BENEFITS ANALYSIS

1.0 INTRODUCTION AND SUMMARY

1.1 Background

The Joseph G. Minish Passaic River Waterfront Park and Historic Area project (Minish Park) is located in the lower valley of the Passaic River, in the City of Newark, New Jersey. The project encompasses approximately two miles of the western bank, extending from Bridge Street and McCarter Highway in the north to Raymond Boulevard and Brill Street in the south.

The project will provide environmental and aesthetic improvements to the surrounding area, and will reduce erosion and provide for shore protection benefits.

The two major features of the project, the bank restoration (Phase I) and the recreational facilities (Phase II & Phase III), will cover approximately two miles of the Passaic River, and extend approximately 40 to 200 feet from the shoreline inland. The restoration of the stream bank from Jackson Street to Bridge Street will consist of construction of a new bulkhead in front of the existing deteriorating bulkhead. From Jackson Street south to Brill Street, the stream bank will be regraded and planted with vegetation to prevent soil erosion.

The other major feature of the project (Phase II) involves the creation of recreation facilities and landscaping including pedestrian walkways, soccer field, promenade, public marina, bicycle path, scenic overlooks, plazas, and seating for open air activities. Although the overall project includes this feature, this Hurricane Sandy Limited Reevaluation Report addresses Phase I only.

The economic justification of the Minish project is linked to the Passaic River Main Stem project (Section 301(b)(10) of the Water Resources Development Act (WRDA) of 1996). The most recent BCRs for the alternatives developed in the ongoing Passaic River Main Stem General Reevaluation Report (GRR) were calculated in 2013 to be between 1.1 and 1.3 for three alternatives, including the authorized plan, confirming findings in the 1995 General Design Memorandum and 1987 Feasibility Report that an overall project for the Passaic Main Stem remains economically justified.

1.2 Purpose and Scope of This Analysis

This analysis provides an update of the economic benefits from the Joseph G. Minish Passaic River Waterfront Park and Historic Area, Newark, New Jersey Design Memorandum May 1996. It also further confirms the vision behind and validity of the planning process, which involved extensive consultations with citizens, community organizations, and elected and appointed officials of Newark.

The Stream Bank Restoration Project, west bank of the Passaic River in Newark, New Jersey, was authorized under Section 101 (a) (18) (B) of the Water Resources

Development Act of 1990 (PL-101-640)(Figures H1-1 and H1-2). The legislation was contained within the language for the overall authorization of the Passaic River Mainstream Flood Protection Project. The authorization calls for:

"the construction of environmental and other streambank restoration measures (including bulkheads, recreation, greenbelt, and scenic overlook facilities) on the west bank of the Passaic River between Bridge and Jackson Streets .... "

Section 118 of the Water Resources Development Act (WRDA) of 1992 (PL 102-580) designated the Stream Bank Restoration Project name change to II Joseph G. Minish Passaic River Waterfront Park and Historic Area. All maps, regulations, documents, signs, records, or other papers pertaining to this project shall use the above name. For this document, the use of the word "Project" shall refer to the authorized name. WRDA 92 also extended the area and provisions of the Project. The extension covered the area beyond Jackson Street down to Brill Street. The purpose of this analysis is to provide economic information as well as benefit analysis relevant to the implementation of the Minish Park study area. The proposed project will be a section of restored stream bank that will include bulkheads, natural banks, environmental restoration, recreation, greenbelt and overlook facilities. The section of restored stream bank will run from Bridge to Brill streets in Newark. The study area includes the City of Newark, Essex County, New Jersey. The project area also lies within the City of Newark. The City of Newark is bounded by the Passaic River to the east, Belleville Township on the north, the Garden State Parkway on the west and Newark Airport on the south. A detailed analysis of project benefits will convey a comprehensive understanding of the nature of this project and the potential role it can play in the reconstruction and revitalization of downtown Newark. In this revitalization, a well-designed, aesthetically pleasing, mixed-use waterfront development organized around Minish Park will complement the other downtown facilities planned and under construction. In addition, the park will serve as a source of employment, recreation, and aesthetic benefits in its own right, as well as contributing to improving the water quality of the Passaic River. This benefit analysis provides an accounting of these various benefits, including:

• preservation of riverbank through erosion control
• recreational benefits
• job creation
• social benefits
• clean up of debris

1.3 Minish Park: Summary of Benefits

• *Shore Protection.* Protecting the shoreline from erosion damage will allow the continued use of shoreline adjacent property for the next 50 years. Equivalent annual benefits from shore protection are $62,000.

• *Reduced Debris Benefits.* Rehabilitation of existing bulkheads will reduce the need for debris removal. Creation of well-maintained recreation facilities will make the greenway area south of Jackson Street less likely to accumulate trash resulting in elimination of shore clean-up efforts. Equivalent annual benefits from reduced debris removal and trash pick-up are $10,200.

• *Recreation.* Creation of new recreation facilities will provide a variety of recreation opportunities, including boating, walking running, cycling, baseball, and soccer. The 1996 Design Memorandum analyzed recreation benefits for only two conditions, which correspond to the without-project condition and Phase III of this project. Phases I and II would also have some recreation benefits associated with them. Phase I, which would result in only replacement of bulkheads and stabilization of the riverbank, would provide some improved access to the Passaic River for sightseeing, fishing, and boating. Phase II would also add limited recreation benefits. These benefits would be associated with the construction of a walkway and park benches along the riverbank. Boating, open space/playground activities, and organized soccer/baseball activities would not be included. The total number of visitor days and the overall rating of the facilities would both be reduced under the Phase I and II conditions. Rather than attempt to reassemble the original panel of judges and reproduce the ratings they conducted, this analysis has assumed that the monetized value of the Phase I condition is approximately ten percent of Phase III. The monetary value of the benefits of these facilities, based on an estimate of the willingness to pay for comparable facilities, is $151,200 annually.

• *Hazardous Soils and Sediments.* Prevention of remediation of soils from contaminated sites is an additional benefit of the project. The project minimizes the extent of soil disturbance and isolates the contaminated soils. In addition, the cost of removing hazardous river sediment is also a benefit of the project. This would include the cost to remove and dispose of the material. The equivalent annual benefits from the avoidance of remediation and the direct removal of contaminated soils are $227,300

• *Job Creation.* The project will be a powerful engine for job creation throughout the period of construction and operation. Using the RECONS economic modeling program developed by the Institute for Water Resources (IWR), it is estimated that over 1,500 jobs will be created as result of project expenditures during construction.

• *Social and Community Benefits.* The project will serve as an "anchor" for other redevelopment projects, linking them physically and thereby allowing pedestrian circulation through a redeveloped downtown Newark. The project is unique in offering benefits to a variety of community organizations and groups, including office workers, concert goers, university students and faculty, and residents of the Ironbound community. The project will provide amenities to all of these groups, support the environmental education programs conducted by the Ironbound community organizations, and contribute significantly to the improving image of downtown Newark.

• *Historic Preservation.* The project will preserve the National Register of Historic Places eligible New Jersey Railroad & Transportation Company /Hudson & Manhattan Railway Passaic River Bridge abutment which will save mitigation costs to record the structure to the Historic American Engineering standards or alternate New Jersey standards. In addition, some remaining elements of the Morris Canal, a 19th-century transportation canal that connected to the Passaic River, are located within the project boundaries. These are already designated as historic structures. By preserving them within the project area, the project will avoid costs associated

with relocating and archiving the structures and associated artifacts. The equivalent annual benefit is $33,400.

This economic analysis will focus on the benefit evaluation from the Joseph G. Minish Passaic River Waterfront Park and Historic Area, Newark, New Jersey Design Memorandum May 1996. Tables 1 and 2 shows the benefit categories and the relative percentage that each category contributes to NED benefits and the combine NED and RED benefit total. The Erosion/Shore Protection benefits and the Regional Economic Benefits will undergo reevaluation. The other benefit categories contribute 0.3% to 6.1% of NED benefits and their combined total contributes approximately 12% of the NED benefits and therefore will be updated using appropriate indices as described below. Since the 1996 Design Memorandum included update factors for future year land values used in the Erosion/Shore Protection analysis, the prior land values will be used. The prior regional economic analysis used RIMS II from the Bureau of Economic Analysis. The current regional economic analysis will use the Corps certified Regional Model, RECONS. The base year for this project is 2016. The interest rate used for the cost benefit calculations is 3.375%.

Table 1 Summary of Methods Used to Update Benefits

Benefit Categories	1996 DM	% of NED Benefit	2015 LRR Update Source	Update Factor
National Economic Benefits				
Erosion/Shore Protection	$1,816,021	86.8%	Recalculate Erosion damages using current discount rate	NA
Building and Infrastructure	$28,857	1.4%	ENR Construction Cost Index	1.787
Debris Removal	$5,700	0.3%	ENR Construction Cost Index	1.787
Flood Protection	$0	0.0%	NA	NA
Recreation	$95,000	4.5%	Consumer Price Index	1.592
Remediation	$127,200	6.1%	ENR Construction Cost Index	1.787
Historic Preservation	$18,700	0.9%	ENR Construction Cost Index	1.787
Total National Economic Benefits	$2,091,500	NA	NA	NA
Regional Economic Benefits	$3,700,000	NA	RECONS model	NA
Environmental Restoration	output = 7.6	NA	NA	NA
Total Annual Benefits	$5,762,621	NA	NA	NA

Table 2 Comparisons of Benefits between 1996 DM and 2015 HSLRR

Benefit Categories	1996 DM FY96 PL	2015 HSLRR FY15 PL
National Economic Benefits		
Erosion/Shore Protection	$ 1,816,021	$ 62,000
Building and Infrastructure	$ 28,857	$ 51,600
Debris Removal	$ 5,700	$ 10,200
Flood Protection	NA	NA
Recreation	$ 95,000	$ 151,200
Remediation	$ 127,200	$ 227,300
Historic Preservation	$ 18,700	$ 33,400
Total National Economic Benefits	$ 2,091,500	$ 535,700
Regional Economic Benefits	$ 3,700,000	$ 5,763,100
Environmental Restoration	output = 7.6	NA
Total Annual Benefits	$ 5,762,621	$ 6,298,800

2.0 REDUCED EROSION AND LOSS OF PROPERTY

This section reexamines the project benefits from the prevention of erosion damage along the Passaic River. Presently, the riverfront is experiencing erosion from both bulkhead failure and natural shoreline retreat.

The project lies along 9,200 feet of the south and west bank of the Passaic River in downtown Newark, New Jersey. Highly developed as an urban city commercial environment, the riverbank is bulkheaded along portions of the project area with some public and private parking. This reach of the Passaic River is eroded, deteriorated, and environmentally degraded from past heavy commercial and industrial use and periodic river flooding. Currently, much of the riverfront is inaccessible and underutilized.

The most extensive bulkhead degradation is evident between Bridge Street and Jackson Street. Along this sub-reach of the project are a number of parking lots, fences, and brick walls that are in various states of failure. Often in conjunction with riverbank bulkhead failure are instances of headwall and discharge (stormwater) pipe failures. These were also visible in various locations along the project riverbank. In evaluating the bulkhead failure rate and riverbank erosion losses, the hydrologic and hydraulic response of the Passaic River watershed was reflected by the use of the 2, *5*, 10, 25, 50 and 100 year return period flowlines and velocities. Flooding and erosive forces generated by watershed events (large storms, hurricanes, storm surge, etc.) that create higher velocities, submergence depths, and river bank and bed erosion periodically exacerbate ongoing bulkhead failure activity. Once failure starts, the presence of higher velocities and flood depths increase the potential rate for bulkhead failure. Since these events are intense but generally short-lived, their impact is not easily identified from average annual bulkhead failure rates. Additional hydraulic forces and related activities that are known to add to bulkhead failure include:

- cyclical tidal activity that submerges and exposes sections of the bulkheads

- periodic flooding that can submerge all or portions the bulkhead for significant periods of time
- poor or clogged drainage systems behind bulkhead walls
- freeze/thaw cycles
- sub-surface piping erosion from leaks causing sediment and soil erosion around discharge pipes, head walls, and bulkheads leading to, or enlarging small to very significant failure sections
- boat induced wave action

After review of field work and analysis in conjunction with the field excursion, it is expected that approximately 4,280 ft of bulkhead will fail in the next 50 years. Of this total, 3,000 lineal feet would fail during the next 20 years while the remainder would fail during the following 30 years. Given an average bulkhead height of 10-12 feet and expected natural side slopes of about 2 - 2.5 feet horizontal to 1 foot vertical, up to 25 feet of horizontal measured property would be lost due to bulkhead failure and collapse over this period if the failed bulkhead sections are not replaced. If a project is not constructed to provide shoreline protection, a total of 130,000 square feet of waterfront property would be lost over the projected 50 year period.

A geographic information system (GIS) software package, ARC Info, was used to model the affects of sequentially failing the bulkheads. The bulkheads were failed such that those characterized as "poor" failed first. Those characterized as "unknown," "fair," "fair to good," and "good" were failed next, in that order. The bulkheads were also failed such that adjacent sections of bulkhead failed sequentially. The model failed the bulkheads at 5 ft per year until 25 ft of bulkhead had eroded. In addition, unprotected natural shorelines were eroded at such a rate as to match that of the adjacent failed bulkhead sections. Three categories of land values were utilized for the analysis[1]

- Parking $48/sq. ft.
- Commercial/Vacant $20/sq. ft.
- Parkland (green acres) $0.03/sq. ft.

It was also assumed that the land values would increase over time as shown in Table 3[2]

[1] Values are in 1994 dollars and are provided by the Corps of Engineers, Baltimore District, Real Estate Branch.
[2] Real estate inflation rates are provided by the Corps of Engineers, Baltimore District, Real Estate Branch.

Table 3 Land Inflation Rate

Year	Estimated Inflation Rate (%)
1995	1
1996	1
1997	1
1998	15
1999	1.5
2000	2
2001	2
2002	2.5
2003	2.5
2004	2.5
2005	3
2006-2026	3
2027-2066	0

As shown in Table 4, the equivalent annual benefit attributable to the prevention of erosion damage to property is $62,000.[3]

[3] The prior analysis (1996 DM) assumed land loss as a cumulative loss brought forth yearly. The current analysis treated the land loss as an incremental loss for each year. The net effect is a reduction in total land loss and benefits are reduced accordingly. Benefits are based on land erosion subsequent to the base year in the without-project condition.

Table 4 Land Erosion and Loss of Property Benefits

Year	Commercial area lost per year (sq ft.)	Greenway area lost per year (sq ft.)	Parking area lost per year (sq ft.)	Total area lost per year (sq ft.)	Commercial area lost cummulative (sq ft.)	Greenway area lost cummulative (sq ft.)	Parking area lost cummulative (sq ft.)	Total area lost cummulative (sq ft.)	Escalation	Commercial Property Value	Greenway Property Value	Parking Property Value	Present Value Factor	Commercial value lost per year (sq ft.)	Greenway value lost per year (sq ft.)	Parking value lost per year (sq ft.)	Property Value Lost per year	Present Value of Property Lost per year
1994	0	0	0	0	0	0	0	0	1.0%	$ 20.00	$ 0.03	$ 48.00						
1995	0	0	0	0	0	0	0	0	1.0%	$ 20.20	$ 0.03	$ 48.48	2.007826	$ -	$ -	$ -	$ -	
1996	0	0	0	0	0	0	0	0	1.0%	$ 20.40	$ 0.03	$ 48.96	1.942274	$ -	$ -	$ -	$ -	
1997	0	0	0	0	0	0	0	0	1.0%	$ 20.61	$ 0.03	$ 49.45	1.878862	$ -	$ -	$ -	$ -	$ -
1998	0	0	0	0	0	0	0	0	1.5%	$ 20.81	$ 0.03	$ 49.95	1.817521	$ -	$ -	$ -	$ -	$ -
1999	0	0	0	0	0	0	0	0	1.5%	$ 21.12	$ 0.03	$ 50.70	1.758182	$ -	$ -	$ -	$ -	$ -
2000	0	0	0	0	0	0	0	0	2.0%	$ 21.44	$ 0.03	$ 51.46	1.700781	$ -	$ -	$ -	$ -	$ -
2001	0	0	0	0	0	0	0	0	2.0%	$ 21.87	$ 0.03	$ 52.49	1.645254	$ -	$ -	$ -	$ -	$ -
2002	0	0	0	0	0	0	0	0	2.5%	$ 22.31	$ 0.03	$ 53.54	1.591539	$ -	$ -	$ -	$ -	$ -
2003	0	0	0	0	0	0	0	0	2.5%	$ 22.87	$ 0.03	$ 54.88	1.539578	$ -	$ -	$ -	$ -	$ -
2004	0	0	0	0	0	0	0	0	2.5%	$ 23.44	$ 0.04	$ 56.25	1.489314	$ -	$ -	$ -	$ -	$ -
2005	0	0	0	0	0	0	0	0	3.0%	$ 24.02	$ 0.04	$ 57.65	1.440691	$ -	$ -	$ -	$ -	$ -
2006	0	0	0	0	0	0	0	0	3.0%	$ 24.74	$ 0.04	$ 59.38	1.393655	$ -	$ -	$ -	$ -	$ -
2007	0	0	0	0	0	0	0	0	3.0%	$ 25.49	$ 0.04	$ 61.17	1.348155	$ -	$ -	$ -	$ -	$ -
2008	0	0	0	0	0	0	0	0	3.0%	$ 26.25	$ 0.04	$ 63.00	1.30414	$ -	$ -	$ -	$ -	$ -
2009	0	0	0	0	0	0	0	0	3.0%	$ 27.04	$ 0.04	$ 64.89	1.261562	$ -	$ -	$ -	$ -	$ -
2010	0	0	0	0	0	0	0	0	3.0%	$ 27.85	$ 0.04	$ 66.84	1.220375	$ -	$ -	$ -	$ -	$ -
2011	0	0	0	0	0	0	0	0	3.0%	$ 28.68	$ 0.04	$ 68.84	1.180532	$ -	$ -	$ -	$ -	$ -
2012	0	0	0	0	0	0	0	0	3.0%	$ 29.54	$ 0.04	$ 70.91	1.141989	$ -	$ -	$ -	$ -	$ -
2013	0	0	0	0	0	0	0	0	3.0%	$ 30.43	$ 0.05	$ 73.03	1.104706	$ -	$ -	$ -	$ -	$ -
2014	0	0	0	0	0	0	0	0	3.0%	$ 31.34	$ 0.05	$ 75.23	1.068639	$ -	$ -	$ -	$ -	$ -
2015	0	0	0	0	0	0	0	0	3.0%	$ 32.28	$ 0.05	$ 77.48	1.03375	$ -	$ -	$ -	$ -	$ -
2016	7775	117.82	0	7892.82	7775	117.82	0	7892.82	3.0%	$ 32.28	$ 0.05	$ 77.48	1	$ 251,011	$ 6	$ -	$ 251,016	$ 251,016
2017	3163	110.88	0	3273.88	10938	228.7	0	11166.7	0.0%	$ 32.28	$ 0.05	$ 77.48	0.967352	$ 102,115	$ 5	$ -	$ 102,121	$ 98,787
2018	2860.38	104.22	0	2964.6	13798.38	332.92	0	14131.3	0.0%	$ 32.28	$ 0.05	$ 77.48	0.93577	$ 92,345	$ 5	$ -	$ 92,350	$ 86,419
2019	2915	97.27	0	3012.27	16713.38	430.19	0	17143.57	0.0%	$ 32.28	$ 0.05	$ 77.48	0.905219	$ 94,109	$ 5	$ -	$ 94,114	$ 85,193
2020	3878	0	0	3878	20591.38	430.19	0	21021.57	0.0%	$ 32.28	$ 0.05	$ 77.48	0.875665	$ 125,199	$ -	$ -	$ 125,199	$ 109,632
2021	4005	157.96	0	4162.96	24596.38	588.15	0	25184.53	0.0%	$ 32.28	$ 0.05	$ 77.48	0.847076	$ 129,299	$ 8	$ -	$ 129,306	$ 109,532
2022	3561	656.65	0	4217.65	28157.38	1244.8	0	29402.18	0.0%	$ 32.28	$ 0.05	$ 77.48	0.819421	$ 114,964	$ 32	$ -	$ 114,996	$ 94,230
2023	3001	1165.74	0	4166.74	31158.38	2410.54	0	33568.92	0.0%	$ 32.28	$ 0.05	$ 77.48	0.792668	$ 96,885	$ 56	$ -	$ 96,942	$ 76,843
2024	2077	1720.38	0	3797.38	33235.38	4130.92	0	37366.3	0.0%	$ 32.28	$ 0.05	$ 77.48	0.766789	$ 67,055	$ 83	$ -	$ 67,138	$ 51,481
2025	1560	2279	0	3839	34795.38	6409.92	0	41205.3	0.0%	$ 32.28	$ 0.05	$ 77.48	0.741755	$ 50,364	$ 110	$ -	$ 50,474	$ 37,439
2026	0.68	2116	479.78	2596.46	34796.06	8525.92	479.78	43801.76	0.0%	$ 32.28	$ 0.05	$ 77.48	0.717538	$ 22	$ 102	$ 37,175	$ 37,299	$ 26,763
2027	0	1613	969.04	2582.04	34796.06	10138.92	1448.82	46383.8	0.0%	$ 32.28	$ 0.05	$ 77.48	0.694112	$ -	$ 78	$ 75,084	$ 75,162	$ 52,171
2028	0	1118	1463.91	2581.91	34796.06	11256.92	2912.73	48965.71	0.0%	$ 32.28	$ 0.05	$ 77.48	0.67145	$ -	$ 54	$ 113,427	$ 113,481	$ 76,197
2029	0	571	1967.73	2538.73	34796.06	11827.92	4880.46	51504.44	0.0%	$ 32.28	$ 0.05	$ 77.48	0.649528	$ -	$ 28	$ 152,464	$ 152,492	$ 99,048
2030	0	0	1968	1968	34796.06	11827.92	6848.46	53472.44	0.0%	$ 32.28	$ 0.05	$ 77.48	0.628323	$ -	$ -	$ 152,485	$ 152,485	$ 95,810
2031	0	0	1490	1490	34796.06	11827.92	8338.46	54962.44	0.0%	$ 32.28	$ 0.05	$ 77.48	0.607809	$ -	$ -	$ 115,449	$ 115,449	$ 70,171
2032	0	0	1000	1000	34796.06	11827.92	9338.46	55962.44	0.0%	$ 32.28	$ 0.05	$ 77.48	0.587965	$ -	$ -	$ 77,482	$ 77,482	$ 45,557
2033	0	0	505	505	34796.06	11827.92	9843.46	56467.44	0.0%	$ 32.28	$ 0.05	$ 77.48	0.568769	$ -	$ -	$ 39,129	$ 39,129	$ 22,255
2034	0	0	0	0	34796.06	11827.92	9843.46	56467.44	0.0%	$ 32.28	$ 0.05	$ 77.48	0.5502	$ -	$ -	$ -	$ -	$ -
2035	0	0	0	0	34796.06	11827.92	9843.46	56467.44	0.0%	$ 32.28	$ 0.05	$ 77.48	0.532237	$ -	$ -	$ -	$ -	$ -
2036	0	0	0	0	34796.06	11827.92	9843.46	56467.44	0.0%	$ 32.28	$ 0.05	$ 77.48	0.51486	$ -	$ -	$ -	$ -	$ -
2037	0	0	0	0	34796.06	11827.92	9843.46	56467.44	0.0%	$ 32.28	$ 0.05	$ 77.48	0.498051	$ -	$ -	$ -	$ -	$ -
2038	0	0	0	0	34796.06	11827.92	9843.46	56467.44	0.0%	$ 32.28	$ 0.05	$ 77.48	0.481791	$ -	$ -	$ -	$ -	$ -
2039	0	0	0	0	34796.06	11827.92	9843.46	56467.44	0.0%	$ 32.28	$ 0.05	$ 77.48	0.466061	$ -	$ -	$ -	$ -	$ -
2040	0	0	0	0	34796.06	11827.92	9843.46	56467.44	0.0%	$ 32.28	$ 0.05	$ 77.48	0.450845	$ -	$ -	$ -	$ -	$ -
2041	0	0	0	0	34796.06	11827.92	9843.46	56467.44	0.0%	$ 32.28	$ 0.05	$ 77.48	0.436126	$ -	$ -	$ -	$ -	$ -
2042	0	0	0	0	34796.06	11827.92	9843.46	56467.44	0.0%	$ 32.28	$ 0.05	$ 77.48	0.421887	$ -	$ -	$ -	$ -	$ -
2043	0	0	0	0	34796.06	11827.92	9843.46	56467.44	0.0%	$ 32.28	$ 0.05	$ 77.48	0.408113	$ -	$ -	$ -	$ -	$ -
2044	0	0	0	0	34796.06	11827.92	9843.46	56467.44	0.0%	$ 32.28	$ 0.05	$ 77.48	0.394789	$ -	$ -	$ -	$ -	$ -
2045	0	0	0	0	34796.06	11827.92	9843.46	56467.44	0.0%	$ 32.28	$ 0.05	$ 77.48	0.3819	$ -	$ -	$ -	$ -	$ -
2046	0	0	0	0	34796.06	11827.92	9843.46	56467.44	0.0%	$ 32.28	$ 0.05	$ 77.48	0.369432	$ -	$ -	$ -	$ -	$ -
2047	0	0	0	0	34796.06	11827.92	9843.46	56467.44	0.0%	$ 32.28	$ 0.05	$ 77.48	0.357371	$ -	$ -	$ -	$ -	$ -
2048	0	0	0	0	34796.06	11827.92	9843.46	56467.44	0.0%	$ 32.28	$ 0.05	$ 77.48	0.345703	$ -	$ -	$ -	$ -	$ -
2049	0	0	0	0	34796.06	11827.92	9843.46	56467.44	0.0%	$ 32.28	$ 0.05	$ 77.48	0.334417	$ -	$ -	$ -	$ -	$ -
2050	0	0	0	0	34796.06	11827.92	9843.46	56467.44	0.0%	$ 32.28	$ 0.05	$ 77.48	0.323498	$ -	$ -	$ -	$ -	$ -
2051	0	0	0	0	34796.06	11827.92	9843.46	56467.44	0.0%	$ 32.28	$ 0.05	$ 77.48	0.312937	$ -	$ -	$ -	$ -	$ -
2052	0	0	0	0	34796.06	11827.92	9843.46	56467.44	0.0%	$ 32.28	$ 0.05	$ 77.48	0.30272	$ -	$ -	$ -	$ -	$ -
2053	0	0	0	0	34796.06	11827.92	9843.46	56467.44	0.0%	$ 32.28	$ 0.05	$ 77.48	0.292837	$ -	$ -	$ -	$ -	$ -
2054	0	0	0	0	34796.06	11827.92	9843.46	56467.44	0.0%	$ 32.28	$ 0.05	$ 77.48	0.283276	$ -	$ -	$ -	$ -	$ -
2055	0	0	0	0	34796.06	11827.92	9843.46	56467.44	0.0%	$ 32.28	$ 0.05	$ 77.48	0.274028	$ -	$ -	$ -	$ -	$ -
2056	0	0	0	0	34796.06	11827.92	9843.46	56467.44	0.0%	$ 32.28	$ 0.05	$ 77.48	0.265081	$ -	$ -	$ -	$ -	$ -
2057	0	0	0	0	34796.06	11827.92	9843.46	56467.44	0.0%	$ 32.28	$ 0.05	$ 77.48	0.256427	$ -	$ -	$ -	$ -	$ -
2058	0	0	0	0	34796.06	11827.92	9843.46	56467.44	0.0%	$ 32.28	$ 0.05	$ 77.48	0.248055	$ -	$ -	$ -	$ -	$ -
2059	0	0	0	0	34796.06	11827.92	9843.46	56467.44	0.0%	$ 32.28	$ 0.05	$ 77.48	0.239957	$ -	$ -	$ -	$ -	$ -
2060	0	0	0	0	34796.06	11827.92	9843.46	56467.44	0.0%	$ 32.28	$ 0.05	$ 77.48	0.232122	$ -	$ -	$ -	$ -	$ -
2061	0	0	0	0	34796.06	11827.92	9843.46	56467.44	0.0%	$ 32.28	$ 0.05	$ 77.48	0.224544	$ -	$ -	$ -	$ -	$ -
2062	0	0	0	0	34796.06	11827.92	9843.46	56467.44	0.0%	$ 32.28	$ 0.05	$ 77.48	0.217213	$ -	$ -	$ -	$ -	$ -
2063	0	0	0	0	34796.06	11827.92	9843.46	56467.44	0.0%	$ 32.28	$ 0.05	$ 77.48	0.210121	$ -	$ -	$ -	$ -	$ -
2064	0	0	0	0	34796.06	11827.92	9843.46	56467.44	0.0%	$ 32.28	$ 0.05	$ 77.48	0.203261	$ -	$ -	$ -	$ -	$ -
2065	0	0	0	0	34796.06	11827.92	9843.46	56467.44	0.0%	$ 32.28	$ 0.05	$ 77.48	0.196625	$ -	$ -	$ -	$ -	$ -
2066	0	0	0	0	34796.06	11827.92	9843.46	56467.44	0.0%	$ 32.28	$ 0.05	$ 77.48	0.190206	$ -	$ -	$ -	$ -	$ -
															Total Discounted Property Value			$ 1,488,544
															Amortization Factor			0.041677
															Equivalent Annual Benefit			$ 62,038

3.0 REGIONAL ECONOMIC DEVELOPMENT BENEFITS

Among the benefits of the project will be expanded economic output and income (measured in terms of change in Gross Regional Product, or GRP), employment (measured in terms of number of jobs), and consequent tax collection. This total effect can be separated into a set of direct effects on GRP of the initial injection of government spending and an indirect, or multiplier, effect. The size of the GRP and employment effects will be estimated using the certified Corps' RECONS (Regional Economics System) model. The effects on tax collections will be undertaken separately because RECONS does not include such an estimate.

These same effects were estimated in the 1996 report, but using a different model, specifically RIMS II from the Bureau of Economic Analysis. Both of these models use an input – output approach and both generate estimates of change in the level of employment and the expenditure multipliers at the local, regional, and notional levels of analysis. Comparing the results of the RIMS II analysis, which was prospective, with those of the RECONS analysis, which was partly retrospective and partly prospective, reveals that the latter estimates are somewhat lower in terms of both the total employment effect and the value of the expenditure multipliers.

Both the RECONS and the RIMS models have as inputs the expenditures to be made in connection with the implementation and operations and maintenance of the project. In this case, such expenditures began in FY 1997 and are scheduled to continue into FY 2016, as set out in Table 5.

Table 5 Expenditure by FY

FY	Nominal Expenditure by FY
1997	$331,157
1998	$594,915
1999	$289,160
2000	$2,518,295
2001	$245,418
2002	$3,345,811
2003	$3,069,964
2004	$578,686
2005	$1,983,703
2006	$5,155,069
2007	$352,365
2008	$2,721,807
2009	$2,421,435
2010	$4,101,402
2011	$270,386
2012	$137,523
2013	$99,599
2014	$639,068
2015	$13,584,000
2016	$38,879,000

On the advice of the RECONS subject matter expert (Ms. Dena Abou-El Seoud of Chicago District), each of these yearly expenditures were converted to their FY '15 equivalents using the September 2014 version of EM 1110-2-1304 (Civil Works Construction Cost Index System (CWCCIS)), lines 10 and 16 as appropriate according to the purpose of the expenditure, and then used as the input into the RECONS model, one by one, setting the model as if all the expenditures occurred in FY '15. Table 6 below adds the FY '15 equivalent expenditures to from Table 5 above.

Table 6 Expenditures in FY'15 Price Level[4]

FY	Nominal Expenditure by FY	Nominal Expenditure in FY '15 Price Level
1997	$331,157	$541,036.85
1998	$594,915	$951,453.76
1999	$289,160	$453,283.92
2000	$2,518,295	$3,895,082.27
2001	$245,418	$374,749.19
2002	$3,345,811	$4,966,152.61
2003	$3,069,964	$4,445,589.16
2004	$578,686	$809,810.12
2005	$1,983,703	$2,641,900.73
2006	$5,155,069	$6,565,553.78
2007	$352,365	$434,173.39
2008	$2,721,807	$3,246,432.09
2009	$2,421,435	$2,789,503.86
2010	$4,101,402	$4,657,796.48
2011	$270,386	$297,295.03
2012	$137,523	$146,631.56
2013	$99,599	$103,186.50
2014	$639,068	$648,462.84
2015	$13,584,000	$13,584,000
2016	$38,879,000	$38,879,000

Putting the past, current, and future expenditures, all in FY '15 price level per CWCCIS, give the results in Table 7 below:

[4] The reader is cautioned that carrying these calculations to the level of two decimal places implies a degree of precision that is unwarranted. All results will be rounded to the nearest hundreds in the final tables.

Table 7 RECONS Regional Economic Benefits Summary[5]

Year	Nominal Expenditure in FY '15 Price Level	Total GRP Resulting from those Expenditures FY'15 PL	Total Labor Income Resulting from those Expenditures FY'15 PL	Total Jobs Resulting from those Expenditures
1997	$541,036.85	$828,326	$524,081	9.5
1998	$951,453.76	$1,456,675	$921,636	16.89
1999	$453,283.92	$693,976	$439,078	8.04
2000	$3,895,082.27	$5,963,371	$3,773,015	69.13
2001	$374,749.19	$573,741	$363,005	6.65
2002	$4,966,152.61	$7,603,179	$4,810,519	88.14
2003	$4,445,589.16	$6,806,197	$4,306,270	78.9
2004	$809,810.12	$1,239,819	$784,432	14.37
2005	$2,641,900.73	$4,044,749	$2,559,106	46.89
2006	$6,565,553.78	$10,051,862	$6,359,795	116.52
2007	$434,173.39	$664,719	$420,567	7.71
2008	$3,246,432.09	$4,970,288	$3,144,693	57.62
2009	$2,789,503.86	$4,208,857	$2,662,937	48.79
2010	$4,657,796.48	$7,027,773	$4,446,460	81.47
2011	$297,295.03	$448,563	$283,805	5.2
2012	$146,631.56	$224,492	$142,036	2.6
2013	$103,186.50	$157,978	$99,952	1.83
2014	$648,462.84	$992,795	$628,140	11.51
2015	$13,584,000	$20,797,105	$13,158,294	241.08
2016	$38,879,000	$59,523,753	$37,660,579	690.01
Totals	$90,431,094.14	$138,278,218	$87,488,400	1,603
Equivalent Annual Regional Benefits		$5,763,057		

[5] Equivalent annual benefits are calculated using an interest rate of 3.375% and a 50-year period of analysis, $138,278,218 x 0.04167726 = $5,763,057.

GRP refers to Gross Regional Product. The parallel totals from the earlier RIMS II, stated in FY '15 price level using the Implicit GDP Deflator estimated by the Bureau of Economic Analysis[6] are shown in Table 8 below:

Table 8 RIMS II Regional Economic Development Benefits Summary

Total GRP Resulting from those Expenditures	Total Labor Income Resulting from those Expenditures	Total Jobs Resulting from those Expenditures
$376,780,000	*$118,530,000*	*4,385*

The RIMS II estimates of the total effects of project expenditures are notably higher than the RECONS estimates, especially in terms of Total GRP and Total Jobs. Nevertheless, even the RECONS estimates suggest that the positive macroeconomic effects of project expenditures have been and will be substantial.

The Total GRP change is, of course, just a subset of the change in GDP (Gross Domestic Product). GDP is an income concept and the bulk of federal tax collections today are based on current income. In FY '13, the latest year for which data is available as of this writing, federal tax collections from New Jersey taxpayers totaled $128,051,899,000 and New Jersey GRP totaled $543,071,000,000.[7] The resulting ratio between federal tax collections and New Jersey GRP is 0.236. Applying this ratio to the total effect of Minish Park expenditures on New Jersey GRP over the 1997 through 2016 period gives an estimate of federal tax collections resulting from the Minish Park project of $32,633,659 (*i.e.*, 0.236 x $138,278,218).

One of the features of the RECONS model is that it permits separating the effect of project expenditures on the GRP of the state in which the project is located from the total effect on GRP experienced by the nation as a whole. By using the change in GRP occurring in New Jersey and the relationship between income derived from in-state sources and New Jersey income tax collections,[8] we can perform a calculation parallel to the one described in the previous paragraph, but this time to estimate New Jersey state income tax collections. In FY '13, New Jersey state income tax collections totaled $14,500,000,000 on GRP of $543,071,000,000, for an income tax revenue to GRP ratio of 0.027. Applying that ratio to the total effect of Minish Park expenditures on New Jersey GRP over the 1997 through 2016 period gives an estimate of New Jersey income tax collections resulting from the Minish Park project of $3,733,512 (*i.e.*, 0.027 x $138,278,218). Because local tax collections are dominated by property taxes, which do not systematically vary with income, it is not possible to estimate the effect on project expenditures on local tax collections plausibly.

4.0 PROJECT COSTS AND BENEFITS SUMMARY

This benefits analysis includes both National Economic Development Benefits and Regional Economic Development benefits. The range of categories presented were developed to allow the Administration, Congress, the State of New Jersey, and the City of Newark to provide a basis for decision making since this provides national and regional, and local social benefits. Project costs

[6] Source: https://research.stlouisfed.org/fred2/data/GDPDEF.txt
[7] Source: U.S. Dept. of Labor, http://lwd.dol.state.nj.us/labor/lpa/industry/gsp/gsp_index.html
[8] Source: http://www.usgovernmentrevenue.com/revenue_chart_2002_2019NJr_15c1li111mcn_10c#tabbed

for past expenditures and future expenditures were brought to FY'15 price level for cost benefit analysis. It is assumed that the project will be completed in FY 2016. Table 9 shows the project cost and interest during construction. Table 10 summarizes the equivalent annual project costs. Table 11 shows the Cost –Benefit summary.

Table 9 Project Cost and Interest during Construction

FY	Nominal Expenditure by FY	Nominal Expenditure (FY15 P.L.)	IDC (3.375% discount rate)
1997	$331,157	$541,036.85	$ 475,497
1998	$594,915	$951,453.76	$ 777,833
1999	$289,160	$453,283.92	$ 343,672
2000	$2,518,295	$3,895,082.27	$ 2,729,599
2001	$245,418	$374,749.19	$ 241,808
2002	$3,345,811	$4,966,152.61	$ 2,937,674
2003	$3,069,964	$4,445,589.16	$ 2,398,744
2004	$578,686	$809,810.12	$ 396,251
2005	$1,983,703	$2,641,900.73	$ 1,164,261
2006	$5,155,069	$6,565,553.78	$ 2,584,562
2007	$352,365	$434,173.39	$ 151,159
2008	$2,721,807	$3,246,432.09	$ 987,370
2009	$2,421,435	$2,789,503.86	$ 729,629
2010	$4,101,402	$4,657,796.48	$ 1,026,460
2011	$270,386	$297,295.03	$ 53,671
2012	$137,523	$146,631.56	$ 20,820
2013	$99,599	$103,186.50	$ 10,804
2014	$639,068	$648,462.84	$ 44,510
2015	$13,584,000	$13,584,000	$ 458,460
2016	$38,879,000	$38,879,000	$ -
Totals		$ 90,431,094	$ 17,532,784

Table 10 Equivalent Annual Cost[9]

Total Project First Cost	$	90,431,100
Interest During Construction	$	17,532,800
Total Investment Cost	$	107,963,900
Equivalent Annual Cost	$	4,499,600
Annual O &M	$	452,200
Total Annual Cost	$	4,951,800

Table 11 Summary of Costs and Benefits

Benefit Categories	FY15 PL (3.375% discount rate)	
Erosion/Shore Protection	$	62,000
Building and Infrastructure	$	51,600
Debris Removal	$	10,200
Flood Protection	$	-
Recreation	$	151,200
Remediation	$	227,300
Historic Preservation	$	33,400
National Economic Benefits	$	535,700
Regional Economic Benefits	$	5,763,100
Total Benefits	$	6,298,800
Cost	$	4,951,800
Benefit/Cost Ratio		1.3
Benefit (NED Only)/Cost Ratio		0.1

[9] O&M costs were assumed to be 0.5% of total project first cost.