APPENDIX E

History and Projection of Traffic, Toll Revenues and Expenses and Review of Physical Conditions of the Facilities of Triborough Bridge and Tunnel Authority

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Triborough Bridge and Tunnel Authority

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HISTORY AND PROJECTION OF TRAFFIC, TOLL REVENUES AND EXPENSES AND REVIEW OF PHYSICAL CONDITIONS OF THE FACILITIES OF TRIBOROUGH BRIDGE AND TUNNEL AUTHORITY

April 30, 2014

To the Triborough Bridge and Tunnel Authority:

In accordance with your request, Stantec Consulting Services Inc (Stantec) conducted this annual study to develop projections of traffic, toll revenues and expenses for the toll bridge and tunnel facilities operated by the Triborough Bridge and Tunnel Authority (TBTA), and to provide an overview of the physical conditions of each facility. We have reviewed the bridge and tunnel inspection reports provided by TBTA and discussed TBTA's on-going maintenance and capital programs with its engineering staff.

Our projections have taken into account: (1) the general physical condition of TBTA's toll facilities; (2) traffic and toll revenue data, reflecting the 16 toll increases since 1972; (3) the impact of the E-ZPass electronic toll collection system; (4) the toll structure; (5) planned and possible future toll increases; (6) economic, population, employment and other demographic forecasts in the New York Metropolitan Area; (7) the traffic capacities of the bridges and tunnels and the existing roadway network that feeds the facilities in terms of the potential for future growth of peak versus non-peak period traffic; (8) current and programmed construction activities on TBTA's facilities and the arterial highway network serving the New York Metropolitan Area, including the toll-free East River bridges; and (9) mass transit network projects.

In 2013, actual total toll revenues for the TBTA facilities were $1,645.2 million, or 0.8 percent higher than our 2013 forecast of $1,631.6 million and 10.3 percent higher than actual 2012 toll revenue. Total revenue traffic was 284.5 million vehicles, or 3.0 percent higher than previously forecasted at 276.1 million vehicles and 0.7 percent higher than actual 2012 traffic.

TRANSPORTATION INFRASTRUCTURE

The New York Metropolitan Area's transportation infrastructure consists of an extensive network of highways, tunnels and bridges (both tolled and toll-free), regional bus and commuter rail and the New York City transit system.

Triborough Bridge and Tunnel Authority (TBTA)

TBTA operates nine toll facilities within New York City (the "City"), consisting of seven bridges and two tunnels that provide vital links across the City's rivers and bays. In 2013, these facilities carried 287.8 million total vehicles, of which 284.5 million were toll paying, and generated $1,645.2 million in toll revenue. (Non-revenue transactions include police, emergency and TBTA vehicles.) The locations of the facilities are shown in the context of the regional highway network on the following map.

Figure 1 Location Map

The facilities are briefly described as follows:

Verrazano-Narrows Bridge - a two-level suspension bridge, with three lanes of traffic in each direction on both decks. It crosses the entrance to New York Harbor and connects Brooklyn and Staten Island.

Robert F. Kennedy (RFK) Bridge (formerly the *Triborough Bridge*) - a complex of three bridges connecting Manhattan, the Bronx and Queens, with a central connecting interchange on Randall's Island. Manhattan is reached via a six-lane vertical lift bridge over the Harlem River. The Bronx is accessed via an eight-lane truss bridge over the Bronx Kill. An eight-lane suspension bridge over the East River leads to Queens.

Bronx-Whitestone Bridge - a suspension bridge, with three lanes of traffic in each direction, which crosses the East River connecting the boroughs of Queens and the Bronx.

Throgs Neck Bridge - a suspension bridge, with three lanes of traffic in each direction, which crosses the upper East River also connecting the boroughs of Queens and the Bronx.

Queens Midtown Tunnel - a twin-tube tunnel with each tube carrying two lanes of traffic under the East River between the boroughs of Queens and Manhattan. During normal morning commuting hours, three lanes are operated in the peak traffic direction.

Hugh L. Carey Tunnel (formerly the *Brooklyn-Battery Tunnel*) - a twin-tube tunnel with each tube carrying two lanes of traffic under the East River connecting the southern tip of Manhattan with Brooklyn. During normal morning commuting hours, three lanes are operated in the peak traffic direction.

Henry Hudson Bridge - a two-level steel arch bridge, with four southbound lanes on its lower deck and three northbound lanes on its upper deck, which crosses the Harlem River to connect the northern tip of Manhattan with the Spuyten Duyvil section of the Bronx.

Marine Parkway - Gil Hodges Memorial Bridge (*Marine Parkway*) - a four-lane crossing of the Rockaway Inlet that connects the Rockaway peninsula in Queens with Brooklyn.

Cross Bay Veterans Memorial Bridge (*Cross Bay*) - a precast post-tensioned concrete T-girder bridge with three lanes of traffic in each direction crossing Beach Channel in Jamaica Bay, connecting the Rockaway peninsula in Queens with the Queens mainland, via Broad Channel.

Metropolitan Area Arterial Network

The New York Metropolitan Area is served by an extensive network of highway facilities. Many of the bridges and tunnels operated by TBTA are links in the Interstate highway network, as these limited-access expressways pass through New York City to serve both local and long distance traffic. These regional facilities are shown on the map on the previous page.

The Verrazano-Narrows Bridge is part of I-278 (Staten Island, Gowanus and Brooklyn-Queens Expressways), which connects with the Hugh L. Carey Tunnel and the RFK Bridge. The Queens Midtown Tunnel carries I-495 (Long Island Expressway) into Manhattan. The RFK Bridge joins I-87 (Major Deegan Expressway) and I-278 (Bruckner Expressway) with I-278/Grand Central Parkway in Queens and the FDR and Harlem River Drives in Manhattan. The Bronx-Whitestone Bridge carries traffic between the Hutchinson River and Merritt Parkways and Long Island via I-678 (Whitestone and Van Wyck Expressways) and the Cross Island Parkway. The Throgs Neck Bridge carries traffic between I-95 (New England Thruway and George Washington Bridge) and Long Island via I-295. The Henry Hudson Bridge is part of the Henry Hudson Parkway, a major commuter route into Manhattan from the extensive parkway network in western Westchester County and beyond.

In addition to TBTA facilities and their expressway/parkway connections, New York City's toll-free East River bridges — Brooklyn, Manhattan, Williamsburg and Ed Koch Queensboro — also connect Manhattan with Brooklyn and Queens; and nine toll-free bridges over the Harlem River connect Manhattan with the Bronx. Unlike the TBTA facilities, the approaches to these bridges are mostly surface arterials, such as Flatbush Avenue and Queens Boulevard. Only a few have expressway ramp connections (such as the Brooklyn-Queens Expressway connection to the Williamsburg Bridge), and the Alexander Hamilton Bridge, or I-95, is part of the Cross Bronx Expressway.

Other Regional Toll Facilities

TBTA is one of a number of toll authorities that operate bridge, tunnel and highway facilities in the New York Metropolitan Area. The agency whose facilities are geographically closest to TBTA's bridges and tunnels is the Port Authority of New York and New Jersey. The Port Authority's George Washington Bridge is linked to the RFK, Bronx-Whitestone and Throgs Neck bridges via the expressway system in the Bronx (plus the George Washington-RFK Bridge connection in Manhattan via the Harlem River Drive and the George Washington-Henry Hudson Bridge connection in Manhattan via the Henry Hudson Parkway); while the Bayonne Bridge, Goethals Bridge and Outerbridge Crossing are linked to the Verrazano-Narrows Bridge via the expressway system in Staten Island. Only motorists using the Port Authority's two tunnels — Holland and Lincoln — must traverse surface streets (in Manhattan) to reach TBTA's and the City's East River crossings.

The other toll authorities in the region are the New York State Thruway Authority (Tappan Zee Bridge and several Thruway sections), New York State Bridge Authority (five Hudson River bridges) and the New Jersey Turnpike Authority (Garden State Parkway and New Jersey Turnpike).

All of these authorities, together with twenty others beyond the New York Metropolitan Area, are linked through the E-ZPass Interagency Group (IAG) to better serve the regional traveler through a common electronic toll collection tag. On March 13, 2012, the IAG announced a new "National Affiliate" membership category which would allow other tolling agencies to join the IAG if their equipment is made compatible with the E-ZPass system. Since then, the IAG has

further expanded its footprint, continuing to work towards national interoperability. E-ZPass and its impact on the TBTA facilities are discussed further, later in this report.

Regional Public Transportation

In addition to the TBTA facilities, most of the public transportation facilities within the City and the suburban counties north and east of the City are part of the Metropolitan Transportation Authority (MTA) system. These include the New York City Transit (NYCT) Authority subway and buses, MTA Bus Company, Staten Island Rapid Transit, Metro-North Commuter Railroad, and Long Island Rail Road. Effective January 1, 2012, the Long Island Bus system (in Nassau County, and serving adjacent portions of Queens and Suffolk County), formerly part of the MTA system, was privatized and is now known as Nassau Inter-County Express (NICE).

For those major TBTA facilities directly serving Manhattan — RFK Bridge, Queens Midtown Tunnel and Hugh L. Carey Tunnel — the motorist can, for the most part, choose to use transit as an alternative. For the outlying bridges, however, the choice is more difficult, due to a reduced level of transit service or different trip characteristics.

TOLL COLLECTION ON THE TBTA FACILITIES

The nine TBTA toll facilities have four toll structures, in terms of toll levels and methods of collection: major, minor, Henry Hudson Bridge, and the Verrazano-Narrows Bridge. The major crossings include the RFK Bridge, Bronx-Whitestone Bridge, Throgs Neck Bridge, Queens Midtown Tunnel and Hugh L. Carey Tunnel. The minor crossings are the Marine Parkway Bridge and Cross Bay Bridge. The Henry Hudson Bridge is the only facility limited to vehicles which are authorized to use parkways. The Verrazano-Narrows Bridge is the only facility on which tolls are collected in one direction only, while the cash[1] tolls for passenger cars on the minor bridges are half the level of those on the major facilities.

Present and Proposed Toll Structures and Operation

The current toll structure, in place since March 3, 2013, is shown in Table 1. Tolls are determined using a basic rate as modified by variables specific to a number of factors. These factors include:

- crossing used
- vehicle classification
- toll payment method
- place of residence
- vehicle occupancy

[1] Appendix E uses the phrase "cash tolls" to refer to crossing charge rates charged for the use of fare media other than E-ZPass by New York E-ZPass Customer Service Center (NYCSC) customers. *See* 21 NYCRR §1021.1. Cash toll rates are charged to cash customers and non-NYCSC E-ZPass customers (effective July 12, 2009), as well as to Tolls by Mail customers at the Henry Hudson Bridge during the cashless phase of the All-Electronic Tolling (AET) pilot which began on November 10, 2012.

Table 1 Current Toll Rates at TBTA Facilities, Effective March 3, 2013

Classification	Verrazano-Narrows Bridge [a]		RFK Bridge Bronx-Whitestone Bridge Throgs Neck Bridge Queens Midtown Tunnel Hugh L. Carey Tunnel[b]		Henry Hudson Bridge		Marine Parkway Bridge Cross Bay Bridge	
	Cash	E-ZPass[c]	Cash	E-ZPass[c]	Tolls by Mail[d]	E-ZPass[c]	Cash	E-ZPass[c]
Two-axle vehicles, including: Passenger vehicles, SUVs, station wagons, self-propelled mobile homes, ambulances, hearses, vehicles with seating capacity of not more than 15 adult persons (including the driver) and trucks with maximum gross weight of 7,000 lbs. and under	$7.50	$5.33	$7.50	$5.33	$5.00	$2.44	$3.75	$2.00
Each additional axle costs	3.00	3.00	3.00	3.00	2.25	2.25	2.25	2.25
The following reduced rate prepaid charges are presently available for the two-axle vehicles referenced above:								
Prepaid charges through reduced rate token roll purchase							2.50	
Prepaid charges per crossing for registered Rockaway Peninsula/Broad Channel Residents using an eligible vehicle							1.79	1.31[e]
Prepaid charges per crossing for registered Staten Island Residents using an eligible vehicle with three or more occupants (HOV)	1.48							
Prepaid charges per crossing for registered Staten Island Residents using an eligible vehicle through token roll purchase	4.265							
Registered Staten Island Residents using an eligible vehicle taking 3 or more trips per month		3.00						
Registered Staten Island Residents using an eligible vehicle taking less than 3 trips per month		3.18						
All two-axle vehicles greater than 7,000 lbs. and buses (other than franchise buses and motor homes)	15.00	9.62	15.00	9.62			7.50	4.81
3 Axle	24.00	15.76	24.00	15.76			12.00	7.88
4 Axle	31.00	20.14	31.00	20.14			15.50	10.07
5 Axle	40.00	26.26	40.00	26.26			20.00	13.13
6 Axle	47.00	30.64	47.00	30.64	(f)	(f)	23.50	15.32
7 Axle	58.00	36.76	58.00	36.76			29.00	18.38
Each additional axle above 7	9.00	6.14	9.00	6.14			4.50	3.07
Two-axle franchise buses	6.25	3.86	6.25	3.86			3.00	1.92
Three-axle franchise buses	7.25	4.58	7.25	4.58			3.50	2.41
Motorcycles	3.00	2.32	3.00	2.32	3.00	1.66	3.00	1.66
Each additional axle costs	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25

Notes:

(a) Under the Verrazano-Narrows Bridge one-way crossing charge collection program, all per crossing charges shown should be doubled; toll is collected in the westbound direction only in accordance with federal law. As discussed in this report, the MTA is also implementing two toll rebate programs at the Verrazano-Narrows Bridge for eligible Staten Island residents and qualifying commercial vehicles using the same New York Customer Service Center (NYCSC) E-ZPass account.

(b) Formerly the Brooklyn-Battery Tunnel.

(c) E-ZPass crossing charges apply to NYCSC transponders only; customers of other E-ZPass CSCs are charged the cash toll. Any motorist, regardless of residence, can obtain a NYCSC transponder.

(d) The second phase of the All-Electronic Tolling Pilot Program at the Henry Hudson Bridge, the switch to cashless tolling, was implemented on November 10, 2012. Vehicles without an NYCSC E-ZPass tag pay the higher cash toll rate via the Tolls by Mail program.

(e) Effective April 1, 2012, eligible Rockaway Peninsula and Broad Channel residents using E-ZPass at the Cross Bay Bridge (CBB) receive a full rebate of the Rockaway Resident E-ZPass toll from the MTA. It is likely that the MTA will continue the CBB rebate program at its current level only if there is sufficient funding to do so. Should there not be sufficient funding to continue the CBB rebate program at its current level, the rebate program would likely revert to the level that existed prior to April 1, 2012, where Rockaway Residents paid the Rockaway Resident E-ZPass toll for the first two trips and received the rebate only for subsequent trips taken during a calendar day using the same E-ZPass tag.

(f) Passage prohibited.

Passenger Car Tolls

TBTA crossings are separated into major and Verrazano-Narrows Bridge and minor and Henry Hudson Bridge categories for toll classification purposes. The single trip passenger car cash toll is $7.50 for the major crossings and the Verrazano-Narrows Bridge. The minor crossing passenger car cash toll is $3.75 on the Marine Parkway and Cross Bay Bridges. On the Henry Hudson Bridge, where cashless tolling is now in effect on a pilot program basis, the passenger car cash toll is $5.00 (this is paid through the new Tolls by Mail method which is currently used only at the Henry Hudson Bridge).[2] All tolls are collected in each direction except on the Verrazano-Narrows Bridge where the round-trip tolls are collected only in the westbound (Staten Island-bound) direction in accordance with Federal law.

Tolls for passenger cars are reduced under the following programs: (1) NYCSC E-ZPass and tokens; (2) place of residence/crossing used; (3) place of residence/vehicle occupancy; (4) frequency of use; and (5) some combination of the foregoing. E-ZPass electronic toll collection is available on all TBTA toll facilities (see the following section for a more complete description of E-ZPass and its impact). Motorists open an E-ZPass account and receive a transponder that they mount on their vehicles (typically their windshields). TBTA toll plazas are all equipped with E-ZPass antennas that identify and read the on-board tags and electronically debit the toll from the motorist's account. Under the current toll schedule, passenger cars equipped with a NYCSC E-ZPass receive a $2.17 reduction per trip at all major facilities ($4.34 for the Verrazano-Narrows Bridge where the round-trip tolls are collected only in the westbound direction), and $1.75 at the Cross Bay and Marine Parkway Bridges. On the Henry Hudson Bridge, passenger cars with a NYCSC E-ZPass receive a $2.56 reduction per trip. Passenger cars equipped with a non-NYCSC transponder pay the same toll rate as cash customers, except at the Henry Hudson Bridge, where non-NYCSC E-ZPass customers pay the same toll rate as Tolls by Mail customers. Any motorist, regardless of residence, can obtain a NYCSC transponder.

A separate reduced rate program is in place for registered Rockaway Peninsula and Broad Channel residents on the Cross Bay and Marine Parkway bridges and for registered Staten Island residents on the Verrazano-Narrows Bridge.

A toll-rebate program for the benefit of E-ZPass customers who are residents of Broad Channel and the Rockaway Peninsula was implemented by the MTA on January 1, 1998 for use on the Cross Bay Bridge. This program was modified during the period from July 23, 2010 to March 31, 2012, during which eligible Rockaway residents were charged the reduced resident toll rate for the first two trips over the Cross Bay Bridge and only subsequent trips during the same calendar day using the same E-ZPass transponder were eligible for the rebate. Effective April 1, 2012, the MTA has been using funds allocated by New York State to restore the rebate for tolls incurred on the first two trips made on the same day over the Cross Bay Bridge by eligible residents. In 2013 the MTA reimbursed the TBTA in the amount of approximately $4.5 million in toll rebates. The TBTA estimates that the reimbursements in 2014 will also total approximately $4.5 million.

[2] Under the Tolls by Mail program at the Henry Hudson Bridge, license plate images for vehicles without E-ZPass tags are matched with information from the Department of Motor Vehicles and a toll bill is mailed to the vehicle owner.

Tolls for Vehicles over 7,000 Pounds

The toll charges for vehicles over 7,000 pounds are a function of weight/number of axles as well as the crossing used. For the major crossings, the present cash rate for these vehicles is $15.00 for two axles, increasing to $58.00 for a seven axle vehicle. These vehicles receive a reduction of approximately 35 percent with a NYCSC E-ZPass. Vehicles with more than seven axles pay a cash rate of $9.00 for each additional axle over seven and a NYCSC E-ZPass rate of $6.14 for each additional axle over seven (rates at the Verrazano-Narrows Bridge are doubled since the toll is collected in the westbound direction only). Vehicles with three to six axles pay varying rates, which increase with the number of axles, as shown in Table 1.

For the minor crossings, the two-axle cash rate for vehicles over 7,000 pounds is $7.50, increasing to $29.00 for a seven axle vehicle. These vehicles presently receive approximately a 35 percent reduction with a NYCSC E-ZPass. Vehicles with more than seven axles pay a cash rate of $4.50 for each additional axle over seven and a NYCSC E-ZPass rate of $3.07 for each additional axle over seven. Vehicles with three to six axles pay varying rates, which increase with the number of axles, as shown in Table 1. Commercial vehicles are not permitted on the Henry Hudson Bridge.

Verrazano-Narrows Bridge Rebate Program

The MTA is implementing two toll rebate programs at the Verrazano-Narrows Bridge (VNB): the Staten Island Resident (SIR) Rebate Program, available for residents of Staten Island participating in the SIR E-ZPass toll discount plan, and the VNB Commercial Rebate Program, available for commercial vehicles making more than ten trips per month using the same NYCSC E-ZPass account. The SIR Rebate Program began on April 25, 2014, retroactive to April 1, 2014. The VNB Commercial Rebate Program will be implemented at a later date, also retroactive to April 1, 2014.

Under the SIR Rebate Program, the MTA is rebating $0.50 of the $6.00 SIR E-ZPass toll paid by Staten Island residents with three or more trips per month across the VNB, and $0.86 of the $6.36 SIR E-ZPass toll paid by Staten Island residents with one or two VNB trips per month.[3] As a result of these MTA toll rebates, Staten Island residents will pay an effective toll of $5.50 per trip across the VNB. Only Staten Island Residents participating in the SIR E-ZPass toll discount plan at the NYCSC would be eligible for the SIR rebate.

Under the VNB Commercial Rebate Program, the MTA is rebating 20 percent of the E-ZPass toll for trucks and other eligible commercial vehicles that make more than ten trips per month across the VNB using the same NYCSC E-ZPass account. Trucks and eligible commercial vehicles using cash customers or non-NYCSC E-ZPass tags would not be eligible for the rebate.

The projected annualized cost of the VNB Rebate Programs is $14 million, with $7 million allocated for the SIR Rebate Program and $7 million for the Commercial Rebate Program. The VNB Rebate Programs are to be funded equally by New York State and MTA. The moneys to fund a year's estimated costs for the VNB Rebate Programs will be transferred by the MTA to the

[3] Tolls at the VNB are collected only in the Staten Island-bound direction, in accordance with federal law.

TBTA prior to the implementation of the VNB Rebate Programs each year. The VNB Rebate Programs will be implemented only for such periods of operation during which, net of State actions or available offsets, MTA's financial responsibility does not exceed half of the expense of the VNB Rebate Programs. In the event such condition is not met, the VNB Rebate Programs will cease and Staten Island residents will be charged the applicable SIR E-ZPass toll and trucks and other commercial vehicles would be charged the applicable NYCSC E-ZPass toll for the Verrazano-Narrows Bridge. MTA has been told by the New York State Division of the Budget that for calendar year 2014, the State's contribution will be provided by the waiving of $7 million of cost recovery assessments levied by the State and payable by the MTA pursuant to Public Authorities Law §2975.

E-ZPass Electronic Toll Collection System

The E-ZPass Electronic Toll Collection (ETC) system has been fully installed at all TBTA bridges and tunnels since December 1996. Unlike cash transactions, vehicles equipped with E-ZPass tags can use the E-ZPass-only lanes. With the exception of the Henry Hudson Bridge, where gates were removed from the E-ZPass-only lanes on January 20, 2011, all E-ZPass-only lanes are gated. When a vehicle with an E-ZPass transponder enters an E-ZPass-only lane, an electronic reader identifies the tag code at the toll plaza and the toll is deducted from the customer's account. TBTA has over 4.2 million E-ZPass tags in use. Currently, participation rates are at 83.3 percent of toll-paying traffic TBTA-wide. The total number of active Interagency Group (IAG) tags in use for all agencies as of December 31, 2013 was over 25.8 million.

With the introduction of E-ZPass at all TBTA crossings, toll plaza operations have improved and vehicle-hours of delay have been reduced. This, in turn, has led to even more motorists enrolling in E-ZPass. Electronic payment of tolls has accelerated vehicle processing through the E-ZPass lanes, thereby reducing the overall vehicle queues at the plazas. TBTA estimates that manual toll lanes are able to process approximately 250 vehicles per hour and dedicated (gated) E-ZPass lanes are able to process approximately 800 vehicles per hour. Prior to implementation of E-ZPass, vehicle processing through the TBTA toll plazas during peak periods was a primary cause of congestion at the crossings. Reports from the TBTA indicate that travel time through the gateless lanes at the Henry Hudson Bridge has decreased due to the elimination of E-ZPass interventions. At the Henry Hudson Bridge, cashless lanes on a pilot program basis provide free-flowing traffic conditions.

TBTA began the initial phase of a pilot program in January 2011 at the Henry Hudson Bridge to test All Electronic Toll Collection (AET) operations. The removal of E-ZPass toll lane gates boosted peak hour throughput from around 800 vehicles per hour to approximately 1,000 vehicles per hour, or 25 percent. In November 2012, TBTA implemented cashless tolling at the Henry Hudson Bridge. All motorists are now able to use any lane to drive through the toll plaza without stopping. Under the cashless tolling system, automatic billing remains the same for drivers with E-ZPass. For drivers without an E-ZPass tag, the image of their license plate is matched with Department of Motor Vehicle (DMV) information and a bill for the toll is mailed to the vehicle's

registered owner. In 2013, 93.4 percent of crossings at the Henry Hudson Bridge were processed through E-ZPass and 6.6 percent were Tolls by Mail transactions.

TBTA, will continue the AET pilot program at the Henry Hudson Bridge through 2014, and has begun the process necessary to formulate a recommendation to the Board on whether to eliminate the collection of cash tolls on a permanent basis at the Henry Hudson Bridge. As a part of that process, in December 2013, TBTA issued a Request for Proposals (RFP) for the implementation of Open Road Tolling (ORT) at the Henry Hudson Bridge. This development would mark the next step in an evolutionary process that was initiated in January 2011. It is expected that, if adopted, the new ORT system would continue to utilize the current methods employed at the Henry Hudson Bridge to capture E-ZPass transponder-reads and license plate images, but will do so in an environment absent a traditional toll plaza, enabling customers to traverse the Henry Hudson Bridge's two tolling areas in free-flow fashion. This project would be executed in concert with a planned structural reconstruction of the Hudson's upper and lower level toll plaza roadways.

Table 2 lists the E-ZPass annual TBTA-wide participation rates starting in 2004, the eighth year since all nine crossings had E-ZPass in operation. Implementation of E-ZPass started in October 1995 on the Verrazano-Narrows Bridge and was phased in gradually on the remaining crossings through December 1996. Also shown are the participation rates for each of the facilities for 2013. Based on customer acceptance of the technology, TBTA expects that the E-ZPass share of total transactions will continue to increase moderately over time.

Table 2 E-ZPass Participation Rates

Year	Annual Participation Rates for all Facilities									
	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Percent Participation	70.1%	71.5%	72.6%	73.5%	74.0%	73.9%	75.8%	79.4%	81.0%	83.3%
Facility	2013 Participation Rate by Facility									
	Throgs Neck	Bronx-Whitestone	RFK Bronx	RFK Manhattan	Queens Midtown	Hugh L. Carey[b]	Verrazano-Narrows	Henry Hudson	Marine Parkway	Cross Bay
Percent Participation	82.2%	77.6%	74.3%	83.9%	87.6%	88.4%	84.3%	93.4%	85.6%	82.5%

Source: TBTA data.
Notes:
(a) Formerly the Brooklyn-Battery Tunnel.

TBTA continues to undertake efforts to increase E-ZPass market share. The most recent toll increase continued to widen the gap between E-ZPass and cash tolls, which has contributed toward a bigger shift toward E-ZPass. In addition, TBTA began selling E-ZPass On-the-Go pre-paid tags in the cash toll lanes at each facility in 2012. The program has been very successful and over 310,000 tags have been sold in the lanes through April 2013. In 2013, On-the-Go accounts represented 49 percent of the total E-ZPass accounts opened for the year.

In another initiative, TBTA launched its MTA Cash Reload Card pilot program in February 2012. This program allows customers who wish to replenish their accounts with cash to receive a MTA credit/debit type card that is directly linked to their E-ZPass accounts. Customers can go to any

one of thousands of Visa ReadyLink retail merchants throughout the New York region and use the card to reload their E-ZPass accounts with cash through a self-service kiosk or through a sales clerk. This eliminates the need for customers who previously had to travel to one of three walk-in centers in Yonkers, Queens, or Staten Island to add cash to their E-ZPass accounts. The card is designed for people who want greater cash control and either do not have or do not want to use a credit card for E-ZPass. Receipts will be provided to the customers at the completion of the reload transaction. Through February 2014, more than 80,000 cards have been issued to customers and currently over 15 percent of total cash replenishments are being made using the reload cards.

On February 5, 2013, TBTA introduced another initiative to increase E-ZPass market share. The E-ZPass Pay Per Trip program allows customers to pay their E-ZPass accounts through a checking account. Unlike other E-ZPass plans, customers under the Pay Per Trip program do not pre-pay for tolls. Once checking account information is provided, tolls will be deducted at the end of each day where toll activity is recorded from the E-ZPass tag. By the end of 2013, nearly 20,000 of these accounts had been established.

E-ZPass is fully integrated at facilities located in 15 states. The transportation network includes the six interstate crossings of the Port Authority of New York and New Jersey, the New Jersey Turnpike and Garden State Parkway operated by the New Jersey Turnpike Authority, the New York State Thruway including its Tappan Zee Bridge, the five bridges of the New York State Bridge Authority (from Bear Mountain northward), the Buffalo and Fort Erie Public Bridge Authority's Peace Bridge, the Atlantic City Expressway, the four toll bridges between New Jersey and Pennsylvania operated by the Delaware River Port Authority, the seven toll bridges between New Jersey and Pennsylvania operated by the Delaware River Joint Toll Bridge Commission, the Delaware Memorial Bridge between New Jersey and Delaware operated by the Delaware River and Bay Authority, the two toll roads in Delaware, toll facilities in Virginia and Maryland, the West Virginia Turnpike, the Maine Turnpike, the Massachusetts Turnpike and the Tobin Bridge operated by the Massachusetts Department of Transportation, the Pennsylvania Turnpike, the New Hampshire Turnpike System, two toll bridges between New Jersey and Pennsylvania operated by the Burlington County Bridge Commission, the toll roads maintained by the Illinois State Toll Highway Authority, the Chicago Skyway Bridge operated by the Skyway Concession Company, the Indiana Toll Road Concession Company, LLC, Chesapeake Bay Bridge and Tunnel District, Rhode Island Turnpike and Bridge Authority, the Ohio Turnpike Commission, and the North Carolina Turnpike Authority.

TBTA's Role in E-ZPass

TBTA was a founding member of the E-ZPass IAG, originally comprising toll authorities in Delaware, Pennsylvania, New Jersey and New York and now encompassing 25 toll agencies in 15 states and one international border crossing. Since the inception of the IAG more than 20 years ago, customers of the member IAG agencies have been able to use their tags on any E-ZPass-equipped facility operated by another IAG member. The IAG processes over 2.4 billion toll transactions annually. As the IAG has grown, the E-ZPass customer base has increased, which has helped increase usage of E-ZPass on TBTA facilities.

With the exception of TBTA customers enrolled in the E-ZPass Pay Per Trip plan, all TBTA customers must pre-pay their E-ZPass accounts. These pre-payments are based on a customer's E-ZPass usage at both TBTA and other IAG member facilities. Through the IAG system, TBTA and other member agencies transfer payments associated with inter-operability to each other on a routine basis. For 2013, TBTA transferred $740.9 million to, and received $408.2 million from, other members within the IAG.

Passenger Car Toll Rate Trends and Inflation

Since 1971, toll rates have been increased periodically on the TBTA facilities. Table 3 displays passenger car toll rates for the nine TBTA bridges and tunnels over the past 42 years.

Passenger Car Toll Rate Trends

Since 1982, passenger car toll rates have been separated into four categories, as follows:

- Major crossings - RFK, Bronx-Whitestone and Throgs Neck Bridges, and the Queens Midtown and Hugh L. Carey Tunnels;
- Minor crossings - Marine Parkway and Cross Bay Bridges;
- Henry Hudson Bridge (treated as a minor facility prior to the 2008 toll increase) – a crossing restricted to passenger vehicles; and
- Verrazano-Narrows Bridge – a major crossing with one-way toll collection since 1986 in accordance with federal law.

Table 3 Historical Trends in Cash Passenger Car Toll Rates

Year	RFK, Bronx-Whitestone and Throgs Neck Bridges, and Queens Midtown and Hugh L. Carey Tunnels[a]	Verrazano-Narrows Bridge[b]	Henry Hudson Bridge	Marine Parkway & Cross Bay Bridges
1971	$0.25	$0.50	$0.10	$0.10
1972 – 1975	0.50	0.75	0.25	0.25
1975 – 1980	0.75	1.00	0.50	0.50
1980 – 1982	1.00	1.00	0.60	0.75
1982 – 1984	1.25	1.25	0.90	0.90
1984 – 1986	1.50	1.50	0.90	0.90
1986 – 1987	1.75	1.75	1.00	1.00
1987 – 1989	2.00	2.00	1.00	1.00
1989 – 1993	2.50	2.50	1.25	1.25
1993 – 1996	3.00	3.00	1.50	1.50
1996 – 2003	3.50	3.50	1.75	1.75
2003 – 2005	4.00	4.00	2.00	2.00
2005 – 2008	4.50	4.50	2.25	2.25
2008	5.00	5.00	2.75	2.50
2009	5.50	5.50	3.00	2.75
2010 – 2013	6.50	6.50	4.00	3.25
2013 – 2014	7.50	7.50	5.00[c]	3.75

Notes:
(a) At the Hugh L. Carey Tunnel (formerly Brooklyn-Battery Tunnel), the cash passenger car toll rates were $0.35 in 1971 and $0.70 in 1972.
(b) Since March 20, 1986, round-trip tolls (twice the amount shown) have been collected on the Verrazano-Narrows Bridge in the westbound direction only in compliance with a Federal legislative mandate. Eastbound traffic uses the bridge toll-free. These amounts are the equivalents of collecting tolls in each direction.
(c) Effective November 10, 2012, cash customers pay via the Tolls by Mail program as part of the AET pilot program at the Henry Hudson Bridge.

In general, tolls for vehicles over 7,000 pounds have also been adjusted upward whenever passenger car toll rates were increased. Notable exceptions occurred in 1987 and 1989 when these toll rates were not raised while there was a general increase for passenger cars. Historically, these vehicles received toll reductions on any TBTA facility when they used pre-paid accounts (as of February 5, 2013, pre-paid accounts are no longer required to obtain a reduced toll rate). This plan continues with E-ZPass with the exception of non-NYCSC customers.

Over the years, various resident toll reduction programs have been implemented. As noted earlier, registered residents are currently eligible for a full rebate of the Cross Bay Bridge crossing charge and a partial rebate of the Verrazano-Narrows Bridge crossing charge.

Under the MTA's new VNB Commercial Rebate Program, qualifying commercial vehicles will be eligible for a partial rebate of the Verrazano-Narrows Bridge crossing charge. As previously stated, implementation of the VNB Commercial Rebate Program will be retroactive to April 1, 2014.

Inflation

The Consumer Price Index Urban (CPI-U), compiled by the US Department of Labor, Bureau of Labor Statistics for United States Cities, is often used to compare toll rate increases. Since over 80 percent of transactions on TBTA facilities are by E-ZPass, we have compared cumulative CPI-U alongside the TBTA major crossing passenger car E-ZPass toll rates. The comparison starts in 1996 when E-ZPass was instituted on TBTA facilities. As indicated in Table 4, TBTA E-ZPass tolls in 2013 were 1.8 times the 1996 E-ZPass toll rate while the CPI-U was 1.5 times the 1996 level. If adjusted for changes in the CPI-U, current tolls are 1.2 times the 1996 rate.

Table 4 E-ZPass Passenger Toll Rates Versus Consumer Price Index

Year	Consumer Price Index[a]	RFK, Bronx-Whitestone and Throgs Neck Bridges, and Queens Midtown and Hugh L. Carey Tunnels[b]	Tolls Adjusted to 1982-84 Dollars[c]
1996[d]	166.9	$3.00	$1.80
2003	197.8	3.50	1.77
2005	212.7	4.00	1.88
2008	235.8	4.15	1.76
2009[e]	236.8	4.57	1.93
2010[f]	240.9	4.80	1.99
2013[g]	254.8	5.33	2.09
Ratio 2013/1996	1.5	1.8	1.2

Notes:
(a) New York Metropolitan Statistical Area: New York–Northern New Jersey-Long Island, NY-NJ-CT-PA, All Urban Consumers, All Items. Base period: 1982-1984 = 100.0. Not seasonally adjusted. Source: US Department of Labor, Bureau of Labor Statistics.
(b) Formerly the Brooklyn-Battery Tunnel.
(c) The current toll divided by the CPI and expressed in dollars.
(d) E-ZPass introduced to all TBTA facilities in December 1996.
(e) Effective July 12, 2009.
(f) Effective December 30, 2010.
(g) Effective March 3, 2013.

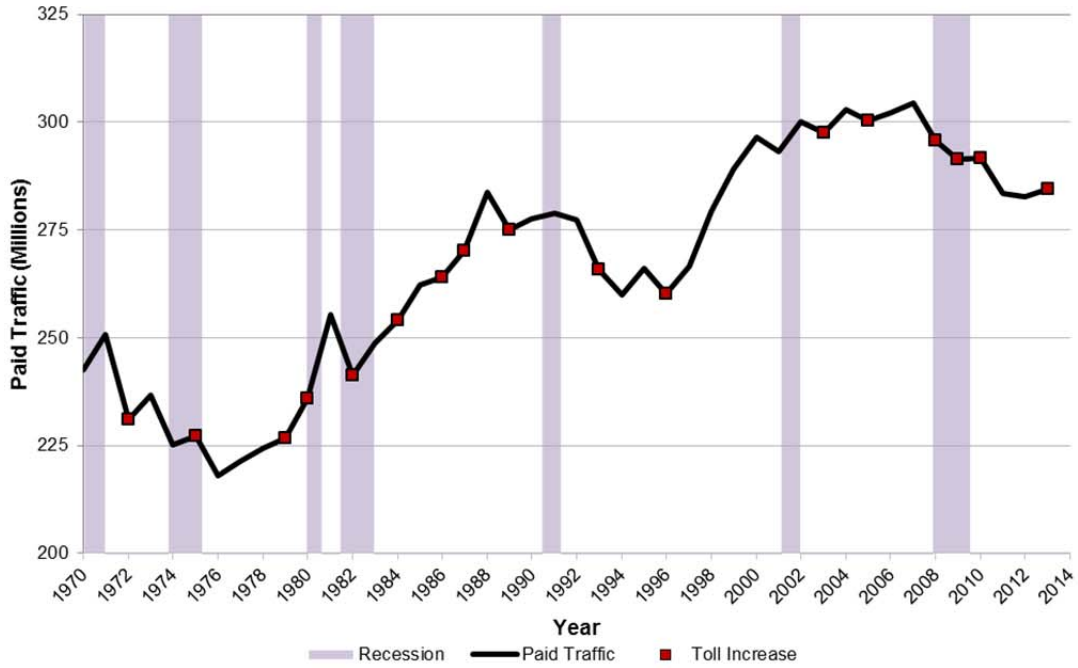
HISTORICAL TRAFFIC, REVENUES AND EXPENSES AND ESTIMATED/BUDGETED NUMBERS FOR 2013

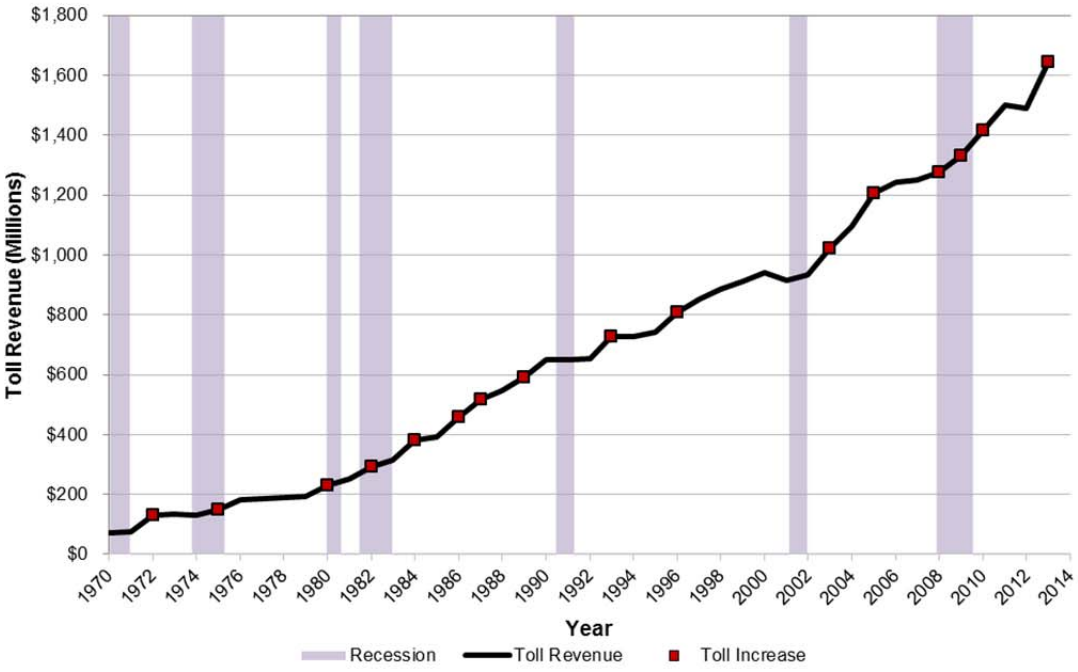
Historical traffic, toll revenues and expenses were reviewed for the nine TBTA bridges and tunnels. Over the last 44 years, paid traffic volumes on the crossings have ranged from a low of 218 million in 1976 to a high of 304 million in 2007. As displayed in Figure 2A/2B, the growth of traffic and revenue has been affected by the region's overall growth in population and employment, offset by the impact of 16 periodic toll increases (represented by the boxes in the graph). By 2000, after 10 toll increases and 18 percent higher traffic volume, toll revenues had increased more than 13-fold, from $72 million to $941 million in 2000. Revenues declined to $915 million in 2001 primarily due to the closures and restrictions on TBTA facilities following the September 11 terrorist attack on the World Trade Center and the regional decline in employment.

In 2007, with tolls having been increased again in 2003 and 2005, and traffic reaching a historical high of 304 million vehicles, revenue reached $1,251 million, $9 million greater than revenues in 2006. Toll increases in March 2008, July 2009 and December 2010 resulted in annual revenue increases through 2011. In 2012, toll revenues were $1,491 million, $11 million less than the 2011 level of $1,502 million, reflecting the negative impacts including temporary closures caused by Sandy, partially offset by modest improvements in the regional and national economies. Toll revenues in 2013 increased to $1,645 million primarily due to the rebound from Sandy and the March 2013 toll increase.

Also note in Figure 2A/2B that, despite the periodic toll increases, the traffic trend was generally upward, except for the last five years when traffic generally declined and then leveled off. Other noticeable declines in traffic have occurred during the fuel crises of the 1970s and during the economic recessions in the late 1980s, early 1990s, and 2008-2009, all periods of difficult and prolonged economic downturns.

Figure 2A/2B Aggregated TBTA Facilities Paid Traffic and Toll Revenue, 1970 to 2013





Source: TBTA data.

Traffic and Toll Revenue, 2003 to 2013

Table 5 lists the traffic and toll revenue record for each of the nine crossings for the 2003-2013 period. Total TBTA traffic and toll revenue are shown in Table 6. The peak in toll-paying traffic, 304 million crossings, occurred in 2007. In general, the pattern historically has been that when toll rates are increased, traffic declines moderately and then traffic begins to rise until the next rate increase. However, the toll rate increase in 2008 was also accompanied by rising fuel prices through mid-2008 and the deteriorating economy, resulting in a 2.9 percent drop in traffic. In contrast, with gasoline prices dropping in the latter portion of 2008, traffic decreased only 1.5 percent between 2008 and 2009, even with a toll increase occurring in July 2009. The December 2010 toll increase was also in the midst of a slowly recovering economy and accelerating gasoline prices, resulting in a 2.8 percent decrease in traffic in 2011. (The historical relationship between toll increases and traffic volume is described in the *Toll Impacts and Elasticity* section of this report.) The six toll increases reflected in Table 5 and Table 6 in 2003, 2005, 2008, 2009, 2010 and 2013 are evident in the jump in average tolls in the years following the increase.

In November 2003, the City's morning peak-period ban on Manhattan-bound single occupant vehicles south of 14th Street was lifted, representing the removal of all traffic restrictions on any of TBTA's facilities due to the residual effects of September 11, 2001. Revenue in 2003 exceeded $1 billion, largely as a result of the May 2003 toll increase. After the March 2005 toll increase, 2005 traffic volumes decreased 0.9 percent and revenue rose to $1,205 million for the year, and both traffic and revenue increased in each of the next two years. In 2008 traffic volumes decreased 2.9 percent from 304 million in 2007 to 296 million as a result of the March 16, 2008 toll increase and also in part due to the increase in gas prices, while toll revenues increased 1.9 percent to $1,274 million, as a result of the toll increase.

The July 12, 2009 toll increase resulted in an overall increase in toll revenue from $1,274 million in 2008 to $1,332 million, an increase of 4.6 percent, while traffic decreased by 1.5 percent from 295.7 million to 291.4 million vehicles. Traffic grew by 0.1 percent in 2010 to 291.7 million vehicles and toll revenue grew 6.4 percent to $1,417 million, primarily due to a full year's impact of the July 2009 toll increase. The December 30, 2010 toll increase resulted in an overall increase in toll revenue from $1,417 million in 2010 to $1,502 in 2011, an increase of 6.0 percent, while traffic decreased by 2.8 percent from 291.7 million to 283.5 million. The reduction in toll traffic was a result of severe winter weather, high gas prices, Tropical Storm Irene in August 2011 (tolls were not collected for approximately two days at the Marine Parkway, Cross Bay, Verrazano-Narrows, Throgs Neck and Bronx-Whitestone Bridges), decreased overall travel and the December 2010 increase in toll rates, among other factors.

Table 5 Annual Toll-Paying Traffic and Toll Revenue: 2003 to 2013

(000s)[a]

Year	Verrazano-Narrows Bridge				RFK Bridge				Bronx-Whitestone Bridge			
	Traffic		Revenue	Average Toll[c]	Traffic		Revenue	Average Toll	Traffic		Revenue	Average Toll
	Volume[b]	Change			Volume	Change			Volume	Change		
2003	71,108	–3.1%	$233,482	$3.28	58,339	–4.0%	$222,224	$3.81	44,413	0.1%	$175,393	$3.95
2004	71,404	0.4	246,322	3.45	61,638	5.7	247,937	4.02	45,223	1.8	187,231	4.14
2005	69,980	–2.0	267,276	3.82	62,841	2.0	280,516	4.46	41,198	–8.9	188,808	4.58
2006	70,381	0.6	274,100	3.89	63,063	0.4	288,300	4.57	39,488	–4.2	186,384	4.72
2007	70,382	0.0	272,837	3.88	62,511	–0.9	285,847	4.57	42,397	7.4	200,076	4.72
2008	68,884	–2.1	278,906	4.05	59,741	–4.4	287,877	4.82	42,803	1.0	212,125	4.96
2009	68,600	-0.4	295,901	4.31	59,449	-0.5	304,794	5.13	42,675	-0.3	225,224	5.28
2010	68,097	-0.7	312,873	4.59	60,107	1.1	326,103	5.43	41,050	-3.8	229,428	5.59
2011	66,020	-3.1	330,886	5.01	57,510	-4.3	339,791	5.91	37,643	-8.3	230,669	6.13
2012	65,626	-0.6	326,797	4.98	57,239	-0.5	336,781	5.88	39,478	4.9	240,236	6.09
2013	65,035	-0.9	352,370	5.42	58,224	1.7	376,769	6.47	39,558	0.2	264,174	6.68

Year	Throgs Neck Bridge				Hugh L. Carey Tunnel[d]				Queens Midtown Tunnel			
	Traffic		Revenue	Average Toll	Traffic		Revenue	Average Toll	Traffic		Revenue	Average Toll
	Volume	Change			Volume	Change			Volume	Change		
2003	39,082	–1.5%	$172,603	$4.42	17,806[e]	15.3%	$61,810	$3.47	27,512[e]	2.3%	$99,994	$3.63
2004	39,439	0.9	184,338	4.67	17,700	–0.6	64,366	3.64	28,181	2.4	107,067	3.80
2005	41,199	4.5	210,242	5.10	17,426	–1.5	70,294	4.03	28,751	2.0	121,666	4.23
2006	43,186	4.8	223,756	5.18	17,718	1.7	73,868	4.17	28,966	0.7	127,075	4.39
2007	41,931	–2.9	217,958	5.20	18,139	2.4	75,980	4.19	29,375	1.4	129,348	4.40
2008	40,492	–3.4	219,855	5.43	16,899	–6.8	73,590	4.35	28,620	–2.6	131,264	4.59
2009	39,050	-3.6	222,825	5.71	15,899	-5.9	73,248	4.61	27,702	-3.2	134,927	4.87
2010	39,381	0.8	240,343	6.10	16,096	1.2	79,225	4.92	28,459	2.7	146,934	5.16
2011	40,391	2.6	266,307	6.59	16,570	2.9	87,879	5.30	28,481	0.1	158,668	5.57
2012	39,376	-2.5	260,468	6.61	15,902	-4.0	83,814	5.27	27,759	-2.5	153,825	5.54
2013	39,958	1.5	291,433	7.29	16,547	4.1	95,549	5.77	27,850	0.3	168,982	6.07

Year	Henry Hudson Bridge				Marine Parkway Bridge				Cross Bay Bridge			
	Traffic		Revenue	Average Toll	Traffic		Revenue	Average Toll	Traffic		Revenue	Average Toll
	Volume	Change			Volume	Change			Volume	Change		
2003	24,582	–0.3%	$37,744	$1.54	7,704	–0.5%	$9,694	1.26	6,919	–2.4%	$8,993	$1.30
2004	24,703	0.5	40,149	1.63	7,719	0.2	10,102	1.31	6,989	1.0	9,477	1.36
2005	24,136	–2.3	43,920	1.82	7,673	–0.6	11,234	1.46	7,182	2.8	10,988	1.53
2006	24,159	0.1	44,901	1.86	7,737	0.8	11,536	1.49	7,361	2.5	11,630	1.58
2007	24,117	–0.2	44,779	1.86	7,833	1.2	11,635	1.49	7,679	4.3	12,090	1.57
2008	22,823	–5.4	46,126	2.02	7,829	–0.1	12,019	1.54	7,589	–1.2	12,212	1.61
2009	22,584	-1.0	49,581	2.20	7,876	0.6	12,921	1.64	7,548	-0.5	12,694	1.68
2010	23,058	2.1	54,452	2.36	7,838	-0.5	13,774	1.76	7,627	1.0	13,914	1.82
2011	22,185	-3.8	59,246	2.67	7,523	-4.0	14,003	1.86	7,148	-6.3	14,139	1.98
2012	21,939	-1.1	57,828	2.64	7,829	4.1	15,698	2.00	7,498	4.9	15,535	2.07
2013	21,830	-0.5	62,444	2.86	7,814	-0.2	16,633	2.13	7,712	2.9	16,840	2.18

Source: TBTA data.

Notes:

(a) Toll rate increases occurred on May 18, 2003, March 13, 2005, March 16, 2008, July 12, 2009, December 30, 2010 and March 3, 2013.

(b) Westbound toll traffic volume doubled, since traffic is not registered in the eastbound direction.

(c) Average toll on basis of revenues divided by doubled westbound volume.

(d) Formerly the Brooklyn-Battery Tunnel.

(e) Reflects traffic restrictions and closures beginning September 11, 2001 and ending gradually through November 17, 2003.

Table 6 Summary of Annual Paid Traffic and Toll Revenue: 2003 to 2013

Year	Total Paying Traffic Volume (000s)	Total Toll Revenue (000s)	Average Toll
2003[a]	297,465	$1,021,937	$3.44
2004	302,995	1,096,989	3.62
2005[a]	300,385	1,204,944	4.01
2006	302,059	1,241,551	4.11
2007	304,364	1,250,549	4.11
2008[a]	295,680	1,273,974	4.31
2009[a]	291,383	1,332,115	4.57
2010[a]	291,714	1,417,046	4.86
2011	283,471	1,501,589	5.30
2012	282,647	1,490,982	5.28
2013[a]	284,528	1,645,193	5.78

Source: TBTA data.
Notes:
(a) Toll rate increases occurred on May 18, 2003, March 13, 2005, March 16, 2008, July 12, 2009, December 30, 2010 and March 3, 2013.

In 2012, traffic volumes decreased by 0.3 percent to 282.6 million and toll revenues decreased 0.7 percent to $1,491 million. The reduction in toll traffic and toll revenue is primarily due to Sandy, which occurred on October 29, 2012 and resulted in travel restrictions on transportation facilities in the New York City area. All of TBTA's facilities were closed at some point during the storm on October 29th. While TBTA bridges were reopened the following day (except for the Cross Bay Bridge, which opened two days later), both the Queens Midtown Tunnel and the Hugh L. Carey Tunnel sustained a substantial amount of damage. The Queens Midtown Tunnel was closed to all traffic until November 6th, when it was reopened to peak period, peak directional buses only. On November 9th, passenger cars and buses were permitted at all times. Truck restrictions were lifted on November 16th, restoring Queens Midtown Tunnel traffic to pre-Sandy operations. The Hugh L. Carey Tunnel was closed to all traffic until November 12th when it was reopened to peak period, peak directional buses only. The following day, November 13th, the Hugh L. Carey Tunnel was reopened to passenger car and bus traffic during peak periods. Unrestricted access for passenger car and bus traffic was restored on November 19th. Truck restrictions were lifted on December 10th, restoring the Hugh L. Carey Tunnel to pre-Sandy operations. In addition, by order of the Governor, tolls were suspended at the Marine Parkway Bridge and the Cross Bay Bridge for the month of November (retroactive to when the bridges reopened after Sandy). The total revenue loss of the suspension was $2.5 million and was reimbursed to MTA by New York State. MTA reimbursed TBTA by the equivalent amount.

Traffic on the Bronx-Whitestone and Throgs Neck Bridges has been of similar magnitude over the years. These two bridges generally serve the same areas in the Bronx and Queens, and historically traffic has shifted back and forth to the crossing providing the better level of service, at times based on lane restrictions due to construction activity. Lane closures associated with deck replacement on the Bronx approach spans of the Bronx-Whitestone Bridge, which occurred for the most of 2010 and 2011 resulted in a reduction of travel lanes on the bridge. As a result, some motorists diverted onto the Throgs Neck Bridge in order to avoid congestion.

Of the nine TBTA toll facilities, the RFK Bridge reported the highest toll revenue for 2013 at $376.8 million, while the Marine Parkway-Gil Hodges Memorial Bridge registered the lowest revenue at $16.6 million. Total annual TBTA toll traffic volume and revenue are shown in Table 6 for the period 2003 through 2013.

In 2013, total toll traffic on all TBTA facilities increased 0.7 percent to 284.5 million and toll revenues increased 10.3 percent to $1,645 million. The increase in revenue is attributed to a combination of the ongoing recovery from Sandy and the continuing moderate economic recovery, while the March 3, 2013 toll increase is an additional factor affecting traffic and revenue.

Preliminary results for January through March 2014 indicate that traffic on the TBTA facilities decreased by 4.0 percent. This decrease is attributed to severe weather conditions (snow storms) in both January and February 2014. Changes by facility are shown below in Table 7.

Table 7 Estimated Changes in January - March Traffic – 2013 to 2014

Facility	Actual Percent Change January-March 2013 to 2014[a]
Throgs Neck Bridge	-2.5%
Bronx-Whitestone Bridge	-6.8
RFK Bridge	-1.7
Queens Midtown Tunnel	1.4
Hugh L. Carey Tunnel[b]	-1.0
Verrazano-Narrows Bridge	-6.6
Henry Hudson Bridge	-2.6
Marine Parkway Bridge	-14.1
Cross Bay Bridge	-10.5
All	-4.0

Notes:
(a) Based on preliminary actual data, subject to final audit.
(b) Formerly the Brooklyn-Battery Tunnel.

Traffic by Facility and Vehicle Class, 2013

TBTA maintains traffic counts for each crossing in 13 toll-paying categories, ranging from passenger cars to trucks with seven axles. Displayed in Table 8 are the 2013 traffic volumes by facility. Passenger cars totaled 263.4 million crossings and represented 93 percent of the total toll-paying vehicles (which has remained relatively constant over time). Of the TBTA facilities, the Verrazano-Narrows Bridge registered the highest traffic volume of 65.0 million toll-paying vehicles. The lowest toll-paying volume, 7.7 million vehicles, was recorded at the Cross Bay Bridge.

Table 8 Traffic by Facility and Vehicle Class, 2013
(000s)[a]

Facility	1 Passenger Cars	2 Pass. Cars w/one-axle Trailer	3 Pass. Cars w/two-axle Trailer	4 Trucks 2 Axles	Franchise Buses 5 2 Axles	Franchise Buses 11 3 Axles	6 Trucks 3 Axles	7 Trucks 4 Axles
Throgs Neck Bridge	35,871	61	53	1,550	1	0	314	297
Bronx-Whitestone Bridge	36,674	18	10	1,336	43	113	294	202
RFK Bridge	53,439	29	14	3,007	29	298	598	106
Queens Midtown Tunnel	25,577	8	5	1,588	58	245	253	39
Hugh L. Carey Tunnel[b]	15,177	3	2	605	0	538	123	16
Verrazano-Narrows Bridge[c]	60,521	39	32	1,978	162	379	410	246
Henry Hudson Bridge[d]	21,616	1	1	164	0	0	3	0
Marine Parkway Bridge	7,455	3	2	243	45	2	28	5
Cross Bay Bridge	7,085	4	2	352	133	36	46	7
Total	263,414	166	121	10,823	471	1,612	2,069	919
Percent of Paid Vehicles	92.6%	0.1%	0.0%	3.8%	0.2%	0.6%	0.7%	0.3%

Facility	8 Trucks 5 Axles	9 Motor-cycles	12 Trucks 6 Axles	13 Trucks 7 Axles	14 Other Vehicles	Total Toll-Paying Vehicles	10 Non-Rev Vehicles[e]	Total Vehicles
Throgs Neck Bridge	1,613	87	101	6	3	39,958	199	40,158
Bronx-Whitestone Bridge	764	86	14	1	2	39,558	208	39,766
RFK Bridge	552	136	14	1	1	58,224	1,060	59,284
Queens Midtown Tunnel	16	58	2	0	1	27,850	374	28,224
Hugh L. Carey Tunnel[b]	3	78	0	0	0	16,547	467	17,013
Verrazano-Narrows Bridge[c]	1,056	164	44	2	2	65,035	633	65,668
Henry Hudson Bridge[d]	1	44	0	0	0	21,830	74	21,903
Marine Parkway Bridge	15	16	2	0	0	7,814	91	7,905
Cross Bay Bridge	19	24	3	0	0	7,712	158	7,870
Total	4,038	693	180	11	10	284,528	3,265	287,792
Percent of Paid Vehicles	1.4%	0.2%	0.1%	0.0%	0.0%	100.0%		

Source: TBTA
Notes:
(a) Totals may not add due to rounding.
(b) Formerly the Brooklyn-Battery Tunnel.
(c) Westbound traffic doubled, since traffic is not registered in the eastbound direction.
(d) Truck passage prohibited.
(e) Includes police, fire and other emergency vehicles and TBTA vehicles.

Monthly Traffic, 2013

Monthly variations in traffic volumes on the nine crossings have been attributed to several factors historically, including severe weather, either winter or tropical storms, which result in lower volumes; and, conversely, traffic reaching its highest levels during the summer months when recreational travel peaks. Traffic volumes also tend to decline in the aftermath of a toll increase. Furthermore, individual facilities can be affected by construction projects on the facility itself or its approaches, and on adjacent arterials or competing bridges. The limited number of crossings in the region, however, sustains the overall demand for TBTA's bridges and tunnels. In addition to these normal impacts, there are extraordinary events such as the effects of September 11th and Sandy.

The data in Table 9 indicate that total traffic on the nine crossings in 2013 peaked in August. June was the second highest month in 2013. For the combined facilities, the monthly variations in 2013 ranged from 9 percent below the annual average in February (due to extremely harsh weather) to 6 percent above in August. This is indicative of a stable traffic mix comprising a solid base of commuting, discretionary and commercial traffic.

Table 9 Monthly Traffic Variations, 2013

Month	Average Daily Toll-Paying Traffic[a]										Ratio to AADT[d]
	Throgs Neck Bridge	Bronx-Whitestone Bridge	RFK Bridge	Queens Midtown Tunnel	Hugh L. Carey[b] Tunnel	Verrazano-Narrows[c] Bridge	Henry Hudson Bridge	Marine Pkwy Bridge	Cross Bay Bridge	Total	
January	98,467	100,955	143,608	69,031	41,641	169,245	54,424	20,843	20,824	719,039	0.92
February	94,997	99,012	143,279	69,644	42,293	166,333	53,671	19,233	19,821	708,285	0.91
March	104,282	106,976	152,393	75,950	42,433	175,485	56,555	19,694	20,298	754,065	0.97
April	108,482	111,916	163,310	73,036	46,379	180,151	61,845	21,257	21,579	787,953	1.01
May	112,943	114,397	165,446	79,020	45,461	182,919	62,871	22,555	22,300	807,911	1.04
June	119,472	112,047	168,591	79,195	46,411	188,499	62,300	24,606	23,512	824,633	1.06
July	119,457	113,401	161,281	74,227	43,972	182,135	58,864	25,658	23,795	802,791	1.03
August	119,543	117,372	169,156	79,778	46,970	187,414	60,260	24,233	22,261	826,987	1.06
September	112,188	110,489	164,942	79,932	45,142	178,246	61,237	20,816	20,678	793,669	1.02
October	111,118	108,618	168,850	81,669	51,309	180,330	65,120	20,212	20,420	807,645	1.04
November	109,373	103,434	159,704	78,012	47,819	173,966	62,409	19,256	19,371	773,343	0.99
December	102,343	101,149	152,682	75,641	44,018	172,537	57,810	18,339	18,577	743,096	0.95
AADT[e]	109,474	108,378	159,518	76,302	45,333	178,179	59,807	21,409	21,129	779,527	1.00

Notes:
(a) Totals may not add due to rounding.
(b) Formerly the Brooklyn-Battery Tunnel.
(c) Westbound traffic doubled.
(d) For total traffic on the nine crossings.
(e) Annual Average Daily Traffic.

Changes in Monthly Traffic, 2012 to 2013

Table 10 lists the monthly average daily traffic changes that have occurred between 2012 and 2013.

Table 10 Changes in Monthly Average Daily Traffic – 2012 to 2013

Month	Percent Change Comparing 2012 Monthly Average Daily Traffic to 2013								
	Throgs Neck Bridge	Bronx-Whitestone Bridge	RFK Bridge	Queens Midtown Tunnel	Hugh L. Carey Tunnel[(a)]	Verrazano-Narrows Bridge	Henry Hudson Bridge	Marine Parkway Bridge	Cross Bay Bridge
January	1.7%	5.6%	3.2%	-3.4%	-0.1%	1.3%	-1.6%	17.3%	18.1%
February	-6.1	-1.4	-1.4	-7.9	-4.6	-3.8	-7.4	6.5	9.6
March	-1.5	1.7	-1.6	-5.8	-9.5	-2.2	-6.3	1.0	5.2
April	-1.1	3.3	2.4	-9.3	-0.5	-1.0	-2.5	11.0	12.6
May	-0.4	3.3	0.0	-3.9	-6.6	-0.7	-3.3	3.5	5.4
June	4.0	-4.0	-1.2	-4.6	-6.5	-1.9	-5.4	-0.5	-0.4
July	4.0	-0.6	1.6	-4.5	-3.6	-0.7	-0.7	-0.1	1.4
August	1.2	0.1	2.7	-1.8	-3.0	-1.1	-0.4	-3.9	-3.3
September	-0.2	0.6	3.0	-0.2	-3.7	-0.9	-0.1	-0.7	0.2
October	10.4	5.5	9.0	12.7	14.3	6.8	10.6	8.0	10.8
November	9.2	-4.0	5.1	51.6	194.8	0.9	15.4	-18.1	-5.9
December	-0.4	-3.9	0.9	3.0	6.9	-4.1	0.8	-14.7	-10.0
Annual	1.8	0.5	2.0	0.6	4.3	-0.6	-0.2	0.1	3.1

Notes:
(a) Formerly the Brooklyn-Battery Tunnel.

Reasons for monthly traffic changes include:

- In 2013, milder weather in January, October and November compared to 2012;
- In 2013, harsher weather in February, March, and June compared to 2012;
- Absence of an additional day of traffic in February 2013 compared to February 2012 which was a leap year;
- Effects of Sandy (2012):
  - Marine Parkway Bridge and Cross Bay Bridge – Increased traffic due to the influx of recovery and construction vehicles to the Rockaways and the suspension of the MTA New York City Transit A train service Post-Sandy from November 2012 through April 2013. As a result, there was an increase in traffic in January to April 2013 and a decrease in traffic in November and December 2013;
  - Queens-Midtown Tunnel and Hugh L. Carey Tunnel – Increased traffic in the final two months of 2013 due to the short-term closures of both tunnels in the same months of 2012 after Sandy;
  - All Facilities – Increased traffic in October 2013 when compared to 2012 due to the closure of all TBTA bridges in 2012 from the afternoon of October 29th through October 30th, with the exception of the Cross Bay Bridge which reopened on October 31st;
- Generally lower gasoline prices in 2013 than in 2012;
- Construction projects on TBTA facilities and other non-TBTA facilities within the New York Metropolitan Region; and
- The March 3, 2013 TBTA toll increase.

Operating Expenses 2003 to 2013

Table 11 displays the historical operating expenses for the TBTA facilities from 2003 through 2013. TBTA divides operating expenses into two major categories: labor and non-labor. Labor includes salaries, overtime and fringe benefits, net of capital reimbursements. Major maintenance, some bridge painting, outside services, insurance, TBTA's share of the E-ZPass Customer Service Center, and other non-personnel expenses are included in non-labor.

TBTA labor expenses increased from $160.0 million in 2003 to $220.7 million in 2013. Part of this increase is due to inflation. A significant part of this increase was due to the creation of 265 new security positions after the events of September 11, 2001. Labor expenses in 2012 related to Sandy amounted to approximately $1.0 million in additional overtime for emergency response and service restoration efforts. TBTA has also taken steps to keep labor costs down. In 2010, TBTA implemented several budget reduction initiatives that have produced ongoing savings of approximately $10 million per year in labor expenses.

Non-labor expenses increased from $169.0 million in 2003 to a high of $200.7 million in 2008. The primary driving factors in TBTA's non-labor expense growth were inflation, an increase in major maintenance and bridge painting activities. Since 2008, non-labor operating expenses have decreased primarily due to capitalization of the bridge painting program and rescheduling of E-ZPass tag purchases to leverage a new contract with lower unit costs. In 2013, non-labor expenses were $188.8 million. Non-labor operating expenses related to Sandy amounted to $10.7 million in 2012, primarily for de-watering of the tunnels, clean-up efforts at the Rockaway crossings, facility inspections and assessments, and other restoration activities.

The 2003 results reflect the additional expenses that were incurred in the aftermath of the 2001 attack on the World Trade Center. Some of the increases associated with these additional costs have been reimbursed to TBTA through MTA from a combination of insurance proceeds and emergency grants from the Federal Emergency Management Agency (FEMA).

Between 2003 and 2008, increases in labor costs were primarily the result of the hiring of additional security staff, adjustments to worker's compensation, and increases in health and welfare fringe benefit rates. In non-labor expenses, increases due to major maintenance and bridge painting were partially offset by decreases in insurance costs, E-ZPass NYCSC costs and other business expenses.

Table 11 Historical Operating Expenses: 2003 to 2013

Year	Operating Expenses (000s)[a]			Percent Change
	Labor[b]	Non-Labor[c]	Total	
2003	$159,976	$169,039	$329,015	9.6%
2004	158,403	160,811	319,214	–3.0
2005	173,549	170,123	343,672	7.7
2006	183,268	169,642	352,910	2.7
2007	196,755	172,270	369,025	4.6
2008	207,305	200,686	407,991	10.6
2009	220,458	177,367	397,825	–2.5
2010	209,499	173,950	383,449	–3.6
2011	208,343	150,503	358,846	-6.4
2012	220,576	157,463	378,040	5.3
2013	220,692	188,804	409,496	8.3

Source: TBTA
Notes:
(a) Totals may not add due to rounding.
(b) Includes salaries, overtime and fringe benefits, net of capital reimbursements.
(c) Non-labor includes the following categories: major maintenance and supplies, bridge painting, outside services, insurance, power, leases and rentals and other expenses.

The operating expenses for 2009 saw a net decrease in expenditures from 2008 of 2.5 percent. Labor expenses increased by 6.3 percent, offset by a decrease in non-labor expenses of 11.6 percent. Total operating expenses in 2010 declined 3.6 percent from 2009. TBTA undertook a major organizational assessment in 2010 which reduced organizational layers. Non-labor expenditures declined 1.9 percent primarily due to the capitalization of much of the bridge painting program. In 2011, total operating expenses decreased for the third year in a row. Expenses in 2011 decreased 6.4 percent from 2010 to $358.8 million, with the majority of the decrease attributed to reductions in non-labor expenses.

Total operating expenses for 2012 increased $19.2 million, or 5.3 percent from 2011 primarily due to the previously discussed emergency response and facility restoration efforts associated with Sandy ($11.7 million) and additional pension costs ($8.5 million) caused by an increased valuation required by the New York City Office of the Actuary requiring an increase in contributions due to a decrease in the rate of return, which included retroactive adjustments to July 2011. These additional costs were partially offset by a net of $1.0 million in reduced expenses across a variety of areas.

Total operating expenses for 2013 increased $31.5 million, or 8.3 percent above 2012 primarily resulting from: $12.6 million in additional bond issuance costs associated with the implementation of Government Accounting Standards Bureau (GASB) 65, which requires that certain expenses that were previously allowed to be amortized over the life of the bonds must now be realized in full when incurred; $5.2 million in Sandy restoration costs; $4.4 million in higher insurance premiums; additional credit/debit card fees of $2.7 million due to the March increase in E-ZPass tolls; another $2.7 million in E-ZPass Customer Service Center costs stemming from account growth and the first full year of cashless tolling at the Henry Hudson Bridge, and; an increase of $1.8 million to the annual write-off of bad debt associated with outstanding E-ZPass account balances.

FACTORS AFFECTING TRAFFIC GROWTH

A previous section of this report identified the historical trends in traffic, revenue and expenses of the nine TBTA bridges and tunnels. Before developing the forecasts, several factors affecting future traffic were considered, including the projected trends in population and employment, TBTA and regional construction impacts, the capacity constraints in the regional highway network, and toll and elasticity impacts. This section of the report concludes with a summary of the assumptions and conditions upon which the traffic and toll revenue forecasts were based.

Employment, Population and Motor Vehicle Registrations

In keeping with federal requirements mandating the preparation of long term demographic and socioeconomic forecasts for travel demand modeling purposes, the New York Metropolitan Transportation Council (NYMTC) prepares and periodically updates employment and population forecasts for the 10-county NYMTC territory and 21 surrounding counties in New York, New Jersey and Connecticut. The latest forecasts, which are included in the following tables and are unchanged from the prior report submission, range from 2010 to 2040 on a 5-year interval basis. They are consistent with historical trends from 1970 to 2012 and will not be revised until the 2050 forecasts are released in Fall of 2014.

The NYMTC forecasting approach begins with econometric modeling of the regional growth in employment relative to national trends and forecasts prepared by IHS Global Insight, calibrated at the county level on an industry-specific basis. IHS Global Insight is a major vendor of economic and financial analysis, forecasts and market intelligence worldwide and provides the New York State Department of Transportation with socioeconomic projections for the state and upstate regions. Employment then drives population growth which is forecasted at the sub-regional level by a model that includes fertility, mortality, net migration of labor force, aged workers, dependents and foreign migrants factors.

Typically, traffic volumes in the region are affected by changes in employment and population. Normally, the demand on TBTA facilities tends to be influenced less by regional employment and population trends than other toll facilities because available water crossings are limited. Motor vehicle registrations are another indicator of trends in traffic volumes. To better understand how these indicators may influence traffic volumes on TBTA crossings over the long term, Stantec first reviewed historical trends and forecasts by NYMTC and others, and then adjusted traffic forecasts in the short term to account for current economic conditions.

Employment Trends and Projections

Job growth traditionally has had an impact on traffic generation. Generally, when the economy is robust and jobs are growing, there is an increase in traffic. Conversely, when employment trends downward traffic volumes generally decline. However, the rate of decline depends upon the severity of employment losses.

Table 12 depicts the long term trend in total employment in the region since 1970. The region is defined as consisting of 31 counties that comprised the commuter-shed: the five boroughs of New York City; 9 suburban counties of New York State in Long Island and the Mid-Hudson; 14 counties of northern and central New Jersey; and 3 counties of Connecticut. Annual trends for the period from 2010 to 2013 are noted in single years while historical data are summarized by decade.

Table 12 Employment Trends
(000s)

Year	New York City	New York Region [a]	New Jersey Region [b]	Connecticut Region [c]	Total [d]
1970	4,066.5	1,554.6	2,447.6	727.4	8,796.1
1980	3,614.0	1,918.6	2,828.2	869.3	9,230.1
1990	3,966.1	2,339.0	3,403.9	1,008.9	10,717.9
2000	4,277.3	2,537.7	3,676.3	1,065.5	11,556.8
2005	4,369.1	2,718.4	3,911.4	1,105.0	12,103.9
2010	4,703.2	2,786.7	3,942.4	1,115.9	12,548.2
2011	4,796.5	2,822.5	3,959.3	1,132.0	12,710.3
2012	4,906.6	2,860.1	4,015.2	1,148.2	12,930.1
2013	5,002.2	2,903.1	4,077.9	1,161.0	13,144.2
Average Annual Percent Change					
1970 to 1980	-1.2%	2.1%	1.5%	1.8%	0.5%
1980 to 1990	0.9%	2.0%	1.9%	1.5%	1.5%
1990 to 2000	0.8%	0.8%	0.8%	0.5%	0.8%
2000 to 2005	0.4%	1.4%	1.2%	0.7%	0.9%
2005 to 2010	1.5%	0.5%	0.2%	0.2%	0.7%
2010 to 2011	2.0%	1.3%	0.4%	1.4%	1.3%
2011 to 2012	2.3%	1.3%	1.4%	1.4%	1.7%
2012 to 2013	1.9%	1.5%	1.6%	1.1%	1.7%

Source: New York Metropolitan Transportation Council, New York State Department of Labor, Connecticut Department of Labor, New Jersey Department of Labor and Workforce Development, and United States Bureau of Economic Analysis.

Notes:
(a) Consists of the following counties: Dutchess, Nassau, Orange, Putnam, Rockland, Suffolk, Sullivan, Ulster and Westchester.
(b) Consists of the following counties: The 13 counties of the North Jersey Transportation Planning Authority (Bergen, Essex, Hudson, Hunterdon, Middlesex, Monmouth, Morris, Ocean, Passaic, Somerset, Sussex, Union, Warren) plus Mercer County of the Delaware Valley Regional Planning Commission.
(c) Consists of the following counties: Fairfield, Litchfield, and New Haven.
(d) Totals may not add due to rounding.

As Table 12 shows, New York City employment, from a peak of 4.1 million jobs in 1970, decreased during the 1980s to 3.6 million. Since 1980, New York City has shown consistent employment growth in each decade, having returned to 1970 levels in the 1990s and gone on to reach 5.0 million jobs by 2013, despite the downturn which occurred in the severe 2007-2009 recession. The Long Island and Mid-Hudson suburbs have reflected continuous growth in the decades since 1970, expanding from 1.6 million jobs in 1970 to 2.9 million by 2013. Slower rates of suburban growth occurred in New Jersey and Connecticut between 1970 and 2010, although by the current decade, growth rates for Connecticut and New Jersey accelerated. Between 1970 and 2013, New Jersey added 1.6 million jobs while Connecticut gained some 400,000. Among the four sub-regions, New York City accounts for the largest employment base with 38 percent of 13.1 million regional jobs, followed by New Jersey with 31 percent, the New York suburbs with 22 percent and Connecticut with 9 percent.

NYMTC prepared a series of 30-year employment forecasts, released in 2011. Forecasted trends are compressed to 5-year intervals which masks cyclical trends between these years, a common practice in long term econometric forecasting. NYMTC projected regional employment growth would increase at an average annual rate of 0.8 percent between 2010 and 2040. However, regional employment levels increased at an average annual growth rate of 1.6 percent between 2010 and 2013, two times greater than the average annual growth rate NYMTC forecasted in 2011. In all sub-regions, annual growth between 2010 and 2013 exceeds the NYMTC forecasted annual average rate of gain between 2010 and 2015, suggesting that NYMTC forecasts understate the near term expansion over the remaining decade, especially for New York City. NYMTC's employment projections from its 2011 30-year employment forecast are presented in Table 13. A revised forecast series, to 2050, is now under development at NYMTC and is expected to be released in Fall 2014.

Table 13 Employment Projections
(000s)[a]

Year	New York City	New York Region [b]	New Jersey Region [c]	Connecticut Region [d]	Total
Average Annual Percent Change					
2010 to 2015	0.3%	0.9%	0.9%	1.2%	0.7%
2015 to 2020	1.0%	1.0%	1.5%	1.0%	1.2%
2020 to 2025	0.9%	0.8%	0.8%	0.8%	0.8%
2025 to 2030	0.8%	0.7%	0.8%	0.9%	0.8%
2030 to 2035	0.8%	0.7%	0.7%	0.9%	0.7%
2035 to 2040	0.9%	0.7%	0.7%	1.0%	0.8%
2010 to 2040	0.8%	0.8%	0.9%	1.0%	0.8%

Source: New York Metropolitan Transportation Council, New York State Department of Labor, Connecticut Department of Labor, New Jersey Department of Labor and Workforce Development, and United States Bureau of Economic Analysis.

Notes:
(a) Forecast is the most recent available, unchanged from the previous year.
(b) Consists of the following counties: Dutchess, Nassau, Orange, Putnam, Rockland, Suffolk, Sullivan, Ulster and Westchester.
(c) Consists of the following counties: The 13 counties of the North Jersey Transportation Planning Authority (Bergen, Essex, Hudson, Hunterdon, Middlesex, Monmouth, Morris, Ocean, Passaic, Somerset, Sussex, Union, Warren) plus Mercer County of the Delaware Valley Regional Planning Commission.
(d) Consists of the following counties: Fairfield, Litchfield, and New Haven.

Based on long term national forecasts to 2040, taking into account the moderate recovery since the 2007-2009 recession, the existing regional outlook suggests that jobs will expand by 0.8 percent annually over the period, slightly below the annual average growth rate of 0.9 percent between 1970 and 2013. The New Jersey and Connecticut Regions are expected to expand at a rate slightly higher than New York City and the New York Region. No sub-region experiences a period of interim decline as each tends to grow with cyclical contractions between a range of 0.6 and 1.0 percent annually on average over the period.

While the economic recovery has resumed in the region and the nation, the New York State Department of Labor reports that New York City's jobless rate had only dropped to 8.5 percent in 2013. On average, 344,200 residents were unemployed in a labor force of 4 million, while more than 105,300 had gained employment between 2010 and 2013. The City's rate of unemployment is marginally greater than the New Jersey and Connecticut suburban counties, but considerably more than that of the New York suburbs which averaged 6.5 percent unemployed in 2013. Labor force conditions are summarized in Table 14.

Table 14 Labor Force Conditions, 2010 & 2013

	NYC	New York Region[a]	New Jersey Region[b]	Connecticut Region[c]
	Labor Force			
2010	3,958,700	2,608,000	3,496,500	1,042,200
2013	4,029,300	2,613,500	3,545,500	1,014,100
	Employed			
2010	3,579,800	2,412,300	3,172,400	945,200
2013	3,685,100	2,444,900	3,258,800	934,400
	Unemployed			
2010	378,900	195,600	324,000	97,000
2013	344,200	168,700	286,800	79,700
	Unemployment Rate			
2010	9.6%	7.5%	9.3%	9.3%
2013	8.5%	6.5%	8.1%	7.9%

Source: State Departments of Labor.
Notes:
(a) Consists of the following counties: Dutchess, Nassau, Orange, Putnam, Rockland, Suffolk, Sullivan, Ulster and Westchester.
(b) Consists of the following counties: The 13 counties of the North Jersey Transportation Planning Authority (Bergen, Essex, Hudson, Hunterdon, Middlesex, Monmouth, Morris, Ocean, Passaic, Somerset, Sussex, Union, Warren) plus Mercer County of the Delaware Valley Regional Planning Commission.
(c) Consists of the following counties: Fairfield, Litchfield, and New Haven.

Over the year 2013, New York City gained 77,000 payroll jobs, with 79,400 jobs added in the private sector, partially offset by public sector losses across all levels of government totaling 2,400. Leading industries included Professional and Business Services, which accounted for a gain of 17,100 jobs, Leisure and Hospitality with 10,700 more jobs, Education and Health Services with 31,700 new jobs, and Trade, Transportation and Utilities with 14,200 added employment opportunities. Financial Activities leveled off with the gain of 300 jobs while Information declined by 2,100 jobs. Construction posted modest gains of 2,600 jobs.

In the housing market, building permits authorizing new housing construction increased in New York City to 18,095 units or by 71 percent in 2013. Housing foreclosures remain less of a problem than nationally, although the City still has nearly 600 stalled construction sites for mostly residential developments. In other property markets, notably office, vacancy rates have increased slightly and office rents have risen as the Manhattan office market continues to recover. At the top, Class A rental rates trimmed to $69.84 per square foot from $70.15 in 2012. Among all classes, average rental rates climbed from $59.23 per square foot to $63.40 in 2013. Net absorption for the borough's office market was down by 3.6 million square feet by year end 2013, a decline from a 507,000 increase in 2012. With 3.9 million square feet of new construction delivered to the market during the year, Manhattan's inventory of office space rose from 392 million square feet in 2012 to 395.3 million square feet in 2013. An additional 3 million square feet is anticipated to be completed, largely at 1 World Trade Center, in 2014. This is expected to increase the borough's vacancy rate further, as office employment is expanding more slowly than available space and firms are consolidating their use of office space.

Population Trends and Projections

Since 1980, US Census data indicate that the population of New York City has increased by 1.3 million persons to 8.3 million residents in 2012. Although the Census Bureau's 2010 population count was disputed by the City of New York as under-counted by several hundred thousand, the City has nonetheless become a desirable place of residence for many young professionals, foreign immigrants and international investors who maintain multiple residences, as well as the City's long-standing residents that have aged in place. Manhattan's population is now larger than in 1970, a City high point, while the Bronx and Brooklyn remain only marginally less populated than in earlier years. Queens and Staten Island have continued to grow with Queens, in particular, a destination of many immigrant groups.

While the City's population has recorded recent and historical periods of contraction, as shown in Table 15, the commuter suburbs of New York, New Jersey and Connecticut have grown continuously over the past 42 years. Compared to 8.3 million residents in New York City, northern and central New Jersey now houses 7 million residents while the 9 counties of Long Island and the Mid-Hudson are home to 5.2 million. Over the period in which the City added 1.3 million more inhabitants, New Jersey acquired 1.2 million residents and the New York suburbs added 650,000. Connecticut, with less than 2 million residents, has attracted 260,000 since 1980.

Table 15 Population Trends
(000s)

Year	New York City	New York Region [a]	New Jersey Region [b]	Connecticut Region [c]	Total
1970	7,895	4,372	5,800	1,682	27,645.0
1980	7,072	4,537	5,857	1,725	26,262.0
1990	7,323	4,635	6,097	1,806	27,185.0
2000	8,008	4,933	6,662	1,889	29,500.0
2005	8,214	5,073	6,874	1,935	30,310.0
2010	8,175	5,124	6,946	1,969	30,390.0
2011	8,245	5,146	6,975	1,976	30,587.0
2012	8,337	5,184	7,015	1,984	30,857.0
Average Annual Percent Change					
1970 to 1980	-1.1%	0.4%	0.1%	0.3%	-0.5%
1980 to 1990	0.3%	0.2%	0.4%	0.5%	0.3%
1990 to 2000	0.9%	0.6%	0.9%	0.5%	0.8%
2000 to 2005	0.5%	0.6%	0.6%	0.5%	0.5%
2005 to 2010	-0.1%	0.2%	0.2%	0.3%	0.1%
2010 to 2011	0.9%	0.4%	0.4%	0.4%	0.1%
2011 to 2012	1.1%	0.7%	0.6%	0.4%	0.2%

Source: US Census Bureau and New York Metropolitan Transportation Council.
Notes:
(a) Consists of the following counties: Dutchess, Nassau, Orange, Putnam, Rockland, Suffolk, Sullivan, Ulster and Westchester.
(b) Consists of the following counties: The 13 counties of the North Jersey Transportation Planning Authority (Bergen, Essex, Hudson, Hunterdon, Middlesex, Monmouth, Morris, Ocean, Passaic, Somerset, Sussex, Union, Warren) plus Mercer County of the Delaware Valley Regional Planning Commission.
(c) Consists of the following counties: Fairfield, Litchfield, and New Haven.

NYMTC's 30-year projections of regional population are presented in Table 16. Between 2010 and 2040, the NYMTC forecast represents a 0.5 percent annual rate of growth between 2010 and 2040, compared to a 0.3 percent increase since 1970. Of this gain, New York City is expected to attract 29 percent of the regional growth. The New Jersey suburbs are expected to have 35 percent of the increase, while Long Island and the Mid-Hudson are expected to attract 24 percent of the total. Connecticut, by contrast, will likely account for 12 percent of the regional growth.

Although employment trends appear to have had a more noticeable effect on traffic volumes on TBTA facilities, population growth will positively affect traffic demand on crossings. However, TBTA traffic variations do not always correlate year by year with regional demographic trends. As evident, demand for TBTA facilities has been strong overall and NYMTC's long term regional population projections indicate an increasing trend over the future. With regard to employment, there may be some years that will show declines, but that is projected to be offset by other years that will be characterized by growth. In general, an upward trend is expected over the long term through the end of NYMTC's current forecast period in 2040.

Table 16 Population Projections
(000s)[a]

Year	New York City	New York Region [b]	New Jersey Region [c]	Connecticut Region [d]	Total
Average Annual Percent Change					
2010 to 2015	0.3%	0.5%	0.5%	0.6%	0.4%
2015 to 2020	0.4%	0.4%	0.5%	0.4%	0.4%
2020 to 2025	0.5%	0.6%	0.5%	0.5%	0.5%
2025 to 2030	0.6%	0.8%	0.7%	0.9%	0.7%
2030 to 2035	0.6%	0.8%	0.8%	1.1%	0.7%
2035 to 2040	0.3%	0.7%	0.7%	1.0%	0.5%
2010 to 2040	0.4%	0.6%	0.6%	0.7%	0.5%

Source: New York Metropolitan Transportation Council, New York State Department of Labor, Connecticut Department of Labor, New Jersey Department of Labor and Workforce Development, and United States Bureau of Economic Analysis.

Notes:
(a) Forecast is the most recent available, unchanged from the previous year.
(b) Consists of the following counties: Dutchess, Nassau, Orange, Putnam, Rockland, Suffolk, Sullivan, Ulster and Westchester.
(c) Consists of the following counties: The 13 counties of the North Jersey Transportation Planning Authority (Bergen, Essex, Hudson, Hunterdon, Middlesex, Monmouth, Morris, Ocean, Passaic, Somerset, Sussex, Union, Warren) plus Mercer County of the Delaware Valley Regional Planning Commission.
(d) Consists of the following counties: Fairfield, Litchfield, and New Haven.

Motor Vehicle Registrations

The trend in motor vehicle registrations in an area is a predictor of growth or stability in levels of vehicular traffic. As Table 17 shows, over the 2002 to 2012 period, motor vehicle registrations in the region remained relatively constant through that period. However, by 2013, there was an increase in vehicular registrations in New York City and New York State.

Although motor vehicle registrations are not projected for future years, there has been a recent increase in auto sales nationally. Over the long term, with full economic recovery and the restoration of consumer confidence in spending, the growth in registrations will likely keep pace with population and employment growth.

Table 17 Motor Vehicle Registrations

(000s)[a]

Year	New York City	New York State[b]	New Jersey	Connecticut
2002	1,946	10,598	6,822	2,977
2003	1,869	10,952	6,852	3,027
2004	1,849	11,269	6,374	3,106
2005	1,857	12,053	6,420	3,124
2006	1,833	11,487	6,122	3,117
2007	1,926	11,811	6,411	3,112
2008	1,945	11,429	6,411	3,160
2009	1,952	11,591	6,272	3,137
2010	1,962	10,603	6,956	3,148
2011	1,961	10,431	7,940	2,829
2012	1,978	10,449	7,911	2,706
2013	2,016	10,887	NA	NA
Average Annual Growth				
2002-2012	-0.16%	-0.14%	1.49%	-0.95%
2002-2013	0.32%	0.24%	NA	NA

Source: United States Federal Highway Administration and New York State Department of Motor Vehicles.
Notes:
(a) This represents the most recent available data for New Jersey and Connecticut and differs in reporting source from the prior year's report, which was based solely upon state data.
(b) Including New York City.

Annual motor vehicle registrations for the period 2009 through 2013 are shown for each of the five boroughs in New York City in Table 18. Throughout the City, the changes in registrations were minimal year-by-year through 2012, but by 2013 significant increases were evident in Brooklyn and Queens. Over the four year period, the average annual City-wide growth rate was 0.8 percent, with Brooklyn recording a 1.4 percent increase. Manhattan registered the lowest average annual growth of 0.4 percent. However, the four outer boroughs are the most significant contributors to trips on the TBTA facilities.

Table 18 New York City Motor Vehicle Registrations, 2009-2013

Borough	2009	2010	2011	2012	2013	Average Annual Rate of Change
Bronx	248,963	248,600	246,748	251,398	254,752	0.6%
Brooklyn	442,124	447,265	448,510	452,775	466,646	1.4%
Manhattan	248,064	247,965	248,410	250,510	251,751	0.4%
Queens	748,982	753,743	752,933	758,587	774,517	0.8%
Staten Island	263,571	264,658	264,727	265,122	268,492	0.5%
Total	1,951,704	1,962,231	1,961,328	1,978,392	2,016,158	0.8%

Source: New York State Department of Motor Vehicles

Fuel Conditions

Traffic and revenue on the TBTA crossings have been affected in varying degrees by the availability and price of gasoline since 1970, with the most recent effects seen following the high prices throughout 2011. The effects on TBTA traffic resulting from fuel shortages and increases in gasoline prices in 1973 – 1974 and in 1979, during the first war in the Persian Gulf in the early 1990s, during the war in Iraq and after Hurricane Katrina can be seen in Figure 2A/2B. In some instances, such as 2011, economic conditions and toll increases also contributed to the reduction of traffic volumes. After Sandy in 2012, odd-even gasoline rationing was implemented in New York City from November 9th until November 24th whereby motorists could purchase gasoline on alternate days based on the last digit of their license plate. The effects were seen as part of the decrease in traffic after the storm.

In July 2008, the average price of regular grade gasoline was the highest recorded - $4.114 per gallon in the U.S. and $4.179 in New York City. Prices then dropped in the second half of 2008, remaining steady through 2009 and increasing through 2010. The next peak, in May, 2011, saw prices at $3.965 per gallon in the U.S. and $4.069 in New York City. As of April 21, 2014, the U.S. Energy Information Administration states that the price of regular grade gasoline averaged $3.683 per gallon nationally, and $3.681 in New York City.

Sharp increases in the price of gasoline in 2008 and 2011 resulted in decreases in vehicle miles of travel in the United States and in the New York metropolitan area. Data from the United States Federal Highway Administration indicates that Vehicle Miles of Travel (VMT) decreased between 2007 and 2008 by 2.5 percent nationally and by 4.1 percent in New York State. In 2011, largely in response to the recession, national VMT was 1.4 percent below the 2007 level and New York State VMT was 4.1 percent below 2007. In 2013, national travel demand increased 0.6 percent, reflecting the slow improvement in the economy. New York State VMT decreased by 0.6 percent from 2012 to 2013, in part due to the availability of significant and reliable public transportation in the New York City area.

Factors contributing to changes in the price and availability of gasoline are both upward and downward and each has an unknown element that contributes to uncertainty. These factors include:

- Dependence on imported crude oil – United States dependence on imported fuel has decreased as a result of continued domestic development of light oil and increased development of offshore resources in the Gulf of Mexico and in North Dakota. In October 2013, the US Energy Information Administration (EIA) of the Department of Energy reported that domestic crude oil production surpassed imports for the first time since February 1995;
- Use of substitute fuels – The use of biofuels has increased in the United States, thus reducing the need for gasoline;
- Increase in demand – Domestic economic recovery is expected to be the slowest growth of any recovery since 1960 and, while the total energy consumption is estimated to increase over the next 25 years, per capita consumption is expected to decrease, according to EIA.

The slowing of domestic demand should result in lower prices; however, this may be offset by increased demand overseas as world economic conditions improve;

- The political situation in oil producing countries creates tension and uncertainty. Economists say these factors are partially reflected in current oil prices; and
- Motor vehicle fuel efficiency – The adjusted composite model year 2012 fuel economy of 23.6 miles per gallon (mpg) was the highest level of fuel efficiency since the United States Environmental Protection Agency (EPA) began its analysis of light-duty automotive vehicles in 1975. In April 2010, both the National Highway Traffic Safety Administration and the EPA raised the fleet-wide Corporate Average Fuel Economy (CAFE) requirements to 34.1 mpg for 2016, which is an average of passenger cars (37.8 mpg) and light trucks (28.8 mpg).

The EIA, in the April 2014 Short-Term Energy Outlook, indicates that they expect the price of regular grade gasoline to average $3.45 per gallon in 2014 and $3.37 per gallon in 2015, compared with $3.51 per gallon in 2013.

Toll Impacts and Elasticity

Tolls that are increased periodically affect traffic usage, especially if they outpace the rate of inflation, as they have on the TBTA facilities, as well as in those instances where competing facilities provide a good alternative. Elasticity, as used herein, is the relationship between traffic volume and the toll rate change, and represents the relative decrease in traffic corresponding to a given increase in toll. Elasticity is expressed as a negative value and the higher the absolute value, the more apt a facility is to lose traffic, which can be due to diversions to competing facilities, switches in travel modes, consolidation of trips and elimination of trips. Elasticity, in this sense, is used to analyze the relationship between tolls and use, i.e., when tolls are increased, motorists react and travel patterns may change.

Elasticity factors vary, demonstrating that users react differently to toll increases depending on influencing conditions. On the TBTA crossings, elasticity tends to be influenced by the proximity of the toll-free City bridges and other considerations. The low factors for the Throgs Neck and Bronx-Whitestone bridges indicate their relative isolation from the nearest toll-free competitor, the Ed Koch Queensboro Bridge. Further south on the East River at the RFK Bridge and the Queens Midtown and Hugh L. Carey Tunnels, elasticity increases as the degree of toll-free competition increases. The TBTA tunnels tend to lose traffic particularly when the competing crossings are operating under reasonable levels of traffic service and providing motorists with viable toll-free alternatives during non-peak periods. In addition, trip purpose influences demand, i.e., peak-period, work-related trips are less elastic than off-peak or discretionary trips that have fewer travel-time constraints.

Two sets of forecasts were developed for this report: one at constant tolls and the other with tolls at the current level in 2013 and 2014 and then toll increases in March 2015 and March 2017 as included in the MTA Financial Plan 2014-2017 adopted by the MTA Board in February 2014. Elasticity factors used for the forecasts in this report are based on factors developed by Stantec in analyzing the elasticity exhibited by historical elasticity factors previously developed for the TBTA facilities and the toll increase in December 2010. After adjusting for normal traffic changes

in the New York City metropolitan area in 2011, including the effects of changes to fuel prices, economic conditions and severe weather, elasticity factors for the December 2010 toll increases were developed as a composite first and then disaggregated into elasticity factors for both cash and NYCSC E-ZPass vehicles. The analysis of the effects of the 2010 toll increase on traffic volumes indicated a significantly higher elasticity for cash transactions than for E-ZPass users. This behavior was generally exhibited also after the March 2013 toll increase although elasticities from this toll increase could not be quantified with adequate specificity due to other factors affecting traffic in 2012 and 2013. These include the impacts of Sandy, other severe weather events and the slow stabilization of regional economic growth. Our analysis of the 2010 toll increase found that cash-paying motorists are more sensitive to tolls since they are generally less frequent users of the facilities, travel during less congested off-peak periods and have fewer time constraints than E-ZPass users. Conversely, most E-ZPass users pay relatively fewer tolls and are less sensitive to toll increases since some drivers may not immediately be aware of the additional amounts they pay. The historical elasticity factors for total traffic and the factors for cash and E-ZPass transactions based on the analysis of the December 2010 toll increase are shown in Table 19.

Table 19 Elasticity Factors

Facility	Elasticity Factors used in this Report[a]		Historical Elasticity Factors
	Cash	E-ZPass	
Throgs Neck Bridge	-0.136	-0.098	-0.109
Bronx-Whitestone Bridge	-0.136	-0.098	-0.109
RFK Bridge	-0.205	-0.147	-0.164
Queens Midtown Tunnel	-0.240	-0.173	-0.192
Hugh L. Carey Tunnel[b]	-0.448	-0.322	-0.358
Verrazano-Narrows Bridge	-0.160	-0.115	-0.128
Henry Hudson Bridge[c]	-0.352	-0.254	-0.282
Marine Parkway Bridge	-0.126	-0.091	-0.101
Cross Bay Bridge	-0.171	-0.123	-0.137

Notes:
(a) For each 1% increase in toll the volume is expected to decrease by the elasticity factor; e.g. for each 1% increase in the cash toll at the Queens Midtown Tunnel, cash traffic would decrease by 0.240%.
(b) Formerly the Brooklyn-Battery Tunnel.
(c) Elasticity factors for the Henry Hudson Bridge are independent of the All-Electronic Pilot Program.

For purposes of this report and Stantec's projections, we have assumed future toll increases in accordance with the MTA Financial Plan 2014-2017 adopted by the MTA Board in February 2014. This plan assumes a 4 percent revenue yield toll increase in March 2015 and another 4 percent revenue yield increase in March 2017. Accordingly, the revenue forecast with a toll increase included in this report includes toll increases averaging 5 percent to be implemented on March 1, 2015 and March 1, 2017, each, estimated by Stantec to produce a revenue yield of 4 percent.

For the toll-increase scenario, it was assumed that the toll levels (i.e., the cash toll for passenger cars) on the major and minor crossings would be increased by 5 percent in 2015 and 2017, as noted above. Further, it was assumed that truck tolls would be increased proportionately, and

that the relationships between cash and E-ZPass tolls for passenger cars would remain the same as those implemented for the toll increase on March 3, 2013.

As for the impacts of the toll increases on traffic demand, the elasticity factors from Table 19, as described above, were used by Stantec to calculate traffic decreases, as shown in Table 20. These traffic impacts represent the reduction in volume from the corresponding annual traffic levels that would be expected if the tolls were not increased.

Table 20 Estimated Percent Change in Average Toll Rates and Traffic in 2015 and 2017

Facility	Elasticity Factors		Estimated Percent Change			
			Toll		Traffic	
	Cash	E-ZPass	Cash	E-ZPass	Cash	E-ZPass
Throgs Neck Bridge	-0.136	-0.098	5.0%	5.0%	-0.7%	-0.5%
Bronx-Whitestone Bridge	-0.136	-0.098	5.0	5.0	-0.7	-0.5
RFK Bridge	-0.205	-0.147	5.0	5.0	-1.0	-0.7
Queens Midtown Tunnel	-0.240	-0.173	5.0	5.0	-1.2	-0.9
Hugh L. Carey Tunnel[(a)]	-0.448	-0.322	5.0	5.0	-2.2	-1.6
Verrazano-Narrows Bridge	-0.160	-0.115	5.0	5.0	-0.8	-0.6
Henry Hudson Bridge[(b)]	-0.352	-0.254	5.0	5.0	-1.8	-1.3
Marine Parkway Bridge	-0.126	-0.091	5.0	5.0	-0.6	-0.5
Cross Bay Bridge	-0.171	-0.123	5.0	5.0	-0.9	-0.6

Notes:
(a) Formerly the Brooklyn-Battery Tunnel.
(b) Estimated percent change in average toll rate and traffic at the Henry Hudson Bridge is independent of the All-Electronic Tolling Pilot Program.

Again, the toll increases indicated above were selected by Stantec, in consultation with TBTA, to provide an increase that would result in a revenue yield of 4 percent in 2015 and an additional 4 percent in 2017. This increase has been assumed by Stantec for forecasting purposes only. Any such toll increase or other adjustments are subject to future action by the TBTA Board.

Availability of Capacity on TBTA Facilities

Stantec's assessment of TBTA's bridges and tunnels indicates that during most, if not all, hours of the day, the facilities are operating at below the carrying capacity. The exceptions, the Hugh L. Carey and Queens Midtown Tunnels, currently are at or near capacity for portions of the morning and evening peak periods. Outside of these high usage periods, ample capacity is available. While this limits growth in these few hours on these two facilities, the vast majority of the hours have sufficient available capacity to absorb any growth that may occur. On the other TBTA facilities, the peak hour demand during a typical weekday is below the carrying capacity of the bridge indicating that more growth can be accommodated.

We also reviewed toll plaza operations with the E-ZPass payment system. Characteristics of the E-ZPass system are discussed throughout this report. The acceleration of vehicle throughput for E-ZPass customers has mitigated congestion at the toll plazas. With the E-ZPass participation rate

at 83 percent in 2013 and the customer base increasing, efficient toll plaza operations are anticipated throughout the forecast period.

TBTA and Regional Operational and Construction Impacts

Traffic volumes on TBTA facilities are in some instances influenced by construction and rehabilitation projects involving roadways and bridges in the New York City area.

Major projects that result in long-term closures on the competing bridges may increase volumes on TBTA's facilities. Also, long-term lane closures on the roadway network serving the TBTA crossings or on the TBTA crossings themselves may affect TBTA traffic volumes or cause traffic to shift from the affected crossing to either another TBTA facility or to one of the City's toll-free bridges. For example, when replacement of the Bronx approach decks on the Bronx-Whitestone Bridge began in early 2009, some traffic diverted to the Throgs Neck Bridge; and when the construction fire on the Throgs Neck Bridge's Queens approach in July 2009 resulted in traffic restrictions, some traffic diverted to the Bronx-Whitestone Bridge.

A number of roadway construction/rehabilitation projects, over the past few years, have influenced traffic volumes on TBTA facilities, and future construction will also affect traffic. The following descriptions also highlight area construction activities and measures that have influenced TBTA volumes and other planned and proposed projects that may affect traffic during the forecast period. Information on future construction activity was obtained from the New York State Department of Transportation, New York City Department of Transportation, NYMTC, and the Port Authority of New York and New Jersey.

In general, the majority of construction activities programmed for the TBTA facilities themselves is scheduled to take place during off-peak hours, including nighttime lane closures in the tunnels. Therefore, they are expected to have no discernible effect on toll revenue.

- On the **Verrazano-Narrows Bridge**, the construction contract for the upper level suspended spans involving the removal and replacement of the existing concrete deck with an orthotropic deck, the widening of the deck to accommodate a Bus/HOV lane, and painting of the superstructure was awarded in November 2012 and will continue into 2018. The construction contract for the improvements of the toll plaza at the east and west bound ramps was awarded in September 2011 and will continue into 2015. The construction contract for a new ramp providing HOV access to the VNB upper level was awarded in December of 2013 and will continue into 2017.

- The **Cross Bay Veterans Memorial Bridge** superstructure/deck rehabilitation was completed in May 2010. Substructure rehabilitation was completed in December 2012. There are no upcoming roadway projects for the Cross Bay Bridge in the near future.

- The **Marine Parkway-Gil Hodges Memorial Bridge** deck rehabilitation on the Rockaway Point Boulevard and Jacob Riis Park Pedestrian Bridges, construction of which will occur in late

2014, will be staged to avoid traffic impacts. Due to low traffic volumes on this bridge, this should not have a detrimental effect on traffic flows.

- On the **Bronx-Whitestone Bridge**, the replacement of the Bronx approach structure began in late 2008 and was completed in 2012. Currently three lanes are open to traffic in each direction with the possibility of daily midday lane closures and weekend lane closures. The Queens approach replacement work started in mid-2011, with no impact to the roadway until staged deck replacement started in mid 2013. Three lanes are being maintained in the peak direction with two lanes in the reverse direction during the staged construction, which is scheduled to be completed in late 2014. As noted above, the Bronx-Whitestone Bridge and the Throgs Neck Bridge serve the same traffic and delays on one of the bridges results in a shift to the other crossing.

- The **Throgs Neck Bridge** suspended span deck replacement design is ongoing with construction planned to begin in mid-2017. With a contraflow lane, three lanes will be maintained in the peak direction. As noted above, the Bronx-Whitestone Bridge and the Throgs Neck Bridge serve similar traffic and a delay on one of the bridges results in a shift to the other crossing.

- Redecking of the lower level of the **Henry Hudson Bridge** was completed in 2010. Construction to replace the upper level curb stringers and sidewalks began in December 2010 and was completed in July 2013. An enabling project to facilitate replacement of both the upper and lower level toll plazas will begin in late 2014; however, due to low traffic volumes minimal traffic impact is expected.

- At the **RFK Bridge,** full-depth deck repairs of the Bronx and Manhattan toll plaza areas and ramps are implemented with various off-peak lane closures, or short duration hard lane closures (24 hours-per-day/seven days-per-week) with generally minor to moderate impact to traffic. The replacement of the Bronx Toll Plaza will begin in late 2014 and will continue into 2019.

- A major **Queens Midtown Tunnel** electrical rehabilitation project was awarded in late 2012 and is scheduled for completion in mid-2017. The Manhattan Tunnel exit plaza structural rehabilitation is currently under design. Major tunnel restoration work primarily attributable to Sandy impacts will begin in early 2015. Construction for the exit plaza will be combined with the major tunnel restoration project to minimize traffic impacts. Work will be carried out via night and weekend closures.

- **Hugh L. Carey Tunnel** plaza rehabilitation in Brooklyn as well as ceiling and wall repairs and rehabilitation of tunnel ventilation and electrical systems are planned in the current capital program. Major tunnel restoration work primarily attributable to Sandy impacts will begin in late 2014. To minimize traffic impacts, construction work on the plaza and in the tunnel will be combined and work will be performed during routine nighttime and weekend tube

closures from 2014 to 2019. A major electrical rehabilitation project is underway with completion planned for late 2014, prior to the start of the tunnel restoration work.

Competing East River Crossings Construction

- **Ed Koch Queensboro Bridge** – Seismic retrofitting of the Ed Koch Queensboro Bridge is programmed to be completed in 2014.

  The replacement of the upper roadways is scheduled to begin in 2016 and to be completed in 2018. Two lanes on the upper level will be closed during construction. TBTA should anticipate increased usage of the Queens Midtown Tunnel.

- **Manhattan Bridge** – Replacement of the Manhattan Bridge suspender ropes and rewrapping all cables was completed in June 2013. Seismic retrofitting is scheduled to be completed in 2014. One lane on the lower roadway will be closed 24 hours a day/7 days a week during this project, except when the Brooklyn Bridge is closed to inbound traffic on weekends. Lanes will be closed on the upper roadway during off-peak hours. Similarly, TBTA should anticipate increased usage of the Hugh L. Carey Tunnel and to some extent the Queens Midtown Tunnel.

- **Brooklyn Bridge** – The reconstruction program that began in 1980 is expected to be completed in 2014. Rehabilitation of the approaches and ramps and the painting of the bridge began in 2010 and will extend through 2015. Having begun in June 2010, all Manhattan-bound lanes will be closed for 24 weekends to be spread out from 2011 through 2015. All construction projects, including seismic retrofitting of the Brooklyn Bridge, are programmed to be complete in 2014. NYCDOT anticipates heavy usage of the Manhattan Bridge on those weekends when the Brooklyn Bridge inbound traffic is detoured. At those times, all Manhattan Bridge inbound traffic travel lanes will be open. Similarly, TBTA should anticipate increased usage of the Hugh L. Carey Tunnel and to some extent the Queens Midtown Tunnel.

Other Major Bridge and Roadway Construction

During the forecast period, several major roadway and bridge projects, which are part of NYMTC's current Transportation Improvement Program (TIP) for Federal Fiscal Years 2011-2015, will potentially have traffic implications for the TBTA facilities. Other bridges, roads and overpasses programmed for construction include:

- **Madison Avenue Bridge** — Rehabilitation of the Madison Avenue Bridge over the Harlem River is scheduled to be performed between March 2017 and September 2018, which includes electrical, mechanical, and miscellaneous operating system-related work. This may result in diversions to the RFK Bridge.

- **Macombs Dam Bridge** — Rehabilitation of fender system and repair/replacement of the superstructure and bridge deck of the 155th Street Viaduct. The project is currently in its

design phase and is expected to be completed in March 2018. Reductions in traffic may result in diversions to the RFK Bridge.

- **127th Street Viaduct** — Replacement of existing span bridge and reconstruction of the Harlem River Drive between Willis Avenue and Third Avenue bridges. Construction is expected to begin in 2014 and is expected to be completed in 2017. Any restrictions on the approach ramps may induce some diversions to the RFK Bridge. This project has been closely coordinated with TBTA's RFK Bridge construction program.

- **Broadway Bridge** — Currently in its final design phase, the reconstruction of the bridge is scheduled to start in August 2016. The project's scope of work includes a major rehabilitation of the roadway deck, superstructure steel and substructure elements of the vertical lift span, as well as the approach spans. It will also include the replacement and rehabilitation of electrical and mechanical components of the vertical lift span, as well as replacement of the existing fender system with a new larger and stronger one. Construction is expected to be completed in July 2019. The construction may divert some traffic to the Henry Hudson Bridge.

- **I-87/Major Deegan Expressway** – Rehabilitation of various overpasses along the Major Deegan Expressway between the RFK Bridge and Mosholu Parkway is scheduled for design and construction through 2021. The anticipated schedule for construction is:
    - RFK Bridge to 138th Street – spring 2016 – spring 2018
    - 160th Street to 232nd Street – spring 2017 – spring 2019
    - 232nd Street to City Line – fall 2019 – summer 2021
    - Over Mosholu Parkway – winter 2013/2014 – summer 2015

  The Major Deegan Expressway between East 138th Street and the 161st Street/Macombs Dam Bridge interchange will be reconstructed to address structural deficiencies. The concrete deck will be replaced, and approximately one mile of the steel structure will be repaired. The substructure will also be repaired. Construction is expected to begin in spring 2014 and to be completed in spring 2018.

  Two bridges over the subway and Metro North rail yard (on the Major Deegan Expressway in the Bronx will be eliminated. Operational improvements to the southbound and northbound roadways are being considered to ensure motorist safety. This project commences in summer 2016 and expected to be completed in summer 2019.

  Safety and operational improvements northbound from Burnside Avenue to Van Cortlandt Park, including West 230th Street, are scheduled from summer 2021 to spring 2023. Traffic impacts at the RFK Bridge should not be significant.

- **I-95/Alexander Hamilton Bridge and Highbridge interchange ramps rehabilitation** – This project will rehabilitate the I-95 corridor between Amsterdam Avenue in Manhattan and Undercliff Avenue in the Bronx. Major construction commenced in spring of 2009 and is expected to be completed in spring 2014. Construction staging was significantly redesigned

to avoid a westbound lane closure on the approach to the George Washington Bridge upper level, and therefore most significant traffic impacts were avoided. There were no significant traffic impacts to TBTA facilities.

- **I-95/Cross Bronx Expressway** – Several rehabilitation projects are in development for the Cross Bronx Expressway. Rehabilitation of six bridges through replacement of deck and superstructure from Boston Road to Bronx River Parkway is expected to begin in summer 2020 and extend through summer 2024.

  Replace the deck on three bridges (Pennyfield Avenue, Lafayette Avenue and Castle Hill Avenue). Other deteriorated elements such as the concrete substructure and bearings will also be repaired to address the structural deficiencies. Construction is currently underway and is expected to be completed in winter 2016.

  Rehabilitation of the Grant Avenue Bridge to address structural deficiencies is scheduled to begin in winter 2015/2016 and expected to be completed in fall 2018.

  General rehabilitation work from Rosedale Avenue to Havemeyer Avenue is expected to be completed in 2014. Resurfacing is currently underway between University Avenue and Havemeyer Avenue and is expected to be completed in 2014. Since alternative routes are limited, it is anticipated that there will be limited effect on TBTA crossings.

- **Bruckner/Sheridan Expressway Interchange** – The project consists of reconstruction of the Bruckner Expressway viaduct and the related ramps to address the poorly rated deck, deteriorated concrete columns, repair/replacement of the bearings, pedestals and other minor work elements. There are twelve bridges in total included in this project. The twelve bridges include ten Bruckner Expressway bridges and two pedestrian bridges. It is anticipated that reconstruction will start in 2017 and be completed in 2020.

- **I-95/Bruckner Expressway** – Addition of fourth lane northbound between Pelham Parkway and East Gun Hill Road and between Wilkinson Avenue and Hutchinson River Parkway. Construction for the former is slated for spring 2016 to spring 2017 and the latter is slated for summer 2016 to summer 2018. Pavement resurfacing of Bruckner Expressway from Evergreen Avenue to Throgs Neck Expressway to ensure motorist safety is in future development, scheduled to start in fall 2016 and expected to be completed in fall 2018. Construction of access improvements between Brush Avenue and Pelham Parkway, which would involve the construction of new bridges, is scheduled from summer 2019 to summer 2020. Since alternative routes are limited, it is anticipated that there will be limited effect on TBTA crossings.

- **Bronx River Parkway** – General repairs on the Bronx River Parkway Bridge, State Route 907H over Metro North, 236th Street, to address corrective maintenance issues. The construction is scheduled to begin in the summer of 2015 and to be completed by late 2017.

- **I-278/Gowanus Expressway** repair and deck replacement — The project includes replacement of the concrete deck and deteriorated elements, until a permanent improvement is constructed. Construction on the eastbound Brooklyn-Queens Expressway connector ramp, from the Hugh L. Carey Tunnel to the Prospect Expressway, the Prospect Expressway to the Belt Parkway and the southern section of the Gowanus Expressway is currently underway. The Belt (Shore) Parkway interchange began construction in 2010 and is expected to be complete in 2015. The project is being designed to minimize lane closures and traffic disruption, although there may be limited impacts on the Hugh L. Carey Tunnel and Verrazano-Narrows Bridge. The eastbound Bus/HOV lane is being maintained from the Verrazano-Narrows Bridge to the Hugh L. Carey Tunnel during the morning peak period.

  Replacement of decks between 4th Avenue and 52nd Street is expected to be completed in May 2015.

  Replacement of decks on the 79th Street Bridge is scheduled to begin in summer 2015 and expected to be completed in summer 2018.

  Emergency repair and deck replacement near the Hugh L. Carey Tunnel is underway to replace 54,000 square feet of bridge deck and repair deteriorated structural steel on the Gowanus Expressway Viaduct in Kings County near the Hugh L. Carey Tunnel and is expected to be completed in June 2016. One lane will be closed approaching and departing from the tunnel to the Gowanus Expressway on weekends to limit impacts during construction. This work is being closely coordinated with repairs to the Brooklyn plaza of the Hugh L. Carey Tunnel.

- **I-278/Brooklyn-Queens Expressway (BQE)** — Replacement of girder/floor beam system on eastbound BQE ramp to Grand Central Parkway is scheduled to begin in summer 2015 and expected to be completed in summer 2018.

  In addition to the above, NYSDOT is scoping future safety and operational improvements. The project is expected to go to construction in 2017 and last one year.

  The BQE Environmental Shield at 63rd Street project proposes the construction of an environmental shield along the south side of the eastbound Brooklyn Queens Expressway at exit 36 off ramp. The primary objective is to offer some shield over the Nathan Weidenbaum Park which is located between 63rd and 64th Streets along Laurel Hill Blvd. The project began in fall 2013 and expected to be completed in fall 2014.

  These above projects could have potential limited impacts on the RFK Bridge and Queens Midtown Tunnel.

  Rehabilitation of the Grand Central Parkway interchange complex from 71st Street to 82nd Street and 25th Avenue on the Brooklyn-Queens Expressway to the Grand Central Parkway ramp is scheduled to begin in 2020, preceded by the section of Grand Central Parkway from

Astoria Boulevard to 44th Street in 2019. The projects involve reconstruction of the highway interchange and both stages are currently in development. This project has the potential for lane closures that could affect the Queens Midtown Tunnel; however, this would affect alternative routes as well. Maintenance and Protection of Traffic (MPT) plans for maintaining traffic flows during construction for these projects are not available at this time and therefore the impacts cannot be assessed.

FHWA and NYSDOT completed the Final Environmental Impact Statement (FEIS) for the I-278/BQE Kosciuszko Bridge project (Phase I and Phase II) on November 25, 2008. The FEIS recommended a replacement of the existing bridge by building a new permanent, parallel structure on the east side of the existing bridge. The recommended alternative provides for maintaining all lanes on the Brooklyn-Queens Expressway and local connections, while constructing a replacement bridge. The project will be a Design-Build project. Phase I has been awarded to the design-build team, and construction began in fall 2013 and is estimated to be completed in 2017. Phase II of the project is expected to begin in spring 2018, with completion expected in summer 2020. This project has the potential for lane closures that could affect the Queens Midtown Tunnel; however, this would affect alternative routes as well. Maintenance and Protection of Traffic (MPT) plans to maintain the existing number of lanes during peak periods on the Brooklyn-Queens Expressway with off-peak closures. Due to construction activities, there may be delays which could cause diversions that would affect traffic at the Queens Midtown Tunnel.

- **Belt Parkway** – Rehabilitation of bridges over four waterways and three overpasses are underway or scheduled through 2014. Traffic impacts should be limited to detours or alternative access routes during off-peak periods, when construction severely limits capacity. Installation of Advanced Traffic Management System equipment from the Gowanus Expressway to Cross Bay Boulevard is scheduled to begin in fall 2018 and end in summer 2020. Traffic to/from the Verrazano-Narrows Bridge, Cross Bay Bridge, and Marine Parkway Bridge may be affected.

  Rehabilitation of the Belt Parkway from Flatbush Avenue to Conduit Avenue to address structural deficiencies and motorist safety is expected to begin in fall 2018 and to be completed in summer 2021. Reconstruction of the seven bridges and their approaches on the Belt Parkway (over three local streets and four waterways) began in the fall of 2009. Group 1 (Paerdegat Basin, Fresh Creek, and Rockaway Parkway Bridge) is expected to be completed in 2014. Gerritsen Inlet Bridge is expected to be completed in summer 2016. Mill Basin Bridge is expected to be completed in fall 2018. Bay Ridge Avenue Bridge is expected to be completed in summer 2015. Nostrand Avenue Bridge is expected to start in Fiscal Year 2022.

- **Grand Central Parkway/94th Street interchange** – This project involves implementing safety and operational improvements at the intersection of 94th Street and Ditmars Boulevard, plus bridge rehabilitation of the 94th Street Bridge and the 62nd Drive pedestrian bridge over the Grand Central Parkway and bridge painting and maintenance of approximately 30-40

bridges. The project began in 2010 and is estimated to be completed in 2014. NYSDOT will also be letting an Intelligent Transportation Systems (ITS) project along the Grand Central Parkway.

Grand Central Parkway and Jackie Robinson Parkway lighting improvement projects are scheduled to start in fall 2019 and expected to be completed in spring 2021.

Reconstruction of the Grand Central Parkway and Brooklyn-Queens Expressway interchange project is scheduled to start in spring 2020 and expected to be completed in spring 2021.

- **I-678/Whitestone Expressway** Bridge over the Flushing River – The project will replace the existing fender system on the Whitestone Expressway bridges to protect the bridge piers as part of corrective maintenance. Construction is expected to begin in winter 2014/2015 with completion in fall 2015. Major impacts are not anticipated.

- **I-678/Van Wyck Expressway –** Rehabilitation of Roosevelt Avenue Bridge is scheduled to begin in 2014 with completion in 2017.

  Replacement of steel girders on the Rockaway Boulevard Bridge on Van Wyck Expressway is scheduled to begin in summer 2018 and expected to be completed in spring 2021. Major impacts are not anticipated.

  The New York State DOT currently has two contracts underway to reconstruct the Kew Gardens Interchange: The first contract, begun in the summer of 2010, is reconstructing a half-mile section of the Van Wyck Expressway between Union Turnpike and Hillside Avenue, as well as a quarter-mile section of Queens Boulevard over the Van Wyck Expressway. Work includes the construction of auxiliary lanes on the Van Wyck Expressway to ease the flow of traffic in both directions at the interchange with the Grand Central Parkway. This project is expected to be completed by the beginning of 2016. The second contract, which got underway in the spring of 2012, continues the reconstruction of the Van Wyck Expressway north to 72nd Avenue, an additional three-quarters of a mile. The contract will replace the northbound Van Wyck Expressway two-lane viaduct with a three-lane version that includes shoulders. It will also replace the ramp connecting the westbound Jackie Robinson Parkway and Union Turnpike with the northbound Van Wyck, widening it from one lane to two. This project is slated for completion in the beginning of 2017. Major impacts are not anticipated.

  Safety improvements are underway for repaving roads using multiple overlays of pavement on the Van Wyck Expressway southbound ramp to the Nassau Expressway. Construction is expected to be completed in January 2015.

- **I-495/Long Island Expressway** – Van Wyck Expressway to Grand Central Parkway — Various projects are underway to improve infrastructure, traffic operations and safety conditions on the Long Island Expressway (LIE), the Grand Central Parkway (GCP), the connecting cloverleaf interchange ramps, the service roads and the collector distributor roads in the

project area. Interim rehabilitation of three bridges at the Long Island Expressway/Grand Central Parkway interchange, involving the replacement of the bridge superstructure, will begin in winter 2014/2015 and extend through fall 2016. Major impacts are not anticipated.

Long Island Expressway lighting improvement from the Grand Central Parkway to Main Street will start in winter 2014/2015 and expected to be completed in summer 2016. Major impacts are not anticipated.

Plans are in development to extend the existing managed HOV/Bus contraflow lane from its current terminus at 58th Avenue to a new terminus in the vicinity of 102nd Street in Queens. The contraflow lane, operating on the left lane of the eastbound side of the LIE, will operate on weekdays from 6AM to 1PM. Construction is expected to begin in Fall 2016 and be completed in Summer 2018.

- **Route 9A** – After Route 9A (West Street) was heavily damaged when the World Trade Center was attacked; a six-lane temporary road was opened, allowing the Hugh L. Carey Tunnel to re-open. Further construction to improve Route 9A to a six- to eight-lane urban highway is ongoing. Upon completion, this may have a positive impact on traffic using the Hugh L. Carey Tunnel as motorists achieve the comfort level with the permanent traffic patterns that will be in place after completion. Construction is expected to be completed in fall 2016.

  The World Trade Campus Security project, in the vicinity of World Trade Center site, is also expected to affect Hugh L. Carey Tunnel traffic when implemented in 2019. An Environmental Impact Statement for the project is in the scoping phase and involves the implementation of a comprehensive perimeter vehicle security plan for the World Trade Center site.

  Projects include restoration and reconstruction of pavement joints and pavements striping, markings, urban design elements, pedestrian bridges, irrigation equipment, ITS equipment, drainage system, traffic signals, street lights, pedestrian bridge elevators/escalators on Route 9A damaged by Sandy in addition to the required repairs of pavement joints, and bikeway/walkway pavement resurfacing and striping. Construction is expected to begin spring 2014 and be completed in winter 2014/2015.

- **Harlem River/FDR Drive** — Reconstruction between East 125th and East 132nd Streets is tentatively scheduled to begin on September 2014 and be completed on August 2017. This construction is being closely coordinated with TBTA's RFK Bridge construction.

  Replacement of decks on northbound Harlem River Drive entrance ramp from 139th Street and the 135th Street exit ramp is scheduled to begin in summer 2015 and expected to be completed in summer 2018.

  Design of safety alignment improvements southbound between East 125th and East 116th Streets is scheduled to begin in 2016 and expected to be completed in spring 2018.

The NYSDOT plans to rebuild the ramps connecting the Harlem River Drive to the Trans-Manhattan Expressway (I-95, US 1 and US 9).

Replacement of the deck on the I-95 ramp is expected to begin in fall 2020 and finish in winter 2022/2023. These projects could have an impact on the RFK Bridge.

- **I-278/Goethals Bridge Replacement –** The environmental review process for The Port Authority of New York and New Jersey's Goethals Bridge Replacement Project was concluded with the United States Coast Guard's issuance of the Final Environmental Impact Statement in August 2010 and the Record of Decision in January 2011. Operation of the new bridge is forecast to begin 2017. After the new bridge is in operation, the old bridge will be demolished. Impacts to the Verrazano-Narrows Bridge should be negligible given that the Goethals Bridge will not be closed during construction.

- **I-278/Staten Island Expressway** – A recent Bus Lane/Priority Lane Study analyzed the feasibility of extending the bus lanes west to the Goethals Bridge toll plaza; and allowing use of the lanes by high-occupancy vehicles (HOV3+). These improvements would provide alternatives to single-occupant automobile use, particularly during peak periods. Construction contract for Bus/HOV lane between Slosson Avenue and Victory Boulevard was awarded in December 2011 and is scheduled for completion in the March 2015. This project could have limited impact on the Verrazano-Narrows Bridge.

  An ongoing project to improve access on the Staten Island Expressway (I-278) between the Verrazano Narrows Bridge toll plaza and Renwick Avenue in Richmond County is scheduled for completion in July 2014. Improvements will include the construction of five new ramps, relocation of two ramps, reconfiguration of one ramp and addition of auxiliary lanes. Work will also include the replacement of the Fingerboard Road Bridge over the expressway. These improvements are largely complete and have been extensively coordinated with the toll plaza reconstruction work ongoing at the Verrazano-Narrows Bridge under an inter-agency agreement between TBTA and the New York State Department of Transportation, thereby minimizing impacts to traffic at the Verrazano-Narrows Bridge.

  Replacing of the decks of two bridges (Hylan Boulevard over northbound and southbound Staten Island Expressway) to address structural deficiency issues is scheduled to begin in winter 2014/2015 and expected to be completed in fall 2016. Minimal impact to the Verrazano-Narrows Bridge is expected as a result of this project.

  Additional projects in Staten Island scheduled for the long term would likely have little negative impacts on the Verrazano-Narrows Bridge during construction but positive impact upon completion.

- **Pulaski Skyway (Routes 1 & 9 in New Jersey)** – The contract for reconstruction and rehabilitation of the Pulaski Skyway, an elevated roadway for automobiles only, extending

from the vicinity of Newark Airport to the approach to the Holland Tunnel, was awarded in May 2012 and is scheduled for completion in 2020. During construction, the Skyway will be closed in the north (east) bound direction for two years starting April 2014. The Verrazano-Narrows Bridge could provide an alternative route for traffic between southern New Jersey and Manhattan but the shift of traffic is anticipated to be minimal. There will be no impact on TBTA toll revenues since the Skyway closure is in the eastbound toll-free direction on the Verrazano-Narrows Bridge.

- **Route 440/Bayonne Bridge** – In December 2010, the Port Authority announced that the Bayonne Bridge would be raised to solve the navigational clearance restrictions. The construction began in the summer of 2013 and will be completed by late 2016.

- **Intelligent Transportation Systems (ITS)** – Funds are programmed for ITS planning, coordination and management, and for operational support of NYCDOT's Joint Transportation Management Center (JTMC) and Integrated Incident Management System. Active management of traffic and incidents could result in smoother flow on the highway system including TBTA facilities.

Transit Improvements

Significant transit improvements, when completed, are expected to affect TBTA traffic levels during the forecast period through the year 2023.

- **MTA Second Avenue Subway** – Construction of Phase 1 started in April 2007 and is scheduled for completion in 2016. Service from new stations at East 96th, East 86th and East 72nd Streets along Second Avenue will connect to the 63rd Street line. Four traffic lanes will be maintained through construction zones, and cross streets will be kept open. Construction of Phase 2 (125th St. to 96th St.), Phase 3 (63rd St. to Houston St.) and Phase 4 (to Lower Manhattan; Houston St. to Hanover Square) is not yet funded and is not included in the current MTA Financial Plan. It is anticipated that some travelers to the East Side may shift to MTA New York City Transit from other modes, including TBTA facilities.

- **MTA/LIRR East Side Access** – This project will result in a new connection from the LIRR Main and Port Washington lines in Queens to a new LIRR terminal beneath Grand Central Terminal in Manhattan. Excavations to create caverns within Grand Central Terminal were completed in 2013. Four new tunnels are being bored in Queens. Tunneling began in May 2011. In Manhattan, new tunnels will be bored from the existing bellmouth structure at Second Avenue and 63rd Street, west and then south, under Park Avenue and Metro-North Railroad's four-track right-of-way into Grand Central Terminal. Project completion is scheduled for 2023. MTA anticipates that some travelers to the East Side will shift to the LIRR from other modes, including TBTA facilities.

- **Penn Station Access Study** – This study is to evaluate proposed additional rail services for the New York Metropolitan Area, which would improve access between Metro-North east-of-

Hudson service area to the West Side of Manhattan, creating two new stations on the West Side of Manhattan and four in the East Bronx. The MTA is preparing a federal Environmental Assessment of the combined Alternatives 1 and 2, and will update key technical analysis that were previously prepared for Draft Environmental Impact Statement (DEIS). MTA expects environmental and federal reviews to be completed by 2017.

Summary of Assumptions and Conditions

TBTA traffic, toll revenues and expenses have been projected by Stantec on the basis of the historical record of traffic, toll revenues and expenses, the capacities of the TBTA facilities, traffic growth forecasts, the estimated traffic elasticity due to toll variations, impacts of construction projects and the following assumptions and conditions, which we believe are reasonable.

- All TBTA facilities will be operated efficiently and maintained in good physical condition in order to attract customers and to sustain traffic demand levels.

- The TBTA 2010 – 2014 Capital Program that was approved by the MTA Board on April 28, 2010 and last amended on July 2013 will be carried out throughout the forecast period. Future capital programs sufficient to maintain the structural integrity of bridges and tunnels will be adopted and implemented throughout the forecast period.

- Electronic toll payment by E-ZPass will continue to be available on all TBTA crossings, and the payment of revenue in full to TBTA will continue to be in accordance with current inter-agency agreements. More than 83 percent of all tolls paid on TBTA facilities are E-ZPass transactions.

- It is assumed that congestion pricing in Manhattan will not be implemented in the time period included in these forecasts.

- Competing East River crossings will continue to operate toll-free and to be maintained in efficient operating condition.

- For the scenario with constant tolls, the present toll schedule will be in effect during the remainder of the forecast period through 2024. For the scenario with toll increases, tolls on TBTA facilities will be increased to provide a revenue yield increase of 4.0 percent on March 1, 2015 and the an additional 4.0 percent revenue yield increase on March 1, 2017, in accordance with the MTA Financial Plan 2014-2017 adopted by the MTA Board in February, 2014.

- Capacity constraints on the local and arterial highway networks which may be somewhat mitigated by stagnant traffic growth in the near term will, however, continue to limit traffic growth on the nine TBTA crossings. This is reflected in conservative growth rates used to forecast TBTA traffic.

- Although city and State budget difficulties continue, highway/crossing improvements, in general, for the competing bridges and roadway network will be made in accordance with the plans and schedules described herein.

- Major TBTA roadway and structural improvements will continue to be performed during nighttime and non-peak hours, and/or in the off-peak direction, and approaches to the nine TBTA crossings will not be significantly impaired by construction work.

- The forecasts are based on the assumption that E-ZPass usage will grow at the rate of 0.50 percent in 2014 through 2017 and 0.25 percent in 2018 and following years. While usage at a higher level would improve toll plaza operating conditions, it would also result in lower average tolls and, therefore, could reduce the rate of increase in gross toll revenues relative to traffic growth. However, growth in traffic volumes would be limited without E-ZPass at the toll plazas.

- Growth assumptions, based on trends in regional employment and population, forecast by New York Metropolitan Transportation Council (NYMTC) through 2040, will be realized in the Tri-State area and in New York City.

- If gasoline prices in the New York metropolitan area were to increase again to and above the levels they did when they spiked in 2008 and 2011, discretionary travel could decline and there may be fewer recreational trips. Also, the reduced non-work travel could also make the toll-free alternatives more competitive. In general, however, TBTA facilities carry regular commuters and other non-discretionary trips so that the overall impact on toll volumes and toll revenues is not expected to be significant if prices do not increase substantially above previously experienced high levels.

- LIRR East Side Access may shift some Long Island auto commuters to rail, after its planned completion in 2023.

- Current reduced rate toll programs remain in effect at current projected levels, including reduced rates for NYCSC E-ZPass customers and for Staten Island residents at the Verrazano-Narrows Bridge and for Rockaway Peninsula and Broad Channel residents at the Cross Bay and Marine Parkway Bridges. The "reduced toll rate" programs are lower crossing schedule charges provided by statute to Staten Island and Rockaway Residents and by Board policy to NYCSC E-ZPass customers.

- The impacts of the pilot program to evaluate cashless tolling on the Henry Hudson Bridge initiated in 2011 are assumed to be fully reflected in the results for 2013, the base for the forecast presented in this report.

- No other reduced rate toll programs will be introduced that would adversely affect the TBTA toll facilities' revenue stream.

- Economic conditions, nationally and in the New York Metropolitan Area, will slowly improve in the next five years at a very moderate pace.

- No material natural disaster or local, state or national emergency will occur that would materially alter travel patterns and divert traffic from the TBTA facilities.

While the projections are made and presented year-by-year by Stantec, they are intended to show trends on the basis of its analysis of historical data and the assumptions and conditions set forth above. Variations in the year-to-year forecasted results may occur and such variations may be significant.

PROJECTED TRAFFIC, REVENUES AND EXPENSES

Current and future traffic and toll revenues are estimated for the 11-year (2014-2024) forecast period for each TBTA facility based on historical trends in traffic and toll revenue, elasticity factors for the future toll increase, toll collection operations, capacities of the nine crossings, facility maintenance, E-ZPass participation levels, externalities such as area roadway improvement plans and regional demographic projections, and the assumptions and conditions summarized previously. Trends in operating expenses for the toll facilities, TBTA's 2014 budget and 2015 through 2017 financial plans, and growth estimates based on the Consumer Price Index and historical trends, are reflected in the future operating expense forecast. Future operating expense estimates are used to develop net toll revenue projections over the forecast period.

Estimated Traffic and Toll Revenue, 2014

Stantec's development of the traffic and toll revenue estimates for 2014 took into account the economic condition of the region, fuel prices, unusual weather events and construction projects. The impacts in the long term, regarding the national and regional economies, projected employment in the Manhattan business districts and the traffic and toll revenue forecasts beyond 2014, are covered in a previous section of this report. In developing the traffic and toll revenue estimates for 2014, Stantec reviewed data for the previous three year period (2011-2013) as well as preliminary 2014 data. In addition, Stantec reviewed data from competing toll and toll-free facilities to determine recent regional traffic trends. The estimates for the remainder of 2014 assume that the base traffic levels for the remaining months of calendar year 2014 will be 0.5 percent greater than volumes in the same months of 2013. The forecast percent changes are shown in Table 21. Traffic volumes in January through March 2014 decreased when compared to the same months in 2013 due to the severe winter weather this year.

Table 21 Estimated Changes in Annual Traffic – 2013 to 2014

Facility	Actual Percent Change January-March 2013 to 2014[a]	Estimated Percent Change April-December 2013 to 2014	Estimated Percent Change Full Year 2013 to 2014
Throgs Neck Bridge	-2.5%	0.5%	-0.2%
Bronx-Whitestone Bridge	-6.8	0.5	-1.2
RFK Bridge	-1.7	0.5	0.0
Queens Midtown Tunnel	1.4	0.5	0.7
Hugh L. Carey Tunnel[b]	-1.0	0.5	0.2
Verrazano-Narrows Bridge	-6.6	0.5	-1.2
Henry Hudson Bridge	-2.6	0.5	-0.2
Marine Parkway Bridge	-14.1	0.5	-2.9
Cross Bay Bridge	-10.5	0.5	-2.1
All	-4.0	0.5	-0.5

Notes:
(a) Based on preliminary actual data, subject to final audit.
(b) Formerly the Brooklyn-Battery Tunnel.

As shown in Table 21, total traffic at the crossings is forecasted to increase at an average rate of 0.5 percent for the remainder of the year; however, due to severe winter weather in January and February 2014, traffic for the full year is projected to decrease 0.5 percent. The highest projected loss in annual traffic is at the Marine Parkway Bridge (-2.9 percent). The facilities estimated to show an increase are the Queens Midtown Tunnel (0.7 percent) and the Hugh L. Carey Tunnel (0.2 percent). Traffic at the RFK Bridge is estimated to be at approximately the same level as 2013. The effects of harsh weather during January and February had an impact on traffic as shown by the decreases from 2013 to 2014 for the first quarter of the year. Average tolls are projected to increase due to the higher tolls implemented in March 2013. The resulting traffic and toll revenue estimates for 2014 are presented in Table 22. Estimated toll revenue for 2014 is based on average toll rates developed from the March 2013 toll schedule and the projected vehicle class distribution and payment method for 2014.

Table 22 Estimated 2014 Toll-Paying Traffic and Toll Revenue

Facility	Traffic (000s)	Average Toll	Revenue (000s)
Throgs Neck Bridge	39,885	$7.42	$295,747
Bronx Whitestone Bridge	39,078	6.79	265,184
RFK Bridge	58,230	6.57	382,628
Queens Midtown Tunnel	28,043	6.17	172,887
Hugh L. Carey Tunnel[a]	16,575	5.87	97,329
Verrazano-Narrows Bridge	64,275	5.50	353,644
Henry Hudson Bridge	21,788	2.91	63,448
Marine Parkway Bridge	7,591	2.16	16,359
Cross Bay Bridge	7,550	2.21	16,692
Total	283,016	$5.88	$1,663,917
Percent Change			
2013-2014 (All Facilities)	-0.5%	1.7%	1.1%

Note:
(a) Formerly the Brooklyn-Battery Tunnel.

Summarizing, our estimates show a 0.5 percent decrease in traffic, a 1.7 percent increase in systemwide average toll and a 1.1 percent increase in system-wide revenue over 2013, which reflects actual performance through March 2014 and anticipated traffic volumes for the remainder of the year. Table 22 provides the transition between the historical traffic and revenue data presented earlier in the report and the 10-year forecasts in Table 23 and Table 24.

Traffic and Toll Revenue at Current Tolls

Traffic and toll revenues were first projected on the basis that the tolls placed into effect on March 3, 2013 will be continued throughout the forecast period. The methodology employed by Stantec to forecast traffic was based on the development of an annual growth rate for each facility (based on historical traffic trends), the construction activities (historical and projected) throughout the highway network (bridges, tunnels and arterials) and the traffic capacity constraints in the network. Regional demographic projections were also taken into consideration.

All indicators point to the potential for traffic growth in the short-term, reflecting gradually improving economic conditions, constrained by the uncertainty regarding cost and supply of motor fuel. An additional factor affecting growth is the potential capacity constraints in the regional transportation network due to construction projects.

The 2014 estimated traffic and revenue from Table 22 includes the impacts of the March 2013 toll increase since preliminary actual data are now available through March 2014. Starting with the estimate for 2014 as a base, Stantec projected the traffic and toll revenue for the forecast period through 2024 (at constant tolls at the current rates established on March 3, 2013), as shown in Table 23.

Changes in traffic volumes are in the range of -2.9 to +0.7 percent in 2014, depending on the facility. This is based on the actual change in traffic on each facility in January through March 2014 (for which preliminary data are available). For the period 2015 through 2016, traffic is projected to increase at 0.5 percent annually. For 2017 through 2024, it is forecast that traffic will grow at 0.25 percent per year. With respect to employment forecasts, our growth assumptions are based on NYMTC's employment projections.

Traffic and Toll Revenue with Assumed 2015 and 2017 Toll Increases

The traffic forecast with toll increases in 2015 and 2017 was built upon the base forecast (from Table 23), to which the elasticity impacts (from Table 19) were applied. In accordance with the MTA Financial Plan 2014 to 2017 adopted by the MTA Board in February 2014, Stantec applied the appropriate increase in toll rates (from Table 20) effective March 1, 2015 and March 1, 2017 (5 percent toll increase with 4 percent revenue yield increase in each year) to calculate the corresponding toll revenues in the respective years. The traffic and revenue forecasts with periodic toll increases are listed in Table 24.

Table 23 Traffic and Toll Revenue Forecast, Constant Tolls

Year	Throgs Neck	Bronx-Whitestone	RFK	Queens Midtown	Hugh L. Carey[a]	Verrazano-Narrows[b]	Henry Hudson	Marine Parkway Bridge	Cross Bay Bridge	Total
Traffic Change										
2013-2014	-0.18%	-1.21%	0.01%	0.69%	0.17%	-1.17%	-0.19%	-2.85%	-2.11%	-0.53%
2014-2015	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
2015-2016	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
2016-2017	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
2017-2018	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
2018-2019	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
2019-2020	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
2020-2021	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
2021-2022	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
2022-2023	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
2023-2024	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Annual Traffic (000s)										
2013	39,958	39,558	58,224	27,850	16,547	65,035	21,830	7,814	7,712	284,528
2014	39,885	39,078	58,230	28,043	16,575	64,275	21,788	7,591	7,550	283,016
2015	40,084	39,273	58,521	28,184	16,658	64,597	21,897	7,629	7,587	284,431
2016	40,285	39,470	58,814	28,324	16,741	64,920	22,007	7,667	7,625	285,853
2017	40,385	39,569	58,961	28,395	16,783	65,082	22,062	7,687	7,644	286,568
2018	40,486	39,667	59,108	28,466	16,825	65,245	22,117	7,706	7,663	287,284
2019	40,588	39,767	59,256	28,537	16,867	65,408	22,172	7,725	7,683	288,003
2020	40,689	39,866	59,404	28,609	16,909	65,571	22,228	7,744	7,702	288,723
2021	40,791	39,966	59,552	28,680	16,952	65,735	22,283	7,764	7,721	289,444
2022	40,893	40,066	59,701	28,752	16,994	65,900	22,339	7,783	7,740	290,168
2023	40,995	40,166	59,851	28,824	17,036	66,065	22,395	7,803	7,760	290,893
2024	41,098	40,266	60,000	28,896	17,079	66,230	22,451	7,822	7,779	291,621
Average Toll										
2013	$7.29	$6.68	$6.47	$6.07	$5.77	$5.42	$2.86	$2.13	$2.18	$5.78
2014	$7.42	$6.79	$6.57	$6.17	$5.87	$5.50	$2.91	$2.16	$2.21	$5.88
2015	$7.40	$6.78	$6.56	$6.16	$5.86	$5.49	$2.90	$2.15	$2.20	$5.87
2016	$7.39	$6.77	$6.55	$6.14	$5.85	$5.48	$2.89	$2.14	$2.20	$5.86
2017	$7.38	$6.76	$6.54	$6.13	$5.84	$5.48	$2.87	$2.13	$2.19	$5.85
2018	$7.37	$6.75	$6.54	$6.13	$5.84	$5.47	$2.87	$2.13	$2.19	$5.84
2019	$7.37	$6.75	$6.53	$6.12	$5.83	$5.47	$2.86	$2.13	$2.18	$5.84
2020	$7.36	$6.74	$6.53	$6.12	$5.83	$5.46	$2.85	$2.12	$2.18	$5.83
2021	$7.36	$6.74	$6.52	$6.11	$5.82	$5.46	$2.85	$2.12	$2.18	$5.83
2022	$7.35	$6.73	$6.52	$6.11	$5.82	$5.45	$2.84	$2.12	$2.17	$5.82
2023	$7.35	$6.73	$6.51	$6.10	$5.81	$5.45	$2.83	$2.11	$2.17	$5.82
2024	$7.34	$6.72	$6.51	$6.10	$5.81	$5.44	$2.82	$2.11	$2.17	$5.81
Toll Revenue (000s)										
2013	$291,433	$264,174	$376,769	$168,982	$95,549	$352,370	$62,444	$16,633	$16,840	$1,645,193
2014	$295,747	$265,184	$382,628	$172,887	$97,329	$353,644	$63,448	$16,359	$16,692	$1,663,917
2015	$296,744	$266,117	$383,956	$173,470	$97,649	$354,831	$63,481	$16,388	$16,722	$1,669,357
2016	$297,785	$267,053	$385,287	$174,025	$97,970	$356,020	$63,490	$16,416	$16,753	$1,674,799
2017	$298,045	$267,364	$385,661	$174,177	$98,030	$356,325	$63,362	$16,396	$16,741	$1,676,100
2018	$298,547	$267,834	$386,330	$174,441	$98,191	$356,955	$63,365	$16,413	$16,760	$1,678,837
2019	$299,050	$268,305	$386,999	$174,735	$98,352	$357,520	$63,369	$16,424	$16,771	$1,681,524
2020	$299,553	$268,777	$387,670	$175,028	$98,513	$358,151	$63,371	$16,441	$16,790	$1,684,296
2021	$300,098	$269,249	$388,341	$175,294	$98,675	$358,718	$63,396	$16,451	$16,801	$1,687,024
2022	$300,603	$269,722	$389,013	$175,588	$98,837	$359,351	$63,398	$16,461	$16,820	$1,689,794
2023	$301,109	$270,195	$389,687	$175,883	$98,998	$359,919	$63,400	$16,479	$16,839	$1,692,509
2024	$301,615	$270,669	$390,361	$176,150	$99,161	$360,554	$63,401	$16,489	$16,850	$1,695,249

Note:
(a) Formerly the Brooklyn-Battery Tunnel.
(b) Westbound traffic doubled, since traffic is not registered in the eastbound direction.

Table 24 Traffic and Toll Revenue Forecast, with Assumed 2015 and 2017 Toll Increases

Year	Throgs Neck	Bronx-Whitestone	RFK	Queens Midtown	Hugh L. Carey[a]	Verrazano-Narrows[b]	Henry Hudson	Marine Parkway Bridge	Cross Bay Bridge	Total
Traffic Change										
2013-2014	-0.18%	-1.21%	0.01%	0.69%	0.17%	-1.17%	-0.19%	-2.85%	-2.11%	-0.53%
2014-2015	0.05	0.04	-0.19	-0.28	-0.95	-0.03	-0.63	0.08	-0.07	-0.16
2015-2016	0.18	0.18	0.14	0.12	0.01	0.16	0.07	0.19	0.16	0.14
2016-2017	-0.20	-0.21	-0.43	-0.52	-1.19	-0.27	-0.87	-0.17	-0.32	-0.41
2017-2018	0.18	0.18	0.14	0.12	0.01	0.16	0.07	0.19	0.16	0.14
2018-2019	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
2019-2020	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
2020-2021	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
2021-2022	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
2022-2023	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
2023-2024	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Annual Traffic (000s)										
2013	39,958	39,558	58,224	27,850	16,547	65,035	21,830	7,814	7,712	284,528
2014	39,885	39,078	58,230	28,043	16,575	64,275	21,788	7,591	7,550	283,016
2015	39,903	39,093	58,121	27,965	16,417	64,258	21,652	7,597	7,544	282,552
2016	39,974	39,162	58,202	27,998	16,419	64,363	21,667	7,612	7,557	282,955
2017	39,894	39,081	57,950	27,851	16,225	64,187	21,478	7,599	7,533	281,797
2018	39,965	39,150	58,030	27,884	16,227	64,292	21,493	7,614	7,545	282,200
2019	40,065	39,248	58,175	27,954	16,267	64,453	21,546	7,633	7,564	282,905
2020	40,165	39,346	58,321	28,024	16,308	64,614	21,600	7,652	7,583	283,613
2021	40,265	39,444	58,467	28,094	16,349	64,775	21,654	7,671	7,602	284,322
2022	40,366	39,543	58,613	28,164	16,390	64,937	21,708	7,691	7,621	285,032
2023	40,467	39,642	58,759	28,234	16,431	65,100	21,763	7,710	7,640	285,745
2024	40,568	39,741	58,906	28,305	16,472	65,263	21,817	7,729	7,659	286,459
Average Toll										
2013	$7.29	$6.68	$6.47	$6.07	$5.77	$5.42	$2.86	$2.13	$2.18	$5.78
2014	$7.42	$6.79	$6.57	$6.17	$5.87	$5.50	$2.91	$2.16	$2.21	$5.88
2015	$7.71	$7.05	$6.83	$6.41	$6.08	$5.72	$3.02	$2.24	$2.29	$6.11
2016	$7.75	$7.08	$6.87	$6.45	$6.11	$5.76	$3.04	$2.25	$2.31	$6.14
2017	$8.02	$7.33	$7.10	$6.67	$6.31	$5.96	$3.14	$2.33	$2.39	$6.36
2018	$8.11	$7.41	$7.19	$6.75	$6.38	$6.04	$3.19	$2.36	$2.43	$6.44
2019	$8.11	$7.41	$7.18	$6.75	$6.37	$6.04	$3.18	$2.36	$2.43	$6.43
2020	$8.11	$7.40	$7.18	$6.75	$6.37	$6.03	$3.18	$2.36	$2.43	$6.43
2021	$8.10	$7.40	$7.18	$6.74	$6.36	$6.03	$3.18	$2.37	$2.43	$6.43
2022	$8.10	$7.39	$7.17	$6.74	$6.36	$6.03	$3.18	$2.37	$2.43	$6.42
2023	$8.10	$7.39	$7.17	$6.74	$6.35	$6.03	$3.18	$2.37	$2.43	$6.42
2024	$8.09	$7.39	$7.17	$6.73	$6.34	$6.03	$3.18	$2.37	$2.43	$6.42
Toll Revenue (000s)										
2013	$291,433	$264,174	$376,769	$168,982	$95,549	$352,370	$62,444	$16,633	$16,840	$1,645,193
2014	$295,747	$265,184	$382,628	$172,887	$97,329	$353,644	$63,448	$16,359	$16,692	$1,663,917
2015	$307,493	$275,413	$396,792	$179,257	$99,850	$367,814	$65,453	$16,980	$17,299	$1,726,352
2016	$309,801	$277,386	$399,553	$180,476	$100,323	$370,605	$65,889	$17,120	$17,433	$1,738,586
2017	$319,867	$286,307	$411,617	$185,796	$102,361	$382,746	$67,526	$17,729	$18,033	$1,791,982
2018	$324,275	$290,101	$417,063	$188,246	$103,462	$388,131	$68,454	$18,000	$18,297	$1,816,029
2019	$324,925	$290,669	$417,873	$188,661	$103,639	$389,037	$68,604	$18,045	$18,342	$1,819,796
2020	$325,617	$291,239	$418,743	$189,048	$103,817	$389,881	$68,775	$18,090	$18,388	$1,823,598
2021	$326,270	$291,809	$419,556	$189,437	$103,978	$390,726	$68,925	$18,143	$18,434	$1,827,278
2022	$326,965	$292,341	$420,429	$189,826	$104,156	$391,638	$69,076	$18,188	$18,480	$1,831,098
2023	$327,620	$292,913	$421,245	$190,216	$104,335	$392,486	$69,227	$18,234	$18,526	$1,834,802
2024	$328,318	$293,486	$422,121	$190,606	$104,497	$393,402	$69,378	$18,279	$18,573	$1,838,661

Note:
(a) Formerly the Brooklyn-Battery Tunnel.
(b) Westbound traffic doubled, since traffic is not registered in the eastbound direction.

Effects of Second Avenue Subway Construction in Forecast Years

The foregoing tables forecasting traffic and toll revenues incorporate estimated effects of the construction of the Second Avenue Subway. While not likely, activity associated with such construction could result in changes to traffic patterns, possibly resulting in a shift of traffic volumes to other TBTA facilities, as well as the toll-free East River Bridges or a diversion to mass transit. Such changes in traffic patterns could have an adverse effect on the forecasts set forth in Table 23 and Table 24 as described in the following paragraph.

Various stages of the project will result in visible construction activity on segments of Second Avenue at any given time. In addition, tunnel construction, either through the use of a tunnel boring machine or cut-and-cover, will affect vehicular activity not only on Second Avenue, but also on adjacent avenues and streets. The first phase of the project is between 96th Street and 63rd Street. With four lanes being maintained on Second Avenue, there have been no discernible impacts on RFK Bridge traffic levels.

Operating Expenses

Operating expenses have been budgeted by TBTA for 2014 at $470.5 million, an increase of 14.9 percent over 2013 operating expenses of $409.5 million. These expenses are split into the following categories: labor expenses of $244.0 million (an increase of 10.6 percent over 2013) and non-labor expenses of $226.5 million (an increase of 20.0 percent over 2013). A primary factor in the increased labor expenses is the impact of ninety new positions for a full year that were authorized for the third quarter of 2013 largely to fulfill the organizational changes required for carrying out long-term restoration and mitigation projects resulting from Sandy; implementation of an MTA-wide Enterprise Asset Management initiative to identify a structured sequence of maintenance, preservation, repair, rehabilitation, and replacement actions that will achieve and sustain a desired state of good repair over the lifecycle of the TBTA's assets at minimal cost; and significant expansion of the current Small Business Mentoring Program effort to increase, facilitate and encourage the participation of small businesses, including Minority and Women-Owned Business Enterprises (M/W/BEs). In addition to the new personnel, higher labor expenses will result from fewer expected vacancies, contractual payroll adjustments, and inflationary increases to fringe benefits. The primary reason for the growth in non-labor expenses is anticipated increases in major maintenance, including bridge painting projects that will not be eligible for capital funding, additional Sandy restoration and mitigation expenses, anticipated increases in property insurance, and higher E-ZPass expenses associated with expected continued growth in usage.

The projection of operating expenses for 2014 through 2024 is shown in Table 25. Total operating expenses, consisting of labor and non-labor, are estimated to increase from $470.5 million in 2014 to $710.2 million in 2024. Labor expenses consist of wages, salaries, overtime and fringe benefits. Non-labor expenses include items such as maintenance, supplies, utilities and other expenses. The table includes operating expenses budgeted by TBTA for 2014, operating expenses projected by TBTA through 2017 and Stantec's projections of operating expenses from 2018

through 2024. Stantec projected that labor expenses would increase at a rate of 4.0 percent annually while non-labor expenses would increase at a rate of 5.0 percent per year. Budgeted expenses from 2015 through 2017 are primarily driven by inflationary adjustments with additional allowances for potential major maintenance and E-ZPass operational needs.

Stantec does not project any variation in operating expenses resulting from the reduced traffic levels brought about by periodic toll increases.

Table 25 Projected Operating Expenses
(000s)

Year	Labor[a]	Non-Labor[b]	Total[c]
2014[d]	$243,984	$226,501	$470,485
2015[d]	250,533	238,044	488,577
2016[d]	257,014	247,559	504,573
2017[d]	264,840	257,015	521,855
2018	275,434	269,866	545,299
2019	286,451	283,359	569,810
2020	297,909	297,527	595,436
2021	309,825	312,403	622,229
2022	322,218	328,024	650,242
2023	335,107	344,425	679,532
2024	348,511	361,646	710,157

Notes:
(a) Salaries, overtime and fringe benefits, net of capital reimbursement.
(b) Non-labor includes the following categories: maintenance and supplies, outside services, insurance, power, leases, rentals and other expenses.
(c) Totals may not add due to rounding.
(d) From TBTA estimates.

Net Revenues from Toll Operations

Finally, the projected operating expenses were deducted from the respective toll revenue forecasts to produce the two sets of estimated net toll revenues (before debt service on outstanding TBTA obligations), one at constant tolls and the other with toll increases in 2015 and 2017, as shown in Table 26. For 2014, net toll revenue under either scenario is estimated at $1.2 billion. By 2024, net toll revenue at constant tolls is estimated to be $1.0 billion, and with toll increases in 2015 and 2017, net toll revenue is estimated to be on the order of $1.1 billion.

Table 26 Net Toll Revenue Forecast
(000s)

Year	Gross Toll Revenues		Operating Expenses	Net Toll Revenues	
	Constant Tolls	With Assumed 2015 and 2017 Toll Increases		Constant Tolls	With Assumed 2015 and 2017 Toll Increases
2014	$1,663,917	$1,663,917	470,485	$1,193,432	$1,193,432
2015	1,669,357	1,726,352	488,577	1,180,780	1,237,775
2016	1,674,799	1,738,586	504,573	1,170,226	1,234,013
2017	1,676,100	1,791,982	521,855	1,154,245	1,270,127
2018	1,678,837	1,816,029	545,299	1,133,537	1,270,730
2019	1,681,524	1,819,796	569,810	1,111,714	1,249,986
2020	1,684,296	1,823,598	595,436	1,088,860	1,228,162
2021	1,687,024	1,827,278	622,229	1,064,795	1,205,049
2022	1,689,794	1,831,098	650,242	1,039,552	1,180,857
2023	1,692,509	1,834,802	679,532	1,012,978	1,155,270
2024	1,695,249	1,838,661	710,157	985,092	1,128,503

REVIEW OF PHYSICAL CONDITIONS

The facilities under TBTA's jurisdiction include two tunnels and seven bridges listed in Table 27, together with facilities on Randall's Island and a parking garage in Manhattan near the Hugh L. Carey Tunnel. Some of these crossings have been in service since the 1930s, i.e., the RFK, Henry Hudson, Marine Parkway-Gil Hodges Memorial and Bronx-Whitestone Bridges. The Queens Mid-town Tunnel opened to traffic in 1940. The Hugh L. Carey Tunnel, formerly the Brooklyn-Battery Tunnel, opened to traffic in 1950. Two bridges opened to traffic in the 1960s: the Throgs Neck in 1961 and the Verrazano-Narrows in 1964 (lower level in 1969). The present Cross Bay Veterans Memorial Bridge opened to traffic in 1970 replacing the previous structure that had been in service since 1939. The aging of the TBTA facilities will influence the overall upkeep and capital improvements that will be necessary to maintain the infrastructure over the forecast period and beyond. Table 28 lists TBTA's capital investments for each facility from 1992 through 2013.

Table 27 Opening Dates of TBTA Facilities

Facility	Open to Traffic	Years in Use
RFK Bridge	1936	78
Bronx-Whitestone Bridge	1939	75
Throgs Neck Bridge	1961	53
Henry Hudson Bridge	1936	78
Queens Midtown Tunnel	1940	74
Hugh L. Carey Tunnel	1950	64
Verrazano-Narrows Bridge	1964	50
Cross Bay Veterans Memorial Bridge	1970	44
Marine Parkway-Gil Hodges Memorial Bridge	1937	77

Stantec has reviewed material pertaining to the physical condition of the TBTA seven bridges and two tunnels. The material reviewed includes pertinent sections and updates of the following:

- Biennial Bridge Inspection Reports;
- Scheduled Tunnel Inspection Reports;
- Post-Sandy Inspection Reports;
- TBTA's current Capital Program;
- Current Quality Assurance Plan; and
- TBTA's Routine and Major Maintenance Program.

Table 28 Capital Investments by Facility, 1992 to 2013
(Millions of dollars)

Facility	Total by Facility 1992 through 2013[a]
Agency Wide[b]	$351.9
Hugh L. Carey Tunnel	384.7
Bronx-Whitestone Bridge	735.9
Cross Bay Veterans Memorial Bridge	98.2
Henry Hudson Bridge	244.6
Marine Parkway-Gil Hodges Memorial Bridge	178.8
Queens Midtown Tunnel	297.8
RFK Bridge	1,108.3
Throgs Neck Bridge	371.3
Verrazano-Narrows Bridge	806.9
Total	$4,578.4

Notes:
(a) Data from TBTA.
(b) Agency-wide refers to projects that have been, or will be, carried out at two or more facilities.

The review by Stantec of the pertinent material consists of the following subtasks:

- Comparison of condition ratings of the current inspection reports with the previous inspection reports to note significant changes in observed deterioration, and repairs to priority conditions from previous inspections, if any;
- Review of the current Capital Program to verify that the repairs recommended by the latest inspection reports are being addressed; and
- Review of TBTA's Routine Maintenance Program to verify that the maintenance-related recommendations of the current inspection reports are being addressed.

Review of Inspection Reports

TBTA's seven bridges and two tunnel facilities undergo periodic condition inspections. Bridges are inspected biennially per Federal and State mandate, with interim yearly inspections of any components that require monitoring. The purpose of the biennial inspection program is to maintain the safety and structural integrity of bridges. TBTA's Bridge Inspection Program was

assessed from 2006 to 2007 by an independent engineering firm well known in the field of structural inspection and appraisal, which noted that "the program is meeting the minimum State and Federal standards" and "in several respects the program exceeds the minimum standards" and "with respect to the accuracy, clarity, and thoroughness of the reports generated, we find them to be of the highest quality."

While there is no Federal or State mandate, TBTA performs regular tunnel inspections of selected tunnels elements as needed, with more comprehensive inspections performed approximately every ten years. The Federal Highway Administration/Federal Transit Administration (FHWA/FTA) Tunnel Inspection Manual recommends an interval of 2-5 years between inspections, thus TBTA is in conformance with this guideline. The regular inspection of the Queens Midtown Tunnel was awarded in 2007 and completed in 2008. In 2013, an inspection was performed on the approach bridges on the Manhattan side of the Queens Midtown Tunnel. An inspection of the Hugh L. Carey Tunnel was awarded in 2011 and completed in 2012. An inspection of the Queens-Midtown Tunnel was awarded in early 2013 and is now ongoing.

The TBTA bridges were last inspected and their physical condition appraised in 2012/2013 by various consultants, under the New York State Biennial Bridge Inspection Program, as shown in Table 29. Separate underwater and substructure inspections were performed in accordance with the five-year cycles of NYSDOT to obtain riverbed contours and to assess potential scour conditions at the substructure.

These ongoing inspections, performed by the inspection consultants, consisted of close visual examination, 100% hands-on inspection of designated critical elements, sounding concrete, and taking appropriate measurements to determine the physical conditions of the bridges and tunnels. The biennial bridge inspection is performed per the guidelines of the New York State Bridge Inspection Manual and the Federal Guidelines. Under these guidelines, each bridge component is inspected and assigned a rating. Any priority conditions are reported immediately to the TBTA for prompt attention. The ratings are reviewed by TBTA personnel to assess what components of the bridge require more comprehensive inspection and rehabilitation, which is then awarded as contracts under the Capital and Maintenance Programs. Bridge components which warrant more frequent monitoring to ensure public safety are monitored annually with a special inspection.

After performing a comparison of the individual overall ratings of the current inspection reports against the previous inspection reports, it was noted that there has been no significant change in the overall ratings and the bridges remain in good condition.

The regular inspections of the tunnels fulfill a similar function. Inspections consist of an overall assessment and rating of the various tunnel components, as documented in TBTA's ECP-318 guidelines, and provide a method of documenting ongoing monitoring of the tunnels for safety, operations and overall structural integrity. Since some tunnel components are not as readily accessible as bridge components, the comprehensive inspections will complement the regular inspections by providing a more in-depth assessment at regularly spaced intervals.

TBTA has an ongoing seismic retrofit program to identify and implement necessary seismic retrofits in order to bring critical facilities to current seismic code standards. This program has made substantial progress in identifying necessary seismic upgrades and incorporating them into various Capital facility rehabilitation design and construction projects when applicable. This effort will continue in the current 2010-2014 Capital Program and the 2015-2019 Capital Program currently under development.

On October 29th 2012, Sandy struck the East Coast of the United States, including the New York Metropolitan Area. In response to this, the TBTA initiated a post-event assessment of all TBTA bridges and tunnels. This assessment was to assure that bridge/tunnel elements identified as vulnerable/susceptible to a major flooding or wind event did not sustain any damage, or that any noted damage was not detrimental to the safe operation of the bridge/tunnel. These inspections and assessments were performed by experienced bridge/structural engineers and inspectors familiar with the structures. The bridges experienced sustained winds of 70 mph with gusts of up to 103 mph. In advance of the major crux of the storm and as a safety precaution due to the wind velocity, all bridges and tunnels were closed to all vehicular traffic. When the Post-Sandy inspection was finalized, it was found that no significant damages were caused by Sandy in any of the bridges; however, some of the ancillary facilities of the Rockaway Bridges (Cross Bay Veterans Memorial Bridge and Marine Parkway-Gil Hodges Memorial Bridge) sustained damage. TBTA's bridges reopened the day after the storm (except the Marine Parkway-Gil Hodges Bridge which reopened October 31st). TBTA's two tunnels sustained structural, electrical and mechanical damage due to flooding. Because of TBTA's engineering and maintenance staff working in conjunction with outside contractors around the clock, both tunnels were back on line in a relatively short period of time.

The consulting engineering firms who performed the 2012 and 2013 biennial bridge inspections and those who performed the 2011/2012 and 2008 tunnel inspections for each facility are shown in Table 29.

Table 29 Facility Inspection Firms

Facility	Consulting Firm
RFK Bridge	HNTB / Hardesty & Hanover (2012)
Throgs Neck Bridge	HNTB (2013)
Bronx-Whitestone Bridge	WSP Sells (2013)
Henry Hudson Bridge	Ammann & Whitney / Pennoni (2013)
Queens Midtown Tunnel	Jenny Engineering (2008)
Facility approach bridges	Ammann & Whitney / Pennoni (2013); URS (2013-2014)
Hugh L. Carey Tunnel	Parsons Brinckerhoff (2011/2012)[a]; Hatch Mott McDonald (2013-2014)
Verrazano-Narrows Bridge	WSP Sells / HAKS (2012)
Marine Parkway-Gil Hodges Memorial Bridge	URS (2013)
Cross Bay Veterans Memorial Bridge	URS (2013)

Notes:
(a) Comprehensive inspection of components for rehabilitation.

These firms are well known in the field of structural inspection and appraisal. Copies of pertinent sections of the final inspection reports for the various facilities were requested and made available by TBTA. Bridges that are part of the even-year inspection cycle listed above will be undergoing inspections this summer, and therefore, the results of these inspections are not available at this time. The results of these inspections, also done by experts in the field, will generally be available at the end of the year.

TBTA Infrastructure Losses from Sandy

Based on preliminary assessments by TBTA staff and independent engineers, the estimated capital cost of repairs due to Sandy, mostly for damage to the tunnels, is $778 million. The cost of infrastructure repairs is expected to be covered by a combination of insurance, FEMA, TBTA resources, including its necessary reconstruction reserve and, if necessary, interim external borrowings. Any such interim borrowings are currently expected to be structured as bond anticipation notes under the TBTA Senior Resolution and amounts of such borrowings not reimbursed by the federal government or from insurance coverage are expected to be paid from the proceeds of bonds issued under the TBTA Senior Resolution in 2016. An additional $96 million for mitigation initiatives in response to the damage from the storm is also anticipated. These mitigation measures will be funded similarly to the $778 million program.

Funds proposed for TBTA's 2010-2014 Capital Program total approximately $2.079 billion (the $778 million and $96 million programs for Sandy are separate and distinct from the 2010-2014 capital program). The plan separates this amount into specific projects by facility as well as agency-wide projects. Comparisons between the Capital Program planned projects and total repair item lists for each facility, as prepared by inspection consultants in the biennial reports, confirm that the Capital Program gives high priority to key rehabilitation projects. By prioritizing necessary facility rehabilitation projects, TBTA addresses all high priority recommendations in the current Capital Program or under maintenance programs that have not been addressed as part of the previous Capital Program.

Current major rehabilitation projects (and designs) addressing the recommendations of the latest inspection consultants' reports and the maintenance and programmatic needs of the facilities include:

RFK Bridge

Projects in the 2010-2014 Capital Program:

- Miscellaneous Structural Repair – The construction award is scheduled for late 2014.
- Reconstruction and Rehabilitation of the Manhattan Approach Ramps – The design contract was awarded in May 2012 and the construction contract is scheduled for late 2014.
- Seismic and Wind Load Study – The study was awarded in December 2012.
- Bronx/Manhattan Toll Plaza Structure Reconstruction – The design contract was awarded in late 2011 and the replacement of the Bronx Toll Plaza is scheduled to start in mid-2014.
- Reconstruction of Manhattan-to-Queens Ramp – The design-build contract was awarded in July 2012. It is an ongoing project with a 72 percent completion rate.
- Interim Repairs to the Manhattan Toll Plaza Deck – The design contract was awarded in December 2011, with Phase II construction contract award scheduled for late 2014.

Projects completed within recent years include: replacement of T-48 Roadway Wearing Surface with Bridge Master overlay at Queens Suspension span, Harlem River Lift Span and approach spans, and the Bronx Kill orthotropic deck span of the RFK Bridge, replacement of the Harlem River Drive Ramp Deck, rehabilitation of decks at Randall's Island, Ward's Island, and construction of a new ramp, miscellaneous steel and concrete rehabilitation, dehumidification of anchorages and additional strand re-anchoring, numerous repair projects such as repair of the bridge deck joints, drains, cracked decks, piers, superstructure, substructure, and maintenance painting of the Ward's Island viaduct and suspended span.

Bronx-Whitestone Bridge

Projects in the 2010-2014 Capital Program:

- Fender protection around Tower Piers – The study/scope development contract was awarded in September 2013.
- Miscellaneous Structural Rehabilitation – The design contract was awarded in September 2013 with the construction contract scheduled for early 2016.
- Installation of Necklace Lighting System and Acoustic Monitoring of Main Cables - The design contract was awarded in December 2011, and the construction contract was awarded in July 2013. It is an ongoing project with a 22 percent completion rate.
- Continued Cable Investigation/Monitoring – The design contract was awarded in September 2013 with the construction contract scheduled for early 2016.
- Elevated and On Grade Queens Approach Structure Replacement – The construction contract was awarded in July 2011. It is an ongoing project with a 69 percent completion rate.

- Bronx Concrete Anchorage Repairs and installation of Dehumidification System – The construction contract was awarded in March 2013. It is an ongoing project with a 65 percent completion rate.

Projects completed within recent years include: painting of the main cables, suspender ropes and towers, installation of orthotropic bridge deck in the suspended span with the removal of the truss system, installation of the fairing system for wind mitigation, concrete repairs and installation of the dehumidification system at the Queens Anchorage, and the replacement of the Bronx approach.

Throgs Neck Bridge

Projects in the 2010-2014 Capital Program:

- Seismic Retrofit and Replacement of Concrete Fill Steel Grid Suspended Span Deck – The design contract was awarded on March 2012 and the construction award is scheduled for mid-2017.
- Miscellaneous Structural Rehabilitation – The construction contract was awarded in June 2011. It is an ongoing project with a variable percent completion rate due to multiple work orders.
- Anchorage Dehumidification – The design contract was awarded in July 2013, with construction scheduled for early 2016.
- Painting of the Bronx Approach Span – It is an ongoing project, awarded July 2011, with an 83 percent completion rate.
- Rehabilitation of Orthotropic Deck – The construction contract was awarded in July 2011. It is an ongoing contract with an 83 percent completion rate.

Projects completed within recent years include: deck replacement and rehabilitation on the Queens approach, tower and structural steel painting, repair of the tower floodlights, steel repairs of the suspended span superstructure, main cables and suspender ropes investigation, structural steel re-habilitation, drainage system repairs and improvements, replacement of concrete deck, rehabilitation of the abutment and retaining walls at the Queens approach, steel repairs at the Bronx approach, painting of the Queens and Bronx Tower Fender System, repair work at the anchorage and tower protection at both Queens and Bronx towers, and roadway lighting repairs.

Henry Hudson Bridge

Projects in the 2010-2014 Capital Program:

- Skewbacks Retrofit (of the sloping surface that supports the arch ends) – The design contract was awarded in November 2013 with construction scheduled for early 2016.
- Replacement of the Upper and Lower Plaza and Southbound Approach – The design contract was awarded in December 2012 with Phase I construction contract scheduled for late 2014.

Projects completed within recent years include: upper level sidewalk and curb stringer replacements, and painting of the new curb stringers, construction of the lower level deck replacement which replaces the lower level deck and sidewalk, northern approach structure, drainage system and roadway lighting, rehabilitation of cross drainage of the approaches between Dyckman Street and the main span, rehabilitation of the lower level garage consisting of concrete repairs, repaving and waterproofing the roadway above the garage, major maintenance projects including spall repairs at the towers, resealing the upper level deck, and light pole rehabilitation on the parkway approaches, stone wall guide rail repairs, structural rehabilitation of high priority elements,.

Queens Midtown Tunnel

Projects in the 2010-2014 Capital Program:

- Service and FE Building Rehabilitation – The design contract was awarded in March 2012 and the construction contract was awarded in June 2012.
- Entrance and Exit Plazas Structural Rehabilitation – The design contract was awarded in December 2011. The construction contract is scheduled to start in early 2015.
- Tunnel Ventilation Building Electrical Upgrade – The construction contract was awarded in December 2012. It is an ongoing project with a 13 percent completion rate.
- Tunnel Wall and Ceiling Repairs and Leak Control – The design contract was awarded in February 2013 and the construction award is scheduled for early 2015.
- Replacement of the Facility Supervisory Control Systems – The design contract is planned for award in April 2014.

In addition to the above planned Capital projects, major Sandy Restoration work is scheduled to commence in early 2015. The Sandy Restoration work is being coordinated and efficiently integrated with planned capital work.

Projects completed within recent years include: replacement of all the tunnel ventilation exhaust fans and minor repairs to the supply fans, the rehabilitation of two overpasses including deck repair and beam encasement repair in the Manhattan approach area, replacement of drainage pumps inside the ventilation building and at the plazas, and reconfiguration of the traffic island in the Manhattan entrance plaza to provide better traffic flow.

Hugh L. Carey Tunnel

Projects in the 2010-2014 Capital Program:

- Service Building Alterations – The design contract was awarded in March 2012. The construction contract award is scheduled for mid-2014.
- Rehabilitation of the Tunnel Walls, Roadway Drainage, and Firelines – The design contract was awarded in December 2012. The construction contract award is scheduled for late 2014.

- Battery Parking Garage Elevator Replacement – The construction contract was awarded in October 2012. It is an ongoing project with a 90 percent completion rate.
- Miscellaneous Repairs at the Parking Garage – The design contract was awarded in October 2012 and the construction contract is scheduled for award in mid-2014.
- Replacement of Electrical Switchgear and Power Distribution Equipment – The construction contract was awarded in December 2010. It is an ongoing project with an 82 percent completion rate.
- Repair/Replacement of Brooklyn Plaza Structural Slab – The design contract was awarded in April 2012. The construction contract award is scheduled for late 2014.

In addition to the above planned Capital projects, major Sandy Restoration work is scheduled to commence in late 2014. The Sandy Restoration work is being coordinated and efficiently integrated with planned capital work.

Projects completed within recent years include: construction of structural and architectural repairs for vent structures, the rehabilitation of the Brooklyn plaza pipe chase, modernization and upgrade of the control room, construction of a new pump system to get water runoff into the sanitary system on Governor's Island, construction of tunnel roadway and drainage system rehabilitation, tunnel leakage repairs and wall tile replacement and structural repairs and lighting system improvements to the Battery Parking Garage and Emergency Garage.

Verrazano-Narrows Bridge

Projects in the 2010-2014 Capital Program:

- Toll Plaza East and West Bound Ramps Improvements – The construction contract was awarded in September 2011. It is an ongoing project with a 56 percent completion rate.
- Main Cable Testing – The design/scoping award is scheduled for late 2014.
- Steel Repair and Concrete Rehabilitation and Drainage Systems – The design contract was awarded in April 2012 with the construction contract awarded in December 2013.
- Widening of Belt Parkway Ramps – The feasibility study and conceptual design for the reconstruction and reconfiguration of the ramps and approaches was awarded in December 2013.
- Painting of the Brooklyn and Staten Island Lower Level Ramps – The construction contract was awarded in December 2013. It is an ongoing project with a 5 percent completion rate.
- Replacement of the Upper Level Suspended Span – The construction contract was awarded in November 2012. It is an ongoing project with a 21 percent completion rate.
- Bus and HOV Ramp Improvement – The construction contract was awarded in December 2013.
- Painting of the Upper Level Superstructure – The construction contract was awarded in November 2012. It is an ongoing project with a 63 percent completion rate.
- Painting of the Belt Parkway Ramps – The design contract award is scheduled for early 2016.
- Substation #1 Rehabilitation – The design-build contract was awarded in February 2014.

Projects completed within recent years include: miscellaneous steel repairs to the tower legs and struts (interior and exterior), rehabilitation of the lower level approaches with the deck replacement on the lower level Brooklyn and Staten Island approaches and Lily Pond Avenue bridge, maintenance bridge painting of the entire suspended spans, rehabilitation of the service building roof, construction of the salt storage facility, and maintenance painting of the Brooklyn approaches and tower painting, the installation of sensors with the provision of real time under bridge clearance, repair of flagged conditions on the structural steel superstructure from anchorage to anchorage, and removal of eight eastbound toll booths, repair of the Toll Plaza Canopy Roof, relocation of the HVAC Unit, the Bus/HOV access improvements, and the painting of the towers below roadway level.

Marine Parkway-Gil Hodges Memorial Bridge

Projects in the 2010-2014 Capital Program:

- Electrical and Mechanical Rehabilitation – The design contract for the project was awarded in December 2011 with the first phase of work planned for award in late 2014 and Phase II construction contract award scheduled for mid-2015.
- Substructure and Underwater Scour Protection – The design contract was awarded in December 2010 and the construction contract was awarded in November 2013.
- Miscellaneous Steel Repairs – The design contract was awarded in January 2013.
- Rehabilitation and Painting of the Rockaway Point Blvd. Overpass and the Jacob Riis Park Pedestrian Bridge – The design contract was awarded in June 2012 and the design-build contract award is scheduled for late 2014.

Projects completed within recent years include: the installation of a pre-engineered service building, structural steel repairs, deck replacement and bridge widening, and replacement of the elevators in the towers.

Cross Bay Veterans Memorial Bridge

Projects in the 2010-2014 Capital Program:

- Scour protection and rehabilitation of pier fender system – Scoping to commence in May 2014.

Projects completed within recent years include: Deck and superstructure rehabilitation, substructure and underwater work, electrical rehabilitation, and the complete concrete and drainage rehabilitation of the promenade and seawall at the Rockaway approach.

Other System-wide Improvements

Agency-Wide – Since the September 11th attack on the World Trade Center, TBTA has engaged consultants to assess security risks of their facilities. As a result of these risk assessments, increased security improvements including various monitoring, surveillance and hardening projects have been implemented or will enter construction shortly at TBTA facilities. Video surveillance software

and hardware upgrades have been installed at many facilities. TBTA has also maintained a security department and incorporates mitigation measures into their operations, capital and maintenance programs.

The 2010 – 2014 Capital Program will continue with Intelligent Transportation System project initiatives including:

- RWIS (Road Weather Information Systems) provide information about the roadway surface and environmental conditions, including temperatures, atmosphere (air temperature, visibility, precipitation and wind speed/gust and direction) states at TBTA's bridges. The AW-35 project will upgrade the current weather systems to provide redundant, reliable and accurate real time weather conditions for all TBTA bridges. The scope includes upgrading the RPU (Remote Processing Unit) of the Roadway Weather Information Systems, which is scheduled for award in late 2014. The RPUs or better known as Weather Stations will be replaced at all four major bridges – Robert F. Kennedy, Verrazano-Narrows, Bronx-Whitestone and Throgs Neck.
- TRANSMIT (an E-ZPass-based system) is currently operational at all facilities. Future plans include installation of additional TRANSMIT readers to provide full coverage on the plaza approaches. Travel times (between TRANSMIT locations) are being measured, stored, and displayed on TBTA's internal website and displayed on the MTA website. Travel time messages for destinations within the NYC region are being displayed on Variable Message Signs (VMS).
- Second Generation E-ZPass in-lane subsystem evaluation and modernization started in late 2010. The project will continue to conduct evaluations to determine how to best modernize the E-ZPass system, concurrent with studies performed by the E-ZPass Group, with funding available for the anticipated replacement of some of TBTA's existing equipment. In addition, the pilot study for All-Electronic Tolling (AET) at the Henry Hudson Bridge is part of this project.
- The Variable Message Sign (VMS) program is proceeding. The 2010–2014 Capital Program will replace and add new signs to display regional traffic information. These signs will allow TBTA to expand the provision of travel time messages to regional destinations at additional facilities.
- Closed Circuit TV and Fiber Optic Cable installation started mid-2013. The project will install and deploy an integrated and extensive fiber optic network at the RFK Bridge and construct connections to the NYSDOT/NYCDOT Joint Traffic Management Center (JTMC) in Queens. The existing Hugh L. Carey Tunnel fiber network will be investigated and tested. The recently upgraded fiber network at the Bronx-Whitestone Bridge will be integrated into the system.
- The Advanced Traffic Management (ATM) system is currently used to manage traffic on all facilities. The system is operational 24-7 and provides real time status of all traffic and incident related activities, with full access to traffic cameras, VMS, variable speed limit signs, lane status, lane-use signal control, regional incident alerts, real time link travel time, and weather sensor data and alarms. Under the operating budget, the ATM IDEAS system, which includes an operations command center and control video wall were replaced, as well as the CCTV subsystem hardware and software for camera viewing.

- The Video Incident Detection System (VIDS) continuously monitors the facility traffic camera images for the purpose of detecting sudden and unusual vehicular stoppages. The system also detects other potential safety hazards such as falling debris and smoke. The system alerts for these incidents allow for appropriate staff action to reduce the severity of the incident and to protect TBTA travelers and employees. In 2013, under the operating budget, the Video Based Incident Detection System was replaced and upgraded at Queens Midtown Tunnel, Hugh L Carey Tunnel, and Throgs Neck Bridge, and a new system was completed at the Henry Hudson Bridge.
- Agency-wide hazardous materials abatement started early 2014. The project will address hazardous materials/asbestos abatement related work.

Other projects completed within recent years include the installation of the traffic and safety improvements, and the restoration of the Robert Moses Building façade at Randall's Island.

As part of the Capital Program planning process, TBTA personnel conduct a 20-year capital needs assessment every five years with the most recent dated September 2012. The assessment is compiled from data from biennial inspections and system improvements suggested by the technical departments, and include factors such as service life of various structural components and normal replacement cycles. Plans for scheduling major maintenance under the 20-year capital needs assessment are developed with input from operating personnel, which consider how to implement construction properly to maintain the optimal level of service to the traveling public both locally and system wide.

Stantec's review of pertinent sections of the recent facility inspection reports found them to be extensive and detailed. The reports, based on Stantec's limited review, appear, in the opinion of Stantec, to be reasonable.

Stantec reviewed the reports of each of TBTA's crossings. The purpose of the reviews was to obtain an update of the respective facility's status relative to the following issues:

- Ongoing rehabilitation projects;
- Ongoing maintenance projects;
- Rehabilitation projects addressing the recommendations of the previous inspection reports; and
- Repairs to alleviate the flagged conditions of the previous inspection reports.

The reviews proved informative. Facility projects and agency-wide projects specific to each structure were discussed.

It is important to note, however, that Stantec's testing or inspection of portions of the work of other parties shall not relieve such other parties from their responsibility for performing their work in accordance with applicable requirements and the customary standard of care. Stantec shall not be responsible for the acts or omissions of other parties engaged by TBTA.

Long-Term Outlook for TBTA Facilities

The useful lives of bridges and tunnels, in general, could possibly be cut short for two main reasons: (a) they are geometrically and functionally unsatisfactory because they are too narrow, too steep, lacking in clearance or sufficient spatial capacity to handle the traffic; or (b) they are structurally unsafe because of deterioration or because their load-carrying capacity is inadequate to handle the loads imposed under current conditions. Deterioration may occur for a variety of reasons, including aging, but it will occur sooner if there has been inadequate or improper maintenance.

On the basis of the foregoing review and information available to us, from reports of others, it is our opinion that the TBTA bridges, tunnels and approaches are all geometrically and functionally adequate and structurally sound and generally maintained to good standards. Ongoing maintenance requirements of the structures are assessed, prioritized and addressed in an appropriate manner by TBTA to maintain a high level of safety to the traveling public, and maintain the structures for many years to come.

TBTA is looking forward, and planning to add lanes, and sometimes use peak contra-flow principles on its structures, in addition to maintaining and rehabilitating the structures, to ensure their future serviceability. We are of the opinion that all the TBTA facilities are and will be physically capable of accommodating traffic volumes at the levels projected for 2024 through the duration of the outstanding bonds that have been issued and future bonds to be issued based on a pledge of TBTA revenues through 2044, assuming maintenance and rehabilitation consistent with past practice.

It is Stantec's opinion that the revenue projections are reasonable and have been prepared in accordance with accepted practice for investment-grade studies. However, given the uncertainties within the current international and economic climate, Stantec considers it is necessary to state that the traffic and revenue projections are based on the following caveats:

- This report presents the results of Stantec's consideration of the information available to us as of the date hereof and the application of Stantec's experience and professional judgment to that information. It is not a guarantee of any future events or trends.
- The traffic and revenue forecasts will be subject to future economic and social conditions and demographic developments that cannot be predicted with certainty.
- The projections contained in this report, while presented with numerical specificity, are based on a number of estimates and assumptions which, though considered reasonable to us, are inherently subject to significant economic and competitive uncertainties and contingencies, many of which will be beyond Stantec's control and that of TBTA. In many instances, a broad range of alternative assumptions could be considered reasonable. Changes in the assumptions used could result in material differences in projected outcomes.
- If, for any reason, any of these conditions should change due to changes in the economy or competitive environment, or other factors, Stantec's opinions or estimates may require amendment or further adjustments.

- Stantec's toll revenue projections only represent its best judgment and Stantec does not warrant or represent that actual toll revenues will not vary from its projections, estimates and forecasts.

Many statements contained in this report, that are not historical facts, are forward-looking statements, which are based on Stantec's opinions, as well as assumptions made by, and information currently available to, the management and staff of Stantec. Because the statements are based on expectations about future events and economic performance and are not statements of fact, actual results may differ materially from those projected. The words "anticipate", "assume", "estimate", "expect", "objective", "projection", "plan", "forecast", "goal", "budget", or similar words are intended to identify forward-looking statements. The words or phrases "to date", "now", "currently", and the like are intended to mean as of the date of this report.

Respectfully,

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