

# Shortfalls in MTA's Response to the Army Corp of Engineers

Anticipated Environmental and Other Impacts  
at York Toll Plaza for  
MTA Recommended Option vs. All Electronic Tolling (AET)

Estimated Impacts \ Option	ORT/Cash@ MM 8.8	AET @MM 6.7
NRCS Wetland (Ac)	1.0 <sup>1</sup>	0
Stream (ft)	80 <sup>1</sup>	0
Vernal Pools	2 <sup>1</sup>	0
FEMA Flood Plain (Ac)	0.3 <sup>1</sup>	0
Threatened/Endangered Species Habitat	3 <sup>1</sup>	0
Right-of-Way	0.3 <sup>1,3</sup>	0
Net Environmental Gain	No	Yes
Meets Engineering Requirements	Some <sup>1</sup>	Yes
Safety (Toll collectors and public)	Poor	Best
Satisfies Purpose & Need	Marginally	Best
Customer Service	Poor	Best
Estimated Construction \$	\$ 40.8 M <sup>2</sup>	\$ 3.8 M <sup>2</sup>
Life-cycle Costs/Retained Revenue	Poor	Best

Acceptability: **Best**      **Marginal**      **Worst**

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for

The Town of York, Maine

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## 1.0 Executive Summary

The Maine Turnpike Authority's (MTA) recent recommendation for replacing the existing York Toll Plaza with a new, hybrid toll plaza at Milepost 8.8 that offers cash and open road toll (ORT) options is inconsistent with its own findings.

On March 17, 2010, after studying options for the York Toll Plaza for several years, the Maine Turnpike Authority (MTA) submitted a Draft Phase I report<sup>i</sup> for the environmental review process by the U.S. Army Corps of Engineers (ACOE). In its May 5, 2010 response<sup>ii</sup> to the MTA's initial submittal, the ACOE noted that the MTA:

- did not properly consider safety issues associated with conventional (cash) toll collection;<sup>iii</sup> and,
- dismissed one-way<sup>iv</sup> and all electronic tolling (AET)<sup>v</sup> options inconsistent with Federal Highway Administration Guidelines for environmental review per Section 404 (b)(1) of the Clean Water Act (hereafter referred to as Guidelines).

The MTA commissioned CDM Smith to conduct *"an impact assessment for possible conversion to Open Road Tolling (ORT) or All Electronic Tolling (AET) at two toll plazas on the Maine Turnpike."*<sup>vi</sup> However, this study (Final Draft released on March 18, 2014) does not respond to several ACOE requests. It is also fraught with significant structural and other issues that bias its results against AET. (e.g. Under the direction of the MTA, the CDM Smith study only considered an AET pilot program at these two plazas).<sup>vii</sup> Nevertheless, even with significant bias in their results, *after "considering traffic, toll rates, operating costs, net revenue over a 10-year period, and capital costs to a hypothetical continuation of the current cash collection of tolls"*<sup>viii</sup>:

**The CDM Smith study found AET to be a  
"financially feasible option" at the York Toll Plaza.<sup>ix</sup>**

CDM Smith also noted that: *"AET offers free flow travel for all motorists with lower overall capital costs."*<sup>x</sup>

However, limitations of scope of this study result in biases in the results, including an estimated \$3.00 (passenger car) surcharge<sup>xi</sup> would be required for those customers not actively enrolled in the ETC program (up to 20% of ALL customers). The author is unaware of any MTA policy this would violate, though a \$3.00 surcharge is rarely required. A significant surcharge is normally charged AET customers who use the license plate toll option and do not pre-enroll in the AET program. This is done to avoid those actively enrolling in the AET program from cross-subsidizing the costs of those that do not actively enroll. This is the fair and equitable approach.

This study also stated that: *"The imposition of a \$3.00 video surcharge is also estimated to result in diversion of traffic to US Route 1 from 3,400 to 5,500 per day."*<sup>xii</sup> Further, it appears that traffic diversions from 3,400 to 5,800 per day were assumed to be realized over the long term. This is not likely as these levels of traffic diversion would be a major portion of that traffic assumed not actively enrolled in the AET program. And, even if traffic diversions at these levels did occur initially, the congestion the diverted traffic would encounter on US Route 1 would be so bad that few motorists would leave the MTA mainline a second time and word about the anticipated congestion on the alternative route would be quickly spread amongst the motoring public. i.e. The problem would be self-regulating and not occur over the long term. Further, traffic diversions at these levels have not been experienced elsewhere.

The Mystic River Bridge (60 miles south of the York Toll Plaza) converted to all AET in July, 2014. While highway engineers argued that there would be significant traffic diversion, there was no drop in traffic after AET was installed. In fact, traffic increased by over 7%. (See data below.)

**Total Transactions - Mystic River Bridge  
AET Implemented in July 2014**

<b>Month / Year</b>	<b><u>Aug</u></b>	<b><u>Sep</u></b>	<b><u>Oct</u></b>	<b><u>Nov</u></b>	<b><u>Dec</u></b>	<b><u>Year Total</u></b>
<b>2014</b>	1,029,823	996,819	1,022,968	931,389	959,549	<b>10,677,868</b>
<b>2015</b>	1,122,826	1,056,865	1,102,529	1,003,845	1,022,756	<b>11,023,092</b>
<b>Change</b>	93,003	60,046	79,561	72,456	63,207	<b>345,224</b>
<b>Increase</b>	<b>9.03%</b>	<b>6.02%</b>	<b>7.78%</b>	<b>7.78%</b>	<b>6.59%</b>	<b>7.44%</b>

Source: Massachusetts Turnpike Authority

This is particularly significant because drivers using this facility have three options to avoid AET: US Route 93 (no tolls), the Ted Williams Tunnel (ORT), or the Callahan Tunnel (ORT).

**Even though an abnormally high level of traffic diversion was assumed upon the conversion to AET, CDM Smith found the AET option at the York Toll Plaza financially feasible in spite of the fact that this study suffers from several major shortfalls which bias the results of this work against the AET option at the York Toll Plaza.**

CDM Smith study also noted that

*"the plaza reconstruction cost <of AET> is greatly reduced. As importantly, there is essentially no additional right-of-way typically required, since the gantries are constructed across existing roadways only. AET also has the benefit of virtually eliminating accident risk at toll plaza locations; toll plazas typically represent high accident locations on toll roads across the country." xiii*

On July 23, 2015 the MTA released the results of a Jacob's Engineering study that reviewed the safety and environmental impacts of five alternative solutions for the York Toll Plaza.<sup>xiv</sup> However, even though CDM Smith found AET financially feasible, an AET alternative was not considered for the York Toll Plaza in these analyses. Therefore, the significant environmental and safety benefits of the AET option were not considered. In summary,

**The MTA eliminated the AET option from the York Toll Plaza analyses even though its own advisors found it to be economically feasible.**

This report provides a summary of the information requested by the ACOE and the MTA's response to these requests. Environmental, safety and financial issues not properly addressed by the MTA in its alternatives analyses are also presented.

This report demonstrates that the AET option is, by far, the most environmentally friendly option. It also demonstrates that the AET option eliminates all of the safety issues associated with collection of tolls at the roadside, as well as the costs and risks associated with this type of toll operation. Consideration of all such costs, as well as realistic estimates of net retained revenue, in a life-cycle cost analysis should also demonstrate that AET is the most financially feasible alternative for the York Toll Plaza.

## 2.0 U.S. Army Corps of Engineers (ACOE) Observations/Requests and the MTA's Response

### 2.1 Major Oversights in the MTA Submittal

In its May 5, 2010 response<sup>xv</sup> to the MTA's initial submittal, the ACOE noted that the MTA's analyses:

- did not properly consider safety issues associated with conventional (cash) toll collection;<sup>xvi</sup> and,
- dismissed one-way<sup>xvii</sup> and all electronic tolling (AET)<sup>xviii</sup> options inconsistent with Federal Highway Administration Guidelines for environmental review per Section 404 (b)(1) of the Clean Water Act (hereafter referred to as Guidelines).

**The MTA has yet to appropriately respond to these concerns.**

### 2.2 Other Issues the ACOE Requested the MTA Investigate

The ACOE asked the MTA to investigate:

- 1) *"available and practicable strategies <that> exist to address out of state/country toll collection";<sup>xix</sup> and,*
- 2) *"the percent loss in revenue with high speed electronic toll collection within the context of a mixed tolling arrangement" <including> other state's experiences with this option".<sup>xx</sup>*

**However, the MTA has yet to appropriately respond to these requests.**

A number of commercial options are available to increase the effectiveness of collecting tolls from out of state vehicles, including:

<http://bestpass.com> and <https://platepass.com>

There have also been several mobile apps introduced to help resolve this issue, including:

<https://www.bancpass.com/ptoll/> and <http://www.paytollo.com/>

There is also at least one company currently offering to provide toll payment services through cell phones. Other commercial solutions will also likely be introduced. Collectively, these and other commercial solutions will likely have a significant impact on the ability of the MTA and others to collect out of state tolls.

The CDM Smith Study commissioned and managed by the MTA also assumed a slight increase in Open Road Toll (ORT) violations at the York Toll Plaza - citing no observed increase in violations at the New Gloucester Toll Plaza since introduction of ORT as justification for this. However, though not routinely reported for several reasons, toll authorities throughout North America have been wrestling with escalating ORT violations. In addition, E-ZPass lane violations are not limited to just open road lanes in ORT operations. For example, the E-ZPass lanes on the Pennsylvania Turnpike (gate-free lanes in the toll plazas) have been subject to such fraud and abuse that:

*"When the Pennsylvania Turnpike's fiscal year ended in May <2015>, there were \$33.3 million still outstanding in unpaid tolls."<sup>xxi</sup>*

Therefore, for this study to assume only modest violations in ORT lanes at the York Toll Plaza is overly optimistic and biases the results against AET.

In response to the MTA's initial submittal, the ACOE also asked the MTA to:

3) provide a technical response to York's recommendation to carry the AET option forward into Phase II of the Highway Methodology process that addresses: <sup>xxii</sup>

- a) how losses in toll revenue under the AET toll option might be mitigated
- b) how revenue risks can be reduced to a practicable level, and
- c) the availability and practicability of "innovative enforcement programs".

**The MTA has yet to appropriately respond to these requests.**

The ACOE also asked the MTA to

4) provide a technical response to the Whippoorwill Home Owners Association's (WHOA): <sup>xxiii</sup>

*"compelling arguments that AET is in fact, economically practicable, particularly if the high costs of new toll plaza construction, long-term maintenance costs of a new toll plaza, and employee salaries are eliminated. Equally compelling is their position that the AET would meet the majority of project goals."*

**The MTA has yet to appropriately respond to this request.**

The ACOE also asked the MTA to:

5) *"consider an AET option but with a design that enabled conversion/expansion in the event that "leakage" could not be addressed or exceeded acceptable thresholds."* <sup>xxiv</sup>

**The MTA has yet to appropriately respond to this request.**

### 2.3 MTA's Response to ACOE Requests - A Quick Summary

Of the ACOE requests (above) in response to MTA's initial submittal:

- #1) and #2) were given only cursory review; <sup>xxv</sup>
- #3 a), b) and c) do not appear to have been addressed;
- #4) was not given adequate consideration in the study commissioned by the MTA; <sup>xxvi</sup> and,
- #5) was dismissed though no defensive reason was presented. <sup>xxvii</sup>

On March 18, 2014 the MTA released the results of a CDM Smith study<sup>xxviii</sup> it had commissioned to conduct an independent assessment of conversion to ORT versus pilot AET operations at the York and the Gardiner toll plazas on the Maine Turnpike. CDM Smith developed a detailed model to analyze the potential net revenue impacts of both AET and ORT at each toll plaza. That effort included a waterfall algorithm to estimate revenue recovery rates at different stages in the process and a detailed sensitivity analyses of the impacts of variations in their major assumptions (e.g. the potential impacts of speculative AET pricing surcharges).

Primary objectives of this study commissioned by the MTA and major assumptions in the analyses resulted in the retention of significant bias against AET in the MTA's recent evaluation of alternative solutions for the York Toll Plaza. For example, the MTA study never considered full deployment of AET:

*"The Maine Turnpike Authority may ultimately consider all electronic tolling on the full system in the future, but this analysis only addressed the potential pilot implementation of AET or ORT at the York and/or Gardiner facilities." <sup>xxxix</sup>*

Therefore, under the direction of the MTA, the CDM Smith study only evaluated the benefits of an AET pilot program at two of the 18 (eighteen) toll plazas operated by the MTA. This resulted in many of the costs associated with the ORT option and benefits of the AET option being overlooked. (The impacts of how this assumption biased the MTA's analyses are explained in further detail in the summary of Safety and Financial Analyses below.) Therefore, the results of this study<sup>xxx</sup> are subject to many of the same limitations as the MTA's previous alternative evaluation efforts that were biased against AET.<sup>xxxi</sup>

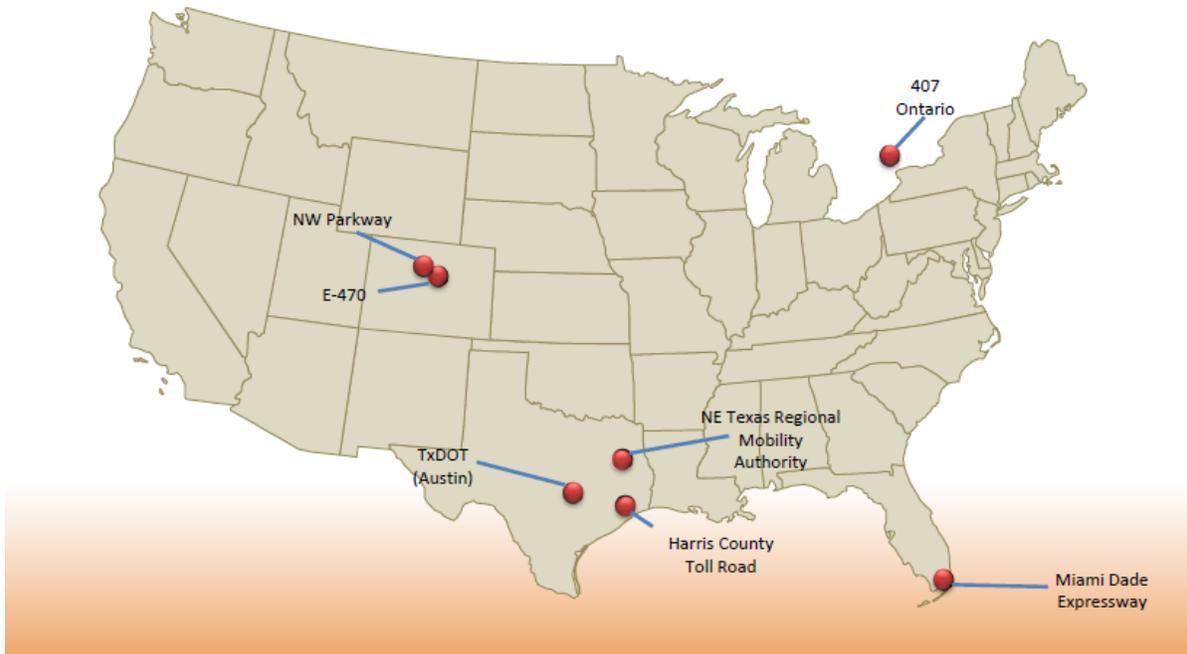
Further, on July 23, 2015 the MTA released the results of a Jacob's Engineering study to review the safety and environmental impacts of five alternative solutions for the York Toll Plaza.<sup>xxxii</sup> However, under the direction of the MTA, an AET option was not considered for the York Toll Plaza in these analyses. Therefore, the significant environmental and safety benefits of AET were not considered; and, as a result, all electronic tolling (AET), a technology successfully introduced on the *Highway 407 ETR* in Toronto, Ontario, in 1997, and successfully implemented at dozens of toll facilities throughout the world since then, has been overlooked in the final options for the York Toll Plaza to be reviewed in detail.

## **2.4 The MTA Dismissed AET - the Most Viable Option for the York Toll Plaza**

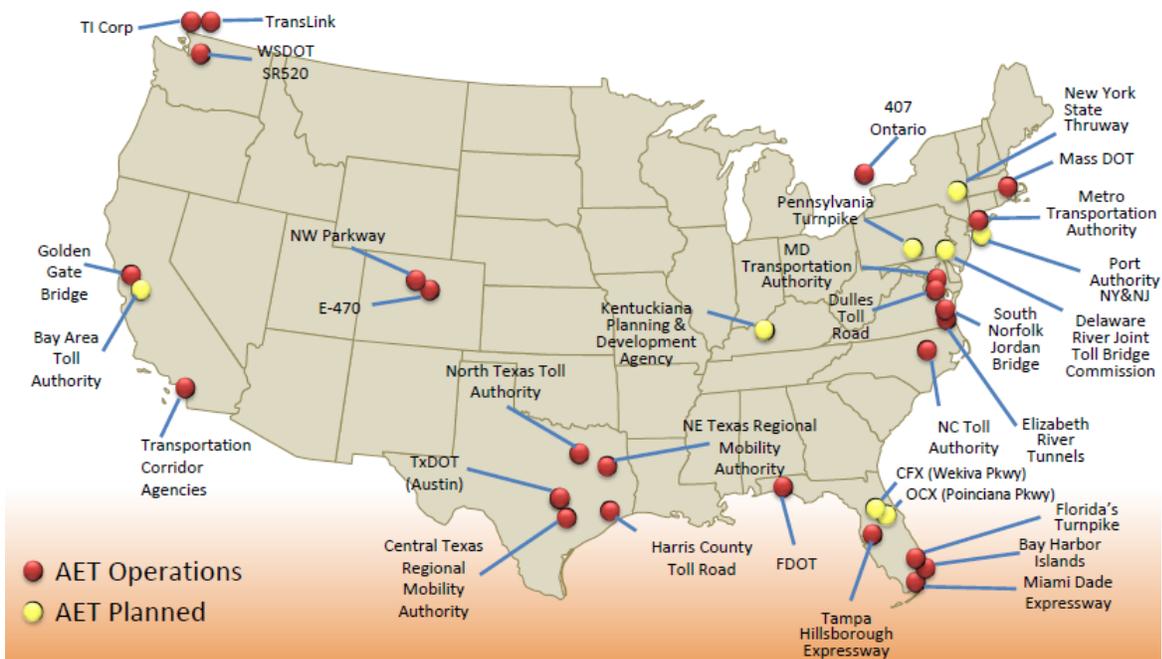
Twenty five toll authorities are currently operating AET successfully in the U.S. and Canada, and several more authorities are planning for the implementation of AET in the near future. There are also several AET operations in South America (Chile, Brazil), Europe, Scandinavia, Japan and Australia, and AET has been recently deployed in the Caribbean and South Africa. Many of these operations have been operating AET successfully for over a decade. These AET operations also span a wide variety of operating conditions, from deploying AET on green-field facilities where the initial transponder penetration was in the low teens when toll collection started (e.g. H407 ETR in Toronto), to successfully collecting tolls from large percentages of vehicles from outside of the country including several operations in Europe.



## All Electronic Tolling (AET) Locations 2010



## All Electronic Tolling (AET) Locations 2015



Source: Central Florida Expressway Authority, February 2016

The Central Florida Expressway Authority, which serves large volumes of out of state travelers, recently studied AET deployments throughout the U.S. and Canada and elected to move forward with AET deployment because AET.<sup>xxxiii</sup>

- a) greatly reduces the environmental impacts of toll collection
- b) reduces capital, operations and maintenance costs
- c) requires less right-of-way
- d) offers increased traffic throughput,
- e) eliminates the safety issues with toll plazas, and
- f) leads to less driver confusion.

Nevertheless, the MTA has dismissed AET again even though the AET option for the York Toll Plaza:

- a) has essentially no environmental impacts (AET actually enables reclamation of several acres of wetlands resulting in a net environmental gain),
- b) eliminates the safety risks (and costs of crashes) of collecting cash tolls at the roadside,
- c) is the better option financially (once all anticipated capital and operating costs and net revenue are considered in a life-cycle cost analysis),
- d) avoids the congestion (and its commensurate environmental impacts) associated with collecting cash tolls at the roadside, and
- e) provides those using the Turnpike with a level of service significantly better than other options.

According to the ACOE:

*"An alternative can only be dismissed if it is not available, not practicable (after considering cost, logistics, and available technology), or more environmentally damaging." xxxiv*

**Since AET is clearly available, the MTA has not demonstrated that AET is not practicable, considering costs, logistics and available technology, and the AET option offers a net positive environmental impact, the AET option should not have been dismissed.**

### 3.0 Environmental, Safety and Financial Issues Not Properly Addressed in MTA's Analyses

Several environmental impacts have been identified with the hybrid toll plaza proposed for Mile Marker 8.8 (refer to summary above), not the least of which is possible intrusion on nearby homes (noise, light and groundwater impacts). The AET solution for upgrade of the York Toll Plaza imposes none of these impacts on the community. Additional details on the environmental and safety benefits of the AET option are presented below.

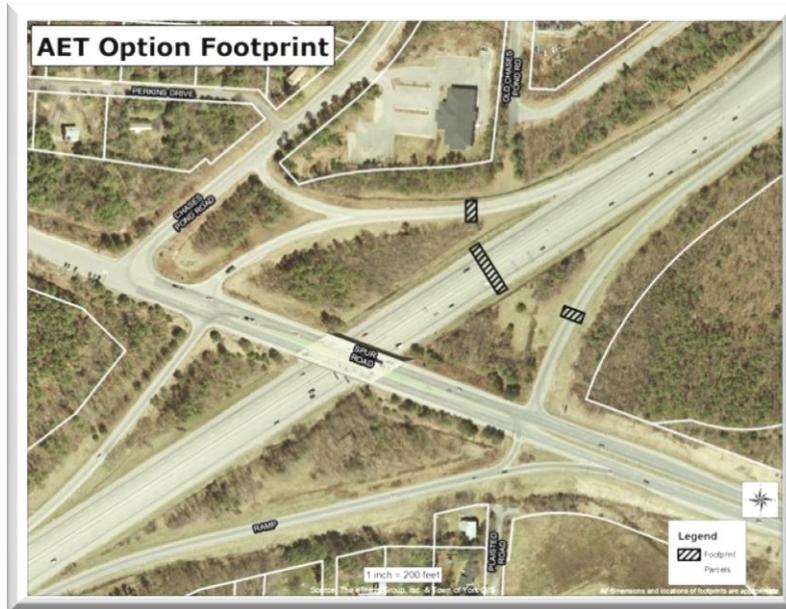
**Residences Near Proposed Location of Relocated York Toll Plaza**



Source: Town of York Maine

### 3.1 Environmental Benefits of an AET Solution for the York Toll Plaza

An AET toll gateway has been proposed immediately North of the Connector at MM 6.7.



**All Electronic Tolling Footprint at Mile Marker 6.7 is the Best Solution from an Environmental Perspective <sup>xxxv</sup>**

**The net aquatic and wetlands environmental impacts of an AET toll gateway at this location are positive.**

An AET toll gateway at this location allows the reclamation of several acres of wetlands once the existing toll plaza footprint outside of the mainline R/W can be abandoned - without transferring the environmental problems at the existing toll plaza to a new location such as the pristine environment that currently exists at MM 8.8.

**An AET toll gateway at MM 6.7 avoids negative impacts to housing.**

The AET option eliminates the need to spread additional salt on the roadway at the toll gateway during inclement cold weather to improve the safety of both vehicles and pedestrians at a barrier toll plaza. The impacts of oil, brake, radiator fluid and other contaminants that, like salt, can leach into the groundwater are also minimized by the AET option because vehicles are not required to stop to pay a toll. Since many of the homes along the MTA corridor in this area are served by groundwater wells, this is a significant environmental benefit of the AET option. Though the recommended location for the new York Toll Plaza at MM 8.8 is not expected to displace existing residences, homes in the area could be significantly impacted by other

environmental impacts such as noise, vehicle emissions and light intrusion should a new hybrid toll plaza be built at that location.

By negating the need to stop and queue vehicles on the corridor, the AET option avoids the heavy vehicle braking and acceleration noise and increased vehicle emissions associated with imposing a stop and go environment on through traffic. The AET option also offers a commensurate reduction in fuel consumption for roadway users. Also, unlike the recommended hybrid toll plaza at MM 8.8, the AET solution at MM 6.7 would not impose visual blight on the corridor, or introduce additional impacts from vehicular noise and emissions. Further, although nighttime lighting would be required at the AET toll gateway, the impacts of this lighting on housing along the MTA corridor at MM 6.7 would be significantly less than the impact of lighting for an ORT and cash toll plaza at MM 8.8 since the interchange immediately south of the proposed AET toll gateway at MM 6.7 is already artificially lit.

### 3.2 Safety Benefits of an AET Solution for the York Toll Plaza

#### **An AET toll gateway immediately North of the Connector at Mile Marker 6.7 is the best solution from a safety perspective.**

The MTA and its advisors repeatedly identify safety as a primary concern in their alternative evaluations for the York Toll Plaza, including providing comparative safety issues between options being investigated. However, the AET option was inappropriately dismissed early in the original analysis (July 2006),<sup>xxxvi</sup> and eliminated from the list of viable options by the MTA during its recent review. Therefore, the significant safety benefits of the AET option have not been given adequate consideration.

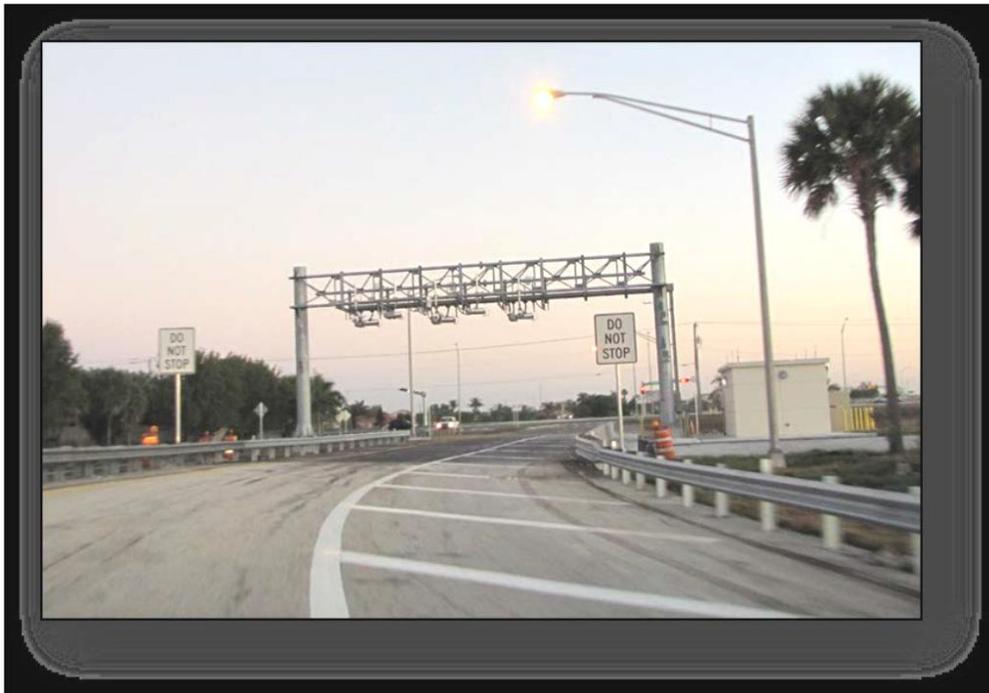
The York Toll Plaza is currently identified as a High Crash Location (HCL) by the Maine DOT.<sup>xxxvii</sup> A summary of Jacob's efforts to review crash data on the Turnpike identifies possible roadway alignment or other geometric issues that could be problematic for location of a toll plaza.<sup>xxxviii</sup> However, no estimates appear to have been made regarding the possible increase in crashes that will occur from introducing a toll plaza at the alternative locations investigated. Cash toll collection at the roadside requires placement of a physical barrier across the roadway to stop vehicles paying the toll. Therefore, the ORT solution proposed by the MTA introduces several major conflicts into the traffic flow. In addition to the physical barriers - the toll booths and safety appurtenances around them, the ORT solution requires vehicles to merge from traffic, slow, get in queue with other vehicles, stop to pay the toll, then accelerate and safely merge back into traffic as they approach mainline speeds. In addition, though a tunnel under the toll plaza can help reduce pedestrian safety issues, pedestrian traffic within the immediate confines of the toll plaza will invariably occur and introduce additional conflict.

Introducing a toll plaza to a mainline corridor creates an inherently dangerous situation where one may not have existed - a phenomenon that is well documented in the literature.

**Relocating an ORT solution for the York Toll Plaza to a "safer" location only relocates the inherent problems associated with the toll plaza environment to the new location.**

A hybrid solution like that being proposed (ORT and cash toll collection) reduces the safety issues somewhat. However, the fact that a barrier toll plaza is proposed where a significant portion of mainline traffic will be required to merge from traffic, successfully navigate through the toll plaza, pay the toll, then merge back with mainline traffic, will cause accidents.

**The AET option for the York Toll Plaza reintroduces free-flow traffic operations on the Maine Turnpike at this location and avoids all of the safety issues associated with a toll plaza in their entirety.**



Source: Central Florida Expressway Authority, February 2016

A recent study funded by SAFER-SIM and the Florida Department of Transportation (FDOT) evaluated the safety effectiveness of converting from traditional mainline toll plazas (TMTP) and Hybrid Mainline Toll Plazas (HMTP) to All-Electronic Toll (AET) collection.<sup>xxxix</sup> (Attached) Before and after data were collected from one hundred mainline toll plazas on more than 750 miles of toll roads in Florida. The data indicate that converting from a TMTP to an AET operation resulted in an average reductions of 77, 76, and 67 percent for total, fatal-and-injury

and Property Damage Only (PDO) crashes, respectively. The safety benefits of converting from a HMTP to an AET operation resulted in reductions of 23, 29 and 19 percent for total, fatal-and-injury, and PDO crashes respectively. <sup>xl</sup> The results of this work demonstrate that converting to an AET operation significantly improves traffic safety for all crash categories, especially, fatalities. Such conversions also change tolling points from amongst the highest risk locations on expressways to posing safety risks associated with routine expressway segments.

**The significance of the risk of fatalities at conventional barrier toll plazas is exemplified by the fact that there have been several fatal crashes at toll plazas in the region in recent years. These include two fatal crashes at the Hampton Toll Plaza on I-95 in New Hampshire, which is essentially an extension of the Maine Turnpike. Two fatal crashes have also occurred at toll plazas in Massachusetts and New Jersey.**

<b>I-95 (New Hampshire)</b>	<b>Hampton Toll Plaza</b>	<b>October 2010</b>
<b>I-95 (New Hampshire)</b>	<b>Hampton Toll Plaza</b>	<b>May 2015</b>
<b>New Hampshire Turnpike</b>	<b>Merrimack Toll Plaza</b>	<b>August 2015</b>
<b>Massachusetts Turnpike</b>	<b>Auburn Toll Plaza</b>	<b>July 2015</b>
<b>Garden State Parkway</b>	<b>Paramus Toll Plaza</b>	<b>October 2015</b>
<b>Atlantic City Expressway</b>	<b>Egg Harbor Toll Plaza</b>	<b>November 2015</b>

**Note that five of these fatal crashes were within the last year!**

Further, although there were no fatalities, in March 2016 six people were injured when a vehicle struck two toll booths at the Newark Toll Plaza on I-95 in Delaware, and four people were injured when a car failed to stop at the Delaware Toll Plaza just outside of Newark.

Crashes involving personal injury are far more frequent and can be catastrophic. Though not a fatal crash, the following video of a tractor trailer crashing through a Dover Toll Booth on the Spaulding Turnpike in May 2015 demonstrates the major risks of collecting cash at the roadside.

[https://www.youtube.com/watch?v=pE\\_83KbHp7g](https://www.youtube.com/watch?v=pE_83KbHp7g)

Treacherous winter driving conditions that frequent this region greatly increase the risk of a serious incident at this location. The fact that a significant share of the motorists using the York Toll Plaza are from out of State, many of whom are unfamiliar with the area and the Toll Plaza, further increases the likelihood of a major incident at this location.

**As long as a physical barrier is used to collect tolls at the York Toll Plaza, a major vehicular crash (whether it is at its current location or a new location) is not a matter of IF, but WHEN.**

Estimates of the costs of all such crashes should be included in the life-cycle cost analyses conducted for the alternatives analyses reviewing options for the York Toll Plaza. As with other costs of AET conversion, these costs should be estimated on a systems-wide basis.

**Thefts at roadside toll collection points are a safety issue that also appear to have been overlooked by the MTA.**

Theft at roadside toll collection points pose significant risk to MTA personnel and the public - exemplified by two recent robberies at toll plazas in the North East. On Sunday afternoon, January 10, 2016, at an East Orange tollbooth on the Parkway. The perpetrator

*"leaned into the tollbooth, pushed the attendant out of the way and took money from the drawer before he drove away,"<sup>xli</sup>*

Though revenue loss from this incident was likely limited by cash drawer management policies established by the authority, collecting cash at the roadside poses a significant risk to life and limb for both MTA personnel and the public at large during such robberies. These events exemplify the risks of armed robbery where cash is collected at the roadside - a risk that can be more effectively managed in a customer service center environment through the implementation of AET.

### **3.3 Shortfalls in the MTA's Financial Analyses**

Good industry practice suggests that a financial analyses of alternative options for a project of this magnitude (refurbishing or relocating the York Toll Plaza) consist of a review of the life-cycle costs of the most-likely operating scenario for each option being considered, as well as a sensitivity analysis of the possible impact on the results of variations in major assumptions. However, the MTA's financial analysis falls significantly short of expectations.

Structurally, there are three significant oversights in the financial analyses of the AET option:

- a) Estimates were developed of retained revenue (vs. life-cycle costs that consider net revenue). The MTA commissioned study also appeared to focus on a worst case (assuming estimated worst case conditions) instead of estimating the results of the most likely scenario. This appears to have included assuming that significant revenue losses and diverted traffic would be sustained throughout the 10 year study period instead of the most likely scenario. This suggests that MTA management would do nothing to manage toll operations to improve revenue collections, reduce violation activity and minimize diversion over time. One has to assume that this would not be the case.

b) The study commissioned by the MTA only considered deployment of a pilot AET toll operation at the York and Gardner toll plazas. The remainder of the MTA operation was assumed to operate "as is", which is mostly in conventional (cash) toll collection mode. Therefore, cost savings from AET operations at the 16 (sixteen) remaining toll plazas on the Turnpike - locations not affected by out-of-state traffic and the challenges associated with collecting these tolls as the York Toll Plaza location - were not considered.

When analyzing AET, economies of scale must also be considered. Amortizing the fixed costs of back office operations of AET over all 18 locations is a key component of the total cost savings. As part of their AET conversion plan, the Massachusetts Department of Transportation will be computerizing the reading and, upon conversion, invoicing all cash users throughout their system. Each license plate becomes an account that can be invoiced on a scheduled basis. Because the single largest group of cash payers on the Maine Turnpike are Mainers, it is easier to enforce the collection of non-cash tolls on these customers.

c) The study commissioned by the MTA only considered a 10 year study period. Since the analysis compared the AET option with a hybrid toll plaza offering ORT and conventional cash toll collection,<sup>xiii</sup> limiting the study to only 10 years did not require consideration of the significant costs of maintaining the conventional toll operation facilities in the out-years, as well as the salaries of the staff required to sustain conventional toll operations at the roadside on a 24/7 basis - nor did it consider the significant cost savings that would be realized by AET during this period. Some of the greatest savings in labor expenses can be achieved by converting to AET at the less traveled toll plazas because all 18 locations are currently manned 24 hours per day, 7 days a week in both directions.

These structural anomalies are significant and bias the results of this evaluation effort against AET. A number of other anomalies also bias the results of these analyses against AET. The more significant of these include:

- a) Estimates of the more significant benefits of converting to an AET operation (including significant enhancements in both environmental and safety conditions) are not considered in the financial analyses.
- b) AET toll surcharges and fees assumed are inconsistent (higher) than those typically encountered on AET operations, and the reasons for establishing these surcharges are inconsistent with Good Industry Practice for pricing AET operations.<sup>xiii</sup>

- c) HNTB's estimate for the capital costs of ORT conversion at the existing toll plaza (\$36.0 million) was used.<sup>xiv</sup> However, Jacobs' recent report (16 Nov 2015) estimates relocation costs to MM 8.8 at \$40.8 million.<sup>xiv</sup> The cost analyses should be updated to include current estimates of costs associated with providing ORT at the recommended York Toll Plaza relocation site.
- d) Traffic diversion estimates are based on surcharges significantly greater than those likely to occur - and it appears that these traffic diversion estimates are assumed to occur through the entire ten year financial analysis. Should such levels of traffic diversions occur, especially over an extended period of time, action would certainly be taken to effectively reduce these diversions.
- e) Toll revenue shrinkage in cash toll operations do not appear to have been adequately considered in the financial analyses. Revenue leakage in cash toll operations is typically significant and admittedly a problem at the MTA based on observed reduced "*run-through violation rates*" at the New Gloucester Toll Plaza after violation enforcement systems were installed in the conventional lanes.<sup>xvi</sup> Run-through violation rates are just one of many sources of "leakage" (revenue losses) in cash toll lanes - all which should have been addressed in the MTA's alternatives analyses.
- f) The business rules for ORT operations associated with license plate tolling and violations enforcement were assumed to be significantly different than those assumed for AET operations. However, the business rules for managing these issues in both operations need to be similar to sustain viability of toll operations in each mode over the long-term.

## 4.0 Summary

The proper review and evaluation of options for the York Toll Plaza requires an investigative effort that responds to observations and requests of the ACOE, and includes an unbiased review and consideration of all options, issues and risks so that a prudent and responsible decision can be made. This measure of care and responsibility, commonly referred to as due diligence, is especially critical when public expenditures and safety risks as significant as those encountered at conventional mainline barrier toll plazas are being considered. Conducting such a review requires a thorough assessment of all aspects of the project, environmental, technical, financial and socio-political, to ensure that the best decision is made.

From an environmental perspective, an unbiased review clearly denotes the benefits of AET when compared to the MTA's preferred option. (A summary of anticipated environmental and other impacts for both options is provided below.) Of particular note is the fact that the AET option (even if implemented system-wide) requires no additional right-of-way beyond the existing footprint of the Maine Turnpike - versus projected right-of-way impacts of relocating just the existing York Toll Plaza at MM 8.8 of 0.3 acres (an estimate that is misleading because it does not include land already purchased by the MTA, or land that may be required to build an access road to the new administration building).

In fact, in addition to offering NO additional environment damage, NO vehicles stopping and creating pollution, and less heavy salting, the AET solution enables reclamation of several acres of wetlands that have been damaged. The environmental footprint of the Maine Turnpike also becomes significantly smaller when AET is implemented throughout the entire system.

The MTA's analysis of options for this project does not adequately consider some critical issues, while giving inappropriate credence to others. This has resulted in the MTA offering a short-list of options for public review and comment that do not pass the scrutiny of an independent assessment. The MTA's review of alternatives for the York Toll Plaza is based on faulty logic and reasoning. A more thorough and current review of the facts is necessary to ensure that an appropriate decision is made on the best way to resolve the York Toll Plaza relocation issue.

**Anticipated Environmental and Other Impacts  
at York Toll Plaza for  
MTA Recommended Option vs. All Electronic Tolling (AET)**

Estimated Impacts \ Option	ORT/Cash@ MM 8.8	AET @ MM 6.7
NRCS Wetland (Ac)	1.0 <sup>1</sup>	0
Stream (ft)	80 <sup>1</sup>	0
Vernal Pools	2 <sup>1</sup>	0
FEMA Flood Plain (Ac)	0.3 <sup>1</sup>	0
Threatened/Endangered Species Habitat	3 <sup>1</sup>	0
Right-of-Way	0.3 <sup>1,3</sup>	0
Net Environmental Gain	No	Yes
Meets Engineering Requirements	Some <sup>1</sup>	Yes
Safety (Toll collectors and public)	Poor	Best
Satisfies Purpose & Need	Marginally	Best
Customer Service	Poor	Best
Estimated Construction \$	\$ 40.8 M <sup>2</sup>	\$ 3.8 M <sup>2</sup>
Life-cycle Costs/Retained Revenue	Poor	Best

Acceptability: Best      Marginal      Worst

1) "Southern Toll Plaza, Technical Memorandum on Alternatives Analysis (draft)", Jacobs Engineering, Evaluation Matrix, July 23, 2015.

2) "Maine Turnpike ORT/AET Analysis (Final Draft)", CDM Smith, March 18, 2014, pg. ES-3.

3) Potential Right-of-Way Impacts includes only land that would need to be acquired and used as a right-of-way for the new toll facility. Land already purchased by the MTA and land that may be required to build an access road to the new administration building is not included in this estimate.

## References

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- <sup>i</sup> "Maine Turnpike Southern Toll Plaza Replacement Study, Draft – Phase I Report", for submittal to the U.S. Army Corps of Engineers, HNTB Corporation, November 5, 2009.
- <sup>ii</sup> Additional Information Required, Application # NAE-2007-01211, Maine Turnpike Authority, Attachment to letter from Jay Clement (ACOE) to Conrad Welzel (MTA), May 5, 2010.
- <sup>iii</sup> IBID, Part 1, Existing Conditions, Section b.
- <sup>iv</sup> IBID, Part 2, Existing Site Evaluation, Section 2.c.
- <sup>v</sup> IBID, Part 2, Existing Site Evaluation, Section 2.d. (1)
- <sup>vi</sup> "Maine Turnpike ORT/AET Impact Analysis (Final Draft)", CDM Smith, March 18, 2014, pg. ES-1.
- <sup>vii</sup> IBID, pg. 1.
- <sup>viii</sup> IBID, pg. ES-4.
- <sup>ix</sup> IBID., pg. ES-4.
- <sup>x</sup> IBID, pg. ES-4.
- <sup>xi</sup> IBID., pg. ES-2.
- <sup>xii</sup> IBID. pg. ES-2.
- <sup>xiii</sup> IBID. pg. 3.
- <sup>xiv</sup> "Southern Toll Plaza, Technical Memorandum on Alternatives Analysis (draft)", Jacobs Engineering Group, July 23, 2015
- <sup>xv</sup> Additional Information Required, Application # NAE-2007-01211, Maine Turnpike Authority, Attachment to letter from Jay Clement (ACOE) to Conrad Welzel (MTA), May 5, 2010.
- <sup>xvi</sup> IBID, Part 1, Existing Conditions, Section b.
- <sup>xvii</sup> IBID, Part 2, Existing Site Evaluation, Section 2.c.
- <sup>xviii</sup> IBID, Part 2, Existing Site Evaluation, Section 2.d. (1)
- <sup>xix</sup> IBID, Part 2, Existing Site Evaluation, Section 2.d. (3)
- <sup>xx</sup> IBID, Part 2, Existing Site Evaluation, Section 2.e.
- <sup>xxi</sup> "Investigation: Hundreds Don't Pay Turnpike Tolls Each Day", CBS Pittsburgh, November 2, 2015.
- <sup>xxix</sup><sup>xxii</sup> IBID, Town of York Submittal.
- <sup>xxiii</sup> IBID. WHOA Submittal.
- <sup>xxiv</sup> IBID, Part 2, Existing Site Evaluation, Section 2.p.
- <sup>xxv</sup> "Practicability of All-Electronic Tolling at the York Toll Plaza", Attachment 1, Final ACOE Response, MTA latest submittal to ACOE, September 1, 2015, pgs. 3-5.
- <sup>xxvi</sup> IBID, pgs. 7-8.
- <sup>xxvii</sup> IBID, pg. 5.
- <sup>xxviii</sup> "Maine Turnpike ORT/AET Impact Analysis (Final Draft)", CDM Smith, March 18, 2014.
- <sup>xxix</sup> IBID, pg 1..
- <sup>xxx</sup> Op cit.
- <sup>xxxi</sup> "York Toll Plaza Upgrade Options, A Realistic Approach", The eTrans Group, Inc., April 23, 2010.
- <sup>xxxii</sup> "Southern Toll Plaza, Technical Memorandum on Alternatives Analysis (draft)", Jacobs Engineering Group, July 23, 2015
- <sup>xxxiii</sup> Central Florida Expressway, February 2016.
- <sup>xxxiv</sup> "Additional Information Required, Application # NAE-2007-01211", Maine Turnpike Authority, Attachment to letter from Jay Clement (ACOE) to Conrad Welzel (MTA), Part 2, Existing Site Evaluation, Section 2.b, May 5, 2010.
- <sup>xxxv</sup> "York Toll Plaza Upgrade Options, A Realistic Approach", The eTrans Group, Inc. April 23, 2010.
- <sup>xxxvi</sup> IBID., pg. 9.
- <sup>xxxvii</sup> "Southern Toll Plaza, Technical Memorandum on Alternatives Analysis (draft)", Jacobs Engineering Group, July 23, 2015, pg. 6.
- <sup>xxxviii</sup> "Southern Toll Plaza, Technical Memorandum on Alternatives Analysis (draft)", Jacobs Engineering Group, July 23, 2015, , pgs. 5-6.
- <sup>xxxix</sup> "Safety Evaluation of All-Electronic Toll Collection System (TRB 15-2700)", Muamer Abuzwidah and Mohamed Abdel-Aty, University of Central Florida, Orlando, Florida, 2015.
- <sup>xl</sup> "IBID.

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<sup>xli</sup> NJ.com, January 15, 2016.

<sup>xlii</sup> *"Maine Turnpike ORT/AET Impact Analysis"*, CDM Smith, March 18, 2014, pgs. ES 2-3.

<sup>xliii</sup> *"Dispelling the Myths: Toll and Fuel Tax Collection Costs in the 21st Century"*, Fleming, etal, Policy Study No. 409, the Reason Foundation, November 2012, pgs 24 to 28.

<sup>xliv</sup> *"Maine Turnpike ORT/AET Impact Analysis"*, CDM Smith, March 18, 2014, pgs. ES 2-3.

<sup>xlv</sup> *"Southern Toll Plaza, Technical Memorandum on Alternatives Analysis (draft)"*, Jacobs Engineering Group, July 23, 2015, , pg. 15.

<sup>xlvi</sup> *"Maine Turnpike ORT/AET Impact Analysis"*, CDM Smith, March 18, 2014, pg. 2.

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**CONTROL SHEET**

**PROJECT:** York Toll Plaza Upgrade (Phase 2)

**DOCUMENT TITLE:** Shortfalls in MTA's Response to the Army Corp of Engineers

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