Re-evaluation of the Southern Toll Plaza

July 9, 2014 DRAFT

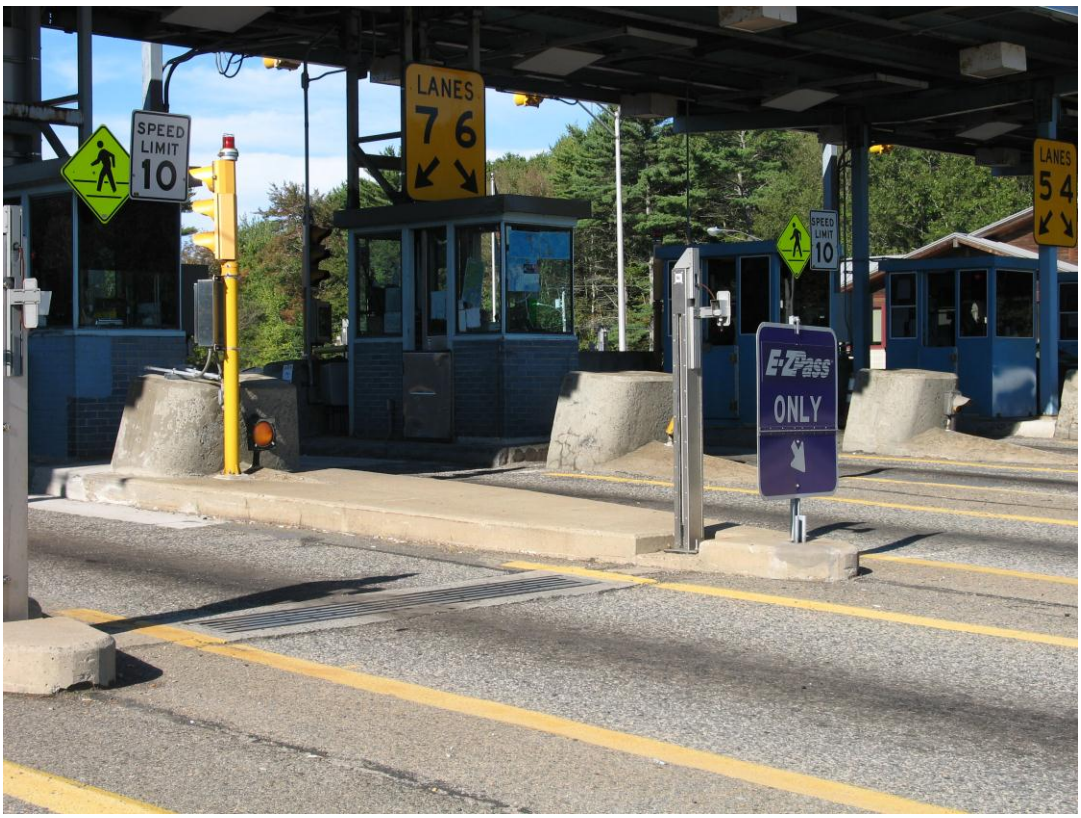
PREPARED FOR

Maine Turnpike Authority

2360 Congress Street
Portland, ME 04102

PREPARED BY

HNTB



EXECUTIVE SUMMARY

The York Toll Plaza is the Maine Turnpike Authority's southern-most toll plaza and has now served beyond its useful life. The plaza, processing more than three times the traffic it did when it first opened in 1969, is suffering from numerous operational and structural deficiencies, and is increasingly a safety concern.

In 2005, the Maine Turnpike Authority (MTA) decided to stop all non-critical repairs and to comprehensively evaluate the existing plaza issues and investigate how to most effectively move forward with a replacement that meets the Authority's goal of operating a safe, efficient and modern, southern toll plaza. A November 5, 2009 Draft Phase I Report for the Maine Turnpike Southern Toll Plaza was submitted to the United States Army Corps of Engineers (USACE). This report outlined that a new Open Road Tolling (ORT) plaza would best meet the Authority's goals.

As part of their review, the USACE requested additional information on the feasibility of All Electronic Tolling (AET). Recognizing the significance of this comment, the Authority decided to conduct a more detailed study of AET. The Authority elected to suspend all other work associated with the Southern Toll Plaza until after the results of a second study of the feasibility of AET is substantially complete. This subsequent study of AET is scheduled for completion in early 2014.

In early spring 2013, the MTA retained HNTB to re-evaluate the feasibility of a new southern ORT plaza. This re–evaluation included a review of the toll plaza size based on revised cash processing rate and current and projected traffic and E-ZPass usage. It also included a preliminary assessment of environmental impacts, permits, estimate of probable construction costs, and a discussion of the toll collection system. This re-evaluation also considers a split plaza which has the northbound cash toll plaza and the south bound cash toll plaza at different locations.

This report outlines that in the opening year of 2017, an ORT facility would require a total of 13 lanes, two less cash lanes than what was assumed as part of the November 2009 Report. In the NB direction, the toll facility should be configured with 4 cash lanes and 2 ORT lanes. SB traffic during peak periods is slightly higher than NB traffic. As a result, the SB toll facility should be configured with 5 cash lanes and 2 ORT lanes.

The smaller plaza size results in fewer environmental impacts, less need to acquire additional property, and lower costs from what was stated in the 2009 report. In addition, the smaller plaza size as well as the split plaza allows for the consideration of some additional sites.

Consistent with the 2009 report, HNTB reviewed the corridor from Spruce Creek at mile 2.2 to Exit 19. Using the project footprint, the candidate sites were then evaluated against screening criteria to determine potential direct impacts using both quantitative and qualitative evaluation methods. The screening criterion includes engineering, natural resources, and built environment (homes) impacts. For each category, the impacts were assigned a relative rating by determining the total range and dividing into three groups; low range of impacts, middle range of impacts, and high range of impacts. (A "high" impact means that the impact is higher than the other sites but does not imply that it is a significant impact.)

Based on their limited impacts, HNTB recommends that the following sites receive further consideration for a southern toll plaza:

Southbound ORT Split Plaza

Location (Mile Marker)	Advantages	Disadvantages
8.1	• Low wetland impact	• Multiple homes within 1000' • Marginal conformance to engineering criteria • Medium stream impact
8.7	• Low wetland impacts • Minimal homes in close proximity	• Medium stream impact
9.9	• Low wetland impact • Low stream impact	• Multiple homes within 1000'

Northbound ORT Split Plaza

Location (Mile Marker)	Advantages	Disadvantages
7.3 (existing plaza location)	• Reuse a portion of the existing site	• Marginal conformance to engineering criteria • High cost • No ORT lanes for interchange traffic • Multiple homes with 1000'
8.7	• Low wetland impacts • Minimal homes in close proximity	• High stream impact
13.2	• Low wetland impact • Low stream impact	• Multiple homes within 1000'

Single Location ORT Plaza

Location (Mile Marker)	Advantages	Disadvantages
8.1	• Low wetland impact	• Multiple homes within 1000' • Marginal conformance to engineering criteria
8.7	• Low wetland impacts • Minimal homes in close proximity	• Medium stream impact

Due to the anticipated environmental impacts, permits are required from State and Federal regulatory authorities prior to construction. The following State and Federal permits are likely:

PERMIT/REGULATION	LIKELIHOOD OF APPLICABILITY		
	Low	Potentially	Likely
State of Maine			
Natural Resources Protection Act			**X**
Site Location of Development	X		
Section 401 Water Quality Certification			X
National Pollution Discharge Elimination System			X
Federal			
Section 404 of Clean Water Act			X

Estimated construction costs for year 2017 vary depending on the alternative. Alternative 1 – single location cash toll plazas and mainline ORT lanes at the same elevation (mainline profile modified to be consistent with cash toll profile) is estimated to be more expensive than Alternative 2 –single location cash toll plaza constructed at a higher elevation than the mainline ORT lanes (No modifications to the mainline profile). Alternative 2 will however have more environmental and right of way impacts. Split plazas, northbound and southbound toll plaza located at different areas, are also feasible for both Alternative 1 and Alternative 2. However, they are estimated to be more costly than a single location toll plaza.

SECTION I - INTRODUCTION

The Maine Turnpike Authority is considering the feasibility of replacing the existing York Toll Plaza. The York Toll Plaza is the Maine Turnpike Authority's southern-most toll plaza and has now served beyond its useful life. The plaza is processing more than three times the traffic it did when it first opened in 1969 and is suffering from numerous deficiencies

The York toll plaza currently has three general areas of deficiencies: toll plaza infrastructure, toll plaza location, and toll system. The toll plaza infrastructure deficiencies are documented in the November 5, 2009 Maine Turnpike Southern Toll Plaza Draft Phase I Report while the Turnpike's system wide toll system deficiencies are discussed in a May 2013 Toll System Assessment Report. While this May 2013 report does not specifically address the York toll plaza, it does address the toll system that is currently in use at York.

Deficient toll plaza infrastructure includes settled concrete roadway slab, settled concrete bumpers, substandard toll booth, and substandard tunnels and canopy. These deficiencies impact the operation of the toll system, operations, and safety. Deficient toll plaza location includes poor vertical and horizontal alignment and proximity to the Exit 7 Interchange all which negatively impact operations and safety.

The May 2013 Toll System Assessment Report outlined that the legacy cash toll system installed in 2004 provides acceptable levels of performance, reliability and system uptime availability based on the originally intended functionality; however it is reaching the end of its anticipated life. The Authority has implemented a program of converting its legacy cash toll collection system at all the side toll plazas to a new toll collection system which is called the Infinity System. The new Infinity system has specific infrastructure requirements such as the need for vehicle detection loops to be installed in a concrete roadway slab with non-metal reinforcement. These slabs are required to have a specific length due to how the loops embedded in the concrete slab interface with the vehicle and the other toll collection equipment.

The Infinity offers the following advantages to the MTA:

- Provides programmed system enhancements for violation enforcement in staffed lanes, video audit and reducing maintenance costs.
- Use of loops embedded in concrete slabs for vehicle classification eliminates the maintenance concern of treadles.

The toll system upgrade at York is not yet scheduled and the MTA has not yet decided whether to proceed with the installation of the Infinity System or some other option. Toll system upgrade/replacement timing at York is influenced by four major considerations.

- **Software** – The extent to which the original software deployed with the current toll system is still supported can impact timing of replacement. The Authority currently relies on operation of its violation enforcement system on operating software that is stable but no longer supported. Other system software is supported but at risk of declining or unavailable support.

- **Hardware** – The primary considerations for end of life relative to toll system hardware involves the availability of spare parts and the condition of installed equipment. The Authority currently operates with an adequate amount of spare parts in most cases with the exception of stated concerns with certain components for the violation system. These components are no longer readily available on the market. However, as the Turnpike continues their ongoing conversion of other toll plaza to the Infinity system, the Authority is creating an inventory of spare parts.

- **New function** – The Authority has identified the goal to reduce maintenance costs for classification equipment, add violation enforcement equipment to the existing staffed lanes and increased audit capabilities in the toll lanes. The legacy toll system does not support these new functions and the most likely cost effective solution to obtaining these functions are as part of a system replacement.

- **Infrastructure deficiencies** –The poor soil conditions at York have resulted in significant settlement of the roadway concrete slab. To construct the new infinity toll system at this location, new concrete roadway slabs founded on piles are desired to minimize long term maintenance issues. In addition, major rehabilitation of infrastructure not related to the toll system such as construction of new pile founded concrete bumpers system is desired in the near future. Any such work should be coordinated with toll system replacements to minimize impact to customers and maximize construction efficiencies.

These deficiencies at York should be mitigated and the most schedule critical deficiency is the existing legacy toll system. This toll system is reaching the end of its anticipated life. However, decisions relating to the replacement of the toll system should consider the practicality of installing the toll system in the deficient infrastructure or whether the infrastructure should be upgraded at the same time in the existing location or an alternate location.

Understanding that a plan for the existing York Toll Plaza Toll needs to be prepared and implemented, the Maine Turnpike Authority retained HNTB Corporation to re-evaluate the feasibility of a new Southern ORT Plaza. This study evaluates the lane requirements of a new southern cash toll plaza based on a revised cash processing rate of 325 vehicles per hours, existing and predicted traffic volumes, and existing and predicted E-ZPass volumes. In addition, this study includes a planning level evaluation of possible environmental and property impacts based on the revised plaza size. This study will be presented to the MTA in 2014. This study, along with a 2014 feasibility study of All Electronic Tolling (conducted by others) will provide the MTA with information to assist them with making a decision on the long term future of the York Toll Plaza.

SECTION 2 - BACKGROUND

In 2005, the Maine Turnpike Authority (MTA) decided to stop all non-critical repairs and to comprehensively evaluate the existing plaza issues and investigate how to most effectively move forward with a replacement that meets the Authority's goal of operating a safe, efficient and modern, southern toll plaza.

A formal study on replacement of the York Toll Plaza was also prompted by LD 534—a Resolve "Directing the Maine Turnpike Authority to Study the Relocation of the York Toll Booth". The report entitled "Response to LD 534" was issued in 2008 and presented a compendium of existing conditions, deficiencies and other safety related findings to date that supported the need for the York plaza replacement. The legislative report included a comprehensive evaluation of options to address immediate and future needs including consideration of (1) the no build alternative, (2) infrastructure upgrade with no additional capacity, (3) upgrading the existing site with conventional tolling and increased capacity, (4) upgrading the site with highway speed tolling and increased capacity and (5) relocating the plaza to an alternate location with Highway Speed Tolling (HST), now referred to as Open Road Tolling, or "ORT". That report also provided an evaluation of various toll collection strategies including HST/ORT, cashless tolling, also known as All Electronic Tolling (AET) and one-way tolling. The report concluded that a new plaza, with HST/ORT in a new location would better meet the safety, capacity, design criteria, and modern toll technology goals than any of the numerous options at the existing site.

The Authority recognized that toll plaza replacement project was a significant project that would require approvals from the United States Army Corps of Engineers (USACE) as well as the Maine Department of Environmental Protection. Therefore, the planning for the project needed to proceed in accordance with the USACE Highway Methodology Process. The Highway Methodology integrates Section 404 permit requirements with highway planning and engineering (and other regulatory processes), provides a guideline which follows the major steps in the USACE permit process and divides the alternatives analysis into two phases. Phase 1 is a planning level analysis in which schematic design alternatives are tested for practicability and are initially screened for relative impacts based on preliminary environmental constraints overlays. Phase 2 involves more detailed analysis of practicable alternatives to permit selection of the Least Environmentally Damaging Practical Alternative (LEDPA).

Following the USACE Highway Methodology Process, a June 16, 2009 Existing Site Evaluation (ESE), was accepted by the Maine Turnpike Authority on September 9, 2009. The ESE begins with an introduction highlighting the project's history, including public participation and coordination with the Maine Legislature. It documents the Project Purpose and Need as required by the USACE. The ESE provides a full analysis of the physical and operational deficiencies of the existing toll plaza. Finally, the ESE documents rehabilitation and reconstruction options ranging from a 'do-nothing' option to a variety of upgrade options at the existing location.

A November 5, 2009 Draft Phase I Report for the Maine Turnpike Southern Toll Plaza was submitted to the USACE in November 2009. This report included the following major components:

1. Part 1 is a brief background of the York Toll Plaza and a summary of the existing conditions of the plaza.
2. Part 2 is the June 16, 2009 Existing Site Evaluation (ESE),
3. Part 3 is the Alternate Site Evaluation (ASE). The ASE documents the identification and analysis of alternate toll plaza sites.
4. Part 4 is the comparative screening of the recommendations from the ESE in Part 2 with the recommendations from the ASE in Part 3. Part 4 also contains the final recommendation for concluding the Phase 1 report to the USACE, which is a shortlist of options and/or alternates recommended to be carried into Phase 2 of USACE's Highway Methodology Process.

The Phase 1 report expanded upon the legislative report by documenting an evaluation of additional existing site options as well as comprehensively reviewing the options within the surrounding area of the existing location. Incorporating input from the public involvement process, the Phase 1 report also includes consideration of "out-of-the-box alternatives" to determine whether other options could meet design criteria, minimize impact to right-of-way and avoid taking homes. Nine options, representing a complete range of existing site alternatives from the no-build alternative to a fully reconstructed plaza with the latest in tolling technology were evaluated and compared based on (1) safety, (2) capacity, (3) operational and physical conditions of the plaza, (4) adherence to basic engineering criteria, (5) property and natural resource impacts and (6) cost.

In addition, the Phase 1 report included further evaluation of toll collection strategies including split toll plaza layouts, one way tolling (which was studied in 2005), All Electronic Tolling (AET) and Open Road Tolling (ORT).

The existing site evaluation produced no options at the existing location that met the Basic Project Purpose without excessive environmental and social impacts and excessive costs, therefore alternate sites were evaluated to provide a reasonable range of alternatives. Initial identification of the corridor for the new plaza considered that the new toll plaza must be located such that it collects tolls from the maximum number of patrons entering the State of Maine from I-95 in New Hampshire; maintains equitable tolls for users of Exit 7 in York; minimizes diversion from the turnpike to local roads; and, is located south of Exit 19, Sanford Road (Route 109), in Wells. Once the corridor was defined, candidate segments, and ultimately candidate sites were identified through an iterative process which considered vertical and horizontal geometry of the existing turnpike, physical separation from existing bridges and interchanges, and the natural and social resources within the corridor. Sixteen potential alternate locations were evaluated considering the same basic design criteria and environmental/social constraint overlays that were used for the existing site evaluation.

This report also detailed a recommendation for advancing a shortlist of options and/or alternatives into a draft Permit Application and Phase 2 investigation as detailed in the USACE Highway Methodology Process. In addition, the report detailed a number of critical items necessary to fully evaluate the physical and operational characteristics of the existing York Toll Plaza. These include: the Standards and Best Practices for design of a toll plaza; the purpose and need for addressing the toll plaza; the toll plaza's operation and what influences that operation; its safety history; and, the proposed size of the new toll plaza given its expected life span.

As part of their review, the USACE requested additional information on the feasibility of All Electronic Tolling (AET). Recognizing the significance of this comment, the Authority decided to conduct a more detailed study of AET. The Authority elected to suspend all other work associated with the Southern Toll Plaza until after the results of a second study of the feasibility of AET is substantially complete. This subsequent study of AET was completed in the Spring 2014 reaching similar conclusions as the original study and is currently being reviewed by the MTA.

SECTION 3 – TRAFFIC ANALYSIS

The York Toll Plaza lies at the southernmost end of the Maine Turnpike. In 2012, York served an average of 43,529 vehicles per day (vpd), making it the busiest plaza on the Maine Turnpike. E-ZPass usage at the York Toll Plaza averaged about 66% of total transactions in 2012.

The York Toll Plaza consists of seventeen lanes – eight serving northbound (NB) traffic and nine serving southbound (SB) traffic. The plaza has two basic types of lanes—dedicated "plaza speed" E-ZPass lanes in which E-ZPass customers roll through at 10 mph, and cash lanes in which customers stop to pay a toll. All cash lanes are equipped to serve both cash and E-ZPass vehicles.

In 2009, HNTB performed an analysis of the York Toll Plaza in order to estimate the appropriate sizing of a new southern toll plaza. However, much has changed over the past four years that has a direct bearing on toll plaza sizing, including the following:

- The estimated year for opening the toll plaza has moved out four years, to 2017.
- The share of E-ZPass usage has grown significantly. In 2009, E-ZPass traffic accounted for 52% of all transactions at the York Toll Plaza. By 2012, the share had increased to 66%.
- Traffic growth at York has been minimal over the past three years. In 2009, an average of 43,046 vehicles per day passed through the plaza. In 2012, this number had grown to 43,529—a change of just 1.1%, or approximately 0.4% per year. This is well below the assumed growth of about 1.66% per year that was used in the previous study.
- The cash processing rate have changes from 275VPH to 325 VPH.

In general, the existing York Toll Plaza operates with 8 available lanes in each direction: 5 cash lanes, 2 dedicated E-ZPass lanes, and 1 convertible lane that can be operated as either a dedicated E-ZPass lane or a cash lane. Additionally, the plaza has a reversible lane in the middle of the plaza that can be devoted to either direction to help serve peak traffic. Thus, the York Toll Plaza can operate with up to nine lanes for the peak direction and up to eight lanes in the opposite direction. In practice, however, the toll plaza rarely employs the reversible lane.

Peak-Hour Volumes

In order to assess toll plaza operations, HNTB identified six critical peak-hour time periods during 2012, the last full year for which data was available:

- **NB Peak – Total Traffic**. This represents the 30th highest hour of NB traffic during a year, considering the combined cash and E-ZPass volumes. It corresponds to a Summer Friday afternoon.
- **NB Peak – Cash Traffic**. This represents the 30th highest hour of NB *cash-paying* traffic during a year. It corresponds to a Summer Saturday midday.
- **SB Peak – Total Traffic**. This represents the 30th highest hour of SB traffic during a year, considering the combined cash and E-ZPass volumes. It corresponds to a Summer Sunday morning.

- **SB Peak – Cash Traffic**. This represents the 30th highest hour of SB *cash-paying* traffic during a year. It corresponds to a Summer Saturday morning.
- **2-Way Peak – Total Traffic**. This represents the 30th highest hour of the York Toll Plaza for both directions of traffic during a year. The peak volumes for two-way traffic generally occur on a Summer Saturday morning.
- **2-Way Peak – Cash Traffic**. This represents the 30th highest hour of the York Toll Plaza for both directions of *cash-paying* traffic during a year. Two-way cash volumes generally reach their peak on a Summer Saturday midday.

Table 3.1summarizes the traffic volumes for the peak time periods of the Southern Toll Plaza.

Table 3.1 – Peak-Hour Volumes at York Toll Plaza – 2012

	NB Volumes				SB Volumes			
Peak Condition	***Cash***	***E-Z***	***Total***	***E-Z%***	***Cash***	***E-Z***	***Total***	***E-Z%***
NB Peak – Total Traffic	1,249	2,354	3,603	65.3%	882	1,229	2,111	58.2%
NB Peak – Cash Traffic	1,408	2,069	3,477	59.5%	1,260	1,617	2,877	56.2%
SB Peak – Total Traffic	993	1,273	2,266	56.2%	1,472	2,288	3,760	60.8%
SB Peak – Cash Traffic	1,136	1,496	2,632	56.8%	1,519	2,177	3,696	58.9%
2-Way Peak – Total Traffic	1,348	1,890	3,238	58.4%	1,408	1,904	3,312	57.5%
2-Way Peak – Cash Traffic	1,320	1,762	3,082	57.2%	1,470	1,979	3,449	57.4%

The toll plaza analysis considered the critical time periods noted above. If the plaza has adequate capacity during these critical time periods, it will be sufficient to meet the traffic demands throughout the year.

Processing Rates

The southern toll plaza assessment is based on the following toll processing capacities:

Cash-paying vehicles pass through cash lanes at a rate of 325 vehicles per hour (vph). This capacity for cash lanes is a planning-level estimate used by the Maine Turnpike Authority (MTA).. In actuality, the capacity is closely tied to the fare that is charged. Certain fares of an even denomination (such as the existing rate of $1.00 at the side toll plazas, or the former rate of $2.00 at York) can yield capacities that are very high, occasionally exceeding 400 vph, however rates this high are not typically sustainable. On the other hand, cash fares that require the handling of change (such as the $2.25 fare currently charged at New Gloucester) typically yield lower capacities in the vicinity of 275-300 vph.

HNTB reviewed processing rates from the Tobin Bridge toll plaza in Boston, which also has a $3.00 toll for cash-paying vehicles. Cash lanes at this plaza routinely serve 320-330 vph during peak commuting periods, which typically occur during the morning rush hour. Therefore, 325 vph is a reasonable estimate for the peak-hour capacity of a cash lane at York.

E-ZPass vehicles pass through dedicated ETC lanes at a rate of 1,150 vph. This capacity of dedicated ETC lanes is based on observations of such lanes at various facilities throughout the northeast. The operating capacity of these lanes—whether at the southern toll plaza, at the Saco toll plaza, on the Massachusetts Turnpike, or on the New York State Thruway—is consistently in the range of 1,100-1,200 vph.

E-ZPass vehicles pass through cash lanes at a rate of 800 vph. E-ZPass vehicles are currently allowed to drive through cash lanes on the Maine Turnpike. Experience has shown that these mixed use lanes are not as effective for E-ZPass use as dedicated E-ZPass lanes. E-ZPass vehicles in mixed use lanes are required to repeatedly stop and start again as they mix with cash traffic waiting in the queue. This causes E-ZPass vehicles to pass through the mixed use lanes at a slightly diminished rate of 800 vph.

E-ZPass vehicles pass through open road tolling (ORT) lanes at a rate of 1,800 vph – An ORT lane essentially functions as a regular highway lane. Analysis of peak traffic levels on the Maine Turnpike suggests that a lane can carry roughly 1,800 vph. While some other interstate highways can accommodate more traffic, those peaks are typically associated with commuter peaks. Therefore, 1,800 vph was used for this study.

Traffic Growth

Future traffic levels for the southern toll plaza were estimated for the 20 year period 2017-2036. The traffic growth estimates were based on the following assumptions documented in the Safety and Capacity Study:[1]

- Design-hour traffic will grow at an annual rate of 1.1% for all locations
- The percentage of ETC traffic will increase over time, consistent with historical trends:
    - When peak-hour ETC usage lies below 60%, the share of ETC usage will increase by 2.15% per year.
    - When peak-hour ETC usage lies in the 60-75% range, its share will increase by 1.25% per year.
    - When peak-hour ETC usage lies in the 75-80% range, its share will increase by 0.40% per year.
    - Peak-hour ETC usage will not exceed 80%.
- Traffic entering the state will *not* be constrained by the limited capacity of the Piscataqua River Bridge. In other words, this analysis assumes that the bridge crossing will be either expanded or reconfigured in order to handle the anticipated increase in peak-hour

[1] Maine Turnpike Needs Assessment – Systemwide Traffic Operation and Safety Study

demand.[2] It also assumes that the 3-lane section of I-95 south of Chases Pond Rd. will be expanded as necessary to handle the projected peak-hour demand.

Based on the above assumptions relative to traffic growth and E-ZPass growth, HNTB developed estimates of future peak-hour traffic volumes for the critical time periods to be used in the analysis. The NB volumes are summarized in Table 3.2, while the SB volumes are summarized in Table 3.3. All peak hour traffic volumes shown in Tables 2 and 3 represent the 30th highest hourly traffic volume for the year. There are four different peak periods that were analyzed for northbound and for southbound traffic. The descriptions of the peak periods follow:

- NB (or SB) Cash Peak – this is the **total** traffic for the northbound (or southbound) direction during the 30th highest hour for cash-paying traffic.
- NB (or SB) Overall Peak – this is the 30th highest hourly traffic volume for the northbound (or southbound) direction
- 2-way Cash Peak – this is the total traffic for the northbound (or southbound) direction during the 30th highest hour for cash-paying traffic in both directions.
- 2-way Overall Peak – this is the total traffic for the northbound (or southbound) direction during the 30th highest hour for all traffic in both directions.

Table 3.2 – Projected NB Volumes at Southern Toll Plaza, 2012-2036

Year	NB Cash Peak		NB Overall Peak		2-way Cash Peak		2-way Overall Peak	
	Vol.	E-Z%	Vol.	E-Z%	Vol.	E-Z%	Vol.	E-Z%
2012	3,477	59.50%	3,603	65.33%	3,082	57.18%	3,238	58.37%
2013	3,515	61.65%	3,643	66.58%	3,116	59.33%	3,274	60.52%
2014	3,554	62.90%	3,683	67.83%	3,150	61.48%	3,310	61.77%
2015	3,593	64.15%	3,724	69.08%	3,185	62.73%	3,346	63.02%
2016	3,633	65.40%	3,765	70.33%	3,220	63.98%	3,383	64.27%
2017	3,673	66.65%	3,806	71.58%	3,255	65.23%	3,420	65.52%
2018	3,713	67.90%	3,848	72.83%	3,291	66.48%	3,458	66.77%
2019	3,754	69.15%	3,890	74.08%	3,327	67.73%	3,496	68.02%
2020	3,795	70.40%	3,933	75.33%	3,364	68.98%	3,534	69.27%
2021	3,837	71.65%	3,976	76.58%	3,401	70.23%	3,573	70.52%
2022	3,879	72.90%	4,020	76.98%	3,438	71.48%	3,612	71.77%
2023	3,922	74.15%	4,064	77.38%	3,476	72.73%	3,652	73.02%
2024	3,965	75.40%	4,109	77.78%	3,514	73.98%	3,692	74.27%
2025	4,009	76.65%	4,154	78.18%	3,553	75.23%	3,733	75.52%
2026	4,053	77.05%	4,200	78.58%	3,592	76.48%	3,774	76.77%
2027	4,098	77.45%	4,246	78.98%	3,632	76.88%	3,816	77.17%
2028	4,143	77.85%	4,293	79.38%	3,672	77.28%	3,858	77.57%
2029	4,189	78.25%	4,340	79.78%	3,712	77.68%	3,900	77.97%
2030	4,235	78.65%	4,388	80.00%	3,753	78.08%	3,943	78.37%
2031	4,282	79.05%	4,436	80.00%	3,794	78.48%	3,986	78.77%
2032	4,329	79.45%	4,485	80.00%	3,836	78.88%	4,030	79.17%
2033	4,377	79.85%	4,534	80.00%	3,878	79.28%	4,074	79.57%
2034	4,425	80.00%	4,584	80.00%	3,921	79.68%	4,119	79.97%
2035	4,474	80.00%	4,634	80.00%	3,964	80.00%	4,164	80.00%
2036	4,523	80.00%	4,685	80.00%	4,008	80.00%	4,210	80.00%

[2] HNTB estimates that the current capacity of the Piscataqua River Bridge is approximately 5,000 vehicles per hour. If this capacity remains unchanged, then the maximum NB volume that could reach the York Toll Plaza (based on current travel patterns at the York and Kittery interchanges) is approximately 4,400 vph.

Table 3.3 – Projected SB Volumes at Southern Toll Plaza, 2012-2036

Year	SB Cash Peak		SB Overall Peak		2-way Cash Peak		2-way Overall Peak	
	Vol.	E-Z%	Vol.	E-Z%	Vol.	E-Z%	Vol.	E-Z%
2012	3,696	58.91%	3,760	60.84%	3,449	57.38%	3,312	57.49%
2013	3,737	61.06%	3,801	62.09%	3,487	59.53%	3,348	59.64%
2014	3,778	62.31%	3,843	63.34%	3,525	61.68%	3,385	61.79%
2015	3,820	63.56%	3,885	64.59%	3,564	62.93%	3,422	63.04%
2016	3,862	64.81%	3,928	65.84%	3,603	64.18%	3,460	64.29%
2017	3,904	66.06%	3,971	67.09%	3,643	65.43%	3,498	65.54%
2018	3,947	67.31%	4,015	68.34%	3,683	66.68%	3,536	66.79%
2019	3,990	68.56%	4,059	69.59%	3,724	67.93%	3,575	68.04%
2020	4,034	69.81%	4,104	70.84%	3,765	69.18%	3,614	69.29%
2021	4,078	71.06%	4,149	72.09%	3,806	70.43%	3,654	70.54%
2022	4,123	72.31%	4,195	73.34%	3,848	71.68%	3,694	71.79%
2023	4,168	73.56%	4,241	74.59%	3,890	72.93%	3,735	73.04%
2024	4,214	74.81%	4,288	75.84%	3,933	74.18%	3,776	74.29%
2025	4,260	76.06%	4,335	77.09%	3,976	75.43%	3,818	75.54%
2026	4,307	76.46%	4,383	77.49%	4,020	76.68%	3,860	76.79%
2027	4,354	76.86%	4,431	77.89%	4,064	77.08%	3,902	77.19%
2028	4,402	77.26%	4,480	78.29%	4,109	77.48%	3,945	77.59%
2029	4,450	77.66%	4,529	78.69%	4,154	77.88%	3,988	77.99%
2030	4,499	78.06%	4,579	79.09%	4,200	78.28%	4,032	78.39%
2031	4,548	78.46%	4,629	79.49%	4,246	78.68%	4,076	78.79%
2032	4,598	78.86%	4,680	79.89%	4,293	79.08%	4,121	79.19%
2033	4,649	79.26%	4,731	80.00%	4,340	79.48%	4,166	79.59%
2034	4,700	79.66%	4,783	80.00%	4,388	79.88%	4,212	79.99%
2035	4,752	80.00%	4,836	80.00%	4,436	80.00%	4,258	80.00%
2036	4,804	80.00%	4,889	80.00%	4,485	80.00%	4,305	80.00%

SECTION 4 – TOLL PLAZA LANE REQUIREMENTS

Based on the above peak hour traffic volumes and the aforementioned toll plaza lane capacities, HNTB developed estimates of future toll plaza lane requirements. The toll plaza lane requirements for a *traditional* (all cash lanes) toll plaza are summarized in Table 4.1. The table summarizes the lane requirements for 2012 through 2036. The data for 2012 through 2016 is for illustrative purposes only, since a new toll facility could not likely be completed until 2017.

Table 4.1 – Required Lanes[1] for Conventional Toll Plaza, 2012-1036

Year	NB Only Lanes	Reversible Lanes	SB Only Lanes	Total Lanes
2012	7	0	7	14
2013	7	0	7	14
2014	6	1	7	14
2015	6	1	7	14
2016	6	1	7	14
2017	6	1	7	14
2018	6	1	7	14
2019	5	2	6	13
2020	7	0	7	14
2021	7	0	7	14
2022	7	0	7	14
2023	7	0	7	14
2024	7	0	7	14
2025	6	1	6	13
2026	6	1	6	13
2027	6	1	6	13
2028	6	1	6	13
2029	6	1	6	13
2030	6	0	7	13
2031	5	1	7	13
2032	5	1	7	13
2033	6	1	7	14
2034	6	2	6	14
2035	6	2	6	14
2036	6	2	6	14

[1]The number of lanes includes the required dedicated E-ZPass lanes and cash lanes needed to accommodate peak hour traffic. The need for E-ZPass lanes increases over time, while the need for cash lanes decreases. Although, the capacity of cash lanes is much lower than that of E-ZPass lanes, so the need for an additional E-ZPass lane will not necessarily correspond to the ability to remove a cash lane. This why the total number of lanes required fluctuates.

As Table 4.1 illustrates, if a conventional plaza were built, it would need to be **14 lanes** wide. Six lanes would need to be dedicated to each direction of travel, with an additional two lanes in the middle of the plaza that could be devoted to either direction as needed.

A more detailed look at the data indicates that the lanes should be signed as follows:

- 1 lane in each direction should be signed as a dedicated E-ZPass lane.
- 2 lanes in each direction should be signed as cash lanes.
- 3 lanes in each direction should have changeable signs, such that the lanes may be operated as either cash lanes or as E-ZPass lanes.
- The reversible lanes should be operated as dedicated E-ZPass lanes.

Table 4.2 summarizes the lane requirements for an southern ORT facility . Because ORT facilities operate with highway speed lanes (ORT) down the middle with cash lanes on the outside, there is no ability to take advantage of reversible lanes.

Table 4.2 – Required Lanes for ORT Toll Plaza, 2012-2036

Year	NB Plaza		SB Plaza	
	Cash	ORT	Cash	ORT
2012	**5**	2	**5**	2
2013	**5**	2	**5**	2
2014	**5**	2	**5**	2
2015	**5**	2	**5**	2
2016	4	2	**5**	2
2017	4	2	**5**	2
2018	4	2	**5**	2
2019	4	2	4	2
2020	4	2	4	2
2021	4	2	4	2
2022	4	2	4	2
2023	4	2	4	2
2024	4	2	4	2
2025	3	2	4	2
2026	3	2	4	2
2027	3	2	4	2
2028	3	2	4	2
2029	3	2	4	2
2030	3	2	4	2
2031	3	2	4	2
2032	3	2	4	**3**
2033	3	2	4	**3**
2034	3	2	4	**3**
2035	3	**3**	4	**3**
2036	3	**3**	4	**3**

The following conclusions may be drawn from Table 4.2:

- An ORT facility would require a total of 13 lanes—one lane fewer than the conventional cash plaza requirement.
- In the NB direction, a total of 6 lanes are required. In the opening year of 2017, the toll facility should be configured with 4 cash lanes and 2 ORT lanes. At some point between

2025 and 2034, one of the cash lanes should be torn down and converted to a third ORT lane. By 2035, the facility should operate with 3 cash lanes and 3 ORT lanes.

- SB traffic during peak periods is slightly higher than NB traffic. Therefore, one additional lane is required to adequately serve SB traffic. In the opening year of 2017, the toll facility should be configured with 5 cash lanes and 2 ORT lanes. At some point between 2019 and 2031, as ORT traffic increases, one cash lane should be torn down and converted to a third ORT lane. By 2032, the facility should operate with 4 cash lanes and 3 ORT lanes.

ADDITIONAL Considerations

- With a processing rate of 325 VPH, maximum queues in 2017 from a 5 lane southbound are expected to be approximately 300'.
- With a processing rate of 325 VPH, the queues in 2017 from a 4 lane southbound plaza are estimated to extend into the mainline travel lanes which is undesirable.
- An increase in the processing rate to 350 vehicles per hour would result in an opening year (2017) reduction from 5 cash lane to 4 cash lanes.
    - Constructing only 4 southbound lanes in 2017 would result in the plaza frequently operating at capacity. A shutdown of cash lane during these periods due to equipment failure, stalled vehicle, lane maintenance, etc., would result in significant traffic queues.
    - Constructing only 4 southbound lanes in 2017 would likely lead to cash capacity issues in the future if another cash lane is replaced in the future with the third southbound ORT lane.

SECTION 5 – CASH TOLL PLAZA

The following is a summary of the toll plaza design criteria.

Exit & Entrance Ramps

The cash plaza exit and entrance ramps have been designed as interchange ramps in accordance with American Association of State Highway and Transportation Officials (AASHTO) policies and with the Federal Highway Authority's State of the Practice and Recommendations on Traffic Control Strategies at Toll Plazas.

Exit Ramp: The roadway connecting the mainline turnpike with the cash toll plaza, allowing vehicles to 'exit' the mainline turnpike. The layout of the plaza approach transition between the ORT lanes and cash lanes was designed in accordance with AASHTO policies for a tapered exit ramp and a major fork.

As discussed in AASHTO, the sight distance on a freeway preceding the approach nose of an exit ramp should exceed the minimum stopping sight distance for the through traffic design speed, desirably by 25% or more. Decision sight distance is desirable where practical. Due to the existing rolling highway profile, reconstruction of the mainline profile preceding the approach nose of the toll plaza exit ramp may be warranted to achieve decision sight distance. This design consideration should be further studied in a subsequent phase of the project.

Entrance Ramp: The roadway connecting the cash toll plaza with the mainline turnpike allowing vehicles to 'enter' back onto the mainline turnpike. The layout of the plaza departure transition (or merge) between the ORT lanes and cash lanes was designed in accordance with AASHTO policies for a tapered entrance ramp.

The design of the opening year and build year considers the AASHTO guideline for balance in the number of traffic lanes on the mainline and ramps. In 2017, the mainline approach to the toll plaza is three lanes. For Alternative 1 with the mainline and the cash toll lanes at the same elevation, at the ramp split, two lanes for ORT traffic continue on the mainline and two lanes of ramp traffic diverge from the mainline. The right lane becomes an exit only lane, the middle lane is a choice lane and the left lane is for ORT only traffic that will remain on the mainline. In the 2032 build year, the mainline approach is still three lanes. At the ramp exit, three lanes for ORT traffic continue on the mainline and one lane of ramp traffic diverges from the mainline. The right lane becomes a choice lane while the middle lane and the left lane are for ORT traffic that will remain on the mainline. A similar condition exists for the plaza departure area. This data is tabulated in Table 5.1

For Alternative 2 with the mainline and the cash lanes at different elevations, two of the three existing mainline travel lanes would be converted to ORT lanes in 2017. The remaining travel lane would be converted to a shoulder. By converting the mainline travel lane to a shoulder, the proper lane balance between the ramps and the mainline is achieved. The right lane becomes an exit only lane, the middle lane is a choice lane and the left lane is for ORT only traffic that will remain on the mainline. In the future when a third ORT lane is warranted, the mainline shoulder can be converted to the third ORT lane. In addition, the off ramp can be striped as a one lane off

ramp because the cash toll volumes are anticipated to warrant only a one lane off ramp. This scenario maintains the desired lane balance

TABLE 5.1 Alternative 1 - Number or required lanes

	Plaza Approach				Plaza Departure			
	Year 2017		Build Year 2032		Year 2017		Build Year 2032	
Area	Number of Lanes	Number of Total Lanes	Number of Lanes	Number of Total Lanes	Number of Lanes	Number of Total Lanes	Number of Lanes	Number of Total Lanes
Mainline Approach	3	3	3	3	3	3	3	3
Mainline at ramp gore	2	4	3	4	2	4	3	4
Ramp	2		1		2		1	

The design considered in the 2008 report assumed that an auxiliary lane was required in the plaza departure area. The current design reduces the overall project footprint for both 2017 and the ultimate build year by eliminating the need for an auxiliary lane.

The design would be similar for alternative 2 with the mainline and the cash lanes at different elevations.

Administration Building, Access and Facilities

The following is a summary of some of the ancillary components and a discussion of their proposed size.

Building: For conceptual planning purposes, the administration building for the Southern Toll Plaza is estimated to be 30 feet by 60 feet (1800 Square feet). The existing York Toll Plaza building has 2100 Square feet. An administration building supporting a single location toll plaza could be slightly larger due the need to support more staff and larger HVAC system. The building area should be further refined in a subsequent stage of the project.

Access/Parking: Access to the building's parking lot is proposed to be from the mainline. The parking area for a split toll plaza is estimated to accommodate 14 vehicles which include provisions for:

- 5 parking spaces for booth attendants
- 5 additional parking spaces for booth attendants at shift change
- 1 parking space for supervisors
- 1 parking space for maintenance
- 2 parking spaces for visitors

The layout of the parking lot, which includes 9 feet by 18 feet parking stalls with 26-foot wide aisles, is in accordance with MaineDOT Design Guide (MDG) parking lot guidelines. A parking area supporting a single location toll plaza would need to be approximately double this size. The parking lot layout and number of spaces should be further refined in a subsequent stage of the project.

Booth Size: The toll island widths provided on recent Maine Turnpike projects have consistently been 8 feet to accommodate a 6-foot wide toll booth with adequate clearance on either side. This is necessary to accommodate modern toll infrastructure, adequate staff accommodations, and safety.

Toll Lane: The toll lanes widths provided on recent Maine Turnpike projects have consistently been 11'. This is desirable to provided adequate width for trucks and Turnpike plows.

Tunnel: A tunnel (or bridge) is desired for toll personnel to safely access the cash booths and to provide a conduit for utilities and location for toll collection equipment. Per FHWA Guidelines, toll collectors should not have to cross more than one live (cash) toll lane. A tunnel or bridge with access to every third booth is desired. For a single location toll plaza, a tunnel or bridge is warranted so no attendant will be required to negotiate the ORT lanes. A second administration building could be constructed in place of a tunnel under the ORT lanes but this would likely be more costly, add to right of way needs and increase environmental impacts.

The dimensions of tunnel or bridge should allow for adequate space for personnel movement, electrical equipment, electronic toll collection (ETC) equipment, utilities, and drainage provisions.

Drainage: Based on initial review of stormwater management considerations, a drainage treatment pond is warranted for new impervious surface.

If a new toll plaza site is selected, excess impervious area at the existing York Toll Plaza will be removed and re-vegetated, thereby helping to offset some of the new impervious surface impacts from a new toll plaza.

Plaza Cross Section Dimensions:

For Alternative 1, cash lanes and mainline profile at the same elevation, the width from centerline, including cash booths lanes and ORT lanes is 139' on the northbound side and 158' on the southbound side. An additional 72' is estimated on the southbound side for a sidewalk, green space, administration building and a driveway. A total cross section width of 449' (including 40' of buffer on both sides) is proposed. Alternative 2, cash toll plaza with existing mainline profile, requires approximately 505'. Slightly less width is required if a retaining wall is used instead of the sloped area to make up the grade differential. Note that the cross sections widths have some flexibility associated with the building size, parking area and buffer area. The actual widths of these areas can be further refined in a subsequent phase of the project.

Single Location Toll Plaza

A single location toll plaza has toll booths across both northbound and southbound roadways at a single location. The entire toll plaza is served by a single administration building. A tunnel under the cash lanes and the ORT lanes is generally required to provide access and services from the administration building to the toll lanes. A bridge is sometimes used in place of a tunnel.

Split Toll Plaza

Split plazas have the toll booths for the northbound lane and southbound lanes at different locations. Split plazas require two administration buildings, one at each toll plaza location. A tunnel under the ORT lanes is not needed. However, a tunnel could be constructed under the cash lanes to provide toll collector and utility access to the booths.

Similar to the single location plaza, the opening year warrants 5 southbound cash lanes, and 4 northbound cash lanes and 2 ORT lanes in both directions.

Potential advantages of split plazas compared to a single location toll plaza are as follows:

- Potential of less total environmental impacts since each split plaza could be placed at a location with minimal environmental impacts.
- No tunnel under ORT lanes.

Potential disadvantages of split plaza compared to a single location toll plaza are as follows:

- Increase in the number of supervisors since each location may require a supervisor
- Increase in the number of toll attendants because of logistical issues associated with switching between the northbound and southbound directions to accommodate peak traffic flows;
- Cost and impacts associated with providing public utilities (water, electric, communication) to two locations.
- Cost associated with reconstructing the mainline at two locations
- Two administration buildings;
- Would require up to four turnarounds for winter maintenance, whereas a single plaza would require up to two

Based on the above noted factors, construction of a split toll plaza would likely cost more than a single location plaza.

Alternatives

Alternative 1 -New cash toll plaza with the cash toll plazas and mainline ORT lanes at the same elevation (mainline profile modified to be consistent with cash toll profile).

This alternative was used in the Maine Turnpike Southern Toll Plaza Draft Phase I report. The cash toll plaza should be on a high point and the approach grade approaching the toll plaza should range from 0.5% to 2%. Since the mainline profile generally does not conform to these

guidelines, the reconstruction of the mainline is required so that it follows the same profile as the cash lanes. This requires the reconstruction of the mainline for approximately the entire project length.

In the future when a third ORT lane is warranted, the innermost cash toll booth and lane can be removed and reconstructed as the third ORT lane with minimal reconstruction of the approach pavement. The typical plaza sections for Alternative 1 are shown in Figure 5.1 in Appendix A.

The project length is measured from the start of the deceleration lane for vehicles departing the mainline to enter the cash lanes to the end of the acceleration lane for the vehicles re-entering the mainline from the cash lanes. A four cash lane northbound plaza requires a project length of 4160'. A five cash lane southbound plaza requires a project length of 4700'.

A conceptual single location ORT plaza for Alternative 1 in the 2017 opening year is shown in Figure 5.2 in Appendix A. The opening year shows 5 southbound cash lanes, and 4 northbound cash lanes and 2 ORT lanes in both directions. The ORT lanes are located inside of the cash lanes and are a continuation of the existing mainline roadway where the alignment, travel lanes, shoulder, and cross slopes match the existing roadway approaching the plaza.

The build year of 2032 is shown in Figure 5.2 in Appendix A. Three ORT lanes in each direction should be provided in 2032 based on the demand for E-ZPass and the corresponding decrease in cash lane demand.

This alternative minimizes the overall plaza footprint and right-of-way impacts. However, it will have higher costs due to the lengthy reconstruction of the mainline for the profile reconstruction.

Alternative 2 - new cash toll plaza constructed at a higher elevation than the mainline ORT lanes (No modifications to the mainline profile)

This alternative consists of a new cash toll plaza constructed adjacent to the mainline on a highpoint with approach grades ranging from 0.5% to 2%. Two of the three existing mainline travel lanes would be converted to ORT lanes. The remaining travel lane would be converted to a shoulder. By converting the mainline travel lane to a shoulder, the proper lane balance between the ramps and the mainline is achieved. A retaining wall or a sloped area between the cash plaza and the mainline is required due the grade differential.

In the future when a third ORT lane is warranted, the mainline shoulder can be converted to the third ORT lane. In addition, the off ramp can be striped as a one lane off ramp because the cash toll volumes are anticipated to warrant only a one lane off ramp. This scenario maintains the desired lane balance. The typical plaza sections for Alternative 2 are shown in Figure 5.3 in Appendix A.

The project length is measured from the start of the deceleration lane for vehicles departing the mainline to enter the cash lanes to the end of the acceleration lane for the vehicles re-entering the mainline from the cash lanes. A four cash lane northbound plaza requires a project length of 4780'. A five cash lane southbound plaza requires a project length of 5750'.

A conceptual single location ORT plaza for Alternative 2 in the 2017 opening year is shown in Figure 5.4 in Appendix A. The opening year shows 5 southbound cash lanes, and 4 northbound

cash lanes and 2 ORT lanes in both directions. The ORT lanes are located inside of the cash lanes and are a continuation of the existing mainline roadway where the alignment, travel lanes, shoulder, and cross slopes match the existing roadway approaching the plaza.

The build year of 2032 is shown in Figure 5.4 in Appendix A. Three ORT lanes in each direction should be provided in 2032 based on the demand for E-ZPass and the corresponding decrease in cash lane demand.

This alternative requires a larger overall plaza footprint and results in more right-of-way impacts.

Both alternatives require adequate mainline site distance preceding the approach nose of the cash ramp gore area. AASHTO (page 10-92) notes "the sight distance on a freeway preceding the approach nose of an exit ramp should exceed the minimum stopping sight distance for the through traffic design speed, desirably by 25 percent or more. Decision sight distance (DSD), as discussed in 3.2.3 is desirable where practical."

Therefore, the actual plaza footprint in any location is dependent on the existing roadway geometry and the need for adequate site distance.

Existing York Toll Plaza Location

Figure 5.5 in Appendix A illustrates an ORT plaza at the existing site. Due to the poor condition of the existing facility, a new toll plaza 200' north of the existing toll plaza was studied. The major difference between this layout and the Alternative 1 layout is the extension of the concrete barrier to eliminate the weaving between the ramp traffic and the ORT traffic. All traffic entering or departing at the interchange are required to use the cash toll lanes which is less than desirable and results in driver confusion.

Figure 5.6 in Appendix A illustrates a possible northbound ORT plaza at the existing site. The mainline is shifted slightly to the west so that the administration building and parking utilizes some of the existing paved area. All of the ramp traffic is required to enter the Turnpike through the cash lanes. A southbound ORT plaza at this location was not deemed practical compared to the other locations due to non-compliance with the industry toll plaza design guidelines.

Both these alternative have the following disadvantages:

- High complexity and cost associated with maintaining toll collection and traffic flow during construction
- Cost associated with mitigation of subsurface soil conditions
- Environmental impacts
- Noncompliance with design guidelines

SECTION 6 – ESTIMATES OF PROBABLE COSTS

Estimated construction costs for year 2017 vary depending on the alternative. The estimated costs are as follows:

Description	**Alternative 1 – Cash Toll Plaza And Mainline Profile At The Same Elevation**	**Alternative 2 - Cash Toll plaza –Maintain Mainline Profile**
Single Location Toll Plaza	$39 million	$29 million
Split Plaza	$46 million	$32 million

These estimates include costs to reconstruct the mainline in the areas preceding the ramp gore or to extend the ramp gore to achieve the desirable decision sight distance. The actual additional cost is very dependent on the existing mainline geometry of each location. Construction cost for any of the existing location alternatives (Mile 7.3) are estimated to be higher than the above stated costs due to complexities associated with maintenance and protection of traffic and toll collection during construction, subsurface soil condition mitigation, and the additional site work due to the location of the interchange. Construction costs do not include engineering, planning, right of way, environmental mitigation costs.

The costs shown represent an estimate of probable costs prepared in good faith and with reasonable care. HNTB has no control over the costs of construction labor, materials, or equipment, nor over competitive bidding or negotiating methods and does not make any commitment or assume any duty to assure that bids or negotiated prices will not vary from this estimate.

SECTION 7 – STUDY AREA

Consistent with the November 5, 2009 report, HNTB reviewed the corridor from Spruce Creek at mile 2.2 to mile 19 and the engineering identification of new plaza locations are consistent with the November 5, 2009 report. It is based on the vertical and horizontal geometry of the existing turnpike; i.e. seeking locations at vertical high points on horizontal tangents, and based on physical separation from bridge overpasses and interchanges. Seventeen candidate locations were identified in the November 5, 2009 report. These same 17 locations are included as part of this study. These locations are noted in Figure 7.1 (Figure 3.6 copied from the 2009 Phase I report).

In addition, this study re-evaluates the feasibility of Location 7.3, the site of the existing mainline toll plaza in York. A southbound split plaza is not discussed at this location since it does not conform to the engineering screening criteria for horizontal alignment, vertical alignment, and separation from interchange. The site is located at the end of a horizontal curve which significantly impacts the horizontal sight distance. It is located at the bottom of a downhill grade which is not desirable from a vertical alignment perspective. An interchange is located just south of the site. While excessive weaving between the ORT lanes and the interchange traffic can be eliminated by requiring that all interchange ramp traffic exit the mainline into the cash lanes, the signing conveying this message can create undesirable driver confusion.

A northbound site is considered since it marginally conforms to the engineering screening criteria. The site is located near the beginning of a horizontal curve so it allows for acceptable sight distance. While the site is located within 1 mile of an interchange, this constraint is mitigated by constructing physical separation between the interchange ramp traffic and the ORT lanes so that excessive weaving is eliminated. As a result, the E-ZPass ramp traffic cannot use the mainline ORT lanes and are must pass through a cash toll lane which creates longer traffic queues in the cash lanes than the traffic queues at the other locations.

Figure 7.1 candidate Toll Plaza Locations

SECTION 8 – SITE COMPARATIVE SCREENING

The site comparative screening portion of the November 5, 2009 Phase I report documents the criteria used for the site comparative screening criteria. This study utilized the same criteria as the 2009 report.

The goals of the site comparative screening is to develop a shortlist of sites that, when compared with others are less environmentally damaging, and are more practicable than the other potential options and locations. The following resources and factors are considered in the site screening. They are not presented in any particular order of importance or weight in the evaluations.

- Right-of-way
- Potential home displacements
- Proximity to homes and subdivisions
- National Wetland Inventory
- Wetland Soils (i.e., hydric soils)
- Streams
- FEMA 100 year Floodplains

The mapping used for November 5, 2009 Phase I report was utilized for this study with the exception that houses located in close proximity to the Turnpike were updated based on 2012 aerial photographs from the State GIS site. The November 5, 2009 Phase I report used 2003 aerial photography and the Maine Office of Geographic Information Systems (Maine OGIS) Data Catalog. Based on this data, hydric soils, National Wetland Inventory (NWI) wetlands, floodplains, streams, and rivers within the study area were mapped.

A typical project footprint was developed for Alternative 2. This alternative was used since it will result in larger impacts than Alternative 1. This Alternative assumes that the gore areas have adequate site distance and therefore the project limits were based on the plaza geometry and the gore areas were not extended. Subsequent analysis conducted in another study phase may reveal that the project limits need to extended to improve site distance to the gore. This would likely result in an increase in impacts.

The following efforts were implored which reduced the project footprint compared to the 2009 Phase I report.

- Reduced the number of cash lanes based on updated traffic analysis
- Refined parking layout to place parking adjacent to the building
- Minimized green space between edge of wide load lane and administration building
- Minimized the size of the building

An administration building was included for the northbound split plaza and the southbound split plaza. A single location ORT plaza with a single administration building may have less impact than the combined impacts of the north bound split plaza and a southbound split plaza due to the second administration building associated with a split plaza.

Consistent with the 2009 report, the limit of impact was assumed to be 40' from the edge of proposed pavement in the building area and 50' from the edge of pavement in all other areas. This impact limit is a reasonable estimate of impacts and allows for the construction of a ditch section or a fill section.

Homes within 75' of project impact line are assumed to be displaced. In addition, lot size was considered during the determination of home displacement. If a majority of a lot is needed for the project, the house on the subject lot was also considered as a displacement. This does not imply that a home requires displacement.

Using the project footprint, the candidate sites were then evaluated against screening criteria to determine potential direct impacts using both quantitative and qualitative evaluation methods. The findings are considered in conjunction with the initial engineering site screening to help select less-damaging and practicable alternatives. Resources used in the initial assessment were adjusted for overlap with the existing Maine Turnpike. For example, wetland soils shown overlapping the roadway were not counted where pavement and embankment clearly exists.

The aerial photographs illustrating the split plaza project footprints and the resource mapping are contained in Appendix B. The plaza footprint has a yellow border.

Appendix C contains an evaluation matrix of the sites with both quantified impacts and qualitative comments. For each resource category, the impacts were assigned a relative rating by determining the total range and dividing into three groups; low range of impacts, middle range of impacts, and high range of impacts. The relative rating is then shown by color to help visualize and show trends when comparing locations and when comparing dissimilar resources. In the table, the least impact range is green, and the most impact range is orange, with yellow representing the middle range. (A "high" impact means that the impact is higher than the other sites but does not imply that it is a significant impact.)

The Maine Turnpike Authority has an option to purchase land west of the mainline at approximately mile marker 8.5. Since the Maine Turnpike does not currently own this land, this area is calculated as "potential right of way impacts" for southbound locations 8.5. 8.6, and 8.7.

Due to their close proximity and similar impacts, Sites 8.5, 8.6, and 8.7 will be considered one site (Site 8.7).

Recommendation for Further Evaluation

We recommend the following sites be considered for further evaluation based on the impacts.

Southbound ORT Split Plaza

Location	Advantages	Disadvantages
8.1	• Low wetland impact	• Multiple homes within 1000' • Marginal conformance to engineering criteria • Medium stream impact
8.7	• Low wetland impacts • Minimal homes in close proximity	• Medium stream impact
9.9	• Low wetland impact • Low stream impact	• Multiple homes within 1000'

Northbound ORT Split Plaza

Location	Advantages	Disadvantages
7.3 (existing plaza location)	• Reuse a portion of the existing site	• Marginal conformance to engineering criteria • High cost • No ORT lanes for interchange traffic • Multiple homes with 1000'
8.7	• Low wetland impacts • Minimal homes in close proximity	• High stream impact
13.2	• Low wetland impact • Low stream impact	• Multiple homes within 1000'

Single Location ORT Split Plaza

Location	Advantages	Disadvantages
8.1	• Low wetland impact	• Multiple Homes within 1000' • Marginal conformance to engineering criteria
8.7	• Low wetland impacts • Minimal homes in close proximity	• Medium stream impact

SECTION 9 – ENVIRONMENTAL PERMITS

This section is a summary of the potential environmental permits that could be required for a replacement southern toll facility, and the factors that trigger the permit requirements.

The Maine Turnpike Southern Toll Plaza would involve construction and ground disturbances that are likely to encroach upon or occur in proximity to protected resource areas. Such actions may trigger permitting requirements for state and federal agencies, and in some circumstances could include local municipality permitting or reviews. Best recognized examples of federal, state and local permits includes USACE Wetland permit (Section 404 of the Clean Water Act), Freshwater Wetland permit (State of Maine Natural Resources Protection Act), and municipal planning or building permits among many others. Generally, during the planning and study phase, a proposed project is reviewed to determine the extent of the work and ground disturbance, presence of natural and social resources, the project activity thresholds, and other actions or triggers applicable to environmental laws, rules and guidance. The collective understanding of the permitting guides the course of navigation through the permit process and strategies. Depending upon the laws and thresholds, there could be instances where general variations of a project due to siting and design differences, might avoid some permits or have a different set of permitting requirements.

A number of state laws have legislative adaptations specific to the unique nature of public infrastructure, including transportation projects of the Maine Turnpike Authority and Maine Department of Transportation. Examples of such adaptations include the wetland Permit by Rule #11 for State Transportation Facilities, the Memorandum of Agreement (MOA) relative to Chapter 500 Stormwater Management Rules, and maintenance exemptions for some activities in wetland resource areas when conducted by a state transportation agency. Most of the adaptations have very specific applicability limitations that must be considered when determining if it should be assigned for a project. An example is the limitation of the Stormwater MOA to apply only to linear portions of a project (e.g. roads, bridges, interchanges, toll facilities), but not for non-linear portions (e.g. maintenance facilities, intermodal transportation facilities).

From our earlier assessment of the southern toll plaza study corridor, we know there are several natural resources that could be impacted and trigger permits or reviews. The corridor contains numerous wetlands, watercourses, protected significant wildlife habitat such as vernal pools, uncommon state-listed plants, and potentially candidate species for listing under the federal endangered species act. The predominant natural resource in the corridor which also has the greatest permitting sophistication includes wetlands. Wetlands are protected by both state and federal wetland laws, and principally include streams, brooks, open water bodies, vernal pools, swamps and marshes.

The list of state and federal laws is exhaustive, but the following laws are discussed as the predominant permitting requirements for the southern toll replacement. As is common with much of the legislative laws, interpretive clarity about applicability is sometimes challenging and sometimes conflicted. Summarized here are the principal permits believed to be applicable to the project based upon established permitting practices for transportation projects in Maine.

Federal

Clean Water Act Section 404, Rivers and Harbors Act Section 10 -US Army Corps of Engineers

The Army Corps of Engineers administers the Clean Water Act wetland program in New England and has established a General Permit and Individual Permit program for Maine. The Corps also administers Section 10 for structures in or over navigable waters, meaning tidal areas, or some of the larger rivers used for navigation beyond the tidal reach. Permitting is required when altering wetland areas such as filling or draining, relocating streams or piping of streams, or work in, under or over any navigable water. There are two different categories of General Permits including Category 1 and Category 2. Generally, projects with less than 3 acres of wetland disturbance (both temporary and permanent), may qualify for a General Permit. Wetland impacts less than 15,000 square feet may qualify for a Category 1 notification, if the performance standards of the permit can be met. Depending upon the total impact and other criteria, the southern toll replacement project is likely to qualify for a Category 2, which is 15,000 square feet or more, but less than 3 acres of wetland impacts. Sometimes projects with unique impacts, or highly complicated or controversial projects, might be elevated to an Individual Permit category, even with less than 3 acres of impacts. There are many standard conditions of the Corps General Permit that must be reviewed and satisfied in order to qualify for the program. Examples of the conditions include historic review, endangered species review, fisheries review, restrictions for in-water work activity during certain seasons, stream crossing design standards, etc.

Endangered Species Act – US Fish & Wildlife Service or National Marine Fisheries Service

The federal Endangered Species Act conserves rare or endangered species and their ecosystems. Species are protected under the Act as either endangered or threatened, and candidate species for listing are also considered. The US Fish & Wildlife Service (USFWS) typically administers species in inland areas, and National Marine Fisheries Service (NMFS), is responsible for marine species in the marine environment. The presence or potential for the presence of a federally listed or candidate species triggers the process and requires review by the agencies. As a federal action, any Army Corps permit issuance must confirm that the action will not adversely affect a federal species. Typically the process is conducted through consultation, either informal or formal, and must be concluded before the Corps can issue the permit. The southern Maine area near the toll replacement study area was noted by USFWS and Maine Department of Inland Fisheries and Wildlife for having the potential for New England Cottontail rabbit (NEC), which is a candidate species for listing. Depending upon the latest data for NEC, additional screening for the species may be needed for some potential plaza locations. As a candidate species, the NEC is not protected under the ESA, however, it is the policy of the USFWS to consider candidate species when making natural resource decisions.

National Environmental Policy Act (NEPA) – Various lead federal agencies

NEPA established environmental protection as a national policy goal and directed all federal agencies to consider the environmental consequences of their projects and permitting actions. The NEPA review provides opportunities for integration of national environmental policy into project planning; public and agency review of potential environmental effects of federal actions (including issuance of federal permits) and programs; coordinated and inter-disciplinary program planning; and resolution of disputes among agencies. Most federal agencies have regulations governing the incorporation of NEPA's reviews into their programs. Typically, as an entity that does not receive federal money for construction projects, the Maine Turnpike Authority does not prepare NEPA documents. However, in some cases, such as with significant projects with

considerable impacts, a lead federal action agency (such as the Army Corps issuing a wetland permit), may require review through NEPA. The type of NEPA study (class of action) could be a Categorical Exclusion, an Environmental Assessment/ Finding of No Significant Impact, or an Environmental Impact Statement (Draft EIS, Final EIS). To date, the extent of potential impacts from the southern toll replacement are not viewed as significant with respect to the criteria identified in NEPA, therefore, no NEPA environmental document or process has been conducted or is foreseen.

National Historic Preservation Act Section 106 (Department of the Interior, State Historic Preservation Office)

The National Historic Preservation Act (NHPA) addresses properties that are on or eligible for listing on the National Register of Historic Places, including archaeological sites. The Maine Historic Preservation Commission (MHPC) administers the NHPA in the State of Maine. Generally, involvement by MHPC occurs when a federal action is pending, such as wetland permitting by the Army Corps. Section 106 of the National Historic Preservation Act requires federal agencies to "take into account" the effects of federal projects on properties listed or eligible for listing on the National Register. The Section 106 consultation process is designed to resolve conflicts between proposed uses and historic places, but it does not guarantee the preservation of the property.

As mentioned in the Army Corps permitting discussion above, Section 106 reviews are a condition of the permitting process. A project that disturbs natural ground in important archaeological landscapes, or is proximate to a listed historic property or structure, would typically trigger some level of historic review work and consultation. Reviews may involve conducting investigations of listed or eligible historic building structures, dams, or archaeological investigations of potential sub-surface resources (prehistoric and historic period artifacts), which could have significance relative to the NHPA. The southern toll replacement project involves new disturbances in natural ground, and therefore, some level of coordination/investigation of historic resources as an element of the Corps permitting process should be anticipated.

State

Natural Resources Protection Act (NRPA) - Maine Department of Environmental Protection

Natural resources protected by the state legislation include coastal sand dune systems, coastal wetlands, significant wildlife habitat, fragile mountain areas, freshwater wetlands, great ponds and rivers, streams or brooks.

A NRPA permit is required when an "activity" will be located in, on or over any protected natural resource, or located adjacent to a coastal wetland, great pond, river, stream or brook or significant wildlife habitat contained within a freshwater wetland, or certain freshwater wetlands.
By definition, an "activity" is dredging, bulldozing, removing or displacing soil, sand, vegetation or other materials; draining or otherwise dewatering; filling, including adding sand or other material to a sand dune; or any construction, repair or alteration of any permanent structure.

For the southern toll plaza replacement project, the prevalent resources in the corridor are wetlands and watercourses, similar to and essentially the same as with the Army Corps jurisdiction. In addition, another key NRPA jurisdictional natural resource found in the corridor includes significant wildlife habitat, such as certain vernal pools.

The NRPA permitting program includes different permit types for wetland resource areas. The NRPA types include Permit by Rule (PBR) (Chapter 305), Chapter 310 Wetlands Tier 1 (for freshwater wetland impacts up to 14,999 square feet), Tier 2 (for freshwater wetland impacts of

15,000 to 43,560 square feet, and Individual for wetland impacts over 43,560 square feet or any other protected resource.

The Chapter 305 PBR program includes a permit category that is specific to State Transportation Facilities carried out by, or under the authority of, the Maine Department of Transportation (Maine DOT) or the Maine Turnpike Authority. Generally, the PBR is reserved for more routine, low impact and non-controversial projects. Some examples of applicable PBR projects include the maintenance, repair, reconstruction, rehabilitation, replacement or minor construction of a State Transportation Facility. Although a design alternative for the replacement plaza might meet the impact criteria for a PBR, it is very likely that the permitting process would warrant at least Tier 2 or 3 due to the proximity to other natural resources, public input, and the procedural methods that would be followed and documented with that permitting course.

Site Location of Development Act (SLODA) – Maine Department of Environmental Protection (sometimes a local municipality if delegated authority)

Site Law is applicable for developments that may have a substantial effect upon the environment. These types of development include projects occupying more than 20 acres, metallic mineral and advanced exploration projects, large structures and subdivisions, and oil terminal facilities. In the law, a "structure" is defined as buildings, parking lots, roads, paved areas, wharves or areas to be stripped or graded and not re-vegetated that cause a total project to occupy a ground area in excess of 3 acres. Since passage of the SLODA, several amendments to the Rules have refined the applicability relative to state roads and associated infrastructure. Generally, a road is exempt from SLODA, as defined in §488: "A structure consisting only of a road or a road together with the structure area within a residential lot, as described in subsection 17 is exempt from the requirements of this article. Railroad tracks other than tracks within yards or stations are exempt from review under this article."

This presents a question relative to how a project such as a toll plaza and supporting infrastructure is treated under the regulation. Under the regulation, a road alone is considered a "structure" and therefore exempted from permitting. However, additional toll facility features (support building, parking areas) might not be exempted as purely "road" and could be subject to permitting. A question remains whether the Turnpike roadway and toll plaza elements of the overall facility would be exempted from the three acre structure area trigger. If so, it is likely that the support building, parking areas, and other elements of the facility alone would not meet the three acre area threshold.

Interpretation of the Maine DEP view of what constitutes the Maine Turnpike infrastructure might be gained from the Chapter 500 Stormwater Memorandum of Agreement (2007) between the Maine DEP, Maine Department of Transportation, and Maine Turnpike Authority. The MOA states that no state transportation system project constructed pursuant to the requirements of the MOA is required to get a permit or DEP approval pursuant to the Maine Stormwater Management Law (one of the triggers for SLODA is the need for a project to obtain a Chapter 500 Stormwater Permit). However, the MOA specifically does not apply to projects that are required to obtain a permit through SLODA.

In the MOA, a state transportation system is defined as a Maine DOT or MTA administered or supervised state or state aid highways along with associated sidewalks, paths, trails, and/or bridges; any associated facilities essential to the safe and efficient operation of those state transportation systems, including but not limited to highway maintenance facilities, transit/rail stations, toll plazas, ferry terminals, cargo ports, intermodal transportation centers, weigh stations, rest areas, visitor information centers, service plazas, and park-and-ride lots as well as parking lots and other infrastructure serving those facilities. Based upon the MOA exemption of a Chapter 500 Stormwater permit for state transportation systems, including toll plazas, it appears that the southern

toll plaza replacement would not trigger the Chapter 500 stormwater permit. Therefore, it follows that the need for a SLODA permit would not be triggered through the stormwater permitting criteria in the law.

Note that in the Stormwater MOA, the linear portion of a project is defined as: All rail lines, roads, highways, bridges, or similar transportation corridors, along with associated interchanges, scenic turnouts, access ramps, airport runways and taxiways, weigh stations, toll facilities, intersections, sidewalks, trails, paths and similar associated facilities including associated parking and building area of up to 5,000 square feet. Through the DEP inclusion of parking and building area of up to 5,000 square feet as elements of the linear portion of a project, it seems to point toward DEP not separating the support buildings, parking areas, and other surfaces from roads. It follows that the same interpretation and intent would be applicable under SLODA, therefore, a Site Location of Development permit should not be necessary for the southern toll plaza replacement project.

The interpretation of applicability must be reviewed further with Maine DEP to conclude the approach and requirements under SLODA. Should it be found that a permit is needed, one approach is the SLODA General Permit authorized in 2009 by the Legislature. That program change established a General Permit program for the Maine Department of Transportation and Maine Turnpike Authority. Should it be determined that a SLODA permit is required for the southern toll plaza replacement, it may be possible to gain approval through the General Permit program by filing a Notice of Intent and meeting the permit conditions of the permit. If a General Permit cannot be used for the project, filing an Individual permit may be necessary.

Chapter 500 Stormwater Management – Maine Department of Environmental Protection (sometimes a local municipality if delegated authority)

The State of Maine Stormwater management law was established to protect the waters of the State through a set of performance standards for projects in organized areas that include one acre or more of disturbed area. Section 420-D of Title 38 states "A person may not construct, or cause to be constructed, a project that includes one acre or more of disturbed area without prior approval from the department. A person proposing a project shall apply to the department for a permit using an application provided by the department and may not begin construction until approval is received."

As described above in SLODA, there are some exceptions to the Maine Chapter 500 Stormwater Management law that were established through the 2007 Stormwater MOA with Maine DEP, Maine Department of Transportation, and Maine Turnpike Authority. In addition to the agreement in the MOA, the exemption is also noted directly in the regulations at: 7. Exemptions (G): "Projects involving roads, railroads and associated facilities conducted by or under the supervision of the Department of Transportation or the Maine Turnpike Authority, do not require review under this section as long as the projects are constructed pursuant to stormwater quality and quantity standards set forth in a memorandum of agreement between the department and the conducting or supervising agency and the project does not require review under article 6. A memorandum of agreement described in this paragraph must be updated whenever the rules concerning stormwater management adopted by the department are finalized or updated."(Note that Article 6 is the Site Location of Development Law).

Should it be determined that a Chapter 500 Stormwater permit is necessary for the southern toll plaza replacement, a series of performance standards would be followed, including both design and construction elements. The program includes two permit courses; a Stormwater Permit by Rule and full Stormwater permit filing. The permit process includes considerable collaboration with Maine DEP regarding stormwater designs for treatment, developing operation and

maintenance plans, and reporting. Regardless of the applicability of a Stormwater permit, the southern toll plaza replacement project should anticipate using appropriate stormwater design features to effectively manage and treat water prior to discharging.

Based upon the stormwater discussion above under SLODA, additional clarification is needed to confirm that Chapter 500 Stormwater permitting is not needed for the southern toll plaza replacement.

401 Water Quality Certification- Maine Department of Environmental Protection

Section 401 is the water quality protection component of the federal Clean Water Act. A project requiring a federal license or permit to conduct an activity that may result in a discharge to the waters of the United States must supply the federal licensing authority with a certification from the State that any such discharge will comply with State water quality standards. The federal license or permit may not be issued until water quality certification has been issued or waived. The most common federal permit requiring the water quality certification is the Army Corps Section 404 wetland permit. Maine DEP may add conditions to the certification, and these must become conditions of the federal license.

Maine DEP has combined the decision concerning Section 401 water quality certification with the review of an application for a state permit that already requires compliance with state water quality standards (such as NRPA Wetlands). The issuance of the order approving the project constitutes both the state permit and the water quality certification.

The Maine DEP has waived Water Quality Certification (WQC) for projects that are authorized by the Army Corps of Engineers Category 1 and Category 2 General Permit. Should the southern toll plaza replacement require an Individual Permit from the Corps (wetland impacts less than 3 acres but with controversial or special circumstances), it should be anticipated that Maine DEP will conduct a WQC review, which would be initiated by the NRPA filing. A Maine DEP Permit by Rule, Tier 1, or Tier 2 NRPA Wetlands permit filing would not automatically trigger the WQC review, since wetland impacts meeting those permit categories would also meet the Corps General Permit.

NPDES Construction General Permit

Construction projects in Maine are subject to the National Pollution Discharge Elimination System program and permitted through the Maine Construction General Permit (CGP). Any construction activity that disturbs one acre or more of land must submit a Notice of Intent to the Maine Department of Environmental Protection under the CGP. Disturbance is defined by the CGP as any clearing, grading or excavation; it does not include maintenance but does include redevelopment. Submission for a CGP must include the Notice of Intent (NOI) form and attachments, such as a location map, site plan, erosion and sedimentation control plan, and photographs of the area to be disturbed. There may be additional requirement if the project is located within an Essential Wildlife Habitat, MS4 area or urban impaired stream watershed. Upon completion of a project that filed a NOI, the applicant must submit a Notice of Termination (NOT) form, along with photographs of the completed project. The applicant is required to maintain records of all submission and erosion and sedimentation control plan documents for three years.

Conclusion

The state and federal permits for the southern toll plaza replacement project are dependent upon the location, presence and proximity to resources, design, impacts, and interpretation of applicability or exemptions for certain regulations. From a review of the corridor and resources, the conceptual design and regulations, the following permits are identified as likely or potential for the project:

Table of Potential Permits for the Southern Toll Plaza Replacement Project

PERMIT/REGULATION	LIKELIHOOD OF APPLICABILITY		
	Low	Potentially	Likely
State of Maine			
Natural Resources Protection Act			**X**
Site Location of Development	X		
Section 401 Water Quality Certification			X
Chapter 500 Stormwater	X		
National Pollution Discharge Elimination System			X
Federal			
Section 404 of Clean Water Act			X
Endangered Species Act	X		
National Environmental Policy Act	X		
National Historic Preservation Act	X		

SECTION 10 ASSESSMENT OF YORK TOLL SYSTEM OPTIONS

The current toll system at the existing York Plaza installed in 2004 provides acceptable levels of performance, reliability and system uptime availability based on the originally intended functionality. However, every electronic system has a limited service life and an upgrade/replacement cycle of seven to ten years is considered typical in other toll agencies for toll systems of this vintage. Conducting the required activities prior to the typical end of service life also helps to reduce risk exposure due to declining spare parts availability, declining equipment performance near end of life, or reductions in system support availability. In the Authority's case, spare parts availability has been stated as a particular concern.

In addition to consideration of service life, replacement also offers key opportunities for the operator to pursue desired enhancements such as reduced maintenance costs, expanded enforcement and increased auditability through careful specification of the replacement system within the scope of the current plaza operations and infrastructure. Issues at the existing York Plaza include high maintenance costs due to classification equipment (treadles), lack of violation enforcement in staffed lanes and limitations on operational audit functionality.

The following are the options for toll collection at the existing York Toll Plaza:

Option 1 Maintain the existing plaza toll system in place using available MTA spares and maintenance services.

Pros

- As other lanes are converted at other toll plazas on the Maine Turnpike as part of ongoing toll system refresh, additional spares will become available, likely providing additional time while the long term plaza solution is determined and implemented.
- Limited costs
- No customer impacts due to upgrading (no lane closures)

Cons

- Same legacy hardware and software, not a long term solution, eventually system replacement will need to occur. Exact timing is not determinable, but only a few years of extended operation can be anticipated.
- The single busiest location receives no programmed system enhancements scheduled as part of the system-wide replacement (No violation enforcement added to staffed lanes, No video audit system added to monitor performance and enhance audit, continued higher maintenance costs for current treadle equipment)
- Delays in upgrading the York toll system will potentially extend the period of time when the MTA is operating with two different types of toll equipment, requiring two different data streams to be handled by MTA back office – delaying MTA long term goal to have one system.

Option 2: Install new Infinity toll system and infrastructure upgrade

This option consists of renovation of the deficient components including the installation of the new Infinity toll system.

Major elements of this option consist of the following:

- On toll departure side, demolish and remove existing settled concrete roadway slab and install new concrete roadway slab founded on piles to prevent settlement. New slab desired to improve operations and minimize maintenance.
- Approach lane concrete bumper founded on piles to maintain integrity and improve safety
- Demolish and install new tunnel roof with nonmetal reinforcement.
- Reconstruction of approach and departure roadway to meet new roadway slab elevation
    - Assume 200' of lightweight fill at both approach and departure. Lightweight fill to be stepped to transition from no settlement at pile founded concrete slab to full depth pavement and gravel section.
    - Assume 800' of bituminous overlay
- Widen southbound roadway to improve queue areas and tapers in conformance with FHWA guidelines.
- Concrete barrier installed in center of plaza approach and departure
- Tunnel rehabilitation
- New overhead signing on toll plaza approach
- Canopy painting and roof sealing
- New Canopy signs

Pros

- More readily addresses end of life cycle concerns with toll system, reducing risk
- All the functionality of the new system.
- Most flexible option for future tolling considerations at the existing toll plaza site.
- Provides programmed system enhancements for violation enforcement in staffed lanes, video audit and reducing maintenance costs.
- Brings the plaza in line with MTA long term single toll system goal.

Cons

- Plaza horizontal and vertical geometry and location adjacent to an interchange would not be in conformance with FHWA guidelines
- Substandard booths would remain
- Complexity and cost associated with maintaining traffic and toll collection during construction
- If the plaza is relocated or changed as a final option,
    - Not all of the new in-place equipment would be able to be salvaged (i.e. axle counting and detection loops in pavement.)
    - Any civil modifications required for the upgraded lanes (such as pavement and electrical work) will be sunk costs and not recovered

Option 3- Install new Infinity toll system and infrastructure upgrade as toll lanes reach the end of their life.

This option consists of renovation of the deficient components including the installation of the new Infinity toll system as lanes reach the end of their useful life

This option is not feasible since it is not practical to mobilize multiple times to construct toll and infrastructure upgrades. In addition it is not practical to upgrade the approach and departure roadways at different times due to the change in elevation between the existing and proposed condition.

Option 4: - Install new Infinity toll system without new concrete roadway slab. Includes infrastructure upgrade

This option consists of renovation of the deficient components including the installation of the new Infinity toll system however; the existing concrete roadway slab would remain.

This option is not feasible. The existing concrete roadway slab contains steel reinforcement, is partially buried under bituminous (due to settlement), and does not conform to the length requirements. These existing conditions are not acceptable for the new Infinity System.

Option 5: - Install new toll system (non Infinity) and infrastructure upgrade

This option consists of renovation of the deficient components including the installation of the new toll system.

This option is not feasible. The installation of a new toll system would require a lengthy procurement, development, and testing process. In addition, new toll systems are all utilizing loops embedded in concrete slabs so the civil work associated with other toll systems are generally of the same magnitude as the Infinity system.

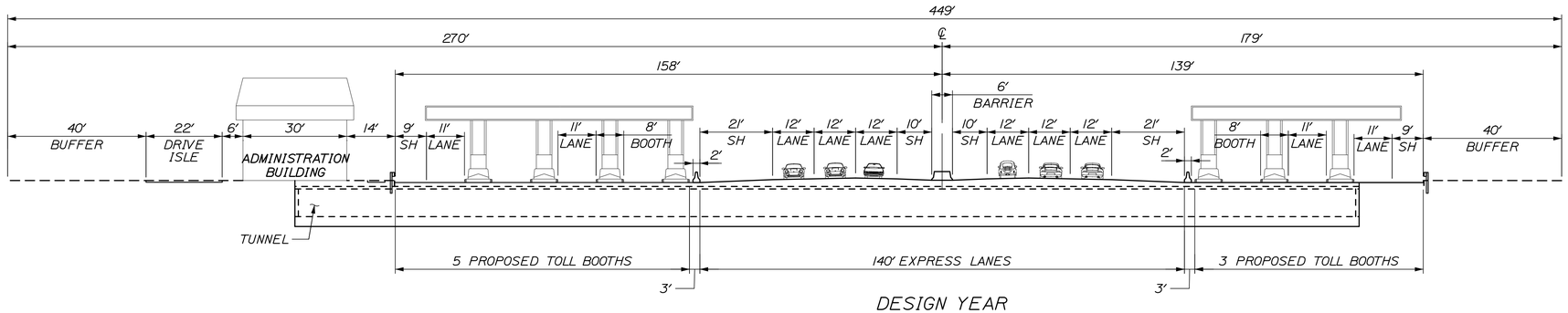
APPENDIX A

APPENDIX B

Aerial photographs illustrating the split plaza project footprints and the resource mapping.

APPENDIX C

Evaluation matrix of the sites with both quantified impacts and qualitative comments (Computed for Alternative 2 only).



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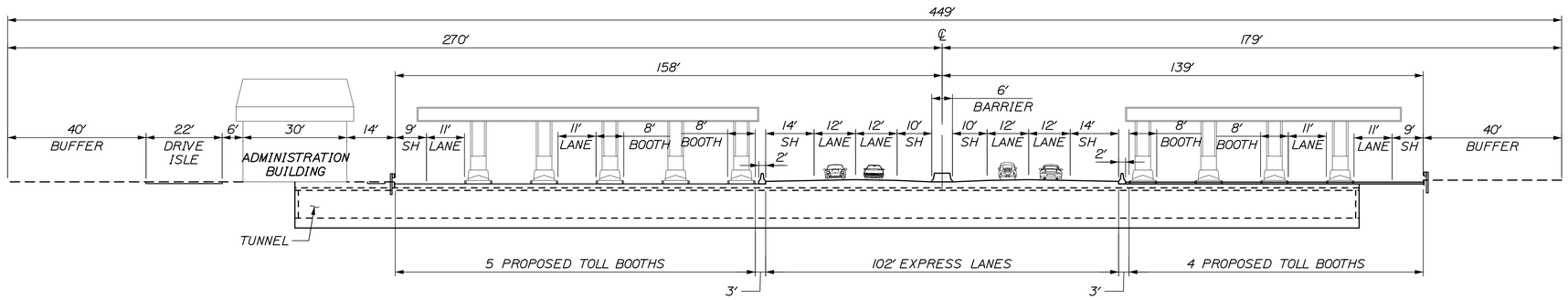
3 NB CASH LANES
4 SB CASH LANES



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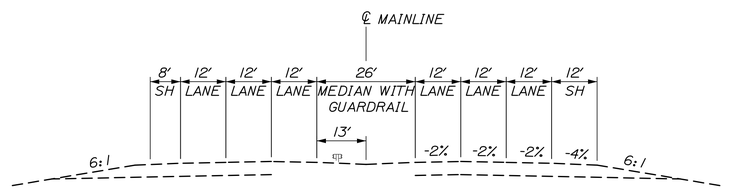


EXISTING APPROACH ROADWAY (3 LANES)

NOTES
1. ADMINISTRATION BUILDING COULD ALSO BE LOCATED ADJACENT TO NORTHBOUND ROADWAY.

Date:7/8/2014

Filename: Figure5.1.dgn

Scale: 20 0 20 40

No.	Revision	By	Date

Designed by: HNTB

CONSULTANT PROJECT MANAGER: Robert J. Driscoll

	By	Date		By	Date
Designed	RJD	11/13	Checked	LZD	11/13
Drawn	MPC	11/13	In Charge of	RAL	11/13

HNTB CORPORATION
340 County Road, Suite 6-C
Westbrook, ME 04092
TEL (207) 774-5155
FAX (207) 228-0909

MAINE TURNPIKE

THE GOLD STAR MEMORIAL HIGHWAY

MTA PROJECT MANAGER: Doug Davidson

REEVALUATION OF SOUTHERN TOLL PLAZA

FIGURE 5.1
ALTERNATIVE 1 - TYPICAL SECTIONS

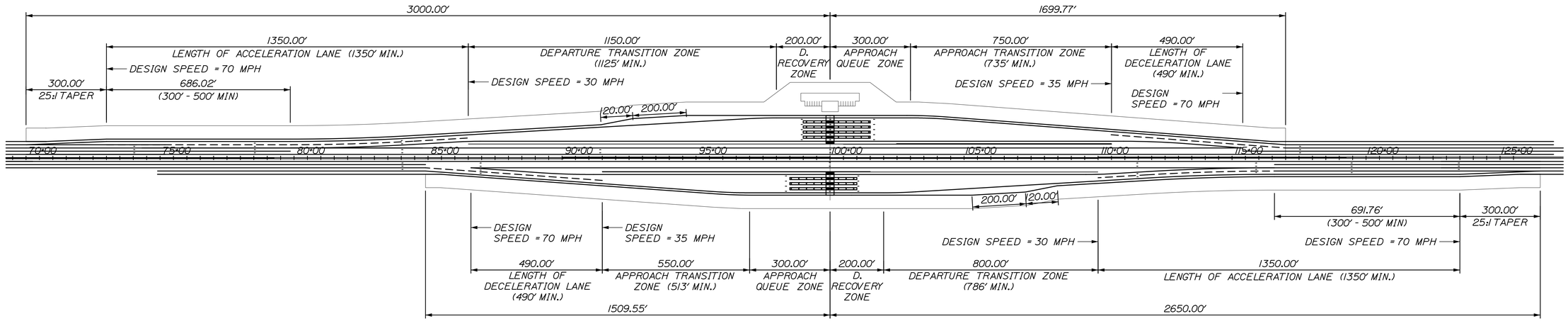
SHEET NUMBER: -

CONTRACT:-

- OF -

SB 5 CASH LANE PLAZA TO PARALLEL ENTRANCE RAMP

SB TAPER EXIT RAMP TO 5 CASH LANE PLAZA



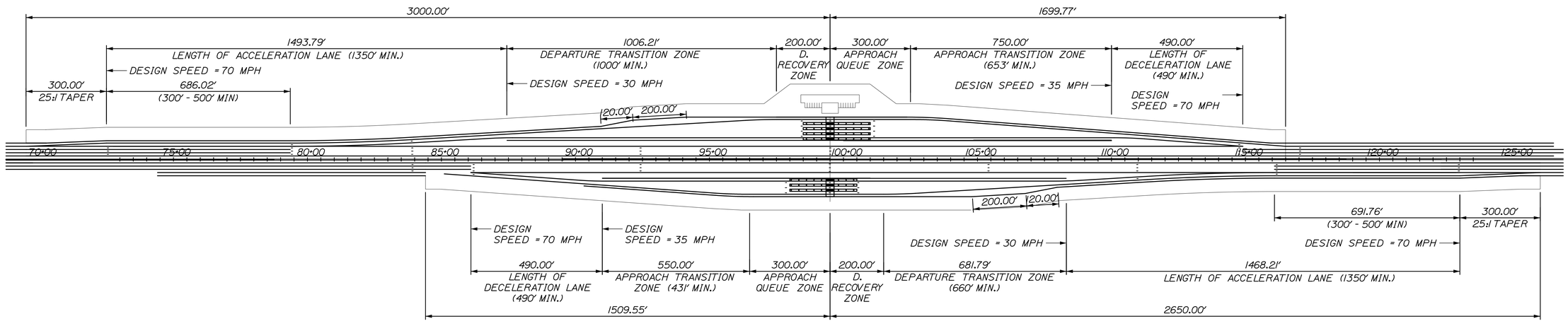
NB TAPER EXIT RAMP TO 4 CASH LANE PLAZA

NB 4 CASH LANE PLAZA TO PARALLEL ENTRANCE RAMP

2017 OPENING YEAR

SB 4 CASH LANE PLAZA TO PARALLEL ENTRANCE RAMP

SB TAPER EXIT RAMP TO 4 CASH LANE PLAZA



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NB 3 CASH LANE PLAZA TO PARALLEL ENTRANCE RAMP

2032 DESIGN YEAR

Date:7/1/2014

Filename: Figure5.2NEW.dgn

Scale:			
No.	Revision	By	Date

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Drawn	MPC	11/13	In Charge of	RAL	11/13

HNTB CORPORATION
340 County Road, Suite 6-C
Westbrook, ME 04092
TEL (207) 774-5155
FAX (207) 228-0909

MAINE TURNPIKE

THE GOLD STAR MEMORIAL HIGHWAY

MTA PROJECT MANAGER: Doug Davidson

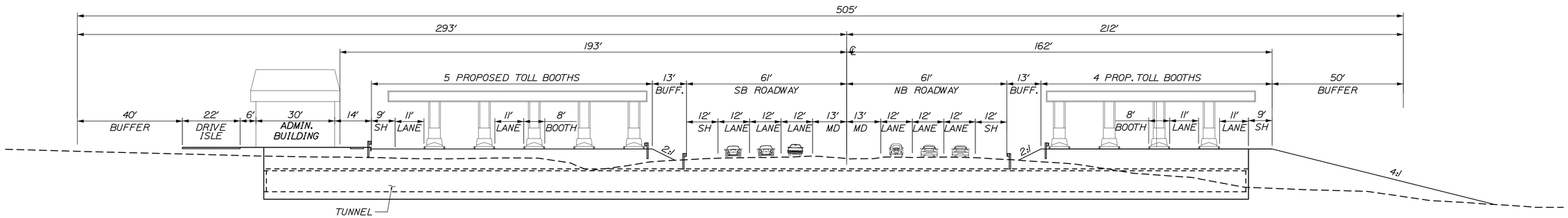
REEVALUATION OF SOUTHERN TOLL PLAZA

FIGURE 5.2
ALTERNATIVE 1 - PLAN

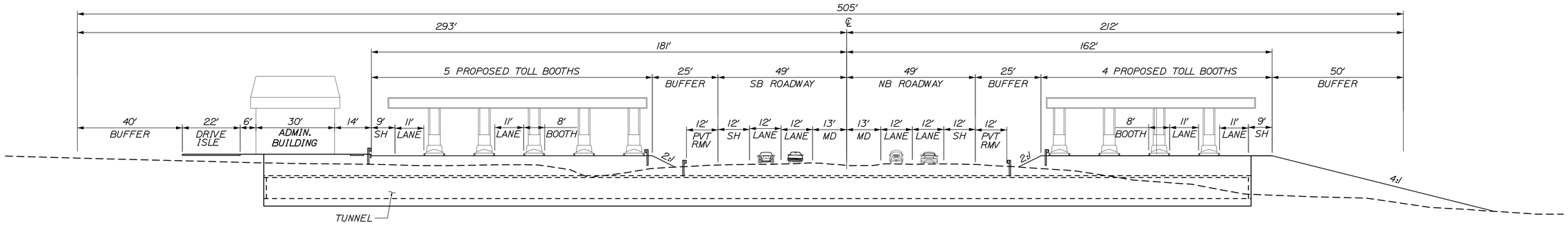
SHEET NUMBER: -

CONTRACT:-

- OF -



DESIGN YEAR
3 EXPRESS LANES EA. DIRECTION
4 NB CASH LANES
5 SB CASH LANES



OPENING YEAR
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Date:7/1/2014

Filename: Figure5.3_Typicals.DGN

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No.	Revision	By	Date

Designed by: HNTB

CONSULTANT PROJECT MANAGER: Robert J. Driscoll

	By	Date		By	Date
Designed	RWH	02/14	Checked	RJD	02/14
Drawn	RWH	2/14	In Charge of	RAL	02/14

HNTB CORPORATION
340 County Road, Suite 6-C
Westbrook, ME 04092
TEL (207) 774-5155
FAX (207) 228-0909

MAINE TURNPIKE

THE GOLD STAR MEMORIAL HIGHWAY

MTA PROJECT MANAGER: Doug Davidson

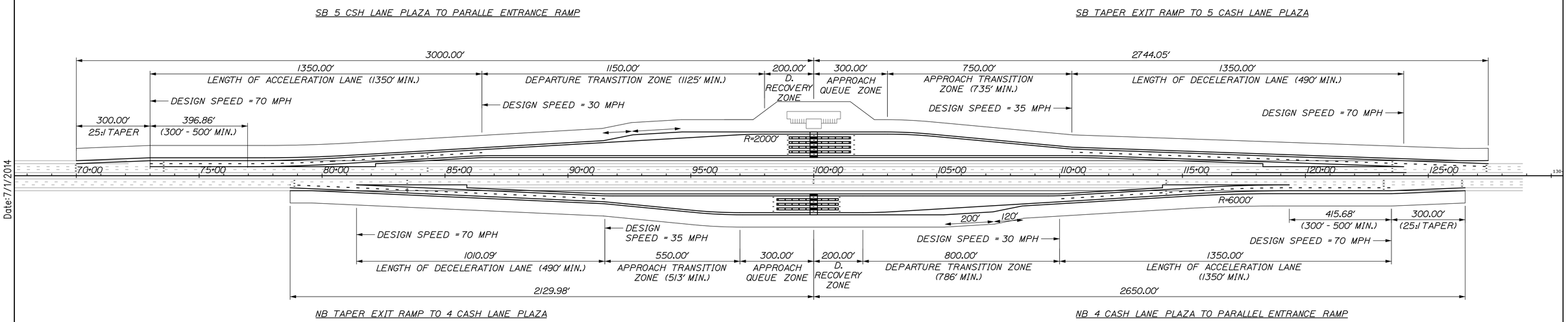
REEVALUATION OF SOUTHERN TOLL PLAZA

FIGURE 5.3
ALTERNATIVE 2 - TYPICAL SECTIONS

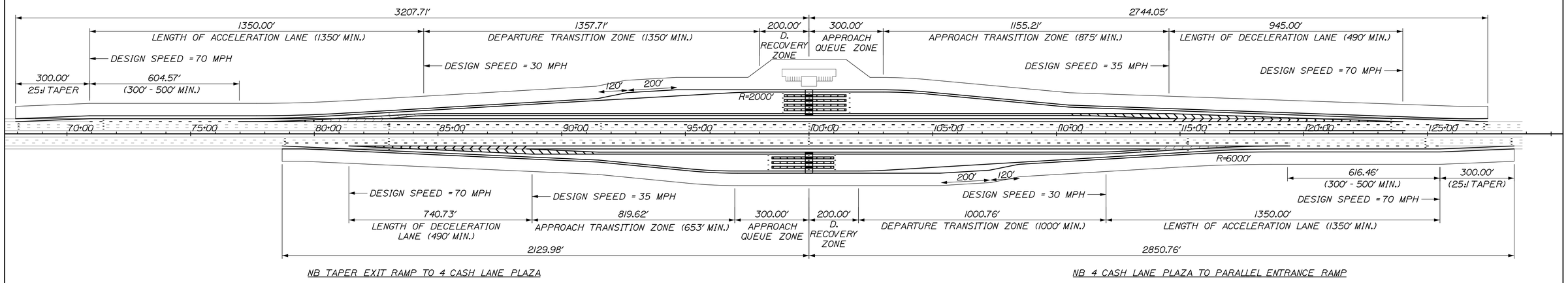
SHEET NUMBER: -

CONTRACT:-

- OF -



2017 OPENING YEAR



2032 DESIGN YEAR

Date:7/1/2014

Filename: Figure5.4_Plan.dgn

Scale:

No.	Revision	By	Date

Designed by: HNTB

CONSULTANT PROJECT MANAGER: Robert J. Driscoll

	By	Date		By	Date
Designed	RWH	02/14	Checked	RJD	02/14
Drawn	RWH	02/14	In Charge of	RAL	02/14

HNTB CORPORATION
340 County Road, Suite 6-C
Westbrook, ME 04092
TEL (207) 774-5155
FAX (207) 228-0909

MAINE TURNPIKE

THE GOLD STAR MEMORIAL HIGHWAY

MTA PROJECT MANAGER: Doug Davidson

REEVALUATION OF SOUTHERN TOLL PLAZA

FIGURE 5.4
ALTERNATIVE 2 - PLAN

SHEET NUMBER: -

CONTRACT:-

- OF -

Date:7/1/2014

Filename: Figure5.5_Location7.3_ORT.dgn

Scale:

Designed by: HNTB

No.	Revision	By	Date

CONSULTANT PROJECT MANAGER: Robert J. Driscoll

	By	Date		By	Date
Designed	RWH	02/14	Checked	RJD	02/14
Drawn	RWH	02/14	In Charge of	RAL	02/14

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MAINE TURNPIKE

THE GOLD STAR MEMORIAL HIGHWAY

MTA PROJECT MANAGER: Doug Davidson

REEVALUATION OF SOUTHERN TOLL PLAZA

FIGURE 5.5
LOCATION 7.3 ORT

SHEET NUMBER: -

CONTRACT:-

- OF -

Date:7/1/2014

Filename: Figure5.6_Location7.3NB_ORT.dgn

Scale:

No.	Revision	By	Date

Designed by:

HNTB

CONSULTANT PROJECT MANAGER: Robert J. Driscoll

	By	Date		By	Date
Designed	RWH	02/14	Checked	RJD	02/14
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MAINE TURNPIKE

THE GOLD STAR MEMORIAL HIGHWAY

MTA PROJECT MANAGER: Doug Davidson

REEVALUATION OF SOUTHERN TOLL PLAZA

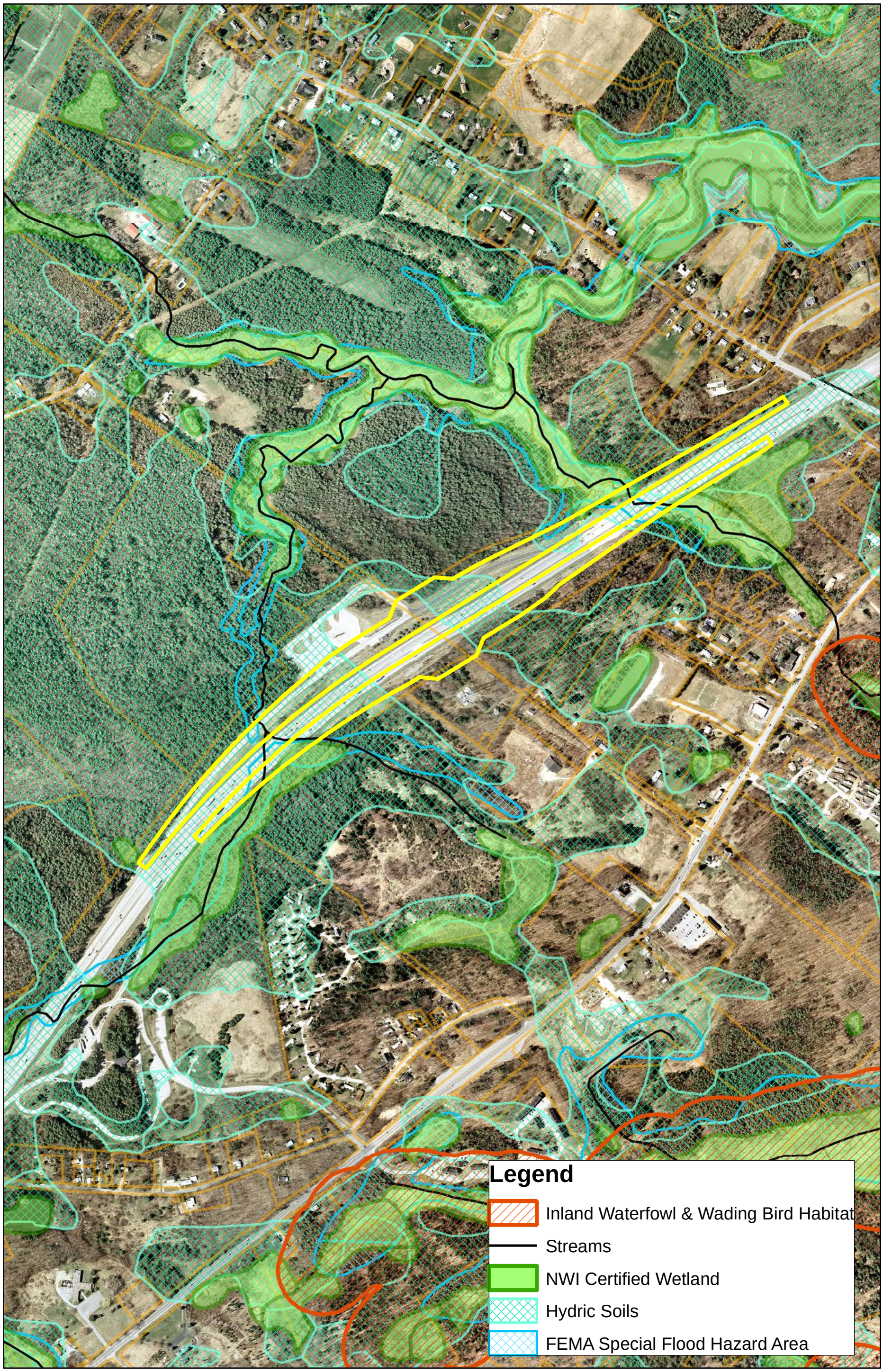
FIGURE 5.6
LOCATION 7.3 NB ORT

SHEET NUMBER: -

CONTRACT:-

- OF -

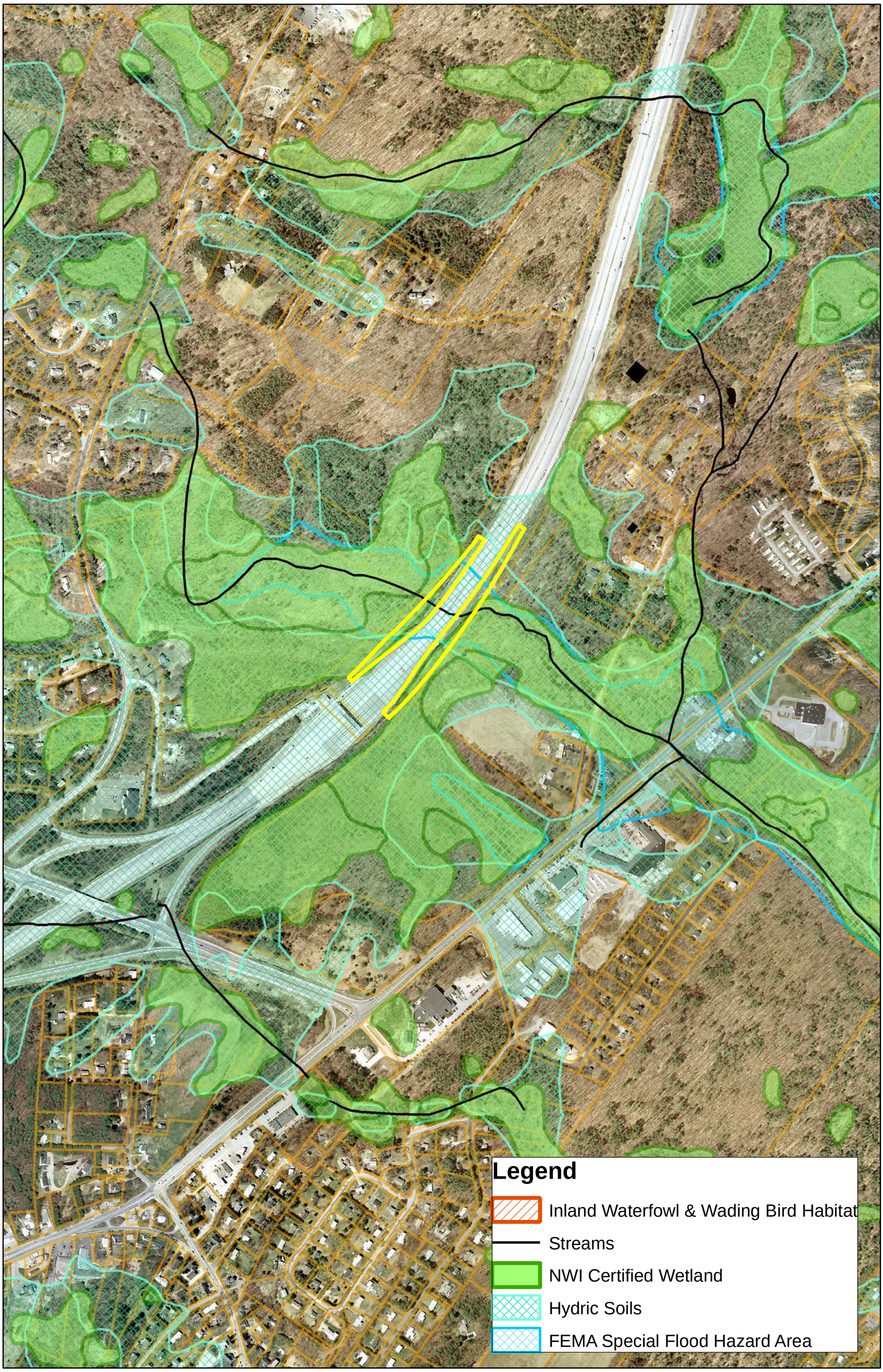
LOCATION 4.5


Legend
Inland Waterfowl & Wading Bird Habitat
Streams
NWI Certified Wetland
Hydric Soils
FEMA Special Flood Hazard Area
0
600
1,200
2,400 Feet

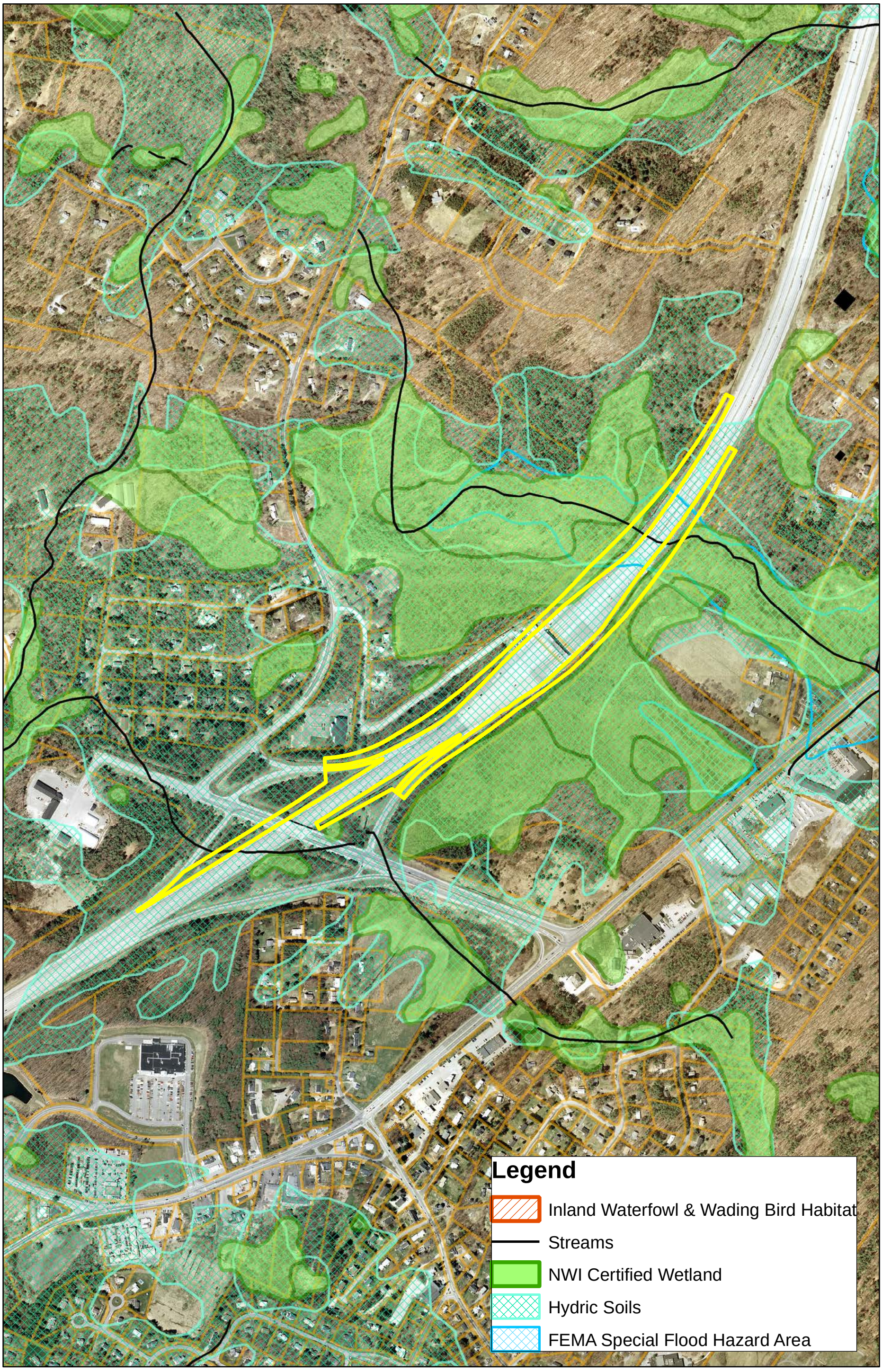
LOCATION 5.4


Legend
Inland Waterfowl & Wading Bird Habitat
Streams
NWI Certified Wetland
Hydric Soils
FEMA Special Flood Hazard Area
0
600
1,200
2,400 Feet

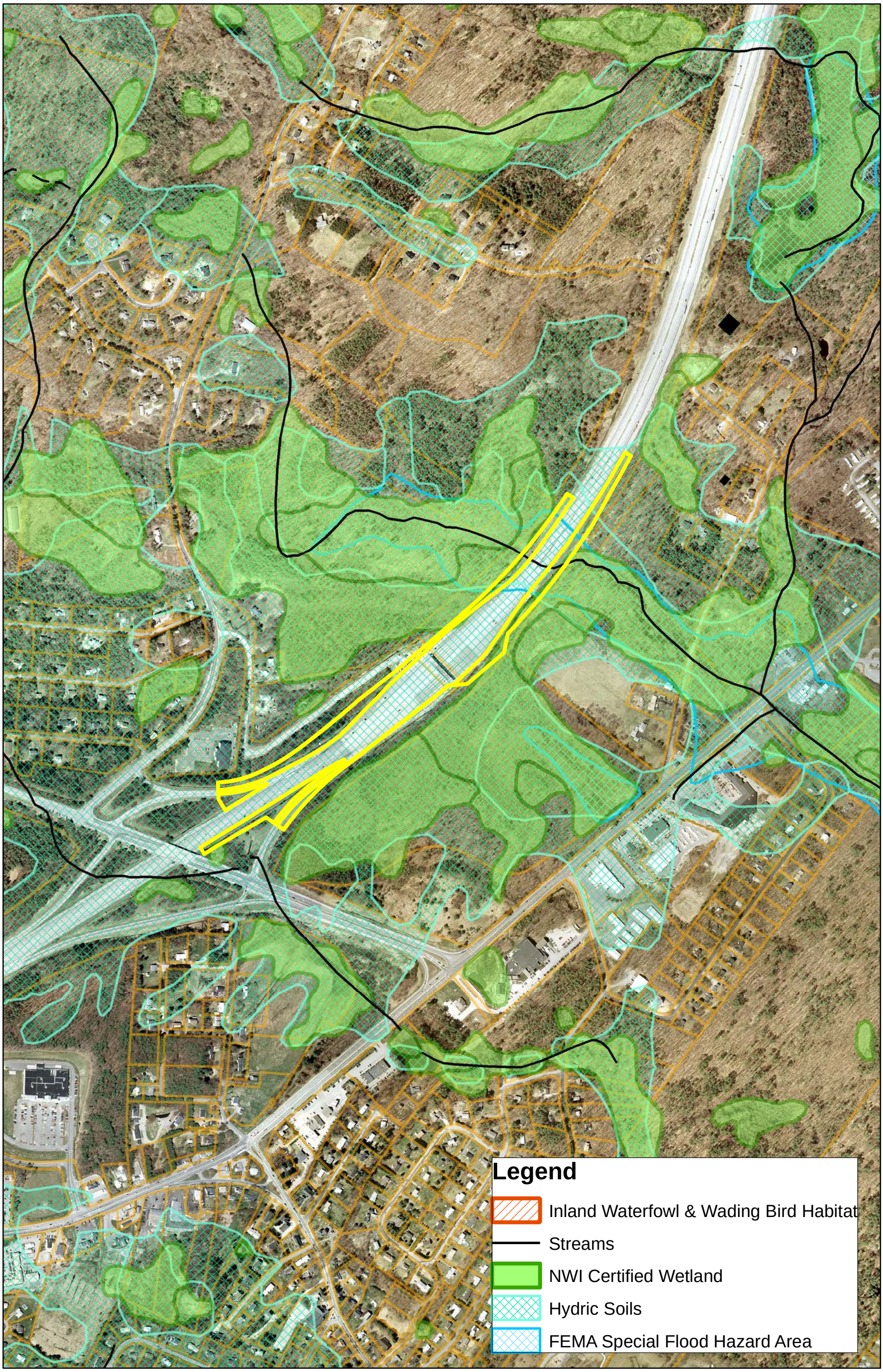
LOCATION 7.3 (CONVENTIONAL)



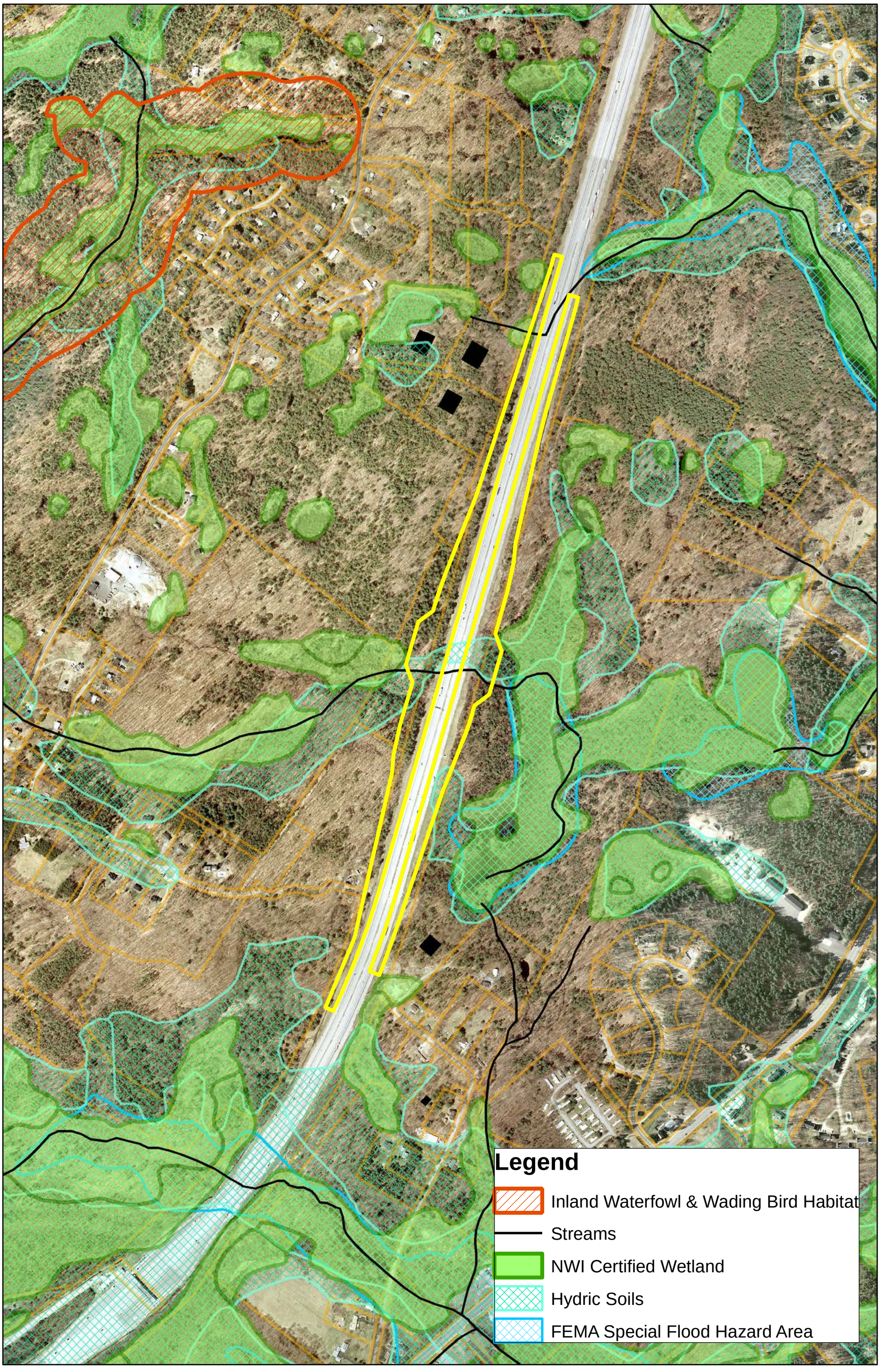
LOCATION 7.3


Legend
Inland Waterfowl & Wading Bird Habitat
Streams
NWI Certified Wetland
Hydric Soils
FEMA Special Flood Hazard Area
0
600
1,200
2,400 Feet

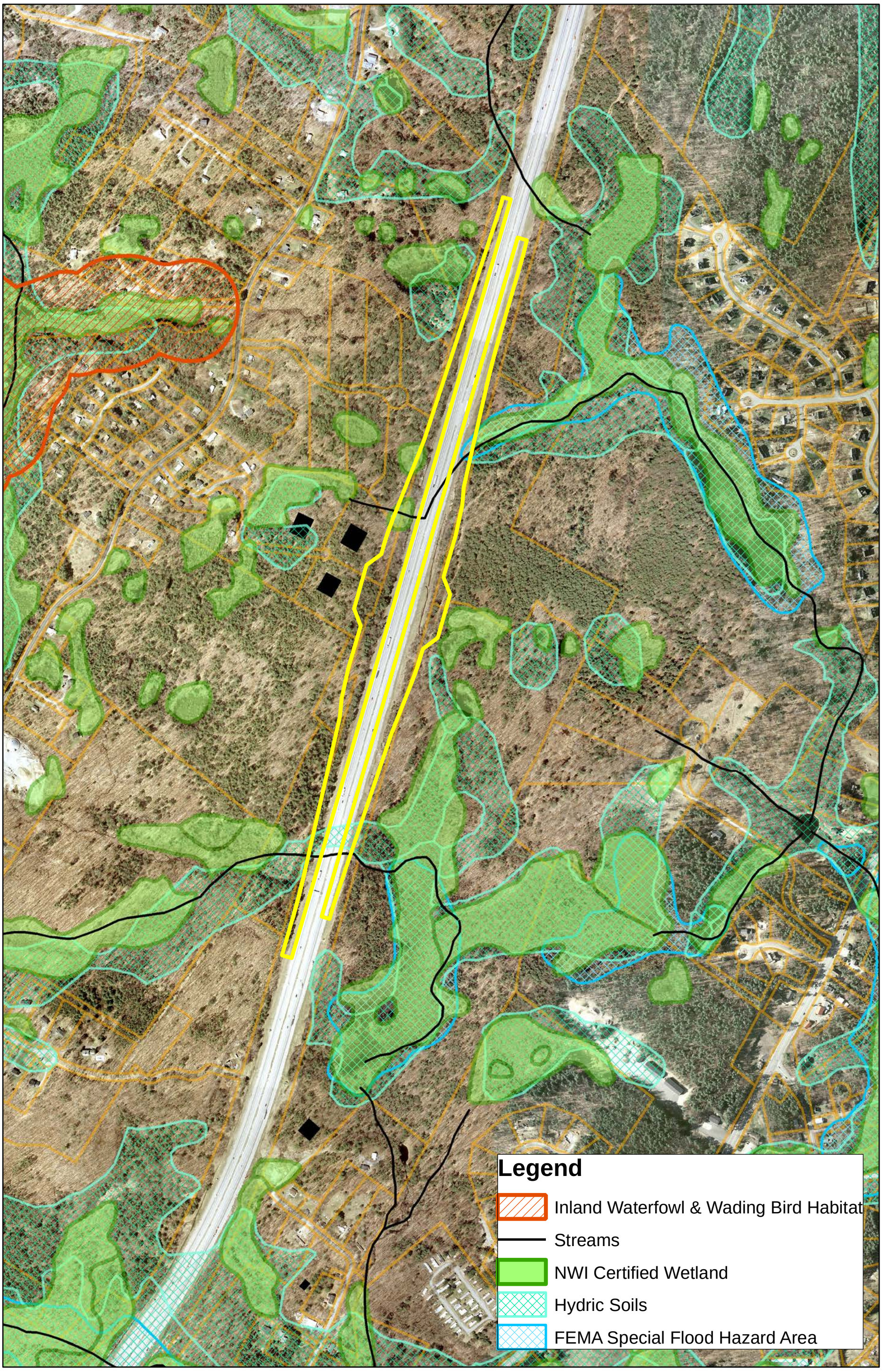
LOCATION 7.3 (NB SPLIT PLAZA)



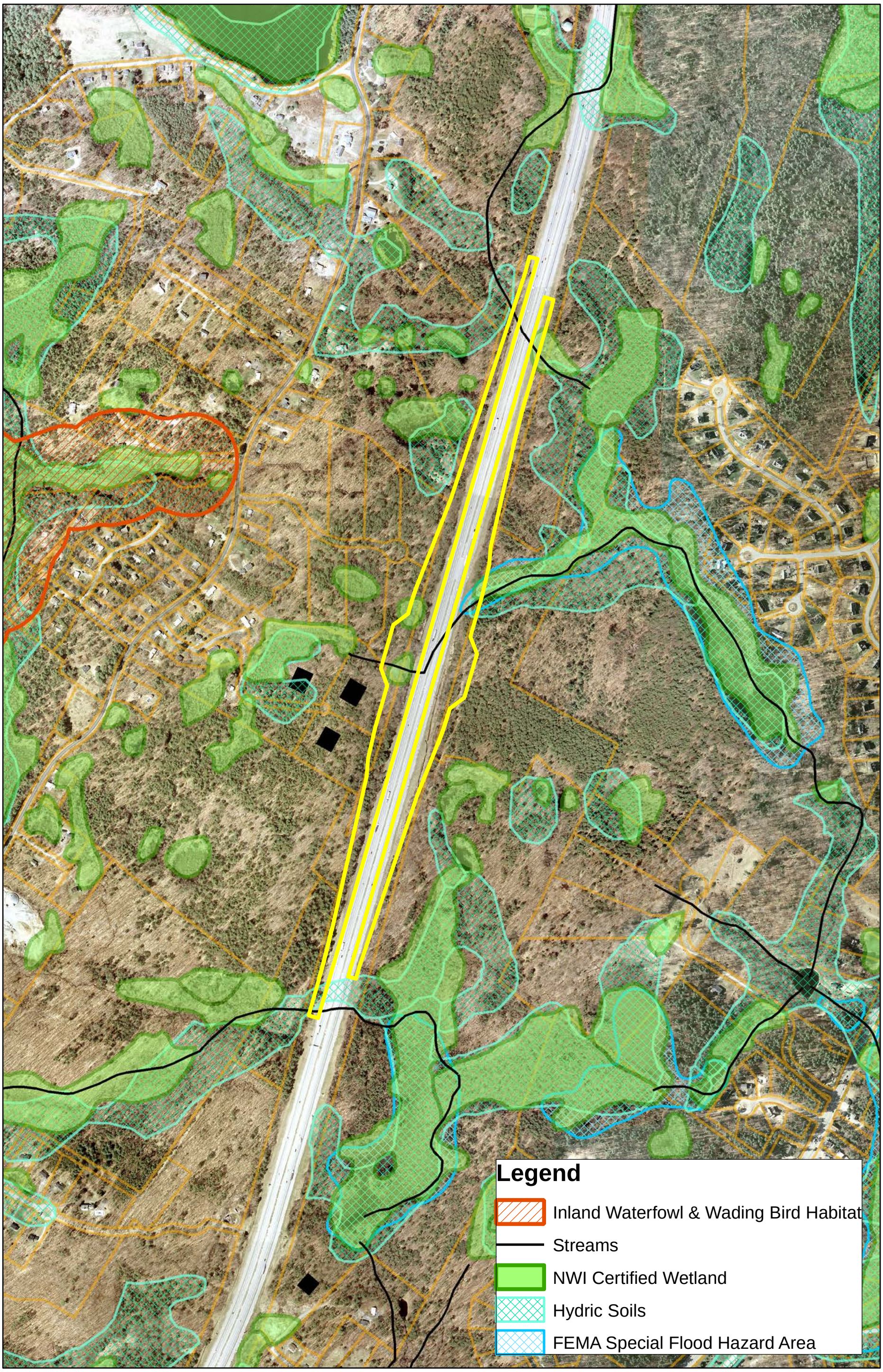
LOCATION 8.1


Legend
Inland Waterfowl & Wading Bird Habitat
Streams
NWI Certified Wetland
Hydric Soils
FEMA Special Flood Hazard Area
0
600
1,200
2,400 Feet

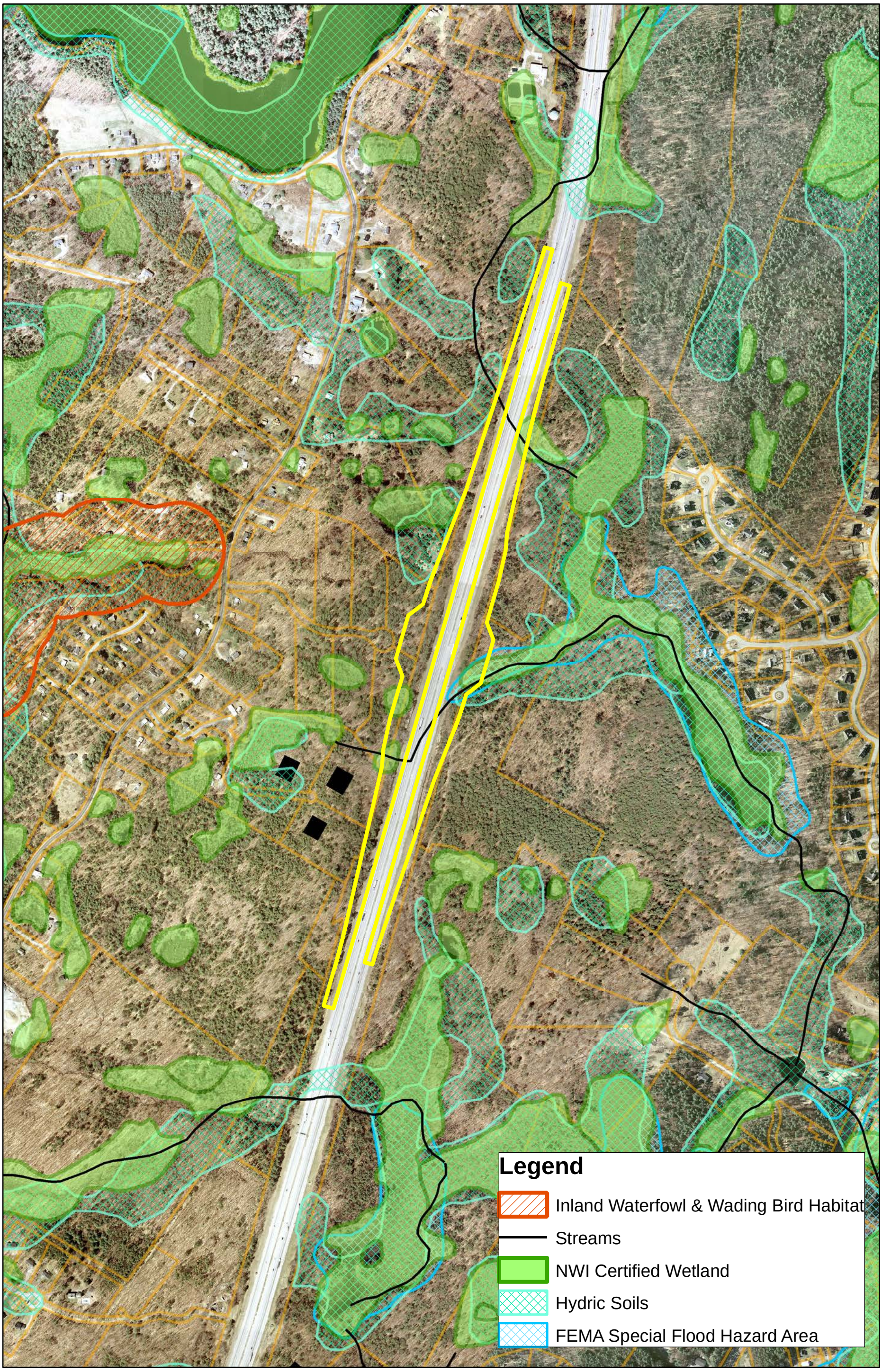
LOCATION 8.5


Legend
Inland Waterfowl & Wading Bird Habitat
Streams
NWI Certified Wetland
Hydric Soils
FEMA Special Flood Hazard Area
0
600
1,200
2,400 Feet

LOCATION 8.6


Legend
Inland Waterfowl & Wading Bird Habitat
Streams
NWI Certified Wetland
Hydric Soils
FEMA Special Flood Hazard Area
0
600
1,200
2,400 Feet

LOCATION 8.7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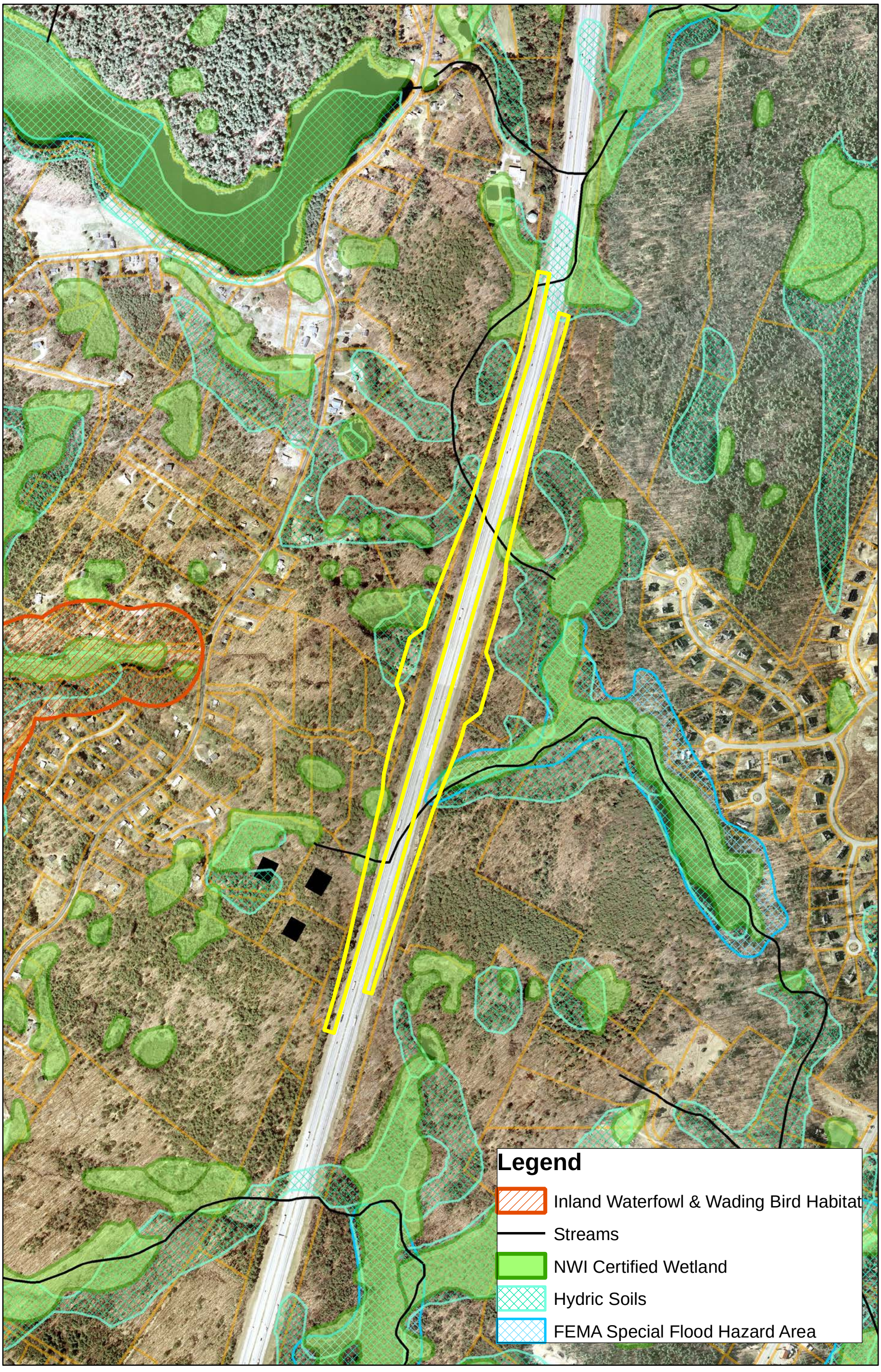
Inland Waterfowl & Wading Bird Habitat
Streams
NWI Certified Wetland
Hydric Soils
FEMA Special Flood Hazard Area
0
600
1,200
2,400 Feet

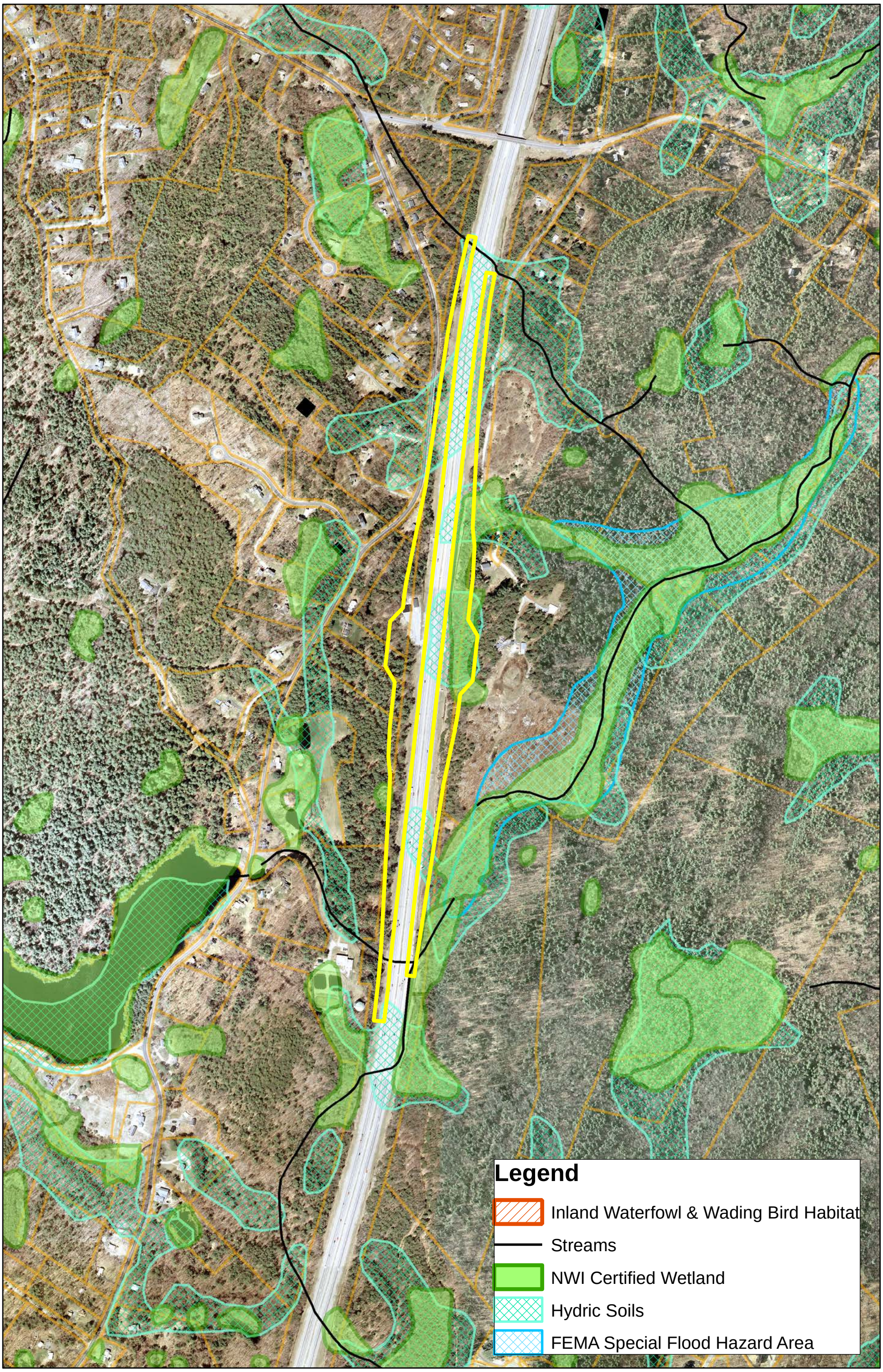
LOCATION 8.8


Legend
Inland Waterfowl & Wading Bird Habitat
Streams
NWI Certified Wetland
Hydric Soils
FEMA Special Flood Hazard Area
0
600
1,200
2,400 Feet

LOCATION 9.1


Legend
Inland Waterfowl & Wading Bird Habitat
Streams
NWI Certified Wetland
Hydric Soils
FEMA Special Flood Hazard Area
0
600
1,200
2,400 Feet

LOCATION 9.9


Legend
Inland Waterfowl & Wading Bird Habitat
Streams
NWI Certified Wetland
Hydric Soils
FEMA Special Flood Hazard Area
0
600
1,200
2,400 Feet

LOCATION 11.3

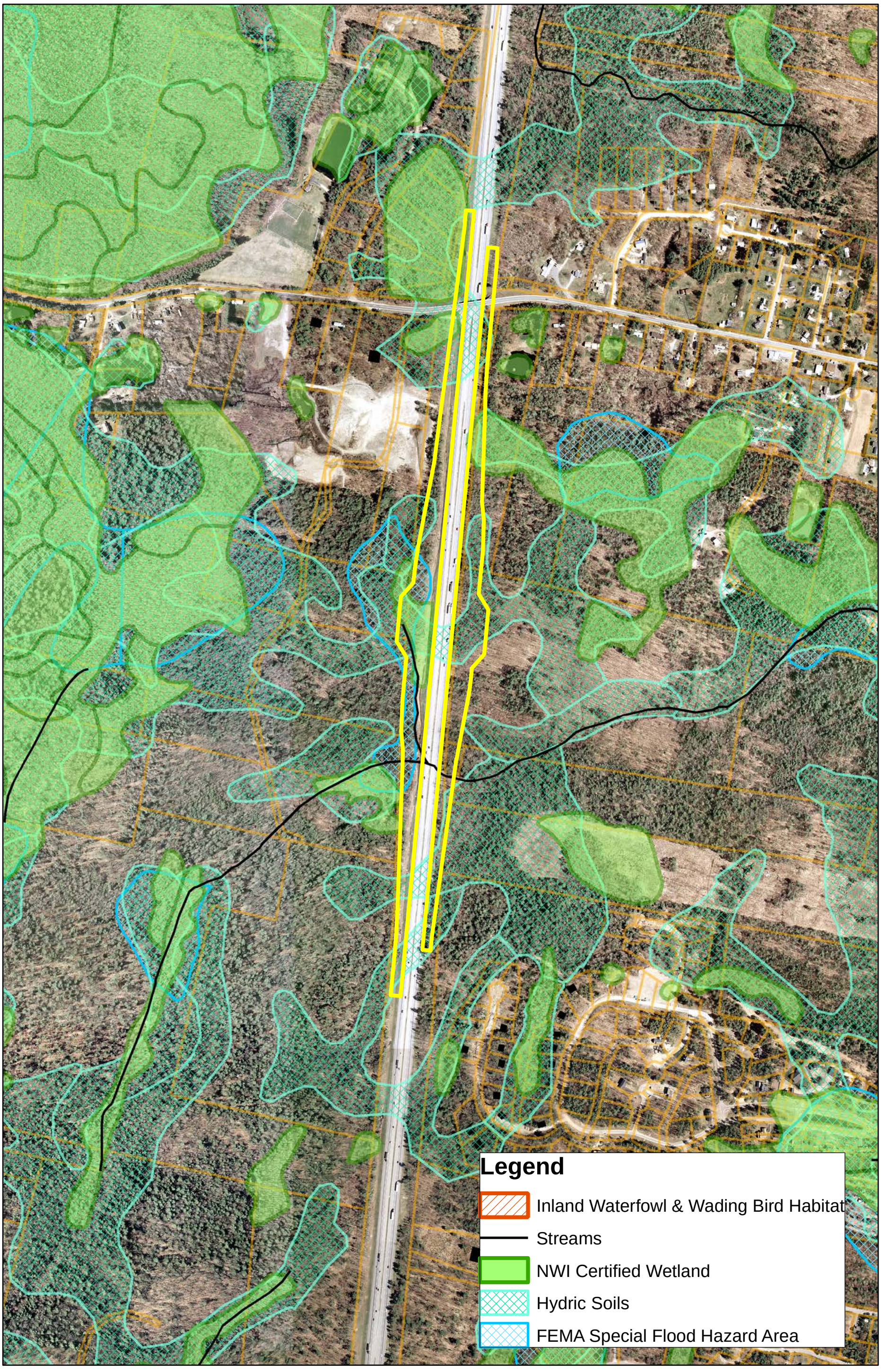
LOCATION 11.4

LOCATION 13.2

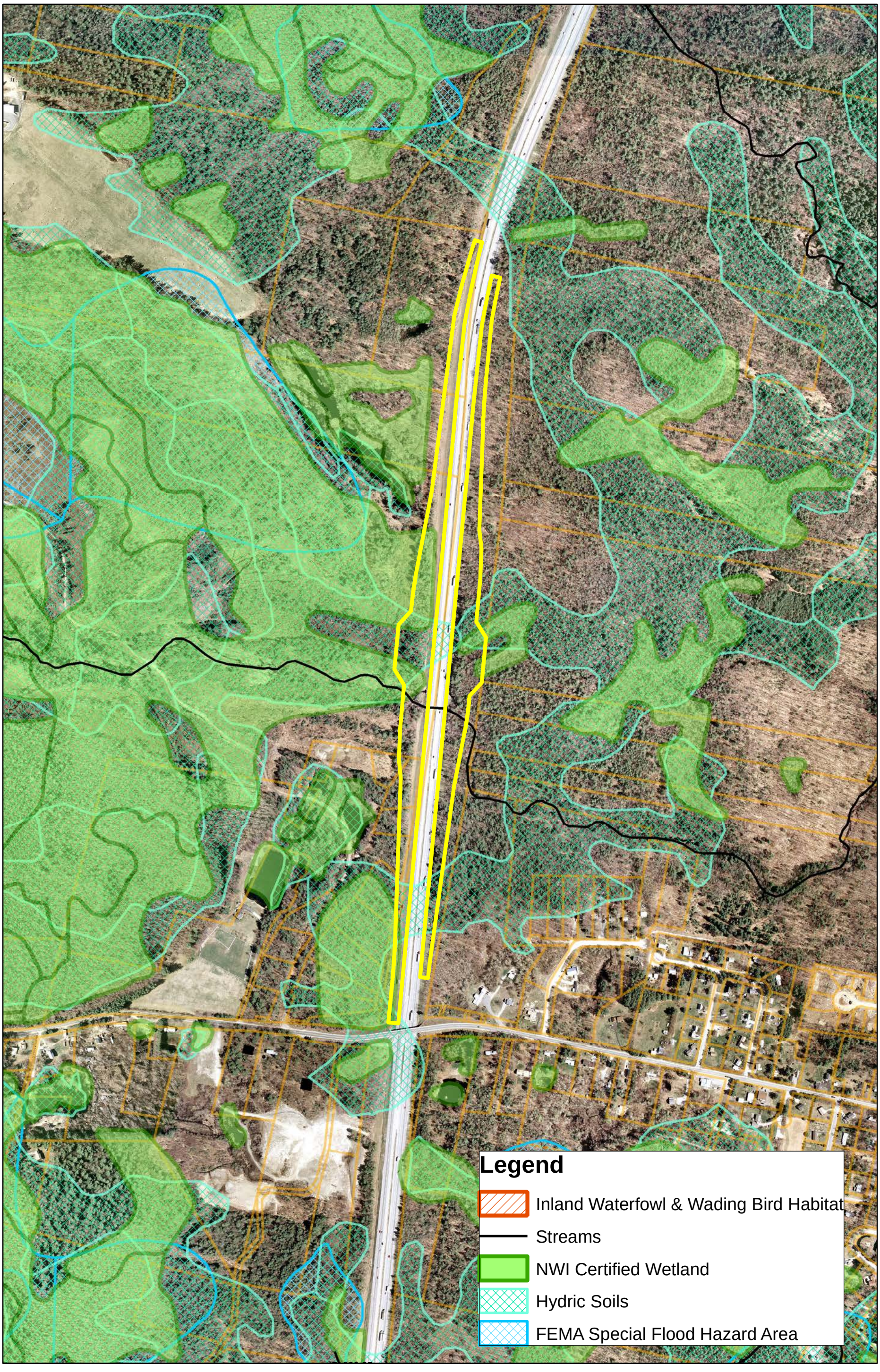
LOCATION 15.8

LOCATION 16.5

LOCATION 16.9



LOCATION 17.7



SOUTHBOUND ORT SPLIT PLAZA EVALUATION MATRIX - ALTERNATIVE 2 MAINTAIN ML PROFILE

Location\Evaluation Parameter	1	2	3	4	5	6	7	8	9	10	11	12	13
	Engineering Criteria						Natural Resource & Built Environment Impacts						
	Horizontal Alignment	Vertical Alignment	Separation from Interchange (>1 mile)	Separation from Overhead Structure (>2000 feet)	Sight Distance	Satisfies Purpose and Need	Potential Right-of-Way Impacts (Acres)	Potential Wetland Impacts - National Wetland Inventory (acres)	Potential Wetland Impacts - Natural Resource Conservation Services (acres)	Potential Stream Impacts - Maine OGIS (LF)	Potential Floodplain Impacts - Federal Emergency Management Agency Floodmaps (acres)	Potential Home Displacements (Homes)[3]	Homes Within 1000 ft. (Homes)
SPRUCE CREEK							PARCELS	NWI	HYDRIC	STREAM	FIRM		
Location 4.5[1] (SB PLAZA)	NOT On Straight Section	At Crest of Hill	Yes	Yes	Good	NO	0.01	0.34	10.45	298.15	0.81	0	41
Location 5.4[1] (SB PLAZA)	On Straight Section	At Crest of Hill	Yes	Yes	Good	NO	2.38	1.42	7.39	154.99	1.39	1	27
EXISTING LOCATION													
Option 1 (Existing Site, No Build)	NOT On Straight Stretch	NOT At Crest of Hill	Marginal	No	Average	NO							
CHASES POND ROAD													
Location 8.1 (SB PLAZA)	On Straight Section	At Crest of Hill[2]	Yes	Yes	Good	MARGINAL	3.10	0.06	1.07	295.86	0.00	0	16
Location 8.5 (SB PLAZA)	On Straight Section	At Crest of Hill	Yes	Yes	Good	YES	2.52	0.62	0.30	240.73	0.00	2	6
Location 8.6 (SB PLAZA)	On Straight Section	At Crest of Hill	Yes	Yes	Good	YES	2.67	0.97	0.23	409.10	0.00	1	6
Location 8.7 (SB PLAZA)	On Straight Section	At Crest of Hill	Yes	Yes	Good	YES	2.84	0.80	0.00	283.25	0.00	0	6
Location 8.8 (SB PLAZA)	On Straight Section	At Crest of Hill	Yes	Yes	Good	YES	2.86	0.54	1.04	355.17	0.00	0	9
Location 9.1 (SB PLAZA)	On Straight Section	At Crest of Hill	Yes	Yes	Good	YES	2.97	0.39	2.45	621.71	0.00	0	13
Location 9.9 (SB PLAZA)	On Straight Section	At Crest of Hill	Yes	Yes	Good	YES	2.78	0.04	1.81	133.29	0.00	1	50
MOUNTAIN ROAD													
Location 11.3 (SB PLAZA)	On Straight Section	At Crest of Hill	Yes	Yes	Good	YES	2.93	0.00	4.54	172.29	0.24	4	59
Location 11.4 (SB PLAZA)	On Straight Section	At Crest of Hill	Yes	Yes	Good	YES	2.89	0.00	5.63	229.28	0.57	2	48
CLAY HILL ROAD													
Location 13.2 (SB PLAZA)	On Straight Section	At Crest of Hill	Yes	Yes	Good	YES	3.23	0.01	3.88	124.69	0.30	1	27
TATNIC ROAD													
Location 15.8[4] (SB PLAZA)	On Straight Section	At Crest of Hill	Marginal	Yes	Good	MARGINAL	3.63	0.37	2.17	71.60	0.00	0	26
Location 16.5[4] (SB PLAZA)	On Straight Section	At Crest of Hill	Marginal	Yes	Good	MARGINAL	3.19	0.94	3.13	666.03	0.52	0	11
Location 16.9[4] (SB PLAZA)	On Straight Section	At Crest of Hill	Marginal	Yes	Good	MARGINAL	0.46	2.26	3.82	1039.27	3.06	0	15
LITTLEFIELD ROAD													
Location 17.7 (SB PLAZA)	Not On Straight Section	At Crest of Hill	No	Yes	Good	MARGINAL	12.63	2.91	2.98	201.06	0.00	0	9
						Low-Range of impacts	0 -0.9	0-0.5	0-1.0	0-100	0-.015	0	0-10
						Middle-Range of impacts	1.0 -3.0	0.51-1.0	1.01-4.0	101-500	.016 -.5	NA	11-30
						High-Range of impacts	>3.0	>1.0	>4.0	>500	>.5	>0	>30

Footnotes:

1. Location would change tolling structure (plaza south of exit 7). New weight station required to replace displaced weight station. Additional environmental impacts for new weigh station likely but not estimatied here.
2. Vertical grade excessive at toll plaza.
3. Taking of any homes is considered a "high-range of impact". Houses within 75' of Project impact line were assumed to be displaced.
4. Barrier separated ramps to accomodate an interchange would require additional envirionmental and social impacts. Additional impacts not estimated here.

NORTHBOUND ORT SPLIT PLAZA EVALUATION MATRIX - ALTERNATIVE 2 MAINTAIN ML PROFILE

Location\Evaluation Parameter	1	2	3	4	5	6	7	8	9	10	11	12	13
	Engineering Criteria						Natural Resource & Built Environment Impacts						
	Horizontal Alignment	Vertical Alignment	Separation from Interchange (>1 mile)	Separation from Overhead Structure (>2000 feet)	Sight Distance	Satisfies Purpose and Need	Potential Right-of-Way Impacts (Acres)	Potential Wetland Impacts - National Wetland Inventory (acres)	Potential Wetland Impacts - Natural Resource Conservation Services (acres)	Potential Stream Impacts - Maine OGIS (LF)	Potential Floodplain Impacts - Federal Emergency Management Agency Floodmaps (acres)	Potential Home Displacements (Homes)[3]	Homes Within 1000 ft. (Homes)
SPRUCE CREEK							PARCELS	NWI	HYDRIC	STREAM	FIRM		
Location 4.5[1] (NB PLAZA)	NOT On Straight Section	At Crest of Hill	Yes	Yes	Good	NO	0.24	0.49	6.47	430.70	1.27	0	46
Location 5.4[1] (NB PLAZA)	On Straight Section	At Crest of Hill	Yes	Yes	Good	NO	1.34	0.05	7.33	400.06	0.01	1	30
EXISTING LOCATION													
Option 1 (Existing Site, No Build)	NOT On Straight Stretch	NOT At Crest of Hill	Marginal	No	Average	NO							
Location 7.3 - ORT (NB Plaza)	Horizontal Curve at End	Small Incline	Marginal	No	Average	Marginal	0.10	0.88	8.82	178.20	1.64	0	35
CHASES POND ROAD													
Location 8.1 (NB PLAZA)	On Straight Section	At Crest of Hill[2]	Yes	Yes	Good	MARGINAL	1.28	0.00	1.53	245.11	0.00	0	14
Location 8.5 (NB PLAZA)	On Straight Section	At Crest of Hill	Yes	Yes	Good	YES	1.30	0.01	0.33	293.98	0.20	0	3
Location 8.6 (NB PLAZA)	On Straight Section	At Crest of Hill	Yes	Yes	Good	YES	1.31	0.44	0.20	384.16	0.47	0	5
Location 8.7 (NB PLAZA)	On Straight Section	At Crest of Hill	Yes	Yes	Good	YES	1.32	0.82	0.34	506.11	0.85	0	5
Location 8.8 (NB PLAZA)	On Straight Section	At Crest of Hill	Yes	Yes	Good	YES	1.33	0.62	0.13	387.82	0.33	0	5
Location 9.1 (NB PLAZA)	On Straight Section	At Crest of Hill	Yes	Yes	Good	YES	1.34	2.33	1.42	1157.37	0.05	0	8
Location 9.9 (NB PLAZA)	On Straight Section	At Crest of Hill	Yes	Yes	Good	YES	1.48	3.55	3.10	160.63	0.00	1	37
MOUNTAIN ROAD													
Location 11.3 (NB PLAZA)	On Straight Section	At Crest of Hill	Yes	Yes	Good	YES	1.38	0.36	2.43	74.02	0.00	0	42
Location 11.4 (NB PLAZA)	On Straight Section	At Crest of Hill	Yes	Yes	Good	YES	1.39	0.01	3.11	224.37	0.00	0	41
CLAY HILL ROAD													
Location 13.2 (NB PLAZA)	On Straight Section	At Crest of Hill	Yes	Yes	Good	YES	1.19	0.00	0.42	246.64	0.00	0	22
TATNIC ROAD													
Location 15.8[4] (NB PLAZA)	On Straight Section	At Crest of Hill	Marginal	Yes	Good	MARGINAL	2.19	0.00	2.87	0.00	0.00	0	26
Location 16.5[4] (NB PLAZA)	On Straight Section	At Crest of Hill	Marginal	Yes	Good	MARGINAL	4.66	0.00	4.70	110.42	0.00	0	17
Location 16.9[4] (NB PLAZA)	On Straight Section	At Crest of Hill	Marginal	Yes	Good	MARGINAL	7.31	0.65	4.81	105.57	0.00	0	17
LITTLEFIELD ROAD													
Location 17.7 (NB PLAZA)	Not On Straight Section	At Crest of Hill	No	Yes	Good	MARGINAL	0.00	0.49	1.59	165.69	0.00	0	8
						Low-Range of impacts	0 -0.9	0-0.5	0-1.0	0-100	0-.015	0	0-10
						Middle-Range of impacts	1.0 -3.0	0.51-1.0	1.01-4.0	101-500	.016 -.5	NA	11-30
						High-Range of impacts	>3.0	>1.0	>4.0	>500	>.5	>0	>30

Footnotes:

1. Location would change tolling structure (plaza south of exit 7). New weight station required to replace displaced weight station. Additional environmental impacts for new weigh station likely but not estimatied here.
2. Vertical grade excessive at toll plaza.
3. Taking of any homes is considered a "high-range of impact". Houses within 75' of Project impact line were assumed to be displaced.
4. Barrier separated ramps to accomodate an interchange would require additional envirionmental and social impacts. Additional impacts not estimated here.

TRADITIONAL ORT PLAZA EVALUATION MATRIX - ALTERNATIVE 2 MAINTAIN ML PROFILE

Location\Evaluation Parameter	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	Engineering Criteria						Natural Resource & Built Environment Impacts							
	Horizontal Alignment	Vertical Alignment	Separation from Interchange (>1 mile)	Separation from Overhead Structure (>2000 feet)	Sight Distance	Satisfies Purpose and Need	Potential Right-of-Way Impacts (Acres)	Potential Wetland Impacts - National Wetland Inventory (acres)	Potential Wetland Impacts - Natural Resource Conservation Services (acres)	Potential Stream Impacts - Maine OGIS (LF)	Potential Floodplain Impacts - Federal Emergency Management Agency Floodmaps (acres)	Potential Home Displacements (Homes)[3]	Homes Within 1000 ft. (Homes)	Building Location
SPRUCE CREEK							PARCELS	NWI	HYDRIC	STREAM	FIRM			
Location 4.5[1]	NOT On Straight Section	At Crest of Hill	Yes	Yes	Good	NO	0.24	0.83	16.57	728.85	2.08	0	53	East
Location 5.4[1]	On Straight Section	At Crest of Hill	Yes	Yes	Good	NO	3.44	1.13	14.48	555.05	1.17	2	34	East
EXISTING LOCATION														
Option 1 (Existing Site, No Build)	NOT On Straight Stretch	NOT At Crest of Hill	Marginal	No	Average	NO								
Location 7.3 - Conventional Toll	Horizontal Curve at End	Small Incline	Marginal	No	Average	Marginal	0.00	1.69	4.67	219.86	2.19	0	14	
Location 7.3 - ORT	Horizontal Curve at End	Small Incline	Marginal	No	Average	Marginal	0.19	2.23	14.13	372.12	2.53	0	40	
CHASES POND ROAD														
Location 8.1	On Straight Section	At Crest of Hill[2]	Yes	Yes	Good	MARGINAL	3.71	0.06	2.19	463.05	0.00	0	16	West
Location 8.5	On Straight Section	At Crest of Hill	Yes	Yes	Good	YES	3.16	0.63	0.63	534.71	0.20	2	6	East
Location 8.6	On Straight Section	At Crest of Hill	Yes	Yes	Good	YES	3.31	1.32	0.43	719.94	0.47	1	8	East
Location 8.7	On Straight Section	At Crest of Hill	Yes	Yes	Good	YES	3.50	1.32	0.20	686.04	0.48	0	8	West
Location 8.8	On Straight Section	At Crest of Hill	Yes	Yes	Good	YES	3.50	1.16	0.60	742.99	0.33	0	11	East
Location 9.1	On Straight Section	At Crest of Hill	Yes	Yes	Good	YES	3.65	2.52	3.84	1763.10	0.05	0	16	West
Location 9.9	On Straight Section	At Crest of Hill	Yes	Yes	Good	YES	3.59	3.06	7.30	293.92	0.00	2	50	West
MOUNTAIN ROAD														
Location 11.3	On Straight Section	At Crest of Hill	Yes	Yes	Good	YES	3.64	0.32	6.93	246.31	0.24	4	59	West
Location 11.4	On Straight Section	At Crest of Hill	Yes	Yes	Good	YES	3.63	0.01	8.74	453.65	0.57	2	49	East
CLAY HILL ROAD														
Location 13.2	On Straight Section	At Crest of Hill	Yes	Yes	Good	YES	3.75	0.01	4.30	371.33	0.30	1	27	East
TATNIC ROAD														
Location 15.8[4]	On Straight Section	At Crest of Hill	Marginal	Yes	Good	MARGINAL	5.16	0.37	5.04	71.60	0.00	0	33	West
Location 16.5[4]	On Straight Section	At Crest of Hill	Marginal	Yes	Good	MARGINAL	7.18	0.94	7.67	776.45	0.52	0	17	West
Location 16.9[4]	On Straight Section	At Crest of Hill	Marginal	Yes	Good	MARGINAL	7.31	2.56	8.05	1038.40	2.40	0	20	East
LITTLEFIELD ROAD														
Location 17.7	Not On Straight Section	At Crest of Hill	No	Yes	Good	MARGINAL	11.96	3.10	3.91	366.75	0.00	0	11	East
						Low-Range of impacts	0 -3.5	0-1	0-1.0	0-300	0-.35	0	0-10	
						Middle-Range of impacts	3.51-5	1.01-2	1.01-5.0	301-700	.36 -.6	NA	11-30	
						High-Range of impacts	>5	>2	>5.0	>700	>.6	>0	>30	

Footnotes:

1. Location would change tolling structure (plaza south of exit 7). New weight station required to replace displaced weight station. Additional environmental impacts for new weigh station likely but not estimatied here.
2. Vertical grade excessive at toll plaza.
3. Taking of any homes is considered a "high-range of impact". Houses within 75' of Project impact line were assumed to be displaced.
4. Barrier separated ramps to accomodate an interchange would require additional envirionmental and social impacts. Additional impacts not estimated here.