

# **2014 TIGER DISCRETIONARY GRANT APPLICATION**



Route 4 Phillips and Madrid, Maine Federal Project STP-1824(700)X Work ID Number 018247.00

PROJECT TITLE: Route 4 Highway Reconstruction, Town of Phillips, Maine and Township of Madrid, Maine

LEAD APPLICANT: Maine Department of Transportation

TYPE OF ELIGIBLE APPLICANT: State Government

AMOUNT OF TIGER FUNDING REQUESTED: \$3.75 Million

DATE OF SUBMITTAL: April 24, 2014

#### **Project Overview**

Project Name: Route 4 Highway Reconstruction Town of Phillips and Township of Madrid State of Maine Project Begin: Latitude 44.856556° Longitude -70.509539° Project End: Latitude 44.850639° Longitude -70.431048° Project Length: 4.57 Miles

General Description:

The proposed project will reconstruct a 4.57-mile section of Route 4 in the Town of Phillips and the Township of Madrid, Franklin County, Maine (Western Maine) and replace two bridges within the project limits.<sup>1</sup> Route 4 is the principal highway linking the county seat town of Farmington to Rangeley, where it joins Route 16, which continues to New Hampshire. Route 4 is classified as a minor arterial and is ranked by the Maine Department of Transportation as a Highway Corridor Priority 2.<sup>2</sup> With the completion of this project added to the previous capital and maintenance investments of \$41,738,102 over the past two decades, the 43-mile Route 4 Corridor from Farmington to Rangeley will have been completely rebuilt to modern standards.

The existing highway conditions on Route 4 are characterized by:

- Severe crowning
- Gravel shoulders
- Minimal clear zone
- Wild animal/vehicle conflicts
- Runoff and sedimentation related concerns and impact to the Sandy River and its tributaries
- Scouring of embankments on the Sandy River and tributaries
- Generally good sight distance
- Inadequate stream crossing culverts in 14 locations

The estimated cost for the highway project *only* is \$9,000,000. (Funding for the bridge replacements is not included in this estimate.) To date, \$650,000 has been obligated on preliminary engineering and right-of-way. The remaining costs for the project are:

<sup>&</sup>lt;sup>1</sup> The TIGER 2014 funding request is strictly to assist in the highway reconstruction. The two bridges will be funded through non-TIGER sources.

<sup>&</sup>lt;sup>2</sup> Priority 1 Highways. These roads include the Maine Turnpike, the interstate system and key principal arterials like U.S. Route 1 in Aroostook County, the Airline (Route 9), and U.S. Route 2 west of Newport, and Route 302. The 1,400 miles of Priority 1 roads represent only 7 percent of the miles, but carry fully 40 percent of all vehicle miles traveled in Maine.

Priority 2 Highways. These roads total about 940 miles. They are non-interstate, high value arterials that represent about 4 percent of the total miles of road but carry 11 percent of all vehicle miles traveled in Maine.

For more information on Highway Corridor Prioritization and Customer Service Levels http://www.maine.gov/mdot/about/assets/glossary/index.shtml#priority

Right-of-Way	\$450,000
Construction	\$7,300,000
Construction Engineering	\$600,000
TOTAL	\$8,350,000

The remaining cost for the highway portion of the project is \$8,350,000. This application request is for \$3,750,000 in TIGER 2014 funds to supplement \$4,600,000 in non-federal (state) funds

The Weymouth Bridge replacement is estimated at \$1,755,000; the Wing Bridge replacement is estimated at \$1,455,000. The cost of the overall effort, which includes the highway reconstruct-tion project and replacement of the two bridges, is \$12,210,000.

#### **Key Threshold Requirements**

- ✓ Eligible Project: Yes, Highway Project eligible under Title 23, USC
- ✓ NEPA complete or under way: Yes
- ✓ Included in relevant planning documents: Yes
- ✓ Ready to obligate all TIGER funds by September 30, 2016: Yes
- ✓ Non-federal match provided: \$4,600,000 for right-of-way, construction and construction engineering costs will be borne by the State of Maine.

#### **Additional Project Considerations**

- ✓ Endangered species habitat has been identified and special treatments will be utilized to avoid negative impacts
- ✓ Wildlife safety features to minimize animal/vehicle collision such as slopes to discourage moose and deer, blinking "Moose Collision Area" signs to warn motorists, and other context-sensitive methodologies or techniques.
- ✓ Standard paved shoulders to be added

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#### I. PROJECT DESCRIPTION

Route 4 in Maine begins in South Berwick and terminates in Oquossoc (*Oh-kwa'-sic*), a village in the Western Maine town of Rangeley. In the southern reaches, Interstate 95 provides a parallel opportunity for north-south travel from Kittery to Auburn. In Auburn, Route 4 and Interstate 95 diverge, significantly increasing the importance of Route 4 as one of the key highways connecting the manufacturing communities and outdoor recreation and tourism destinations of Western Maine. The 43-mile section of Route 4 between Farmington and Oquossoc provides the primary highway link between communities along the way, such as Strong, Avon, Phillips, Madrid (*Mad*-drid), Sandy River Plantation, and Rangeley Plantation. Farmington, in addition to being the County Seat of Franklin County, is the largest service center in the county, while Rangeley is the service center community for the more westerly communities in Franklin County. Rangeley and Farmington are two of the economic centers for northwestern Franklin County. Franklin County is one of Maine's most rural areas.



The specific Project Area is a 4.57-mile section of highway in the town of Phillips and the township of Madrid, which is the last remaining section of the 43-mile corridor that has not been modernized. Over the past two decades, the Maine Department of Transportation (MaineDOT) has invested more than \$41 million in capital improvements and maintenance projects for both highways and bridges. This last "gap" will complete the modernization efforts.

Rangeley and the surrounding communities form a part of the iconic "Maine Woods," which has been a destination for anglers, recreationists, and outdoor enthusiasts for over 130 years. With an unrivaled brook trout and landlocked salmon fishery, the area is a mecca to the fishing enthusiast during the

spring and summer. The fall season brings "leaf peepers" to observe spectacular fall foliage of the Western Maine Mountains and winter is noted for the New England Pond Hockey Festival, Nordic and alpine skiing, and snowmobiling. Other destinations accessed via Route 4 include the Appalachian Trail, Rangeley Lakes State Park, and Lake Umbagog (umm-**b**ā- gog) National Wildlife Refuge.

Forest management in this area of Western Maine is a major economic contributor. Large tracts of undeveloped land are privately owned and provide much of the wood product needed for paper mills in Rumford, Madison, and Hinckley, wood pellet mills in Strong, a biomass electric plant in Stratton, and numerous lumber manufacturers throughout Maine. Many of the large trucks observed on Route 4 carry logs from these wood harvesting operations. In fact, 24% of the estimated 1,423 Annual Average Daily Traffic (AADT) is trucks.

Although difficult to quantify, but worth noting is the US Navy's only cold weather Survival, Evasion, Resistance and Escape (SERE) school (or what is locally referred to as the "Navy Seals Base"), which is situated on 12,000 acres in Reddington Township near Rangeley in northwestern Maine. Since 1962, almost 50,000 air crewmen and other personnel have

completed SERE and Cold Weather Environmental Survival Training (CWEST). Route 4 is the primary highway providing access to the facility. In the fall of 2013, the Pentagon announced that the Reddington facility is one of five East Coast locations being considered for a new Anti-Ballistic Missile System that could intercept incoming intercontinental ballistic missiles. Unfortunately, there is little information publically available concerning current or future transportation needs or impacts of SERE, but anecdotally, it is worth noting.

Rangeley and the towns northwest of Farmington rely on Route 4 for nearly all goods and services. A look at the Vehicle Classifications data recorded at two points along the highway shows nearly 12% of vehicles are types typically associated with delivery of commodities

(classes 5-8), such as food, mail, home heating fuel, etc. Heavy trucking associated with the forest industry and bulk fuel (classes 9-10) account for an additional 7% of the vehicles in this corridor. With the addition of bus traffic, the proportion of large vehicles using the corridor exceeds 20%. Although there are other highways connecting with Rangeley, notably Route 17 from Mexico and Route 16 from Stratton, these highways add substantial distance and travel time from Farmington

"If Route 4 was unavailable, when I commuted to Farmington, I would have had to quit my job rather than work just to support the cost of the commute."

Resident of Rangeley

and are not practicable alternatives to meeting the needs of those communities along Route 4 previously mentioned. Such a detour would lead to increased costs to citizens for food, transportation and home heating fuel. Additionally, both alternative routes are posted with very restrictive weight limits for two months each spring, making both alternatives unsuitable and impractical in the supply chain.

The overall improvements will reconstruct the roadway and replace two bridges for a cost of \$9.0 million and \$3.12 million respectively.<sup>3</sup> The existing highway conditions in the project area include severe crowning, gravel shoulders, minimal clear zone, large animal/vehicle conflicts, scouring of embankments on the Sandy River and tributaries, runoff and sedimentation related concerns and potential impacts on Atlantic salmon restoration, deteriorated bridges, and inadequate steam crossing culverts in fourteen locations.

The existing highway alignment has generally good sight distance with the exception that the replacement bridges will be elevated from their current positions, thus improving the sight distance at these crossings. The reconstruction will hold the centerline in its current location, thereby eliminating the need to acquire additional land for the project. The proposed 22' of travel lane and 8' of shoulders can easily be accommodated within the existing 4 rod (66') right-of-way. Ledge along a small section of the project will need to be removed to accommodate the improved shoulders and drainage. Construction and maintenance easements likely will be required. Additional construction and maintenance easements may also be required for other sections where slope widening or stabilization is needed.

The two bridges within the project area are structurally deficient, functionally obsolete, and scour critical. The Weymouth Bridge (#2934) and Wing Bridge (#2955) will be replaced at a

<sup>&</sup>lt;sup>3</sup> TIGER 2014 funds are being requested for the highway portion of the project only. Funding for the two bridges will not be from TIGER 2014.

cost of \$1,755,000 and \$1,455,000, respectively. Weymouth Bridge is a 49' concrete tee beam design structure. The bridge has a 25' width and a travel surface of 22' with inadequate to non-



existent shoulders. The banks supporting the bridge are slumping and action is prescribed to forestall further scouring and channel deterioration. Wing Bridge is a 62' steel stringer/girder design structure. Like the prior bridge, this one has a 25' width and a travel surface of 22' with inadequate to non-existent shoulders.

Temporary detour bridges will be installed during construction to allow for the new, permanent replacement structures to be

built on the same alignment as exists today. Presently, the highway slopes downward as the bridges are approached. The new bridges will be elevated sufficiently to eliminate that downward slope creating a more uniformly matched elevation between the bridge and highway surface, thereby creating greater sight distance.

### II. PROJECT PARTNERS

The project financial partners include the Maine Department of Transportation and the Federal Highway Administration – Maine Division.

Table 1: Current Project Costs and TIGER 2014 Funding Breakdowns							
HIGHWAY	TIGER 2014	NON- FEDERAL MATCH	FHWA STP	MaineDOT MATCH	TOTAL		
Preliminary Engineering	\$0.00	\$0.00	\$480,000	\$120,000	\$600,000		
Right-of-Way	\$202,096	\$247,904	\$40,000	\$10,000	\$500,000		
Construction	\$3,278,443	\$4,021,557	\$0.00	\$0.00	\$7,300,000		
Construction Engineering	\$269,461	\$330,539	\$0.00	\$0.00	\$600,000		
HIGHWAY TOTAL	\$3,750,000	\$4,600,000	\$520,000	\$130,000	\$9,000,000		

# **III. GRANT FUNDS AND SOURCES/USES OF PROJECT FUNDS**<sup>4</sup>

**Table 1** contains costs and cost sharing for TIGER 2014 specifically for the Route 4 highway portion of the project. The highway portion of the project will utilize TIGER 2014 funds, FHWA STP, and MaineDOT funds.

<sup>&</sup>lt;sup>4</sup> FHWA STP and MaineDOT funds have been programmed for Preliminary Engineering \$600,000 and Right-of-Way \$50,000. These figures are shown above. The State share of Right-of-Way includes \$247,904 match for TIGER 2014 and a \$10,000 as match for the Right-of-Way programmed allocation of \$50,000. The FHWA STP Right-of-Way share of \$40,000 is not part of the TIGER 2014 request. The Preliminary Engineering and Right-of-Way funds are shown in order to account for the complete project cost of \$9,000,000 for the highway portion of the project

Table 2: Bridge Project Costs and Funding Breakdown (Non-TIGER 2014)						
BRIDGE NAME	TIGER 2014 NON- FEDERA MATCH		FHWA STP	MaineDOT MATCH	TOTAL	
Weymouth	\$0.00	\$0.00	\$1,164,000	\$291,000	\$1,455,000	
Wing	\$0.00	\$0.00	\$1,404,000	\$351,000	\$1,755,000	
BRIDGE TOTALS	\$0.00	\$0.00	\$2,568,000	\$642,000	\$3,210,000	

**Table 2** contains costs and cost sharing for the Weymouth Bridge and Wing Bridge that will be replaced in conjunction with the Route 4 highway project. Funding for the two bridges is from FHWA STP and MaineDOT funds. TIGER 2014 funds will not be used for bridge replacements.

#### IV. SELECTION CRITERIA

#### A. Primary Selection Criteria

#### 1. State of Good Repair

The project will improve 4.57 miles of Route 4 including two bridges to modern design standards and will complete a nearly two-decade effort to transform the 43-mile highway from Farmington to Oquossoc into a safe, efficient, and well-constructed highway. Route 4 in this region of the State is considered a Corridor of Regional Economic Significance for Transportation (CREST), as determined by an extended public involvement process including the Androscoggin Valley Council of Governments, the Androscoggin Valley Economic Development District, and the Maine Department of Transportation (MaineDOT). Following this public involvement effort, MaineDOT established a six-tier Highway Corridor Priority system, with Priority 1 being the most important transportation asset, e.g. I-95, while Priority 2 is assigned to transportation assets at the next highest level of importance (support regional and inter-regional economies).

In addition to the Priority ranking system, MaineDOT has in place an aggressive maintenance program to identify and repair problems to protect these investments into the future and extend their life. For example, once completed, the newly constructed highway will be inspected biennially using a highly specialized Automatic Road Analyzer (ARAN) that collects data for ongoing evaluation of pavement conditions. To supplement that, the tried-and-true method of periodic inspection by regional MaineDOT personnel provides the human dimension to the evaluation.

Depending on the collective findings of these two simultaneous efforts, MaineDOT may undertake:

- Crack sealing in the first 3 5 years at a cost of approximately \$7,000/mile.
- A <sup>3</sup>/<sub>4</sub>" overlay after 10 years at a cost of approximately \$160,000/mile or a 1<sup>1</sup>/<sub>4</sub>" overlay after 12 years at a cost of approximately \$210,000/mile.
- Winter maintenance at a cost of approximately \$5,000/mile.

As with all highway and bridge projects, MaineDOT has pursued the most practicable, least cost solution to remedy the structural deficiencies of this section of Route 4.

## 2. <u>Economic Competitiveness</u>

Route 4 is a vital transportation link in Western Maine connecting Farmington, the region's largest service center and Franklin County Seat, to Rangeley, the most westerly service center community in the region. The highway and bridges are an essential transportation link for the efficient, cost-effective delivery of forest products to the paper and lumber mills of Western and Central Maine; for commuter access to jobs in communities other than those in which they live;

"Without the (Wing) bridge, children from Madrid would be cut off from district schools. Detours would be time consuming, if not impossible, and costly to the school district. Logging roads would be unsafe as an alternative. Hopefully this scenario does not occur."

School district administrator

access for year-round tourism and recreation; and for the supply of consumer products, food, and even health care at the regional hospital in Farmington.

Route 4 is essential to moving school-age children from homes to schools. The additional costs to the school district would likely translate into increased taxes to support the added costs of busing.

The township of Madrid and the town of Phillips, where the project is located are Economically Distressed

communities within Franklin County, Maine, which is one of Maine's Economically Distressed counties.<sup>5</sup> United States Per Capita Income (PCI) in past 12 months (2012 dollars), 2008 - 2012 = \$28,051. Using the 80% of United State PCI, Economically Distressed Areas have an adjusted PCI of \$22,440.80 or lower. Franklin County has an adjusted PCI of \$22,148, which is \$292.80 below the threshold.<sup>6</sup>

The Average Annual Daily Traffic (AADT) for 2015 is projected to be 1,423 vehicles of which 24% are trucks – half of these the type typically associated with essential commodity deliveries, such as heating fuel, food, mail, UPS/FedEx, etc. Heavy trucking of forest products and larger vehicles carrying bulk fuels make up most of the remaining volumes. If the highway and the bridges in the project area were to close, the increase in Vehicle Miles Traveled (VMT) is estimated at 6,013,063 miles. All three of the alternative routes available are weight-limit posted during the spring, further exacerbating supply chain inefficiencies. Additionally, the detour

<sup>&</sup>lt;sup>5</sup> Economically distressed areas, a phrase defined by 42 U.S.C. 3161 is an area is economically distressed if it has a per capita income of 80 percent or less of the national average or if it has an unemployment rate that is, for the most recent 24-month period for which data are available, at least 1 percent greater than the national average unemployment rate.

<sup>&</sup>lt;sup>6</sup> <u>http://quickfacts.census.gov/qfd/states/00000.html</u>

route would substantially reduce traffic volumes through Phillips and Madrid, and likely to some of the surrounding towns, which would further worsen the already negative conditions.

This project will benefit working people of the region in a number of different ways. Highway and bridge construction pay good wages and are highly prized jobs in Maine. This project will take nearly two years to complete. Therefore the earnings from employment on this project will provide for a more extended benefit. For the construction worker, good wages will be paid.

As to other users of the highway, it will provide a higher degree of efficiency, resulting in time savings. For others such as trailer trucks, particularly log trucks, the flattening of the road crown and improved surface will provide for smoother and safer operation, but also allow these vehicles to move through the system at the posted speed limit.

How the project would "grow" the economy is difficult to quantify, especially since much of the forest-based economy has been modernized with machinery that reduces the huge amount of labor once needed. The local economies around Rangeley thrive on a tourism business that has

its roots in the early 1880s likely before such visitors were called "tourists." All the elements for a vibrant hospitality industry are in place, but the path to success is to provide a quality, memorable experience to the visitor. An improved highway is an important component to that success.

"Folks don't remember a good road, but give them a rough one and that seems to be at the front of their memories."

Hospitality provider

Observation and experience of this author suggest that when visitors come to Maine, if their "take-away" is positive then they likely will return again and recommend the area to others. This is true of not only the hospitality one feels, but also of the overall "quality of place" - roads are certainly one of the more visible attributes of "place." A "modern" improved road will be taken for granted and hardly deserving of a comment by a traveler; a rough or perceived unsafe road will be the source of criticism and disdain. The touring public has far too many options available to which they may take their business. The completion of the reconstruction of Route 4 from Farmington to Rangeley will contribute to a positive visitor experience. Maine Office of Tourism data indicates that Maine has a higher-than-average visitor return rate, suggesting that positive experiences bring people back, helping to sustain the economy of this region.

This project will provide a vital link from Maine's Western Mountains area to Farmington, the county seat, and subsequently to Interstate 95, Augusta, Lewiston, and Auburn and will create short term economic activity and in the long-term help sustain jobs in the forest products and tourism industries.

# 3. **Quality of Life**

The Route 4 Corridor is an important part of what makes the Phillips, Madrid, Rangeley Lakes area, and the entire region livable. People can drive or bike along the scenic corridor which abounds in hiking, biking, boating, skiing, and countless other outdoor activity opportunities. Rangeley and the surrounding communities form a part of the iconic "Maine Woods" that has been a destination for anglers, recreationists, and outdoor enthusiasts for over a hundred years. Route 4 is a key highway corridor connecting outdoor recreation destinations of Western Maine.

This project will complete the last section of the highway corridor from Farmington to Rangeley, which will vastly improve safety for the traveling public, including bicyclists. The roadway is part of the Rangeley Lakes National Scenic Byway. The scenery is outstanding, and the road provides crucial access to unrivaled brook trout and landlocked salmon fishing opportunities, the Western Maine Mountains and lakes, alpine and cross-country skiing, snowmobiling, the Appalachian Trail, Rangeley Lakes State Park, and Lake Umbagog (umm-**bā**- gog) National Wildlife Refuge, as well as the vast undeveloped areas of Western Maine and New Hampshire.

Recreational bicycling is growing in popularity, as highway improvements provide a higher degree of safety. Wider shoulders on many of Maine's highways have sparked renewed interest in bicycle travel routes that would have been otherwise overlooked just a few years ago. This section of Route 4 is also on one of the 33 official Scenic Maine Bicycle Loops, as found in the "Explore Maine by Bike, 33 Loop Tours," published by MaineDOT and the Maine Office of Tourism. For areas like Rangeley, long recognized by recreationists as a place to enjoy outdoor adventure, the emergence, or perhaps resurgence, of bicycling has generated a new interest in developing local bicycle trails, particularly single track downhill. Interestingly, growth in single-track trails for recreation is occurring in numerous locations across Maine's interior, particularly adjacent to and with access from a number of scenic byways, including the Rangeley Lakes National Scenic Byway. The expanded opportunities for the user also translate into expanded opportunities for the hospitality service businesses in the region.

Improving the last gap of the roadway will help make it safe, scenic, and inviting, and the needed improvement is vital to the area's economic vibrancy, livability, and quality of life. The reconstruction and roadway improvements are necessary to improve safe access for motor vehicles, bicyclists and the occasional pedestrian. The addition of a 4-foot paved shoulder on each side will create a much safer facility.

The improved roadway will provide an important improvement to livability in general for residents and visitors alike. It will help to attract economic development and lead to an overall improved quality of life.

### 4. Environmental Sustainability

MaineDOT's Bureau of Project Development and the Environmental Office are currently reviewing the project in accordance with the Maine Federal Highway Administration (FHWA)/ MaineDOT Agreement for Categorical Exclusions (CE). This project is categorized as a CE and is within the purview of 23 CFR 771.117(d)(1) and will need approval from FHWA, Maine Division. MaineDOT's assessment regarding NEPA is as follows:

- <u>Public participation</u> No anticipated public opposition.
- <u>Right-of-way acquisitions</u> No full property right-of-way acquisitions/No displacements.
- <u>Hazardous materials</u> No known state or federal uncontrolled oil or hazardous material sites within or adjacent to the action.

- <u>Section 106 of the National Historic Preservation Act</u> There are no National Register eligible or listed historic properties (concurred with Maine State Historic Preservation Officer on 5/17/12).
- Section 4(f) There is no use of Section 4 (f) properties for the project.
- <u>Wetland impacts</u> The project will require an U.S. Army Corps of Engineers Maine General Permit Category II and Maine Department of Environmental Protection Permit by Rule (Water Quality Certification and CZM). MaineDOT anticipates obtaining permits by 3/15/16.
- <u>Noise</u> The proposed action will not affect the Noise Abatement Criteria levels (23 CFR 772) and/or the MaineDOT Noise Policy.
- <u>Air Quality</u> The proposed action conforms to the air quality and/or conformity requirements.
- <u>Endangered Species</u> Project is located within Canada Lynx review area, Northern Long-Eared Bat review area and Atlantic Salmon Distinct Population Segment (DPS) and Critical Habitat. The project will require



formal consultation with U.S. Fish and Wildlife Service. A Biological Assessment will be written and MaineDOT anticipates a Biological Opinion by 10/1/15.

• <u>Environmental Justice</u> - As evaluated in accordance with Executive Order 12898, the direct and indirect effects of the action is not expected to cause disproportionately high and adverse human health or environmental effects that will occur on minority populations and low-income populations.

MaineDOT and FHWA anticipate the action will not have significant impacts to planned growth or land use for the area; will not require the relocation of people; will not involve significant air, noise, or water quality impacts; will not have any significant impacts on travel patterns; and will not individually or cumulatively have any significant environmental impacts. MaineDOT expects an approved NEPA CE by 11/6/15.

Measures that will minimize the impact during construction and over the life of the finished project will be incorporated into the design and constructed in accordance with those design elements.

# 5. <u>Safety</u>

The project area will improve safety throughout its length by:

- Adding paved shoulders and eliminating soft gravel shoulders.
- Reducing large animal/vehicle conflicts. Innovative techniques will be used to minimize those conflicts (further discussion of these follow in next section).
- Reducing the roadway crown, minimizing problems associated with shifting loads in large trucks, particularly logging trucks.

• Making the road surface smoother, thereby facilitating winter plowing conditions by allowing more complete snow removal.

# **B.** Secondary Selection Criteria

## 1. <u>Innovation</u>

Innovation on this project lies not so much in new technology or funding mechanisms, simply because both the highway construction and bridge replacement for this project follow more traditional design-build techniques. However, at least one opportunity to employ alternative, innovative methodologies will be considered. Improved culvert design with wider widths to better accommodate stream flows and new design elements to accommodate fish movement will be given consideration during the design phase.

Other innovation opportunities do exist in terms of the need to minimize the large animal /vehicle conflicts and to reduce the short- and long-term environmental impacts to the Sandy River and its tributaries.

As noted previously, large animal/vehicle crashes in Phillips and Madrid account for 66 of the 300 crashes over the past ten years in this corridor between Strong and Rangeley. Of those crashes, 49 were moose/vehicle crashes and 17 were deer/vehicle crashes. <u>Appendix A</u>, entitled "<u>Large Animal Crashes</u>" contains details of crashes over the period from 2003 - 2013.

Safety elements to be utilized on the project include flashing warning signs to alert drivers to "Moose Crash Zones" and slope treatment techniques such as strategically placed to channel moose to more suit-able crossing locations where sight distance is optimum. Moose do not like to walk on surfaces, so, by using in critical locations, moose can be "coaxed" to more suitable



crossing locations.

The Sandy River, and in particular, Orbeton Stream, a tributary of the Sandy River, has been designated by the federal government as critical to the Atlantic salmon. A major effort by the Maine Department of Marine Resources to restore the endangered Atlantic salmon is continuing on Orbeton Stream.

The MaineDOT Environmental Office is closely involved with the planning of the Route 4 project. The project runs for much of its length parallel, and in close proximity to the Sandy River. Additionally, two bridges and 14 smaller stream-crossing culverts will be replaced. The careful design and construction techniques employed will seek to mitigate runoff and sedimentation from the project during construction

and to eliminate scouring and long-term run-off and sedimentation that could affect the Sandy River and the Atlantic salmon restoration program.

# 2. <u>Partnership</u>

As noted in the innovation section, best management practices will be used to mitigate short- and long-term impact on the fisheries and the Sandy River. MaineDOT has begun working with its State and Federal agency partners to ensure that mitigation of impact is appropriate to meet the challenges presented along the project. Early discussions have been useful in identifying the potential problems and focusing attention on the most practicable and innovative measures needed to meet those challenges. The inter-agency meetings will occur regularly during the development of the final project design.

# V. DEMONSTRATED PROJECT READINESS

# A. Technical Feasibility

MaineDOT has the technical capability to effectively develop, construct, and complete this project.

- Preliminary engineering is underway.
- NEPA is under way.
- Preliminary Design Report will be completed by March 26, 2015.
- Funding will be obligated by June 30, 2016

<u>Appendix B</u> is a "<u>Design Review of the Route 4</u>" project area showing a detailed evaluation of existing conditions, upon which a new design will be premised. <u>Appendix C</u> provides specific details on the "<u>Construction Materials and Costs</u>" of the project.

### **B.** Financial Feasibility

The Madrid-Phillips, Route 4 highway project, STP-1824(700)X, was approved on November 2, 2011 and authorized to proceed on November 7, 2011 for Preliminary Engineering and Right-of-Way.

### C. Project Schedule

- Initial Team Meeting July 2, 2014
- Preliminary Environmental evaluation July 23, 2014
- Preliminary Public Meeting October 15, 2014
- Preliminary Alignment Complete October 27, 2014
- Final Environmental Evaluation October 28, 2014
- Final Public Meeting March 3, 2015
- Preliminary Design Report Complete March 26, 2015
- Preliminary Environmental Coordination March 27, 2015
- Plan Impacts Complete August 23, 2015
- NEPA Complete November 6, 2015
- Final Environmental Coordination November 7, 2015

- Right-of-way Certification June 21, 2016
- Environmental Approvals and Package June 21, 2016
- PS&E Complete June 29, 2016
- Funding Obligated June 29, 2016
- Project Advertise July 20, 2016.

#### D. Assessment of Project Risks and Mitigation Strategies

The Project is located within Canada Lynx review area, Northern Long-Eared Bat review area and Atlantic Salmon Distinct Population Segment (DPS) and Critical Habitat. The project will require formal consultation with U.S. Fish and Wildlife Service.

The Route 4 project crosses the Sandy River in two locations and is very close to the road, paralleling the stream through most of the project area. As was noted previously, Orbeton Stream, a tributary of the Sandy River, is the location of an Atlantic salmon restoration project. Young fish ply the waters of Orbeton Stream and the Sandy River until they are sufficiently grown to migrate to the Atlantic Ocean. The pristine waters of the Sandy River and its tributaries offer prime habitat to support the young fish population. Additionally, the Atlantic salmon is an Endangered Species and activities that could harm the restoration effort are at the forefront of thinking early on in the environmental and construction planning.

MaineDOT in partnership with other State and Federal agencies (stakeholders) have had early and on-going discussions about the potential project impacts on the Sandy River and the types of mitigation that will be needed. Although it is too early to specify which erosion and sedimentation control practices will be deployed, the proximity of the Sandy River to the project area will likely utilize best management practices and new, innovative practices that may be needed to assure minimal impacts on the fisheries.

A Biological Assessment will be written and MaineDOT anticipates a Biological Opinion by 10/1/15. These early discussions and efforts are important in order to meet the project timeline for construction advertising in July, 2016.

### E. Project Costs and Benefits Analysis

The Phillips-Madrid, Route 4 highway is an important regional highway. As a Priority 2 Corridor, Route 4 is among a group of highways considered to be of statewide significance, but of lesser priority than the Interstate and most arterials in Maine. There are two bridges that serve this highway. They are Weymouth Bridge (#2934, built in 1933) and the Wing Bridge (#2955, built in 1933) both of which carry Route 4 over different sections of the Sandy River. The structures are single span structures of 45' and 62', respectively. Those bridges are considered part of this analysis. Both structures are considered structurally deficient and scour critical. The deck widths do not meet current design standards. The detour lengths, if these structures are closed are very long, as there are no alternative routes serving this area.

A benefit-cost analysis (BCA) was conducted on the highway reconstruction of the Phillips-Madrid section of Route 4. The analysis looks at the project from the standpoint of society as a whole, and accounts for the net benefits and net costs, based on the criteria described in the TIGER Grant NOFA, February 25, 2014. The analysis presented here addresses benefits from travel time savings, user costs, safety, and emissions reduction. Several benefits of this project are difficult to quantify. These unquantified benefits include increased economic competitiveness and livability enhancement. For additional information, see <u>Appendix D</u> entitled, "<u>Benefit-Cost</u> <u>Analysis Spreadsheet</u>."

### 1. <u>Base Case Assumption</u>

This benefit cost analysis compares the reconstruction project to the "no build" scenario, which is the base case assumption. This assumes that the existing bridges would be closed to traffic. The spreadsheets and files pertinent to this BCA are referenced in the BCA spreadsheet and are included in the Appendices to this application. The "no build" scenario assumed in this BCA is that both bridges would be closed effectively closing this important corridor. Existing and future traffic would be diverted to alternate routes, and to other bridges, thereby increasing travel time, mileage, air emissions and increased accidents.

# 2. <u>Project Benefits</u>

# A. Travel Costs

If the Bridges were closed and this section of roadway taken out of service, travelers would be forced to use alternate crossings and encounter significant detour routes. The resulting increase in vehicle-miles-traveled is estimated at 6,010,063 miles for 2015. This number was developed using MaineDOT's Statewide Travel Demand Model, a transportation analysis tool, based on the TRIPS modeling software that can be used to evaluate the impact of major changes in the highway network. The Model relies on population demographics, employment, and economic activity in order to forecast VMT. The Model can be used to evaluate the travel time and distance benefits of a major new bridge or highway facility and can also be used to evaluate the travel costs (disbenefits) of closing a major facility. For further information, see <u>Appendix E</u> entitled, "<u>Road Closure</u>."

For this analysis, the Model was run twice, once with the bridges in place and operating and once with the bridges lost or removed from service. The Model run with the bridges in place represents existing conditions. The Model run with the bridges removed represents conditions in which the loss of the bridge forces bridge users to alternate river-crossing routes that are longer in distance and time between the start and end points of their trips. Subtracting the existing conditions, Model results from the closed conditions provides an estimate of the increases in user costs from closure of the bridge, rather than allowing the crossing to be lost, represent the user benefits of a replacement bridge. The table below summarizes the assumptions for the calculations. Due the large volume of truck traffic the average vehicle-mile costs and average vehicle-hour costs are increased based on proportionate share. The total annual user costs are estimated at \$5,938,059 in the first year of closure, and increasing thereafter based on traffic growth. These operating costs are avoided by the highway reconstruction and bridge replacements.

# B. <u>Safety</u>

The loss of the river crossings is prevented by the replacement of the existing bridges in conjunction with the highway reconstruction project, and the increase in VMT and VHT would be avoided. The added travel from the loss of the bridges could potentially increase the number of crashes, and increase crash costs by a potential \$738,661 annually, based on overall Maine crash statistics.

# C. State of Good Repair

Estimated annual maintenance costs are derived from historic expenditures. If the bridges were closed, these costs are avoided. In this BCA, the annualized costs are added to user benefits since they are avoided costs to society if a new bridge is constructed. For additional information, see <u>Appendix F</u> entitled, "<u>Maintenance Costs</u>."

# D. Sustainability

The avoided air emissions are based on avoided VMT from closure of the bridge and the loss of this crossing location. The emission savings have been calculated for nitrogen oxides, volatile organics, and carbon dioxide. The calculations are based on factors that were applied to the avoided VMT resulting from closure of the bridge. Data is not available for sulfur dioxide or particulate emissions. Based on the annual VMT and VHT, approximately 3,700 metric tons of CO<sup>2</sup>, 3 metric tons of VOCs, and 4 metric tons of NOX, are avoided. These emissions amount to a total of over \$ 159,000 annually. The cost of carbon in CO2 emissions has been calculated in the BCA spreadsheet using the social cost of carbon (SCC) assumptions found in "Technical Support Document: Social Cost of Carbon for Regulatory Impact Analysis Under Executive Order 12866." The SCC increases over time because future emissions are expected to produce larger incremental damages as physical and economic systems become more stressed in response to greater climatic change. In conformity with this viewpoint, this analysis escalates the CO<sup>2</sup> portion of the air emissions cost increases estimated on Table 5: "Changes in the Average Annual Growth Rates of SCC Estimates between 2010 and 2050" in the report. The net present value of air emissions costs is 6.6 million at a 3% discount rate. For additional information, see Appendix G entitled, "Emissions Reduction on Route 4."

# 3. Project Cost

# A. <u>Total Construction Costs</u>

The benefit-cost analysis uses the replacement construction cost of \$12.2 million. The bridges are estimated at about \$1.4 and \$1.8 million separately, and the highway reconstruction is about \$9.0 million.

## 4. Conclusion

The Route 4 highway in Phillips and Madrid is two-lane rural highway serving Franklin County. It connects Maine with northern New Hampshire through a connection with State Route 16. It serves as an important economic link between Western Maine and Northern New Hampshire. A benefit-cost analysis was conducted on this highway reconstruction project. The analysis looks at the project from the standpoint of society as a whole, and accounts for the net benefits and net costs based on the criteria described in the TIGER Grant NOFA, February 25, 2014. The analysis presented here addresses benefits from travel time savings, user costs, crash reduction costs, and emissions reduction. The Benefit-Cost Analysis can be found in the Appendix together with the Benefit-Cost Analysis spreadsheet. The matrix below summarizes key factors for the analysis.

Current Status	Highway Reconstruction Including Two Bridge Replacements	Type Of Impacts	Population Affected	BCA Factors	Page Reference In BCA Narrative
<u>Highway</u> : Severe crowning, gravel shoulders, minimal clear zone, wild animal/vehicle conflicts, runoff	Route 4 and the two bridges over the Sandy River will be upgraded to meet current design standards. Over the past few	Without the new highway and bridges the public would experience,	The two bridges serve the rural arterial highway. The corridor links	Estimated dollar value of increased VMT, VHT.	Page 1-2
and sedimentation related concerns and impact to the Sandy River and	years, MaineDOT has made significant investments in	detours, delays, increased travel costs	Western Maine and Northern New	Cost of air emissions.	Page 2
tributaries, scouring of embankments	reconstruction of Route 4, a priority 2 corridor. The	and air quality impacts.	Hampshire and is important to	costs.	1 490 2
Bridges: cracking on abutment, scour issues, fair/poor condition, insufficient deck width, 81 years old, obsolete	section on highway in the towns of Philips and Madrid remains a deficient section, badly in need of reconstruction.		the regional and state economies.	Total Project Cost	Page 3

The annual benefits and costs values were discounted at 3% and 7% over a 50 year time horizon. Three percent is the most appropriate rate for the analysis because bridge has a very long life, and in addition, the alternate use of funds would be a public expenditure as opposed to a private

investment. The full analysis can be found in the spreadsheet attachment to this application. A summary of the results of this analysis are as follows.

- Total Benefits of \$195.6 million
- Avoided Air Quality Impacts valued at \$6.6 million
- Reduced User Costs estimated at \$173.2 million
- Avoided Crash Costs of \$21.5 million
- Avoided Maintenance Costs of \$47,000
- Total Costs of \$12.2 million
- Benefit-Cost ratio of 15.4

When discounted at 7%, the benefits and costs are lower. A larger discount rate implies that time preference for future amounts are preferentially discounted more severely. The amounts are show below.

- Total Benefits of \$98.7 million
- Avoided Air Quality Impacts valued at \$3.2 million
- Reduced User Costs estimated at \$90.9 million
- Avoided Crash Costs of \$11.3 million
- Avoided Maintenance Costs of \$25,400
- Total Costs of \$11.8 million
- Benefit-Cost ratio of 8.3

User costs represent a large portion of the total annual benefits. These user-cost savings are the key driver of the benefit-cost ratio; the other cost savings individually have a small influence on these results.

### VI. FEDERAL WAGE RATE CERTIFICATION

Maine Department of Transportation Commissioner David B. Bernhardt's <u>Certification of Federal Wage Rates.</u>

# APPENDICES

- Appendix A. Large Animal Crashes
- Appendix B. Design Review of Route 4
- Appendix C. <u>Construction Materials and Costs</u>
- Appendix D. Benefit Cost Analysis Spreadsheet
- Appendix E. <u>Road Closure</u>
- Appendix F. Maintenance Costs
- Appendix G. Emissions Reduction on Route 4

To view the entire file for the TIGER 2014 Grant Application, click on the following link.

http://www.maine.gov/mdot/tigergrants/tiger2014/phillipsmadrid/index.htm

