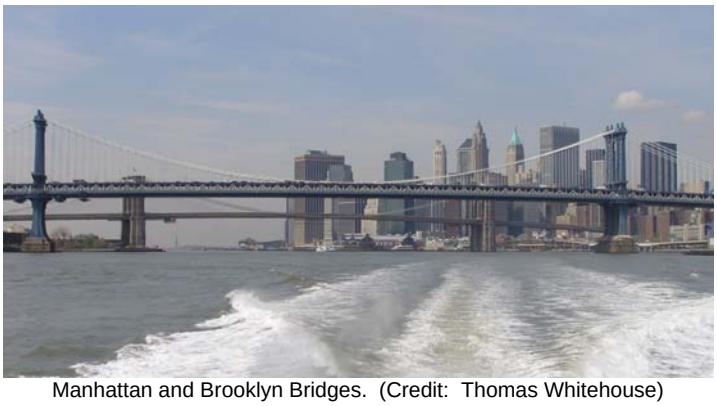
East River Bridges

A $3.14 billion reconstruction program is underway to rehabilitate all four East River crossings. In 2006, these bridges carried some 494,576 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.



Manhattan and Brooklyn Bridges. (Credit: Thomas Whitehouse)

BROOKLYN BRIDGE

Arguably the most influential bridge in American history, the Brooklyn Bridge remains one of New York City's most celebrated architectural wonders. Designed by the brilliant engineer John Augustus Roebling, and completed by his equally ingenious son Washington Roebling, this elegant structure was, at the time of its completion in 1883, the longest suspension bridge in the world. It was declared a National Historic Landmark in 1967.

The Brooklyn Bridge carried some 126,805 vehicles per day in 2006. The $611 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, the painting of the entire suspension bridge, as well as the seismic retrofitting of the structural elements that are within the Contract #6 project limits.

Engineering Landmark Plaque. (Credit: Michele N. Vulcan) 1899 Plaque Near the Franklin Truss of the Bridge, Marking the Site of George Washington's First Presidential Mansion, Franklin House. (Credit: Hany Soliman)

Historic Landmark, 1954 Reconstruction, and Two Cities Plaques. (1954 & Cities Credit: Michele N. Vulcan)

Seismic retrofitting of the remaining bridge elements requiring strengthening will be carried out under a separate contract by the end of 2014. 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 $20 million current construction contract will replace the four existing travelers with a new state-of-the-art technology system including motors, reducers, braking systems, electrical controls, programmable logic controller system, and trouble shooting devices. A Notice to Proceed was issued to the contractor with a start date of November 22, 2006. All four travelers were removed in November 2007. The fabrication work for the new travelers to be installed is underway. Construction is scheduled to conclude in June 2009.

Brooklyn Side Traveler. (Credit: Michele N. Vulcan)
Working on a Traveler. (Peter Basich)

Removing the Brooklyn Bridge Main Span Travelers.

The 160 100-watt mercury vapor lamps of the necklace lights on the Brooklyn Bridge are scheduled to be replaced by new energy efficient lights in 2008.

MANHATTAN BRIDGE

The youngest of the three NYCDOT suspension bridges that traverse the East River, the Manhattan Bridge carries some 391,121 commuters – 74,621 vehicles and 316,500 mass transit riders - between Manhattan and Brooklyn daily. It was designed by Leon Moisseiff and completed in 1909. The bridge supports seven lanes of vehicular traffic as well as a subway transit line upon which four different train lines operate.

Manhattan Bridge. (Credit: Michele N. Vulcan)
View From the Beach. (Credit: Jonathan Smith)

The $834 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 April 2008. This work will be followed by the upcoming Contract #14 to rewrap the cables and replace the suspenders and necklace lighting. Completion is expected in 2012. The

reconstruction will end with a seismic retrofit of the bridge, slated for completion in 2014. Work completed on the bridge to date includes reconstruction of the south and north upper roadways, reconstruction of the north and south subway lines, installation of a truss stiffening system to reduce twisting, restoration of the Manhattan Plaza, including the historic arch and colonnades, reconstruction of the south walkway, installation of a new north bikeway, and replacement of the lower roadway.

"The Spirit of Commerce" Sculpture and the Underside of the Arch. Part of the Colonnades.
The "Native American Buffalo Hunt" Sculpture Panel. (Credit: Peter Basich)

Contract #11

A Notice to Proceed for this project 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; upgrading of the lower roadway lane control signals, installation of a fire protection system, rehabilitation of the tower canopies and balconies, and rehabilitation of the Brooklyn Plaza. The work on the lower roadway began in October 2006. The roadway was reopened on October 1, 2007. The contractor will be paid the maximum incentive of $3.9 million for early completion of the work related to the opening of the lower roadway. This $148 million project is expected to be complete in April 2008.

Contract #11 in 2005: Masonry Cleaning of the Brooklyn Granite Pier and of the North Face of the Brooklyn Anchorage. Installing Conduit for the New North Upper Roadway Street Lighting.

Contract #11 in 2005: Waterblasting to Remove Existing Microsurfacing From the South Upper Roadway. Manually Removing the Microsurfacing.

Contract #11 in 2005: Preparing the Deck for New Microsurfacing on the South Upper Roadway.

Contract #11 in 2005: Placing the New Microsurfacing on the South Upper Roadway. Newly Resurfaced Roadway.

Contract #11 in 2005: The Brooklyn Tower Canopy. Removing the Canopy.

In 2005 and 2006, the rehabilitation of the interior of the anchorages proceeded with the contractor repairing and replacing concrete slabs, patching spalled concrete areas, and performing vacuum-injected epoxy crack repairs to mitigate the problem of moisture seeping into the anchorage chambers. In addition, masonry cleaning work was performed on the exterior of the anchorages, piers, and abutments, as well as on the retaining walls on the approach spans. This cleaning was followed by masonry joint pointing and repairs to the damaged granite stones of these structures. Other significant tasks underway in 2006 were the installation of new street lighting on the lower and north upper roadways, and the rehabilitation of the canopy and balcony areas at both towers.

Contract #11 in 2006: Pointing Joints on East Face of Brooklyn Anchorage. Masonry Cleaning Inside Archway of Brooklyn Anchorage. Installing Conduit and Wire for New Lower Roadway Lighting.

Contract #11 in 2006: Ironworkers Removing Existing Rivets in Preparation for Replacement of Lower Roadway. Installing Steel-Faced Curb for Sands Street Realignment. Erecting Scaffold to Build Painting Containment at Base of Brooklyn Tower.

Contract #11 in 2006: Removal of Existing Suspender Rope From Cable Band on Main Span. Sawcutting Lower Roadway Deck on Manhattan Approach Span.

In preparation for the major steel removal and replacement work on the lower roadway, which began in October of 2006, the contractor fabricated steel (floorbeam, stringers, grid deck, and barrier), completed the installation of a temporary underdeck platform, and performed abrasive blasting operations to remove the paint from the existing steel connection areas. Effective October 15, 2006, the lower roadway was closed to traffic for one year. The first floorbeam was removed on October 17, 2006 at the Manhattan approach.

Contract #11 in 2006: Removal of First Floorbeam for Lower Roadway Reconstruction. The Fabricated Steel, Complete With Bearings, In The Contractor's Storage Yard.

Contract #11 in 2006: Sequence of Removing Existing Floorbeam at Brooklyn Tower.

Contract #11 in 2006: Sequence of Installing New Double Floorbeam at Brooklyn Tower.

Contract #11 in 2006: Installation of Full Width Grid Deck Panels.
Lower Roadway Grid Deck Concrete Pour in December 2006.

The work plan developed by the contractor maximized access to the work zones by providing

access for equipment and materials from both the Manhattan and Brooklyn approaches. The construction began with two crews at the Manhattan Anchorage, with one crew proceeding west toward the Manhattan abutment and one crew proceeding east toward the Brooklyn abutment. As a time savings measure, the existing deck and stringers were removed in panels.

The new stringers were preassembled in groups of two in the shop to speed erection. In addition, the floorbeams came to the site with the elastomeric pads pre-installed. This preassembly allowed for quick erection of the structural steel.

The complete closure of the lower roadway eliminated the need for construction joints in the grid deck and concrete placements were made from deck joint to deck joint – no cold joints were required. The grid deck panels run the complete width of the roadway with no need for splicing of the main bars.

Contract #11 in 2007: Installation of a New Modular Joint on the Lower Roadway at the Brooklyn Tower. Installation of New Lower Roadway Grid Deck Panels on the Brooklyn Side Span. Removal of the Existing Roadway at the Manhattan Transition.

Contract #11 in 2007: Bending a Reinforcing Bar for the New Lower Roadway Grid Deck. Welding of the New Lower Roadway Grid Deck. Removal of the Existing Lower Roadway Grid Deck and Stringers on the Brooklyn Approach Span.

Contract #11 in 2007: Concrete Placement in the New Lower Roadway Grid Deck on the Main Span. New Lower Roadway Floorbeams, Stringers and Grid Deck on the Brooklyn Approach Span.

Contract #11 in 2007: The New Lower Roadway Grid Deck on the Brooklyn Approach Span. The New Lower Roadway on the Brooklyn Side Span After Concrete Placement. New Lower Roadway Concrete Placement on the Brooklyn Main Span, and at the Brooklyn Anchorage.

Contract #11 in 2007: Masonry Cleaning of the Upper Section of the South Face of the Manhattan Anchorage. Milling of the Existing Lower Roadway Pavement at the Manhattan Plaza. Masonry Cleaning of the Lower Roadway Wall at the Brooklyn Transition. Concrete Placement in Manhattan Plaza at the Entrance to the Lower Roadway.

Deputy Chief Engineer Jay Patel, Engineer-in-Charge Brian Gill, Chief Bridge Officer Henry Perahia, and Deputy Chief Engineer Russell Holcomb at the Bridge Arch.
Commissioner Janette Sadik-Khan at the Manhattan Bridge With Deputy Chief Engineer Patel, Chief Bridge Officer Perahia, and Director of East River Bridges Hasan Ahmed (With Bicycle). Chief Bridge Officer Perahia and the Commissioner on the Shared Use South Walkway. Engineer-in-Charge Gill, Chief Bridge Officer Perahia and the Commissioner Reviewing the Construction.

The north bikeway, which was closed since October 9, 2006 to enable the rehabilitation of the tower canopies and balconies over the bikeway, was reopened on August 6, 2007. The south walkway then reverted to pedestrian use only.

The lower roadway, closed on October 15, 2006, reopened on Monday October 1, 2007, earlier than the scheduled completion date of October 14, 2007. The bridge is now fully opened for all modes of transportation - buses, carpoolers, motorists, bicycles, pedestrians and subway service.

The reopening of the lower roadway of the Manhattan Bridge provided the City with an opportunity to optimize the use of this important interborough connection – by opening a new HOV 2+ lane on the upper roadway. The first regular HOV access into Lower Manhattan over an East River Bridge, the lane is in effect Monday – Friday 6 AM to 10 AM. Traffic changes also

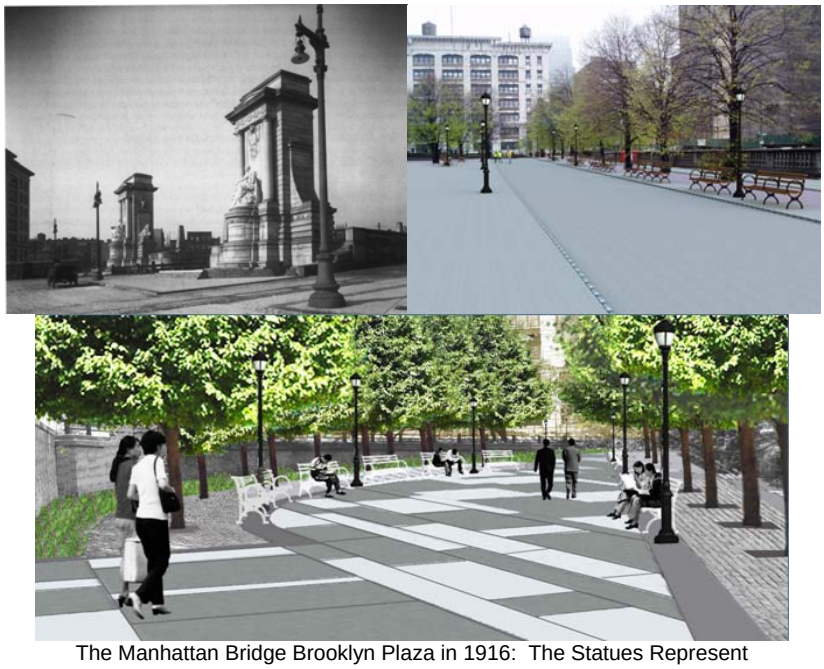
included limiting truck access on the north upper roadway and preventing north upper roadway traffic from entering Canal Street westbound when the lower roadway is Manhattan-bound. These traffic modifications resulted in a 25% or more Manhattan-bound travel time savings across the bridge when compared to preconstruction usage.

Contract #11 in 2007: Placement of New Asphalt on the Lower Roadway at the Brooklyn Approach Span. Placement of New Microsurfacing on the Lower Roadway at the Manhattan Side Span.

Division and Contractor Personnel at the Reopening of the Manhattan Bridge Lower Roadway, Including: Assistant Civil Engineer Javed Sarwar (3rd From Left), Assistant Engineer-in-Charge Syed Arfeen (6th From Left), Engineer-in-Charge Brian Gill (7th From Left), Civil Engineer Mohammad Hossain (8th From Left), Deputy Chief Engineer Jay Patel (9th From Left), and Assistant Civil Engineer Sergey Kholdarov (10th From Left).

Other significant Contract #11 work performed in 2007 included the cleaning of the masonry structures in Manhattan and Brooklyn, installation of the anchorage dehumidification exhaust system, installation of a fire protection system, replacement of the truss wind pin assemblies, replacement of the tower anchor bolts, rehabilitation of the canopies and plaques on the bikeway and walkway, and installation of the lower roadway lighting system. In December 2007, the contractor re-started the rehabilitation of the 20,000 square foot Brooklyn Plaza.

Contract #11 in 2007: View of the Restored Canopy at the Brooklyn Tower. Manhattan Bridge North Upper Roadway With HOV Lane Delineators.



The Manhattan Bridge Brooklyn Plaza in 1916: The Statues Represent Manhattan and Brooklyn. Rendering of the New Plaza.

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 $777 million reconstruction commenced in April 1981 with Contract #1, continues with Contract #6, which began on October 31, 2003, and is scheduled for completion by the end of May 2008, and will end with a seismic retrofit of the bridge, slated for completion in August 2014. 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 186,110 vehicles per day in 2006.

Queensboro Bridge in 2005. (Credit: Michele N. Vulcan)
Close-up of the 1909 Dedication Plaque. (Credit: Peter Basich)

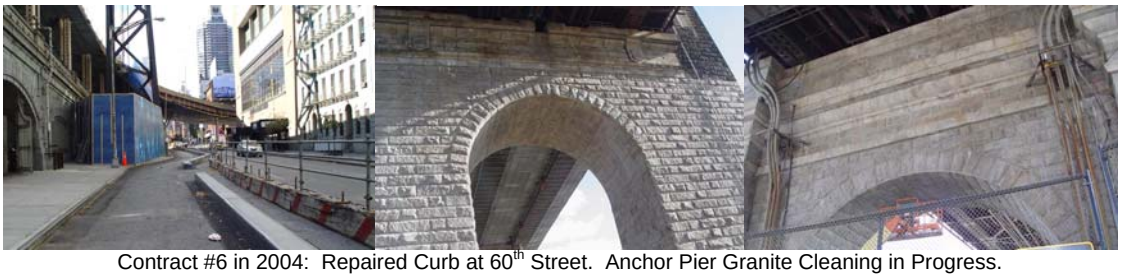
Contract #6

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 was restored. This small historical structure was in an advanced state of disrepair and had been damaged by repeated vehicular impacts. This $43 million project is expected to be complete by the end of June 2008.

Views of the Queensboro Plaza Kiosk in 2003. Proposed Rehabilitation of the Arch Infill for the Sanitation Department.

Contract #6 in 2004: Repairing the Steel of the 59th Street Arch Ceiling. Starting Curb Replacement at 60th Street. Improving the Drains at the Vehicle Storage Area.

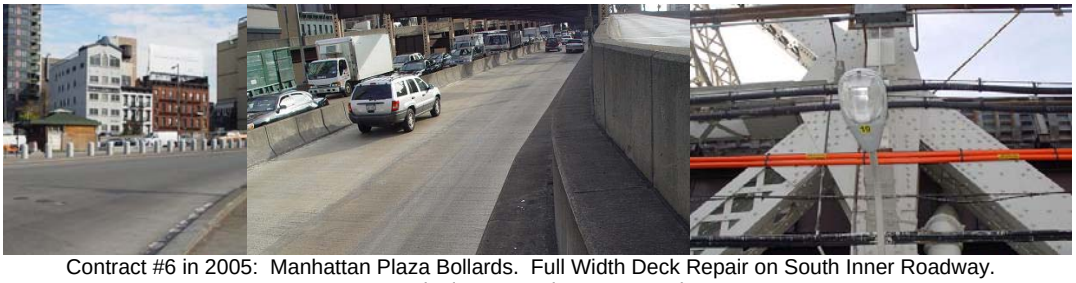
Contract #6 in 2004: Repairing Spalled Concrete at the 59th Street Overpass. Sanitation Arch Infill Work Progressing at 60th Street. Repaired Sidewalk Between 61st & 62nd Streets.



Contract #6 in 2004: Repaired Curb at 60th Street. Anchor Pier Granite Cleaning in Progress.

In 2004, work was completed at the retaining wall at York Avenue. In 2005, work was completed on the kiosk bollards on the Manhattan plaza, the sidewalk between 61st and 62nd Streets, the rehabilitation of the Sanitation Department area arch infill, and the modifications to the maintenance facility beneath the Manhattan approach plaza.

Contract #6 in 2005: Bent Column Ready for Jacking. Decorative Fence. Repairing the Drainage Pipes.



Contract #6 in 2005: Manhattan Plaza Bollards. Full Width Deck Repair on South Inner Roadway. New Luminaire on North Upper Roadway.

Contract #6 in 2005: Rehabilitated Sanitation Department Arch Infill.

Contract #6 in 2005: Traveler Platform. New Window.

In 2006, work was completed on the protective screening, the aviation warning lights, the drainage improvements, the repair of the south upper roadway concrete overfill and overlay, the underside of the 59th Street overpass, and the condition inspection of the eyebar heads and pins.

Contract #6 in 2006: Microsurfacing the North Upper Roadway. Repairing the 59th Street Overpass.

The kiosk in the plaza on the Manhattan side of the bridge was originally built in 1908 and is constructed primarily of terracotta panels set between ornate cast iron columns, with copper roofs and cast iron fascias. The interior walls and Guastavino timbrel arch ceiling are covered with glazed tile. The open front (now glassed in) originally served as the entrance and exit to the old subway station. There is no floor in the kiosk, as it served only to shelter the stairways leading to the station below. The restoration of the kiosk was completed in September 2006.

Contract #6 in 2006: Restored Queensboro Kiosk Ceiling and Other Elements.

Contract #6 in 2006: Restored Queensboro Bridge Kiosk.

In 2007, work was completed on the geometric improvements at Crescent Street and Queens Plaza South, the installation of concrete barriers and protective screening at the Queens

approach on the north outer roadway, and the repair of the north and south upper roadway overlay. The upgrading of the roadway lighting was substantially completed by the end of 2007.

Contract #6 in 2007: Rendering of Bridge Flag Site. Protective Screening at the Queens Approach. Protective Screening and Roadway Lighting Upgrade on the North Outer Roadway. (Screening Credit: Adam Caplan)

Contract #6 in 2007: Rendering Geometric Improvements at Crescent Street (Credit: Adam Caplan)

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.

Bridge Painting in Progress: July 2007.

The work is performed within an entirely sealed Class 1A containment system (under negative pressure) which acts as an added safety measure to prevent 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.

Platform Installed for Painting of the Queensboro Bridge. (Credit: Vadim Sokolovsky)
Working Inside the Containment. Protected Roadway.

View of Roadway Platform. Painted Area.

By the end of 2005, the contractor completed cleaning and painting the Manhattan and Queens anchor piers; the Manhattan approach; ramp A; the off ramp and ramp B over the Silver Cup Studio parking lot; the off ramp over Queens Plaza South towards 13th Street; approaches B and C from 23rd Street to Thompson Avenue (except over the railroad tracks); the Queens approach underside of the lower roadways (from 21st Street to Vernon Boulevard); the main bridge underside of the lower and upper roadways from PP123 to PP68; and the main bridge above the upper roadway from PP77 to PP109.

Protective Coating in 2005: Newly Painted Section Along the Upper Roadway. Containment on the Queens Side Tower. (Credit: Peter Basich) Queensboro Bridge Work Platform. Painters Arriving at the Platform. (Credit: Michele N. Vulcan)

By the end of 2006, the contractor completed cleaning and painting the Queens approach at the inner roadways from PP0 to PP39; at the main span's inner and under upper roadways above Roosevelt Island and one half of span #2 from PP75 to PP37; the main span trusses above the upper roadway from the Manhattan anchor pier to the Roosevelt Island west tower has been completed from PP0-PP15, PP30-PP47, and PP109-PP123; and the ramps on the Queens side over the LIRR tracks. Installation of cables and platform, on the main span under the lower roadway from PP17 to PP37, was also underway.

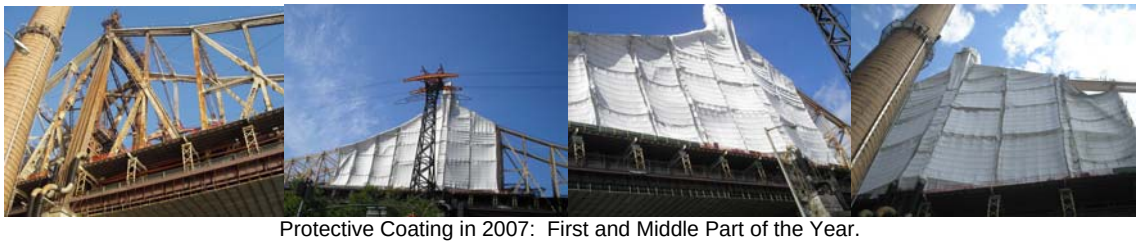
Protective Coating in 2006: Upper Roadway in Progress. (Credit: Peter Basich) Inside the Containment on the North Side of the Inner Roadway. Installed Platform Above South Outer Roadway.

Protective Coating in 2006: Inside the Containment Rigging at Span #1. Finish Coat on the Trusses at Span #5 on the Upper Roadway. Class 1A Containment Installed on the Trusses at Span #2, And the Working Platform Above the South Outer Roadway.

By the end of 2007, the contractor completed cleaning and painting the Queens approach at the inner roadways from PP90 to PP39; at the main span's inner and upper roadways from PP1 to PP37; and the main span trusses above the upper roadway from PP30-PP15 and PP47-PP55. The installation of containment rigging along the upper roadway on Span 3 was also underway.

Protective Coating in 2007: First Part of the Year.

Protective Coating in 2007: Spans 1 and 2 Upper Level.



Protective Coating in 2007: First and Middle Part of the Year.

Protective Coating in 2007: Middle and Last Part of the Year.

Scheduled work for spring 2008 includes the tower interiors, the upper roadway trusses on Span 3, and approach B above the Amtrak property. Remaining touch-up work areas include the Queens approach at the inner roadways from PP90 to PP39, the main span's inner and upper roadways from PP1 to PP37, and the main span trusses above the upper roadway from PP30-PP15, as well as PP47-PP55.

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. By the end of 2007, approximately 87% of the contract work was complete. 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.

WILLIAMSBURG BRIDGE

The largest of the three suspension bridges that traverse the East River, the Williamsburg Bridge carries some 207,040 daily commuters – 107,040 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 $1,048 million reconstruction commenced in 1983 with Contract #1, and continues with Contract #8, which began in March 2003 and is scheduled for completion by the end of 2008.

Williamsburg Bridge. Bridge Subway Structure. (Credit: Peter Basich).
Contract #8 in 2004: Looking South at a Cable Band Retensioning Crew.

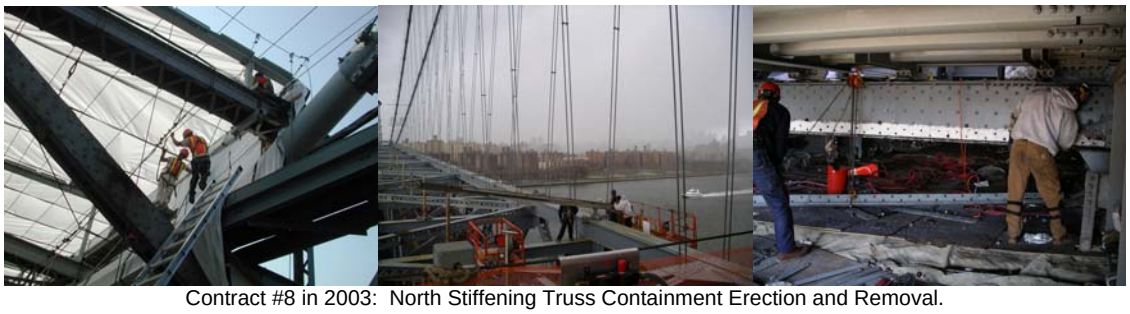
In order to minimize disruption to the riding public and ensure that traffic is maintained across the bridge, the rehabilitation of the Williamsburg Bridge was divided into several contracts. In the contracts completed to date, all four main cables have been completely rehabilitated, the south and north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

View From the South Footwalk.

Contract #8

Contract #8 began on March 3, 2003, and is scheduled to finish by the end of 2008. This $220 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.

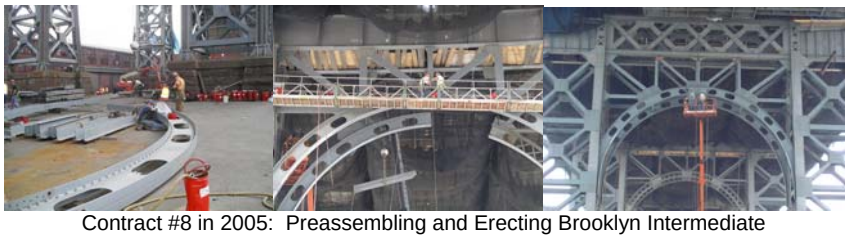
Painting of the south side stiffening trusses, which began on June 1, 2003, was completed on September 6, 2003. Painting of the north side stiffening trusses, which began on September 6, 2003, was completed on November 25, 2003. Steel replacement on both main towers began in 2003 and will continue through spring of 2006. Steel replacement on both the intermediate towers and the upper and lower chords of the stiffening trusses began in 2003 and was completed in 2005.



Contract #8 in 2003: North Stiffening Truss Containment Erection and Removal.
South Truss Bottom Chord Rehabilitation.

Contract #8 in 2004: Looking East at the Brooklyn Main Tower Temporary Work Platforms. Manhattan Main Tower Temporary Platform Erection. Strengthening Plate Operation on Brooklyn Main Tower.

Contract #8 in 2004: Pier Stationed & Barge Mounted Cranes at Brooklyn Main Tower Pier. Steel Arch Replacement. Looking West at the North Truss Top Chord Steel Rehabilitation.



Contract #8 in 2005: Preassembling and Erecting Brooklyn Intermediate Tower Arch Steel.

Contract #8 in 2005: Rehabilitation of the Brooklyn Main Tower Steel. Torch Cutting on the Tower.

Contract #8 in 2005: Removing the Existing Steel of the Brooklyn Main Tower. Inspecting a Rebar Cage at the Manhattan Main Tower. Installing a Column at the Brooklyn Main Tower.

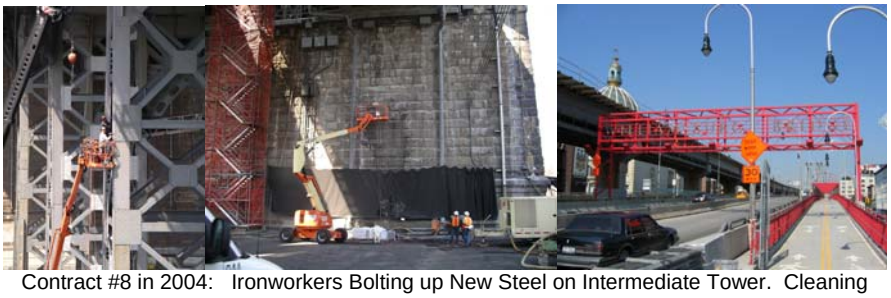
Installation of the strengthening plates on the four river-side column legs of each of the main towers was completed in 2004. This operation began with the hoisting of the plates from the roadway to the highest level of each tower and was completed during weekends on which the transit tracks were removed 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 in 2005: Torque Testing Bolts at the Brooklyn Intermediate Tower. Erecting a Leg of the Brooklyn Main Tower. Erecting Brooklyn Main Tower Leg Bearing Support Steel. Replacing the Manhattan Approach Footwalk Expansion Joint Covers.

During the fall of 2005 the work of replacing the footwalk expansion joint cover plates began and the 24 joints on the Manhattan approach and south foot walk were completed. The work on the seven joints on the north foot walk was completed in early 2006.

Twenty-eight wire rope cable suspenders and 56 tension rods were replaced during 2004 on the suspended main span. All of the suspenders were systematically adjusted in 2005 to optimize the profile of the bridge. In addition, the truss bearings at the anchorages were replaced in 2005.

Contract #8 in 2004: High Strength Bolt Torque Inspection. Cable Band Bolt Retensioning. Steel Bracing Replacement Operation at the Brooklyn Intermediate Towers.



Contract #8 in 2004: Ironworkers Bolting up New Steel on Intermediate Tower. Cleaning the Brooklyn Anchorage Exterior Granite Surface. Entrance to North Walkway. (Walkway Credit: Peter Basich)

Contract #8 in 2005: Cable Band Bolt Retensioning. (Credit: Bojidar Yanev) Demolition of the Brooklyn South Comfort Station Balcony. Installing Brooklyn Main Tower Aviation Lights. FHWA Engineering Intern River Hwang Inspecting the Cable Wrapping.

Rehabilitation of the north comfort stations began on February 21, 2006. The south outer roadway of the bridge was closed on June 1, 2006 for the removal and replacement of the asphalt overlay. Work was completed on the Manhattan side on June 6, 2006, and on the Brooklyn side on June 14, 2006. Installation of the balconies on both main towers began on June 22, 2006. The first traveler platform for the bridge was brought to the contractor's facility in Carteret, New Jersey on December 05, 2006.

Contract #8 in 2006: North Comfort Station. Manhattan Anchorage Joint Cleaning and Painting. Pointing of Comfort Station Roof.

Contract #8 in 2006: Truss A Removal, Manhattan and Brooklyn Towers.

Contract #8 in 2006: Priming Application and Asphalt Paving Operation on the South Outer Roadway.

Contract #8 in 2006: Water Blasting. Curb Angle Cleanup and Tack Coat. Core Drilling The Brooklyn North Comfort Station.

Contract #8 in 2006: Touchup Painting on the North Truss. First Traveler Platform. Bearing Survey.

The seismic retrofitting of the steel portions of the intermediate towers was completed on July 20, 2007. The Brooklyn and Manhattan maintenance travelers were delivered on barges and raised into position in August and October 2007. Installation of the top chord transverse bearings at the main towers was completed in October 2007. Installation of the Brooklyn anchorage maintenance platforms, the Manhattan anchorage hoist and new stair cases for both anchorages were also completed in 2007.

Contract #8 in 2007: Survey Work in Brooklyn. Excavation for Concrete Encasement. Brooklyn Tower.

Contract #8 in 2007: Checking the Progress of the Brooklyn North Comfort Station. Seismic Retrofit Concrete Work in Brooklyn. Brooklyn Tower Balcony (South).

Contract #8 in 2007: Seismic Retrofit Concrete Work at the Intermediate Piers in the Kent Avenue Yard.

Contract #8 in 2007: Modifying the South Footwalk Drainage. Repairing the Navigation Lights. Seismic Retrofit Concrete Work in Manhattan.

Contract #8 in 2007: Brooklyn South Comfort Station Rehabilitation. Raising the Manhattan Side Traveler at the Manhattan Tower. Manhattan Tower North.

Work anticipated to be completed in 2008 includes the installation of the Brooklyn anchorage hoist and the main tower fender system, the erection of the new Manhattan entry electroliers and rehabilitated main tower electroliers, the replacement of the intermediate tower truss bearings at panel points 10 and 15, the completion of the maintenance travelers, the implementation of a south inner roadway contra-flow system, and the seismic retrofit of the intermediate tower bases.

First Deputy Commissioner Lori Ardito, Chief Bridge Officer Henry Perahia, Commissioner Janette Sadik-Khan, and Press Secretary Seth Solomonow at the Williamsburg Bridge. Ascending the Cable.

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)

Opened on June 29, 1940, the Mill Basin Bridge is adjacent to the Jamaica Bay Wildlife Refuge and the Gateway National Recreation Area. It is the only movable bridge on the Belt Parkway. The current clearance over Mean High Water is 35-feet. 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 2007, the number of openings declined further to a total of only 182 openings.

In addition, significant and costly traffic congestion results from the operation of this outmoded drawbridge. In 2006, the Mill Basin Bridge carried 143,917 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 2007, on a New York State-mandated scale from 1 to 7, this bridge had a condition rating of 2.955, or "poor." 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 existing Mill Basin Bridge is 864-feet long and 14 spans, including double movable leaf bascule spans and a steel superstructure, supported on reinforced concrete pier on timber piles, and abutments supported on pre-cast concrete piles. The existing structure and immediate approaches will be demolished and replaced.

Belt Parkway Bridge Over Mill Basin.

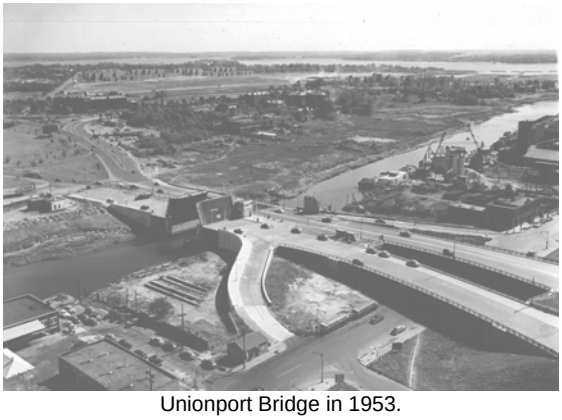
The replacement will be a 1,757-foot, 11 span fixed bridge, north of the existing structure. The bridge will have a 36-foot wide roadway with a 12-foot wide right shoulder and a 4-foot wide left shoulder in each direction. The eastbound side will carry a dedicated pedestrian/bike path along

the south fascia. The new bridge will be a fixed structure with a 60-foot clearance over Mean High Water, obviating the need for opening and closing the structure to accommodate tall vessels. The new design of the bridge will result in increased sight distances, an increase in lane width from 11-feet 4-inches to 12-feet, and the inclusion of safety shoulders in both directions. The channel will remain navigable during construction, and the clear channel width will remain the same after the new structure is in place. A new fender system will be installed to protect the bridge substructure from marine traffic. Currently in its final design phase, the reconstruction of the Mill Basin Bridge (part of the second Belt Parkway Group) is scheduled to start in 2010, and to last approximately 4 years.

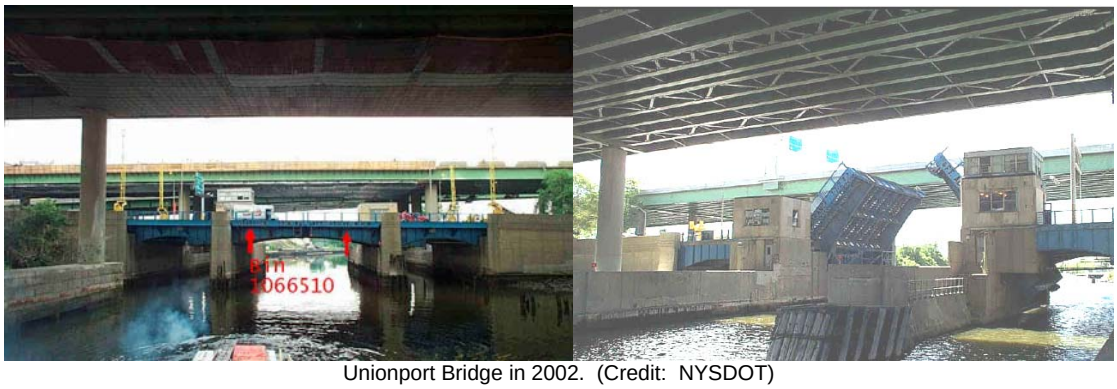
BRUCKNER EXPRESSWAY (NB & SB SERVICE ROAD) OVER WESTCHESTER CREEK (UNIONPORT BRIDGE) (BRONX)

This double leaf bascule bridge opened in 1953. In 2006, the bridge carried 61,262 vehicles per day. The 17 span structure (three waterway and fourteen concrete approach) 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 October 2009. The estimated construction duration will be a total of 36 months with approximately 18 months lead time. The project's scope of work includes replacement of the bascule, flanking, and approach superstructures, rehabilitation of the substructures, replacement of the existing mechanical and electrical systems for the bascule span, reconstruction of the bridge operator and control houses, and replacement of the existing fender system, drainage system, street lighting, traffic signal facilities, and gates. The "float out the old/float in the new" technique may be incorporated into the replacement scheme for the bascule span.

Onsite construction will be carried out in six stages. Incentives and disincentives will be used to expedite the completion of the project. Construction is expected to be completed in December 2011.



Unionport Bridge in 1953.



Unionport Bridge in 2002. (Credit: NYSDOT)

HAMILTON AVENUE BRIDGE OVER THE GOWANUS CANAL (BROOKLYN)

The Hamilton Avenue Bridge opened in 1942. In 2006, the bridge carried 55,526 vehicles per day. As part of the $55 million reconstruction of this bridge, the new bascule spans with trunnion towers will be shop-assembled and tested off-site, then will be shipped to the site 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.

A Notice to Proceed for the reconstruction of this bridge was issued to the contractor with a start date of August 4, 2005. Each of the 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.


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 was closed from June 29, 2007 to August 31, 2007, and it was replaced. The Manhattan-bound bascule span was removed in halves on July 2 and July 6, 2007. Due to the contractor's chosen means and methods, the new east leaf of the Hamilton Avenue Bridge was not "floated-in" as originally proposed, but was trucked-in, and assembled at the site. The Manhattan-bound span reopened three days earlier than scheduled on the morning of August 31, 2007. The contractor will earn an incentive for early completion of this milestone.

Removing the East Span in July 2007.

2007: Hamilton Avenue Bridge Construction.

Administrative Engineer Robert Collyer and Associate Project Manager Reza Lotfi at the Reopening of the Hamilton Avenue Manhattan-Bound Span. Open Span.

Construction work completed in 2007 included lead and asbestos abatement work in the control and gate tender houses and the replacement of the Manhattan-bound bascule span and all related tasks, including the installation of new submarine cables, the reopening of all roadways and sidewalks, the replacement of the fender system, and the installation of new dolphin clusters. Fabrication of structural steel and machinery for the Brooklyn-bound span is in progress.

Open Hamilton Avenue Bridge in August 2007.

In Stage 2, the Brooklyn-bound span will be closed from July 1, 2008 to August 31, 2008, and it will be replaced. The new west leaf is scheduled to be trucked-in for assembly and installation. The project is expected to be complete in January 2009.

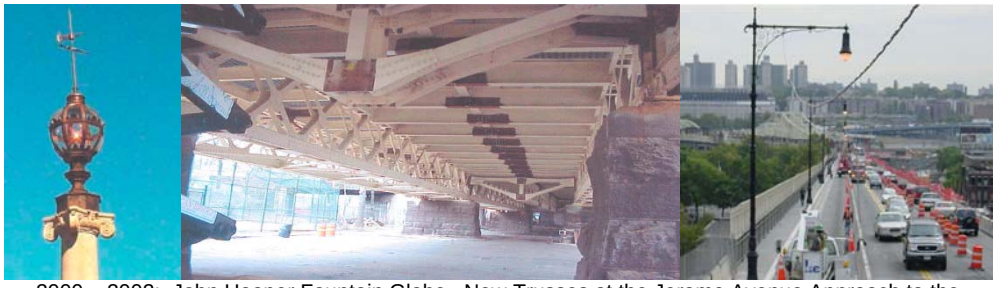
MACOMBS DAM BRIDGE OVER THE HARLEM RIVER (BRONX/MANHATTAN)

The Macombs Dam Bridge, which has one of the longest swing spans in the world, was opened in 1895. In 2006, the bridge carried 39,878 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 not only strengthened the structure, it returned 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) Close-up of a Gate House. (Credit: Peter Basich)

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



2000 – 2002: John Hooper Fountain Globe. New Trusses at the Jerome Avenue Approach to the Bridge. West 155th Street Viaduct of the Macombs Dam Bridge.

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.

2003: Looking West Along the West 155th Street Viaduct of the Macombs Dam Bridge. Demolition of Truss Deck. New Floor Beams in the East Approach of the Bridge. Existing Steel Beams After Removal of Concrete on Ramp B.

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. In 2003 and 2004, electrical and mechanical components and equipment were installed, and the brakes were replaced. In 2005 and 2006, the contractor worked on window replacement, touch-up painting, restoration of park land, removal and replacement of actuators, finishing the signage, sidewalk replacement, the construction of a concrete wall at 161st Street, and extended testing. The reconstruction of this bridge was substantially completed on May 29, 2007.

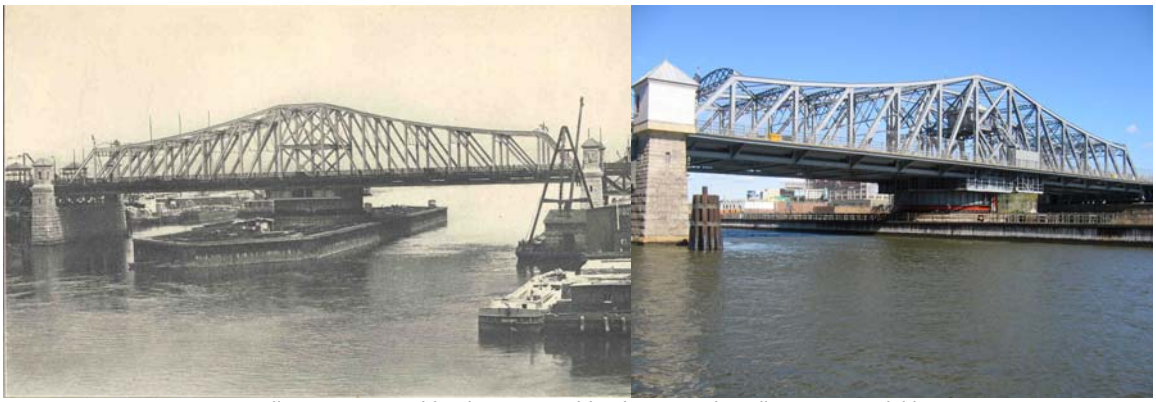
View of the Roadway From Above the Control House – Yankee Stadium is on the Right. (Credit: Peter Basich)
Bridge Protective Fencing and Staircase. (Credit: Michele N. Vulcan)

Quality Assurance Personnel Pausing During an Inspection of the Macombs Dam Bridge in May 2007: Assistant Civil Engineers Jayesh Mehta and Yuliy Zak, and Civil Engineer Ten Ming Rhee. (Credit: Masroor Mahmood) Detail of the Bridge – Yankee Stadium Banner is Visible on the Right.

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 2014 and end in January 2017.

MADISON AVENUE BRIDGE OVER HARLEM RIVER (BRONX/MANHATTAN)

A project for seismic retrofit, electrical, mechanical, masonry and miscellaneous work is scheduled to be performed between March 2013 and September 2014. 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. The final design phase of this project is expected to begin in winter 2009. In 2006, the bridge carried 43,805 vehicles per day.



Madison Avenue Bridge in 1910. Bridge in 2005. (Credit: Peter Basich)

ROOSEVELT ISLAND BRIDGE OVER EAST RIVER/EAST CHANNEL (MANHATTAN/QUEENS)

This lift bridge opened in 1955. In 2006, the bridge carried 9,685 vehicles per day. In 2007, the lift span opened 48 times for vessels. The 8 span structure carries two lanes of traffic over the East Channel of the East River. It is the only vehicular access to Roosevelt Island from the Borough of Queens.

Roosevelt Island Bridge Under Construction in 1952.

A Notice to Proceed for the $86.5 million reconstruction of this bridge was issued to the contractor with a start date of March 12, 2007. The estimated construction duration will be a total of 33 months with approximately 8 months' lead time. The project's scope of work includes rehabilitation of the existing bridge superstructure, substructure and approaches, replacement of some of the existing mechanical and all of the electrical systems for the lift span, rehabilitation of the bridge operator house, installation of safety fences on the sidewalk, replacement of the street lighting, resurfacing of the approach roadways, installation of pigeon proofing systems and re-painting the entire structure. The project will also include the installation of a dedicated right-hand turn lane onto the southbound Vernon Boulevard in Queens, and the construction of a new back-up generator building under the Queens approach. Fabrication of mechanical and structural components was in progress by the end of 2007.

Roosevelt Island Bridge in 2005. (Credit: Peter Basich) Bridge Tower and View From Deck in 2005. (Credit: Michele N. Vulcan)

Construction of the Below Deck Shield for the Queens Approach of the Roosevelt Island Bridge. Above Deck Containment on the Lift Span. The Lift Span Shield Looking Northeast.

The cleaning and repainting of the bridge began in January 2008. 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.

The work is performed within an entirely sealed Class 1A containment system (under negative pressure) which acts as an added safety measure to prevent 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.

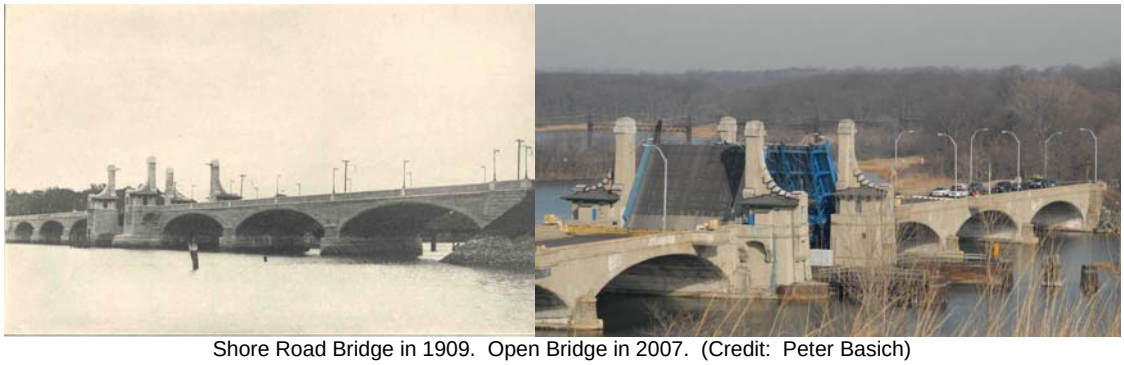
Onsite construction will be carried out in three stages. The project has an incentive tied to one of the milestones. The contractor will be paid an incentive of $18,500 per calendar day for early completion of this milestone with a maximum allowable incentive of $277,000. Late completion will carry a disincentive of $18,500 per calendar day with no limit on the maximum amount. Vehicular traffic will be maintained during all of the stages. Construction is expected to be completed in November 2009.

SHORE ROAD BRIDGE OVER THE HUTCHINSON RIVER (BRONX)

This bridge, built in 1908, was originally called the Pelham Parkway Bridge over Eastchester Bay. In 2006, the bridge carried 16,749 vehicles per day. The $5 million interim rehabilitation of the existing bridge superstructure and substructure will enable the Department to keep it operational 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.

Shore Bridge in 2007. (Credit: Peter Basich)

As of the end of 2007, various alternatives for the new bridge were being evaluated for further design. The preferred alternative is a mid-level, single leaf bascule movable bridge which will be constructed to the south of and parallel to the existing bridge. An environmental impact study is expected to begin in March 2008. The project to construct a new Shore Road Bridge is scheduled for construction between October 2012 and January 2017.



Shore Road Bridge in 1909. Open Bridge in 2007. (Credit: Peter Basich)

WARDS ISLAND PEDESTRIAN BRIDGE OVER HARLEM RIVER (MANHATTAN)

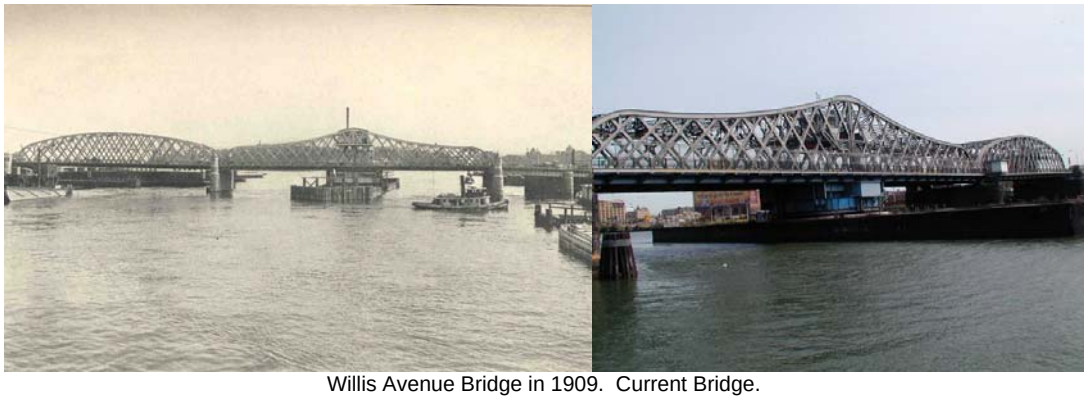
The Wards Island Bridge is a pedestrian bridge connecting the East River Housing Project at East 103rd Street in Manhattan to Wards Island. Located along the East River, the bridge is located between exits 14 and 15 of the FDR Drive. This vertical-lift bridge has a total of twelve spans. Spans one through four are located on the Manhattan side of the bridge and are oriented from south to north. At span five the bridge turns from west to east. The curb-to-curb width of the lift span is 3.66 meters, the clear width of the Manhattan approach ramp is 3.66 meters and the clear width of the Wards Island approach ramp measures about 3.76 meters.

A protective coating project was completed in May 2003 at an approximate cost of $1.2 million. Currently in its final design phase, the reconstruction of the bridge is scheduled to start in July 2012. The project's scope of work includes the replacement of the electrical and mechanical components along with a new control system, the replacement of the walkway deck, the rehabilitation of the steel superstructure members, and restoring the control and tender houses to their original condition. Construction is expected to be completed in July 2014.

Wards Island Pedestrian Bridge After Completion of Painting in 2003.

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.



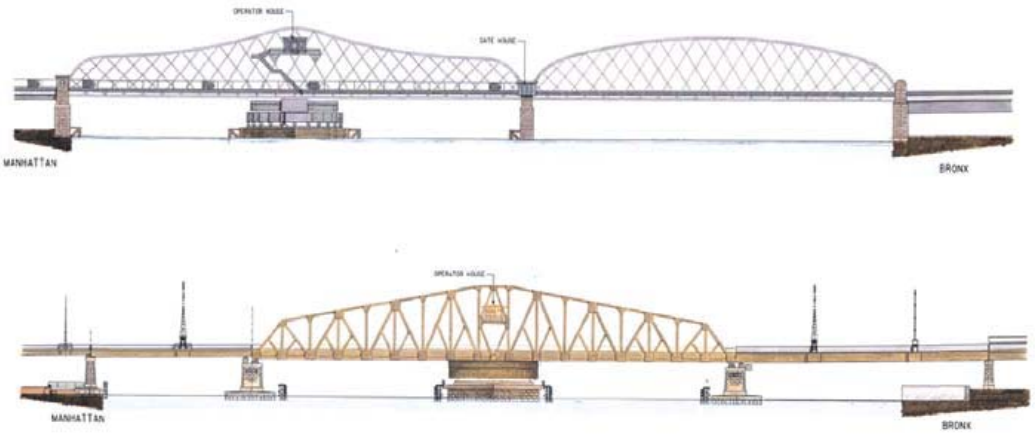
Willis Avenue Bridge in 1909. Current Bridge.

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 66,212 vehicles per day in 2006. Ten local and interstate bus lines use the bridge as a principal route from New York City to points throughout the northeastern United States.

Open Willis Avenue Bridge.

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.



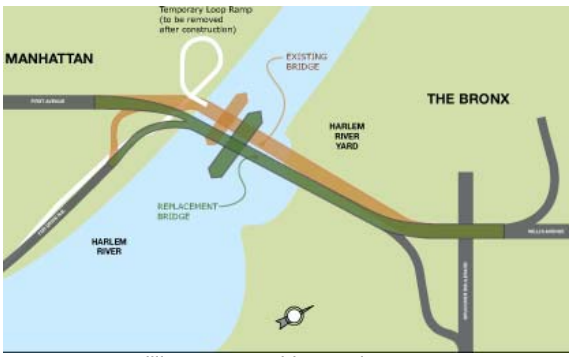
Existing Willis Avenue Bridge Swing Span. New Span.

A direct connection to the northbound Major Deegan Expressway in the Bronx will be constructed. There will be wider travel lanes with shoulders, and a broader, combined pedestrian/bicycle pathway along the north side of the bridge.

New, tested and inspected materials will be used including placement of a solid riding surface on the swing span instead of the open grating deck currently in use. In addition, modern electrical, mechanical and communications systems will be installed.

Traffic will continue to use the current bridge until the new bridge opens, resulting in limited impact to motorists and nearby communities. The NYC Marathon will not be impacted: runners will continue to use the current bridge each year until the new bridge is completed.

Throughout the project, little impact to marine traffic will be experienced. The new swing span is being fabricated and assembled off site, and will be floated into place once the foundations, center pier and rest piers are ready to receive it. A symbolic portion of the historic original Willis Avenue Bridge will be retained in place as a monument to the bridge in Harlem River Park.



Willis Avenue Bridge Project Map.

The project will also replace the FDR Drive approach ramp and the ramp onto Bruckner Boulevard. NYCDOT will also reconstruct Willis Avenue over the Major Deegan Expressway for the New York State Department of Transportation.

A Notice to Proceed for the replacement of this bridge was issued to the contractor with a start date of August 27, 2007. Foundation construction work was in progress by the end of 2007. The project is slated for completion in December 2012.

Rendering of the New Willis Avenue Bridge.

On January 3, 2008, the East 125th Street exit ramp off the northbound FDR Drive was closed. This closure was necessary so that work on the construction of a temporary ramp, as well as construction of the new north-bound FDR Drive ramp to the Willis Avenue Bridge, could begin. The East 125th Street exit ramp, which typically carries only a low volume of traffic, will not reopen until the temporary ramp is removed in June 2011.

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

The existing 145th Street Bridge is a swing type bridge with two 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 2006, the 145th Street Bridge carried approximately 21,733 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. Arial View of Existing 145th Street Bridge.

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 continued in Pennsylvania. Fabrication and assembly of mechanical and electrical components began in 2005. Installation of mini-piles at the rest and center piers of the bridge began in November 2004, and was completed in March 2005. In 2005, the contractor also completed the survey and the tieback borings. In 2006, the contractor replaced most of the north half of the bridge in the approaches as well as on spans 1, 2, 3, 6, 7, and 8. The new swing span was assembled in Albany, New York in late 2005, and was floated-in on February 9, 2007.

2005: Replacing Span #3of the 145th Street Bridge. Swing Span Truss Assembly.

2005: Precast Deck Units for the 145th Street Bridge at the Fabrication Facility. Placing the Bottom Chord of the Swing Span on the Supporting Towers.

2006: Assembling the New 145th Street Bridge Swing Span in Albany.

Stage I reconstruction of the bridge began on March 16, 2006. The Manhattan-bound roadway and sidewalk were closed and one lane of traffic in each direction, as well as pedestrian access, were maintained on the south half of the bridge.

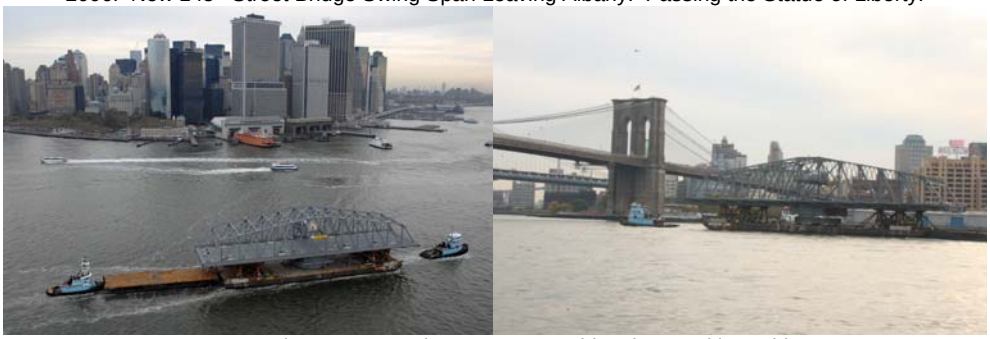
2006: Continued Assembly of the New 145th Street Bridge Swing Span. Removing Steel Girders Over the Harlem River Drive.

2006: Testing the Concrete for Pier 3 - FHWA Summer Intern Keisha Esprit on Left, and Assistant Civil Engineer Khalid Mohammed on Right. Ms.Esprit Taking Notes on the Concrete Placement.

2006: Demolition of 145th Street Bridge Manhattan Approach. Aerial View of Construction.

The transfer barge carrying the new swing span arrived at the Third Avenue Bridge site on October 31, 2006. Effective November 1, 2006, the bridge was fully closed for four months. Demolition activities began started around 2:00 a.m. on November 8. A sound barrier was erected prior to the start of the demolition.

2006: New 145th Street Bridge Swing Span Leaving Albany. Passing the Statue of Liberty.



2006: Passing Lower Manhattan. Approaching the Brooklyn Bridge.

2006: NYPD Launch Monitoring the Barge Passing Under the Manhattan Bridge. (Manhattan Credit: Bojidar Yanev) Passing Under the Williamsburg Bridge.

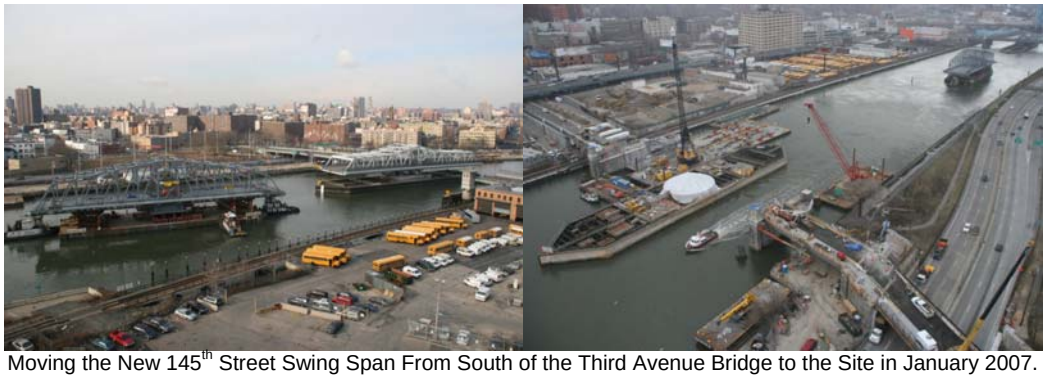
2006: New 145th Street Bridge Swing Span Passing Under the Queensboro Bridge. (Credit: Peter Basich) Third Avenue Bridge Site. (Site Credit: Russell Holcomb)

The contractor completed the removal of the swing span in December 2006, and it was transferred off site.

2006: Barge Carrying Crane Passing The Open Madison Avenue Bridge on the Way to Dismantle the Old 145th Street Swing Span. Dismantling the Truss.

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, sidewalks, and bridge railing. 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 was only impacted for the 15-month period of March 16, 2006 to June 18, 2007.

Various construction activities, including the installation of the grid deck, took place while the swing span truss was moored south of the Third Avenue Bridge. The float-in of the swing span was successfully performed on February 9, 2007.



Moving the New 145th Street Swing Span From South of the Third Avenue Bridge to the Site in January 2007.

Floating In the New 145th Street Span in February 2007.

Stage II was completed when two lanes of the bridge were opened to vehicular traffic at 12:20 AM on March 22, 2007. The north sidewalk was opened to pedestrians as well, while demolition work for stage III of the South side continued. The Manhattan and Bronx approaches as well as the Bronx bound lanes of spans 1, 2, 3, 6, 7 and 8 were demolished and rebuilt.

New 145th Street Bridge Swing Span Wrapped in Plastic During the Lightweight Concrete Curing Period. Preparing for the Concrete Deck Placement. Night View of the Encapsulated Deck.

All four lanes of the bridge were opened to vehicular traffic at 7:00 AM on June 16, 2007. The south sidewalk has been kept closed to the public for some ongoing work.

New 145th Street Bridge Ready for Traffic.

Bridge Sign. New 145th Bridge at Night.

These upgrades will restore the structural integrity and extend the useful life of the 145th Street Bridge. The project is slated for completion in September 2008.

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, 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. The float-in of the new swing span of the 145th Street Bridge was performed in February 2007.

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 a consultant 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 were 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.

Data from geotechnical bridge studies performed within the five boroughs of NYC has been compiled, and a new edition is scheduled for publication in summer 2008 to replace the 1998 Seismic Design Criteria. A series of generalized subsurface soil and bedrock profiles were developed to be representative of the range of soil profiles, overburden thickness, and rock types found within NYC.

A fully probabilistic approach, utilizing Random Vibration Theory (RVT) in conjunction with the new hard rock ground motions, was used to develop vertical and horizontal Uniform Hazard Spectra (UHS), from which design rock and soil response spectra are being derived. The method accounted, in a rigorous probabilistic manner, for variations and uncertainties in the softness of the soil, the hardness of the rock, the stress-strain nonlinearity and material damping, and, the depth of soil to rock.

The development of these parameters for the NYCDOT Guidelines represent a significant improvement to the previous guidelines and other codes, as they will result in better representation of the ground motions at a bridge site, bringing closer the generic ground motions to those that could be obtained from site-specific studies. The new guidelines will better fit the specific characteristics of the NYC region, thus enabling the engineers to evaluate the need for retrofit of existing bridges or strengthen new ones at the right places.

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 $998,030 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 the Shore Road over Hutchinson River and the Belt Parkway over Mill Basin bridges with new bridges built with higher clearances, thereby reducing the number of times the bridges must be opened. The third bridge, Hamilton Avenue, does not require a higher elevation.

Summary of Vessel Openings 1993 - 2007

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Brdn Ave. (Q)	141	0	0	105	15	0	3	0	28	0	0	0	1	0	0
Brdwy (B/M)	10	6	7	24	7	2	0	6	27	83	49	16	2	18	42
Brcknr Expwy (Estrn Blvd) (B)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brcknr Expwy (Unnprt Brdg) (B)	554	594	431	386	363	257	345	385	420	332	300	309	253	250	281
Carroll St. (K)	669	704	432	245	142	110	174	102	80	124	186	49	22	28	13
Grand St. (K/Q)	224	254	239	189	37	23	24	17	50	19	10	8	5	2	5
Grnpoint Ave. (K/Q)	587	549	498	557	626	669	787	688	641	659	738	1093	1045	905	641
Hmltn Ave. (K)	1300	1336	1246	1191	1157	996	982	933	832	946	824	757	677	1077	354
Hntrs Point Ave. (Q)	141	0	0	113	15	0	1	0	36	0	0	0	0	0	1
Htchnsn River Pkwy (B)	0	0	37	31	32	75	46	5	120	30	5	37	10	2	51
Macombs Dam (B/M)	0	6	5	13	3	0	0	0	0	0	0	0	0	0	4
Mdsn Ave. (B/M)	5	5	0	0	0	0	0	0	0	0	0	7	0	9	35
Metrpltn Ave. (K)	225	310	272	407	423	448	513	279	366	339	342	153	0	104	329
Mill Bsn (K)	1151	1250	954	903	628	591	433	336	317	142	173	164	162	174	182
Pulaski (K/Q)	224	239	206	195	291	332	383	276	208	308	599	694	734	433	489
Rsvlt Islnd (M/Q)	0	0	0	0	0	4	0	58	48	125	63	669	150	54	48
Shore Rd (Pelham Pky) (B)	2138	2222	2190	2167	2158	2274	2162	2168	2222	1897	1910	2011	1683	1704	1645
Union St. (K)	657	713	432	236	144	103	144	85	101	62	24	21	11	9	5
Ward's Isnd Pdstrn (M)	2	0	1	0	2	1	0	0	279	0	0	7	2	8	4
Willis Ave. (B/M)	8	18	24	17	9	0	4	4	40	0	7	25	2	41	67
3rd Ave. (B/M)	7	19	20	18	9	0	2	1	1	0	0	0	0	6	60
3rd St. (K)	663	732	432	256	149	112	157	178	117	212	152	99	43	31	39
9th St. (K)	927	836	0	0	0	0	192	513	808	733	547	457	360	480	333
145th St. (B/M)	0	9	24	24	3	0	0	1	6	0	0	9	0	0	0
W.207th St. (B/M)	1	6	4	12	7	2	0	6	14	4	6	10	1	12	24
TOTAL	**9634**	**9808**	**7454**	**7089**	**6220**	**5999**	**6352**	**6041**	**6761**	**6015**	**5935**	**6595**	**5163**	**5347**	**4652**

Roadway Bridges

INNOVATIONS

Innovations in the design and construction of Roadway Bridges continued in 2007. 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. In addition, the implementation of applicable Environmentally Preferable Purchasing (EPP) standards on bridge projects will ease the impact of the increased demands on resources and surrounding environment, and Best Management Practices (BMP) in all applicable projects will mitigate the impact of the project on the surrounding environment.

ANNADALE ROAD BRIDGE OVER SIRT SOUTH SHORE (STATEN ISLAND)

This project will replace the existing two span bridge with a single span bridge, including the removal of the existing pier, the replacement of the existing north abutment and the rehabilitation of the existing south abutment. In addition, the work will include removal and replacement of the existing concrete deck, sidewalks and curbs, and the replacement of the existing bridge railing system. The bridge will be replaced in two stages. One lane in each direction will be open to traffic at all times during construction. Pedestrian traffic will be maintained by the use of three temporary pedestrian bridges. A Notice To Proceed was issued with a deferred date of May 27, 2008, the date when the portion of an ongoing DDC area-wide sewer and water main installation project within the bridge limits is scheduled to be completed.

Construction is expected to begin in May 2008 and is expected to be completed in September 2010.

Annadale Road Bridge in 2001. (Credit: NYSDOT)

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

On a New York State-mandated scale from 1 to 7, six of these seven bridges possess a condition rating of “fair” (3.001 – 4.999), and the seventh is rated “poor” (1.000 – 3.000). In 2007, the Paerdegat Basin Bridge was 3.222; the Fresh Creek Bridge was 3.333; the Rockaway Parkway Bridge was 4.000; the Gerritsen Inlet Bridge was 3.597; the Mill Basin Bridge was 2.955; the Bay Ridge Avenue Bridge was 3.313; and the Nostrand Avenue Bridge was 4.097. All are original

structures, which were built beginning in 1939. 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.

The Seven Belt Parkway Bridges.

Reconstruction of the seven bridges and their approaches on the Belt Parkway (over three local streets and four waterways) is scheduled to start in the second half of 2008. Group 1 (Paerdegat, Fresh Creek, and Rockaway Bridges) is expected to be complete in spring 2014. Group 2 (Gerritsen Inlet and Mill Basin Bridges) is expected to start in summer 2010, and to be complete in summer 2014. Group 3 (Bay Ridge Avenue and Nostrand Avenue) is expected to start in fall 2011, and to be complete in late 2014.

During the past 60 years traffic demand along the Belt Parkway corridor has increased dramatically. The opening of New York International Airport (now JFK Airport) in 1948, the development of suburban communities on Long Island post World War II, and the opening of the Verrazano-Narrows Bridge in 1964 have dramatically increased demand on the Belt Parkway. When the parkway first opened the two-way average daily traffic was about 20,000 vehicles per day. Presently it is about 150,000 per day.

Reconstruction of these bridges and their approach roadways is necessary to alleviate substandard conditions and bring these areas into compliance with current state and federal standards. These standards require wider lanes, 12-foot safety shoulders, median barriers, super-elevation of the roadway around curves, and realignment of the approach roadways resulting in improved sight distances. The Department anticipates that these improvements will reduce the current accident rate on this section of the Belt Parkway by approximately 45%.

NYCDOT conducted research to provide recommendations and design guidelines for the treatment of the parkway corridor. The goals of the analysis were threefold: first, to propose improvements to the parkway to satisfy safety and accessibility standards; second, to preserve and re-establish the historic character of the parkway; and third, to retain and improve public access for all parkway users. The recommendations also include complementary designs of the seven bridges.

The research provided detailed recommendations on how common elements should be incorporated to achieve a consistent and historical character to the corridor. Items considered included trees and vegetation, lighting fixtures, railings and fences, design of bicycle and pedestrian paths across the bridges, as well as stonework detailing on bridge abutments with relief detailing on bridge parapets.

On July 18, 2006, the Art Commission selected the Seven Belt Parkway Bridge reconstruction project for a Design Award in its 24th annual Excellence in Design Awards.

Belt Parkway Bridge Design Renderings.

All of the bridges except for the Bay Ridge Avenue and Nostrand Avenue Bridges are either located within, or adjacent to, the Gateway National Recreation Area, (GNRA) a division of the US Parks Service. This bridge and highway program will be in full compliance with New York City Department of Environmental Protection (NYCDEP) requirements for the initiation of a long-term plan that will increase wetlands, decrease pollution into the bay, and decrease the highway's footprint around the rim of Jamaica Bay. NYCDOT is also working closely with New York City Department of Parks and Recreation (NYCDPR), New York State Department of Environmental Conservation (NYSDEC), GNRA, the US Coast Guard (USCG), and the US Army Corps of Engineers (USACE) to ensure compliance with all environmental protocols. In addition to mitigating environmental impacts along the Belt Parkway corridor, an off-site Wetland Mitigation Plan has been approved. This plan focuses on compensating for wetland losses by increasing and improving the quality of habitats. Approximately 2.3 acres of land at Floyd Bennett Field will be cleaned of rubbish and debris and converted to wetland area.

The existing Paerdegat Basin Bridge is a 692-foot long, 13 span, multi-girder, simple supported steel superstructure, supported on reinforced concrete pier cap beams and abutments supported on reinforced concrete piles. The bridge has two 34-foot wide roadways carrying three lanes of traffic in each direction; with a 3-foot safety walk on the north side, a 4-foot wide center median/barrier, and an 8-foot wide south pedestrian/bicycle sidewalk. The existing structure and immediate approaches will be demolished and replaced by two new bridges and new approach roadways on split alignments.

The existing bridge consists of 12 cast-in-place concrete bents. Two navigation channels cross under the bridge. At one of these channels (bent number 7) a concrete pier has been damaged. Because of this damage and other structural concerns, the Paerdegat Basin Bridge has been under continuous monitoring since September of 2004.

The replacement bridges will consist of two angled trapezoidal steel box girder structures: the 825-foot, 3 span westbound bridge, north of the existing structure, and the 1,227-foot, 5 span eastbound bridge, south of the existing structure, remaining at 28 feet over the navigable channel. Both bridges will have a 36-foot wide roadway with a 12-foot wide right shoulder. The eastbound bridge will have a 4-foot wide left shoulder, while the westbound bridge will have a 10-foot wide left shoulder. The southern structure will carry eastbound traffic while the northern structure will accommodate westbound traffic. Both the horizontal and vertical alignments will change resulting in improved sight distances on the bridge and its approach roadways. The bridge carrying eastbound traffic will also have a dedicated pedestrian/ bicycle path along the south side. The pedestrian/bicycle path will be separated from traffic lanes by a concrete barrier on the bridge, and by a 15-foot wide grass mall on the approach roadways.

Paerdegat Basin Bridge.

Proposed Paerdegat Basin Bridge.

The existing Fresh Creek Bridge is a 264.5 foot, 5 span, multi-girder, simple supported steel superstructure, supported on pre-cast concrete columns founded on four reinforced concrete piers on concrete piles with concrete gravity abutment walls on timber piles. The bridge has two 34'-2" wide roadways, a 5-foot wide center median/barrier, and a 10-foot wide south sidewalk. The parkway east and west of the bridge has a 10-foot wide bike footpath on the south side. The existing structure and immediate approaches will be demolished and replaced.

The replacement bridge will be a 309-foot, 3 span structure; the new structure will have only two support piers, resulting in a wider channel. The proposed construction will result in improved landscaping on the bridge approaches. The bridge deck and approaches will be widened to 120 feet from the existing 86 feet to accommodate three 12-foot lanes in each direction, 12-foot wide shoulders, and a 12-foot wide bike path, separated from the traffic lanes by a barrier system. The pedestrian and bicycle pathway will be maintained at all times.

Fresh Creek Bridge in 2002. (Credit: NYSDOT) Proposed Fresh Creek Bridge.

The existing Rockaway Parkway Bridge is a 150-foot, 4 span, multi-stringer, simple supported steel superstructure, supported on steel cap beams on concrete filled steel pipe columns, and reinforced concrete abutment walls supported by concrete pile foundations. The bridge has two

34'-2" wide roadways, a 5-foot wide center median/barrier, and a 10-foot wide south sidewalk. The existing structure and immediate approaches will be demolished and replaced.

The replacement bridge will be a single span structure to improve visibility along Rockaway Parkway. The new structure will be built in the same alignment as the existing bridge. The bridge deck will be widened to 109 ½ feet from the existing 84 feet to accommodate three 12-foot lanes with a 12-foot wide right shoulder and 4-foot left shoulder in each direction, including 5 ½ feet for median and parapet width. The right shoulder lane on each approach will be 10 feet (while the width of the right shoulders on the bridge structure will be 12 feet), with the other dimensions the same width as those on the bridge. In addition to reconstruction of the bridge, four access ramps will also be reconstructed as will Rockaway Parkway in the vicinity of the Belt Parkway.

Rockaway Parkway Bridge in 2002. (Credit: NYSDOT) Proposed Rockaway Parkway Bridge.

Milestone A consists of all work required to complete the reconstruction of the Paerdegat, Fresh Creek, and Rockaway Bridges, including all roadway sections and ramps, within the limits of the construction, adjacent to and between the bridge structures. The contract provides for an incentive of $35,000 per day for each day that milestone A is early, with a maximum incentive of $14.98 million. There is a similar disincentive if the milestone is exceeded, with no maximum.

The existing Gerritsen Inlet Bridge is a 520-foot long, 9 span, steel girder and reinforced concrete beam superstructure, supported on reinforced concrete piers, and abutments supported on timber piles. The existing structure and immediate approaches will be demolished and replaced.

The replacement bridge will be a consist of a 496-foot, 3 span bridge, aligned 10'-6" north of the centerline of the existing structure, and remaining 35 feet over the navigable channel. The bridge will have a 36-foot wide roadway with a 12-foot wide right shoulder and a 4-foot wide left shoulder in each direction. The eastbound side will carry a dedicated pedestrian/bike path along the south fascia.

Gerritsen Inlet Bridge in 2002. (Credit: NYSDOT) Proposed Gerritsen Inlet Bridge.

Opened on June 29, 1940, the Mill Basin Bridge is adjacent to the Jamaica Bay Wildlife Refuge and the Gateway National Recreation Area. It is the only movable bridge on the Belt Parkway. The current clearance over Mean High Water is 35-feet. 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 2007, the number of openings declined further to a total of only 182 openings.

In addition, significant and costly traffic congestion results from the operation of this outmoded drawbridge. In 2006, the Mill Basin Bridge carried 143,917 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.

The existing Mill Basin Bridge is 864-feet long and 14 spans, including double movable leaf bascule spans and a steel superstructure, supported on reinforced concrete pier on timber piles, and abutments supported on pre-cast concrete piles. The existing structure and immediate approaches will be demolished and replaced.

The replacement will be a 1,757-foot, 11 span fixed bridge, north of the existing structure. The bridge will have a 36-foot wide roadway with a 12-foot wide right shoulder and a 4-foot wide left shoulder in each direction. The eastbound side will carry a dedicated pedestrian/bike path along the south fascia. The new bridge will be a fixed structure with a 60-foot clearance over Mean High Water, obviating the need for opening and closing the structure to accommodate tall vessels. The new design of the bridge will result in increased sight distances, an increase in lane width from 11-feet 4-inches to 12-feet, and the inclusion of safety shoulders in both directions. The channel will remain navigable during construction, and the clear channel width will remain the same after the new structure is in place. A new fender system will be installed to protect the bridge substructure from marine traffic.

Mill Basin Bridge. Proposed Mill Basin Bridge.

The existing Bay Ridge Avenue Bridge is a 58-foot long, single span, reinforced concrete deck on a multi-girder system superstructure over Bay Ridge Avenue. The superstructure is supported by concrete gravity type abutments on pile foundations. The underpass is access to the NYCDEP Owl's Head Waste Treatment Plant. The existing superstructure will be demolished and replaced.

The replacement bridge superstructure will consist of pre-stressed concrete box beams and a reinforced concrete slab. The bridge will have three 12-foot wide lanes in the eastbound direction and two 12-foot wide lanes separated by a 4-foot wide painted stripe flush median in the westbound direction. There is no pedestrian/bike path on the structure. The existing bridge will be reconstructed using pre-cast deck sections. The clearance will be increased to 14-feet 6-inches, which removes the need for clearance signs currently posted for a substandard condition and will obviate the need for underdeck wood shielding.

Bay Ridge Avenue Bridge in 2002. (Credit: NYSDOT) Proposed Bay Ridge Avenue Bridge.

The existing Nostrand Avenue Bridge is a 140-foot long, 3 span, multi-girder superstructure, consisting of a concrete deck with an asphalt overlay over Nostrand Avenue. The superstructure is supported by concrete pier columns with a steel cap beam, and abutments on concrete filled steel pile foundations. The existing structure and immediate approaches will be demolished and replaced.

The replacement will be a single span bridge consisting of standard steel girders with a cast-in-place deck superstructure and reinforced concrete abutments on pile footings, thus eliminating the need for intermediate support piers and resulting in improved sight lines on Nostrand Avenue. The bridge will have three 12-foot wide lanes with a 12-foot wide right shoulder. The approaches will have a 10-foot wide right shoulder and a 4-foot wide left shoulder in each direction. Nostrand Avenue will be widened to 81 feet and realigned with the existing approaches. On the Belt Parkway, the bridge will be widened in order to provide new safety shoulders in both directions. New safety-shape parapets will be installed and the existing corrugated metal center guide-rails will be replaced with a reinforced concrete center median, which will result in a safer condition.

Nostrand Avenue Bridge. Proposed Nostrand Avenue Bridge.

A computerized traffic simulation model was developed to analyze traffic conditions in connection with the Division's plans to reconstruct these seven bridges on the Belt Parkway. This model was a useful tool for understanding the impact of construction on the traveling public and helped us determine appropriate construction schedules. It enabled us to rapidly evaluate the impact of a variety of combinations of construction staging.

BROOKLYN-QUEENS EXPRESSWAY (WB) & (EB) OVER CADMAN PLAZA AND FULTON STREET (BROOKLYN)

The Brooklyn-Queens Expressway over Cadman Plaza and Old Fulton Street, oriented East to West, and located just west of the Brooklyn Bridge, consists of two-level two-span superstructures, one above the other, founded on concrete abutments and piers sharing a common footing on H piles. The bridge was constructed in 1948.

The westbound side (the lower of the two-level structure) is a two-span continuous steel stringer, concrete deck superstructure supported by concrete abutments and a solid concrete center pier. The stringers are supported by fixed bearings at the center pier and with expansion bearings at the abutments. The bridge deck is a reinforced concrete slab overlaid with an asphalt wearing surface.

The eastbound side (located on the upper level) is a cantilever two span continuous steel rigid frame structure of built-up riveted girders. The girders are concrete-encased and rigidly framed into the framing at both abutments and center pier. The existing railings are substandard, and the granite veneer on the substructures has been removed from both of the abutment stems and the south side wing walls.

BQE Bridge Over Cadman Plaza in 2002 – Upper Level is Eastbound, Lower Level is Westbound.
(Credit: NYSDOT)

Structural demolition will include removing the existing wearing surface, demolishing and removing the existing bridge railings, safety walks, concrete deck (WB), deck expansion joints, concrete approach slabs, and the top portion of existing abutment and pier stems (WB). New construction for both the westbound and eastbound structures will include new top portions for the abutment stems and pier caps, new abutment expansion bearings and pier fixed bearings, new shear stud connectors on top flanges at existing stringers, new exodermic deck on steel stringers, new approach slabs at the westbound and deck/underdeck repair at the eastbound structure, half-size permanent concrete barriers at both fascias, new deck plug joints, a new wearing surface, and a new waterproof membrane over the concrete deck surface.

The project is currently in its final design phase. Construction is expected to begin in February 2011, and is expected to be complete in March 2012.

CITY ISLAND ROAD BRIDGE OVER EASTCHESTER BAY (BRONX)

The existing City Island Road Bridge was built in 1901 and is the only vehicular, bicycle and pedestrian access between the mainland Bronx and City Island. In 2006, the bridge carried 15,339 vehicles per day. The bridge is part of City Island Road, which is located within Pelham Bay Park and crosses over Eastchester Bay. With seven spans and six piers in the water, the bridge has outlived its useful life and requires extensive continuous maintenance.

Original Bridge in 1873.

The existing bridge will be replaced along the same alignment with a new single span, single tower cable-stayed bridge which will be a unique structure type in the NYC area. The new bridge will be approximately 17 feet wider than the existing one to accommodate three standard 12-foot wide traffic lanes, a 6-foot wide bicycle lane and a 6-foot wide pedestrian walkway on each side. The tower and concrete counterweight for backstay anchorage of the new bridge will be located in Pelham Bay Park. The new bridge will be designed to current standards and with its wider roadway width, will allow future repair and rehabilitation to be carried out while maintaining one 12-foot lane in each direction. In order to maintain traffic during the demolition of the existing bridge and construction of the new bridge, a temporary bridge will be constructed on the south side of the existing bridge.

City Island Road Bridge. Vertical Clearance Posting. (Credit: NYSDOT)

The project is currently in its final design phase. The construction phase for this project is scheduled to begin in June 2009 with an approximate duration of 3 years.

Rendering of New City Island Road Bridge.

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 March 2009, and is expected to be complete by March 2011.

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 October 2010, and is expected to be complete in April 2012.

Concourse Village Avenue Bridge. (Credit: NYSDOT)

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 superstructure in the right of way only, approaches and two 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 November 2010, and is expected to be complete in May 2012.

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 girders, deck slabs, approaches, and existing steel caps on the steel pier columns. 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 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 November 2010, and is expected to be complete in April 2012.

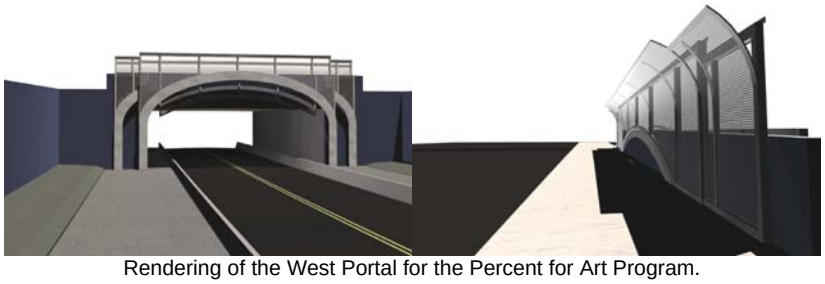
Crooke & Newkirk Avenue Bridges. (Credit: NYSDOT)

GRAND CONCOURSE BRIDGE OVER EAST 161ST STREET (BRONX)

This $52 million project 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 were closed to traffic during the Yankees' off-season only. The reconstruction will be completed in 5 main stages with various sub-stages. This arrangement ensures the maintenance of a minimum of two traffic lanes in each direction along the Grand Concourse. A Notice to Proceed for the project was issued to the contractor with a start date of January 3, 2006. The reconstruction project is expected to be complete by the accelerated date of November 2008.

Before Construction: The Bridge over East 161st Street. View of West Portal. Lou Gehrig Plaza.

Rendering of New Lou Gehrig Plaza. Existing Grand Concourse. Rendering of New Grand Concourse.



Rendering of the West Portal for the Percent for Art Program.

Soil boring operations began on January 3, 2006, and were completed on January 6, 2006. Stage I reconstruction of the bridge began on March 27, 2006. Stage IB reconstruction of the bridge began on June 21, 2006.

2006: Transporting Trees From East Median for Replanting. Uncovering Live ECS Cables Above Tunnel Roof Before Bridge Demolition. Excavation for Replacement of Sewer Pipes.

2006: Grand Concourse Bridge: Demolition of Existing Con Ed Vault. Backfill and Compaction of Sewer Manhole.

2006: Removing Asphalt and Concrete Roadway. Installing Sewer Between East 165th and East 166th Streets.

Stage II reconstruction of the bridge began on October 26, 2006. The underpass was closed to traffic as part of this stage, which was completed in April 2007.

2006: Demolition of the Bridge. Removing Debris From the Bridge.

2006: Removing Concrete at the Springline of the South Abutment Stem. Formwork and Concrete Placement at South Abutment.

Installation of precast panels began in the intersection of the Grand Concourse and 161st Street on December 19, 2006. Construction of the west side of the Grand Concourse was nearly complete by the end of 2006.

2006: Installing the Precast Panels.

The construction of the underpass and its approaches was completed in April 2007 during the Yankees' off season. The reconstruction of the north East 161st Street Service road and sidewalks was also completed in April 2007.

Construction of Underpass Abutment Wall. Reconstructed Grand Concourse Underpass, Sidewalks, and Bridge. Grand Concourse in November 2007.

On December 6, 2007, Commissioner Janette Sadik-Khan and Bronx Borough President Adolfo Carrión Jr. announced that the planned 45-month renovation of the key roadways will be wrapped up in November 2008—a full 316 days ahead of schedule.

As part of the original renovation contract, DOT reserved the option to accelerate the schedule if the contractor met key milestones. In response to Borough President Carrión's call for accelerating the project, and in light of the contractor's demonstrated ability to speed up the work, DOT has successfully negotiated for the faster pace.

Stage IVB reconstruction began on December 18, 2007. At present the center portion of the Grand Concourse from East 164th Street to East 166th Street is open to traffic. The East 161st Street Service in the east bound direction is closed to traffic from Gerard Ave to Sheridan Ave while the roadway, sidewalks, water main, drainage, and utility facilities are replaced.

Demolition and Reconstruction of the Northeast Retaining Wall of 161st Street Between the Grand Concourse and Sheridan Avenue.

Pouring Concrete for Pavement. Rigs in Lou Gehrig Plaza Drilling and Installing Cantilever Soldier Piles.

By the end of 2007, the roadways, sidewalks and water main and sewer works along the Grand Concourse were complete. Current work includes the installation of granite pavers and curbs in the Lou Gehrig Plaza area.

GUN HILL ROAD BRIDGE OVER METRO NORTH RR (BRONX)

The existing Gun Hill Road Bridge was constructed in 1918. An 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, and constructing new concrete parapets with pedestrian fencing. The bridge is being 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.

Gun Hill Road Bridge in 2002. (Credit: NYSDOT) 2005: View of Bridge at the MPT Stage. Demolition of the Existing Bridge Deck. (Deck Credit: Muhammad Siddiqui)

2005: Project Engineer Muhammad Siddiqui Inspecting the Stay-in-Place Formwork for the New Gun Hill Road Bridge Deck. Installing Deck Reinforcement. Concrete Placement.

Effective March 9, 2005, the southbound off ramp of the Bronx River Parkway at Gun Hill Road was closed to traffic for a three year duration. Stage II reconstruction of the bridge began on November 3, 2005. At the end of 2006, the project was in Stage III which consisted of the reconstruction of the northern 1/3 of the bridge.

Gun Hill Road Bridge in January 2006: Stage 2 Construction Zone, South Side of Bridge. March 2006: Looking West From The East Abutment at The Utility Supports for The Gas mains. July 2006: Stage 2 Construction Zone, Prior to Girder Removal.

July 2006: Looking East - Placing Concrete for The Gun Hill Road Bridge East Abutment Backwall, and a Quality Assurance Engineer Inspecting the Work. September 2006: Stage 2 Construction Zone, Placing Concrete for the Deck. November 2006: Looking East - Removing the Existing Water Main Pipe on the Bridge.

Gun Hill Road Bridge in December 2006: Looking East at the Stage III Traffic Shift, and Looking Northeast at Laborers Securing Plastic Covers on ECS Cables.

April 2007: Looking West – Gun Hill Road Bridge Stage III Girders and Temporary Support for Existing ECS Cables. June 2007: Using a Pump to Place Stage III Bridge Deck Concrete.

Gun Hill Road Bridge in June 2007: Looking Southwest at Laborers Demolishing the Existing Center Pier. July and August 2007: Installing a New Water Main.

On December 13, 2007, traffic was shifted to the newly constructed Stage III area of the bridge, and work for Stage IIIA began. The northbound entrance to the Bronx River Parkway was reopened on this date. Due to interference of the existing rubble walls with the alignment of the 48-inch water main on the north side in the approach area, thereby resulting in additional work (removing existing rubble walls in north east and north west corners and reconstructing new reinforced concrete retaining walls), the completion of the water main work in this area has been delayed. Construction is expected to be complete in May 2008.

HILL DRIVE BRIDGE OVER PROSPECT PARK LAKE (BROOKLYN)

The landmark Hill Drive Bridge was built in 1890. The existing bridge is a three span simply supported steel girder/beam structure, with the center arch span crossing Prospect Park Lake, and the other two spans consisting of masonry cellular structures with multiple interior masonry-bearing walls and non-composite concrete deck and concrete sidewalk. The substructure of the bridge consists of solid gravity abutments with U-type wing walls and piers.

This project will include the replacement of the existing masonry cellular abutments with new reinforced concrete abutments clad with existing stone and new brick masonry; the removal, storage, and reinstallation of the existing stone wing walls with a new reinforced concrete core;

the replacement of the existing stringers and floor beams with new steel stringers; the reinforcement of the existing arch girders with new cover plates; the reinstallation of the steel arch girders at their current locations to replicate original construction; and the replacement of the existing masonry arches spanning between floor beams by masonry cladding on the underside of the new arched concrete deck. The concrete deck, approaches, sidewalk, and roadway will be replaced within the project limits.

The ornamental cast iron and stones will be rehabilitated and reinstalled, replicating all the historic features and aesthetics of the original bridge. New bridge lighting and drainage systems will be installed. The park landscape will be restored, and trees identified by the Prospect Park Alliance as rare and/or historic shall remain undisturbed during construction.

The project is currently in its final design phase. Construction is expected to begin in March 2009, and is expected to be complete in May 2011.

Hill Drive Bridge in 2001. (Credit: NYSDOT)

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 commenced 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 included 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 included 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 was completed in three stages, with one lane of vehicular traffic maintained in each direction during construction. On Manhattan College Parkway, the work was also completed in three stages, with one lane of vehicular traffic maintained in the westbound 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. The reconstruction of the Manhattan College Parkway and West 232nd Street Bridges was substantially completed on September 28, 2006.

Old Fence on the Manhattan College Parkway Bridge. Newly Installed Picket Fence.

Manhattan College Parkway Bridge Deck During Construction. Completed Bridge.

Old Fence on the West 232nd Street Bridge. Deck During Construction. Completed Bridge.

On West 239th Street, the work was completed in three stages, with one lane of vehicular traffic maintained in the each direction during construction. Stage I reconstruction (northern half) of the bridge began on April 25, 2005. Stage II reconstruction began on September 22, 2005. The bridge re-opened to traffic on April 20, 2006. The reconstruction of the West 239th Street Bridge was substantially completed on December 5, 2006.

West 239th Street Bridge Before Reconstruction. During Construction. Installing the New Picket Fence.

Newly Installed Steel-Backed Timber Guide Rail at West 239th Street Bridge. Completed Bridge.

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. The work on this bridge began on January 3, 2006.

West 252nd Street Bridge Before Reconstruction.

The removal of the existing bridge sections over the northbound Henry Hudson Parkway was performed at night on October 25 and 26, 2006. The removal of the sections over the southbound Henry Hudson Parkway was performed at night on October 31 and November 1, 2006. The demolition of the north half of the bridge was completed in November 2006.

2006: Cutting and Removing the Existing West 252nd Street Bridge Sections Over the Parkway.

2006: Wire Sawing the Deck and Removing the Existing West 252nd Street Bridge Sections Over the Parkway.

2007: West 252nd Street Bridge Formwork and Rebar Fabrication at the Pier and West Abutment. Concrete Placement in Progress.

The new superstructure for the north half of the bridge, comprised of pre-stressed concrete beams and cast-in-place reinforced concrete deck and sidewalks, was completed in May 2007. The approach pavements, steel-backed timber guide rails and ashlars veneer parapet wall on the bridge were completed in October 2007. Stage II is anticipated to start in March 2008. The four bridge project is expected to be complete in April 2009.

Grouting of the West 252nd Street Bridge Box Beams in February 2007.

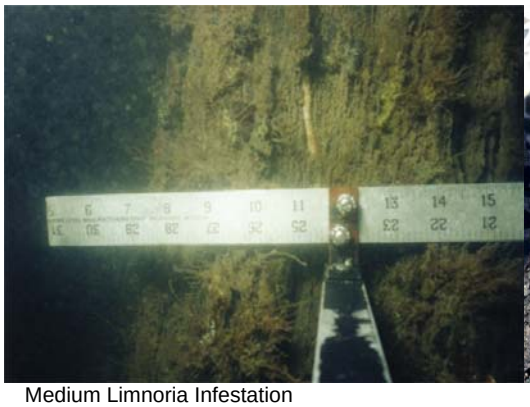
West 252nd Street Bridge: Transverse Post-Tensioning of the Pre-Cast Concrete Beams in March 2007. Installed Asphalt on Bridge Approach in July 2007.

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. Mitigation work for the impact of the construction on the bodies of water will be done under a separate contract. The construction work is expected to commence in January 2009.

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 May 2008, and is expected to be complete in May 2011.

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 replaced two bridges, originally built in 1937, that connect over 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.

Steinway Street Bridges in 2002. (Credit: NYSDOT)

Steinway Street Bridges.

The contract provided 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) were utilized to advise motorists of impending nightly lane closures on the Grand Central Parkway.

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. 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 were utilized to carry two lanes of traffic along the northbound direction on Steinway Street over the Grand Central Parkway and resulted 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.

2004: Erection of the South Steinway Street Temporary Bridge.

2004: Erection of the North Steinway Street Temporary Bridge.

Steinway Street Temporary Bridges in Place in December 2004. Opening of the Temporary Bridges.

Aerial View of Steinway Street in January 2005.

The original contractor was defaulted by the City in March 2005. The surety then took over the responsibility for completing all of the remaining construction work, and, with the concurrence of

the Agency, selected a replacement contractor. The new contractor re-started construction activities at the project site in September 2005.

2005: Utility Workers Excavating a Trench In Order to Deactivate the Feeder Cables in the Manholes Along Steinway Street. Driving a Sleeve for the Installation of Piles at the Center Fill Area.

2005: Preparing to Install Piles at the Southern End of the South Bridge. Removing the Utility Conduit Pipes From the Western Side of the Steinway Street Bridges.

The bridge was constructed in two stages. In the first stage, the remaining two-thirds of the bridges was demolished and reconstructed.

2006: Demolition of the Existing Structure. Steel Erection Over the Grand Central Parkway.

2006: Steel Erection Over the Grand Central Parkway.

2006: Concrete Placement of Abutment Wall. Inspecting the South Bridge Deck Placement.

This bridge structure was opened to pedestrian and vehicular traffic on October 26, 2006, five days ahead of schedule, earning the contractor the full acceleration payment of $132,000. All traffic was then shifted to the newly reconstructed portion, which carried two lanes of vehicular traffic in each direction, as well as a pedestrian walkway. The traffic routes along north and south Astoria Boulevard were restored to their regular pattern on October 30, 2006.

Two-Thirds Bridge Structure Open to Traffic in October 2006. Restored Traffic Route Along Astoria Boulevard.

The temporary bridges and the existing abutments were removed during the last weekend of January and the first weekend of February 2007. The contractor completed removal of the temporary pedestrian bridge in September 2007.

Installation of South Steinway Street Bridge Steel Frame Posts and Steel Erection in March 2007.

Installed Steinway Street Bridge Diaphragms in March 2007. Concrete Placement at the North Abutment of the South Bridge.

Deck Placement on the Steinway Street One-Third structure in June 2007. Shifting Traffic to the Eastern Side of the Bridges. Concrete Placement for the West Sidewalk in October 2007.

The rebuilding of the remaining one-third of the bridge structure was completed on October 31, 2007. On that date, the entire bridge roadway was opened to vehicular traffic and the east sidewalk was opened to pedestrians. The reconstruction of the bridges was substantially completed on October 31, 2007.

WESTCHESTER AVENUE BRIDGE OVER THE HUTCHINSON RIVER PARKWAY (BRONX)

This two span bridge supports a transit structure overhead and has substandard clearance over the highway below. A project to install an ITS solution, which includes an overheight vehicle detection system that flashes 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 are activated by acoustics and that will document future damage to the bridge as well as the offending vehicles' descriptions and plate numbers for recoupment of costs by the City. The contractor completed extra work associated with landscaping in the spring of 2006. 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

Video Stills From the Westchester Avenue Bridge BDSS.

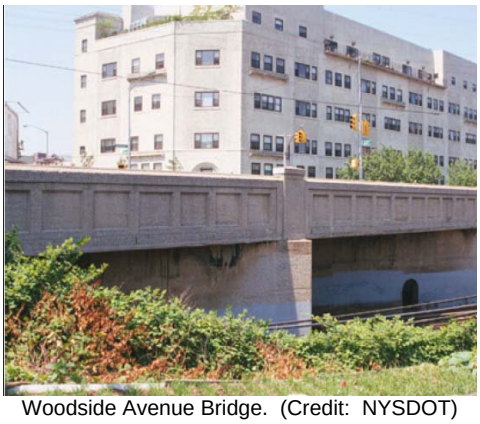
The Westchester Avenue Bridge's vertical clearance over the Hutchinson River Parkway is sub-standard. Due to the number of truck and bus vehicles that mistakenly enter the Hutchinson River Parkway, where commercial vehicles are not allowed, the fascia steel girders of the bridge have been severely impacted and damaged numerous times. The planned lowering of the parkway will make it possible to eliminate the existing sub-standard vertical clearance of the bridge over the parkway without adversely impacting the NYCT elevated structure and its transit train operations. The total length for the lowering of the parkway will be 1000 feet (north and south), with a maximum lowering of the parkway of 2.5 feet under the Westchester Avenue Bridge.

The rehabilitation of the bridge will include the replacement of the existing reinforced concrete deck slab with a new reinforced concrete deck, steel faced curbs, a new parapet wall and protective screenings, concrete sidewalks, rehabilitation of the damaged steel fascia girders, and replacement of the diaphragms and other bridge elements, including a new steel water main.

This rehabilitation project is currently in final design. Computer traffic simulation models for the proposed maintenance and protection of traffic schemes for both the Westchester Avenue Bridge and the Hutchinson River Parkway are underway. The purpose of the models is to perform traffic capacity/queuing analyses, traffic signal timing optimization and traffic network simulation for the highway and streets. Construction is expected to begin in March 2009, and is expected to be complete in November 2011.

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 August 2011, and is expected to be complete by August 2013.



Woodside Avenue Bridge. (Credit: NYSDOT)

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

The East 8th Street access ramp (Guider Avenue 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 new 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 pile foundation, 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 October 2008, and is expected to be complete in July 2010.

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

11TH AVENUE VIADUCT (WEST 30TH STREET TO WEST 33RD STREET) OVER LIRR WEST SIDE YARD (MANHATTAN)

This project will consist of the re-decking of the viaduct, the replacement of the sidewalks, the upgrading of the existing bearings to seismic isolation bearings, and the replacement of the street lighting. The work will also include performing repairs of the existing pier and abutment walls. The viaduct will be constructed in two stages, one half of the viaduct at a time. Three south bound travel lanes will be maintained at all times. Construction is expected to begin in October 2008, and is expected to be completed in July 2010.

11th Avenue Viaduct (West 30th Street to West 33rd Street) in 2006. (Credit: NYSDOT)

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

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 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 on February 8, 2005.

15th Avenue Bridge in 2002. (Credit: NYSDOT). Final Touches on Completed Bridge.

The 18th Avenue Bridge is also 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 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 were installed. The water main, gas main, and sewer were removed and relocated. A new concrete deck, approach slabs, and sidewalks were also part of this reconstruction project. The bridge was constructed in four stages, with one lane open in each direction at all times, as well as pedestrian access to local businesses. The 18th Avenue Bridge was substantially completed on May 16, 2005.

18th Avenue Bridge in 2003. (Credit: NYSDOT) Bridge Nearing Completion.

Finishing the Road. Completed 18th Avenue Bridge.

Similar construction at the 17th Avenue and 20th Avenue Bridges began after the completion of the 15th and 18th Avenue Bridges. The reconstruction of the 17th Avenue Bridge began on May 17, 2005. Effective July 13, 2005, the bridge was closed to vehicular traffic. The work included the demolition of the existing concrete arch superstructure and the existing concrete piers to top of footings. The superstructure was replaced with a new four span reinforced pre-cast pre-stressed rigid frame with new reinforced pre-cast pre-stressed concrete piers and slabs. Utilities were upgraded by installing additional 300 mm water main, gas main and electrical ducts. The bridge was re-opened to vehicular and pedestrian traffic on December 13, 2005, 29 days ahead of schedule. The 17th Avenue Bridge was substantially completed on February 24, 2006. The sidewalks were reopened to pedestrian use 16 days ahead of schedule earning the contractor the maximum incentive payment of $150,000. The total 17th Avenue Bridge project was completed

45 days ahead of schedule.

17th Avenue Bridge in 2002. (Credit: NYSDOT) Prior to Reconstruction in 2005.
Inspecting the Bridge Before Construction.

Demolition of the 17th Avenue Bridge Deck. Casting the New East Abutment Wall.
Installing Precast Concrete Footings.

Installing Pier Walls for the 17th Avenue Bridge. Installing Precast Deck Panels.
Placing the Reinforced Concrete Bridge Deck.

Completed 17th Avenue Bridge and Fence.

Work on the 20th Avenue Bridge began on May 15, 2006 after the utility company performed extensive work on the gas main. The bridge is expected to be complete in fall 2008. The scope of this project includes the demolition of the existing six span reinforced concrete rigid frame and replacing it with a single span integral abutment reinforced-concrete composite superstructure. New combined sewer pipes, manholes, and water main will also be installed.

20th Avenue Bridge in 2002. (Credit: NYSDOT) Stage I Sewer Work in 2006.

Removing the 20th Avenue Bridge Arch Overburden in January 2007. Bridge demolition in February 2007.

20th Avenue Bridge Structural Steel Erection in August 2007.

At the end of 2007, the contractor had completed sewer work, pile driving for the new abutments, soldier piles and lagging. The installation of steel girders and new abutments for the north side of the bridge was also complete. Installation of stay-in-place deck forms and gas main work is currently in progress.

Installing the Gas Main Under the 20th Avenue Bridge North Sidewalk in September 2007. Installing Metal Forms for the Bridge Deck in November 2007. Gas Mains Prior to Modification in December 2007.

The four bridge project is scheduled for completion in fall 2008.

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

The current bridge is a nine span reinforced concrete structure over the FDR Drive. There is a ferry house on the East River Esplanade which was used for storage for the old ferry when the

bridge was built in 1940. The bridge is supported on the ferry house structure on the Esplanade side. 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 fourteen span bridge will include steel piers with caisson foundations, a ramp retaining wall, and new superstructure using welded structural tubing, vertical steel railing, and horizontal hand rails, as well as protective fencing. A new cast-in-place reinforced concrete deck will be installed. The proposed west ramp will be enclosed with a stone masonry wall to match the existing park wall. 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 December 2008, and is expected to be complete in February 2010.

153RD STREET BRIDGE OVER METRO NORTH (BRONX)

This project, currently in the final design stage, will construct 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 by the end of 2008 and be completed by the end of 2011.

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 December 2008 and is expected to be completed in February 2010.

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

Design-Build

In 2007 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.

RIKERS ISLAND BRIDGE OVER RIKERS ISLAND CHANNEL (QUEENS)

Cores taken from the bridge deck in 2003 revealed that the estimated useful life of the deck would soon expire, thus making bridge rehabilitation necessary. In 2006, the bridge carried approximately 13,146 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 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, the replacement of the bridge will require coordination with the Department of Corrections. Construction is expected to begin in 2017, and is expected to be complete in 2019.

As an interim measure, a project was planned to rehabilitate the bridge deck. The Notice to Proceed was issued to the contractor with a start date of August 24, 2005.

2006: Looking North at a New Bridge Slab And The Roadway Repairs. Painting Under the Bridge.

2006: Performing Underdeck Repairs. Working Inside the West Rebar Box Frame. Beam Repair. Concrete Placement.

The project work expanded to include superstructure painting, various superstructure repairs, and repairs of the pier caps. The rehabilitation of the bridge deck was substantially completed on December 22, 2006. The painting was completed in 2006, and all of the other repairs were completed in summer 2007. This rehabilitation will allow the extension of the bridge's useful life to at least 2017, when the existing bridge will be replaced.

BRUCKNER EXPRESSWAY BRIDGES (NB AND SB) OVER AMTRAK & CSX (BRONX)

A tanker truck carrying home heating fuel overturned and caught fire on the northbound bridge on the evening of October 4, 2005. The traffic on the bridge, and on the Amtrak and CSX railroad lines below, was adversely affected. The bridge was inspected and core samples of the concrete from the fire-affected deck were tested. Division crews assisted in emergency repairs and clean-up, re-setting all expansion plates on the abutment, and performing deck repair. The crews worked continuously, and the roadway was re-opened in time for the morning rush hour on October 6, 2005.

Bruckner Expressway Bridge in 2002. (Credit: NYSDOT)

The Tanker Truck. Repairs and Cleanup. (Credit: Bojidar Yanev)

To protect the trains and railroad facilities below the bridge after the October 4, 2005 tanker truck fire, contractor crews began the nighttime installation of protective timber shielding under the bridge on October 5, 2005. The project was completed on November 8, 2005. The Division's Surveying Unit assisted the Inspections Unit in monitoring the deflection of the bridge.

The fire on the bridge weakened its members. While the immediate results of the fire were addressed by in-house forces, the aftereffects remain unresolved. The most recent inspection conducted on September 14, 2006 revealed that at least four girders have sagged and they are hit by CSX railroad cars below. The concrete deck has separated from the steel girder and there is a one to two inch gap between the top of the flange and the bottom of the haunches. In addition, the diaphragms between the girders have been burned and their capacity has been weakened. Urgently required repairs were handled by the When and Where contractor. The contractor installed additional timber bracing of the bridge's timber shielding in January and February 2007, performed emergency removal of loose underdeck concrete in July and August 2007, and repaired a red flag condition at the bridge stringers in September 2007. This will be followed up by the replacement of the northbound bridge's superstructure and the southbound bridge's deck, which will be done under a Design-Build contract. Construction is expected to begin in spring 2009, and is expected to be complete in fall 2010.

CROSS ISLAND PARKWAY BRIDGE OVER FORT TOTTEN ENTRANCE (QUEENS)

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 a new superstructure; pushing back the abutments to establish a longer bridge; adding one lane in each direction on 212th Street; geometric alignment improvements; and signal and lighting modifications. This project is currently in the preliminary engineering stage. Construction is expected to begin in summer 2010, and is expected to be complete in 2012.

Cross Island Parkway Bridge in 2002. (Credit: NYSDOT) Aerial View. Andre Celestin About to Inspect the Abutment.

Cross Island Bridge Exit Ramp on the Northeast Side. Bridge Underdeck. South View of the Bridge.
(Credit: Tamara Berlyavsky)

HARLEM RIVER DRIVE AT EAST 127TH STREET (MANHATTAN)

This project involves the replacement of the existing 11 span bridge and the reconstruction of the Harlem River Drive between the Willis Avenue and Third Avenue Bridges, 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, and 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. The viaduct currently carries two northbound and three southbound traffic lanes and serves approximately 79,000 vehicles per day. This area currently has 40 times the State average number of accidents. Construction is expected to begin in spring 2014, and is expected to be complete in spring 2016.

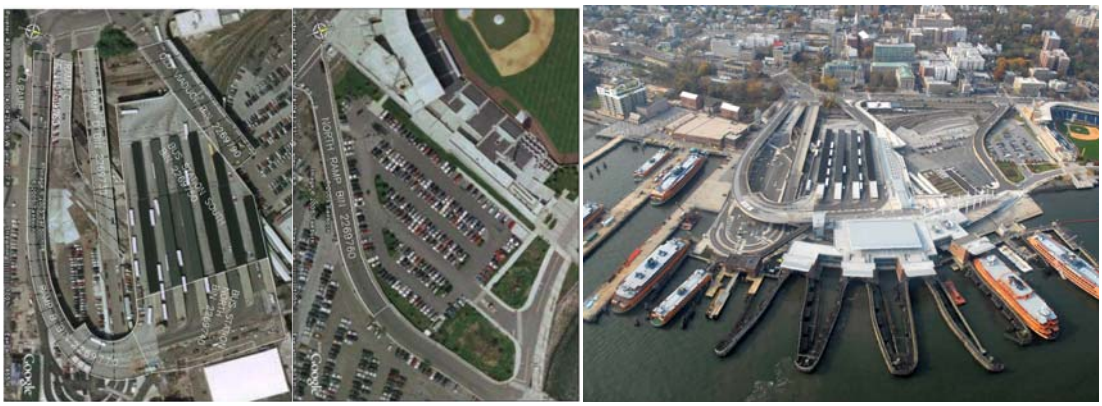
Harlem River Drive at East 127th Street. Deputy Director of Design-Build Beatriz Duran and Director of Design-Build/Emergency Contracts Chris Sklavounakis at the Bridge.

EIGHT RAMPS AND ONE PEDESTRIAN BRIDGE AT THE ST. GEORGE STATEN ISLAND FERRY TERMINAL (STATEN ISLAND)

Ferry service between Staten Island and Manhattan began in 1898, and its operations were taken over by the City's Department of Docks and Ferries in 1905. Today it is run by NYCDOT's Passenger Transport Division and services more than 19 million passengers each year, according to Captain James C. DeSimone, the ferry's Chief Operations Officer. The St. George Ferry Terminal itself recently underwent a major reconstruction project. The old drab, dingy building was converted into a well-lit, modern multi-modal facility. In addition to ferry service, the terminal also includes a very active MTA bus station and a Staten Island Railway Station. To complete the make-over of the St. George Terminal, the Division's

Design Build Unit is undertaking a major rehabilitation project to upgrade vehicular access to the site.

Currently a series of eight ramps carry bus and passenger car traffic in and out of the facility. Seven of the eight ramps were constructed in 1948, with the eighth dating back to the early part of the 20th century. The last major structural work on these bridges was a deck replacement project in 1985 that only addressed three of the eight bridge structures. The planned design-build project will upgrade these eight vehicular structures (and one pedestrian bridge), and provide a design life of 75 years. For seven of the ramps, the project will provide new decks and eliminate joints where feasible, retrofit poorly detailed steel connections, and rehabilitate/replace deteriorated steel super- and sub-structure members, as well as install new paint systems. Lead paint removal and the installation of a new drainage system as well as a pigeon deterrent system will also be included. The eighth ramp is the existing load-restricted north ramp adjacent to the Richmond County Bank Stadium. It will be demolished and reconstructed on a more efficient alignment in order to alleviate traffic congestion at the intersection of Richmond Terrace and Wall Street. In addition, this project will replace the superstructure of a pedestrian bridge connecting the terminal to an office facility, and will address traffic improvements for the entire stretch of Richmond Terrace outside the terminal. Construction is expected to begin in fall 2009, and is expected to be complete by fall 2012.



Arial Views of the Staten Island Ferry Terminal Ramps.

The Ferry Terminal Pedestrian Bridge.

When and Where Unit

In 2007, the following structures were worked on under the Division's When and Where contracts: Mosholu Parkway Bridge over Bronx River, Bridge South of Allerton Avenue over Bronx River, Footbridge North of Route 1 over Bronx River, Southern Boulevard over Bronx River, Belt Parkway Bridge over Fresh Creek, Belt Parkway Bridge over Paerdegat Basin,

Belt Parkway Bridge over Spring Creek, Brooklyn Bridge Promenade, Bruckner Expressway Bridges over Amtrak & CSX, Bus Station Exit Ramp over SIRT, Columbia Heights Bridge over Brooklyn-Queens Expressway, Depot Place Bridge over Conrail Hudson Division, Douglaston Parkway Bridge over Cross Island Parkway, Eastchester Road Bridge over NYCTA, FDR Drive at East 15th Street, Promenade over FDR Drive from East 79th to East 91st Streets, Fort Tryon Park Bridge South of Cloisters, Harlem River Drive Northbound Ramp over Harlem River (ramp to Trans Manhattan Expressway), Hempstead Avenue Bridge over Cross Island Parkway, Henry Hudson Parkway Viaduct over West 72nd to West 79th Street, Jackie Robinson Parkway Bridge over Metropolitan Avenue, Knapp Street Bridge over Belt Parkway, Matthewson Road over MacCracken Avenue, Mosholu Parkway (southbound) at Major Deegan Expressway, Riverside Drive Viaduct at West 158th Street, Roosevelt Island Bridge over East River/East Channel, St. George Ferry Terminal Ramp D, Superior Road Bridge over Cross Island Parkway, Union Turnpike Bridge over Cross Island Parkway, Willis Avenue Bridge over Harlem River, 14th Avenue Bridge over Cross Island Parkway, West 35th Street Bridge over Amtrak 30th Street Branch, East 51st Street Pedestrian Bridge over FDR Drive, Pedestrian Bridge at 73rd Street over HHP and Amtrak, East 78th Street Pedestrian Bridge over FDR Drive, 79th Street Ramp to the Garage over the 79th Street Boat Basin Garage, 163rd Street Pedestrian Bridge over Hawtree Basin, Woodhaven Boulevard Bridge over Atlantic Avenue, and the 191st Street Tunnel between St. Nicholas Avenue and the Broadway IRT.

Existing Eastchester Road Bridge Joint Condition Covered With Roadway Plates. Removal of Existing Concrete Header. Newly Installed Concrete Header Reinforcement.

Newly Poured Eastchester Bridge Concrete Header Joint. Preparing the Steel. Installing New Steel Joint Angles. New Reinforcement.

Eastchester Bridge Concrete Header and Steel Joint Angle Prior to Rubber Seal. Pouring Concrete for the New Joint Headers. Installing the Seal. Completed Project.

Hempstead Avenue Bridge Repairing the Column. Existing Steel Column Deterioration. Newly Reinforced Column. General View of the Repaired Area.

Missing Grout on the Woodhaven Boulevard Bridge Parapet Wall. Repairing the Grout.

Removing Loose Overhead Concrete at the Staten Island Ferry Terminal Bus Ramps.

Repairing the Center Roadway Asphalt Overlay of the 14th Avenue Bridge.

Removing Loose Concrete From the Underdeck of the Superior Road Bridge, And Installing Expanded Wire Mesh.

Currently scheduled projects include the Bus Station North Ramp over SIRT, and the Riverside Drive Bridge over West 155th Street.

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 April 18, 2005.

Marine bridge repairs already completed include 145th Street Bridge over Harlem River, Hutchinson River Parkway Bridge over Hutchinson River, Shore Road Bridge over Hutchinson River, Boston Post Road over Hutchinson River, Depot Place Bridge over Conrail Hudson Division, Belt Parkway Bridge over Mill Basin, Roosevelt Island Bridge over East River/East Channel, Hamilton Avenue Bridge over Gowanus Canal, 163rd Street Pedestrian Bridge over Hawtree Basin, and Belt Parkway Bridge over Fresh Creek.

Starting the New Timber Fender Protection
for Pier 6 of the 163rd Street Bridge.

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.

A consultant issued an urgent flag to repair the pier cap beams of the Belt Parkway Bridge over Fresh Creek, since all of the concrete pier caps were found to be excessively damaged with huge section loss in both the concrete and the accompanying rebars. It was concluded by the consultant that the load-carrying capacity of the bridge was also significantly reduced. Therefore an urgent flag was routed to the Marine When And Where contract to make a special type (on an interim basis) repair to these cap beams under this flag. All of the rebars were properly cleaned and coated with protective coating, and the required concrete patch work was done. After completion of all of the concrete repairs, a carbon fiber wrapping was placed to prevent further deterioration to these cap beams. The rehabilitation of this bridge was completed on August 14, 2007. This 16-month project required a lot of staff-hours and specialized equipment and succeeded in restoring the structural integrity of this four pier concrete bridge for a few years until the Belt Parkway seven bridge project begins. This project required special construction management and engineering skills, and close communications among the designer, contractor, and engineering support services to make this rehabilitation a success.

General View of the Fresh Creek Bridge Before Work Began on the Piers. Contractor's Barge Under the Bridge.

Working Under the Bridge at Low Tide. Scaffolding System Utilized to Work on the Concrete Pier Structures.

Reinforcing the Newly Restored Fresh Creek Bridge Concrete Pier Structure With Fiber Wrapping. Positioning the Barge Between the Piers. Removing and Repairing the Concrete for Each Pier.

Finishing the Fiber Wrapping of the Four Piers. Removing the Scaffolding and Other Materials from the Bridge Site. View of Rehabilitated Cap Beams.

Currently scheduled projects include additional repairs to the Shore Road Bridge over Hutchinson River, the Third Street Bridge over the Gowanus Canal, and a newly flagged condition at the Brooklyn Bridge Brooklyn Fountain/Esplanade requiring sealing of the existing cofferdam steel sheeting and soil stabilization.

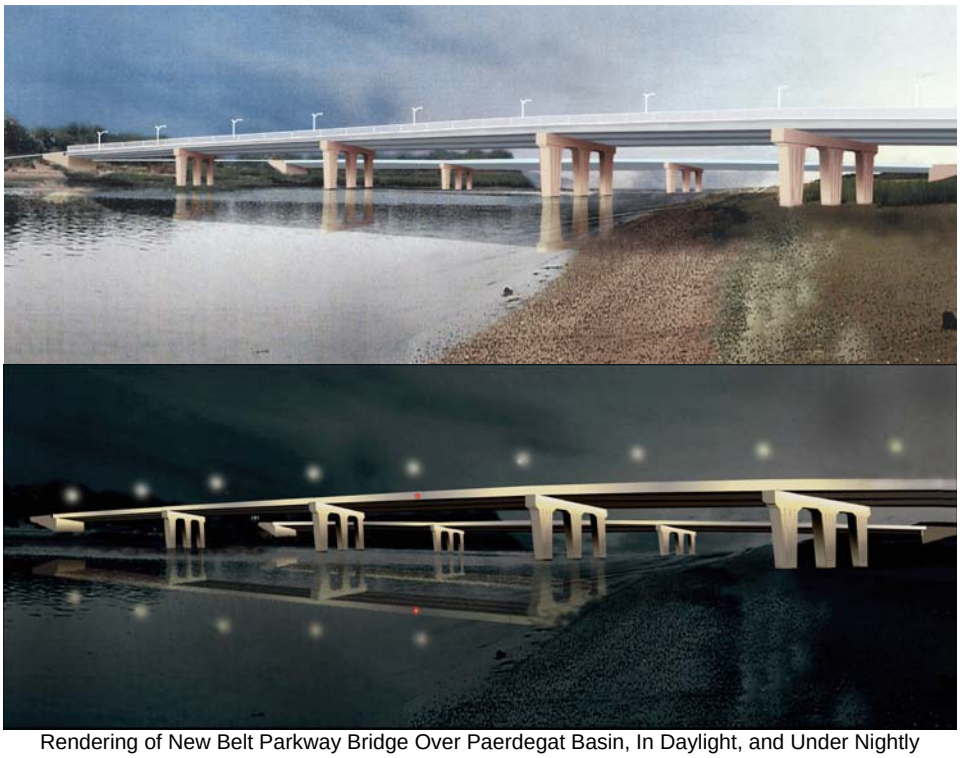
Holes in the Steel Sheet Cofferdam of the Brooklyn Bridge Esplanade. View of the Work Area. View of the Pavers Before Work Began to Stabilize the Area.

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 2007 included the Belt Parkway Bridge over Paerdegat Basin in Brooklyn. The existing bridge with its nest of thirteen piers will be replaced by two split bridges, one each for eastbound and westbound traffic. The bridge for eastbound traffic will have four piers whereas the bridge for westbound traffic will have two piers. This is the first bridge to be designed by NYCDOT with trapezoidal steel box girders utilizing high performance steel and seismic isolation sliding bearings. In addition, the aesthetics of the bridge will be enhanced by its nightly illumination utilizing light emitting diodes on both fascias and piers. This project will also include wetland mitigation and landscaping in the immediate vicinity of the proposed bridges. The project is now in the final design stage, and it will be constructed together with other two adjacent bridges in the Belt Parkway Corridor as a combined contract.



Rendering of New Belt Parkway Bridge Over Paerdegat Basin, In Daylight, and Under Nightly Illumination. (Credit: Alexander Berens)

Rendering of Existing and Proposed Belt Parkway Bridges Over Paerdegat Basin. (Credit: Alexander Berens)

Other projects underway include the Union Turnpike Bridge over Cross Island Parkway (and Creedmoor Center Road), and Hillside Avenue Bridge over Cross Island Parkway in Queens. Both bridges are two span concrete structures. The In-House Design staff prepared the scope of work and a sub-consultant performed surveys, borings, corings, and traffic studies. The project is in the preliminary design stage.

This unit, along with the Department of Design and Construction, is also involved in the design of a proposed pedestrian bridge that will connect Park Row to an existing Park Row overpass adjacent to Police Plaza. The bridge will enhance the area while providing a safe pedestrian connection from Police Plaza to Pearl Street. The new bridge will be part of a Park Row/Chatham Square project, which is being handled by DDC.

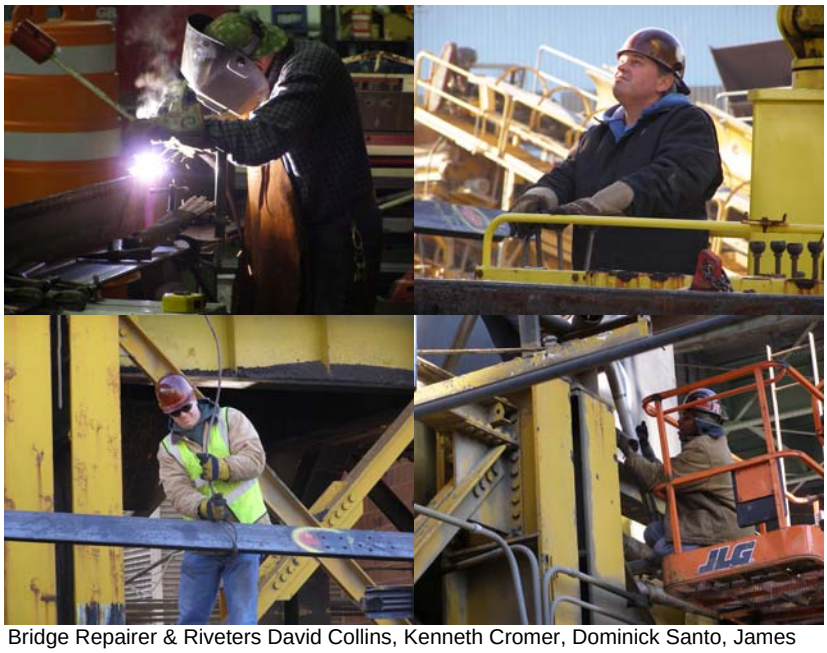
In-House Design's Electrical Group reviews and/or prepares contract documents for all electrical and street lighting work on all projects on the Division's Capital Program. Some of the contracts reviewed during 2007 included the Willis Avenue, Broadway, 145th Street, and Wards Island Pedestrian Bridges over the Harlem River; Third Street and Hamilton Avenue Bridges 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; Park Avenue Tunnel; Manhattan Bridge; Brooklyn Bridge; and the Staten Island Advanced Management Traffic System.

HAMILTON AVENUE ASPHALT PLANT EMERGENCY REPAIRS

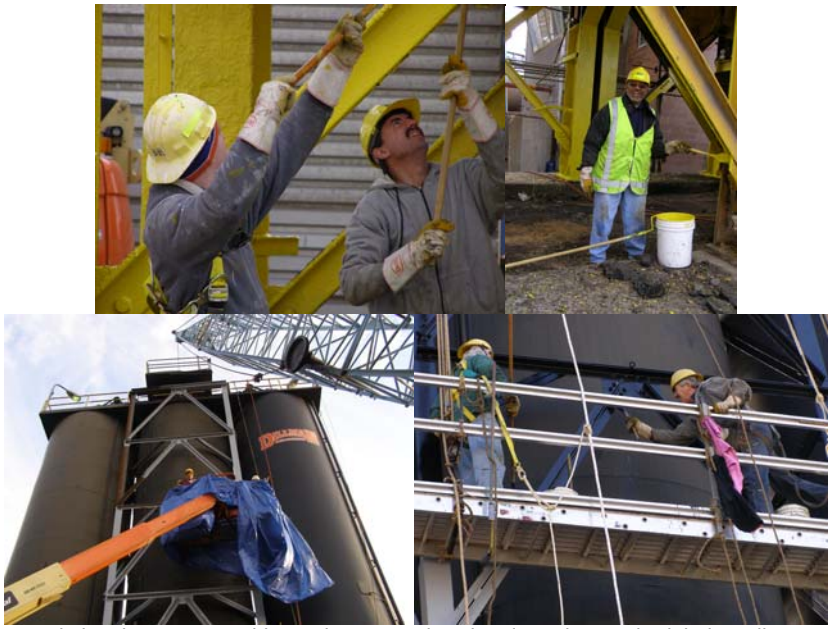
In late 2007, the existing support system for the conveyor platform of the Roadway Repair and Maintenance Division's Hamilton Avenue Asphalt Plant exhibited some settlement. This rendered the plant inoperable. Our staff was requested to perform the urgent total design of a new support system. The Surveying Unit conducted field measurements of the damaged structure on December 7, 11, 20, and 21, 2007. Within two weeks, the In-House Design staff designed the system and prepared fabrication drawings for the Bridge Maintenance, Inspections and Operations Bureau. The Division's In-House Repair personnel then fabricated and installed the side frames, bracings, and I-beams necessary to restore operations at the facility. Additional emergency repairs were also made to the drum, conveyor belt, and hopper. Upon completion, Division bridge painters painted the new steel. The plant is now operational and 400 tons of asphalt were processed on January 21, 2008.

NYCDOT Hamilton Avenue Asphalt Plant. Erecting the New Support System.
(Support System Credit: Hany Soliman)

Measuring the Steel: Bridge Repairer & Riveters David Collins and Yiu Liu, and Assistant Civil Engineers Clara Medina (Obscured) and Hany Soliman. Bridge Repairer & Riveters Brook Budd and James Wright III. (Credit: George Klein)



Bridge Repairer & Riveters David Collins, Kenneth Cromer, Dominick Santo, James Wright III Working on the Asphalt Plant Support Frame. (Credit: George Klein)



Painting the Frame: Bridge Painters Frank Duic, Vlato Zic, Frank Pinheiro, Albert Pappas, Branko Grzancic, and Milan Radovic. (Credit: Earlene Powell)


Bridge Painters Frank Duic, Vlatko Zic, Branko Grzancic, Frank Piniero, Michael Scotti, Supervisor Bridge Painter Georgeios Ploumis, Bridge Painters Reynaldo Grant, Milan Radovic, and Albert Pappas. The Completed Project. (Credit: Earlene Powell)

FABRICATION MANAGEMENT SERVICES

In 2007, a critical floor beam of the fast-paced Hamilton Avenue Bridge Project rolled over in a highway accident while being transported to the bridge site. The fabrication of a new floor beam would not only cause delay to the project schedule, but would also result in assembly difficulties at the site because all of the other structural components of the bridge leaf were transported and partially installed in the field, and as such, were not available for a shop assembly verification. It was therefore essential to evaluate the extent of the damage suffered by the beam before deciding if it could be satisfactorily utilized in the bridge structure, or if fabrication of a new floor beam was absolutely needed.

The Fabrication Management Services staff of the Quality Assurance Section developed an extensive non-destructive testing program involving radiographic, ultrasonic, and magnetic particle testing techniques that the contractor was asked to execute under close supervision of the unit's engineers to assure the Division that the beam did not suffer damage and was still usable for the project. Upon obtaining satisfactory results from this testing program, which confirmed that there was no latent damage, the beam was allowed to be utilized in the project after the repair of minor skid marks and damage to the paint. This extraordinary effort from the Quality Assurance engineers not only resulted in completing the east leaf of the Hamilton Avenue Bridge in time but also avoided the potential field misfits and adjustments that a newly fabricated beam would have required.

Thomas Deluca, Commissioner Janette Sadik-Khan, Chief Bridge Officer Henry Perahia, and Mohammed Afzal Looking at Specimens and Radiographs From Welding Qualification Procedure Test Plates. The Quality Assurance Section Examines These Plates to Ensure That Fabricator Welding Processes Conform to the Division's Specifications. (Credit: Yuliy Zak)

ENVIRONMENTAL ENGINEERING

The Environmental Engineering staff of the Quality Assurance Section provides environmental oversight and compliance on all capital projects in the Division. Lead paint abrasive cleaning projects underway or completed in 2007 included the Queensboro Bridge, Manhattan Bridge, Rikers Island Bridge, Roosevelt Island Bridge, Brooklyn Bridge, Willis Avenue Bridge, and the Williamsburg Bridge. In addition, the unit continued to provide emergency response related to environmental issues.

As part of the Environmental Committee for the Office of Environmental Assessment and Compliance (OEAC), the unit assisted in developing environmental procedures such as spill prevention, control and countermeasures protocols, roadway spill clean-up protocols, RCRA contingency plans and the disposal of universal waste. The unit also worked with OEAC to develop and implement training for working over water as well as the Clean Water Act.

The unit performs quarterly water discharge monitoring in compliance with the NYSDEC SPDES system for bridges that cross waterways such as the Gowanus Canal, English Kills Creek and the Newtown Creek. Environmental oversight was provided to emergency work-over-water projects on the Brooklyn Bridge, Mill Basin Bridge, Roosevelt Island Bridge, Willis Avenue Bridge, Hamilton Avenue Bridge, Gerritsen Inlet Bridge, Paerdegat Basin Bridge, Third 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.

The unit also manages hazardous waste generated by both the in-house work of the Division and the capital projects. Through the use of environmental testing laboratories, the unit has continued to identify and dispose of out-of-date and expired chemical products stored in bridge facilities. Hazardous waste such as spent paints, solvents, oils and lead-paint debris is generated during maintenance and construction projects. This waste is managed in accordance with all applicable regulations for treatment and disposal. The unit is responsible for providing reports to the NYSDEC regarding the management and disposal of this waste.

The unit ensures compliance with storm water regulations, hazardous waste management, Clean Air Act requirements, Clean Water Act requirements, asbestos regulations, lead paint removal protocols, and health and safety on NYCDOT bridge projects. This includes projects such as the Hamilton Avenue Bridge, Willis Avenue Bridge, and Roosevelt Island Bridge, where compliance with environmental concerns such as dredging and dewatering is required in conjunction with submarine cable installation, pier demolition, pier construction, and channel widening.

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 Rikers Island Bridge, Roosevelt Island Bridge, Manhattan Bridge, Williamsburg Bridge, Metropolitan Avenue Bridge, and the Queensboro Bridge Painting Project.

BRIDGE PROJECT SPECIFICATIONS

In 2007, the Specifications staff of the Engineering Support Section prepared and/or reviewed contract proposal books and/or specifications for 25 bridge rehabilitation and reconstruction contracts which included several combined or multiple-bridge contracts and four private developer contracts. Six of these contracts totaling approximately $660 million in construction costs were either bid or advertised for bid. The five bid contracts are currently in different stages of award and registration. Out of ten contracts with an estimated construction cost of $552 million that were submitted to the Law Department for approval, six

were approved, another three are still in the approval process, and one contract was put on hold. The specifications for the remaining eleven contracts are in various stages of preparation.

Notable among the bridge contracts prepared and/or reviewed are: replacement of Willis Avenue Bridge over Harlem River; maintenance of various movable bridges; reconstruction of Shore Road Circle Bridge over Amtrak; reconstruction of Annadale Road Bridge over SIRT; construction of East 153rd Street Bridge over Metro North, and Component Rehabilitation of Ten Bridges Citywide.

CONVERSION OF DIVISION ENGINEERING ARCHIVES

Since the first digitizing contract of engineering records began nine 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 (over 100,000 frames of film). 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.

The purpose of the new contract is not only to transfer microfilms and photographs to a digital CD-WORM media, but more importantly, to consolidate them according to their BIN (Bridge Identification Number) for future use. The scope of work include records for an estimated 467 bridge contracts on 35mm microfilm (approx. 107,000 frames) and about 2,500 historic bridge construction photographs to be burn to CD and shown in index file.

While awaiting the award of this contract, the key contract pages of all digitized projects were scanned and placed on the Agency server. By linking drawing images (Title Sheet, List of Drawings, General Notes, etc.) from the digital archives to a contract number in the database file the essential information about every job is supplied.

Server-based records support quality communications and enhance our public image. They ensure faster, flexible and effective delivery, improve document security, and organize, retrieve, distribute and print all documents more efficiently.

We also updated the specifications for the preparation of record drawings and electronic media. This first major revision of the specifications in six years concentrated on the elimination of the microfilming requirement for all record drawings. The new specifications are concise, well-illustrated, and simple to follow. A copy of the specifications in PDF format is easy to transmit electronically and we do not need to print large quantities of books.

The switch to electronic media archiving and a server-based database will save money on drawing submissions as well, and will lead to the establishment of a unified electronic database for bridge archives. Digitizing documents and storing them online, where they are easy to access and print, will simplify contract submission process and cut costs in a long run.

The Specifications unit is also scanning the Number One Books of previously bid bridge contracts so that they may be searched, retrieved and sent electronically. Out of 531 books total (407 contracts), 489 contract books were scanned and transmitted to 56 CD's as a backup and for storage purposes.

GRACE ASPHALT PLANT

The Department intends to acquire the Grace Asphalt Plant in Corona, Queens (both the real estate and the plant equipment) for its Roadway Repair and Maintenance Division. The acquisition of this private plant will help the City streamline its asphalt procurement and save costs. The Department will also be able to recycle some milled asphalt materials. The Land Use Unit is coordinating the ULURP application process for this project. The site and field investigations were complete by the end of 2007.

CRP/EXTELL PARCEL H PROJECT

The CRP/Extell Parcel H, LP 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. The project will also include a half tunnel section in what was formerly known as the Miller Highway Tunnel. 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. Construction is complete for three of the bridges (which are open for traffic), and design is complete and approved for the other four bridges. The first phase of construction for the half tunnel section is complete and phase two is in progress. The project is now in its second stage, and is 80 percent complete overall.

Quality Assurance Engineers Yuliy Zak and Javed Sarwar Inspecting the Asphalt and Concrete on the Manhattan Approach of the Manhattan Bridge. (Credit: Masroor Mahmood) Quality Assurance Engineer Masroor Mahmood Inspecting the Concrete for the West Abutment Wall of the New 63rd Street Bridge. (Credit: Yuliy Zak)

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 twenty-two spray trucks, six plow trucks and several smaller plows. Ten of the spray trucks are combination spray/plow trucks with a 1,000 gallon tank capacity, and five are spray-spreader/plow trucks with a 360 gallon spray capacity, and a nine cubic yard spreader capacity. There are twenty chemical storage tanks, with a total storage capacity of 114,250 gallons.

New anti-icing yards storing both chemicals have been established under all four East River bridges. Supervisors monitor the bridge decks during storm events by traversing them and using thermal instrumentation installed in their vehicles to make informed decisions as to when to apply chemicals. GPS capabilities have been installed in key vehicles to assist supervisors with the decision making process.

In the winter of 2006-2007, a total of 51,300 gallons of potassium acetate and 62 tons of sodium acetate were applied on the roadways of all four East River Bridges.

Anti-Icing Trucks. (Credit: Chris Gilbride)

INSPECTIONS

In 2007, Inspections covered 114 bridges and 635 spans. Emphasis was placed on ensuring public safety through the monitoring of potentially hazardous conditions and temporary repairs. The unit performed 322 monitoring inspections, and 166 special winter monitoring inspections of cellular structures, shorings, and potential fire hazards. In addition, 255 emergency inspections were conducted in response to hot line calls, in-house requests, or citizen complaints.

The new Bridge Data System (BDS) allows inspection reports to be generated and transmitted electronically. It provides access to data from the latest inspection reports on all bridges to all Division units. In addition, when an emergency arises, our inspectors are able to send photographs and other information to the main office via a wireless connection to the internet. This feature enables bridge repair engineers to assess the condition and dispatch repair crews with the appropriate equipment in a timely manner. The test version of the system was field verified in 2006, along with the selected portable computers. The production version of the system was implemented in 2007.

Work is underway under a new contract to expand the BDS capabilities by incorporating data from capital reconstruction projects. Additional features will include in-depth inspection reports by consultants as well as GPS data.

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.

Assistant Civil Engineer Andrew Hoang Inspecting the Brooklyn Bridge. (Credit: Clara Medina) Snooper Truck Utilized in March 2007 During an Emergency Inspection of the Northbound Henry Hudson Parkway.

The Consultants Used the Division's Borescope on the Williamsburg Bridge to Inspect Fracture-Critical Details That They Were Unable to Access by Their Own Devices. They Were Assisted by Mechanical Engineering Intern Anton Depasquale. (Credit: Kevin McAnulty)

Following the collapse of the bridge carrying I-35W in Minnesota on August 1, 2007, inspection practices nationwide were intensely scrutinized. On instruction of Commissioner Janette Sadik-Khan, Dr. Yanev assembled a panel of experts including representatives of the consultant community, academia and members of the Bridge Management and Maintenance Committees of the Transportation Research Board, of which he is a member. A questionnaire was circulated among the panelists in order to facilitate their responses. These responses and the opinion of in-house experts were taken into account in considering the potential benefits of using non-destructive techniques for the health monitoring of structures in the future. It was concluded that the current inspection methods and frequency are safe. As a result of the rehabilitations of the past decade, bridge conditions have improved significantly. The Bridge Inspection and Research and Development Units have pioneered the use of various nondestructive tests on City bridges, including X-ray diffraction, fiber optics, strain-gauging, ground penetrating radar, and ultrasonic testing. Future applications of such technologies are under consideration.

On September 17, 2007, Division representatives, along with engineers from NYS DOT, the Port Authority of New York and New Jersey, and the Metropolitan Transit Authority reported to the New York City Council on the safety of the bridges and the methods of inspection and hazard mitigation.

STRAIN GAUGE AND TELLTALE TESTING

In July 2007, a team headed by Vera Ovetskaya of Bridge Preventive Maintenance tested several structural members on the Brooklyn Bridge after a fractured secondary steel member was discovered by Bridge Maintenance. The project involved attaching strain-gauges to the structure at selected locations and monitoring the response to live loads. It was concluded that the fractured member was not critical and it could be repaired without consequences to the structure.

Assistant Mechanical Engineer Vera Ovetskaya (White Hat), Mechanical Engineer Ibrahim Ibrahim (Yellow Hat) and Mechanical Engineering Intern Shafqat Wasi (Red Hat) Conducting the Strain Gauge Monitoring on the Brooklyn Bridge. (Credit: Bojidar Yanev) Summer College Intern Stephanie Dini. (Credit: Michail Zamostin)

Mechanical Engineer Ibrahim Ibrahim, Assistant Mechanical Engineer Vera Ovetskaya, College Aide Michail Zamostin, and Summer College Intern Edward Yee on the Brooklyn Bridge. (Credit: Shafqat Wasi) View Under the Roadway Looking Towards Brooklyn Along the Length of the Structure's Top and Bottom Chord Diagonal Connections. (Credit: Michail Zamostin) Bridge Repairer and Riveter Ignazio Trapani. (Credit: Vera Ovetskaya)

Assistant Mechanical Engineer Vera Ovetskaya Checking the Equipment on the Brooklyn Bridge. (Credit: Shafqat Wasi and Ibrahim Ibrahim) Mechanical Engineer Ibrahim Ibrahim Explaining the Procedures to Mechanical Engineering Intern Shafqat Wasi. (Credit: Vera Ovetskaya)

Mechanical Engineering Intern Shafqat Wasi and Summer College Intern Edward Yee Installing a Strain Gauge on the Pulaski Bridge. (Credit: Edward Yee and Vera Ovetskaya)

Telltales for crack monitoring have been installed at several locations, including three pre-stressed bridges in Staten Island and the FDR Drive at 92nd Street. These devices are attached to both sides of the crack and allow us to measure the changes from one inspection to the next. There is a grid on the face of the telltale that allows for precise measurements.

CLEANING

In 2007, 9,363 cubic yards of debris were removed from bridges and their surrounding areas, and 1,316 drains were cleaned.

Seasonal Assistant City Highway Repairers Jonathan Adorno and Benjamin Castro Jr. Installing a Recycling Bin on the Brooklyn Bridge Walkway as Part of the Recycling Pilot Program. (Credit: Paul Schwartz)

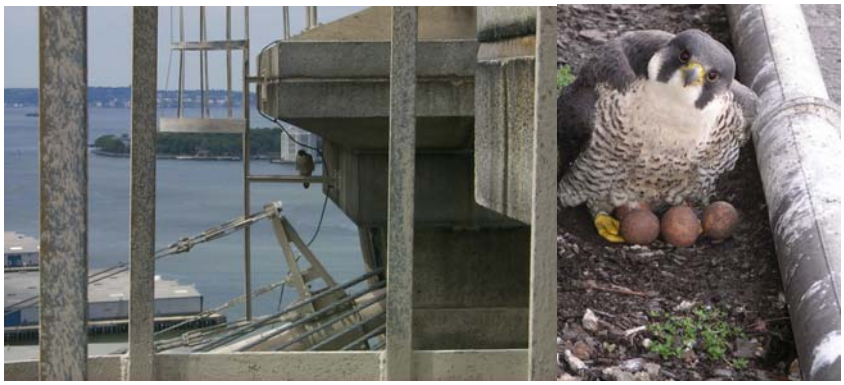
PIGEON DETERRENCE

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. In 2006, the type of barrier used to cage out pigeons was changed from the drop ceiling method to netting. The netting is supported by steel cables that are clipped to the beams. This method is currently in use under the Brooklyn Queens Expressway (over Prospect Street), at the Pulaski Bridge, under the Brooklyn Bridge at “Ash Alley,” and at the anti-icing tank storage area under the Brooklyn Bridge at Dover Street. In addition, a pigeon deterrent system involving low voltage wires is in place at the Belt Parkway Bridge over Ocean Parkway. The wires are installed along the web of the girders and are hardly visible, yet highly effective. The system has been in operation for over two years now and no pigeons have been observed under or by the bridge ever since. The community is pleased that we addressed one of their most serious and longstanding complaints. The system requires minimum maintenance and is extremely easy to operate.

In 2007, pigeon dropping removal and/or pigeon proofing were performed at the 207th Street (University Heights) Bridge over the Harlem River; the Brooklyn Bridge; the Brooklyn Bridge ramp to Pearl Street; the Highland Boulevard NB Bridge over Vermont Avenue; the Pennsylvania Avenue Bridge over Belt Parkway; the Belt Parkway Bridge over Rockaway Parkway; 84th Street; Bay Parkway Bridge over Sheepshead Bay Road; West 31st Street Bridge over Amtrak Layup Tracks; the LiRR bridges at Austin Street, 104th Street, and Junction Boulevard; the Brooklyn-Queens Expressway at Atlantic Avenue and Congress Street; the FDR Drive at 37th Street; the Henry Hudson Parkway at 96th Street; the Livonia Avenue Pedestrian Bridge over LIRR; the Greenpoint Avenue Bridge over Newtown Creek, the Tompkins Avenue Bridge over Greenfield Avenue, the Jackie Robinson Parkway Bridge over Austin Street; the Hutchinson River Parkway Bridge over Hutchinson River, the Belt

Parkway Bridge over Bay Ridge Avenue; Brooklyn Bridge at Prospect Street, and the Brooklyn Bridge at Dover Street.



Nature's Pigeon Deterrent—A Falcon on the Brooklyn Bridge South Side Tower. Falcon Family on the Williamsburg Bridge. (Family Credit: Russell Holcomb).

PAINTING

In 2007, the following bridges were painted: Astoria Boulevard Bridge (EB) over BQE West Leg, Belt Parkway Bridge over Ocean Avenue, Brooklyn-Queens Expressway (WB) over Furman Street, Bruckner Boulevard Overpass from 133rd to 135th Streets, Chambers Street Pedestrian Bridge over West Side Highway, Coney Island Avenue Bridge over Belt Parkway, Cropsey Avenue Bridge over Belt Parkway, Flatbush Avenue Bridge over Belt Parkway, Grand Concourse Bridge over East 170th Street, Guy R. Brewer Boulevard Bridge over Belt Parkway, Harlem River Drive Ramp to the northbound Harlem River Drive, Henry Hudson Parkway Viaduct over West 79th Street, Henry Hudson Parkway Bridges (NB & SB) over the Ramp to 96th Street, Henry Hudson Parkway Bridge over West 158th Street, Knapp Street Bridge over Belt Parkway, Linden Boulevard Bridge over Conduit Avenue, Northern Boulevard Bridge over Cross Island Parkway, Park Avenue Viaduct over East 42nd Street, PS-5 Pedestrian Bridge over 10th Avenue, Sunrise Highway WB Bridge over Laurelton Parkway EB, Sunrise Highway WB Bridge over Laurelton Parkway WB, Union Turnpike Bridge over Jackie Robinson Parkway, Whitelaw Pedestrian Bridge over Conduit Avenue, Woodhaven Boulevard Bridge over Atlantic Avenue, 17th Avenue Pedestrian Bridge over Belt Parkway, 27th Avenue Pedestrian Bridge over Belt Parkway, 80th Street Bridge over 71st to 77th Avenues, 130th Avenue Bridges over Laurelton Parkway (NB & SB), East 174th Street Bridge over Sheridan Expressway & Amtrak, and the 174th Street Pedestrian Bridges (North and South) over Sheridan Expressway.

Bridge Painter Francisco Pinheiro Coordinates Equipment, Supplies, and Paint. Bridge Painter Albert Pappas at the Woodhaven Boulevard Bridge. Painting the Bridge. (Credit: Earlene Powell)

Bridge Painters Joao Silva and Reynaldo Grant at the Whitelaw Pedestrian Bridge. (Credit: Earlene Powell) Deputy Director of In-House Painting Earlene Powell.

Painting the Belt Parkway Over Ocean Avenue Bridge. Bridge Painters Samuel Martinez, Anthony Attore, and Brian Casey, And Supervisor David Yanolatus at the Belt Parkway Over Ocean Avenue Bridge. (Credit: Earlene Powell)

Supervisor Bridge Painter Hughie Flood Painting the Chambers Street Pedestrian Bridge. (Credit: Earlene Powell)

Loading Equipment. Bridge Painter Willie Tyler Painting the Chambers Street Pedestrian Bridge. (Credit: Earlene Powell)

During 2007, the following structures were also painted: DEP Plant at Tallman Island, (Queens), DOT Electric Shop at 125 Cadman Plaza, Railings of Francis Lewis Boulevard Bridge over Laurelton Parkway (EB), Harper Street Maintenance and Repair Shop, 352 Kent Avenue Bridge Maintenance Shops, 59th Street Bridge Operations Facility, and the 59th Street DOT Sign Shop.

Bridge Painter Vlatko Zic, Supervisor Bridge Painter Cesar Pazmino, and Bridge Painters Jamie Andrade, Michael Scotti, and William Budge Repainting the Markings on the Brooklyn Bridge Walkway and Bikeway. Fresh Markings. (Credit: Earlene Powell)

GRAFFITI REMOVAL

In 2007, 6,611,453 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. Bridge Painters Frank Duic and Russell Newme Feeding the Spray Pump and Preparing the Paint.

During 2007, graffiti was also removed from the following structures: 59 Adams Street Ironworker Shop, Arthur Kill Road at Ellis Street, Bartow Avenue over the Hutchinson River Parkway, Battery Park Underpass of the FDR Drive, Broadway Bridge Operator House, Brooklyn-Queens Expressway at Northern Boulevard, Brookville Boulevard at Sunrise Highway, Chatterton Avenue near the Bruckner Expressway, Cohancy Street, Congress

Street Bridge over Brooklyn-Queens Expressway, Cropsey Avenue Bridge over Belt Parkway, Cross Island Parkway, Delancey Street Yard under the Williamsburg Bridge, FDR Drive, Grand Central Parkway at 27th Avenue, Grand Concourse over Burnside Avenue, Grand Concourse over East 204th Street, Grand Street Bridge Operator House, Greaves Avenue Bridge over SIRT South Shore, Henry Hudson Parkway over Kappock Street, Henry Hudson Parkway over West 158th Street, Hylan Boulevard near the Staten Island Expressway, Madison Avenue Bridge over Harlem River, Marathon Route, Metropolitan Avenue Bridge over English Kills, Mosel Avenue near the Staten Island Expressway, North and South Conduit Avenue, Orchard Beach Road west of Bartow Circle, Pugsley Avenue near the Bruckner Expressway, Pulaski Bridge over Newtown Creek, Pulaski Street Yard, Rodney Street at Keap Street, Rust Street Bridge over Flushing Avenue, Superior Road Bridge over Cross Island Parkway, Third Avenue Bridge over Harlem River, Tompkins Avenue Bridge over Greenfield Avenue, Utopia Parkway Bridge over Cross Island Parkway, Van Pelt Avenue near Linden Avenue, Williamsbridge Road Bridge over Amtrak, Williamsburg Street between Ross Street and Bedford Avenue, Woodhaven Boulevard Bridge over Atlantic Avenue, 9th Street Bridge Operator House, 24th Avenue at 32nd Street, 27th Avenue Pedestrian Bridge over Belt Parkway, 41st Avenue at Bowne Street, 43rd, 47th, and 50th Avenues, West 43rd Street between 10th and 11th Avenues, 71st Avenue Bridge over Cooper Avenue, 150th Street Bridge over Cross Island Parkway, 163rd Street Pedestrian Bridge over Hawtree Basin, East 174th Street and Selwyn Avenue, 191st Underground Street to Broadway, West 207th Street/West Fordham Road Bridge over Harlem River, West 207th Street Bridge Operator House, 131st Street at Riverside Drive, and the 236th Street Pedestrian Bridge over Henry Hudson Parkway.

RESEARCH AND PRESENTATIONS

In 2007, research work and/or case histories of the Division were presented in the following proceedings:

ASHE Region 6, New York Metro Section, New York City, 18 January 2007. Sklavounakis, C., and Duran, B. *Replacement of the Bascule Span Deck of the Mill Basin Bridge on the Belt Parkway*.

The Municipal Engineers of the City of New York, 28 February 2007. Sklavounakis, C. *Replacement of the Bascule Span Deck of the Mill Basin Bridge on the Belt Parkway*.

ASCE Metropolitan Section infrastructure Group, New Trends in Seismic Evaluation and Retrofit of Infrastructures, Brooklyn, New York, 26 – 27 March 2007. Gajer, R., Thomann, T, Dobry, R., and Silva, W. *2007 NYCDOT Seismic Design Guidelines*.

ASCE Metropolitan Section Construction Group, Construction in Urban Settings 2007, New York City, 16 – 17 April 2007. Parroco, R., and Baycora, A. *East 153 Street Bridge.*

24th Annual International Bridge Conference, Pittsburgh, 4 – 6 June 2007. Rauch, R. *Bridge Painting Challenges in New York City*.

Ralls, M. J. *Prefabrication Saves Time and Money on Bridge Projects*. Innovator, June 2007, Volume 1, Number 1.

2007 Annual Meeting of the AASHTO Subcommittee on Bridges and Structures (Technical Committee for Movable Bridges T-8), Wilmington, Delaware, 8 – 13 July. Collyer, R. O. *Reconstruction of the 145th Street Bridge.*

Capka, J. Richard. *Big Part of LIFE: Several New Projects Highlight FHWA Program Under SAFETEA-LU*. Roads & Bridges, July 2007, Volume 45, Number 7.

4th New York City Bridge Conference, New York City, 27 – 28 August 2007. Biegel, D. *Borden Avenue Bridge Slides into the Twenty-First Century*.

4th New York City Bridge Conference, New York City, 27 – 28 August 2007. Rosales, M. *Conceptual Design of Four Pedestrian Bridges Over the Belt Shore Parkway, Brooklyn, NY*.

4th New York City Bridge Conference, New York City, 27 – 28 August 2007. Schmidt, J. C. T*he 2006 Rope Access Inspection of the Brooklyn Bridge Towers: A New View of an Old Bridge*.

4th New York City Bridge Conference, New York City, 27 – 28 August 2007. Stieb, J., Kroely, B., and McAnulty, K. *A Bridge Inspection Management and Data System for the New York City Department of Transportation*.

Bruce Podwal Seminar Series in Structural, Environmental, and Transportation Engineering, New York City, 11 December 2007. Perahia, H. D., and King, L.S. *Construction of East 153rd Street Bridge over Metro North Rail Road*.

In addition, Dr. Bojidar Yanev, the Division's Executive Director of Inspections and Bridge Management continued his participation on the technical advisory panel of the National Council for Highway Research (NCHR) for the following project: D1057 Structural Safety Appraisal Guidelines for Suspension Bridge Cables

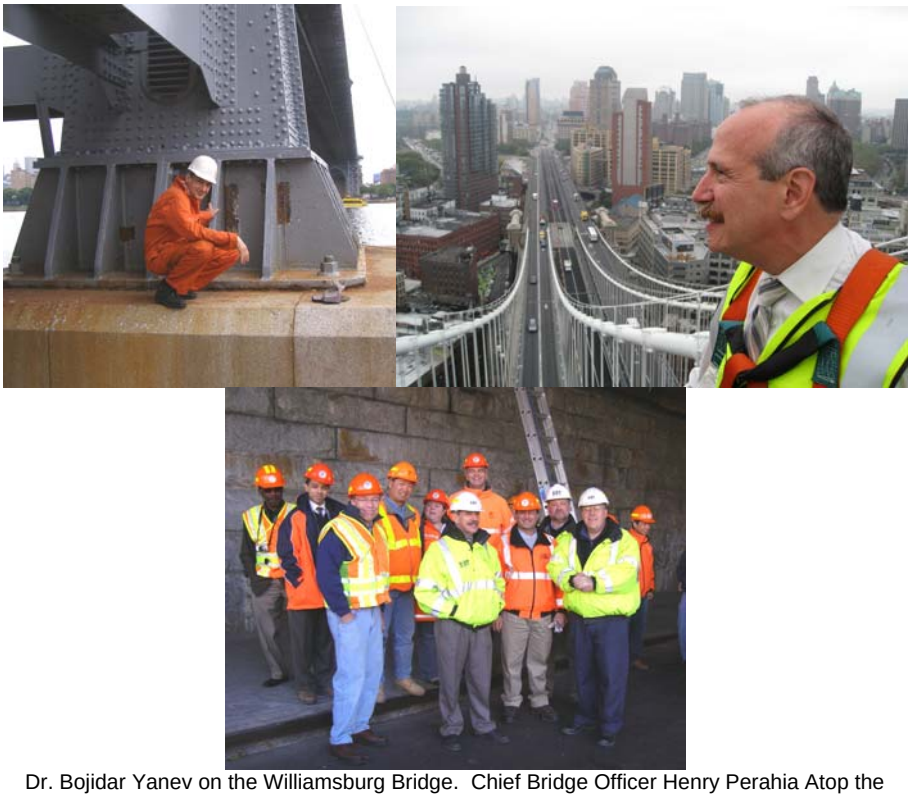
Dr. Yanev is on the review panel for NCHRP Project 20-07/Task 244 *Modifications for AASHTO LRFD Bridge Design Specifications to Incorporate or Update the Guide Specifications for Design of Pedestrian Bridges*.

Dr. Yanev served on the Structural/Foundation Technical Committee working on revising the NYC Building Code, which is part of the *New NYC Construction Codes - LL 33/2007.* He continues to serve on the advisory panel of the NYC Department of Buildings for emergency response after citywide disasters.

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 2007 included: early detection of metal corrosion under paint, bridge scour, bridge monitoring, plastic design systems, and new developments in water repellents.

Executive Director of Inspections and Bridge Management Dr. Bojidar Yanev, Press Secretary Seth Solomonow, Doug Reese, Commissioner Janette Sadik-Khan, First Deputy Commissioner Lori Ardito, and Chief Bridge Officer Henry Perahia on the Williamsburg Bridge. Dr. Yanev Leading the Cable Walk.

On June 10, 2007, a Team of Researchers From Rutgers University Presented a Ground Penetrating Radar (GPR) System. The Demonstration was Held at the FDR Northbound Between East 92nd and East 95th Streets. The Result is an Assessment of the Road Bed Density. The Technology May be Considered For Use at Other Locations Where Undermining is Suspected. A Thermographic Method to Detect Moisture Under Paint was Developed by Brooklyn Polytechnic and Tested on Various Bridges in Brooklyn. Thermal Imaging of Delaminated Paint on a Steel Bridge Column on July 17, 2007.



Dr. Bojidar Yanev on the Williamsburg Bridge. Chief Bridge Officer Henry Perahia Atop the Brooklyn Tower of the Manhattan Bridge. Chief Bridge Officer Henry Perahia and Executive Director of Bridge Preventive Maintenance and Repair Thomas Whitehouse (in Yellow Jackets) Hosting a Visit by NYSDOT Engineers to the Brooklyn Bridge: the Visitors Observed Oiling, Flag Repairs, and Work at the Iron Shop.
(Brooklyn Credit: Bojidar Yanev)