company of New York, Inc.

M29 Transmission Line Project

Exhibit E-4

Engineering Justification

EXHIBIT E-4: ENGINEERING JUSTIFICATION

This Exhibit addresses the requirements of 16 NYCRR §88.4.

This exhibit presents Con Edison's engineering justification for the Project, as required pursuant to 16 NYCRR §88.4(a)(1), (2), (3) and (4), including a demonstration of the relationship of the Project to the Applicant's existing facilities and interconnected network; an indication of the specific benefits with respect to reliability and economy to the Applicant and the interconnected network; the proposed date for completion of the transmission line and the expected impacts on the systems of the Applicant and others if the scheduled Project completion date is not met; and provision of appropriate studies, showing expected flows on the line under normal, peak, and emergency conditions, including effects on the stability of the interconnected system.

E-4.1 Introduction and Relation to Existing Transmission Network

As part of its ongoing electrical load planning efforts, Con Edison periodically re-evaluates its existing transmission network and substation facility infrastructure, as well as its electric supply load forecasts. The ten-year load forecast reflects projected substation peak loadings, taking into account load increases from new and imminent projects that will contribute to the anticipated electrical load growth in each region served by an area substation. The area substations and associated supply feeders must be capable of supplying their projected peak loads during a first contingency condition. A first contingency condition is defined as the loss of an area transformer and/or its associated 138 kV feeder. Area substation capabilities are determined based on this emergency condition, i.e., one facility (first contingency) being out of service.

The proposed M29 transmission line originates at Con Edison's Sprain Brook Substation in Yonkers and terminates at the new Academy Substation in upper Manhattan, at which point the power would be stepped down to 138 kV for interconnection to the Sherman Creek Substation for network distribution. Operation of the proposed M29 transmission line will enhance reliability of load supply into the Bronx load area served by Con Edison's electrical distribution system, which has seen rapid and significant load growth over the last few years. The M29 transmission line will increase the supply capacity of the Sherman Creek Substation, which serves sections of the Bronx and Washington Heights in Manhattan. Additionally, the Project would enhance Con Edison's ability to import power into New York City by approximately 300 MW, permitting increased delivery of economy power to its in-City customers.

The East 179th Street load area is defined as that part of the Con Edison in-City system supplying the Bronx and upper Manhattan area stations, whose aggregate summer peak load demand is now estimated to approach 1,250 MW over the next ten years. With little generation capacity within the load area, load must be served almost entirely by transmission line feeders carrying energy from sources to the north (i.e., Westchester County) and from within New York City (e.g., Astoria). Studies have indicated that other transmission feeders supplying the East 179th load area would overload following the contingency loss of Feeder X28, the largest transmission feeder into the area, emanating from Sprain Brook Substation. Until the M29 transmission line is placed in service, operational protocols are in place to mitigate these potential overloads and maintain reliability of load supply.

The M29 transmission line would provide sufficient additional transmission capacity to the East 179th load area to not only meet its first contingency design requirements, but also provide enough margin to achieve close to second contingency capability over the next ten years. As compared to other potential transmission solutions, the M29 transmission line also directly benefits the Sherman Creek Substation by providing it with an additional supply source. With the M29 transmission line, anticipated load growth at the Sherman Creek Substation could also be supplied while maintaining second contingency transmission capability into the area substation. In addition, the M29 transmission line would also benefit the Dunwoodie North load area, an area that is electrically interconnected to the East 179th Street load area, and forecasted to experience significant load growth.

Moreover, the M29 transmission line, by virtue of its origination at the Sprain Brook Substation (outside of the in-City System) and termination at the new Academy Substation (located within the in-City System electrical boundary), will become part of the New York City cable interface, thus increasing overall transfer capacity into New York City by approximately 300 MW. The Project not only provides a path for increasing transfer capacity into the City, but also improves the voltage performance of the electric system with its own line capacitance (200 MVARs) and its two 345/138-kV autotransformers, which help enhance voltage regulation on the Con Edison bulk power transmission system.

E-4.2 Benefits to Reliability and Economy for Applicant

The installation of the M29 transmission line and associated upgrades at the existing Sprain Brook Substation and the new Academy Substation will allow Con Edison to meet expected electrical load growth within the East 179th Street load area, including portions of the Bronx and upper Manhattan. The Project will also improve reliability on the Con Edison electric

transmission and distribution system. First contingency overload conditions, as reflected in Con Edison's most recent Ten-Year Load Relief Forecast for the Sherman Creek Substation, will be relieved through Project construction. With the proposed Project, Con Edison's ability to import power into New York City will increase by about 300 MW, allowing the increased delivery of economy power to its in-City customers.

E-4.3 Schedule

The M29 transmission line, with a planned in-service date of **March 2009**, is designed to meet both near-term and anticipated long-term electric load growth in the East 179th Street load area. Failure to meet this in-service date will increase the likelihood of electrical supply disruptions caused by overload conditions following the contingency loss of Feeder X28, which currently serves the East 179th Street load area.

E-4.4 System Studies

Con Edison conducted a System Reliability Impact Study ("SRIS") for the M29 transmission line to evaluate the impact of the proposed Project on the operation and stability of the interconnected electric transmission system. The SRIS was conducted in compliance with the scope approved by the New York Independent System Operator ("NYISO") and in conformance with applicable Northeast Power Coordinating Council ("NPCC"), New York State Reliability Council ("NYSRC"), NYISO and local utility planning standards and design criteria. The NYISO Operating Committee approved the results of the SRIS on July 28, 2005. The SRIS report contains critical infrastructure information; therefore, upon request, a complete copy of the SRIS report will be provided to the DPS staff under separate cover.

E-4.5 Public Interest Considerations

The proposed M29 transmission line, combined with the equipment installations at Sprain Brook Substation and the new Academy Substation, will serve the public in several ways, including:

- Providing increased energy transfer capability to the East 179th Street load area to meet expected load growth and avoid potential overload conditions;
- Providing additional benefit to the Dunwoodie North load area, an area that is electrically interconnected to the East 179th Street and also projected to have significant load growth;
- Assuring the continued availability and reliability of electric service in portions of the Bronx and upper Manhattan;

- Improving the voltage performance of the electric distribution system and enhancing voltage regulation on the Con Edison bulk power transmission system;
- Minimizing potential environmental impacts through the installation of the new 345 kV transmission feeders within existing roadways; and
- Minimizing potential system disruptions through the installation of time-tested and reliable technology with the 345 kV HPFF pipe-type underground line.

This Project is essential to the region's electric transmission and distribution system. Construction of the Project would result in minimal environmental impacts to residential and commercial operations in the area.

Consolidated Edison Company of New York, Inc.

M29 Transmission Line Project

Exhibit E-5

Effect on Communications

EXHIBIT E-5: EFFECT ON COMMUNICATIONS

This Exhibit addresses the requirements of 16 NYCRR §88.5.

The Project is expected to have no adverse effects on broadcast communications (i.e., television and radio), principally because the 345 kV high-pressure fluid-filled (HPFF pipe-type) transmission line will be installed primarily underground. No adverse effect on underground communication cables (copper conductor or fiber optic lines) is expected from the installation or operation of the proposed transmission facility. Con Edison will comply with applicable sections of the latest version of the National Electrical Safety Code (“NESC”) related to appropriate spacing between power and communication cables, and adequate separation will be maintained between the electric transmission line and communication facilities.

New York State has established rules for the protection of underground facilities to assure public safety and to prevent damage to public and private property, as required by General Business Law Article 36 and Public Service Law Section 199-b. 16 NYCRR Part 753 details the procedures that must be implemented by any party undertaking excavation activities in New York.

Implementing regulations establish a notification service, *Dig Safely New York*, whereby anyone undertaking excavation activities notifies one entity, which subsequently notifies the affected utility companies (including communication facilities) of the intended action. Con Edison will ensure that the construction contractor and any subcontractors retained will call *Dig Safely New York* at 1-800-962-7962 to notify utility companies of all excavation activities planned for the Project. This requirement will be replicated in all construction specifications and bid documents issued by Con Edison. Additionally, Con Edison’s Construction Manager will meet with the selected construction contractor, affected utilities, MTA, and NYSDOT officials to review plans and locate existing underground utilities and communication lines to ensure that appropriate clearances are achieved.

The addition of new circuit breakers and related equipment at the Sprain Brook Substation and the interconnection of the Project transmission line to the new Academy Substation is also expected to have no effect on communication facilities, since the required improvements will be made within the confines of Con Edison property already dedicated to, or adjacent to existing equipment used for, electric utility service.

Consolidated Edison Company of New York, Inc.

M29 Transmission Line Project

Exhibit E-6

Effect on Transportation

EXHIBIT E-6: EFFECT ON TRANSPORTATION

This Exhibit addresses the requirements of 16 NYCRR §88.6.

E-6.1 Roads

The Project's transmission line will be installed primarily within the curb-to curb portion of the rights-of-way of public roadways. All construction will be conducted within guidelines set forth by the New York State Department of Transportation ("NYSDOT"), the New York City Department of Transportation ("NYCDOT"), the City of Yonkers and Westchester County, as applicable. Consequently, no significant impacts on traffic are anticipated due to lane closures during the construction of the transmission line.

Prior to the filing of this Application, Con Edison notified the NYSDOT, the NYCDOT, the City of Yonkers and Westchester County to review the proposed Project. NYSDOT suggested generally that it preferred the routing utility services under the sidewalk or in the shoulder of the roadway. Con Edison attempted to comply with these suggested boundaries since the reduced burial requirement of three feet of cover (instead of five feet) would reduce construction time and minimize inconvenience and disruption to the affected communities. However, during detailed design it became apparent that routing the transmission line beneath sidewalks or roadway shoulders in an effort to avoid pavement would be extremely difficult because of the numerous obstructions from existing facilities (e.g., manhole and vault structures, telephone, electric facilities, gas mains, water and sewer pipes, trees, etc.) along the route. Con Edison's design standard requires a minimum pipe clearance from other facilities while maintaining a minimum bending radius of 40 feet for ten-inch steel pipe. Avoidance of existing subsurface facilities with a smaller bending radius would compromise the shape of the pipe, fail to maintain minimum pipe clearance from other facilities, and violate cable-pulling limits. Aside from impacting trees in sidewalks, the community would also be adversely affected by trenches in sidewalks as they disrupt entrance/egress and have the potential for damaging adjoining property, walls, fences, and landscaping. Routing beneath the sidewalk or roadway shoulder would also require crossing, and potentially damaging, utility services to every house or building.

Construction of the M29 transmission line would generally be underground, below local streets and roads, but would have four short aboveground segments at river and road crossings where the transmission line would be attached to the underside of the bridges or installed within the

bridge roadway. Along Tuckahoe Road, the transmission line will cross under the New York State Thruway (Interstate 87) and cross over the New York City New Croton Aqueduct. The following four bridge crossings are anticipated:

Old Nepperhan Avenue Bridge Over the Saw Mill River

Old Nepperhan Avenue Bridge is a single span bridge over the Saw Mill River, rebuilt in the 1990s. The bridge is 56 feet wide with steel rails on both sides. It is approximately 24 feet long. The bridge has a 35-foot wide carriageway with a minimum of 8-foot wide sidewalks on both sides. The bridge has steel beams topped with pre-cast concrete composite super structure panels. Utilities are currently in place under the north sidewalk concrete panel. The south sidewalk concrete panel has no utilities under it. The M29 transmission line piping would be under-hung between the girders on the south side of the bridge below the sidewalk. Sufficient space exists to install six pipes if multiple bays are used. New openings in the abutment walls will be required.

Tuckahoe Road Bridge Over the Aqueduct and Railroad Right-of-Way

The Tuckahoe Road Bridge, built in the early 1990s, is a single-span bridge over an aqueduct and an abandoned railroad right-of-way. The bridge is 58 feet wide with a four rail steel bridge railing on both sides. It is about 67 feet long. The bridge has a 46-foot wide carriageway with 5-foot sidewalks on both sides. Existing utilities mounted on the underside of the bridge superstructure include twelve, 4-inch diameter telephone ducts, an 8-inch gas main, and six, 5-inch steel electrical conduits. The M29 transmission line piping would be under-hung between the center girders. Sufficient space exists to install six pipes in the center bay. New openings in the abutment wall will be required.

252nd Street Bridge Over the Henry Hudson Parkway

The 252nd Street Bridge in the Bronx spans the Henry Hudson Parkway. It is approximately 85 feet long by 55 feet wide and is presently under reconstruction by the NYCDOT. As part of the NYCDOT bridge reconstruction, all existing facilities will be removed and replaced. On the south side of the bridge, new 12-inch water and gas mains will be installed. On the north side of the bridge, nine, 4-inch conduits, four 5-inch conduits, one 10-inch and one 6-inch steel pipes will be installed. The M29 transmission line piping would be under-hung between the girders on the north side of the bridge below the sidewalk.

Nepperhan Avenue Bridge Over the Saw Mill River

Nepperhan Avenue Bridge was built in the 1970s and is a one-span bridge over the Saw Mill River. It consists of 58 three-foot wide pre-stressed concrete box beams spanning the reinforced concrete abutment walls. The bridge is approximately 178 feet long and 30 feet wide. The bridge carries three separate roadways on top of fill. The widths of the roadways are 20 feet, 30 feet, and 35 feet. The M29 transmission line pipes would be installed within the existing bridge roadway, with the pipes installed in a flat configuration and steel plates installed as required below the sub-base of the road.

The specific location and engineering design for the above crossings would be determined in consultation with the NYCDOT, NYSDOT, Westchester County and City of Yonkers and permit applications, if required, would be filed by Con Edison with respective departments for the work, consistent with the Commission's ongoing jurisdiction under Article VII of the Public Service Law. Con Edison intends to fully comply with the requirements set forth in NYCDOT's Street Opening Permits and Construction Activity Permits (Permit Number 0102 for Major Installations-high voltage) for the Project. The Applicant also intends to comply with all applicable New York State traffic control standards to provide for the maintenance and protection of traffic along various roadways.

Con Edison will coordinate with NYSDOT, NYCDOT, the City of Yonkers and Westchester County, as applicable, to finalize proposed highway crossing locations and techniques and to develop and implement a Maintenance and Protection of Traffic Plan to ensure safe and adequate traffic operations along the Henry Hudson Parkway and other local roadways.

Federal, state, county, and local environmental laws, policies, and regulations were reviewed for applicability to construction and operation of the Project. During construction, the procedures contained in the New York State Manual on Uniform Traffic Control Devices ("NYSMUTCD"), New York City Street Opening Permits and Construction Activity Permits and the New York State Vehicle and Traffic Law will be followed. NYSMUTCD sets forth the basic principles governing design, use, installation, and operation of traffic control devices. These principles are reflected throughout the text in discussions of devices, and should be followed in the selection and application of each device. The standards in this manual apply to all highways open to public travel, regardless of type or the governmental agency having jurisdiction.

The NYSDOT requires an application for a Utility Work Permit to install utilities within or adjacent to State highway rights-of-way. In addition to this permit, NYSDOT regulations require the applicant for any project with construction duration of greater than five days to retain a New York State-approved consultant inspector to oversee site activities. Con Edison intends to comply with the requirements of the Utility Work Permit, consistent with the ongoing jurisdiction of the Commission under Article VII. Con Edison also intends to comply with all applicable state traffic control standards.

The permit applications required by NYCDOT for Street Openings and Construction Activities along City roads will be followed. More specifically, Street Opening Permit Number 0102 (Major Installations-high voltage), Construction Activity Permit Numbers 0211 (Temporary closing of roadway) and 0215 (Temporary sidewalk closing) will most likely be required and will be submitted as and when needed. The specifications laid out in the Yonkers City Code will be followed while working on the streets under City of Yonkers Jurisdiction. The Westchester County Department of Public Works follows the procedures contained in the NYSMUTCD.

TRC reviewed available traffic count information in the vicinity of the site from the NYSDOT and Westchester County, as well as other sources. In addition to traffic count information, several field observations were performed during various times of the day. The review of the traffic volumes referenced indicates that the Weekday Peak Traffic Volumes along some of the roadways generally occur between 8:00 AM and 9:00 AM and 4:00 PM and 6:00 PM.

The following is a description of the major roadways that constitute the preferred route:

- Tuckahoe Road – Tuckahoe Road consists of two lanes per direction, flowing in an east/west direction. The portion of Tuckahoe Road between Central Park Avenue and Interstate 87 Interchange is under the jurisdiction of Westchester County and the remaining portion is under the jurisdiction of NYSDOT. The posted speed limit is 30 mph with lane widths of approximately 12 feet with sidewalks along both directions of the roadway for the majority of the roadway.
- Old Nepperhan Avenue – Old Nepperhan Avenue consists of one lane per direction, flowing in an east/west direction. Lane widths are approximately 12 feet with sidewalks along both directions of the roadway. It is under the jurisdiction of the City of Yonkers.
- Nepperhan Avenue – Nepperhan Avenue consists of one to three lanes per direction, oriented in a north/south direction. The portion of Nepperhan Avenue between Old Nepperhan Avenue and Ashburton Avenue is under the jurisdiction of the City of Yonkers, and the portion between Ashburton Avenue and Riverdale Avenue is under the

Jurisdiction of NYSDOT. The posted speed limit is 30 mph with lane widths of approximately 12 feet with sidewalks along both directions of the roadway.

- Riverdale Avenue – Riverdale Avenue consists of two lanes per direction, flowing in a north/south direction. The portion of Riverdale Avenue both within Westchester County and NYCDOT is under the jurisdiction of NYSDOT. It has a posted speed limit of 30 mph with curbside parking in both directions. Lane widths are approximately 12 feet with sidewalks along both directions of the roadway.
- Henry Hudson Parkway West Service Road – Henry Hudson Parkway West Service Road is a one-way road consisting of one to two lanes oriented in a north/south direction. It is under the jurisdiction of NYCDOT. Lane widths are approximately 12 feet with a sidewalk along the west side of the roadway.
- 230th Street – 230th Street consists of two lanes per direction, flowing in an east/west direction. It is under the jurisdiction of NYCDOT. Lane widths are approximately 12 feet with sidewalks along both directions of the roadway.
- Route 9 (Broadway) – Broadway consists of two lanes per direction, flowing in a north/south direction. Lane widths are approximately 12 feet with sidewalks along both sides of the roadway. Broadway is under the jurisdiction of the NYSDOT. A portion of Broadway has elevated train tracks used by the MTA Transit’s subway system (the Broadway/7th Avenue Local No. 1 and 9 trains). That portion of the Broadway is divided and has service roads in both the directions.
- 204th Street – 204th Street consists of one lane per direction, flowing in an east/west direction. It is under the jurisdiction of NYCDOT. Lane widths are approximately 12 feet with sidewalks and curbside parking along both directions of the roadway.
- Tenth Avenue - Tenth Avenue consists of two lanes per direction, flowing in a north/south direction. It is under the jurisdiction of NYCDOT. Lane widths are approximately 12 feet with sidewalks and curbside parking along both directions of the roadway.

Truck traffic generated by construction of the proposed transmission line will consist of a one-time per daily work location delivery and removal of equipment for trenching and earth moving; plus occasional limited site visits by trucks delivering fuel and lubricants for onsite equipment and trucks delivering construction supplies and equipment such as steel pipe, select backfill, and precast concrete manholes. Truck trips for these various purposes would be minimal.

Traffic impacts along the preferred transmission line route will be mitigated by the work that will progress over the route at multiple locations, rather than one location being the focus of construction activities for an extended period. Furthermore, not all types of crews will be needed

at the same time or location. For example, after the steel pipe is installed at a location, there will be no further need for that activity at that location. Con Edison will coordinate with local jurisdictions, NYSDOT, NYCDOT, and Westchester County, as applicable, to develop and implement a Maintenance and Protection of Traffic Plan to ensure safe and adequate traffic operations along all roads as well as the temporary relocation, if required, of bus stops along the preferred route. All pavement surfaces removed for required excavation will be resurfaced. Appropriate construction practices will be used, such as the use of steel plates to cover the trench, barricades and fencing to dissuade pedestrians from entering construction zones and to avoid the potential for conflicts associated with pedestrian traffic potentially present along all local roadways. All traffic control measures will be implemented according to the guidelines set forth in Subchapter H "Highway Work Zone Traffic Control" of the NYSMUTCD.

The preferred construction time will be during non-peak load periods to minimize the impacts on the Con Edison transmission system. During the work period, construction crew availability, and the projected speed of construction, will determine the total number of crews working at one time. For example, it is expected that two to three sets of crews would be installing the trenches, ducts, and manholes at different locations along the right-of-way.

Con Edison will ensure that impacts to the surrounding community will be minimized. For example, if any detector loops at traffic signals are impacted by the construction of the transmission lines, the detector loop will be re-installed. Operation of the proposed transmission line will not generate any traffic, with the exception of occasional maintenance activities.

E-6.2 Pedestrian Traffic

Sidewalks are prevalent throughout the Project area, and pedestrian traffic is expected along most of the local roadways that comprise the preferred route for the proposed transmission line. Standard construction and/or operating practices to be implemented by the Applicant seek to minimize pedestrian traffic impacts from construction. Construction practices, such as the use of steel plates to cover open trenches and the use of barricades and fencing to dissuade pedestrians from entering the construction zone, will reduce the significance of potential impacts to pedestrian traffic. Particular consideration will be accorded in the vicinity of the school zones and in the vicinity of commercial and high-density residential land uses.

E-6.3 Railroads

The preferred route includes a crossing of an abandoned railroad via the Tuckahoe Road Bridge. The M29 transmission line piping would be under-hung between the center girders of the bridge. Applicable clearance will be maintained. New openings in the abutment wall will be required. The use of the existing Tuckahoe Road Bridge will preclude the need for any special construction techniques.

The proposed transmission line also crosses the Metro-North Railroad line that parallels the north shore of the Harlem River in the Bronx. This crossing will be installed **within a new tunnel**, and **conceptual plans indicate the tunnel ceiling would be approximately 100 feet below the railroad grade**. Railroad operations will be unaffected during construction and operation of this proposed crossing.

E-6.4 Airports

The construction and operation of the proposed Project will not interfere with nor result in impacts to any airports.

E-6.5 Mass Transit

The “Bee-Line Bus System,” a service of the Westchester County Department of Transportation, provides transit service in Westchester County, and the MTA New York City Transit provides bus and subway service in the Bronx and Manhattan (New York County). Table E-6-1 provides a listing of the bus and subway routes that are encountered along the preferred route and identifies their location. As necessary, Con Edison will coordinate with the respective departments to temporarily relocate bus stops along the preferred route as part of the Maintenance and Protection of Traffic Plan to ensure safe and adequate bus and subway operations and transit rider access throughout the Project area during the construction of the proposed transmission line.

Table E-6-1: Bus and Subway Routes Encountered Along the Preferred Transmission Line Route

Bus Route	Service/Type	Location on Preferred Route
Manhattan		
Bx20	NYC Transit – Local	Along West 204 th Street and Broadway in Inwood
Bx7	NYC Transit – Local	Along Broadway in Inwood
M100	NYC Transit – Local	Along Broadway and then 9 th Avenue in Inwood
Bx12	NYC Transit – Local	Along Broadway between West 207 th St. & Isham St. in Inwood
Bx9	NYC Transit – Local	Crosses route at West 225 th Street in Marble Hill
Bronx		
Bx7	NYC Transit – Local	Along West 230 th St. and Riverdale Avenue in Spuyten Duyvil & Riverdale
Bx10	NYC Transit – Local	Along Riverdale Avenue in Spuyten Duyvil & Riverdale
Bx20	NYC Transit – Local	Along West 230 th St in Kingsbridge and Riverdale Avenue in Spuyten Duyvil
Yonkers		
Route 8 (Mount Saint Vincent-Yonkers-Tuckahoe)	Bee-Line Local	Along Riverdale Avenue, Nepperhan Avenue and Tuckahoe Road in Yonkers
Route 1 (Bronx– Yonkers- Westchester Medical Center)	Bee-Line Local	Along Prospect Street between Riverdale Avenue & South Broadway in Downtown Yonkers
Route 78 (Getty Square- Stew Leonard Drive)	Bee-Line Local	Along Nepperhan Avenue adjacent to City Hall and north of Ashburton Avenue; and Tuckahoe Road in Yonkers

Bus Route	Service/Type	Location on Preferred Route
Route 5 (Yonkers-White Plains-Harrison-New Rochelle)	Bee-Line Local	Along Nepperhan Avenue between New Main Street and Elm Street, and between Walsh Road and Old Nepperhan Avenue in Yonkers
Route 7 (Yonkers – Mount Vernon – New Rochelle)	Bee-Line Local	Along Nepperhan Avenue between New Main Street and Yonkers Avenue in Yonkers
Route 9 (North Yonkers – Yonkers Railroad Station)	Bee-Line Local	Along Nepperhan Avenue between New Main Street and Walsh Road in Downtown Yonkers
Route 91 (Playland–New Rochelle–MountVernon–Yonkers)	Bee-Line-Summer	Along Nepperhan Avenue between New Main Street and Elm Street in Downtown Yonkers
Route 3 (Bronx-White Plains-Purchase)	Bee-Line -Express Limited Stops	Along Nepperhan Avenue north of Ashburton Avenue, Saw Mill River and Tuckahoe Road in Yonkers
Subway Route		
Broadway/7 th Avenue Local No. 1 and No. 9	NYC Transit	Along Broadway; Manhattan stops at West 207 th St. and West 215 th St.; Bronx stops at Marble Hill/225 th St. Route continues north in the Bronx with stops at 231 st St., 238 th St., and Van Cortland Park/242 nd St.

Source: MTA Manhattan and Bronx Bus Route Maps, November 2005, Bee-Line Bus System Map, County of Westchester, Department of Transportation, 2005.