

BENEFIT COST ANALYSIS

CARTERET INTERMODAL FERRY TERMINAL USDOT FY2025 BUILD GRANT APPLICATION

BOROUGH OF CARTERET
MIDDLESEX COUNTY, NEW JERSEY

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1. PROJECT SUMMARY

A benefit-cost analysis (BCA) was conducted for the *Carteret Intermodal Ferry Terminal* for submission to the U.S. Department of Transportation (USDOT) as a requirement of a discretionary grant application for the FY2025 *BUILD Grant Program*. The analysis was conducted in accordance with the benefit-cost methodology outlined in the 2022 Benefit-Cost Analysis Guidance for Discretionary Grant Programs, supplied by the USDOT, the costs and benefits of which are summarized below. The period of analysis corresponds to 25 years and includes two (2) years of construction and 27 years of benefits after operations begin in 2024.

The Carteret Intermodal Ferry Terminal project continues the Borough of Carteret's effort to redevelop their existing waterfront area to create a regional transit village with high-density residential, commercial, office, and retail components supporting ridership for the passenger ferry and establishing Carteret as a destination for working, living, and entertainment. The service will provide commuters with water access to Manhattan. .

Due to lack of convenient rail stations, bus stations, or ferry terminals, highway routes to Manhattan are congested and operate at or over-capacity. The Carteret Ferry Terminal will support intermodal mass transit operations between buses, cars, and pedestrian commuters by providing ready access to a fleet of two (2) 149-passenger commuter ferries providing round trip service between Carteret, Lower Manhattan and Midtown Manhattan, helping to eliminate vehicles from daily commuter routes and provide travelers with a more enjoyable commuting experience.

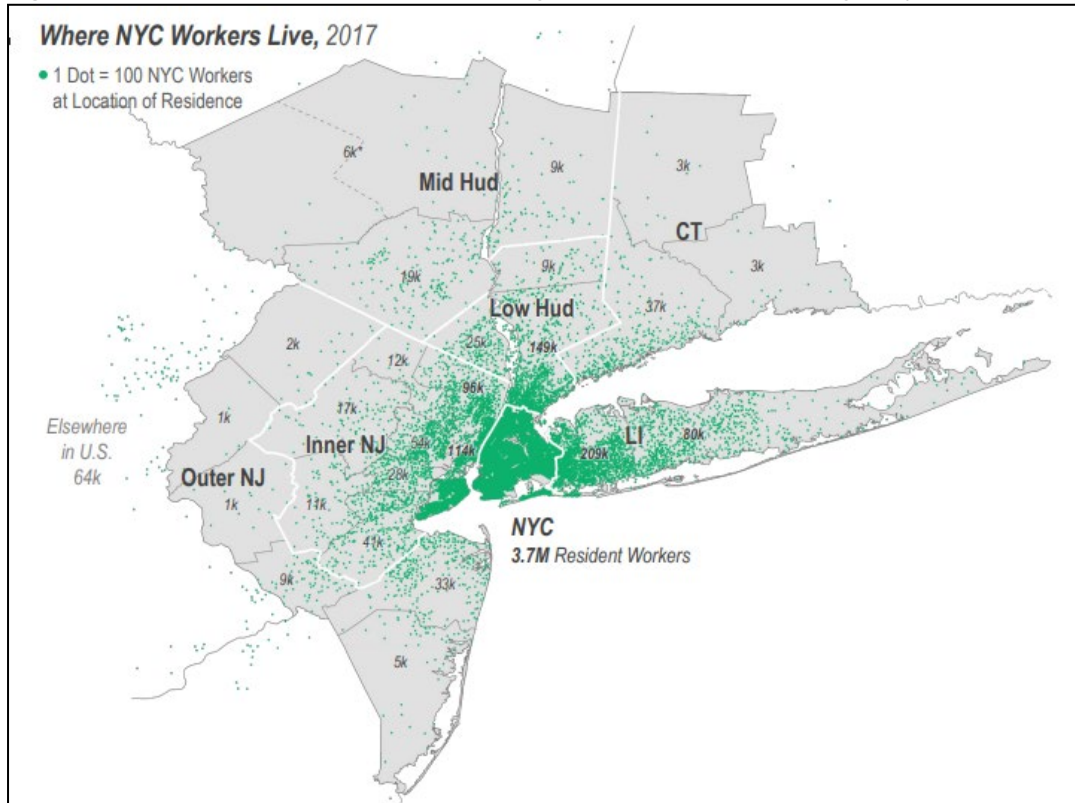
The project represents a critical investment to connect the densely-populated central and northern New Jersey region with direct access to the New York City job market. According to the *NYC Planning's Ins and Outs of Commuting*, in 2017, approximately 4.6 million commuters traveled into NYC from New Jersey, with approximately 38% travelling by car, van, or truck. Traffic is anticipated to grow, with an estimated 3% increase in traffic each year within the Borough of Carteret (Nelson Nygaard). **Figure 1** shows the distribution of commuters within the NYC Metropolitan region and Carteret's central location in the metropolitan area.

It is noted that this report's corresponding BUILD grant application is seeking funding for the landside intermodal improvements only, including the ferry terminal building, a 696-space parking facility, access roads, and associated work. As laid out in the Project Cost Estimate (See **Appendix B**), grant funding for costs related to the ferry boats, docking facilities, bulkheads, is not being sought as it has been partially funded by other state and federal agencies. However, as the need for the ferry service and the ferry terminal are not mutually exclusive, costs related to the operation and maintenance of the ferries themselves have been included in this analysis for a holistic examination of the project. The project is expected to be financed according to the allocation shown in **Table 1**.

Table 1: Project Costs by Funding Source, in Undiscounted Dollars

	Amount
FY25 BUILD Grant Request	\$6,000,000
NJ Congressional Earmark Funding	\$16,000,000
FY22 FTA Grant	\$6,000,000
FY24 FTA Grant	\$5,613,489
USDOT via NJDOT	\$6,000,000
Local Matching Funds	\$5,125,110
TOTAL:	\$42,036,100

Figure 1: NYC commuter distribution throughout the NYC Metro Region (NYC Planning)



Costs

The capital cost for this project is expected to be \$42,036,100 in undiscounted 2024 dollars. To comply with the BCA guidance provided by USDOT, the costs are converted from their base year values in 2024 dollars to 2020 dollars to align with standardized factors used to calculate the benefits and costs in the analysis. The discounted values are 2020 dollars in the year 2024. At a 7% real discount rate, (as prescribed by the USDOT), the capital cost is \$36,715,958. Operation and maintenance costs are anticipated to average \$298,768 per year after construction, in undiscounted 2024 dollars. Over the analysis period the operation

and maintenance costs are \$7,767,968 in total undiscounted 2024 dollars, or \$2,859,631, when discounted at 7%. Lastly, rehabilitation and replacement costs are expected to total \$1,044,836 in undiscounted 2024 dollars over this same period, or \$314,042 when discounted at the 7% rate. Additional costs for air pollutant emissions and fuel were also considered for the passenger ferries and are detailed in **Appendix A**.

Benefits

In 2020 dollars, the project is expected to generate \$59,279,158 in discounted benefits, using a 7% discount rate. The construction of the ferry terminal and associated site improvements at the Carteret Waterfront will reduce the number of commuter vehicles on the road, leading to a decrease in accidents, air pollutants, wear and tear on vehicles and facilitate the swift and comfortable transport of commuters into Manhattan. The benefits lead to an overall project The overall project impacts can be seen in **Table 3**, which shows the level of change for the multiple impact categories due to the net reduction in the following impact categories.

Table 2: Project Benefits Summary, in Discounted Dollars

	Type of Impact	Group Affected	Economic Benefit	Summary of Results <small>(at 7% discounted rate)</small>
Economic Competitiveness	Costs and Savings	Auto	Reduced fuel consumption for commuters	\$4,812,960
Safety	# of crashes	Auto	Reduced fatalities, injuries, and property damage incidents	\$4,757,579
Revenue	Cost and Savings	Owner	Revenue to be applied back into the Borough	\$18,575,609
Environmental Sustainability	Air Quality	Society	Emissions reductions	\$23,475,694
Residual Value	Cost and Savings	Owner	Salvage value to be applied back into the Borough	\$3,939,142
Resilience	Infrastructure	Region	Emergency response	-
Economic Development	Cost and Savings	Region	Economic link with NYC market	-

Net Present Value (NPV) of \$3,764,956 (discounted at 7%) and a Benefit Cost Ratio (BCR) of 1.07. The overall project benefit matrix can be seen in **Table 2**. As the calculated NPV is

greater than zero and the BCR is greater than 1.0, the cost for the proposed project is justified.

Table 3: Project Impacts and Savings, 25-Year Life Span

Category	Unit	Quantity
Fuel Consumed	Value (2020)	\$2,788,310
Fatalities	Value (2020)	\$999,558
Injury Accidents	Value (2020)	\$2,718,616
Property Damage Only Accidents (PDO)	Value (2020)	\$4,757,579
CO ₂ Emissions	Metric Tons	2,557,688
NO _x Emissions	Metric Tons	478
PM ^{2.5}	Metric Tons	63

1. INTRODUCTION

BCA Framework

A BCA is a systematic process for identifying, quantifying, and comparing expected economic benefits and costs of a proposed infrastructure project. All benefits and costs are quantified to the best extent possible. The overall goal of a BCA is to determine if the expected benefits justify the required costs for the project. A BCA framework aims to demonstrate the net welfare change created by a project by comparing the cost savings and increases in welfare, with the disbenefits and potential welfare reductions.

The BCA framework defines a Base-Year case or “No Build” case and compares against a “Build” case, assuming the grant request is awarded and the proposed project is constructed. A BCA analyzes both the No-Build and Build cases over a project life-cycle. As the project is a completely new development, the No-Build case is the existing growth of Carteret without the reduction in commuters from roadways. The values of future net-value change are determined through discounting, which is the principle that benefits and costs that occur sooner in time are more highly valued than those that occur in the more distant future, and that there is a cost associated with diverting the resources needed for an investment from other productive uses in the future. This process results in future expected benefits and costs to be expressed in the same present value terms.

The BCA presented in this report was conducted in accordance with the methodology provided by the USDOT in the 2022 Benefit-Cost Analysis Guidance for Discretionary Grant Programs.

- ❖ The analysis procedures include the following: Defining existing and future conditions under a Build case;
- ❖ Estimating benefits and costs associated with the project over a 27-year analysis period;
- ❖ Standard USDOT values have been utilized fatalities, injuries, property damage, emissions, and estimating best practices for quantifying other benefits;
- ❖ Discounting benefits and costs with a real discount rate of 7%, as defined by the USDOT.

2. PROJECT OVERVIEW

Description

The Borough of Carteret, New Jersey is applying to the US Department of Transportation's BUILD Grant Program for construction of a 43,450 square-foot intermodal transportation building at its waterfront, and all associated site work, including but not limited to a 696-space parking lot, access roads, utilities and stormwater infrastructure, and associated work. Once complete, the building will provide access to several forms of alternative transportation in the form of ferry service to New York City, Borough jitney service, NJ Transit bus service along the 48 and 116 routes, and bicycling and walking via a two-mile river walk that is designed and ready to begin construction. The project is located in approximately 20 miles from Manhattan by waterway, as shown on the route map in **Appendix C**.

The planned intermodal transportation building is part of a larger multi-year, \$173.5 million plan to transform the Borough of Carteret's Waterfront into a regional transportation hub and destination. The overall vision includes two miles of open public access waterfront along the Arthur Kill (under construction); construction of a \$47 million marina adjacent to the project site, (completed in 2019); the construction of two commercial docks along with supporting infrastructure; the construction of a 500,000 square-foot film production studio; helipad, and 150,000 square feet of ancillary retail and hotel space. See **Appendix D** for the overall concept plan prepared by Melillo Bauer Carman, March 2022.

The Borough, together with its partners including the New Jersey Department of Transportation (NJDOT), NJTransit (NJT), North Jersey Transportation Planning Authority (NJTPA), and Port Authority of New York and New Jersey (PANYNJ), envision improved, faster, and more environmentally friendly transportation options between central New Jersey and New York City via the introduction of daily ferry service and access via NJTransit bus and Borough jitney services. The project site will include a mixed-use intermodal transportation center, 20-foot-wide elevated pedestrian boardwalk, fixed pier, floating docks, wave screen, and handicap access ramp. The project encompasses environmental remediation, public access and recreation, economic development, and improved public transportation.

In addition to serving as a commuter service, the ferries will also provide educational and sightseeing tours, as well as serve as critical logistics tool during emergencies. As was seen during the September 11th attacks, when bridges and tunnels into and out of New York City were shutdown. Vessels were the only means of transportation for people, first responders and equipment. Ferry service to the Borough provides a third critical regional link for ferry service, adding to existing service from Belford, Highlands, and Atlantic Highlands in Monmouth County, and routes back and forth across the Hudson River between Jersey City and Edgewater.

General Assumptions

Evaluation Period:

The project evaluation period analyzes a 25-year span, evaluating benefits and costs starting in 2024 and ending in 2049. A 25-year evaluation period for the service was selected as it aligns with the anticipated service life of the vessels.

Discount Rates:

For the purposes of present value discounting, all benefits and costs are assumed to occur at the end of each year. All benefits from the project Build case are assumed to begin in the calendar year immediately following the final construction year.

For consistency with prior reports, all project benefits and costs monetary values are given in year-end 2020. The real discount rate used for this analysis is 7%, as given by the USDOT 2022 Benefit-Cost Analysis Guidance for Discretionary Grant Programs.

Base Case and Build Case

The analysis of the ferry terminal project examined long term benefits versus costs resulting from the Build Case scenario for its users and regional residents, compared to the No-Build situation where the improvements are not made.

In the Build case the project includes the construction of the intramodal ferry terminal building and all associated site improvements. The No-build case includes the societal costs of not constructing the ferry terminal project while highway and local traffic continues to increase, leading to additional vehicular accidents, increased traffic delays, increased property damage/damage to existing infrastructure, increased costs for vehicles, and increased vehicular emissions. The Build case and calculations reflect the net difference in these benefits and costs.

Projected Ridership and Ferry Operations

In order to determine the costs and net benefits that will be realized from the implementation of ferry service, this analysis draws upon previous ridership and feasibility studies commissioned by the Borough for this facility. These include the following:

- “Proposed Carteret Passenger Ferry Expanded Ridership Demand Study”, prepared by Rutgers University, dated October 23, 2018
- “Carteret Ferry Feasibility Study, Tier 2 Analysis”, prepared by Nelson Nygaard and Weinberger & Associates, dated December 2016

These reports were used to establish existing travel patterns and modes, potential ferry routes, ridership projections, revenues, operation and maintenance costs, vehicle trip times, and costs and benefits related to emissions and modal shifts in commuter transportation.

Based on the recommendations and forecasts in these reports, ferry service will include two (2) 149-passenger ferry boats, each making one round-trip voyage from Carteret to at least two (2) stops in Manhattan during the AM peak and from Manhattan to Carteret during the PM peak. In the time during the AM and PM peak commuting periods, the vessels are anticipated to remain in the Upper New York Harbor to eliminate fuel costs associated with a return trip to Carteret during off-peak hours.

The Nelson Nygaard study ranked the following Manhattan commuter destinations in order of preference: (1) Wall Street; (2) Midtown West (W. 39th Street); (3) World Financial Center; and, (4) Midtown East (E. 35th Street). This BCA will assume ridership statistics and operational costs associated with daily trips to and from routes (1) and (2) only as they ranked highest when comparing parameters including overall travel time reductions over traditional transportation and projected demand.

The Study also established annual ridership numbers for each of the routes assuming a \$15 one-way fare, in 2022 undiscounted dollars. This price has been adjusted from \$13 (2016 dollars) at the time the study was generated to reflect changes in the consumer price index (CPI). This fare represents the medium-price option and was selected as a reasonable balance between ridership demand and projected revenues. Annual ridership numbers for year 2015 and 2040 are summarized below in **Table 4**.

Table 4: Ridership Forecasts, (Nelson Nygaard, 2016)

Forecast Year	Annual One-Way Ridership
Maximum Demand Forecast, 2015	48,776
Maximum Demand Forecast, 2040	70,838

Assuming a linear growth rate between the base year and 2040, annual ridership numbers have been adjusted in the BCA calculations accordingly. Using a growth rate of approximately 3 passengers per day, per year, 215 riders are forecasted to use the ferry when it opens in 2022. In the final two years of the analysis the ferry vessels will be at maximum capacity of 298 passengers.

3. PROJECT COSTS

Capital Costs

Initial Project investment (capital) costs include soft costs, such as engineering and design, construction, and contingency, totaling \$42,036,100 in 2024 dollars. In discounted 2020 dollars, the total cost of the ferry project is \$36,715,958. **Table 5** shows the estimated schedule of the project. The intermodal ferry terminal building is anticipated to open in 2024. A detailed cost estimate is provided in **Appendix B**.

Table 5: Project Costs, In 2024 Dollars

Project Activity	Total
Design and Construction Costs	\$42,036,100

Right of Way Acquisition

The property on which the project is proposed at 200 Lighthouse Way (Block 304, Lot 2.02) is owned by the Borough. Accordingly, no right-of-way acquisition is required for the construction of this project.

Table 6: Project Schedule and Cost, In Discounted Dollars

Project Activity	Unit	Value
Construction Design/Start	Year	2024
Construction End	Year	2026
Construction Duration	Year	2
Project Opening	Year	2025
Capital Cost – Construction and Professional Services	\$2020	\$42,036,100

Operations and Maintenance Costs

The annual operating and maintenance (O&M) costs are included in this benefit-cost analysis. Since the redevelopment area is currently vacant and exempt from taxes, there are no O&M costs associated with the project until the first year that ferry service is fully operational, which is anticipated to be 2025 in conjunction with the completion of site work for the access roads and parking lot. While the permanent ferry terminal building is anticipated to be completed in 2026, a temporary shelter and ticketing facility will be constructed to accommodate commuters in the interim.

The Build case includes the operational and maintenance costs for the ferry terminal building and vessels assuming all improvements are constructed.

These costs include the following:

- Facility and vessel maintenance costs
- US Coast Guard inspections
- Fuel and consumables
- Janitorial and crew costs
- Utility costs

O&M costs for the building have been determined on a per square foot basis according to Facility Service Partners, and are summarized below. O&M costs for the building have been calculated based on industry standards for facility maintenance for the 43,450 square foot building on a per square foot basis of \$5.15 per square foot as shown in **Table 7**.

Table 7: Facility Maintenance, In 2024 Dollars per Square Foot

Cost	Cost per Square Foot
Maintenance	\$1.63
Utilities	\$2.15
Janitorial	\$1.37
Total:	\$5.15

Additionally, every two (2) years, the passenger ferries will need to be dry-docked, serviced, and inspected by the US Coast Guard at a cost of \$75,000 per vessel.

The annual combined operating and maintenance costs for the Build case is shown in **Table 8**.

Repair and Rehabilitation (R&R) Costs

It is anticipated that repair and rehabilitation will be required for the Build case of the project in the future. The assumptions have been based on similar site improvements made for other projects throughout the Borough as well as information provided by New York Waterways and May Shipbuilding of Staten Island, NY. Furthermore, it is estimated that the project site will need repairs in 2039 for a mill and overlay of the parking lot surface, and continue on a 15-year basis, and engine replacement every seven (7) years (approximately every 2,000 hours), costing \$100,000 per vessel. Additionally, maintenance dredging is projected to be required every ten (10) years after project construction at an estimated cost of \$250,000; therefore, the cost of this task is shown in years 2034 and 2044.

O&M and R&R results are shown in **Table 8** below.

Table 8: Schedule of Operations and Maintenance and Repair/Rehabilitation/Replacement Costs (In Undiscounted Dollars)

Year	Build Case	
	O&M	R&R
2022	\$0	\$0
2023	\$0	\$0
2024	\$223,768	\$0
2025	\$373,768	\$0
2026	\$223,768	\$0
2027	\$373,768	\$0
2028	\$223,768	\$0
2029	\$373,768	\$0
2030	\$223,768	\$0
2031	\$373,768	\$200,000
2032	\$223,768	\$0
2033	\$373,768	\$0
2034	\$223,768	\$250,000
2035	\$373,768	\$0
2036	\$223,768	\$0
2037	\$373,768	\$0
2038	\$223,768	\$200,000
2039	\$373,768	\$444,836
2040	\$223,768	\$0
2041	\$373,768	\$0
2042	\$223,768	\$0
2043	\$373,768	\$0
2044	\$223,768	\$250,000
2045	\$373,768	\$200,000
2046	\$223,768	\$0
2047	\$373,768	\$0
2048	\$223,768	\$0
2049	\$373,768	\$0

Emissions Costs

The passenger ferry boats will emit small quantities of certain pollutants into the air. The three (3) emissions analyzed are: nitrous oxide (NO_x), particulate matter (PM), and carbon dioxide (CO₂). SO_x emissions have been disregarded as the vessel will operate using ultra low sulfur diesel fuel. Costs related to emissions for electricity generation to power the building are included in the per-square foot costs of building O&M. The total cost related to the emissions specified, in total discounted dollars, is \$12,690,020, as shown in **Tables 9 and 10**.

Table 9: Valuation of Environmental Costs

Cost	Total Cost	
	Undiscounted	Discounted
Total Emissions	\$34,618,605	\$12,690,020

Table 10: Valuation of Environmental Costs

Cost	Total Cost	
	Undiscounted	Discounted
CO ₂ Emissions	\$142,800	\$45,779
NO _x Emissions	\$29,797,362	\$10,925,583
PM _{2.5} Emissions	\$4,678,443	\$1,718,659

Fuel Consumption

The average trip of one passenger ferry to NYC is 20.45 miles, which equates to 21,350 VMT for one boat annually. Diesel fuel consumption has been calculated as 146 gallons per vessel per round trip at a current average cost of \$3.79 per gallon. The total fuel cost after the 25-year analysis is \$7,509,930 in undiscounted dollars, and \$2,788,310 in discounted dollars.

Table 11: Valuation of Diesel Fuel Consumption Costs, in Discounted Dollars

Cost	Ferry Costs	
	Undiscounted	Discounted
Total Fuel and Operating Cost	\$7,509,930	\$2,788,310

4. PROJECT BENEFITS

Benefits from this project can be categorized by the following: user benefits, which include automobile operating costs; and social benefits, including decreases in fatalities, emissions, property damage reductions, residual value, agglomeration economies, and increased emergency resilience.

The BCA covers the following quantifiable benefits:

- ❖ Safety Benefits
- ❖ Vehicle Operating Cost Savings
- ❖ Revenue
- ❖ Reduced Emissions
- ❖ Residual Value

All standardized factors come from the USDOT 2022 Benefit-Cost Analysis Guidance for Discretionary Grant Programs to determine the monetized value for the various benefits generated by the project, where applicable. These benefits reduce or prevent future costs associated with the existing highways and the No-Build Condition and are summarized in **Table 12** below.

Table 12: Project Benefits

Type of Benefit	Description	Monetized Value (Discounted)
Safety	Reduction in crashes, fatalities, and injuries	\$8,475,754
Vehicle Operating Cost Savings	Reduction in wear and tear on vehicles, reduced fuel consumption due to modal shift from passenger cars to ferry	\$4,812,960
Revenue	One-way ticket sale revenue	\$18,575,609
Reduced Emissions	Quality of life enhancements, reduced health risks	\$23,475,694
Residual Value	Value of project after design life	\$3,305,232
Resilience	Improved transportation infrastructure resilience during emergencies and/or natural disasters	-
Economic Development	Access to new jobs, economic development potential, property value increase, and enhanced quality of life	-

Valuation of Operating Costs (Benefits from Modal Shift)

Commuters consider in-vehicle travel time a cost in their day-to-day lives. Less travel time allows for more time available to distribute to work, leisure, etc. Based on the existing modal splits for commuters in the no-build scenario (See **Figure 2**), it is assumed that these splits will be mirrored across new ferry ridership.

Figure 2: Modal Split to for NYC-bound Carteret commuters (Nelson Nygaard, 2016)

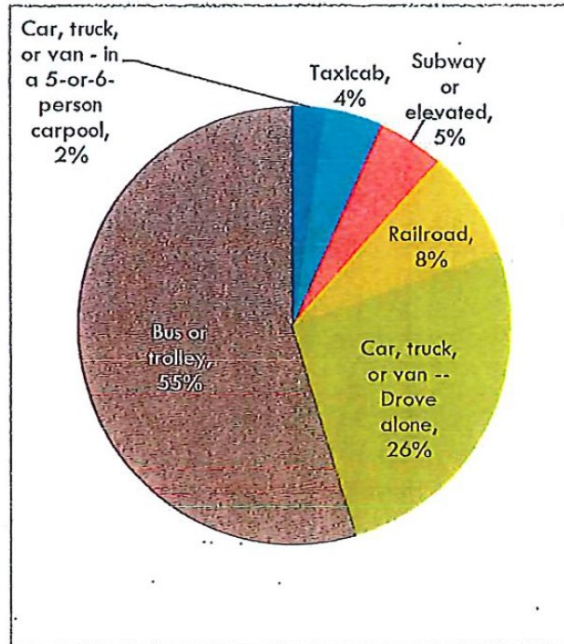


Table 13: Economic Competitiveness Valuation of Benefits, in Discounted Dollars

Benefit	Ferry Opening Year		Final Year of BCA (2049)	
	Undiscounted	Discounted	Undiscounted	Discounted
Total Fuel and Operating Cost Savings	\$437,619	\$333,857	\$602,519	\$84,692

Safety

The following safety benefits have been assessed in this analysis: reduction in fatalities, injuries, and property damage caused by accidents.

As previously mentioned, the New Jersey commuter routes leading to New York City are overcrowded and frequently operate above capacity, with conditions only projected to worsen during the analysis period. This often leads to accidents along the highways and frequent delays. Approximately 7.28 fatalities occur per 1 billion VMT (vehicle mile traveled) and similarly 84 injuries and 147 property damage incidents occur per every 100 million VMT

according to USDOT statistics. Since the ferry terminal project is designed to eliminate vehicles from the roadway, fatalities, injuries, and property damage incidents will be reduced. Over the span of the analysis, it has been calculated that shift away from drivers and taxis will result in 0.22 fewer fatalities, 25 fewer injuries, and 44 fewer property damage only incidents per year. Safety savings benefits are provided in **Table 14** below.

Table 14: Valuation of Safety Benefits, in 2020 Dollars

Benefit	Ferry Opening Year		Final Year of BCA (2049)	
	Undiscounted	Discounted	Undiscounted	Discounted
Fatality Reduction	\$90,885	\$69,336	\$125,131	\$17,589
Injury Reduction	\$247,190	\$188,580	\$340,335	\$47,838
Property Damage Reduction	\$432,583	\$330,016	\$595,586	\$83,717
Total Safety Benefits	\$770,658	\$587,932	\$1,061,052	\$149,144

Environmental Sustainability

There are environmental and sustainability benefits associated with the project as it relates to reduction of air pollutants through decreased vehicle traffic. Reducing air pollution has a positive impact on society's health and plays a role in the protection of the environment. The total savings associated with a reduction in emissions for vehicular travel as a result of the ferry terminal build case is \$23,475,694 in discounted 2020 dollars as shown in **Table 15**.

Table 15: Valuation of Environmental Benefits, in 2020 Dollars

Benefit	Combined Savings	
	Undiscounted	Discounted
Total Emissions Reduction	\$66,791,437	\$23,475,694

Values and assumptions made to quantify the savings in emissions are taken from the U.S. DOT 2022 BCA Guidance for Discretionary Programs and shown below.

As directed, three (3) types of emissions were analyzed, estimated, and monetized for the BCA: nitrous oxide (NO_x), particulate matter (PM), and carbon dioxide (CO₂). Cost per metric ton varies by year. Values for the calculations were given in the USDOT 2022 Guidance for Discretionary Grant Programs and can be seen in **Appendix A**. These reductions represent the reduction in single passenger vehicle trips equivalent to the number of passenger cars removed from the road due to a proportionate amount of commuters utilizing the ferry.

The reach of these environmental benefits extends to more than just users of the ferry terminal building. The emissions reduction helps the surrounding area where less vehicles need to be on the roads and highways to commute to New York. The types of emissions can be broken down into the following savings:

Table 16: Valuation of Environmental Benefits, per Parameter, in 2020 Dollars

Benefit	Total Savings	
	Undiscounted	Discounted
CO ₂ Emissions Reduction	\$4,076,037	\$1,245,933
NO _x Emissions Reduction	\$8,479,189	\$3,251,187
PM _{2.5} Emissions Reduction	\$54,236,211	\$18,978,575

Residual Value

The residual value calculated within the benefit-cost analysis is determined by the percentage of useful life remaining after the final year of the analysis period, and multiplying that value by the total construction cost for the project. A design life of 75 years has been recommended by the project architect, consistent with the class of construction and observed service life of similar public facilities. The analysis period for the ferry terminal project is 25 years of service, and the design life is 75 years, so the residual value is 67% of the initial build cost when using the straight-line depreciation method. Using our construction cost of \$35,271,410.25 for the intermodal ferry terminal, multiplied by 67%, the total undiscounted value is \$23,514,273.50. The leftover capital can be considered savings, or a benefit, applied to the last year of the BCA period. The residual value, expressed in 2020 dollars, is discounted to \$3,305,232.48 when applied as shown in **Table 17**.

Table 17: Valuation of Residual Value

Benefit	Final Year of BCA (2049)	
	Undiscounted	Discounted
Total Residual Value Benefits	\$28,024,067	\$3,939,142

Revenue

The ferry terminal is expected to generate revenue each year through the purchase of tickets by commuters. Using the Nelson Nygaard feasibility study recommended one-way ticket price of \$13 (adjusted via CPI for \$15 in 2022 dollars), the terminal will generate a total of \$52,586,280.00 through the 25-year analysis period, or \$18,575,608.82 when discounted at 7% as shown in **Table 18**.

Table 18: Valuation of Revenue

Benefit	Final Year of BCA (2049)	
	Undiscounted	Discounted
Total Residual Value Benefits	\$52,586,280	\$18,575,609

5. SUMMARY OF RESULTS

Evaluation Measures

As previously mentioned, the benefit-cost analysis compares potential benefits and costs of a complete build out scenario associated with the project. The following evaluation measures were used to analyze this BCA for the Carteret Intermodal Ferry Terminal project:

- ❖ **Net Present Value (NPV):** The NPV provides clarity on the overall dollar value of cash flows over time in today's dollar terms by comparing the net benefits (benefits minus costs) after applying the 7% discount rate given by the USDOT. A NPV greater than zero indicates the cost-effectiveness of a project.
- ❖ **Benefit Cost Ratio (BCR):** The BCR analyzes the relationship between discounted benefits and discounted costs to see whether a project's benefits exceed or fall below the costs. The BCR is determined by taking the present value of incremental benefits and dividing the present value of incremental costs. A BCR greater than 1.0 indicates the cost-effectiveness of a project

BCA Results

Table 19 below shows the evaluation results for the proposed project. Results are given in both undiscounted and discounted (at 7%) dollar values over a 25-year evaluation period.

Total benefits and costs were used to determine the desirability of the project. The total benefits of the complete build out are \$59,279,158 in discounted 2020 dollars. The total capital costs including design, construction, operation, and maintenance and repairs, equate to \$55,514,202 in discounted 2020 dollars. The difference between discounted costs and discounted benefits result in a net present value of \$3,764,956 discounted in 2020 dollars, and BCR of 1.07.

Table 19: Benefit Cost Analysis Results, In 2020 Dollars

BCA Metric	Project Life Cycle	
	Undiscounted	Discounted
Total Benefits	\$184,998,466	\$59,279,158
Total Costs	\$93,477,439	\$55,514,202
Net Present Value (NPV)	\$91,521,027	\$3,764,956
Benefit Cost Ratio (BCR)	1.98	1.07

Other Non-Quantifiable Benefits

Resilience:

This analysis recognizes the difficulty in correlating a monetary measure to resilience benefits. Notably, ferry service was an invaluable mode of rescuing commuters, residents, and victims of the September 11th, 2001 attacks on the World Trade

Center. The frequency of such an event cannot be reliably estimated. This report also notes that one of the ferry vessels purchased by the Borough was the first responder to the 2009 crash landing of US Airways Flight 1549 in the Hudson River, rescuing 24 victims from the aircraft. This vessel has also been involved in the 2017 rescue of a man that had jumped into the Hudson River and rescuing a helicopter pilot that had ditched into the River in 2019.

Economic Development:

A significant non-quantifiable benefit resulting in the build out of the ferry terminal project is the creation of agglomeration economies. Agglomeration economies are defined as the benefits that come when firms and people locate near one another in cities and industrial clusters. The Intermodal Ferry Terminal connects people of Carteret and surrounding municipalities to the massive New York City market. Both firms and households benefit from the effects of the connected economic activity. The ferry terminal and adjacent land is to be developed into a regional transportation hub, with future retail, residential, and commercial spaces supporting the proposed hot spot. The additional benefits of living in a desirable area, plus the proposed ferry terminal project that will transport passengers to the newly accessed NYC job market, brings future residents into the Borough of Carteret and boosts the local economy. See **Appendix D** for the overall conceptual design of the Waterfront Redevelopment Area, highlighting the importance of this project on a local and regional level.

Conclusion

A benefit-cost analysis (BCA) was conducted for the *Carteret Intermodal Ferry Terminal* for submission to the USDOT as a requirement of a discretionary grant application for the *Rebuilding American Infrastructure with Sustainability and Equity (BUILD) Grant Program*. The analysis was conducted in accordance with the benefit-cost methodology outlined in the 2022 Benefit-Cost Analysis Guidance for Discretionary Grant Programs, supplied by the USDOT. The period of analysis corresponds to 25 years and includes two (2) years of construction and 25 years of benefits after operations begin in 2024.

The BCA examined all costs associated with ferry operations at the waterfront development area in Carteret, New Jersey. The benefits lead to an overall project Net Present Value (NPV) of \$3,764,956 (discounted at 7%) and a Benefit Cost Ratio (BCR) of 1.07. The overall project benefit matrix can be seen in **Table 2**. As the calculated NPV is greater than zero and the BCR is greater than 1.0, the cost for the proposed project is justified.

REFERENCES

1. "Guidance for Discretionary Grant Programs", prepared by USDOT, 2022
2. "NYC Ins and Out of Commuting", prepared by NYC Planning, 2022
3. "Carteret Ferry Feasibility Study, Tier 2 Analysis", prepared by Nelson Nygaard and Weinberger & Associates, December 2016
4. "Proposed Carteret Passenger Ferry Expanded Ridership Demand Study", prepared by Rutgers University, October 23, 2018
5. "The Economic and Societal Impact of Motor Vehicle Crashes", prepared by NHTSA, 2010 (revised)
6. "Navigational Safety Plan, Borough of Carteret Ferry Service to Manhattan", prepared by Panaveer Quality Partners, February 14, 2020.
7. "Greenhouse Gas Emissions from a Typical Passenger Vehicle", prepared by US EPA, March 2018
8. "Estimated National Average Vehicle Emissions Rates per Vehicle by Vehicle Type Using Gasoline and Diesel", prepared by Bureau of Transportation Statistics, 2021
9. Facility Service Costs provided by Facility Service Partners
10. Operational and maintenance resources: New York Waterways, Weehawken, NJ and May Shipbuilding, Staten Island, NY

APPENDIX A
BENEFIT COST ANALYSIS

**BENEFIT COST ANALYSIS
2025 BUILD INTERMODAL GRANT APPLICATION
CARTERET INTERMODAL FERRY TERMINAL
BOROUGH OF CARTERET, MIDDLESEX COUNTY, NEW JERSEY**

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Table 1: BCA Overall Results

TOTAL COST		DISCOUNTED COSTS		TOTAL BENEFITS		DISCOUNTED BENEFITS	
\$	93,477,439	\$	55,514,202	\$	184,998,466	\$	59,279,158

NET PRESENT VALUE (NPV): \$ 91,521,027 \$ 3,764,956

BENEFIT-COST RATIO (BCR): 1.98 1.07

BENEFIT COST ANALYSIS
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Table 2: Total Costs of Project

YEAR	TOTAL COST	DISCOUNTED COST
	<u>"Future"</u>	<u>2020</u>
2022	\$ 42,036,100	\$ 36,715,958
2023	\$ -	\$ -
2024	\$ 1,722,694	\$ 1,314,235
2025	\$ 1,894,828	\$ 1,350,987
2026	\$ 1,766,794	\$ 1,177,290
2027	\$ 1,938,781	\$ 1,207,376
2028	\$ 1,810,831	\$ 1,053,920
2029	\$ 1,982,923	\$ 1,078,579
2030	\$ 1,861,483	\$ 946,284
2031	\$ 2,211,483	\$ 1,050,660
2032	\$ 1,861,483	\$ 826,521
2033	\$ 2,011,483	\$ 834,694
2034	\$ 2,111,483	\$ 818,870
2035	\$ 2,011,483	\$ 729,054
2036	\$ 1,865,053	\$ 631,758
2037	\$ 2,015,053	\$ 637,914
2038	\$ 2,065,053	\$ 610,975
2039	\$ 2,459,889	\$ 680,180
2040	\$ 1,865,053	\$ 481,965
2041	\$ 2,015,053	\$ 486,662
2042	\$ 1,865,053	\$ 420,967
2043	\$ 2,015,053	\$ 425,069
2044	\$ 2,115,053	\$ 416,976
2045	\$ 2,215,053	\$ 408,122
2046	\$ 1,865,053	\$ 321,154
2047	\$ 2,015,053	\$ 324,283
2048	\$ 1,865,053	\$ 280,508
2049	\$ 2,015,053	\$ 283,242

TOTAL: \$ 93,477,439 \$ 55,514,202

**BENEFIT COST ANALYSIS
2025 BUILD INTERMODAL GRANT APPLICATION
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BOROUGH OF CARTERET, MIDDLESEX COUNTY, NEW JERSEY**

Table 3: Capital Costs of Project

YEAR	CAPITAL COST	DISCOUNTED COST
	<u>"Future"</u>	<u>2020</u>
2022	\$ 42,036,100	\$ 36,715,958
2023	\$ -	\$ -
2024	\$ -	\$ -
2025	\$ -	\$ -
2026	\$ -	\$ -
2027	\$ -	\$ -
2028	\$ -	\$ -
2029	\$ -	\$ -
2030	\$ -	\$ -
2031	\$ -	\$ -
2032	\$ -	\$ -
2033	\$ -	\$ -
2034	\$ -	\$ -
2035	\$ -	\$ -
2036	\$ -	\$ -
2037	\$ -	\$ -
2038	\$ -	\$ -
2039	\$ -	\$ -
2040	\$ -	\$ -
2041	\$ -	\$ -
2042	\$ -	\$ -
2043	\$ -	\$ -
2044	\$ -	\$ -
2045	\$ -	\$ -
2046	\$ -	\$ -
2047	\$ -	\$ -
2048	\$ -	\$ -
2049	\$ -	\$ -
Total		\$ 36,715,958

**BENEFIT COST ANALYSIS
2025 BUILD INTERMODAL GRANT APPLICATION
CARTERET INTERMODAL FERRY TERMINAL
BOROUGH OF CARTERET, MIDDLESEX COUNTY, NEW JERSEY**

Table 4: Operational and Maintenance Costs of Project

YEAR	DISCOUNTED COST	
	"Future"	2020
2022	\$ -	\$ -
2023	\$ -	\$ -
2024	\$ 223,768	\$ 170,712
2025	\$ 373,768	\$ 266,491
2026	\$ 223,768	\$ 149,106
2027	\$ 373,768	\$ 232,764
2028	\$ 223,768	\$ 130,235
2029	\$ 373,768	\$ 203,305
2030	\$ 223,768	\$ 113,752
2031	\$ 373,768	\$ 177,574
2032	\$ 223,768	\$ 99,356
2033	\$ 373,768	\$ 155,100
2034	\$ 223,768	\$ 86,781
2035	\$ 373,768	\$ 135,471
2036	\$ 223,768	\$ 75,798
2037	\$ 373,768	\$ 118,325
2038	\$ 223,768	\$ 66,205
2039	\$ 373,768	\$ 103,350
2040	\$ 223,768	\$ 57,826
2041	\$ 373,768	\$ 90,270
2042	\$ 223,768	\$ 50,507
2043	\$ 373,768	\$ 78,845
2044	\$ 223,768	\$ 44,115
2045	\$ 373,768	\$ 68,866
2046	\$ 223,768	\$ 38,532
2047	\$ 373,768	\$ 60,151
2048	\$ 223,768	\$ 33,655
2049	\$ 373,768	\$ 52,538
TOTAL	\$ 7,767,968	\$ 2,859,631

Table 5: Repair and Rehabilitation Costs of Project

YEAR	DISCOUNTED COST	
	"Future"	2020
2022	\$ -	\$ -
2023	\$ -	\$ -
2024	\$ -	\$ -
2025	\$ -	\$ -
2026	\$ -	\$ -
2027	\$ -	\$ -
2028	\$ -	\$ -
2029	\$ -	\$ -
2030	\$ -	\$ -
2031	\$ 200,000	\$ 95,019
2032	\$ -	\$ -
2033	\$ -	\$ -
2034	\$ 250,000	\$ 96,954
2035	\$ -	\$ -
2036	\$ -	\$ -
2037	\$ -	\$ -
2038	\$ 200,000	\$ 59,173
2039	\$ 444,836	\$ 123,001
2040	\$ -	\$ -
2041	\$ -	\$ -
2042	\$ -	\$ -
2043	\$ -	\$ -
2044	\$ 250,000	\$ 49,287
2045	\$ 200,000	\$ 36,850
2046	\$ -	\$ -
2047	\$ -	\$ -
2048	\$ -	\$ -
2049	\$ -	\$ -
TOTAL	\$ 1,544,836	\$ 460,283

**BENEFIT COST ANALYSIS
2025 BUILD INTERMODAL GRANT APPLICATION
CARTERET INTERMODAL FERRY TERMINAL
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Table 6: CO₂ Emissions Cost

YEAR	METRIC TONS	COST / METRIC TON	COSTS		DISCOUNTED
			"Future"	2020	
2022					
2023					
2024	3,570	\$ 1.00	\$ 3,570	\$ 2,724	
2025	3,570	\$ 1.00	\$ 3,570	\$ 2,545	
2026	3,570	\$ 1.00	\$ 3,570	\$ 2,379	
2027	3,570	\$ 1.00	\$ 3,570	\$ 2,223	
2028	3,570	\$ 1.00	\$ 3,570	\$ 2,078	
2029	3,570	\$ 1.00	\$ 3,570	\$ 1,942	
2030	3,570	\$ 1.00	\$ 3,570	\$ 1,815	
2031	3,570	\$ 1.00	\$ 3,570	\$ 1,696	
2032	3,570	\$ 1.00	\$ 3,570	\$ 1,585	
2033	3,570	\$ 1.00	\$ 3,570	\$ 1,481	
2034	3,570	\$ 1.00	\$ 3,570	\$ 1,385	
2035	3,570	\$ 1.00	\$ 3,570	\$ 1,294	
2036	3,570	\$ 2.00	\$ 7,140	\$ 2,419	
2037	3,570	\$ 2.00	\$ 7,140	\$ 2,260	
2038	3,570	\$ 2.00	\$ 7,140	\$ 2,112	
2039	3,570	\$ 2.00	\$ 7,140	\$ 1,974	
2040	3,570	\$ 2.00	\$ 7,140	\$ 1,845	
2041	3,570	\$ 2.00	\$ 7,140	\$ 1,724	
2042	3,570	\$ 2.00	\$ 7,140	\$ 1,612	
2043	3,570	\$ 2.00	\$ 7,140	\$ 1,506	
2044	3,570	\$ 2.00	\$ 7,140	\$ 1,408	
2045	3,570	\$ 2.00	\$ 7,140	\$ 1,316	
2046	3,570	\$ 2.00	\$ 7,140	\$ 1,229	
2047	3,570	\$ 2.00	\$ 7,140	\$ 1,149	
2048	3,570	\$ 2.00	\$ 7,140	\$ 1,074	
2049	3,570	\$ 2.00	\$ 7,140	\$ 1,004	
Total			\$ 142,800	\$ 45,779	

Note: Cost per metric ton varies based on values provided by USDOT

**BENEFIT COST ANALYSIS
2025 BUILD INTERMODAL GRANT APPLICATION
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Table 7: NOx Emissions Cost

YEAR	METRIC TONS	COST / METRIC TON	COSTS	
			"Future"	2020
2022				
2023				
2024	64.26	\$ 16,200.00	\$ 1,041,012.00	\$ 794,183.07
2025	64.26	\$ 16,500.00	\$ 1,060,290.00	\$ 755,972.12
2026	64.26	\$ 16,800.00	\$ 1,079,568.00	\$ 719,361.74
2027	64.26	\$ 17,100.00	\$ 1,098,846.00	\$ 684,306.06
2028	64.26	\$ 17,400.00	\$ 1,118,124.00	\$ 650,758.35
2029	64.26	\$ 17,700.00	\$ 1,137,402.00	\$ 618,671.33
2030	64.26	\$ 18,100.00	\$ 1,163,106.00	\$ 591,264.11
2031	64.26	\$ 18,100.00	\$ 1,163,106.00	\$ 552,583.28
2032	64.26	\$ 18,100.00	\$ 1,163,106.00	\$ 516,432.97
2033	64.26	\$ 18,100.00	\$ 1,163,106.00	\$ 482,647.64
2034	64.26	\$ 18,100.00	\$ 1,163,106.00	\$ 451,072.56
2035	64.26	\$ 18,100.00	\$ 1,163,106.00	\$ 421,563.14
2036	64.26	\$ 18,100.00	\$ 1,163,106.00	\$ 393,984.24
2037	64.26	\$ 18,100.00	\$ 1,163,106.00	\$ 368,209.57
2038	64.26	\$ 18,100.00	\$ 1,163,106.00	\$ 344,121.10
2039	64.26	\$ 18,100.00	\$ 1,163,106.00	\$ 321,608.50
2040	64.26	\$ 18,100.00	\$ 1,163,106.00	\$ 300,568.69
2041	64.26	\$ 18,100.00	\$ 1,163,106.00	\$ 280,905.32
2042	64.26	\$ 18,100.00	\$ 1,163,106.00	\$ 262,528.34
2043	64.26	\$ 18,100.00	\$ 1,163,106.00	\$ 245,353.59
2044	64.26	\$ 18,100.00	\$ 1,163,106.00	\$ 229,302.42
2045	64.26	\$ 18,100.00	\$ 1,163,106.00	\$ 214,301.32
2046	64.26	\$ 18,100.00	\$ 1,163,106.00	\$ 200,281.61
2047	64.26	\$ 18,100.00	\$ 1,163,106.00	\$ 187,179.08
2048	64.26	\$ 18,100.00	\$ 1,163,106.00	\$ 174,933.72
2049	64.26	\$ 18,100.00	\$ 1,163,106.00	\$ 163,489.45

Total

\$ 29,797,362.00 \$ 10,925,583.32

Note: Cost per metric ton varies based on values provided by USDOT

**BENEFIT COST ANALYSIS
2025 BUILD INTERMODAL GRANT APPLICATION
CARTERET INTERMODAL FERRY TERMINAL
BOROUGH OF CARTERET, MIDDLESEX COUNTY, NEW JERSEY**

Table 8: PM_{2.5} Emissions Cost

YEAR	METRIC TONS	COST / METRIC TON	COSTS	
			"Future"	2020
2022				
2023				
2024	0.21	\$ 788,100.00	\$ 165,501.00	\$ 126,259.92
2025	0.21	\$ 801,700.00	\$ 168,357.00	\$ 120,036.21
2026	0.21	\$ 814,500.00	\$ 171,045.00	\$ 113,974.51
2027	0.21	\$ 827,400.00	\$ 173,754.00	\$ 108,205.26
2028	0.21	\$ 840,600.00	\$ 176,526.00	\$ 102,739.74
2029	0.21	\$ 854,000.00	\$ 179,340.00	\$ 97,549.08
2030	0.21	\$ 867,600.00	\$ 182,196.00	\$ 92,619.21
2031	0.21	\$ 867,600.00	\$ 182,196.00	\$ 86,560.01
2032	0.21	\$ 867,600.00	\$ 182,196.00	\$ 80,897.20
2033	0.21	\$ 867,600.00	\$ 182,196.00	\$ 75,604.86
2034	0.21	\$ 867,600.00	\$ 182,196.00	\$ 70,658.75
2035	0.21	\$ 867,600.00	\$ 182,196.00	\$ 66,036.21
2036	0.21	\$ 867,600.00	\$ 182,196.00	\$ 61,716.09
2037	0.21	\$ 867,600.00	\$ 182,196.00	\$ 57,678.59
2038	0.21	\$ 867,600.00	\$ 182,196.00	\$ 53,905.22
2039	0.21	\$ 867,600.00	\$ 182,196.00	\$ 50,378.71
2040	0.21	\$ 867,600.00	\$ 182,196.00	\$ 47,082.91
2041	0.21	\$ 867,600.00	\$ 182,196.00	\$ 44,002.72
2042	0.21	\$ 867,600.00	\$ 182,196.00	\$ 41,124.04
2043	0.21	\$ 867,600.00	\$ 182,196.00	\$ 38,433.68
2044	0.21	\$ 867,600.00	\$ 182,196.00	\$ 35,919.33
2045	0.21	\$ 867,600.00	\$ 182,196.00	\$ 33,569.46
2046	0.21	\$ 867,600.00	\$ 182,196.00	\$ 31,373.33
2047	0.21	\$ 867,600.00	\$ 182,196.00	\$ 29,320.87
2048	0.21	\$ 867,600.00	\$ 182,196.00	\$ 27,402.68
2049	0.21	\$ 867,600.00	\$ 182,196.00	\$ 25,609.98

Total **\$ 4,678,443.00** **\$ 1,718,658.57**

Note: Cost per metric ton varies based on values provided by USDOT

TOTAL COMBINED **\$ 34,618,605.00** **\$ 12,690,020.42**

**BENEFIT COST ANALYSIS
2025 BUILD INTERMODAL GRANT APPLICATION
CARTERET INTERMODAL FERRY TERMINAL
BOROUGH OF CARTERET, MIDDLESEX COUNTY, NEW JERSEY**

Table 9: Fuel Costs

YEAR	ROUND TRIPS / YEAR	FUEL PER ROUND TRIP (GAL)	COST/GAL	COSTS	DISCOUNTED COSTS
2022					
2023					
2024	522	146	\$ 3.790	\$ 288,843	\$ 220,357
2025	522	146	\$ 3.790	\$ 288,843	\$ 205,941
2026	522	146	\$ 3.790	\$ 288,843	\$ 192,469
2027	522	146	\$ 3.790	\$ 288,843	\$ 179,877
2028	522	146	\$ 3.790	\$ 288,843	\$ 168,110
2029	522	146	\$ 3.790	\$ 288,843	\$ 157,112
2030	522	146	\$ 3.790	\$ 288,843	\$ 146,833
2031	522	146	\$ 3.790	\$ 288,843	\$ 137,227
2032	522	146	\$ 3.790	\$ 288,843	\$ 128,250
2033	522	146	\$ 3.790	\$ 288,843	\$ 119,860
2034	522	146	\$ 3.790	\$ 288,843	\$ 112,018
2035	522	146	\$ 3.790	\$ 288,843	\$ 104,690
2036	522	146	\$ 3.790	\$ 288,843	\$ 97,841
2037	522	146	\$ 3.790	\$ 288,843	\$ 91,440
2038	522	146	\$ 3.790	\$ 288,843	\$ 85,458
2039	522	146	\$ 3.790	\$ 288,843	\$ 79,868
2040	522	146	\$ 3.790	\$ 288,843	\$ 74,643
2041	522	146	\$ 3.790	\$ 288,843	\$ 69,759
2042	522	146	\$ 3.790	\$ 288,843	\$ 65,196
2043	522	146	\$ 3.790	\$ 288,843	\$ 60,931
2044	522	146	\$ 3.790	\$ 288,843	\$ 56,945
2045	522	146	\$ 3.790	\$ 288,843	\$ 53,219
2046	522	146	\$ 3.790	\$ 288,843	\$ 49,738
2047	522	146	\$ 3.790	\$ 288,843	\$ 46,484
2048	522	146	\$ 3.790	\$ 288,843	\$ 43,443
2049	522	146	\$ 3.790	\$ 288,843	\$ 40,601
Total:		3,796		\$ 7,509,930	\$ 2,788,310

BENEFIT COST ANALYSIS
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Table 10: Total Benefits of Project

YEAR	TOTAL SAVINGS		DISCOUNTED SAVINGS	
	"Future"		2020	
2022	\$	-	\$	-
2023	\$	-	\$	-
2024	\$	5,055,934	\$	3,857,148
2025	\$	5,105,872	\$	3,640,416
2026	\$	5,154,747	\$	3,434,826
2027	\$	5,228,979	\$	3,256,345
2028	\$	5,291,940	\$	3,079,957
2029	\$	5,364,530	\$	2,917,949
2030	\$	5,483,662	\$	2,787,615
2031	\$	5,507,152	\$	2,616,408
2032	\$	5,634,150	\$	2,501,630
2033	\$	5,705,479	\$	2,367,571
2034	\$	5,784,638	\$	2,243,383
2035	\$	5,855,968	\$	2,122,472
2036	\$	6,033,576	\$	2,043,781
2037	\$	6,106,106	\$	1,933,037
2038	\$	6,186,466	\$	1,830,352
2039	\$	6,258,996	\$	1,730,664
2040	\$	6,388,395	\$	1,650,883
2041	\$	6,460,925	\$	1,560,398
2042	\$	6,541,285	\$	1,476,454
2043	\$	6,613,815	\$	1,395,164
2044	\$	6,694,175	\$	1,319,734
2045	\$	6,766,704	\$	1,246,760
2046	\$	6,847,064	\$	1,179,034
2047	\$	6,919,594	\$	1,113,573
2048	\$	6,992,124	\$	1,051,631
2049	\$	35,016,191	\$	4,921,974
TOTAL:	\$	184,998,466	\$	59,279,158

**BENEFIT COST ANALYSIS
2025 BUILD INTERMODAL GRANT APPLICATION
CARTERET INTERMODAL FERRY TERMINAL
BOROUGH OF CARTERET, MIDDLESEX COUNTY, NEW JERSEY**

Table 12: Valuation of Fatality Savings

YEAR	FATALITY	COST PER FATALITY	SAVINGS	DISCOUNTED SAVINGS
2022				
2023				
2024	0.01	\$ 12,837,400.00	\$ 90,884.92	\$ 69,335.67
2025	0.01	\$ 12,837,400.00	\$ 92,202.09	\$ 65,738.82
2026	0.01	\$ 12,837,400.00	\$ 93,519.26	\$ 62,315.83
2027	0.01	\$ 12,837,400.00	\$ 94,836.43	\$ 59,059.36
2028	0.01	\$ 12,837,400.00	\$ 96,153.61	\$ 55,962.27
2029	0.01	\$ 12,837,400.00	\$ 97,470.78	\$ 53,017.65
2030	0.01	\$ 12,837,400.00	\$ 100,105.13	\$ 50,888.37
2031	0.01	\$ 12,837,400.00	\$ 100,105.13	\$ 47,559.22
2032	0.01	\$ 12,837,400.00	\$ 102,739.47	\$ 45,617.55
2033	0.01	\$ 12,837,400.00	\$ 104,056.64	\$ 43,179.81
2034	0.01	\$ 12,837,400.00	\$ 105,373.82	\$ 40,865.78
2035	0.01	\$ 12,837,400.00	\$ 106,690.99	\$ 38,669.72
2036	0.01	\$ 12,837,400.00	\$ 108,008.16	\$ 36,586.10
2037	0.01	\$ 12,837,400.00	\$ 109,325.33	\$ 34,609.60
2038	0.01	\$ 12,837,400.00	\$ 110,642.51	\$ 32,735.13
2039	0.01	\$ 12,837,400.00	\$ 111,959.68	\$ 30,957.78
2040	0.01	\$ 12,837,400.00	\$ 114,594.02	\$ 29,613.27
2041	0.01	\$ 12,837,400.00	\$ 115,911.20	\$ 27,994.07
2042	0.01	\$ 12,837,400.00	\$ 117,228.37	\$ 26,459.99
2043	0.01	\$ 12,837,400.00	\$ 118,545.54	\$ 25,006.81
2044	0.01	\$ 12,837,400.00	\$ 119,862.72	\$ 23,630.53
2045	0.01	\$ 12,837,400.00	\$ 121,179.89	\$ 22,327.29
2046	0.01	\$ 12,837,400.00	\$ 122,497.06	\$ 21,093.44
2047	0.01	\$ 12,837,400.00	\$ 123,814.23	\$ 19,925.47
2048	0.01	\$ 12,837,400.00	\$ 125,131.41	\$ 18,820.04
2049	0.01	\$ 12,837,400.00	\$ 125,131.41	\$ 17,588.82
Total			\$ 2,827,969.78	\$ 999,558.42

**BENEFIT COST ANALYSIS
2025 BUILD INTERMODAL GRANT APPLICATION
CARTERET INTERMODAL FERRY TERMINAL
BOROUGH OF CARTERET, MIDDLESEX COUNTY, NEW JERSEY**

Table 13: Calculation of Fatalities per Year

YEAR	VMT	BILLION VMT	FATALITY RATE PER BILLION VMT	FATALITIES
2022				
2023				
2024	972,486	0.001	7.28	0.01
2025	986,580	0.001	7.28	0.01
2026	1,000,674	0.001	7.28	0.01
2027	1,014,768	0.001	7.28	0.01
2028	1,028,862	0.001	7.28	0.01
2029	1,042,956	0.001	7.28	0.01
2030	1,071,144	0.001	7.28	0.01
2031	1,071,144	0.001	7.28	0.01
2032	1,099,332	0.001	7.28	0.01
2033	1,113,426	0.001	7.28	0.01
2034	1,127,520	0.001	7.28	0.01
2035	1,141,614	0.001	7.28	0.01
2036	1,155,708	0.001	7.28	0.01
2037	1,169,802	0.001	7.28	0.01
2038	1,183,896	0.001	7.28	0.01
2039	1,197,990	0.001	7.28	0.01
2040	1,226,178	0.001	7.28	0.01
2041	1,240,272	0.001	7.28	0.01
2042	1,254,366	0.001	7.28	0.01
2043	1,268,460	0.001	7.28	0.01
2044	1,282,554	0.001	7.28	0.01
2045	1,296,648	0.001	7.28	0.01
2046	1,310,742	0.001	7.28	0.01
2047	1,324,836	0.001	7.28	0.01
2048	1,338,930	0.001	7.28	0.01
2049	1,338,930	0.001	7.28	0.01
Total:				0.22

**BENEFIT COST ANALYSIS
2025 BUILD INTERMODAL GRANT APPLICATION
CARTERET INTERMODAL FERRY TERMINAL
BOROUGH OF CARTERET, MIDDLESEX COUNTY, NEW JERSEY**

Table 14: Valuation of Injury Savings

YEAR	INJURIES	COST PER INJURY	SAVINGS	DISCOUNTED SAVINGS
2022				
2023				
2024	0.82	\$ 302,600.00	\$ 247,190.38	\$ 188,580.36
2025	0.83	\$ 302,600.00	\$ 250,772.85	\$ 178,797.58
2026	0.84	\$ 302,600.00	\$ 254,355.32	\$ 169,487.69
2027	0.85	\$ 302,600.00	\$ 257,937.79	\$ 160,630.69
2028	0.86	\$ 302,600.00	\$ 261,520.26	\$ 152,207.17
2029	0.88	\$ 302,600.00	\$ 265,102.73	\$ 144,198.32
2030	0.90	\$ 302,600.00	\$ 272,267.67	\$ 138,407.08
2031	0.90	\$ 302,600.00	\$ 272,267.67	\$ 129,352.41
2032	0.92	\$ 302,600.00	\$ 279,432.61	\$ 124,071.42
2033	0.94	\$ 302,600.00	\$ 283,015.07	\$ 117,441.19
2034	0.95	\$ 302,600.00	\$ 286,597.54	\$ 111,147.47
2035	0.96	\$ 302,600.00	\$ 290,180.01	\$ 105,174.59
2036	0.97	\$ 302,600.00	\$ 293,762.48	\$ 99,507.52
2037	0.98	\$ 302,600.00	\$ 297,344.95	\$ 94,131.80
2038	0.99	\$ 302,600.00	\$ 300,927.42	\$ 89,033.57
2039	1.01	\$ 302,600.00	\$ 304,509.89	\$ 84,199.52
2040	1.03	\$ 302,600.00	\$ 311,674.83	\$ 80,542.70
2041	1.04	\$ 302,600.00	\$ 315,257.30	\$ 76,138.76
2042	1.05	\$ 302,600.00	\$ 318,839.77	\$ 71,966.33
2043	1.07	\$ 302,600.00	\$ 322,422.24	\$ 68,013.97
2044	1.08	\$ 302,600.00	\$ 326,004.71	\$ 64,270.73
2045	1.09	\$ 302,600.00	\$ 329,587.18	\$ 60,726.17
2046	1.10	\$ 302,600.00	\$ 333,169.64	\$ 57,370.31
2047	1.11	\$ 302,600.00	\$ 336,752.11	\$ 54,193.64
2048	1.12	\$ 302,600.00	\$ 340,334.58	\$ 51,187.07
2049	1.12	\$ 302,600.00	\$ 340,334.58	\$ 47,838.39
Total			\$ 7,691,561.58	\$ 2,718,616.43

**BENEFIT COST ANALYSIS
2025 BUILD INTERMODAL GRANT APPLICATION
CARTERET INTERMODAL FERRY TERMINAL
BOROUGH OF CARTERET, MIDDLESEX COUNTY, NEW JERSEY**

Table 15: Calculation of Injuries per Year

YEAR	VMT	100 MILLION VMT	INJURY RATE PER 100 MILLION VMT	INJURIES
2022				
2023				
2024	972,486	0.0097	84	0.82
2025	986,580	0.0099	84	0.83
2026	1,000,674	0.01	84	0.84
2027	1,014,768	0.01	84	0.85
2028	1,028,862	0.01	84	0.86
2029	1,042,956	0.01	84	0.88
2030	1,071,144	0.01	84	0.90
2031	1,071,144	0.01	84	0.90
2032	1,099,332	0.01	84	0.92
2033	1,113,426	0.01	84	0.94
2034	1,127,520	0.01	84	0.95
2035	1,141,614	0.01	84	0.96
2036	1,155,708	0.01	84	0.97
2037	1,169,802	0.01	84	0.98
2038	1,183,896	0.01	84	0.99
2039	1,197,990	0.01	84	1.01
2040	1,226,178	0.01	84	1.03
2041	1,240,272	0.01	84	1.04
2042	1,254,366	0.01	84	1.05
2043	1,268,460	0.01	84	1.07
2044	1,282,554	0.01	84	1.08
2045	1,296,648	0.01	84	1.09
2046	1,310,742	0.01	84	1.10
2047	1,324,836	0.01	84	1.11
2048	1,338,930	0.01	84	1.12
2049	1,338,930	0.01	84	1.12
Total:				25.42

**BENEFIT COST ANALYSIS
2025 BUILD INTERMODAL GRANT APPLICATION
CARTERET INTERMODAL FERRY TERMINAL
BOROUGH OF CARTERET, MIDDLESEX COUNTY, NEW JERSEY**

Table 16: Valuation of Property Damage Savings

YEAR	PROPERTY DAMAGE INCIDENTS	COST PER VEHICLE	SAVINGS	DISCOUNTED SAVINGS
2022				
2023				
2024	1.43	\$ 302,600	\$ 432,583	\$ 330,016
2025	1.45	\$ 302,600	\$ 438,852	\$ 312,896
2026	1.47	\$ 302,600	\$ 445,122	\$ 296,603
2027	1.49	\$ 302,600	\$ 451,391	\$ 281,104
2028	1.51	\$ 302,600	\$ 457,660	\$ 266,363
2029	1.53	\$ 302,600	\$ 463,930	\$ 252,347
2030	1.57	\$ 302,600	\$ 476,468	\$ 242,212
2031	1.57	\$ 302,600	\$ 476,468	\$ 226,367
2032	1.62	\$ 302,600	\$ 489,007	\$ 217,125
2033	1.64	\$ 302,600	\$ 495,276	\$ 205,522
2034	1.66	\$ 302,600	\$ 501,546	\$ 194,508
2035	1.68	\$ 302,600	\$ 507,815	\$ 184,056
2036	1.70	\$ 302,600	\$ 514,084	\$ 174,138
2037	1.72	\$ 302,600	\$ 520,354	\$ 164,731
2038	1.74	\$ 302,600	\$ 526,623	\$ 155,809
2039	1.76	\$ 302,600	\$ 532,892	\$ 147,349
2040	1.80	\$ 302,600	\$ 545,431	\$ 140,950
2041	1.82	\$ 302,600	\$ 551,700	\$ 133,243
2042	1.84	\$ 302,600	\$ 557,970	\$ 125,941
2043	1.86	\$ 302,600	\$ 564,239	\$ 119,024
2044	1.89	\$ 302,600	\$ 570,508	\$ 112,474
2045	1.91	\$ 302,600	\$ 576,778	\$ 106,271
2046	1.93	\$ 302,600	\$ 583,047	\$ 100,398
2047	1.95	\$ 302,600	\$ 589,316	\$ 94,839
2048	1.97	\$ 302,600	\$ 595,586	\$ 89,577
2049	1.97	\$ 302,600	\$ 595,586	\$ 83,717
Total			\$ 13,460,233	\$ 4,757,579

**BENEFIT COST ANALYSIS
2025 BUILD INTERMODAL GRANT APPLICATION
CARTERET INTERMODAL FERRY TERMINAL
BOROUGH OF CARTERET, MIDDLESEX COUNTY, NEW JERSEY**

Table 17: Calculation of Property Damage Incidents

YEAR	VMT	100 MILLION VMT	PROP. DAMAGE RATE 100 MILLION VMT	PROPERTY DAMAGE INCIDENTS
2022				
2023				
2024	972,486	0.01	147	1.43
2025	986,580	0.01	147	1.45
2026	1,000,674	0.01	147	1.47
2027	1,014,768	0.01	147	1.49
2028	1,028,862	0.01	147	1.51
2029	1,042,956	0.01	147	1.53
2030	1,071,144	0.01	147	1.57
2031	1,071,144	0.01	147	1.57
2032	1,099,332	0.01	147	1.62
2033	1,113,426	0.01	147	1.64
2034	1,127,520	0.01	147	1.66
2035	1,141,614	0.01	147	1.68
2036	1,155,708	0.01	147	1.70
2037	1,169,802	0.01	147	1.72
2038	1,183,896	0.01	147	1.74
2039	1,197,990	0.01	147	1.76
2040	1,226,178	0.01	147	1.80
2041	1,240,272	0.01	147	1.82
2042	1,254,366	0.01	147	1.84
2043	1,268,460	0.01	147	1.86
2044	1,282,554	0.01	147	1.89
2045	1,296,648	0.01	147	1.91
2046	1,310,742	0.01	147	1.93
2047	1,324,836	0.01	147	1.95
2048	1,338,930	0.01	147	1.97
2049	1,338,930	0.01	147	1.97

Total: 44.48



Total Safety: \$ 23,979,764 \$ 8,475,754

BENEFIT COST ANALYSIS
2025 BUILD INTERMODAL GRANT APPLICATION
CARTERET INTERMODAL FERRY TERMINAL
BOROUGH OF CARTERET, MIDDLESEX COUNTY, NEW JERSEY

Table 18: Valuation of CO₂ Emissions Savings

YEAR	METRIC TONS	COST / METRIC TON	SAVINGS		DISCOUNTED
			"Future"	2020	
2022					
2023					
2024	82,841	\$ 1.00	\$ 82,841	\$ 63,199	
2025	84,042	\$ 1.00	\$ 84,042	\$ 59,921	
2026	85,243	\$ 1.00	\$ 85,243	\$ 56,801	
2027	86,443	\$ 1.00	\$ 86,443	\$ 53,832	
2028	87,644	\$ 1.00	\$ 87,644	\$ 51,009	
2029	88,844	\$ 1.00	\$ 88,844	\$ 48,325	
2030	91,246	\$ 1.00	\$ 91,246	\$ 46,385	
2031	91,246	\$ 1.00	\$ 91,246	\$ 43,350	
2032	93,647	\$ 1.00	\$ 93,647	\$ 41,580	
2033	94,847	\$ 1.00	\$ 94,847	\$ 39,358	
2034	96,048	\$ 1.00	\$ 96,048	\$ 37,249	
2035	97,249	\$ 1.00	\$ 97,249	\$ 35,247	
2036	98,449	\$ 2.00	\$ 196,898	\$ 66,696	
2037	99,650	\$ 2.00	\$ 199,300	\$ 63,093	
2038	100,850	\$ 2.00	\$ 201,701	\$ 59,676	
2039	102,051	\$ 2.00	\$ 204,102	\$ 56,436	
2040	104,452	\$ 2.00	\$ 208,904	\$ 53,985	
2041	105,653	\$ 2.00	\$ 211,306	\$ 51,033	
2042	106,853	\$ 2.00	\$ 213,707	\$ 48,236	
2043	108,054	\$ 2.00	\$ 216,108	\$ 45,587	
2044	109,255	\$ 2.00	\$ 218,509	\$ 43,078	
2045	110,455	\$ 2.00	\$ 220,910	\$ 40,703	
2046	111,656	\$ 2.00	\$ 223,312	\$ 38,453	
2047	112,856	\$ 2.00	\$ 225,713	\$ 36,324	
2048	114,057	\$ 2.00	\$ 228,114	\$ 34,309	
2049	114,057	\$ 2.00	\$ 228,114	\$ 32,064	
Total	\$ 2,577,688		\$ 4,076,037	\$ 1,245,932	

Note: Cost per metric ton varies based on values provided by USDOT

**BENEFIT COST ANALYSIS
2025 BUILD INTERMODAL GRANT APPLICATION
CARTERET INTERMODAL FERRY TERMINAL
BOROUGH OF CARTERET, MIDDLESEX COUNTY, NEW JERSEY**

Table 19: Calculation of CO₂ Emissions

YEAR	CARS ANNUALLY	METRIC TON CO₂ PER CAR	METRIC TONS
2022			
2023			
2024	18,009	4.6	82,841
2025	18,270	4.6	84,042
2026	18,531	4.6	85,243
2027	18,792	4.6	86,443
2028	19,053	4.6	87,644
2029	19,314	4.6	88,844
2030	19,836	4.6	91,246
2031	19,836	4.6	91,246
2032	20,358	4.6	93,647
2033	20,619	4.6	94,847
2034	20,880	4.6	96,048
2035	21,141	4.6	97,249
2036	21,402	4.6	98,449
2037	21,663	4.6	99,650
2038	21,924	4.6	100,850
2039	22,185	4.6	102,051
2040	22,707	4.6	104,452
2041	22,968	4.6	105,653
2042	23,229	4.6	106,853
2043	23,490	4.6	108,054
2044	23,751	4.6	109,255
2045	24,012	4.6	110,455
2046	24,273	4.6	111,656
2047	24,534	4.6	112,856
2048	24,795	4.6	114,057
2049	24,795	4.6	114,057

**BENEFIT COST ANALYSIS
2025 BUILD INTERMODAL GRANT APPLICATION
CARTERET INTERMODAL FERRY TERMINAL
BOROUGH OF CARTERET, MIDDLESEX COUNTY, NEW JERSEY**

Table 20: Valuation of NOx Emissions Savings

YEAR	METRIC TONS	COST / METRIC TON	SAVINGS		DISCOUNTED
			"Future"	2020	
2022					
2023					
2024	29.70	\$ 16,200	\$ 481,088	\$ 367,020	
2025	26.52	\$ 16,500	\$ 437,617	\$ 312,015	
2026	22.98	\$ 16,800	\$ 386,122	\$ 257,290	
2027	21.45	\$ 17,100	\$ 366,850	\$ 228,456	
2028	18.80	\$ 17,400	\$ 327,073	\$ 190,360	
2029	17.15	\$ 17,700	\$ 303,543	\$ 165,107	
2030	15.10	\$ 18,100	\$ 273,250	\$ 138,907	
2031	15.10	\$ 18,100	\$ 273,250	\$ 129,819	
2032	15.49	\$ 18,100	\$ 280,441	\$ 124,519	
2033	15.69	\$ 18,100	\$ 284,037	\$ 117,865	
2034	15.89	\$ 18,100	\$ 287,632	\$ 111,549	
2035	16.09	\$ 18,100	\$ 291,227	\$ 105,554	
2036	16.29	\$ 18,100	\$ 294,823	\$ 99,867	
2037	16.49	\$ 18,100	\$ 298,418	\$ 94,472	
2038	16.69	\$ 18,100	\$ 302,014	\$ 89,355	
2039	16.88	\$ 18,100	\$ 305,609	\$ 84,503	
2040	17.28	\$ 18,100	\$ 312,800	\$ 80,833	
2041	17.48	\$ 18,100	\$ 316,395	\$ 76,414	
2042	17.68	\$ 18,100	\$ 319,991	\$ 72,226	
2043	17.88	\$ 18,100	\$ 323,586	\$ 68,259	
2044	18.08	\$ 18,100	\$ 327,181	\$ 64,503	
2045	18.27	\$ 18,100	\$ 330,777	\$ 60,945	
2046	18.47	\$ 18,100	\$ 334,372	\$ 57,577	
2047	18.67	\$ 18,100	\$ 337,968	\$ 54,389	
2048	18.87	\$ 18,100	\$ 341,563	\$ 51,372	
2049	18.87	\$ 18,100	\$ 341,563	\$ 48,011	
Total	477.87		\$ 8,479,189	\$ 3,251,186	

Note: Cost per metric ton varies based on values provided by USDOT

**BENEFIT COST ANALYSIS
2025 BUILD INTERMODAL GRANT APPLICATION
CARTERET INTERMODAL FERRY TERMINAL
BOROUGH OF CARTERET, MIDDLESEX COUNTY, NEW JERSEY**

Table 21: Calculation of NOx Emissions

YEAR	CARS ANNUALLY	METRIC TON NOx PER CAR	METRIC TONS
2022			
2023			
2024	18,009	0.001648998	29.70
2025	18,270	0.001451682	26.52
2026	18,531	0.001240272	22.98
2027	18,792	0.001141614	21.45
2028	19,053	0.00098658	18.80
2029	19,314	0.000887922	17.15
2030	19,836	0.000761076	15.10
2031	19,836	0.000761076	15.10
2032	20,358	0.000761076	15.49
2033	20,619	0.000761076	15.69
2034	20,880	0.000761076	15.89
2035	21,141	0.000761076	16.09
2036	21,402	0.000761076	16.29
2037	21,663	0.000761076	16.49
2038	21,924	0.000761076	16.69
2039	22,185	0.000761076	16.88
2040	22,707	0.000761076	17.28
2041	22,968	0.000761076	17.48
2042	23,229	0.000761076	17.68
2043	23,490	0.000761076	17.88
2044	23,751	0.000761076	18.08
2045	24,012	0.000761076	18.27
2046	24,273	0.000761076	18.47
2047	24,534	0.000761076	18.67
2048	24,795	0.000761076	18.87
2049	24,795	0.000761076	18.87

**BENEFIT COST ANALYSIS
2025 BUILD INTERMODAL GRANT APPLICATION
CARTERET INTERMODAL FERRY TERMINAL
BOROUGH OF CARTERET, MIDDLESEX COUNTY, NEW JERSEY**

Table 22: Valuation of PM_{2.5} Emissions

YEAR	METRIC TONS	COST / METRIC TON	SAVINGS		DISCOUNTED
			"Future"	2020	
2022					
2023					
2024	2.03	\$ 788,100	\$ 1,600,277	\$ 1,220,844	
2025	2.06	\$ 801,700	\$ 1,651,485	\$ 1,177,486	
2026	2.09	\$ 814,500	\$ 1,701,822	\$ 1,133,996	
2027	2.12	\$ 827,400	\$ 1,753,125	\$ 1,091,758	
2028	2.15	\$ 840,600	\$ 1,805,831	\$ 1,051,010	
2029	2.18	\$ 854,000	\$ 1,859,749	\$ 1,011,580	
2030	2.24	\$ 867,600	\$ 1,940,430	\$ 986,416	
2031	2.24	\$ 867,600	\$ 1,940,430	\$ 921,884	
2032	2.30	\$ 867,600	\$ 1,991,494	\$ 884,247	
2033	2.32	\$ 867,600	\$ 2,017,026	\$ 836,994	
2034	2.35	\$ 867,600	\$ 2,042,558	\$ 792,139	
2035	2.38	\$ 867,600	\$ 2,068,089	\$ 749,571	
2036	2.41	\$ 867,600	\$ 2,093,621	\$ 709,182	
2037	2.44	\$ 867,600	\$ 2,119,153	\$ 670,870	
2038	2.47	\$ 867,600	\$ 2,144,685	\$ 634,535	
2039	2.50	\$ 867,600	\$ 2,170,217	\$ 600,083	
2040	2.56	\$ 867,600	\$ 2,221,281	\$ 574,021	
2041	2.59	\$ 867,600	\$ 2,246,813	\$ 542,635	
2042	2.62	\$ 867,600	\$ 2,272,345	\$ 512,898	
2043	2.65	\$ 867,600	\$ 2,297,877	\$ 484,730	
2044	2.68	\$ 867,600	\$ 2,323,409	\$ 458,052	
2045	2.71	\$ 867,600	\$ 2,348,941	\$ 432,790	
2046	2.74	\$ 867,600	\$ 2,374,473	\$ 408,874	
2047	2.77	\$ 867,600	\$ 2,400,005	\$ 386,234	
2048	2.80	\$ 867,600	\$ 2,425,537	\$ 364,806	
2049	2.80	\$ 867,600	\$ 2,425,537	\$ 340,940	
Total	63.18		\$ 54,236,211	\$ 18,978,575	

Note: Cost per metric ton varies based on values provided by USDOT

**BENEFIT COST ANALYSIS
2025 BUILD INTERMODAL GRANT APPLICATION
CARTERET INTERMODAL FERRY TERMINAL
BOROUGH OF CARTERET, MIDDLESEX COUNTY, NEW JERSEY**

Table 23: Calculation of PM_{2.5} Emissions

YEAR	CARS	METRIC TON PM PER CAR	METRIC TONS
2022			
2023			
2024	18,009	0.000112752	2.03
2025	18,270	0.000112752	2.06
2026	18,531	0.000112752	2.09
2027	18,792	0.000112752	2.12
2028	19,053	0.000112752	2.15
2029	19,314	0.000112752	2.18
2030	19,836	0.000112752	2.24
2031	19,836	0.000112752	2.24
2032	20,358	0.000112752	2.30
2033	20,619	0.000112752	2.32
2034	20,880	0.000112752	2.35
2035	21,141	0.000112752	2.38
2036	21,402	0.000112752	2.41
2037	21,663	0.000112752	2.44
2038	21,924	0.000112752	2.47
2039	22,185	0.000112752	2.50
2040	22,707	0.000112752	2.56
2041	22,968	0.000112752	2.59
2042	23,229	0.000112752	2.62
2043	23,490	0.000112752	2.65
2044	23,751	0.000112752	2.68
2045	24,012	0.000112752	2.71
2046	24,273	0.000112752	2.74
2047	24,534	0.000112752	2.77
2048	24,795	0.000112752	2.80
2049	24,795	0.000112752	2.80

Total Emissions Savings:

\$ 66,791,437 \$ 23,475,694

**BENEFIT COST ANALYSIS
2025 BUILD INTERMODAL GRANT APPLICATION
CARTERET INTERMODAL FERRY TERMINAL
BOROUGH OF CARTERET, MIDDLESEX COUNTY, NEW JERSEY**

Table 24: Valuation of Fuel Savings

YEAR	AVERAGE TRIP (MILES/DAY)	CARS REMOVED (DAY)	WORKDAYS PER YEAR	VMT (ANNUALLY)	COST/MILE	SAVINGS	DISCOUNTED SAVINGS
2022							
2023							
2024	54	69	261	972,486	\$ 0.45	\$ 437,619	\$ 333,857
2025	54	70	261	986,580	\$ 0.45	\$ 443,961	\$ 316,538
2026	54	71	261	1,000,674	\$ 0.45	\$ 450,303	\$ 300,056
2027	54	72	261	1,014,768	\$ 0.45	\$ 456,646	\$ 284,376
2028	54	73	261	1,028,862	\$ 0.45	\$ 462,988	\$ 269,463
2029	54	74	261	1,042,956	\$ 0.45	\$ 469,330	\$ 255,285
2030	54	76	261	1,071,144	\$ 0.45	\$ 482,015	\$ 245,032
2031	54	76	261	1,071,144	\$ 0.45	\$ 482,015	\$ 229,002
2032	54	78	261	1,099,332	\$ 0.45	\$ 494,699	\$ 219,652
2033	54	79	261	1,113,426	\$ 0.45	\$ 501,042	\$ 207,914
2034	54	80	261	1,127,520	\$ 0.45	\$ 507,384	\$ 196,772
2035	54	81	261	1,141,614	\$ 0.45	\$ 513,726	\$ 186,198
2036	54	82	261	1,155,708	\$ 0.45	\$ 520,069	\$ 176,165
2037	54	83	261	1,169,802	\$ 0.45	\$ 526,411	\$ 166,648
2038	54	84	261	1,183,896	\$ 0.45	\$ 532,753	\$ 157,622
2039	54	85	261	1,197,990	\$ 0.45	\$ 539,096	\$ 149,064
2040	54	87	261	1,226,178	\$ 0.45	\$ 551,780	\$ 142,590
2041	54	88	261	1,240,272	\$ 0.45	\$ 558,122	\$ 134,794
2042	54	89	261	1,254,366	\$ 0.45	\$ 564,465	\$ 127,407
2043	54	90	261	1,268,460	\$ 0.45	\$ 570,807	\$ 120,410
2044	54	91	261	1,282,554	\$ 0.45	\$ 577,149	\$ 113,783
2045	54	92	261	1,296,648	\$ 0.45	\$ 583,492	\$ 107,508
2046	54	93	261	1,310,742	\$ 0.45	\$ 589,834	\$ 101,567
2047	54	94	261	1,324,836	\$ 0.45	\$ 596,176	\$ 95,943
2048	54	95	261	1,338,930	\$ 0.45	\$ 602,519	\$ 90,620
2049	54	95	261	1,338,930	\$ 0.45	\$ 602,519	\$ 84,692
Total:				\$ 30,259,818		\$ 13,616,918	\$ 4,812,960

BENEFIT COST ANALYSIS
2025 BUILD INTERMODAL GRANT APPLICATION
CARTERET INTERMODAL FERRY TERMINAL
BOROUGH OF CARTERET, MIDDLESEX COUNTY, NEW JERSEY

Table 25: Revenue Generated from Intermodal Ferry Terminal

YEAR	ONE-WAY TICKETS	ONE-WAY TICKET PRICE	REVENUE	DISCOUNTED REVENUE
2022	-	-	\$ -	\$ -
2023	-	-	\$ -	\$ -
2024	112,230	\$ 15.00	\$ 1,683,450	\$ 1,284,296
2025	113,796	\$ 15.00	\$ 1,706,940	\$ 1,217,025
2026	115,884	\$ 15.00	\$ 1,738,260	\$ 1,158,276
2027	117,450	\$ 15.00	\$ 1,761,750	\$ 1,097,129
2028	119,538	\$ 15.00	\$ 1,793,070	\$ 1,043,583
2029	121,104	\$ 15.00	\$ 1,816,560	\$ 988,088
2030	123,192	\$ 15.00	\$ 1,847,880	\$ 939,368
2031	124,758	\$ 15.00	\$ 1,871,370	\$ 889,074
2032	126,846	\$ 15.00	\$ 1,902,690	\$ 844,817
2033	128,412	\$ 15.00	\$ 1,926,180	\$ 799,296
2034	130,500	\$ 15.00	\$ 1,957,500	\$ 759,152
2035	132,066	\$ 15.00	\$ 1,980,990	\$ 718,002
2036	134,154	\$ 15.00	\$ 2,012,310	\$ 681,639
2037	135,720	\$ 15.00	\$ 2,035,800	\$ 644,482
2038	137,808	\$ 15.00	\$ 2,067,120	\$ 611,586
2039	139,374	\$ 15.00	\$ 2,090,610	\$ 578,071
2040	141,462	\$ 15.00	\$ 2,121,930	\$ 548,347
2041	143,028	\$ 15.00	\$ 2,145,420	\$ 518,147
2042	145,116	\$ 15.00	\$ 2,176,740	\$ 491,319
2043	146,682	\$ 15.00	\$ 2,200,230	\$ 464,132
2044	148,770	\$ 15.00	\$ 2,231,550	\$ 439,943
2045	150,336	\$ 15.00	\$ 2,255,040	\$ 415,489
2046	152,424	\$ 15.00	\$ 2,286,360	\$ 393,701
2047	153,990	\$ 15.00	\$ 2,309,850	\$ 371,725
2048	155,556	\$ 15.00	\$ 2,333,340	\$ 350,939
2049	155,556	\$ 15.00	\$ 2,333,340	\$ 327,981
Total			\$ 52,586,280	\$ 18,575,609

Note: Full operation assumed to begin January 2024

**BENEFIT COST ANALYSIS
 2025 BUILD INTERMODAL GRANT APPLICATION
 CARTERET INTERMODAL FERRY TERMINAL
 BOROUGH OF CARTERET, MIDDLESEX COUNTY, NEW JERSEY**

Table 26: Valuation and Calculation of Residual Value

YEAR	RESIDUAL VALUE	DISCOUNTED
	"Future"	2020
2022	\$ -	\$ -
2023	\$ -	\$ -
2024	\$ -	\$ -
2025	\$ -	\$ -
2026	\$ -	\$ -
2027	\$ -	\$ -
2028	\$ -	\$ -
2029	\$ -	\$ -
2030	\$ -	\$ -
2031	\$ -	\$ -
2032	\$ -	\$ -
2033	\$ -	\$ -
2034	\$ -	\$ -
2035	\$ -	\$ -
2036	\$ -	\$ -
2037	\$ -	\$ -
2038	\$ -	\$ -
2039	\$ -	\$ -
2040	\$ -	\$ -
2041	\$ -	\$ -
2042	\$ -	\$ -
2043	\$ -	\$ -
2044	\$ -	\$ -
2045	\$ -	\$ -
2046	\$ -	\$ -
2047	\$ -	\$ -
2048	\$ -	\$ -
2049	\$ 28,024,067	\$ 3,939,142
Total	\$ 28,024,067	\$ 3,939,142

$$RV = \frac{U - Y}{U} * \text{Project Capital Cost}$$

$$RV = 28,024,066.67$$

U = Useful life = 75 yrs
 Y = Analysis Period = 25 yrs
 Capital Cost = \$42,036,100.00

APPENDIX B

COST ESTIMATE

**CONSTRUCTION COST ESTIMATE
CARTERET FERRY TERMINAL
BOROUGH OF CARTERET, MIDDLESEX COUNTY, NEW JERSEY**

Code	Description	Amount
000	General Conditions, Construction Mgmt, Insurance,	\$ 4,069,000
005	Temporary Requirements	\$ 1,073,200
010	Sitework	\$ 2,294,600
020	Foundations	\$ 2,669,100
030	Superstructure	\$ 4,918,900
040	Exterior Closure	\$ 9,932,900
050	Roofing	\$ 1,289,100
060	Interior Closure	\$ 1,930,100
061	Interior Finishes	\$ 996,000
062	Interior Specialties	\$ 208,200
070	Vertical Transportation	\$ 1,180,500
080	Plumbing	\$ 1,051,300
081	H.V.A.C.	\$ 1,331,300
082	Fire Protection	\$ 530,800
083	Building Controls	\$ 380,300
090	Electrical	\$ 3,556,000
111	Equipment - Building	\$ 235,400
112	Furnishings	\$ 102,600
113	Special Construction Allowances	\$ 1,546,500
113	Construction Consultant Services, Commissioning, 3rd Party Testing	\$ 2,740,300
TOTAL (LUMP SUM):		\$ 42,036,100



12/17/24

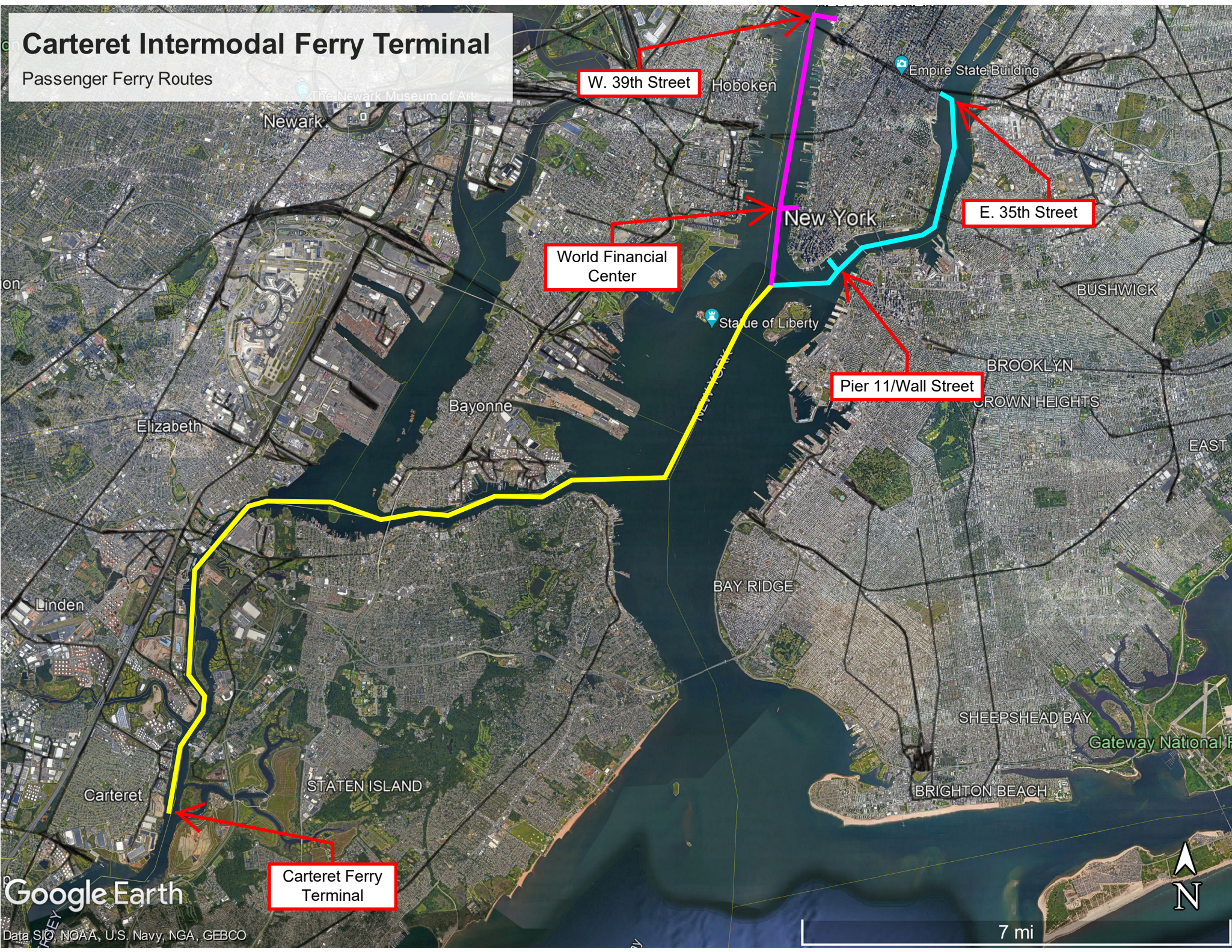
Trevor J. Taylor, PE, PP, CME
NJ License No. 44578

APPENDIX C

FERRY ROUTE MAP

Carteret Intermodal Ferry Terminal

Passenger Ferry Routes



Google Earth

Data SIO, NOAA, U.S. Navy, NGA, GEBCO

Carteret Ferry Terminal

7 mi



APPENDIX D

OVERALL WATERFRONT CONCEPT PLAN

