

# **MaineDOT - HIGHWAY PRELIMINARY DESIGN REPORT**

**Project Name:** Bar Harbor, Route 3 Highway Improvements  
**WIN 19197.00**

**Draft Distribution Date:** 12/13/13

**Final Distribution Date:**

<b>Town(s):</b> Bar Harbor		<b>Route(s):</b> Rt. 3	
<b>WIN:</b> 19197.00		<b>Federal Project No:</b> AC-STP-1919(700)X	
<b>Project Type:</b> Rehabilitation			
<b>Project Location:</b> Beginning 0.58 miles westerly of Sand Point Road and extend easterly 4.76 miles to the intersection with Eagle Lake Road and Mt. Desert Street			
<b>Length:</b> 4.76 miles		<b>BRLM:</b> 98.66	<b>ERLM:</b> 103.46
<b>RLM Date:</b> 11/08/2013			
<b>Program:</b> Highway		<b>Program Manager:</b> Brad Foley	
<b>Project Manager:</b> Paul MacDonald		<b>Designer:</b> HNTB Corporation	
<b>FHWA Oversight:</b> Yes		<b>Engineer of Record:</b> Roland Lavallee, HNTB	

## **PLANNING**

### **Project History:**

The project has gone through an extensive Context Sensitive Solutions (CSS) process which has involved the Maine Department of Transportation and the Town of Bar Harbor in an effort to identify the desired characteristics for the proposed roadway improvements. This process culminated in a Final CSS report developed by the Department on May 25, 2011. Utilizing the CSS report, the Department's Planning Section developed preliminary scoping recommendations for each section of the project (previously identified as four sections).

Members of the project team met with the Town of Bar Harbor's Public Advisory Committee (PAC) on July 11, 2013 to present the preliminary design. The bulk of the presentation revolved around presenting what the town originally desired for a roadway typical section and what was currently being proposed. The content of the meeting was well received from the PAC members; therefore a Preliminary Public Meeting was scheduled.

The preliminary public meeting was held in Bar Harbor on August 8, 2013. Preliminary design was generally well received from the public. Typical to most projects, many comments received revolved around construction duration and its impact to the community during that time. As well, many comments were received from property owners during the informal Q&A session inquiring on the specific impact to their parcel.

### **Purpose & Need:**

The following excerpt from the Vision Statement of the Final CSS Report captures the purpose and need of the Route 3 Highway Improvement Project: "We envision Bar Harbor Route 3, from Ireson Hill to Mount Desert Street, will provide a safe, efficient, and aesthetically pleasing transportation corridor that encourages multiple uses and maintains or enhances the historic standards representative of Bar Harbor and Acadia National Park."

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## Brief Summary of Proposed Scope of Work:

Highway rehabilitation of Route 3 in Bar Harbor beginning 0.58 miles westerly of Sand Point Road and extends easterly 4.76 miles to the intersection with Eagle Lake Road and Mt. Desert Street. The work will include approximately two miles of full depth roadway reconstruction, approximately two and half miles of treated pavement reclamation with shoulder widening, sidewalk improvements, multi-use trails, open and closed drainage systems, retaining walls, and intersection improvements at the Route 3 intersections with West Street and at Route 3 intersection with Eagle Lake Road and Mt. Desert Street. From the Route 3 intersection with West Street to project end at the Eagle Lake Road/Mt. Desert Street intersection, roadway construction consists of mill & fill with a box widening on the right side for drainage improvements. Intersection improvements at West Street consist of formalizing left turn lanes and associated channelization islands. Intersection improvements at Mt. Desert Street consist of conversion to a signalized intersection, formalizing left turn lanes and associated channelization islands.

## Scope Changes:

Based on Geotechnical information, it was determined that the portion of the project from Hull's Cove (Sta. 217+50) to West Street intersection (Sta. 348+75) be changed from full depth construction to full depth recycled pavement with shoulder widening. The construction schedule would greatly benefit from the change, thus reducing any potential impacts to this heavy seasonal tourist community.

## TRAFFIC

	Section 1	Section 2	Section 3	Section 4
<b>Corridor Priority</b>	1	1	1	1
<b>Functional Class</b>	Minor Arterial	Minor Arterial	Minor Arterial	Minor Arterial
<b>NHS/Non-NHS</b>	Non NHS	Non NHS	Non NHS	Non NHS
<b>Posted Speed</b>	40 mph	35 mph	35 mph	40 mph
<b>Design Speed</b>	40 mph	35 mph	35 mph	40 mph
<b>2016 AADT (Current)</b>	10850	10850	10850	10850
<b>2036 AADT (Design)</b>	13020	13020	13020	13020
<b>DHV</b>	1,693	1,693	1,693	1,693
<b>CRF (Critical Rate Factor) 2008 – 2010: 0.90</b>				
<b>High Crash Locations:</b>				

	Section 5	Section 6
<b>Corridor Priority</b>	1	1
<b>Functional Class</b>	Minor Arterial	Minor Arterial
<b>NHS/Non-NHS</b>	Non NHS	Non NHS
<b>Posted Speed</b>	35 mph	25 mph
<b>Design Speed</b>	35 mph	25 mph

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<b>2016 AADT (Current)</b>	10850	10850
<b>2036 AADT (Design)</b>	13020	13020
<b>DHV</b>	1,693	1,693
<b>CRF (Critical Rate Factor) 20XX – 20XX: 0.90</b>		
<b>High Crash Locations:</b>		
<ul style="list-style-type: none"> <li>Element 3122353/200417 (Intersection of Eden Street and Highbrook Rd to Non-Int Eden Street), CRF = 1.49 (2012 HCL Listing), CRF = 1.52 (2011 HCL Listing)</li> </ul>		

**DESIGN** (Attach Highway Design Requirements Form)

**Proposed Cross Section / Typical Section**

	<b>Section 1</b>	<b>Section 2</b>	<b>Section 3</b>	<b>Section 4</b>
<b>Travel Lane Width</b>	11'	11'	11'	11'
<b>Shoulder Width</b>	4'	4'	5'	5'
<b>Front Slope</b>	4:1 (typ.)	4:1 (typ.)	4:1 (typ.)	4:1 (typ.)
<b>Back Slope</b>	2:1	2:1	2:1	2:1, 1:4 (in ledge)
<b>Guardrail Slope</b>	N/A	2:1	2:1	2:1
<b>Clear Zone</b>	16'	16'	16'	16'

	<b>Section 5</b>	<b>Section 6</b>
<b>Travel Lane Width</b>	11'	11'
<b>Shoulder Width</b>	4'	4-5'
<b>Front Slope</b>	4:1 (typ.)	4:1 (typ.)
<b>Back Slope</b>	2:1	2:1
<b>Guardrail Slope</b>	N/A	2:1
<b>Clear Zone</b>	16'	12'

**Pavement Structure / Section Depth**

	<b>Full Depth Construction</b>		<b>Pavement Rehabilitation</b>	
	<b>Thickness</b>	<b>Type</b>	<b>Thickness</b>	<b>Type</b>
<b>Pavement</b>	6"	HMA	4"	HMA
<b>Recycled layer</b>	N/A	N/A	5"	TBD
<b>Gravel Base Depth</b>	N/A	N/A	N/A	N/A
<b>Gravel Subbase Depth</b>	24"	Type D	N/A	N/A
<b>Shoulder Pavement</b>	6"	HMA	4"	HMA
<b>Pavement Design Submitted (date): 8/15/2013</b>				
<b>Pavement Design Reviewed (date): TBD</b>				

**Summary of Pedestrian & Bicycle Accommodations:**

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Consistent with the preliminary scoping recommendations provided by the Department, the following accommodations have been provided:

- Section 1: 4 foot paved shoulders are proposed to accommodate bicycle traffic.
- Section 2: Pedestrian traffic will be accommodated with a new sidewalk from approximately Sta. 180+00 to Sta. 216+15 right. Four foot paved shared use shoulders are proposed to accommodate bicycle/pedestrian traffic.
- Section 3: Five foot paved shared use shoulders are proposed to accommodate bicycle/pedestrian traffic.
- Section 4: Five foot paved shared use shoulders are proposed to accommodate bicycle/pedestrian traffic.
- Section 5: A new 8' wide multi-use path has been provided for both pedestrians and bicycles from Sta. 289+00 to Sta. 347+50, LT. In portions of the noted station range the path replaces an existing sidewalk. A new 5' wide sidewalk is proposed from approximately Sta. 304+75 to Sta. 323+00, RT to provide pedestrian egress from the adjacent motel/hotel establishments.
- Section 6: An existing 4-5' wide sidewalk is to remain for providing pedestrian accommodations. 4-5' paved shoulders are proposed to accommodate bicycle traffic.

## ADA Compliance – Existing and Proposed Facilities

	Existing	Compliant (Y/N)	Upgrades Proposed (Y/N)	Proposed	Compliant (Y/N)
<b>Sidewalks</b>					
Width	Varies	N	Y/N	5' – 8'	Y
Cross-slope	Varies	N	Y/N	1% - 2%	Y
<b>Ramps (Crosswalk)</b>			Y/N		
Width	Varies	Y/N	Y/N	6' min	Y
Slope	Varies	Y/N	Y/N	1:12 max (running slope) 2% max (cross slope)	Y
Detectable Warnings	Varies	Y/N	Y/N	Y	Y
<b>Ramps (Entrance)</b>			Y/N		
Width	Varies	Y/N	Y/N	5' – 10'	Y
Slope	Varies	Y/N	Y/N	1:12 max (running slope) 2% max (cross slope)	Y
<b>Pedestrian Signals</b>					
(Y/N)	N	-	-	Y	-

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## Summary of existing non-compliant facilities to be upgraded or left in place:

The existing sidewalk facilities within Section 6 (West Street to Eagle Lake Road) are the only existing pedestrian facilities to remain left in place. Section 6 project scope consists of pavement rehabilitation in the form of a 1.5" mill and fill, with shoulder widening on the right side and the existing sidewalk facilities to remain left in place located on the left side. With the exception of approximately the first 500', the existing sidewalk was recently reconstructed in accordance with ADA. The remaining 500' of sidewalk, although concrete condition is fair, appears to be ADA compliant as well. An exception is at the Cottage Street intersection, where there is no detectable warning field present for the northerly curb ramp (i.e. back station side of intersection). In accordance with Engineering Instruction C5, sidewalk improvements for Section 6 are not being proposed. This section is a mill & fill.

## Design Exceptions:

Controlling Element	Required Standard	Proposed Design	Date Approved
SSD (HLSD)	305'	223'	submitted w/ DRAFT
SSD (HLSD)	250'	168'	submitted w/ DRAFT
SSD (HLSD)	305'	265'	submitted w/ DRAFT
MG	10%	10.35%	submitted w/ DRAFT
SE	4%	5.86%	submitted w/ DRAFT
ADA Exceptions (Yes or No):			No
Driveway Exceptions (Yes or No):			To be submitted at later date.

## ENVIRONMENTAL PERMITS / ISSUES

**Team Member:** Laurie Rowe and Megan Hopkin

MaineDOT is performing all Environmental (ENV) activities in-house for this project. Environmental permits, potential issues and additional avoidance and minimization efforts will be coordinated as part of the DRAFT PDR review.

<b>NEPA (4F, 5F, sect. 106):</b>	Ind cc 6 mo after PIC	<b>In-Stream Work-Window:</b>	7/15-10/01
<b>MHPC Signoff:</b>	Most likely adverse effect (4 mo after PIC)	<b>Wetland Mitigation:</b>	Potentially
<b>MHPC Mitigation:</b>	Potentially	<b>Public Lands:</b>	Acadia
<b>DEP:</b>	PBR	<b>Ch. 500 – Stormwater/MS4:</b>	No
<b>ACOE:</b>	Cat II	<b>Endangered Species:</b>	Salmon and bats
<b>Fish Passage:</b>	yes	<b>Soil Contamination:</b>	General note
<b>Watershed:</b>		<b>Other:</b>	

## Avoidance & Minimization:

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To be completed upon coordination with Department during the DRAFT PDR review period. The Department will provide the necessary information.

## RIGHT-OF-WAY COORDINATION

**Team Member:** Steve Michaud

MaineDOT is performing all Right-of-Way (ROW) activities in-house for this project. Further dialogue regarding Avoidance and Minimization for Right-of-Way activities shall be coordinated with the Department prior to Final PDR.

	Section 1	Section 2	Section 3	Section 4	Section 5	Section 6
<b>Total Existing Width:</b>	Varies					
<b>Total Proposed Width:</b>	Varies					
<b># of Abutters:</b> 193						
<b># of Acquisitions:</b> 0						
<b># of Relocations:</b> 0						
<b>Reserved Areas:</b> TBD						
<b>Building Availability:</b> N/A						

## UTILITY IMPACTS/ISSUES

**Team Member:** Derrick Carleton

**Above Ground Utilities:** Above ground utilities involved in the project with their anticipated upgrades are the following:

- Bangor Hydro Electric: Installation of new transmission line through project, as well as updates to the distribution line.
- Time Warner Cable: Aerial transfers, but could entail new line installation depending on the extent of utility pole relocations.
- University of Maine System: Aerial updates
- FairPoint: Aerial transfers, but could entail new line installation depending on the extent of utility pole relocations.

**Below Ground Utilities:** Below ground utilities involved in the project with their anticipated upgrades are the following:

- Bar Harbor Water Division anticipates replacing their seasonal water line from the beginning of the Route 3 project to just shy of Sand Point Road (approximately 3000 lf) with a permanent 8" water main. A second 8" main replacement is planned from East Hillside Drive to the south end of Lookout Point Road (approximately 1000 lf). A third water main replacement is planned in the vicinity of the Sonogee Rehabilitation and Living Center, with approximately 700 lf of 8" main. A fourth and final water main

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replacement is planned from the south end of Highbrook Road to Eagle Lake Road. Approximately 1900 lf of 16" water main will be installed.

In addition to the water main replacements, there will be numerous side-road and residential stub-outs to the ROW line for future connections, numerous valve and gate replacements, and fire hydrant relocations/replacements.

- o Bar Harbor Wastewater Division anticipates adjusting all their manhole and other appurtenances to grade, to coincide with the project. They will also be replacing a small stretch of 3" force main in the vicinity of the Bar Harbor Motel. Additionally, 4 manholes will be replaced in the vicinity of the West Street intersection, along with numerous stub-outs to the ROW line for replacement to individual residents.
- o Bangor Hydro Electric: No upgrades anticipated other than adjustments required to accommodate the project.
- o Fairpoint: No upgrades anticipated other than adjustments required to accommodate the project.

	<b>Necessary for this Project? (Yes or No)</b>	<b>Coordination Still Needed? (Yes or No)</b>
<b>Pole List:</b>	Yes	Yes
<b>Utility Agreements:</b>	Yes	Yes
<b>RR PRTS:</b>	No	No
<b>Railroad Agreement:</b>	No	No

**ROW issues related to utilities:** Assessment of ROW issues and impacts related to utilities has not occurred due to the necessary coordination still required with Environmental, Right-of-Way and Utilities.

## GEOTECHNICAL COORDINATION

**Team Member:** Kitty Breskin, MaineDOT Team Member & Haley and Aldrich (H&A), subconsultant to HNTB.

**Field Analysis:** Field work is complete. Laboratory testing is ongoing. Preliminary Geotechnical report shall be submitted under separate cover upon completion of testing.

**Preliminary Recommendations:** Preliminary Geotechnical Data Report developed by Haley and Aldrich was submitted under separate cover after completion of geotechnical exploration program and lab analysis.

## PUBLIC PROCESS

**Proposed Public Contact Method and Date(s):** Preliminary Public Hearing held on August 8, 2013.

**Concerns Identified at Preliminary Public Meeting:** No significant opposition to the project was voiced at the public meeting. Public comments and questions included the following:

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- Concerns with the shoulder width and designation as bicycle lane: *Explained that the paved shoulder will allow for bicycle use but will not be designated as a bicycle lane.*
- Concerns with construction schedule and impacts to businesses: *This is a topic in which further discussion will occur later in the design process. Need to understand what is being constructed before can understand how to construct it.*
- Concerns that the path from Breakneck Road to the park service road was not included: *Responded that this path was dismissed as part of the planning efforts due to the park service indicating their future desire to relocate or upgrade the Hull's Cove entrance.*

**Municipal Agreement:** Developed as part of preliminary scoping, titled "Bar Harbor Route 3 Improvements" and signed into effect April 20, 2012.

## M&O ISSUES /CONCERNS

In correspondence received from the Department, the following concerns were identified:

- Rockfall issues at the bluffs.
- Drainage issues at the bluffs – catch basins and closed drainage system are in poor shape
- Drainage issues near College of the Atlantic and by Jack Russell's (across from former Blue Nose Ferry)
- Drainage issues south of West Street Extension (lack of drainage and poor condition of existing system)
- General issue – trees shading the road – might include provisions for an arborist in the contract for trimming trees (with consideration for aesthetics)
- Retaining walls in Hulls Cove – narrowness of roadway footprint, and related drainage issues
- Large culvert north of Hulls Cove in poor shape, as is STRUT in the vicinity of West Street Extension

## CONSTRUCTION SCHEDULE

<b>PS&amp;E Date</b>	8/17/15
<b>Advertise Date</b>	9/07/15
<b>Construction Begin Date</b>	2015
<b>Construction Complete</b>	2016

## BUDGET

	<b>Programmed</b>	<b>Available</b>	<b>PDR Estimate</b>
<b>Date</b>			
<b>Preliminary Engineering</b>	1,369,243	2,000,000	2,000,000
<b>Right of Way</b>	1,693,898	1,087,031	800,000
<b>Construction</b>	10,534,129	10,534,129	10,200,000
<b>Construction Engineering</b>	402,730	402,730	1,000,000



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<b>Other</b>			
<b>TOTAL</b>	14,000,000	14,023,890	14,000,000
<b>Total Cost per Mile:</b>			
<b>Funding Strategy (Sources):</b>			

## SUMMARY OF PRELIMINARY ENGINEERING

**Existing and Proposed Design Elements (including variances from design standards)**

### **Horizontal Alignment:**

Existing horizontal alignment consist of 47 horizontal curves. Only one of the 47 curves does not meet design criteria for minimum radius, where only seven of the 47 do meet the design criteria for minimum length of curve. Many of these horizontal curves also require modification to the superelevation as they do not meet the design criteria. In numerous locations, horizontal middle ordinate is not satisfied as there are sight obstructions (trees, ledge, business signs, utility poles, etc.) blocking motorists view.

Proposed horizontal alignment generally matches the existing horizontal alignment, with minor improvements for design criteria to reduce project impacts except at the locations listed below. The horizontal alignment for Route 3 has been designed in accordance with functional classification of minor arterial.

In order to minimize property and potential building impacts through the project, the recommended length of curve criteria could not be achieved for the entirety of the Route 3 alignment.

The horizontal alignment was evaluated for Off-tracking to confirm adequate pavement is present for a WB-50 design vehicle. Five horizontal curves have been designed with additional pavement width to accommodate the WB-50. Consistent with the Department’s current practice, the additional width is accomplished through shoulder widening and full depth pavement.

- Station 195+00 to 209+00: Alignment shifted 2-4’ on average right (away from Hull’s Cove) in an effort to minimize Right-of-Way and environmental impacts.
- Station 251+00 to 275+50: Alignment shifted by as much as 11’ left (toward Frenchmen’s Bay) to accommodate a rock catchment ditch for the area known as “the Bluffs.”
- Station 311+00 to 320+00: Alignment shifted by as much as 7’ right to minimize environmental impacts at Station 313+55 stream crossing caused by the unbalanced typical section.
- Station 320+00 to 329+00: Alignment shifted by as much as 6’ to allow for the shared use path.
- Sta. 340+50 to 351+00: Alignment shifted to accommodate the recommended intersection geometry at West Street/West Street Extension. Existing granite masonry retaining wall, Station 345+00 to 346+00 RT, was a constraint considered when setting the horizontal alignment in this area. Impacts to this existing wall are considered impractical given the size and cost associated with a replacement or modification.

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## **Vertical Alignment:**

The existing vertical alignment is rolling terrain in nature, consisting of 75 vertical curves (36 crest curves and 39 sag curves). Of the 75 vertical curves, 12 curves do not satisfy design criteria for the posted speed. A review of crash statistics and crash reports does not provide conclusive evidence that vertical geometry could have been the cause for these accidents. However, improvements over existing were made where practical, but in some cases still necessitated a Design Exception.

Multiple vertical alignment alternatives were evaluated during the preliminary design phase of the project. The first alternative assumed full depth construction for all but Section 6 of the project while adhering to design criteria. At Coach Point Meeting #1, the team provided guidance on how to evaluate if substantial vertical alignment improvement should be made. Points of discussion revolved around minimizing project impacts while addressing necessary safety improvements. The direction the team agreed to was: where safety issues (accident history, perception by public, etc.) have been identified for a specific curve or series of curves; then those would be the areas where design standards should be satisfied. The second alternative developed took this team guidance into consideration, making significant modification to the vertical alignment. The result was a vertical alignment that closely resembles the existing alignment through the rural section of the project (Section 1-4) with minor cuts and fills. In Section 5, the second alternative vertical alignment was predominately in a minor cut (<1') to minimize project impacts caused by formalizing curb with sidewalks and the multi-use path on the left.

This vertical alignment was presented to the public at the Preliminary Public Hearing on August 8, 2013. Generally the proposed horizontal and vertical alignments were well received, with no substantial opposition to the proposed vertical alignment.

The recommended preliminary vertical alignment for Route 3 has been designed in accordance with the rural highway/high speed urban highway classification and functional classification of minor arterial. Level roadway stopping sight distance criteria was used to determine the required Design Exceptions necessary to minimize project impacts. The vertical alignment will satisfy existing posted speeds, except at three vertical curves discussed below.

- The headlight sight distance (HLSD) for the existing sag vertical curve at station 167+00 meets a design speed of 30 mph but not 35 mph as posted. This area is located in close proximity to an existing vernal pool, where no accident history is present. Due to the environmental impacts, vertical alignment improvements are not recommended. A design exception for this controlling standard will be requested.
- The HLSD for the existing sag vertical curve at station 217+35 meets a design speed of 25 mph but not 35 mph as posted. This area is located at the transition from full depth construction to pavement rehabilitation. Located within the limits of this vertical curve are two side street intersections with Route 3, a gas station and a stream crossing underneath Route 3. Due to the Right-of-Way, environmental impacts and no accident history present, vertical alignment improvements are not recommended. Consistent with the Department's practice for Rehabilitation projects, this curve was evaluated for comfort criteria. The minimum length of

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curve to satisfy comfort criteria equals 132', where the proposed length is 280'. A design exception for HLSD as a controlling standard will be requested.

- The HLSD for the existing sag vertical curve at station 268+40 meets a design speed of 30 mph but not 35 mph as posted. This area is located at the southerly limits of the "Bluffs". This area is constrained by the "Bluffs" ledge face on the westerly, right side, and Frenchman's Bay on the easterly, left side. Due to the environmental impacts and no accident history present, vertical alignment improvements are not recommended. Consistent with the Department's practice for Rehabilitation projects, this curve was evaluated for comfort criteria. The minimum length of curve to satisfy comfort criteria equals 71', where the proposed length is 280'. A design exception for HLSD as a controlling standard will be requested.

The proposed vertical alignment was evaluated for minimum and maximum grades. One location exceeds the maximum allowable grade of 10%; station 189+40 to station 195+85 has a grade of 10.35%. The maximum grade was exceeded in this location to minimize impacts to historic parcels. A design exception for maximum grade will be requested.

In conjunction with evaluating the vertical alignment grades, critical length of grade criteria was considered. Four grades were evaluated for their adherence to design criteria. Two of the four grades evaluated exceed a 10 mph speed reduction; Station 131+25 to station 143+40 with a grade of 8.80%, and Station 189+40 to station 195+85 with a grade of 10.35%. In both instances, a truck climbing lane or a flatter grade was not considered practical due to the additional ROW, historic property impacts, and additional project cost.

## **Typical Section:**

The existing roadway can be broken down into four distinct areas:

- Area 1, beginning of project to Breakneck Road (station 217+00), contains 10-12' travel ways with a mix 3-4' gravel and paved shoulders. Some segments of curbing and a 3-5' sidewalk are present near the Hull's Cove School House and Church of Our Father parcels (station 187+00 to station 194+00).
- Area 2, Breakneck Road (station 217+00) to the Sonogee Rehabilitation Center (station 290+00), contains 10-12' travel ways with a mix 4-8' gravel and paved shoulders. This area has a variety of conditions from an auxiliary lane for the national park entrance to an over-wide gravel shoulder at the "Bluffs".
- Area 3, Sonogee Rehabilitation Center (station 290+00) to West Street/West Street Extension Intersection (station 348+00), contains 10-12' travel ways with a 1-4' paved shoulders. Many locations within this area are curbed with sidewalks. Curb type varies and includes bituminous, granite and concrete. Numerous retaining walls of varying type exist.
- Area 4, West Street/West Street Extension Intersection (station 348+00) to Eagle Lake Road/Mount Desert Street Intersection, contains 10-12' travel ways with a 4-5' paved shoulders. Curb type primarily is concrete, present only on the left side of the roadway. A 4-5' sidewalk is present throughout this area.

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Recommendations for the roadway typical sections are summarized below which generally are consistent with the recommendations developed through the Context Sensitive Solutions (CSS) process. The proposed roadway is broken into six Sections:

- Section 1, beginning of project to Wildwood Way (station 180+00), contains 11' travel ways with 4' paved shoulders. The reconstructed roadway sub-base will be a combination of standard daylight section, consisting of 4:1 foreslope with 2:1 backslope when in a ditch section, and boxed section with 6" underdrain to minimize project impacts. As well, curbed boxed sections with underdrain are being utilized in various locations to minimize project impacts.
- Section 2, from Wildwood Way (station 180+00) to Breakneck Road (station 217+50), contains 11' travel ways with 4' paved shoulders. From Barton's Motel, station 180+00, to Hull's Cove General Store, station 216+15, a sidewalk is proposed on the right side. The left side is a combination of standard daylight sections and boxed sections with underdrain.
- Section 3, from Breakneck Road (station 217+50) to approximately the Acadia National Park Entrance (station 236+00), contains 11 travel ways, 5' paved shoulders and an 11' auxiliary lane from Breakneck Road to the Acadia National Park Entrance. Section 3 is the beginning of the pavement rehabilitation, which would consist of full depth hot mix asphalt and recycled pavement with shoulder widening, both daylight sections and boxed sections with 6" underdrain to minimize project impacts.
- Section 4, from approximately the Acadia National Park Entrance (station 236+00) to approximately the Duck Crossing (station 296+00), contains 11 travel ways, and 5' paved shoulders. In the area known as the "Bluffs", Haley and Aldrich (H&A) conducted geotechnical evaluations and concluded a rock catchment ditch varying in width from 10' to 14' was recommended for rock fall protection; see H&A Memorandum dated 4 June 2013 provided under separate cover. An 8' wide multi-use path begins at the Sonogee Rehabilitation Center on the left side, station 289+00. This widens to a 10' wide path at station 295+00 and continues into Section 5. See discussion within "Multi-Use Path" below for additional details regarding the design of the path.
- Section 5, from approximately the Duck Crossing (station 296+00) to the West Street/West Street Intersection with Route 3, (station 346+50), contains 11' travel ways and 5' paved shoulders in a curbed box section configuration. The 10' wide multi-use path continues on the left from Section 4 throughout this section, with a few spot reductions to an 8' width to minimize impacts to environmental resources or high value property elements. On the right side of the road a standard curb box section is proposed, with a new sidewalk being added at the request of the Town of Bar Harbor from station 304+75 to the entrance at Cleftstone Manor and Bluenose Inn (station 323+00).
- Section 6, from the West Street/West Street Extension Intersection with Route 3 to the end of project at the Eagle Lake Road/Mount Desert Street Intersection with Route 3, contains 11' travel ways and 4-5' paved shoulders in a curbed box section configuration. This Section is proposed to receive a 1.5" mill and fill with full depth boxed section construction for shoulder widening on the right side to formalize the curb line and drainage system. Existing curb and sidewalk to remain left in place on the left side as the facilities appear to be ADA compliant.

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## **Other Design Issues**

The clear zone requirements for the project consist of 16 ft from the edge of travel way for all sections except Section 6 which consists of a 12 ft clear zone. Complete identification of potential hazards and their specific disposition will occur in Final Design. Hazards within the specified clear zone identified to remain; a Design Exception will be requested. In accordance with Engineering Instruction C2.1, the side slope for the speed, AADT and Corridor Priority combination is required to be 4:1. In multiple locations the use of 3:1 front slopes has been proposed to minimize environmental impacts to sensitive resources. A Design Exception for these locations will be submitted in Final Design in conjunction with the Clear Zone exception.

Superelevation rates were primarily based on rural highway/high speed urban highway classification (i.e.  $e_{max} = 6\%$ ) with the exception being in Section 5 and Section 6. A portion of Section 5, from the College of the Atlantic (COA) to the West Street/West Street Extension Intersection with Route 3, low speed urban classification was utilized due to the challenges with adhering to rural highway design criteria, both for superelevation rates and transition controls. Section 6 consists of a 1.5" mill and fill, therefore cross slope correction is not being proposed in order to minimize project impacts and construction cost. A superelevation Design Exception has been submitted in conjunction with this PDR. Due to the horizontal alignment consisting of numerous closely spaced horizontal curves, superelevation transition controls were applied in a fairly subjective manner.

Much team discussion occurred on the design topic of where the shoulder break location should be, if there is a break at all, and should there be full depth pavement for 12' or full width of the roadway. Consensus gained at Coach Point Meeting #1;

1. Entire project shall be straight grade, except for the high side of superelevated horizontal curves to mitigate against stormwater sheeting across roadway, and
2. Entire length of project shall receive full depth pavement for the entire width of roadway pavement.

### **Pavement Structure:**

Sections 1-2 are proposed with full depth construction consisting of 6" Hot Mix Asphalt full width of roadway and 24" Aggregate Subbase Course Gravel (Type D). Sections 3, 4 and 5 are proposed as pavement rehabilitation consisting of 4" Hot Mix Asphalt and 5" Full Depth Recycled Pavement with stabilizer. Where shoulder widening is required within the pavement rehabilitation section, 18" of Aggregate Subbase Course Gravel (Type D) is assumed underneath the 4" H.M.A and 5" FDR with stabilizer.

Confirmation of the preliminary pavement design will occur upon completion of the geotechnical program; which is now complete.

### **Drainage/Hydrology:**

The existing corridor consists of a combination of open and closed drainage systems. Consistent with the existing condition, the proposed roadway template consist of both open drainage with a day-lighted subbase and boxed sections with underdrain in order to minimize the impacts to adjacent properties. The preliminary design

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is being proposed with primarily all new drainage features, as field investigations found the existing features to be in poor condition.

Additional information can be found in the preliminary drainage report developed jointly by HNTB Corporation and Northstar Hydro, provided under separate cover. Detailed information on the hydrology and hydraulic design for the project is contained in this report; to include the use of BMPs and the preservation/protection of water quality.

## **Guardrail:**

Ten locations have been identified where the use of guardrail is proposed in order to minimize project impacts. Of the ten locations, four are replacing existing guardrail and the remaining six are new guardrail locations. In eight of twenty terminal locations, a tangential end treatment has been proposed to reduce impacts.

## **Intersection Geometry:**

The project contains three major intersections; Route 3 at the Acadia National Park Entrance, Rout 3 at West Street/West Street Extension and Route 3 at Eagle Lake Road/Mount Desert Street. The following summarizes each of the major intersection improvements.

*Route 3 at the Acadia National Park Entrance:* The existing intersection is a “T” non-signalized intersection with a turning roadway for traffic heading into the national park. The park entrance is stop controlled, with Route 3 being a non-controlled free flow movement.

Proposed design intent for this intersection was to minimize construction as much as possible (i.e. attempting to match the existing edge lines/island layouts). Turning movements were developed in an effort to understand what design vehicle the existing layout can accommodate. National Park Service has planning efforts underway to relocate/reconfigure their entrance in conjunction with a new visitor’s center site, therefore expanding edge lines to accommodate a WB-67 design vehicle did not seem prudent.

*Rout 3 at West Street/West Street Extension:* The existing intersection is a highly skewed non-signalized, four legged intersection with channelizing island separating eastbound from westbound Route 3 traffic. However there are no turning lanes to provide storage for Route 3 traffic looking to turn left onto West Street or West Street Extension. The existing West Street leg contains an auxiliary right turn lane and delineated bicycle lane. The existing West Street Extension leg is delineated as a yield condition.

Per traffic recommendations, turning lanes have been added in the proposed design to provide sufficient storage on Route 3 for left turning vehicles (approximately 100’ for left onto West Street and 60’ for left onto West Street Extension). Turning movements were developed to establish edge lines and island layouts. The proposed design provides access for a WB-40 and 40 foot school bus. Note for the West Street leg of the intersection, very little improvements are being made for the edge line and island layouts since most of the work is only associated with a mill and fill operations. The existing right turn storage and taper length on West Street do not

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meet design standard. However, modifications would require impacts to curb lines, sidewalk and a large granite masonry retaining wall thus making improvements impractical.

*Route 3 at Eagle Lake Road/Mount Desert Street:* The existing intersection is a highly skewed non-signalized, four legged intersection with channelizing islands on three of the four legs. There is a turning roadway for right turning traffic from Route 3 (Eden Street) onto Route 233 (Eagle Lake Road). The Eagle Lake Road and Mount Desert Street legs are non-controlled free flow movements, whereas the Eden Street leg is stop controlled for the straight/left turn movements and a yield control on the turning roadway.

Per traffic recommendations, the proposed design includes signalization with the implementation of formalized turning lanes for left turning traffic from Route 233 (Eagle Lake Road) and Route 3/233 (Mount Desert Street). The proposed design provides access for a WB-40 and 40 foot school bus. The turning roadway from Route 3 to Route 233 shall be retained, but modified to provide improved access for the design vehicles. As well, pedestrian improvements have been included for the turning roadway as the Town of Bar Harbor expressed concerns with safe egress through the intersection for pedestrian traffic from the west heading towards downtown. Pedestrian improvement include; relocating the sidewalk to adjacent to the curb line, adding a crosswalk across the turning roadway, clearing for appropriate site lines back along Route 3 and having ADA compliant ramps. Once crossing the turning roadway, the pedestrian movement will become part of the signalized intersection. Multiple design alternatives were evaluated on a conceptual level for structure type (i.e mast arms, truss structure, span wire, etc).

In addition to the three major intersections, there are 29 minor side roads, streets and private lanes. These side road's edge lines/curb lines were developed based on a comparison to existing with only minor improvements being made if impacts are reasonable and practical.

- An exception to this is at the Breakneck Road intersection with Route 3. The existing condition consists of uncontrolled access for the Hull's Cove General Store, Hull's Cove Post Office and "Wind and Wine" retail establishment. Formalization of curb returns has been included in the preliminary design as safety improvements to eliminate traffic cutting or darting through the intersection into the general store's facility. Coordination in Final Design will be required to ensure that the proposed design modifications do not have a significant adverse impact to the Hull's Cove General Store gas station operations.

## **Right-of-Way:**

MaineDOT is performing all Right-of-Way (ROW) activities in-house for this project.

## **Utilities:**

MaineDOT is performing all utility coordination activities in-house for this project.

## **Multi-Use Path:**

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In accordance with the Municipal Agreement between the Department and the Town of Bar Harbor, the preliminary design incorporates a multi-use path from station 289+00 (up station entrance of the "Sonogee Rehabilitation and Living Center") to station 347+50 (West Street Intersection). The preliminary scoping recommendations outlined the use of an eight foot multi-use path separated from the roadway with a three foot esplanade. Upon research of AASHTO "Guide for the Development of Bicycle Facilities 2012 Fourth Edition", a minimum ten foot wide path is recommended, with only spot reductions to eight feet to avoid impacts to "physical constraints such as an environmental feature, bridge abutment, utility structure, fence and such." The preliminary design utilizes a ten foot path for the entire length except at the following locations:

- Station 289+00 to station 294+00 to minimize impacts to Duck Brook,
- Station 306+50 to station 308+00 to minimize impacts to an existing retaining wall,
- Station 346+00 to station 347+50 to transition to the existing sidewalk width on West Street.

In addition to path width, other elements of the path typical sections that were investigated include; esplanade width, path cross slope, bench (or shoulder width on the outside of path), and barrier or fencing requirements.

- *Esplanade width:* The AASHTO bicycle guide recommends a 5 foot separation between the roadway and multi-use path. When less than 5 feet is provided a barrier or railing should be provided "to prevent path users from making undesirable or unintentional movements from the path to the roadway and to reinforce the concept that the path is an independent facility." The current design, consistent with the recommendations from the Department's planning efforts, is a three foot esplanade separating the roadway from path. There are multiple challenges with placing a barrier or railing system within the esplanade such as roadway clear zone/crash worthiness, sight distance for intersections and driveways and winter maintenance/plowing activities.
- *Cross Slope:* Although atypical, the preliminary design utilizes a cross slope of two percent pitched away from the roadway when in fill conditions. The result is a six inch elevation savings at the back side of the trail, thus minimizing grading impacts. In conjunction with pitching the path away, a modified solution is necessary at driveway location to ensure gutter drainage would not flow down the drive. In accordance with the AASHTO guide, "a cross section that provides a center crown with no more than one percent in each direction may be used." Therefore, at driveway locations, the proposed path is designed to utilize a one percent crown located seven feet from the gutter line to ensure that maximum gutter depth does not drain down the driveway.
- *Bench (or shoulder width on the outside of path):* The AASHTO guide recommends the need for a graded shoulder area of three to five feet in width no greater than 6:1 in slope. A minimum of two foot graded area should be provided for clearance to lateral obstructions. The proposed preliminary design utilizes a two foot width shoulder area graded co-planar to the slope of the trail. Spot consideration will be given to allow for a 0'-2' offset depending upon adjacent conditions.
- *Barrier or fencing requirements:* In accordance with the AASHTO guide, barrier or fencing shall be utilized when the situations outlined below are encountered. Barrier or fencing types conducive to the character of Bar Harbor and abutting properties will be investigated as part of Final Design.
  - Slopes 3:1 or steeper, with a drop of 6 feet or greater;



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- Slopes 3:1 or steeper, adjacent to a parallel body of water or other substantial obstacle;
- Slopes 2:1 or steeper, with a drop of 4 feet or greater; and
- Slopes 1:1 or steeper, with a drop of 1 ft or greater.

The multi-use path impacts property elements (e.g. “The Regency” business sign, “The Regency” granite masonry wall, the ferry terminal entrance sign, etc.). In many instances, these elements are retaining or decorative walls.

## **Duck Brook Culvert Rehabilitation/Reconstruction:**

The existing structure, constructed in 1963, consists of an elliptical corrugated plate pipe culvert measuring approximately 9.5 feet wide and 12 feet tall. A 0.5 foot thick layer of concrete exists along the lowest portion of the culvert and was installed, presumably, after the date of original construction to address deterioration at the pipe invert. The longitudinal slope of the culvert is approximately 4.5% resulting in fairly high flow velocity through the structure. A small dam, measuring approximately six feet in height, is located approximately 300 feet downstream from the culvert outlet.

The most recent in-service bridge inspection of this structure found the culvert to be in generally poor condition with heavy rust scaling along the top of the invert lining, fist-sized corrosion holes in the lower three feet of the culvert, and water seepage occurring at the culvert plate joints. The channel of Duck Brook leading up to and away from the culvert was rated as being in stable condition.

On a conceptual level, several rehabilitation and replacement options were evaluated that will accommodate the proposed roadway fill slopes and address the deficiencies with the existing culvert. These options included sliplining and extending the existing culvert, replacement with a new single-cell precast concrete box culvert, replacement with a steel plate pipe arch, and replacement with a concrete arch structure.

The results of the conceptual evaluation show the culvert sliplining option will satisfy the Department’s goals of passing the design flow, providing a structure of appropriate length, and resolving the structural deficiencies associated with the existing structure. In addition, sliplining is the least cost option and will have minimal impact to the traveling public.

## **DRAFT PDR DISTRIBUTION TEAM COMMENTS AND RESPONSE**

### **Comments:**

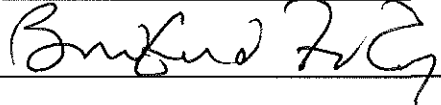
<b>Comment Deadline</b>	<b>Date:</b>

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## PRELIMINARY APPROVAL

Approved for Public Meeting		Date: 6.16.14
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## PUBLIC PARTICIPATION COMMENTS AND RESPONSE

Comments:

## ADDITIONAL TEAM COMMENTS AND RESPONSE

Comments:

Comment Deadline	Date:
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## FINAL APPROVAL

Public Participation Complete		Date:
Approved for Final Design		Date: