HISTORY AND PROJECTION OF TRAFFIC, TOLL REVENUES AND EXPENSES

AND

REVIEW OF PHYSICAL CONDITIONS

OF THE FACILITIES OF

TRIBOROUGH BRIDGE AND TUNNEL AUTHORITY

September 4, 2002

Prepared for the

Triborough Bridge and Tunnel Authority

By

URS

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September 4, 2002

To Triborough Bridge and Tunnel Authority:

In accordance with your request, URS Corporation-New York (URS) conducted this annual study to develop projections of traffic, revenues and expenses for the toll bridge and tunnel facilities operated by 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, toured the facilities in light of these inspection reports with TBTA Engineering and Facilities staff, 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 revenue data, reflecting the 10 toll increases since 1972; (3) the impact of the *E-ZPass* electronic toll collection system; (4) the toll structure; (5) possible future toll increases; (6) 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) construction conditions on the arterial highway network serving the New York Metropolitan Area, including the toll-free East River bridges; and (9) the impacts of the September 11 attack on the World Trade Center.

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 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 2001, these facilities carried 297 million total vehicles, of which 293 million were toll paying, and generated $915 million in toll revenue. (Non-revenue transactions include police, emergency and TBTA vehicles.) The locations of the facilities are shown on the following map in the context of the regional highway network.

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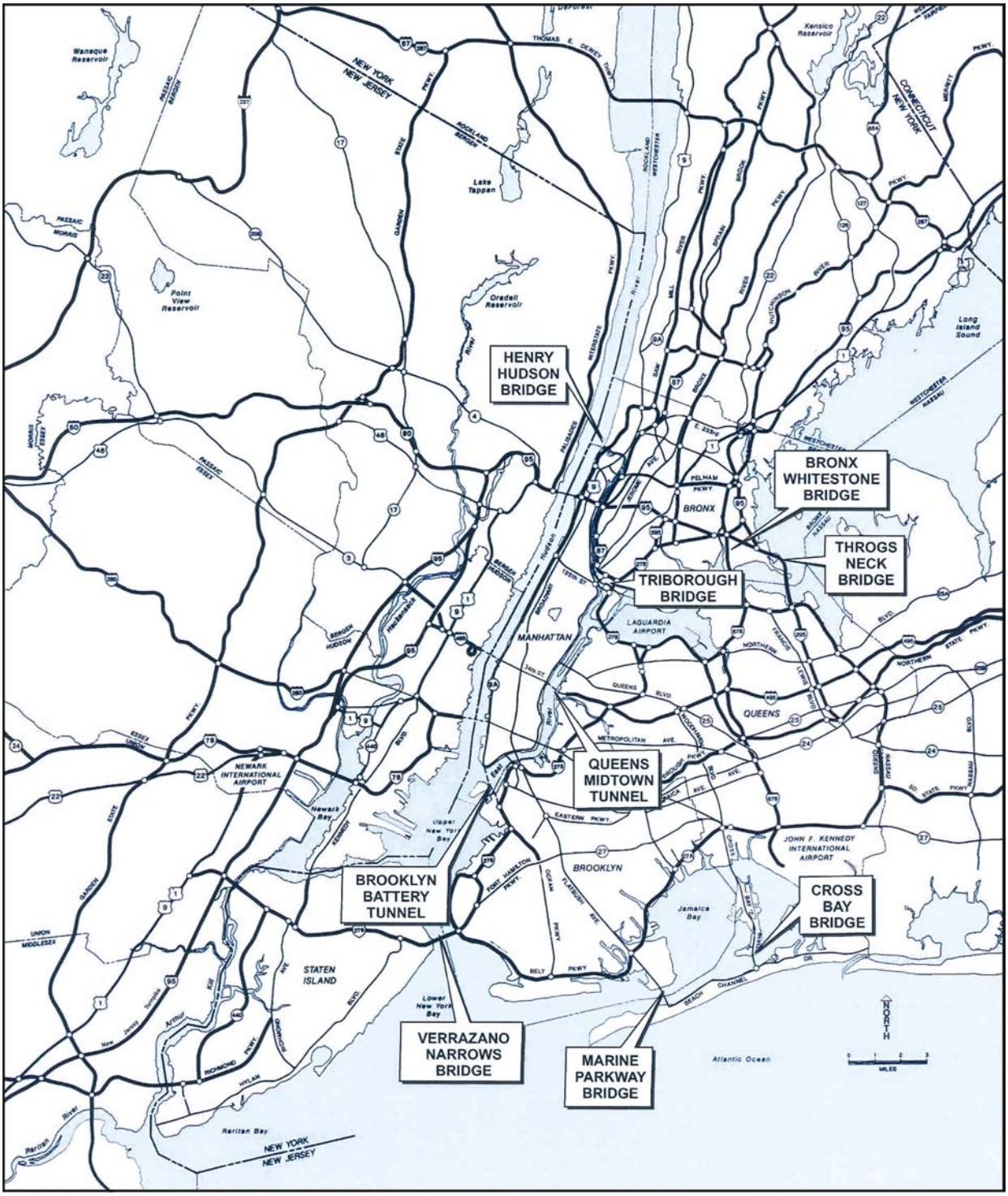
Figure 1: Location Map



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.

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 a six-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 commuting hours, three lanes are operated in the peak traffic direction.

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 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, that 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 - a four-lane crossing of the Rockaway Inlet which connects the Rockaway peninsula in Queens with Brooklyn.

Cross Bay Veterans' Memorial Bridge - a pre-stressed concrete viaduct 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 page 2.

The Verrazano-Narrows Bridge is part of I-278 (Staten Island, Gowanus and Brooklyn-Queens Expressways) which connects with the Brooklyn-Battery Tunnel and the Triborough Bridge. The Queens Midtown Tunnel carries I-495 (Long Island Expressway) into Manhattan. The Triborough Bridge joins I-87 (Major Deegan Expressway) and I-278 (Bruckner Expressway) with I-278/Grand Central Parkway in Queens and the FDR Drive 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 the TBTA facilities and their expressway/parkway connections, New York City's toll-free East River bridges — Brooklyn, Manhattan, Williamsburg and Queensborough — 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 Triborough, Bronx-Whitestone and Throgs Neck bridges via the expressway system in The Bronx (plus the George Washington-Triborough 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), New Jersey Turnpike Authority, and the New Jersey Highway Authority (Garden State Parkway).

All of these authorities, together with fifteen others beyond the New York Metropolitan Area, are already linked, or are in the process of being linked through the *E-ZPass* Interagency Group (IAG) to better serve the regional traveler. *E-ZPass* and its impact on the TBTA facilities are discussed further in this report.

Regional Public Transportation

In addition to the TBTA facilities, most of the public transportation facilities within New York 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 Authority subway and buses, Staten Island Rapid Transit, Metro-North Commuter Railroad, Long Island Rail Road, and the Long Island Bus system (in Nassau County, and serves adjacent portions of Queens and Suffolk County).

For those major TBTA facilities directly serving Manhattan — Triborough Bridge, Queens Midtown Tunnel and Brooklyn-Battery Tunnel — the motorist can, for the most part, choose to use transit; but for the outlying bridges, the choice is more difficult, due to less transit service or different trip characteristics.

TOLL COLLECTION ON THE TBTA FACILITIES

The nine TBTA toll facilities have three toll structures, in terms of toll levels and methods of collection: major, minor and the Verrazano-Narrows Bridge. The major crossings include the Triborough Bridge, Bronx-Whitestone Bridge, Throgs Neck Bridge, Queens Midtown Tunnel and Brooklyn-Battery Tunnel. The minor crossings are the Henry Hudson Bridge, Marine Parkway-Gil Hodges Memorial Bridge and Cross Bay Veterans' Memorial Bridge. The Verrazano-Narrows Bridge is the only facility on which tolls are collected only in one direction, while the cash tolls for passenger cars on the minor bridges are only at half the level of those on the major facilities.

Current Toll Structure and Operation

The current toll structure, in place since March 24, 1996, 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

Table 1 Current Toll Rates at TBTA Facilities
Effective Since March 24, 1996

Classification	Verrazano-Narrows Bridge[a]		Triborough Bridge Bronx-Whitestone Bridge Throgs Neck Bridge Queens Midtown Tunnel Brooklyn-Battery Tunnel		Henry Hudson Bridge		Marine Parkway-Gil Hodges Memorial Bridge Cross Bay Veterans' Memorial Bridge	
	Cash	*E-ZPass*	Cash	*E-ZPass*	Cash	*E-ZPass*	Cash	*E-ZPass*
Two-axle vehicles, including: Passenger vehicles, 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	$3.50	$3.00	$3.50	$3.00	$1.75	$1.25	$1.75	$1.25
Each additional axle costs	1.50	1.50	1.50	1.50	0.75	0.75	0.75	0.75
The following discounted prepaid charges are presently available for the two-axle vehicles referenced above:								
Prepaid charges through token roll purchases							1.25	
Prepaid charges per crossing for registered Staten Island Residents using an eligible vehicle with three or more occupants	0.625							
Prepaid charges per crossing for registered Staten Island Residents using an eligible vehicle through token roll purchase	2.40							
Registered Staten Island Residents using an eligible vehicle		1.60						
Prepaid charges per crossing for registered Rockaway Peninsula/Broad Channel Residents using an eligible vehicle							1.00	0.67[b]
All two axle vehicles greater than 7,000 lbs. and buses (other than franchise buses and motor homes)	6.00	4.80	7.00	5.60	(c)	(c)	3.50	2.80
Each additional axle costs	3.50	2.80	4.00	3.20	(c)	(c)	2.00	1.60
Two-axle franchise buses		2.00		2.00	(c)	(c)		1.00
Three-axle franchise buses		2.60		2.60	(c)	(c)		1.40
Motorcycles	1.75	1.75	1.75	1.75	1.75	1.25	1.75	1.25
Each additional axle costs	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75

Notes:
(a) Under the Verrazano-Narrows one-way crossing charge collection program, all per crossing charges shown should be doubled; toll is collected in westbound direction only.
(b) Rockaway Peninsula and Broad Channel residents using *E-ZPass* at the Cross Bay Veterans' Memorial Bridge receive a rebate of this amount, reimbursed to TBTA by MTA. This program was instituted January 1, 1998.
(c) Passage prohibited.

Passenger Car Tolls

TBTA crossings are separated into major and minor categories for toll classification purposes. The passenger car cash toll is $3.50 for the major crossings. The minor crossing passenger car cash toll is $1.75. 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 order to comply with a provision of Federal law.

Tolls for passenger cars are discounted under the following programs: (1) *E-ZPass* and tokens; (2) place of residence/crossing used; (3) place of residence/vehicle occupancy; and (4) some combination of the foregoing. *E-ZPass* electronic toll collection is available on all TBTA bridge and toll facilities (see the following section for a more complete description of *E-ZPass* and its impact). Motorists open a pre-paid E-Z*Pass* account and receive a transponder that they mount on 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 pre-paid account. Passenger cars equipped with *E-ZPass* are allowed a $0.50 discount per trip for all facilities ($1.00 for Verrazano-Narrows Bridge westbound only).

Toll payment by token had provided a $0.50 discount per trip; *E-ZPass,* which has replaced the tokens, continues the $0.50 per trip discount. A separate discount program is in place for registered Staten Island residents on the Verrazano-Narrows Bridge and for registered Rockaway peninsula and Broad Channel residents on the Cross Bay and Marine Parkway-Gil Hodges Memorial bridges. A toll-rebate program for the benefit of *E-ZPass* customers who are residents of Broad Channel and the Rockaway peninsula was implemented on January 1, 1998 for use on the Cross Bay Bridge. MTA reimburses the TBTA in the amount of the toll rebates.

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 (except for the Verrazano-Narrows Bridge), the cash rate for these vehicles is $7.00, and $4.00 for each additional axle over two. For *E-ZPass* customers, the corresponding rates are $5.60 and $3.20. For the Verrazano-Narrows Bridge, the cash rate for vehicles over 7,000 pounds is $6.00, and $3.50 for each additional axle over two (should be doubled, toll is collected in westbound direction only). For *E-ZPass* customers the corresponding rates are $4.80 and $2.80 (should be doubled, toll is collected in westbound direction only).

For the minor crossings, the two-axle rate for vehicles over 7,000 pounds is $3.50, with an additional per axle rate at $2.00. These vehicles are eligible for a 20 percent discount with *E-ZPass*. Commercial vehicles are not permitted on the Henry Hudson Bridge.

E-ZPass Electronic Toll Collection System

The *E-ZPass* electronic toll collection system has been fully installed at all TBTA bridges and tunnels since December 1996. *E-ZPass* usage at each facility has shown strong growth as motorists have become more familiar with the system and its time-saving advantages. Unlike cash transactions, vehicles equipped with *E-ZPass* tags can use the gated *E-ZPass*-only lanes. As mentioned previously, an electronic reader identifies the tag code at the toll plaza and the toll is deducted from the customer's pre-paid account. TBTA has approximately 2.6 million *E-ZPass* tags in use. Participation rates grew to over two-thirds of toll-paying traffic systemwide by the end of 2001. The total number of active IAG tags in use as of June 2002 was 6.5 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 queue at the plazas. TBTA estimates that manual toll lanes are able to process approximately 250 vehicles per hour, and dedicated *E-ZPass* lanes are able to process approximately 900 to 1,000 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.

Table 2 lists the *E-ZPass* systemwide participation rates starting in January 1997, when all nine crossings had *E-ZPass* in operation. Implementation of *E-ZPass* had started in October 1995 on the Verrazano-Narrows Bridge and was phased in gradually on the other crossings through December 1996.

Table 2 Systemwide *E-ZPass* Participation Rates

Month	*E-ZPass* Users as a Percent of Toll-Paying Vehicles – Overall Average					
	1997	1998	1999	2000	2001	2002
January	29%	55%	60%	62%	68%	69%
February	35	56	61	63	68	69
March	39	57	61	64	68	68
April	42	57	60	63	68	69
May	43	56	59	63	68	69
June	44	57	60	63	67	—
July	44	55	58	61	65	—
August	44	55	58	63	66	—
September	50	58	59	64	69	—
October	52	59	60	66	68	—
November	52	59	61	67	68	—
December	53	59	61	66	67	—

Source: TBTA

Based on customer acceptance of the technology, TBTA expects that the *E-ZPass* share of total transactions will exceed the 70 percent level by 2005.

Implementation of the *E-ZPass* system also has occurred and is occurring on other regional toll facilities, e.g., the six interstate crossings of the Port Authority of New York and New Jersey, the New Jersey Turnpike, the Garden State Parkway, 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 Atlantic City Expressway, the four bridges between New Jersey and Pennsylvania operated by the Delaware River Port Authority, the two toll roads in Delaware, the toll facilities in Maryland, the West Virginia Turnpike, the Massachusetts Turnpike and the Pennsylvania Turnpike. The growing number of *E-ZPass*-equipped toll plazas has resulted in an increasing number of tag-equipped vehicles.

During 2000, TBTA *E-ZPass* market share was aided by the introduction of *E-ZPass* on the Garden State Parkway gradually over the summer months and by the New Jersey Turnpike in September 2000. At the time of the introduction of *E-ZPass*, the Turnpike increased tolls for cash passenger cars with lower rates for *E-ZPass* users, with additional discounts during off-peak periods. A similar variable pricing program utilizing *E-ZPass* was introduced by the Port Authority of New York and New Jersey on its crossings in March 2001.

TBTA was a founding member of the *E-ZPass* Interagency Group (IAG), originally comprised of toll authorities in Delaware, Pennsylvania, New Jersey and New York, and now including Maryland, Massachusetts, West Virginia, New Hampshire and the Peace Bridge between Buffalo and Fort Erie, Ontario. The IAG has been working since 1991 toward the development and delivery of a compatible electronic toll collection system for the entire region. In 1995, TBTA entered into an inter-operability agreement with the IAG.

Customers of the member IAG agencies are able to use their tags at any *E-ZPass*-equipped facility operated by an IAG member. All IAG members provide inter-operability among agencies for their customers. As IAG members implement electronic toll collection systems, the *E-ZPass* customer base will increase, which will help increase usage of *E-ZPass* on TBTA facilities.

As mentioned earlier, 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.

Passenger Car Toll Rate Trends and Inflation

Since 1971, toll rates have been periodically increased on the TBTA facilities. Table 3 displays passenger car toll rates for the nine TBTA bridges and tunnels over the past 30 years.

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

- Major crossings - Triborough, Bronx-Whitestone and Throgs Neck bridges, and the Queens Midtown and Brooklyn-Battery tunnels;

- Minor crossings - Henry Hudson, Marine Parkway-Gil Hodges Memorial and Cross Bay bridges; and

- Verrazano-Narrows Bridge — a major crossing with one-way toll collection.

Table 3 Historical Trends in Non-Discounted Cash Passenger Car Toll Rates

	Verrazano-Narrows Bridge	Triborough, Bronx-Whitestone and Throgs Neck Bridges and Queens Midtown Tunnel	Brooklyn-Battery Tunnel	Henry Hudson Bridge	Marine Parkway-Gil Hodges Memorial & Cross Bay Bridges
1971	$0.50	$0.25	$0.35	$0.10	$0.10
1972 – 1975	0.75	0.50	0.70	0.25	0.25
1975 – 1980	1.00	0.75	0.75	0.50	0.50
1980 – 1982	1.00	1.00	1.00	0.60	0.75
1982 – 1984	1.25	1.25	1.25	0.90	0.90
1984 –1986	1.50	1.50	1.50	0.90	0.90
1986 – 1987	1.75[(b)]	1.75	1.75	1.00	1.00
1987 – 1989	2.00[(b)]	2.00	2.00	1.00	1.00
1989 – 1992	2.50[(b)]	2.50	2.50	1.25	1.25
1993 –1995	3.00[(b)]	3.00	3.00	1.50	1.50
1996 – Present[(a)]	3.50[(b)]	3.50	3.50	1.75	1.75

Notes:
(a) Last toll rate increase effective March 24, 1996.
(b) Effective 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.

Verrazano-Narrows Bridge

The Verrazano-Narrows Bridge one-way cash toll of $7.00 is collected westbound only. The current one-way cash passenger car toll rate, effective March 24, 1996, for the major crossings is $3.50, collected in each direction. Cash tolls on the three minor crossings are $1.75, collected in each direction.

Over the years, various discount programs have been introduced. In March 1987, the Staten Island Carpool Program was initiated. Staten Island residents were offered 30-round trip coupons for vehicles with three or more occupants at a discounted price of $30.00. This program was revised to 24 coupons for $30.00 in July 1989 and is still available.

In general, tolls for vehicles over 7,000 pounds have also been adjusted upward whenever passenger car toll rates were increased. A notable exception was 1987 when these toll rates were not raised while there was a general increase for passenger cars. In 1989, tolls for vehicles over

7,000 pounds on the Verrazano-Narrows Bridge remained constant while all other tolls were raised. Historically, these vehicles received discounts on any TBTA facility when they used pre-paid accounts and this plan continues with *E-ZPass*.

Inflation

The Consumer Price Index (CPI), compiled by the US Department of Labor, Bureau of Labor Statistics for United States Cities, is intended to represent the average inflation rate for all urban consumers. Table 4 displays the TBTA major crossing passenger car toll rates from the 1971 level of $0.25 to the current toll rate of $3.50 set in 1996, alongside the CPI. Also shown is the CPI for June 2002 alongside the $3.50 toll.

Table 4 Cash Passenger Toll Rates Versus Consumer Price Index

Year	Triborough, Bronx-Whitestone and Throgs Neck Bridges and Queens Midtown Tunnel	Consumer Price Index[(a)]	Tolls Adjusted to 1982-84 Dollars[(b)]
1971	$0.25	40.5	0.62
1972	0.50	41.8	1.20
1975	0.75	53.8	1.39
1980	1.00	82.4	1.21
1982	1.25	96.5	1.30
1984	1.50	103.9	1.44
1986	1.75	109.6	1.60
1987	2.00	113.6	1.76
1989	2.50	124.0	2.02
1993	3.00	144.5	2.08
1996	3.50	156.9	2.23
June 2002	3.50	179.9	1.95
Ratio 2002/1971	14.0	4.4	3.1

Notes: (a) United States City average, all Urban Consumers. Base period: 1982-1984 = 100.0
(b) The minimal toll divided by the CPI and expressed as a decimal.

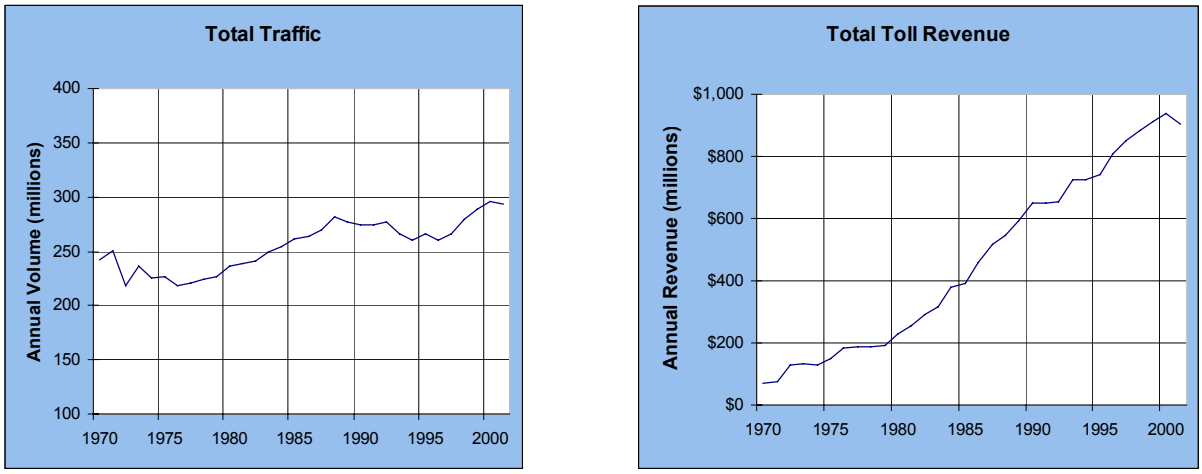
Source: US Department of Labor, Bureau of Labor Statistics.

As indicated in the table, TBTA tolls in nominal dollars have risen faster than the CPI during the 30-year period. The actual passenger car cash toll for major crossings since 1996 has been $3.50. As can be seen in Table 4, the current $3.50 toll in 2002 dollars is equivalent to a toll of $1.95 in 1982-1984 dollars. The actual 2002 cash toll for passenger cars is 14 times the actual toll in 1971. However, if adjusted for inflation, the toll today is lower than in 1989 and only 3.1 times that in 1971 (in each case based on 1982-1984 dollars).

HISTORICAL TRAFFIC, REVENUES AND EXPENSES AND ESTIMATED/BUDGETED NUMBERS FOR 2002

Historical traffic, revenues and expenses were reviewed for the nine TBTA bridges and tunnels. Over the last 30 years, traffic volumes on the crossings have ranged from approximately 220 million in the 1970s to 296 million in 2000. As displayed in Figure 2, the growth of traffic reflects the region's moderate overall growth in population and employment, offset by the impact of 10 periodic toll increases. With tolls essentially now at 14 times the 1971 level, toll revenues increased more than 13-fold, from $72 million to a high of $941 million in 2000. Revenues then declined to $915 million in 2001 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. Since 1970, annual operating expenses for the toll facilities have risen by 10 times, from $25 million to $257 million in 2001, during which time the CPI increased by 4.4 times.

Figure 2: Aggregated TBTA Facilities Traffic and Toll Revenue, 1970-2001



Traffic and Toll Revenue, 1991 - 2001

Table 5 lists the traffic and toll revenue record for each of the nine crossings for the 1991-2001 period. Total TBTA traffic and toll revenue are shown in Table 6. The peak in paid traffic during this period, 296 million crossings, occurred in 2000. The general systemwide pattern has been that when toll rates are increased, traffic declines moderately and then traffic begins to rise until the next rate increase. The two most recent toll increases, in 1993 and 1996, are evident in the jump in average tolls in such years. The strong growth of over 3 percent per annum between 1996 and 2000 is due in part to increases in regional population and the introduction of *E-ZPass*.

In 1991, toll revenue was reported at $649 million. As stated above, revenues rose to $941 million in 2000, an increase of approximately 45 percent, and then declined in 2001 due to the impact of September 11 and a decline in regional employment. As shown in Table 5 and explained in the subsection of the report on pages 16 through 19, the greatest impact from September 11 was due to closures and restrictions at the Brooklyn-Battery Tunnel, with negative impacts also occurring at the Queens Midtown Tunnel and at the Triborough and Bronx-Whitestone bridges.

Table 5 Annual Toll-Paying Traffic and Toll Revenue:[a] 1991 to 2001

(000's)

Year	Verrazano-Narrows Bridge				Triborough Bridge				Bronx-Whitestone Bridge			
	Traffic		Revenue	Average Toll[c]	Traffic		Revenue	Average Toll	Traffic		Revenue	Average Toll
	Volume[b]	Change			Volume	Change			Volume	Change		
1991	61,783		$152,912	$2.47	60,137		$151,259	$2.52	35,993		$93,598	$2.60
1992	63,063	2.1%	155,112	2.46	60,246	0.2%	151,669	2.95	36,471	1.3%	94,560	2.59
1993	60,927	–3.4	166,935	2.74	57,566	–4.5	169,825	2.95	35,231	–3.4	106,153	3.01
1994	60,213	–1.2	167,249	2.78	54,871	–4.7	165,500	3.02	36,042	2.3	112,259	3.11
1995	61,351	1.9	169,766	2.77	56,913	3.7	171,103	3.01	40,215	11.6	125,106	3.11
1996	60,176	–1.9	178,444	2.97	54,976	–3.4	186,313	3.39	37,258	–7.3	132,434	3.55
1997	62,848	4.4	185,131	2.95	56,766	3.3	200,451	3.53	36,372	–2.4	135,593	3.73
1998	65,886	4.8	192,788	2.93	59,524	4.9	208,324	3.50	38,112	4.8	140,083	3.68
1999	67,480	3.4	196,556	3.91	61,929	4.0	216,414	3.49	40,123	5.3	147,597	3.68
2000	69,089	2.4	203,172	2.94	63,642	2.8	222,614	3.50	42,285	5.4	155,938	3.69
2001	70,929	2.7	208,164	2.93	62,506	-1.8	215,241	3.44	42,090	-0.5	152,881	3.63

Year	Throgs Neck Bridge				Brooklyn-Battery Tunnel				Queens Midtown Tunnel			
	Traffic		Revenue	Average Toll	Traffic		Revenue	Average Toll	Traffic		Revenue	Average Toll
	Volume	Change			Volume	Change			Volume	Change		
1991	36,841		$102,726	$2.79	20,622		$49,321	$2.39	26,175		$64,143	$2.45
1992	36,868	0.1%	103,003	2.79	20,568	–0.3%	49,064	2.39	26,829	2.5%	65,686	2.45
1993	36,702	–0.4	122,273	3.33	18,277	–11.2	50,706	2.77	25,419	–5.3	72,664	2.86
1994	35,707	–2.7	122,838	3.44	18,550	1.5	53,068	2.86	23,052	–9.3	67,402	2.92
1995	33,440	–6.3	116,732	3.49	18,399	–0.8	52,742	2.87	22,812	–1.0	66,671	2.92
1996	35,208	5.3	136,948	3.89	17,064	–7.3	54,900	3.22	23,506	3.0	77,489	3.30
1997	36,711	4.3	147,106	4.01	17,029	–0.2	56,166	3.30	24,600	4.7	83,543	3.40
1998	37,660	2.6	149,711	3.98	19,651	15.4	63,578	3.24	25,362	3.1	85,626	3.38
1999	38,069	1.1	152,134	4.00	20,766	5.7	67,080	3.23	25,961	2.4	87,284	3.36
2000	37,525	-1.4	152,453	4.06	21,288	2.5	69,018	3.24	26,560	2.3	89,451	3.37
2001	37,802	0.1	150,764	3.99	16,452[d]	-22.7	52,188	3.17	26,177[d]	-1.4	87,067	3.33

Year	Henry Hudson Bridge				Marine Parkway-Gil Hodges Memorial Bridge				Cross Bay Bridge			
	Traffic		Revenue	Average Toll	Traffic		Revenue	Average Toll	Traffic		Revenue	Average Toll
	Volume	Change			Volume	Change			Volume	Change		
1991	19,813		$21,733	$1.05	8,009		$8,109	$1.01	5,661		$6,213	$1.10
1992	19,953	0.7%	20,801	1.04	7,811	–2.5%	7,835	1.00	5,476	–3.3%	5,955	1.09
1993	18,784	–5.9	22,743	1.21	7,656	–2.0	8,153	1.06	5,362	–2.1	6,268	1.17
1994	18,829	0.2	23,329	1.24	7,456	–2.6	7,936	1.06	5,208	–2.9	6,043	1.16
1995	20,364	8.2	25,303	1.24	7,385	–1.0	8,178	1.11	5,184	–0.5	6,214	1.20
1996	19,922	–2.2	28,031	1.41	7,086	–4.0	8,219	1.16	4,967	–4.2	6,460	1.30
1997	19,757	–0.8	28,687	1.45	7,304	3.1	8,589	1.18	5,133	3.3	6,727	1.31
1998	20,300	2.7	28,731	1.42	7,322	0.2	8,577	1.17	5,647	10.0	7,021	1.24
1999	21,285	4.8	30,068	1.41	7,391	0.9	8,461	1.14	6,009	6.4	7,199	1.20
2000	22,541	5.9	31,938	1.42	7,206	-2.4	8,370	1.16	6,354	5.7	7,650	1.20
2001	23,290	3.3	32,242	1.38	7,263	1.0	8,344	1.15	6,712	5.7	7,965	1.19

Notes: (a) Toll rate increases occurred on January 31, 1993 and March 24, 1996.
(b) Westbound toll traffic volume doubled.
(c) Average toll on basis of revenues divided by doubled westbound volume.
(d) Reflects traffic restrictions and closures beginning September 11, 2001.

The Triborough Bridge reported the highest toll revenue for 2001 at $215 million, while the Cross Bay Bridge registered the lowest revenue at $8 million. (The relationship between toll increases and traffic volume is described in the *Toll Impacts and Elasticity* section of this report.)

Traffic volumes and toll revenues on the Throgs Neck Bridge and Bronx-Whitestone Bridge should be considered together since they serve many of the same trips; and, when there is construction activity in the area, traffic shifts between the two facilities. For example, in 1995 some traffic diverted from the Throgs Neck Bridge to the Bronx-Whitestone Bridge when the approach ramps from the Cross Island Parkway to the Throgs Neck Bridge were rehabilitated. In 2001, traffic again diverted from the Throgs Neck Bridge to the Bronx-Whitestone Bridge due to reconstruction activities on the Cross Bronx Expressway in the vicinity of the Throgs Neck Bridge.

Total annual TBTA toll traffic and revenue are shown in Table 6 for the period 1991 through 2001.

Table 6 Summary of Annual Paid Traffic and Toll Revenue:[(a)] 1991 to 2001

Year	Total Paid Traffic (000)	Total Revenue (000)
1991	275,034	649,014
1992	277,285	653,686
1993	265,924	725,720
1994	259,928	725,624
1995	266,063	741,815
1996	260,163	809,256
1997	266,520	851,993
1998	279,463	884,439[(b)]
1999	289,013	912,792[(b)]
2000	296,490	940,607[(c)]
2001	293,220	914,856

Notes: (a) Toll rate increases occurred on January 31, 1993 and March 24, 1996.
(b) Includes $2.5 million relating to tokens and tickets not likely to be redeemed.
(c) Includes $9.7 million relating to tokens and tickets not likely to be redeemed.
Source: TBTA

Traffic by Facility and Vehicle Class, 2001

TBTA maintains traffic counts for each crossing in 13 toll-paying categories, ranging from passenger cars to trucks with seven axles. Displayed in Table 7 are the 2001 traffic volumes by facility. Passenger cars totaled 274 million crossings and represented 93 percent (which has remained relatively constant over time) of the total toll-paying vehicles. The Verrazano-Narrows Bridge registered the highest two-way traffic volume of 71 million toll-paying vehicles. The lowest volume, 7 million vehicles, was recorded at the Cross Bay Bridge.

Table 7 Traffic by Facility and Vehicle Class, 2001

(000's)

Facility	VC 1 Passenger Cars	VC 2 Pass. Cars w/ 1 Axle Trailer	VC 3 Pass. Cars w/ 2 Axles Trailer	VC 4 Trucks 2 Axles	Franchise Buses		VC 6 Trucks 3 Axles	VC 7 Trucks 4 Axles
					VC 5 2 Axles	VC 11 3 Axles		
Throgs Neck Bridge	33,948	46	32	1,392	2		290	371
Bronx-Whitestone Bridge	39,091	16	8	1,381	134		296	207
Triborough Bridge	58,935	23	9	2,224	209	2	421	102
Queens Midtown Tunnel	23,988	9	5	1,501	298	31	259	22
Brooklyn-Battery Tunnel	15,196	2	2	471	148	417	137	4
Verrazano-Narrows Bridge[a]	66,256	32	21	1,792	122	349	473	253
Henry Hudson Bridge	23,172	2	1	78			2	
Marine Parkway-Gil Hodges Mem. Br.	7,043	3	1	132	48		17	2
Cross Bay Bridge	6,372	6	1	191	79		31	3
Total	274,000	139	79	9,162	1,038	798	1,926	965
Percent of Paid Vehicles	93.4%	0.0%	0.0%	3.1%	0.4%	0.3%	0.7%	0.3%

Facility	VC 8 Trucks 5 Axles	VC 9 Motor-cycles	VC 12 Trucks 6 Axles	VC 13 Trucks 7 Axles	VC 14 Other Vehicles	Total Paid Vehicles	VC 10 Non-Rev. Vehicles[b]	Total Vehicles
Throgs Neck Bridge	1,601	53	65	1	2	37,802	244	38,046
Bronx-Whitestone Bridge	862	50	44		1	42,090	242	42,332
Triborough Bridge	479	79	23		1	62,506	1153	63,659
Queens Midtown Tunnel	19	41	1		2	26,177	409	26,586
Brooklyn-Battery Tunnel	32	38	5			16,452	413	16,865
Verrazano-Narrows Bridge[a]	1,472	109	48	1	2	70,929	627	71,556
Henry Hudson Bridge	1	34				23,290	97	23,387
Marine Parkway-Gil Hodges Mem. Br.	7	10				7,263	87	7,350
Cross Bay Bridge	12	14	1			6,712	143	6,855
Total	4,485	428	187	2	10	293,220	3,416	296,636
Percent of Paid Vehicles	1.5%	0.1%	0.0%	0.0%	0.0%	100.0%		

Notes: May not add due to rounding.
(a) Westbound traffic doubled.
(b) Includes police, fire and other emergency vehicles and TBTA vehicles.
VC = vehicle class
* = Less than 500.
Source: TBTA.

Monthly Traffic, 2001

Monthly traffic variations on the nine crossings are normally attributed to several factors. Traffic volumes historically have been weather-related; i.e., severe winter weather may result in lower volumes. Conversely, traffic reaches its highest levels during the summer months when recreational travel peaks. Toll rate increases have also affected the traffic volumes in the aftermath of a toll increase. Furthermore, individual facilities can be affected by construction projects on adjacent arterials or competing bridges. The limited number of crossings in the region sustains the overall demand for TBTA's bridges and tunnels. However, added to these normal impacts was the effect of September 11.

Table 8 Monthly Traffic Variations, 2001

Month	Average Daily Toll-Paying Traffic										Ratio to AADT[(b)(c)]
	Throgs Neck	Bronx-Whitestone	Tri-borough	Queens Midtown	B'lyn-Battery	Verrazano Narrows[(a)]	Henry Hudson	Marine Pkwy	Cross Bay	Total	
Jan.	86,706	105,948	153,633	67,812	54,247	173,257	56,810	16,528	15,650	730,592	0.91
Feb.	90,261	111,828	162,428	72,731	57,903	181,319	60,081	16,872	15,923	769,347	0.96
Mar.	92,406	109,567	165,434	72,966	58,464	183,227	60,143	17,933	16,662	776,802	0.97
Apr.	100,503	121,368	178,982	76,525	58,512	195,589	66,639	18,461	17,892	834,471	1.04
May	103,021	123,216	181,277	76,613	59,004	196,573	67,495	20,364	18,770	846,333	1.06
June	109,119	126,455	183,171	78,431	61,183	205,005	68,377	23,577	21,555	876,871	1.10
July	111,219	125,174	175,109	72,950	57,491	199,896	64,163	25,544	22,091	853,638	1.07
Aug.	117,989	121,466	179,743	77,125	59,737	205,202	66,431	24,521	20,711	872,924	1.09
Sept.	106,710	107,869	159,859	62,074	22,161	184,916	56,506	19,424	17,864	737,383	0.91
Oct.	112,856	108,766	174,760	65,917	12,987	202,422	64,486	18,597	18,182	778,972	0.96
Nov.	107,779	111,104	171,531	68,274	16,609	200,754	67,569	18,224	17,788	779,631	0.96
Dec.	103,264	110,857	168,494	69,234	23,127	202,766	66,759	18,455	17,379	780,336	0.96
AADT[(c)]	103,567	115,315	171,250	71,717	45,074	194,325	63,808	19,899	18,388	803,342	1.00

Notes: May not add due to rounding.
(a) Westbound traffic doubled.
(b) For total traffic on the nine crossings.
(c) Annual Average Daily Traffic.

The data in Table 8 indicate that total traffic on the nine crossings peaked in the summer, the peak season for recreational travel in the Metropolitan Area. For the combined facilities the monthly variations in 2001 ranged from 10 percent below the annual average in January to 10 percent above in June. Normally, August is the highest month and was a close second in 2001. Usually, this is indicative of a stable traffic mix comprised of a solid base of commuting and commercial traffic, but the normal monthly variations were disrupted by the events of September 2001, as discussed in the next section of the report.

Impact of September 11 Terrorist Attack

In assessing the impact of the terrorist attacks on toll revenue, the following factors had to be considered separately and then in combination: (a) the direct consequences of the operational restrictions at the Brooklyn-Battery and Queens Midtown tunnels (along with the four City-owned bridges south of 63 Street, Queensboro, Williamsburg, Manhattan and Brooklyn) and on the Verrazano-Narrows Bridge (along with the Gowanus Expressway that connects the Verrazano-Narrows Bridge with the Brooklyn-Battery Tunnel); and (b) the indirect economic impacts in terms of job losses and dislocations and, therefore, reduced trip-making. This section focuses on the impact of the attack on the transportation network during the months between September 2001 and June 2002 (the last month for which TBTA data are available), in order to estimate the impact on traffic during the remainder of 2002. A discussion of the continuing impact beyond 2002 follows in the section covering the factors affecting traffic growth.

The attack on the World Trade Center had a direct effect on transportation facilities through the destruction of the Port Authority Trans Hudson subway (PATH) downtown service between New Jersey and Manhattan and the station at the World Trade Center, and damage to the 1/9 subway line. In addition, the operations of the Brooklyn-Battery Tunnel were affected, as it feeds into West Street, which runs immediately adjacent to the World Trade Center Complex site. West Street was closed until March 29, 2002, and this limited the use of the Brooklyn-Battery Tunnel.

Aside from the direct impact on transportation facilities, a number of measures were introduced following the attack to cope with the loss of capacity, security issues and the clean up of the affected area around the World Trade Center.

The following significant changes were made following the September 11 attack, which are relevant in terms of TBTA traffic and revenues.

- On September 11, the Brooklyn-Battery Tunnel was closed to all vehicles, except emergency vehicles.
- On September 17, the New York City DOT implemented a free municipal (passenger-only) ferry service between Manhattan and Brooklyn, to which the Federal Emergency Management Agency has committed funding for at least until the end of 2002.
- On September 27, a Single Occupancy Vehicle (SOV) ban was initiated on all Manhattan-bound East River crossings between 6:00 AM and 12:00 PM.
- On October 8, the SOV ban hours were reduced to between 6:00 AM and 11:00 AM on weekdays.
- On October 14, the Brooklyn-Battery Tunnel was opened to passenger vehicles outbound to Brooklyn. Manhattan-bound traffic remained restricted at all times. The Brooklyn Bridge was opened in both directions, but SOV restrictions remained in place.
- On October 18, the SOV hours were reduced (except for Holland Tunnel) to between 6:00 AM and 10:00 AM.
- October 28, the N and R subway lines resumed service connecting Manhattan and Brooklyn. (Cortlandt Street Station remains closed.)
- On November 15, the inbound to Manhattan Brooklyn-Battery Tunnel was opened to passenger vehicles on weekdays between the hours of 8:00 PM and 6:00 AM.
- On March 29, 2002, the Brooklyn-Battery Tunnel was re-opened in both directions at all times; however, SOV restrictions remain in place inbound to Manhattan 6:00 AM to 10:00 AM, Monday through Friday.
- On April 22, the SOV restrictions were lifted on the Queensboro Bridge, the Queens Midtown Tunnel and the Lincoln Tunnel, that is, on all crossings north of 14 Street.

Changes in Travel Patterns and Mode Choice

The impacts on employment and to the transportation infrastructure primarily affected work-related trips during the peak morning and evening commute periods; not only was there a reduction in the total number of people crossing the East River, there were also changes in the mode of transportation used.

The total number of people entering Manhattan, across the East River, during the morning peak period fell by 13 percent from 609,000 to 530,000 in the immediate aftermath of the September 11 attack. The largest decline in absolute terms (39,000) was in the number of people using subway stations south of Canal Street, followed by a reduction of 35,000 people using private automobiles. These declines represent percentage decreases of 21 and 37 percent, respectively, of the total number of people commuting by subway and automobile in the morning peak period. New York City interborough buses and the Brooklyn ferry service gained 8,000 and 1,000 passengers, respectively. In the case of interborough buses, this represents a 49 percent increase. Although the data are incomplete after November 2001, there are indications that the number of people commuting during the morning peak was increasing over time, although the November number remained 11 percent below the pre-September 11 levels.

Impact on Peak Hour East River Vehicular Traffic

The introduction of the SOV restrictions on September 27 resulted in a greater reduction in vehicle-trips than person-trips, because of the increase in the auto-occupancy rates during the morning peak travel period.

The total number of vehicle trips using all the East River crossings in the morning peak period fell by 45 percent, or approximately 40,000 trips during the October 1-17 period. The most significant reduction in traffic occurred on the Brooklyn Bridge and at the Brooklyn-Battery Tunnel, due to the severe restrictions on movement at the southern end of Manhattan during this period. By January 2002, the number of vehicles crossing the East River during the morning peak had increased but was still 31 percent below pre-September 11 levels. The recovery of traffic differed considerably between the crossings depending on the timing of the lifting of restrictions. Peak period traffic using the Brooklyn-Battery Tunnel was down 72 percent in January compared with 87 percent in the immediate aftermath of the attack. Usage of the Queensboro Bridge in January was 17 percent below its pre-September levels compared with 28 percent in the period immediately following the September attack. Usage of the Brooklyn Bridge increased even more dramatically, recovering from 67 percent below normal in October to just 32 percent below in January.

Impact on TBTA Facilities

For the TBTA facilities specifically, the impact of September 11 has been most dramatic at the Brooklyn-Battery Tunnel, as mentioned above, followed by the Queens Midtown Tunnel and then the Triborough Bridge and Henry Hudson Bridge, the four crossings that serve Manhattan. The truck restrictions introduced at the Holland Tunnel had a positive impact on the Verrazano-Narrows Bridge. The outlying bridges, including the Throgs Neck Bridge and the Bronx-Whitestone Bridge, were affected essentially only in September 2001. As stated above, these two bridges should be viewed in combination, as construction activities result in traffic shifts back and forth, and because they serve generally the same areas in Queens and the Bronx.

Table 9 lists the traffic changes that have occurred between January 2001 and June 2002, for which data are now available, highlighting the major changes that occurred in September 2001.

Table 9 Changes in Monthly Traffic – January 2001 through June 2002

Month	Percent Change in Monthly Traffic								
	Throgs Neck	Bronx-Whitestone	Tri-borough	Queens Midtown	B'klyn-Battery	Verrazano Narrows	Henry Hudson	Marine Pkwy	Cross Bay
2001 vs. 2000									
Jan.-Aug.	–1.9%	+3.0%	–0.8%	+1.3%	–0.2%	+2.3%	+5.1%	+1.9%	+6.1%
September	–0.5	–11.6	–11.4	–12.8	–62.1	–5.1	–12.2	–7.5	–1.0
October	+8.7	–9.5	–2.7	–7.5	–77.5	+5.9	–1.5	–1.9	+7.1
November	+9.0	–5.1	–1.0	–5.4	–71.0	+6.0	+6.7	–1.1	+7.9
December	+11.3	+1.6	+3.3	+0.6	–59.5	+9.8	+10.6	+8.8	+8.4
2002 vs. 2001									
January	+11.4	–0.6	+1.4	–4.8	–60.4	+7.5	+6.7	+3.4	+6.9
February	+13.0	0.0	+1.5	–5.3	–59.0	+7.9	+6.9	+4.8	+8.7
March[(a)]	+14.1	+6.6	+1.5	–1.4	–57.0	+9.1	+9.7	+4.1	+8.3
April[(a)]	+4.0	+1.7	–3.2	–3.0	–32.0	+3.9	+6.5	+6.3	+5.5
May[(b)]	+7.1	+2.1	–3.3	–1.1	–23.9	+4.8	+6.4	+6.0	+5.2
June[(b)]	+7.4	+1.0	–2.3	–3.0	–19.7	+2.9	+4.1	+7.5	+7.2

(a) March and April are affected by Easter, which fell in April 2001 and March 2002. The two months, therefore, should be viewed in combination.

(b) Preliminary numbers.

Note that the changes reflect the gradual improvement in operating conditions, as summarized on page 17. With the Brooklyn-Battery Tunnel having been reopened on March 29, 2002, except for the SOV restrictions, there was a significant improvement in traffic flow from March to June, as shown in the table: the 57 percent traffic loss in March 2002 (versus March 2001) improved to a 20 percent loss in June. Note also that the only other facility that has continued to have traffic losses is the Queens Midtown Tunnel, where the SOV restrictions south of 63 Street were not lifted until April 22. Traffic growth on the Triborough Bridge had been positive from December through March, and then turned negative again partly due to construction activity that will continue through April 2004. On the Henry Hudson Bridge, traffic growth has been substantially positive since November.

These results and the positive trends reflected in Table 9 were used to develop the traffic estimates for 2002.

Estimated Traffic and Toll Revenue, 2002

The development of the traffic and toll revenue estimates for 2002 necessarily took into account the continuing, but improving, conditions in the aftermath of the World Trade Center attack. The impacts in the long term, regarding the national and regional economies, projected employment in lower Manhattan and the traffic and revenue forecasts beyond 2002, are covered in the following chapters of the report. In developing the traffic and toll revenue estimates for 2002, we extrapolated the monthly traffic changes listed in Table 9 through June to the remaining months of the year, as shown in Table 10.

Table 10 Estimated Changes in Monthly Traffic – July-December 2002

Month	Percent Change in Monthly Traffic								
	Throgs Neck	Bronx-Whitestone	Tri-borough	Queens Midtown	B'klyn-Battery	Verrazano Narrows	Henry Hudson	Marine Pkwy	Cross Bay
2002 vs. 2001									
July	+1	+1	–3	–1	–16	+3	+5	+2	+5
August	+1	+1	–3	–1	–12	+3	+5	+2	+5
September	+7	+7	+11	+14	+132	+8	+19	+10	+5
October	+1	+1	+1	+7	+292	+1	+5	+4	+5
November	+1	+1	–1	+5	+203	+1	+5	+3	+5
December	+1	+1	–1	0	+117	+1	+5	+2	+5

The extrapolated percentages reflect the continuing SOV restrictions at the Brooklyn-Battery Tunnel (expected to be lifted in September 2003) and the recovery from the depressed traffic levels in the aftermath of September 11. For the Brooklyn-Battery Tunnel in particular, the magnitude of the percentages (exceeding 100 percent) starting in September (2002 versus 2001) reflect the mathematics of applying the recovery percentages to the depressed traffic levels that began in September 2001. For example, the reciprocal of the 77.5 percent traffic reduction from October 2000 to October 2001 from Table 9 in terms, theoretically, of returning to the pre-September 11 level, is an increase of 344 percent. The 292 percent increase posted for October (2002 versus 2001) reflects URS' view that traffic at the Brooklyn-Battery Tunnel is still being affected by post-September 11 conditions. The negative monthly changes at the Triborough Bridge reflect the continuing construction during the remainder of 2002.

The traffic and toll revenue estimates for 2002 are developed in Table 11. The July-December traffic volumes are estimated based on the actual data for July-December 2001 and the estimated percentages from Table 10.

Table 11 Estimated 2002 Toll-Paying Traffic and Toll Revenue
(000)

Facility	Traffic								Avg. Toll	Toll Revenue
	Actual Jan.-June[(a)]	Estimated								
		July	Aug.	Sept.	Oct.	Nov.	Dec.	Total		
Throgs Neck Br	19,194	3,482	3,694	3,425	3,534	3,266	3,233	39,828	$4.01	$159,712
Bronx-Whitestone Br	21,457	3,919	3,803	3,463	3,405	3,366	3,471	42,885	3.64	156,100
Triborough Br	30,653	5,266	5,405	5,309	5,461	5,100	5,124	62,317	3.43	213,747
Queens Midtown Tun	13,024	2,239	2,367	2,123	2,186	2,151	2,146	26,236	3.31	86,841
Brooklyn-Battery Tun	6,188	1,497	1,630	1,545	1,577	1,512	1,559	15,508	3.16	49,004
Verrazano-Narrows Br*	36,264	6,383	6,552	5,991	6,328	6,074	6,339	73,932	2.95	218,098
Henry Hudson Br	12,206	2,088	2,162	2,017	2,099	2,128	2,173	24,875	1.37	34,079
Marine Parkway	3,622	808	775	641	600	563	584	7,592	1.15	8,731
Cross Bay Br	3,434	719	674	568	592	560	566	7,113	1.21	8,607
Total	146,042	26,401	27,063	25,082	25,782	24,720	25,195	300,286		$934,919

(a) Preliminary numbers for May and June (see Table 9)
* Westbound toll traffic volume doubled.
Note: May not add due to rounding.

The average tolls in Table 11, used to estimate toll revenues, are the actual average tolls calculated from the January-June 2002 traffic and revenue data.

The $934.9 million estimate for 2002 in Table 11 falls just short of the $940.6 million revenues collected in 2000, and the estimated 300.3 million traffic volume would exceed the level experienced in 2000. The Brooklyn-Battery Tunnel is the only crossing where the 2002 volumes are estimated to be substantially below the 2000 level.

The robust 2002 total volume for the nine facilities can be attributed generally to the continuing *E-ZPass* inducement and specifically to the continuing truck restrictions at the Holland Tunnel that has diverted trucks to the Verrazano-Narrows Bridge, despite the reduced volumes at the Brooklyn-Battery Tunnel. Revenues, however, are expected to be down from the 2000 level due to the inflated revenue in 2000 from the $9.7 million in redeemed tokens and tickets that had previously been deferred.

Table 11 provides the interface between the historical traffic and revenue data presented on the preceding pages and the 10-year forecasts in Tables 20 and 21. The methodology used to develop the estimated growth rates starting in 2003 is discussed on pages 42 through 44.

Operating Expenses 1991 – 2001

Table 12 displays the historical operating expenses for the TBTA facilities from 1991 through 2001. TBTA divides operating expenses into two major categories: Personnel Services and Other Than Personnel Services (OTPS). Personnel services include salaries, overtime and fringe benefits, net of capital reimbursements. Maintenance, outside services, insurance, Coliseum operations, TBTA's share of the *E-ZPass* Customer Service Center, and other non-personnel expenses are included in OTPS.

TBTA personnel services expenses increased from $104.6 million in 1991 to $123.3 million in 2001. Personnel expenses grew by much less than inflation because of the introduction of the *E-ZPass* system. TBTA was able to eliminate over 200 bridge and tunnel officer positions through attrition with *E-ZPass*, and these reductions were the primary offset to growth in wage and fringe benefit expenses in the period.

OTPS expenses increased from $51.0 million in 1991 to $133.2 million in 2001. The primary driving factors in TBTA's OTPS expense growth were inflation, an increase in major maintenance and bridge painting activities, and costs associated with *E-ZPass* including, particularly, the issuance of tags.

Timing of major expenses and extraordinary items has also resulted in some year-to-year fluctuations. In 1993, OTPS expenses increased primarily due to one-time expenses associated with lead remediation and an increase in insurance reserves. An enhanced bridge painting program, including lead paint removal, implemented as part of TBTA's effort to extend the useful life of the structural elements of its facilities, began to increase OTPS expenses starting in 1995.

E-ZPass startup costs for tags and customer service center operations were primarily responsible for OTPS growth in 1996 and 1997. In 1998, *E-ZPass* startup costs eased and bridge painting activities were deferred due to an extensive evaluation of contractor experience. Resumption of the planned level of bridge painting increased OTPS costs in 1999, and rental expenses for TBTA administrative offices at 2 Broadway that were formerly in the New York Coliseum office building increased OTPS costs in 1999 and 2000.

Table 12 Historical Operating Expenses: 1991-2001

Year	Operating Expenses (000s)			Percent Change[c]
	Personnel[a]	OTPS[b]	Total	
1991	$104,651	$50,986	$155,637	–0.6%
1992	114,659	53,855	168,514	8.3
1993	113,473	73,844	187,317	11.2
1994	107,417	62,976	170,393	–9.0
1995	112,212	84,858	197,070	15.7
1996	109,256	95,915	205,171	4.1
1997	111,651	112,222	223,873	9.1
1998	106,603	101,587	208,190	–7.0
1999	107,430	120,561	227,991	9.5
2000	112,256	129,807	242,063	6.2
2001	123,316	133,198	256,514	6.0

Notes: (a) Includes salaries, overtime and fringe benefits, net of capital reimbursements.
(b) OTPS is Other Than Personnel Services and includes the following categories: maintenance and supplies, outside services, insurance, power, leases and rentals and other expenses.
(c) For discussion on expense fluctuations, see preceding text.
Source: TBTA

The 2001 numbers reflect the additional expenses that were incurred in the aftermath of the attack on the World Trade Center. TBTA describes the added expenses as overtime labor costs for security and traffic management, cleanup costs for the Brooklyn-Battery Tunnel and Battery Parking Garage, and emergency electricity generation for the Brooklyn-Battery Tunnel. Also included are costs associated with assigning personnel to disaster recovery tasks and overtime incurred by represented employees required to make up for lost time as a result of the temporary closure of 2 Broadway, TBTA's main office. The increases associated with these additional costs are expected to be reimbursed to TBTA from a combination of insurance proceeds and emergency grants from FEMA.

Forecast of Expenses, 2002

Operating expenses have been forecast by TBTA for 2002 at $291.2 million. These expenses are divided into the following two categories: Personnel Services of $129.7 million and OTPS of $161.5 million.

The 2002 forecast also reflects the additional expenses incurred after the terrorist attack that includes an upgrade of communication and electrical systems and the replacement of a radio communication system. It also includes a delay in bridge painting from 2001 to 2002.

The increases in actual 2001 and forecast 2002 expenses over the two-year period represent the net expense increment to TBTA. While some of the additional costs are expected to be reimbursed to TBTA from a combination of insurance proceeds and emergency grants from FEMA, expanded security measures are also included in the forecast amount. No further additional expenses associated with the September 11 attack are forecast at the present time.

FACTORS AFFECTING TRAFFIC GROWTH

The previous section of the report set forth the historical traffic and revenue data for the nine TBTA bridges and tunnels. Before developing the forecasts, several factors affecting future traffic were considered, including projected growth (population and other demographics), TBTA and regional construction impacts, capacity constraints in the regional highway network, and toll and elasticity impacts. *E-ZPass* improvements were discussed previously on pages 8 and 9. In addition to these "normal" factors which are considered when developing traffic growth forecasts, the "extraordinary" circumstances following September 11 were analyzed to estimate the ongoing impact on traffic growth. The effects on regional transportation facilities were covered in connection with the historical data (pages 16 through 19). In this section of the report, the employment impacts are discussed in preparation for the traffic forecasts. 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

Regional demographic data providing information on long-term trends are maintained by the New York Metropolitan Transportation Council (NYMTC). Information from NYMTC regarding employment and population history and projections from 1970 to 2010 is included in the following tables. In general, traffic volumes in the region are affected by changes in employment and population. Normally the demand on the TBTA facilities tends to be less influenced by regional demographic trends because water crossings are limited; however, the scale of the events of September 11 has resulted in reduced traffic levels on the crossings serving lower Manhattan. The short- and intermediate-term impacts of this event are discussed below based on information provided by regional agencies and organizations. Another indicator of trends in traffic volumes is motor vehicle registrations, which have continued to trend upward since 1970 in the tri-state region. To understand better how these indicators may influence traffic volumes on the TBTA crossings, URS reviewed historical trends and forecasts by NYMTC and others.

Employment Trends and Projections

Jobs traditionally influence traffic generation. Generally, when the economy is robust and jobs are plentiful, there is an increase in traffic. Conversely, when employment trends are downward, traffic volumes generally decline.

The long-term trend in employment in the region is shown in Table 13. A downward trend in employment occurred between 1970 and 1980 in New York City. Jobs declined by 1.2 percent per year, from 4,084,000 in 1970 to 3,627,000 in 1980. Staten Island, where employment increased by 3.4 percent per year, was the exception. The most recent new employment forecasts were released by NYMTC in December 2000. These forecasts have future year growth levels for New York City similar to previous forecasts developed in 1996, but the estimated year 2000 employment base was higher than had previously been forecast. The year 2000 estimates showed New York City's employment at a higher level than at any time since 1970.

Between 1970 to 1990, employment increased in the New York suburbs, in Northern New Jersey and in Southern Connecticut. NYMTC projected that employment in the area/region as a whole would grow during the forecast period through 2010, in the range of 0.4 to 1.3 percent annually.

Table 13 Employment Trends and Projections
(000s)

Year	New York City						New York Region[b]	New Jersey Region[c]	Connecticut Region[d]
	Manhattan	Bronx	Brooklyn	Queens	Staten Island	Total[a]			
1970	2,654.9	247.3	592.2	543.1	45.9	4,083.7	1,561.4	2,453.9	729.9
1980	2,364.8	211.9	485.7	499.8	64.4	3,626.6	1,925.4	2,832.6	872.6
1990	2,565.1	237.8	504.4	567.3	91.5	3,966.2	2,335.9	3,391.5	1,026.8
2000-Projected	2,621.8	252.0	550.6	604.2	117.4	4,145.9	2,519.3	3,689.7	1,070.3
2005-Projected	2,730.4	266.1	569.5	618.8	125.0	4,309.8	2,615.9	3,900.6	1,126.2
2010-Projected	2,804.7	278.4	580.0	636.7	130.7	4,430.5	2,701.7	4,081.0	1,159.7
Average Annual Percent Change									
1970 to 1980	–1.2%	–1.5%	–2.0%	–0.8%	3.4%	–1.2%	2.1%	1.4%	1.8%
1980 to 1990	0.8	1.2	0.4	1.3	3.6	0.9	2.0	1.8	1.6
1990 to 2000	0.2	0.6	0.9	0.6	2.5	0.4	0.8	0.8	0.4
2000 to 2005	0.8	1.1	0.7	0.5	1.3	0.8	0.8	1.1	1.0
2005 to 2010	0.5	0.9	0.4	0.6	0.9	0.6	0.6	0.9	0.6

Notes: (a) Totals may not add due to rounding.
(b) Consists of the following counties: Dutchess, Nassau, Orange, Putnam, Rockland, Suffolk and Westchester.
(c) Consists of the following counties: Bergen, Essex, Hudson, Middlesex, Monmouth, Morris, Passaic, Somerset and Union.
(d) Consists of the following counties: Fairfield, Litchfield, New Haven.

Source: New York Metropolitan Transportation Council (historical data and projections as of 2002).

A review of historical traffic demand for the TBTA crossings indicated that volumes did fluctuate systemwide during the 1970s and increased through the 1980s. During the 15-year period from 1985 to 2000, the most noticeable fluctuations occurred during the toll increase years, when traffic declined while revenues increased.

The disruption to the New York City economy and traffic caused by the September 11 World Trade Center attack, at least in the short-term, combined with the fact that the NYMTC forecasts pre-date both the release of the 2000 census findings and the events of September 2001, necessitated a review of other more recent forecasts of employment as part of the process of developing the traffic and revenue forecasts.

The most current forecasts of intermediate-term employment for the city were developed by the New York City Office of Management and Budget (OMB), and the Office of the Comptroller. OMB produces forecasts as part of the process of developing the mayor's budget. In May 2002 the Comptroller's office published a review of the OMB forecast for the period between 2002 and 2006, which anticipates a slower recovery in the city than indicated in the OMB forecasts.

As can be seen from Table 14, the difference in growth projections translates into the complete recovery of the jobs lost in 2001 and 2002 by 2005 under both scenarios; however, the forecasts prepared by the comptroller's office indicates a greater job loss and slower recovery.

Table 14 Forecasts of Payroll Jobs, Total and Year-over-Year Change 2002-2006 (in Thousands)

Year	2000*	2001*	2002	2003	2004	2005	2006
Source	Total Payroll Jobs						
Comptroller	3,723	3,702	3,608	3,638	3,678	3,728	3,783
OMB	3,723	3,702	3,621	3,656	3,702	3,752	3,783
	Change in Number of Jobs						
Comptroller	NA	-20.9	-94.0	30.0	40.0	50.0	55.0
OMB	NA	-20.9	-81.2	35.3	46.4	36.8	31.0

* 2000 and 2001 = actual

Sources: New York City Comptroller's Office and Office of Management and Budget.

Population Trends and Projections

Between 1970 and 1980 population in New York City declined in The Bronx, Brooklyn, Manhattan and Queens, but increased on Staten Island. For the five boroughs, population totaled 7.9 million in 1970 and 7.1 million in 1980, as displayed in Table 15. The 1990 Census indicated that there was a turnaround and population grew at an average annual rate of approximately 0.3 percent. The Census results for the year 2000 show the population of New York City grew by approximately one percent annually and now exceeds 8,000,000. The nearby New York and New Jersey counties also show increased growth. In Connecticut, population increases were in Fairfield County, the closest county to the TBTA facilities.

Table 15 Population Trends and Projections
(000s)

Year	New York City						New York Region[(b)]	New Jersey Region[(c)]	Connecticut Region[(d)]
	Manhattan	Bronx	Brooklyn	Queens	Staten Island	Total[(a)]			
1970	1,539	1,472	2,602	1,987	295	7,895	4,178	5,006	1,682
1980	1,428	1,169	2,231	1,891	352	7,072	4,314	4,915	1,725
1990	1,488	1,204	2,301	1,952	379	7,323	4,401	4,990	1,806
2000 Census	1,537	1,333	2,465	2,229	444	8,008	4,681	5,431	1,889
2000-Projected	1,560	1,184	2,267	2,010	417	7,449	4,598	5,278	1,821
2005-Projected	1,585	1,199	2,246	2,014	428	7,472	4,670	5,382	1,887
2010-Projected	1,612	1,205	2,253	2,024	438	7,534	4,747	5,525	1,920
Average Annual Percent Change									
1970 to 1980	–0.7	–2.3	–1.5	–0.5	1.8	1.1	0.3	–0.2	0.3
1980 to 1990	0.4	0.3	0.3	0.3	0.7	0.3	0.2	0.2	0.5
1990 to 2000	0.3	1.0	0.7	1.3	1.6	0.9	0.6	0.8	0.4
2000 to 2005	0.3	0.1	–0.2	0.0	0.5	0.1	0.3	0.4	0.7
2005 to 2010	0.3	0.1	0.1	0.1	0.5	0.2	0.3	0.5	0.3

Notes: (a) Totals may not add due to rounding.
(b) Consists of the following counties: Dutchess, Nassau, Orange, Putnam, Rockland, Suffolk and Westchester.
(c) Consists of the following counties: Bergen, Essex, Hudson, Middlesex, Monmouth, Morris, Passaic, Somerset and Union.
(d) Consists of the following counties: Fairfield, Litchfield, New Haven.
Sources: New York Metropolitan Transportation Council, US Census Bureau.

NYMTC's latest population projections for the Tri-State region for 2000 to 2010 were prepared in 2000, and 2010 population for New York City is forecast as reaching 7,534,100. As noted above, the Census results for New York City show the population in 2000 exceeded 8,000,000 and NYMTC's forecast for 2010. It should be noted that NYMTC's latest population projections for the Tri-State region for 2000 to 2010 were adopted in December 2000, prior to the release of the Census findings.

With the 2000 Census exceeding previous expectations and population increases region-wide, population growth should have a positive effect on traffic demand on the TBTA crossings.

Motor Vehicle Registrations

One of the indicators of traffic stability and/or growth in an area is the trend in the number of motor vehicle registrations. As shown in the following table, motor vehicle registrations increased slightly for the period 1992 through 1996 in New York, New Jersey and Connecticut, and decreased slightly in New York City. Motor vehicle registrations grew at a higher pace during the 1997-2001 period, reaching an average annual growth rate of 1.7 percent in New York City and State. The most recent data available indicate that between 1997 and 1999 vehicle registrations grew by an average annual rate of growth of 2.0 percent in New Jersey and, between 1997 and 2001, by 2.4 percent in Connecticut. As illustrated in Table 16, these figures represent a 10-year upward trend in motor vehicle registration growth for the Tri-State area.

Motor vehicle registrations are not projected for future years. However, based on past trends, it is expected that growth will continue in regional motor vehicle registrations in parallel with the demographic indicators.

Table 16 Motor Vehicle Registrations
(000s)

Year	New York City	New York State[a]	New Jersey	Connecticut
1992	1,898[b]	8,988[b]	5,364	2,527
1993	1,911	9,110	5,410	2,536
1994	1,907	9,149	5,534	2,559
1995	1,896	9,177	5,607	2,582
1996	1,862	9,235	5,632	2,578
1997	1,907	10,027[c]	5,688	2,610
1998	1,943	10,174	5,683	2,663
1999	2,001	10,437	5,917	2,703
2000	2,044	10,661	NA	2,760
2001	2,025	10,707	NA	2,871
Average Annual Growth				
1992-1996	–0.5%	0.7%	1.2%	0.5%
1997-2001	1.7	1.7	2.0[d]	2.4

Notes: (a) Including New York City.
(b) Beginning in 1992 New York State changed the reporting of motor vehicle registrations from the number of registrations issued to the number of registrations in force.
(c) A computer change in 1997 resulted in numbers that are not comparable to earlier years.
(d) Average annual growth rate for 1997-1999.
Source: New York State Statistics Yearbook 1988-1998, New York State Department of Motor Vehicles, Connecticut Department of Motor Vehicles and New Jersey Department of Motor Vehicles.

In summary, generally, employment indicators overall seem to have had a more noticeable effect on traffic volumes on the TBTA facilities than population growth. However, regional demographic trends are not always independently discernable relative to the yearly traffic variations. As discussed throughout this report, demand for the TBTA facilities has been strong overall, and NYMTC's regional population projections indicate an increasing trend throughout the forecast period. With regard to employment, a return to previous levels is anticipated within the next three years.

Fuel Conditions

The availability and pricing of motor fuel has affected the use of TBTA facilities. During the past 29 years, fluctuations in traffic volumes occurred when fuel was either in short supply and/or prices increased rapidly. These conditions existed in 1973-1974, the summer of 1979, during the Persian Gulf tensions and war in 1990-1991 and, most recently, during 1999 and the beginning of 2000 when prices increased due to restricted supplies.

In 1974, there was a 4.9 percent decline in TBTA traffic and slower growth in subsequent years (1.5 percent per year in contrast to the 3.8 percent prior to 1974) as the economy slowed

and fuel prices rose. Succeeding fuel shortages caused temporary traffic decreases that resulted in no permanent effects on traffic growth in subsequent years.

The United States has established the Strategic Petroleum Reserve (SPR) to provide protection against short-term disruptions in petroleum supplies. Recent inventory levels provide 52 days of protection based on the United States net import rate for crude and petroleum products as of August 2002. Nevertheless, as the United States becomes increasingly dependent on foreign sources for petroleum and refined products, it becomes more susceptible to foreign disruptions in supplies. There are factors in the world petroleum market, however, that lower these risks. These include the erosion in the market share held by the Organization of Petroleum Exporting Countries (OPEC) during the past 20 years due to the growth in production by non-OPEC nations and a diversity of interests among OPEC members that conditions OPEC's strategic objectives regarding pricing and resource development.

Unadjusted fuel prices declined from 1980 to 1985 and began to increase through the 1990s. However, when adjusted by the consumer price index, fuel prices actually declined between 1980 and 1997 by 51 percent. Prices have increased for the last two years due to OPEC controls on output; however, these price increases did not adversely affect TBTA traffic. On July 1, 2002 (the latest period for which data are available), the average price was $1.39 per gallon, compared to $1.47 in July 2001.

When adjusted to reflect changes in the CPI, the current price of gasoline is significantly below the 1980 peak price, which, if adjusted for inflation, would be more than $2.50 per gallon in current dollars. It is anticipated that future increases in gasoline prices will not affect traffic unless they are of a magnitude exceeding that adjusted 1980 value.

The seasonal change over to summer grade gasoline was smoother this year than last. Gasoline inventories and the level of imports are high resulting in dampened motor gasoline prices this summer despite record levels of consumption. It is anticipated by the US Department of Energy, Energy Information Administration (EIA) that pump prices may rise a little over the course of the summer, as crude prices are expected to remain strong and demand is expected to increase over the next few months. The EIA base projections forecast that the US monthly average retail price of gasoline will peak at around $1.43 per gallon during the summer. EIA anticipates a further rise in prices by 10-15 cents per gallon on an annual basis next year, assuming rising crude oil prices and recovering refiner margins, and economic growth increase the demand for gasoline. Currently, gasoline inventories are at the high end of the normal range, as compared to last year when they were below normal. Last year's shortage was responsible for the unusually high prices seen last spring. World oil prices are expected to stay firm in 2002 and early 2003 before declining again in mid-2003.

OPEC did not raise their production quotas at its June 26, 2002 meeting. The continued slump in global oil demand and a warm winter let to a counter-seasonal rise in Organization for Economic Cooperation and Development (OECD) inventories from December through May, as OECD stocks ended over 50 million barrels higher than they were a year ago at this time and over 150 million barrels higher than they were in May 2000. However, the EIA believes that

with the OPEC production cuts earlier in the year, reduced exports from Iraq and an anticipated demand recovery, oil prices will rise. The EIA outlook is for world demand growth of over 600,000 barrels per day in 2002 beginning in the third quarter of the year. With the expected recovery of the economy in 2003, particularly in the US, where GDP growth of over 3 percent annually is anticipated, demand for oil could increase by 1.2 million barrels a day in 2003, with half of this demand coming from the US.

The Annual Energy Outlook, 2002, issued by the EIA addresses the longer-term trends in energy demand and supply. Fuel supplies in the transportation sector are projected to be sufficient during the next 10 years. Motor gasoline use is projected to increase 1.6 percent per year over the next 20 years. Alternative fuels are projected to displace about 3.2 percent of light-duty vehicle fuel consumption, in response to current environmental and energy legislation intended to reduce petroleum-based fuel use during that 20-year period. Gasoline's share of demand is expected to be sustained, however, by relatively low gasoline prices and slower fuel efficiency gains for conventional light-duty vehicles than were achieved during the 1980s. Over the longer term, economic growth is expected to lead to an increase in freight transportation with a corresponding increase in diesel use.

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. The factor, *e,* represents the relative decrease in traffic corresponding to a given increase in toll. The higher absolute value, which is a negative figure, 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.

URS developed a set of elasticity factors for each of the TBTA crossings based on historical toll increases to estimate the impact on traffic and toll revenue when tolls are increased in the future. 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.

In estimating revenue for toll facilities, elasticity factors represent the relationship between traffic volume and toll rate changes. As used herein, elasticity represents the decrease in traffic corresponding to the increase in tolls. The factors developed by URS for each crossing are updates of previously-derived factors (including the most recent toll increases) and are based on an analysis of traffic data for the periods before, at the time of, and after the toll increases.

URS last developed elasticity factors in 1997 following the TBTA general rate increase in March 1996. These elasticity factors (which are averages compiled from analyses of the 1996 and previous toll increases) remain appropriate, in the opinion of URS, for use in projecting traffic and revenues in reaction to future toll increases on the TBTA facilities. However, the factors are considered conservative since *E-ZPass* has afforded the users of the TBTA facilities improved travel conditions.

Table 17 Elasticity Factors

Facility	Elasticity Factor
Throgs Neck and Bronx-Whitestone Bridges	–0.085
Triborough Bridge	–0.196
Queens Midtown Tunnel	–0.208
Brooklyn-Battery Tunnel	–0.386
Verrazano-Narrows Bridge	–0.120
Henry Hudson Bridge	–0.298
Marine Parkway-Gil Hodges Memorial Bridge	–0.110
Cross Bay Bridge	–0.149

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 Queensboro Bridge. Further south on the East River at the Triborough Bridge and the Queens Midtown and Brooklyn-Battery tunnels in that order, 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 trips that do not have travel-time constraints.

If the historical increase patterns continue, it can be expected that tolls will be increased again during the forecast period (through 2010). Accordingly, for the purposes of projecting traffic and toll revenue, URS has prepared two sets of forecasts: one at constant tolls (at the present level); and the other with toll increases in January 2004 and again in January 2008.

For the toll-increase alternative, it was assumed that the toll levels (i.e., the cash toll for passenger cars) on the major and minor crossings would be increased to $4.00 and $2.00, respectively, in January 2004, and to $4.50 and $2.25, respectively, in 2008. It was also assumed that the truck tolls would be increased proportionately, and that the *E-ZPass* tolls for passenger cars would consistently be 50 cents lower than the respective cash tolls. This is consistent with the experience of the March 1996 toll increase. In the context of the assumed toll increase scenario, the average toll would increase 14.3 percent in 2004 and 12.5 percent in 2008. (These percentages are listed in Table 18 in connection with the elasticity impacts.) The increases in the average tolls themselves are listed in Table 21 as part of the revenue forecast for the toll-increase alternative.

As for the impacts of the toll increases on traffic demand, the elasticity factors from Table 17 were applied in Table 18, assuming the toll increases described previously would occur on January 1, 2004 and January 1, 2008. These traffic impacts represent the reduction in values from the corresponding annual traffic levels that would be expected if the tolls were not increased.

Table 18 Traffic/Toll Elasticity

Facility	Elasticity Factor	Estimated Percent Change in Toll Rates and Traffic			
		2004		2008	
		Toll	Traffic	Toll	Traffic
Throgs Neck Bridge, Bronx-Whitestone Bridge	–0.085	14.3%	–1.2%	12.5%	–1.1%
Triborough Bridge	–0.196	14.3	–2.8	12.5	–2.4
Queens Midtown Tunnel	–0.208	14.3	–3.0	12.5	–2.6
Brooklyn-Battery Tunnel	–0.386	14.3	–5.6	12.5	–4.8
Verrazano-Narrows Bridge	–0.120	14.3	–1.7	12.5	–1.5
Henry Hudson Bridge	–0.298	14.3	–4.3	12.5	–3.7
Marine Parkway-Gil Hodges Memorial Bridge	–0.110	14.3	–1.6	12.5	–1.4
Cross Bay	–0.149	14.3	–2.1	12.5	–1.9

Bridge and Tunnel Capacities

URS assessed the peak-hour capacity level of each facility at the mid-point of the bridge or tunnel, based on a highway-type capacity analysis. We recognize, however, that the TBTA bridges and tunnels have different physical and operational characteristics than do highways. Therefore, in our capacity assessment, we considered operational factors such as ramp approaches, vehicle merges, grades, sight lines, lane widths, lack of shoulders, and vehicle spacing and lane configuration at toll plazas, including *E-ZPass* lanes.

The local street system feeding the TBTA crossings also becomes constrained during peak periods, with unstable traffic flows occurring on congested roadways.

We also reviewed toll plaza operations with the electronic toll 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 *E-ZPass* use ranging from 65 percent to 69 percent during 2001 depending on the season, and the customer base increasing, efficient toll plaza operations are anticipated throughout the forecast period.

Additionally, we reviewed past annual traffic volumes at each facility for comparison with the current traffic levels. The last time URS conducted this review (in early 2001), the traffic volumes for the year 2000 were matched against the highest annual volumes recorded, by facility, going back to 1970. For this report, the 2001 volumes would have been selected for the comparison, had it not been for the distortions in traffic patterns due to September 11. Accordingly, URS chose to use the estimated 2002 volumes (developed in Table 11) for the comparison.

Note, in Table 19, that four of the nine TBTA crossings are expected to carry their highest volumes in 2002, despite the aftermath of September 11, due, in part, to the improved traffic service brought about by *E-ZPass*. Other reasons for the good performance could be the restrictions placed on the City-owned East River bridges following September 11, and below normal snowfall levels during the first quarter of the year; and, as stated previously, the especially high volume at the Verrazano-Narrows Bridge reflects the continuing restrictions at the Holland Tunnel.

Table 19 Comparison of 2002 Estimated Traffic with Highest Recorded Levels Since 1970

Facility	Highest Volume Since 1970		2002 Volume (000s)*	2002 Percent of Highest Volume
	Year	Volume (000s)		
Throgs Neck Bridge	2002	39,828*	39,828	100%
Bronx-Whitestone Bridge	2002	42,885*	42,885	100
Triborough Bridge	1988	64,215	62,317	97
Queens Midtown Tunnel	1971	28,742	26,236	91
Brooklyn-Battery Tunnel	1971	22,920	15,508	68
Verrazano-Narrows Bridge	2002	73,932*	73,932	100
Henry Hudson Bridge	2002	24,875*	24,875	100
Marine Parkway-Gil Hodges Mem. Br.	1971	9,150	7,592	83
Cross Bay Bridge	1972	7,562	7,113	94

* Estimated, from Table 11

While traffic volumes during peak hours may approach capacity and limit traffic growth during these hours, there is room for traffic growth during non-peak conditions through peak spreading. Traffic volumes can continue to grow, but growth would be at a slower pace.

TBTA and Regional Operational and Construction Impacts

Traffic volumes on TBTA facilities are influenced by construction and rehabilitation projects involving roadways and bridges in the New York City area. In addition to projects which are scheduled as part of long-term rehabilitation planning, any of the emergency measures that have been either implemented or proposed to address transportation deficiencies resulting from the events of September 11, 2001, and which are expected to remain in place beyond 2002, are discussed in this section.

Major projects that result in long-term closures on the competing bridges may increase volumes on TBTA's facilities. In particular, the rehabilitation of the Queensboro and Williamsburg bridges, completed this year, resulted in traffic diversions to the Queens Midtown Tunnel. Also, long-term lane closures on the roadway network serving the TBTA crossings may adversely affect TBTA traffic volumes or cause traffic to shift from the affected crossing to another TBTA facility. For example, when the approach ramps from the Cross Island Parkway to the Throgs Neck Bridge were rehabilitated in 1995, some traffic diverted from the Throgs Neck Bridge 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 introduced following September 11 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, NYMTC, and the Port Authority of New York and New Jersey.

In general, the majority of construction activities programmed for the TBTA facilities themselves are 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. However, re-decking on the suspended span of the Triborough Bridge necessitates the full-time closure of one lane. Work began on July 9 and will continue for approximately 21 months. Due to available capacity in the lanes that will remain open, little adverse impact on revenue is anticipated. For the last few years, half of the Marine Parkway Bridge has been closed for re-construction. This work was completed in May 2002. Four lanes will be maintained in the peak hours, and three in the off-peak hours.

Operational Changes Resulting from September 11, 2001

Of all the measures introduced following the events of September 11, only the following three remain in place as of August 2002:

- The SOV ban remains in place for crossings south of 14 Street, between the hours of 6:00 AM and 10:00 AM. For the purposes of our analysis, we have been instructed by the MTA to assume it will remain in place through the end of September 2003.
- Brooklyn Ferry Service, which the New York City DOT implemented between Manhattan and Brooklyn on September 17, 2001, is funded at least until the end of 2002.

- Without specific information from the Port Authority of New York and New Jersey, URS has assumed that the truck restrictions at the Holland Tunnel will be lifted by January 2004.

Proposed Operational Changes

Following September 11, a comprehensive review by URS of all transportation services between Manhattan, the other boroughs and New Jersey has been undertaken on behalf of FEMA, and a number of changes to the existing transportation services are under consideration. Most of the proposals are for changes to the services between New Jersey and Manhattan and would not affect TBTA facilities, but the following changes are also being proposed to services across the East River, between Brooklyn, Queens and Manhattan and between Staten Island and Manhattan:

- Staten Island to Downtown Ferry Service. This proposal would allow for the implementation of a new private ferry service from Staten Island's south shore to downtown Manhattan. The primary purpose of this proposed service is to provide an additional viable transportation service for Staten Island residents to access Manhattan. This service would focus on a different market from the existing service, serving residents who live in the central portion of the Island. If approved, all of the necessary improvements needed for the service could be in place in 9 to 12 months.

- Ferry Service between Hunters Point (Queens West) and downtown. The idea is to provide ferry landings or a series of ferry landings designed to provide relief from the increased congestion levels on each of the East River crossings. It would also facilitate travel "across" Manhattan to the Jersey City waterfront. Even if this proposal is adopted, the first year ridership is estimated at 700 riders a day, so the likely impact on the East River crossings would be minimal. This project would take six months to complete.

- Water Taxi Landings throughout Downtown and Midtown Manhattan. This proposal is for the creation of a network of ferry landings connecting waterfront communities in Brooklyn, Queens and Manhattan via small, 24-knot, 75-passenger catamarans. The service would also provide a feeder and distribution service for the large-scale ferries currently serving lower Manhattan. This project would take six months to complete.

Competing East River Crossings Construction

- Queensboro Bridge – Since 1989, numerous rehabilitation projects have involved the upper or lower levels, or ramp approaches to the bridge. This work has now been completed and the only closures that occur are for routine maintenance. Currently, the north outer roadway may be partially closed overnight from 7:00 PM to 7:00 AM, while still accommodating bicyclists and pedestrians. One lane may be closed on either the south upper or south inner lower roadway from 10:00 AM to 3:00 PM, Monday to Friday. The south outer roadway eastbound to Queens may be closed weeknights from 1:00 AM to 6:00 AM and Saturday from 1:00 AM to 7:00 AM.

  It is not anticipated that any of these lane closures will result in significant traffic diversions to the Queens Midtown Tunnel and Triborough Bridge.

- Williamsburg Bridge – Between 1991 and 1995, the bridge cables were rehabilitated and the suspenders were replaced. The south roadways were rehabilitated between 1994 and 1998.

  The reconstruction of the north roadways, which is a mirror image of the south roadways, started in April 1999 and is scheduled to be completed in December 2002. The replacement of the Marcy Avenue ramp connector has been added as a change order. The north outer roadway to Manhattan was reopened in December 2001, having been completed almost two months ahead of schedule. This opening is complemented by early reopening of the Marcy Avenue connector ramp from the Brooklyn-Queens Expressway to the Williamsburg Bridge. The north inner roadway was scheduled to remain closed until July 2002; however, it was reopened to traffic in June 2002. All of the bridge's eight lanes have been restored, but two lanes are closed intermittently for continuing work; four lanes are maintained in the peak direction during each rush hour period as the reconstruction project continues. Manhattan-bound truck traffic is now allowed back on the bridge.

  In 2001, the closures on this bridge were causing diversions of traffic to the Queens Midtown Tunnel. Some of this traffic will now return, but will be subject to the continuing SOV ban south of 14 Street until September 2003.

- The Manhattan Bridge – From August 2001 to August 2002, one of the three lanes on the lower roadway has been closed for construction activity, and a second lane may be closed Monday to Friday from 10:00 AM to 3:00 PM. The south upper roadway operates weeknights from 9:00 PM to 5:00 AM with two lanes open inbound and three outbound. There are also some closings on the weekend. Currently, the reconstruction and repainting of the north spans of the bridge, is underway. Under the contract there are no roadway closures taking place at this point in time. The north upper roadway is currently scheduled for closure and reconstruction; completion and reopening is scheduled for July 2003.

  The current lane closures probably do not result in any significant shift in traffic to the Brooklyn-Battery Tunnel; however, the closure of the north upper roadway in August could result in increased traffic at the Brooklyn-Battery Tunnel.

- Brooklyn Bridge – The Brooklyn Bridge emergency design build deck replacement contract started in October 1998 and was completed on April 2000. Current closures are for routine maintenance work. As of March 2002, one of three Brooklyn-bound lanes may be closed between 10:00 AM and 3:00 PM and one lane Brooklyn-bound may be closed on Saturdays between 6:00 AM and 2:00 PM.

Major Roadway Construction

During the forecast period, several major roadway projects, which are part of NYMTC's Transportation Improvement Program (TIP) for 2000-2004, will potentially have traffic implications for the TBTA facilities. The TIP includes the planned year of construction;

however, it is not mandated that this schedule be adhered to. Some of these projects do not yet have lane closure plans, which will be developed in coordination with NYCDOT and local community boards. As a matter of policy, NYCDOT seeks to restrict lane closures to off-peak and nighttime hours. Roads programmed for construction include:

- The Willis Avenue Bridge – Connecting the FDR Drive, Harlem River Drive, Major Deegan Expressway and Bruckner Expressway, this bridge will undergo major reconstruction during NYMTC's current five-year TIP. Currently, one lane may be closed on weekdays from 10:00 AM to 3:00 PM, for painting operations; and at night (11:00 PM to 5:00 AM), one of two lanes from the First Avenue and FDR approaches may be closed for maintenance work. This work should have a positive impact on the Triborough Bridge.

- Major Deegan Expressway – Multi-year rehabilitation of roadway structures from the Triborough Bridge to New York City line that is scheduled for completion in 2002. Current work on this project involves asphalt replacement, which will be undertaken at night. Between late March and the beginning of June, for part of the night one lane was closed, and for shorter periods two lanes were closed between the city line and the Triborough Bridge. Two of three lanes in each direction may continue to be closed on weeknights. This work may have some negative effects on Triborough Bridge traffic.

- Cross Bronx Expressway – Work on milling and resurfacing all three lanes of the westbound Cross Bronx Expressway between Castle Hill Avenue and Rosedale Avenue resumed in April 2002. As of mid-August, there are periodic single-lane closures on the following ramps to facilitate construction :

  - Southbound Bruckner Expressway to westbound Cross Bronx Expressway;
  - Eastbound Cross Bronx Expressway from Havemeyer Avenue to northbound Bruckner Expressway;
  - Westbound Cross Bronx Expressway Extension from Hutchinson River Parkway to Bruckner Interchange; and
  - Northbound Hutchinson River Parkway to westbound Cross Bronx Expressway.

  The entire program is scheduled for completion by June 2003. The impact of this work on the Throgs Neck and Bronx-Whitestone bridges traffic should be minimal.

- Bruckner Expressway/Bronx River Parkway – Bronx River Parkway from Bruckner Expressway to Gun Hill Road: one lane in each direction may be closed at specific locations to accommodate shoulder activities during off peak hours on weekdays.

- Gowanus Expressway – Several alternatives to rehabilitation are currently being reevaluated. All current closures are during off-peak hours for various maintenance operations. The final EIS is expected to be completed in 2004 and an executive decision made in 2005.

- Brooklyn-Queens Expressway (BQE) – Construction work on the "BQE Reconstruction Project " began in March 2000 and is scheduled for completion in spring 2004. The vertical and horizontal realignment of the road and the deterioration of 16 bridges require reconstruction of not only the BQE overpasses, but also of the adjacent streets. The challenge lies in doing it while maintaining the existing number of lanes in the primary direction of traffic in peak hours. Stage II of the project involves:

  - Complete realignment of railroad bridges;
  - Construct Triborough connector on mainline of BQE bridges/ramps; and
  - Construct bridges on eastern leg to Grand Central Parkway.

  This work is mostly completed but some elements will continue until 2004. As of August 2002, one lane is periodically closed in each direction between Broadway and 25 Avenue during off-peak periods of the day and at night and during the day on Sunday. Between Broadway and 61 Street, one of three lanes in each direction is closed periodically during off-peak periods during the day on weekdays and weekends. Stage III, which is also underway, involves the construction of bridges on the Grand Central Parkway connector and constructing the middle and eastern portion on BQE mainline bridges and ramps. One of two westbound lanes will be closed between 10:00 AM and 3:00 PM for three years. This work is not expected to have a significant impact on bridge traffic.

- Long Island Expressway (LIE) – Reconstruction work is being undertaken to repair and improve structural, operational and safety deficiencies of the roadway and varying temporary lane geometry. The work primarily involves single-lane closures during off-peak periods. The entire project is scheduled to be completed in 2003. This may have a negative effect on Queens Midtown Tunnel traffic.

- Queens Boulevard – Reconstruction of the Queens Boulevard and Honeywell Street bridges over the Long Island Rail Road's Sunnyside Yard began in April 2001 and is scheduled for completion in the fall of 2002. Besides connecting Sunnyside and Long Island City in Queens, the Queens Boulevard Bridge is a vital link between western Queens and Manhattan via the Queensboro Bridge. Stage II of construction, involving the removal of half the roadway deck, is currently underway. Traffic was moved from the existing portion of the bridge to the newly constructed portion in December 2001. The bridge remains open in the Manhattan-bound direction at all times while Queens-bound traffic is diverted. The number of travel lanes is reduced from three to two. This work has a positive impact on the volume of traffic using the Queens Midtown Tunnel, which offsets the LIE construction impacts.

- The Honeywell Street Bridge over the Long Island Rail Road's Sunnyside Yard does not form a critical connection like the Queens Boulevard Bridge. Its complete closure between August 2001 and October 2002 does not have significant repercussions for river crossing traffic.

- Throgs Neck Bridge/Expressway approach in the Bronx – Rehabilitation of the south-bound structure over the Cross Bronx Expressway, began early in the year and continued through July 2001, resulting in a one-lane closure throughout the project period. This work is now completed and work has begun on the Bruckner Expressway reconstruction between the Throgs Neck Expressway and Pelham Parkway. This project is scheduled for completion in 2005 and involves the closure of one of three lanes between 7:00 AM and 3:00 PM on weekdays. This work is not expected to have a significant impact on bridge traffic.

- Henry Hudson Parkway – Two-year (2000-2002) safety improvement project, including roadway resurfacing. Construction is currently resulting in the following traffic pattern changes:

  - At West 160 Street to West 180 Street, one lane may be closed periodically north-bound and southbound during off-peak daytime periods during the week and weekends.
  - West 139 Street in vicinity of Dyckman Street, one lane may be closed during off-peak daytime periods during the week.
  - One lane of the bridge is closed northbound during the morning and southbound in the afternoon during the week.

  This work has had very little effect on Henry Hudson Bridge traffic.

- FDR Drive – NYSDOT has programmed and will design or implement rehabilitation projects from East 28 to East 38 Street and from East 56 Street north to the Triborough Bridge. Work on the upper segment may have a negative effect on Triborough Bridge Traffic. On the upper segment, aside from work on a pedestrian bridge at East 78 Street, which will close one of three lanes in each direction late at night, there is no indication of any other rehabilitation work going on that this time.

- Harlem River Drive – NYSDOT is reconstructing the Harlem River Drive viaduct from East 127 Street to Dyckman Street as well as other spot ramp and geometric improve-ments on other sections of the Drive. During 2002, one lane may be closed southbound and northbound during off-peak time periods in the vicinity of West 178 Street for bridge construction work. Further south, under the Macombs Dam Bridge, one of three lanes northbound and southbound may be closed weekdays during off-peak periods. This may have a negative effect on Triborough Bridge traffic.

- Belt Parkway – Four waterway bridges were identified (as of April 2000) in NYMTC's Transportation Improvement Program as in need of rehabilitation: Mill Basin (2001), Fresh Creek (2001), Gerritsen Inlet (2002) and Paerdegat Basin (2003). Work on these bridges has been postponed since the Ocean Parkway/Belt Parkway interchange was identified as a priority. Design work on this interchange is underway and construction is scheduled for 2004.

- The modernization and expansion of the Goethals Bridge, which is a Port Authority of New York and New Jersey facility, is currently on hold due to a lack of funding for the project.

Other Considerations

Other considerations in the development of traffic and revenue forecasts for the TBTA facilities include the potential impacts of transit improvements and Clean Air regulations in the Metropolitan Area.

- *Impact of Transit Improvements.* There are no transit improvements that are expected to affect significantly TBTA traffic levels during the forecast period through the year 2010. This is reinforced, for example, by the last major transit improvement on Long Island that might have affected TBTA traffic levels when it was completed in 1988: the extension of electrification on The Long Island Rail Road's (LIRR) Ronkonkoma branch. There was no noticeable impact.

  Similarly, no impact is expected from the two major transit improvements, one of which was recently completed and the other is presently under construction. The subway connection between the 63 Street tunnel and Northern Boulevard, via the F line was completed in November 2001, and the new V train service started in December 2001. These new services increase weekday service by 20 percent, or from 41 to 50 trains an hour during the morning rush hour. The second project is the JFK Airtrain connections to the subway line at Howard Beach and the LIRR and subway at Jamaica, planned for completion early in 2003. The guideway along the median of the Van Wyck Expressway to Jamaica was completed in August 2001, ahead of schedule, and work, now underway at the LIRR Jamaica station, is 25 percent complete.

  The 1/9 subway tunnel between Chambers Street and South Ferry that was closed due to the World Trade Center collapse is scheduled to reopen by the end of 2002. No TBTA bridge and tunnel impacts are anticipated.

  Other longer-range transit improvements in various stages of planning that might affect TBTA traffic levels beyond the forecast period include the Eastside Access project to bring LIRR trains into Grand Central Terminal, which LIRR anticipates will result in shifts from other modes, including TBTA facilities. Other long-range projects are the lower Manhattan-Brooklyn improvements to the existing subway tunnels (signalization, etc.), Metro-North Hudson line access to Penn Station (via Amtrak's west side trackage), LaGuardia Airport subway access, and a Second Avenue subway.

- *Clean Air Regulations*. In response to Section 182(d)(1)(B) of the Clean Air Act, the State of New York imposes voluntary regulations aimed at increasing the average vehicle occupancy of work-related trips. Known as the Employee Commute Options (ECO) program, the plan encourages employers of 100 or more persons in the severe ozone non-attainment areas to submit a compliance plan that is aimed, through ride sharing, at

reducing the number of employees that commute to work alone by automobile. Included in New York State's severe ozone non-attainment areas are all five boroughs of New York City, and the counties of Nassau, Suffolk, Rockland, Westchester, and portions of Orange. Similar programs are currently in place for severe non-attainment areas in New Jersey, Connecticut and Pennsylvania. Since URS' traffic estimates are derived from 2001 and 2002 year levels that already take into account any impacts the ECO program may have, no further adjustments are necessary to reflect any negative effects this might have on TBTA revenues.

Summary of Assumptions and Conditions

TBTA traffic, revenues and expenses have been projected by URS on the basis of the historical record of traffic, revenues and expenses, the capacities of the TBTA facilities, traffic growth forecasts, the estimated traffic elasticity due to toll variations 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 adopted capital program for 2000-2004 will be implemented as planned 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.

- The SOV restriction at the Brooklyn-Battery Tunnel will be lifted in September 2003.

- The heavy commercial vehicle ban at the Holland Tunnel will be lifted by January 2004.

- For the scenario with periodic toll increases, toll rate increases will be implemented in accordance with the schedule contained in this report.

- Elasticity factors, prepared by URS based on previous toll increases, are valid in their application to future toll rate increases to estimate future traffic and toll revenue.

- 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 interagency agreements.

- Capacity constraints in the arterial highway network will continue to limit traffic growth on the nine TBTA crossings.

- 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 beyond the items discussed in this report.

- The forecasts are based on the assumption that *E-ZPass* usage will level off at 70 percent. 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 level of increase in gross toll revenues. Growth in traffic volumes would be limited without *E-ZPass* at toll plazas.

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

- The trends in regional employment and population, forecast by the New York Metropolitan Transportation Council, the New York City OMB and the Office of the Comptroller, and presented in this report, will be realized in the Tri-State area and in New York City.

- Should fuel shortages occur, they will be limited in duration, and motor fuel prices (i.e., the average price for regular gasoline) in the foreseeable future will not increase above the 1980 peak, which, if adjusted for inflation, in current dollars would not be more than $2.50 per gallon.

- Public transportation systems will not undergo any major construction programs nor schedule changes that would materially alter regional commuter patterns and result in significant traffic diversions from TBTA facilities.

- Current toll discount programs remain in effect at current projected levels, including the $0.50 discount for *E-ZPass* auto customers and the Staten Island residents' discount program for the Verrazano-Narrows Bridge.

- The effects of the toll-rebate program, implemented in January 1998, for the benefit of *E-ZPass* customers who are residents of Broad Channel and Rockaway peninsula traveling on the Cross Bay Bridge, are fully reflected in the results since 1998 and, therefore, no further impact will occur.

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

- No natural disaster, or local, state or national emergency, over and above the September 11 terrorist attacks, will occur that would alter travel patterns and divert traffic from the TBTA facilities.

While the projections are made and presented year-by-year by URS, 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

Future traffic and toll revenues are estimated for the 11-year (2002-2012) forecast period for each TBTA facility based on historical trends in traffic and revenue, the impacts of September 11, elasticity factors for future toll increases, 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. Changes in these factors, which may potentially affect future traffic and toll revenue, are detailed throughout this report.

Trends in operating expenses for the toll facilities, TBTA's 2002 budget estimate, and growth estimates based on the current CPI-U for OTPS and salary and wage increases, and the CPI-Medical Care Component used for fringe benefit cost escalation, are input to the future operating expense forecast. Future operating expense estimates are used to develop net revenue projections over the forecast period.

Traffic and toll revenues were first projected on the basis that the current tolls will be continued throughout the forecast period. Then, using these estimates as a base, URS applied the elasticity impact factors listed in Table 17 and adjusted the average tolls to develop the forecast with periodic toll increases.

Traffic and Toll Revenue at Current Tolls

The methodology employed by URS to forecast traffic was based on the development of an annual growth rate for each facility (based on the historical traffic trends), modified by the residual impact of September 11, 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 increases in the future at modest rates of growth. URS estimates that traffic on the Throgs Neck, Verrazano-Narrows, Bronx-Whitestone, Henry Hudson and Triborough bridges will increase primarily during the off-peak period, since these bridges have exceeded or are expected to exceed their capacity levels with respect to the highest recorded levels achieved since 1970 (from Table 19) during the forecast period. Capacity constraints in the highway network are contributing factors. The technique used in the forecast was to reduce the potential growth rates by 50 percent to reflect lower overall growth once the capacity level is reached in the peak period. This approach produces conservative forecasts inasmuch as the introduction of *E-ZPass* has provided some additional capacity at the toll plazas.

For the other facilities, the use of the selected growth rates will result in volume increases during the forecast period that will remain below the previous highest levels achieved.

On this basis, starting with the 2002 estimated traffic by facility from Table 11 (that now reflects the impact of September 11 and the impact of the use of *E-ZPass* on TBTA facilities as well as the traffic constraints in the highway network), URS projected the traffic by facility in Table 20, and calculated the corresponding toll revenue based on the 2002 average tolls by facility (also from Table 11).

General traffic growth in the range of 0.55 to 1.7 percent annually is estimated in the forecast period. This growth is based on the actual growth in traffic on each facility during the last 10 years, after the impact of toll increases was taken into account, and a review of actual and forecast population and employment growth in the region in the post-September 11 period. Since the actual population growth during the last 10 years exceeded NYMTC's estimated growth during the period and its population forecast for 2010, greater weight was given to the historical trends in developing the forecasts as well as the use of the recent employment forecasts developed by the New York City OMB in the post-September 11 period. The irregularities in the forecast are the result of the construction, capacity and *E-ZPass* participation factors described herein:

1. For the Queens Midtown Tunnel, the growth rates in 2002 reflect the continuing recovery from September 11, and attainment of year 2000 traffic levels in 2003.

2. Traffic at the Brooklyn-Battery Tunnel reflects the continuation of the SOV ban through September 2003 and the continued weakness of the employment in lower Manhattan. Traffic is assumed to regain year 2000 levels in 2005, based on the forecasts of employment growth discussed in the earlier sections of the report.

3. For the Throgs Neck Bridge, Bronx-Whitestone Bridge, Verrazano-Narrows Bridge, Henry Hudson and Triborough Bridge, the growth rates for traffic are reduced by 50 percent to reflect capacity conditions.

4. Verrazano-Narrows Bridge traffic increased by approximately 3 percent above its normal trend in 2001 following the imposition of truck restrictions at the Holland Tunnel. It is assumed that these restrictions will remain in place until January 2004, after which the extra traffic will divert back to the Holland Tunnel.

5. Construction on the main span of the Triborough Bridge reduced capacity and transactions starting in April 2002 traffic. These restrictions are assumed to remain in place until construction is completed in April 2004.

The maintenance work on of the Gowanus Expressway, started during 2000, did not have an effect on traffic growth in the Brooklyn-Battery Tunnel and on the Verrazano-Narrows Bridge; therefore, there are no additional impacts estimated during the time period included in these forecasts. Also, in 2003, Throgs Neck Bridge and Bronx-Whitestone Bridge traffic have

been redistributed to reflect a return to the historical distribution of traffic on these two bridges after the completion of the current construction projects on the Cross Bronx Expressway.

Traffic and Toll Revenue with Periodic Toll Increases

As mentioned previously, the traffic forecast with periodic toll increases was built upon the base (current tolls) forecast (from Table 20), to which the elasticity impacts (from Table 18) were applied. URS then applied the appropriate increased average tolls (the 2002 averages from Table 11 increased by the percentages in Table 18) in the years 2004 and 2008 (effective January 1) to calculate the corresponding toll revenues in the respective years. URS made adjustments to the growth rates to reflect the available capacity due to traffic reductions resulting from the impacts of toll rate increases. The traffic and revenue forecasts with periodic toll increases are listed in Table 21.

Table 20 Traffic and Toll Revenue Forecast
Constant Tolls

Years	Throgs Neck[b]	Bronx-Whitestone[b]	Tri-borough[b][c]	Queens Midtown[d]	Brooklyn-Battery[d]	Verrazano Narrows[b][e]	Henry Hudson[b]	Marine Parkway-Gil Hodges Memorial	Cross Bay	Total
Annual Traffic (000s)										
2002[a]	39,828	42,885	62,317	26,236	15,508	73,932	24,875	7,592	7,113	300,286
2003	40,048	43,121	62,558	26,559	19,103	74,560	25,223	7,721	7,234	306,127
2004	40,268	43,358	64,708	26,772	20,230	72,938	25,576	7,852	7,357	309,059
2005	40,490	43,596	65,064	26,986	21,288	74,177	25,934	7,986	7,482	313,003
2006	40,712	43,836	65,421	27,202	21,458	74,808	26,297	8,122	7,609	315,466
2007	40,936	44,077	65,781	27,419	21,630	75,444	26,666	8,260	7,739	317,952
2008	41,161	44,320	66,143	27,639	21,803	76,085	27,039	8,400	7,870	320,460
2009	41,388	44,563	66,507	27,860	21,977	76,732	27,417	8,543	8,004	322,992
2010	41,615	44,809	66,873	28,083	22,153	77,384	27,801	8,688	8,140	325,546
2011	41,844	45,055	67,240	28,307	22,330	78,042	28,190	8,836	8,279	328,124
2012	42,074	45,303	67,610	28,534	22,509	78,705	28,585	8,986	8,419	330,726
Traffic Growth (Percent)										
2002-2003	0.55%	0.55%	0.39%	1.23%	23.19%	0.85%	1.77%	1.70%	1.70%	
2003-2004	0.55	0.55	3.44	0.80	5.90	–2.18	1.40	1.70	1.70	
2004-2005	0.55	0.55	0.55	0.80	5.23	1.70	1.40	1.70	1.70	
2005-2006	0.55	0.55	0.55	0.80	0.80	0.85	1.40	1.70	1.70	
2006-2007	0.55	0.55	0.55	0.80	0.80	0.85	1.40	1.70	1.70	
2007-2008	0.55	0.55	0.55	0.80	0.80	0.85	1.40	1.70	1.70	
2008-2009	0.55	0.55	0.55	0.80	0.80	0.85	1.40	1.70	1.70	
2009-2010	0.55	0.55	0.55	0.80	0.85	0.85	1.40	1.70	1.70	
2010-2011	0.55	0.55	0.55	0.80	0.80	0.85	1.40	1.70	1.70	
2011-2012	0.55	0.55	0.55	0.80	0.80	0.85	1.40	1.70	1.70	
Average Toll										
2002	$4.01	$3.64	$3.43	$3.31	$3.16	$2.95	$1.37	$1.15	$1.21	$3.11
Toll Revenues (000s)										
2002[a]	$159,712	$156,100	$213,747	$ 86,841	$49,004	$218,098	$34,079	$ 8,731	$ 8,607	$ 934,919
2003	160,592	156,959	214,573	87,911	60,367	219,951	34,556	8,879	8,753	952,541
2004	161,475	157,823	221,947	88,615	63,928	215,166	35,039	9,030	8,902	961,925
2005	162,363	158,691	223,168	89,323	67,270	218,824	35,530	9,184	9,054	973,406
2006	163,256	159,564	224,395	90,038	67,808	220,684	36,027	9,340	9,207	980,320
2007	164,154	160,441	225,629	90,758	68,351	222,559	36,532	9,499	9,364	987,288
2008	165,057	166,324	226,870	91,484	68,898	224,451	37,043	9,660	9,523	994,311
2009	165,965	162,211	228,118	92,216	69,449	226,359	37,562	9,824	9,685	1,001,389
2010	166,878	163,103	229,373	92,954	70,004	228,283	38,088	9,991	9,850	1,008,524
2011	167,795	164,000	230,634	93,698	70,564	230,223	38,621	10,161	10,017	1,015,715
2012	168,718	164,902	231,903	94,447	71,129	232,180	39,162	10,334	10,187	1,022,963

Notes:
(a) From Table 11, based on estimates for 2002.
(b) Growth rates reduced by 50 percent based on assumption that the capacity level has been reached in the peak period.
(c) Traffic reduced to reflect construction impact between April 2002 and April 2004.
(d) Growth of traffic reflects return after September 11, 2002.
(e) Truck restrictions at Holland Tunnel, assumed to be removed January 2004, increasing traffic on Verrazano-Narrows Bridge.

Table 21 Traffic and Toll Revenue Forecast
Periodic Toll Increases

Years	Throgs Neck	Bronx-Whitestone	Triborough	Queens Midtown	Brooklyn-Battery	Verrazano Narrows	Henry Hudson	Marine Parkway-Gil Hodges Memorial	Cross Bay	Total
Traffic Change (from Table 20) due to Toll Elasticity										
2002-2003	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.9%	0.0%	—
2004-2007	–1.2	–1.2	–2.8	–3.0	–5.6	–1.7	–4.3	–1.6	–2.2	—
2008-2010[(a)]	–1.1	–1.1	–2.4	–2.6	–4.8	–1.5	–3.7	–1.4	–1.9	—
Annual Traffic (000s)										
2002	39,828	42,885	62,317	26,236	15,508	73,932	24,875	7,592	7,113	300,286
2003	40,048	43,121	62,558	26,559	19,103	74,560	25,223	7,721	7,234	306,127
2004	39,785	42,838	62,898	25,969	19,098	71,698	24,477	7,727	7,195	301,683
2005	40,004	43,073	63,244	26,176	20,096	72,916	24,819	7,858	7,318	305,504
2006	40,224	43,310	63,592	26,386	20,257	73,536	25,167	7,992	7,442	307,905
2007	40,445	43,548	63,941	26,597	20,419	74,161	25,519	8,128	7,569	310,327
2008	40,220	43,306	62,750	26,113	19,594	73,670	24,919	8,150	7,551	306,273
2009	40,441	43,544	63,095	26,321	19,751	74,296	25,268	8,289	7,679	308,685
2010	40,664	43,784	63,442	26,532	19,909	74,928	25,622	8,429	7,810	311,119
2011	40,887	44,025	63,791	26,744	20,068	75,564	25,980	8,573	7,943	313,576
2012	41,112	44,267	64,142	26,958	20,229	76,207	26,344	8,719	8,078	316,055
Average Toll										
2002-2003	$4.01	$3.64	$3.43	$3.31	$3.16	$2.95	$1.37	$1.15	$1.21	
2004-2007	4.58	4.16	3.92	3.78	3.61	3.37	1.57	1.31	1.38	
2008-2012	5.16	4.68	4.41	4.26	4.06	3.79	1.76	1.48	1.56	
Toll Revenues (000s)										
2002	$159,712	$156,100	$213,747	$ 86,841	$49,004	$218,098	$34,079	$ 8,731	$ 8,607	$ 934,919
2003	160,592	156,959	214,573	87,911	60,367	219,951	34,556	8,879	8,753	952,541
2004	182,351	178,227	246,591	98,248	68,978	241,754	38,328	10,156	8,706	1,073,339
2005	183,354	179,207	247,947	99,034	72,584	245,863	38,865	10,329	10,121	1,087,303
2006	184,363	180,193	249,311	99,826	73,165	247,953	39,409	10,505	10,293	1,095,016
2007	185,377	181,184	250,682	100,625	73,750	250,061	39,961	10,683	10,468	1,102,789
2008	207,389	202,698	276,762	111,142	79,618	279,454	43,898	12,052	11,749	1,224,762
2009	208,530	203,813	278,285	112,031	80,255	281,829	44,513	12,257	11,948	1,233,460
2010	209,677	204,934	279,815	112,927	80,897	284,225	45,136	12,465	12,151	1,242,227
2011	210,830	206,061	281,354	113,830	81,544	286,641	45,768	12,677	12,358	1,251,064
2012	211,989	207,195	282,902	114,741	82,197	289,077	46,409	12,893	12,568	1,259,970

Notes: (a) Compounded impact of the two toll increases in 2004 and 2008.

Operating Expenses

The projection of operating expenses is shown in Table 22. Total operating expenses, consisting of personnel and OTPS (other than personnel services), are estimated to increase from $291.2 million in 2002 to $381.1 million in 2012. Personnel expenses consist of wages, salaries, overtime and fringe benefits. OTPS includes items such as maintenance, supplies, utilities and other expenses.

The operating expense projections for the year 2002 were based on TBTA estimates. For the remainder of the forecast period (2003-2012), URS estimated operating expenses based on the current Consumer Price Index (CPI) (All Urban Consumers for the US City average) of 2.8 percent per annum for all costs except fringe benefits; fringe benefits costs were assumed to increase at the same rate as the medical component of the CPI (medical CPI-U) of 4.4 percent per annum, as directed by TBTA. Also included in the projections are the additional security measures that are being gradually introduced during 2002.

In addition, TBTA will replace the outstanding *E-ZPass* tags that are approaching the end of their useful life over the three-year period, 2002-2004. The estimated total cost is $60.3 million, spread over the three-year period, with annual costs of $17.2 in 2002, $30.8 in 2003 and $12.3 in 2004. These costs have been included in the OTPS expenses for the appropriate years.

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

Table 22 Projected Operating Expenses
(000s)

Year	Personnel[(a)]	OTPS[(b)]	Total
2002	$129,654	161,544	291,198
2003[(c)]	133,760	179,186	312,946
2004[(c)]	138,002	164,840	302,842
2005[(c)]	142,385	167,882	310,267
2006[(c)]	146,913	172,582	319,495
2007[(c)]	151,592	177,415	329,007
2008[(c)]	156,426	182,383	338,809
2009[(c)]	161,422	187,489	348,911
2010[(c)]	166,585	192,739	359,324
2011[(c)]	171,921	198,135	370,056
2012[(c)]	177,436	203,683	381,119

Notes:
(a) Includes wages, salaries, fringe benefits and overtime, net of capital reimbursements.
(b) Represents Other Than Personnel Services and includes the following categories: maintenance and supplies, outside technical and maintenance services, insurance, power, and other expenses.
(c) Based on current CIP-U (all items) and CPI-U (Medical).

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 revenues, one at constant tolls and the other with periodic toll increases, as shown in Table 23. For 2002, net toll revenue under either scenario is estimated at $644 million. In year 2012, net toll revenue at constant tolls is estimated to be $642 million and, with periodic toll increases, net toll revenue is estimated to be $879 million.

Table 23 Net Toll Revenue Forecast
(000s)

Year	Gross Toll Revenue		Operating Expenses	Net Toll Revenue	
	Constant Tolls	Periodic Toll Incr.		Constant Tolls	Periodic Toll Incr.
2002	$ 934,919	$ 934,919	291,198	$643,721	$643,721
2003	952,541	952,541	312,946	639,595	639,595
2004	961,925	1,073,339	302,842	659,083	770,497
2005	973,406	1,087,303	310,267	663,139	777,036
2006	980,320	1,095,016	319,495	660,825	775,521
2007	987,288	1,102,789	329,007	658,281	773,782
2008	994,311	1,224,762	338,809	655,502	885,953
2009	1,001,389	1,233,460	348,911	652,478	884,549
2010	1,008,524	1,242,227	359,324	649,200	882,903
2011	1,015,715	1,251,064	370,056	645,659	881,008
2012	1,022,963	1,259,970	381,119	641,844	878,851

Note: May not add due to rounding.

It is our opinion that the revenue and expense projections are reasonable and that they have been prepared in accordance with accepted practice for investment-grade studies. However, given the uncertainties within the current international and economic climate, it is important to note the following limitations:

1. This report presents the results of our consideration of the information available to us as of the date hereof and the application of our experience and professional judgment to that information. It is not a guarantee of any future events or trends.

2. The traffic, revenue and expense forecasts will be subject to future economic and social conditions and demographic developments that cannot be predicted with certainty.

3. 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 con-

tingencies, many of which will be beyond our 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.

4. If, for any reason, any of these conditions should change due to changes in the economy or competitive environment, or other factors, URS' opinions or estimates may require amendment or further adjustments.

REVIEW OF PHYSICAL CONDITION

The facilities under TBTA's jurisdiction include two tunnels and seven bridges listed in Table 24, together with Randall's Island Facilities and a parking garage in Manhattan near the Brooklyn-Battery Tunnel. Some of these crossings have been in service since the 1930s, i.e., the Triborough, Henry Hudson, Marine Parkway-Gil Hodges Memorial and Bronx-Whitestone bridges. The Queens Midtown Tunnel opened to traffic in 1940, and the Brooklyn-Battery Tunnel 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 Bridge opened to traffic in 1970. 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 24 Opening Dates of TBTA Facilities

Facility	Open to Traffic	Years in Use
Triborough Bridge	1936	66
Bronx-Whitestone Bridge	1939	63
Throgs Neck Bridge	1961	41
Henry Hudson Bridge	1936	66
Queens Midtown Tunnel	1940	62
Brooklyn-Battery Tunnel	1950	52
Verrazano-Narrows Bridge	1964[(a)]	38
Cross Bay Bridge	1970[(b)]	32
Marine Parkway-Gil Hodges Memorial Br.	1937	65

Notes: (a) Lower level opened in 1969.
(b) The present structure replaced the previous structure that had been in service since 1939.

Periodic contact with TBTA personnel is maintained by URS to monitor and review material, as it becomes available, pertaining to the physical condition of their seven bridges and two tunnels. This review material includes pertinent sections and updates of the following:

- Biennial Bridge Inspection Report,
- Scheduled Tunnel Inspection Report,

- Interim Inspection Report,
- TBTA's 2000-2004 Capital Program,
- Current Quality Assurance Plan, and
- TBTA's Routine and Major Maintenance Program.

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

- Comparison of Conclusions and Recommendations sections of the current inspection reports with the previous inspection reports to note significant changes in observed deterioration, if any;
- Review of the 2000-2004 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, comprehensive condition inspections. The tunnel inspection frequency is generally every ten years, whereas the bridges are inspected every two years. The TBTA's bridges were last inspected and their physical condition appraised in 2000/2001 by various consultants, under the New York State Biennial Bridge Inspection Program. New cycles of NYSDOT Biennial Bridge Inspection are currently underway. In addition, 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.

The most recent comprehensive condition inspection of TBTA's tunnels was performed in 1990. The Brooklyn-Battery Tunnel is currently undergoing an inspection. The Queens Midtown Tunnel is not currently scheduled for a comprehensive inspection, as current construction has addressed the critical needs of the structure at this time. Unlike bridges, federal and state mandated inspection cycles are not specified for tunnels; however, ongoing tunnel rehabilitation projects create ideal access conditions for the monitoring of these structures. As contract work progresses, construction inspection of the work and adjacent areas allows new areas of deterioration to be identified and addressed as part of the ongoing contract. TBTA has performed an assessment of the vulnerability of its tunnels to a major fire, such as the recent one in Mont Blanc, France. Results of this assessment include significant differences between the TBTA's tunnels and Mont Blanc Tunnel. These include the fact that TBTA's tunnels have two tubes each, with cross passages to allow motorists access to the opposite tube. In addition, TBTA's tunnels provide much better ventilation, a wet fire standpipe system, patrols several times an hour, 24-hour closed-circuit TV system monitoring and a superior communication system for emergencies.

These foregoing inspections, performed by the inspection consultants, consisted of visual examination, sounding and chipping concrete, scraping and cleaning steel, and taking appropriate measurements to determine the physical conditions of the bridges and tunnels.

The inspection consultants also prioritized the necessary repairs and provided the TBTA with cost estimates. The results of these facility inspections and appraisals form the basis for much of the rehabilitation and improvement projects to be funded under the 2000-2004 TBTA Capital Program.

The consulting engineering firms who performed the 2000 and 2001 biennial and interim bridge inspections and those who performed or are performing the 1990 or 2001 tunnel inspections for each facility were/are:

Facility	*Consulting Firm*
Triborough Bridge	Baker Engineering (2000)
Throgs Neck Bridge	Charles H. Sells, Inc. (2001)
Bronx-Whitestone Bridge	Lichtenstein Engineering Associates, P.C. (2001)
Henry Hudson Bridge	Ammann & Whitney (2001)
Queens Midtown Tunnel	Ammann & Whitney (2001) (facilities) Sverdrup Corp. (1990) (tunnel)
Brooklyn-Battery Tunnel	Parsons Brinckerhoff (2001)
Verrazano-Narrows Bridge	Charles H. Sells, Inc. (2000) Ammann & Whitney (2000)
Marine Parkway-Gil Hodges Mem. Br.	HNTB Engineering & Architecture, P.C. (2001)
Cross Bay Bridge	HNTB Engineering & Architecture, P.C. (2001)

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.

Funds programmed for TBTA's 2000-2004 Capital Program total $1.0 billion dollars. The plan breaks this amount into specific projects by facility as well as agency-wide projects. Comparisons between the Capital Program projects and total repair item lists for each facility, as prepared by inspection consultants, confirm that the Capital Program gives high priority to key rehabilitation projects. Conclusions, recommendations and cost estimates for each facility can be found in the latest biennial bridge and tunnel inspection reports. By prioritizing necessary facility rehabilitation projects, TBTA addresses all high priority recommendations in the 2000-2004 Capital Program that had not been addressed as part of the 1995-1999 Capital Program. Lower priority recommendations will be addressed by the next Capital Program.

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

Triborough Bridge - The electrical, mechanical and deck rehabilitation of the Bronx truss is nearing completion. The rehabilitation of the Bronx approach is approximately three-quarters complete and the reconstruction of the cellular concrete junction structure is (approximately) at the halfway point. The design phase of the contract for the deck replacement for the Manhattan toll plaza and ramps is underway with construction anticipated for the next capital program. At

the East River suspended span the replacement of the suspender ropes is complete. The deck replacement at the suspended span and the Queens viaduct is underway and is approximately 25 percent complete. Design of the Ward's Island and Randall's Island viaducts is complete, with construction expected to start in the next capital improvement cycle. The mechanical work associated with the Harlem River and Manhattan lift span is complete and deck replacement is ongoing. Projects completed within recent years include: main cable rewrapping and anchorage rehabilitation, bridge deck rehabilitation at the Queens approach, Harlem River Lift Span mechanical/electrical rehabilitation, a new east ramp auto shop, toll plaza canopy roof improvements, and sidewalk replacement; an electrical upgrade of the facility; prototype deck panel testing and installation and numerous repair projects such as repair of the bridge deck joint drains, cracked deck, piers, superstructure, and substructure.

Bronx-Whitestone Bridge - Oiling of the cable strands in the anchorages is complete for this maintenance cycle. Portions of the recommendations from recently completed studies which investigated deck replacement with a lightweight deck and improving the aerodynamic and seismic performance of the bridge are being incorporated with various structural repairs in TBTA's maintenance and capital programs. The following describes these programs and their status. The design of the lightweight windfaring to replace the stiffening truss on the suspended span is complete; construction is underway. The design of a lightweight orthotropic deck, required to replace the roadway deck, is at the halfway point and actual construction is anticipated in 2004 (awarded in 2003). Construction and testing of the prototype deck replacement for the suspended span is in progress and scheduled for completion in August 2002. Monitoring for constructability is continuing. The study of feasible methods for complete replacement of the main cables, should that become necessary in the future, is underway with completion of the study anticipated in 2003. Repairs of flagged conditions noted in the biennial inspection reports and pin replacement are continuing. Painting and replacement of the collars of the suspender ropes are substantially complete. The addition of two new tollbooths is complete. The 2000-2004 Capital Program includes the design of the replacement of the roadway deck on the Bronx/Queens approach spans with construction anticipated in the next capital improvement program. The design of the new fender system will be incorporated with an agency-wide upgrade in the security system at each facility. Projects completed within recent years include: the reinforcement of eyebars as part of the anchorage rehabilitation, cable rewrapping and rehabilitation of the suspension span superstructure, the installation of acoustic sensors for cable monitoring at the main cables, the rehabilitation of the Bronx/Queens approach ramps, the new entry ramp north of Schley Avenue, completion of the Service building expansion, installation of the new gantry and VMS north of the toll plaza and an electrical system upgrade.

Throgs Neck Bridge - The resurfacing of the suspended spans deck has been completed. The new electrical system upgrade, which includes the installation of new electrical switch gear at the four electrical substations, is approximately 85 percent complete. The construction of the Bronx approach (slab on grade) south of the toll plaza is complete. The orthotropic deck prototype and the design of the global deck replacement associated with it are underway. The design of the rehabilitation of the main cable, including lubrication and rewrapping in the suspended span, is scheduled to be completed in 2003. The design of the scour backfilling at piers 42 and 52 and fender rehabilitation at the Queens anchorage and piers 19 and 20 is

approximately 70 percent complete and is frozen at that level pending a facility-wide security review. Design of structural steel rehabilitation and drainage system improvement at the suspended span and viaducts and maintenance painting design are complete. The award of this contract is anticipated for later in 2002. Suspender rope testing is also anticipated for early 2003. The design for a prototype light pole and luminaire replacement project is anticipated later in 2002 with award of a construction contract in 2003. The reconstruction of the Bronx approach plaza north of the tollbooths has begun. Projects completed within recent years include: rehabilitation of the Queens approach slab on grade and the first eleven spans of the Queens viaduct reinforced concrete deck, ramp reconstruction (Cross Island Parkway to the bridge), replacement of floodlights at the towers, rehabilitation of the Bronx approach, and deck rehabilitation at the suspended span.

Henry Hudson Bridge - The contract for replacement of the Dyckman Street Bridge deck and superstructure with reinforced concrete beams and slab is approximately 70 percent complete. The overlaying of the roadway at all the toll lanes is substantially complete. The conceptual study for the southbound lower level toll plaza expansion is complete and design is anticipated to start in the 2000-2004 Capital Program. The design of the replacement of the upper level deck in the vicinity of the toll plaza is anticipated in the next Capital Program with construction to begin in the next cycle. Comprehensive maintenance painting and steel repairs have begun for the complete bridge structure. Under the maintenance program, the additional tollbooth at the southbound lower level plaza has been completed. Rock bolting and scaling of the slopes adjacent to the approaches are substantially complete. As-needed construction includes the installation of a discharge recovery system for groundwater, which has just begun. At the Bronx approach, retaining walls have been repaired, a new concrete stairway and sidewalk installed, as well as new lighting and transformer shielding for the electric room. Major maintenance projects have included steel repairs and spall removal at the lower level garage and the enlargement of the boiler room door for improved access. On the bridge, steel stringer pedestal defects identified in the biennial inspections are being addressed through ongoing repair design and construction. Projects completed within recent years include: Replacement of northbound approach roadway and drainage system, upper deck roadway replacement, expansion of the service building, and the installation of a new toll booth HVAC system.

Queens Midtown Tunnel - Rehabilitation of tunnel ceiling and walls (tunnel finish and leak repairs and upgrading of the fire standpipe system) is substantially complete. A contract for a study and the development of a master plan for a tunnel ventilation system and electrical controls project has been awarded. The design of the tunnel ventilation portion of the study is scheduled for award later in 2002. The design of the rehabilitation of the 36 Street and Second Avenue overpasses is in the development phase with the award of contract scheduled for 2003. The design for replacement of drainage pumps inside the ventilation building and at the plazas is complete and construction has started. Major maintenance projects include the repair and replacement of sidewalks at the ventilation and service buildings, replacement of the tunnel officer station booths at the tunnel entrances, and the design of a new air conditioning system at the service building. Projects completed within recent years include various structural repairs in the ventilation building, and a new radio and cellular phone system.

Brooklyn-Battery Tunnel - Replacement of the exhaust fans in the ventilation buildings is approximately 80 percent complete with completion scheduled for later in 2002. Design of masonry and roof repairs to the existing service building is complete; however, construction has been deferred to the next capital program. Design of tunnel roadway and drainage system rehabilitation, tunnel leakage repairs and wall tile replacement, and fire standpipe and water line valve replacement is complete. Construction is scheduled to be awarded later in 2002. Pump replacement design is complete, and construction is underway. Traffic control and signal system replacement construction is ongoing and approximately 85 percent complete. Repaving of the Brooklyn plaza is underway and is approximately 25 percent complete. The Manhattan plaza repaving and the replacement of the tollbooth's HVAC ducts are complete. One lane of each tube of the tunnels was repaved; however, the repaving of the remaining traffic lanes in the tunnel has been deferred to later in 2002. In the service area, the sidewalks have been replaced and parking lots have been repaved. In the ventilation structures the design of the elevator upgrades, egress improvements and the replacement of the façade in the Governors Island building is approximately 40 percent complete. Construction is anticipated to start in 2003. Projects completed within recent years include: replacement of all underground fuel tanks, repainting of toll booths, addition of a new manual toll booth at lane 8, and rehabilitation of the Manhattan plaza, as well as replacement of the tunnel ceiling and lighting system.

Rehabilitation of the Battery Parking Garage (located near the Manhattan portal of the Brooklyn-Battery Tunnel) Phase II (facade replacement and related structural rehabilitation) is underway and is approximately 30 percent complete. In addition, also at the Garage, design of Phase III (mechanical/electrical system replacement) is complete, construction is underway and approximately 30 percent complete.

Verrazano-Narrows Bridge - Painting of the entire suspended spans except the towers at the upper and lower roadways is approximately 50 percent complete. The contract for the oiling of the eyebars and strands in the anchorages is complete. The Brooklyn approach pavement rehabilitation is approximately 60 percent complete. The dehumidifying of the Brooklyn and Staten Island anchorages is complete. The design of the rehabilitation and sealing of the anchorages are substantially complete and construction is anticipated for 2002. Rehabilitation of the electrical system in the suspended spans has recently begun. A study to evaluate the condition of the tollbooths, plaza, tunnel pavement, utility and lighting systems and signage and traffic interchange in the vicinity of the toll plaza has been completed. A feasibility study to investigate widening of the Belt Parkway ramps has also been completed. As part of the major maintenance program, miscellaneous concrete repairs at the service building and steel repairs near the towers of the bridge have been undertaken. Projects completed within recent years include: prototype deck repairs at the suspended spans and rehabilitation of flagged floor beam and fascia stringers.

Marine Parkway-Gil Hodges Memorial Bridge - Deck replacement and bridge widening are complete and service on all bridge lanes resumed in May 2002. The repainting contract is ongoing and is scheduled to be completed this year. The east and west side structural steel repairs are substantially complete. The construction of a utility connection is complete. A design contract to replace the elevators in the towers is scheduled to be complete this year with construction planned for next year. The design of a new service building is approximately 40

percent complete with construction scheduled for 2005. Brick pointing, door replacement, boiler replacement and tollbooth painting have been completed under the maintenance program. The refurbishing of the toll booths and toll lane repaving have been deferred until the next maintenance cycle. Projects completed within recent years include: precast deck installation, sanitary line repair, bearing repair in the clutch shaft in the main shaft tower, oil/gas tank replacement, and installation of an HVAC system for the toll booths.

Cross Bay Bridge - The door replacement and brick pointing design for the service building has been completed and the contract has been awarded. The design of structural and electrical rehabilitation of the concrete slab on grade at Ramp 'D' (southbound ramp extending from the main bridge lanes) is complete, with construction anticipated for late 2002. The design of the replacement of the main high voltage feeders from the south abutment to the main service building has begun. The design of the rehabilitation of the drainage system at the promenade at the Rockaway approach and the seawall is complete with construction anticipated to begin in late 2002. The design of rehabilitation of the air conditioning system in the service building is underway; however, toll lane repaving and tollbooth refurbishing have been deferred to the next maintenance cycle. Toll booth painting, door replacement at Pier 8, installation of continuity plates in the median barrier, unit heater replacement inside the garage, and rumble strip repairs have been completed. Concrete deterioration identified in the last Biennial Inspection, deck resurfacing and median repairs will be addressed in the next capital improvement program. Projects completed within recent years include an intercom system, boiler replacement, pipe insulation in the garage, and the HVAC system rehabilitation for the tollbooths.

Agency Wide -Increased security measures including added security guards and cameras have been implemented since the September 11 attack at the World Trade Center. Additional measures are being considered such as additional lighting, alarms, and expansion of the CCTV system. Security enhancement projects are currently in the preliminary design phase at 40 percent completion. The Triborough Bridge Manhattan Plaza overhead toll Message Signs project is complete. The design for expansion of the Variable Message System (VMS) system, and gantry to the remaining TBTA facilities is under design. Sign installation will begin with variable speed limit signs during this capital program and will continue into the next capital program. Other ITS (Intelligent Transportation System) projects scheduled for the 2000-2004 Capital Program include:

- The installation of weather recording systems at the Cross Bay, Henry Hudson and Marine Parkway-Gil Hodges Memorial bridges which is at the 15 percent level of completion;
- Upgrading and installation of a CCTV network for effective monitoring and managing of traffic and incidents as well as upgrading of the communications network with fiber;
- Upgrading of the operations centers at all TBTA's facilities and integrating them internally with the Randall's Island Operations Center (RIOC), which will also be upgraded and in-turn linked externally to regional transportation operations centers such as TRANSCOM, for improving transportation services both at TBTA facilities and the region as a whole; and

- Installation and expansion of a TRANSMIT system (an *E-ZPass*-based incident detection, traveler information and traffic management system) at TBTA's facilities, and upgrading of the toll registry system which will improve the efficiency and enhance the integrity and reliability of the toll revenue collection.

Projects completed within recent years include: the installation of the Computer Aided Drafting and Design (CADD) system, traffic, safety improvements, tank testing and replacements, installation of weather recording system and inspection platform, Randall's Island Garage roof replacement, *E-ZPass* initial installation at 119 toll booths systemwide, facility improvements to comply with Americans with Disabilities Act (ADA) requirements, the installation of main electrical feeders to increase capacity at Randall's Island, and the installation of the HVAC system at the Robert Moses Building. Restoration of the Robert Moses Building at Randall's Island, and the installation of Closed Circuit Television (CCTV) to allow observation of traffic and activity at all bridges and tunnels were also completed. A Capital Programming System has been developed by the TBTA Engineering and Construction Department as part of TBTA's long-term needs assessment to help determine long-range capital and maintenance priorities. The system calculates estimated repair and rehabilitation costs based on mathematical modeling of structural deterioration.

URS' review of pertinent sections of the recent facility inspection reports found them to be extensive and detailed. Report conclusions and rehabilitation recommendations appear in the opinion of URS to be reasonable appraisals of the required effort to maintain the operational integrity of each facility.

URS performed a facility orientation walk-through at each TBTA facility in March 2002. This walk-through was for orientation purposes only, and not to re-inspect the facility or critique previous inspection reports. The walk-through visits included an on-site meeting with each facility's engineer/manager 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 walk-through inspections and meetings proved informative. Facility projects and agency-wide projects specific to each structure were discussed at the meetings. The walk-through inspection provided URS with a greater understanding of the structural make-up of each facility, as well as a check on the status of capital improvement and major maintenance projects.

It is important to note, however, that URS' 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. URS shall not be responsible for the acts or omissions of other parties engaged by TBTA.

Long-Term Outlook for TBTA Facilities

Bridges and tunnels, in general, can reach the end of their useful lives 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.

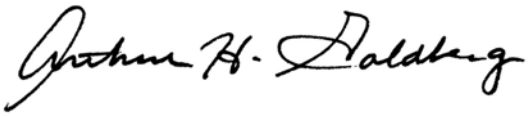
On the basis of the foregoing review and other information available to us, it is our opinion that the TBTA bridges, tunnels and approaches are all geometrically and functionally adequate and structurally sound and generally maintained to high standards.

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 2012 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 2032, assuming maintenance consistent with past practice.

Respectfully,

URS CORPORATION – NEW YORK

Kathleen Massarelli, AICP
Vice President



Arthur H. Goldberg, P.E.
Vice President

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