PRESENTED TO THE MAINE TURNPIKE AUTHORITY

OPERATION AND MAINTENANCE ANNUAL REPORT

2015

Prepared By:

HNTB

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HNTB

October 1, 2015

Maine Turnpike Authority
2360 Congress Street
Portland, ME 04102

Ladies and Gentlemen,

We are pleased to submit our 2015 Operation and Maintenance Annual Report for the Maine Turnpike. This report sets forth our findings as to the condition of the Maine Turnpike and our recommendations concerning maintenance, operation, insurance, and deposits to be made to the Capital Improvement and Reserve Maintenance funds and the Operation and Maintenance budget.

Our findings and recommendations are based on a visual inspection of the turnpike facilities performed between March and June 2015; several additional visual inspections of turnpike facilities made during the year; and, on a careful evaluation of turnpike operation and maintenance procedures. We have periodically reported to the Executive Director, Chief Operations Officer, or Director of Engineering, on other items which warranted prompt attention.

We appreciate the opportunity to provide Consulting Engineering Services and we acknowledge the excellent cooperation of Authority members and personnel in the performance of these services.

Best regards,

Roland A. Lavallee

Roland A. Lavallee, P.E., PLS
Vice President
Director of Operations

Maine Turnpike

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1 INTRODUCTION

This 2015 Operation and Maintenance Annual Report is based on the findings of a visual inspection of turnpike facilities; a review of current operating practices; and a review of the insurance coverage currently in effect, all as conducted by the licensed Professional Engineers of HNTB Corporation. It sets forth observations, conclusions and recommendations concerning the condition, maintenance, repair, and operation of the turnpike and its associated structures. Additionally, this report includes recommendations for the amount of funding required for the proper maintenance, repair, and operation of the turnpike to be deposited into the Capital Improvement fund, Reserve Maintenance fund, and the Operation and Maintenance budget. Finally, recommendations regarding insurance coverage have also been provided.

In 1941, the Maine Turnpike Authority (Authority) was created as an independent state agency and given the mandate to construct a turnpike *"from some point at or near Kittery to a point at or near Fort Kent"*. The legislature intentionally delegated the responsibility for turnpike construction and operation and maintenance to the Authority and precluded any financial commitment by the state.

The original 45 miles of turnpike, Section I, from Kittery to Portland opened to traffic in 1947 and Section II, from Portland to Augusta, was completed in 1955. In early-2015, the MTA purchased from the MaineDOT 1.9 miles of the Interstate in Kittery. With this purchase, the Maine Turnpike extends from approximately 75 feet north of the northern most joint of the approach bridge of the high level bridge over the Piscataqua River to Augusta. Almost two-thirds of the 111 mile turnpike is a four-lane divided highway; the other one-third is a six-lane divided highway. Turnpike facilities include 202 structures (184 bridges and 18 minor spans), 22 interchanges, 19 toll plazas, an administration building, including the E-ZPass Customer Service Center and the State Police offices, five service areas, and nine maintenance facilities.

The Maine Turnpike, designated as I-95, is one of the major north-south highways in the state, extending from Kittery to Augusta, Maine and is part of the National Highway System (NHS). The NHS includes the Interstate Highway System as well as other roads important to the nation's economy, defense, and mobility. The NHS was developed by the Department of Transportation (DOT) in cooperation with the states, local officials, and Metropolitan Planning Organizations (MPOs). The Maine Turnpike is the only interstate highway from Kittery to Portland, making it one of the most critical elements of Maine's transportation network (see **FIGURE 1**). It also includes a three mile spur from the turnpike mainline to Route 1 and Interstate 295 in Falmouth. The turnpike is a safe and efficient highway that accommodated over 62.8 million trips with 75.0 million transactions in 2014.

The demands placed on turnpike facilities are enormous. Its roadways, bridges, interchanges, toll plazas, service areas and maintenance areas are subjected to increasing stress due to age, traffic levels, a high weight limit (100,000 lb. trucks allowed), and the demands of the harsh northern New England climate. To ensure the sound condition and effective operation of the turnpike, the Authority funds and implements aggressive Operation and Maintenance, Reserve Maintenance, and Capital Improvement programs. The vigilance of the Authority through these programs has resulted in a well maintained and efficiently operated turnpike. The Authority looks to continue

initiatives such as pavement rehabilitation, bridge rehabilitations and replacements, and system modernization to assure that turnpike facilities meet current safety standards as well as projected demands.

ANNUAL INSPECTION PROGRAM

In accordance with Section 806 of the Bond Resolution dated May 1, 1991, HNTB Corporation, as the consulting engineers, is required to inspect the turnpike at least once a year and submit to the Authority a report setting forth the following:

- Opinion as to whether the turnpike has been maintained in good repair, working order and condition;
- Advice and recommendations as to the proper maintenance, repair and operation of the turnpike during the ensuing fiscal year and an estimate of the amount of money necessary for such purposes;
- Advice and recommendations as to the amounts and types of insurance to be carried; and,
- Recommendations as to the amount of money that should be deposited into the Reserve Maintenance fund during the upcoming fiscal year.

To comply with the listed requirements, the engineers and staff of HNTB Corporation annually conduct a visual inspection of the entire Maine Turnpike. The inspection covers pavement, cut sections, embankments, bridges, roadway lighting, drainage structures, signs, pavement markings, toll plazas, utility buildings, service areas, maintenance areas, and other facilities. This report is based on observations made during the inspection which was conducted between March and June of 2015. The opinions, statements and recommendations made herein are based solely on conditions revealed by visual inspection. No representation or warranty is made that all defects have been discovered or that defects will not appear later. Inspections of specific turnpike facilities are conducted whenever special attention is warranted.

A detailed Annual Inspection Report was submitted to the Authority in July of 2015, to be used in conjunction with this 2015 Operation and Maintenance Annual Report.

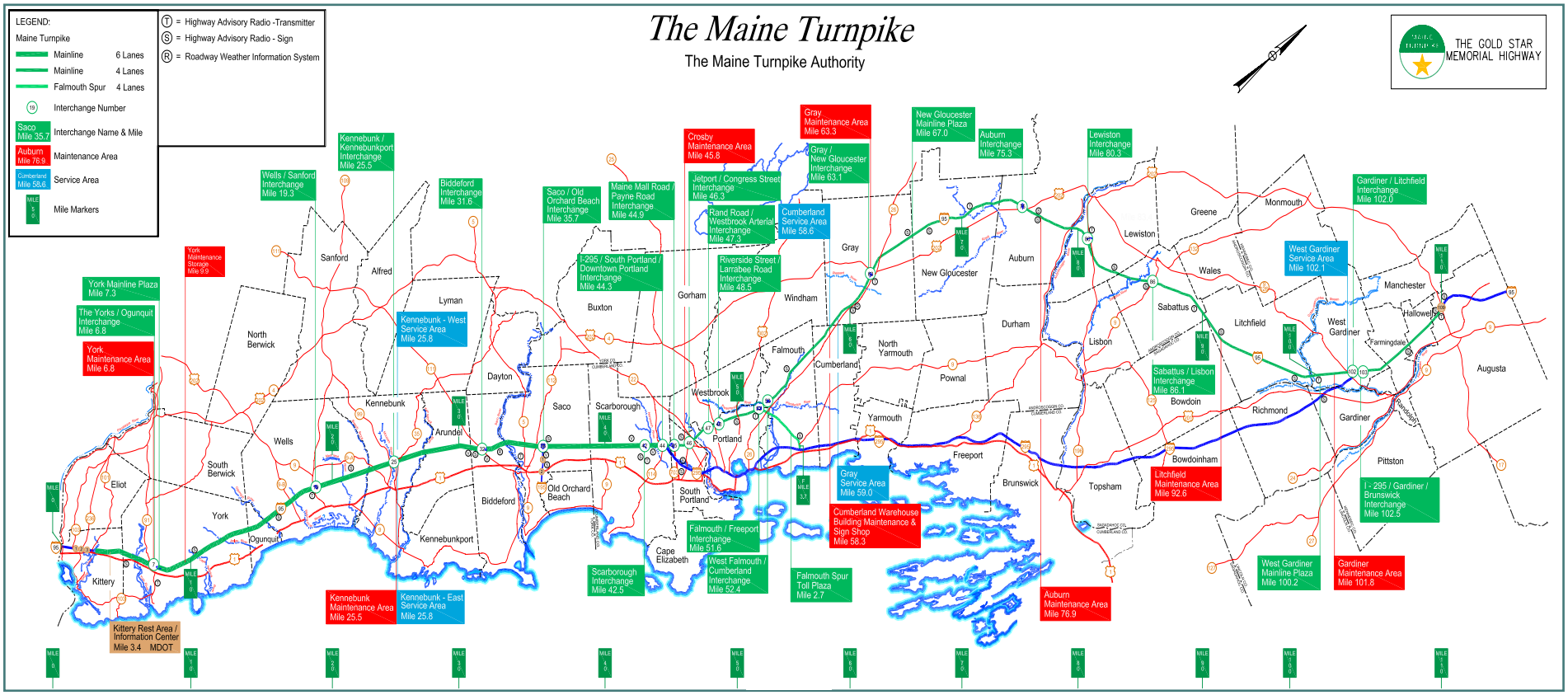

The Maine Turnpike
The Maine Turnpike Authority
THE GOLD STAR MEMORIAL HIGHWAY
LEGEND:
Maine Turnpike
Mainline 6 Lanes
Mainline 4 Lanes
Falmouth Spur 4 Lanes
Interchange Number
Saco Mile 35.7 Interchange Name & Mile
Auburn Mile 76.9 Maintenance Area
Cumberland Mile 58.6 Service Area
Mile Markers
T = Highway Advisory Radio -Transmitter
S = Highway Advisory Radio - Sign
R = Roadway Weather Information System
York Mainline Plaza Mile 7.3
The Yorks / Ogunquit Interchange Mile 6.8
York Maintenance Area Mile 6.8
York Maintenance Storage Mile 9.9
Wells / Sanford Interchange Mile 19.3
Kennebunk / Kennebunkport Interchange Mile 25.5
Biddeford Interchange Mile 31.6
Kennebunk - West Service Area Mile 25.8
Kennebunk Maintenance Area Mile 25.5
Kennebunk - East Service Area Mile 25.8
Kittery Rest Area / Information Center Mile 3.4 MDOT
Saco / Old Orchard Beach Interchange Mile 35.7
Maine Mall Road / Payne Road Interchange Mile 44.9
I-295 / South Portland / Downtown Portland Interchange Mile 44.3
Scarborough Interchange Mile 42.5
Crosby Maintenance Area Mile 45.8
Jetport / Congress Street Interchange Mile 46.3
Rand Road / Westbrook Arterial Interchange Mile 47.3
Riverside Street / Larrabee Road Interchange Mile 48.5
Falmouth / Freeport Interchange Mile 51.6
West Falmouth / Cumberland Interchange Mile 52.4
Gray Maintenance Area Mile 63.3
Gray / New Gloucester Interchange Mile 63.1
Cumberland Service Area Mile 58.6
Gray Service Area Mile 59.0
Cumberland Warehouse Building Maintenance & Sign Shop Mile 58.3
Falmouth Spur Toll Plaza Mile 2.7
New Gloucester Mainline Plaza Mile 67.0
Auburn Interchange Mile 75.3
Auburn Maintenance Area Mile 76.9
Lewiston Interchange Mile 80.3
Sabattus / Lisbon Interchange Mile 86.1
Litchfield Maintenance Area Mile 92.6
Gardiner / Litchfield Interchange Mile 102.0
West Gardiner Service Area Mile 102.1
I - 295 / Gardiner / Brunswick Interchange Mile 102.5
West Gardiner Mainline Plaza Mile 100.2
Gardiner Maintenance Area Mile 101.6
York
Kittery
Eliot
South Berwick
North Berwick
Wells
Ogunquit
Kennebunk
Kennebunkport
Arundel
Dayton
Biddeford
Old Orchard Beach
Saco
Scarborough
South Portland
Portland
Cape Elizabeth
Westbrook
Falmouth
Gorham
Windham
Gray
Buxton
Standish
Sanford
Alfred
Lyman
Cumberland
North Yarmouth
Yarmouth
Freeport
Brunswick
Topsham
Pownal
Durham
New Gloucester
Auburn
Lewiston
Greene
Wales
Sabattus
Lisbon
Litchfield
Bowdoin
Bowdoinham
Richmond
Gardiner
Pittston
West Gardiner
Farmingdale
Hallowell
Manchester
Monmouth
Augusta

FIGURE 1

2 INSPECTION FINDINGS AND CORRECTIVE MEASURES

The Maine Turnpike has been maintained in generally good condition and presents a favorable appearance. Traffic volumes and the age of the facility necessitate continued high levels of maintenance. The Authority's Maintenance forces undertake routine maintenance while private contractors normally construct larger projects which are publicly bid. These contracts include pavement resurfacing, bridge deck replacements, bridge repairs and painting, slope repairs, and new building construction. The following sections summarize the findings of the 2015 Maine Turnpike Inspection by HNTB Corporation.

TURNPIKE MAINLINE

VEGETATIVE COVER

Vegetative cover generally includes the grass median and side slopes of the roadway. The inspection revealed that most median slopes are in good condition and most side slopes are stable with good vegetative cover. Slope locations requiring minor corrective action are detailed in the Annual Inspection Report. Corrective actions are warranted due to loss of berm drop-off (gravel shoulder directly adjacent to the paved shoulder) and minor gullying which may lead to an erosion issue if not mitigated. In most instances, the Authority's Maintenance forces can accomplish this work, or this work should be completed by Contract. In 2015, berm drop-off corrections were completed as part of Contract 2015.01 pavement rehabilitation work from Mile 51 to Mile 54.5 and along the Falmouth Spur.

We recommend that berm drop-off corrections be completed by Authority Maintenance forces, or included as part of the pavement rehabilitation projects as warranted.

PAVEMENT

Roadway and shoulder pavement is in generally good condition and the riding quality of the turnpike continues to be acceptable.

TABLE 1
PAVEMENT CONTRACTS 2001 - 2015

Year	From MM	To MM	Roadway
2015	51	54.5	NB/SB
	68.5	74.9	NB/SB
	FS0.5	FS3.8	EB/WB
	Int. 46		
2014	23.3	30.3	NB/SB
	102.6	109.1	NB/SB
	57.0	59.5	NB
2013	7.4	13.5	NB/SB
	88.0	92.0	NB/SB
	Int. 7 & 44		
2012	30.0	35.0	NB/SB
	92.0	98.0	NB/SB
	102.0	Plaza	NB/SB
	Int. 42, 45 & 53		
2011	13.3	23.3	NB/SB
	Int. 19 & 48		
2010	2.2	7.0	NB/SB
	44.0	51.2	SB
	45.0	51.2	NB
2009	35.3	43.9	SB
	35.4	44.5	NB
2008	57.0	64.4	SB
	80.8	85.2	NB/SB
	Int. 102 & 103		
2007	64.4	68.5	NB/SB
	25.0	Plaza	NB/SB
	58.0	Plaza	SB
	59.0	Plaza	NB
	Int. 36		
2006	45.3	45.8	SB
	74.9	80.8	NB/SB
	Int. 80		
2005	59.4	64.8	NB
	85.2	88.6	NB/SB
2004	98.0	102.6	NB/SB
	102.6	109.1	NB/SB
	Int. 86		
2003	56.6	58.3	NB
	68.4	74.9	NB/SB
2002	99.6	106.2	NB/SB
2001	25.4	28.4	NB/SB

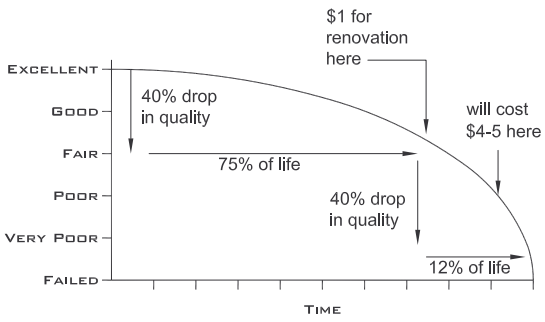
In 2015, approximately 34.6% of the turnpike pavement (based on centerline miles) is rated in good or new condition, 43.0% is rated in generally good condition, and 22.4% is rated in generally fair to good condition. No pavement was rated in marginal condition. This is an improvement from 2014 when 24.8% of the centerline miles was reported in good or new condition.

To maintain pavement quality and roadway safety, the Authority has a planned program of pavement rehabilitation and the Authority generally rehabilitates a pavement section every 12 to 15 years. **TABLE 1** illustrates Pavement Contracts over the past 15 years.

Studies indicate that pavement maintained in good condition costs substantially less to preserve than pavement that is allowed to deteriorate to poor condition. Based on this concept, the Authority's resurfacing program consists of rehabilitating one or more sections of roadway, totaling approximately six to seven centerline miles each year, in order to minimize the cost of future repairs.

FIGURE 2 illustrates the rate of deterioration and relative cost of rehabilitation at various times throughout the Life Cycle of a section of pavement. Evidence that pavement requires rehabilitation includes wheel rutting, excessive cracking, and poor ride quality.

FIGURE 2 - PAVEMENT LIFE CYCLE



Starting in 2014, pavement rehabilitation contracts specified polymer modified asphalt to alter several characteristics of the asphalt, each of which is intended to improve pavement durability, weatherability and performance. This practice continued in 2015. Contract 2015.01 rehabilitation work consists of milling and filling the travel lanes northbound and southbound from Mile 51 to Mile 54.5; 3.8 miles eastbound and westbound on the Falmouth Spur, excluding the area either side of the toll plaza; and pavement rehabilitation on the Exit 52 northbound and southbound off-ramps. Contract 2015.02 rehabilitation work consists of milling and resurfacing the travel lanes and the median shoulder from Mile 68.5 to Mile 74.9 in Auburn. Contract 2015.03 rehabilitates the pavement at Exit 46. In all locations, the top 2" of the existing roadway surface is being removed, cracks filled, and the pavement is then replaced with a 1/2" shim and a 1-1/2" lift of surface pavement. These contracts are currently ongoing.

PAVEMENT REHABILITATION, MM 102.6 TO MM 109.1

The Federal Highway Administration (FHWA) is currently developing performance measures for condition of pavement which will likely be implemented by the Maine Department of Transportation (MaineDOT). The Maine Turnpike Authority (MTA) is coordinating with the MaineDOT on these measures.

2016 RECOMMENDATION

Due to generally fair conditions of the pavement, and to maintain pavement quality and roadway safety, HNTB recommends the rehabilitation of the northbound and southbound roadway from Mile 54.5 to Mile 64.4. The rehabilitation should continue the current practice of removing 2" of existing travel lane pavement, crack sealing, shim, and overlay. These projects should also include

repairs to the drainage system such as catch basin repair and repairing pipe outlets.

DISPENSED AT OVER 350 DEGREES THE RUBBERIZED ASPHALT SEALANT IS INJECTED DIRECTLY INTO THE PAVEMENT CRACKS

BRIDGES AND MINOR SPANS

The MTA is responsible for the operation and maintenance of 184 bridges, defined as spans measuring more than 20 feet in length, and 18 minor spans measuring between 10 and 20 feet in length. The Authority's Operation and Maintenance Program for these structures involves multiple aspects including developing and maintaining a detailed inventory of Authority-owned structures, scheduling and completing condition and safety inspections, compiling repair and replacement recommendations, and the development and execution of contracts for repair or replacement. The goals of this program are to accurately forecast bridge and minor span repair needs, identify critical deficiencies, repair and upgrade structures on a timely basis, and to maintain the safe condition of MTA bridges and minor spans.

This report quantifies and discusses bridges and minor spans separately. The FHWA National Bridge Inspection Standards requires that bridges are inspected on a predetermined schedule and that the inspection data is reported to the National Bridge Inventory. No federal inspection or reporting requirements exist for minor spans. However, the MaineDOT collects and monitors condition data for minor spans for internal use. Since 2013, the inspection of MTA minor spans has been completed and reported using bridge inspection procedures. This process provides inspection consistency between the MTA and MaineDOT and provides documentation of the condition of the Authority's minor spans.

BRIDGE AND MINOR SPAN INSPECTION PROGRAM

Inspections of Maine Turnpike structures are completed by qualified inspectors in accordance with the National Bridge Inspection Standards established by FHWA. Once these inspections are complete, the condition ratings for each bridge are compiled and transmitted to MaineDOT for inclusion in the National Bridge Inventory. The inspection data also becomes part of the Authority's records which are used to develop the MTA's repair program.

The following is a discussion of the bridge inspection program:

ROUTINE BRIDGE AND MINOR SPAN INSPECTIONS

All MTA bridges and minor spans undergo routine inspections on an annual basis. The purpose of these inspections is to identify potential safety concerns, document areas of deterioration, and to record condition ratings for key bridge elements. The 2015 routine inspection by HNTB identified that the bridges and minor spans along the turnpike range from fair to very good condition. Structures that have been rehabilitated or reconstructed during the past 20 years were found to be in fair to very good condition, while those that have never been rehabilitated were generally noted to be in fair condition.

UNDERWATER INSPECTION

The FHWA requires an inspection of underwater bridge elements every five years. Accordingly, an underwater inspection was performed in September 2011 for 17 bridges and culverts that carry the turnpike over rivers and water bodies where certain elements of the substructures or culverts cannot be inspected as part of the routine inspection.

No serious structural deficiencies were noted during the 2011 underwater inspection. The overall conditions of the exposed portions of the underwater substructures were fair to good with most deficiencies attributed to freeze-thaw deterioration and abrasion from ice and debris. Based on the underwater inspection report, repairs were programmed at multiple locations and substructure repairs are currently underway at York River Overpass, Cape Neddick River Box Culvert, and Josias River Box Culvert.

The next underwater inspection should be completed in 2016. Spruce Creek overpass, one of the bridges purchased from MaineDOT in 2015, will be included in the underwater inspection.

DETAILED INSPECTIONS

Detailed inspections are completed on bridges with special features that warrant increased attention and inspection effort. Two sets of turnpike structures, the Androscoggin River Bridges and the York River Bridges, require detailed inspections.

The Androscoggin River Bridges, each measuring 850 feet long, consist of roadway surfaces supported on stringer and floor beam framing systems. The loads from these roadway framing systems are carried nearly entirely by two primary girders.

ANDROSCOGGIN RIVER BRIDGE

Because these structures are carried by only two primary girders, the bridge has insufficient redundancy to prevent a progressive collapse of all, or part of, the bridge if one of the primary girders were to fail. As a result, these structures are classified as "fracture critical" and are subject to more rigorous inspection requirements as outlined in FHWA's Bridge Inspection Standards. To achieve compliance with these inspection standards, the Androscoggin River Bridges should have a fracture critical inspection completed at least once every 24 months. The last fracture critical inspection was completed in spring 2015. No significant concerns were identified other than the detachment of the recently constructed wrapping between the tendon sleeve and the anchorage device at several locations. The repair of this condition is warranty work and the Authority is working with the Contractor for its repair. The next fracture critical inspection of this structure should be scheduled for early-2017.

At the York River Bridges, the girder framing system includes pin-and-hanger assemblies. Because routine inspection procedures are insufficient to identify defects in the pins, ultrasonic testing of these elements is necessary. A detailed inspection and ultrasonic testing of the pin-and-hanger systems at the York River Bridges was completed in December 2011. No serious structural deficiencies were noted during that inspection. The next ultrasonic inspection of the pins should be completed in 2016.

PIN-AND-HANGER ASSEMBLY UNDER A FINGER JOINT AT THE YORK RIVER BRIDGE

SIGN BRIDGE INSPECTION

Routine or ground inspection of the Authority's sign bridges is conducted yearly as part of the routine bridge inspection and

no significant issues have been observed. We recommend the continuation of this practice in 2016.

A hands-on inspection of the Authority's 42 sign structures and two space frames was conducted by HNTB in early-2015. A concern noted during these inspections was missing and broken sign clips on multiple sign structures. HNTB recommends repair and the installation of the proper number of sign clips be completed within the next year.

We recommend a hands-on inspection of the one aluminum sign structure at Mile 8.3 southbound in early-2017 and the inspection of all overhead sign structures in 2021. This recommendation is consistent with the FHWA guidance that a typical two tower, two or four post sign bridge with a steel superstructure, be hands-on inspected every six years while aluminum structures should be hands-on inspected every two years.

SPECIAL DAMAGE INSPECTIONS

Special damage inspections are conducted as a result of collisions or when a condition requiring a more detailed inspection is noted. When this occurs, HNTB conducts an immediate field investigation to determine the extent of the damage and whether it is safe for traffic to continue using the structure. In some cases, emergency repairs or lane restrictions are required to maintain traffic on the structure.

The Hackett Road Underpass at Mile 76.9 was struck by an overheight vehicle traveling south on October 7, 2014 and again on March 20, 2015. HNTB conducted special damage inspections after both of these occurrences and made recommendations to the Authority for the repair of the impact damage. This repair is now complete.

The Dutton Hill Road Underpass at Mile 59.9 was struck by an overheight vehicle traveling northbound on June 8, 2015 and again on July 11, 2015. HNTB conducted special damage inspections after both of these occurrences and noted to the Authority that the minor damage did not present a load capacity concern so repairs were not recommended.

DUTTON HILL ROAD UNDERPASS, MILE 59.9

BRIDGE AND MINOR SPAN REHABILITATION

During the Annual Inspection, structure components such as the concrete deck, superstructure, substructure, culvert, and river channel conditions are assigned condition ratings. Using these ratings, structures requiring repair are further separated into five groups based on their overall condition and the safety implications of their deficiencies.

- **GROUP V -** Bridges are not in need of any repair (typically new or recently rehabilitated).
- **GROUP IV -** Bridges need repair, but of a minor nature. This work can most likely be done by Maintenance crews.
- **GROUP III -** Bridges need repair, but generally the structural safety is not jeopardized at present.
- **GROUP II -** Bridges should be repaired as soon as possible. However, the problem is such that a short delay is not likely to create a safety problem. If left too long, it will become a Group I Bridge.
- **GROUP I -** Bridges need immediate repair. The problem is such that the safety of the highway is in danger if the

TABLE 2 - BRIDGE AND MINOR SPAN TABULATION

BRIDGES						
Year	**Group V**	**Group IV**	**Group III**	**Group II**	**Group I**	**Total**
2015	8	72	104	0	0	184
2014	5	67	105	0	0	177
2013	6	73	98	0	0	177
2012	17	70	90	0	0	177
2011	9	66	100	1	0	176
MINOR SPANS						
Year	**Group V**	**Group IV**	**Group III**	**Group II**	**Group I**	**Total**
2015	1	4	13	0	0	18
2014	1	6	11	0	0	18
2013	1	7	10	0	0	18

repair is not made quickly. For example, heavy concrete deterioration under bridge bearings, scour around bridge foundations, weakened girders due to impact, etc.

TABLE 2, Bridge and Minor Span Tabulation, illustrates the number of structures in each group category based on the 2015 Annual Bridge Inspection. The previous four years of data has also been provided for reference. The grouped structures are then further prioritized for repair or replacement considering factors such as safety, bridge age, importance, rate of deterioration, scour susceptibility, load capacity, and traffic volumes.

Higher priorities are typically assigned to bridges and minor spans that are classified as “structurally deficient”. A structure classified as structurally deficient is not necessarily unsafe; however, these structures require repair and maintenance in the near future to ensure their continued safe operation. There are several key structural components that are considered by FHWA in reaching this classification. These components primarily include: Deck, Substructure, Superstructure, and Culvert. If any one of these components have a condition rating of 4 or less (indicating that an element is in "poor" condition), the bridge is considered structurally deficient.

MAP-21, Moving Ahead for Progress in the 21st Century Act, was passed into law in July 2012 and establishes performance standards for State Agencies. MAP-21 requires that no more than 10% of the total deck area of National Highway System (NHS) bridges may be classified as structurally deficient for three

TABLE 3 - TABULATION OF STRUCTURALLY DEFICIENT DECK AREA

Structurally Deficient Bridges				
Year	**All Authority Owned Bridges**		**Authority Owned NHS Bridges**	
	Deficient Area (SF)	**Percentage**	**Deficient Area (SF)**	**Percentage**
2009	235,112	13.60%	129484	14.24%
2010	163,052	9.43%	106811	11.75%
2011	149,014	8.62%	98216	10.80%
2012	27,445	1.59%	6975	0.77%
2013	55,311	3.20%	24121	2.65%
2014	58,209	3.37%	24121	2.65%
2015	19,682	1.14%	0	0.00%

consecutive years. If this requirement is not met, FHWA will require that a greater portion of the State Agency's Federal Funding be reapportioned to bridges on the NHS. Maine Turnpike bridges located on the NHS network are included in the State of Maine's NHS bridge inventory.

Since 2009, a primary focus of the Authority's bridge program has been to repair or rehabilitate structurally deficient bridges, and good progress has been made. The 2009 inspection noted 24 structurally deficient bridges equaling 13.60% of all Authority-owned bridges and 14.24% of Authority-owned bridges on the NHS. With the rehabilitation of four structurally deficient bridges completed in 2014, the percentage of structurally deficient deck area has been reduced to 1.14% of all Authority-owned bridges and 0.00% of Authority-owned bridges on the NHS. A Tabulation of Structurally Deficient Deck Area by year is provided in **TABLE 3** on the previous page.

During the 2015 bridge inspection, three structurally deficient bridges and two minor spans were identified. **TABLE 4**, Structurally Deficient Structure Summary, provides a listing of Maine Turnpike structures currently classified as "structurally deficient". The table also identifies programmed repair or rehabilitation dates for these bridges. The Authority's planned bridge and minor span rehabilitation program is reviewed and adjusted after each year's inspection program. We recommend that the repair or replacement of structural deficient bridges continue to be prioritized.

2015 Bridge Rehabilitation and Replacement Projects

Several rehabilitation and repair contracts are ongoing in 2015. These contracts include deck replacement, repairing concrete deterioration, replacing substandard bridge elements such as joints, railings and endposts, increasing bridge underclearance, improving load capacity, and other miscellaneous repairs.

The following is a brief summary of the 2015 bridge work:

- **Mile 1.8 Ramp H (Route 1 On-Ramp Underpass)**

The work entails installation of snow fence, cleaning and painting of bearings, substructure and deck repair, and the installation of fabric troughs under the joints to control water.

- **Mile 1.61 Ramp M (Route 1 SB Over I-95 NB)**

The work includes the installation of snow fence and substructure repair.

Table 4 - Structurally Deficient Structure Summary

Structure Name	Structure Type	Mile Marker	Status
Cape Neddick River Box Culvert	Minor Span	9.60	Repairs ongoing and scheduled for completion in 2015.
Josias River Box Culvert	Minor Span	11.80	Repairs ongoing and scheduled for completion in 2015.
Gray Interchange Underpass	Bridge	63.1	Gray interchange project scheduled for construction in 2015/2016. Bridge will be removed from service as a part of this project.
Maxwell Road Underpass	Bridge	90.00	Programmed for rehabilitation in 2017.
Small Road Underpass	Bridge	95.10	Programmed for rehabilitation in 2016.

- **MILE 5.2 YORK RIVER OVERPASS (NB & SB)**

The project includes new bridge wearing surface, deck repairs, pile jacket repairs, pin and hanger repair, and repairs to the substructure.

YORK RIVER OVERPASS, MILE 5.2

- **MILE 9.6 CAPE NEDDICK RIVER BOX CULVERT**
  [Structurally Deficient]

This double concrete box culvert exhibits areas of advanced concrete deterioration throughout the structure. The work includes chipping and patching areas of deteriorated concrete within the culvert and on its headwalls and wingwalls.

CAPE NEDDICK RIVER BOX CULVERT, MILE 9.6

- **MILE 11.8 JOSIAS RIVER BOX CULVERT**
  [Structurally Deficient]

This double concrete box culvert exhibits areas of advanced concrete deterioration throughout the structure. The work includes chipping and patching areas of deteriorated concrete within the culvert and on its headwalls and wingwalls.

JOSIAS RIVER BOX CULVERT, MILE 11.8

- **MILE 11.9 CLAY HILL ROAD UNDERPASS**

The work includes deck repairs, substructure repairs, installation of a new waterproofing membrane, the replacement of the bituminous wearing surface, and the installation of snow fence.

- **MILE 44.9 SOUTH PORTLAND INTERCHANGE 45 UNDERPASS**

This project includes bridge joint repairs, substructure repairs, deck repairs, new bridge deck membrane, deck and approach paving, and the installation of a lightweight barrier system. The lightweight barrier system is a short-term repair to replace the function of the deteriorated metal bridge rail system until the final disposition of this bridge can be decided. This bridge may need to be replaced if a Turnpike Connector to Gorham is constructed.

- **MILE 46.4 JETPORT INTERCHANGE UNDERPASS**

The repairs at this location include deck repair, installing new waterproofing membrane, the replacement of the bituminous wearing surface, and the repair of the asphaltic plug joints. The paving limits extend onto the approach roadways and additional shim pavement has been placed at the bridge approach to mitigate the settlement of the approach roadway.

- **MILE 50.0 FOREST AVENUE OVERPASS (NB & SB)**

The work includes the replacement of the bridge

joints and the removal and replacement of the bituminous wearing surface and waterproof membrane along with deck repairs.

- **MILE 51.2 RIVERSIDE STREET OVERPASS (NB & SB)**

The work includes the addition of steel plates to the existing joint and the removal and replacement of the bituminous wearing surface and waterproof membrane along with deck repairs.

- **MILE 55.5 PISCATAQUA RIVER OVERPASS (NB & SB)**

- **MILE 56.6 PISCATAQUA RIVER OVERPASS (NB & SB)**

The work involves the superstructure replacements, concrete substructure modifications and repairs, approach work and paving. The work is scheduled for completion in 2015.

- **MILE 71.1 ROYAL RIVER OVERPASS (NB & SB)**

The southbound bridge work includes deck repair, the removal and replacement of the bituminous wearing surface and waterproof membrane. The northbound bridge work includes a bituminous overlay.

- **MILE 71.6 BALD HILL ROAD OVERPASS (NB & SB)**

These two bridges, one carrying northbound traffic and one carrying southbound traffic, have deteriorated abutments and pavement. The repairs at this location include repair of the concrete abutments and deck, installing new waterproofing membrane, and the replacement of the bituminous wearing surface.

- **MILE 80.3 LEWISTON INTERCHANGE OVERPASS (NB & SB)**

New bridges are under construction as part of the Lewiston Interchange reconstruction project. The bridge will be longer to facilitate the construction of a single point urban interchange.

NEW LEWISTON BRIDGE UNDER CONSTRUCTION, MILE 80.3

- **MILE 99.0 LUNTS HILL ROAD UNDERPASS**

The work includes the removal and replacement of the steel superstructure, concrete deck, wearing surface, and joints. It also includes raising the structure to increase the clearance between the bottom of the bridge to the roadway pavement beneath the bridge to minimize the potential of overheight vehicle collisions.

LUNTS HILL ROAD UNDER CONSTRUCTION, MILE 99.0

- **MILE 102.01 RAMP E UNDERPASS (I-295 INTERCHANGE BRIDGE)**

This bridge serves as the canopy of the Exit 103 Toll Plaza and the bridge is currently not open to traffic. The 2014 inspection of this underpass identified several areas of deterioration including substructure and pavement surface. Substructure repairs were completed by Authority Maintenance forces. The bridge should continue to be monitored and major repairs or demolition should be contemplated as part of the 2019 Toll Plaza Project.

- **MILE 3.60 FALMOUTH SPUR ROUTE 9 UNDERPASS**

The project includes substructure and deck repairs and installation of new waterproofing membrane, and pavement.

In addition, snow fence is being installed at the following locations:

- **MOUNTAIN RD UNDERPASS (MM 10.6)**
- **RUNNING HILL ROAD UNDERPASS (MM 45.4)**
- **WARREN AVENUE OVERPASS (MM 48.9)**
- **AUBURN STREET UNDERPASS (FS 0.60)**

2015 EMERGENCY BRIDGE REPAIRS

Emergency bridge repairs are periodically required and are usually related to a collision. Minor repairs are completed by Authority Maintenance forces; however, significant repairs warranting heavy equipment or specialty services such as heat straightening are completed through construction contracts. The Hackett Road Underpass at Mile 76.9 was struck by an overheight vehicle traveling south on October 7, 2014 and again on March 20, 2015. HNTB conducted special inspections after both of these occurrences and made recommendations to the Authority for the repair of the impact damage. This repair is now complete.

HACKETT ROAD UNDERPASS IMPACT DAMAGE, MILE 76.9

RECOMMENDED 2016 BRIDGE PROJECTS

Based on the findings of the 2015 Bridge Inspection Program, HNTB recommends the following bridge repair and rehabilitations.

The following is a brief description of each bridge recommended for repair in 2016:

- **MILE 44.6 SPRING STREET UNDERPASS**

The work includes substructure repairs and the removal and replacement of the bituminous overlay and waterproof membrane, and deck repairs.

- **MILE 61.6 HUNTS HILL ROAD OVERPASS (NB &SB)**

The work includes substructure repairs and the removal and replacement of the bituminous overlay and waterproof membrane, and deck repairs.

- **MILE 63.3 ROUTE 202 UNDERPASS**

The work includes substructure repairs and the removal and replacement of the bituminous overlay and waterproof membrane, and deck repairs.

- **MILE 95.1 SMALL ROAD UNDERPASS**

The work includes the removal and replacement of the bridge superstructure (steel beams, concrete deck) and substructure repairs. In addition, the work includes raising the bridge to increase the vertical clearance to minimize the potential for damage to the bridge from an overheight vehicle.

- **MILE 106 MAPLE STREET UNDERPASS**

The work includes the removal and replacement of the bridge superstructure (steel beams, concrete deck) and substructure repairs.

BRIDGE REPAIRS (MISCELLANEOUS LOCATIONS):

- **DENNETT ROAD PRESERVATION**
- **RAMP J - REPLACE MISSING SEAL**
- **TWO ROD ROAD PARAPET REPAIR**
- **FOREST AVENUE SUBSTRUCTURE REPAIR**

- EAGLES NEST END POST REPAIRS
- SNOW FENCE AT VARIOUS LOCATIONS

BRIDGE PAINTING

The Authority has implemented an effective painting program by issuing painting contracts. This painting program is important because it reduces the potential for costly future repairs to correct steel corrosion. Since 1990, over 50 Authority-owned bridges have been repainted, with the most recent being the Saco River Overpass (NB and SB original steel beams) and the partial painting of the Androscoggin River Overpass (NB and SB) in 2014. No bridges are being painted in 2015.

During project development, the cost of repainting existing steel girders versus replacing the steel girders should be considered for all bridge rehabilitation projects. This analysis should consider cost, the load capacity of the existing girders, and the condition of the existing paint system.

HNTB recommends the following structures be painted in 2016.

- MOUSAM RIVER (EACH ORIGINAL STRUCTURE)
- FALMOUTH SPUR INTERCHANGE
- WEST FALMOUTH INTERCHANGE

BRIDGE OPERATIONS AND MAINTENANCE PROGRAM

HNTB recommends the following annual bridge maintenance activities on Maine Turnpike bridges:

- DECKS - Sweep (power broom) and flush with ordinary water (preferably power rinse) particularly the gutter areas. Patch obvious delaminations and potholes, scaling. Remove loose spalls over lanes of traffic.
- PARAPETS - Power rinse.
- SUPERSTRUCTURE - Pressure rinse the beams/girders and bearings particular at the joint locations.

The Authority maintains detailed bridge files as part of their bridge Operation and Maintenance Program. In accordance with FHWA requirements, these bridge files contain inventory and appraisal information such as bridge geometrics and age, as-built drawings, condition ratings, safe load capacities, and scour evaluations.

The following initiatives were undertaken to update the Authority's bridge files:

LOAD RATING OF IN-SERVICE BRIDGES

In 2014, the MTA completed its initiative to develop load ratings for all of their bridges. Load ratings are used primarily to understand the safe load capacity of bridges and to identify structures that should be posted for load limits. Additionally, load ratings are used to evaluate overweight permit load requests and to prioritize bridge repair projects. These uses require that bridge load ratings be reliable, uniformly consistent, and current. The results of these load ratings were reported to MaineDOT and are saved in the Authority's bridge files. HNTB recommends the completion of a bridge load rating when bridge construction with significant alterations are completed or when significant deterioration may impact a load rating.

BRIDGE INSPECTION PROCEDURES

In March 2013, FHWA issued a memorandum regarding new legislation established under the Moving Ahead for Progress in the 21st Century Act (MAP-21). This new legislation modifies existing inspection standards for bridges located on the National Highway System, and requires the collection of element level data for those structures beginning October 1, 2014. In 2013, AASHTO released an updated Manual for Bridge Element Inspection that incorporated the new FHWA element level data collection standards, followed by interim revisions in 2014 providing additional guidance on element level coding. Since the MTA submitted all inspection results from the 2014 Annual Inspection (i.e., prior to October

1, 2014) to the MaineDOT in the spring of 2015, the MTA will begin reporting element level data starting in the spring of 2016. Therefore, the 2016 Annual Inspection will incorporate element level data recording for all of the bridges.

With this recent change to the element level data collection, the MaineDOT decided to transition from PONTIS as their main inspection recording platform to InspectTech. The MTA has been actively coordinating with the MaineDOT on the software transition with the understanding that InspectTech is likely a possible option for the MTA to provide consistency with the MaineDOT.

FUNCTIONALLY OBSOLETE

The Maine Turnpike Authority's bridge inventory includes structures that are classified as "functionally obsolete". Functionally obsolete bridges have features that are not in compliance with current design guidelines such as narrow lanes or shoulder widths, or the inability to handle current traffic volume, speed, size, or weight. The Authority should consider reducing the total number of functionally obsolete bridges in its inventory. Improvements, such as bridge raising and shoulder widening, should be considered as part of the Authority's Capital Improvement Program.

DRAINAGE

The roadway's surface drainage system, consisting of side slopes, drainage ditches, catch basins and cross culverts, was inspected and found to be in fair to good condition. An important component of roadway drainage is allowing for the sheet flow of stormwater from the pavement down the side slope. The presence of winter sand buildup under guardrail prevents the sheet flow resulting in a channelized flow which may lead to an erosion issue.

Routine berm, ditch, and side slope maintenance and repairs are required for proper upkeep of the highway. Minor drainage, slope repairs and maintenance are completed by the MTA while larger repairs are completed by Contractors. Catch basin repair, pipe repair, winter sand removal, and slope repairs are completed as part of the pavement rehabilitation projects, while isolated areas requiring significant repair are typically bid as a Contract and completed separately. We recommend the continuation of this practice.

Numerous rivers and streams pass under the turnpike through box culverts and culvert pipes. All box culverts and pipes 60" in diameter or greater are inspected every year (a total of 76 individual culvert ends), and are in satisfactory condition. Culvert pipes 36" to 54" are inspected every five years and were last inspected in 2013. They are in satisfactory condition. These pipes should be inspected again in 2018.

All cross-culverts 30" and smaller are scheduled for inspection between 2013 and 2018. In 2013, the inspection of culverts 30" and smaller from Mile 90 to 109 was completed. This program continued in 2014 with the inspection of culverts 30" and smaller between Mile 50 and 60; and Mile 68 and 75, and on the Falmouth Spur. In 2015, the inspection of all culverts 30" and smaller between Mile 60 and 68 and Mile 75 and 90 was completed. These pipes were found to be in poor to good condition. Many of the cross-culverts are reinforced concrete under the core roadway but change to metal under the side slopes. While the concrete portion of the culverts are generally in fair to good condition, many of the metal pipe ends are in poor condition. Common issues observed are rusted flow lines, disconnected joints, and disconnected metal flared end sections.

These conditions lead to erosion issues on the side slope which may eventually impact the roadway.

Periodically the Authority issues contracts to repair drainage issues that the Authority's Maintenance forces cannot repair due to their location or the type of equipment required to cost effectively complete the repair.

HNTB RECOMMENDATION

We recommend the locations rated poor in the detailed Annual Inspection Report be monitored by the Authority. Locations that can reasonably be repaired by Authority Maintenance forces should be repaired. Areas that are not feasible for repair by Authority Maintenance forces should be programmed for repair. These repairs include the complete removal of the deteriorated metal pipe ends and their replacement with high density polyethylene or concrete pipe, along with slope and drainage channel stabilization. Drainage repairs should be included in the pavement rehabilitation contracts.

GUARDRAIL AND SAFETY IMPROVEMENTS

The Authority has continued its program of improving safety by upgrading large sections of the roadway side slopes each year. These improvements include removal of vegetation and guardrail upgrades.

GUARDRAIL

The FHWA has a September 29, 1994 policy that all roadside hardware (guardrail) installed on the National Highway System be in compliance with the crash testing and evaluation criteria contained in the Manual for Assessing Safety Hardware (MASH) or its predecessor the National Cooperative Highway Research Program (NCHRP Report 350 - published in 1993). FHWA further suggested that the non-crashworthy hardware be removed or replaced with crashworthy roadside hardware at the earliest possible opportunity in concert with the maintenance of the roadway.

A program to upgrade Maine Turnpike guardrail by construction contract was initiated in 1996. This program includes the following:

- Installation of thrie beam guardrail at select locations;
- Closing median openings that are not critical for authorized vehicles;
- Constructing new median openings at areas with adequate sight distance;
- Replacing non-crash attenuating guardrail terminal end sections with impact attenuating units;
- Adjusting guardrail heights;
- Improving strength of guardrail at locations where the guardrail was in close proximity to bridge piers;
- Adding additional guardrail; and,
- Constructing new terminal end sections.

This work continued in 2015 with upgrades to the guardrail on the Falmouth Spur; Mile 51 to Mile 54.5; and Mile 68.5 to Mile 74.9 as part of pavement rehabilitation contracts.

ROADWAY SIDE SLOPES

The clearing of vegetation in close proximity to the roadway commenced in 2012. This clearing improves safety by removing vegetation in close proximity to the roadway and helps with winter maintenance by minimizing the shading of the roadway. **TABLE 5** illustrates the Side Slope Clearing completed to date.

TABLE 5 - SIDE SLOPE CLEARING

Year	Locations
2012	Mile 92.8 to Mile 100.3
2013	Mile 82.9 to Mile 93.0
2014	Mile 51 to Mile 63
2015	Mile 63 to Mile 75

Mile 53.4, Looking South (Before)

Mile 53.4, Looking South (After)

As part of a 2015 pavement rehabilitation project, an 1,800' long section of the southbound roadway side slope is under reconstruction in Falmouth to improve safety. In this 1,800 feet, a section of guardrail is being removed and slopes flattened to accommodate a wider roadside recovery area for errant vehicles.

2016 RECOMMENDATION

HNTB recommends that guardrail continue to be monitored and repaired as needed. Upgrades such as adjusting guardrail height are still needed as a regular activity and should be reviewed yearly for possible inclusion in the yearly paving rehabilitation contract. We also recommend that any entity installing or maintaining roadside safety hardware, including Authority Maintenance forces and contractors, are trained for completing this work in accordance with the manufacturer's instructions.

HNTB also recommends that the Authority continue the clearing of vegetation in close proximity to the roadway. Clearing should be programmed from Mile 75 to 83 and Mile 100 to 109 in 2016.

LIGHTING

The roadway lighting system is generally in good condition. During the inspection, we noted that most interchanges and service plazas had a few lights that were out. Authority Maintenance forces replace these lights as required to maintain acceptable lighting levels.

In 2010, the MTA implemented a pilot study by installing Light-Emitting Diode (LED) lighting at the Cumberland Service Area, Exit 46 Area, the Exit 45 canopies, Crosby Maintenance, and the Kennebunk Park & Ride lot. While LED lights are more costly to purchase, they have longer service life and use substantially less electricity to operate. In 2011, LED light fixtures were installed at Interchange 48 as part of a construction project to extend the acceleration lanes. This program continued in 2012 with the installation of LED luminaires at Interchanges 45, 53 and 75 as part of the acceleration lane lengthening projects; and in 2014 with the installation of LED highway lighting installed at the newly reconstructed Lewiston Interchange ramps; and with the replacement of the existing high mast 1,000 watt light fixtures at Saco and West Gardiner with LED fixtures. In 2015, LED lights were installed at Exit 46. As a result of these changes, light fixture maintenance and power consumption has been reduced.

In 2015, HNTB inspected 30 weathering steel high mast light poles and determined they were all in generally good condition. HNTB prepared a May 20, 2015 Summary Report which recommended repairs of some minor deficiencies such as loose anchor bolts, damaged grout pads, and loose access panels.

HNTB RECOMMENDATION

The MTA should continue to maintain their roadway lighting system on a regular basis to minimize the number of outages and replace all remaining non-LED lighting fixtures with LED lighting fixtures.

We recommend repair of the high mast light minor deficiencies noted in the May 20th report and that the lights be inspected on a two year interval. The next inspection of high mast lights should be completed in 2017.

SIGNAGE

The MTA maintains its signs in generally good condition. The MTA Sign Shop fabricates the majority of the regulatory, route marker, warning, and specialty signs on the Maine Turnpike and routinely replaces signs that are damaged, faded, or otherwise in poor condition. In 2012, the MTA contracted with 3M to capture sign attributes, locations, and photographs for all signs within the turnpike right-of-way. Included in 3M's deliverables were the sign photos and a GIS sign database. The MTA has been enhancing the database with nighttime retro-reflectivity inspection results, sign updates, and other pertinent data. This database is used to assist with the scheduling of replacement signs.

HNTB RECOMMENDATION

HNTB recommends the Authority continue to monitor, maintain, and replace the regulatory, route marker, warning, and specialty signs as needed and initiate the process of replacing all existing guide signs since they are close to the end of their expected life. The replacement of the guide signs should be constructed over the 2016 thru 2019 time period.

ROADWAY MARKINGS

The Authority's Maintenance forces re-stripe the turnpike once a year to maintain roadway markings in good condition.

The Authority is also utilizing reflectorized pavement marking tape installed in grooves at interchange ramps and to supplement the white skip lines on the mainline. The tape improves visibility of the pavement markings in wet conditions.

Double yellow lines in two-way traffic areas in the interchanges are typically painted twice a year. The newly paved areas are also painted twice per year. The paint lines are adequately maintained.

HNTB RECOMMENDATION

HNTB recommends the MTA continue their current practice.

TOLL PLAZAS

TOLL COLLECTION EQUIPMENT

A May 2013 Toll System Assessment Report outlined that the legacy cash toll collection 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 Toll System offers the following advantages to the MTA:

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

The Infinity Toll System has been installed at the New Gloucester mainline toll and its implementation is complete or substantially complete at Exits 19, 25, 42, 46 SB, 47 and 48. Construction of the new system is ongoing at Exit 52 and West Gardiner as part of the conversion of these toll plazas to Open Road Tolling (ORT). The new toll system is functioning as intended and is scheduled for installation at the remaining toll plazas.

TOLL PLAZAS

The 19 toll plazas comprised of tollbooths, canopies, utility buildings and other structures are in various stages of repairs and upgrades as part of the system-wide upgrade to the Infinity Toll System discussed in the previous section. The tollbooths and canopies are rated in fair to good condition while other components, such as concrete slabs, bumpers and tunnels, are rated in poor to fair condition.

EXIT 19 TOLL PLAZA

MAINLINE TOLL PLAZA

The six mainline plazas shown in Table 6 generated $98.0 million in toll revenue in 2014, which accounted for approximately 79% of all toll revenue collected by the Authority. The other 21% of toll revenue was generated by the 11 side toll plazas. A Tabulation of Traffic, Revenue and E-ZPass Usage is illustrated in **TABLE 6**.

Some items of note:

- York Toll Plaza accounts for almost half of all Maine Turnpike revenue.
- In general, E-ZPass usage appears to decline the farther north you go on the system. At all plazas between York and New Gloucester, E-ZPass usage averaged approximately 70%. At the two northernmost plazas, E-ZPass usage was closer to 60%.
- E-ZPass usage among trucks is extremely high - in the vicinity of 90% at most

TABLE 6 - TABULATION OF TRAFFIC, REVENUE AND E-ZPASS USAGE

Traffic Characteristic	York	Exit 44	Exit 52	New Gloucester	W. Gardiner I-95	Gardiner I-295
Annual Traffic (millions)	16.4	8.5	4.1	6.4	3.4	8.0
Annual Revenue ($millions)	$57.8	$7.9	$3.5	$15.0	$6.0	$7.8
Share of Total Turnpike Revenue	46.8%	6.4%	2.8%	12.1%	4.9%	6.3%
Truck% (MTA Classes 3-6)	10.9%	6.2%	4.9%	12.0%	10.7%	8.5%
E-ZPass Usage (overall)	73.5%	69.9%	69.6%	69.3%	58.8%	56.9%

mainline plazas. Trucks appear to value the cost- and time-saving advantages of E-ZPass more than cars do.

YORK TOLL PLAZA

The existing York Toll Plaza was constructed in 1969 and is challenged by both operational and safety issues and the existing toll system has reached the end of its useful life. The plaza is rated in fair to poor condition. Considering the condition of the plaza, 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 existing location, or an alternate location selected for a new plaza.

EXISTING YORK TOLL PLAZA - CONSTRUCTED IN 1969

The Authority is in the process of developing a comprehensive plan and implementation schedule for this facility. A study of All Electronic Tolling (AET) at York was recently completed and concluded it was not practical. With that study complete, the Authority commenced another study to determine the best location to construct an ORT Plaza to replace the existing York Toll Plaza. ORT lanes allow E-ZPass patrons to safely proceed through the toll plaza at highway speeds without slowing or stopping. This study includes examining the existing location as well as other locations. At the completion of this study, the Authority will decide on the future of the existing York Toll Plaza. If the Authority determines that the existing toll plaza is to remain for the foreseeable future, HNTB recommends a comprehensive review of the plaza conditions so that a detailed plan for operations, safety, and rehabilitation is developed.

NEW GLOUCESTER TOLL PLAZA

On April 1, 2013, the MTA opened the ORT lanes at New Gloucester and all the cash toll collection equipment was replaced. A number of elements were replaced or rehabilitated as a part of this work including the slabs. As a result, this plaza is rated in good condition.

WEST GARDINER I-95 TOLL PLAZA

The conversion of the West Gardiner I-95 Toll Plaza to ORT is under construction. This plaza is currently in fair to good condition.

WEST GARDINER I-295 TOLL PLAZA

The existing West Gardner I-295 Mainline Toll Plaza is rated in fair to poor condition and is functionally obsolete. The age of the toll plaza, the outmoded conditions of the existing tollbooths, canopy and tunnel, and location under an existing bridge make upgrade and expansion of the existing facility problematic.

The feasibility of ORT will likely be studied at this location for possible construction in 2019-2020.

EXIT 44 I-295 TOLL PLAZA

Exit 44 connects the Maine Turnpike to I-295 south of Portland. This plaza is vitally important to the interstate transportation network and is rated in fair to good condition, although the plaza is becoming functionally obsolete. The conversions of Exit 44 to ORT is scheduled for 2017-2018.

EXIT 52 FALMOUTH SPUR TOLL PLAZA

Exit 52 connects the Maine Turnpike to Interstate I-295 north of Portland and is an integral part of the transportation network. As with Exit 44, this plaza is also becoming functionally obsolete. The conversion of the Exit 52 Toll Plaza to ORT is currently under construction. This construction will also include upgrades to the existing facility.

SIDE TOLL PLAZAS

The MTA has programmed the replacement of all the cash toll collection equipment at all toll plazas along with an infrastructure repair and upgrade. This program is currently ongoing and its implementation is complete or substantially complete at Exits 19, 25, 42, 46 SB, 47 and 48. At many of the older toll plaza such as Exits 32, 36, 45, 53 and 63 not yet reconstructed, the tollbooths and canopies are rated in fair to good condition while other components, such as concrete slabs, bumpers and tunnels, are rated in poor to fair condition. Repairs and toll system upgrades at Exits 32 and 36 are programmed for 2015 and 2016. New toll plazas are scheduled for Exits 53 and 63 in 2016. The schedule for the upgrade and repairs at the Exit 45 toll plaza are dependent on the outcome of the Gorham East West Corridor Study.

SERVICE AREAS

There are five service plazas in four locations on the turnpike.

In 2007, new buildings were completed and parking was improved for cars and trucks at Kennebunk NB and SB, Cumberland SB, and Gray NB service plazas. The new service plaza located at the confluence of the turnpike (I-95) and I-295 in West Gardiner opened in November 2008.

Each location has a service station, food services, and a convenience store. The service plazas are in good condition, however, HNTB noted several areas where repairs are warranted at the service plaza buildings. These areas should be repaired as part of ongoing maintenance activities.

MAINTENANCE FACILITIES

Nine Maintenance Facilities are located along the turnpike. Each maintenance area has a different combination of buildings ranging from material storage, vehicle and equipment storage, to repair facilities and offices as shown in **APPENDIX A**. Between 1992 and 2012, seven of the nine Maintenance Facilities were upgraded. All the maintenance areas are in fair to good condition.

HNTB RECOMMENDATION

Our inspection noted damaged roof trusses at multiple locations in the old salt storage buildings that are currently used for cold storage. These roof trusses should be repaired.

3 TOLL COLLECTION SYSTEM

ELECTRONIC TOLL COLLECTION

The MTA operates its Electronic Toll Collection (ETC) system as a closed-barrier toll system from the York Toll Plaza north to the New Gloucester Toll Plaza, and as an open-barrier toll system from the New Gloucester Toll Plaza north to the turnpike terminus in Augusta. The open-barrier toll system allows free travel between interchanges within the limits of the mainline barrier toll plazas on the northern section of the turnpike. All trips between Exit 75 in Auburn and Exit 86 in Sabattus are toll-free. It is estimated that toll-free trips account for roughly 3% of all Maine Turnpike trips.

NEW GLOUCESTER TOLL PLAZA

E-ZPASS GROUP

On February 1, 2005, the Maine Turnpike Authority implemented its current ETC system, E-ZPass. One of the greatest benefits to the Authority for converting to E-ZPass was admittance into the E-ZPass Group, formerly known as the Inter Agency Group (IAG). The E-ZPass Group includes 26 toll agencies that operate over 47 toll roads, bridges and tunnels in 15 states from Maine to North Carolina to Illinois. The E-ZPass Group's primary objective is the operation of a regionally compatible toll system with seamless travel based on common operating protocols and policies. The backbone of the E-ZPass Group's system is a network of customer service centers and computer systems used to support the 28.2 million E-ZPass toll tags currently in circulation. As a result, many travelers from other states pay their toll to the Maine Turnpike in a cashless mode through the transponder. This reduces congestion and the need for larger toll plazas.

Membership in the E-ZPass Group allows the MTA a voice in one of the largest interoperable and reciprocal ETC systems in the world. This group collectively manages the procurement and deployment of the E-ZPass technology.

Started in 1990 with seven agencies, today the E-ZPass Group boasts 16.9 million active accounts.

TOLL SCHEDULE

On November 1, 2012, the MTA increased cash and E-ZPass toll rates to raise additional toll revenue to meet the 30-year plan of maintenance and rehabilitation of the turnpike's network of bridges, interchanges and pavement as well as paying off debt.

For cash-paying passenger vehicles, the updated toll is $3.00 at the York Toll Plaza; $2.25 at the New Gloucester Toll Plaza; $1.75 at the West Gardiner Toll Plaza; $1.50 for motorists traveling north from Exit 19 in Wells, and south from Exit 63 in Gray; and $1.00 at all other locations. Maine E-ZPass fares increased by 15%, from 6.7 cents per mile to 7.7 cents per mile. The E-ZPass fares are also structured in such a way that they are equal to or less than the cash rate for a particular movement.

A passenger car traveling the full length of the turnpike pays $7.00 (6.6 cents per mile), and $28.00 (26.4 cents per mile) for five-axle tractor trailers. E-ZPass patrons who have an E-ZPass tag from other toll system highways are charged the cash fare.

For those who acquire their E-ZPass tag from the MTA, the following discount programs are available:

* VOLUME BASED DISCOUNT PROGRAM

The MTA offers the Volume Based Discount Program to all Maine E-ZPass account holders. Under this system, the total fare for travelers of the turnpike is discounted by 25% if more than 30 one-way trips occur in a month, and a 50% discount if 40 or more one-way trips occur in a month.

The Volume Based Discount Program replaces the previous Commuter Discount Program that began in 1982 through 2012. The new discount program will be applied as shown in the **TABLE 7** below.

* PERSONAL

Patrons who drive a motorcycle, passenger car, van, or pickup with four tires or less can establish a Personal Account. Advantages of a personal account include having tolls automatically deducted from your pre-paid balance when traveling on the Maine Turnpike or other E-ZPass compatible facilities, no-stop payment of tolls and often times paying less than but never more than the cash fare. Trips are charged based on the lesser of the current cash fare or the E-ZPass rate per mile fare. Passenger cars with a Maine-based E-ZPass account save an average of 33% compared to the cash rate.

* BUSINESS

Business Accounts are intended for commercial vehicles. As with passenger cars, commercial vehicles having an E-ZPass tag from the Maine Turnpike Authority are charged the lesser of the current cash fare or the underlying per-mile rate. Commercial vehicles that enroll in this program can establish either a pre-paid or a post-paid account. The post-paid account requires a $5,000 surety bond, and it qualifies the account holder for a volume discount (see below). The pre-paid account does not require a surety bond, but neither does it provide a volume discount.

* POST-PAID PLAN VOLUME DISCOUNT

Commercial vehicles having a post-paid E-ZPass account with the Maine Turnpike Authority receive an additional "volume discount" based on the amount of their monthly tolls. **TABLE 8** describes how the Post-Paid Plan Volume Discount program works. In essence, all tolls in excess of $50 for the month are discounted by up to 20%. On a system-wide basis, post-paid E-ZPass business accounts receive an average volume discount of nearly 18%. This discount program is in addition to the already-discounted E-ZPass fares described below.

TABLE 7 - VOLUME BASED DISCOUNT PROGRAM

NUMBER OF TRIPS PER MONTH	VOLUME BASED DISCOUNT PROGRAM (Personal Accounts Only)
30-39 account trips per month	25% discount applied to monthly account trips
40 + account trips per month	50% discount applied to monthly account trips

TABLE 8 - POST-PAID PLAN VOLUME DISCOUNT

MONTHLY E-ZPASS CHARGES	POST-PAID PLAN VOLUME DISCOUNT (BUSINESS ACCOUNTS ONLY)
Between $0 and $50	No discount
Between $50 and $100	10% discount off everything over $50
Between $100 and $300	$5 discount plus 15% off everything over $100
Over $300	$35 discount plus 20% off everything over $300

4 TRAFFIC MANAGEMENT AND TECHNOLOGY

Since opening in 1947, the Maine Turnpike has served as the transportation lifeline for the state. In 1956, a total of 3.8 million vehicles traveled on the turnpike. This volume rose to over 60 million in 2003, and it has stayed at or above this level ever since.

Two common measures of turnpike traffic are annual Vehicle-Miles Traveled (VMT) and annual number of trips. In 2014, the Maine Turnpike logged 1.22 billion VMT while serving nearly 63 million trips.

FIGURE 3 illustrates the trends of both of these measures over the past 15 years. Annual Trips and VMT both experienced rapid growth in the early-2000's, but both measures have been relatively stagnant over the past decade. In fact, VMT in 2014 was approximately 7% lower than it was in the high-water mark of 2004.

In 2014, the annual number of trips rose by 3.5% compared to 2013. The total number of trips served in 2014 was 62.8 million - the third highest annual trip total in Maine Turnpike history. VMT in 2014 registered an increase of 2.7% compared to 2013. In short, traffic levels in 2014 were notably higher than 2013,

The average trip length on the Maine Turnpike was 19.4 miles in 2014. This is down by over 10% since 2000, when the average trip was 21.6 miles. Some of this reduction in trip length may be attributed to the growth in shorter trips in the Greater Portland area. Another factor appears to be that travelers making the long-distance trip between Greater Portland and Augusta are tending to use I-295 as opposed to the turnpike.

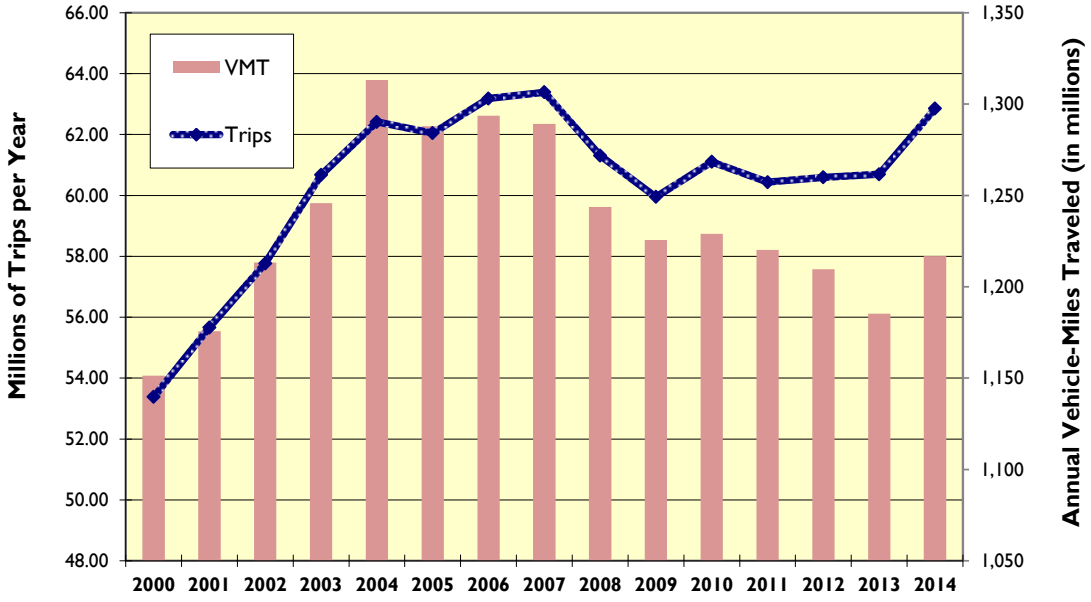
COMMUNICATION

The MTA plans to install a fiber optic line in the Portland area. Conduit was installed under the Stroudwater River Bridge at Mile 46.7 in 2014, under the MCRR bridges at Mile 47.9, and Falmouth Spur at Mile 0.4 in 2015 to facilitate the future installation of fiber optic lines. This fiber optic line will be used to improve turnpike communication.

REDUCED SPEED LIMIT SIGNS

As part of an overall effort to reduce vehicle

FIGURE 3 - VMT & ANNUAL TRIPS



speeds and crashes during poor travel conditions, Authority Maintenance forces added eight new flashing "45 MPH Reduced Speed Limit" signs that are controlled remotely from the Turnpike Communication Center. These new signs supplement the existing 10 manually operated reduced speed limit signs. The next phase is a conversion to allow the existing signs to be controlled remotely by the Turnpike Communication Center.

TRAFFIC COUNT STATIONS

To gather accurate and timely traffic data, the Authority began installing traffic count stations at interchanges in 1996. Each station is composed of a Type 170 Controller housed in a traffic cabinet. The controller currently utilizes side-fired radar technology to continuously record traffic volume and speed data. The system enables the Authority to collect the data automatically. Additional count stations are scheduled for installation in the lower 1.9 miles of mainline and ramps in Kittery purchased by the MTA in early-2015.

ROADWAY SENSORS

Roadway Weather Information Systems (RWIS) were installed in the fall of 2008 at the Saco River Bridge Overpass in Saco and at the Eagles Nest Bridge Overpass in Gray. The RWIS measures the surface temperature of the road, road state, and roadway friction. These RWIS units provide information that can help maintenance supervisors make cost effective decisions regarding chemical applications regarding the potential for inclement weather. The pavement sensors are used to understand road conditions. Road conditions can be reported as dry, damp, wet, frost or ice.

VARIABLE MESSAGE SIGNS (VMS)

The Authority currently maintains a network of Variable Message Signs (VMS) to provide motorists with critical real-time traffic information. There are 14 VMS installed at different locations along the turnpike, primarily focused in the more heavily traveled southern section. The signs typically advise turnpike patrons of current traffic conditions, weather restrictions, accidents, delays, etc. Message displays are controlled by turnpike dispatchers from the communication center at the Maine Turnpike Authority Headquarters. The 14 VMS were recently upgraded with new controllers and power supplies, which has extended the useful life of the VMS. The VMS located east of Exit 36 was relocated to Mile 28 southbound to provide information to more patrons.

Twenty-five Portable Changeable Message Signs (PCMS) have been deployed long-term throughout portions of the turnpike for incident management purposes and can be controlled from the communication center in the same manner as the fixed VMS.

HIGHWAY ADVISORY RADIO

The MTA installed its first Highway Advisory Radio (HAR) transmitter in Saco in 1997.

Transmitters along the turnpike are located in strategic locations to provide information at critical decision points along the highway, typically at or near interchanges. The radios are supplemented by signs advising motorists to tune their radios to 1610 AM to receive real-time turnpike information. Prerecorded messages are continually broadcast to provide information about traffic conditions, weather, and construction zones. The Turnpike Communication Center has the ability to control and quickly update messages. The HAR system is a significant resource for providing information to motorists. In 2007, the Authority upgraded 11 transmitter sites and the software platform located in the Turnpike Communication Center. This upgrade synchronized all the HAR transmitters improving coverage on the mainline.

HIGHWAY ADVISORY RADIO

An additional HAR transmitter was installed in 2011 in the vicinity of the Kennebunk

TABLE 9 - HIGHWAY ADVISORY RADIO TRANSMITTER LOCATIONS

TOWN / CITY	GENERAL LOCATION	MILE MARKER
York	I-95 SB at York Toll Plaza	7.3
Wells	I-95 SB at Sanford Road Overpass	19.1
Kennebunk	I-95 NB at Fletcher Street Overpass	25.3
Saco	I-95 NB at Boom Road Underpass	33.4
Scarborough	I-95 NB at Holmes Road Underpass	43.0
Falmouth	Exit 53 On-Ramp	53.0
Gray	I-95 SB at Gray Maintenance	63.3
Auburn	Exit 75 NB On-Ramp	75.4
Lewiston	Exit 80 SB On-Ramp	80.3
Litchfield	I-95 NB at Marsh Road Underpass	89.2
West Gardiner	I-95 NB at West Gardiner Toll Plaza	100.2
Augusta	I-95 SB, N. of Winthrop Street Underpass	108.7

Service Plazas to better cover the gap in reception between the two adjacent transmitters. The Highway Advisory Radio Transmitter Locations are listed in **TABLE 9**.

CLOSED CIRCUIT TELEVISION (CCTV) SYSTEM

There are currently 12 CCTV cameras transmitting streaming video 24-hours a day, seven days a week, to monitors located in the communication center at the Maine Turnpike Authority Headquarters. Still images from these cameras are also viewable on the Maine Turnpike website.

The CCTV cameras are located at the following locations:

- **YORK TOLL PLAZA - NB & SB**
- **EXIT 25 (ROUTE 35) - NB & SB**
- **EXIT 32 (ROUTE 111) - NB & SB**
- **BETWEEN EXITS 32 & 36 (BOOM RD) - NB ONLY**
- **BETWEEN EXITS 36 & 42 (FLAG POND RD) - NB & SB**
- **EXIT 42 (HOLMES RD) - NB ONLY**
- **EXIT 63 (GRAY) - NB & SB**

These cameras allow the Turnpike Communication Center to view traffic in the vicinity of these heavily traveled interchanges.

Two additional CCTV cameras are located with the RWIS that were installed in the fall of 2008 at the Saco River Bridge in Saco and Eagles Nest Overpass in Gray. These cameras are providing still images viewable through the RWIS website only at this point in time, but the cameras do have the capability to provide streaming video. It is anticipated that these cameras will be incorporated into the CCTV system in the near future.

Four additional trailer-mounted CCTVs were purchased after 2010 for temporary work zone monitoring and incident management.

OVERHEIGHT VEHICLE DETECTION SYSTEM

Many of the turnpike bridges have been struck and damaged by overheight loads. This issue has been mitigated by the Authority's policy of increasing the underclearance as part of bridge rehabilitation projects and by constructing new bridges with a minimum of 16.5' of underclearance. However, a number of bridges still have minimal underclearance and have a potential for damage if struck by an overheight vehicle. The Authority is addressing this concern by the implementation of an Overheight Vehicle Detection System at select locations. These systems detect overheight vehicles and send a signal to a flashing sign that notifies the driver of an overheight vehicle to come to a stop. The Turnpike's Communication Center is also notified of the occurrence and receives video of the incident. A system was

installed on Warren Avenue in 2012; Auburn Interchange in 2013; and on the mainline in West Gardiner in 2014.

ZOOM TURNPIKE EXPRESS

The Maine Turnpike Authority provides partial funding for the ZOOM Turnpike Express, a commuter bus service operating between Biddeford, Saco, and Portland. Currently, the Maine Turnpike Authority and ZOOM have a Memorandum of Understanding for July 2014 to June 2016. The MTA provides a designated bus pickup and drop-off area at the Exit 36 Park & Ride lot; and the MaineDOT has parking at the Exit 32 Park & Ride lot in Saco. The MTA also pays for Wi-Fi on the buses.

The commuter bus provides an alternative to driving on the most heavily traveled commuter route in the state. Typically, ZOOM buses serve about 125 travelers per weekday. The heaviest months of use are September and October.

A regular one-way fare on ZOOM costs $5.00, with a 10 ride ticket costing $39.00. There are also monthly commuter cards available for $100 and a quarterly pass for $260. ZOOM riders are eligible to transfer for free to any connecting Shuttle bus, Metro, or South Portland bus route.

GO MAINE PROGRAM

Since April 2013, the Maine Turnpike Authority has administered the GO Maine Program. This is a statewide program that helps commuters find information on commuting options.

There are three main components of the administration of this program; they are: Program Administration and Coordination, Rideshare and Technology Services, and Marketing, Education and Outreach. The MTA and the MaineDOT's goal is to have a robust, updated, and well-functioning database of commuters who wish to carpool or commute by another means other than a single occupancy vehicle.

The Maine Turnpike plans to continue to manage the database to ensure that good commuter matches are made as well as reach out to local businesses, municipalities, and others, to tell people about the program and how easy it is to find a carpool match. In the fall of 2015, GO Maine has begun a partnership with NuRide, a ride matching program that is the nation's largest rewards program for individuals who take greener trips, which include walking, biking, telecommuting, carpooling, vanpooling, or taking public transportation. GO Maine users are able to continue to look for carpool and vanpool matches, and now they will be rewarded for any green trips they take. Users of the program simply record their trips on their NuRide profile page and earn points that can be redeemed for discounts and coupons to popular restaurants and online retailers.

GO Maine has and will continue to reach out to larger employers in Maine to let them know how easy it is for their employees to search for a vanpool or a carpool. In the past year, GO Maine has initiated contact with some of the largest employers in Maine such as, BIW, Portsmouth Naval Shipyard, and Bank of America.

PARK & RIDE LOT PROGRAM

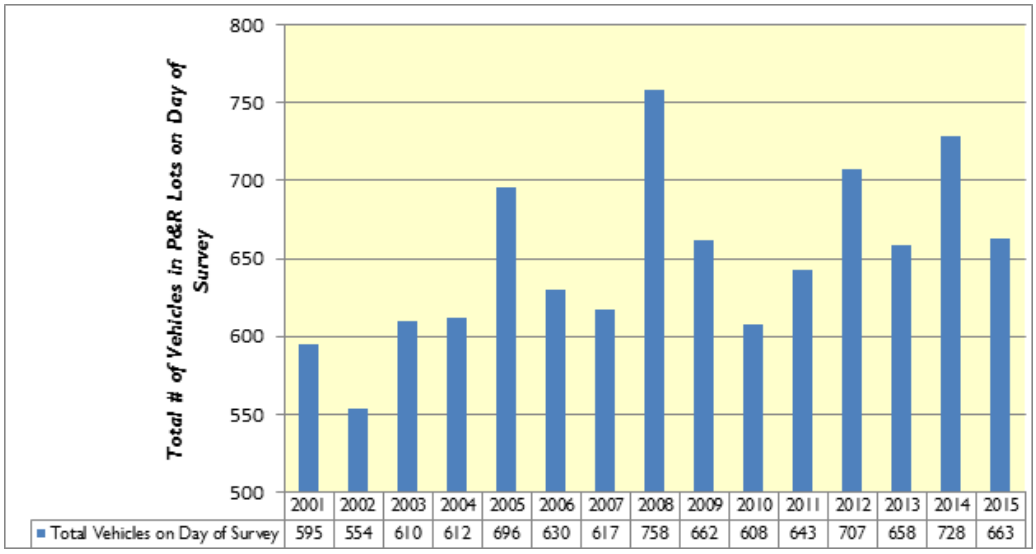
The Authority strongly encourages motorists to utilize its Park & Ride lots to reduce congestion on the turnpike through ridesharing. Currently, the Authority maintains a network of 16 Park & Ride lots located at or near most interchanges. The Authority monitors the use of these lots to assure that adequate capacity is available.

TABLE 10 summarizes overall Park & Ride Lot Usage from 2001 through 2015 (on the day of the survey).

The following observations may be drawn from the table:

- Total Park & Ride lot usage has stayed

TABLE 10 - PARK & RIDE LOT USAGE - 2001 THROUGH 2015



in a fairly narrow range from about 550 vehicles (recorded in 2002) to just over 750 vehicles (recorded in 2008).

- In 2015, total usage on the day of the survey was 663 vehicles. Given that a total of 1,181 spaces were available, the overall system operated at about 56% of its capacity. By comparison, in 2002, the Park & Ride lots were operating at less than 50% capacity.

Four relative spikes in usage have been noted over the past decade:

- The first was in the fall of 2005, when fuel prices rose rapidly in the wake of Hurricane Katrina.
- The second was in the spring of 2008, when fuel prices hit record highs.
- The third was in the spring of 2012, when fuel prices again climbed abruptly after a temporary reprieve in prices over the winter.
- The fourth was in 2014. This is mostly associated with more patrons using the new, larger lot in Lewiston.

TABLE 11, on the following page, summarizes Park & Ride Lot Usage Per Location, on the day it was surveyed, as part of the 2015 Annual Inspection of the Maine Turnpike. The table also records the number of spaces available at each lot, as well as each lot's operational capacity.

As Table 11 indicates, the two busiest lots on the turnpike are at Saco (Exit 36; Owned by MaineDOT) and Gray (Exit 63). Gray serves over 70 vehicles, with Saco serving well over 100 vehicles.

Two lots - Saco and Gray - are currently operating at over 75% capacity. The capacity issue at the Saco lot has been alleviated by the addition of an overflow lot on Route 112. A new Gray Park & Ride lot with a total of 130 spaces is currently under construction. The opening of this lot will mitigate the capacity issues at the Gray Park & Ride lot.

TURNPIKE SAFETY AND LAW ENFORCEMENT

In 2014, approximately 636 crashes were reported on the Maine Turnpike. This is a 3% increase from 2013 (619 crashes) as reported by the Maine Turnpike Authority. The majority of crashes are in the northbound direction (335 vs. 301). An additional 202 crashes happened at the Maine Turnpike ramps and the adjacent intersections with the local roads in 2014.

TABLE 11 - PARK & RIDE LOT USAGE PER LOCATION - 2015

Town	Location	Owner	Spaces	2015 Volume	% Capacity
York	Chases Pond Road, US-1 Connector	MaineDOT	26	11	42.3%
Wells	Maine Tpk Exit 19, adj. to Wells Trans. Center	MTA	100	39	39.0%
Kennebunk	Maine Tpk Exit 25 SB, on Rt. 35	MTA	52	32	61.5%
Biddeford	Maine Tpk Exit 32, on Rt. 111	MTA	155	108	69.7%
Saco	I-195 Exit 1, on Industrial Park Road	MaineDOT	135	115	85.2%
Scarborough	Maine Tpk Exit 42, shared w/ Cabela's Parking Lot	MTA	66	20	30.3%
S. Portland	Maine Tpk Exit 45, on Rt. 703	MaineDOT	111	47	42.3%
Portland	Maine Tpk Exit 46, adj. to Toll Plaza	MTA	68	21	30.9%
Westbrook	Larrabee Road, near Maine Tpk Exit 47	MaineDOT	91	61	67.0%
W. Falmouth	Maine Tpk Exit 53, adj. to Toll Plaza	MTA	19	8	42.1%
Gray	Maine Tpk Exit 63, on US-202	MTA	74	60	81.1%
Auburn	Maine Tpk Exit 75, on US-202	MTA	137	62	45.3%
Lewiston	Maine Tpk Exit 80 - Route 196	MTA	93	41	44.1%
W. Gardiner	Maine Tpk Exit 102, near Rt. 126	MTA	54	38	70.4%
		Overall	1181	663	56.1%

From 2012 - 2014, there were seven High Crash Locations (HCL) on the Maine Turnpike, which includes the mainline, toll plazas, and interchange ramps. This is a reduction of one over the number of HCLs from 2011 - 2013. Four additional HCL's are documented at intersections adjacent to the turnpike ramps. A High Crash Location is defined as a roadway node or segment that has more than eight crashes in a three-year period, and a Critical Rate Factor (CRF) greater than 1.0. The Critical Rate Factor relates the crash rate at a particular link or node to the statewide crash rate average for a similar type of facility. A Summary of HCLs and their corresponding CRF Locations (2012 - 2014) are shown in **TABLE 12**. The crash data for HCLs will be reviewed as part of the 2015 Safety and Capacity Study to understand if mitigation measures are warranted. The West Gardiner HCL should be mitigated upon the completion of the ongoing roundabout construction project.

Law enforcement services on the turnpike are provided by Troop G of the Maine State Police. Troop G is funded entirely by the MTA and located in the MTA Administration Building. With access at Exit 46, Troop G has a safe entry/exit to the turnpike mainline, and good accessibility to the public. In addition, Troop G now benefits from a modern facility with state-of-the-art law enforcement components similar to other recently constructed state police facilities.

TABLE 12 - SUMMARY OF HCL AND CRF LOCATIONS (2012 - 2014)

Town / City	Location Description	Crashes	CRF
York	NB approach to York Barrier Toll Plaza	8	3.27
Biddeford	Biddeford / Saco Town Line NB	16	1.05
New Gloucester	Mayall Road to Bennett Road SB	8	1.15
Falmouth	Mountain Road to Piscataqua River NB	13	1.58
Biddeford	Biddeford Toll Plaza	9	1.69
Litchfield	Stevenstown Road to Lunts Hill Road NB	8	1.11
Augusta	Augusta/Hallowell Town Line SB	12	1.20
Biddeford	Intersection – Exit 32 Ramps with Route 111	55	1.12
South Portland	Intersection – WB Approach Road Ramps with Maine Mall Road	37	1.35
Portland	Intersection – Exit 48 Ramps with Riverside Street	68	1.88
West Gardiner	Intersection – Exit 102 Ramps & Routes 9/126	13	13.68

Troop G currently has 29 troopers assigned to the turnpike. At full strength, Troop G has 35 troopers. They patrol the entire turnpike, 24-hours a day, 365 days per year. This provides turnpike patrons with a very high level of coverage.

These troopers are dedicated to making the road safer by enforcing speed limits; assisting disabled motorists; detecting and apprehending operators who are under the influence of drugs or alcohol; and, enforcing other Maine State laws.

5 MAINE TURNPIKE AUTHORITY/MAINEDOT JOINT INITIATIVES

OPERATIONS & MAINTENANCE

As part of 2013 LD 1538 (the MTA Omnibus Bill), the MTA is providing transportation dollars or credit to the MaineDOT for projects and initiatives that will provide a benefit to the MTA. This includes MaineDOT projects that physically connect to the Maine Turnpike or are consistent with the overall Maine Turnpike Authority mission. Alternative Programs, such as the ones identified below, are included in these transportation dollars provided to the MaineDOT.

The MTA and the MaineDOT have a long history of working together to provide an efficient transportation system. Since 1995, the Authority has been providing winter maintenance and litter patrol for a fee on a two mile stretch of I-95 (from Kittery to York) owned and maintained by the MaineDOT (sharing with NHDOT, the winter maintenance of the Piscataqua River Bridge). In 2004, the two agencies agreed that the MTA would provide winter maintenance on I-195, and the MaineDOT would provide winter maintenance at the Kittery Rest Area and the Park & Ride lot in South Portland. Additional discussions occur annually to confirm that all overlap points are being covered in the most efficient manner.

The Authority has also procured signs from the MaineDOT Sign Shop on a limited basis. The MTA coordinates with the MaineDOT when developing pavement rehabilitation projects. This relationship has provided more consistent Interstate paving specifications between the two agencies.

The MTA and MaineDOT also work together regarding storm-water issues. Permitting processes through Maine Department of Environmental Protection (MaineDEP) are reviewed jointly by both agencies and three party agreements are signed so that MaineDOT and MTA are treated the same for transportation purposes.

This working relationship also involves the planning and construction of projects. Both agencies worked together on the Maine Turnpike Gardiner Service Plaza project, the Central York County and Gorham East-West Corridor Studies, and the paving of a two mile section of MaineDOT owned I-95 in Kittery where MaineDOT reimbursed the MTA the cost.

PARK & RIDE LOT COORDINATION

The MTA and MaineDOT continue to coordinate on the use, condition, and improvements to Park & Ride lots. The MTA, in coordination with MaineDOT, performed an updated inventory of all Park & Ride lots throughout the State of Maine in the spring of 2013. This involved an inventory of available parking spaces, an assessment of signing and amenities, and a count of the number of vehicles served by each lot.

The MTA and MaineDOT agree to continue to work to identify future Park & Ride lot needs through the continued inventory and evaluation of these lots. These are described in more detail in SECTION 4.

ALTERNATIVES PROGRAM COORDINATION

The MTA has participated in and funded all or part of Alternative Programs that were deemed to have a direct or indirect benefit to the Maine Turnpike. Examples of these Alternative Programs include GO Maine and ZOOM Turnpike Express. These are described in more detail in Section 4.

PROJECT DEVELOPMENT

The MTA coordinates with the MaineDOT on projects that are located near the Maine Turnpike. In West Gardiner, the MTA is

coordinating with the MaineDOT on improvements to the Route 126/Exit 102 Intersection, and in Auburn the MTA is coordinating with the MaineDOT on the planning of a bus terminal and parking area.

6 PLANNING STUDIES

As the Authority evaluates possible new transportation projects, various planning studies must be undertaken to evaluate and identify the best available alternatives. Recent or ongoing planning studies are described in the following paragraphs.

THE CENTRAL YORK COUNTY AND GORHAM EAST-WEST CORRIDOR STUDIES

In response to growing pressures to improve east-west connections in York and Cumberland Counties, the 123rd Maine State Legislature directed the MaineDOT and MTA to study the opportunity to enhance, expand, and preserve highway connections west of Route 1 in York and Cumberland Counties, specifically noting the Gorham and Sanford areas.

Jointly, the MaineDOT and MTA developed a scope of services for two separate studies to directly address this resolve. The resolve specifically requires that these studies assess all modes of transportation in addition to land use strategies, in accordance with the Sensible Transportation Policy Act (STPA) and the Growth Management Act (GMA).

Both the York and Cumberland County studies are referenced in the MaineDOT's Long Range Plan and the PACTS Destination Tomorrow Long Range Plan, and are consistent with the mission statement in the MTA's 10 Year Plan. The following details each study:

- ### GORHAM EAST-WEST CORRIDOR STUDY

The Gorham East-West Corridor Study began in the spring of 2009 and is a major new transportation and land use study of the corridor immediately west of Portland. This area is the location of what has historically been the fastest-growing residential market in Maine. The study's goal is to evaluate all the options and find the right package of alternatives to protect homeowners' quality of life over the long-term, without adding excess transportation capacity.

The study began when the municipalities of Gorham, Westbrook, Scarborough, and South Portland signed a joint resolution in 2007 asking for such a study, specifically to assess the feasibility of a new Maine Turnpike Spur that will connect to the new Gorham By-pass. The resolution states that existing ways to manage traffic congestion, such as widening roads and adding turning lanes, will have a negative effect on their downtowns, village centers and neighborhoods. Both the MTA and MaineDOT officials believe that integrating all modes of transportation (transit, bike, pedestrian) is an integral part of the study.

A Draft Study Report was completed in the spring of 2011. Study findings determined that a combination of land use, transit, and roadway actions could help to improve transportation mobility, mode choice, and community quality of life. Study recommendations included identification of additional tasks to further evaluate and identify possible funding for specific land use, transit, and roadway actions.

Additional analysis was completed to better determine the feasibility of the recommended actions identified in the Draft Study Report; specifically the roadway improvement scenario that will address current and future safety and congestion. Findings from this additional analysis were presented to the Maine Turnpike Authority Board and MaineDOT to determine next steps.

A Final Study Report was completed in the fall of 2012. A copy of the Report can be found at **www.gorhamcorridor.org**. The MTA is currently coordinating with the United States Army Corps of Engineers to finalize a project purpose statement and next steps moving forward.

- **CENTRAL YORK COUNTY STUDY**

This study was completed in fall of 2012. The final study can be found at **www.connectingyorkcounty.org**. As a result of one of the study recommendations, the MTA is increasing capacity at Exit 19 in Wells by adding a second left turn lane. Construction of this project is ongoing and is scheduled for completion later this year.

SAFETY AND CAPACITY STUDY

Periodically, the MTA requests that a System-Wide Traffic Operation and Safety Study of the Maine Turnpike be conducted to assess both current and future operating conditions of all interchanges, mainline sections, ramps, and toll plazas between Kittery and Augusta.

Based on the data collected and results of the analyses performed for this study, a series of recommendations were presented. These recommendations include possible future improvements (such as roadway or interchange ramp widening, addition of toll plaza capacity, and safety improvements), an approximate time table of when the improvements become necessary, and an estimate of the forecasted construction costs. This document is used by the MTA as a long-range planning tool. The last study was completed in 2012. HNTB is preparing a 2015 Systemwide Traffic Operation and Safety Study.

GRAY INTERCHANGE FEASIBILITY STUDY

The Gray Interchange Feasibility Study was completed in the fall of 2013. This study evaluated the transportation operations and efficiency, safety improvements, environmental impacts, and construction costs for the alternatives that are evaluated at the Exit 63 Interchange. As a result of that study, two alternatives were advanced for additional evaluation.

Over the past year, the MTA in coordination with VHB and HNTB, have developed a design for the Gray Interchange which addresses the current and future safety and efficiently issues at the existing interchange location. The new design includes a relocation of the southbound on- and off-ramps to the west side of the turnpike, which will eliminate the need for southbound traffic to travel over the turnpike, which is currently accommodated with the interchange bridge. When interchange construction is complete, the old ramp bridge will be removed. The work at this interchange is ongoing.

7 FUNDING

Funds for the operation, maintenance and improvement of the Maine Turnpike are deposited into accounts designated for specific purposes. These accounts are:

- **CAPITAL IMPROVEMENT FUND:**

  Includes specific projects to upgrade roadway facilities and improve highway safety, such as the Electronic Toll Collection system.

- **RESERVE MAINTENANCE FUND:**

  Includes projects that exceed the constraints of normal maintenance, such as bridge reconstruction programs.

- **OPERATION AND MAINTENANCE FUND:**

  Includes routine operation and maintenance work carried out by Authority personnel such as daily operations, repairs, and improvements.

The details of each fund are described below, as well as the recommended amounts of money to be deposited for fiscal year 2016. In addition, the recommendation regarding insurance coverage is included.

CAPITAL IMPROVEMENT FUND

As part of the Sensible Transportation Policy Act, the Authority identified projected deficiencies in turnpike facilities that needed to be addressed in the near- and long-term. From this planning effort, the Authority developed a Capital Improvement Program which detailed the need to significantly expand the extent of rehabilitation and maintenance work. It was clear that routine maintenance programs could no longer stem the deterioration of turnpike facilities nor provide the higher level of operational efficiency made possible by current technologies.

The Capital Improvement Program was proposed for projects that require a faster pace of reconstruction work due to compelling public safety interests and for projects intended to significantly enhance operations. At the end of 2015, we estimate this fund will have a balance of $46,137,432. Including carryover projects from 2015, we estimate $48,502,588.00 in Capital Improvement expenditures in 2016.

We recommend $2,500,000.00 be deposited in the Capital Improvement Fund for 2016 projects.

RESERVE MAINTENANCE FUND

The Reserve Maintenance Fund dedicates the revenue required to keep turnpike infrastructure safe and in proper operational condition. This category normally funds contract work, which exceeds the scope of routine maintenance such as bridge rehabilitation, bridge painting, and annual paving projects. The recommended deposit to the Reserve Maintenance Fund for fiscal year 2016 is $36,500,000.

OPERATION AND MAINTENANCE FUND

Operation and Maintenance work is usually carried out by Authority personnel and includes activities such as administration, toll collection, snow plowing, minor repair work, sign replacements and other activities. We estimate that the cost of Operation and Maintenance during 2016, exclusive of Reserve Maintenance and Capital Improvement expenditures, will be in the amount of $40,655,250. This estimate is based on careful examination of 2015 expenditures and an evaluation of factors expected to influence these costs during 2016.

INSURANCE

Based on the replacement values provided by HNTB, the current Maine Turnpike insurance coverage appears to adequately protect the

properties, interests, and operations of the Authority. Insurance is provided under a number of policies including a comprehensive commercial package; worker's compensation; and public officials and employee's liability. A detailed schedule of insurance is presented in **APPENDIX B**.

APPENDIX A - MAINTENANCE AREA BUILDINGS

DESCRIPTION	York	Old York	Kennebunk	Crosby	Sign Shop	Gray	Auburn	Litchfield	Gardiner	TOTAL
	Mile 7	Mile 10	Mile 25	Mile 46	Mile 58	Mile 63	Mile 77	Mile 93	Mile 102	
Maintenance Garage, 3 Bay		1						1		**2**
Maintenance Garage, 4 Bay			1			1			1	**3**
Maintenance Garage, 5 Bay				1						**1**
Maintenance Garage, 8 Bay			2	1		1	1	1		**6**
Maintenance Garage, 10 Bay			1	1						**2**
Salt Shed	1		1	1		1	1	1	1	**7**
Sand/Salt Storage Building	1		1	1		1	2	1	1	**8**
Flammable Storage Building	1		1	1						**3**
Storage/Body Shop Building						1				**1**
Cold Storage Building	1	1	2	1	1		1	1	1	**9**
Hazardous Waste Storage Vault						1				**1**
Central Inventory Building					1					**1**
Sign Shop					1					**1**
Storage/Tool Shed					1		1			**2**
Office Building				1						**1**
Office Building, 6 Bay Garage						1				**1**
Office Building, 7 Bay Garage							1	1	1	**3**
Office Building, 10 Bay Garage			1							**1**
Office Building, 14 Bay Garage	1									**1**
Fuel Distribution System	1			1			1			**3**
Generator Building	1		1	1		1	1	1	1	**7**

APPENDIX B - SCHEDULE OF INSURANCE

Comprehensive Package Policy Including Turnpike Property

Underwritten by the Acadia Insurance Company **Agent: Cross Insurance**

Commercial Package

Policy No.: CPA1000627-33 **Term: October 1, 2015 to October 1, 2016**

Risk	Coverage	Limit	Remarks
Fire and Related Blanket	Buildings	$86,124,000	Agreed Amount and
	Contents	$27,134,215	Replacement Cost
	Extra Expense & Loss of Rents	$ 3,611,500	
	Boiler and Machinery	Included	
	(Excludes bridges, overpasses & underpasses)		
	Scheduled Property:		
	Miscellaneous Unscheduled		
	Locations**	$ 500,000	
	Bridges, Overpasses, and Underpasses	$278,225,000	
	Ordinance of Law Coverage	$10,000,000	
	Fine Arts**	$ 200,000	
	Property In Transit*	$ 100,000	
	Business Income -	$10,000,000	
	(Specific to flood/quake/auto accident to the roads only)		
Inland Marine			
a. Direct Physical loss or damage	Scheduled Maintenance Equipment	$ 3,356,667	
b. Direct Physical loss or damage	Valuable Papers*	$ 500,000	
	EDP Includes E-Z Pass Equipment*	$ 1,292,714	
	Radar Counters, Radios, camera equipment, Signs and transmitting equipment		
	Message Boards	$ 360,834	
	Flood & Earthquake	$10,000,000	

*Included in the Contents Limit on Policy

Business Auto

Policy No.: CAA1000628-33 **Term: October 1, 2015 to October 1, 2016**

Comprehensive	Bodily Injury Liability, CSL, BI & PD	$ 1,000,000	Each Occurrence
	Uninsured Motorist	$ 1,000,000	Each Occurrence
	Medical Payments	$ 5,000	Per Person
	Hired & Non-Owned Liability	$ 1,000,000	
	MCS-90		Included
Auto Physical Damage	Comprehensive and Collision	$ 1,000	
	Deductible Applies to PPT and applies to light trucks	$ 3,000	
	Hired Physical Damage	$ 200,000	
	Garagekeepers	$ 100,000	

Comprehensive General Liability Policy
Underwritten by Acadia Insurance Co. **Agent: Cross Insurance**

General Liability
Policy No.: CPA1000627-33 **Term: October 1, 2015 to October 1, 2016**

Comprehensive General Liability	
Each Occurrence Limit	$1,000,000
Personal & Advetising Injury	$1,000,000
General Aggregate Limit	$2,000,000
Products-Completed Ops Aggregate	$2,000,000
Fire Legal Liability	$ 500,000
Premises Medical Payments	$ 5,000
Employee Benefits Liability	$1,000,000

**A $25,000 deductible applies.

Comprehensive Crime
Underwritten by Zurich American Insurance Company **Agent: Cross Insurance**

Policy No.: MPL 5834934-03 **Term: October 1, 2015 to October 1, 2016**

Crime	Coverage	Limits	Deductible
	Employee Theft	$2,000,000	$50,000
	Forgery or Alteration	$2,000,000	$50,000
	On Premises	$2,000,000	$50,000
	In Transit	$2,000,000	$50,000
	Computer Fraud	$2,000,000	$50,000
	Funds Transfer Fraud	$2,000,000	$50,000
	Money Orders/Counterfeit Money	$2,000,000	$50,000
	Electronic Data or Computer Programs Restoration Cost	$ 50,000	$25,000
	Investigative Expenses	$ 50,000	$ 0

Worker's Compensation Self-Insurance Excess Policy

Underwritten by New York Marine & General Insurance Company **Agent: USI Insurance Services**

Policy No.: WC2015EPP00249 **Term: February1, 2015 to February 1, 2016**

Policy in keeping with the laws of the State of Maine; cancellation; 60 days

$750,000 Insurers retention for each accident or each employee for disease insurer's Limit of Indemnity for each employee for disease

1. As respects Coverage A (worker's compensation)
   - $25,000,000 Each Accident
   - $25,000,000 Aggregate - Disease
2. As respects Coverage B
   - $1,000,000 Each Accident
   - $1,000,000 Aggregate - Disease

$22,846,841 Total Estimated Annual Remuneration - February 2015-2016

Claim Service: Cannon, Cochran Management Service, Inc.

Public Officials and Employees Liability

Underwritten by ACE American Insurance Company **Agent: Cross Insurance**

Policy No. EON M00608592 003 **Term: October 1, 2015, to October 1, 2016**

Public Officials Employee Liability	Elected and appointed officials and all full-time and part-time employees	$5,000,000 each loss and aggregate for each policy year	Retention: $50,000 loss

Fidelity Bond-Public Officials

Underwritten by Travelers Insurance Company **Agent: TD Insurance, Inc.**

Member of Authority	Term	Amount of Bond	Remarks
Peter S. Mills Executive Director Policy No. 105619973	May 24, 2015-2016	$500,000	Insures faithful performance of duties by the individual
Douglas D. Davidson Treasurer Policy No. 105220484	January 1, 2015-2016	$500,000	
Jonathan Arey Secretary Policy No. 105220456	January 2, 2015-2016	$ 50,000	

Fiduciary Responsibility
Underwritten by ACE Insurance Company **Agent: Cross Insurance**

Policy No.: G25749522 003 **Term: October 1, 2015 to October 1, 2016**

Limit $2,000,000
Provides protection for your errors/omissions or negligent acts in connection with handling of employee benefit plans: Maine State Health Insurance Plan; Maine State Dental Insurance Plan; Maine Turnpike Group Life Insurance Plan; and Maine State Retirement System

Group Hospital-Surgical
Effective April 1999

Primary Coverage	Aetna	Full semi-private room allowance

Self-Insured Workers Compensation Bond
Underwritten by Travelers Insurance Company

Policy No.: 103464379 **Term: December 2015**

Obligee: Maine Bureau of Insurance

Privacy & Network Liability Insurance
Underwritten by ACE Insurance Company **Agent: Cross Insurance**

Policy No.: EON G23691280 002 **Term: October 1, 2015 to October 1, 2016**

		Each Claim	Aggregate
A.	**Limit of Liability for Insuring Agreements**		
A.	Privacy Liability	$10,000,000	$10,000,000
B.	Data Breach Fund	$ 1,000,000	$ 5,000,000
C.	Network Security Liability	$10,000,000	$10,000,000
B.	**Regulatory Proceeding Sub-Limit of Liability**	$ 5,000,000	$ 5,000,000
C.	**Maximum Policy Aggregate Limit of Liability**		$10,000,000

Excess Cyber Liability
Underwritten by Philadelphia Insurance Company **Agent: USI Insurance**

Policy No.: To Be Determined **Term: October 1, 2015 to October 1, 2016**

	Each Claim	Aggregate
Limits of Liability	$ 2,000,000	$ 2,000,000

HNTB