



2012 NYC DOT Bridges & Tunnels Annual Condition Report









NEW YORK CITY DEPARTMENT OF TRANSPORTATION DIVISION OF BRIDGES 2012 BRIDGES AND TUNNELS ANNUAL CONDITION REPORT



Commissioner Janette Sadik-Khan, Neighborhood Activist Loretta Ponticello, and Chief Bridge Officer Henry D. Perahia Crossing the Newly Constructed East 78th Street Pedestrian Bridge over the FDR Drive After the Ribbon Cutting Ceremony on January 20, 2012.

Michael R. Bloomberg, Mayor Janette Sadik-Khan, Commissioner Lori A. Ardito, First Deputy Commissioner

Henry D. Perahia, P.E., Chief Bridge Officer

Russell Holcomb, P.E., Deputy Chief Engineer, Maintenance, Inspections & Operations Robert O. Collyer, P.E., Deputy Chief Engineer, Bridge Capital Design & Construction George W. Klein, P.E., Deputy Chief Engineer, Specialty Engineering & Construction Dorothy Roses, Executive Director, Management & Support Services Anilkumar Vyas, P.E., Deputy Chief Engineer, Engineering Review & Support Joannene Kidder, Chief Staff Manager/Executive Director, Community Affairs

Contents									
Acknowledge	iii								
Commissione	iv								
Section 1	2012 Executive Summary	1							
Section 2	2012 Division Overview	4							
Section 3	2012 Chronology								
	January to June	13							
	July to December	29							
Section 4	2012 Accomplishments and Planned Projects								
	Bridge Capital Design & Construction								
	East River Bridges	49							
	Movable Bridges	58							
	Roadway Bridges	76							
	Specialty Engineering & Construction	112							
	Engineering Review & Support	128							
	Maintenance, Inspections & Operations	135							
Section 5	2012 Bridge Capital Program – Appendix A	144							
Section 6	2012 Flag Conditions – Appendix B	159							
Section 7	2012 Inventory – Appendix C	164							
	Inventory Sorted by Structure Number	178							
	Inventory Sorted by Borough and Community Board District	198							
	Inventory Sorted by Feature Carried	218							
	Staten Island Culverts	238							
Section 8	2012 Glossary of Bridges	239							
Section 9	Components of the Preventive Maintenance Program	265							
Section 10	Maintenance Personnel Resources – 2012 vs. 1900	272							
Section 11	Bridge Inspection Equipment List	274							
Section 12	Suggested Reading	275							
Section 13	2012 Inventory Location Maps	285							

Note: The photographs in this report have been converted from color to grayscale for printing. The electronic version of the report retains the color versions.

Acknowledgements

Research and Analysis

For their contributions and assistance in the preparation of this report, the Division of Bridges would like to thank the following: Hasan Ahmed, Krishan Baweja, Robert Cohen, Robert Collyer, Udayakumar Dommaraju, Beatriz Duran, Hani Faouri, James Gallagher, Brian Gill, Russell Holcomb, Sudhir Jariwala, Paul Kahn, George Kern, Joannene Kidder, George Klein, Doreen Langhorne, Kevin McAnulty, NYSDOT, Raisa Rapoport, Ronald Rauch, Abdur Razzaq, Javed Riaz, Vera Ribakove, Dorothy Roses, Paul Schwartz, Dinesh Shah, Rahul Shah, Anilkumar Vyas, Thomas Whitehouse, Bojidar Yanev, and Antoinette Zeitoun.

Photography

For the photographs used in this report, the Division of Bridges would like to thank the assistance of the following: Artemio Angeles, Robert Avellino, Alexander Berens, Evgenia Campbell, Rudy Collins, Alexander Engel, Mark Feinman, Jingqin Gao, Nicole Garcia, Brian Gill, Nikita Gupta, Kevin Hillery, Russell Holcomb, George Jarvis, George Kern, Thomas Leung, Rafael Lopez, MTA/Patrick Cashin, Stephen Mallon, Maria Mikolajczyk, Gladys Millan, Edgardo Montanez, Anatoly Orlov, Vera Ovetskaya, Sergey Parayev, Earlene Powell, Serge Rigaud, Will Ryman and Paul Kasmin Gallery, Paul Schwartz, Hany Soliman, Richard Solomon, Samuel Teaw, Thomas Whitehouse, and Bojidar Yanev.

Cover Photographs

Division projects completed during the Bloomberg administration that won awards (Third Avenue, Queens Boulevard, Williamsburg, Roosevelt Island, Andrews Avenue, Hamilton Avenue, Metropolitan Avenue, Willis Avenue, Grand Concourse, and Borden Avenue), including the Staten Island Ferry Terminal Ramp Project, which is the largest ARRA-funded stimulus project in New York State. (Borden Avenue Credit: Sergey Parayev, Hamilton Avenue Credit: Hardesty & Hanover, Willis Avenue Credit: Douglas Reese)

Cover Design

Michele N. Vulcan, Director of Analysis – Bridges David Moidel – NYCDOT Director, and Melanie Michel – Graphic Designer, Creative Services

Procurement of Printing Services

James Gallagher, Director, Budget & Fiscal - Bridges

Map and Inventory Preparation

Kevin McAnulty, Director, Bridge Management Unit Fitz Arthur Brown and Lidiya Akhmedova, Bridge Management Unit Claudio Revelo, NYSDOT Region 11

> Report Compiled and Prepared by: Michele N. Vulcan, Director of Analysis - Bridges New York City Department of Transportation 55 Water Street, 5th Floor New York, New York 10041

A Message from the **Commissioner**



Dear Friends,

On behalf of the many dedicated professionals who staff the Division of Bridges, it is my pleasure to present the 2012 Edition of the New York City Department of Transportation's Annual Bridges and Tunnels Condition Report, as mandated under the New York City Charter. This report provides DOT with an opportunity to display the many achievements, innovations and improvements that were realized by the Division of Bridges during the 2012 calendar year.

The cover highlights various Division projects that were completed during the Bloomberg administration that won awards, including the Staten Island Ferry Terminal Ramp Project, which is the largest ARRA-funded stimulus project in New York State.

The Division of Bridges includes 787 DOT employees who manage the City's capital bridge program, conduct bridge inspections and monitorings, and maintenance. Our bridges include, among many others, the notable East River and Harlem River Bridges, the Belt Parkway Bridges, and pedestrian bridges and elevated roadways located City-wide.

The Division of Bridges takes pride in its vital participation in the work both before and after Hurricane Sandy struck the City on October 29, 2012. The Division's skilled and specialized employees responded to the emergency effort wherever they were needed and did not stint their efforts.

Hurricane Sandy arrived in the metropolitan region in time to catch both the full moon and lower Manhattan's high tide. The 8 to 13 foot storm surge overwhelmed the Battery and roared into both the Battery Park Underpass and the West Street Underpass (which serves as the Brooklyn Battery - Hugh Carey Tunnel entrance). Pre-storm efforts by Division operations, painting, and electrician employees included barricading the tunnels to prevent motorists' attempts to ford the flow, which prevented injury and potential loss of life to an unwary public. Generators were brought to the site to power the sump pumps. After the storm, they coordinated the effort to remove 10 to 15 million gallons of seawater from the tunnels with the assistance of the Department of Environmental Protection and the Army Corps of Engineers. The crews worked around the clock for over a week to de-water the tunnels, remove storm debris, pressure wash tunnel walls, and perform initial inspections of the tunnels' electrical, ventilation and lighting operating systems.

Not long after the tunnels were drained, the metropolitan region braced for a second storm. On November 7, a snow laden nor'easter hit the City and although it did not hit, as the hurricane did, in perfect concert with time, tide and the moon, the surge was still expected to reach more than seven feet at the Battery. In anticipation of this impact, Division highway repairer and ironworker crews (with the assistance of a team from the Sidewalk and Inspection Management Division), filled and placed 1,000 sandbags at the underpass to hold off the second surge in less than ten days. Just 12 hours after the operation began, the tunnel was closed 35 minutes ahead of schedule.

Bridge Inspections personnel performed emergency inspections of the city's bridges and other affected structures. The four East River Bridges were the first bridges in New York City to reopen on October 30. With MTA's subways knocked offline, Division engineers assisted in launching a "bus bridge" shuttle service between Brooklyn and Manhattan, moving tens of thousands of passengers along dedicated MTA bus lanes on the East River bridges. Division

carpenters provided assistance to the Office of Emergency Management (OEM) with storm damage emergency repairs at George Washington High School in Washington Heights. In addition, Division ironworkers assisted OEM in unloading heavy equipment at the Citifield staging area in Queens.

Hurricane Sandy surged water levels in the English Kills by over six feet, flooding into the counterweight pits of the Metropolitan Avenue Bridge control house. Flood waters damaged the electrical control system, burning out the transformer and power supply. Approximately 187,000 gallons of water flowed into both bridge pits. On the morning of October 31, Division oilers and electricians began the recovery effort with portable pumps, pumping continuously for four straight days. The Department of Environmental Protection augmented the pumping effort with larger pumps and the bridge pits were finally drained dry on November 3. On November 4, a crew of ten oilers began a manual operation process which took five straight hours of hard labor but permitted a fuel oil barge to enter its port. Further access for fuel barges was also undertaken on November 6 when the opening time was reduced to 1.5 hours as the hydraulic system was returned to service.

Three important bridges on the Belt Parkway are currently under reconstruction: Fresh Creek Bridge, Rockaway Parkway Bridge and Paerdegat Basin Bridge. Situated along the picturesque south shore of Brooklyn and adjacent to the Gateway National Park, this lovely but low-lying area's propensity for flooding is well known. Keeping the roadway dry, safe and open is always a priority; during storm events it is critical. As soon as the storm began, Division engineers went to the field office and began coordinating the effort to keep the pumps running and keep the road open. Both during and after the hurricane, this effort also included coordinating the removal of the tons of debris that washed onto the walkways and roadway.

In the aftermath of the hurricane, a massive deployment of heavy equipment and removal of debris was undertaken. Over-dimensional truck permits enable the movement of construction equipment and important goods into and through the city on travel routes that protect the city's bridge infrastructure and in turn, the city as a whole. The Division's Truck Permit Section, working without one of their most important tools – mapping software, continued to process permit applications for essential truck permits to facilitate storm clean up, the delivery of essential clean-up equipment and the arrival of goods necessary to the immediate and long term recovery of the City. They were a vital part of the effort that kept the construction industry moving.

The Division of Bridges proved an essential part of the tremendous effort provided by our great City's municipal workers. Thanks to all of the devoted public servants, our City rose above its disaster and showed the world a shining example of civic pride, courage and effectiveness.

New York City has a rich tradition of bridge design, construction, maintenance and administration. The Department of Transportation appreciates the importance of its duties and responsibilities, and the Division of Bridges is proud to shoulder the task of maintaining and rehabilitating our city's vital bridge infrastructure.

Sincerely,

anette Sadik-Khan

v

Commissioner

Inventory

In calendar year 2012, the inventory of bridges under the jurisdiction of the Division increased to 788. NYCDOT owns, operates, and/or maintains 758 non-movable bridges, 25 movable bridges, and five tunnels. Over the past 10 years, there has been a decline in the number of bridges rated "Poor," and an increase in the number of bridges rated "Very Good," as shown below.

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Poor	4	6	4	3	3	3	[!] 4	4	3	1
Fair	429	456	458	456	459	455	456	462	459	460
Good	209	212	210	210	215	213	209	207	215	212
Vgood	111	116	118	118	111	116	116	113	109	114
Closed					1	1	1	1	1	1
	753	*790	790	787	789	788	786	787	787	788

[•] In 2004, 32 Department of Parks and Recreation structures, 1 Department of Education structure, and 7 Division of Ferries structures were absorbed into the inventory. 30 of these additions (22 from Parks, 6 from Ferries, and the 1 from Education) were rated "Fair," which accounted for the increase in Fair rated bridges. 1 of the Parks additions, Flushing Meadow Park Pedestrian Bridge over Willow Lake and 76th Road, was rated "Poor." It has since been closed. ¹ In 2009, the newly "Poor" rated Hill Drive Bridge in Prospect Park was closed to vehicular traffic. In 2009, 93 of the Parks bridges accounted for 20.4% of the "Fair" rated structures. In 2012, 100 of the Parks bridges accounted for 21.7% of the "Fair" rated structures.

The City has only one bridge that was rated "poor" after its last inspection. A poor rating means that there are components of the bridge that must be rehabilitated; it does not mean that the bridge is unsafe. If a bridge was deemed unsafe, it would be closed. The term "structural deficiency" is an engineering term-of-art used by the Federal government to indicate a defect requiring corrective action. According to the FHWA, "structurally deficient" means there are elements of the bridge that need to be monitored and/or repaired. The fact that a bridge is "deficient" does not imply that it is likely to collapse or that it is unsafe. It means it must be monitored, inspected, and maintained. Because we use the New York State rating system, we do not use that term and instead use the terms "very good," "good," "fair" and "poor." As with the Federal term, the terms "fair" and "poor" describe the condition of bridge elements and whether they are functioning as designed. Although these elements are not considered hazardous, the ratings are used to determine whether the elements require repair or rehabilitation. Again, any bridge deemed unsafe would be shut to the public.

The City bridge that is rated "poor" is the Brooklyn Bridge. It was given a "poor" rating during its last inspection because there are certain elements of the bridge that need to be rehabilitated. While the main spans are in good condition, the decks on both the Manhattan and Brooklyn ramps to the bridge are aging and are being replaced during a rehabilitation project that began on January 19, 2010. It should be noted that of the 75 spans of the bridge, only 6 spans contribute to the low condition rating. None of them are among the three suspended spans (i.e. between the anchorages).

Contract Acceleration

1

Acceleration measures are a contract provision used in some reconstruction projects that is implemented through a contract pay item. This contract provision provides a mechanism to implement measures to accelerate the contractor's work to maintain critical path milestones. This provision does not apply to measures undertaken by the contractor to make up for time it lost in the progress schedule. Only the NYCDOT representative invokes this provision when the contract

schedule is compromised due to unforeseen conditions during construction that are out of the contractor's control, and when it is deemed in the City's interests to accelerate.

Incentive and disincentive (I/D) clauses are another contract provision used in some reconstruction projects that is implemented through a contract pay item. Under this provision, the contractor is compensated a certain amount of money for each day if the identified work in a critical milestone is completed ahead of schedule and is assessed a deduction for each day the contract overruns the allocated time. The amounts for the I/D clauses are based upon such items as traffic safety, maintenance and road user delay costs, Resident Engineering & Inspection (REI) expenses and cost of traffic enforcement agents. These amounts are implemented in accordance with guidelines established by Federal Highway Administration (FHWA).

East River Bridges Anti-Icing Program

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.

In the winter of 2011-2012, a total of 12,800 gallons of potassium acetate and 43.5 tons of sodium acetate were applied on the roadways of all four East River Bridges.

Marine Borer Remediation

In October 1999, the Department began a study to assess the present 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. An updated underwater inspection was performed within the limits of the proposed contract in 2009. The final design is now complete. The construction work commenced in April 2012, and is expected to be complete in April 2016.

2012 Awards

In 2012, the outstanding work of the Division was recognized by the receipt of several awards.

In March 2012, the American Council of Engineering Companies of New York selected the replacement of the Willis Avenue Bridge for both a Gold and a Diamond Award in the structural systems category in its 2012 Engineering Excellence Awards. The Manhattan Bridge biennial inspection and the emergency reconstruction of the Borden Avenue Bridge were selected for Platinum Awards in the structural systems category, the reconstruction of the Roosevelt Island

Bridge was selected for a Diamond Award in the transportation category, and the protective coating project on the Belt Shore Parkway Bridges received a Silver Award in the transportation category.

In April 2012, the American Council of Engineering Companies selected the replacement of the Willis Avenue Bridge and the reconstruction of the Roosevelt Island Bridge for National Recognition Awards in its 2012 Engineering Excellence Awards.

In May 2012, the Metropolitan Section of the American Society of Civil Engineers selected the replacement of the Willis Avenue Bridge as its Construction Achievement Project of the Year.

In June 2012, the New York Chapter of the New York State Society of Professional Engineers selected the replacement of the Willis Avenue Bridge as its Project of the Year.

In November 2012, Director of Quality Assurance Muhammad Afzal received an Outstanding Achievement Award from the South Asian American Association.

In November 2012, Roads & Bridges Magazine selected the replacement of the Willis Avenue Bridge as the fifth place finisher in its annual selection of the country's top 10 bridge projects.

In November 2012, the Municipal Engineers of the City of New York selected the St. George Ferry Terminal Ramps Rehabilitation project as its 2012 Municipal Project of the Year.

In November 2012, Interim Director of Bridge Preventive Maintenance Paul Schwartz was presented the Young Engineer of the Year award from the Municipal Engineers of the City of New York.

The dedication and hard work of all members of the Division ensures that the Department is stronger than ever and more capable than ever to meet the challenges of maintaining a diverse and impressive bridge infrastructure.