S.a.M.

18

New Hampshire DOT
Department of Transportation

THE STATE OF NEW HAMPSHIRE
DEPARTMENT OF TRANSPORTATION

VICTORIA F. SHEEHAN
COMMISSIONER

WILLIAM CASS, P.E.
ASSISTANT COMMISSIONER

Bureau of Highway Design
January 20, 2017

His Excellency, Governor Christopher T. Sununu
and the Honorable Council
State House
Concord, New Hampshire 03301

REQUESTED ACTION

Authorize the Department of Transportation to **retroactively** enter into a Memorandum of Agreement (MOA) with the Maine Department of Transportation, Vendor #177142, Augusta, ME for transferring obligation authority to fulfill the Department's match requirement in the amount not to exceed $37,250.00 for a collaborative pilot project on green infrastructure techniques for Coastal Highways effective upon Governor and Council approval through June 30, 2017.

EXPLANATION

This request is the result of approved Federal authority to transfer Obligation Authority only of FHWA funds from NHDOT to the State of Maine DOT. There is no expenditure as a result of this request. This request is **retroactive** because work was started by the State of Maine DOT when the grant was approved in June 2016.

The pilot project is highly consistent with efforts in the coastal region to adapt and build highways resilient to storm surge and rising sea level. The effort includes work by the New Hampshire Coastal Risk and Hazards Commission. Highway embankments, with natural approaches to stabilization, have performed better in many cases than seawalls and bulkheads in the aftermath of recent storms across the nation. This FHWA grant will allow several State DOTs to develop adaptive engineering techniques and set priorities. This pilot study, involving a segment along NH 1B and a segment of Route 209 in Maine, will help support the feasibility study programmed in the 10-year plan (project #29614) for the NH 1B causeway that provides access to the Town of New Castle.

Research activities included in the requested action will evaluate traditional design approaches with natural as well as hybrid alternatives. The study will also include a benefit/cost analysis of each alternative. The pilot will fact check climate projections and apply design alternatives using the T-Coast model developed in Maine. The technical team will evaluate the existing regulatory construct for the most cost-effective alternative and recommend language to facilitate the use of highway components more resilient than design methods currently in use. A guidance document in addition to engineering design alternatives will be completed for the two highway segments. It is anticipated that the approach will be transferable to other vulnerable highways and Department assets.

Sincerely,

Victoria F. Sheehan

Victoria F. Sheehan
Commissioner

Attachments

JOHN O. MORTON BUILDING • 7 HAZEN DRIVE • P.O. BOX 483 • CONCORD, NEW HAMPSHIRE 03302-0483
TELEPHONE: 603-271-3733 • FAX: 603-271-1558 • TDD: RELAY NH 1-800-735-2964 • INTERNET: WWW.NHDOT.COM

New Hampshire DOT
Department of Transportation

MaineDOT

MEMORANDUM OF AGREEMENT
between
NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION
and
MAINE DEPARTMENT OF TRANSPORTATION

THIS AGREEMENT, executed in duplicate, this 16th day of FEB. 2017, between the NEW HAMPSHIRE DEPARTMENT of TRANSPORTATION, hereinafter called the NHDOT, located at the John O. Morton Building, 7 Hazen Drive, Concord, New Hampshire 03301, and the MAINE DEPARTMENT of TRANSPORTATION, hereinafter called MaineDOT, located at 16 State House Station, Augusta, Maine 04333.

WITNESSTH that,

WHEREAS, NHDOT and MaineDOT have coastal highway design work to address vulnerable coastal road embankments and risk relative to storm surge and sea level rise (SLR).

WHEREAS, the NHDOT and MaineDOT will collaborate on the pilot project (NHDOT project 41226) for developing innovative design alternatives for two segments of long standing highways now vulnerable to coastal erosion and/or SLR. The pilot study investigates benefit / cost alternatives for coastal highway resilience. It is funded by the Federal Highway Administration (FHWA) Office of Planning, Environment, Realty (HEP) and requires a 50% match shared by NHDOT & MaineDOT. The MaineDOT-lead proposal with NHDOT sharing in the match was selected with four other pilots covering the Gulf, Atlantic, & West Coast of the country. FHWA is funding these projects to analyze the potential for nature-based solutions (FHWA Order 5520, Policy Statement on Climate Adaptation – June 2011) to protect roads from climate change impacts. The work plan includes engineering, benefit/cost, and collaborative regulatory construct evaluation of green - gray alternatives for cost effective adaptation techniques that provide coastal highway resilience.

WHEREAS, this joint applied research on green infrastructure techniques for coastal highway resilience is promoted by the FHWA.

WHEREAS, the work plan will aid NHDOT in completing a feasibility study for resilient action for the NH 1B causeway access to New Castle and ultimately other coastal highways in addition to the section of ME Route 209 included in this pilot project.

WHEREAS, the total Project cost is $149,000.

WHEREAS, this project will use 50% Federal and 50% State funding, as 25% from MaineDOT, and 25% from NHDOT.

WHEREAS, NHDOT match is $37,250.00.

WHEREAS, for the project, the University of New Hampshire (UNH) will develop a range of innovative protection systems for two coastal road segments, with integrated review by the advisory committee, UNH will select and develop appropriate design conditions and shoreland protection plans for both a Maine (ME Route 209, Phippsburg) and New Hampshire (NH Route 1B, New Castle) coastal road locations.

WHEREAS, MaineDOT will perform the lead support for project coordination and oversight between the execution date of this AGREEMENT and JUNE 30, 2017 at which time this AGREEMENT will expire.

NOW THEREFORE, MaineDOT will execute lump sum sole source contracts with consultants and a cooperative agreement with UNH.

NOW THEREFORE, the NHDOT will transfer authority to MaineDOT for administration of the pilot study funds including the total match as approved by the respective FHWA Division Offices.

NOW THEREFORE, MaineDOT will administer all of the pilot study funds.

NOW, THEREFORE, in consideration of the above premises and in further consideration of the agreements herein set forth by and between the parties hereto, it is mutually agreed as follows:

- The duration of this agreement will remain in effect from the date of this signature until JUNE 30, 2017
- The duration of this agreement can be extended through mutual consent of both parties.
- All invoices authorized during this time period shall be capped at $149,000.00 with 50% match shared equally between NHDOT and MaineDOT.
- This agreement may be terminated by either party with thirty (30) days written notice to the other party, provided that the parties agree to consult during the period prior to termination to seek agreement on amendments or other actions that would avoid termination.

NOW, THEREFORE, NHDOT will transfer its share of the project match ($37,250.00) by completing an FHWA transfer form to send an eligible program code and its corresponding obligation limitation transferring funds to MaineDOT.

by _____
Victoria F. Sheehan
Commissioner
New Hampshire Department of Transportation

by _____
David Bernhardt
Commissioner
Maine Department of Transportation

Date:
Authorized to enter into Agreement
approved by Governor and Council

Approved by Attorney General

By: Dianne Mart Date: 4/17/17

Title: AAG

Approved by Governor and Council

By: _____ Date: _____

Solicitation for Applied Research Projects: **Green Infrastructure Techniques for Coastal Highway Resilience: A Joint Proposal by Two Northeastern DOTs**

Contact Information:

Judy Gates, Director
Environmental Office, Maine Department of Transportation
16 State House Station
Augusta, ME 04333
(207) 624-3097
Judy.gates@maine.gov

Timothy S. Mallette, Hydraulics Engineer
Design Services Section, NH Department of Transportation
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Concord, NH 03302-0483
(603) 271-2011
tmallette@dot.state.nh.us

Attachment A: New Hampshire Project Location
Attachment B: New Hampshire Project Location Detail
Attachment C: Maine Project Location
Attachment D: Long-term shoreline change, Popham Beach, Phippsburg, Maine
Letters of Support: Maine Geological Survey
The Nature Conservancy, Maine Chapter
Maine Natural Areas Program
Maine Department of Environmental Protection
Maine Coastal Program
New Hampshire Coastal Program

1. **Description of the proposed effort.**

Maine

Maine has invested a substantial effort to investigate current and future impacts of sea level rise and storm surge to the natural and built landscapes. Multiple interrelated studies focused on potential marsh migration and its implications for land conservation choices, anticipated changes to coastal state parklands, impacts to coastal communities, and adaptation of both inland and coastal state transportation infrastructure. MaineDOT's proposal is to build on the collective knowledge gained from past and current research by using the highly studied ecosystem near Popham Beach, Phippsburg, Maine to assess the feasibility of green or green-gray infrastructure to stabilize threatened areas of Route 209 from erosion, storms and sea level rise (see http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0154735). State Route 209 provides the sole access to this peninsula owned and maintained by MaineDOT, and serves year-round residents and visitors as well as a large seasonal influx of summer tourists to Popham Beach State Park, and the historic sites of Fort Popham and Popham Colony. East of the park entrance, Route 209 is experiencing active coastal erosion due to storm events. Modeling of this area shows that continued erosion will result in the loss of this section of road within the easily foreseeable future if stabilization measures are not taken. **By evaluating the feasibility, effectiveness, and benefit-cost outcomes in this location, MaineDOT will standardize the decision process as part of its environmental risk matrix, currently being automated across state transportation projects. MaineDOT's partners in this project will consider whether a similar step-wise approach in the applicability of green infrastructure is transferable to a broad suite of intents, ecosystems and coastal communities.**

New Hampshire

Likewise New Hampshire has been very active in identifying vulnerabilities to sea level rise and storm surge and developing strategies and recommendations for improving resilience to coastal infrastructure as it is constructed, rehabilitated or replaced. The NHDOT evaluated the impact of these vulnerabilities in its 2014 report *Potential Impact of Climate Change on Transportation Infrastructure – Assessment of Vulnerability and Recommendation of Adaptive Strategies.* Among other things, this report calls for the DOT to incorporate climate change in transportation design and to utilize appropriate techniques to protect vulnerable bridges and roadways, including living shoreline and low impact development. Further, the state has established a legislative Commission (RSA 483E) which has recommended incorporation of specific scenarios for future sea level rise, storm surge and extreme precipitation in infrastructure design based on risk tolerance. (The Coastal Risk and Hazards Draft Report can be found here: Draft CRHC Report) The MPO designated for the direct seacoast has completed flooding inundation models for the sea level rise scenarios and an assessment of transportation infrastructure and assets vulnerable with each scenario. (The Tides to Storms vulnerability and assessment planning report can be founder here: Tides to Storms Coastal NH Vulnerability and Assessment Report)

Among the roadways most at risk are sections of Route 1B (New Castle Avenue) which is a causeway connecting Portsmouth to the Town of New Castle. The NHDOT and the State 10 Yr. Transportation Plan have programed a feasibility study for this roadway to investigate and evaluate alternatives to improve resilience particularly to sea level rise. The causeway traverses a sensitive salt marsh fringe identified as "highest ranked habitat" by NH Fish & Game. Options to elevate the

coastal causeway by conventional means (other than a bridge) are limited. Several low impact, adaptive alternatives have been identified, but more thorough evaluation is needed. **As with Maine Route 209, a standardized evaluation process applied here would be broadly useful on other assets with similar vulnerabilities.**

Study Component Descriptor	Maine	New Hampshire
Infrastructure	• Route 209 • Corridor Priority 5 • Evacuation Route • Sole state access for Popham Beach State Park, Fort Popham, and Popham Colony • Coastal Zone community	• NH Rte. 1B • Evacuation Route • Road segment identified as highly vulnerable by MPO • NH 1B provides only highway access to New Castle, but from two directions. • Project in 10 yr. Plan (pending approval) for causeway improvement feasibility study • Coastal Zone community • Developed Public Land
Ecosystem	• Unique maritime pitch pine woodland-northwest of Route 209 • Coastal sand dune and beach system southeast of Route 209 Long-term trend in shoreline change and habitat modeled to multiple erosion, sea level rise, and storm surge scenarios • Low to moderate energy shoreline	• High rating for seafloor habitats supporting shellfish • Armored versus non-armored sites (flora and fauna, bed shear stresses) • Light and darkness (effect on flora) • Sensitive saltmarsh fringing north and south of road • Surrounding fringing salt marsh identified as "highest ranked habitat" in 2015 NH Fish & Game Wildlife Action Plan • Successful marsh restoration/mitigation occurred on nearby segment of New Castle Ave. in 2006
Threats/limitations	• Active erosion of the road shoulder • Threat of inundation due to storm surge, extreme tides, and sea level rise • Loss of Route 209 will compromise access and flood storage • Loss of Route 209 will expose unique ecosystem to active coastal erosion • Geology of Maine coast limits applicability of green infrastructure	• Road subject to over-topping in the 1 percent-annual-chance-floodplain & at highest tide and storm surge condition • Approximately half the road segment is vulnerable to daily tidal flooding at 1.7' SLR, and nearly all at 4.0' SLR • Bridging vulnerable sections would be expensive by conventional means of elevating that require excessive fill and questionable permitting outcomes • Nearby homes are in the 1 percent-annual-chance-floodplain and vulnerable to sea-level rise
Benefits	• Diffusion of wave/surge energy • Ecosystem habitat improvement • Use modeling of sea level rise, hurricane, marsh migration and long-term shoreline change trends • Build on accepted decision support tool/environmental risk matrix • Development of a potential transferable	• Address roadway flooding with minimal tidal wetland impact • Integrate living shoreline element with structural change (green/gray) Structural Shoreline Inventory is available • Establish decision support tool for resiliency applicable to other transportation assets with similar vulnerabilities

	methodology for threatened roads in other beach/dune systems • Partnering across geographic areas, government levels, and state agencies	• Ecosystem habitat improvement • Development of potential methodology for application to similar transportation assets
Options/Evaluation	• Effectiveness for stabilization • Benefit-cost analysis of alternative measures using existing T-COAST model • Maine regulatory structure has standards specific to state transportation projects • In-house expertise for hydrologic/ engineering/ policy analysis • Transferability to other green infrastructure project evaluations	• Effectiveness for stabilization • Effectiveness for green/gray BMPs (eg. gabions with shells or material beneficial to seafloor habitat, and/ or enhance fringing marsh) • Benefit-Cost Analysis for Rip Rap Revetment vs. Bulkhead Wall vs. Living Shore solutions at appropriate location identified in the Shoreline Structure Inventory • Transferability to other green infrastructure project evaluations

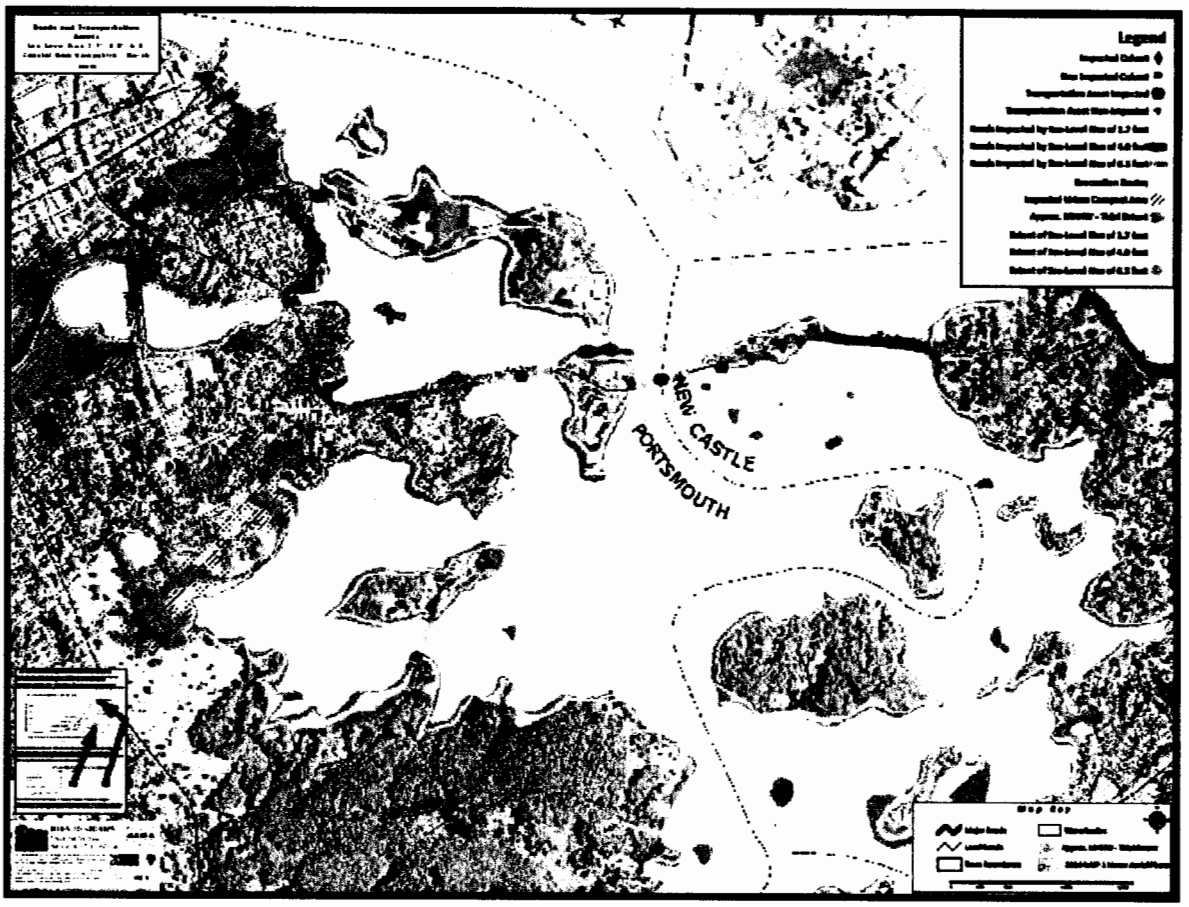
2. Dedicated Staffing & Resources

Study Component Descriptor	Maine	New Hampshire
Partners	• MaineDOT – Judy Gates, Charles Hebson, Assistant Highway Engineer • Maine Natural Areas Program- Kristen Puryear • Maine Department of Environmental Protection- Nathan Robbins • Maine Geological Survey- Peter Slovinsky • Maine Coastal Program- Kathleen Leyden • The Nature Conservancy- Jeremy Bell, Alex Mas • NOAA – Ellen Mecray	• NHDOT – Timothy S. Mallette, Hydraulics Engineer, Kevin Russell, Assistant District Engineer • NH DES Coastal Program – Steve Couture, Coastal Program Manager & Kirsten Howard, Coastal Resilience Specialist • Rockingham Planning Commission / MPO Cliff Sinnott, Executive Director; David Walker, Transportation Program Manager • UNH, Dr. Thomas P. Ballestero • UNH, Dr. Cameron Wake
Nexus with other Climate Change & Coastal Hazards Mitigation Efforts	• Past/ongoing NOAA Projects of Special Merit: Changing Shorelines: Adaptation Planning for Maine's Coastal State Parks (2011); Integrating Science into Policy: Adaptation Strategies for Marsh Migration (2014) • State Park Natural Resource Inventory, Popham Beach State Park • NOAA Living Shorelines Grant Project • SLR Simulation Model for Conservation Planning • FHWA-funded Resiliency Grant • Eco-logical Implementation Grant • Adaptation Strategies for Maine's Coastal Transportation Infrastructure	• Pilot Implementation of Climate Change Transportation Infrastructure Report recommendations • 10 Yr. Plan includes feasibility study for NH 1B causeway • NHDES Coastal Program Shoreline Management initiatives • Identified in RPC/MPO "Tides to Storms" vulnerability assessment and adaptions strategies • Consistent with NH Coastal Risk and Hazards Commission Report recommendations • Priority for Local Vulnerability Assessments and Hazard Mitigation Plans and actions for Portsmouth and New Castle

3. Draft Work Plan, Resource Allocation & Budget

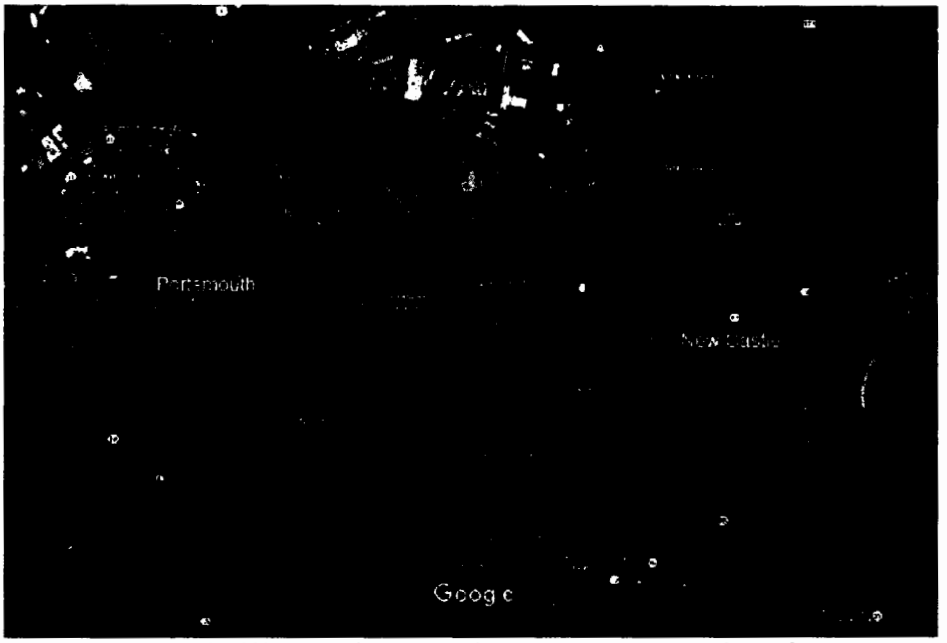
Task #	Task Description	Deliverable	Key participants to delivery	Target Timeframe	Estimated total cost
1	Contract procurement for consultants	Executed contracts	Gates, Mallette	Aug – Sep 2016	~$500
2	Partnering meetings by state to determine subsequent task involvement, schedule, and budget	Attendance list; Meeting notes; Updated work plan	Gates; All	Sep 2016	~$2,000
3	Conference call between MaineDOT and NHDOT to coordinate any updates to work plan	Conference call notes	Gates, Hebson, Mallette	Aug 2016	~$500
4	Establish Project Advisory Committee in each State to include State DOTs, State Partners, MPOs and community representatives	Meeting agendas, materials and summaries	ME: Gates, Hebson NH: Mallette, Sinnott, Walker	4 meetings: Aug 2016-Jul 2017	In-kind
5	Refine standardized decision tool for evaluating green infrastructure alternatives	Evaluation matrix and input parameters	Gates, Mallette, other partners, modeling consultant	Initial: Sept 2016; Final: April 2017	~$5,000
6	Develop 3 engineered designs (green, green/gray, and gray), and cost estimates for each site	Engineered designs & estimates;	Ballestero, Hebson	August – November 2016	~$40,000
7	Fact check climate projections; apply to design alternatives using T-COAST model (as per GEI Consultants Inc.) or similar	Model outputs; benefit-cost analyses	Hebson, Wake, Ballestero, Slovinsky, consultant	October – December 2016	~$73,000
8	Evaluate existing regulatory construct for most cost-efficient, effective alternative; recommend any language to facilitate use of green infrastructure components	Description of permitting efforts required and/or suggested revisions for regulatory language	Gates, Robbins, Mallette, Howard	January 2017	~$2,000
9	Two participants per state attend peer exchange with other pilot participants	Summary of discussions	TBD	TBD	~$8,000
10	In-person meeting with both states and partners to discuss results and standardize decision process for Environmental Risk	Meeting notes; draft work flow incorporating results into existing DOT decision processes; draft report outline	Gates, Hebson, Mallette, Russell, Walker	February 2017	~$10,000
11	Report outline and draft to partners	Draft pilot report	Gates, Mallette	April 2017	~$5,000
12	Partners review draft	Comments	Gates, Mallette	April 2017	In kind
13	Revision & draft submission to FHWA	Draft pilot report	Gates, Mallette	May 2017	~$3,000
14	Partners review final pilot report	Comments	Gates, Mallette	June 2017	In kind
15	Final pilot report submitted to FHWA	Final pilot report	Gates, Mallette	June 2017	-
Total Project Cost					$149,000
Total State match	New Hampshire State Match as Turnpike Toll Credit or in-kind match				$37,250
	Maine State Match as state fund allocation				$37,250
Total grant funding request to FHWA					**$74,500**

Attachment A: New Hampshire Project Location



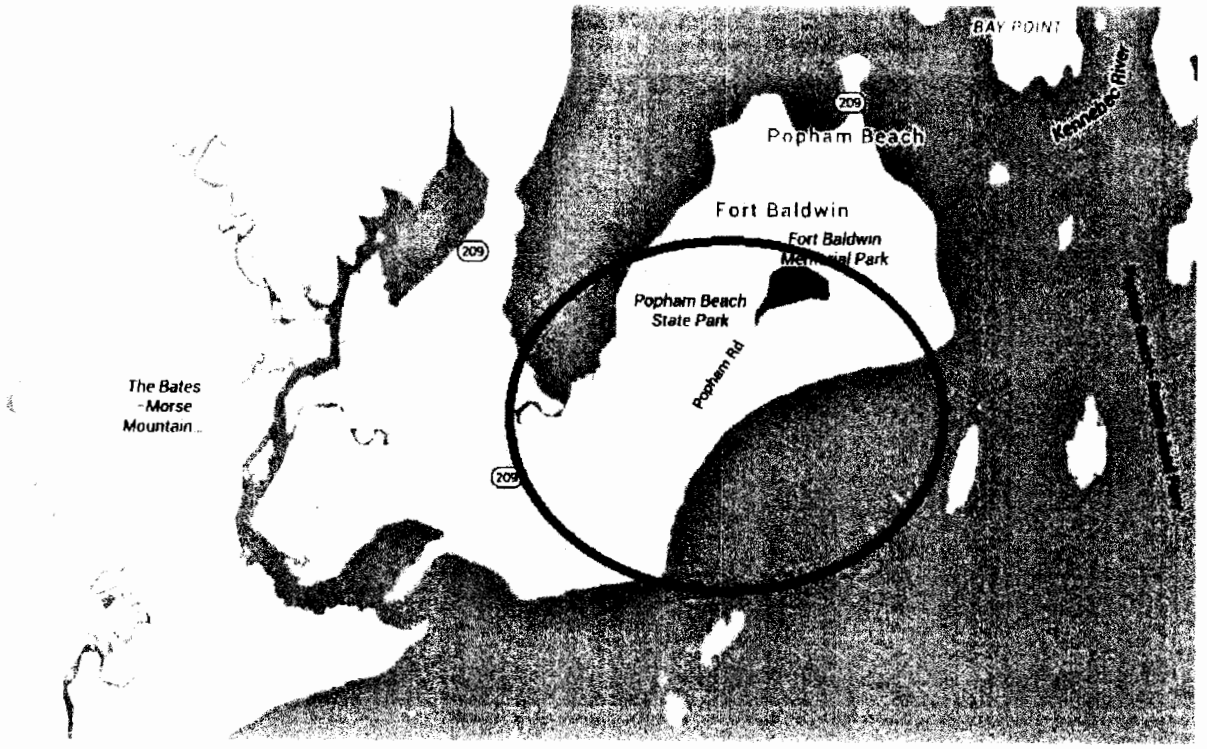
Attachment B: New Hampshire Project Location Detail

New Hampshire Project Location
NH Route 1-B (New Castle/Portsmouth Ave.)

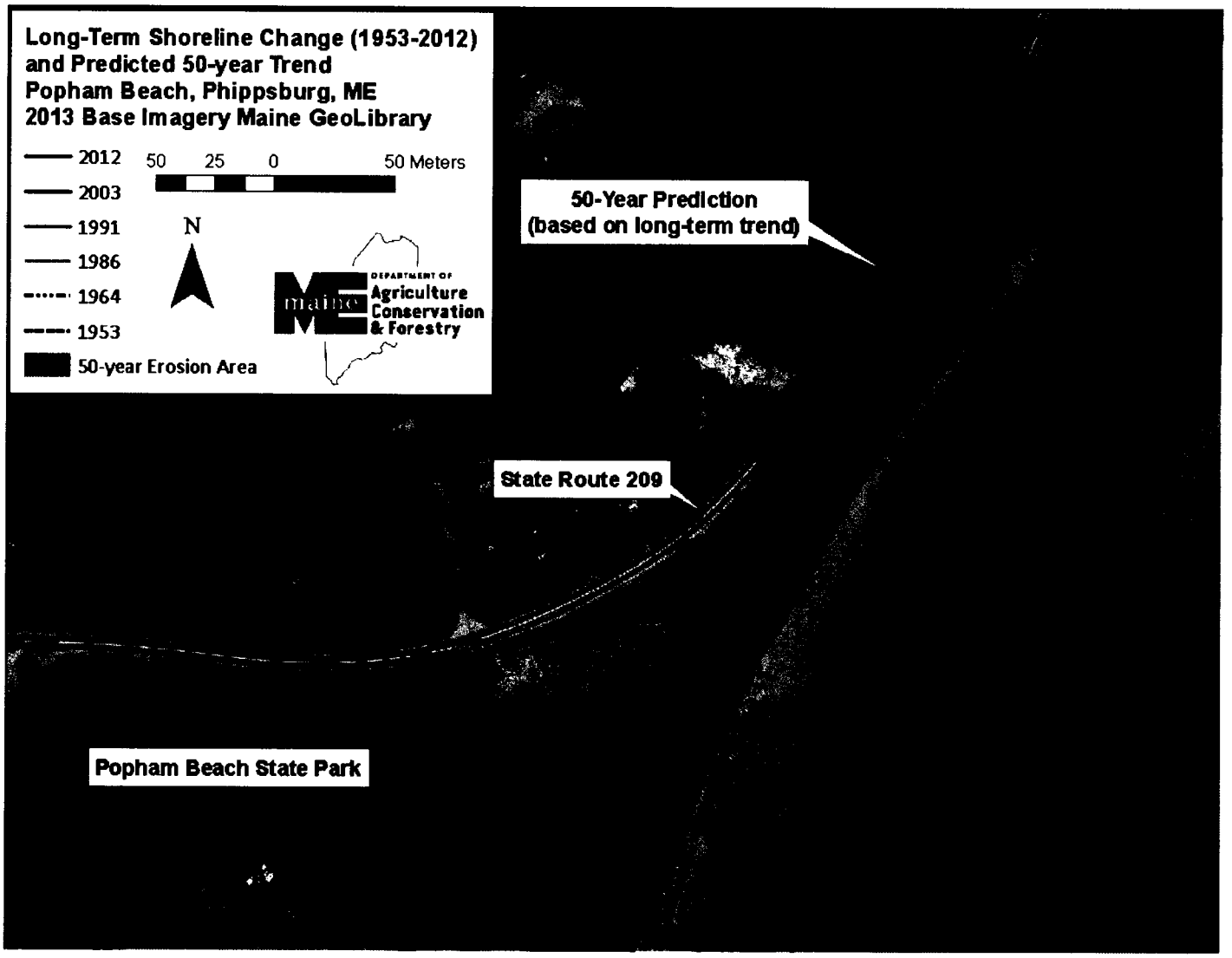


Imagery ©2016 Cnes/Spot Image, DigitalGlobe, Maine GeoLibrary, U.S. Geological Survey, USDA Farm Service Agency, Map data 1000 ft
©2016 Google

Attachment C: Maine Project Location



Attachment D: Long-term shoreline change, Popham Beach, Phippsburg, Maine



Letters of Support

STATE OF MAINE
DEPARTMENT OF ENVIRONMENTAL PROTECTION

PAUL R. LEPAGE
GOVERNOR

PAUL MERCER
COMMISSIONER

May 31, 2016

Judy Gates, Director
Environmental Office, Maine Department of Transportation
16 State House Station
Augusta, ME 04333
RE: Green Infrastructure Techniques for Coastal Highway Resilience

Dear Judy,

Green Infrastructure (GI) is a unique adaptation practice to integrate more fully in the State of Maine, and GI brings with it multiple potential benefits to our built infrastructure and natural communities. Further gains from the use of GI is also likely with increasing intensity and frequency of storms, and current and future impacts of sea level rise. In order to further implement GI in Maine a better understanding of the strengths, limitations, and any barriers to projects is needed. The effectiveness of its application, and transferability to other sites therefore would be benefitted through a pilot to responsibly allocate funding resources in the near term, and maximize returns on investments in the future.

The Maine Department of Environmental Protection (ME DEP) is responsible for protecting and restoring Maine's natural resources and supports efforts that contribute to the achievement of this mission. ME DEP supports MaineDOT and its partners in its pursuit of the Green Infrastructure Techniques for Coastal Highway Resilience grant. We will commit one staff person to serve as a liaison between the project partners and ME DEP permitting staff to aid in the review of this pilot project, and also to evaluate the existing regulatory construct for future projects.

We look forward to further working with those interested in evaluating and implementing nature-based resiliency practices in the State of Maine. If you have any further questions, please feel free to contact me at (207) 592-6590 or at nathan.p.robbins@maine.gov.

Nathan Robbins, Climate Change Specialist
Maine Department of Environmental Protection

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STATE OF MAINE
DEPARTMENT OF AGRICULTURE, CONSERVATION & FORESTRY
93 STATE HOUSE STATION
AUGUSTA, MAINE 04333

PAUL R. LEPAGE
GOVERNOR

WALTER E. WHITCOMB
COMMISSIONER

May 31, 2016

Judy C. Gates, Director
Environmental Office
Maine Department of Transportation
16 State House Station
Augusta, Maine 04333

Dear Judy,

The Maine Natural Areas Program (MNAP) in the Maine Department of Agriculture, Conservation and Forestry serves as Maine's most comprehensive source on the State's important natural features, and provides objective and up to date information to equip decision makers with the necessary tools to make informed and responsible decisions for development and land management. In response to growing concerns about the impacts of sea level rise to built infrastructure and significant ecological systems, MNAP has recently completed projects to map existing tidal marsh areas and the areas that they are projected to migrate to. MNAP has also identified and evaluated the vulnerability of significant habitat areas within coastal state parks that will be impacted by sea level rise. It is well understood that conservation and land management strategies that protect both existing tidal marshes and the areas that will be needed to accommodate marsh migration will be vital for maintaining Maine's valuable coastal systems. Also important will be coastal infrastructure designed to improve coastal resiliency and reduce risks from erosion and flooding to both natural and human communities alike.

The Green Infrastructure Techniques for Coastal Highway Resiliency project proposed by the Maine and New Hampshire Departments of Transportation will be an important step in the process towards understanding how to make and implement decisions with regard to green and gray infrastructure in vulnerable coastal systems and communities. This project also represents an opportunity for MNAP to apply field verified mapping data of unique and sensitive marsh and dune communities towards adaptation strategies for marsh migration and the implementation of green infrastructure. MNAP will support this project through technical knowledge of coastal marsh and dune systems in Maine as well as our involvement in the State Park Natural Resource Inventory Project and familiarity with Popham Beach, and through efforts to identify opportunities to support coastal resilience.

I strongly support this proposed project and the approach towards standardizing the decision process with regard to infrastructural improvements that can benefit and protect both human communities and natural systems in the context of sea level rise.

Sincerely,

Kristen Puryear, Ecologist
Maine Natural Areas Program
Kristen.Puryear@maine.gov / (207) 287-8043

MOLLY DOCHERTY, DIRECTOR
MAINE NATURAL AREAS PROGRAM

Agriculture Conservation & Forestry
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STATE OF MAINE
DEPARTMENT OF AGRICULTURE, CONSERVATION & FORESTRY
BUREAU OF RESOURCE INFORMATION & LAND USE PLANNING
93 STATE HOUSE STATION
AUGUSTA, MAINE 04333

PAUL R. LEPAGE
GOVERNOR

WALTER E. WHITCOMB
COMMISSIONER

May 23, 2016

Judy Gates, Director
Environmental Office, Maine Department of Transportation
16 State House Station
Augusta, ME 04333
RE: Green Infrastructure Techniques for Coastal Highway Resilience

Dear Judy:

The Maine Geological Survey (MGS) is happy to provide this letter of support for your application to the Federal Highway Administration (FHWA) Green Infrastructure Techniques for Coastal Highway Resilience project program.

MGS has been involved in a number of projects that have resulted in the creation of numerous datasets available that help gauge the vulnerability of roads to climate-related hazards. Through this work, we have pinpointed that a stretch of ME State Route 209 in Phippsburg, ME would be an ideal location to conduct a pilot project to assess a green infrastructure solution to improve the resilience of coastal highways to climate change impact. This stretch of road is at high-risk to long-term erosion, storm-related short-term erosion and flooding, and sea level rise. It is also situated within a regulated coastal sand dune system, a unique maritime pitch-pine woodland habitat, and within the boundaries of Popham Beach State Park, making it a prime site for a pilot assessment of potential green infrastructure solutions.

Many coastal communities in Maine have similarly situated (and vulnerable) state and local roads, so the transferability of the findings of this pilot effort to other transportation infrastructure would be palpable.

As part of this project, MGS can provide available and applicable project data and technical assistance, as needed, to the Maine Department of Transportation. I look forward to working with you on this effort should the pilot project be funded.

Please contact me with any questions at (207) 287-7173 or at peter.a.slovinsky@maine.gov.

Regards,

Peter Slovinsky, Marine Geologist
Maine Geological Survey

ROBERT MARVINNEY, STATE GEOLOGIST
MAINE GEOLOGICAL SURVEY

maine Department of Agriculture Conservation & Forestry

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FAX: (207) 287-2353
www.maine.gov/dacf/mgs

The Nature Conservancy

The Nature Conservancy in Maine
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Brunswick, ME 04011

tel [207] 729-5181
fax [207] 729-4118

nature.org/maine

May 31, 2016

Judy C. Gates, Director
Environmental Office
Maine Department of Transportation
16 State House Station
Augusta, Maine 04333

Dear Ms. Gates,

The Nature Conservancy in Maine is pleased to provide this letter of support for the Maine Department of Transportation's (MDOT) Green Infrastructure Techniques for Coastal Highway Resilience grant application. The Conservancy applauds the proactive approach MDOT is taking with regard to its coastal infrastructure and sea level rise.

The Conservancy is honored to participate in the development of MDOT's project on Route 209 in Phippsburg, an area with extremely high ecological value. MDOT's proposal represents critical work in a sensitive location as well for coastal risk. This work would raise the profile of improved infrastructure planning for sea level rise, and would represent one of the early efforts in the state to promote 'green infrastructure' for our roads network.

As you may know, The Conservancy is a leader in coastal resiliency planning. In Maine, we are currently developing an online tool to map areas in the state for community planning around sea level rise with regard to both community risk and resiliency as well as sea level rise. This work by MDOT represents site level planning that could inform how communities can use our tool, which will be available in 2017, to better plan projects for an increasingly uncertain future. To this end, we encourage the Federal Highway Administration to support this work by fully funding the grant to MDOT.

Sincerely,

Jeremy M. Bell
Aquatic Habitat Restoration Manager

STATE OF MAINE
DEPARTMENT OF AGRICULTURE, CONSERVATION & FORESTRY
93 STATE HOUSE STATION
AUGUSTA, MAINE 04333

PAUL R. LEPAGE
GOVERNOR

WALTER E. WHITCOMB
COMMISSIONER

May 31, 2016

Judy Gates
Director, Environmental Office, Maine Department of Transportation
16 State House Station
Augusta, Maine 04333

Dear Judy:

I am writing to offer my enthusiastic support for your proposal, "Green Infrastructure Techniques for Coastal Highway Resilience".

The Maine Coastal Program has placed emphasis over the past several years on green infrastructure and in particular, "living shorelines". We have sponsored workshops on green design, published guidance on Low Impact Development, and provided grants to several coastal towns to improve stormwater management through the use of green infrastructure.

In addition, the proposed project leverages two significant NOAA funded-projects currently underway.

- In our current project, "Changing Shorelines: Adaptation at Maine State Parks and Historic Sites", we found the most critical current adaptation need is to address flooding on Route 209, the only access road to the park, two significant historic sites and a densely developed village area.
- In our "Advancing Living Shorelines" project (beginning in June 2016), we will be investigating the feasibility of using different types of soft shoreline treatments on the Maine coast including addressing regulatory barriers, public outreach and development of guidance materials.

If funded, the proposed project will lend important field information, decision support guidance, and lessons learned to our ongoing efforts and help build a cross-agency community of practice, in partnership with other organizations.

I will serve on the Project Advisory Committee, work to integrate this effort with other ongoing climate adaptation projects and assist in publicizing any case study results to municipalities and other New England states.

Sincerely,

Kathleen Leyden
Director, Maine Coastal Program

KATHLEEN LEYDEN, DIRECTOR
22 SHS
MAINE COASTAL PROGRAM
38 SHS

DEPARTMENT OF Agriculture Conservation & Forestry

PHONE: (207) 287-

FAX: (207) 287-

WWW.MAINE.GOV/DACF/MCP/

The State of New Hampshire
DEPARTMENT OF ENVIRONMENTAL SERVICES

Thomas S. Burack, Commissioner

May 27, 2016

Subject: Green Infrastructure Techniques for Coastal Highway Resilience
U.S. Department of Transportation
Federal Highway Administration

Dear Review Committee:
As Manager of the N.H. Department of Environmental Services Coastal Program (NHCP) I strongly support the proposal submitted by the Maine Department of Transportation in partnership with the New Hampshire Department of Transportation (NHDOT) for the Green Infrastructure Techniques for Coastal Highway Resilience applied research pilot project solicitation. In our 309 Strategy developed together with the National Oceanic and Atmospheric Administration (NOAA), our federal partner organization, NHCP has identified a priority goal of promoting resilient coastal New Hampshire communities in the face of coastal hazards, and this project aligns directly with that goal.

The NHCP is excited to leverage additional federal resources and partner with NHDOT and other collaborators on this project as we work to build our collaborative relationship around coastal resilience issues at the nexus of environmental management and infrastructure protection. The NHCP has been working closely with NHDOT on the NH Coastal Risk and Hazards Commission which identified several recommendations for a resilient coastal New Hampshire in its recently released draft report. This project is directly in line with the work of the Commission, and will be a critical pilot project as we begin exploring and developing methodologies for assessing green infrastructure and other resilient options to protect and adapt our built landscape in the face of existing and future hazards, such as sea-level rise and coastal storms. Additionally, the opportunity to partner with and learn from MaineDOT is unique and will be extremely valuable for our state.

Route 1-B is an important causeway for our coastal communities. Several existing vulnerability analyses have identified this piece of roadway as highly vulnerable to coastal flooding and sea-level rise. Additionally, the surrounding fringing salt marsh is of great important to wildlife and provides coastal protection services. NHCP is currently working on two pilot "living shoreline" projects for coastal New Hampshire as part of a larger program to promote comprehensive shoreline management in tidal areas, and this project would make a great third pilot project to include in our efforts.

This letter serves as confirmation of NHCP's commitment to this project. Please contact me if you have any further questions about our support and commitment on this proposed project.

Sincerely,

Steven M. Couture
Manager, NHDES Coastal Program

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