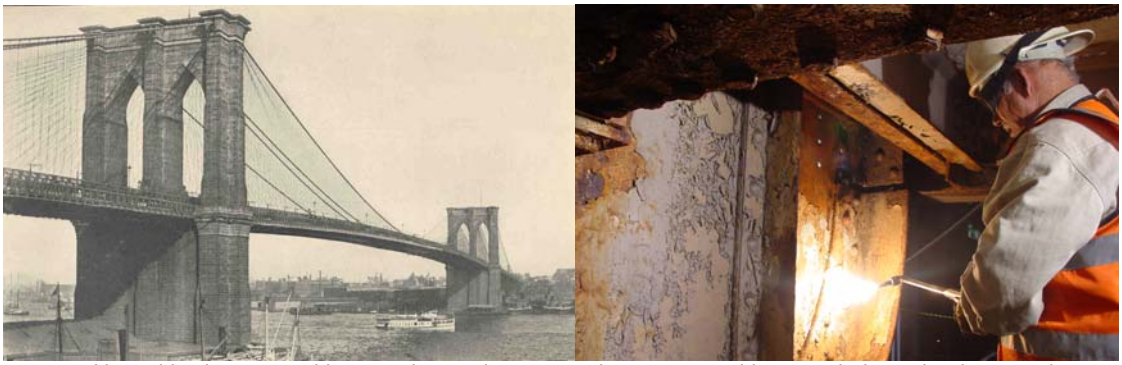
East River Bridges

A $2.9 billion reconstruction program is underway to rehabilitate all four East River crossings. In 2003, these bridges carried some 493,418 vehicles per day. In 2002, working in coordination with the NYPD and other law enforcement agencies, the Division implemented enhanced security measures on these bridges. This work is ongoing.

BROOKLYN BRIDGE

The Brooklyn Bridge carried some 134,444 vehicles per day in 2003. The $470 million reconstruction commenced in 1980 with Contract #1, and will continue with Contract #6, currently in the design phase and scheduled for completion in 2013. This contract will include the rehabilitation of both approaches and ramps, as well as the painting of the entire bridge. In addition, the bridge is scheduled to be seismically retrofitted by the end of 2013. Work completed on the bridge to date includes reconditioning of the main cables, replacement of the suspenders and cable stays, rehabilitation of the stiffening trusses, and the replacement of the suspended spans deck. The next work scheduled for the bridge is a project to replace the existing travelers with a state of the art technology system. Construction is scheduled to begin in the spring of 2006 and conclude in the spring of 2008.



Brooklyn Bridge in 1909. Bridge Repairer & Riveter Joseph Antony Repairing a Red-Flagged Stringer on the Bridge. (Repair Credit: Hany Soliman)

Pedestrian Vibration Study

The major blackout of August 14, 2003 forced City officials to close the bridge to vehicular traffic and open the entire bridge to pedestrians. During this mass exodus, several pedestrians reported that the bridge was vibrating and thus causing them great anxiety. At the request of the Office of Emergency Management, an emergency inspection of the bridge was performed that evening as a result of these complaints of “swaying”; no structural problems were found. DOT decided to retain a consulting firm to study the effects of pedestrian induced vibration for this bridge.

All necessary instruments were installed on the bridge to measure ambient bridge vibrations. A controlled test was performed in February 2004. This study was completed in summer 2004. The report concluded that pedestrian-induced vibrations can get to the point where people will feel uncomfortable, but not to where the bridge structure will suffer significant damage.

Measuring Ambient Vibrations on the Bridge. (Credit: Bojidar Yanev)

MANHATTAN BRIDGE

The youngest of the three suspension bridges that traverse the East River, the Manhattan Bridge carries some 313,767 commuters – 73,767 vehicles and 240,000 mass transit riders - between Manhattan and Brooklyn daily. It was designed by Leon Moisseiff and completed in 1909. The bridge supports a subway transit line upon which four different train lines operate.

Manhattan Bridge. (Credit: Yuliy Zak). Engineer-in-Charge Reza Lotfi Inspecting the Bridge Cable.

The $777 million reconstruction commenced in 1982 with Contract #1, progressed with Contract #10, and continues with Contract #11, currently in construction and scheduled for completion in 2008. This work will be followed by Contract #14 to rewrap the cables and replace the suspenders and necklace lighting. Completion is expected in 2011. The reconstruction will end with a seismic retrofit of the bridge (Contract #15), slated for completion in 2012. Work completed on the bridge to date includes reconstruction and painting of the south and north spans, installation of a truss stiffening system to reduce twisting, restoration of the historic arch, colonnades and Manhattan Plaza structures, reconstruction of the south walkway, and installation of a new north bikeway. The reopening of the south walkway and north bikeway is notable in that it marks the first time in 40 years that pedestrians and bicyclists have access across the bridge between Brooklyn and downtown Manhattan.

Contract #10

Begun in March 2001, and scheduled for completion in early 2005, **Contract #10** will bring the following improvements: rehabilitation of the north main span; refurbishment of the approach spans, tunnels and truss bearings; installation of a dedicated bicycle way on the bridge's north side, and painting. The Manhattan Bridge bicycle path was closed in the 1960's because it fell into such disrepair that it became unsafe. The restored south walkway and north bikeway reflect the original design of the bridge.

Contract #10 Temporary Truss Jacking Frame Used in the Work to Replace the Existing Truss Bearings. Replacement of Steel Stringers and Floorbeams on the North Upper Roadway Main Span. Installing a New End Frame on the Main Span Side of the Brooklyn Tower.

Contract #10 Painting Containment Structures on the Cables of the Manhattan Approach Span. Construction of the New Bikeway Approach Ramp in Manhattan.

The scope of work includes a new Intelligent Transportation System (ITS). The ITS, providing coverage from Bowery Street in Manhattan to Tillary Street in Brooklyn, consists of Closed Circuit Televisions (CCTV), and Variable Message Signs (VMS). This provides full coverage for the Manhattan Bridge upper and lower roadways, including the south walkway and north bikeway. Ranging radar detectors determine the volume and occupancy of the traffic on the bridge, and the CCTV is utilized to confirm any incident. Operators at the Traffic Management Center in Long Island City obtain data and video from the ITS. This enhances the management of traffic on the bridge and its vicinity and improves response to incidents. A total of 19 cameras and 7 VMS are installed on the bridge.

The north lane of the lower roadway was closed to traffic in June 2001 for use as a construction staging area. At the same time, the south lane of the lower roadway was reopened to traffic. Subway service was restored to the south tracks on July 22, 2001. On that same day, service was temporarily discontinued on the north tracks until February 22, 2004.

Effective August 1, 2002, the bridge's north upper roadway was closed for a scheduled 12-month period, and the north lane of the lower roadway was reopened during peak hours. The roadway was re-opened to traffic on June 1, 2003, 61 days ahead of schedule, thus earning the contractor a $3 million incentive.

Contract #10 Removing an Existing North Upper Roadway Floorbeam on the Main Span of the Bridge. Installing the New Grid Deck for the North Upper Roadway on the Brooklyn Side Span. Preparing the Brooklyn Elevated Structure Grid Deck for Concrete Placement.

Contract #10 Placing Concrete on the Manhattan Side Span Grid Deck of the North Upper Roadway. Placing and Finishing Concrete on the Grid Deck of the Brooklyn Elevated Structure.

Contract #10 Placing the Microsurfacing Overlay on the Main Span. Placing the Asphalt Overlay on the Brooklyn Approach Span.

A Notice to Proceed for the additional work for NYCT on the bridge's north side tracks was issued to the contractor with a start date of September 9, 2002.

Contract #10 Installation of New Floorbeams & Stringer Panels for the Subway Support Steel. Placing the Waterproof Protection Layer on the Anchorage Roof Inside the North Track Envelope.

Full access to the north tracks, originally scheduled in the MOU for January 11, 2004, was given to NYCT on December 15, 2003. Power to the third rail was energized on January 16. NYCT restored revenue service on the north tracks on February 22, 2004.

Contract #10 Installation of New Ties for the North Subway Track. Torquing the Bolts for the Installation of the Upper Laterals for the Truss Stiffening System. Installation of a Permanent Maintenance Platform Under the Bridge on the Brooklyn Approach Span.

During 2003, the replacement of truss C and D bearings on the approach spans in Brooklyn and Manhattan was completed. Also, permanent maintenance platforms below the North and South subway tracks on the approach spans were installed.

Placing Concrete for the New Interior of the Manhattan Colonnade and Arch. Preparing Subgrade for the Brooklyn Approach Ramp of the New North Bikeway and for the Path to the Bikeway Along Sands Street.

Placing Concrete on Manhattan Approach Ramp of New North Bikeway. Finishing Concrete for the Sidewalk Along Forsyth Street. Engineer-in-Charge Reza Lotf (in White Hard Hat) Inspecting the Placement of Concrete for North Upper Roadway at Nassau Street Intersection.

Landscaping Work in Progress Along the Brooklyn Approach Ramp of the North Bikeway. Installing Protective Fencing for the Bikeway.

Putting Final Touches on the Historic Arch.

Contract #11

A Notice to Proceed for the reconstruction of this bridge was issued to the contractor with a start date of January 14, 2005. **Contract #11** will include the following improvements: reconstruction of the lower roadway; rehabilitation of the anchorages; rehabilitation of the travelers; installation of new lighting on the north upper roadway and lower roadway; and upgrading of the lower roadway lane control signals. The work on the lower roadway is scheduled to begin in August 2006 and be completed in July 2007. The contractor will be paid an incentive of $65,000 per calendar day for early completion with a maximum incentive of $3.9 million. Late completion will carry a disincentive of $65,000 per calendar day with no limit on the maximum amount. This $148 million project is expected to be complete in 2008.

These upgrades will not only restore the structural integrity of the Manhattan Bridge, but will also allow it to carry an increasing number of pedestrians and bicyclists. This will reduce automobile congestion and its related air pollution in New York City.

QUEENSBORO BRIDGE

At the time of its completion in March 1909, the Queensboro Bridge (popularly referred to as the 59th Street Bridge), was the longest continuous cantilever-truss bridge in the world. While its starring role in the hierarchy of bridges has since been eclipsed by longer and larger structures, the Queensboro Bridge's importance to the mobility and unity of New York City remains undimmed. The bridge was designated as a national landmark on November 23, 1973. The $741 million reconstruction commenced in April 1981 with Contract #1, continues with Contract #6, which began on October 31, 2003, and is scheduled for completion in early 2006, and will end with a seismic retrofit of the bridge, slated for completion in 2011. Work completed on the bridge to date includes the rehabilitation of the lower inner roadways, the lower outer roadways,

and the restoration of the Guastavino arches and Bridgemarket area. The south outer roadway is open to automobile vehicular traffic, and the north outer roadway is open to pedestrians and bicyclists. The work on this vital link between Manhattan and the outer boroughs will enable this 75,000-ton workhorse to better provide the citizens and commerce of New York City with a second century of reliable, prosperous transport. The Queensboro Bridge carried some 184,964 vehicles per day in 2003.

Queensboro Bridge. (Credit: Peter Basich)

Contract #6

Contract #6, which began on October 31, 2003, will include the following: condition investigation of the eyebar heads and pins, replacement of the protective screening and the aviation warning lights, drainage improvements, rehabilitation of the overhead sign structures in Manhattan, the upgrading of roadway lighting (by replacing all low-pressure sodium lights on the bridge and ramps with high-pressure sodium lights), cleaning and miscellaneous repairs of the anchor piers, the geometric improvement of Crescent Street, bikeway and walkway improvement, and repair of the south upper roadway concrete overfill and overlay, the promenade platform, the traveler platform, the sidewalk between 61st and 62nd Streets, and the underside of the 59th Street overpass. The work will also include the rehabilitation of the Sanitation Department area's arch infill, and modifications to the maintenance facility beneath the Manhattan approach plaza. In addition, the kiosk in the plaza on the Manhattan side of the bridge will be restored. This small historical structure is in an advanced state of disrepair and has been damaged by repeated vehicular impacts. This $35 million project is expected to be complete in early 2006.

Views of the Queensboro Plaza Kiosk

Proposed Rehabilitation of the Arch Infill for the Sanitation Department. Repairing the Steel of the 59th Street Arch Ceiling.

In 2004, work was completed at the retaining wall at York Avenue, the kiosk bollards on the Manhattan plaza, the sidewalk between 61st and 62nd Streets, and the maintenance facility beneath the Manhattan approach plaza.

Starting Curb Replacement at 60th Street. Improving the Drains at the Vehicle Storage Area. Repairing Spalled Concrete at the 59th Street Overpass.

Sanitation Arch Infill Work Progressing at 60th Street. Repaired Sidewalk Between 61st & 62nd Streets, and Curb at 60th Street.

NYCT Column Relocation Work. Anchor Pier Granite Cleaning in Progress.

Protective Coating

The $168 million Queensboro Bridge painting contract commenced in January 2004. The Department and its contractor strictly adhere to the safety requirements regarding lead paint removal as approved by the United States Environmental Protection Agency and the Occupational Safety and Health Administration, New York City Departments of Health and Environmental Protection, and the New York State Departments of Health and Environmental Conservation.

Containment on the Manhattan Ramp. (Credit: Peter Basich)

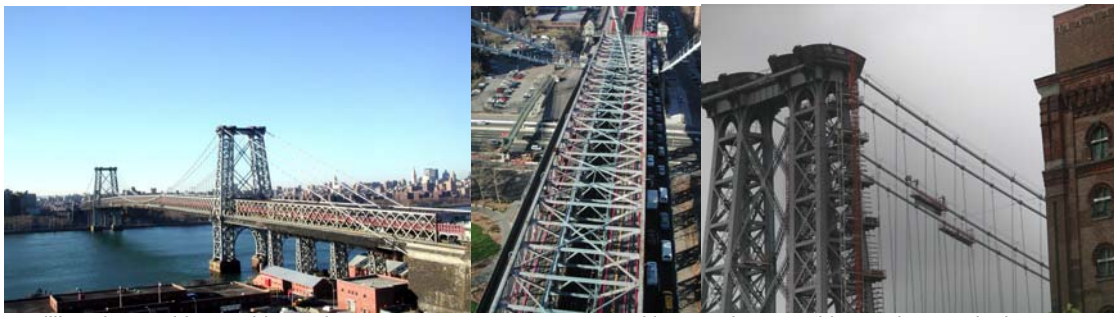
The work is performed within an entirely sealed Class 1A containment system (under negative pressure) which prevents any materials from escaping into the air. Filtration of the enclosed air prevents paint waste dust from being released. The Department has placed several air monitoring stations in the area around the bridge. The Department performs continuous monitoring and testing of the soil and air quality as well as noise levels in the area surrounding the containment enclosure to minimize impacts and ensure the safety and quality of life for workers and residents nearby.

Active measures are taken to reduce noise at its source, such as the use of mufflers, sound screens, low noise producing equipment, and noise blankets. Light shields are utilized to reduce glare from work lights. All staging areas are behind a screened fencing. This project is expected to be completed in January 2009, and will result in the total re-painting of the bridge.

Work Platform and Containment Installation on the Queensboro Bridge. (Credit: Daniel Lima) Painting in Progress on the South Outer Roadway. (Credit: Peter Basich)

WILLIAMSBURG BRIDGE

The largest of the three suspension bridges that traverse the East River, the Williamsburg Bridge carries some 200,243 daily commuters – 100,243 in vehicles and 100,000 via mass transit - on eight traffic lanes, two heavy rail transit tracks, and a pedestrian footwalk, between Manhattan and Brooklyn. The bridge supports a subway transit line upon which three different train lines operate (J, M, and Z). The $989 million reconstruction commenced in 1983 with Contract #1, continues with Contract #8, which began in March 2003 and is scheduled for completion in 2006, and will end with a seismic retrofit of the bridge, slated for completion in 2011.



Williamsburg Bridge. Bridge Subway Structure. Contract #8 Looking South at a Cable Band Retensioning Crew.

In order to minimize disruption to the riding public and ensure that traffic is maintained across the bridge, the rehabilitation of the Williamsburg Bridge was divided into several contracts. In the contracts completed to date, all four main cables have been completely rehabilitated, the south and north roadways of the bridge have been replaced and the BMT subway structure across the bridge was completely reconstructed.

Contract #7

In June 2004, the Metro New York/New Jersey Chapter of the Construction Management Association of America selected the Reconstruction of the North Roadways of the Williamsburg Bridge (Contract #7) as a “Project of the Year.” This reconstruction work was a mirror image of the completed reconstruction work on the south roadways. It included the complete replacement of the main bridge deck with a steel orthotropic deck system and the construction of new structures on both the Manhattan and Brooklyn approaches. This $202.8 million contract included provisions for financial incentives to ensure that the project was completed within the scheduled roadway closure period, thereby minimizing the impact the closures had on the public.

Contract #7 Installing An Orthotropic Deck Panel. Working on the North Roadways.

Work on the north roadway substructure (pile foundations, piers and columns), began in early 2000. All four lanes that constitute the north roadways of the bridge were closed to traffic on January 29, 2001 for demolition and reconstruction.

The two lanes on the north outer roadway were completed and reopened to traffic on December 10, 2001, 50 days ahead of schedule. This allowed four travel lanes into Manhattan during the morning rush hour, and four lanes into Brooklyn during the afternoon rush hour. In addition, Manhattan-bound truck traffic was restored to the two outer roadway lanes, decreasing the demand at both the Manhattan Bridge and the Queens Midtown Tunnel. The contractor earned $100,000 per day (for a maximum of 50 days) in incentive payments for early completion.

The north outer roadway reopening was complemented by the State Department of Transportation's early reopening of the Marcy Avenue connector ramp from the Brooklyn-Queens Expressway to the Williamsburg Bridge. This is the first time in the State's history that a segmented highway bridge was built using technology suited to situations requiring rapid construction with minimal traffic and community impacts.

The north inner roadway was re-opened to traffic on June 10, 2002, 50 days ahead of schedule, thus earning the contractor a $5 million incentive. The opening ceremony was presided over by Mayor Bloomberg and Commissioner Weinshall.

Contract #7 Replacing the North Inner Roadway Deck & Erecting the Footwalk. Bikeway Steel Erection.

During construction, the Department maintained pedestrian/bike access across the bridge. The south footpath/bikeway remained open at all times. During Contract #7, DOT constructed a new Manhattan approach ramp and north footpath/bikeway. The new footpath/bikeway has one common access point for pedestrians and cyclists in Manhattan at Clinton Street, which leads to a crossover before the main span of the bridge to enable people to access either the north or south paths. The north path is open to both pedestrians and bicyclists and leads to an access point at Washington Park in Brooklyn. The south path is dedicated to pedestrians and leads to an access point at Bedford Avenue. Completion of the new north walkway also means that, for the first time ever, the bridge is accessible to wheelchair users and meets the requirements of the Americans with Disabilities Act.

Contract #7 was substantially completed on December 12, 2002. The newly completed pedestrian walkway opened to traffic at 3:00 PM on this day.

Contract #8

Contract #8 began on March 3, 2003, and is scheduled to finish in February 2006. This $173 million project will see the rehabilitation of the tower bearings, the truss system, the steel structure of all eight towers, and the north comfort station houses, the replacement and/or adjustment of the cable suspenders, the installation of maintenance travelers (inspection platforms) under the main span, as well as painting of the stiffening trusses. Architectural work

will include the restoration of decorative lights on the main towers and in the Manhattan Plaza. Work inside the anchorage houses on both the Manhattan and Brooklyn sides will include the construction of new stairs, a hoisting system, ventilation and lighting, and oiling platforms. The project will also include the installation of several Intelligent Transportation System (ITS) components, including variable message signs and closed circuit television cameras.

Painting of the south side stiffening trusses, which began on June 1, 2003, was completed on September 6, 2003. Painting of the north side stiffening trusses, which began on September 6, 2003, was completed on November 25, 2003. Steel replacement on both the main and intermediate towers, as well as on the upper and lower chords of the main span trusses began in 2003 and will continue through 2005.

Contract #8 North Stiffening Truss Containment Erection and Removal. South Truss Bottom Chord Rehabilitation.

Contract #8 Degreasing the Brooklyn Main Tower Saddle Bearing. Manhattan Main Tower Member Replacement & South Pier Platform Erection.

The most significant accomplishment of 2004 was the successful installation of strengthening plates on the four river-side column legs of each of the main towers. This operation began with the hoisting of the plates from the roadway to the highest level of each tower and was completed during weekends on which the transit tracks were removed from service. This work included over 800,000 pounds of steel attached through over 30,000 individual bolt holes drilled into the existing steel.

Contract #8. Looking East at the Brooklyn Main Tower Temporary Work Platforms. Manhattan Main Tower Temporary Platform Erection.

Strengthening Plate Operation on Brooklyn Main Tower. Pier Stationed & Barge Mounted Cranes at Brooklyn Main Tower Pier. Steel Arch Replacement.

Fourteen wire rope cable suspenders and twenty-eight tension rods were replaced during 2004 at select locations on the suspended main span. All of the suspenders will be systematically adjusted in 2005 to optimize the profile of the bridge. Other work anticipated to be completed in 2005 includes the replacement of truss bearings at the anchorages and the main towers, as well as the installation of the new maintenance traveler system.

Looking West at the North Truss Top Chord Steel Rehabilitation. High Strength Bolt Torque Inspection. Cable Band Bolt Retensioning.

Steel Bracing Replacement Operation at the Brooklyn Intermediate Towers. Ironworkers Bolting up New Steel on Intermediate Tower. Cleaning the Brooklyn Anchorage Exterior Granite Surface.

Entrance to North Walkway. (Credit: Peter Basich)

Such improvements will not only restore the structural integrity of the Williamsburg Bridge, but will also allow it to carry an increasing number of pedestrians and bicyclists, thereby reducing automobile congestion and its concomitant air pollution in New York City.

Movable Bridges

As NYCDOT completes reconstruction work on the East River Bridges, more attention is being devoted to other key City-owned bridges, such as the movable bridges. Building on the success of the East River Bridge projects, the Department is implementing many of the innovative concepts originated during the rehabilitation of East River Bridges on these other major reconstruction projects.

BELT PARKWAY BRIDGE OVER MILL BASIN (BROOKLYN)

When the Mill Basin Bridge was constructed during the first half of the 20th century, New York City's inland waterways were among the most heavily navigated thoroughfares in the country. However, as maritime traffic in New York City steadily decreased since the mid-1960s, the need for movable bridges lessened as well. In 1941, during its first full year of operation, the Mill Basin Bridge was opened 3,100 times; by 1953, that figure decreased to 2,173; by 2004, the number of openings declined further to a total of only 164 openings.

In addition, significant and costly traffic congestion results from the operation of this outmoded drawbridge. In 2003, the Mill Basin Bridge carried 141,212 vehicles per day. The average opening and closing time for the bridge (and others like it) is ten minutes. Thus, this structure's operation has a negative and significant effect on the efficiency of New York City's vehicular traffic flow.

In 2004, on a New York State-mandated scale from 1 to 7, this bridge had a condition rating of 3.25, or "fair." While the bridge is not in any immediate danger of structural failure, its reconstruction is required in order to maintain mobility and public safety on this vital artery.

The bridge is a 14 span structure, consisting of a double leaf steel bascule span. The substructure is made of reinforced concrete abutments and piers supported on precast concrete or timber piles.

Mill Basin Bridge

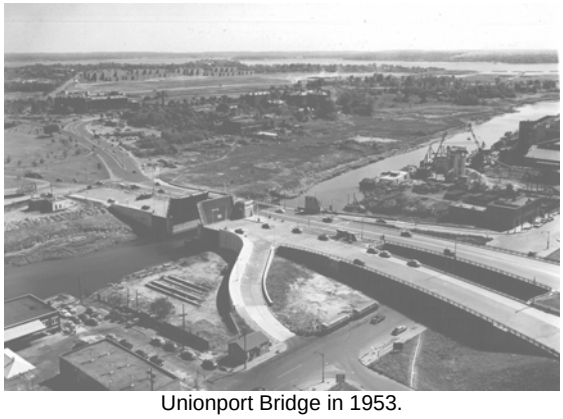
Under the Department's current proposal, the Mill Basin Bridge will be replaced with a new, 11 span, high-level, fixed bridge with a pre-stressed concrete superstructure and reinforced concrete substructure on piled footings. The bridge will be constructed next to the existing structure so as to maintain traffic during the construction period. It will feature three lanes of vehicular traffic, as well as a 12-foot wide shoulder in each direction. A new sidewalk/bicycleway will also be constructed, and the stopping sight distance for the bridge and approach roadway will be improved.

Currently in its final design phase, the reconstruction of the Mill Basin Bridge is scheduled to start in spring 2008, and to last approximately 4 years. The new bridge will be constructed off-line while maintaining three traffic lanes in each direction and a bike/pedestrian path on the eastbound side on the existing bridge during construction. The existing bridge will be demolished after the new bridge is fully opened to vehicular traffic.

BRUCKNER EXPRESSWAY NB & SB SERVICE ROAD (UNIONPORT BRIDGE) OVER WESTCHESTER CREEK

This double leaf bascule bridge opened in 1953. In 2003, the bridge carried 60,993 vehicles per day. The 17 span structure carries five lanes of the Bruckner Boulevard Expressway service road traffic over Westchester Creek. Currently in its final design phase, the reconstruction of the bridge is scheduled to start in December 2005. The estimated construction duration will be a total of 28 months with approximately 9 months lead time. The project's scope of work includes rehabilitation of the existing bridge superstructure, substructure and approaches, replacement of the existing mechanical and electrical systems for the bascule span, and reconstruction of the bridge operator house.

Onsite construction will be carried out in five stages. Incentive and disincentives will be used to expedite the completion of the project. Construction is expected to be completed in March 2008.



Unionport Bridge in 1953.

HAMILTON AVENUE BRIDGE OVER THE GOWANUS CANAL

The Hamilton Avenue Bridge opened in 1942. In 2003, the bridge carried 59,108 vehicles per day. The $45 million reconstruction of this landmark bridge will use the "float out the old/float in the new" technique. The new bascule spans with trunion towers will be shop-assembled and tested off-site, then will be floated in and erected on the rehabilitated piers. This will reduce the roadway closure time for the construction of each span from 14 months to only 2 months. Other reconstruction work will include: the rehabilitation and seismic retrofitting of the existing piers; the replacement of all electrical and mechanical and control equipment; the removal and replacement of the approach slabs of both sides of the bridge; the rehabilitation of the backwalls and abutments; and the renovation and extension of the bridge operator house.

Hamilton Avenue Bridge. (Credit: NYSDOT)

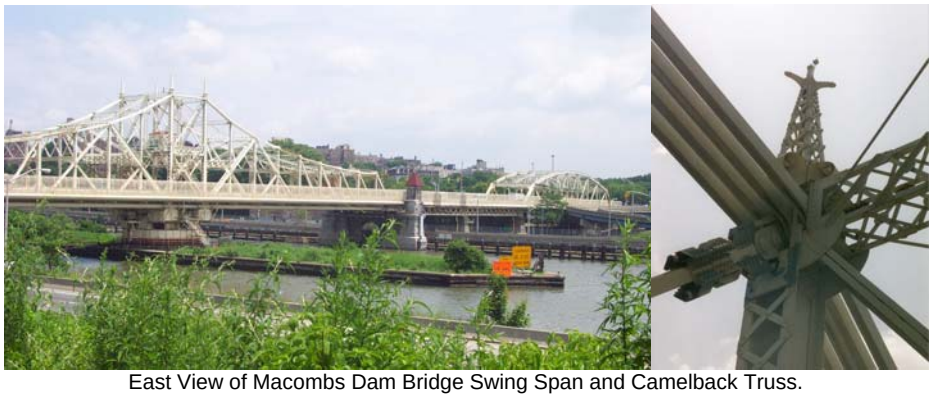
The bridge's appearance will also be enhanced artistically. A permanent new lighting art structure will be installed on the bridge buildings that will be viewable by pedestrians, motorists, mariners and the general public as part of the Percent For Art Program administered by the Department of Cultural Affairs.

Mock-up of the Hamilton Avenue Light Sculpture. (Credit: Gholamali Mozaffari) Open Bridge. (Credit: NYSDOT)

In Stage I, the Manhattan-bound span will be closed from July 1, 2007 to August 31, 2007, and it will be replaced. In Stage 2, the Brooklyn-bound span will be closed from July 1, 2008 to August 31, 2008, and it will be replaced. Each of these two main stages of the contract includes an incentive for early completion of $25,000 of per day with a cap of $300,000. There is a disincentive of $25,000 for each day the contractor is late in finishing a stage with no limit to the amount of penalty. The project is scheduled for construction between July 2005 and May 2009.

MACOMBS DAM BRIDGE OVER THE HARLEM RIVER (BRONX/MANHATTAN)

The Macombs Dam Bridge, which has one of the longest swing spans in the world, was opened in 1895. In 2003, the bridge carried 42,254 vehicles per day. The $145 million reconstruction of this landmark bridge includes the West 155th Street viaduct, the west approach plaza over the Harlem River Drive and Seventh Avenue, the swing span over the Harlem River, the deck and camelback trusses over Metro-North Railroad and Conrail, the Major Deegan interchange (consisting of the east approach and four ramps), and the Jerome Avenue viaduct. Each of the three stages of the contract included an incentive for early completion of $50,000 of per day with a cap of $2 million. There was a disincentive of $100,000 for each day the contractor would be late in finishing a stage with no limit to the amount of penalty. The rehabilitation work will not only strengthen the structure, it will also return the bridge's appearance to its turn of the century grandeur.



East View of Macombs Dam Bridge Swing Span and Camelback Truss.
(Credit: Peter Basich) Architectural Detail of the Bridge. (Credit: Michele N. Vulcan)

As part of this project, the historic John Hooper Fountain, which dates from 1894, was fully rehabilitated in 2000. After studying detailed old photographs, the globe and weather vane were recast and replicated. Cast aluminum was used with high impact glazing similar to the lanterns installed in Central Park in the 1980's. Just east of the fountain, a garden of rose bushes was added for the community's pleasure. Other additions included a new paved island, new curbs,

and a steel fence. Bollards were installed at the western end of the island to protect the fountain from vehicular traffic.

The first stage of construction was completed on March 31, 2001. It included the installation of structural components, as well as the deck replacement of the northern one-third area of the bridge and the West 155th Street viaduct. This milestone date was met even though 31 calendar days were lost from the work period due to the post season play of the New York Yankees. Essentially twelve months' worth of work was compressed into the five worst weather months of the year.

The second stage of construction began on November 2, 2001, after the conclusion of World Series play at Yankee Stadium. It consisted of the installation of structural components as well as the deck replacement of the middle one-third area of the bridge. This stage was completed on February 20, 2002, 39 days ahead of schedule.

The third and final stage of construction began on October 7, 2002. Work included replacement of the structural deck, and rehabilitation of the superstructure steel and the concrete substructure members on the southern portion of the bridge. In addition, truss members in both the swing span and camelback portions of the bridge were reinforced. This stage was completed on March 31, 2003. Concluding items will include necessary paint work, installation and testing of electrical and mechanical systems, and additional steel repairs of the 155th Street viaduct. Park areas impacted by the construction project will be restored in spring 2005. Expected completion of the project is the end of 2005.

Close-up of the 1894 Dedication Plaque. (Credit: Hani Faouri)
View of the Swing Span Control House. (Credit: Michele N. Vulcan)

View of the Roadway From Above the Control House – Yankee Stadium is on the Right. Closeup of a Gate House. (Credit: Peter Basich)

The bridge is also being assessed for seismic vulnerabilities. A seismic retrofit of this bridge will include strengthening the existing foundations and superstructure steel members. Retrofitting work will be completed throughout the length of the structure from the 155th Street Viaduct to the Jerome Avenue Approach. This will include installation of mini-piles in the existing piers that support the swing span, strengthening of the steel columns and floor beams of the 155th Street Viaduct and installation of lock-up devices to disseminate loads during a seismic event. The seismic retrofit project is currently scheduled to start in July 2013 and end in January 2016.

MADISON AVENUE BRIDGE OVER HARLEM RIVER (BRONX/MANHATTAN)

This rehabilitation project began in 1994. The work included rehabilitating the swingspan and approaches, and replacing the bridge's barriers, handrails, fencing, mechanical and electrical systems. The bridge's electrical system was vandalized in August 2000. Both submarine cables and most of the bridge wiring had to be replaced. More than $2.5 million in damage was done by the vandals for the salvage value of the copper wiring they removed. A temporary drive was installed to make the bridge operational. In late June 2002, the bridge was successfully partially opened utilizing the interim drive machinery, except for the end lifts. This was the first time the bridge had opened under its own power in several years. The remaining work on the Bronx approach traffic signals and the submarine cables was completed in 2004. Test openings of the bridge in the counter-clockwise direction are expected to be performed in the summer of 2005, to check for any interference or binding in high temperatures.

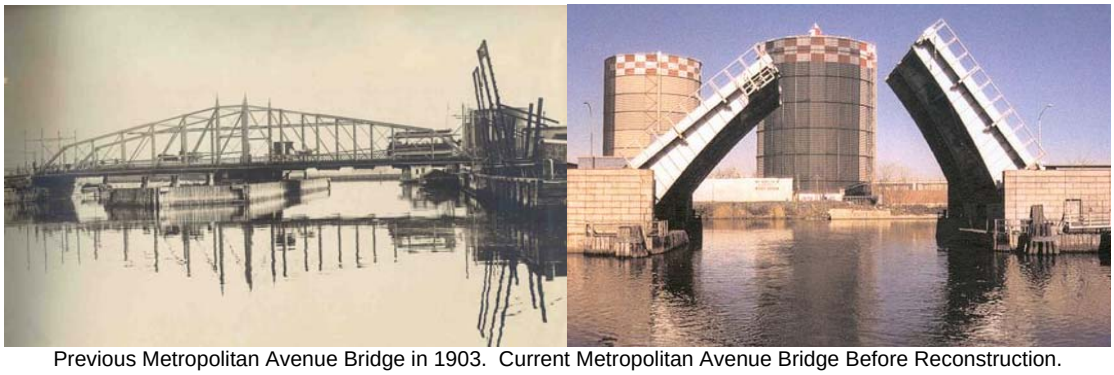
A project for seismic retrofit, electrical, mechanical, masonry and miscellaneous work is scheduled to be performed between March 2012 and September 2013. A preliminary seismic assessment indicates that a new center pivot pier may need to be constructed to support the swing span to meet seismic demands. If this assessment is confirmed by a further detailed analysis, the construction duration will be longer since it will require construction of new foundations for the swing span located in the Harlem River. In 2003, the bridge carried 41,575 vehicles per day.

Madison Avenue Bridge in 1910

METROPOLITAN AVENUE BRIDGE OVER ENGLISH KILLS (BROOKLYN)

This bridge is a double leaf bascule constructed in 1931. The five span structure carries four lanes of traffic over the English Kills. In 2003, the bridge carried 40,284 vehicles per day. A $30.7 million rehabilitation project began in October 2003. The estimated construction duration will be 36 months with approximately 16 months lead time. The project's scope of work includes rehabilitation of the existing bridge superstructure, substructure, and approaches, replacement

of the existing mechanical and electrical systems for the bascule span, and reconstruction of the Bridge Operator House.



Previous Metropolitan Avenue Bridge in 1903. Current Metropolitan Avenue Bridge Before Reconstruction.

Stage I reconstruction of the bridge began on March 15, 2004. The bridge was divided in two distinct halves, north and south, with the first stage of rehabilitation commencing on the north half.

Looking West at the Open Metropolitan Avenue Bridge Before Splitting of the Leaves. Looking North at the Demolition of the Bridge Operator House. Looking East at the Rebuilding of the Operator House.

The north half grid deck, the east and west approach spans, the existing operator house and the existing pier walls and wingwalls were demolished. An existing rest pier, cribbing, and contaminated soil were also removed to facilitate subsurface construction. Steel repairs were completed, and blasting and painting are nearly complete on this half of the bridge. Seismic retrofitting of the trunnion columns was completed. A new operator house was constructed and bridge control equipment was delivered and placed inside the house; the interior finishing work remains. A new submarine cable was placed, and the bridge's grid deck was replaced and filled with a lightweight concrete. New machinery and bedplates with a housing were installed in the pit areas. The flanking spans and on grade approach slabs were reconstructed. New pier walls and wingwalls were constructed on the east and west sides of the bridge, and new warning and barrier gates were installed on both approaches. Sidewalk construction is nearly complete on the approaches, and is already complete in the park island areas. The bridge currently operates using a temporary hydraulic system.

Demolition of the Northwest Flanking Span of the Metropolitan Avenue Bridge. Looking West at the Installation of Sheet Piles on the Northeast Approach Slab. Looking West at the Removal of the Northwest Sidewalk.

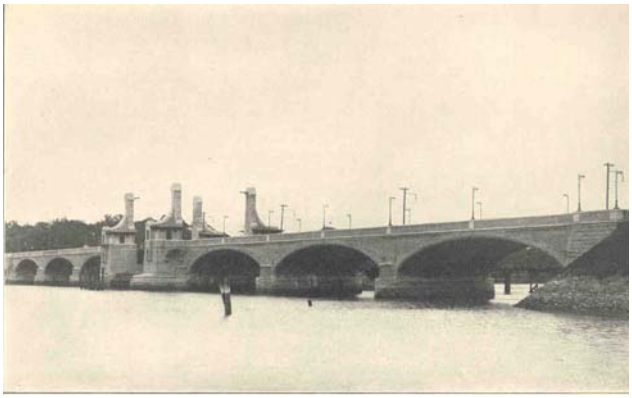
Working on the Approaches. Metropolitan Bridge Under Construction.

Onsite construction will be carried out in three stages. Incentives and disincentives are tied to the completion of Stage I and Stage II and the opening of each half of the bridge to traffic. The maximum project incentive is $900,000. There is no maximum value associated with the disincentives. Construction is expected to be complete in mid-2006.

SHORE ROAD BRIDGE OVER THE HUTCHINSON RIVER (BRONX)

This bridge, built in 1908, was originally called the Pelham Parkway Bridge over Eastchester Bay. In 2003, the bridge carried 18,023 vehicles per day. The $5 million interim rehabilitation of the existing bridge superstructure and substructure will enable the Department to keep it operational for a period of 10 years while a new bridge is being designed and built adjacent to the existing bridge. The existing bridge will be demolished once the new bridge is in service. The rehabilitation project began in April 2001, and all traffic lanes were reopened to traffic on April 24, 2002, three days earlier than scheduled. The interim rehabilitation of this bridge was substantially completed on June 17, 2002.

As of the end of 2004, various alternatives for the new bridge were being evaluated for further design. The project to construct a new Shore Road Bridge is scheduled for construction between August 2011 and November 2015.



Shore Road Bridge in 1909

THIRD AVENUE BRIDGE OVER THE HARLEM RIVER (BRONX/MANHATTAN)

The Third Avenue Bridge carried some 43,065 vehicles per day in 2003. The bridge was built in 1899 and was last rehabilitated in the 1950's. The design of the approximately $120 million reconstruction project of this rim bearing swing bridge was completed in October 2000. Construction began in July 2001. Reconstruction will include complete replacement of the approaches and the swing span. Elimination of the center median on the main span will greatly improve the traffic flow on the bridge. This bridge will use a center spherical roller thrust bearing for supporting the span and for seismic loads. The bearing will be the largest of this type made for this purpose. The existing pivot pier will also be reinforced for seismic loads. The approximate design loading is 7,000,000 lbs. vertical and 2,400,000 lbs. horizontal. A temporary bridge, adjacent to the current one, was in place for five months to maintain two lanes of traffic into Manhattan while the swing span was being replaced.

If the roadway is completed five months ahead of schedule, the contractor will receive a maximum incentive of $5 million. As a disincentive, the contractor will be penalized from $25,000 to $37,500 each day the milestone date is exceeded with no set maximum penalty. Completion of the project is scheduled for May 2005.

Third Avenue Bridge in 1914

In 2004, the project's land work was escalated by the construction of a crossover ramp from Third Avenue in the Bronx to the existing swing span and into the staged ramp construction in Manhattan. This enabled the Bruckner Boulevard ramp to be reconstructed about four months early and concurrent with the work to demolish the existing swing span. Meanwhile, fabricated steel and machinery were shipped from northwest Alabama to the Port of Chickasaw in Mobile, where the new swing span was erected and prepared for a 1,800 mile journey to New York City.

South Truss of New Third Avenue Swing Span Fully Erected in Alabama in March 2004. Installation of Top Lateral Bracing. Erecting the Northeast Section of the Truss. (Credit: Rahul Shah)

Control House Machinery Frame Leaving Russellville, Alabama in April 2004. Erecting the Swingspan in Mobile, Alabama in April 2004.

Third Avenue Temporary Bridge Nearly Complete in Early June 2004. (Credit: Daniel Hom) Transfer of New Swing Span to an Ocean Barge in Alabama. New Swing Span Leaving Mobile, Alabama in June 2004.

By mid-2004, all of the river foundations were completed, the existing swing span was demolished and removed from the site, and a temporary bridge was erected and used for two lanes of Manhattan-bound traffic. This bridge was in service from June 13, 2004 through December 5, 2004. During the summer of 2004, all of the existing river piers were demolished and reconstructed on the new foundations for the new swing span, which was delivered to Harlem in July and parked along the Manhattan side of the Harlem River where final machinery and structural components were installed.

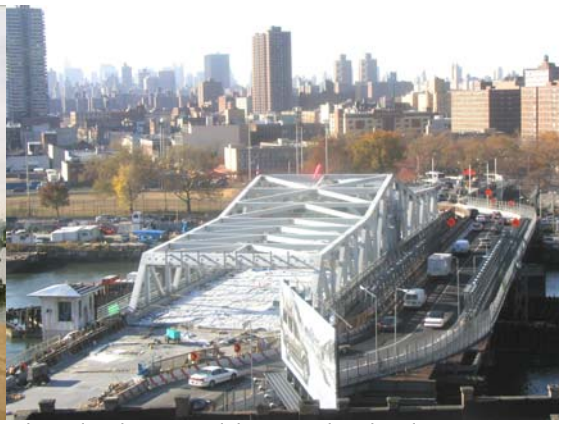
Starting the Removal of the Old Swing Span. Removing the Bronx Half of the Old Swing Span. (Credit: Daniel Hom)

New Swing Span Passing Under the Williamsburg Bridge and Passing the United Nations.

Ocean Barge Arrival at the Bridge Site. (Credit: Bojidar Yanev)
New Swing Span on the Working Barges. (Credit: Daniel Hom)

On October 29, 2004, the new swing span was floated-into final position. By December, the new span had received two of its five lanes of traffic, the temporary bridge was removed from service and floated out, the Bruckner Ramp was 90% completed and ready for opening in early 2005, and the auxiliary bridge machinery systems were installed and ready for turning the bridge for mariners through the hydraulic machinery. The bridge was opened to five lanes of traffic at 5 AM on February 10, 2005.

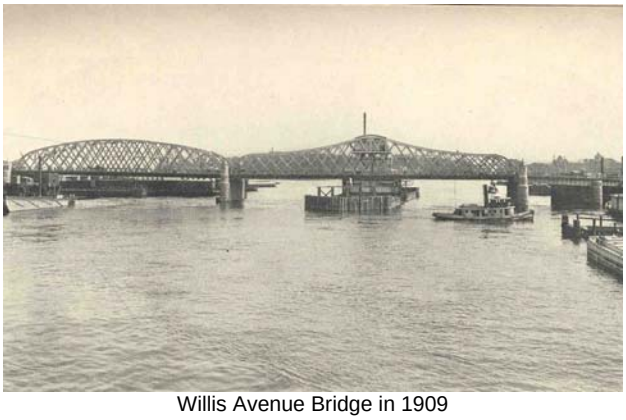
Preparing for the Float-in of the New Swing Span. Tugboats Pushing the Span Into Final Position. (Credit: Keith Burrowes)

Director of Bridge Repair George Klein and Engineer-in-Charge Daniel Hom at the Float-in.
(Credit: Russell Holcomb) Almost Completed New Span and Temporary Bridge.
(Credit: Daniel Hom)

WILLIS AVENUE BRIDGE OVER THE HARLEM RIVER (BRONX/MANHATTAN)

Measuring 3,212 feet in length and opened to traffic on August 23, 1901, the Willis Avenue Bridge remains one of New York City's most heavily traveled bridges. The bridge is a bowstring truss swing bridge which spans the Harlem River, and connects Manhattan's First Avenue and 125th Street to Willis Avenue and 132nd Street in the Bronx. Engineered by Thomas C. Clarke, the bridge was designed to relieve traffic congestion on the Third Avenue Bridge.



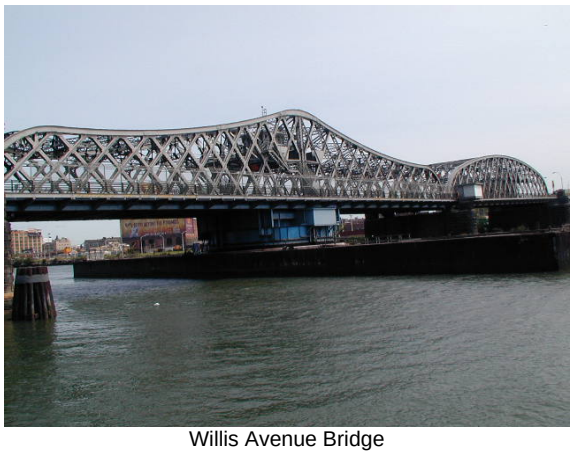
Willis Avenue Bridge in 1909

A major hub between the FDR Drive in Manhattan, the Major Deegan Expressway and the Bruckner Expressway in the Bronx, the Willis Avenue Bridge carried approximately 66,710 vehicles per day in 2003. Ten local and interstate bus lines use the bridge as a principal route from New York City to points throughout the northeastern United States.

Because of substandard curves which are present on the structure's approaches, the Willis Avenue Bridge has been one of the City's most accident-prone crossings. Between 1992 and 1994, there were 809 vehicular accidents on the bridge, for an average of 269 per year. Under the Department's proposed reconstruction program, these substandard curves will be eliminated.

Because of the advanced age and condition of the Willis Avenue Bridge, the City of New York proposes to replace the existing bowstring truss swing bridge with a new swing span bridge

constructed just to the south of the existing bridge. Elimination of the center median on the main span will greatly improve the traffic flow on the bridge. Due to begin in March 2007, this project is slated for completion in March 2012.



Willis Avenue Bridge

145TH STREET BRIDGE OVER THE HARLEM RIVER (BRONX/MANHATTAN)

The existing 145th Street Bridge is a swing type bridge with three throughtrusses. An eight-span structure, it carries four lanes of vehicular traffic over the Harlem River Drive, the Harlem River and Oak Point Link Railroad. Spans one and two were constructed in 1957 when the bridge was extended to span the Harlem River Drive. Spans six, seven and eight were reconstructed in 1990 in place of the original Bronx flanking span to provide a right-of-way for the Oak Point Link. In 2003, the 145th Street Bridge carried approximately 23,034 vehicles per day. This makes it one of the most essential routes for vehicles and pedestrians traveling between Manhattan and the Bronx. Vehicles, which cross this rim bearing swing bridge each day between the two boroughs, include buses, trucks and cars.

Bridge Operator House in 1958.

A Notice to Proceed for the $69.4 million reconstruction of this bridge was issued to the contractor with a start date of July 15, 2004. Fabrication of steel components for the approach and new swing span commenced in Pennsylvania. Installation of mini-piles at the rest and center piers of the bridge began in November 2004. The new swing span will be assembled in Albany, New York and is scheduled to be barged down the Hudson River for a final float-in during the winter of 2007.

The project will include the complete replacement of the swing span and six approach spans, seismic retrofitting, partial reconstruction of substructures and the reconstruction of the approach roadways. The design for the bridge utilizes elements pre-fabricated off-site so as to allow a very quick replacement of the existing bridge in 3 stages totaling 18 months. Traffic will only be impacted for the 15-month period of March 16, 2006 to June 18, 2007. The project is slated for completion in September 2007.

These upgrades will restore the structural integrity and extend the useful life of the 145th Street Bridge.

145th Street Bridge

FLOAT OUT/FLOAT IN

A technique referred to as "float out the old/float in the new" is being incorporated into replacement schemes for many movable bridges. Under this scheme, the old spans are floated out in their entirety and the new spans are floated in. Having the new spans constructed off-site and barged to the project allows for quick and efficient replacement of the removed span. Current projects that will incorporate this technique are: 145th Street Bridge, Hamilton Avenue Bridge, Borden Avenue Bridge, and Grand Street Bridge. The float-in of the new swing span of the Third Avenue Bridge was successfully performed in October 2004.

THREE TUNNEL PROJECT

Rehabilitation work continued on the Battery Park Underpass, and the Park Avenue and First Avenue tunnels in Manhattan. The contract includes the rehabilitation of the mechanical and electrical systems, as well as the ventilation, fire, lighting and drainage systems. This project, (particularly the Battery Park Underpass, which was used as a route to remove debris), was greatly impacted by the World Trade Center disaster, and the subsequent default of the electrical subcontractor. The project is scheduled for completion in early 2005.

BRIDGE SEISMIC DESIGN AND RETROFITTING

The seismic retrofitting of bridges in New York City is part of the inspection and rehabilitation program mandated by Congress and administrated by the FHWA through the local authorities. During the period of 1993 to 1996, four major bridge owners in the New York City area (NYCDOT, NYSDOT, MTA, and the Port Authority of New York and New Jersey) retained seismologists to study hard rock seismic ground motions. The rock motions generated by these studies differed from each other and from the AASHTO spectrum as modified by NYSDOT. The differences were such that the resulting retrofit costs varied widely, depending upon which motions were adopted. To resolve this issue, NYCDOT, in association with NYSDOT and the FHWA, retained Weidlinger Associates to assemble an expert panel to develop recommendations for rock motions that would be adopted uniformly by the New York City region. The panel consisted of a team of six internationally recognized experts in the fields of

seismology, geology, earthquake engineering, ground motion, and geotechnical studies. There were several brainstorming workshops held in New York, where the senior officials from NYCDOT, NYSDOT, and the FHWA provided their input to the panel members. NYCDOT also invited other city agencies to participate in the process.

The expert panel came up with definitive recommendations regarding rock motions, time histories, ground motions and bridge performance criteria to be used for critical, essential or other bridges undergoing structural analyses. The panel detail findings are described in the report entitled "New York City, Seismic Hazard Study and its Applications, Final Report, December 1998." This report is now extensively used by NYCDOT, NYSDOT, the FHWA, their consultants, and other agencies in the New York area for bridge projects. Thus, NYCDOT's leading role and efforts to establish ground motion standards have brought uniformity in seismic design to the New York City area. This will result in savings in bridge retrofit costs.

In 1997, the Division began a unique project aimed at conducting a seismic evaluation and subsequent retrofit of the Macombs Dam and 145th Street Bridges over the Harlem River. It is also intended to develop schemes for the strengthening of the unreinforced masonry piers on these movable bridges. The project's findings may be applied to other NYC bridges that have similar masonry substructures.

The 1998 Seismic Design Criteria generated by NYCDOT and adopted by all local bridge entities includes a requirement that they be revisited every 3-4 years. In 2002, a panel of seismologists prepared a report to update the existing 1998 criteria. This report was reviewed by NYCDOT, NYSDOT, FHWA, and also by a few consultants working on NYCDOT projects. A meeting was held on November 13, 2002, and was attended by NYCDOT, NYSDOT, and FHWA. It was unanimously agreed to continue to follow the existing 1998 seismic design criteria at least until the new USGS national hazard maps are finalized and incorporated in a national code.

On June 3, 2004, in a meeting attended by NYCDOT, NYSDOT and FHWA, it was unanimously agreed to adopt the new hard rock ground motions recommended by the panel of seismologists.

BRIDGE CLASSIFICATION

The Coast Guard regulations, which govern the operation of the City's movable bridges, define the owner's responsibility to the mariner by classifying a bridge as "open on demand" or "open on advance notice." An "on demand" bridge provides an immediate opening to any vessel wishing to pass the bridge. An "advance notice" bridge opens after the mariner requests an opening several hours in advance. "On demand" bridges must be staffed at all times. "Advance notice" bridges are staffed only when necessary. DOT redesigned the work process in order to reduce personnel costs to the City and improve the delivery of services to the maritime community.

In October 2000, the Department implemented the United States Coast Guard-approved changes, establishing a four-hour notice for the Harlem River bridges, and a two-hour notice for the remaining "advance notice" bridges. The "on demand" classification remains for three bridges. The revised advance notice requirements allowed the formation of mobile crews with overlapping responsibilities, meeting the mariners' needs and, in some instances, improving service by providing two mobile crews to expedite a vessel's travel along a waterway.

The reduction in planned personnel will save approximately $930,435 annually. In addition, bridge operational capabilities, general maintenance, and debris and snow removal have been enhanced through the more efficient utilization of existing personnel.

The remaining task is the conversion of the three remaining bridges to "on demand" status. This will be achieved by the replacement of two of the bridges with new bridges built with higher clearances, thereby reducing the number of times the bridges must be opened.

Summary of Vessel Openings 1990 - 2004

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Brdn Ave. (Q)	218	282	107	141	0	0	105	15	0	3	0	28	0	0	0
Brdwy (B/M)	0	12	3	10	6	7	24	7	2	0	6	27	83	49	16
Brcknr Expwy (Estrn Blvd) (B)	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brcknr Expwy (Unnprt Brdg) (B)	745	743	635	554	594	431	386	363	257	345	385	420	332	300	309
Carroll St. (K)	552	517	627	669	704	432	245	142	110	174	102	80	124	186	49
Grand St. (K/Q)	610	419	549	224	254	239	189	37	23	24	17	50	19	10	8
Grnpoint Ave. (K/Q)	1390	1014	860	587	549	498	557	626	669	787	688	641	659	738	1093
Hmltn Ave. (K)	1597	1466	1331	1300	1336	1246	1191	1157	996	982	933	832	946	824	757
Hntrs Point Ave. (Q)	157	264	106	141	0	0	113	15	0	1	0	36	0	0	0
Htchnsn River Pkwy (B)	30	8	0	0	0	37	31	32	75	46	5	120	30	5	37
Macombs Dam (B/M)	0	0	0	0	6	5	13	3	0	0	0	0	0	0	0
Mdsn Ave. (B/M)	9	3	1	5	5	0	0	0	0	0	0	0	0	0	7
Metrpltn Ave. (K)	351	301	356	225	310	272	407	423	448	513	279	366	339	342	153
Mill Bsn (K)	699	867	879	1151	1250	954	903	628	591	433	336	317	142	173	164
Pulaski (K/Q)	577	584	426	224	239	206	195	291	332	383	276	208	308	599	694
Rsvlt Islnd (M/Q)	2	0	0	0	0	0	0	0	4	0	58	48	125	63	669
Shore Rd (Pelham Pky) (B)	2457	1968	1996	2138	2222	2190	2167	2158	2274	2162	2168	2222	1897	1910	2011
Union St. (K)	574	502	547	657	713	432	236	144	103	144	85	101	62	24	21
Ward's Isnd Pdstrn (M)	0	0	0	2	0	1	0	2	1	0	0	279	0	0	7
Willis Ave. (B/M)	9	15	6	8	18	24	17	9	0	4	4	40	0	7	25
3rd Ave. (B/M)	7	3	1	7	19	20	18	9	0	2	1	1	0	0	0
3rd St. (K)	638	410	549	663	732	432	256	149	112	157	178	117	212	152	99
9th St. (K)	1082	864	984	927	836	0	0	0	0	192	513	808	733	547	457
145th St. (B/M)	0	2	0	0	9	24	24	3	0	0	1	6	0	0	9
W.207th St. (B/M)	0	0	0	1	6	4	12	7	2	0	6	14	4	6	10
TOTAL	**11707**	**10244**	**9963**	**9634**	**9808**	**7454**	**7089**	**6220**	**5999**	**6352**	**6041**	**6761**	**6015**	**5935**	**6595**

Roadway Bridges

INNOVATIONS

Innovations in the design and construction of Roadway Bridges continued in 2004. The continued use of weathered steel for bridges over railroads eliminates expensive costs involved in maintenance painting. Where feasible, the continued use of precast elements in bridge reconstruction reduces construction duration and the resulting negative impacts on the traveling public.

Stainless steel clad rebars and galvanized steel rebars, to reduce concrete deck deterioration, are being utilized in pilot projects such as the Congress Street Bridge over the Brooklyn-Queens Expressway, and the East Third Street Bridge over the Bay Ridge LIRR.

ANDREWS AVENUE BRIDGE OVER LIRR (QUEENS)

The Andrews Avenue Bridge was built in 1937. A Notice to Proceed for the $3.7 million replacement of this bridge was issued to the contractor with a start date of August 4, 2003. The bridge was completely closed beginning in winter 2004, and the new bridge was fully re-opened to traffic on November 24, 2004. The new bridge, designed by the Division's In-House Design Section, accommodates two 3.6-meter traffic lanes and two 2.5-meter wide sidewalks to better serve the community. The old four-span bridge was completely removed and replaced with a single span concrete-filled grid deck with multiple weathering steel stringers and girders supported by precast modules for the abutments and wing walls. This was the first use of this material in a NYCDOT bridge project. The proposed geometry of the south approach roadway required the construction of a retaining wall at the edge of a soccer field, lumber yard, and other private properties, due to the rise in profile. The precast wall required the excavation of only half a meter as compared to about two meters with the use of conventional cast-in-place concrete. The installation of these wall units greatly minimized the disturbance to the adjacent private properties, and enabled installation of the precast units in a relatively short time, even in winter. Precast wall units also improved the aesthetics of the playground and the area within the project limits. The use of precast concrete modules assured better quality concrete, and ease of installation reduced the total construction time from 15 months to 9 months. This project was substantially completed on February 1, 2005.

Installation of the Grid Deck on the New Andrews Avenue Bridge.

Rendering of New Andrews Avenue Bridge

ATLANTIC AVENUE BRIDGES (EB & WB) OVER EAST NEW YORK AVENUE (BROOKLYN)

The existing eastbound and westbound Atlantic Avenue bridges are on either side of the LIRR. Each is a two span steel multi-stringer structure, supported by a steel pier and reinforced concrete abutments. The NYCT structure overhead is partially supported by these bridges. The scope of work included replacement of the roadway and sidewalks, repair of the bridge deck, and cleaning and painting of the exposed surface of the steel structure.

Atlantic Avenue Bridges in 2003. (Credit: NYSDOT)

The pavement, sidewalks and curbs of the East New York Avenue underpass and service roads were replaced. At the East New York Avenue underpass, new 5" thick concrete walls were built in front and attached to existing retaining walls. In addition, a new median mall was constructed, as well as wheel guard plates around steel pier columns and steel guide rails in front of the columns. A Notice to Proceed for the $4.2 million reconstruction of these bridges was issued to the contractor with a start date of September 9, 2002. The bridges were reconstructed in two stages. The eastbound Atlantic Avenue Bridge, which had been closed to vehicular and pedestrian traffic since October 22, 2002, was re-opened on June 11, 2003. The westbound Atlantic Avenue Bridge, which had been closed to vehicular and pedestrian traffic since June 12, 2003, was re-opened on October 17, 2003. The project was substantially completed on August 20, 2004.

Northeast Retaining Wall at Northbound East New York Avenue After Construction. New Sidewalk & Newly Paved Roadway at Northbound East New York Service Road. New Sidewalk at Westbound Atlantic Avenue Service Road.

BELT PARKWAY BRIDGES OVER FRESH CREEK, GERRITSEN INLET, PAERDEGAT BASIN, ROCKAWAY PARKWAY, NOSTRAND AVENUE, AND BAY RIDGE AVENUE (BROOKLYN)

On a New York State-mandated scale from 1 to 7, these six bridges possess a condition rating of "fair" (3.001 – 4.999). In 2004, the Fresh Creek Bridge was 3.22; the Gerritsen Inlet Bridge was 3.68; the Paedergat Basin Bridge was 3.13; the Rockway Parkway Bridge was 4.11; the Nostrand Avenue Bridge was 4.09; and the Bay Ridge Avenue Bridge was 3.66. While none of the bridges are in any immediate danger of structural failure, their reconstruction is required in order to maintain mobility and public safety on this vital artery.

Under the Department's current proposal, the existing 5 span, 264.5 foot Fresh Creek Bridge will be replaced with a new 3 span, 309-foot bridge; the existing 11 span, 520-foot Gerritsen Inlet Bridge will be replaced with a new 3 span, 496-foot bridge; the existing 4 span, 150-foot Rockaway Parkway Bridge will be replaced with a new single span 95-foot bridge; the existing 3 span 140-foot Nostrand Avenue Bridge will be replaced with a new single span 98-foot bridge; and the existing single span 58-foot Bay Ridge Avenue Bridge will be replaced with a new single span, 58-foot bridge. The stopping sight distance for the bridge and approach roadways will be improved except for the Bay Ridge Avenue Bridge, where improvement is not needed.

The reconstruction of the Fresh Creek Bridge, currently in its final design phase, is scheduled to start in summer 2007, and will last for approximately 3 years. The bridge and the approach roadways will be constructed in four stages, while maintaining three traffic lanes in each direction and a bike path on the eastbound side during construction.

The reconstruction of the Gerritsen Inlet Bridge, currently in its final design phase, is scheduled to start in fall 2007, and will last for approximately 4 years. The bridge and the approach roadways will be constructed in four stages, while maintaining three traffic lanes in each direction and a bike/pedestrian path on the eastbound side during construction.

The reconstruction of the Rockaway Parkway Bridge, currently in its final design phase, is scheduled to start in summer 2008, and will last for approximately 3 years. The bridge and the approach roadways will be constructed in five stages, while maintaining three traffic lanes in each direction during construction.

The reconstruction of the Nostrand Avenue Bridge, currently in its final design phase, is scheduled to start in summer 2008, and will last for approximately 2½ years. The bridge and the approach roadways will be constructed in five stages, while maintaining three traffic lanes in each direction during construction.

The reconstruction of the Bay Ridge Avenue Bridge, currently in its final design phase, is scheduled to start in summer 2008, and will last for approximately 1½ years. The bridge will be constructed in five stages, while maintaining three traffic lanes eastbound and two traffic lanes westbound during Stage I, and two traffic lanes in both directions during Stages II, III, IV, and V during construction.

Fresh Creek, Gerritsen Inlet & Bay Ridge Avenue Bridges in 2002. (Credit: NYSDOT)

Rockaway Parkway& Nostrand Avenue Bridges in 2002. (Credit: NYSDOT)

The Paerdegat Basin Bridge will be replaced by a new bridge (with complete replacement of the superstructure and substructure). It will be constructed on a new off-line alignment conforming to current standards. The new split bridge will be within the right-of-way of the parkway. This project is scheduled to begin construction in the spring of 2007, and to last for approximately four years.

Paerdegat Basin Bridge

A computerized traffic simulation model is under development in connection with the Division's plans to reconstruct seven bridges on the Belt Parkway. This model will serve as a useful tool to establish the impact of construction on the traveling public and to help determine appropriate construction schedules. In addition, it will enable us to rapidly evaluate the impact of a variety of combinations of construction staging.

BROOKLYN-QUEENS EXPRESSWAY (WB) OVER FURMAN STREET & BROOKLYN-QUEENS EXPRESSWAY (EB) OVER BROOKLYN-QUEENS EXPRESSWAY (WB) (BROOKLYN)

A Notice to Proceed for the $1.1 million project to reconstruct the transverse expansion joints on the Brooklyn-Queens Expressway (BQE) in Brooklyn Heights between Orange and Joralemon Streets was issued to the contractor with a start date of May 3, 2004. The first (lower) cantilevered level carries the westbound vehicular traffic. The second (intermediate) cantilevered level carries the eastbound vehicular traffic, and the third (top) cantilevered level supports the Brooklyn Heights promenade.

BQE Bridge in 2003 – Upper Level is Eastbound, Lower Level is Westbound. (Credit: NYSDOT)

This section of the BQE was originally constructed approximately 50 years ago and due to the aging process, the original joint material is no longer capable of preventing water from infiltrating the structural concrete. If this situation continues unabated, the concrete will become severely damaged due to the water's freeze/thaw action and its corrosive effect on the reinforcing steel. Installing new joint material will reestablish the watertight seals while allowing for the necessary expansion of the superstructure, thus extending the useful life of the structural concrete that supports the westbound and eastbound roadways of the BQE. There are a total of 100 joints; 50 joints on the first cantilevered level, and 50 joints on the second cantilevered level within the project limits. Each joint is 33½ feet in length for a total 3,350 feet of joint replacement. The work will be performed only during the nighttime hours of 12:01 AM to 5:00 AM under two lane closures, with the third lane open to traffic. At all other times, all three lanes in both the westbound and eastbound directions will be open to traffic. The eastbound cantilevered level was completed in November 2004. The project is expected to be complete in October 2005.

CLAREMONT PARKWAY BRIDGE OVER METRO NORTH RR (BRONX)

The Claremont Parkway Bridge was built in 1889, with major reconstruction in 1938. This project, currently in its final design phase, will include removal of the entire superstructure and approaches. The new bridge will consist of pre-stressed concrete box beams supporting a reinforced concrete deck and approach slab, concrete sidewalks and reinforced concrete parapet walls with protective fencing, and reconstructed approach roadways. A portion of both existing abutments will be removed to accommodate the new bridge profile. The utility work will include the installation of two new water mains, a gas main, and electrical conduits. The bridge will be constructed in four stages, with one traffic lane open in each direction at all times during construction. Construction is expected to begin in October 2005, and is expected to be complete by April 2007.

Claremont Parkway Bridge. (Credit: NYSDOT)

CONCOURSE VILLAGE AVENUE BRIDGE OVER METRO NORTH (BRONX)

This project will include demolishing the existing bridge deck, removing loose encasement on the structural members, localized steel repairs, and restoring the encasement. A new concrete deck will be installed, and new approach slabs, an east parapet, steel faced curbs, and concrete sidewalks will be built. The existing granite blocks will be repointed as necessary. The bridge will be reconstructed in four stages, with one 4.3 meter wide southbound lane maintained during construction. Construction is expected to begin in September 2008, and is expected to be complete in early 2010.

Concourse Village Avenue Bridge. (Credit: NYSDOT)

CONGRESS STREET BRIDGE OVER BROOKLYN-QUEENS EXPRESSWAY, AND LINCOLN ROAD BRIDGE OVER BMT SUBWAY (BROOKLYN)

A Notice to Proceed for the reconstruction of these bridges was issued to the contractor with a start date of April 26, 2004. The project is expected to be completed in March 2007. The project originally contained three bridges, but the Seeley Street Bridge was removed from the contract in September 2004.

The existing Congress Street Bridge is a two span structure over the Brooklyn-Queens Expressway (BQE). The major substandard feature of the bridge is its vertical clearance over the BQE. There is evidence of vehicular impacts on the bridge superstructure. The rehabilitation will include reconstructing a new bridge superstructure with high strength steel that will add 12 inches of additional vertical clearance. Epoxy coated reinforcement will be used for

concrete deck reinforcement, and the bridge substructure will be rehabilitated to conform to seismic requirements. The reconstruction of this bridge will be accomplished in two stages. The existing bridge carried one-way east bound traffic, which will be maintained for the duration of the construction. The reconstruction will involve BQE lane closures at certain times. Traffic Enforcement Agents will be posted for the duration of the BQE lane closures to ensure the smooth flow of traffic. The Congress Street Bridge is expected to be completed in October 2005.

Congress Street Bridge Deck Demolition. (Credit: Carlos Ramirez)

Congress Street Bridge Deck Demolition and Structural Steel Removal. (Credit: Carlos Ramirez)

The Lincoln Road Bridge project will include a replacement of a water trunk main under the railroad track which is within the limits of the bridge reconstruction. The replacement of the water trunk main will be funded by NYCDEP. The existing bridge is a four span structure with a steel pier bent and reinforced concrete abutments. The bridge spans over NYCTA Brighton Beach line. The rehabilitation will include removal of the existing bridge in its entity and the construction of a new bridge. The new bridge will be a single span flexible type integral abutment bridge built compositely with a steel stringer and a concrete deck. The project work will be accomplished in three stages. The water trunk main will be replaced during the first stage. One eastbound lane of vehicular traffic and a pedestrian sidewalk will be maintained throughout the construction, beginning in March 2005. Due to high traffic volume in the vicinity of the project, Traffic Enforcement Agents will be posted for part of the construction period. The Lincoln Street Bridge is expected to be completed in March 2007.

Lincoln Road Bridge in 2003. (Credit: NYSDOT)

CORTELYOU ROAD BRIDGE OVER NYCT (BROOKLYN)

This $3.7 million project is being constructed in three stages. Two-way traffic will be maintained by providing one lane in each direction during construction, and no detours will be required. The existing bridge is a one span steel through-girder, floorbeam and steel stringer bridge with very short approach spans. Two steel column bents, rising out of the passenger platforms, support each end of the main span. The reconstruction will replace the existing deck slab and steel stringers with modified floorbeams and through-girders. Construction began in April 2002, and is expected to be complete in July 2005.

Cortelyou Road Bridge in 2003. (Credit: NYSDOT)

Reconstructing the Sidewalk Area & Approach Roadway During Stage I. Stage II Work in Progress.

CROOKE AVENUE AND NEWKIRK AVENUE BRIDGES OVER BMT SUBWAY (BROOKLYN)

The existing four span Crooke Avenue Bridge was constructed in 1916. A recent inspection revealed significant deterioration of the superstructure. This project, currently in its final design phase, will include removal of the entire superstructure, approaches and three piers. The new single span bridge will consist of pre-stressed concrete box beams supporting a reinforced deck and approach slabs, concrete sidewalks, reinforced parapet walls with protective fencing and reconstructed approach roadways. The top portion of the abutments will be removed and reconstructed. The utilities will be relocated within project limits. The new bridge will also meet current NYCT sight distance and horizontal clearance standards. The bridge will be constructed in two stages, with one vehicle lane and one sidewalk maintained. Construction is expected to begin in August 2006, and is expected to be complete in April 2008.

The Newkirk Avenue Bridge is a three span structure between East 16th Street and Marlborough Road. This project, currently in its final design stage, will include the removal of the entire superstructure, including pier caps, girders, deck slabs and approaches. The new three span bridge will consist of steel stringers and light weight concrete deck. The exterior and middle columns will be replaced with new steel columns. The existing steel caps on the steel pier columns will be replaced. The top portion of the abutments will be removed and reconstructed. New utilities will be installed. Pedestrian access to the Newkirk Avenue station will be maintained during the three stage construction. During Stage III of construction the bridge will be closed to vehicular traffic. Construction is expected to begin in October 2007, and is expected to be complete in March 2008.

Crooke & Newkirk Avenue Bridges. (Credit: NYSDOT)

CROSS BAY BOULEVARD BRIDGE OVER CONDUIT BOULEVARD (QUEENS)

The bridge was built in 1949. A recent inspection by the Division revealed that the bridge had outlived its useful service life. The effects of age, weather and increased traffic volume have rendered reconstruction necessary. The bridge connects the communities of Howard Beach and Ozone Park, and provides seasonal access to the beaches at Gateway National Recreation Area and the Rockaways. The existing bridge structure consisted of a two span reinforced deck slab, and carried four lanes of traffic in each direction. The new bridge structure consists of a two span concrete grid deck and a concrete parapet wall with protective bridge fencing. It carries the same lanes as before. The approach slabs, curb and sidewalk, median, roadbase, and guiderails were replaced. New traffic signals, street lighting, traffic regulatory signs and thermoplastic stripping were installed. Utilities such as the gas main, Con Edison, telephone, Fire Department and Time Warner were installed across the bridge under the deck.

Approximately 66 new trees will be planted as part of the landscaping improvement of this project.

The bridge was constructed in five stages, with four lanes of traffic maintained southbound and three lanes of traffic northbound at all times. In addition, traffic enforcement agents were deployed to stream line the traffic during peak hours.

Backfilling and Compacting the Northwest Sidewalk. Curing the Northwest Wingwall and South Roadway. (Credit: Muhammad Siddiqui) Fixing the Formwork During Construction of the Eastern Pier Columns and Cap.

Placement of the Grid Deck Panels. Placing the Concrete for the Grid Deck. (Credit: Muhammad Siddiqui)

A Notice to Proceed for the $8.75 million reconstruction of this bridge was issued to the contractor with a start date of July 15, 2002. Effective October 10, 2002, the left lane in each direction on Conduit Avenue at Cross Bay Boulevard was closed to traffic for a period of two years. The bridge was re-opened to traffic on July 14, 2004, some two months ahead of schedule. The contractor received an incentive of $300,000 for opening the bridge early. The reconstruction of this bridge was substantially completed on September 22, 2004.

Landscaping Work at the East Side of the New Bridge.

GLENMORE AVENUE, PITKIN AVENUE, SUTTER AVENUE, AND LIBERTY AVENUE BRIDGES OVER LIRR BAY RIDGE (BROOKLYN)

This $12 million project will reconstruct four bridges over the LIRR tracks in Bay Ridge. A Notice to Proceed for the reconstruction of the Glenmore Avenue, Pitkin Avenue, and Sutter Avenue Bridges over LIRR Bay Ridge was issued to the contractor with a start date of January 14, 2003. The reconstruction of Liberty Avenue over LIRR Bay Ridge will commence after the completion of these bridges. Glenmore Avenue, Sutter Avenue, and Liberty Avenue will be fully closed to pedestrian as well as vehicular traffic during construction. The Pitkin Avenue bridge will be constructed in two stages. One traffic lane in each direction and one sidewalk will be open at all times during construction.

Glenmore & Pitkin Avenue Bridges in 2002. Sutter Avenue Bridge in 2003. (Credit: NYSDOT)

The reconstruction of the Glenmore Avenue Bridge was substantially completed on July 16, 2004. Stage I reconstruction of the Pitkin Avenue Bridge began on July 23, 2004. The reconstruction of the Sutter Avenue Bridge was substantially completed on October 19, 2004. Effective November 11, 2004, the Liberty Avenue Bridge was closed to traffic for rehabilitation, as agreed to by the community. The project is expected to be complete in December 2005.

Demolishing the Old Glenmore Avenue Bridge. Installing Tiebacks at the East Abutment.

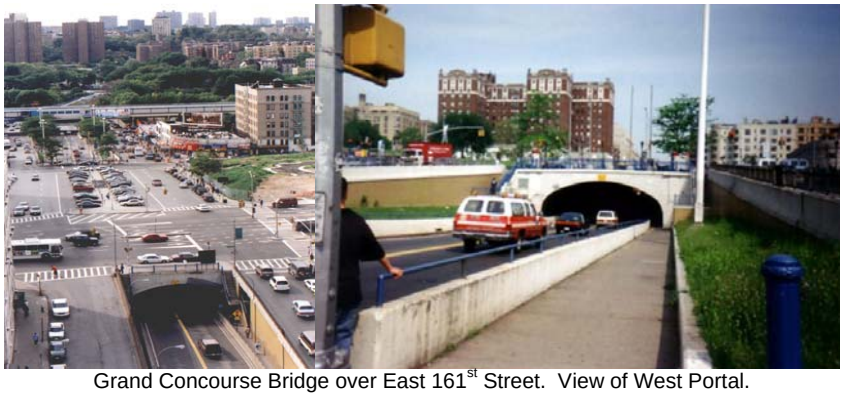
New Bearings Installed at the Central Pier & East Abutment of the Glenmore Avenue Bridge. Erecting Structural Steel. Placing the Deck Slab Concrete.

Demolishing the Old Sutter Avenue Bridge. Erecting Structural Steel.

Installing Stay-in-Place Forms on the Sutter Avenue Bridge. Placing the Bridge Deck Concrete.

GRAND CONCOURSE BRIDGE OVER EAST 161ST STREET (BRONX)

This project, currently in the rebidding process, will include the rehabilitation of the Lou Gehrig Plaza and the reconstruction of the Grand Concourse from East 161st Street to East 166th Street, as well as landscaping improvements. In addition, artwork will be included under the Percent For Art Program administered by the Department of Cultural Affairs. The underpass and its approaches will be closed to traffic during the Yankees' off season only. Two traffic lanes in each direction will be maintained at the Grand Concourse during construction. Construction of the bridge is scheduled to begin in November 2006, and is expected to be complete by November 2009.



Grand Concourse Bridge over East 161st Street. View of West Portal.

Existing Lou Gehrig Plaza

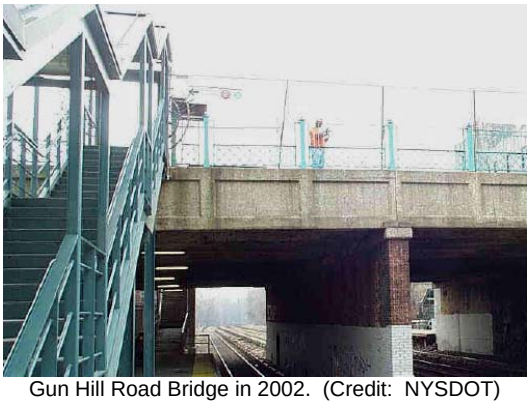
Rendering of New Plaza

Existing Grand Concourse

Rendering of New Grand Concourse

GUN HILL ROAD BRIDGE OVER METRO NORTH RR (BRONX)

A recent inspection by the Division revealed that the superstructure of the bridge has outlived its useful service life. The effects of age and weather have rendered reconstruction necessary. This project will include the removal of the existing superstructure and the top portion of the existing concrete abutments, and the construction of new approach slabs, roadway, and sidewalks. The work will also include replacing the water and gas mains, as well as other utilities, erecting new steel girders, installing new utility supports, placement of a new reinforced concrete deck, constructing new concrete parapets with pedestrian fencing. The bridge will be reconstructed in three stages, with two lanes of traffic maintained during construction. A Notice to Proceed for the $7.4 million reconstruction of this bridge was issued to the contractor with a start date of December 1, 2004. Construction is expected to be complete in December 2008.



Gun Hill Road Bridge in 2002. (Credit: NYSDOT)

HARLEM RIVER DRIVE AT EAST 127TH STREET (MANHATTAN)

This project, currently in its preliminary design phase, involves the replacement of the existing 11 span bridge and the construction of a flyover ramp over the Third Avenue Bridge, in addition to various highway improvements. It eliminates a major weaving problem between the southbound Harlem River Drive traffic destined for the Second Avenue exit and the Third Avenue Bridge exit ramp; allows at-grade access for a future Park/Promenade to be developed by the Department of Parks at 127th Street between the Harlem River Drive and the Harlem River; and improves operational characteristics of the Harlem River Drive from the Third Avenue Bridge to the Willis Avenue Bridge. The viaduct currently carries two northbound and three southbound traffic lanes and serves approximately 79,000 vehicles per day. The bridge will be reconstructed in six stages. During construction, two southbound lanes and three northbound lanes of traffic will be maintained. Construction is expected to begin in July 2012, and is expected to be complete in July 2015.

Harlem River Drive at East 127th Street.

INSPECTION OF THE HIGH BRIDGE PEDESTRIAN BRIDGE OVER THE HARLEM RIVER (BRONX/MANHATTAN)

In support of the Department of Parks and Recreation (DPR), the Division prepared a detailed scope of work for the comprehensive in-depth inspection of this eleven span landmark structure, the oldest (circa 1848) bridge over the Harlem River. The bridge is under DPR's jurisdiction.

A Notice to Proceed was issued to the contractor with a start date of July 18, 2002. Engineering consultants are conducting this inspection, which is scheduled for completion in the spring of 2005, at an estimated cost of $1.6 million. The Division administers and supervises this work.

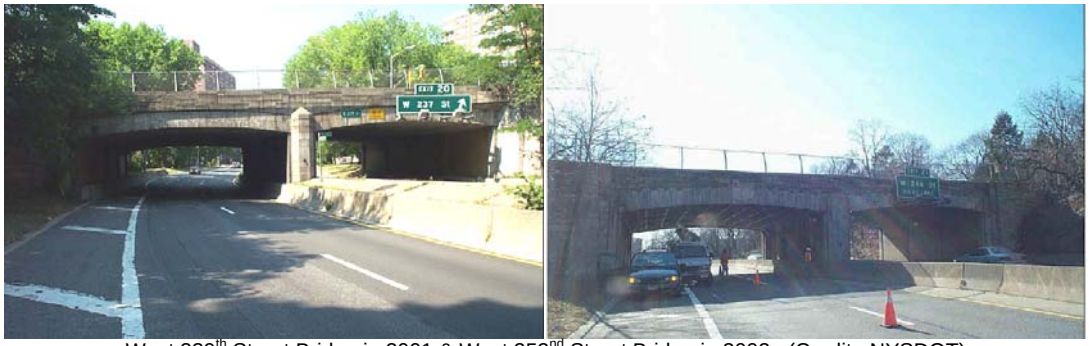
The resultant report will be furnished to DPR to pursue rehabilitation of the structure. Its goal is to open the historic promenade level for public use by pedestrians and cyclists and, once again, link the Bronx and Manhattan portions of High Bridge Park.

High Bridge Pedestrian Bridge. (Credit: Michele N. Vulcan)

MANHATTAN COLLEGE PARKWAY, WEST 232ND STREET, WEST 239TH STREET, AND WEST 252ND STREET BRIDGES OVER HENRY HUDSON PARKWAY (BRONX)

This $6.6 million project will reconstruct four bridges over the Henry Hudson Parkway. A Notice to Proceed was issued to the contractor with a start date of February 23, 2004. The reconstruction of the West 239th Street and West 252nd Street Bridges will commence after the substantial completion of the Manhattan College Parkway and West 232nd Street Bridges. Work on the Manhattan College Parkway, West 232nd Street, and West 239th Street Bridges will include the demolition and removal of the existing pavement and roadway slab down to the concrete arch of each bridge, and replacing it with a new deck on a protected membrane waterproofing system. In addition, the reconstruction of these bridges will include drainage, repointing the existing stone masonry, new signage and pavement markings, improving the under deck lighting systems, and private utility work.

Manhattan College & West 232nd Street Bridges in 2001. (Credit: NYSDOT)



West 239th Street Bridge in 2001 & West 252nd Street Bridge in 2002. (Credit: NYSDOT)

On West 232nd Street, the work will be completed in three stages, with one lane of vehicular traffic maintained in each direction during construction. On Manhattan College Parkway, the work will also be completed in three stages, with one lane of vehicular traffic maintained in the westbound direction during construction. On West 239th Street, the work will be completed in four stages, with one lane of vehicular traffic maintained in the each direction during construction.

The West 232nd Street Bridge re-opened to traffic on August 20, 2004, some three months ahead of schedule. The Manhattan College Parkway Bridge re-opened to traffic on October 29, 2004, some six weeks ahead of schedule. These two bridges are expected to be complete in early 2005.

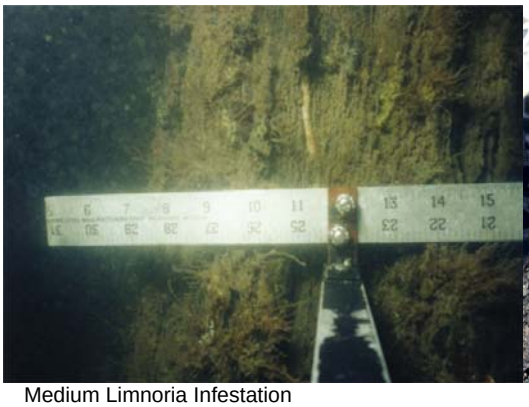
Work on the West 252nd Street Bridge will include the demolition of the existing concrete arch bridge deck, and replacing it with a new prestressed concrete box beam superstructure. In addition, the reconstruction of this bridge will include installing a new 300 mm diameter water main, improving the under deck lighting systems, private utility work, partial removal of the pier and abutments, new roadway lighting, and adjustment of the existing drain inlets, manholes, and catch basins. The work will be completed in four stages, with one lane of vehicular traffic maintained in the eastbound direction during construction. The four bridge project is expected to be complete in September 2006.

MARINE BORER REMEDIATION (MANHATTAN & BROOKLYN)

Marine borers pose an immediate and serious danger to the thousands of piles and other structures of timber built in the marine environment. In New York Harbor, as the water quality improved due to many years of clean up efforts, marine borer (limnoria, teredo, etc.) activity has increased significantly in recent years. The recent inspections of timber structures by various local agencies (such as The Port Authority of NY & NJ, NYS Department of Transportation, NYC Department of Sanitation, and NYC Economic Development Corporation) indicate increasing damage to their structures resulting from marine borer activity. These agencies are implementing measures to protect the structures against marine borers.

Marine Borer – Limnoria Species

Marine Borer – Teredo Species



Medium Limnoria Infestation

Teredo Damage (holes up to ¼" diameter)

In October 1999, the Department began a study to assess the existing damage caused by marine borers as well as the potential for future damage at several waterfront DOT structures, including the supporting structures of the relieving platforms along the FDR and Harlem River Drives, and the timber piles and structures of the Carroll Street and Ocean Avenue bridges in Brooklyn. The underwater inspection of timber piles supporting the FDR Drive began on May 8, 2000. Inspection of the Brooklyn sites was conducted during the week of October 23, 2000. The inspections were completed in October 2000, and the Marine Borer Evaluation Report was published in June 2001. Using the results of the underwater inspections, preliminary plans were developed for the implementation of repairs and remediation measures to protect the structures from attack. These preliminary plans were completed in December 2001. The final design is in progress and is scheduled for completion by April 2005. The construction work is expected to commence in summer 2006.

SHORE ROAD CIRCLE BRIDGE OVER AMTRAK (BRONX)

This project will include the removal of the existing two span bridge and the construction of a new single span bridge structure with a reinforced concrete deck over steel girders. The work will also include the construction of new reinforced concrete abutments and wing walls, as well as new parapet walls with protective steel fences. The bridge will be reconstructed in three stages, with one lane of traffic maintained in each direction during construction. Construction is expected to begin in February 2006, and is expected to be complete in July 2007.

Shore Road Circle Bridge in 2003. (Credit: NYSDOT)

STEINWAY STREET BRIDGES OVER GRAND CENTRAL PARKWAY WB & EB (BROOKLYN-QUEENS EXPRESSWAY) (QUEENS)

This $16 million project will replace two bridges, originally built in 1937, that connect over the Grand Central Parkway. The contract has incentive/disincentive clauses amounting to $5,000 a day for a maximum of 90 days for incentive. There is an equal amount for disincentive with no limit. This means that the contractor will receive a bonus of $5,000 a day for every day that the work is completed ahead of schedule, up to 90 days, or will be penalized $5,000 a day with no limit if the work is completed late.

Steinway Street Bridges in 2002. (Credit: NYSDOT)

Temporary Bridges in Place in December 2004.

The contract provides for several NYPD Traffic Agents to maintain the flow of traffic at the Steinway Street intersections affected by the bridge for the duration of the replacement. Variable Message Signs (VMS) will be utilized to advise motorists of impending nightly lane closures on the Grand Central Parkway.

A Notice to Proceed for the reconstruction of these bridges was issued to the contractor with a start date of July 1, 2002.

During 2004, the contractor completed all pre-stage construction activities and commenced Stage I construction activities. On July 23, 2004, during the demolition process to remove the first one-third of the existing bridge in preparation for installing the new bridge components, a portion of the existing north bridge collapsed onto the westbound roadway of the Grand Central Parkway. An ongoing forensic investigation is in progress to study and determine the cause of the sudden collapse of the north bridge. In a coordinated emergency effort by the NYPD, NYCFD, NYCDOT and the contractor, the Grand Central Parkway was completely closed for a period of twenty hours during which time the first one-third of the existing bridges'

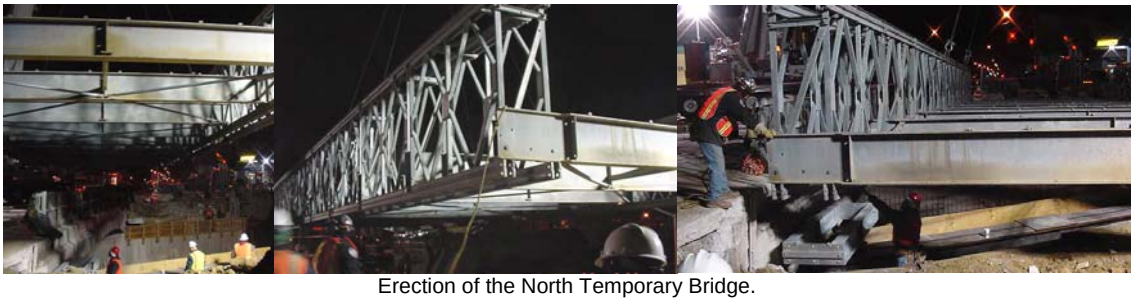
superstructures over the eastbound and westbound Grand Central Parkway was removed and carted away from the construction site.

In the interim period between August 2004 and December 2004 and as a precautionary measure, a decision was made by the Department to completely close the remaining two-thirds of the existing bridges to both vehicular and pedestrian traffic. As a result, traffic detour routes along north and south Astoria Boulevard were established with appropriate placement of signs, barricades and traffic control devices in an effort to facilitate the movement of traffic through the construction zone. NYPD Traffic Enforcement Agents were along deployed at critical location along the detour routes to assist in the smooth flow of traffic around the construction zone.

Also during this period a decision was made by the Department to have the contractor install temporary vehicular bridges capable of carrying the Standard HS 20 Highway Loading (with a provision for a pedestrian walkway) in the location where the first one-third of the existing bridges were removed. These temporary bridges will be utilized to carry two lanes of traffic along the northbound direction on Steinway Street over the Grand Central Parkway and will result in the elimination of the northbound detour route that was established when the bridges were closed to traffic in July 2004.

The design and construction of these temporary bridges began in September 2004. The bridges were opened to two lanes of northbound traffic, as well as pedestrians, on January 10, 2005. The bridge will be constructed in two stages. In the first stage, the remaining two-third of the bridges will be demolished and reconstructed. In the second stage the final one-third will be rebuilt after removal of the temporary bridges. Traffic will be maintained in the newly constructed two-third portion. The project is scheduled for completion in April 2007.

Erection of the South Temporary Bridge.



Erection of the North Temporary Bridge.

Director of Bronx, Queens & Staten Island Roadway Bridges Ali Mallick. Chief Bridge Officer Henry Perahia and Director OCMC Thomas Whitehouse.

Concrete & Asphalt Work on the Temporary Bridges.

Opening of the Temporary Bridges.

WESTCHESTER AVENUE BRIDGE OVER THE HUTCHINSON RIVER PARKWAY (BRONX)

This bridge supports a transit structure overhead and has substandard clearance over the highway below. In 2004, 10 unauthorized overheight vehicles struck the bridge's girders. A project to install an ITS solution, which includes an overheight vehicle detection system that will flash signs directing vehicles identified as being over 9' in height to exit the parkway, was substantially completed on December 3, 2004. It also includes cameras that will be activated by acoustics and will document future damage to the bridge as well as the offending vehicles' descriptions and plate numbers for recoupment of costs by the City. A separate project is underway to reconstruct the bridge and lower the Parkway.


Westchester Avenue Bridge in 2001. (Credit: NYSDOT) Overheight Sensor Unit on the Hutchinson River Parkway. (Credit: Roly Parroco)

New Vehicle Detection System

WOODSIDE AVENUE OVER LIRR (QUEENS)

This project, currently in its final design phase, will include the removal of the existing three span bridge and the construction of a new single span structure. The superstructure and abutments will be completely redesigned to comply with current seismic requirements. The bridge will be reconstructed in six stages. Construction is expected to begin in October 2005, and is expected to be complete by October 2007.

Woodside Avenue Bridge. (Credit: NYSDOT)

2ND AVENUE BRIDGE OVER LIRR (BROOKLYN)

This $9 million project reconstructed the bridge in two stages. During both stages, the bridge was open for one lane of traffic in each direction. Pedestrian traffic on the bridge was maintained at all times. The existing six span bridge was constructed in 1912. The existing bridge superstructure was completely removed and replaced with a new two span, cast-in-place reinforced concrete deck and weathering steel composite superstructure. A recent inspection revealed significant deterioration of the steel frames and the reinforced concrete piers. The bridge had been supported by temporary 12"x12" wooden columns at various locations. A Notice to Proceed for the reconstruction of this bridge was issued to the contractor with a start date of November 4, 2002. The reconstruction of this bridge was substantially completed on December 17, 2004, some two months ahead of schedule.

Demolition of the 2nd Avenue Bridge Superstructure. Abutment Footing and Stem Reinforcement. Installation of Footing and Column Reinforcement for the Bridge's Center Pier.

Excavation Protection System at the New 2nd Avenue Bridge North Abutment. View of the Partially Completed Center Pier and South Abutment. View of the New North Abutment Stem Wall.

Installation of Stay-in-Place Deck Forms on the 2nd Avenue Bridge. Structural Steel Erection.

Placing the Deck Concrete.

EAST 3RD STREET AND 52ND STREET BRIDGES OVER LIRR (BROOKLYN)

This $4 million project reconstructed these two bridges, built in 1906. The bridges span a railroad track owned by LIRR, and presently used by New York and Atlantic Railway for freight service. A Notice to Proceed for the reconstruction of these bridges was issued to the contractor with a start date of May 5, 2003. The work included building new superstructures of steel stringers, reinforced concrete decks, parapets with protective screenings, and steel faced curbs and concrete sidewalks. The bridges were constructed in two stages, with one traffic lane in each direction and one sidewalk open at all times during construction. The reconstruction of the East 3rd Street Bridge was substantially completed on October 25, 2004. The reconstruction of the 52nd Street Bridge was substantially completed on January 11, 2005.

East 3rd Street Bridge Before Reconstruction. Removing the Stringer Encasements. Removing the West Side Bridge Deck.

Demolition of the East 3rd Street Bridge South Abutment. Installing Structural Steel. Placing Concrete for the Approach Slabs.

Installing Galvanized Rebar for the Approach Slab. East 3rd Street Bridge After Reconstruction.

52nd Street Bridge Before Reconstruction. Demolition of the Bridge Deck. Installation of Temporary Supports.

Installation of Structural Steel on 52nd Street Bridge. Placing Concrete on the Bridge Deck.

New 52nd Street Bridge East Sidewalk.

7TH AVENUE BRIDGE OVER NYCT (BROOKLYN)

The old two span concrete encased steel stringer bridge consisted of one span and a cantilever over a concrete encased steel column pier. The reconstruction of this bridge included the replacement of the entire existing superstructure, the repair of the existing abutments and pier, and the reconstruction of the approaches. The bridge was closed to traffic for 10 months beginning on June 19, 2002, as agreed to by Community Board #7. This $3.7 million bridge reconstruction began in April 2002, and was substantially completed on May 17, 2004.

Installation of Safety Wrap Around the High Pressure Gas Main and the Con Edison Oil-o-Static Pipeline.
Installation of Reinforcement in the 7th Avenue Bridge Abutment Stem and Backwall.

The New 7th Avenue Bridge. (Credit: Jiaji Shi)

EAST 8TH STREET ACCESS RAMP OVER BELT PARKWAY (BROOKLYN)

The East 8th Street access ramp provides vehicular access to the westbound Belt Parkway from Coney Island Avenue and the surrounding area, south of the Belt Parkway. The bridge also serves pedestrian traffic crossing the Belt Parkway. The bridge is a four span, simply supported, multi-girder steel superstructure with a reinforced concrete deck. The abutments and wingwalls are also reinforced concrete, as are the three piers. The entire substructure is supported on reinforced concrete pile caps and steel piles. The project will include the replacement of the superstructure with new steel stringers, a cast-in-place deck including a sidewalk, a new steel bridge railing with protective screen fencing, and the replacement of the tops of the existing pier columns and abutments. In addition, the piers will be modified by adding two columns on new steel piles, and underdeck and ramp lighting will be installed, as well as new catch basin frames. The ramp will be closed to both vehicular and pedestrian traffic for the duration of the reconstruction. Traffic will be diverted to local streets. Construction is expected to begin in September 2005, and is expected to be complete in May 2007.

East 8th Street Bridge in 2002. (Credit: NYSDOT)

14TH AVENUE BRIDGE OVER LIRR (BROOKLYN)

This $3.3 million project reconstructed a bridge originally built in 1927. The old four span superstructure was removed and replaced with a single span precast, pre-stressed concrete and steel composite jointless superstructure. The bridge was constructed in two stages. During each construction stage, two lanes of traffic, one lane in each direction, were maintained. Pedestrian traffic was maintained at all times. A Notice to Proceed for the reconstruction of this bridge was issued to the contractor, with a start date of December 2, 2002. The project was substantially completed on May 21, 2004.

Installation of the Soldier Piles for the Excavation Protection System for the 14th Avenue Bridge. Excavation for the Abutment Footing. Installation of Abutment Footing.

Installation of Stem Reinforcement for the 14th Avenue Bridge. View of Reinforcement and Form Work Installation at the Bridge Abutment.

Concrete Pour at the 14th Avenue Bridge Abutment. View of the Partially Completed Abutments. Installing the Precast Panels.

The New 14th Avenue Bridge. (Credit: Jiaji Shi)

15TH AVENUE, 18TH AVENUE, 17TH AVENUE, AND 20TH AVENUE BRIDGES OVER NYCT (BROOKLYN)

The 15th Avenue Bridge is an arch barrel bridge, constructed in 1912-1913 between 63rd and 64th Streets. Age, weather and increased traffic had affected the bridge. The roadway slab, concrete abutments and concrete piers were severely deteriorated. The bridge had outlasted its useful life. The scope of this project included the removal of the existing pavement, sidewalk, piers, columns, roof beams, portions of the abutments and the concrete arches over the NYCT tracks. The reconstruction included portions of the abutments, installation of precast reinforced concrete pier wall and deck panels, construction of a reinforced concrete deck on top of precast deck panels, and the installation of a 300 mm water main, 408 mm gas main and electric facilities. The approach slabs and bridge joints were replaced. In addition, new roadways, sidewalks, steel faced curbs, and a concrete parapet with pedestrian fencing and street lighting were constructed. The 15th Avenue Bridge was substantially completed in January 2005.

The 18th Avenue Bridge is also an arch barrel bridge, constructed in 1912-1913 between 63rd and 64th Streets. Age, weather and increased traffic have affected the bridge. The roadway slab, concrete abutments and concrete piers are severely deteriorated. The bridge has now outlasted its useful life. The scope of this project includes sewer work, the removal of a portion of the existing abutments, columns, roof beams, piers and the arches over the NYCT tracks. Cast-in place concrete piles, a steel superstructure, and new integral abutments will be installed. The water main, gas main, and sewer will be removed and relocated. A new concrete deck, approach slabs, and sidewalks will also be part of this reconstruction project. The 18th Avenue Bridge is expected to be completed by July 2005. The bridge is being constructed in four stages, with one lane open in each direction at all the times.

15th Avenue Bridge in 2002 & 18th Avenue Bridge in 2003. (Credit: NYSDOT)

Similar construction at the 17th Avenue and 20th Avenue Bridges is scheduled to begin after the completion of the 15th and 18th Avenue Bridges. A Notice to Proceed for the $17.7 million reconstruction of these four bridges was issued to the contractor with a start date of September 29, 2003. The project is scheduled for completion in December 2007.

17th Avenue & 20th Avenue Bridges in 2002. (Credit: NYSDOT)

WEST 37TH STREET BRIDGE OVER AMTRAK (MANHATTAN)

A Notice to Proceed for the $3.4 million reconstruction of this bridge was issued to the contractor with a start date of January 21, 2002. A new reinforced concrete deck and approach slabs were installed, approach roadways were reconstructed, and wingwalls, abutments, and pier crash walls were replaced. Concrete encasement was removed from the existing stringers, and they were cleaned and painted. New water mains and electrical conduits were installed. The reconstruction of this bridge was substantially completed on January 27, 2004.

West 37th Street Bridge Before Reconstruction. Stage 1 Construction. Deck Pour.

Deck Placement. New West 37th Street Bridge Sidewalk.

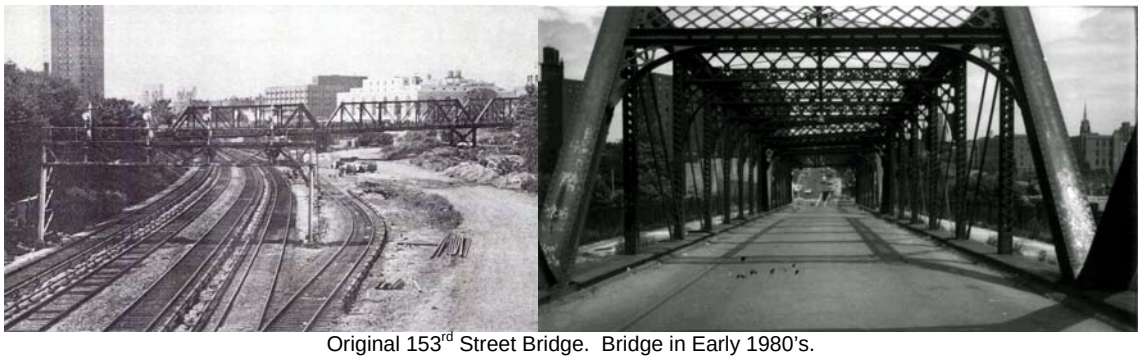
EAST 78TH STREET PEDESTRIAN BRIDGE OVER FDR DRIVE (MANHATTAN)

The current bridge is a nine span reinforced concrete structure over the FDR Drive. This project, currently in its final design phase, will include the removal of the entire superstructure; concrete deck, floor beams, parapet, girders, railing, protective screening, encased steel beams in the ferry house, existing concrete stair case on the esplanade side, existing substructure of piers, and ramp walls and wall of the ferry house, as well as a portion of the pier foundations below grade. The new twelve span bridge will include steel piers with caisson foundations, a ramp retaining wall, and new superstructure using welded structural tubing, steel railing, and hand rails, as well as hand-protective screening. A new cast-in-place reinforced concrete deck will be installed on stay-in-place forms on the viaduct spans and ramps. The new bridge will comply with ADA regulations.

During construction, pedestrian traffic will be detoured to the 71st and 81st Street pedestrian bridges. Construction is expected to begin in July 2005, and is expected to be complete in April 2006.

153RD STREET BRIDGE OVER METRO NORTH (BRONX)

This project, currently in the design and environmental impact assessment stage, will include a two-span, single tower, cable stayed vehicular bridge. It will be the first of its kind in New York City. The new four lane bridge will extend East 153rd Street in the Bronx across the Mott Haven rail yards from Morris Avenue to the Grand Concourse just north of Hostos Community College in the Melrose Section of the Bronx. This bridge will complete a link the street lost in the early 1980's when the old turn-of-the-century bridge was closed and demolished because of its age and deterioration. Construction of the new bridge is tentatively scheduled to begin in December 2006 and be completed in December 2008.



Original 153rd Street Bridge. Bridge in Early 1980's.

The new bridge will significantly ease congestion on the current east-west streets in the South Bronx, along 149th and 161st Streets as well as on the local streets in this neighborhood. With this bridge, East 153rd Street will be a continuous east-west thoroughfare from the commercial hub of Third Avenue to the Civic Center area of the Grand Concourse. It will serve the new revitalization projects of Melrose Commons, the Concourse Shopping Plaza and the Bronx Criminal Court Complex.

The bridge's graceful design, similar to the Tampa Bay Bridge in Florida, will create a very prominent landmark for this neighborhood. The cable-stayed structure will contain a tower rising above East 153rd Street to add to the Bronx skyline, with ribbons of steel cables holding up the roadway structure. The roadway will run between the two towers, and the sidewalk and bicycle lanes will be located on cantilever sections outside of the towers. This will reduce the overall depth of the superstructure by reducing the floor beam depths.

Rendering of New 153rd Street Bridge

EAST 183RD STREET BRIDGE OVER METRO NORTH (BRONX)

This project will include the removal of the existing single span bridge and the construction of a new single span bridge structure with a reinforced concrete deck over steel girders. The work will also include the rehabilitation of existing abutments and wing walls. The bridge will be closed during construction and will be reconstructed in a single stage. Construction is expected to begin in November 2005 and is expected to be completed in January 2007.

East 183rd Street Bridge in 2002. (Credit: NYSDOT)

Design-Build

In 2004 the Department continued to use the Design-Build process to expedite capital bridge rehabilitation. These contracts retain the same company for both design and construction on selected projects. It is evident that there are many advantages to the Design-Build program, including the use of one consolidated procurement rather than two or more, resulting in significant time savings; the ability to commence construction before design completion; the avoidance of project escalation costs as construction commences two or three years earlier than with the conventional design-bid-build method; minimization of design change orders; and better coordination between design and construction, as critical field issues are addressed expeditiously. In addition, the design is custom made and reflects the capabilities and strength of the specific contractor; the Department establishes a single point of contact for communicating its goals and objectives; and overall costs are reduced substantially.

BELT PARKWAY BRIDGE OVER OCEAN PARKWAY (BROOKLYN)

This $55 million project involved the replacement of the Belt Parkway Bridge over Ocean Parkway, reconfiguration of the interchange, roadway work on approximately a mile of the Belt Parkway, and roadway and associated landscaping work on Ocean Parkway from approximately Avenue Z to West End Avenue.

Old Belt Parkway Bridge Over Ocean Parkway

The bridge needed to be replaced because of its deteriorating condition; this could not be done without affecting the already substandard ramps. This necessitated the re-design of the entire

interchange and the associated work on Belt Parkway and on Ocean Parkway. The existing traffic patterns at the bridge and interchange ramps were projected to reach unacceptable levels of service within the next ten years without the reconstruction. The existing interchange design placed pedestrians in conflict with vehicles, especially at the loop ramps that were adjacent to Coney Island Hospital, located to the northeast of the interchange.

The Belt Parkway is a significant corridor of the Regional Transportation System with daily volumes of 166,000 vehicles. Coupled with the rapid deterioration of the bridge, the possibility of closure, and our concern for public safety, the New York State Department of Transportation (NYSDOT) requested that NYCDOT procure this project using Design-Build. The project secured 80% federal funding since it involves this significant corridor of the Belt Parkway, as well as the Historic Ocean Parkway, which was the first parkway of its kind in the United States. It was part of the Special Experimental Project No. 14 Program, a Federal Program that allows innovative contracting practices to be used.

This project extensively utilized precast elements. The precast deck units, beams, parapets, and approach slabs were fabricated in upstate New York and transported to the site on an as-needed basis.

Two Girders For a Precast Unit at the Schuylerville, New York Fabrication Shop. Placing Stainless Steel Reinforcement and Formwork For a Deck Unit at the Shop.

Director of Design-Build/Emergency Contracts Chris Sklavounakis and Beatriz Duran Inspecting the Precast Sections. Precast Pieces Laid Out at the Fabricator's Plant.

Precast Pier Capbeam Section Prior to Setting it on the Cast-in-Place Columns. Installing T-Walls. Precast Panels and Joints Awaiting Cast-in-Place Concrete Placement.

New Stringers Under the Deck and A Pier. Completed Northeast Abutment Retaining T-Wall and Abutment Cap Beam. Reinforcing for the Cast-in-Place Pier Columns.

A temporary bridge was placed at the south side of the existing bridge. Traffic was diverted onto the temporary bridge and the existing south portion, while the north portion was demolished and rebuilt. The newly built north portion was wide enough to accommodate all six lanes (three in each direction) on the Belt Parkway while the south was demolished and rebuilt.

Launching of the 54 Meter (190 ft) Temporary Bridge in February 2004. Original Bridge Under Demolition.

The project included incentives and disincentives and liquidated damages clauses to ensure timely completion of critical activities and to minimize the inconvenience to the public. The project included an incentive for early completion of $85,000 per day with a cap of $2 million. There was a disincentive of $85,000 for each day the contractor might be late in finishing the project with no limit. A Notice to Proceed for the design-build reconstruction of this bridge was issued to the contractor with a start date of September 12, 2002. Pre-construction preparatory activities began in September 2003.

The erection of the temporary bridge was completed at 12:15 AM on February 28, 2004, in less than 20 minutes. Eastbound Belt Parkway traffic was shifted to the temporary bridge the evening of March 23, 2004, and on the evening of March 25, 2004, westbound traffic was shifted to the former eastbound lanes.

The temporary bridge was removed during the early morning hours of July 20, 2004. The new southern portion of the bridge was complete by August 2004.

Contractor Personnel and Engineer-in-Charge Valeriya Remezova (in the Middle) Inspecting the Bridge Approach. Nearly Completed Project.

The new bridge has shoulders and an increased width of 40.5 meters (133 ft.) In addition to carrying three lanes each way, the added width allows for an acceleration and deceleration lane at the ends of the bridge to ease vehicle access and departure, as well as the introduction of shoulder lanes, a feature that was previously missing from the Belt Parkway. The new interchange configuration eliminates the old geometric deficiencies and enhances traffic flow. As part of the project, a mile of the Belt Parkway (half a mile on each side of the bridge) received new pavement; Ocean Parkway was widened and its mainline was separated from its service road by two malls (one landscaped and the other for pedestrian and bicycle use); new watermains were provided; all sewers within the project limits were cleaned; and new lighting was provided, as well as new signals at the Ocean Parkway intersection with the Belt Parkway service roads. In addition, extensive landscaping was done on Ocean Parkway, both where the old interchange loop ramps used to be, and along both Belt Parkway service roads. The new bridge itself is aesthetically pleasing with architectural details at the abutments and parapets, and decorative lighting at the abutments. Other architectural work included the placement of historic type lampposts on Ocean Parkway. In addition, a pigeon deterrent system was installed on the new bridge.

The reconstruction of this bridge was substantially completed on December 3, 2004. This early completion resulted to the contractor collecting the maximum incentive of $2 million. This project brought this segment of the Belt Parkway up to current design standards and will provide a minimum 50-year useful service life.

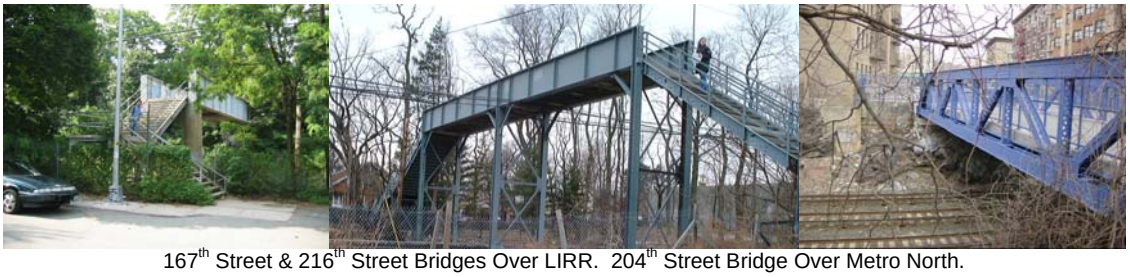
Engineer-in-Charge Valeriya Remezova, Andre Celestin, Beatriz Duran, and Leonid Gitis Inspecting the Nearly Completed Belt Parkway Bridge.

PEDESTRIAN BRIDGES

In 2004, the Division procured another design-build project to replace 22 pedestrian bridges in all five boroughs. The bridges are Bethel Avenue over SIRT South Shore, and Tracy Avenue over SIRT South Shore in Staten Island; Crocheron Park over BCIP, 51st Avenue over LIRR Main Line, 55th Avenue over LIRR Main Line, 71st Avenue over LIRR, 94th Street over LIRR, 167th Street over LIRR Port Washington Branch, and 216th Street over LIRR Port Washington Branch in Queens; 204th Street over Metro North in the Bronx; Morris Street over Brooklyn Battery Tunnel Plaza, Pedestrian Bridge West of 8th Avenue over West 155th Street, 81st Street Stairway at the Promenade over FDR Drive, East 111th Street over FDR Drive, Pedestrian Bridge over East 128th Street, 129th to 130th Street over ramp off 3rd Avenue, West 155th Street over Amtrak 30th Street Branch, and West 181st Street over Henry Hudson Parkway NB in Manhattan; West 8th Street over Surf Avenue, 17th Avenue over BSHP, 27th Avenue over BSHP, and 92nd Street over BSHP in Brooklyn. Construction is expected to begin in March 2005, and be complete in the summer of 2007, with no construction activity at any single location exceeding six months. In addition, no construction is expected to take place at the West 8th Street Bridge during the summer months, so as not to interfere with Aquarium activities and access to the waterfront.

Bethel Avenue & Tracy Avenue Bridges Over SIRT. Crocheron Park Bridge Over BCIP.

51st Avenue, 55th Avenue, & 94th Street Bridges Over LIRR.



167th Street & 216th Street Bridges Over LIRR. 204th Street Bridge Over Metro North.

Morris Street Bridge Over Tunnel Plaza. West 155th Street Bridge. 81st Street Stairway.

East 111th Street Bridge Over FDR Drive. East 128th Street Bridge. East 129th Street Bridge.

West 155th St. Over Amtrak Bridge. West 181st Street Bridge. West 8th Street Bridge.

17th Avenue, 27th Avenue, & 92nd Street Bridges Over Belt Parkway

Bridge	Average 2002 Daily Pedestrian Traffic - Weekday	Average 2002 Daily Pedestrian Traffic - Weekend
Bethel Avenue over SIRT South Shore	390	169
Tracy Avenue over SIRT South Shore	410	179
Crocheron Park over BCIP	176	351
51st Avenue over LIRR Main Line	635	188
55th Avenue over LIRR Main Line	244	186
71st Avenue over LIRR	No Existing Bridge	No Existing Bridge
94th Street over LIRR	626	369
167th Street over LIRR Port Washington Branch	254	176
216th Street over LIRR Port Washington Branch	58	30
204th Street over Metro North	131	102
Morris Street over Brooklyn Battery Tunnel Plaza	789	632
Pedestrian Bridge West of 8th Avenue over West 155th Street	N/A	N/A
81st Street Stairway at the Promenade over FDR Drive	687	578
East 111th Street over FDR Drive	563	389
Pedestrian Bridge over East 128th Street	602	329
129th to 130th Street over Ramp off 3rd Avenue	598	340
West 155th Street over Amtrak 30th Street Branch	567	434
West 181st Street over Henry Hudson Parkway NB	416	883
West 8th Street over Surf Avenue	1051	1129
17th Avenue over BSHP	648	916
27th Avenue over BSHP	394	813
92nd Street over BSHP	393	773

RIKERS ISLAND BRIDGE OVER RIKERS ISLAND CHANNEL (QUEENS)

This project, currently in the preliminary engineering phase, involves replacing the superstructure of this rapidly deteriorating bridge. Cores taken from the bridge deck reveal that the estimated useful life of the deck will soon expire, thus making bridge rehabilitation necessary. In 2003, the bridge carried approximately 16,966 vehicles per day.

Rikers Island Bridge in 2001. (Credit: NYSDOT)

The Division had previously completed the replacement of the bridge's substructure in 1998. The salty environment of the channel significantly contributes to the deterioration of the superstructure. This continued deterioration could also negatively impact the recently completed substructure work. The Division considered Design-Build to be the best project delivery method for this project, as it can expeditiously bring projects to the construction stage, and is the preferred method in all cases where time is of the essence. As the bridge exclusively serves the Rikers Island Correctional Facility, this project will require coordination with the Department of Corrections. Construction is expected to begin in 2012. As an interim measure, a project is planned for the latter half of Fiscal Year 2005 to rehabilitate the bridge deck.

Emergency Contracts

BELT PARKWAY BRIDGE OVER MILL BASIN (BROOKLYN)

On November 6, 2002, in the interest of public safety (pursuant to Section 103(4) of the General Municipal Law and Section 315 of the New York City Charter) the Department declared that an emergency existed relative to the movable bridge carrying the Belt Parkway over Mill Basin.

A Notice to Proceed for this $3 million emergency contract was issued to the contractor with a start date of December 23, 2002. The project included an incentive for early fabrication completion of $10,000 per day with a cap of $50,000, and an incentive for early construction completion of $10,000 per day with a cap of $70,000. There were disincentives of the same amounts for a late finish with no limit to the amount of penalty.

The contractor completed the emergency median guide rail installation and re-opened all lanes to traffic on March 29, 2003, six days ahead of schedule, thus collecting an incentive of $60,000. The bridge was re-opened to marine traffic on April 3, 2003. The emergency project on this bridge, which began on December 23, 2002, was substantially completed on April 5, 2003.

Crash tests were performed at a testing site on a copy of the new barrier, resulting in the need to make some modifications to the barrier that was installed. Additional crash tests were completed in 2004, and further modifications were made. The new barrier has already proved

its worth by saving lives on more than one occasion. Recent accidents at the site have resulted in property damage only.

The next significant work on this bridge will consist of the replacement of the rapidly deteriorating bridge grid deck. Construction is expected to begin in late summer 2005 and to be complete by March 2006. The contract will provide incentives/disincentives of $10,000 per calendar day, with a maximum incentive amount of $ 300,000, to ensure timely completion of the construction activities. The new deck will serve traffic needs until April 2012. At that time a new bridge carrying the Belt over Mill Basin will have been built and the existing one will be demolished.

BELT PARKWAY BRIDGE OVER PAERDEGAT BASIN (BROOKLYN)

On February 21, 2003, NYCDOT was informed by the Police Harbor Unit that extensive damage was observed to one of the columns supporting the bridge. The column appeared to have been hit by a vessel. Inspection revealed that the column was cracked through, and was hanging from the bridge instead of supporting it. The cap beam between this column and the adjacent column was also pulled out of place, as was the pedestal.

Broken Pier Column at the Belt Parkway Over Paerdegat Basin Bridge in 2003. (Credit: Bojidar Yanev)
Connecting Joint of Newly Installed and Existing Span. (Credit: Valeriya Remezova)

In order to immediately address this condition, NYCDOT took traffic off the part of the road whose load the damaged column would carry. Today the bridge has three narrower lanes of traffic and weight restrictions are being strictly enforced. We used our in-house forces to remove the cap beam and the deck over the damaged column.

The real concern, however, is that the column adjacent to the one that was hit exhibited significant distress. This column was now taking more load than that for which it was designed. This reinforced concrete column had cracks running lengthwise along its height. The column also exhibited cracks and spalls at the level where the first column was damaged. Failure of this column could result in a catastrophic failure of the bridge, and therefore posed an immediate threat to life and property.

The above described condition had to be corrected as soon as possible by implementing the necessary repairs. These repairs included the following: removal of unsafe structural elements and obstructions of the existing bridge; repair of distressed elements (columns, dolphins, etc.); replacement of stringers and concrete deck around the location of the impact; protection of elements of the bridge from marine traffic; replacement of a portion of the bridge railing; creation of cuts in the median barrier on the approaches with removable barriers to allow overweight emergency vehicles to make u-turns; and installation of overhead gantries at the Rockaway Parkway and Flatbush Avenue entrances to the Belt Parkway to warn motorists of the bridge

restrictions.

In the event of another emergency that would make the bridge unable to carry heavy loads (and necessitate its closing), the gates installed at the median barrier would enable emergency vehicles to turn around and travel in the opposite direction on the Belt Parkway to the closest exit, and then re-enter the parkway at an entrance pass the bridge. Traffic lights to stop the traffic in such an event were installed as well as appropriate signs to notify motorists of the upcoming traffic light.

The Department was notified by its consultant that the bridge may be left in service for 7 years until the programmed replacement (planned to be completed in 2011), provided that all repairs mentioned above were carried out on an emergency basis.

On June 18, 2003, in the interest of public safety, pursuant to Section 103(4) of the General Municipal Law and Section 315 of the New York City Charter, the Department declared that an emergency exists relative to the bridge carrying the Belt Parkway over Paerdegat Basin.

Installation of Fender System on the Belt Parkway Bridge. Inspecting the Movable Median Barrier.
(Credit: Valeriya Remezova)

A Notice to Proceed for this $11.3 million emergency contract was issued to the contractor with a start date of September 3, 2003. The project included a milestone for the structural portion of the work involving the replacement and/or repair of the distressed column and the replacement of that portion of the deck. This work required that one westbound lane on the Belt Parkway be closed for 24 hours. The contractor was given nine days to complete this work. In spite of adverse weather conditions, the contractor completed this work on November 14, 2003, in only 6 days, thus collecting the maximum incentive of $120,000. The emergency repair project on this bridge was substantially completed on February 17, 2004.

When and Where Unit

In 2004, the following structures were worked on under the Division's When and Where contracts: B&O Railroad (Abandoned) Bridge over Robin Road, Bedford Avenue Bridge over LIRR Bay Ridge, Belt Parkway Bridge over Rockaway Parkway, Brooklyn-Queens Expressway over Furman Street, Brooklyn-Queens Expressway over Nassau Street, Central Drive Bridge over Transverse Road #1 (at 65th Street), Bridge over Dam at North End of Clove Lake, FDR Drive at East 14th Street, Promenade over FDR Drive from East 79th to East 91st Streets, Harlem River Drive Northbound Ramp over Harlem River (ramp to Trans-Manhattan Expressway), Hempstead Avenue Bridge over Cross Island Parkway Service Road, Henry Hudson Parkway Viaduct over West 72nd to West 79th Street, Ramp From the Southbound Henry Hudson Parkway Over Amtrak, Houston Street Bridge over FDR Drive, Knapp Street over Belt Parkway, Long Island Expressway over Utopia Parkway, Matthewson Road Bridge over MacCracken Avenue,

Richmond Avenue Bridge over Richmond Creek, Sackett Street Bridge over Brooklyn-Queens Expressway, East 14th Street Pedestrian Bridge over Belt Parkway, East 51st Street Pedestrian Bridge over FDR Drive, 80th Street over 71st to 77th Avenues, 92nd Street Pedestrian Bridge over Belt Parkway, 153rd Street and 3rd Avenue DOT Parking Garage, West 155th Street Pedestrian Bridge over Amtrak 30th Street Branch, West 181st Street Pedestrian Bridge over Henry Hudson Parkway NB, 191st Underground Street between St. Nicholas Avenue to Broadway IRT, and 216th Street Pedestrian Bridge over LIRR Port Washington Branch.

An Emergency Safety Netting System was Installed at Both Ends of the Abutment of the Abandoned Railroad Bridge Over Robin Road to Protect the Adjoining Property Owners From Falling Deteriorated Concrete. (Credit: Thomas Leung)

Bridge over Dam at North End of Clove Lake—the Deteriorated Asphalt Wearing Surface was Restored & a New Belgian Block Drainage Trough System was Installed. (Credit: Thomas Leung)

MARINE WHEN AND WHERE

New York State DOT conducts the underwater inspections of our waterway structures. A contract was needed to facilitate the performance of marine repairs and to maintain structures in need. The objective is to perform marine structural repairs and maintenance together with other appurtenant work, which constitutes repairs of defective and deteriorated parts of bridge structures due to and in a water environment. The Department has neither the staffing nor the equipment to handle this type of special work. The work could not be handled under the usual time and materials When and Where contract, because the work is unique, in that it requires a consultant with underwater-licensed inspectors to supervise and inspect the work for compliance and adequacy. Furthermore, detailed note taking is necessary by the inspectors to check and approve payments for the contractor's work. A Notice to Proceed for this project was issued to the contractor with a start date of February 14, 2002.

Marine bridge repairs already completed include Botanical Garden Road Bridge over the Twin Lakes inside the Bronx Botanical Garden, 145th Street Bridge over the Harlem River, Hutchinson River Parkway Bridge over the Hutchinson River, Shore Road Bridge over the Hutchinson River, Boston Post Road over the Hutchinson River, Carroll Street Bridge over the Gowanus Canal,

East 15th Street over the FDR Drive, Depot Place Bridge over Conrail Hudson Division, Belt Parkway Bridge over Mill Basin, Roosevelt Island Bridge over the East River East Channel, and Hamilton Avenue Bridge over the Gowanus Canal.

Some of these locations experience repeated damage due to heavy marine traffic and/or a narrow channel. The issuance of new flags necessitates new visits to even recently completed projects. Timber fender systems are subject to recurring hits by barge traffic, and consequently require periodic restoration. In addition to damage due to impact, timber elements are also replaced because of deterioration and attack by marine borers, whose activity has vastly increased as the water quality in the New York City area has improved.

Currently scheduled projects include the Broadway Bridge over the Harlem River and the 207th Street Bridge over the Harlem River, as well as newly flagged conditions at the Hamilton Avenue Bridge over the Gowanus Canal, and the Roosevelt Island Bridge over the East River East Channel.

Installation of Two Newly Retrofitted Steel Median Bridge Railing Transition Units on the Belt Parkway Bridge Over Mill Basin. (Credit: Thomas Leung)

Engineering Review and Support

IN-HOUSE DESIGN

In-House Design staff prepares plans and specifications for bridge replacement/reconstruction projects that enable the Division to restore bridges considered “structurally deficient” to a “very good” condition rating. This unit handles urgent Division projects, as well as special projects under construction by the Bureau of Bridge Maintenance, Inspections and Operations. Projects underway in 2004 included Belt Parkway Bridge over Paerdegat Basin (both replacement and Emergency Repair projects) in Brooklyn; and Hempstead Avenue Bridge over Cross Island Parkway, Springfield Boulevard Bridge over Belt Parkway, Union Turnpike Bridge over Cross Island Parkway (and Creedmoor Center Road), Hillside Avenue Bridge over Cross Island Parkway, Linden Boulevard Bridge over Cross Island Parkway, and Sunrise Highway (Westbound) over Belt Parkway (Westbound) in Queens.

Rendering of New Belt Parkway Bridge Over Paerdegat Basin. (Credit: Alexander Berens)

In-House Design's Electrical Group reviews and/or prepares contract documents for all electrical and street lighting work on all projects on the Division's Capital Program. Some of the contracts reviewed during 2004 included the Willis Avenue, Broadway, Macombs Dam, Madison Avenue, 145th Street, Third Avenue, and Wards Island Pedestrian Bridges over Harlem River; Hamilton Avenue Bridge over Gowanus Canal; Metropolitan Avenue Bridge over English Kills, and Belt Parkway bridge over Paerdegat Basin in Brooklyn; Roosevelt Island Bridge over East River Channel; Bruckner Expressway NB & SB Service Road (Unionport Bridge) over Westchester Creek in the Bronx; Williamsburg and Manhattan Bridges; and the Battery Park Underpass under West Street to FDR Drive in Manhattan.

ENVIRONMENTAL ENGINEERING

The Environmental Engineering staff of the Quality Assurance Section provides environmental oversight on all capital projects in the Division. Lead paint abrasive cleaning projects underway or completed in 2004 included Queensboro Bridge, Cortelyou Road Bridge, Metropolitan Avenue Bridge, Andrews Avenue Bridge, Belt Parkway over Ocean Parkway, Congress Street Bridge, Washington Bridge, East 241st Street Bridge, Williamsburg Bridge and Madison Avenue Bridge. In addition, this staff provided environmental engineering services for the dewatering and dredging operations at the Third Avenue Bridge. In accordance with NYSDEC requirements, a discharge monitoring system was established at the construction site in the Harlem River to ensure the quality of the water during dredging operations. Additional projects consisted of the remediation of contaminated soils, asbestos abatement and discharge of excavation dewatering wastewater at the Metropolitan Avenue Bridge over English Kills; permitting for the drilling of seismic cores in the East River at the Brooklyn Bridge; and permitting and oversight for the discharge of wastewater generated during drilling operations at the 145th Street Bridge.

The unit was responsible for developing wastewater discharge applications in accordance with the NYSDEC SPDES system for seven bridges that cross waterways such as the Gowanus Canal, English Kills Creek and the Newtown Creek. The project involved collection and analysis of numerous water samples and establishment of a discharge monitoring system. Environmental oversight was provided to emergency work-over-water projects on the Brooklyn Bridge, Mill Basin Bridge, Roosevelt Island Bridge, Willis Avenue Bridge, Borden Avenue Bridge, Greenpoint Avenue Bridge, and Metropolitan Avenue Bridge. This environmental oversight ensured that there was no environmental impact to the city's waterways during emergency repair projects.

In addition, the staff continued the implementation of a new quality assurance plan for coating inspection and application on Division bridge structures. Services are implemented through the use of consultant contracts. Coating inspection services and engineering were provided on numerous projects such as the Queensboro Bridge Painting Project; Cortelyou Road Bridge

construction; rehabilitation of the Liberty, Pitkin and Sutter Avenue Bridges; and the Metropolitan Avenue Bridge.

BRIDGE PROJECT SPECIFICATIONS

In 2004, the Engineering Support Section prepared and/or reviewed specifications for 21 bridge rehabilitation and reconstruction contracts which included five combined or multiple-bridge contracts. Eight of these contracts totaling approximately $340 million in construction costs have been bid and are currently in different stages of award and registration. Five contracts with a total construction cost of approximately $90 million have been approved by the Law Department and are either waiting to be advertised, or are already advertised but not yet bid. The specifications for the remaining eight contracts are in various stages of preparation.

Notable among the bridge contracts prepared and/or reviewed are the 145th Street Bridge over the Harlem River; Manhattan Bridge Rehabilitation; Rehabilitation of the Grand Concourse Bridge over 161st Street (includes the Grand Concourse from 161st to 166th Streets); Protection Against Marine Borers of the FDR Drive (and two bridges in Brooklyn); Battery Park Underpass and West Street Underpass; Hamilton Avenue Bridge over the Gowanus Canal; Rikers Island Bridge; Belt Parkway Bridge over the Fresh Creek Basin; Woodside Avenue Bridge over LIRR; and Gun Hill Road Bridge over Metro North Railroad.

SUPERSIZED LOADS

The weight and frequency of very heavy loads traveling over the City's bridges and roadways have taken a toll on the bridges' infrastructure. The Engineering Review Section is very involved in reviewing the requests for issuing permits for these vehicles. NYSDOT has a project to develop a computerized Automated Overweight Permitting Program for use on State–owned bridges that will handle the complete permitting process and its accompanying required analyses. At the request of NYCDOT, the State is including our locations in their ongoing consultant contract. This will ensure both a lower development cost for the City as well as compatibility between the two systems (routes often pass over both City and State owned bridges). The Department's Management and Information Systems Section has been managing the City's part of the project beginning in 2002, and they assisted in the preparation of the Memorandum of Agreement with the State. This project is expected to begin in 2005.

The new system will have the following benefits:

As the turn-around time will be days instead of weeks, truckers will be more likely to apply for permits rather than ignoring the restrictions and driving without permits on the bridges.

Ease of permit rule enforcement efforts by the NYPD, as they will have access to the system.

The program will create a database of bridges used by the trucks on the approved routes. This will help the Division to assess the affected bridges when creating the scope of work for rehabilitation and/or reconstruction, and to decide whether or not to design them for higher loads.

Many consumers are now buying merchandise via the Internet. Giant warehouses are being built around the country for packaging and shipping these goods by trucks. We expect a large increase of overweight truck movement in the City in the near future. The new permit computer program will be able to handle a large number of permit requests.

A streamlined vehicle permitting approval process coupled with the ongoing inspections of the bridges being subjected to repetitive super-loads will actually reduce the yearly capital outlays of the Department in the long run.

CONVERSION OF DIVISION ENGINEERING ARCHIVES

Since the first digitizing contract of engineering records began five years ago, we have converted over 58,000 full-size drawings and 20,000 construction photographs into digitized image and data formats, a total of 43 CD-ROMs.

The next phase of the project will consist of the digitizing of the microfilm collection. Since we began microfilming contract and other drawings in the early 1980s, we have accumulated more than 360 microfilm rolls. Microfilming of records is rapidly becoming an obsolete technology as it cannot be used to perform rapid searches, sorting of information, or sending and sharing files via the Internet and/or copying electronic files to CDs.

While we await the award of this contract, we upgraded our microfilm reader/printer. This newer model has the following features and capabilities: standard PC/network connectivity to send and print images over the Agency network; digital image convertibility -- once images are scanned, they may be conveyed electronically via fax and E-mail, uploaded onto the Internet, or stored on CD-ROM; compatibility with all microfilm formats, including aperture cards submitted to us by NYSDOT; automatic switching between negative or positive film images; productivity enhancements -- automatic focusing and exposure, background erasure, automatic skew correction; and high-quality (600-dpi) resolution printing with automatic enlargement for large-format, ledger-size (11” x 17”) printouts.

TRUMP/NEW WORLD PROJECT

The Trump/New World project (Riverside Drive between 59th and 72nd Streets) includes the construction of seven new bridges, a ramp, and connector roads along Riverside Drive as a part of the residential and commercial development over the former Penn Central Rail Yard. When completed, the infrastructure network will be transferred to DOT for maintenance. The Division is providing engineering review of the design drawings, as well as quality assurance inspections, to ensure the developer’s compliance with DOT’s construction and design standards. The project is now in its second stage, and is 70 percent complete overall.

Bridge Maintenance, Inspections and Operations

EAST RIVER BRIDGES ANTI-ICING PROGRAM

Traditional snow and ice control practices rely heavily on the use of salt, a material known to corrode steel and accelerate the deterioration of concrete and asphalt surfaces. A new method of snow and ice control was needed to protect the City’s $2.5 billion investment in the rehabilitated East River Bridges. This method, known as anti-icing, involves the application of a chemical freezing point depressant to the roadway surface to prevent snow and ice from bonding to the roadway. Frequent plowing removes any accumulation of unbonded snow or ice before traffic is affected.

The Division’s Anti-Icing Program uses the liquid chemical potassium acetate and aggregate chemical sodium acetate. The anti-icing fleet consists of fifteen spray trucks, ten plow trucks and several smaller plows. Six of the spray trucks are combination spray/plow trucks with an 1800 gallon tank capacity, and four are spray-spreader/plow trucks with a 900 gallon spray

capacity and an eleven cubic yard spreader capacity. There are twenty chemical storage tanks, with a total storage capacity of 113,750 gallons.

In the winter of 2003-2004, a total of 97,000 gallons of anti-icing chemicals were applied on the roadways of all four East River Bridges.

SEISMIC RETROFITTING OF FLATBUSH AVENUE BRIDGE OVER BELT PARKWAY (BROOKLYN)

The Flatbush Avenue Bridge over Belt Parkway was rehabilitated in 2002 without the required seismic retrofitting that it needed. The rehabilitation design of the bridge was completed prior to the introduction of the Division's new seismic criteria and retrofitting requirements. The design of retrofitting the bridge for seismic loads was completed after the award of work to the contractor. The Division refused to accept a huge change order cost estimate proposed by the rehabilitation contractor, and instead entrusted the work to our in-house repair and maintenance forces. The Division crews successfully completed the seismic retrofitting work, which involved the modification of all of the bearings, the strengthening of the pier and abutments and other miscellaneous work.

The center pier was strengthened at eight locations on each side. Additional reinforcement was provided to strengthen the pier at the barrier level. Division engineers planned the locations of new buttresses, including where to drill holes and saw cut. Division masons performed saw cutting for the new buttresses and grooves; drilled 176 precisely measured holes; excavated below roadway level to reach the pier caps; grouted the rebars to the inside of the drilled holes using special grout pumps and grouting material; and poured concrete for each buttress. After saw-cutting the masons broke the concrete at the barrier level using jack hammers and excavated the roadway. Division ironworkers fabricated jigs for drilling holes, installed m-rails to protect the work area, installed rebars, and assisted the masons in drilling and bending of rebars after grouting. Division carpenters fabricated and installed form work for the concrete pours. Division engineers monitored work at each stage and ensured compliance with specifications. Concrete was tested at each pour. Division electricians relocated electrical conduits and fixtures as necessary. They also provided light and power for the work. When the concrete work was completed, the m-rails were removed, the roadway was paved and the area was cleaned. The project was completed on December 13, 2004. This is the first time that the in-house construction group has performed highly specialized work.

View of the Center Pier Before Project Start. Drilling the Holes at the Center Pier—Assistant City Highway Repairer Robert Rivas, Highway Repairer Vincent Sciulla, Cement Mason John Padovano, & Highway Repairer James Barlett. (Drilling Credit: Peter Basich) Rebars Installed by Ironworkers for Each Buttress.

Engineer Hany Soliman Inspecting the Form Work and Rebar Installation Before the Concrete Pour. (Credit: Peter Basich) Cement Masons Frank Finizio, Lawrence Marks, Thomas Valentino, & John Padovano Working on the Pier. (Credit: Peter Basich) Electricians Jerry Salzman & Robert Stackpole Relocating Electric Lines.

Carpenters Stephen Buckley & Joseph Moschella, Highway Repairer Vincent Sciulla, and Supervisor Carpenter Joseph Vaccaro Working on the Pier. View of the Center Pier After Project Completion.

INSPECTIONS

In 2004, Inspections covered 114 bridges and 696 spans. Emphasis was placed on ensuring public safety through the monitoring of potentially hazardous conditions and temporary repairs. The unit performed 350 monitoring inspections, and 304 special winter monitoring inspections of cellular structures, shorings, and potential fire hazards. In addition, 146 emergency inspections were conducted in response to hot line calls, in-house requests, or citizen complaints.

The unit is also preparing a software and hardware upgrade of the system for bridge inspections using portable computers, to be completed in 2005.

Division Personnel Preparing to Conduct an Emergency Inspection of Paerdegat Bridge. (Credit: Alaa Ahmed) Emergency Inspection of the Northbound FDR Drive at 86th Street. (Credit: Samuel Teaw)

In 2002, the Division began to receive State DOT bridge inspection reports in CD-ROM format. Flag reports are now also transmitted electronically. As of September 2003, standard inspection work is funded by a federal grant. Emergency response inspections and administrative support remain city funded.

The Division is inspecting 31 Parks Department bridges on a priority basis, and the necessary flag repairs are being performed under our present When and Where contract utilizing $500,000 transferred to us by Parks for this work. The bridges are: Footbridge North of Route 1 over Bronx River, West Footbridge over Prospect Park Stream, Footbridge Near Boathouse over Prospect Park Lake, Pedestrian Bridge at 73rd Street over HHP/Amtrak, West 151st Street Footbridge over Conrail 30th Street Branch, Footbridge Opposite 62nd Street over Bridle Path, Pedestrian Bridge Between 73rd and 74th Streets over the Lake, Footbridge Opposite 77th Street over the Lake, Pedestrian Walk Opposite 77th Street over Stream to Lake, Pedestrian Walk Opposite 86th Street over Bridle Path (both directions), High Bridge Pedestrian Overpass, Isham Park Pedestrian Bridge over Harlem River Inlet, Belmont Park Ramp, Motor Parkway Pedestrian Bridge over Francis Lewis Boulevard, Motor Parkway Pedestrian Bridge over Bell Boulevard, Motor Parkway Pedestrian Bridge over Springfield Boulevard, Motor Parkway Pedestrian Bridge over Hollis Court Boulevard, Flushing Meadow Park Pedestrian Bridge over Lawrence Street, Motor Parkway Pedestrian Bridge over 73rd Avenue, Motor Parkway Pedestrian Bridge over Alley Park Pedestrian Walk, Flushing Meadow Park over Willow Lake and 76th Road, Flushing Meadow Park over Stream North of Long Island Expressway, Highland Park Pedestrian Bridge over Pedestrian Path, Flushing Meadow Park Road over Aquacade Lake, West Footbridge over Clove Lake, East Footbridge over Clove Lake, Bridge over Dam at North End of Clove Lake, South of Brooks Lake over Stream in Park, Footbridge over Brooks Lake Dam, and Footbridge South of Forest Avenue over Stream in Park. In 2004, these bridges were added to the Division inventory.

STRAIN GAUGE TESTING

The monitoring of cracks in the Manhattan Bridge anchorages utilizing displacement gauges by Strain Monitoring Systems continued in 2004. In a demonstration project provided at no cost to the City, the reduction in the main span torsion on the Manhattan Bridge under train loads is monitored with fiber-optic strain gauges as the stiffening of the structure approaches conclusion.

CLEANING

In 2004, 10,008 cubic yards of debris were removed from bridges and their surrounding areas, and 1,221 drains were cleaned.

PIGEON DETERRENCE

Excessive numbers of pigeons cause property deterioration, unsafe working conditions and health hazards. Besides being unsightly, accumulation of pigeon droppings and feathers is corrosive to steel structures and raises concerns about health hazards. Many disease organisms have been associated with pigeons. They harbor ectoparasites which can infest or bite humans. Pigeon droppings also harbor fungi that can trigger serious, even fatal, lung diseases such as Histoplasmosis, Cryptococosis and Toxoplasmosis, when the spores are transmitted to humans who breathe in the harmful dust.

The Division utilizes a relatively low tech, and passive, approach to deterring pigeons. Chicken wire or heavier wire fabric is attached to metal studs to create panels which are used, much like a drop ceiling, to keep the pigeons out. The panels rest horizontally on top of the bottom flanges of the steel beams, and vertically along the top of the abutment walls. The pigeons are caged

out. This method is currently in use under the Brooklyn Bridge approach (over Cadman Plaza East), Shore Parkway over Bay Ridge Avenue, and under the Pulaski Bridge approach (over Clay Street). In 2004, pigeon dropping removal and/or pigeon proofing were performed at the East Tremont Avenue Bridge over Hutchinson River Parkway, the Hutchinson River Parkway Bridge over the Hutchinson River, the Van Cortlandt Park Bridge over Henry Hudson Parkway, the Boston Post Road Bridge over the Hutchinson River, the Belt Parkway Bridge over Bay Parkway, the East 14th Street Pedestrian Bridge over Belt Parkway, the Madison Avenue Bridge over the Harlem River, the Roosevelt Island Bridge over the East River and East Channel, the Tompkins Avenue Bridge over Greenfield Avenue, SIRT South Shore over Amboy Road, SIRT South Shore over Luten Avenue, SIRT South Shore over South Railroad Avenue, SIRT South Shore over Buel Avenue, SIRT South Shore over Seaview Avenue, SIRT South Shore over Cromwell Avenue, SIRT South Shore over Bay Street, the Grand Concourse Bridge over East 174th Street, the Grand Concourse Bridge over East 175th Street, the Bruckner Expressway Southbound over the Bronx River, and the Cross Island Parkway over Fort Totten Entrance.

Nature's Pigeon Deterrent—A Falcon
on the Brooklyn Bridge South Side Tower

PAINTING

In 2004, the following bridges were painted: Belt Parkway Bridge over Bay Parkway, Belt Parkway Bridge over Bay Ridge Parkway, Brooklyn-Queens Expressway over Atlantic Avenue, Cross Bay Boulevard Bridge over Belt Parkway, Farmers Boulevard Bridge over Southern Parkway, FDR Drive Promenade at the Brearly School, Grand Avenue Bridge over Long Island Expressway, Greenpoint Avenue Bridge over Newton Creek, Hamilton Place Bridge over Long Island Expressway, Henry Hudson Parkway Viaduct over West 72nd to West 79th Street, Linden Boulevard Bridge over Cross Island Parkway, Madison Avenue Bridge over Harlem River, Park Avenue Tunnel under 34th Street, Queensboro Bridge, Seeley Street Bridge over Prospect Avenue, Superior Road Bridge over Cross Island Parkway, Winchester Boulevard Bridge over Cross Island Parkway, 5th Avenue Bridge over Prospect Expressway, 11th Avenue Viaduct over LIRR West Side Yard, 17th Avenue Pedestrian Bridge over Belt Parkway, 69th Street Bridge over Long Island Expressway, 81st Street Pedestrian Bridge over the Belt Parkway, 130th Street Bridge over Belt Parkway, 236th Street Pedestrian Bridge over Henry Hudson Parkway, and East 241st Street Bridge over the Bronx River Parkway and Metro North.

Detail of Freshly Painted East 241st Street Bridge. Queensboro Bridge Work Platform & Containment. (Queensboro Credit: Daniel Lima)

Madison Avenue Bridge Containment. Detail of Freshly Painted Bridge.

During 2004, the following structures were also painted: Borden Avenue Bridge Operator House, Railings of Battery Place Bridge over FDR Drive, Brooklyn Army Terminal Fleet Services Facility, Railings of Brooklyn Bridge over Brooklyn-Queens Expressway, Railings of Promenade over FDR Drive from East 79th to East 91st Streets, Flatlands Fleet Services Facility Trailer, Glendale Yard Highway Maintenance Facility, Hamilton Avenue Asphalt Plant Control Tower and Hall, Harper Street Fleet Services Facility, Mill Basin Bridge Operator House, DEP Plant at Port Richmond, Staten Island, Pulaski Bridge Operator House, Red Light Camera Offices at 34-02 Queens Boulevard, Riverside Drive Facility at West 158th Street, Union Street Bridge Operator House, Van Courtland Yard Highway Maintenance Facility, Willis Avenue Bridge Operator House, 3rd Street Bridge Operator House, Support Column of East 10th Street Pedestrian Bridge over FDR Drive, DEP Plant at West 135th Street at North River.

GRAFFITI REMOVAL

In 2004, 5,530,319 square feet of graffiti were eliminated. This program focuses its primary attention on the four East River bridges, as well as the following 21 arterial highways: Clearview Expressway, Gowanus Expressway/Belt Parkway, Major Deegan Expressway, Harlem River Drive, Van Wyck Expressway/Whitestone Expressway, Brooklyn-Queens Expressway, Jackie Robinson Parkway, Sheridan Expressway, Hutchinson River Parkway, Henry Hudson Parkway, West Shore Expressway, Richmond Parkway, Martin Luther King Jr. Expressway, Staten Island Expressway, Bruckner Expressway, Prospect Expressway, Grand Central Parkway, Long Island Expressway, Cross Bronx Expressway, Nassau Expressway, and Bronx River Parkway.

Pressure Washing Machine Used for Graffiti Removal. It is Set to 2500 psi and 212˚ F.

Williamsburg Bridge Graffiti Removal. (Credit: Vadim Sokolovsky)

Removing Graffiti From the Manhattan Pier of the Williamsburg Bridge. (Credit: Vadim Sokolovsky)

During 2004, graffiti was also removed from the following structures: Atlantic Avenue, Barlow Circle, Battery Park Underpass, Bruckner Boulevard, City Hall Area, Cortelyou Road between Ocean Avenue and Coney Island Avenue, Cross Island Parkway, FDR Drive, Grand Concourse over East 175th Street, Harper Street Yard, Liberty Park Tunnel, Madison Square Garden Area, the New York City Marathon Route, Orchard Beach Road, Park Avenue Tunnel under 34th Street, Pulaski Bridge over Newtown Creek, Westside Highway, Whitehall Street, and Woodhaven Boulevard.

RESEARCH AND PRESENTATIONS

In 2004, research work and/or case histories of the Division were presented in the following proceedings:

Bridges 2004: The 12th Annual Conference and Exhibition, London, England, 9 March 2004. Dr. Bojidar Yanev, the Division's Executive Director of Inspections and Bridge Management, delivered the address, *Management for the Bridges of New York City*, as well as a case study of the East River Bridges.

5th International Conference on Case Histories in Geotechnical Engineering, New York City, 13 – 17 April 2004. Yegian, M. K. *Seismic Geotechnical Investigation of Bridges in New York*.

Moving New York: Transportation Projects in the Metropolitan Area (10th Annual Seminar) of the New York Interagency Engineering Council, 13 May 2004. The Division presented papers dealing with the sensor system at Westchester Avenue over the Hutchinson River Parkway and the future East 153rd Street cable-stayed bridge over MNRR.

4th International Workshop on Structural Control, New York City, 10 – 11 June 2004. Ye, Q. *Dynamic Testing on the Brooklyn Bridge*.

"Foundation Retrofit of Third Avenue Bridge in New York," Geotechnical Engineering For Transportation Projects: Proceedings Of Geo-trans 2004, July 27-31, 2004, Los Angeles, California (Geotechnical Special Publication).

Second National Prefabricated Bridge Elements and Systems Workshop, New Brunswick, New Jersey, 8 – 10 September 2004. Sklavounakis, C., and Norrish III, C. *Replacement of the Belt Parkway Bridge over Ocean Parkway*.

Bridge Engineering Association, 4 October 2004. Chief Bridge Officer Henry Perahia delivered the opening presentation of the "Bridge Structures: Assessment, Design and Construction" seminar. His subject was the "Float-In of the Third Avenue Swing Span". Dr. Yanev chaired the session on the Monitoring and Testing of Bridges.

In addition, Dr. Yanev continued his participation on the technical advisory panels of the National Council for Highway Research (NCHR) for the following projects: FHWA DTFH61-98-C-00094 *Seismic Vulnerability of the Highway System* and NCHRP 10-57 *Strength Evaluation of Parallel Wire Suspension Bridge Cables*. The results of the latter work were published in NCHRP Report 534 "*Guidelines for Inspection and Evaluation of Suspension Bridge Parallel-Wire Cables*."

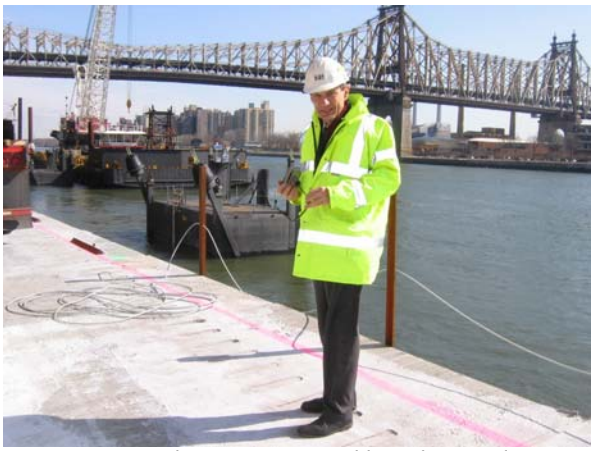
Dr. Yanev serves on the ASCE Committee working on revising the NYC Building Code. He continues to serve on the advisory panel of the NYC Department of Buildings for emergency response after citywide disasters.

Dr. Yanev is coordinator of the bridge track on the Congress Steering Committee for the 2005 ASCE Structures Congress: Metropolis & Beyond, to be held in New York, 20 – 24 April, 2005.

Dr. Yanev hosted the New York leg of the annual U. S. - Japan Bridge Engineer's tour in October 2004, the visit of Osaka Municipal Engineers in November 2004, and the visits of Tokyo Municipal Engineers and Hanshin Expressway Engineers in December 2004.

In addition, the Division sponsors an in-house lecture series, inviting speakers from industry and academia several times a month. Highlight topics of the presentations in 2004 included: remote structural monitoring; refurbishment and strengthening of bridges; concrete emergencies and long-term repairs and strengthening.

Dr. Yanev (Center) With the Children at the Agency's Third Annual "Take Our Children to Work Day." (Credit: Michele N. Vulcan)



Dr. Yanev on the Temporary Northbound FDR Drive at 60th Street. (Credit: Samuel Teaw)