
EXECUTIVE SUMMARY

This summarizes the results of a tolling study of the F.E. Everett Turnpike from the Massachusetts State Line in Nashua to Interstate 293 in Manchester. Wilbur Smith Associates was retained by the New Hampshire Department of Transportation Bureau of Turnpikes to evaluate the potential negative toll revenue impact that the Manchester Airport Access Road (MAAR) could have on the Everett Turnpike, as well as, the feasibility of eliminating one or more of the Merrimack ramp toll plazas. Eleven alternative tolling scenarios along the Everett Turnpike were studied to assess their potential to eliminate one or more of the Merrimack ramp toll plazas, and minimize or off-set the loss of toll revenue as a result of the MAAR. The New Hampshire Department of Transportation as required by HB 2010, which was signed into law on June 28, 2010, will present a report of the F.E. Everett Turnpike study to the Governor, Governor's Advisory Commission on Intermodal Transportation (GACIT), House, Senate, and legislative committees on or before November 30, 2010. Details of the tolling study results are included in the full report.

PROJECT BACKGROUND AND DESCRIPTION

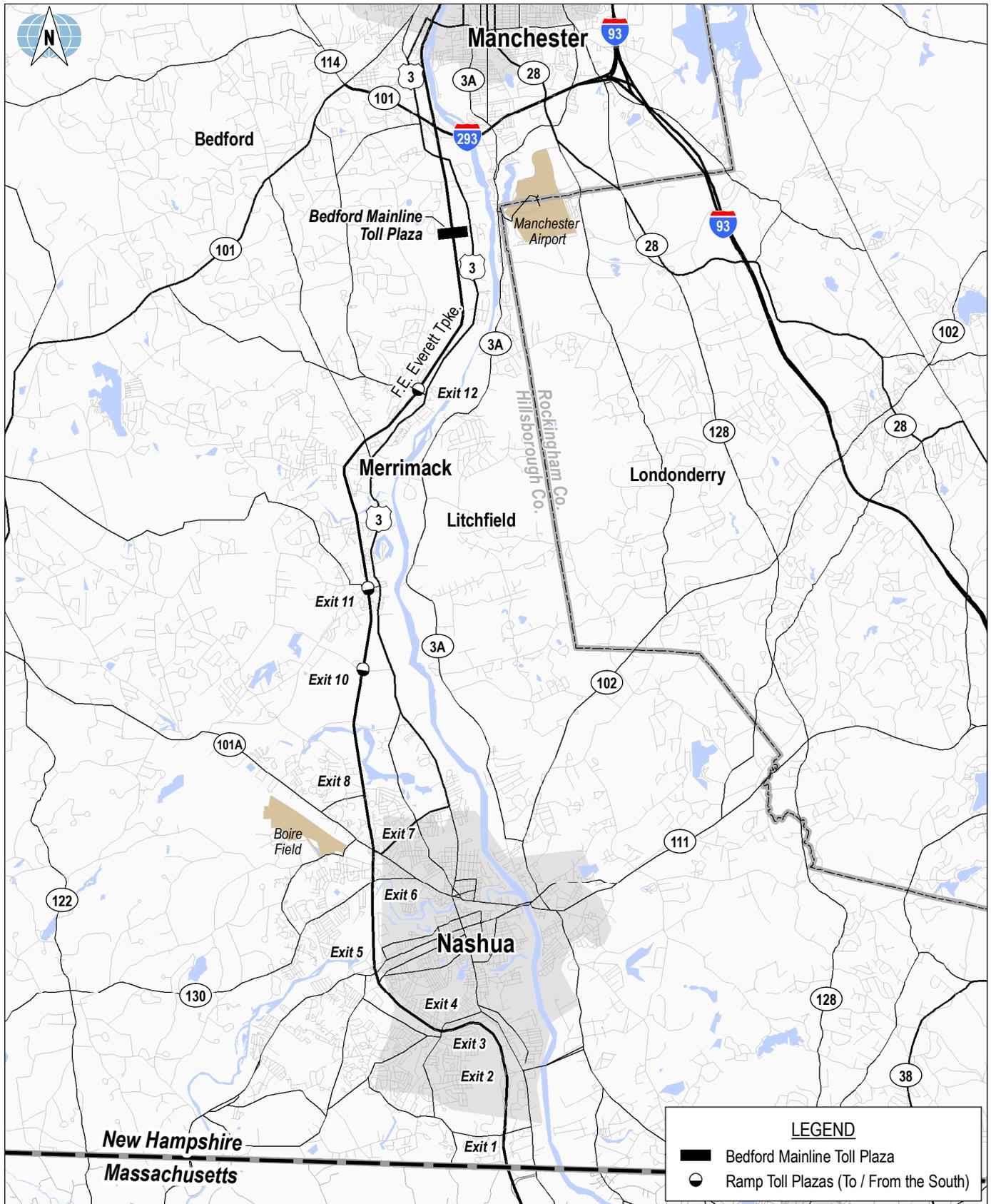
THE CENTRAL TURNPIKE

The New Hampshire Turnpike system is comprised of three independent Turnpike systems; the F.E. Everett (Central) Turnpike, the Blue Star Turnpike and the Spaulding Turnpike. This study focused on the portion of the Central Turnpike from the Massachusetts State Line in Nashua to Interstate 293 in Manchester (Figure ES-1). Within these limits, there is an existing mainline toll plaza located in Bedford and three ramp toll plazas located at Bedford Road (Exit 12), Continental Boulevard (Exit 11), and Industrial Drive (Exit 10) in Merrimack. The passenger vehicle toll rate at the Bedford mainline toll plaza is \$1.00 for cash and out-of-state E-ZPass users, while NH E-ZPass account holders get a 30 percent discount and pay \$0.70. The passenger vehicle toll rate at the ramp plazas is \$0.50 for cash and out-of-state E-ZPass users, while NH E-ZPass account holders pay \$0.35.

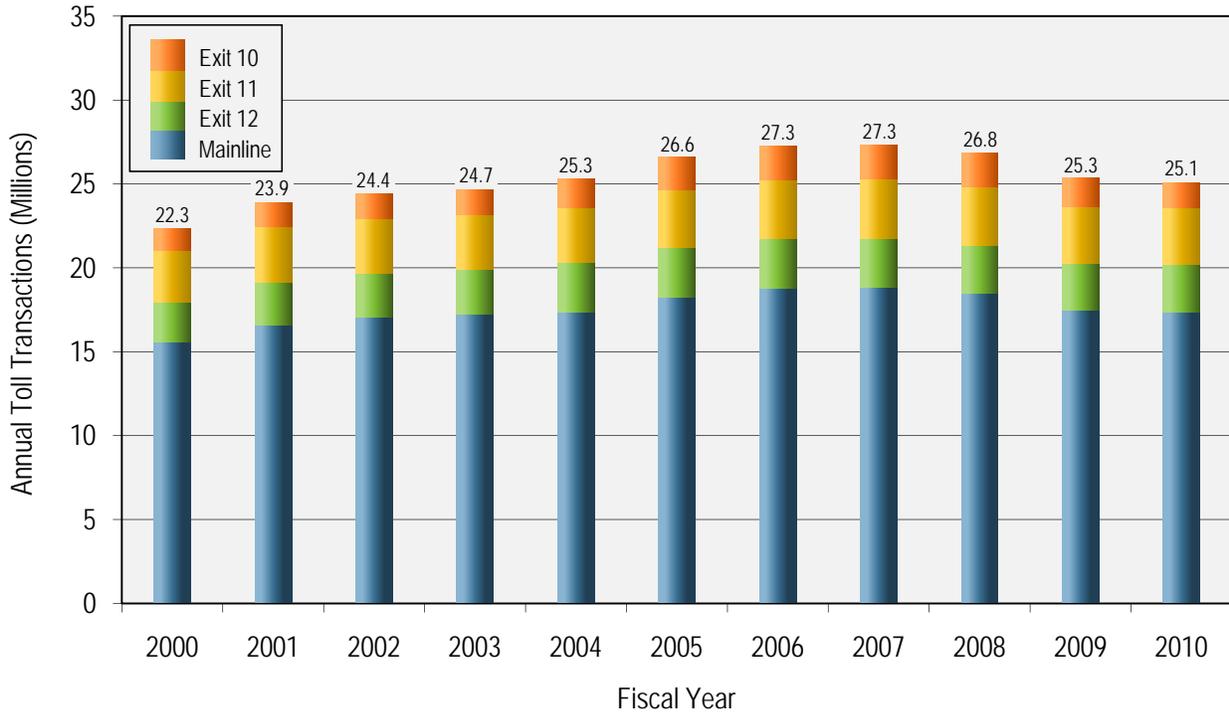
HISTORICAL ANNUAL TRANSACTIONS AND TOLL REVENUE (BEDFORD MAINLINE AND MERRIMACK RAMP PLAZAS)

Annual toll transaction and toll revenue data for the Bedford Mainline Toll Plaza and ramp toll plazas for fiscal year 2000 through 2010 are displayed in Figure ES-2. From FY 2000 through FY 2007, annual transaction grew by an average of 2.9 percent per year. Toll transaction in FY 2008 decreased by 1.8 percent, followed by a further reduction of 5.6 percent in FY 2009. These reductions are attributable to the increase in gas prices in 2008 and the significant national recession experienced since 2009. In FY 2010, although transactions continued to decrease by 1.0 percent, the economic recovery, although slow, had begun to take place. Since FY 2007, the largest percent decrease in transactions has occurred at Exit 10 which has seen its toll traffic decrease by nearly 25 percent.

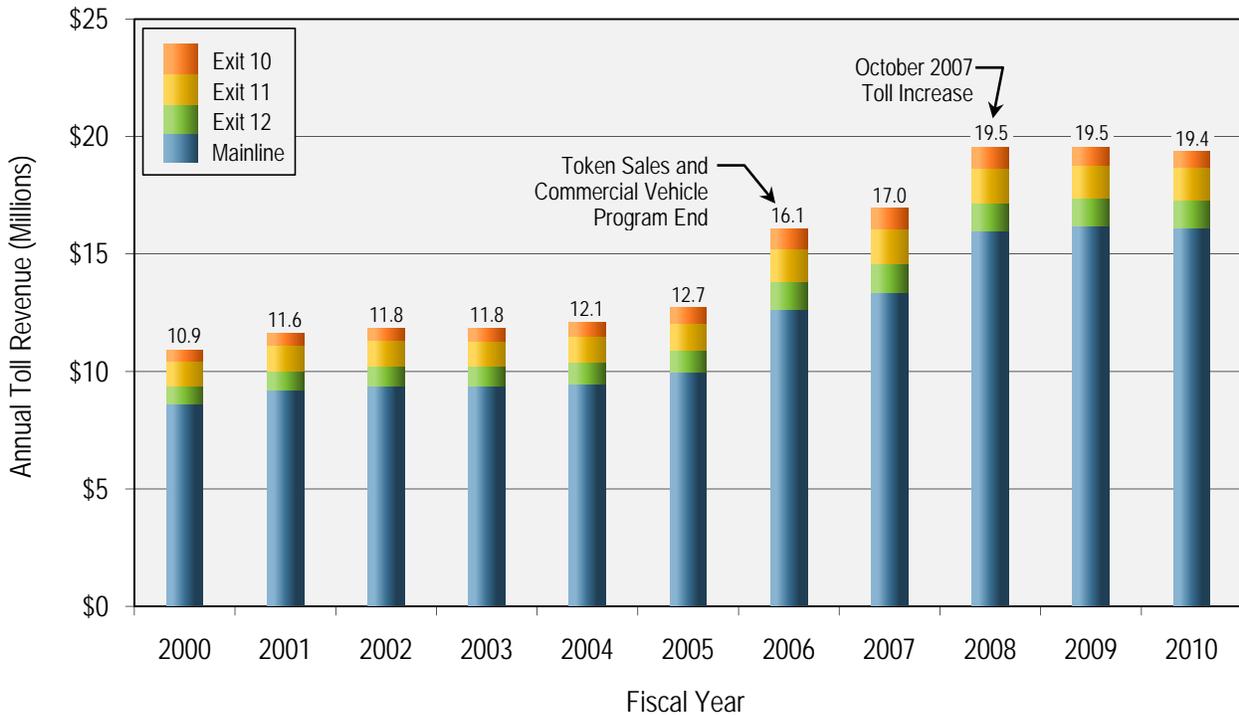
Annual toll revenue between FY 2000 and FY 2005 grew by an average annual rate of 3.1 percent. Fiscal year 2006 showed a strong increase in toll revenue due to the end of both the token sales and the commercial vehicle program which resulted in a 23 percent increase in the average toll rate between FY 2005 and FY 2006. Toll revenue grew by 15.1 percent in FY 2008 as a result of the October 2007



Annual Toll Transactions



Annual Toll Revenue



HISTORICAL ANNUAL TRANSACTIONS AND TOLL REVENUE

mainline toll increase of \$0.25 for passenger vehicles and \$0.50 for commercial vehicle classes. Annual toll revenue has decreased by about 1 percent from the high of \$19.54 million in FY 2008 to \$19.37 million in FY 2010.

FISCAL YEAR 2010 ANNUAL TOLL TRANSACTIONS AND TOLL REVENUE (BEDFORD MAINLINE AND MERRIMACK RAMP PLAZAS)

Annual toll transaction and toll revenue data for fiscal year 2010 are shown in Table ES-1. The Bedford mainline plaza processed nearly 17.4 million transactions yielding nearly \$16.1 million in gross toll revenue. The three existing ramp plazas processed 7.7 million transactions and generated almost \$3.3 million in gross toll revenue. The Bedford Mainline toll plaza accounts for about 69 percent of total transactions, but 83 percent of total revenue as a result of the higher toll rate at the mainline (\$1.00) versus the three ramp plazas (\$0.50).

FY 2010	Bedford Mainline Toll Plaza	Merrimack Ramp Plazas				Total	Percent From Bedford Mainline
		Exit 12	Exit 11	Exit 10	Ramp Totals		
Transactions	17,377,045	2,812,625	3,375,744	1,529,710	7,718,079	25,095,124	69%
Toll Revenue	\$16,100,772	\$1,178,418	\$1,407,587	\$681,069	\$3,267,074	\$19,367,846	83%
Average Toll	\$0.93	\$0.42	\$0.42	\$0.45	\$0.42	\$0.77	

LICENSE PLATE SURVEY

A vehicle license plate survey was conducted at two locations on the F.E. Everett Turnpike in order to observe the amount of New Hampshire and Massachusetts vehicles traveling northbound and southbound during a typical weekday and weekend day. In addition, trucks with 3 or more axles and vehicles from states other than New Hampshire and Massachusetts were categorized separately. The survey was conducted on Wednesday September 22, 2010 and Saturday September 25, 2010 between 6:30am and 6:30pm. The two locations chosen for the survey were south of Exit 10 and north of the Massachusetts/New Hampshire State border, including the Exit 36 northbound on-ramp.

Weekday survey results showed that 72.3 percent of vehicles identified south of Exit 10 had New Hampshire license plates. This percentage drops to 53.4 percent at the Massachusetts border. During the weekday survey south of Exit 10, vehicles with Massachusetts license plates accounted for only 13.2 percent of total vehicles. This proportion increased significantly to nearly a third of all traffic at the State border survey location.

Two-thirds of the Saturday traffic identified south of Exit 10 had New Hampshire license plates. This proportion drops to 48.1 percent at the State Border. Vehicles with Massachusetts license plates accounted for 39.9 percent of the total Saturday traffic at the State border.

In summary, about 65 to 70 percent of the traffic identified south of Exit 10 has New Hampshire license plates. This proportion reduces to approximately 50 percent at the Massachusetts State border.

MANCHESTER AIRPORT ACCESS ROAD (MAAR)

A new connection from the F.E. Everett Turnpike to U.S. 3, N.H. 3A and the Manchester Boston Regional Airport is currently under construction (Figure ES-3). This new roadway, designated as the Manchester Airport Access Road (MAAR), will have traffic impacts on the Everett Turnpike and other major roads in the Merrimack/Bedford/Manchester corridor. The MAAR has the potential to result in a significant negative toll revenue impact at the existing Bedford Mainline Plaza. The negative impacts at the Bedford mainline toll plaza would be a result of the following two conditions:

- Traffic to and from the south on the Everett Turnpike that currently travels to the Manchester Boston Regional Airport passes through the Bedford mainline toll plaza. Once the MAAR is open, these same trips will not pass through the Bedford mainline toll plaza as the ramps to and from the MAAR for these trips are south of the mainline plaza. Traffic would also be able to use the MAAR to connect to Brown Avenue and continue north without having to pay the Bedford Mainline toll.
- Non-airport traffic will be able to divert around the Bedford mainline toll plaza. Vehicles heading north on the Everett Turnpike that are south of the MAAR could take the northbound to eastbound exit to the MAAR, reverse direction on the ramp system, and take the westbound to northbound ramp from the MAAR to continue heading north on the Everett Turnpike. Vehicles heading south on the Everett Turnpike that are north of the MAAR can evade the existing Bedford Mainline Toll Plaza by first taking the southbound to eastbound exit ramp to the MAAR, reverse direction on the ramp system, and then take the westbound to southbound loop ramp to continue heading south on the Everett Turnpike.

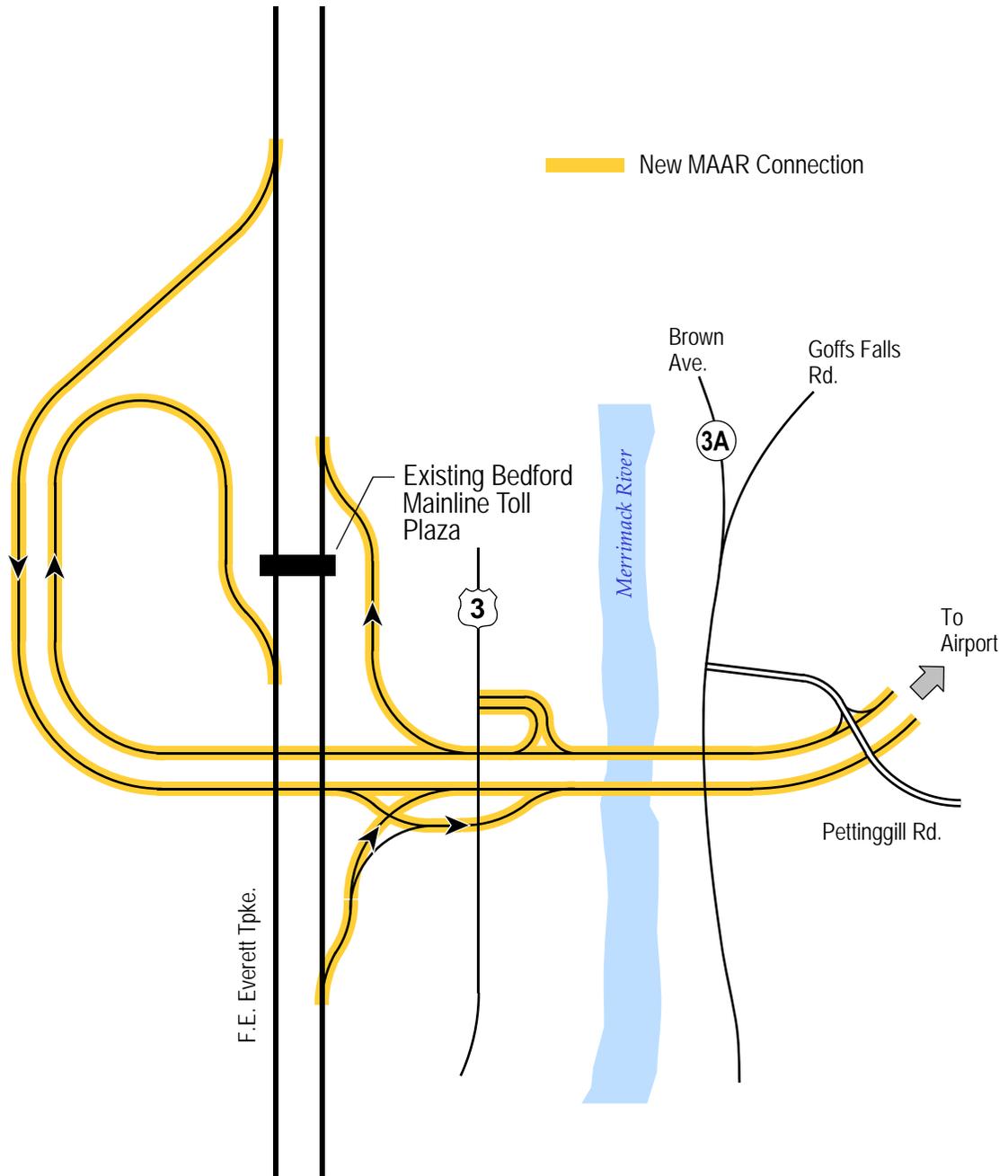
Because of their close proximity, the opening of the MAAR will not only impact the Bedford Mainline Toll Plaza, but also the usage of the ramp tolls at Exit 12, and to a much lesser degree at Exit 11. Traffic that now enters or exits at the Exit 12 ramp toll plazas and pays the \$0.50 toll will be able to utilize the MAAR ramps to access U.S. 3 without paying a toll.

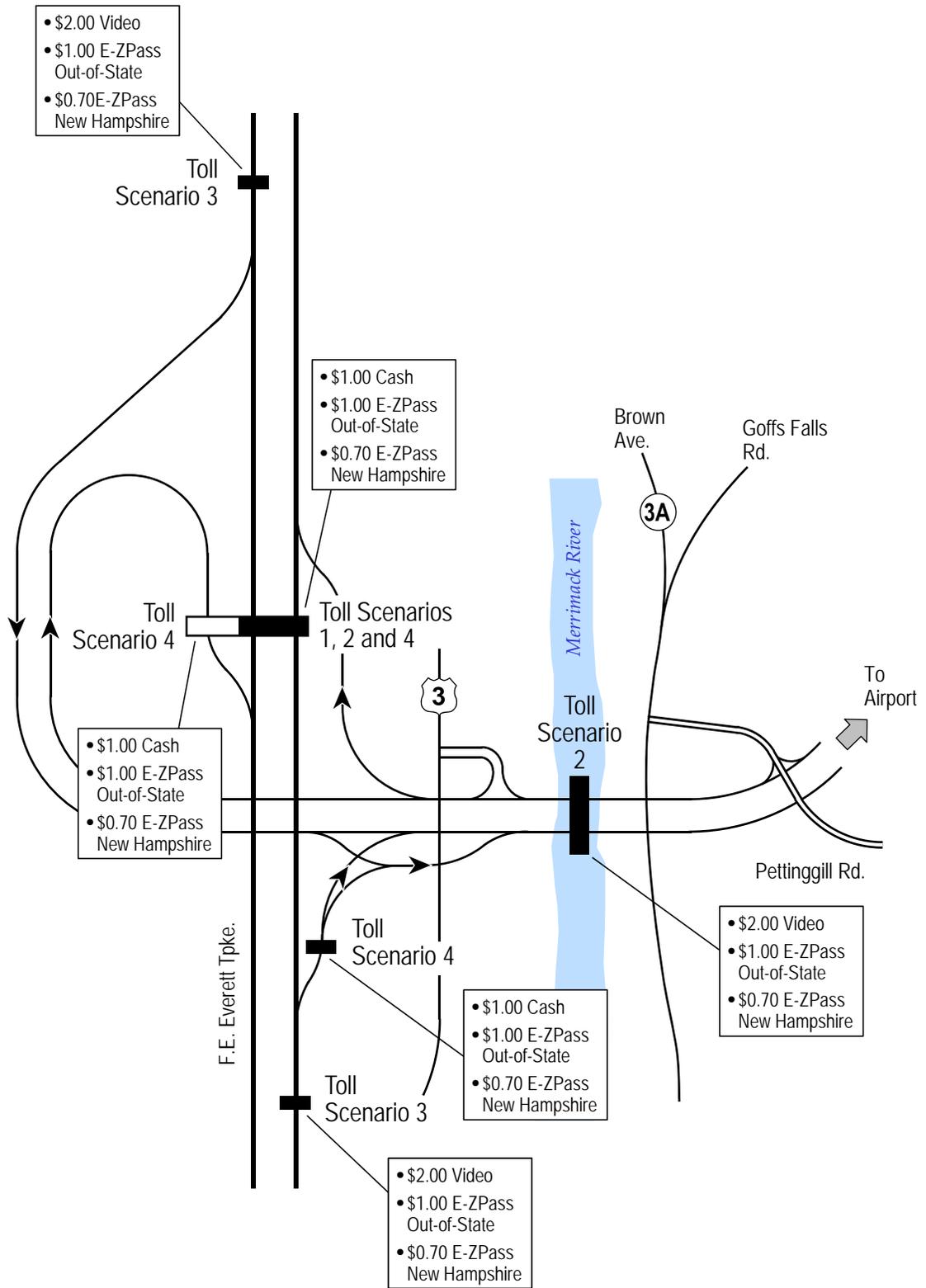
ALTERNATIVE TOLLING SCENARIO DESCRIPTIONS

This study performed an evaluation of eleven tolling alternatives on the Everett Turnpike, extending from Nashua to the existing Bedford mainline toll plaza. These alternative scenarios were studied to assess their potential to minimize or off-set the loss of toll revenue as a result of the MAAR. Detailed descriptions of the eleven scenarios are presented below.

Bedford Scenarios (See Figure ES-4)

- **Scenario 1** - In this scenario, there would be no tolls on the MAAR after it is opened and the Bedford Mainline Toll Plaza would remain as it is today. The ramp tolls at Exits 10, 11, and 12 would also remain.





- **Scenario 2** - A new all electronic toll (AET) plaza, collecting tolls in both directions, would be located at the new bridge over the Merrimack River on the MAAR. The existing Bedford Mainline Toll Plaza would remain in place. The ramp tolls at Exits 10, 11, and 12 would also remain.
- **Scenario 3** - The existing Bedford Mainline Toll Plaza would be removed. Northbound tolls would be collected at a new AET plaza just south of the northbound to eastbound exit ramp of the MAAR. Southbound tolls would be collected at a new AET plaza just north of the southbound to eastbound exit ramp of the MAAR. There would be no tolls on the MAAR. The ramp tolls at Exits 10, 11, and 12 would also remain.
- **Scenario 4** - The existing Bedford Toll Plaza would remain as it is and two ramp tolls would be added - one on the northbound to eastbound exit ramp of the MAAR and the other on the westbound exit loop ramp of the MAAR to southbound on the Everett. There would be no tolls on the MAAR. The ramp tolls at Exits 10, 11, and 12 would also remain.

Toll Removal at Exits 11 and 12 - In addition to the Bedford Toll Scenarios, a toll removal analysis at Exits 11 and 12 was performed for three conditions.

- **Alternative 1 – MAAR Opens, Tolls Remain** - Under this condition, a 500,000 square-foot mall development in the vicinity of Exit 10 would not be built and the ramp tolls would remain at Exits 10, 11, and 12.
- **Alternative 2 – MAAR Opens, Mall Build Condition, Tolls Remain** - A 500,000 square-foot mall development would be built and opened in 2012 and the ramp tolls would remain at Exits 10, 11, and 12.
- **Alternative 3 – MAAR Opens, Mall Build Condition, Toll Removal** - The 500,000 square-foot mall development would be built and opened in 2012. Ramp toll plazas at Exits 11 and 12 would be removed in conjunction with the mall opening.

Cross-Impacts of Bedford and Toll Removal Scenarios - Since there are important relationships between the Bedford Mainline and the ramp plazas at Exit 10, 11, and 12, the cross-impacts of the Bedford tolling scenarios with the potential toll removal at Exits 11 and 12 were evaluated. For example, the Exit 12 ramp plaza currently provides diversion protection to the Bedford mainline plaza. Removing Exit 12 ramp tolls would likely result in a negative revenue impact at the Bedford mainline since users could utilize the toll free Exit 12 to divert around the Bedford Mainline toll plaza. The magnitude of these impacts differs among the various Bedford Scenarios analyzed. Cross-impacts were estimated under the following Scenario 1 and Scenario 4 conditions:

- **Scenario 1A** - This assumes the MAAR is opened in 2012, the Bedford Toll Plaza remains as it is today, the Mall development is not built, and the ramp tolls remain at Exits 10, 11 and 12.

- **Scenario 1B** - This assumes the MAAR is opened in 2012, the Bedford Toll Plaza remains as it is today, the Mall development is built and opened in 2012, and the ramp tolls remain at Exits 10, 11 and 12.
- **Scenario 1C** - This assumes the MAAR is opened in 2012, the Bedford Toll Plaza remains as it is today, the Mall development is built and opened in 2012, and the ramp tolls are removed at Exits 11 and 12, but will remain at Exit 10.
- **Scenario 4A** - This assumes the MAAR is opened in 2012, the Bedford Toll Plaza remains as it is and tolls are placed on the MAAR ramps to and from the south, the Mall development is not built, and the ramp tolls remain at Exits 10, 11 and 12.
- **Scenario 4B** - This assumes the MAAR is opened in 2012, the Bedford Toll Plaza remains as it is and tolls are placed on the MAAR ramps to and from the south, the Mall development is built, and the ramp tolls remain at Exits 10, 11 and 12.
- **Scenario 4C** - This assumes the MAAR is opened in 2012, the Bedford Toll Plaza remains as it is and tolls are placed on the MAAR ramps to and from the south, the Mall development is built, and the ramp tolls are removed at Exits 11 and 12, but will remain at Exit 10.

For each of the above six cross-impact conditions, estimates of toll transactions, gross toll revenue, operations and maintenance costs, and net revenue were developed and compared against the capital investment of each scenario.

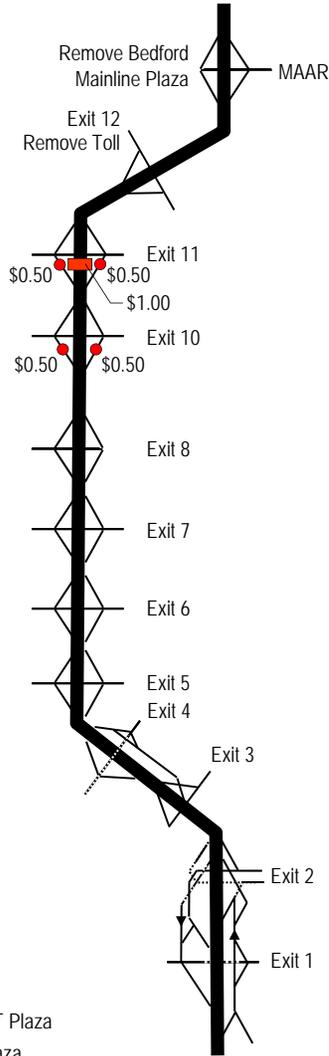
Following the analysis of the Bedford toll scenarios and cross impact analysis, the study scope was expanded to include the following eight additional scenarios:

Relocation Scenarios (See Figure ES-5)

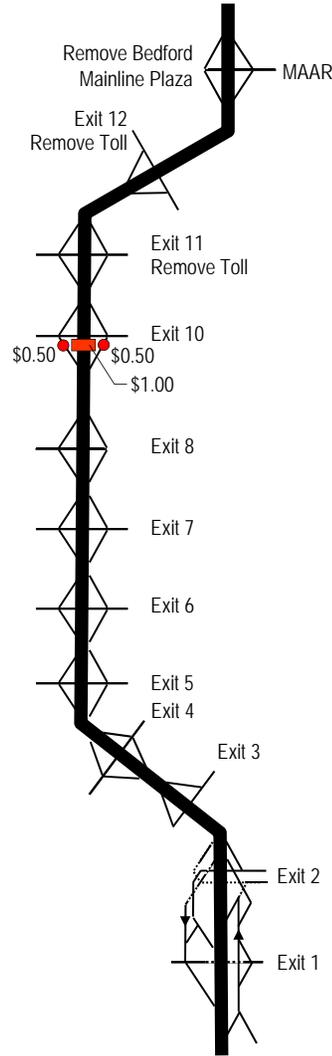
For all the following scenarios, the mall is assumed to be opened:

- **Scenario 5** - In this scenario, the Bedford Mainline Toll Plaza and the ramp plazas at Exit 12 would be removed. A new open road tolling plaza would be constructed along the mainline at Exit 11. The ramp tolls to and from the south at Exit 10 and 11 would remain.
- **Scenario 6** - In this scenario, the Bedford Mainline Toll Plaza and the ramp plazas at Exits 11 and 12 would be removed. A new open road tolling plaza would be constructed along the mainline at Exit 10. The ramp tolls to and from the south at Exit 10 would remain.
- **Scenario 7** - In this scenario, the Bedford Mainline Toll Plaza and the ramp plazas at Exits 10, 11, and 12 would be removed. A new open road tolling plaza would be constructed in Nashua between Exits 1 and 2. In addition, a toll would be placed on the ramps to and from the south at Exits 1 and 2.

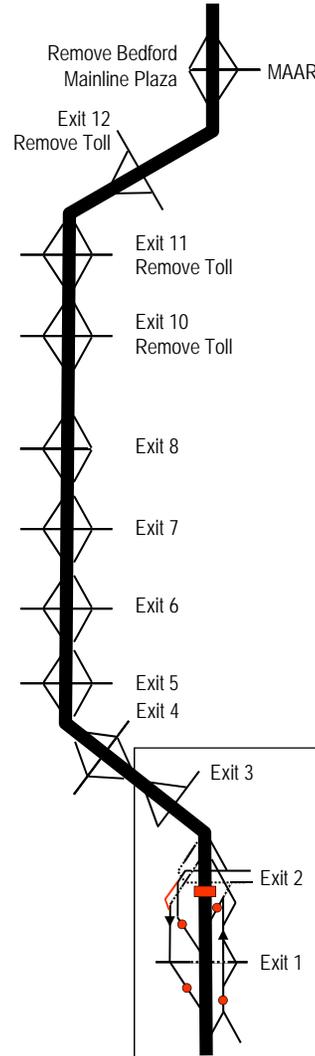
Scenario 5
New Mainline ORT Plaza
at Exit 11



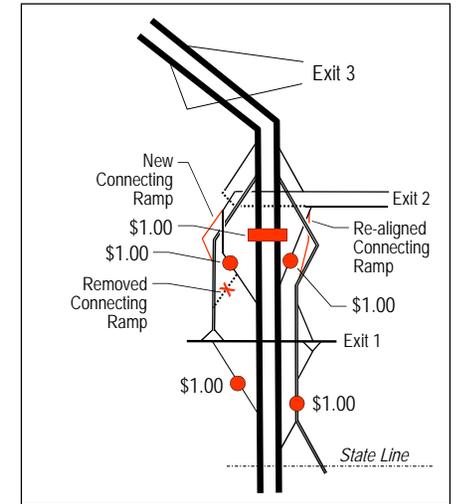
Scenario 6
New Mainline ORT Plaza
at Exit 10



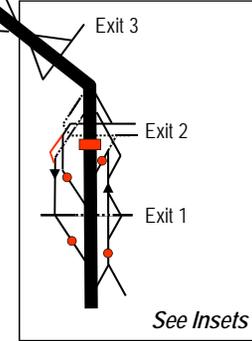
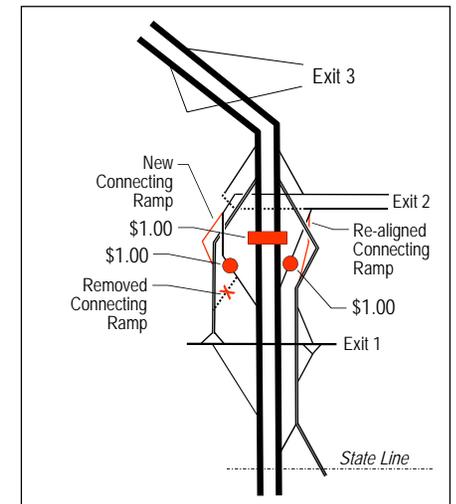
Scenario 7 / 8
New Mainline ORT Plaza
in Nashua



Inset - Scenario 7



Inset - Scenario 8



See Insets

Note: Toll rates shown are passenger vehicle toll rates.

New Hampshire E-ZPass discounts for passenger vehicles are assumed to be 30% of base rate.

- **Scenario 8** – In this scenario, the Bedford Mainline Toll Plaza and the ramp plazas at Exits 10, 11, and 12 would be removed. A new open road tolling plaza would be constructed in Nashua between Exits 1 and 2. In addition, a toll would be placed on the ramps to and from the south at Exit 2.

All Electronic Toll (AET) Scenarios (See Figure ES-6)

- **Scenario 9** – This scenario is identical to Scenario 6 except that the tolling location would operate as a cashless system. Vehicles without a transponder would have their license plate captured by video and post billed. A \$1.00 surcharge in addition to the base toll rate was assumed for video users.
- **Scenario 10** - This scenario is identical to Scenario 7 except that the tolling location would operate as a cashless system. Vehicles without a transponder would have their license plate captured by video and post billed. A \$1.00 surcharge in addition to the base toll rate was assumed for video users.
- **Scenario 11** – This scenario assumes a new AET location just south of the MAAR and also assumes that the existing Bedford mainline and the ramp plazas at Exits 10, 11, and 12 are removed.

STUDY APPROACH OVERVIEW

TRAFFIC AND REVENUE MODELING

The overall modeling approach used in the study required the enhancement and utilization of two travel demand models:

- Southern New Hampshire Regional Planning Commission (SNHPC) Regional Travel Demand Model
- Nashua Regional Planning Commission (NRPC) Travel Demand Model

The models were obtained from the regional planning commissions and were enhanced to include network configurations for the various tolling scenarios. The model was also enhanced to include WSA's toll diversion algorithms that were used to estimate traffic and revenue for the various scenarios.

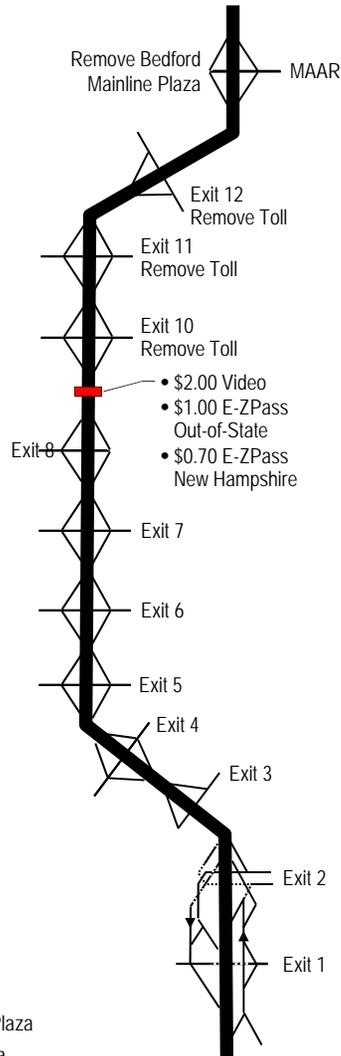
GROSS TOLL REVENUE ESTIMATES

For each scenario, projections of average weekday traffic and toll revenues estimated from the toll traffic model were annualized.

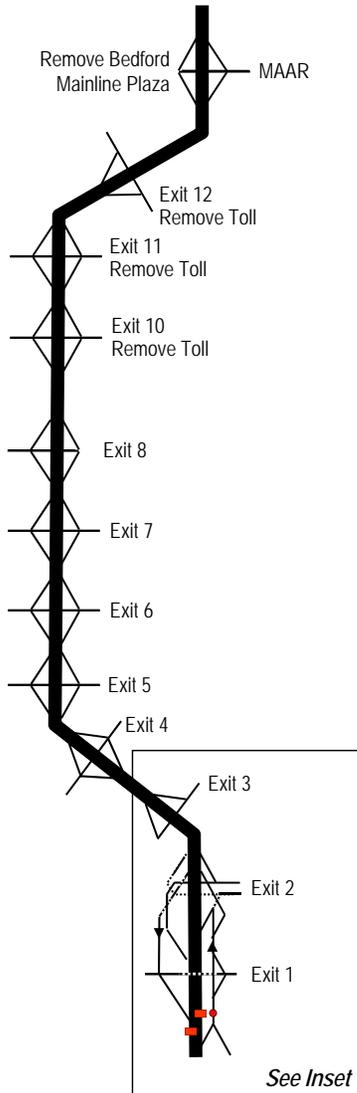
OPERATING AND MAINTENANCE COST ESTIMATES

Operation and maintenance cost estimates related to tolling were prepared for each scenario and used to calculate expected resultant toll revenue (gross toll revenue minus operation and maintenance cost) for each scenario.

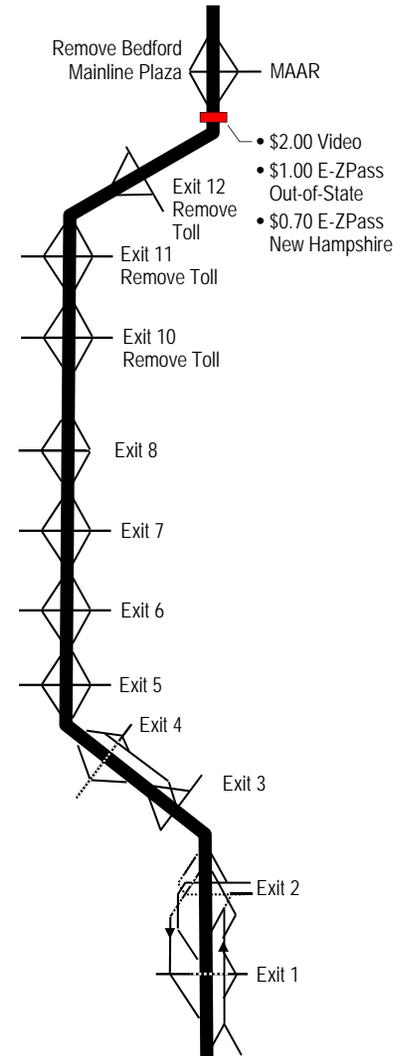
Scenario 9
New Mainline AET Plaza
South of Exit 10



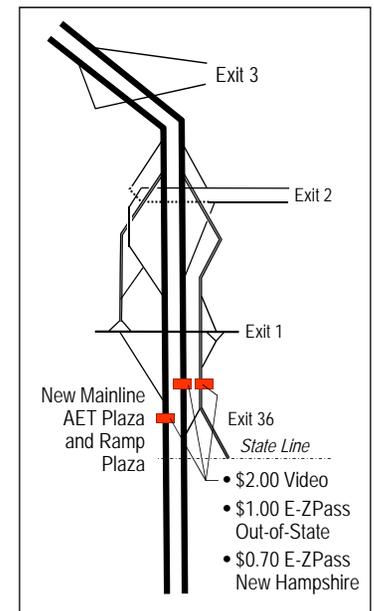
Scenario 10
New Mainline AET Plaza
and Ramp Plaza in Nashua



Scenario 11
New Mainline AET Plaza
South of MAAR



Inset - Scenario 10



Note: Toll rates shown are passenger vehicle toll rates.

CAPITAL COST ESTIMATES AND NET REVENUE ASSESSMENT

Preliminary capital costs associated with each scenario were developed and compared against gross toll revenue minus operating and maintenance cost to assess the net revenue for each scenario.

SCENARIO ASSESSMENT

A summary of the financial implications and other factors such as diversion potential and operational issues for viable scenarios is presented.

ESTIMATED TRAFFIC AND REVENUE

NO BUILD (MAAR NOT IMPLEMENTED) FORECAST

Table ES-2 shows the forecast of annual toll transactions and toll revenue for the Bedford Mainline Toll Plaza and the three ramp toll plazas through 2017. This forecast assumes that the MAAR is not built and serves as the baseline to compare all other scenarios against. Fiscal year 2010 numbers shown are actual observed numbers. By 2012, annual transactions and revenue for the Bedford Mainline and the Exit 10, 11, and 12 ramp plazas are estimated to increase to 26.1 million and \$20.2 million, respectively. By 2017, annual transactions and toll revenue is estimated to increase to 28.5 million and \$21.9 million, respectively. Between 2012 and 2017, this is an average increase in revenue of 1.6 percent annually.

Fiscal Year	Annual Transactions			Annual Toll Revenue		
	Bedford Mainline	Merrimack Ramps	Total	Bedford Mainline	Merrimack Ramps	Total
2010	17,377,045	7,718,079	25,095,124	\$16,100,772	\$3,267,074	\$19,367,846
2011	17,744,000	7,873,000	25,617,000	\$16,447,000	\$3,333,000	\$19,780,000
2012	18,110,000	8,031,000	26,141,000	\$16,794,000	\$3,400,000	\$20,194,000
2013	18,428,000	8,169,000	26,597,000	\$17,057,000	\$3,458,000	\$20,515,000
2014	18,751,000	8,310,000	27,061,000	\$17,325,000	\$3,518,000	\$20,843,000
2015	19,080,000	8,454,000	27,534,000	\$17,596,000	\$3,579,000	\$21,175,000
2016	19,415,000	8,600,000	28,015,000	\$17,872,000	\$3,641,000	\$21,513,000
2017	19,756,000	8,748,000	28,504,000	\$18,153,000	\$3,704,000	\$21,857,000

BEDFORD SCENARIOS, EXIT 11 AND 12 TOLL REMOVAL, AND CROSS-IMPACTS

The estimated annual toll revenues for the Bedford Scenarios are shown in Table ES-3. When the MARR opens it is estimated that the annual gross toll revenue at the Bedford Mainline Toll Plaza will be reduced by 31.0 percent or \$5.2 million. Scenario 2 produces estimated gross toll revenues that are 7.2

percent higher than the No Build condition in 2012. However, placing the toll location on the MAAR Bridge significantly impacts the usage of the new connection, reducing travel across the new river crossing by an estimated 35 percent as compared to a non tolled situation (Scenario 1). In addition, there would be significant additional toll operational costs associated with video tolling and back office support to invoice and collect the tolls at the AET location on the MAAR Bridge. It is estimated that this additional cost would result in lower net toll revenue as compared to the No Build (MAAR not implemented) condition. Since the MAAR construction is being paid for by the Federal Highway Administration (FHWA), tolling the new Bridge over the Merrimack River may result in the need for a significant reimbursement of money to the FHWA.

Table ES-3
Bedford Scenarios - Annual Gross Toll Revenue Estimates

Year	Annual Gross Toll Revenue (Total of Bedford Mainline and Airport Access Toll Locations)								
	No-Build	Scenario 1	Percent Impact	Scenario 2	Percent Impact	Scenario 3	Percent Impact	Scenario 4	Percent Impact
2010	\$16,100,772	---	---	---	---	---	---	---	---
2011	\$16,447,000	---	---	---	---	---	---	---	---
2012	\$16,794,000	\$11,593,000	-30.97%	\$18,003,000	+7.2%	\$17,804,000	+6.0%	\$16,726,000	-0.40%
2013	\$17,057,000	\$11,805,000	-30.79%	\$18,405,000	+7.9%	\$18,054,000	+5.8%	\$16,991,000	-0.39%
2014	\$17,325,000	\$12,020,000	-30.62%	\$18,816,000	+8.6%	\$18,307,000	+5.7%	\$17,261,000	-0.37%
2015	\$17,596,000	\$12,240,000	-30.44%	\$19,237,000	+9.3%	\$18,564,000	+5.5%	\$17,535,000	-0.35%
2016	\$17,872,000	\$12,463,000	-30.27%	\$19,667,000	+10.0%	\$18,824,000	+5.3%	\$17,814,000	-0.32%
2017	\$18,153,000	\$12,691,000	-30.09%	\$20,106,000	+10.8%	\$19,087,000	+5.1%	\$18,096,000	-0.31%

Note: Gross revenue numbers for fiscal years 2010 are actuals at the Bedford Mainline Plaza. MAAR assumed to be opened during FY 2012.

Scenario 3 is estimated to produce gross toll revenue that is 6.0 percent higher than the No Build (MAAR not implemented) condition in 2012. However, there would be significant additional toll operational costs associated with video tolling and back office support to invoice and collect the tolls under this AET scenario. It is estimated that this additional cost would result in lower net toll revenue as compared to the No Build (MAAR not implemented) condition. There would also be an added capital cost of building gantries at the new tolling locations and for removal of the existing Bedford Mainline toll plaza. Since the MAAR construction is being paid for by the Federal Highway Administration (FHWA), tolling of travel to or from the MAAR under this scenario may result in the need for reimbursement of money to the FHWA for the cost of the two off ramps downstream of the toll location.

Scenario 4 is estimated to be approximately revenue neutral as compared to No Build (MAAR not implemented) condition as this solution all but removes the ability to divert around the Bedford Mainline Toll Plaza. It is also the closest situation to the existing condition in terms of who actually pays a toll to access the Manchester Airport today. Currently, travelers along the Everett Turnpike heading northbound to the Manchester Airport pay a toll at the Bedford Mainline toll plaza. Under Scenario 4, they would pay that same toll as they exit on the ramp to the MAAR. Travelers that currently come from the west or north of the Turnpike and utilize Brown Avenue to the Manchester Airport do not currently

pay a toll. Their situation would not change under Scenario 4, where these same trips will get the benefit of utilizing the MAAR without paying a toll. There would be some additional operational costs and capital costs associated with adding ramp toll plazas under Scenario 4. Similar to Scenario 2 and 3, it may be necessary to reimburse FHWA for the cost of the two ramps to and from south at the MAAR which now would be tolled.

An analysis of a potential toll removal at Exit 11 and 12 was performed as a parallel exercise to the Bedford scenario evaluation. A significant commercial development has been proposed on Industrial Drive near Interchange 10 of the F.E. Everett Turnpike. This will result in an increase in traffic and toll revenue at this interchange. It has been suggested that when this development opens it may be feasible to eliminate ramp tolls from both Exit 11 and Exit 12. Toll revenue at Exits 11 and 12 account for more than 79 percent of the total revenue generated by the three toll plazas. The traffic at the existing Exit 10 plaza would have to increase by more than 300 percent to make up for the lost gross toll revenue associated with a toll removal at Exits 11 and 12.

Table ES-4 presents the results of the toll removal analysis with and without the Mall development. The implementation of the MAAR is estimated to reduce toll revenue at the existing ramp plazas by more than 18 percent. This is mostly a result of traffic that would now use the MAAR to access U.S. 3 versus paying the toll at the Bedford Road ramp toll plaza (Exit 12). The Mall development is estimated to produce about 20 percent more toll revenue among the ramp plazas, resulting in toll revenue that is near levels estimated under the No Build (MAAR not implemented) condition. As shown, the increased demand at Exit 10 due to the Mall will not be able to make up for the lost toll revenue if tolls are removed at Exits 11 and 12. Toll revenues would be expected to be about 69 percent lower than the No Build (MAAR not implemented) condition.

Fiscal Year	No-Build	Alternative 1	Percent Impact	Alternative 2	Percent Impact	Alternative 3	Percent Impact
2010	\$3,267,074						
2011	\$3,333,000						
2012	\$3,400,000	\$2,771,000	-18.5%	\$3,361,000	-1.1%	\$1,041,000	-69.4%
2013	\$3,458,000	\$2,820,000	-18.4%	\$3,411,000	-1.4%	\$1,056,000	-69.5%
2014	\$3,518,000	\$2,870,000	-18.4%	\$3,461,000	-1.6%	\$1,072,000	-69.5%
2015	\$3,579,000	\$2,922,000	-18.4%	\$3,513,000	-1.8%	\$1,087,000	-69.6%
2016	\$3,641,000	\$2,974,000	-18.3%	\$3,565,000	-2.1%	\$1,103,000	-69.7%
2017	\$3,704,000	\$3,027,000	-18.3%	\$3,618,000	-2.3%	\$1,119,000	-69.8%

Note: Alternative 1: MAAR open, tolls remain at Exits 10, 11 and 12 beginning in 2012.
Alternative 2: MAAR open, Mall open, tolls remain at Exits 10, 11 and 12 beginning in 2012.
Alternative 3: MAAR open, Mall open, tolls removed at Exit 11 and 12, tolls remain at Exit 10 beginning in 2012.

Cross-Impacts between the implementation of the MAAR, the Mall development, and toll removal at Exits 11 and 12 were developed for Scenario 1 and Scenario 4. Table ES-5 presents a summary of the estimated gross toll revenue. As shown, a removal of tolls at Exit 11 and 12 (Scenario 4C) would have significant impacts on the potential revenue due to the toll evasion that would occur at Exit 12. If Scenario 4 was to be implemented, tolls at Exit 11 and 12 would need to remain in place in order to protect the new ramp toll plazas to and from the south at the MAAR (see Scenario 4B in Table ES-5). Removing tolls at Exit 11 and 12 would have no impact at the existing Bedford Mainline toll plaza under Scenario 1, as the MAAR would already be providing that toll evasion opportunity.

Fiscal Year	Toll Plazas	No-Build	Scenario 1A	Scenario 1B	Scenario 1C	Scenario 4A	Scenario 4B	Scenario 4C
2011	Bedford Mainline	\$16,447,000						
	10,11,&12 Total	\$3,333,000						
	Total	\$19,780,000						
2012	Bedford Mainline	\$16,794,000	\$11,593,000	\$12,343,000	\$12,343,000	\$16,726,000	\$17,808,000	\$15,052,000
	10,11,&12 Total	\$3,400,000	\$2,771,000	\$3,361,000	\$1,041,000	\$3,427,000	\$4,021,000	\$1,041,000
	Total	\$20,194,000	\$14,364,000	\$15,704,000	\$13,384,000	\$20,153,000	\$21,829,000	\$16,093,000
2013	Bedford Mainline	\$17,057,000	\$11,805,000	\$12,558,000	\$12,558,000	\$16,991,000	\$18,073,000	\$15,277,000
	10,11,&12 Total	\$3,458,000	\$2,820,000	\$3,411,000	\$1,056,000	\$3,482,735	\$4,076,735	\$1,056,000
	Total	\$20,515,000	\$14,625,000	\$15,969,000	\$13,614,000	\$20,473,735	\$22,149,735	\$16,333,000
2014	Bedford Mainline	\$17,325,000	\$12,020,000	\$12,775,000	\$12,775,000	\$17,261,000	\$18,344,000	\$15,506,000
	10,11,&12 Total	\$3,518,000	\$2,870,000	\$3,461,000	\$1,072,000	\$3,539,485	\$4,133,485	\$1,072,000
	Total	\$20,843,000	\$14,890,000	\$16,236,000	\$13,847,000	\$20,800,485	\$22,477,485	\$16,578,000
2015	Bedford Mainline	\$17,596,000	\$12,240,000	\$12,997,000	\$12,997,000	\$17,535,000	\$18,619,000	\$15,738,000
	10,11,&12 Total	\$3,579,000	\$2,922,000	\$3,513,000	\$1,087,000	\$3,597,267	\$4,191,267	\$1,087,000
	Total	\$21,175,000	\$15,162,000	\$16,510,000	\$14,084,000	\$21,132,267	\$22,810,267	\$16,825,000
2016	Bedford Mainline	\$17,872,000	\$12,463,000	\$13,222,000	\$13,222,000	\$17,814,000	\$18,899,000	\$15,974,000
	10,11,&12 Total	\$3,641,000	\$2,974,000	\$3,565,000	\$1,103,000	\$3,657,100	\$4,250,100	\$1,103,000
	Total	\$21,513,000	\$15,437,000	\$16,787,000	\$14,325,000	\$21,471,100	\$23,149,100	\$17,077,000
2017	Bedford Mainline	\$18,153,000	\$12,691,000	\$13,453,000	\$13,453,000	\$18,096,000	\$19,182,000	\$16,212,000
	10,11,&12 Total	\$3,704,000	\$3,027,000	\$3,618,000	\$1,119,000	\$3,718,000	\$4,311,000	\$1,119,000
	Total	\$21,857,000	\$15,718,000	\$17,071,000	\$14,572,000	\$21,814,000	\$23,493,000	\$17,331,000

Note: MAAR assumed to be open in 2012.

RELOCATION SCENARIOS

The estimated annual gross toll revenue for each of the Relocation Scenarios is shown in Table ES-6. Only Scenario 7 is estimated to produce gross toll revenue that is higher than the No Build (MAAR not implemented) condition. Scenarios 5 and 6 are estimated to produce 18 and 21 percent less gross toll revenue than the No Build (MAAR not implemented) condition, respectively. Scenario 8 is estimated to generate gross toll revenue that is 11 percent lower than the No Build (MAAR not implemented) condition in 2012.

Table ES-6
Estimated Annual Gross Toll Revenue
Relocation Scenarios 5, 6, 7, and 8

Fiscal Year	No-Build	Scenario 1B	Percent Impact	Scenario 5	Percent Impact	Scenario 6	Percent Impact	Scenario 7	Percent Impact	Scenario 8	Percent Impact
2011	\$19,780,000										
2012	\$20,194,000	\$15,704,000	-22%	\$16,647,150	-18%	\$16,023,647	-21%	\$23,911,064	18%	\$17,906,017	-11%
2013	\$20,515,000	\$15,969,000	-22%	\$16,874,224	-18%	\$16,240,320	-21%	\$24,161,795	18%	\$18,054,511	-12%
2014	\$20,843,000	\$16,236,000	-22%	\$17,104,396	-18%	\$16,459,923	-21%	\$24,415,155	17%	\$18,204,235	-13%
2015	\$21,175,000	\$16,510,000	-22%	\$17,337,707	-18%	\$16,682,496	-21%	\$24,671,172	17%	\$18,355,202	-13%
2016	\$21,513,000	\$16,787,000	-22%	\$17,574,201	-18%	\$16,908,078	-21%	\$24,929,873	16%	\$18,507,420	-14%
2017	\$21,857,000	\$17,071,000	-22%	\$17,813,921	-18%	\$17,136,711	-22%	\$25,191,288	15%	\$18,660,900	-15%

Note: MAAR assumed to be open in 2012.

However, in order to get a more direct comparison of the financial implications of each Relocation Scenario, it is necessary to compare net toll revenue after the deduction of toll operation and lane maintenance costs. These costs vary among the scenarios depending upon the number of cash and E-ZPass toll lanes assumed under each scenario and the number of hours that each cash plaza will be attended. Table ES-7 shows the estimated revenue for each relocation scenario after deducting for toll operation and lane maintenance costs. A percent comparison against the No Build (MAAR not implemented) condition is shown. Scenario 7 is the only revenue positive scenario when compared against the No Build (MAAR not implemented) condition among these scenarios. Scenario 6 has estimated resultant revenue that recaptures roughly half of the projected revenue loss due to the MAAR (Difference between the No Build (MAAR not implemented) condition and Scenario 1B). Significant toll operation and maintenance cost reductions are realized with Scenario 6. Scenario 8 is estimated to produce resultant revenue that is 12 percent lower than the No Build (MAAR not implemented) condition. Scenario 8 also allows for additional diversion as compared to Scenario 7 due to the ramps to and from the south at Exit 1 not being tolled.

Table ES-7
Estimated Annual Revenue (Gross Toll Revenue Minus Operating and Maintenance Cost)
Relocation Scenarios 5, 6, 7, and 8

Fiscal Year	No-Build	Scenario 1B	Percent Impact	Scenario 5	Percent Impact	Scenario 6	Percent Impact	Scenario 7	Percent Impact	Scenario 8	Percent Impact
2011	\$16,513,000										
2012	\$16,862,000	\$12,372,000	-27%	\$13,290,150	-21%	\$14,201,647	-16%	\$19,757,064	17%	\$14,802,017	-12%
2013	\$17,117,000	\$12,571,000	-27%	\$13,449,224	-21%	\$14,382,320	-16%	\$19,924,795	16%	\$14,888,511	-13%
2014	\$17,376,000	\$12,769,000	-27%	\$13,611,396	-22%	\$14,564,923	-16%	\$20,092,155	16%	\$14,974,235	-14%
2015	\$17,639,000	\$12,974,000	-26%	\$13,774,707	-22%	\$14,748,496	-16%	\$20,262,172	15%	\$15,061,202	-15%
2016	\$17,907,000	\$13,181,000	-26%	\$13,939,201	-22%	\$14,936,078	-17%	\$20,432,873	14%	\$15,147,420	-15%
2017	\$18,178,000	\$13,392,000	-26%	\$14,106,921	-22%	\$15,124,711	-17%	\$20,604,288	13%	\$15,233,900	-16%

Note: MAAR assumed to be open in 2012.

Net revenue reflects deductions for O&M cost.

AET SCENARIOS

The estimated annual gross toll revenue for each of the AET Scenarios is shown in Table ES-8. Scenario 9 and 10 are estimated to produce gross toll revenue that is higher than the No Build (MAAR not

implemented) condition. Scenario 11 is estimated to produce gross toll revenue that is 10 percent lower than the No Build (MAAR not implemented) condition.

Table ES-8
Estimated Annual Gross Toll Revenue
AET Scenarios 9, 10, and 11

Fiscal Year	No-Build	Scenario 1B	Percent Impact	Scenario 9	Percent Impact	Scenario 10	Percent Impact	Scenario 11	Percent Impact
2011	\$19,780,000								
2012	\$20,194,000	\$15,704,000	-22%	\$20,968,000	4%	\$28,858,000	43%	\$18,259,000	-10%
2013	\$20,515,000	\$15,969,000	-22%	\$21,181,000	3%	\$29,016,000	41%	\$18,462,000	-10%
2014	\$20,843,000	\$16,236,000	-22%	\$21,396,000	3%	\$29,174,000	40%	\$18,668,000	-10%
2015	\$21,175,000	\$16,510,000	-22%	\$21,613,000	2%	\$29,333,000	39%	\$18,875,000	-11%
2016	\$21,513,000	\$16,787,000	-22%	\$21,832,000	1%	\$29,494,000	37%	\$19,086,000	-11%
2017	\$21,857,000	\$17,071,000	-22%	\$22,053,000	1%	\$29,655,000	36%	\$19,300,000	-12%

Note: MAAR assumed to be open in 2012.

However, these gross toll revenue estimates for Scenarios 9, 10 and 11 reflect the additional toll revenue due to the \$1.00 surcharge applied to video toll users. In order to get a more direct comparison of the financial implications of the AET Scenarios, it is necessary to compare resultant revenue after the deduction of toll operation and lane maintenance costs, and in particular the added back office costs of identifying and invoicing video toll users. Table ES-9 shows the estimated resultant revenue for each AET scenario after deducting for toll operation, lane maintenance costs, and back office operations. A percent comparison against the No Build (MAAR not implemented) condition is shown. Scenario 10 is estimated to be the only revenue positive scenario when compared against the No Build (MAAR not implemented) condition. Scenario 9 has estimated resultant revenue that is 20 percent lower than the No Build (MAAR not implemented) condition. Scenario 11 is estimated to produce resultant revenue that is 32 percent lower than the No Build (MAAR not implemented) condition.

Table ES-9
Estimated Annual Revenue (Gross Toll Revenue Minus Operating and Maintenance Cost)
AET Scenarios 9, 10, and 11

Fiscal Year	No-Build	Scenario 1B	Percent Impact	Scenario 9	Percent Impact	Scenario 10	Percent Impact	Scenario 11	Percent Impact
2011	\$16,513,000								
2012	\$16,862,000	\$12,372,000	-27%	\$13,428,000	-20%	\$18,050,000	7%	\$11,480,435	-32%
2013	\$17,117,000	\$12,571,000	-27%	\$13,548,000	-21%	\$18,130,000	6%	\$11,599,453	-32%
2014	\$17,376,000	\$12,769,000	-27%	\$13,669,000	-21%	\$18,209,000	5%	\$11,720,203	-33%
2015	\$17,639,000	\$12,974,000	-26%	\$13,791,000	-22%	\$18,289,000	4%	\$11,840,668	-33%
2016	\$17,907,000	\$13,181,000	-26%	\$13,914,000	-22%	\$18,370,000	3%	\$11,962,828	-33%
2017	\$18,178,000	\$13,392,000	-26%	\$14,038,000	-23%	\$18,449,000	1%	\$12,087,664	-34%

Note: MAAR assumed to be open in 2012.
Net revenue reflects deductions for O&M cost.

COMPARISON OF SCENARIOS

DESCRIPTIVE SUMMARY OF TOLLING SCENARIOS

The study was performed for a total of eleven scenarios (Scenario 1 through 11) with additional sub-alternatives regarding toll removal at Exit 11 and 12 ramps as well as assumptions regarding the 500,000 square foot mall development (Mall). Each scenario used various assumptions regarding the location of toll plazas, as well as the type of tolling. A summary of assumptions for the various alternatives are shown in Table ES-10.

ELIMINATION OF TOLLING SCENARIOS

During the course of the study six scenarios were screened out of the final comparison due to negative impacts on traffic or extreme losses of revenue. Table ES-11 presents an overview of these alternatives and the reasons for their elimination.

Scenario 1C with tolls removed from Exits 11 and 12 shows revenue losses that are not being compensated by reduced operation and maintenance (O&M) cost and therefore would have a negative impact on the net revenue basis.

Tolling the MAAR on the bridge crossing the Merrimack River in Scenario 2 would result in a large reduction (35%) in MAAR traffic as compared to a non-tolled implementation of the MAAR. Additional back office operations cost would be incurred from AET on the MAAR and would result in lower net toll revenue than the No Build (MAAR not implemented) condition. Significant reimbursement for the MARR construction to FHWA would be likely.

Scenario 3 with the offset location of a new AET plaza north and south of the MAAR interchange will result in some additional gross toll revenue. However, additional back office operations costs and capital costs associated with removal of the existing Bedford Mainline plaza and AET implementation, as well as, reimbursement for a portion of the MARR construction costs to FHWA would result in lower net toll revenue than the No Build (MAAR not implemented) condition.

Scenario 4C with tolls removed from Exits 11 and 12 allows for a large amount of toll diversion via Exit 12 to U.S. 3 which results in reduced revenue at the main line location. The savings in operating costs as a result of the toll removal at Exits 11 and 12 will not compensate the revenue losses.

Scenario 8 with tolling at the state line in Nashua by means of a new ORT plaza between Exits 1 and 2 as well as tolls at the Exit 2 will result in a reduction of revenue as compared to the No Build (MAAR not implemented) condition. This is the result of a large amount of toll evasion, via the Exit 1 ramps, which are assumed to be toll-free in this scenario. In addition, significant capital cost investment would be required.

Table ES-10
Description of Planning Scenarios

Plaza Location	No-Build (no MAAR) Base Condition for Comparison Purposes Only	Scenario 1A, Exit 10, 11 and 12 Tolled, Bedford Mainline Tolled, No Mall	Scenario 1B, Exit 10, 11 and 12 Tolled, Bedford Mainline Tolled, Mall Open	Scenario 1C, Exit 10 Tolled, No Tolls Exit 11 and 12, Bedford Mainline Tolled, Mall Open	Scenario 2, AET MAAR Bridge, Tolls at Exits 10, 11 and 12, Bedford Mainline Tolled, No Mall	Scenario 3, Offset AET Bedford Mainline, Tolls at Exits 10, 11 and 12, No Mall	Scenario 4A, Exit 10, 11 and 12 Tolled, Bedford Mainline and MAAR Ramps to and from the South tolled, No Mall	Scenario 4B, Exit 10, 11 and 12 Tolled, Bedford Mainline and MAAR Ramps to and from the South tolled, Mall Open	Scenario 4C, Exit 10 Tolled, No Tolls at Exit 11 and 12, Bedford Mainline and MAAR Ramps to and from the South tolled, Mall Open	Scenario 5, New ORT Plaza at Exit 11, Exit 10 Tolled, No Toll at Bedford Mainline and Exit 12, Mall Open	Scenario 6, New ORT Plaza at Exit 10, No Toll at Bedford Mainline and Exit 11 and 12, Mall Open	Scenario 7, New ORT Plaza between Exit 2 and 1, Ramp Tolls at Exit 2 and 1, No Toll at Bedford Mainline and Exits 10, 11 and 12, Mall Open	Scenario 8, New ORT Plaza between Exit 2 and 1, Ramp Tolls only at Exit 2, No Toll at Bedford Mainline and Exits 10, 11 and 12, Mall Open	Scenario 9, New AET Plaza south of Exit 10, No Toll at Bedford Mainline and Exit 10, 11 and 12, Mall Open	Scenario 10, New AET Plaza North of State Line in Nashua, No Toll at Bedford Mainline and Exits 10, 11 and 12, Mall Open	Scenario 11, New AET Plaza South of MAAR, No Toll at Bedford Mainline and Exit 10, 11 and 12, Mall Open
New Development at Exit 10	No-Build	No-Build	Build	Build	No-Build	No-Build	No-Build	Build	Build	Build	Build	Build	Build	Build	Build	Build
Manchester Airport Access Road	No-Build	Build, Toll-Free	Build, Toll-Free	Build, Toll-Free	Build and All Electronic Tolling (AET)	Build, Toll-Free	Ramps to and from the South Tolled	Ramps to and from the South Tolled	Ramps to and from the South Tolled	Build, Toll-Free	Build, Toll-Free	Build, Toll-Free	Build, Toll-Free	Build, Toll-Free	Build, Toll-Free	Build, Toll-Free
Bedford Mainline Plaza	Current Condition	Current Condition	Current Condition	Current Condition	Current Condition	Offset New Bedford Mainline AET	Current Condition	Current Condition	Current Condition	Tolls Removed	Tolls Removed	Tolls Removed	Tolls Removed	Tolls Removed	Tolls Removed	Tolls Removed
Proposed AET Plaza South of MAAR	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	New AET Mainline Plaza South of MAAR
Exit 12 Ramp Tolls to and from the South	Tolled	Tolled	Tolled	Tolls Removed	Tolled	Tolled	Tolled	Tolled	Tolls Removed	Tolls Removed	Tolls Removed	Tolls Removed	Tolls Removed	Tolls Removed	Tolls Removed	Tolls Removed
Exit 11 Ramp Tolls to and from the South	Tolled	Tolled	Tolled	Tolls Removed	Tolled	Tolled	Tolled	Tolled	Tolls Removed	New ORT Mainline Plaza at Exit 11	Tolls Removed	Tolls Removed	Tolls Removed	Tolls Removed	Tolls Removed	Tolls Removed
Exit 10 Ramp Tolls to and from the South	Tolled	Tolled	Tolled	Tolled	Tolled	Tolled	Tolled	Tolled	Tolled	Tolled	New ORT Mainline Plaza at Exit 10	Tolls Removed	Tolls Removed	Tolls Removed	Tolls Removed	Tolls Removed
Proposed AET Plaza South of Exit 10	---	---	---	---	---	---	---	---	---	---	---	---	---	---	New AET Mainline Plaza South of Exit 10	---
Proposed Nashua Mainline Plaza	---	---	---	---	---	---	---	---	---	---	---	New Nashua ORT Plaza	New Nashua ORT Plaza	---	New AET Plaza North of State Line	---
Exit 2 Ramps to and from the South	---	---	---	---	---	---	---	---	---	---	---	New Exit 2 Ramp Plazas	New Exit 2 Ramp Plazas	---	New AET Plaza North of State Line	---
Exit 1 Ramps to and from the South	---	---	---	---	---	---	---	---	---	---	---	New Exit 1 Ramp Plazas	---	---	New AET Plaza North of State Line	---

Note: ORT Open Road Tolling assumes high speed electronic travel lanes for EZPass equipped vehicles close to the median and conventional cash toll collection on the right-hand side of the roadway.
AET All Electronic Tolling assumes high speed electronic toll collection for EZPass equipped vehicles and video tolling for non-equipped vehicles assuming a processing surcharge.

Table ES-11
Reasons for Elimination of Planning Scenarios

Relevant Type of Impact	Scenario 1C, Exit 10 Tolloed, No Tolls Exit 11 and 12, Bedford Mainline Tolloed, Mall Open	Scenario 2, AET MAAR Bridge, Tolls at Exits 10, 11 and 12, Bedford Mainline Tolloed, No Mall	Scenario 3, Offset AET Bedford Mainline, Tolls at Exits 10, 11 and 12, No Mall	Scenario 4C, Exit 10 Tolloed, No Tolls at Exit 11 and 12 , Bedford Mainline and MAAR Ramps to and from the South tolloed, Mall Open	Scenario 8, New ORT Plaza between Exit 2 and 1, Ramp Tolls only at Exit 2, No Toll at Bedford Mainline and Exits 10, 11 and 12, Mall Open	Scenario 11, New AET Plaza South of MAAR, No Toll at Bedford Mainline and Exit 10, 11 and 12, Mall Open
Traffic Impact on Manchester Airport Access Road	----	Large reduction of MAAR traffic	----	----	----	----
Traffic Impacts Local Road Network	----	----	----	Toll diversion via Exit 12 ramps causes significant traffic impacts on local road network	Toll diversion via Exit 1 ramps causes significant traffic impacts on local road network	Toll diversion via Exit 12 ramps causes significant traffic impacts on local road network
Revenue Impacts	Revenue losses at Exits 11 and 12 are not being compensated by additional revenue from Exit 10 and Mall	Combined estimated annual net revenue is lower than No-Build	Combined estimated annual net revenue is lower than No-Build	Revenue losses at Exits 11 and 12 are not being compensated by additional revenue from Exit 10 and Mall / Significant reduction in toll revenue at Bedford Mainline Plaza due to toll diversion at Exit 12	Revenue losses due to toll evasion at Exit 1 ramps	Large reduction in toll revenue due to toll diversion at Exit 12 and toll removal at Exits 10, 11, and 12
Capital Cost	----	Additional capital cost for AET implementation on MAAR	Additional cost for AET implementation at offset mainline location and removal of existing mainline plaza.	----	Significant cost for ORT implementation at mainline and ramp location and removal of existing mainline plaza.	Additional Capital Costs For AET
Operating Cost	Savings in reduced operating cost do not compensate for revenue losses	Increased operating cost due to MAAR tolling	Additional back office costs associated with video toll collection	Savings in reduced operating cost do not compensate for revenue losses	Savings in reduced operating cost do not compensate for revenue losses	Additional back office costs associated with video toll collection
Other		Significant Reimbursement to FHWA	Reimbursement to FHWA	Reimbursement to FHWA		Reimbursement to FHWA

FINANCIAL IMPLICATION OF TOLLING SCENARIOS

A comparison of revenue-related impacts for a No Build (MAAR not implemented) condition and Scenarios 1B, 4B, 5, 6, 7, 9 and 10 is presented in Table ES-12. This table shows estimates of annual gross toll revenue and transactions, operation and maintenance costs, incremental leakage of video toll revenue for AET scenarios, total capital costs, annualized capital cost estimates, and annual net revenue. Annualized capital costs were derived from the preliminary construction cost estimates, for each scenario, using a 20 year period and 5 percent interest rate. The cost and net toll revenue estimates presented in Table ES-12 only includes cost components that will change between the various alternatives. Costs that remain constant, i.e. turnpike administration, etc. are not included in these estimates.

Annual Net Revenue - When comparing the various alternatives, the hypothetical No Build (MAAR not implemented) condition is being used as a base line which revenue and cost amounts are being compared to. The comparison is shown for fiscal year 2012. The No Build (MAAR not implemented) condition in 2012 is estimated to have annual net revenue of \$16.9 million. After deductions of annual operating costs, Scenario 1B is estimated to have annual net revenue of \$12.4 million, resulting in a reduction of the annual net revenue of \$4.5 million compared to the No Build (MAAR not implemented) condition. This would reflect the condition after the MAAR is implemented and tolls are collected at the existing plaza locations in their present day configuration.

Scenario 4B, Scenario 7, and Scenario 10 will be able to capture a similar amount of net revenue as the No Build (MAAR not implemented) scenario (\$16.1 million, \$16.3 million, and \$16.5 million, respectively). Scenarios 6 and 9 are estimated to have a \$12.7 million and \$12.8 million annual net revenue, respectively. Scenario 5 is estimated to produce the lowest net revenue at \$11.3 million.

The transaction and revenue numbers shown above are relative, not absolute, numbers for purposes of comparing the various alternatives. The calculations are based on reasonable and generally accepted practices and assumptions. The capital cost totals and O&M cost assumptions are the result of preliminary cost estimates. The results are not intended for project financing and once a scenario is determined to be implementable, a more detailed in-depth analysis will need to be performed.

DIVERSION IMPACTS

Table ES-13 presents the estimated average weekday volumes in thousands in schematic format for Scenarios 1B, 4B, 5, 6, and 9. Average weekday volumes are shown by direction on the mainline and at each on and off ramp location along the Turnpike between the MAAR and Exit 6. Scenario 4B would result in relatively minor diversion to the Exit 12 ramp (\$0.50) in order to bypass the higher toll (\$1.00) at the new ramp tolls to and from the MAAR.

Scenario 5 would result in diversion around the new mainline plaza located at Exit 11. In the southbound direction, a significant impact would occur at the Exit 11 southbound off ramp where traffic is estimated to increase due to toll diversion of the new mainline toll plaza and due to the addition of a free movement due to the ramp tolls being removed from the Exit 12 southbound on ramp. In addition, traffic that previously exited the Turnpike at Exit 10 will now utilize the Exit 11 off ramp to avoid

Table ES-12
Comparison of Revenue Related Impacts of Planning Scenarios in 2012

Item	Relevant Type of Impact	No-Build (no MAAR) Base Condition for Comparison Purposes Only	Scenario 1B Exit 10, 11 and 12 Tolled, Bedford, Mall Open	Scenario 4B, Exit 10, 11 and 12 Tolled, Bedford, MAAR Ramps to and from the South tolled, Mall Open	Scenario 5, New ORT Plaza at Exit 11, Exit 10 Tolled, No Toll at Bedford and Exit 12, Mall Open	Scenario 6, New ORT Plaza at Exit 10, No Toll at Bedford and Exit 11 and 12, Mall Open	Scenario 7, New ORT Plaza between Exit 2 and 1, Ramp Tolls at Exit 2 and 1, No Toll at Bedford and Exits 10, 11 and 12, Mall Open	Scenario 9, New AET Plaza south of Exit 10, No Toll at Bedford and Exit 10, 11 and 12, Mall Open	Scenario 10, New AET Plaza North of State Line in Nashua, No Toll at Bedford and Exits 10, 11 and 12, Mall Open
1	Annual Gross Revenue	\$20,194,000	\$15,704,000	\$21,829,000	\$16,647,150	\$16,023,647	\$23,911,064	\$20,968,000	\$28,858,000
2	Annual Transactions	26,141,000	21,540,000	28,655,000	21,309,422	19,047,147	25,785,535	18,010,000	24,788,000
3	Annual Operating Cost	\$3,332,000	\$3,332,000	\$4,366,000	\$3,356,000	\$1,822,000	\$4,154,000	\$6,798,000	\$9,351,000
4	Estimated Incremental Leakage AET Revenue	---	---	---	---	---	---	\$742,000	\$1,457,000
5 (= 1 - 3 - 4)	Annual Revenue Minus Operating Cost	\$16,862,000	\$12,372,000	\$17,463,000	\$13,291,150	\$14,201,647	\$19,757,064	\$13,428,000	\$18,050,000
6	Total Construction and Toll Removal Cost Estimate	---	---	\$16,390,000 (2)	\$24,670,000	\$18,415,000	\$43,440,000	\$7,991,000	\$19,260,000
7	Annualized Capital Cost Estimate (1)	---	---	\$1,315,000	\$1,980,000	\$1,478,000	\$3,486,000	\$641,000	\$1,545,000
8 (= 5 - 7)	Net Revenue	\$16,862,000	\$12,372,000	\$16,148,000	\$11,311,150	\$12,723,647	\$16,271,064	\$12,787,000	\$16,505,000
	Net Revenue Comparison against Scenario 1B	\$4,490,000	---	\$3,776,000	(\$1,060,850)	\$351,647	\$3,899,064	\$415,000	\$4,133,000

Note: (1) The annualization of the capital cost assumes a 20 year period and a 5.00% interest rate.
(2) Capital Cost assumes \$14.3 million reimbursement to FHWA for tolled ramp connections to and from the south.

Table ES-13
Estimated Local Diversion Impacts of Tolling Scenarios
Travel Segment between MAAR and Exit 6

Interchange	Total Average Weekday Traffic in Thousands																						
	Scenario 1B			Scenario 4B					Scenario 5					Scenario 6					Scenario 9				
	South-bound	North-bound	Total	South-bound	North-bound	Total	Difference	Percent Difference	South-bound	North-bound	Total	Difference	Percent Difference	South-bound	North-bound	Total	Difference	Percent Difference	South-bound	North-bound	Total	Difference	Percent Difference
MAAR																							
Distance: 2.00 Miles	29.9	29.9	59.8	28.9	28.9	57.8	-2.0	-3.3%	28.6	28.6	57.2	-2.6	-4.3%	29.6	29.6	59.2	-0.6	-1.0%	29.6	29.6	59.2	-0.6	-1.0%
Bedford Road Exit 12																							
	2.8	2.8	5.6	3.8	3.8	7.6	+2.0	+35.7%	3.6	3.6	7.2	+1.6	+28.6%	3.9	3.9	7.8	+2.2	+39.3%	3.8	3.8	7.6	+2.0	+35.7%
Distance: 3.85 Miles	32.7	32.7	65.4	32.7	32.7	65.4	--	--	32.2	32.2	64.4	-1.0	-1.5%	33.5	33.5	67.0	+1.6	+2.4%	33.4	33.4	66.8	+1.4	+2.1%
Continental Blvd Exit 11																							
	4.1	4.1	8.2	4.1	4.1	8.2	--	--	9.6	9.6	19.2	+11.0	+134.1%	4.1	4.1	8.2	--	--	4.1	4.1	8.2	--	--
	5.1	5.1	10.2	5.1	5.1	10.2	--	--	5.1	5.1	10.2	--	--	6.7	6.7	13.4	+3.2	+31.4%	6.3	6.3	12.6	+2.4	+23.5%
Distance: 1.25 Miles	33.7	33.7	67.4	33.7	33.7	67.4	--	--	27.7	27.7	55.4	-12.0	-17.8%	36.1	36.1	72.2	+4.8	+7.1%	35.6	35.6	71.2	+3.8	+5.6%
Industrial Drive Exit 10																							
	6.6	6.6	13.2	6.6	6.6	13.2	--	--	3.0	3.0	6.0	-7.2	-54.5%	12.6	12.6	25.2	+12.0	+90.9%	13.1	13.1	26.2	+13.0	+98.5%
	4.7	4.7	9.4	4.7	4.7	9.4	--	--	4.7	4.7	9.4	--	--	5.5	5.5	11.0	+1.6	+17.0%	4.0	4.0	8.0	-1.4	-14.9%
Distance: 2.19 Miles	31.8	31.8	63.6	31.8	31.8	63.6	--	--	29.4	29.4	58.8	-4.8	-7.5%	29.0	29.0	58.0	-5.6	-8.8%	26.5	26.5	53.0	-10.6	-16.7%
Somerset Pkwy Exit 8																							
	3.0	3.0	6.0	3.0	3.0	6.0	--	--	2.5	2.5	5.0	-1.0	-16.7%	2.5	2.5	5.0	-1.0	-16.7%	2.1	2.1	4.2	-1.8	-30.0%
	11.2	11.2	22.4	11.2	11.2	22.4	--	--	11.8	11.8	23.6	+1.2	+5.4%	12.0	12.0	24.0	+1.6	+7.1%	12.3	12.3	24.6	+2.2	+9.8%
Distance: 0.91 Miles	40.0	40.0	80.0	40.0	40.0	80.0	--	--	38.7	38.7	77.4	-2.6	-3.2%	38.5	38.5	77.0	-3.0	-3.8%	36.7	36.7	73.4	-6.6	-8.2%
Amherst Street Exit 7																							
	4.6	4.6	9.2	4.6	4.6	9.2	--	--	4.2	4.2	8.4	-0.8	-8.7%	4.2	4.2	8.4	-0.8	-8.7%	3.7	3.7	7.4	-1.8	-19.6%
	18.0	18.0	36.0	18.0	18.0	36.0	--	--	18.9	18.9	37.8	+1.8	+5.0%	19.1	19.1	38.2	+2.2	+6.1%	19.9	19.9	39.8	+3.8	+10.6%
Distance: 0.55 Miles	53.4	53.4	106.8	53.4	53.4	106.8	--	--	53.4	53.4	106.8	--	--	53.4	53.4	106.8	--	--	52.9	52.9	105.8	-1.0	-0.9%
Broad Street Exit 6																							
Total Volume for Segment (1) (Average Weekday in Thousands)	221.5	221.5	443.0	220.5	220.5	441.0	-2.0	-0.5%	210.0	210.0	420.0	-23.0	-5.2%	220.1	220.1	440.2	-2.8	-0.6%	214.7	214.7	429.4	-13.6	-3.1%
Total Vehicle Miles Travelled (2) (Average Weekday in Thousands)	363.1	363.1	726.2	361.1	361.1	722.2	-4.0	-0.6%	344.6	344.6	689.2	-36.9	-5.1%	361.1	361.1	722.1	-4.0	-0.6%	352.7	352.7	705.3	-20.8	-2.9%

Note: (1) Difference in total of volumes represents shifting of traffic patterns from or to F.E. Everett Turnpike. Overall magnitude of negative sign is indicative of reduction of traffic using the F.E. Everett Turnpike.
(2) Vehicle miles travelled (VMT) are estimated based on mainline volumes and the distance between the middle of interchanges.
Overall magnitude of difference in VMT is indicative of additional miles travelled on local roads.

paying the mainline toll. In the northbound direction, additional traffic would be expected to exit the Turnpike at Exits 7 and 8 to avoid paying the mainline toll at Exit 11. The northbound entrance ramp at Exit 11 would see a similar impact as the southbound off ramp to Exit 11.

Scenario 6 would result in diversion of the new mainline plaza located at Exit 10. In the southbound direction, the significant impact would occur at the Exit 10 off ramp where traffic is estimated to increase due to toll diversion of the new mainline toll plaza and due to the addition of free movements due to the ramp tolls being removed from the Exit 11 and 12 southbound on ramps. In the northbound direction, additional traffic would be expected to exit the Turnpike at Exits 7 and 8 to avoid paying the mainline toll at Exit 10. The northbound entrance ramp at Exit 10 would see a similar impact as the southbound off ramp at Exit 10.

Scenario 9 would result in diversion patterns similar to Scenario 6, but with a slightly higher magnitude due to the higher toll rate for Exit 10 users and the \$1.00 surcharge for all video toll users.

At the bottom of Table ES-13, a comparison is made between each build scenario against Scenario 1B. The first comparison is for the total amount of mainline volume for the segment between the MAAR and Exit 6. A larger negative impact is indicative of a higher amount of local network diversion. A second comparison is for vehicle miles travelled on the Turnpike. Again, this percentage is indicative of the amount of toll diversion from the Turnpike onto the local network. In Scenario 5, 5.1 percent of the vehicle miles on the total segment are estimated to shift to local routes and in Scenario 9 roughly 2.9 percent of the miles travelled on the entire segment are estimated to divert to local routes. Scenario 4B and Scenario 6 would have little impact (only 0.6 percent of VMT diverted) on the local network.

Table ES-14 presents the estimated average weekday volumes in thousands for Scenario 1, 7, and 10. Average weekday volumes are shown by direction at the mainline and at each on and off ramp location along the Turnpike between the State Line and Exit 3. Scenario 7 would result in diversion around the ramp plazas at Exit 1 and Exit 2 and the new mainline plaza. Traffic at the mainline plaza is estimated to decrease by nearly 15 percent, while traffic at the Exit 1 and Exit 2 ramp plazas would be expected to decrease by roughly 30 percent. Traffic at the border would be reduced by an estimated 19 percent. The ramps to and from the north at Exits 1 and 2 would be expected to increase by 19 percent and 14 percent, respectively. This is a result of the diverted traffic rejoining the Turnpike in the northbound direction after diverting around the Mainline Toll Plaza. In the southbound direction, the off ramps at Exits 1 and 2 serve as the point of diversion to avoid the Mainline Toll Plaza. Scenario 10 results in similar diversion patterns to Scenario 7, except greater in magnitude due to the \$1.00 surcharge for all video toll users. The same volume and VMT comparison was performed along this segment of the Turnpike.

Table ES-14
Estimated Local Diversion Impacts of Tolling Scenarios
Travel Segment between Exit 3 and State Line

Interchange	Total Average Weekday Traffic in Thousands													
	Scenario 1B			Scenario 7					Scenario 10					
	South-bound	North-bound	Total	South-bound	North-bound	Total	Difference	Percent Difference	South-bound	North-bound	Total	Difference	Percent Difference	
Daniel Webster Hwy Exit 3 Distance: 0.77 Miles	50.2	50.2	100.4	48.4	48.4	96.8	-3.6	-3.6%	47.9	47.9	95.8	-4.6	-4.6%	
Circumferential Hwy Exit 2 Distance: 0.48 Miles	8.8	8.8	17.6	10.0	10.0	20.0	+2.4	+13.6%	10.3	10.3	20.6	+3.0	+17.0%	
Spit Brook Road Exit 1 Distance: 0.49 Miles	32.4	32.4	64.8	27.7	27.7	55.4	-9.4	-14.5%	26.7	26.7	53.4	-11.4	-17.6%	
Circumferential Hwy Exit 2 Distance: 0.43 Miles	7.3	7.3	14.6	5.2	5.2	10.4	-4.2	-28.8%	5.0	5.0	10.0	-4.6	-31.5%	
Spit Brook Road Exit 1	5.9	5.9	16.8	4.1	4.1	11.7	-5.1	-30.4%	3.9	3.9	11.1	-5.7	-33.9%	
Exit 36 On-Ramp Distance: 0.54 Miles	45.6	45.6	91.2	37.0	37.0	74.0	-17.2	-18.9%	35.6	35.6	71.2	-20.0	-21.9%	
State Line														
Total Volume for Segment (1) (Average Weekday in Thousands)	209.3	209.3	418.6	184.4	184.4	368.8	-49.8	-11.9%	179.5	179.5	359.0	-59.6	-14.2%	
Total Vehicle Miles Travelled (2) (Average Weekday in Thousands)	115.9	115.9	231.7	103.2	103.2	206.4	-25.3	-10.9%	100.7	100.7	201.4	-30.4	-13.1%	

Note: (1) Difference in total of volumes represents shifting of traffic patterns from or to F.E. Everett Turnpike.
Overall magnitude of negative sign is indicative of reduction of traffic using the F.E. Everett Turnpike.
(2) Vehicle miles travelled (VMT) are estimated based on mainline volumes and the distance between the middle of interchanges.
Overall magnitude of difference in VMT is indicative of additional miles travelled on local roads.

SUMMARY OF REVENUE AND DIVERSION POTENTIAL

In evaluating the Build Scenarios of 4B, 5, 6, 7, 9 and 10, there are not only revenue implications to consider, but also the financial impacts of costs associated with the toll collection concept, and the diversion impacts to the local network. Table ES-15 displays the net revenue of each scenario, a comparison of each Build scenario net revenue against Scenario 1B, plus the percentage reduction of vehicle miles travelled (VMT) along the impacted segments of the Turnpike. The net revenue is the difference of annual revenue minus operating costs and the annualized construction and toll removal cost. The VMT reduction on the Turnpike is an indication of the amount of diversion to the local road network. The VMT to the local network would likely be somewhat higher than the reduction on the Turnpike due to longer travel distances; however this measure of VMT reduction on the Turnpike is a valid measure in which to assess each scenario. Scenario 10 and Scenario 7 produce the highest amount of net revenue, but also result in the largest percentage reduction of VMT along the impacted segment of the Turnpike among the various scenarios. This would have the highest impact on the local road network. Scenario 4B produces slightly lower revenue than the No Build (MAAR not implemented) condition and also is estimated to have very low diversion impacts. Scenario 5 produces lower net revenue than Scenario 1B. Although Scenario 6 is estimated to produce revenue that is only slightly higher than Scenario 1B, it has the benefit of reducing operating costs significantly and offering open road tolling to E-ZPass users. It also has one of the lowest VMT impacts as a percent of the impacted segment.

Table ES-15
Comparison of 2012 Net Revenue and Diversion Impacts

Scenario	Net Revenue	Net Revenue		% VMT Reduction on Impacted Turnpike Segment
		Surplus versus Scenario 1B		
No Build (1)	\$16,862,000	\$4,490,000		---
1B (2)	\$12,372,000			---
4B	\$16,148,000	\$3,776,000		-0.6%
5	\$11,311,150	(\$1,060,850)		-5.1%
6	\$12,723,647	\$351,647		-0.6%
7	\$16,271,064	\$3,899,064		-10.9%
9	\$12,787,000	\$415,000		-2.9%
10	\$16,505,000	\$4,133,000		-13.1%

Note: (1) No Build (no MAAR) is shown as a base condition for comparison purposes only.
(2) Scenario 1B represents the existing Bedford and Merrimack Plazas as they exist today with the MAAR and the Mall open.

ACKNOWLEDGEMENT AND ASSUMPTIONS

Traffic and revenue estimates for the F.E. Everett Turnpike corridor, included in this report, are based on travel demand data provided by the Southern New Hampshire Planning Commission and the Nashua Regional Planning Commission. The estimates were generated using widely accepted, reasonable analytical procedures. However, any deviation from the assumptions used in this study will impact results shown in this document. Actual traffic and revenue, on the F. E. Everett Turnpike, may well differ from forecasts, due to economic conditions, operational conditions, unusual circumstances and other factors outside the control of the forecasters. Such differences could be material.

All estimates and projections in our report are based on experience and judgment and a review of information provided by the planning agencies, New Hampshire Department of Transportation, and data and information collected by WSA, additional information provided to WSA, limited visual observation of conditions at the relevant sites, and a review of other publicly available reports and information. These estimates and projections are not necessarily indicative of actual values or predictive of future results, which may ultimately be more or less favorable than those suggested by our report and are therefore subject to uncertainty.

In addition, annual revenue forecasts, included in this report, are intended to represent a general trend over the long-term of the project life, and not necessarily the revenue in any given year. Traffic and revenue in any given year may well vary from the forecast, based on circumstances which cannot be known at this time. Certain statements made in the report that are not historical facts may constitute estimates, projections, or other forward-looking statements and even though it is believed that such forward-looking statements are reasonable and are based on reasonable assumptions, as of the date in this report, such forward-looking statements, by their nature, involve risks and uncertainties that could cause actual results to differ materially from the results predicted.

This report is necessarily based upon scientific, governmental, market, economic, demographic, and other conditions as in effect on, and information made available to us, as of the date of our report. It should be understood that subsequent developments may affect the estimates or projections expressed in the report and cannot be predicted with certainty. We specifically do not guarantee or warrant any estimate or projections, contained in our report.