Date	To
January 26, 2017	Maine Turnpike Authority
	From
Technical Memorandum	HNTB
	Subject
	Southern Toll Plaza: Existing Site Conceptual Replacement Options

HNTB

At the request of the Maine Turnpike, HNTB re-evaluated conceptual costs estimates associated with replacing the existing York Toll Plaza located at MM7.3. Three options were re-evaluated and are summarized below.

1) Option 1A – Renewal and Replacement with Geotechnically Supported Toll Islands/Bumpers/Slabs: Retain existing toll booths and canopy, with new concrete island, bumpers and concrete slabs (structural and roadway). New concrete elements are assumed to be pile supported consistent with concepts applied at Exit 63 – Gray Interchange and to be applied at Exit 44 – Scarborough (I-295). Additionally, this option applies the renewal and replacement cost delta between existing and new plaza at existing locations (as developed in 2008/2009) inflated to 2017 dollars.

2) Option 1B – Replace in Kind: All existing infrastructure to be replaced with new in exact same location with same horizontal highway geometry (i.e. no highway widening). Minor vertical improvement assumed included to adjust highway approaches to new concrete slabs. Vertical adjustments assumed to be constructed with "lightweight fill/advanced soil construction." New concrete islands, bumpers, slabs, toll booth, canopy, tunnel assumed to be pile supported consistent with concepts applied at Exit 63 – Gray Interchange and to be applied at Exit 44 – Scarborough (I-295). Cost estimate increased due to shear complexity of constructing a new toll plaza in same location as existing while maintaining toll operations.

3) Option 2 – Replace 200' north with marginally improved highway geometry: New toll plaza located 200' north with improvements to horizontal geometry requiring ROW and Environmental impacts. Vertical adjustments assumed to be constructed with "lightweight fill/advanced soil construction." New concrete islands, bumpers, slabs, toll booth, canopy, tunnel assumed to be pile supported consistent with concepts applied at Exit 63 – Gray Interchange and to be applied at Exit 44 – Scarborough (I-295).

Table 1 - Conceptual Cost Estimates

Option	Conceptual Cost (2017 $$)
Option 1A	$26.0M
Option 1B	$34.5M
Option 2	$38.2M

*Unit costs for Tolling Infrastructure (toll island, bumpers, slabs, toll booths, canopy) developed based on Exit 52, Exit 53, and Exit 63

*Unit costs for Geotechnical Infrastructure and New Tunnel developed from Exit 44 Engineer's Estimate

*Conceptual Costs noted above include Construction Engineering (24%).

Turnpike Exhibit S

York Meetings 2006 - 2016

2014-10-14	Workshop on wetland mapping	MTA	Dean Lessard, Dick Bilden, MTA Staff
2014-10-16	MTA Board Meeting-wetland mapping presentation	MTA	MTA Board and Staff, Think Again
2014-10-20	Think Again Meeting	Norma's	Erin Courtney, Sara Zografos, Think Again
2014-12-18	MTA Board Meeting- plaza sizing presentation	MTA	MTA Board and Staff, Think Again
2014-12-18	Workshop on plaza sizing	MTA	Dean Lessard, Dick Bilden, David Linney, MTA Staff & Jacobs
2015-03-23	Pre Board Meeting Workshop on exisitng plaza location	MTA	Dean Lessard, Dick Bilden, MTA Staff
2015-03-26	MTA Board Meeting-existing site presentation	MTA	MTA Board and Staff, Think Again
2015-05-28	MTA Board Meeeting	MTA	MTA Board and Staff
2015-06-25	MTA Board Meeting- alternative site matrix	MTA	MTA Staff, Think Again
2015-06-25	Workshop on alternative site matrix	MTA	Dean Lessard, Dick Bilden, David Loane, MTA Staff
2015-07-23	MTA Board Meeting	MTA	MTA Board and Staff
2015-07-27	York Selectmen's Meeting	York	Peter Mills, Bruce Van Note, York
2015-08-03	Workshop-answer questions on the evaluation matrix	MTA	MTA Staff, Think Again, York
2015-09-03	MTA Board Meeting-public comment on the alternative sites matrix	MTA	MTA Staff and Board, Think Again, York

Turnpike Exhibit S

York Meetings 2006 - 2016

Date	Reason for meeting	Where	Attendees
2006-09-26	Town Mangers meeting	York Maintenance	Towns of York, Ogunquit, Wells, MTA Staff
2006-10-25	Joint Select Board Meeting	Ogunquit Town Hall	Towns of York, Ogunquit, Wells, MTA Staff
2007-03-21	Presentation to York County Delegation		York County Legislators, MTA Staff
2007-08-09	Legislative Tour and Briefing	York Toll Plaza	Legislators, MTA Staff
2007-08-10	Legislative Tour and Briefing	York Toll Plaza	Legislators, MTA Staff
2007-09-21	Legislative Tour and Briefing	York Toll Plaza	Legislators, MTA Staff
2007-11-29	Town Mangers meeting	Tour of York Toll	Towns of York, Ogunquit, Wells, MTA Staff
2007-12-10	Legislative Tour and Briefing	York Toll Plaza	Legislators, MTA Staff
2008-01-22	Town Mangers meeting		Towns of York, Ogunquit, Wells, MTA Staff
2008-01-23	Joint Select Board Presenation	Ogunquit Town Hall	Towns of York, Ogunquit, Wells, MTA Staff
2008-02-15	Town Mangers meeting		Towns of York, Ogunquit, Wells, MTA Staff
2008-02-27	Public Meeting	York Middle School	Members of the public (about 40 signed in) MTA and HNTB Staff
2008-04-03	Public Meeting	York Middle School	Members of the public (over 350 signed in), Think Again, Town of York, MTA and HNTB Staff

Turnpike Exhibit S

York Meetings 2006 - 2016

2008-04-29	MTA/York Meeting	MTA	MTA Staff, MTA Board, York Selectmen
2008-05-15	Authority and York Selectmen meeting	York Beach Fire Station	MTA Staff, Think Again, HNTB, York Selectmen, Town of York
2009-06-19	Presentation of the York Toll Existing Site Feasibility Study	MTA	MTA Board members and Staff, York selectmen
2009-09-03	Letter to Joan Jarvis from Conrad Welzel with answers to questions they submittted on the Existing Site Evaluation		
2009-09-09	Letter from Chairman Conley to York regarding the Resolution to accept the Recommendations from HNTB		
2009-10-26	Second set of answers sent to Think Again		
2009-11-05	Authority and York Selectmen meeting	MTA	Members of the public (about 50 signed in) Think Again, MTA Board and Staff
2009-12-16	Abutters meeting	York Middle School	Abutters, MTA and HNTB Staff
2010-01-21	Public Meeting	York Middle School	Members of the public, Think Again, Dawn Hill, Town of York, MTA and HNTB Staff
2010-02-10	York Water District meeting		YWD, HNTB, MTA Staff
2012-03-08	York Water District meeting	YWD	YWD, HNTB, MTA Staff
2014-05-14	Think Again Meeting	Norma's	Sara Zografos, Peter Mills, Think Again
2014-09-15	Think Again Meeting	Norma's	Erin Courtney, Sara Zografos, Think Again

Turnpike Exhibit S

York Meetings 2006 - 2016

2015-11-19	MTA Board Meeting	MTA	MTA Staff and Board
2016-05-26	MTA Board Meeting Executive Session	MTA	MTA Staff and Board
2016-06-23	MTA Board Meeting Executive Session	MTA	MTA Staff and Board
2016-10-05	Public Meeting	York Maintenance	MTA Staff and Board, Think Again, York

Maine Turnpike Authority

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January 28, 2017

Jay L. Clement, Senior Project Manager, Maine Project Office
Department of the Army, New England District, Corps of Engineers
675 Western Avenue #3
Manchester, Maine 04351

Re: Southern Toll Plaza for Maine Turnpike Authority USACE No: NAE-2007-01211

Dear Mr. Clement:

Owens McCullough has responded separately to Questions 1 through 3 on stormwater issues. This letter responds to Questions 4 and 5, the tolling questions, posed in your email of December 5, 2016.

The Alternatives Analysis

Primary opposition to this application is from York residents who argue that the Turnpike should abandon cash tolls at York and attempt instead to collect 4.4 million annual transactions by photographing license plates, searching for addresses and billing by mail.

If the abandonment of cash collection is not practicable, it seems undisputed that the best location for a new ORT plaza is at Mile 8.8. There is clear evidence that this is the Least Environmentally Damaging Practicable Alternative (LEDPA) for continuing to offer patrons the opportunity to pay cash.

The nature and extent of environmental impact to wetlands, vernal pools, streams, and habitat have not been raised as an issue. Indeed, the relatively small proposed impacts at Mile 8.8 are fully mitigated by proposals in the application.

The remaining issue, as framed by intervenors, is whether the Turnpike should be required to adopt All Electronic Tolling (AET), a system that is not "electronic" but is intensely manual. The Turnpike has studied and rejected AET in a well considered decision reached after a lengthy period of deliberation and public engagement. In exercise of its statutory and fiduciary duties, the MTA board cannot responsibly abandon cash collection at the York toll at any time within the foreseeable future.

The question, then, is whether tolls, both cash and electronic, will be collected in a new ORT plaza at Mile 8.8 or at the existing slow speed barrier toll that fails to meet the purpose of this project or the needs of the fifteen million motorists who pass through the York toll each year.

The means and methods of electronic tolling are complex. The purpose of this letter is to answer some good open questions that continue to be asked and to add to the store of information contained in our application.

January 28, 2017

General Issues to Place the York Tolling Decision in Context

Questions 4 and 5 raise broad issues about tolling that deserve discussion with supplemental materials that we have attached. These issues include:

1. What factors in the tolling climate at York (or more generally in Maine and New Hampshire) make it necessary to continue collecting cash?
2. What conditions in Massachusetts led to a different decision?
3. Are the decisions made by Maine based on data that is consistent with national experience?
4. How does the York toll conversion fit within the Turnpike's system?

1. What is Different about Maine?

Attachment A is a letter from Gary Quinlin of January 12, 2017, summarizing what distinguishes Maine's tolling environment based on his national perspective. His points include:

1. Maine's high cash market share;
2. the high proportion of out-of-state motorists;
3. the prevalence of low frequency users;
4. nearby routes that offer alternatives to turnpike travel;
5. conflicting customer protocols arising from adopting AET at only one plaza; and
6. the absence of reliable data from DMV records.

Additional points are made in our answers below, but one thing should be said about Mr. Quinlin's comment number 6 on Maine DMV data. The fact that 17% of Maine motorists fail to keep their addresses on file with the Secretary of State is not a function of state system obsolescence. It is a product of general neglect or reluctance by motorists to keep their addresses current. The problem is universal. In Maine, it is compounded by the fact that vehicle registrations are purchased and renewed at town offices with attendant delays in getting data into the DMV.

Regardless of the cause, the point is well made that the absence of current DMV data, not only in Maine but in other jurisdictions, is a significant reason for widespread losses in AET toll collections. The Maine Turnpike Authority encounters this problem every day as we attempt to reach violators whose plates we have photographed. Our diurnal bundles of returned mail are voluminous. Yet the scale of our current violation enforcement system is tiny compared to what AET would require.

2. Massachusetts in Contrast to Maine

Interchanges built on the Massachusetts Turnpike are functionally obsolete and not capable of hosting cash toll collections. As AECOM, their consultant, explained in 2012 at the beginning of a voluminous analysis:

> To economize construction on these early expressways, the limited-access interchanges were designed to funnel all movements, entry and exit, east-bound and west-bound, into a single toll collection point where staffed toll collection operations were conducted. These "trumpet" type interchanges – named for their resemblance to the bell and tubing of a trumpet – are functionally obsolete by today's engineering standards and no longer employed in modern construction. In order to focus all traffic onto a single point, the trumpet interchange ramps are configured with tight-radius curves and short approaches into the toll plaza. Traffic movements are very circuitous and slow.
>
> See page ES-2 of Enclosure B.

Highway and interchange constraints made it almost impossible for Massachusetts to continue collecting cash within their legacy system. An October 2013 article from TollRoadsNews (Enclosure D) explains that Massachusetts was also motivated by development opportunities arising from abandoning cash tolls in places like Allston:

> The project called the Allston Interchange or Allston Straightening is a rebuild of an elevated half a mile of the Turnpike that sits on about 30 structurally deficient spans that go back to original construction in the 1960s. . . . The straightening of the mainline and elimination of the three toll plazas and complex ramps will free up some 60 acres of land for urban development, both housing and commercial.

Deficiencies and opportunities at the Allston interchange exemplify -- to an extreme -- conditions that are found throughout the Massachusetts system.

There was also the matter of their cash collection system which continued to depend on tickets until recent times. The amount collected at each toll varied based on the class of the vehicle and on the motorist's point of origin. The toll collector had to examine each ticket and make change in an amount that differed from car to car. The process was time consuming and it backed up traffic. One of the reasons Massachusetts converted to AET was to try to replicate the ticket system by continuing to charge former cash customers from point-to-point based on matching plate photos at every stage of the journey.

By contrast, Maine did away with tickets 20 years ago. All cash tolls in Maine are paid in the same amount within each class at each location, regardless of where the trip originated. The cash toll at York and those north of Gray are mainline barrier tolls with simple collection systems. Even Maine's side tolls are essentially barrier tolls except that they are generally paid in only one direction -- on entering the turnpike and not departure.

The simplicity of Maine's cash system means that a collector can handle upward of 325 transactions per hour. In fact, their shifts are scheduled on that basis.

Most of Maine's interchanges have either been built or rebuilt since barrier tolls were adopted, thus eliminating traffic limitations of the sort that have plagued Massachusetts.

AECOM presented Massachusetts with the choice of moving to AET to preserve their historic collection protocol or adopting a new barrier toll system with Open Road Tolling (ORT). Although AET was the preferred choice for Massachusetts, AECOM had the following to say about ORT on the first page of their report:

> ORT is a tolling approach that has been successfully implemented by many toll agencies. It is a tolling strategy intended to provide maximum convenience and time savings to ETC [electronic] customers, the payment method exposing an agency to the lowest processing cost, highest accuracy and lowest payment risk to the operating agency. . . . The 'ORT Plaza' design concept has emerged as the best way to accommodate E-ZPass and cash toll collection at a given location. Drivers with E-ZPass are provided high-speed, multi-lane free-flow ORT lanes, and cash-paying drivers are provided adjacent cash toll plaza lanes.

Other points in the AECOM report are included in Enclosures B through F to this letter.

3. Data on AET is Elusive, for Understandable Reasons.

There is little public information about how much money is lost when agencies convert to AET. To reveal such data can be detrimental to the agency's efforts to persuade motorists to open electronic accounts. If word gets out that nearly half the pay-by-plate motorists will not have to pay, or that the

agency can't read plates during a snow storm or heavy rain, or that motorists can't be pursued if registered in other jurisdictions, then motorists may refuse or neglect to open an electronic account.

At a recent national conference, a toll executive from another state described the experience of converting a toll road to AET by announcing that the losses were only 5%. When asked afterward whether it was 5% of the former cash traffic or 5% of gross revenue, the reply was 5% of gross, which turned out to be 50% of cash. They had adopted AET for a commuter highway where the electronic penetration rate was at 90%. The authority actually lost half of its cash receipts, an experience similar to that of other agencies whose data is disclosed.

Last year, the North Texas Tollway Authority did release its AET revenue losses in an unusual display of candor. Gary Quinlin of CDM Smith reviewed the data and provided the following analysis:

> In the end, our analysis of the revenue leakage at York and the recommended video surcharge is very similar to that for NTTA.We estimated that a total of 42.2 percent of York video tolls would be uncollected (versus 45 percent for NTTA facilities) and we recommended a 100 percent video toll surcharge to make up for revenue leakage (versus a 90 percent recommended video surcharge for NTTA facilities).
>
> Perhaps this is just a coincidence, but it does support the fact that the level of revenue leakage and associated video surcharge we are recommending are not outside the limits of what other facilities experience. There certainly are many AET facilities with less than 100 percent video surcharges, but I suspect that in many of those cases, the ETC rates are subsidizing losses incurred by the video transactions or they simply accept that there will be a net loss of revenue (in the case of facilities that are converting to AET).

Many toll agencies operate on accrual accounting. They include as current revenue the toll that is owed by every motorist who uses the road. In a later accounting period, after all efforts to collect have been exhausted, they prepare an entry to write off all the tolls that are then deemed uncollectible, but this occurs years after the trips that generated the write off. Thus, the losses and the costs are spread out and no longer associated with the period in which they occurred.

It is difficult to obtain figures for lost revenue and collection costs from public records of AET agencies when it is counter to their interests to reveal them.

The best way to obtain good information is to hire a consultant like CDM Smith who is retained by agencies throughout the industry to track revenue and costs from internal data so that agencies and bond holders can make rational decisions tailored to the circumstances of each road.

We hired CDM Smith because of their lack of bias and their access to data. They have assisted many agencies in converting to AET and have helped others decide when it is best to continue collecting cash on the highway. At the outset of working for Maine Turnpike, they were asked specifically to tell us how to implement AET at York and at West Gardiner/I-295 and to provide our staff, our board, and our bondholders their best judgment on what the consequences would be.

Whether to incur those consequences raises significant issues of financial risk, traffic management, fairness, and public policy that we know are also appreciated by environmental regulators.

CDM Smith's recent letters of July 22, 2016, and January 19, 2017, appended to these answers as Enclosures A and F describe the consultant's role and the current challenges being faced by agencies across the nation in making these complex decisions tailored to the special conditions of each road.

4. York Plaza's Relationship to the Rest of the Turnpike

The building of a new toll plaza at York is only one component of a complete overhaul of the 19 Maine locations where tolls are collected. 13 of them are side tolls where all tolls, both electronic and cash, are collected at reduced speeds. The remaining six have been built or planned as highway speed ORT plazas.

Two of the mainline ORT plazas are in full operation, one at New Gloucester since 2013 and the other at West Gardiner since 2016. Two others are under construction at the Falmouth Spur and at Exit 44 in Scarborough. The design for York is essentially complete and an ORT plaza at West Gardiner/I-295 is planned. New Hampshire is operating two ORT facilities, one at Hampton since 2010 and the other at Hooksett since 2013. An ORT for Bedford is in design and a fourth site is being considered.

Opponents argue that the Turnpike should abandon collection of cash tolls altogether and toll by mail. We do not believe that they are arguing for a split system in which former cash customers are charged by mail at York but continue to pay cash elsewhere on the same system. That would mean that a non-E-ZPass motorist coming into Maine at York would be treated first as a customer tolled by mail but later as a violator if the vehicle passed through E-ZPass gantries in other locations.

Being a violator quickly leads to being fined and losing one's registration. For an AET customer who can be found and is being billed by mail, there is an iterative and lengthy process before converting the debt to violation status.

Such a conflict in business and collection protocols would be problematic, bordering on impossible to explain and administer, and is not employed anywhere else to our knowledge.

When Massachusetts made the transition to AET, they started first with the Tobin Bridge which was a free-standing barrier toll, independent of the turnpike. When they expanded AET to the turnpike, they converted every segment of the road to AET on the same day.

Answers to Specific Tolling Questions Posed

What follows below are more specific responses to questions 4 and 5. The questions are in bold.

4. Recognizing that a key argument that the Authority is using against the AET alternative is cost, please address the following for further support and clarification of that argument:

Because the answer to question 4f serves as a predicate to other answers, we address that question first. We have also combined answers to question 4b and question 5 because they both deal with conditions at the existing site.

4f. Throughout the multitude of studies and reports that have been developed throughout the planning process, there is a confusing mix of percentages and dollar values attributable to the potential revenue loss from AET. In very simple terms, what percent of the Authority's total annual revenue comes from the York Toll Plaza and what does that equate to in dollars; what percent of that revenue is non-EZ Pass and what does that equate to in dollars; and what is the annual total dollar value of tolls projected to be lost with AET? And finally, for that total projected loss, have all available and practicable measures for mitigating that loss been pursued such that in spite of those measures, AET remains economically impracticable?

Answer to Question 4f:

The Latest Revenue Data: York in Context

In 2016, the total net toll revenue for the Turnpike was $134.16 million. The portion from York was $57.08 million, or 42.55%.

26.67% of the York revenue, $15.22 million, came from cash. The value of cash collected at York is significant in that it represents 39.81% of all cash collected on the Turnpike.

Losses from AET

Decisions about changing toll structures on the Turnpike can be made only by performing a responsible actuarial analysis. This is required as a matter of public policy, responsible business planning, and more specifically by Section 802 of the Turnpike's standing bond resolution.

CDM Smith performed an analysis of AET at York and at Gardiner/I-295 resulting in a report of April 14, 2014, included as Appendix 2F to the Turnpike's permit application. The firm estimated that York cash receipts for 2015 would be $14.776 million for the year. This became their starting point for projecting risks, losses and costs associated with converting from cash to AET.

Because traffic rebounded in 2015 and 2016, the York toll collected $.5 million more in cash during 2016 than had been estimated for 2015. Thus, the losses from converting to AET are likely to be greater than those projected by the CDM Smith report.

On page 17 of their report, CDM Smith projected that AET at York without a toll surcharge would lose $4.55 million in revenue in the first year and increase operational costs by $2 million for a net difference of $6.55 million compared with present operations.

To complete the contrast between ORT and AET, we must account for how ORT would improve the toll collection system by capturing more revenue and reducing operational costs. On page 28 of the report, CDM Smith projected that ORT at York will generate new revenue and save costs at the combined rate of $.95 million per year over present conditions. This is consistent with the Authority's experience at many other plazas where the new electronic suite is already up and running, including two ORT plazas on the main line at New Gloucester and West Gardiner.

Adding the operating gains from ORT ($.95 million) to the losses and costs of AET ($6.55 million) yields $7.5 million as the first year's difference in net impact between AET and ORT. This number demonstrates why substantial surcharges are necessary for AET to break even. It also demonstrates why it is worthwhile to make the capital investments to preserve the efficiencies and reliability of cash collection.

The difference in up front capital cost between AET and ORT at York is about $31 million. Without a surcharge to support AET, $7.5 million is a conservative projection of ORT's operating gain over AET in just the first year. It is reasonable to conclude that nearly a quarter of the capital outlay for ORT will be recovered in one year and the remainder within a few years thereafter.

The changeover to the new electronic system has already taken place in most of the Authority's other plazas, including two that are operating as highway speed ORT facilities where it was possible to convert relatively new existing barrier tolls quickly and at modest cost.

Mitigation of AET Losses

There is only one good way to mitigate for AET losses: Convert cash payers to E-ZPass customers. Otherwise the loss must be recovered through a surcharge or unfair impositions on other drivers.

When present management took over the Turnpike in April of 2011, we persuaded the Maine

Legislature to change state law to make it easier to promote E-ZPass aggressively. We did so because it makes the system better no matter how tolls are collected, whether by the present system, by ORT, or by AET.

The Authority has since promoted E-ZPass by:

1. adopting reciprocal toll enforcement with Massachusetts and New Hampshire,
2. lowering the transponder price from $25 to $10,
3. increasing transponder sales to more than 3000 per month for the past 50 months;
4. selling more than half of its transponders over the Internet,
5. creating a family discount for E-ZPass subscribers that returns $8.5 million per year,
6. continuing one of the few discounts in the nation for E-ZPass business customers,
7. raising tolls by applying higher rates on non-E-ZPass customers,
8. conducting E-ZPass promotions on radio and social media,
9. installing modern electronic lane equipment to replace outmoded systems, and
10. reaping the collateral benefit of E-ZPass promotions in New Hampshire and Massachusetts.

Since October of 2012, the number of open and active E-ZPass accounts, both business and personal, has grown by 53% from 146,717 to 224,653. The number of active transponders has grown by 60% from 238,301 to 380,501.

When E-ZPass was relatively new in 2006, the electronic toll percentage on the Maine Turnpike was 40%. By 2010, it was 59%. Initiatives in recent years have raised it to 71.5% and this growth will likely continue, but ever more slowly. For a state like Maine with fewer commuters, many visitors from diverse jurisdictions, a toll road of limited length with free road alternatives, and a large portion of its population outside the toll road's service area, it will be difficult to raise electronic penetration into higher ranges.

Given the success of transponder sales, the growth in electronic revenue is much less than one might expect. The difference can be explained by the fact that so few new account holders use the turnpike with great frequency, an issue discussed in our answer to the next question 4a.

4a. What if transponders were given away for free, would there be greater penetration into that tolling stream that would mitigate identified losses from AET? This question was apparently raised by opponents in the past and I did not see it closed out in the application materials.

Answer to question 4a:

Free transponders will not make AET practicable. There are costs and inefficiencies for opening accounts and issuing transponders to customers who seldom need them. Giving away transponders to infrequent users and carrying their open accounts would cost more than the tolls collected.

When other states have given away transponders or charged a refundable deposit, we are told that these efforts have not materially increased electronic usage and were not worth the investment. Once an agency starts giving away transponders, there is no going back. Agencies recently entering the E-ZPass system are doing what Maine has always done: selling transponders at cost.

When we convert a frequent cash customer to E-ZPass, it usually reduces future collection costs. But that is not true for a customer who uses the turnpike only a few times a year. There are costs, either to the customer or to the turnpike, for opening and maintaining an account.

Many agencies charge a monthly fee for open accounts. Maine does not. To encourage the use of E-ZPass, Maine carries all accounts at no charge, even those with little or no activity.

At the end of 2016, Maine had 216,414 open personal accounts. 76,180 of them had no activity in December. 33,634 of them had no transactions for more than 120 days.

Associated with these accounts, Maine had 327,568 outstanding auto transponders, of which 96,818 had no activity during December. 40,072 of the valid transponders had not been used for at least four months.

Most public agencies contract out their account maintenance functions to private companies like Xerox or TransCore. These companies charge a service fee for each open account. Because the Maine Turnpike administers its own E-ZPass accounts, we internalize these costs. They are not passed on to customers, as is the practice in many other agencies.

When an E-ZPass agency in another state has received adverse publicity for imposing fees on open accounts, the local press has sometimes pointed out that Maine charges nothing. For weeks after such publicity, the Maine Turnpike Authority would receive many new accounts from out of state motorists because they only had to pay for the transponder. If transponders were also free, we would be flooded with having to manage accounts for people throughout the northeast.

The Turnpike's wholesale cost for transponders is $7.40. 80% of the new transponders are shipped by mail. It costs $2.74 to mail out one or $3.14 to mail two. For each transponder, we charge a flat fee of $10 plus tax which covers the wholesale cost plus mailing, but nothing for activating the transponder and for setting up and maintaining the account.

Maine has been selling 3000 to 5000 transponders per month since November of 2012 when we were first able to promote on line sales with a family discount. Although the Authority's recent revenue growth comes from electronic tolls, our cash receipts persist as a substantial portion of our revenue.

To open an E-ZPass account for a personal automobile, the patron pays $20 as an advance against tolls and $10.55 for the transponder ($10 plus 5.5% tax) for a total of $30.55. If an automobile owner is unwilling to pay for the transponder, the owner is not likely to open an account. It's the account that is important and Maine charges nothing to service them.

Question 4b. is answered in conjunction with Question 5.

4c. Information in the application indicates that NH has reportedly come to the same conclusion on the AET alternative that the Authority has, that it is not economically practicable at this time. But the MA decision to go AET at the Tobin Bridge, Newton, and other locations is repeatedly brought up by those opposed to the relocation, implying that if MA has determined that the conversion is economically practicable, why can't MTA? MTA notes that MA is prepared to accept probable revenue loss and doesn't have to concern itself with bond rating impacts. Is there any greater insight to the MA determination that hasn't already been noted?

Answer to Question 4c:

This question is addressed in Section 2 of our general discussion at the head of this letter and in Enclosures B through F. Cash tolls in Massachusetts caused severe traffic congestion. Obsolete interchanges and highway constraints left insufficient room to continue or expand cash collection. The Tobin Bridge is an obvious and familiar example; but the tunnels and the interchanges at Allston, Weston-128, Auburn-290, Westborough-495, and other sites were also unsuitable.

Experience from other agencies across the U.S. and Canada has taught the industry that AET is most appropriate for toll roads where:

- high volumes of daily commuters can be induced to pay electronically;
- a predominance of in-state traffic makes enforcement easier;
- tolls are high enough to justify the cost of postage and back office processing;
- lack of available real estate makes it cost prohibitive to build cash booths near the road;
- there is no room on bridges, tunnels or constrained highways for cars to stop;
- license-obscuring snow storms are less frequent;
- the capital cost for new cash plazas significantly outweighs the losses and costs for AET;
- motorists on the toll road have few alternative routes; and
- the agency's credit is not dependent on revenue bonding.

Most of these criteria apply to Massachusetts. None of them to York, and none of them to Hampton, Hooksett, New Gloucester, or West Gardiner where ORT is already up and running, or to the Falmouth Spur, Maine Mall Exit 44, or Bedford where ORT is in construction or design.

4d. According to your consultants, AET would require a surcharge be placed on non-EZ Pass holders to make up for predicted revenue loss/leakage. Presumably the Authority and its consultants considered a lower, unilateral toll increase for ALL drivers in order to mitigate the cost increase to non-EZ Pass holders (and associated deviation onto secondary roads to avoid tolls)? Undoubtedly 'fairness' enters in to this discussion but perhaps there were other reasons why this wasn't available or practicable? And if I understand the Authority's use of 'fairness' as it relates to our 404(b)(1) Guidelines, it essentially relates to an alternative being found contrary to the public interest (in this case the driving public)?

Answer to Question 4d.

Leveling the toll is not only unfair, it is poor business practice. If the toll were the same for those who pay (or fail to pay) by mail as for those who pay electronically, it would remove one of the chief incentives for opening an electronic account. Those who argue for an AET plaza assert that the surcharge will soon convert everyone to electronic accounts. Analysis and data from CDM Smith proves that this isn't true. But surely it would be less true if the surcharge were eliminated and all the electronic customers were commensurately overcharged.

Opponents argue that risking up to $15 million in annual cash at York is both trivial and temporary. It is neither. While the loss may attenuate over time, it remains substantial over a period that is many times greater than the time to amortize the capital cost of preserving cash revenue. Table 4 on page 17 of the CDM Smith report of April 14, 2014, deserves special scrutiny on this point.

The seven member board of the Maine Turnpike Authority has determined that spreading the losses of AET to other travelers would be against public interest and contrary to good business practice.

4e. It has been presented by opponents that AET may result in a net increase in revenue over the design life of the project, despite initial losses. The application doesn't appear to thoroughly dismiss this allegation.

Answer to Question 4e:

The opponents simply borrowed this conclusion from pages 47 and 48 of CDM Smith's report of April 14, 2014, but failed to include the following paragraph:

> The above AET scenario is net revenue positive, however, only by imposing a $3.00 video surcharge on unregistered customers. Toll diversion levels of between 3400 and

5500 per day would also result under this AET scenario as a result of the video surcharges.

Table 5 on page 21 of the report shows that an AET system can, indeed, produce a positive return after a number of years but only by imposing a $3 surcharge on non-E-ZPass motorists. Almost any inefficient system can make money so long as the price is raised high enough on those who are left to pay.

Two pages later, the consultant produced a similar chart (Table 6 on page 23) to show that ORT makes an operating profit of nearly a million dollars in the first year and continues to produce an ever increasing positive return for the indefinite future without raising the toll. That is because ORT captures more revenue than the present system and operates at lesser cost.

Doubling the charge for cash customers under AET will cause a chaos of diverted traffic onto nearby roads. It is environmentally detrimental and contrary to the public interest for many reasons.

Not the least of these is the fact that motorists from many jurisdictions as well as Maine will use the turnpike for free because we have no way to identify them even with perfect photos. These include, for example, motorists from Vermont, Connecticut and the Maritimes.

Many others will use the highway for free because we cannot enforce collections from them even when they are identified or because it is not economical to pursue them. In our arrangement with Massachusetts, neither agency seeks enforcement from the other until the unpaid tolls on a single plate exceed $25. With New Hampshire, we each take action only when the number of violations is ten or more.

And it snows in Maine. When it snows, any toll-by-plate system loses thousands of images. In our violations enforcement system, we presently examine between six and nine thousand plates a day. While some are violators, a majority are E-ZPass customers whose tags are not in the car or can't be read. During snow storms, our ability to read plate numbers often drops by 30% or more.

Converting York from cash to AET would add four million new transactions per year to be billed exclusively through photographs and mail. Converting the entire road to AET would add 22.7 million.

Getting every digit of the plate number correct and identifying the state are not sufficient to begin a search for the owner. One must also interpret the associated ideograph, e.g., a lobster, black bear or Purple Heart, to establish the type of plate. Maine has 54 types. There are said to be over a thousand types within the United States. Many plates have exactly the same letters and numbers but differ only as to type.

Our Customer Service Center spends untold hours tracing down and removing toll charges made to Maine E-ZPass motorists by mistakes from out-of-state agencies tolling by plate.

By investing the capital to preserve cash collection on the road, the turnpike's primary remaining cost is to pay the toll collectors, whose staffing levels are adjusted to maintain efficient collection at all times of day during all seasons of the year. Lanes are staffed based on our experience that a single toll attendant can make up to 325 collections per hour. Staffing, our major variable collection cost, is tuned to meet the anticipated traffic.

At rush hour, we hire collectors to work for four hour shifts so that we have just enough people during the busy times and can reduce staffing during lulls. At night in York, there is only one person to cover traffic in each direction. Yet even then, each collector will bring in $800 to $1200 during seven hours of nighttime duty. On busy summer Sunday afternoons, each of the five workers in the southbound cash lanes at York will easily collect $3000 per shift. A single attendant in the truck

lane may collect as much as $12,000.

The certainty of cash collection is as close to 100% as any system can provide. Its efficiency, its reliability, and its low operating cost cannot be matched by trying to bill by mail.

4b. Another element that may not be thoroughly discussed, although it has been brought up in the past, is the high revenue loss from taking the existing toll plaza off line (and demolishing it) while an AET facility is built at that same location. Some opponents have taken the position that an AET facility can simply be erected at the present toll plaza's location, perhaps even using some of the same infrastructure, and have virtually no environmental or socio-economic impact. Perhaps this alternative is even more costly than the application describes?

5. The no build alternative is addressed in the application but not specifically the rehabilitation alternative. Rehabilitation in this case would be upgrading or replacing existing facilities with as much 'mitigation' for the facility's short comings as possible, including ORT. Is it the Authority's position that the discussion of alternative 7.3 equates to the 'rehabilitation alternative'?

Answer to questions 4b and 5:

Pictures of AET and ORT sites may lead one to believe that electronic tolling is a simple system of overhead antennas hanging from a gantry. However, completely out of sight is one of the most important and sensitive components of a modern toll system: an array of underground loops carefully set within the road surface of each lane. The loops are buried a quarter inch below the surface usually in concrete reinforced by fiberglass rebar to reduce electro-magnetic interference.

A lane controller sends electrical currents through the loops to produce continuous electro-magnetic fields just above ground. The loops are tuned to measure even slight inductance variations caused by vehicles passing over top. These tuned loops are sensitive to the point where they can discriminate among many types of vehicles and even detect trailer hitches linking a vehicle to its trailer. The system works reliably even when vehicles pass through at 100 mph (when tested by State Troopers).

Electronic loops are essential for classifying vehicles. Without them, if a 100,000 pound, six-axle truck used a car transponder at York, it would be charged only $3 rather than $13.50 because the E-ZPass antenna receives information only from the transponder. It cannot classify the vehicle carrying it. Even if the toll is charged by mail after a license plate photo, it is the in-ground classification system--and not the plate photo--that determines how much to charge.

Loop systems have no moving parts subject to failure and are being installed throughout the industry to replace 40-year-old electro-mechanical treadle systems that are unreliable, expensive to maintain, and useable only for low speed traffic.

Massachusetts has installed loops in every lane under every E-ZPass gantry. Maine has installed them in most of its tolling locations, but York is still using mechanical treadles.

To work effectively over time, the loops must be set within a rigid pad on stable ground, a condition that cannot be maintained at mile 7.3 without piling support.

The highway near mile 7.3 is built on deep compressible clays. The plaza itself rests on piles, but the approach and departure paving has been sinking by nearly 1 inch per year. Physical stability is essential to the functioning of the loops. To install loops in each of York's 17 present lanes requires excavating each of the approach and departure zones and driving piles down to bedrock 60 or 65 feet below the surface to support a slab to house the loops in a stable environment. And even when done,

the plaza itself would continue to limit speeds to 10 mph.

There is nothing salvageable at the present plaza if we intend to meet the project purpose. The toll lanes are only 10 feet wide; the tunnel leaks; and there is little space for sheltering computers. The electricity supply is inadequate. Pilings under the tunnel create a huge hump across the road that must be eliminated for highway speed traffic. The site is too close to adjoining ramps. It's at the bottom of a hill and around a bend in the road. Even by 1969 standards, the toll should never have been built at this location.

Whether the existing site could be rehabilitated in exactly the same location was addressed by HNTB in Section 7 of Part 2 of the Draft-Phase One Report filed with ACOE in 2009 and incorporated by reference in our application. That information is up-dated by a Tech Memo attached to this letter as Enclosure G. To rehabilitate the old site with modern electronics can only be accomplished by driving piles and adding tunnel capacity. The final 10 mph toll would not meet the purposes of the project.

Because the York Town Council favored building a new plaza near the old, we tasked Jacobs Engineering to examine with care the possibility of building a new ORT plaza a short distance north of the existing plaza. This became, in essence, the rebuild alternative. It would require elaborate preparation of the underlying soils. When compared with other choices, it was more costly by half and environmentally more invasive than any other site evaluated. These factors are charted and reviewed in the alternatives analysis in our application.

The York project has these primary goals:

(1) to replace obsolete electronics;
(2) to convert to high speed tolling for E-ZPass traffic;
(3) to preserve revenue and reduce operating costs;
(4) to remedy safety deficiencies; and
(5) to minimize impacts to the state transportation system, abutters and the environment.

A modern ORT plaza at Mile 8.8 achieves these goals. AET does not. Neither is it feasible to achieve them by trying to repair the present site. To retrofit the site by installing modern electronics a few lanes at a time can only be done at great expense; and it would not provide high speed tolling. It would still be the same 10 mph E-ZPass plaza that it is today.

In Closing

The Turnpike has no plan to abandon the collection of cash at York, nor any prudent basis for proposing to our bondholders that we do so.

Over a ten year span of time, the Authority has carefully considered its options in an orderly process with the help of the best engineering, environmental and financial advice available. Board proceedings have been open and the public has been fully engaged at every turn, first in deciding whether cashless tolling was feasible and then in determining where best to locate a plaza to meet the Turnpike's purpose and need.

The building of a new ORT plaza and closing of the old will reduce noise and air emissions, increase fuel efficiency, and enhance the productivity of Maine citizens while preserving Turnpike revenue. By attracting more traffic onto the Turnpike, it will reduce congestion on neighboring roadways.

We have chosen a site that best minimizes environmental impacts. It is also further from residential property than the present plaza at mile 7.3.

We have more than honored mitigation concerns of the various permitting agencies, including agreed payments to compensate for wetland losses and to enhance protection for wildlife, both at the site and in other areas of special concern to Maine IF&W.

Wetland around the old site will be reclaimed and the highway moved away from existing homes. Stormwater management for the York Water District will be greatly improved.

We bought land near mile 8.8 from owners who had it permitted for an eight lot subdivision. By taking it out of development, this project will protect its wetlands, vernal pools and wildlife habitat and preserve a welcome forested buffer for established residential neighbors.

The Maine Turnpike has approached this project with every intention to fulfill our mission by balancing the impacts in ways that will leave the land, our neighbors, and the natural environment in a better state than we found it.

Respectfully submitted,

Peter Mills

Peter Mills
Executive Director, Maine Turnpike Authority

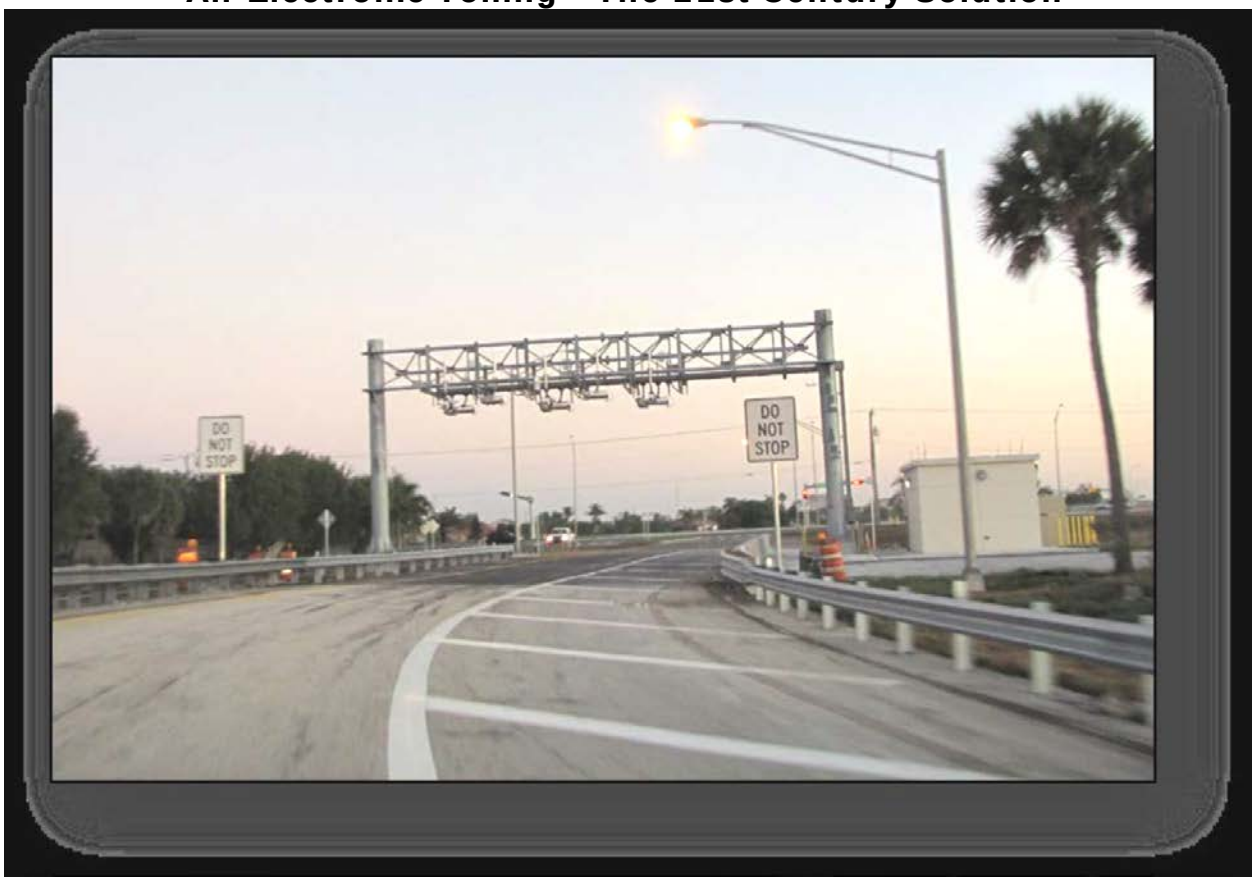
Enclosures:

A. Letter from Gary Quinlin of CDM Smith dated January 12, 2017
B. The first five pages of the Executive Summary of the 2012 AECOM report entitled "Feasibility of Implementing a Statewide Tolling Strategy--Western Turnpike."
C. TollRoadsNews article dated August 19, 2013
D. TollRoadsNews article dated October 24, 2013
E. Review & Comments on AECOM's Report by Gary Quinlin dated September 9, 2015
F. Pages 5 through 7 of Gary Quinlin's letter of July 22, 2016
G. HNTB Tech Memo of January 26, 2017, on York Toll replacement options

cc: Robert Green, Maine DEP (with enclosures)

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

All-Electronic Tolling - The 21st Century Solution



Source: Central Florida Expressway Authority

Prepared
by
The eTrans Group, Inc.

for

The Town of York, Maine

Contents

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[i] for the environmental review process by the U.S. Army Corps of Engineers (ACOE). In its May 5, 2010 response[ii] to the MTA's initial submittal, the ACOE noted that the MTA:

- did not properly consider safety issues associated with conventional (cash) toll collection; [iii] and,

- dismissed one-way[iv] and all electronic tolling (AET)[v] 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).

T~~herefore, t~~he 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."* [vi] ~~T~~However, the CDM Smith study (Final Draft released on March 18, 2014) does not adequately respond to several ACOE requests. ~~and~~ It is also fraught with significant structural and other issues that bias its results against AET. (e.g. The CDM Smith study only considered an AET pilot program at these two plazas).[vii] 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"* [viii]:

The CDM Smith study found AET to be a
***"financially feasible option"* at the York Toll Plaza[ix].**

The CDM Smith study also noted that*: "AET offers free flow travel for all motorists with lower overall capital costs."*[x]

However, due to the bias in their results~~b) T~~ the CDM Smith study estimated that a $3.00 (passenger car) surcharge [xi] would be required for those customers not actively enrolled in the ETC program (up to 20% of all customers eventually). ~~However, t~~ The author is~~n't~~ unaware of any MTA policy this would violate. In fact, ~~a significant surcharge (~~though $3.00 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.

~~c)~~ **The CDM Smith study also estimated 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."*** [xii] Therefore, ~~I~~in addition to the bias against AET in their results leading to an overestimate of~~ing~~ the video surcharge that will be necessary, the exaggerated estimate of the video surcharge was used to predict trip diversions to Route 1 upon implementation of AET. ~~, s~~Suggesting that ~~long-term~~ traffic diversions from 3,400 to 5,800 would be realized over the long term is not defensible~~at this level are unrealistic~~. At these levels, the traffic assumed to divert onto Route 1~~ed~~ would be a major portion of that assumed will not be actively enrolled in the AET program. ~~to be video tolled; and,~~ And, even if traffic diversions at these levels ~~of this significance~~ did occur initially, the level of service ~~on US Route 1~~ the diverted traffic would encounter on US Route 1 would be so poor that few motorists would leave the MTA mainline a second time and the challenges associated with the alternative route would be quickly spread amongst the motoring public. i.e. ~~t~~The problem would, to a great extent, be self-regulating.

Therefore, the CDM Smith study 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. The 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]

Nevertheless, 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.[xiv] However, even though the CDM Smith study 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 has eliminated the AET option from the York Toll Plaza analyses even though its own advisors have found it to be economically feasible.

Further, this report will demonstrate that the CDM Smith analysis is fraught with several structural and other issues that bias the results against AET, making the AET option an even better solution from a financial perspective than the results of the CDM Smith study would suggest. Since the AET option is, by far, the most environmentally friendly option, and it eliminates all of the safety issues associated with collection of tolls at the roadside, elimination of the AET option from the York Toll Plaza analysis is highly irregular and indefensible.

2.0 U.S. Army Corps of Engineers (ACOE) Observations/Requests

2.1 Major Oversights in the MTA Submittal

In its May 5, 2010 response[xv] 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; [xvi] and,

- dismissed one-way[xvii] and all electronic tolling (AET)[xviii] 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 ~~Investigation~~ Requested~~s~~ 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"*; [xix] 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".* [xx]

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 will have a significant impact on the ability of the MTA and others to collect out of state tolls.

The CDM Smith Study 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, several toll authorities have been wrestling with escalating ORT violations - and E-ZPass lane violations are not limited to just ORT. 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, there were $33.3 million still outstanding in unpaid tolls."*[xxi]

Therefore, the CDM Smith study assuming only modest violations in ORT lanes at the York Toll Plaza is overly optimistic for ORT operations and biases their results against AET.

In response to the MTA's initial submittal, ~~At that time~~ 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: [xxii]

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".~~; and, to~~

The MTA has yet to appropriately respond to these~~is~~ requests.

The ACOE also asked the MTA to

4) provide a technical response to the Whippoorwill Home Owners~~hip~~ Association's (WHOA): [xxiii]

> *"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."* [xxiv]

The MTA has yet to appropriately respond to this request.

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

~~Also, o~~Of the ACOE requests above:

#1 and #2 were given only cursory review; [xxv]
#3 a, b and c do not appear to have been addressed;
#4 was dismissed based on ~~the~~ biased results of the CDM Smith study; [xxvi] and,
#5 was dismissed though no defensive reason was presented. [xxvii]

~~Also, the CDM Smith study only evaluated the benefits of an AET pilot program at these two toll plazas.[xxviii]~~ On March 18, 2014 the MTA released the results of a CDM Smith study to conduct an independent assessment of conversion to ORT or 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). However, the CDM Smith study[xxix] is subject to many of the same limitations as the MTA's previous alternative evaluation efforts that were equally biased against AET. [xxx]

These anomalies and several ~~other~~ major assumptions in CDM Smith's analysis 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 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."* [xxxi]

Therefore, on 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. The impacts of how this assumption biased the MTA's analyses are explained in further detail in the ~~(Refer to~~ summary of Safety and Financial Analyses below.~~)~~

Further, on~~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.[xxxii] However, as a result of the ~~biased results from the CDM Smith~~ limited safety reviews inappropriately focused and structured financial analysis biasing the results of the CDM Smith study, 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; and, as a result, all electronic tolling (AET), a technology successfully introduced on the *Highway 407 ETR* in Toronto, Ontario, in 1997, has been overlooked in the final options 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 ~~AET operations~~ in the Caribbean and South Africa. Many of these operations have been successfully operating for over a decade. These ~~successful~~ AET operations also span a wide variety of operating conditions, from deploying AET on green-field facilities where the 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 (e.g. several operations in Europe). For example, 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:

a) greatly reduces the environmental impacts of toll collection

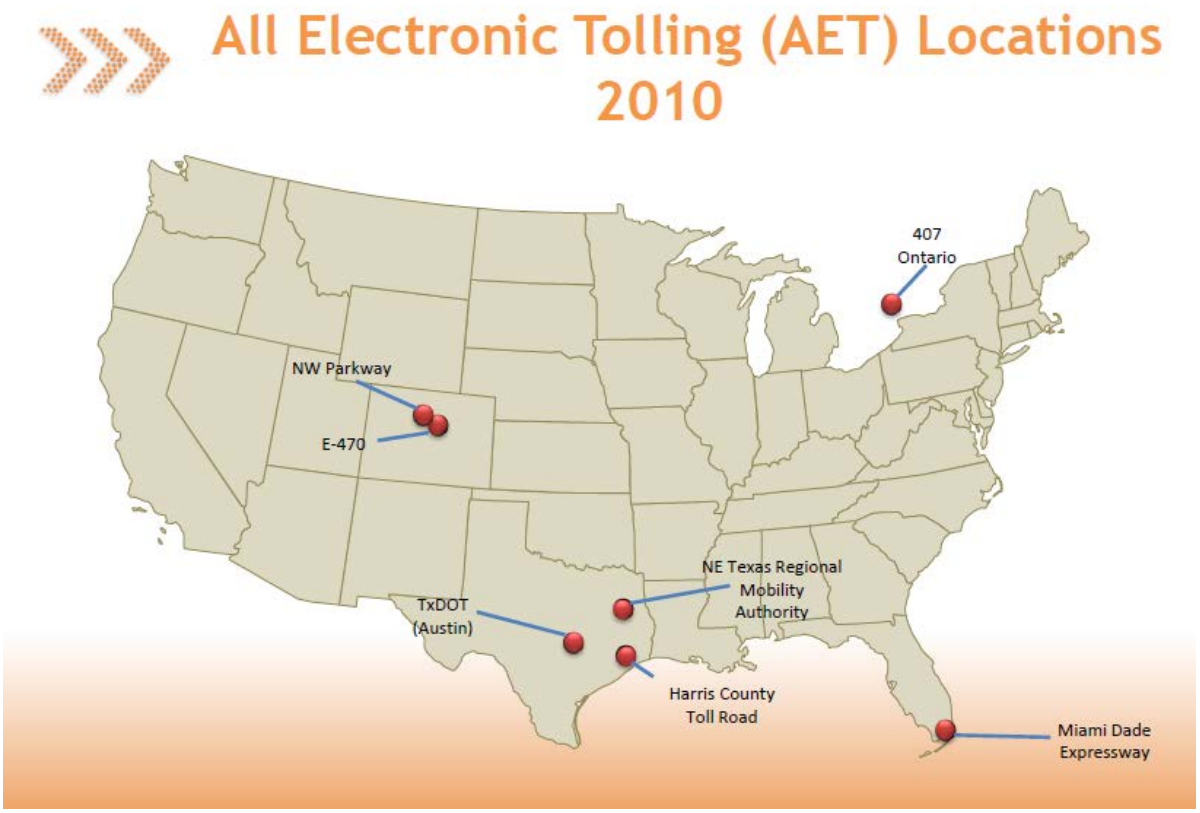
b) reduces capital, operations and maintenance costs

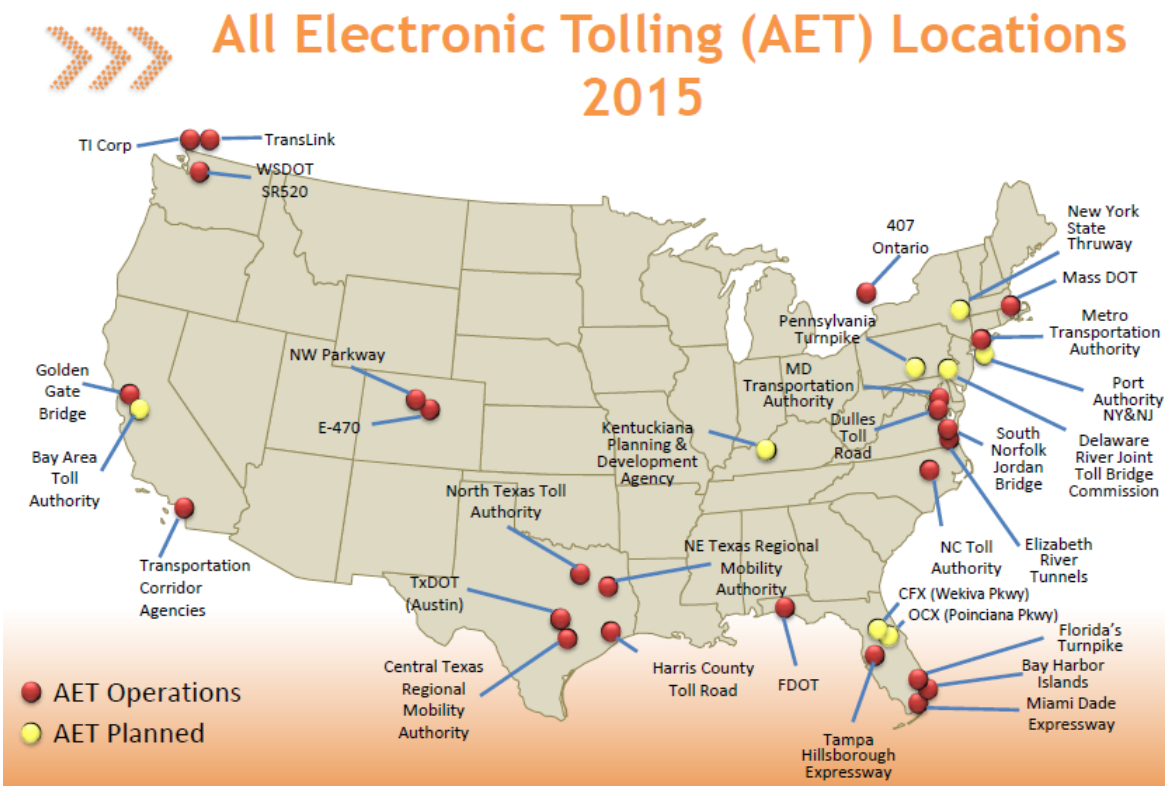
c) requires less right-of-way

d) offers increased traffic throughput,

e) eliminates the safety issues with toll plazas, and

f) leads to less driver confusion.





Source: Central Florida Expressway Authority

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

a) has essentially no environmental impacts (and even provides the opportunity to reclaim several acres of wetlands through removal of the existing toll plaza (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 capital and operating costs are considered),
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."* [xxxiii]

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.

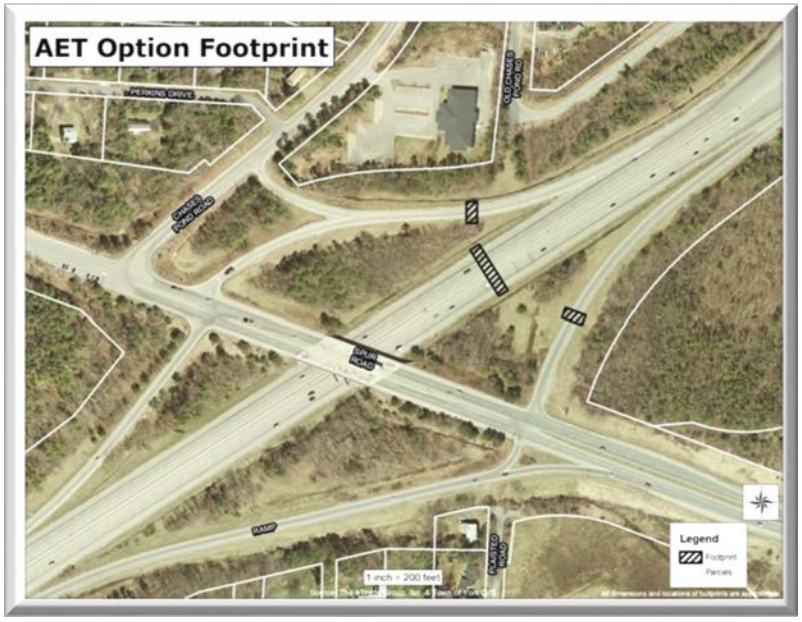
3.0 Environmental, Safety and Financial Issues Not Properly Addressed in MTA's Analyses

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). Additional details on the ~~summary of additional~~ environmental and safety benefits of the AET option are presented below. ~~, and additional b~~ Biases against AET from ~~both~~ the structure, inappropriate focus and assumptions of MTA's financial analyses are provided below.

Source: INSERT SOURCE

3.1~~A)~~ Environmental Benefits of an AET Solution for the York Toll Plaza

An AET toll gateway ~~can be easily installed~~ immediately North of the Connector at Mile Marker 6.7 is the best solution identified from an environmental perspective. At this location vehicles would be tolled on both the ramps and the mainline.



All Electronic Tolling Footprint at Mile Marker 6.7 [xxxiv]

The net aquatic and wetlands environmental impacts of an AET toll gateway at MM 6.7 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. For example, 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 contaminates that, like salt, can leach into the groundwater are also minimized by the AET option since 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.

An ~~Installing~~ AET toll gateway at MM 6.7 ~~also~~ avoids other negative impacts to housing. Though no home displacements are expected at the recommended location for the new York Toll Plaza at MM 8.8, new 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. The AET option avoids the need to stop and queue vehicles

on the corridor and the resultant heavy vehicle braking and acceleration noise and increased vehicle missions 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~~does~~ not impose visual blight on the corridor, or introduce additional impacts from~~negatively impact~~ vehicular noise and emissions. ~~; and, t~~Further, although nighttime lighting would be required at the AET toll gateway, the impacts of this lighting on housing along the MTA corridor at ~~an AET gateway at~~ MM 6.7 would be ~~likely~~ significantly less than the impact of lighting ~~those~~ 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, since the AET option was inappropriately dismissed early in the original analysis (July 2006), [xxxv] and eliminated from the list of~~screed out of~~ viable options by the MTA using ~~similarly~~ the biased results from the CDM Smith study of March 18, 2014, the significant safety benefits of the AET option have been overlooked.

The York Toll Plaza is currently identified as a High Crash Location (HCL) by the Maine DOT.[xxxvi] A summary of Jacob's efforts to review crash data on the Turnpike in this area in an attempt to identify possible roadway alignment or other geometric issues that could be problematic for location of a toll plaza is presented on pp. 5 and 6 of this Technical Memorandum. Though this is appropriate, 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. This introduces several~~ing~~ major conflicts into the traffic flow. In addition to the physical barriers - the toll booths and safety appurtenances around them, this also 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. ~~Also, t~~Though a tunnel can help reduce pedestrian safety issues, pedestrian traffic within the immediate confines of the toll plaza will invariably occur and introduce additional conflict. This creates an inherently dangerous situation ~~even~~ where one may not have existed - a phenomenon that is well documented in the literature.

Relocating the York Toll Plaza to "safer" location only relocates the inherent problems associated with the toll plaza environment at the new toll plaza. 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, must not be overlooked. The AET option for the York Toll Plaza reintroduces free-flow traffic operations on the MTA corridor and avoids all of the safety issues associated with a toll plaza in their~~this issue~~ entire~~t~~ly.

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. (Refer to Attachment X.) Before and after data were collected from one hundred mainline toll plazas on more than 750 miles of toll roads in Florida. The data indicated 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. [xxxvii] The results of this work proved that converting to an AET operation significantly improved traffic safety for all crash categories, especially, fatalities. Such conversions also changed tolling points from amongst the highest risk locations on expressways to posing safety risks similar to routine expressway segments.

Highway 407 ETR®, Toronto, Ontario

The significance of the risk of fatalities at conventional barrier toll plazas ~~this safety issue~~ is exemplified by the fact that there have been at least five~~three~~ fatal crashes at toll plazas in the region since May~~August~~ of 2015.

Recent Fatal Crashes at Toll Plazas in the North East Region

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

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

https://www.youtube.com/watch?v=pE_83KbHp7g

Catastrophic and fatal accidents are difficult to predict. However, treacherous winter driving conditions that frequently occur in 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 which are unfamiliar with the area or the Toll Plaza itself, further increases the likelihood of a major incident at this location. ~~Th~~As long as a barrier toll plaza is used to collect tolls at the York Toll Plaza~~us~~ the possibility of a major vehicular crash ~~at the York toll Plaza~~ (at its current location or a new location) is not a matter of IF this will happen, but WHEN it will happen.

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.

An additional safety issue of collecting tolls at the roadside that appears to have been overlooked by the MTA is dangers to MTA personnel and the public - exemplified by a robbery 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,"* [xxxviii]

Though revenue loss from this incident was likely limited by cash drawer limitation 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 - a risk that can be avoided entirely through the implementation of AET.

3.3 Inherent Biases 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 errors with the financial analyses of the AET option. The financial analyses by CDM Smith consider only:

a) Estimates of retained revenue (vs. life-cycle costs). The CDM Smith study focuses on a worst case scenario and appears to assume that estimated worst case conditions, including 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 be unwilling or incapable 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, but this is what was analyzed.

b) A pilot study of AET toll operations 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 plagued by the extent of out-of-state traffic and the challenges associated with collecting these tolls as the York Toll Plaza location - were not considered.

c) A 10 year study period. Since this analysis was comparing the AET option with a hybrid toll plaza offering ORT and conventional cash toll collection, [xxxix] limiting the study to only 10 years enabled avoiding 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 man the conventional toll operation at the roadside on a 24/7 basis.

All three of these structural anomalies are significant and bias the results of the CDM Smith work against AET. A number of oversights and major assumptions 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 and 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 (significantly higher) than those typically encountered on AET operations, and the reasons for establishing these surcharges are inconsistent with Good Industry Practice for AET operations. [xl] (Refer to *"AET Business Model"* , a summary of appropriate AET pricing policies provided as Attachment Y.)

c) Toll plaza relocation cost data used were inconsistent with current estimates. HNTB estimates for the capital costs to maintain the existing York Toll Plaza (about $22.1 million), costs for ORT conversion at $36.0 million, and AET capital costs of about $4.8 million were used. [xli] or about $17.3 million less than the existing condition." However, Jacobs recent report (16 Nov 2015) assumes relocation costs to Milepost 8.8 at $40.8 MM. [xlii] Therefore, the cost analyses should be updated to include all costs associated with providing ORT at the York Toll Plaza location, including those above.

~~c)~~d) Traffic diversion estimates are based on surcharges significantly greater than those likely necessary - and it appears that these traffic diversions are assumed to occur through the entire ten year financial analysis.

~~d)~~e) Toll revenue shrinkage in cash toll operations do not appear to have been 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. [xliii] (It should be noted that run-through violation rates are just one of many sources of "leakage" in cash toll lanes - all which appear to not have been addressed in the MTA's alternatives analyses.)

~~e)~~f) The business rules for ORT operations (including license plate tolling and violations enforcement) were assumed to be significantly different than those assumed for AET operations. However, ~~when, in reality,~~ the business rules for both operations need to be similar to sustain viability of toll operations in each mode over the long-haul.

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~~the~~ unbiased review and consideration of all options, issues and risks so that a prudent and responsible decision can~~has~~ be~~en~~ 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, technical, financial and socio-political, to ensure that the best decision is made. From an environmental perspective, an unbiased review clearly denotes the beneftis of AET when compated to the MTA's preferred option.

Anticipated Environmental and Other Impacts of AET vs. Recommended~~Practicable~~ Option~~s~~

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

For example, the AET solution offers NO additional environment damage, recovery of areas that were damaged, NO vehicles stopping and creating pollution, and less heavy salting. The footprint of the Maine Turnpike also becomes smaller throughout the entire system when AET is implemented.

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 recommendation that do not pass the scrutiny of an independent assessment. Individually, these oversights suggest that the MTA's review of alternatives for the York Toll Plaza is based on faulty logic. Collectively, they demand a more thorough and current review of the facts to ensure that an appropriate decisions is made on the best way to resolve the York Toll Plaza relocation issue.

~~**End of File**~~

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[iii] IBID, Part 1, Existing Conditions, Section b.
[iv] IBID, Part 2, Existing Site Evaluation, Section 2.c.
[v] IBID, Part 2, Existing Site Evaluation, Section 2.d. (1)
[vi] *"Maine Turnpike ORT/AET Impact Analysis (Final Draft)",* CDM Smith, March 18, 2014, pg. ES-1.
[vii] IBID, pg. 1.
[viii] IBID, pg. ES-4.
[ix] IBID., pg. ES-4.
[x] IBID, pg. ES-4.
[xi] IBID., pg. ES-2.
[xii] IBID. pg. ES-2.
[xiii] IBID. pg. 3.
[xiv] *"Southern Toll Plaza, Technical Memorandum on Alternatives Analysis (draft)",* Jacobs Engineering Group, July 23, 2015
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[xvi] IBID, Part 1, Existing Conditions, Section b.
[xvii] IBID, Part 2, Existing Site Evaluation, Section 2.c.
[xviii] IBID, Part 2, Existing Site Evaluation, Section 2.d. (1)
[xix] IBID, Part 2, Existing Site Evaluation, Section 2.d. (3)
[xx] IBID, Part 2, Existing Site Evaluation, Section 2.e.
[xxi] *"Investigation: Hundreds Don't Pay Turnpike Tolls Each Day",* CBS Pittsburgh, November 2, 2015.
[xxiixxii] IBID, Town of York Submittal.
[xxiii] IBID. WHOA Submittal.
[xxiv] IBID, Part 2, Existing Site Evaluation, Section 2.p.
[xxv] *"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.
[xxvi] IBID, pgs. 7-8.
[xxvii] IBID, pg. 5.

[xxix] *"Maine Turnpike ORT/AET Impact Analysis (Final Draft)",* CDM Smith, March 18, 2014.
[xxx] *"York Toll Plaza Upgrade Options, A Realistic Approach",* The eTrans Group, Inc., April 23, 2010.
[xxxi] IBID, pg. <xx> [reference to just an AET pilot program evaluated]
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[xxxv] IBID., pg. 9.
[xxxvi] *"Southern Toll Plaza, Technical Memorandum on Alternatives Analysis (draft*)", Jacobs Engineering Group, July 23, 2015, pg. 6.
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[xli] *"Maine Turnpike ORT/AET Impact Analysis",* CDM Smith, March 18, 2014, pgs. ES 2-3.
[xlii] *"Southern Toll Plaza, Technical Memorandum on Alternatives Analysis (draft)",* Jacobs Engineering Group, July 23, 2015, Southern Toll Plaza, Technical Memorandum on Alternatives Analysis (draft), Jacobs Engineering Group, July 23, 2015, pg. 15.
[xliii] *"Maine Turnpike ORT/AET Impact Analysis",* CDM Smith, March 18, 2014, pg. 2.

CONTROL SHEET

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