

MAINE RAILROAD BRIDGE CAPACITY PROJECT

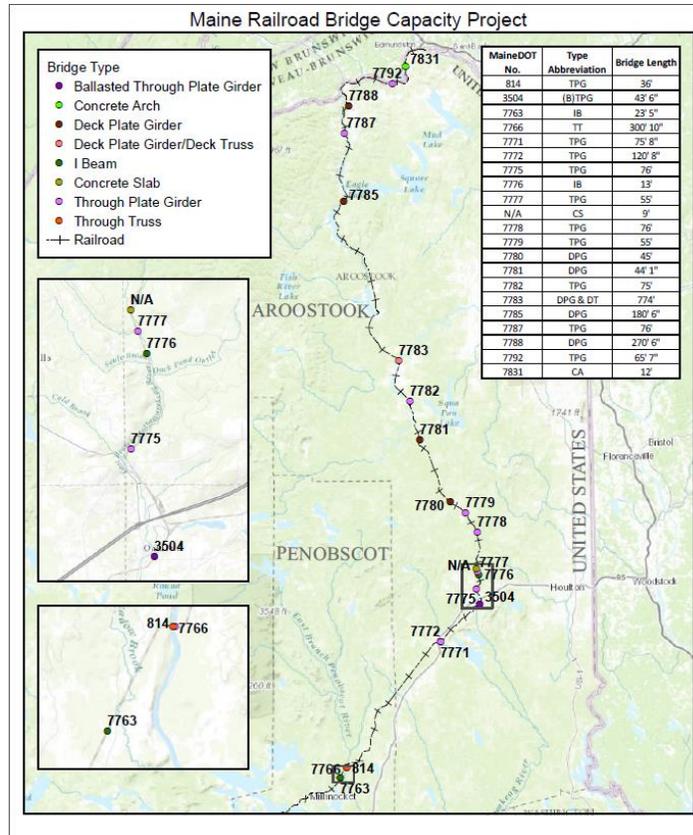
Project Name	Maine Railroad Bridge Capacity Project
Was a FASTLANE application for this project previously submitted?	No
If yes, what was the name of the project in the previous application?	
<i>Previously Incurred Project Cost</i>	\$ 0
<i>Future Eligible Project Cost</i>	\$ 15,780,000
Total Project Cost	\$ 15,780,000
FASTLANE Request	\$ 7,890,000
Total Federal Funding (including FASTLANE)	\$ 8,140,000
Are matching funds restricted to a specific project component? If so, which one?	Yes, \$250,000 from NBRC for Sheridan Bridge
Is the project or a portion of the project currently located on National Highway Freight Network?	No
Is the project or a portion of the project located on the National Highway System, <ul style="list-style-type: none"> • Does the project add capacity to the Interstate system? • Is the project in a national scenic area? 	Yes, through current and future truck traffic to rail No
Do the project components include a railway-highway grade crossing or grade separation? <ul style="list-style-type: none"> • If so, please include the grade crossing ID. 	No
Do the project components include an intermodal or freight rail project, or freight project within the boundaries of a public or private freight rail, water (including ports), or intermodal facility?	Yes, freight rail project
If answered yes to either of the two component questions above, how much of requested FASTLANE funds will be spent on each of these project components?	Freight Rail – 100%
State(s) in which the project is located	Maine
Small or large project	Small
Urbanized Area in which project is located, if applicable	Rural
Population of Urbanized Area	NA
Is the project currently programmed in the: <ul style="list-style-type: none"> • TIP • STIP • MPO Long Range Transportation Plan • State Long Range Transportation • State Freight Plan? 	Yes (amendment requested) Yes (amendment requested) N/A no MPO Yes Yes

MAINE RAILROAD BRIDGE CAPACITY PROJECT

**U.S. Department of Transportation
 FOSTERING ADVANCEMENTS IN SHIPPING AND TRANSPORTATION
 FOR THE LONG-TERM ACHIEVMENT OF NATIONAL EFFICIENCIES
 “FASTLANE”
 GRANT APPLICATION**

Project Name: Maine Railroad Bridge Capacity Project
 Project Type: Freight Rail
 Project Location: Rural, Maine 2nd Congressional District
 Funds Requested: \$ 7,890,000 - (50%)
 Other Federal Funds Matched: \$ 250,000 - (2%)
 Non-Federal Funds Matched: \$ 7,640,000 - (48%)
 Total Project cost: \$15,780,000
 Contact: Mr. Nathan Moulton, Director Rail Program
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 DUNS #: 80-904-5966

MAINE RAILROAD BRIDGE CAPACITY PROJECT



Project Summary

Maine Department of Transportation (“MaineDOT”) is seeking \$7,890,000 from a U.S. Department of Transportation (“USDOT”) Fostering Advancement in Shipping and Transportation for the Long-term Achievement of National Efficiencies (“FASTLANE”) grant. The total cost of the project is \$15,780,000, fifty percent of which (\$7,890,000) will be matched by MaineDOT (\$5,640,000), other federal dollars (\$250,000) and the private operating railroad Maine Northern Railway (\$2,000,000).

The *Maine Railroad Bridge Capacity Project* will:

- a) Make improvements and upgrades to 22 railroad bridges on a state-owned railroad operated by the Maine Northern Railway allowing freight on that line to be transported in railcars loaded up to the industry standard of 286,000 pound gross vehicle weight, improving customer access to the national rail network and reducing highway congestion in the upper northeast corner of the U.S.
- b) Continue to leverage a successful public-private partnership that has already resulted in the restoration and revitalization of a transportation resource crucial to ensuring economic competitiveness within the region.
- c) Improve the accessibility and long-term prospects for the economy and the environment in a challenged rural region by improving the efficiency of the freight transportation network that is vital to industry and global competitiveness.
- d) Realize the USDOT goal of improving inadequate first-mile and last-mile segments and facilitating freight movement across land border crossings.

The *Maine Railroad Bridge Capacity Project* (“Project”) will invest in upgrades and improvements to 22 railroad bridges on the Maine state-owned railroad operated by the Maine Northern Railway in the northeast corner of the state and the country. These improvements will allow the railroad to safely increase the loaded weights for railcars traversing the bridges yielding more than 10% additional capacity per-railcar as the gross weight of railcars reaches the North American railroad standard of 286,000 pounds at the track speed of 25 mph. The additional capacity per railcar creates efficiencies with obvious public benefits such as reduced fuel consumption and accompanying greenhouse gas emissions for the same amount of freight moved, fewer trucks on the state’s and region’s highways and improved transportation efficiencies for the manufacturing industries in northern Maine. These improvements satisfy USDOT’s stated goal of improving first-mile and last-mile segments by putting them in a state of good repair and expanding the industry standard to the region. Given the connectivity of this region to multiple border crossings, it also facilitates a more efficient movement of goods through those crossings. Funds from this FASTLANE grant will leverage recent public and private investment in this railroad and other short line railroad infrastructure in Maine continuing to create solid and sustainable distribution corridors. This project continues to capitalize on the TIGER II and pending TIGER VII investments made by USDOT, MaineDOT and short lines in Maine to ensure the continuation and improvement of regional freight rail service. The former project saved the railroad and transportation in the region from near-certain rail abandonment and customers reacted with rail traffic on the line that has grown far beyond initial projections. The latter project will make capacity improvements that allow this railroad to continue to grow

and absorb even more traffic for customers on the line in addition to capacity for new customers. These increases in the capacity on the line allow for improved competitiveness for industry in this vital region and it will further allow Maine industries to compete effectively both nationally and internationally. This project will create long lasting positive impacts on industries in the region thus ensuring the preservation and creation of jobs and economic viability in this very rural area of the country.

The Project will be ready to proceed immediately upon receiving an award and contracts for final design on the bridges being let with construction immediately following. The work to be completed is upgrades and improvements for railroad bridges. They are on existing railroad operating right of way; therefore, a Categorical Exclusion is expected for most of the project areas with modest permitting for seven of the bridges where in-water work is required. Assuming grants awards are made in the spring of 2017, MaineDOT anticipates the Project will be completed by the end of 2019. The parties to this grant application have successfully completed projects with USDOT funding in the past and have demonstrated the ability and commitment to complete those projects early or on-time.

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Standard Form 424, Application for Federal Assistance

Project Narrative

I. Project Description

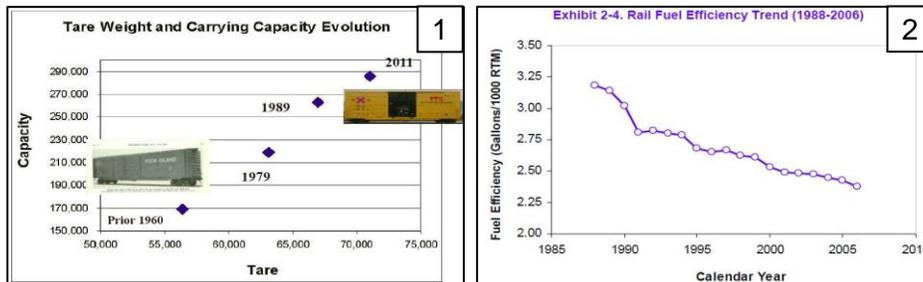
a) PROJECT DETAILS AND BACKGROUND

Within a decade of the passage of the Staggers Act that deregulated the US freight rail industry in 1980, railroads, now more focused on sustainable earnings in a competitive environment, began detailed research into the impact of increasing the allowable gross vehicle weight on rail (“GVW”); the total weight of the freight shipped in each railcar plus the tare weight of the railcar itself. By 1991, the freight rail industry began accepting railcars with 286,000 lb. gross vehicle weight (“286”) in interchange service through the use of bilateral agreements between railroads.¹ By the mid-1990s, *some 20 years ago*, 286 was approved for railcars on the general railroad

¹ Transportation Research Forum, Introduction of Heavy Axle Loads by the North America Rail Industry, Carl Martland, http://www.trforum.org/journal/downloads/2013v52n2_06_HeavyAxleLoads.pdf p. 102 (last visited Dec. 5, 2016).

network.² While this significantly increased the near term and long term capital costs for upgrading and then maintaining track and bridges, the increased capacity and resultant operating savings that it generated exceeded those capital costs in most instances for the Class I railroads which could enjoy the savings over many customer shipments that traveled long distances. With more tons per load, fewer cars and less fuel would be needed to transport a given amount of freight, and more net tons could be handled without increasing the number of train miles or crews.³ The longer the distance of the trip and the greater the number of carloads, the more beneficial it would be to the railroads investing in the upgrade which could enjoy the fuel savings and reduction in crew costs per lading. For short line railroads, however, which normally have very light carload density in comparison to Class Is and are far shorter in terms of miles variable expenses that investment was far more challenging to justify.

While not the sole driver (locomotive improvements, new technology, improved operating practices and shifts to unit trains also had an impact), the technological shift to larger cars with greater carrying capacity and lower tare weights (see Chart 1)⁴ has been a significant driver to the ratio of gross ton miles (“GTM”) per revenue ton mile (“RTM”) which has fallen and fuel efficiency has thus increased. FRA describes this as a principal contributor to the fuel efficiency improvements. The fuel efficiency improvements of the North American rail system between 1990 and 2006 improved by over 20%⁵ (see Chart 2)⁶. “Technical improvements in railroad freight cars, most importantly the increase in allowed total car weight from 263,000 lb to 286,000 lb over most of the U.S. railroad network. This increase in total car weight increases the ratio of payload to empty weight for all car types, leading to a direct reduction in the GMT/RTM ratio and, hence, power consumption for a given volume of freight.”⁷ More simply, the higher the net/tare ratio of the railcar, and more lading is moved with the same weight of the car.



Fast forward to 2016, and nearly all of the North American Class I railroad network can handle 286 loads and railroads now boast of being able to carry a ton of freight nearly 500 miles on a single gallon of gas. It has now become the industry standard such that all new railcar construction is for railcars that can accommodate 286 GVW (the exception would be specialty cars for unique cargo). That said, in the last survey taken by the American Short Line and Regional Railroad Association (“ASLRRA”), it revealed that more than 35% of route miles on

² Comparative Evaluation of Railroad and Truck Fuel Efficiency on Competitive Corridors, US DEP’T OF TRANSPORTATION Federal Railroad Administration, <https://www.fra.dot.gov/eLib/details/L04317>, p. 23.

³ See id. p.105.

⁴ Robert Pickel, page 3,

<http://www.aar.com/standards/AAR%20Damage%20Prevention%20and%20Freight%20Claim%20Conference/6-18-13-main%20session.pdf>

⁵ SUPRA note 2, Comparative Evaluation of Railroad and Truck Fuel Efficiency on Competitive Corridors p. 11

⁶ SUPRA note 2, Comparative Evaluation of Railroad and Truck Fuel Efficiency on Competitive Corridors p. 14.

⁷ SUPRA note 2, Comparative Evaluation of Railroad and Truck Fuel Efficiency on Competitive Corridors p 33.

Class II and Class III railroads still cannot accept 286 traffic, roughly 22,000 route miles.⁸ For those rail properties that cannot accept 286 traffic this shows up as a disadvantage to shippers located on their lines. They do not enjoy the most modern rail equipment and suffer from higher shipping prices as the railroads must charge more as their costs are higher to ship restricted weight traffic. FRA itself put it simply, “Just as the 53-foot truck trailer is ubiquitous to the highway freight system today, the 286,000-pound car is now a permanent part of the rail freight system. A carrier unable to handle cars of this weight cannot offer its customers the efficiencies (and lower rates) that come from this service. These benefits manifest themselves in fewer cars to load and unload and lower shipping rates.”⁹ The key factor that allows for the fuel efficiency and other operational benefits of 286 is the ratio of a railcar’s carrying capacity to its empty weight.

Short lines continue to face multi-front challenges with the overall increases in the standard of the rail network. Since they originate and terminate traffic yet do not move it great distances they cannot enjoy the savings that are amplified over greater distances. With little potential for savings directly on their line, there is still the push to get to 286 as their customers are disadvantaged without those capabilities and that ultimately could cost them business of their own.¹⁰ Since these lines are normally rather light density with few customers, it is even more important that the customers that they do have on the line both survive, but as importantly grow and generate more traffic. While not with the specific intent to harm the short lines and their customers, the rail market place often does just that by offering better rate structures to customers that can ship 286 loads. In some cases, Class Is that are both within trucking distance from the short line’s customers and where trucks and drivers are plentiful, have set up transloading sites to truck the freight from the customer’s door, around the short line that directly serves the customer, and puts it on the Class I for long-haul delivery at the more efficient 286 weight. The challenges to these lines are many, the operating savings over these short distances often few but the potential *public* benefits for improving the lines to handle 286 can still be great.

The Maine Northern Railway (“MNR”) mainline Madawaska Sub, the focus of the Project, is only 151 total route miles (there are also 53 miles of branch lines so any individual shipment would travel a shorter distance) so the operating and fuel savings that would allow for the significant investment to bring the line to 286 capacity if solely focused on the returns from the investment on this property alone are only realized in that short distance while the rail system and public would benefit from the full travel distance of the load from origin to destination. In the case of MNR, shipments can go from northeast Maine as far as the west coast, some 3,000 rail miles or more, so more than 90% of the benefits would be realized *off* of the railroad that requires the first-mile and last-mile upgrades. From a public perspective, there is a substantial increase in truck traffic on the highway that could instead enjoy the public benefits of being on the rail but if not for the capital investment to allow for the upgrade to safely handle 286 traffic. In many cases short lines are made to feel like they are forced to absorb the capital costs to upgrade to allow that traffic when there is simply not the business case to be made.

⁸ American Short Line Railroad Association, Short Line and Regional Railroad Facts and Figures, 2014 Edition, <https://www.aslrra.org>.

⁹ Summary of Class II and Class III Railroad Capital Needs and Funding Sources, U.S. DEPT. OF TRANSPORTATION, Federal Railroad Administration, <https://www.fra.dot.gov/Elib/Document/14131>, p. 19.

¹⁰ See An Estimation of the Investment in Track and Structures Needed to Handle 129,844 kg (286,000 lb.) Rail Cars on Short Line Railroads, Resor, Zarembski and Patel, http://www.sdfreightrail.com/docs/286_study.pdf, p. 2.

Preserving a vibrant rail system has long been a goal of the Maine DOT both in words and deeds. Due to Maine's geographic location, light density of population and abundance of natural resources, connecting Maine to the broader U.S. economy as well as making it competitive as an exporter to Canada, Latin America and Europe, is vital. To accomplish this, the region must preserve existing industry and continue to create access to the global marketplace for Maine's resources and finished goods. While Maine enjoys the benefits of the local connections and dedication of numerous short line (Class II and Class III) railroads, it is one of only three states in the US that does not have a Class I railroad within its geography, a critical void in the transportation system of the region.¹¹ Without the national reach of a major system and the resulting revenues that can be enjoyed by shipping commodities long distances across the same rail network it has proven difficult for Maine's railroads to make the kinds of investments required to keep speeds competitive and the railroads "fit for purpose." Additionally the Maine economy that supported rail investment has historically been driven by the pulp and paper industry. Today there are eight remaining pulp and paper mills, fewer than half the number that existed in the state in 1980.¹² Transportation of the feed ingredients to the mills, pulp wood and chips today have to travel a greater distance within the state as only one mill remains in northern Maine with the rest now in eastern and southern Maine. Combined with a light density of industry and customer base and a large geography and little overhead traffic (the vast majority of rail traffic originates or terminates in Maine), the railroads in Maine have needed a financial lift to create the kind of investment required to return the railroads to speeds they enjoyed in the past when the paper industry was more robust and mill closures were not an unfortunate and too frequent occurrence. They received that in the form of a TIGER VII grant. Through these investments and improvements to the infrastructure and the resulting improvements in transit time to market, the existing customers in the paper and forest products industry will be more competitive and resilient. This will afford the railroads more traffic and revenues allowing for further and continuous investment in their properties. The remaining piece of the puzzle to more completely modernize the Maine rail system, the collection of short lines that are almost entirely first-mile and last-mile segments, is to invest in 286 capability for the railroad in the northeast corner of Maine that was nearly abandoned at the end of the last decade and is now a vibrant short line shipping over 17,000 carloads in 2016. The east-west lines that allow rail traffic to flow in and out of Maine both from and to Canada will have 286 capability upon completion of the TIGER VII grant and the line that runs south into and out of Maine connecting the region with the US eastern Class Is is 286. The MNR railroad in northern Maine requires improvements and upgrades to some 22 rail bridges to allow 286 traffic for the customers and highway users in that region to enjoy its benefits and to flow 286 traffic in all directions onto the North American rail network.

This project continues a virtuous investment cycle for Maine industries and railroads that will allow them to compete on more equal footing for decades to come. Better rail service results in more competitive industries, which in turn drives more traffic to the rails and onto the national and international rail network resulting in more capital investment by the railroads. This is a story that has been playing out in the US and Canada for well over a decade and now there is a

¹¹ See Appendix B, Maps with Project Locations, Geospatial Data, Photos.

¹² Paper Mill Closings Take Their Toll, Patrick Whittle, The Boston Globe, Nov. 11, 2014 "Decline of Maine's paper mills hurts middle class."

path to replicate it Maine. The project better connects the major employers of northern and eastern Maine to the national freight transportation system preserving existing good paying manufacturing jobs and creating new jobs in an area that has seen a steady decline in industry and employment well below the national average.

Pulp, paper and allied products along with lumber or wood are the primary commodities originating in this section of Maine. They combine for over 30 percent of Maine exports overall and 96 percent of originating rail traffic in Maine and a similar number on the MNR.¹³ In 2015, forest products was Maine's largest export industry with sales of wood, pulp, paper and lumber totaling an aggregated \$740 million.¹⁴ This is important for our country as the region is one of the largest sources of wood fiber east of the Mississippi River and this important resource is needed by industries both within the region and outside of the northeast. Upgrading the capacity of this rail line will allow products to get to ports and to the national rail systems of the US and Canada in a more cost effective, efficient and timely manner. This is particularly important in the US which relies on a just in time economy.

Because so many of the industries and so much of the rail traffic on the line are in the forest products business, the increase in the capacity of the railcar is ideally suited to achieve the efficiency gains that come with bigger equipment. "The full benefits of the 286k GVM limit cannot be achieved unless there is a match between the cubic capacity of the car and the density of the commodity; it is quite possible that a car rated for 286k GVW can be fully loaded without reaching the 286k limit."¹⁵ The products shipped on this line all move most efficiently in railcars at 286 loading. Those include printing paper, logs, woodchips, lumber and manufactured beams. Each of these products can take advantage of higher capacity railcars. Boxcars loaded with paper have loading patterns that maximum the space and weight. Log cars can get an extra row of logs in the higher capacity cars. Woodchip hoppers with higher sidewalls were designed specifically to load up to 286. Centerbeam flat cars that carry finished lumber products and beams also can be loaded up to 286. For over 95% of the existing traffic on the line there is a match between the commodity and a higher capacity railcar. Presently MNR leases over 1,400 railcars and every car was built to handle 286 loads. The match is ideal. The greater the loaded capacity of the railcars, the stronger the advantage is over trucks further improving the public benefits of fuel savings and highway expense reduction.

Ultimately the benefits of the project are accrued by shippers and customers not only within the region and but to areas far outside of the region. An August-2009 study funded in part by USDOT entitled "Northeast CanAm Connections: Integrating the Economy and Transportation" (the "NE CanAm Study") focused on transportation in the northeast states of Maine, New York, New Hampshire and Vermont and the eastern Canadian Provinces.¹⁶ The study reached several important conclusions supportive of the regionally significant and transformative impacts of this project. It found in the rail transportation improvement scenarios, the "benefits are almost

¹³ See 2014 Maine State Rail Plan, <http://maine.gov/mdot/ofbs/docs/drafrailplan2014.pdf> (last visited May 28, 2015).

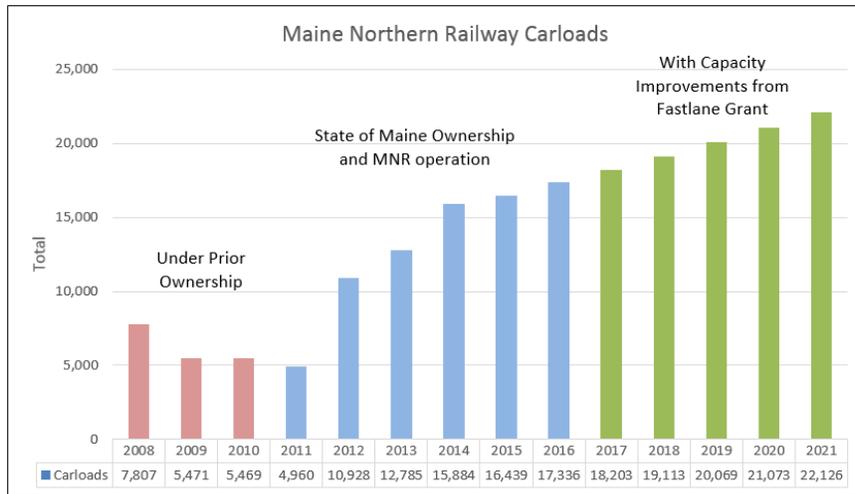
¹⁴ See Maine Development Foundation, Measures of Growth, <http://www.mdf.org/publications/Measures-of-Growth-2016/859/> p. 11 (last visited Dec. 5, 2016).

¹⁵ Transportation Research Forum, Introduction of Heavy Axle Loads by the North America Rail Industry, Carl Martland, http://www.trforum.org/journal/downloads/2013v52n2_06_HeavyAxleLoads.pdf p. 107 (last visited Dec. 5, 2016).

¹⁶ See NORTHEAST PANAM CONNECTIONS: INTEGRATING THE ECONOMY AND TRANSPORTATION FINAL REPORT, Wilbur Smith, <http://canamconnections.com/bm~doc/Final-Report.pdf> (last visited May 28, 2015).

entirely accrued by shippers outside of the NE CanAm Region.”¹⁷

At the time of the proposed abandonment of the rail lines that today comprise the MNR, the railroad was down below 5,000 carloads. Since that time volumes have more than tripled and will crest 17,000 carloads in 2016. In the four years after the completion of the TIGER II grant (2012-16), rail traffic volumes increased nearly 60%, or some 15% per-year. Projections after the completion of this FASTLANE grant to improve capacity are another 5% per-year over the previous five years based on existing customer feedback and potential new business on the line.



With a strong history as guide, this level of improvement is conservative and achievable. As stated previously, these are almost entirely outbound loads from shippers on the line and a majority are exported from the US. This continued growth aids the challenged manufacturers in this region and our country’s balance of trade.

The Project enjoys significant support at many and varied levels throughout the region. Manufacturers on the line have been vocal about the need for modernizing the rail line to the national standard to allow them ship their products more competitively with Canadian mills. The Northern Maine Development Commission (“NMDC”) which, recognized the clear-cut need to save and preserve the rail line and was so supportive of the TIGER II grant, and is now a strong proponent of this capacity improvement project. The NMDC is a membership organization of participating communities and counties in the Northern Maine Economic Development District. It provides federal and state services at the regional and local levels and is the regional EDA planning and management entity and serves as the lead agency for the USDA Aroostook Country Empowerment Zone. The other major shortlines in Maine each support the project and the positive impact it will have on rail traffic; Pan Am Railway, Central Maine and Quebec Railway and Eastern Maine Railway. Support for this project is included in various aspects of the 2014 Maine State Rail Plan (discussed further in Project Parties).

The Project is led by MaineDOT, which has successfully prosecuted multiple grants from USDOT. MaineDOT is again partnering with the railroad operator Maine Northern Railway who has consistently shown to be a fine steward of public investments in their railroad to support

¹⁷ See id.

the public good of taking trucks off the highway and promoting the vibrancy of northeast Maine. The MNR is also a strong financial partner for the Project. The Project is expected to be completed by 2019 but the region will only begin to realize the benefits from the Project upon to full completion, as it is the upgrade to 286 to the final bridge that will safely accommodate the first heavier traffic on the railroad.

Quantitative and Other Facts

Project Name: Maine Railroad Bridge Capacity Project¹⁸

- The \$15,780,000 in freight rail infrastructure investment will yield \$47,340,000 in economic output for this region.¹⁹
- The project has a total Net Present Value (NPV) of at least \$48 million and a benefit-cost ratio of at least 3.28 to 1. For the purposes of this FASTLANE grant application, the Benefit Cost Analysis is extremely conservative, as it assumes no growth after 2021.
- Over a 20-year period fuel savings are valued up to \$12.8 million at a 7% discount rate.
- The NPV of the reduction in carbon emissions is at minimum \$ 3.1 million over 20 years.
- The NPV of the savings on highway maintenance costs is \$11.08 million over 20 years.
- A private company match of \$2,000,000 (12.7%) has been committed by Maine Northern Railway.²⁰
- Approved Maine State bonding will contribute \$5,640,000 (35.7%) to the project.²¹
- Additional federal funding of \$250,000 (1.6%) from the Northern Border Regional Commission will be directed to a specific bridge in Aroostook County.
- The project is in Aroostook County and Penobscot County.
- The project is in Maine's Second Congressional District represented by Bruce Poliquin.
- The state is represented by U.S. Senators Susan Collins and Angus King.
- Total Cost of the Project: \$15,780,000.

b) Statement of Work

The focus of the Project is to raise the loading capacity of railcars on the Maine Northern Railway to the industry standard of 286 GVW and at a speed of 25 mph to match the yard and interchange improvements that are being made with the TIGER VII grant to ensure greater efficiency and reliability. There are 42 bridges on the Madawaska Subdivision of the Maine Northern Railway. VHB (a firm of 1,300 professional engineers, planners, scientists and designers, described more thoroughly in Project Parties) conducted a hands-on visual inspection of each of these bridges. Additionally, VHB developed draft as-inspected load ratings for 28 of the existing bridges for which existing plans were available to determine if they could support 286k train traffic at 25mph. (Briefs describing each individual each bridge can be found at <http://www.maine.gov/mdot/tigergrants/tiger2017/>).

¹⁸ See Appendix A, Benefit-Cost Analysis.

¹⁹ Association of American Railroads studies indicate that every dollar invested in freight-rail infrastructure created by investment tax incentives generates more than three dollars in total economic output due to investment, purchases and employment occurring among upstream suppliers. See ASSOCIATION OF AMERICAN RAILROADS, INFRASTRUCTURE INVESTMENT, <https://www.aar.org/BackgroundPapers/Freight%20Railroad%20Capacity%20and%20Investment.pdf> (last visited Dec. 5, 2016).

²⁰ See Appendix E, Match Letters.

²¹ See Appendix D, Support Letters.

Based on VHB’s inspections and as-inspected load ratings, 22 of the 42 structures on the Madawaska Subdivision require strengthening or repairs to carry 286k train traffic at 25mph *(Please note that there are only 21 unique bridge numbers as recorded by MaineDOT that will be part of the Project but one bridge has two unique sections requiring different improvements. As such, the Project considers that a separate bridge and the count of bridges that must be completed is 22. The Project Plan and all descriptions in this application reflect that count of 22.)* At least 20 of these bridges are greater than 60 years old (two of the bridges have *unknown* build dates), 16 of which were built before World War I and nine were built during Grover Cleveland’s second term in office in the middle 1890s. They range in length from less than ten feet to over 600-feet.



Of the 22 bridges that are part of the Project, 14 bridges require strengthening, three bridges require superstructure replacements, one bridge require complete replacement and four bridges require significant repairs. For the bridges that require strengthening, the scope of work will primarily be the replacement of existing top and bottom flange cover plates on primary members (deck plate girders, through plate girders and truss members) and the installation of cover plates or replacement of secondary members (floorbeams and stringers). There are three bridges that are short spans, ranging from 9’-0” to 23’-5” that cannot be strengthened and will instead require new superstructures. There is also a concrete arch which is in very poor condition and requires complete replacement.



Existing plans for the 14 concrete and granite structures were not available so these bridges were not rated. As noted in the MaineDOT Bridge Load Rating Guide, “a concrete bridge with unknown details need not be posted for restricted loading if it has been carrying normal traffic and shows no distress.” There are non-destructive methods for determining the spacing and size of reinforcing steel in concrete structures but they can be costly and less accurate than desired for load rating purposes. Based on the observed condition of these bridges, none of these bridges require restrictions for 286k train traffic at 25mph except for one concrete arch which is in very poor condition and will be replaced.

There are four structures that have sufficient load carrying capacity, but have either superstructure or substructure deterioration that requires repairs to safely carry 286k traffic at 25mph.

- The through truss in Grindstone (MaineDOT Bridge No. 7766) has a cracked floorbeam

MAINE RAILROAD BRIDGE CAPACITY PROJECT

that requires repair. Additionally, all of the existing bridge timbers on the truss are in poor condition and need to be replaced.

- At the 2 span through plate girder bridge in Island Falls (MaineDOT Bridge No. 7772), the west end of the pier is spalling and has started to undermine to bearing area. Since the bridge is a two girder system, a failure at this bearing will cause a failure of the bridge. The deteriorated concrete at the west end of the pier will be removed and the pier end will be rebuilt.
- There are 2 bridges that carry the Madawaska Subdivision over the Fish River; one in Eagle Lake (MaineDOT Bridge No. 7785), and one in Fort Kent (MaineDOT Bridge No. 7788). The abutments and piers at both of these bridges are very tall, with a maximum height near 40 feet. All four abutments at these bridges have significant cracking between the wingwalls and the abutments. The wingwalls will be stabilized to prevent a failure of the wingwall.



In addition to the strengthening and major repairs described above, minor repairs and maintenance work will be completed at all 22 structures that are proposed to be part of the program. These repairs will generally include concrete patch repair, masonry repointing, replacement of small timber wingwalls and retaining walls, bearing repairs, and bridge timber replacement to bring these structures to a state of good repair.

There are a terrific variety of structures that are part of the Project. While eleven of the bridges are through plate girder bridges and five are deck plate girder bridges, there are also I-beam bridges, a concrete arch bridge, a concrete slab bridge, a deck truss bridge and a through truss bridge. Because there are so many types of bridges the repair work is in many categories. The breakdown of the \$15.78M total Project cost is in the adjacent table.

Project Areas	Cost
Truss Strengthening and Repairs	\$2,740,000
Substructure Repairs	\$2,410,000
Superstructure Strengthening and Repairs	\$1,470,000
Bridge Timber Replacement	\$1,270,000
Mobilization	\$1,020,000
Culvert Replacement	\$932,000
Misc. Items	\$900,000
Superstructure Replacement	\$430,000
Site Access / Maint. of Roadway Traffic	\$370,000
Maint. of RR Traffic/Protection Cost	\$330,000
Bearing Repairs / Replacement	\$150,000
Contingency (10%)	\$1,210,000
Engineering	\$1,588,800
Inflation Adjustment Factor for 2018/2019 Construction	\$951,200
Total Project Cost	\$15,780,000

Included in those costs are the engineering work required, contingencies of 10% as well as an inflation factor on the current year cost estimate that reflects that the actual construction and repairs will not take place until 2018 and 2019 assuming a grant is awarded in the spring of

2017. (A detailed project schedule along with a Gantt chart is included in Project Readiness.) Upon completion of the Project, the bridges on the MNR will be able to handle 286 traffic at 25 mph for the long term. The aged bridges on the railroad will be returned to a state of good repair also reducing future maintenances costs and saving approximately \$235,000 in annual bridge maintenance because of the Project's improvements. Shippers will be able to ship railcars loaded to their capacity north to export to Canada, south to connect with other Maine short lines for furtherance east to New Brunswick, Canada for export, west to Quebec, Canada for export and south into the main US rail system. When combined with the improvements pending from the TIGER VII grant, Maine will have a rail system that operates 286 traffic at 25 mph and shippers in the state and region can fully participate with the North American rail systems at the industry standard for the first time.

If a FASTLANE grant is not awarded and the Project is not completed as described, the traffic growth for shippers served by the MNR could begin to wane as they fall further behind economically. MaineDOT which has responsibility for maintenance of the bridges on the railroad will fulfill its commitments and obligations to maintain the current level of service as it is committed to the customers on the line. The goal, however, for including this important region and the shippers as part of the North American rail standard would not be met within 15 years. Maine could afford to slowly and gradually make upgrades but it would take far longer to complete the last of the bridges which then allows for the safe increase in loading capacity. Eventually the rail system standard will take another leap forward in capacity. It is inevitable. "The history of freight railroad technology shows a pattern of increasing vehicle size with increasing axle loads as developments in materials and engineering knowledge have made their use technically feasible and economically undesirable." There is nothing magical about 286 GVW loading. The rail industry will once again expand beyond that. Without the benefits of the Project, shippers would get left further and further behind and the rail mode at the present level of only 263,000 of GVW will be made less competitive.

Completion of the Project yields a vastly different outcome. Manufacturing industries in this challenged region will be given a better chance to compete and deliver their goods to market as efficiently as their neighboring competitors across the border. That will improve their cost structures and prospects to compete for the long term. With expected rail traffic growing to over 22,000 annual railcars from existing customers within five years of completion of the Project, additional trucks kept off the highways reducing costs of road infrastructure, saving fuel, reducing greenhouse gas emissions and improving safety. This region desperately needs the chance to compete on an equal footing.

II. Project Location

- a) Location - Maps, geo-spatial information²²
- b) The project is in Aroostook County and Penobscot County.
- c) The project is in Maine's Second Congressional District represented by Bruce Poliquin. The state is represented by U.S. Senators Susan Collins and Angus King.²³
- d) This is a Rural project.

²² See Appendix B, Map and Photos.

²³ See Appendix D, Support Letters.

The vast majority of the railroad and 19 of the bridges in the Project are located in Aroostook County, Maine, with the balance in Penobscot County. Aroostook County is the largest county in the US by land area east of the Mississippi River; the size of Connecticut and Rhode Island combined. Yet unlike Connecticut and Rhode Island which combined have a population over 4.5 million people, Aroostook County's population has fallen below 70,000 residents and has been falling steadily for nearly 60 years. Since 1960, the population of Maine has grown 37% while the population of Aroostook County has fallen 32%.²⁴ This is driven by the diminishing employment in the region as paper and lumber mills and the good manufacturing jobs they have supported, have been eliminated with mill closures. While Maine overall has kept up nicely with reductions in unemployment and is now below the national average, Aroostook County's current unemployment is 5.5%. This far exceeds the state average of 4.1% as well as the national average of 5.0%.²⁵

Aroostook and Penobscot Counties are each within the Northern Border Region. The Northern Border Region Commission ("NBRC") was formed by Congress in 2008 in order to help alleviate distress in hard-hit northern counties as changing markets global competition have challenged the northeast's once vibrant economy. Both of the counties are considered "Distressed" because they "have high rates of poverty, unemployment and outmigration" and "are the most severely and persistently economic distressed and underdeveloped."²⁶

Aroostook County in particular is strategically vital for US national interests given its extensive border with Canada. The Maine-Canada border is 611 miles and well over half of that borders Aroostook County. That includes more than a dozen border crossings including one by rail. Given that proximity, businesses and manufacturers in particular, are always in competition with Canadian counterparts. On the Canadian side of the border, shippers are served by the Class I Canadian National or spinoffs of the Canadian Pacific, and their tracks have long been cleared for 286. Completion of the Project would allow US shippers in the region to compete on an even playing field and to improve their economics when exporting their products.

III. Project Parties

1. Maine DOT – Funding \$5,640,000

The Maine Department of Transportation (MaineDOT) is a cabinet-level state agency with primary responsibility for statewide transportation by all modes of travel. MaineDOT employs approximately 1,900 people and expends or disburses more than \$600 million per year, including federal, state, and local funds. State bond funding will be the primary source of the non-federal match for the Project. In Maine it comes from State bonds approved by the legislature and taxpayers in 2015 and 2016 for use on multimodal (non-highway) projects. The primary source of transportation funding in Maine is gas tax revenue, which by statute gas can be used for highways and bridges only. As such the only significant source of capital for multimodal projects is State bonds. Each year there are more capital needs in the passenger and freight multimodal community than there is funding available and competition for these funds is fierce

²⁴ Maine.gov, Maine Population, <https://data.maine.gov/Statistics/Maine-Population-2000-2010-by-Counties/ysgk-d38e/data> (last visited Dec. 5, 2016).

²⁵ Maine Center for Workforce Research and Information, Maine Unemployment Rate 4.0 Percent in October, <http://www.maine.gov/labor/cwri/news/release.html> (last visited Dec, 5, 2016).

²⁶ Northern Border Regional Commission, Northern Border Region, <http://www.nbrc.gov/content/northern-border-region> (last visited Dec. 5, 2016).

within MaineDOT. Due to its significant economic and transportation impact on the entire State and region, this project has been prioritized by MaineDOT.

The Maine State Rail Plan written in 2014 clearly identified several aspects of the Project as a priority for Maine, for shippers and railroads.²⁷ The Plan includes six goals with specific objectives and those directly supportive of the outcomes of the Project are below:

- A rail network in Maine that is fully integrated with the North American rail system, including compatibility with current standards for rail car size and weight.
- Encourage state of good repair investment to maintain rail infrastructure and right-of-way for current and future use.
- Reduce barriers to growth of rail market share by eliminating bottlenecks caused by weight and height constraints.
- Increase freight rail market share of heavy haul commodities and product diversity to reduce impacts on public infrastructure and budgets.
- Continue public-private partnerships that enable continuing and significant investments in rail.

The importance of a vibrant and improved rail system is vital to preserving the industries in Maine and MaineDOT has recognized and supported that through investments of its own and matching investments and commitments for federal grants, including this one, exceeding \$51 million since 2001.

2. Maine Northern Railway – Funding \$2,000,000

The entirety of the Project will be spent on bridges on the MNR in furtherance of improvements that were realized from a TIGER II grant and pending TIGER VII grant. The MNR runs from Madawaska at the Canadian border in northern most Maine in Aroostook County to Millinocket, ME in the center of Penobscot County. Since 2011, the railroad has been owned by the State of Maine and operated under a long term lease and operating agreement by MNR. While the State of Maine is responsible for structural bridge repairs and improvements, the MNR is responsible for the balance of maintenance and upkeep on the line. Primary customers for that railroad include the Irving Woodlands, Twin Rivers Papers, Maibec, Inc., Woodland Pulp, Huber Engineered Wood and Louisiana Pacific which ship and receive forest and paper industry products. Additionally there are several agri-businesses such as McCain Foods, Cavendish, Maine Foods and Maine Potato Growers and customers who receive heating oil and propane such as Dead River Fuels. Total rail carload volumes will exceed 17,000 in 2016, increasing to over 22,000 upon completion of the Project. Over 50% of those carloads terminate in Canada making this an important export corridor. Since 2013, MNR has invested over \$3.4 million in track, infrastructure and equipment on the line.

3. Northern Border Regional Commission – Funding \$250,000 (targeted)

The NBRC was formed by Congress in 2008 in order to help fund promising economic and community development projects in Maine, New Hampshire, Vermont, and New York.

²⁷ MAINE DEP'T OF TRANSPORTATION, Maine State Rail Plan 2014, July 2015 - http://maine.gov/mdot/ofbs/docs/Rail_Plan_7-9-2015.pdf.

America's northeast has a long and storied history of entrepreneurship, forest projects manufacturing, and surviving off the rich natural resources of the region. However, changing markets and global competition have challenged the northeast's once vibrant economy. In response, the NBRC was formed to help alleviate distress in the hard-hit northern counties of each State. Bordering Canada, these counties generally have higher levels of unemployment, population loss, and lower incomes. The NBRC can invest in economic and infrastructure projects in both Aroostook and Penobscot Counties and because each country is considered “distressed” NBRC funded projects can be eligible for up to an 80% matching grant. Bridge number 7783 in Sheridan is being specifically targeted with NBRC funding of \$250,000 for that aspect of the Project.

4. VHB – Partner with MaineDOT developing the Project requirements

VHB has extensive experience inspecting, load rating and designing railroad bridges along the east coast. Over the past 25 years, VHB has provided these services for multiple state agencies including the Maine Department of Transportation, Massachusetts Department of Transportation, Vermont Agency of Transportation, Virginia Department of Transportation, Florida Department of Transportation and Connecticut Department of Transportation. Additionally, VHB has worked with railroad owners and operators including the Massachusetts Bay Transportation Authority, Metro-North Railroad, Metropolitan Transportation Authority, Northern New England Passenger Rail Authority, SunRail, Pan Am Railways, Norfolk Southern Railway and many others. VHB’s inspection team for this project had over 100 combined years of experience and included four NBIS certified team leaders and two NBIS certified inspectors. The load ratings and preliminary repair and strengthening recommendations were developed by a team with extensive railroad bridge load ratings and design experience which included six Professional Engineers licensed in the State of Maine.

VHB has successfully completed many similar projects including:

1. South Coast Rail Bridge Evaluations, Southeastern Massachusetts
2. Restoration of Passenger Rail Service, Boston, MA to Portland, ME
3. Passenger Rail Upgrade of the Rockland Branch Rail Line, Brunswick to Rockland, ME
4. Railroad Load Rating and Inspection, Vermont.²⁸

MaineDOT, MNR and VHB have been working together for many years for the benefit of the state owned line and are natural partners to make continued improvements to the bridges on the line preserving existing rail traffic and developing continued growth in the region. They have long demonstrated the ability to plan, develop and execute projects including projects utilizing both state and federal funds and to complete those projects on time and within budget. The project schedule anticipates completion by the end of 2019 and sees no obstacles to achieving that.

²⁸ See Appendix G for VHB Project Descriptions.

IV. Grant Funds Sources and Uses of Project Funds

a) Table showing sources and uses of project funds

Fund Source and Use	Project Amount	Project Percentage
FASTLANE Grant Funds	\$7,890,000	50.0%
Maine DOT State Bond Funding	\$5,640,000	35.7%
Maine Northern Railways	\$2,000,000	12.7%
Northern Border Regional Commission (Federal) targeted for Bridge #7783	\$250,000	1.6%
TOTAL	\$15,780,000	100%

b) State Matching Funds

The State of Maine matching portion of the Project, \$5,640,000, comes from State bonds approved by the legislature and taxpayers in 2015 and 2016 for use on multimodal (non-highway) projects. The Commissioner of the Maine Department of Transportation has signed a commitment letter to the Secretary of Transportation and MaineDOT is prepared to begin the Project immediately upon awarding of a grant. Maine has successfully completed numerous projects with USDOT funding and is able to fund, manage and complete the Project.

c) Other Federal Matching Funds

Maine Governor Paul LePage has prioritized \$250,000 in NBRC funding for this project due to the significant impact the Project will have in improving economic conditions for shippers in Aroostook and Penobscot Counties. Overall, other federal non-FASTLANE funds will be some 1.6% of the total cost of the Project, and below the maximum match from other federal sources described in the NOFO.

d) Private Matching Funds

For their portion of the Project, Maine Northern Railway is contributing \$2,000,000 towards completion of the Project, 12.7%. MNR has signed a commitment letter to the Secretary of Transportation and can begin the project upon receipt of the award.²⁹ They have received USDOT grant funding in the past and they are able to fund, manage and complete their portion of the project.

V. Criteria

a) Introduction

Focused on perhaps the most economically challenged region in the northern US, the Maine Railroad Bridge Capacity Project will greatly accelerate allowing shippers, manufacturers and residents in the northern border region to enjoy the benefits of the national standard for rail transportation. Resulting in improved capacity and travel times for rail traffic, the Project aids the manufacturing economy of the region, reduces spending on the interstate highway system and roads in the region, reduces traffic at US/Canada border crossings and satisfies the USDOT goal of improving first-mile and last-mile access for shippers. It affords the environmental benefits that accrue when goods are kept to a minimum on trucks and shifted into a more eco-friendly mode of transportation for greater travel distances. The Project puts key rail

²⁹ See Appendix E, Match Commitment Letters.

infrastructure into a state of good repair and increases the capacity of the existing railroad without placing undo harm to the environment.

b) Merit Criteria

1) Economic Outcomes

The State of Maine was awarded a TIGER II grant in 2010 that helped to save what today is the Maine Northern Railway from abandonment. In that application, it was assumed that with the improvements to the decaying railroad an additional 3,644 annual carloads would be added over the course of the first two years in service and then it would grow 2% per-year thereafter. Instead what happened was dramatic growth in rail traffic. When the shippers of the region were given a better chance to compete they utilized the more efficient shipping option. Instead of the predicted 5,400 carloads of growth over two years, rail traffic grew by well over 12,000 carloads. Instead of experiencing growth of 2% the line saw average annual growth of 15%. When manufacturers in this region are given an improved playing field and improved economic conditions they have demonstrated that they take full advantage of it. This project will bring the railroad up to the national standard of 286 which will spur growth in carloads to an expected at 5% annual level. The growth is through the continued preservation of the existing customers combined with the greater efficiency afforded by the Project. The additional per-car capacity will be absorbed and further growth will occur. The railroad and their customers have proven it before and they are poised to prove it again.

With the investments made through this FASTLANE grant, in year 3 of the project an additional 40.8 million gross ton-miles of freight will be moved as a result of the improvements. Over the course of 20 years, after the bridge repair and replacement is project, more than 1.2 billion gross ton-miles of freight will move on rail in a safe and efficient manner.

Fuel Savings

Federal investment in this project creates a reduction in future truck trips throughout Maine and crossing the Northern Border into Canada. It creates more capacity along the rail line bringing the bridges on the railroad up to the industry standard of 286. By Year 3, this rehabilitation that allows the MNR to move railcars fully loaded, rather than at reduced weights to accommodate the outdated bridges, will prevent more than 9,000 trucks, or more than 2.27 million vehicle miles from the freight highways system on an incremental basis. The reduction in future truck traffic while increasing capacity will significantly increase the region's competitiveness on the global market due to the reduction in transportation costs and through increased efficiency.

Lower fuel costs, a large component of transportation rates, will enable shippers to pass cost savings directly on to the end users making them more competitive on the global market. The BCA analysis is conservative in that it assumes a no growth scenario in fuel used between 2022 and 2035 even though the number of rail carloads will increase year over year. In Year 3 of the project, these benefits translate into saving a minimum of 251,856 gallons of fuel by moving the freight more efficiently. This project will see an annual transportation cost savings in Year 3 of at least \$809,467 (using an average price of \$3.123/gallon for diesel fuel anticipated for 2017).³⁰ Looking at the incremental growth resulting from this reduction in mileage using U.S.

³⁰ See U.S. ENERGY INFORMATION ADMINISTRATION, GASOLINE AND DIESEL FUEL UPDATE, <http://www.eia.doe.gov/oog/info/gdu/gasdiesel.asp> (last visited Nov. 30, 2016).

Department of Energy estimates for the cost of diesel fuel each year for the next 20 years, the fuel savings has an NPV of more than \$12.8 million using a seven percent discount value.³¹ These savings are felt by all and are a significant public benefit to funding this project.

The reduction of America's dependence on foreign oil will serve the purpose of improving the country's energy security, while at the same time reducing the carbon footprint created by transportation modes. The project moves the US closer to seeing a real reduction its dependency on foreign oil without having to extract more product from the ground. This will not only improve the nation's standing in the world by becoming more energy independent it will also make business more globally competitive.

2) Mobility Outcomes

Stated goals of the FASTLANE grant program are "improving the safety, efficiency, and reliability of the movement of freight" and "improving inadequate first and last mile segments." This Project clearly targets all aspects of those goals. Increasing the shipments of goods by rail versus the only alternative mode in the region of trucks is safer and more efficient. There are fewer possibilities for highway accidents with up to four trucks kept off the highway for each additional 286 railcar. The fuel efficiency advantages of rail versus truck are clear and even greater at 286 versus the current maximum loads. Improvements to the bridges while increasing their load capacity have the added benefit of making those bridges more reliable. It reduces the need for on-going maintenance to those bridges. Normal maintenance to railroad bridges often interrupts train traffic. Reducing the frequency for on-going maintenance improves the reliability for shippers as there are fewer interruptions to train schedules. The Project is squarely focused on improving the first and last mile of freight shipments. This railroad has virtually no "overhead" traffic. That is, less than 1% of shipments are not either originated or terminated on this rail line. Presently over 90% of the shippers' traffic on the line originates at a customer served by the MNR.

The first and last mile segments of the freight rail system often occur on short lines throughout the country. As mentioned, today some 35% of short line miles, over 21,000, are still not up to the industry standard of 286. The upgrades and improvements to the MNR bridges would reduce the miles from the last survey of the industry by over 1%. This will have a significant impact on the efficiency of the national freight rail system.

While highway congestion is not a problem in northern Maine, the Project improves freight mobility and relieves highway congestion further south in the region and nationally as it reduces future long haul truck trips. It brings the railroad bridge infrastructure into a state of good repair. The improvements to the capacity and state of good repair for the railroads allow for greater capacity and the continued growth of freight traffic by rail. An additional benefit of preventing heavy trucks from the highway and state system is the reduction in damage to the national highway infrastructure, particularly the aging bridges throughout the region. It is estimated each

³¹ See Appendix A, Benefit Cost Analysis.

truck kept the highway saves \$.01 per truck ton mile of highway maintenance costs.³² This project seeks to address congestion and mobility challenges faced everyday by the companies shipping freight and by the people sharing the highways and state roads with the freight trucks, by reducing the future miles trucks travel in this rural section of the northeastern part of the country. This will not only reduce congestion on the highway freight system but will have a significant impact on the lives of the people in the northeastern US through reduced congestion, improved safety on the roads and reduced emissions.

In Year 3 of the project there will be a highway maintenance savings of \$795,082. Looking at the growth that will exist if this project is completed yields nearly \$11 million in highway maintenance savings over 20 years using a 7% discount rate.³³

Highway congestion in the US costs \$87 billion in wasted travel time (4.2 billion total hours or nearly a full week for every traveler) and results in 2.8 billion gallons of wasted fuel per year. According to the Federal Highway Administration, the congestion savings per ton mile eliminated from the road system is \$0.009. Therefore, the congestion savings over a twenty year period at a 7% discount rate is more than \$10 million.

The benefit of not having to build additional capacity further south in the region to accommodate future truck traffic in a no build scenario as well as capacity for automobiles is not fully known and therefore is not quantified in the benefit cost analysis. The prevention of trucks miles from the highway decreases travel time for the average highway user thus improving mobility. This travel time benefit has not been quantified, but clearly exists creating efficiencies in the system by keeping more trucks from these already severely congested state highways and interstate highways. This congestion relief not only improves freight movements but also improves movement of people who share the roads. However, travel time of locomotive engineers has been calculated. Due to the increased efficiency of the line the Project will produce a travel time savings of \$752,230 over a twenty year period.

3) Safety Outcomes

Moving freight by rail instead of truck will help address safety issues on the national freight system. In 2008, a Federal Motor Carrier Safety Administration (FMCSA) study stated that the number of large trucks involved in fatal crashes per 100 million vehicle miles traveled was 1.79.³⁴ This project will result in more than 67 million truck-miles being eliminated from the highway system over 20 years. Using FMCSA data, the dollar value of lives saved by project Year 3 is expected to be \$285,368. The same FMCSA study stated that in 2008 the number of large trucks involved in crashes that resulted in injuries per 100 million vehicle miles traveled was 29.1. To be conservative, this application assumes that all the injuries would be minor (i.e. Maximum Abbreviated Injury Scale Level 1). The value of preventing injuries is \$22,686 by Year 3.³⁵ This is a conservative figure since there would be accidents involving large trucks with

³² See CONGRESSIONAL BUDGET OFFICE, SOCIAL COST PRICING IN FREIGHT TRANSPORTATION, https://www.cbo.gov/sites/default/files/113th-congress-2013-2014/presentation/49838-social-cost-pricingfreighttransportation_0.pdf (last visited Dec. 5, 2016).

³⁴ See U.S. DEP'T. OF TRANSPORTATION FEDERAL MOTOR CARRIER SAFETY ADMINISTRATION, 2008 LARGE TRUCK CRASH OVERVIEW <HTTP://NTL.BTS.GOV/LIB/51000/51300/51327/2008LARGETRUCKCRASHOVERVIEW.PDF> (last visited Nov. 15, 2016).

³⁵ The fraction of the Value of a Statistical Life used for a MAIS Level 1 accident is .003, as per the FASTLANE BCA guidance.

other than minor injuries sustained. The economic impact of these crashes is \$4,198 per accident, which also assumes that all the crashes are classified as a MAIS Level 1 accident. The benefit of eliminating these crash impacts by Year 3 has a value of \$3,444. The BCA details the safety savings realized through this project.

The bridges on the MNR are safe and routinely inspected, but they are old and in need of upgrades to modern standards. Improvements that result from this project make those old bridges safer, and for the long term.



4) Community and Environmental Outcomes

The project has significant environmental benefits resulting from moving freight by rail as opposed to by truck. Railroads are four times more fuel-efficient than trucks and are able to move one ton of freight 480 miles on one gallon of fuel. A single truck requires the same highway capacity as almost four automobiles. Additionally, the EPA estimates that for every ton-mile, a typical truck emits roughly three times more nitrogen oxides and particulate than a locomotive.

Pollutants of Concern

Most freight transportation is powered by diesel engines, which are major sources of emissions of nitrogen oxides (NO_x), sulfur dioxide, and particulate matter (PM). NO_x reacts with volatile organic compounds to form ground-level ozone, commonly known as smog. Ground-level ozone can trigger a variety of health problems, including aggravated asthma, reduced lung capacity, and increased susceptibility to respiratory illnesses like asthma, pneumonia, and bronchitis. Many scientific studies have linked breathing PM to a series of significant health problems including aggravated asthma, difficult breathing, chronic bronchitis, myocardial infarction (heart attacks) and premature death. Diesel exhaust is of specific concern because it is likely to be carcinogenic to humans by inhalation and may additionally cause non-cancer respiratory effects.³⁶

Freight truck transportation is a major source of greenhouse gas (GHG) emissions, which contribute to global climate change. By far the most important greenhouse gas to monitor is carbon dioxide (CO₂).³⁷ In 2003, truck freight accounted for 77 percent of freight-related GHG emissions, while rail freight accounted for only 8.7 percent, the balance being from marine and air transportation modes.³⁸ Several Class I Railroads have CO₂ Emissions Calculators included in

³⁶ See U.S. DEP'T. OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION, CHAPTER 2: NATIONAL FREIGHT TRANSPORTATION TRENDS AND EMISSIONS, http://www.fhwa.dot.gov/environment/air_quality/publications/effects_of_freight_movement/chapter02.cfm (last visited Nov. 27, 2016).

³⁷ See id.

³⁸ See U.S. DEP'T. OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION, CHAPTER 2: NATIONAL FREIGHT TRANSPORTATION TRENDS AND EMISSIONS,

their websites for rail versus truck comparisons. Using the BNSF Carbon Calculator and an escalating cost of carbon ton as stated in the Federal Register Notice of Funding Opportunity for FASTLANE, the reduction in CO₂ emissions is valued at approximately \$3.1 million over the next 20 years using a seven percent discount value.³⁹

Emissions of sulfur oxide also will be reduced through this project. Sulfur oxide is valued at \$0.097 g/mile, at a seven percent discount value this project will produce a savings of \$145,622 over a 20-year period. Trucks produce approximately 9.191 g/mile of NO_x. The FASTLANE BCA Guidance value the cost of NO_x reduction to be approximately \$7,147/short ton. Based on the estimated traffic volumes that will result from the continued use of this line and the increased efficiency, over a 20-year period, the reduction in NO_x emissions could be valued up to \$1.2 million using a seven percent discount value.

From an overall environmental perspective, railroads are less impactful to the environment than long-distance truck hauls and that is the intended and expected outcome of the Project. The result is better fuel consumption, fewer emissions, less new geographic footprint impacted and more and better use of an existing footprint, one that mostly requires only Categorical Exclusions from NEPA to complete.

c) Other Review Criteria

1) Partnerships and Innovation

Since the TIGER II grant and restoration of the line brought them together, MaineDOT and MNR have had a rather rare relationship in the rail industry. It is a true public private partnership. The partners have a long term operating agreement whereby MaineDOT, the owner of the line, is responsible for the on-going maintenance to the structural components of the bridges on the line while the MNR markets, maintains and operates the railroad. Each of the partners has invested significantly in the line. The State of Maine has spent \$4.3M on the MNR in the 4 years since it has been upgraded in addition to committing an additional \$2.8M towards the pending TIGER VII grant which MNR is a participant. In that same time the MNR has invested \$3.4M in track, infrastructure and equipment including building a new locomotive shop that is presently under construction. In addition to the funding partners and project parties for the Project there, long term support for the line and now this application has come from the Northern Maine Development Corporation, the Aroostook Partnership, Southern Aroostook Development Corporation, and Maine Better Transportation Association along with the more than twenty active shippers on the line.

The primary innovative practice that will be utilized on this project will be Accelerated Bridge Construction (ABC) techniques. This is necessary to minimize the track outages that are required to complete the work. All of the bridges in the proposed program are located on active freight lines so it is not feasible to completely shut down large sections of track for an extended period of time without significantly harming shippers on the line. To reduce the required outages as much as possible, the following ABC techniques will be considered:

http://www.fhwa.dot.gov/environment/air_quality/publications/effects_of_freight_movement/chapter02.cfm (last visited Nov. 26, 2016).

³⁹ See Appendix (F), BNSF Carbon Calculator.

- There are three bridges that are anticipated to require complete superstructure replacements. All three bridges are single span bridges with short spans varying from 9 to 24 feet long. At each of these bridges, the proposed superstructure can be completely constructed adjacent to the existing bridge. Once the entire superstructure has been constructed, the existing superstructure can be removed and the new superstructure can be installed during a limited train outage. It is anticipated that a minimal outage of approximately 24 hours would be required at each bridge to complete the superstructure replacements.
- At many locations where strengthening of existing members is required, the strengthening method that is anticipated to be utilized is the removal of existing cover plates and installation of new, stronger cover plates. To accomplish this work, the existing rivets must be removed which is a lengthy process. Based on past experience, approximately four rivets can be removed and replaced with high strength bolts per hour. Given the current freight traffic, the existing rivets can be removed and replaced with high strength bolts between trains. Once that has been completed, the cover plates can be replaced during a limited train outage. It is anticipated that a minimal outage of approximately 12 to 24 hours would be required at each bridge to complete the cover plate replacements.

In addition, the use of innovative materials, such as corrosion-resistant reinforcing steel, glass-fiber reinforced plastic, metalizing proposed steel members, and ultra-high performance concrete will also be evaluated in an attempt to extend the service life of the improvements.

2) Cost Share

Already-allocated State Bonds designated for freight transportation projects will be the primary non-federal match for the Project. Other federal match dollars currently set aside by Governor LePage from the NBRC will comprise an additional 1.6% of the Project. And previous federal and state grant partner Maine Northern Railways has committed to \$2,000,000 of private investment, nearly 13% of the Project. Funding sources, both state and private, are committed, stable and have a history of success with USDOT.

As mentioned, Maine is one of only three states that has no Class I railroad. It is the Class I system that can afford to spread the costs of an upgrade in capacity across many, much longer train trips. FRA points out that “a more recent trend in the railroad industry is for Class II and Class III railroads to partner with Class I railroads to make capital improvements. Most of the situations in which this happens are when short lines own a strategic asset and have the possibility to improve the competitive position of a Class I through the joint use of that strategic infrastructure.”⁴⁰ In the case of the MNR, the only Class one that they directly connect with is the Canadian National who already is 286 cleared and serves customers already enjoying that competitive advantage. There is not a financial justification to drive that benefit to others. Because there is always another connecting railroad between MNR and another Class I it is too challenging to create a structure to invest in improvements on MNR. That eliminates matching the primary beneficiary with the expenditures and a normal source of financial assistance for this type of project and leaves a federal grant focused like FASTLANE as the best chance for success.

⁴⁰ See U.S. DEP’T OF TRANSPORTATION Federal Railroad Administration, Summary of Class II and Class III Railroad Capital Needs and Funding Sources, Report to Congress, Oct. 2014, <https://www.fra.dot.gov/Elib/Document/14131>, p. 19.

This project will complement other MaineDOT rail program initiatives, including the Industrial Rail Access Program (IRAP) and Freight Rail Improvement Program (FRIP) that provide funding to enhance the free flow of goods via rail throughout Maine. Since 2001, Maine has invested \$12,641,550 in IRAP which leveraged an additional \$17,613,181 in private business matching investment. This project further leverages the nearly 20-year MaineDOT IRAP program that combines public and private funds to build rail access directly to customers. The project makes those connections to the railroad mainlines more valuable as shipping options increase with the reliability that will result. The FRIP in Maine has had \$2.2 million in investment, leveraging another \$2.2 million in private railroad matching funds. Maine has invested and is committed to invest over \$50M in state rail lines including the MNR since 2001.

VI. Large/Small Requirements

- a) Small Project – The \$15.78M project cost is below both \$100M and Maine’s One-State Minimum of \$56M.
- b) The Project is cost effective with a BCA (please note Cost Effectiveness section below) exceeding 3.0 at 7% NPV.
- c) As described throughout the application, the Project will greatly impact this strategic border region by improving the economic efficiency of shippers and allowing the region to have a rail system that now meets the North American standard. This will allow them to compete on an equal footing with neighboring Canadian companies, draw more freight to rail reducing the total transportation spend, reduce fuel consumption and expenditures on regional highways and roads.

VII. Cost Effectiveness

Benefits are discussed in narrative form in the application and are, when possible, quantified in the attached benefit cost analysis Excel worksheet.⁴¹ A summary is below.

7% NPV Summary		
	COSTS	BENEFITS
CAPEX	\$13,782,863	
MAINTENANCE		\$3,042,722
TRAVEL TIME SAVINGS		\$752,230
FUTURE TRUCK ELIMINATION		\$62,740,468
RAIL COST BASELINE	\$7,444,396	
CO2 SAVINGS		\$3,101,359
TOTAL	\$21,227,259	\$69,637,079
BENEFIT COST RATIO		3.28

3% NPV Summary		
	COSTS	BENEFITS
CAPEX	\$14,874,163	
MAINTENANCE		\$4,380,579
TRAVEL TIME SAVINGS		\$1,082,979
FUTURE TRUCK ELIMINATION		\$95,131,959
RAIL COST BASELINE	\$11,369,169	
CO2 SAVINGS		\$3,101,359
TOTAL	\$26,243,332	\$103,696,876
BENEFIT COST RATIO		3.95

⁴¹ See Appendix A, Benefit Cost Analysis.

In addition to the quantifiable benefits, this project will greatly expand the capacity and reliability of freight movements via rail throughout the northeast and beyond into the US.

ASCE’s 2013 Report Card for America’s Infrastructure notes that despite \$91B in Federal, State and Local capital investments annually, road infrastructure is still projected to decline.⁴² Congestion on major urban highways “cost the economy an estimated \$101 billion in wasted time and fuel annually.”⁴³ The breakdown by State located in the I-95 Northeast Corridor which would be forced to absorb much of the truck traffic that the Project is targeting, is as follows⁴⁴:

State	% Major Roads in Poor Condition	% of Bridges considered Functionally Obsolete	Cost per year in extra Vehicle costs per Motorists due to condition of Roads
Rhode Island	41%	35%	\$661.94
Connecticut	41%	25%	\$661.26
New Jersey	35%	26%	\$604.88
New York	23%	27%	\$504.90
Massachusetts	19%	43%	\$478.01
Maine	7%	18%	\$450.86
New Hampshire	17%	18%	\$404.43

According to the American Road & Transportation Builders Association, spending only the federal portion of investment for the Project would only alternatively pay for approximately 1.5 miles of rural Maine roads.

VIII. Project Readiness

All aspects of the Project will be on existing bridges on existing railroad right of way. As such, nearly all required filings for the National Environmental Policy Act (“NEPA”) process will be through Categorical Exclusions (“CE”). There are a few known modest exceptions and each are not expected to face obstacles nor delay completion of the project in any way based on the number of bridges requiring work and the timing of design and then improvements for the bridges. The proposed scope of strengthening and repair at most of the bridges does not include any in-water work and therefore it is anticipated that there will little to no environmental permitting at these locations. At those locations where in-water work is required, the permitting will be completed by the MaineDOT under NEPA. Based on the anticipated scope of repair work, there is likely to be in-water work at approximately seven bridges. The scope of work at these bridge locations requires temporary construction access, in-stream work and other temporary impacts to complete patch repairs of the existing abutments and piers, minor scour repairs and other miscellaneous in-water work. Based on the anticipated scopes of work, it is likely that a CE will be required and therefore it is not likely that an Environmental Impact Statement (EIS) or Environmental Assessment (EA) will be needed. It is anticipated that the permitting effort will likely take 6 to 9 months.

There is also at least one bridge (the Sheridan Truss – MaineDOT Bridge 7783/MP 193.50) that is known to be historic and consultation with the Maine Historic Preservation Commission will be required. The primary work at this location is truss strengthening and in-kind replacement of stringers and diagonal members. Since all member replacement will be done in-kind, there are

⁴² American Society of Civil Engineers, Roads, *ASCE: 2013 Report Card for America’s Infrastructure* 2013, <http://www.infrastructurereportcard.org/a/#p/grade-sheet/americas-infrastructure-investment-needs> (last visited Dec. 5, 2016).

⁴³ See id.

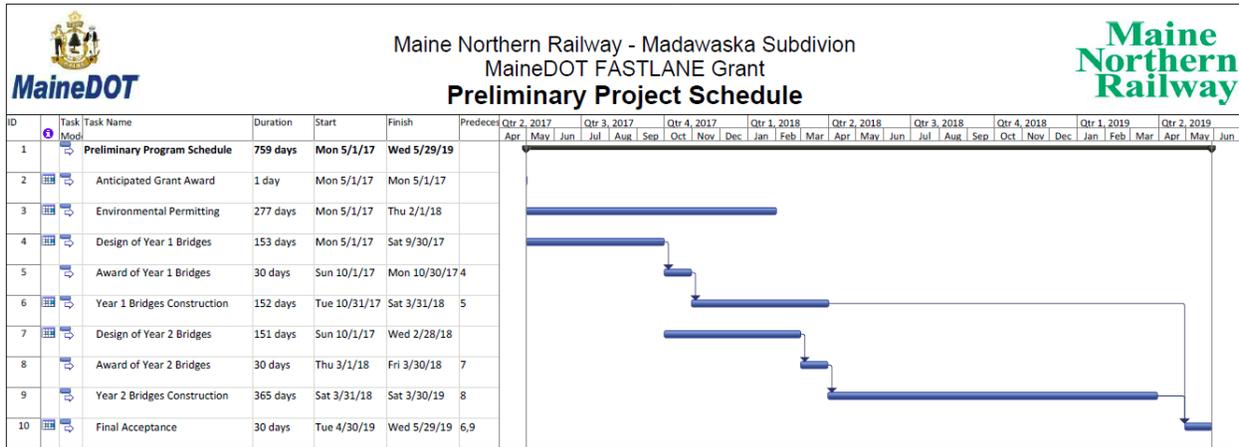
⁴⁴ See id. at States.

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no anticipated issues related to the historic nature of this bridge. During final design, the MaineDOT will consult with the Maine Historic Preservation Commission to determine if any additional bridges qualify as historic.

Any bridges in which environmental or historical permitting is required will likely be constructed during the second year of construction. This will allow sufficient time to complete all of the required permits prior to advertising for bids. Since many of the bridges do not require any permitting, it is possible to start construction of the first group of bridges in the first construction season after grant award.

Gantt Chart for the Project schedule⁴⁵



All of the project participants are committed to a quick start and timely completion as the benefits cannot be realized for the shippers until work on the final bridge is completed which allows the line to be safely operated with higher capacity loaded equipment. All matching funds, both state and private, are committed. Project cost estimates were developed after extensive design and study of options by engineering and design firm VHB (described more fully in Project Parties) which already had great familiarity with the bridges. There are no pending agreements or legislative approvals required. The project focuses solely on bridge infrastructure improvements that are already stated goals in the Maine Rail Plan (completed by MaineDOT in June-2014) and all work in the project will be done on existing railroad right of way with no change of purpose for use. Pursuit of a Categorical Exclusion for each line under NEPA can be completed quickly upon award. Where additional permitting is required, it can be completed and MaineDOT expects full completion and receipt of environmental approvals by Fall-2018. With expectations of awards in the spring of 2017, given the necessary bridge design, work on the bridges would Fall-2017. After a grant agreement is reached, but during the expected six or more months until construction can commence, design work will be completed, permitting will be filed and materials and contractors will be ordered to fully take advantage of the entire work season and force account construction agreements will be reached with the railroad. Since it will require two construction seasons to complete all 22 bridges, those that require no permitting will be completed first. Those that do require permitting will have the permitting work done upon award of the grant with construction done in the latter year of the project. As such, all 22 bridges will be completed by the end of 2019. The same community that rallied in support of the TIGER II grant which save the railroad is fully in support of this capacity improvement project as well.

⁴⁵ See Appendix C, Cost Estimate, Budget and Gantt Chart.

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(Please see letters of support in Appendix D.) These include support from the state’s congressional delegation and the governor.

Risks for the Project are few. They are described in the trailing chart along with mitigation plans to prevent or to react if they are encountered. Customers on the line are existing and well established and strongly supportive. Environmental challenges are minimal due to Categorical Exclusions and permitting only for modest in-water work on seven of the 22 bridges. Execution risk is low as all participants are past USDOT grant awardees that have completed projects on time and within project budget. Funding for the Project has the backing of the State of Maine at the highest levels and a commitment letter from a private participant with a history of meeting federal grant commitments. With over 76,000 railroad bridges in the US⁴⁶ the design and construction aspects to the Project are straight forward and similar to projects routinely accomplished. In Maine the potential for interruptions to construction always exists due to weather but that only has potential to delay the Project whose schedule has completion well in advance of statutory timelines for fund obligations. It is difficult to see where risks are a threat to Project completion, fund expenditures and benefit realization.

Project Risks	Mitigations
Track Outage Times <ul style="list-style-type: none"> • Limited track outages can drive up construction costs. • Longer track outages impact freight movements/operator revenue. 	Accelerated Bridge Construction (ABC) techniques will be used as applicable <ul style="list-style-type: none"> • At superstructure replacements, the new superstructure can be built as a panel and installed in a limited work window (24 hours +/-). • At strengthening locations, existing rivets can be replaced with high strength bolts between typical freight movements. Once that is complete, the cover plates can be replaced in limited work windows (12-24 hours +/-).
Environmental Permitting <ul style="list-style-type: none"> • At the few locations where environmental permitting is required, this could delay the construction schedule. 	Proper scheduling of the work <ul style="list-style-type: none"> • At many locations, there is no in-water work and the environmental permitting will not impact the construction schedule of those bridges. Those bridges will be rehabilitated in the first construction year. This will allow sufficient time to complete environmental permitting for the bridges that do require in-water work. Those bridges will be rehabilitated in the second construction year.
Contract Size <ul style="list-style-type: none"> • At bridges where there is limited work, releasing contracts with only one bridge would likely drive up the cost due to small quantities and the remote location of the project. • If all of the locations are issued in one or two large contracts, it may be too large for local contractors to effectively compete for the work. 	“Right Sizing” the contracts <ul style="list-style-type: none"> • The work will be released in multiple contracts and most of the contracts will contain multiple bridges. The contracts will be composed of bridges that have similar work. This will provide an economy of scale by increasing the quantities in each contract, without making the contracts so big that local contractors cannot effectively compete for the work.
Cost Control <ul style="list-style-type: none"> • Final design has not been completed for the recommended improvements at these bridges which could lead to scope and cost increases if additional required work is identified. 	Thorough Preliminary Evaluation <ul style="list-style-type: none"> • All of the bridges received a thorough hands-on inspection to identify the required repairs. • A preliminary load rating was developed for each bridge to identify the extent of any strengthening or replacement required.

⁴⁶ See Railroad Bridges and Tunnels, Federal Role in Providing Safety Oversight and Freight Infrastructure Investment Could be Better Targeted 2007, US Government Accountability Office Report, <http://www.gao.gov/new.items/d07770.pdf>.

Grant Request Supporters*

MaineDOT's grant request for FASTLANE funds is supported by a diverse group of elected officials, shippers and rail stakeholders due to the significant economic impact the project will have on the region. This list of supporters includes:

Members of Congress

U.S. Senator Susan Collins
U.S. Senator Angus King
U.S. Congressman Bruce Poliquin
U.S. Congressman Chellie Pingree

State Elected Officials/Offices

Governor Paul LePage

Government

Maine Port Authority – Executive Director

Customers

Woodland Pulp LLC
Louisiana Pacific Building Products
Columbia Forest Products

Local Organizations

Aroostook Partnership
Maine Better Transportation Association
Southern Aroostook Development Corporation

Maine Short Line Railroads

Central Maine and Quebec Railway - CEO
Eastern Maine Railway - CEO

* As additional letters of support are submitted, they will be forwarded to USDOT with the Project name clearly labeled.

APPENDIX

Benefit-Cost Analysis Worksheet	A
Maps, Project Locations, Photos	B
Cost Estimate and Budget, Gantt Chart	C
Letters of Support	D
Match Commitment Letters	E
BNSF Carbon Calculator Sample	F
VHB Past Project Examples	G

Links to information, photos and briefs on each bridge in the Project can be found at <http://www.maine.gov/mdot/tigergrants/tiger2017/>