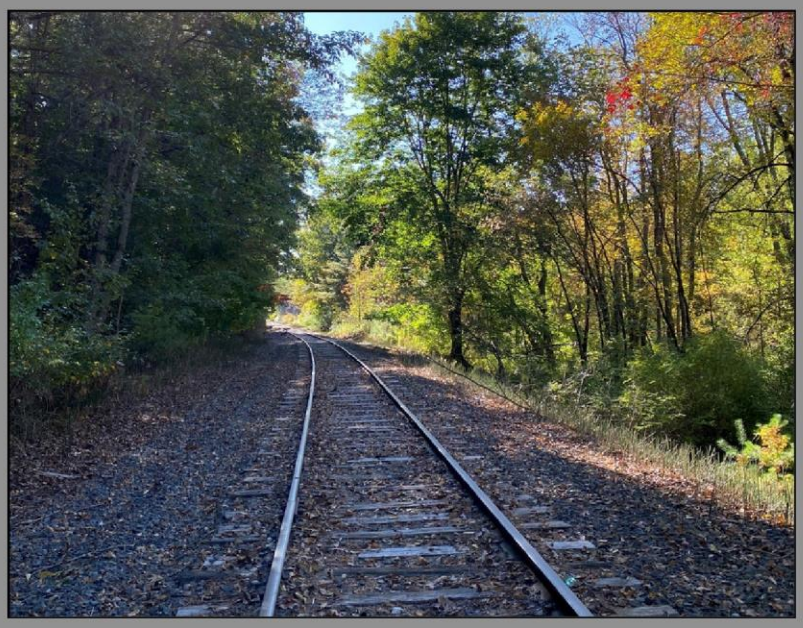

LEWISTON LOWER ROAD RAIL CORRIDOR FEASIBILITY STUDY: POTENTIAL USES AND ECONOMIC BENEFITS

SUMMARY REPORT

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Contents

1. Introduction and Summary

1.1 Purpose and Contents

This report provides a high-level planning assessment of potential uses of the Lewiston Lower Road railroad corridor, specifically between Lisbon and Brunswick. The report will assist the MaineDOT Rail Use Advisory Council (RUAC), established by 23 M.R.S §75. (2021), in their effort to consider and evaluate the feasibility of each potential use. The three potential uses under consideration are: Rail, Interim Trail, and Rail with Trail, defined as:

- **Rail** – Rehabilitate the existing corridor tracks to support a freight rail operation meeting the requirements of Federal Rail Authority (FRA) Class 1 or Class 2 track.
- **Interim Trail**– While preserving the potential for future rail use as required by 23 M.R.S §7107 (2021), modify existing corridor tracks, and develop a mixed-use trail on the former track bed. The trail surface may be paved or stone dust.
- **Rail with Trail** – Rehabilitate the existing tracks to support a freight rail operation meeting the requirements of FRA Class 1 or Class 2 track and establish an adjacent mixed-use trail with either a paved or stone dust surface.

This report provides a high-level description of each potential use, identifies constraints, and analyzes potential economic benefits and costs. A conceptual construction cost estimate was developed for each potential use. HNTB combined a review of Geographic Information Systems (GIS) Mapping and historical documentation of the corridor in the development of this report. A site visit was conducted in December 2023. Infrastructure analyzed during the site visit included tracks, bridges, culverts, grade crossings, existing trail sections, and general topography. No topographical survey was conducted at this stage

1.2 Background and Study Area

The study area consists of approximately 2.57 miles of a 9-mile section of the State-owned, former Maine Central Railroad corridor known as the Lewiston Lower Road rail corridor (Figure 1). The state-owned Lewiston Lower Road corridor limits extend from about 2500 linear feet south of the Sabattus River railroad bridge (Valuation Plan station 498+33) in Lisbon to Pleasant Street (Valuation Plan station 14+10) north of the wye in Brunswick. The Sabattus River railroad bridge is located at the confluence of the Sabattus River and Androscoggin River in the Town of Lisbon. There are three bridges, a public boat ramp, and a park and ride lot located along the entire 9-mile corridor.

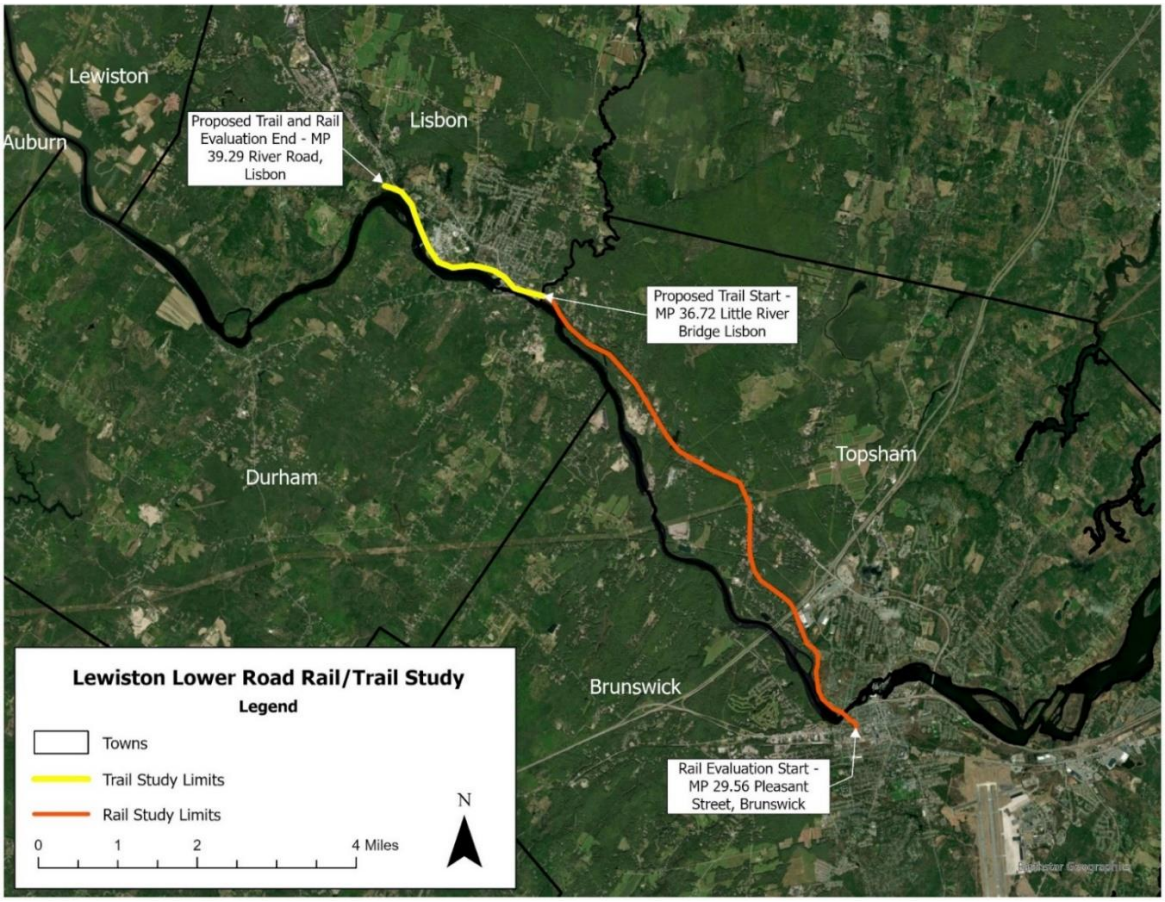

Figure 1: Lewiston Lower Road Rail/Interim Trail Study Location

1.3 Summary of Findings

The three uses for the corridor and their associated cost estimates are further described based on options for FRA track class (Class 1 or Class 2) and trail surface (paved or stone dust). Table 1 summarizes conceptual cost estimates for each option. A more detailed breakdown of estimated costs is included as Appendix A. Based on these estimates, the least expensive option is to develop an Interim Trail with a stone dust surface ($2.1 million) and the most expensive option is FRA Class 2 Rail with Trail Use with a paved trail surface ($26.1 million).

Table 1: Summary of Conceptual Cost Estimates for Three Use Options for the Lewiston Lower Road Study Area, Lisbon, ME.

Option	Use Scenario	Total Cost
Option 1: Rail Use		
1A	Rail (Class 1)	$4,600,000
1B	Rail (Class 2)	$5,200,000
Option 2: Interim Trail		
2A	Interim Trail (Paved)	$2,400,000
2B	Interim Trail (Stone Dust)	$2,100,000
Option 3: Rail with Trail		
3A	Rail (Class 1) with Interim Trail (Paved)	$25,500,000
3B	Rail (Class 1) with Interim Trail (Stone Dust)	$25,200,000
3C	Rail (Class 2) with Interim Trail (Paved)	$26,100,000
3D	Rail (Class 2) with Interim Trail (Stone Dust)	$25,800,000

Rail Use estimates include costs necessary to rebuild the existing tracks to the requirements of either FRA Class 1 or FRA Class 2. Additional study will be required to determine if there is specific interest from industries in an active freight line on the corridor and to develop options for a potential freight rail operation.

Two options were evaluated for constructing a shared-use trail over the approximately 2.57-mile segment located within the Town of Lisbon. Interim Trail Use estimates include costs to remove the existing tracks and construct a mixed-use trail on the existing track bed. Rail with Trail estimates include rehabilitation of the existing tracks and construction of a mixed-use trail adjacent to the tracks, co-aligned to the extent practicable. In general, the construction of a mixed-use trail could introduce several benefits into the region, including increased property values, economic contributions from tourists, and increased health benefits for area residents.

In terms of economic benefits, extending existing trail segments to the Lisbon-Topsham town line would be an overall benefit to the Town of Lisbon. In addition to some revenue added by trail users drawn to the area (Section 3), health and modal improvements would prove beneficial. Given the costs associated with restoring rail service to Class 1 or Class 2, any benefits stemming from freight or passenger rail are likely to negate any benefits from these services.

2. Rail Use

2.1 Description of Use

Use of the Lewiston Lower Road tracks is currently limited to turn-around of Amtrak Downeaster trains on the southern-most section of the track in Brunswick for return trips south to Boston. There is one freight customer on the line west of Brunswick, a scrap metal business located in Topsham, which has not utilized the rail for five or more years. Rail Use evaluated in this study would consist of restoring existing tracks to support a freight or passenger rail operation. The extent of track restoration would be defined by the class of track level mandated by the FRA within the Code of Federal Regulations specific to track safety standards (Title 49, Part 213, Subpart A to F). Each FRA track class corresponds to an allowable operating speed (Table 2).

Table 2: Maximum Allowable Speeds Excepted Track to FRA Class 5

FRA CLASS	FREIGHT	PASSENGER
Excepted	10 MPH	Not Allowed
Class 1	10 MPH	15 MPH
Class 2	25 MPH	30 MPH
Class 3	40 MPH	60 MPH
Class 4	60 MPH	80 MPH
Class 5	80 MPH	90 MPH

Each class of track is further defined by a variety of factors that each represent the overall condition of the track bed, including rail alignment (i.e., straightness, levelness),consistency of the distance between the rails (aka gauge), and proportion of crossties in acceptable condition along a typical rail length.

Existing rail infrastructure in the corridor is periodically maintained by MaineDOT and the current rail class is "Excepted". This study focused on upgrading to either FRA Class 1 (10 MPH) or Class 2 (25 MPH), each of which would achieve operating speeds necessary for efficient freight or passenger rail service. This level of service is consistent with most other active freight railroad corridors in the State of Maine and can be achieved without a complete track reconstruction.

2.2 Existing Inventory and Methodology

2.2.1 Methodology

Study limits for Rail Use extend beyond the 2.57-mile segment within the Town of Lisbon to encompass the entire 9-mile section of track between Lisbon and Topsham. Study limits and cost estimates for the trail are limited to the 2.57-mile section shown in Figure 1. The segment between MP 29.56 in Brunswick (the start of the Lewiston Lower Road section) and MP 37.72 (the Little River Bridge on the Topsham/Lisbon border) has also been included for a total evaluation length of 9.73 miles. Evaluation of the longer segment allows for a more complete perspective on work required to restore the line to a higher rail class. Each element of the track structure was assessed for existing conditions to inform cost estimates to meet requirements of either Class 1 or Class 2

track. Cost estimates are conservative to provide a track that can operate within its FRA classification without requiring ongoing heavy maintenance or repairs for at least five years. The assessment was based on site visits, review of available data, known material condition, and discussions with MaineDOT.

2.2.2 Roadbed and Ballast

The roadbed in the corridor has been preserved through periodic maintenance and is clear of vegetation. Drainage ditches filled in over the years could benefit from ditching to encourage drainage away from track structures. Several track washouts were observed in Lisbon and northwestern Topsham (Figure 2), likely caused by recent flooding and likely to continue based on the track's proximity to ponds and the Androscoggin River. Discrete sections of track, including south of Canal Street in Lisbon, are directly below a steep side slope with no intermediate drainage ditch, creating a prime condition for washouts. Additional stormwater management measures beyond ditching, such as new cross culverts, may be warranted.

Figure 2: Typical Washout

Ballast (i.e., gravel infill between ties) condition varies throughout the nine-mile corridor. Ballast in Miles 30 and 31 is generally in good, clean condition, providing for a stable track structure. However, other long sections are characterized by fouled ballast full of soil and moss (Figure 3). This was particularly evident near the end of the evaluation limits in Lisbon. These areas would require removal of fouled material and installation of clean ballast.

Figure 3: Fouled Ballast (Lisbon)

2.2.3 Crossties

Field inspection included periodic tie evaluations throughout the corridor. Timber ties along the existing rail corridor would require the most extensive rehabilitation via replacement. The average life of a railroad tie is 25 to 50 years under regular traffic. Many ties in the corridor were installed in 1970's and 1960's, with some dating as far back as the 1940's. Ties have not seen regular service in recent years but have deteriorated naturally due to prolonged weather exposure (Figure 4). There was limited evidence of recent tie replacement sporadically through the 9-mile rail section, generally concentrated in the southern segment of the corridor.

Depending on the location, 15 to 40 percent of the ties were noted to in acceptable condition. Tie condition was consistent with ballast condition and areas with fouled ballast had a higher proportion of failing ties. Many areas had skewed and/or bunched ties resulting in gaps where the rail was not supported (Figure 5). FRA standards require a greater proportion of acceptable ties per typical rail length for Class 2 compared to Class 1 service; this is a significant factor in the cost difference between the two classes.

Figure 4: Typical failing crosstie

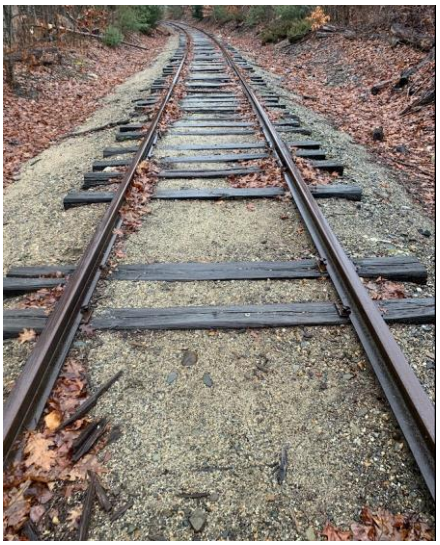

Figure 5: Gaps in cross tie spacing

2.2.4 Rail and OTM (Other Track Materials)

The existing corridor rail is primarily 85 lb per yard, which was installed in the 1920s. Grade crossings include more recently installed 115 lb rail. North of approximately MP 38.4, trail size changes to 75 lb rail for the remainder of the evaluated segment. The 75 lb rail on the corridor was rolled in 1896 and is an uncommon size. Procuring equivalent weight rail and compatible tie plates would be challenging, and more critically, would not meet current FRA requirements for Class I or II service.

Rail and joint bar assemblies are generally in sufficient condition for re-use, with minor spot replacements as necessary. No broken rails were observed; most rail joints were noted to be in good condition. Short segments of rail between MP 30 and 33 showed signs of wear consistent with heavy train loads navigating curved track (Figure 6). If restoration of rail service is included in the RUAC recommendation, rail should be scanned to identify defects prior to running higher speed service with passengers or any hazardous materials.

New ties installed in the track would receive new or relay tie plates and railroad cut spikes. The tie plates will need to accommodate the existing 85 lb rail base width of 5 3/16 inches and the 75 lb rail base of 5 inches. The existing tracks do not include rail anchors. Rail anchors will prevent rail and tie movement and their installation is recommended to support Class 1 and 2 conditions.

Figure 6: Typical Rail Wear

2.2.5 Bridges and Culverts

MaineDOT's existing bridge inventory includes four existing bridges and a masonry culvert along the entire 9-mile corridor from approximately MP 29.56 in Brunswick to MP 38.72 in Lisbon, including the Sabattus River Bridge at MP 39.20 (Appendix B). The 2.57-mile study area contains a single bridge over the Little River at MP 36.74 in Lisbon. Field visits to assess bridge conditions were completed on October 10 and December 27, 2023. Existing conditions descriptions and photographs of the existing bridges were also obtained from the 2020 and 2023 inspection reports in MaineDOT's Asset-wise database. Existing bridge conditions range from poor to satisfactory.

2.2.6 Roadway Grade Crossings

The corridor includes many grade crossings on both public and private roads with either paved or gravel roadway surfaces. The existing track within the crossings is assumed to have deteriorated through many years of vehicular traffic and winter roadway treatments. New crossings will require new 115RE welded rail crossing panels or rubber rail seal, new ballast stone, underdrains, and either hot mix asphalt pavement or gravel re-surfacing. Several trail crossings in Lisbon were recently constructed to include passive warning signs and fencing.

2.2.7 Automatic Highway Crossing Warning Systems

There are eleven highway-rail grade crossings on the MaineDOT-owned Lewiston Lower Road corridor, beginning at Pleasant Street (RX26.56) in Brunswick and ending at Main Street-Route 9 (RX37.32) in Lisbon (Table 3).[1] Two of the crossings are equipped with an active automatic highway warning systems that include flashing lights and bells; however, the crossing case at River Road (RX33.81) has been severely damaged and out of-service for several years. This crossing and the Cumberland Street crossing (RX29.68) show signs of deterioration or outdated equipment. Should MaineDOT opt to upgrade track to Class 1 or Class 2 freight operation and potential future passenger service, seven of the eleven crossings evaluated would likely require installation of a complete, new automatic warning systems with gates, flashing lights and bells. In addition, detailed assessments of these seven identified crossings should be performed by a competent "Diagnostic Team", including MaineDOT representatives. A "Diagnostic Team" evaluation would determine

[1] RX refers to Railroad Crossings.

the specific type of active warning equipment required for optimal safety and efficiency. Some upgrades, such as installing conduit runs for cable at unprotected crossings for future upgrades, could be incorporated during reconstruction and new rail trail construction to avoid future signal equipment conflicts.

Table 3: Existing Grade Crossing on the Lewiston Lower Road Rail Corridor Between s Pleasant Street (RX26.56) in Brunswick and ending at Main Street Route 9 (RX37.32) in Lisbon.

#	Roadway Name	RX # *	Roadway	Town	Existing Warning System
1	Pleasant Street	RX 29.56	2 lanes (1 way) with 2 sidewalks	Brunswick	Crossbucks
2	Cumberland Street	RX 29.68	2 lanes with 1 sidewalk	Brunswick	Flashing lights & bell
3	River Rd (Winter St)	RX 30.81	2 lanes without sidewalk	Topsham	Crossbucks
4	Alphonse Drive (Private Crossing)	RX 31.XX	1 lane (dirt) without sidewalk	Topsham	Stop, Advanced Warning & Private Crossing signs
5	Whitehouse Crossing Road	RX 32.59	2 lanes without sidewalk	Topsham	Crossbucks
6	River Rd (County Rd aka Jack's)	RX 33.81	2 lanes without sidewalk	Topsham	Flashing lights & bell (out of service - case damaged)
7	Recycle Drive	RX 34.XX	2 lanes without sidewalk	Topsham	Advanced Warning signs
8	Pejepscot Boat Ramp	RX 36.XX	1 lane (dirt) without sidewalk	Topsham	Gated
9	US Gypsum (Private Crossing)	RX 36.70	2 lanes without sidewalk	Topsham	Gated
10	Mill Crossing (Private Crossing)	RX 36.74	2 lanes without sidewalk	Lisbon	Gated
11	Main Street (Canal Street- Route 9)	RX 37.32	2 lanes with 2 sidewalks	Lisbon	Flashing lights & bell (out of service - paved over)

2.2.8 Track Sidings and Turnouts

The evaluated rail sections include five track sidings (Table 4). Only the siding to Grimmel Industries is within the active track limits leading to the siding is in acceptable condition, but replacement of all switch ties would be recommended with any rail rehabilitation to support renewed service (Figure 7). There is a No. 8 turnout just north of the Pejepscot Boat Ramp (Figure 8). This turnout has been partly dismantled, with removed materials stacked adjacent to the track.

Approximately 1,500 feet west of the Little River there is a No. 8 turnout leading to a 200 ft. stub-ended siding. Both the turnout and the siding track would require rehabilitation of both the ties and rails. A double-ended siding starts just East of Canal Street in Lisbon. This siding is approximately 1300 feet long and its tracks are mostly buried by soil and sediment. The tracks within Canal Street have been paved over. There is also a 500 ft. long siding adjacent to the Lisbon Rail Trail Parking Lot off Capital Avenue. The No. 8 turnout leading to the siding appears to be relatively new.

Table 4: Track Sidings and Turnouts on the Lewiston Lower Road Rail Corridor Between Pleasant Street (RX26.56) in Brunswick and ending at Main Street Route 9 (RX37.32) in Lisbon, ME.

#	Siding Location/Name	MP	Turnouts	Town	Approx. Siding Length
1	Grimmel Siding	MP 35 to 36	No. 10, 85 lb rail with Rail Bound Manganese Frog	Topsham	6,000 ft.
2	Pejepscot Boat Ramp	MP 35 to 36	No. 8, 85 lb rail with Rail Bound Manganese Frog, curved	Topsham	0 ft. (siding dismantled)
3	Stub-Ended Industry Siding	MP 37 to 38	No. 8, 85 lb rail with Self Guarded Frog	Lisbon	200 ft.
4	Double-Ended Siding	MP 37 to 38	1. No. 8, 85 lb rail with Spring Frog (East of Canal Street) 2. No. 8, 85 lb rail with Rigid Bolted Frog (West of Canal Street)	Lisbon	1300 ft.
5	Stub-Ended Recycling Siding	MP 38 to 39	No. 8, 100 lb rail with Rail Bound Manganese Frog	Lisbon	500 ft.

Figure 7: Turnout to Grimmel Industries Siding

Figure 8: Turnout Adjacent to Rail Trail Parking Lot

2.2.9 Material Salvage

As noted, the corridor includes several ancillary siding tracks. It is assumed these sidings would be removed under a Rail Use option, except for the siding to Grimmel Industries in Topsham. Any future passenger rail operation would likely require a different siding track layout. Timber crossties from the existing track are in poor condition and are not likely to be salvageable. The ties are treated with creosote and would require disposal in accordance with environmental, including tie removal, temporary storage, and transport to a licensed disposal facility. Steel rail and OTM components (e.g., joint bars, tie plates, bolts, and spikes) removed from the existing track have salvage value. Loose scrap steel and rail would need to be cut into four-foot lengths for disposal at a scrap yard.

2.3 Environmental Considerations

As part of this initial feasibility study, HNTB evaluated the environmental requirements likely needed to reestablish rail service to the Lewiston Lower Road line. Because the corridor is currently maintained by MaineDOT, it can be inferred that there would be no newly associated wetland impacts with the Rail Use option. However, a field delineation would be required prior to preliminary design for rail rehabilitation to ensure the existing corridor meets this condition. The nine-mile section of rail corridor includes 26 ephemeral or permanent stream or river crossings; evaluating current condition and quality of these crossings was not included in the scope of this feasibility study. Repair or replacement of these crossings may lead to minor wetland and/or waterbody impacts, which would be quantified as part of a following study phase. Developing exact estimates of these impacts would require field delineation.

2.4 Conceptual Cost Estimate

Conceptual cost estimates for the 2.57-miles of rail in the Town of Lisbon are summarized in Tables 5 and 6. Values used to develop the conceptual cost estimates as well as an estimate for restoring the entire 9.73-mile rail segment are included as Appendix A. Conceptual estimates include track rehabilitation, ditching, fouled ballast replacement, a roadway crossing, bridges, culverts, crossing warning systems, track removal and salvage costs. The track removal and salvage estimate are a net cost that includes the expense to remove and properly dispose of material offset by the revenue generated from the sale of salvaged steel material. Costs are based on escalated values from recent similar studies, recent track and railroad bridge construction projects in Maine, and recent quotes from material suppliers. No costs for additional infrastructure such as sidings, yard tracks, or other facilities are included.

Additional costs have been calculated for design engineering and construction management fees necessary to execute the project. Due to the conceptual level of the estimate, a 30% contingency has been included to address additional costs that can be further defined in subsequent design stages.

Table 5: Lewiston Lower Road Feasibility Study Conceptual Cost Estimate for FRA Class 1 Rail Use (MP 36.72 to MP 39.29 (Lisbon Only)).

Item No.	Description	Total
1	Track Rehabilitation	$1,112,300
2	Bridge and Culvert Rehabilitation	$1,057,500
3	Roadway Crossings	$358,200
4	Track Removal and Salvage	$70,000
	Construction Subtotal:	**$2,598,000**
	Contingency (30%):	$779,400
	Construction Total:	**$3,377,400**
	Design Engineering (20%):	$675,480
	Construction Mgmt. and Engineering (15%):	$506,610
	Subtotal:	**$4,559,490**
	Round up	
	Total:	**$4,600,000**

Table 6: Lewiston Lower Road Feasibility Study Conceptual Cost Estimate for FRA Class 2 Rail Use (MP 36.72 to MP 39.29 (Lisbon Only)).

Item No.	Description	Total
1	Track Rehabilitation	$1,398,300
2	Bridge and Culvert Rehabilitation	$1,057,500
3	Roadway Crossings	$358,200
4	Track Removal and Salvage	$110,000
	Construction Subtotal:	**$2,924,000**
	Contingency (30%):	$877,200
	Construction Total:	**$3,801,200**
	Design Engineering (20%): Construction Mgmt. and Engineering (15%):	$760,240 $570,180
	Subtotal:	**$5,131,620**
	Round up	
	Total:	**$5,200,000**

2.5. Economic Considerations

2.5.1 Potential Rail Use

In addition to serving potential existing customers along the corridor and creating railroad jobs, an active rail line could promote opening of new businesses or bring economic opportunity to the Town of Lisbon. State Route 196 generally parallels the existing ROW for the Lisbon portion of the Lewiston Lower Road rail line. This route connects the Town of Lisbon northwest to Lewiston and Auburn and southeast to Topsham. In general, travel outside of Lisbon has little or no congestions daily. Trucking along Route 196 is the principal modal competition to the Lewiston Lower Road rail corridor. Restoring Class 2 rail operations has the potential to divert heavy truck traffic from Maine's state roads, resulting in a reduction in annual costs to repair and maintain these roads. However, costs associated with an FRA track Class of 1 or 2 rehabilitation is not likely to be cost or time competitive with the "just-in-time" transit logistics via trucking (Tables 7 and 8).

Table 7: Factors Under Consideration by Mode.

Factor	Roadways	Railway
Transit Distance	55-miles +/-	50-miles +/-
Lading	Up to 50-tons	Up to 125-tons
Cost per ton-mile	$0.12 - $0.25	$0.02 - $0.05
Posted Roads Restrictions	Up to 55% of the year	No restrictions
Average transit speed	39.3 MPH	See Table 19

Table 8: Class 1 and 2 Maximum Allowable Speeds Excepted Track.

FRA Class	Freight	Passenger
Excepted	10 MPH	Not Allowed
Class 1	10 MPH	15 MPH
Class 2	25 MPH	30 MPH

In addition to challenges with "just-in-time" transport, only one commercial user of this section of rail has been identified and their freight rail use has not been active for approximately 5 years. This user has not expressed an interest in reviving freight rail as an integral part of their scrap transport operations. In terms of passenger service, connecting the 2.57-mile section of track considered in this study to other passenger rail systems would require a feasibility study of the entire 9-mile corridor from Lisbon to Topsham to determine potential ridership.

2.5.2 Consideration for the Creation of a Foreign Trade Zone

One catalyst for attracting new rail-centric businesses along the corridor could be the establishment of a Foreign Trade Zone (FTZ), either on or adjacent to the corridor. FTZ are secure areas under U.S. Customs and Border Protection (CBP) supervision that are generally considered outside CBP territory upon activation. Located in or near CBP ports of entry, they are the United States version of international free-trade zones. The State of Maine currently has only 4 of the over 230 FTZ projects (and nearly 400 subzones) in the United States, located in Bangor, Madawaska, Waterville, and Lewiston-Auburn. Sizeable cost savings and other benefits can be achieved by taking advantage of an FTZ program. Using an FTZ can significantly reduce costs from customs duties, taxes, and tariffs; improve global market competitiveness; and minimize bureaucratic regulations.

While FTZ designation has the potential for economic benefits to the study area, the corridor lacks available properties suitable for development as distribution terminals. Prior to pursuing FTZ designation, the Town of Lisbon would need to assess and confirm their community's as well as surrounding communities' interest in hosting an FTZ and paying the applicable fees. Also, as discussed in Section 7.2, several existing or potential businesses would need to demonstrate interest in both rail shipments and utilization of the FTZ. Multiple businesses will be necessary to provide the volumes necessary to justify the initial infrastructure expenses associated with restoring active rail service and ultimately support a self-sustaining railroad operation. If these factors are not present, a railroad oriented FTZ may be better suited for an alternative active rail corridor in Maine

2.5.3 Potential Economic Benefits of Rail Use

Large-scale construction projects generate substantial economic stimulus as they create job opportunities and require significant expenditures on materials. This, in turn, creates personal income and business revenues that are, at least in part, spent or invested in the local economy (Econsult Corporation et al., 2012). As with other parts of this study, additional consideration of economic values specific to this rail section should be included in any future feasibility study related to restoring rail in this corridor. Potential economic benefits of revitalizing rail use on the Lisbon section of the Lewiston Lower Road rail corridor could include:

- Potential jobs created within a newly established rail development zone, which could result in 4-5 times spending generated by jobs, families and business supporting daily life activities in

communities

- Jobs created for reconstruction of the 2.57-mile Lewiston Lower Road rail section within the Town of Lisbon, dependent upon the type of construction, FRA track class, and a 15-year operating plan for traffic levels that generate the need for additional infrastructure expansion, such as switching yards, maintenance facilities, etc.
- Rehabilitation of the Lewiston Lower Road rail corridor would generate local economic activities to support construction and engineering forces involved in the ongoing maintenance of the railroad.
- Jobs created from direct employment at the railroad, support industries, and at shippers utilizing rail access.
- Development of FTZ industrial development parks for industries that are FTZ-centric.
- Economic benefits generated by new job creation within FTZ industries.
- Reutilization of the rail service would potentially provide shippers with lower transportation costs and expanded market opportunities.
- Rail service on the corridor would potentially provide enhanced safety on public roads through reduced heavy truck traffic, and reduction of the financial burden on public maintenance of the roadways. In addition, reduced truck traffic will likely reduce the air pollution levels in the community.

3. Interim Trail Use

3.1 Description of Use

Interim Trail Use would include removing existing track materials and constructing a mixed-use trail on the 2.57-mile of the existing rail bed between the Lisbon-Topsham town line adjacent to State Route 196 at the Little River and ends at the intersection with River Rd off State Route 196 and 450' west of the Sabattus River. In concept, the interim trail is anticipated to be 10 feet wide and surfaced with either asphalt pavement or stone dust. The Interim Trail study area includes three bridges and one culvert. For this study, the existing bridges are assumed to accommodate the proposed trail on the existing track alignment. The bridge decks would require minor modifications to support Interim Trail use, providing uniform surface and railing system as needed to safely accommodate users. Should rail service be restored in the future, the trail would need to be removed or relocated.

3.2 Potential Constraints

An Interim Trail constructed on the existing track could experience periodic flooding by the Androscoggin River. Field reviews showed evidence of ballast fouling and sedimentation from flooding that would similarly impact any interim trail use. The feasibility of raising the trail elevation can be explored in the next phase of study.

Two parking areas could potentially serve a proposed trail. At the northwestern end of the 2.57-mile segment of the study corridor, there is an existing trailhead for the Papermill Trail, also called Miller Park. Situated where the Androscoggin and Sabattus Rivers converge, this trailhead offers a boat ramp, seasonal portable toilet, and picnic facilities. An existing walking path goes under Route 196 from Miller Park and could be extended to also be used as a trailhead for this proposed trail (Figure 8). An additional MaineDOT park and ride lot is adjacent to the proposed trail at the intersection of State Route 196 and Main Street, 30' from the proposed trail near the middle of the 2.57-mile segment (Figure 9).

Figure 8: Miller Park Parking/Trailhead

Figure 9: MaineDOT Park and Ride lot near Intersection of Route 196 and Main Street.

3.3 Environmental Considerations

As part of this initial feasibility study, HNTB evaluated the environmental requirements likely needed to construct an Interim Trail on a portion of the Lewiston Lower Road line. Because the trail would most likely be constructed within the footprint of the existing rail line, the potential for environmental impacts is primary related to soil disturbance within 75-feet of the river and streams in the project area and replacement or rehabilitation of several existing stream crossings under the rail bed. However, a field delineation would be required prior to preliminary design for rail rehabilitation to confirm the project could meet all applicable regulatory standards. Repair or replacement of these crossings may lead to minor wetland and/or waterbody impacts, which would be quantified as part of a following study phase. Exact estimates of these impacts would be needed to complete state and federal permitting prior to construction. Erosion and sedimentation controls would be required to be maintained throughout construction until disturbed areas are stabilized with stone dust, asphalt, or vegetation. The nine-mile section of rail corridor includes 26 ephemeral or permanent stream or river crossings; evaluating current condition and quality of these crossings was not included in the scope of this feasibility study.

3.4 Conceptual Cost Estimates

Cost estimates for Interim Trail include conceptual construction costs for a mixed-use trail on the existing rail bed over the 2.57-mile rail segment in Lisbon. Estimates were developed for a trail with either a paved or stone dust surface (Table 10). Cost estimates do not include potential parking facilities, property acquisitions, permitting costs or any other incidentals. Assumptions associated with the conceptual cost estimates included: minor amounts of excavation and gravel required for track infill; salvage value of steel track components (e.g., rail, tie plates, and OTM), and low to non-existent salvage value of timber crossties due to their age and level of deterioration.

The only at-grade crossing along the 2.57-mile segment is at the intersection of Canal St. and State Route 196. This crossing would require traffic signal upgrades to add an additional pedestrian phase; these improvements were also included in the conceptual cost estimates. Existing bridges within the Lisbon rail section would require rehabilitation and/or replacement to accommodate

the Interim Trail. Associated costs include timber planking for the trail surface as well as a railing system to safely accommodate trail users.

Estimated costs are based on escalated costs from recent similar construction projects in Maine. Additional costs have been calculated for design engineering and construction management fees necessary to execute the project. Due to the conceptual level of the estimate, a 30% contingency has been included to address additional costs that can be further defined in subsequent design stages.

Table 10: Lewiston Lower Road Feasibility Study Conceptual Cost Estimate for Interim Trail Use (MP 36.72 to MP 39.29 (Lisbon Only)).

2A. Trail Use - Paved		
Item No.	**Description**	**Total**
1	Common Excavation	$177,360
2	Trail Base (Gravel)	$231,345
3	Trail Surface (Paved)	$334,200
4	Canal St Roadway Crossing	$40,000
5	Bridge Rehabilitation/Replacements	$335,000
6	Cost to Remove and Salvage Track	$220,000
	Construction Subtotal:	**$1,337,905**
	Contingency (30%):	$401,372
	Construction Total:	**$1,739,277**
	Design Engineering (20%):	$347,855
	Construction Mgmt. and Engineering (15%):	$260,892
	Subtotal:	**$2,348,024**
	Round up	
	Total:	**$2,400,000**
2B. Trail Use – Stone Dust		
Item No.	**Description**	**Total**
1	Common Excavation	$177,360
2	Trail Base (Gravel)	$231,345
3	Trail Surface (Stone-Dust)	$147,800
4	Canal St Roadway Crossing	$40,000
5	Bridge Rehabilitation/Replacements	$335,000
6	Cost to Remove and Salvage Track	$220,000
	Construction Subtotal:	**$1,151,505**
	Contingency (30%):	$345,452
	Construction Total:	**$1,496,957**
	Design Engineering (20%):	$299,391
	Construction Mgmt. and Engineering (15%):	$224,544
	Subtotal:	**$2,020,892**
	Round up	
	Total:	**$2,100,00**

3.5 Economic Considerations

Economic benefits presented in this section apply to both Interim Trail and Rail with Trail Uses.

3.5.1 Property Value Impacts

The value of a property is a function of numerous characteristics and locational factors, including property and structural characteristics, such as the number of bedrooms, age of the house, lot size and square footage; and locational characteristics, like crime, school quality, and weather (Center for Urban Policy and the Environment 2003). Proximity to parks, trails, and green space (hereafter "green space") are locational characteristics are found to, the vast majority of the time, increase property values as these amenities have been proven to increase the quality of life of residents and increase the livability of communities (Crompton and Nicholls 2019).

Not only is green space considered an amenity, but abandoned railways and corridors are often considered a dis-amenity. Abandoned railways disconnect transportation systems and dissect neighborhoods. They can even have the potential to become a health and safety risk (Noh 2019). One study in Muskego, Wisconsin found that within the study area, home values increased for each foot away from an abandoned rail corridor, albeit by less than 1% (Kashian, Winden, and Storts 2018). Table 11 summarizes some of the relevant literature on the relationship between green space and property values. Studies on this relationship show that the premium on green space can range from above 15% to, in some rare cases, a small negative premium. The most frequently occurring outcome, however, is a small premium between 3% to 5% for a single-family home (Crompton and Nicholls 2019).

Table 11: Summary of Relevant Studies on the Property Value Impact of Trails, Parks, and Green Space.

Source	Location	Proximity Definition	Proximity Effect
"Transforming Abandoned Rail Corridor into Multi-purpose Trails: Applying a Spatial Hedonic Approach to Estimating the Economic Benefits of the Little Miami Scenic Trail in Cincinnati, Ohio, USA," Zhang et al. (2018)	Little Miami Scenic Trail	10,000 Feet	3.6%
"The Implicit Price of Urban Public Parks and Greenways: A Spatial Contextual Approach," Payton & Ottensmann (2015)	The Monon Trails and Other Greenway Trails	0.5 miles	Monon Trails: 4.1% (declines as neighborhood income increases) Other trails: 1.8%
"The Effect of a Recreational Bike Path on Housing Values in Muskego, Wisconsin," Kashian et al. (2018)	Muskego, WI	Within city boundaries	8.6% increase in sales price after trail opening

3.5.2 Methodology and Data

Physical addresses in Lisbon near the Lewiston Paper Mill Rail to Trail Corridor were gathered using the Town of Lisbon tax accessor database. Estimates of the area surrounding a proposed rail or trail project was initially developed using Google Maps; the list of addresses was subsequently refined to those within a one half-mile range of potential project limits.[2] Addresses within this area were sorted to exclude commercial, government, and church buildings. Each residential address was then linked to its respective block group and the median housing value of that block group. A total of five block groups covers the two potentially affected census tracts in the Town of Lisbon.

To estimate the one-time increase in property values resulting from the implementation of an Interim Trail, the median housing value associated with each of the addresses within the buffer was multiplied by 4.1percent. This percentage increase was chosen as it aligns with the results of the Payton and Ottensmann (2015) study, as well as related research.

Impacts of a trail on property tax revenues were calculated for the town. Total estimated increase in property values for each block group was multiplied by Lisbon's municipal property tax rate.

3.5.3 Limitations and Assumptions

There are several limitations and assumptions of this study. The first, and perhaps the most evident, limitation is that each block group median housing value was used as a proxy for the property value of each address. Ideally, parcel data containing the assessed value of each property would be used; however, this data was not readily available for the addresses within the project area.

A second limitation is that, at the time of this study, certain aspects of the Interim Trail are still unknown and/or subject to change. For example, whether the trail will be exclusively an Interim Trail or an Interim Trail adjacent to active Rail Use remains undetermined.

A third limitation of this study is the assumption that usage for the Mountain Division and Fryeburg trails are appropriate metrics with which to compare potential usage on the Lisbon Interim Trail.

A fourth limitation is the assumption that increases in property value will be consistent across the area evaluated. Houses within a half-mile of the trail differ in their proximity to the trail. Values have been shown to increase the closer the property is to a trail (Zhang, Oh, and vom Hofe 2018). Neighborhood characteristics and household income also affect the extent to which green space influences property values (Payton and Ottensmann 2015).

The fifth and final limitation of this study is that the method in which the trail is built, maintained, and operated influences the value of nearby properties. As previously mentioned, in some rare cases trails may adversely impact property values. Greenways have the potential to generate noise, heavy traffic, littering, trespassing, or other crimes, and losses of privacy can reduce the premium associated with greenways (Crompton and Nicholls 2019; Noh 2019). While this may cause concern, it is more so a limitation associated with future phases of potential trail development that relies on management practices that ensure trails are designed to alleviate losses in privacy and are well-maintained.

[2] A half-mile was chosen as this distance is often characterized as a "reasonable distance to walk to a park" (Harnik et al., 2013).

3.5.4 Results

The estimated property value impacts of the proposed trail are shown in Table 11. There are a total of 810 residential properties within a half-mile of the potential trail corridor.

Based on the median value of the respective block group of the affected address and using a 4.1 percent increase in property value, the total estimated increase in value exceeds $5.9 million.

Table 11: Estimated Property Value Impact of a Trail.

Town	Addresses Within 1/2 mile	Estimated Aggregate House Value Within 1/2 Mile	Estimated Increase in Property Value
Tract 302 Block Group 1	363	$66,066,000	$2,708,706
Tract 302 Block Group 2	354	$59,224,200	$2,428,192
Tract 302 Block Group 3	2	$427,200	$17,515
Tract 301 Block Group 4	10	$1,644,000	$67,404
Tract 301 Block Group 6	81	$17,463,600	$716,008
Total	810	$144,825,000	$5,937,825

Table 12 shows the additional tax revenue resulting from increased property values. The proposed trail is estimated to increase property tax revenues by over $130,000 annually.

Table 12: Estimated Annual Property Tax Revenue from a Trail.

	Lisbon
2021-2022 Tax Rate	0.0211
Additional Revenue	$125,288

3.5.5 Predicted Trail Usage

3.5.5.a Methodology

Current and future use estimates are essential to determining the social and economic impacts of the new trail. Use and impact studies for similar trails, such as the Lewiston Paper Mill Rail to Trail Corridor, provided information about trail use and typical trail users. Two trail count reports done completed by the Bicycle Coalition of Maine for the existing portions of the Mountain Division Trail in Gorham and Fryeburg (Bicycle Coalition of Maine 2020; 2021) were also considered.

Trail use can be estimated based on the average number of users per mile of the shorter trails and using that per mile metric to calculate visitation on the longer trails. The existing portions of the

Mountain Division Trail range from 35 (for the Gorham section of trail) to 85 (for the Fryeburg section of trail) users per mile. These per mile estimates were multiplied by the length of the proposed trail, 2.57 miles, to estimate the number of trail users per day. This resulted in a range from 90 to 218 users per day.

Trail use will also differ based on the time of year; many trails see a decrease in visitation on days with inclement weather and in the winter. This is evident in the Bicycle Coalition of Maine trail counts, with visitation dropping to nearly zero on rainy days. Because of this, the number of sunny days as calculated by National Oceanic and Atmospheric Administration (NOAA) was used to determine the average number of trips by month for May to October. From November to April we used this same calculation but also reduced the trail counts by 43.9 percent based on studies that indicate individual participation rates in outdoor recreation and exercise decrease substantially in the winter and due to poor weather conditions, including cold (Wagner et al. 2019).

3.5.5.b Results

Table 13 presents the expected range of low trail usage (90 trips per day) and high trail usage (218 trips per day) for the proposed trail. Keep in mind that the characteristics of the final trail will have an impact on usage. For example, increased neighborhood access to and parking adjacent to the trail will increase usage, while motorized vehicle access (such as ATVs) has been shown to decrease non-motorized recreation.

Table 13: Estimated Number of Annual Trips.

Months	Low (90 trips per day)	High (218 trips per day)
May through October	16,560	40,112
November through April	9,189	22,258
Total	25,749	62,370

Estimates of local and non-local trips can be difficult to obtain without direct data from trail users. It also depends greatly on the definition of local, which may or may not include out-of-state visitors. The Maine Office of Tourism conducted a survey that showed 23 percent of visitors that come to Maine for overnight leisure trips are here to engage in outdoor recreation. For this report, Estimates of non-local as people visiting from outside of the state of Maine are based on 23 percent to determine non-local visitation (Maine Department of Agriculture, Conservation & Forestry and Bureau of Parks and Land 2019). Table 14 illustrates the estimated number of local and non-local trips projected.

Table 14: Estimated Number of Local and Non-Local Trips.

User	Low (25,749 annual trips)	High (62,370 annual trips)
Local (77% of trips)	19,827	48,025
Non-local (23% of trips)	5,922	14,345

3.5.5.c Future Usage Factors

In the United States participation in outdoor activities has hovered around 50 percent since 2007. While outdoor participation increased greatly during Covid it has decreased slightly in 2022 and remains above pre-pandemic levels (Outdoor Foundation 2023). Multiple other factors could impact trail use in the future, including trail improvements, future connections, and usage of the trail for events and attractions in the area. Maine's Eastern Trail, for example, has shown an increase in user trips as the trail has been continuously improved. From 2014 to 2018, the number of users on the trail almost tripled. Improvements have included adding water stations, parking, and new trail segments (Camoin Associates 2021; Eastern Trail Alliance 2014; 2019).

3.5.6 Economic Impacts of Interim Trail Usage

Trails can be valuable assets to a community, drawing in visitors from outside of the area that contribute to the local economy. Communities have often reported new openings of tourism-related business, such as restaurants and lodging facilities, and increases in business sale volumes, following the opening of a trail (John McDonald and Laura Brown 2015). This section estimates the economic impact that tourists from out-of-state using an Interim Trail would potentially bring the State of Maine.

3.5.6.a Methodology and Data

Estimates of out-of-state user trips presented in Section 3.5.5.b were used to calculate the economic impacts of a trail. These estimates range from a low of 5,922 trips per year to a high of 14,345 trips (Table 15). Estimates of user spending per trip were then broken out into spending categories for both low and high scenarios. Estimates of average user spending per trip were taken from a report by Camoin Associates (2021) on the hypothetical expansion of the Eastern Trail in Maine. User spending estimates per person per trip are presented in Table 15.

Table 15: New User Spending Per Trip.

Category	Spending per Trip	Low (5,922 trips)	High (14,345 trips)
Lodging	$54.39	$322,098	$780,225
Food	$28.33	$167,770	$406,394
Retail	$15.86	$93,993	$227,512
Transportation	$15.86	$93,993	$227,512
Other Recreation	$6.80	$40,270	$97,546
Equipment	$12.46	$73,788	$178,739
Total	$133.70	$782,912	$1,917,928

Source: (Camoin Associates 2021)

Using IMPLAN, the project team estimated the direct, indirect, and induced effects of new user spending brought in by an Interim Trail (Section 3.5).

3.5.6.b Results

Table 16 shows economic activities that would be expected to be affected or created by new user spending brought in by a trail. Results indicate that, for the low use scenario, fewer than 10 jobs are likely to be created and/or supported by the project, yielding approximately $345,000 in labor income, over $650,000 in value added (gross regional product, or GRP), and over $1 million in revenue (output). For the high use scenario, nearly 20 jobs, over $800,000 in labor income, over $1.5 million in value added, and over $2.5 million in output may be created and/or supported.

Table 16: Economic Impact of New Users for Low and High Scenarios

Impact	Employment	Labor Income	Value Added	Output
Low Scenario				
Direct	5.4	$208,000	$407,000	$621,000
Indirect	1.1	$65,000	$107,000	$209,000
Induced	1.3	$72,000	$139,000	$232,000
Total	7.8	$345,000	$653,000	$1,062,000
High Scenario				
Direct	13.1	$503,000	$987,000	$1,504,000
Indirect	2.6	$156,000	$258,000	$506,000
Induced	3.1	$175,000	$338,000	$563,000
Total	18.8	$834,000	$1,583,000	$2,573,000

3.5.7 Recreational Use Value

This section describes estimates of recreational-use value associated with a trail. Recreational-use value of an activity can be thought of as a monetary estimate of the net benefits received by a user by participating in a recreational activity (sometimes called consumer surplus). These value is calculated by taking the maximum amount a user is willing to pay to participate in an activity (the "benefits" to the participant) minus the costs associated with the activity (which may include transportation or equipment costs and the opportunity cost of time). While the economic impact associated with the trail measures how spending by recreational users affects economies within a given geography; the recreational-use value is not actual money that changes hands (Section 3.5). It is the benefit to the individual of participating in an activity, aggregated over all the participants (Washington State Recreation and Conservation Office and ECONorthwest 2019).

3.5.7.a Methodology and Data

The population within a half-mile of the trail was estimated using the methodology outlined in Section 3.5.2 to determine the number of addresses within the area and data from the American Community Survey. This was accomplished by using the average household size for the units multiplied by the number of addresses for each town.

To estimate the current number of trips taken by this population, the project team utilized survey data from the latest Maine State Comprehensive Outdoor Recreation Plan (SCORP) on the percentage of Mainers listing selected activities as one of their five favorites (Maine Department of Agriculture, Conservation & Forestry and Bureau of Parks and Land 2019). The percentage for each of the selected activities was multiplied by the estimated population within a half-mile of the trail to determine the number of existing "users." Only activities common on similar trails were

included.

The recreational use-value of an activity is for a singular trip. Survey data on the frequency of participation in outdoor recreation was used to estimate the average number of trips taken per year per user (Maine Department of Agriculture, Conservation & Forestry and Bureau of Parks and Land 2019). There were eight possible responses. The project team determined "every few days" to mean every four days, and "every few weeks" to mean every three weeks. The number of additional users was multiplied by the average number of trips per year to determine the annual number of new trips.

The recreational use-value associated with the selected activities was estimated using a benefit transfer methodology by utilizing the United States Geological Survey (USGS) Benefit Transfer Toolkit. The Toolkit provides a regional average, minimum, and maximum of existing studies on the recreational use-values of selected activities. For walking, running, and snowshoeing, the minimum value[3] of studies on the recreational use value of hiking in the northeast was used as the Toolkit does not include these activities. For all the other selected activities, the average value of studies in the northeast was chosen. Finally, the recreational use-value associated with each activity was multiplied by the number of new trips for each activity to determine the total increase in value resulting from the implementation of the proposed trail.

3.5.7.b Results

Table 17 shows the current base of recreational users and trips within a half-mile of the trail.

Table 17: Estimated Current Base of Recreational Users in Within a Half-Mile of the Proposed Trail, By Activity Type.

Activity	Percent of Population Participating	Population Within ½-Mile
Population		2,098
Hiking	69%	1,448
Bicycling	37%	776
Walking	29%	608
Skiing/Ski	25%	525
Running	12%	252
Snowshoeing	11%	231
Wildlife Watching	8%	168
ATV/Snowmobiling	8%	168
Total Existing Recreational Base		4,176

Source: (Maine Department of Agriculture, Conservation & Forestry and Bureau of Parks and Land 2019; U.S. Census Bureau 2019a; 2019b).

An average of 87 trips per year was calculated, and this figure was multiplied by the number of users for each activity It was assumed that within a half-mile radius, the number of individuals

[3] Activities occurring closer to home tend to have lower associated recreational-use values (Washington State Recreation and Conservation Office and ECONorthwest 2019). The minimum value was chosen as the population

using the proposed trail will increase by 25 percent[4] after the trail is completed (Table 18).

Table18: Estimated Amount and Value of Increase Resulting from Implementation of Rail Trail.

Activity	% of Population Participating	Total Increase in Trips	Recreational Use Value Per Trip[5]	Total
Hiking	69%	31,494	$8.18	$257,621
Bicycling	37%	16,878	$26.27	$443,385
Walking	29%	13,224	$8.18	$108,172
Skiing/Ski	25%	11,419	$56.31	$643,004
Running	12%	5,481	$8.18	$47,779
Snowshoeing	11%	5,024	$8.18	$41,096
Wildlife Watching	8%	3,654	$8.90	$32,521
ATV/Snowmobiling	8%	3,654	$93.00	$339,822
Total Value of Increase in Trips		90,828	$217.20	$1,910,456

Source: Maine Geological Survey, n.d.

3.5.8 Health Benefits

The project team estimated the expected health benefits resulting from the implementation of the proposed trail as cost savings due to increased activity. Accessibility is an important factor in participation in outdoor recreation (Maine Department of Agriculture, Conservation & Forestry and Bureau of Parks and Land 2019; Rails to Trails Conservancy 2017). Access to a safe place to walk has been linked with increased participation in outdoor recreation (Rails to Trails Conservancy 2017). Participation rates in outdoor recreation in the United States have ranged from a low of 42 percent to a high of 50 percent (Maine Climate Action Council, 2020). Participation in outdoor recreation activities does not always translate to adequate levels of physical activity. Rural populations are less likely to be sufficiently active than their urban counterparts, with estimates of the national population considered physically inactive to be 24 percent. The CDC puts Maine's inactivity rate at 24.8 percent (Carlson et al. 2015; Centers for Disease Control and Prevention 2022; Gilbert et al. 2019).

Furthermore, the obesity rate in Androscoggin County is 31 percent. Increased participation in outdoor exercise would likely have a positive effect on this rate. As adults who do not meet the recommended amount of physical activity incur increased health care costs compared to those who do, increase physical activity is expected to improve health outcomes and lower health care costs. Lower health care costs may translate to additional economic benefits for the State as households will likely spend at least a portion of their savings in other areas of the local economy.

3.5.8.a Methodology and Data

To estimate the health benefits of the trail, the project team looked at the number of people who live in the area who might change their activity levels from being inactive to moderately active, and

[4] This figure was chosen based on a literature review conducted by the CDC, which found that the median effect size of "creating or enhancing access to places for physical activity and providing informational outreach" on the proportion of the population to physically active at least three times a week to be a 25% increase (Centers for Disease Control and Prevention, 2011).

[5] Adjusted to 2023 Dollars

from inactive to adequately active. Activity rates can be difficult to calculate, particularly for rural areas as most trail use studies are conducted in urban communities, therefore, Maine's inactivity figure of 24.8 percent is used to calculate the number of inactive individuals for the relevant population (Centers for Disease Control and Prevention 2022). The project team determined the inactive population within a half-mile of the trail to be 520 people.

3.5.8.b Results

The CDC estimates that inactive adults incur $1,931[6] in additional health care costs annually, and inadequately active adults, who participate in activities but do not meet the CDC's definition of sufficiently active, incur an additional $959[7] in annual health care costs (Camoin Associates 2021; Centers for Disease Control and Prevention 2011).

The CDC puts activity increase due to additional access to places for physical activity at 25% of the local population (Centers for Disease Control and Prevention, 2011; Gilbert et al., 2019). Some studies have indicated increases in activity resulting from the implementation of a new trail often include people who are using a new trail, but who were already active but simply changed the location of their activity (Centers for Disease Control and Prevention 2022; 2011; Gilbert et al. 2019). For this reason, health cost savings are calculated for a low percentage increase scenario and a high percentage increase scenario.

The project team then used the medical cost savings that come with increased physical activity to estimate the cost-saving for the following scenarios:

- Cost savings if 1 - 25 percent of the inactive population moves from inactive to inadequately active.
- Cost savings if 1 - 25 percent of the inactive population move from inactive to sufficiently active.

3.5.9 Additional Impacts and Benefits of Trail Development

3.5.9.a Climate Change

A 20 percent reduction of vehicle miles traveled by 2030 is one of the transportation goals listed in *Maine Won't Wait: A four-year plan for climate action* (Maine Climate Action Council 2020). The Lewiston Lower Road Rail Corridor could, if connected with other trails, provide an alternate transportation route for rural residents.

3.5.9.b Increased Accessibility

In the latest Maine SCORP report, increasing and improving the amount of outdoor recreation opportunities meeting accessibility standards was listed as a priority. As there is a substantial number of Mainers with disabilities, and the State has an aging population, this is unsurprising (Maine Department of Agriculture, Conservation & Forestry and Bureau of Parks and Land 2019).

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[5] This figure was chosen based on a literature review conducted by the CDC, which found that the median effect size of "creating or enhancing access to places for physical activity and providing informational outreach" on the proportion of the population to physically active at least three times a week to be a 25% increase (Centers for Disease Control and Prevention, 2011).

[6] Activities occurring closer to home tend to have lower associated recreational-use values (Washington State Recreation and Conservation Office & ECONorthwest, 2019). The minimum value was chosen as the population included in this study will very likely be participating in these activities closer to home than the studied populations included in the USGS Benefit Transfer Toolkit.

[7] Adjusted to 2023 dollars

[8] Adjusted to 2023 dollars

It is also important to note here that accessibility is not just an issue for people with disabilities, but those they participate in outdoor recreation with are also impacted. A family with individuals with mobility issues is going to want to participate in recreation that is accessible to the entire group (USDA Forest Service 2012).

While the proposed trail is not currently proposed to connect directly with existing trails, the existing Paper Mill Trail is only ~400 feet away from the northeast end of the trail. Trail connectivity has several potential benefits. Connecting the proposed trail with existing trails could enable more individuals to commute to work by trail instead of by car. This would in turn reduce carbon emissions and improve health outcomes. Currently, according to the Census's OntheMap tool, approximately 26 percent of Lisbon workers commute to either Lewiston or Auburn (United States Census Bureau 2021). Very few residents of Lisbon report commuting by bike (United States Census Bureau, American Community Survey Five Year Estimates 2021). However, increasing accessibility will likely enable an increase in those choosing to commute to work by bike rather than drive.

3.5.9.c Employment Retention

Having ways to increase physical activity while at work, and living in areas with access to parks and open space are both shown to be important to employees. Businesses that instituted policies that supported increased access to both green spaces and opportunities for increased physical activity showed increased rates of employee satisfaction (Center for Disease Control and Prevention 2022).

3.6 Summary of Results

This socio-economic evaluation of the three options indicates that constructing a multi-use trail would benefit the Town of Lisbon, its citizens, and other users of the trail in terms of increased visitation, future connectivity to other trail sections, health benefits to users of the trail, and potential reduction of greenhouse gas emissions through modal shift.

4. Rail with Trail Use

4.1 Description of Use

Figure 10 shows a conceptual layout for a mixed-use trail adjacent to the existing railroad tracks as one of the options considered through this feasibility study. An advantage identified with this option is reduced risk associated with rail service restoration because the trail would be adjacent to the track rather than on the rail bed itself. As with the Interim Trail option, the proposed 2.57-mile trail would be 10' wide, surfaced with either asphalt pavement or stone dust. Because this option assumes the rail could return to service, the near edge of the trail (not including shoulder) must be a minimum of 15-feet from the near rail, in accordance with MaineDOT standards for Development of "Trail with Rail". However, this setback may be reduced to 10.5 feet if a fence meeting MaineDOT standards is installed at the edge of trail shoulder between the trail and rail.

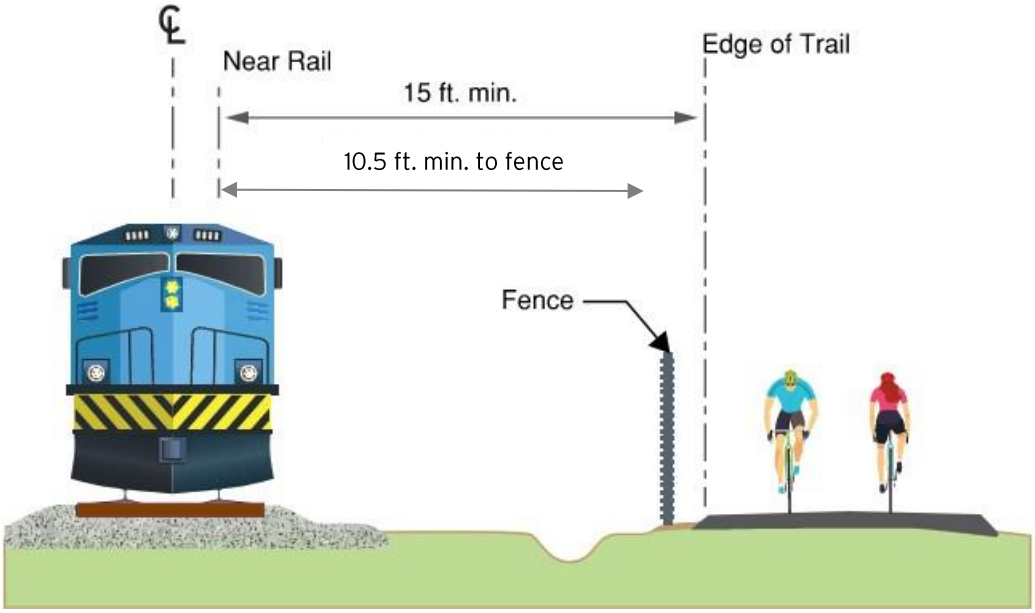


Figure 10: Typical Rail with Trail Cross-section

The most recent, publicly available Geographic Information Systems (GIS) data, including aerial imagery, property lines, and contour elevations, was used in conjunction with field observations to determine approximate track location with reference to existing rail. Right-of-way and setback of the trail would vary throughout the corridor. A preferred location of the mixed-use trail within the railroad corridor would be determined during a subsequent study phase, and include:

- Trail setback from track
- Trail location east or west of the track
- Positive separation between the track and trail and existing walking path, i.e., longitudinal guardrail or fencing limits
- Historical flooding patterns

Per MaineDOT standards for Trail with Rail, a Trail should not be required to cross the track unless at an at grade intersection. In some cases, this may not be feasible and retaining walls may be required to avoid property impacts or acquisition of property rights may be required.

The 2.57-mile rail section includes three bridges and one culvert. For the purposes of this report, the assumption is that the abutments at each existing bridge would be extended, and additional

girders installed adjacent to the existing rail alignment to accommodate additional width for a mixed-use trail.

4.2 Potential Constraints

The primary constraint with the Rail with Trail option is the need to widen embankments or construct retaining walls through areas constrained by water bodies, wetlands, existing infrastructure, or steep embankments. Future phases of the feasibility study will inform decisions regarding additional environmental impacts, initial construction costs, and lifecycle replacement costs for this option, if selected. Co-locating the trail with a local road network to avoid these impacts does not appear feasible based on this initial study because it would require rerouting the trail outside of current rights-of-way. Should the RUAC opt to further consider co-location with the road system, further investigation is warranted.

As previously mentioned, the offset between a shared use trail and the existing rail corridor may be constrained due to environmental, property or topographic features. In addition, crossing the tracks to avoid impacts is generally not permitted outside of at-grade crossings. In these areas, retaining walls may be required to avoid impacts. For the purposes of this high-level study, retaining walls are assumed for 43 percent of the trail length. This assumption is based on high level review of elevations along the corridor in GIS and experience with similar trail sections within the State.

For discussion on potential trailhead parking areas, see Section 3.2.

4.3 Environmental Considerations

4.3.1 Natural Resources

GIS analysis identified potential impacts to existing natural resources, including Mapped Significant Vernal Pools, Inland Waterfowl and Wading Bird Habitat, Endangered, Threatened and Concerned Wildlife, the US FWS National Wetland Inventory (NWI), and the USGS National Hydrography Dataset. Desktop-level GIS analyses are limited by the availability and quality of publicly available natural resource data and should not be used for permitting purposes. However, these data can be used to approximate resource abundance, estimate potential impacts, and guide the decision-making process towards feasibility and scope of the project.

Restoring the existing corridor to Class 1 or Class 2 condition for Rail Use Only is assumed to not result in any environmental impacts. All disturbance would be within the existing rail bed and access points currently exist. This assumption should be confirmed by review of construction methods prior to undertaking any rail rehabilitation.

Because the trail would be constructed over the existing rail infrastructure, for the purposes of this feasibility study construction was assumed to occur only within the existing railbed and road crossing footprints. The existing railbed was considered upland for the purpose of this desktop review; therefore, it was inferred that there would be no wetland impacts associated with this option. However, a field delineation would be required prior to preliminary design to ensure the existing corridor meets this condition. Sizing, condition, and quality of the existing infrastructure relating to these water crossings was not considered for this feasibility study. Repair or replacement of these crossings may lead to minor wetland impacts; however, the quantification of these impacts cannot be calculated via a desktop effort. Additionally, any work associated with the existing culverts or crossings would likely require permit approvals.

For the Rail with Trail option, the parallel expansion of the corridor would impact several wetlands, streams, and associated stream crossing structures. A parallel offset of 22 feet to the railroad would provide sufficient separation such that fencing along the trail on the track side would not be required, wetland and waterbody impacts adjacent to the existing rail bed would more than likely require state and federal permitting. Incorporating this offset into the current corridor condition yields an approximate 12-foot expansion of the existing corridor. Impacted wetland types would consist of freshwater forested, scrub shrub, emergent, lacustrine, riverine, and floodplain wetland. As NWI data historically underrepresents wetland presence, a field delineation for wetlands and vernal pools would be needed to properly quantify the true level of impact associated with this buildout.

4.3.2 Wetlands of Special Significance

Buildout options could impact Wetlands of Special Significance as defined in Section 4 of Maine's Chapter 310, Wetland and Waterbodies Protection Rule.[8] Confirmation using field data collection and resource agency review would be required as part of future study. While there are currently no known significant vernal pools within the project's extent, a field survey by a qualified biologist would be necessary to confirm presence/absence of this resource within the corridor.

Review of the Maine Department of Inland Fisheries and Wildlife's (MDIF&W) Beginning with Habitat GIS layers revealed the presence of a "Rare Animal" polygon, subsequently identified by MDIF&W as the federally listed Blanding's Turtle.[9] Section 9 of the Endangered Species Act (ESA) prohibits the take (e.g., harm or harassment) of an ESA-listed species.[10] Further, Part 1.1.5 and Appendix D of the federal 2022 Construction General Permit require determination of eligibility regarding protection of threatened and endangered species as well as designated critical habitat.[11] Impacts to state and federally listed endangered species should be assessed during field reconnaissance due to potential permitting implications, such as timing or disturbance limitations. Although similar special protections are not required for Species of Special Concern and associated habitat, their presence should be of note during future evaluations for Interim Trail or Rail with Interim Trail options, should either be selected.

4.3.3 Permitting Requirements

An Interim Trail would require a lower level of permitting effort than the Rail with Trail option. However, due to the prevalence of wetlands along the existing corridor, some level of disturbance directly or adjacent to protected natural resources can be anticipated. Should the project disturb over an acre of soil, it would also require a Maine Construction General Permit (MCGP) submittal. Should the rail be removed, disposal of any rails, ties, and potentially contaminated soils must comply with Maine State solid waste regulations.

4.4 Conceptual Cost Estimates

The items noted in Section 3.4, Table 10, of the Conceptual Cost Estimate for Interim Trail Use that apply to the Rail with Trail Use option are:

- Two trail surface options: paved or stone dust surface.
- The at grade crossing at Canal St. and State Route 196

[8] 096c310(4).
[9] https://webapps2.cgis-solutions.com/beginningwithhabitat/mapviewer/.
[10] https://www.fws.gov/media/endangered-species-act
[11] https://www.epa.gov/system/files/documents/2022-01/2022-cgp-final-appendix-d-endangered-species-protection.pdf

Cost estimates include potential construction costs for constructing a mixed-use trail within the existing right-of-way. Cost estimates do not include additional potential parking facilities, property acquisitions, permitting costs or any other incidentals. Other assumptions with the cost estimates included: 43 percent of the proposed 2.57 miles is constrained by narrow right-of-way, water bodies, environmental features, or challenging topography resulting in significant cuts or fills, and broad level assumptions based on use of GIS versus field data for the study area. Further investigation would be required to refine assumptions should this option be selected.

Costs for property takings to avoid retaining walls or permitting costs associated with wetland or water body impacts are not included. Costs for relocating the trail outside of the railroad corridor to avoid the constrained areas described previously have not been included.

Existing bridges and culverts would require rehabilitation and/or replacement to accommodate the interim rail with trail. The existing culverts will need to be lengthened and fill will be placed on top to support the trail. It is assumed the bridges within the corridor will have their abutments lengthened and new beams added to support the trail.

Conceptual cost estimates for Rail with Trail Use are also limited to the 2.57-mile section within the Town of Lisbon (Table 19). These costs and Rail Use costs from Appendix A are combined to form the total cost of this option.

Table 19: Lewiston Lower Road Feasibility Study Conceptual Cost Estimate - Rail with Trail Use (MP 36.72 to MP 39.29 (Lisbon Only)).

Class 1 Rail with Paved Trail Use		
	Description	**Total**
Rail	Class 1 Rail Use	$4,600,000
Trail	Co-Aligned Paved Trail	$20,900,000
	Total	**$25,500,000**
Class 1 Rail with Stone Dust Trail Use		
	Description	**Total**
Rail	Class 1 Rail Use	$4,600,000
Trail	Co-Aligned Stone Dust Trail	$20,600,000
	Total	**$25,200,000**
Class 2 Rail Use with Paved Trail Use		
	Description	**Total**
Rail	Class 2 Rail Use	$5,200,000
Trail	Co-Aligned Paved Trail	$20,900,000
	Total	**$26,100,000**
Class 2 Rail Use with Stone Dust Trail		
	Description	**Total**
Rail	Class 1 Rail Use	$5,200,000
Trail	Co-Aligned Stone Dust Trail	$20,600,000
	Total	**$25,800,000**

4.5 Economic Considerations

Potential socio-economic benefits associated with Rail with Interim Trail Use can be assumed to be cumulative. Were this option to be selected, benefits associated with Rail Use could be considered, including safety benefits that may result from a shift from over-the-road shipping to rail shipping, increased economic opportunity through design and construction, and potential to attract additional rail line users to the area. These benefits would be combined with those identified as resulting from Interim Trail Use. The Town of Lisbon, its citizens, and other users of the trail would benefit in terms of increased visitation, future connectivity to other trail sections, health benefits to users of the trail, and potential reduction of greenhouse gas emissions through modal shift. As with other parts of this study, additional consideration of economic values should be included in any future feasibility study related to restoring rail in this corridor.

Appendix A
Cost Estimate Tables

LEWISTON LOWER BRANCH RAIL CORRIDOR
COST ESTIMATE (LISBON LIMITS)
FOR FRA CLASS 1 TRACK CONDITION

MILE	DITCHING		TIES		SUB GRADE EXCAV.		TIE PLATES		RAIL ANCHORS		RAIL		BALLAST		SURFACING		BRIDGE REPAIRS		BRIDGE DECKS		SMALL CULVERTS		GRADE CROSSINGS PRIVATE		GRADE CROSSINGS PUBLIC		WARNING SYSTEM		TOTAL COST PER MILE	CUMULATIVE COST
	UNIT COST $11.00	LF	UNIT COST $130.00	EA	UNIT COST $27.00	CY	UNIT COST $22.00	EA	UNIT COST $5.50	EA	UNIT COST $110.00	TF	UNIT COST $30.00	TON	UNIT COST $10.00	TF	UNIT COST Varies	EA	UNIT COST $1,500.00	LF	UNIT COST $3,000	EA	UNIT COST $5,500	EA	UNIT COST $1,100	LF	ACTIVE $235,000	PASSIVE $8,800		
	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost				
36.72 to 37	840	$9,240	296	$38,438	293	$7,904	591	$13,010	1,213	$6,671			750	$22,504	1478.4	$14,784	1	$555,000	64	$118,000		$0	2	$11,000				$17,600	$814,151	$814,151
37 to 38	3000	$33,000	1,184	$153,920	1,162	$31,363	2,368	$52,096	4,332	$23,826			2,830	$84,902	5280	$52,800					3	$9,000	1	$5,500	50	$55,000	$235,000	$8,800	$745,208	$1,559,359
38 to 39	3000	$33,000	1,216	$158,080	1,162	$31,363	2,432	$53,504	4,332	$23,826			2,830	$84,902	5280	$52,800					2	$6,000	3	$16,500	0	$0		$8,800	$468,776	$2,028,135
39 to 39.29	870	$9,570	371	$48,256	337	$9,095	742	$16,333	1,256	$6,910			821	$24,622	1531.2	$15,312	1	$280,000	43	$86,500	1	$3,000	0	$0	0	$0			$499,597	$2,527,732
ITEM TOTAL	7,710	$84,810	3,067	$398,694	2,953	$79,725	6,134	$134,943	11,133	$61,233	0	$0	7,231	$216,931	13,570	$135,696	2	$835,000	107	$204,500	6	$18,000	6	$33,000	50	$55,000		$270,200		
AVERAGE COST PER MILE	3,000	$33,000	1,193	$155,134	1,149	$31,021	2,387	$52,507	4,332	$23,826			2,814	$84,409	5,280	$52,800	0.78	$324,903	41.6	$79,572	2.3	$7,004			19.5	$21,401		$105,136		$983,553

LEWISTON LOWER BRANCH RAIL CORRIDOR
COST ESTIMATE (LISBON LIMITS)
FOR FRA CLASS 2 TRACK CONDITION

MILE	DITCHING		TIES		SUB GRADE EXCAV.		TIE PLATES		RAIL ANCHORS		RAIL		BALLAST		SURFACING		BRIDGE REPAIRS		BRIDGE DECKS		SMALL CULVERTS		GRADE CROSSINGS PRIVATE		GRADE CROSSINGS PUBLIC		WARNING SYSTEM		TOTAL COST PER MILE	CUMULATIVE COST
	UNIT COST $11.00	LF	UNIT COST $130.00	EA	UNIT COST $27.00	CY	UNIT COST $22.00	EA	UNIT COST $5.50	EA	UNIT COST $110.00	TF	UNIT COST $30.00	TON	UNIT COST $10.00	TF	UNIT COST Varies	EA	UNIT COST $1,500.00	LF	UNIT COST $3,000	EA	UNIT COST $5,500	EA	UNIT COST $1,100	LF	ACTIVE $235,000	PASSIVE $8,800		
	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost				
36.72 to 37	840	$9,240	470	$61,152	293	$7,904	941	$20,698	1,213	$6,671			750	$22,504	1478.4	$14,784	1	$555,000	64	$118,000		$0	2	$11,000				$17,600	$844,553	$844,553
37 to 38	3000	$33,000	1,824	$237,120	1,162	$31,363	3,648	$80,256	4,332	$23,826			2,830	$84,902	5280	$52,800					3	$9,000	1	$5,500	50	$55,000	$235,000	$8,800	$856,568	$1,701,120
38 to 39	3000	$33,000	1,856	$241,280	1,162	$31,363	3,712	$81,664	4,332	$23,826			2,830	$84,902	5280	$52,800					2	$6,000	3	$16,500	0	$0		$8,800	$580,136	$2,281,256
39 to 39.29	870	$9,570	557	$72,384	337	$9,095	1,114	$24,499	1,256	$6,910			821	$24,622	1531.2	$15,312	1	$280,000	43	$86,500	1	$3,000	0	$0	0	$0			$531,892	$2,813,148
ITEM TOTAL	7,710	$84,810	4,707	$611,936	2,953	$79,725	9,414	$207,117	11,133	$61,233	0	$0	7,231	$216,931	13,570	$135,696	2	$835,000	107	$204,500	6	$18,000	6	$33,000	50	$55,000		$270,200		
AVERAGE COST PER MILE	3,000	$33,000	1,832	$238,107	1,149	$31,021	3,663	$80,590	4,332	$23,826			2,814	$84,409	5,280	$52,800	0.78	$324,903	41.6	$79,572	2.3	$7,004			19.5	$21,401		$105,136		$1,094,610

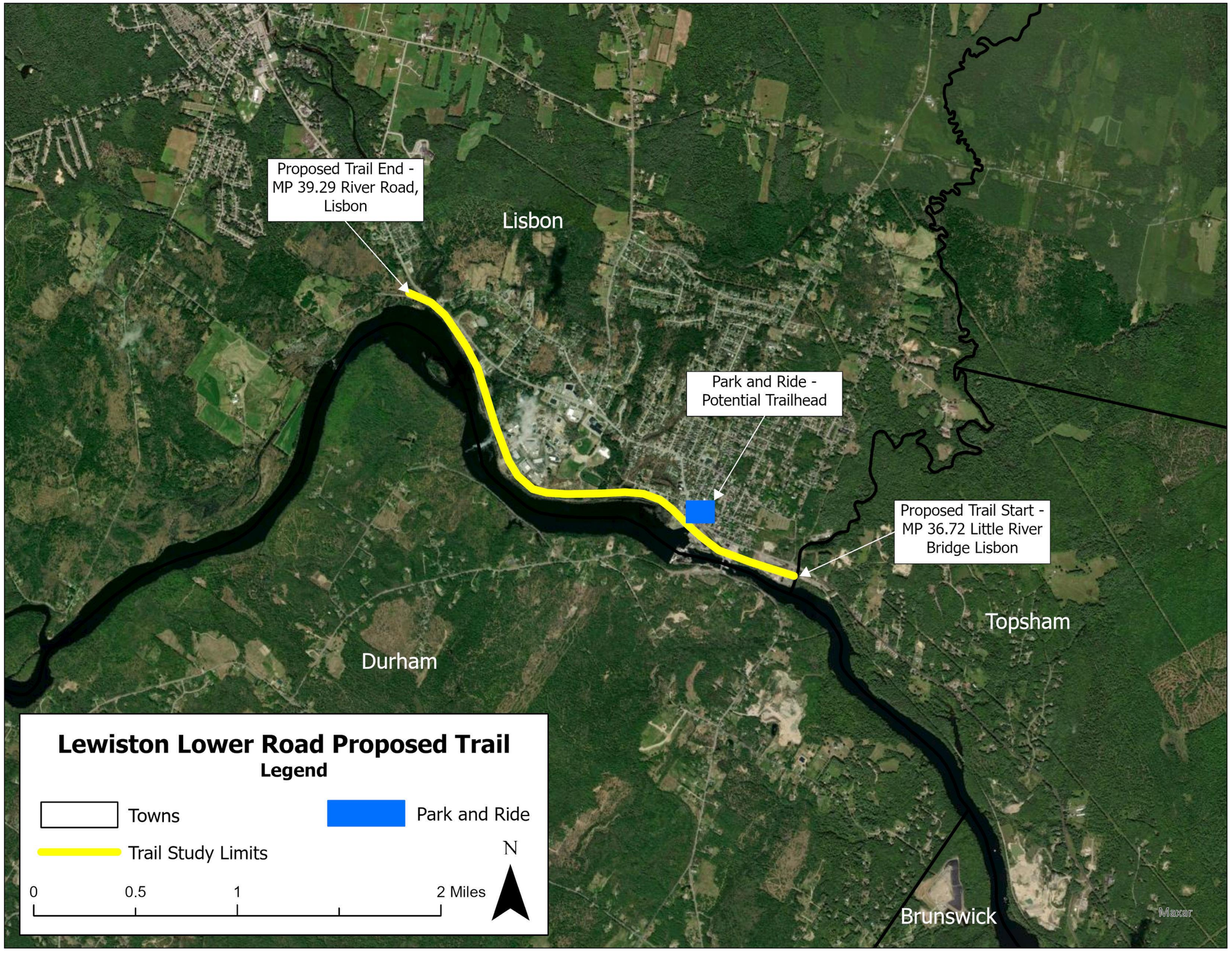
Bridge Replacement & Repair Estimates in 2024 Dollars

Mile Post	Type	Length	Deck	Crossings	Year Built	Actions	Estimated Cost[1,2]
29.79	Riveted Built up Through Girder	76.5'	ballasted	Mill Street/ Route 1	1957	clean, steel repairs, fill ballast, substructure repairs	$250,000
29.81	(2) Deck Truss + (1) Deck Plate Girder	35' 150' 150'	open	Androscoggin River	1957	clean, jack, reset brgs, repoint, clear veg, replace isolated ties, strengthening	$415,000
36.74	Riveted Built up Through Girder	64'	open	Little River	1890	clean, clear veg, repoint, strengthening	$155,000
39.20	Riveted Built up Through Girder	43'	open	Sabattus Stream	1890	clean, repoint, repair substructure, strengthening	$280,000
						TOTAL	**$1,100,000**

[1] Estimated costs based and engineering judgement alone. Detailed estimates have not been performed.
[2] Substructure repairs are assumed in all costs.

Appendix B

Potential Parking and Trailhead Locations


Proposed Trail End - MP 39.29 River Road, Lisbon
Lisbon
Park and Ride - Potential Trailhead
Proposed Trail Start - MP 36.72 Little River Bridge Lisbon
Topsham
Durham
Brunswick
Maxar
Lewiston Lower Road Proposed Trail
Legend
Towns
Park and Ride
Trail Study Limits
N
0
0.5
1
2 Miles