

Benefit-Cost Analysis Technical Memorandum

1.1. Executive Summary

The benefits and costs of the **Eastern Trail Expansion – North Berwick, Wells, and Kennebunk Project** (the Project) were evaluated in a benefit-cost analysis (BCA) in accordance with USDOT’s recommended methodology (BCA Guidance).¹ A summary of the analysis is provided in Table 1, which details community benefits related to active modes of transportation.

The BCA demonstrates the measurable benefits that the project yields and the costs incurred. The benefits of the Project are assumed to start in 2030 and are considered through 2054 (a 25-year period); costs are incurred beginning in 2024. The Project benefits and costs were discounted using the prescribed 7% discount rate as prescribed in the USDOT BCA Guidance. All monetized benefits and costs are presented in 2021 dollars and reflect net present values. The Project costs are estimated to be **\$3.4 million in 2021\$ using the prescribed discount rates**. The costs include capital expenses identified in a preliminary cost estimate developed by VHB and the Maine Department of Transportation, and costs associated with the operation and maintenance of the bridge.

The Project is expected to provide substantial benefits that would stem from creation of additional bike and pedestrian connections between North Berwick, Wells, and Kennebunk in Maine. The improved trail will create great value to residents by linking cultural resources, parks, commercial centers, and neighborhoods. The Project will encourage a modal shift by providing an improved path for active modes of transportation. This shift to more active modes of transportation will bring health benefits to travelers.

When monetized, the total benefits amount to approximately **\$3.6 million** using the prescribed discount rates, yielding a benefit-cost ratio of **1.05**. The assumptions used to quantify the benefits were conservative and pragmatic. A full description of the input data, data limitations, assumptions, and methodologies of the analysis are included in the following sections.

¹ U.S. Department of Transportation, Office of the Secretary, “Benefit-Cost Analysis Guidance for Discretionary Grant Programs,” January 2023.

Table 1: Discounted Project Costs and Benefits

Description	Cost	Benefit
Costs		
Total Capital and Operating Costs	\$3,437,162	
Category subtotal	\$3,437,162	
Quality of Life		
Cycling Facility Improvement		\$501,233
Active Transportation		\$2,731,883
Category subtotal		\$3,233,116
Residual Value		
Residual Value		\$384,416
Category subtotal		\$384,416
Total Project Benefits		\$3,617,532
Total Project Costs	\$3,437,162	
Net Present Value		\$180,370
Benefit Cost Ratio		1.05

Baseline

The Eastern Trail provides a multi-use, 65-mile connection from Kittery to South Portland. Approximately one-third of the existing trail is made up by off-road segments, while the remaining segments are comprised of on-road routes. The Project seeks to introduce two new off-road segments to the Eastern Trail between North Berwick, Wells, and Kennebunk. These segments, of approximately 2 and 0.7 miles in length, are part of a potential larger 11-mile off-road segment.

Analysis Period

The analysis period begins when the NTP is projected to be granted in 2024. The construction is expected to be completed in 2029. The benefits are assumed to start in 2030 and are calculated for a period of 25 years.

Trip Data and Assumptions

The analysis makes use of Eastern Trail Alliance bike counts with projections based on extension of the path in Kennebunk, while the North Berwick projection is based on a similar path previously constructed in Arundel, ME with access at Arundel Rd. Based on the induced bike trips, projected induced pedestrian trips based on the percentage increase in bike trips from 2021 normalized counts from Eastern Trail Alliance.

In addition, the trail in North Berwick will abut a Pratt & Whitney manufacturing center with 2,100 employees. As a subsidiary of Raytheon, which has a wellness program and encourages employees to lead a healthy lifestyle by providing employees access to fitness centers across the country, the analysis assumes fifteen percent of Pratt & Whitney employees will walk on average 3 times a week.

1.2. Benefits

Mortality Benefits of Active Transportation

The BCA Guidance recognizes that active modes of transportation are healthier than motorized options. The document recommends values per induced cycling or walking trip in Table A-13. The analysis uses the latest trip count data with these recommended values to calculate the mortality benefits associated with active transportation for the Project. The value of this benefit is **\$2.7 million**.

Benefits From Bicycle Facility

The Project will provide an off-road trail, which creates great value for bicyclists. The BCA Guidance provides a way to quantify these benefits by providing a dollar value multiplier for cycling mile in Table A-9. The analysis uses this method to determine that the value of benefits from cycling facility improvement is **\$501 thousand**.

Residual Value

Construction of the Eastern Trail segments in North Berwick, Wells, and Kennebunk will have residual value after the end of the 25-year analysis period, because the useful life of these

elements is longer than 25 years. The useful life of the Project elements is assumed to be 75 years. The value of each project component was depreciated straight-line over the useful life of the Project component. The first 25 years of depreciation were excluded from the residual estimation as they are the basis of the benefits estimated elsewhere in the analysis. The value of the remaining useful life for the Project discounted at 7% is **\$384 thousand**.

1.3. Costs

The capital cost for this project is projected to be **\$5.4 million** in 2021 dollars – adjusted from 2023 dollars, when the estimate was made. The analysis used a 2.50% annual inflation per Federal Reserve Bank of Philadelphia inflation forecasts². The capital cost is spread between 2023 and 2029.

The operation and maintenance costs for each phase of the Project are evenly spread over the analysis period. The general operation cost over the life of the project is approximately **\$5,000** over the project life.

The grand total cost of the Project in 2021 dollars is **\$5.5 million**. With the 7% discount applied, the net present value for grand total cost is **\$3.4 million**.

Table 2: Project Costs

Grand Total Costs (2021\$)	\$5,456,488
Grand Total Costs (2021\$) - Discounted	\$3,437,162

² Federal Reserve Bank Philadelphia, <https://www.philadelphiafed.org/surveys-and-data/real-time-data-research/inflation-forecasts>