MEMORANDUM

To: Robby Stone, Public Services Director, City of High Point

Dorothy Darr, Southwest Renewal Foundation of High Point

From: Spencer Finch and Tom Natwick, Alta Planning + Design

Date: January 5, 2023

Re: Benefit-Cost Analysis Methodology Summary

High Point, NC – Building a Resilient Inner-City Southwest High Point Through Rehabilitation, Restoration + Enhancement Project

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Introduction – The FEMA BRIC Program

The Federal Emergency Management Agency's (FEMA's) Building Resilient Infrastructure and Communities (BRIC) program aims to categorically shift the federal focus away from reactive disaster spending and toward research-supported, proactive investment in community resilience. Examples of BRIC projects are ones that demonstrate innovative approaches to partnerships, such as shared funding mechanisms, and/or project design. The City of High Point, the Southwest Renewal Foundation of High Point (SWRF), and the Piedmont Triad Regional Council (PTRC) are collaborating to help secure funds for just such an innovative project in High Point, NC. These partners contacted Alta Planning + Design, Inc. (Alta) to ask for engineering assistance and grant support services, and for preparation of the Benefit-Cost Analysis (BCA) in anticipation of submitting a grant aplication to FEMA by the deadlines for the Fiscal Year 2022 grant cycle.

FEMA's BRIC program requires that the BCA meet cost-effectiveness requirements in compliance with OMB Circular A-94 using FEMA-approved BCA methods and tools. This memorandum documents the metohodlogy used in this BCA analysis, including a description of the current issues the City of High Point is facing, the proposed mitigation project, the BCA approach including pre-mitigation and post-mitigation losses, benefits to disadvantaged populations, and analysis results. This analysis also includes as an attachment a completed FEMA BCA Toolkit Version 6.0 spreadsheet that documents the calculations performed according to FEMA guidance.

Project Understanding

Project Location and Vision

The proposed project is located on the southwest side of downtown High Point, which is a focus for City and SWRF redevelopment efforts. This area of industrial and commercial vacancy is undergoing redevelopment, with parallel efforts to address the area's issues of flooding and outdated infrastructure which have a regional impact that goes beyond the city boundaries. Utlimately, the goal is to transform the neighborhood into a modern, resilient, inner-

city manufacturing/business park in southwest High Point where people can live, play, and work (a strategy and City priority first recommended by the 2007 High Point Core City Master Plan that was adopted by City Council).

Current Conditions to be Addressed

The Richland Creek watershed starts in this section of southwest High Point, and crosses the neighborhood, before meeting Depp Creek and leading into the Randleman Reservoir, which has the capacity to serve a third of the populations of Guilford and Randolph counties (which combined have a population of over 700,000). Over the past 10 years, based on sampling data on Richland Creek, stormwater runoff, sewer infiltration and exfiltration, and other nonpoint sources of pollution have contributed to impacts to the creek and to High Point's Eastside wastewater treatment plant (WWTP). Pollutants of concern include fecal coliform and turbidity. High turbidity is most likely caused by unmanaged stormwater runoff, soil erosion of streambanks and a lack of riparian (or vegetated) buffers; while the fecal coliform contamination is being continuously investigated, but is most likely the result of sewer exfiltration, leaks and overflows from very old piping and infrastructure.

Flooding is a frequent issue in the neighborhood and at the headwaters of the creek. As an example, in August 2019 heavy downpours overwhelmed the stormwater sewers that channel one of the headwaters of the creek, and created flash flooding along West Green Drive. Where the monthly average precipitation for High Point is around 4 inches, and daily rates are typically less than a quarter inch, the storms generated nearly an inch and a half over 36 hours—a concentrated surge over two days, but not overwhelming the monthly average. Yet, disruptions from flooding included shutting down the Salvation Army office located downtown at 301 W. Green Drive, displacing 34 women and children. The Salvation Army center was closed nearly four months for refurbishing, but reopened in time for Christmas 2019.

In summary, Richland Creek and its parallel sewer and stormwater infrastructure are not only outdated, but actively failing on a daily basis. Under stress by increasing frequency and intensity of storm events, the occasional acute flooding or drinking water source contamination event is becoming chronic.

Proposed Project

The project partners have proposed to use an innovative, nature-based approach that not only repairs existing infrastructure, but creates a multifaceted, integrated and synergistic approach to manage the sewer, stormwater, and drinking water issues facing High Point and the region. The project's three major components will be:

(1) *Rehabilitate Sewers*: 26,000 feet of aging wastewater (sewer) conveyance systems as it runs parallel to the Richland Creek will be rehabilitated. First, all lengths of pipe have to be cleaned; second, in order to determine the integrity of the piping, the systems will be inspected via TV investigation. Based on assessment of pipe integrity the third step will be to line the pipes with Cast in Place Pipe; based on need to access pipes additional repairs may be needed to the pavement system; construction attributes could also include need for additional safety features while process is occurring.

(2) *Restore Streambanks*: Stabilization, Enhancement and/or Restore up to 3,170 feet of the Richland Creek; this will incorporate up to approximately 7.41 acres, with 3.23 acres included for native Riparian Buffer establishment.

(3) *Build Green Stormwater Infrastructure* (GSI): Construct green stormwater control measures (SCMs) that will capture excessive run-off from the headwaters region of the Richland Creek watershed in the urban core of the southwest region of High Point. These SCMs will work in conjunction with the sewer conveyance repairs and the stream stabilization efforts listed above (as well as other planned adjacent projects) to greatly reduce the stormwater runoff loading into Richland Creek, thus mitigating the flood risks for the entire neighborhood and for downstream areas. The SCMs consist of three stormwater basins that capture runoff from the public rights-of-way of neighborhood streets. A larger SCM basin near the intersection of Oak Street and Russell Street will be approximately 63,000 sf; two smaller basins (approximately 27,500 sf and 8,500 sf in size) will collect runoff from Grimes Avenue. Utilizing a 10:1 loading ratio as a starting point, these basins would be able to manage up to approximately 22 acres of stormwater runoff from the city's street network.

Green Stormwater Infrastructure Strategy

Green Stormwater Infrastructure (GSI) consists of a toolbox of practices and techniques that replace traditional "grey infrastructure" such as improperly sized stormwater inlets and oversized underground stormwater sewers that might not address changing levels of stormwater impacts and provide no tangible benefit to the livability of the streets and neighborhoods above. GSI instead utilizes rain gardens, bioswales, tree protection, and permeable pavement, among other greener strategies – that reproduce a more natural drainage pattern and keep stormwater onsite instead of letting it be rapidly conveyed away (which used to be a goal of old-school grey stormwater systems) and possibly overwhelm other stormwater systems and communities further downstream. GSI practices protect groundwater supplies and stream health, create greener, more livable streets and neighborhoods, and can cost much less over time than managing stormwater with large detention basins and large underground pipes.

Project Benefits:

The project will result in multiple benefits:

- prevent flooding
- provide better storm water management, and improve water quality on Richland Creek (a water source used for drinking)
- increase the resiliency for not only the neighborhood (reduced flooding), but also for the region (improving the creek water quality and reducing impacts on a critical regonal drinking water source)
- improve the public realm + quality of life
- foster economic development
- reduce the urban heat island effect
- attract business to create jobs
- promote public health by encouraging walking and bicycling
- enhance the context of the SW Heritage Greenway
- leverage the $19.8M USDOT RAISE grant secured by the City last year, thus extending positive benefits to even more neighborhoods

- expand equity in a disadvantaged Qualified Census Tract (QCT 143)

Lifelines – The primary FEMA Community Lifelines that will be benefited with this project include Transportation; Food, Water and Shelter; Safety and Security; and Hazardous Materials, as follows:

● Transportation - the project will mitigate current constant flooding conditions on and near major arterials and emergency routes in High Point (including W. Green Drive / SR 1300, Grimes Avenue, Taylor Avenue, and Vail Avenue)

● Food, Water, and Shelter - the project will protect the headwaters of the Richland Creek, and reduce pollutant loads onto the Randleman Reservoir, which provides drinking water to thousands in Guilford and Randolph counties

● Safety and Security - the project will mitigate flooding which most recently impacted the Salvation Army facilities in town in 2019, which displaced nearly three dozen families that had been sheltering there.

● Hazardous Materials - finally, the project will reduce non-point source pollutants and provide redundancy for flooding and accidental hazardous materials spills, by providing an additional layer of filtration and infiltration before contaminants could reach the watershed.

FEMA-BRIC Benefit-Cost Analysis Parameters

The FEMA Benefit-Cost Calculator v6.0

FEMA developed the BCA Toolkit to perform an analysis of cost-effectiveness to include in an application submitted to its pre-disaster and post-disaster mitigation grant programs. The BCA Toolkit uses Office of Management and Budget cost-effectiveness guidelines and FEMA-approved methodologies and tools to complete a benefit-cost analysis. This BCA Analysis was conducted using the Benefit-Cost Calculator v6.0 Excel spreadsheet tool (BCA Calculator), and the guidance from the BCA Toolkit and FEMA's Final BCA Reference Guide, June 2009.

As described above, the project contains three different components to synergistically address the flooding, stream water quality, and drinking water supply issues for Southwest High Point. Accordingly, the BCA Calculator was used to model the potential benefits of each of these elements individually, focusing on the primary benefit of each even though each element would also secondary benefits and potential synergistic effects for which could not be accounted. The primary benefits for each element were as follows:

1. Sewer Repairs – Drainage improvements
2. Streambank Restoration – Floodplain and Stream Restoration
3. GSI Basin Construction – Bioretention

The FEMA Benefit-Cost Calculator v6.0 Parameters Used

The parameters used in the calculations for each of these project elements are summarized and further discussed, where needed, below:

1. Sewer Repairs

- Property Structure Type – Utilities
- Hazard Type – Riverine Flood – this is the most pressing issue, and thus was used as the parameter for all analyses
- Mitigation Action Type – Drainage Improvement. Sewer repairs will reduce the both the quantity of runoff and the infiltration and overflows that create flooding conditions at low points along the project area.
- Project Useful Life – 50 years, as is the standard in the FEMA BCA guidance for utility infrastructure
- Annual Maintenance Costs – provided by the High Point Department of Public Works, estimated to be an average of $2,000/year, and to include periodic cleaning and episodic replacement of minor components.
- Year Property was Built – Sewer lines that will be repaired in the project area vary in age from 1908 to more recent segments installed in the 1960s and 1970s. Many of the lines were installed in the 1920s, and specifically in 1924, so that was the year selected for the analysis.
- Utility Properties:
    - Type of service – the major utility service impacted is that of sewer services
    - Number of Customers Served – the High Point Department of Public Works, which manages the local sewer service, provided an estimate of 500 accounts affected in the service area covered by the project's sewer shed. To arrive at the total number of customers served, we multiplied that number by the average number of people per household in Highpoint (2.53), thus arriving at 1,256 customers.
    - Value of Unit of Service – the default value was used
- Historical Damages Before Mitigation – two sets of damages are included in this section. The first one is based on the damages to the Salvation Army facility in 2019 (mentioned above); the second is based on the High Point Department of Public Works (DPW) recent experience with annual maintenance / post-minor flood repairs along the project area. They are:
    - Major Flooding Event – latest event in 2019
        - Recurrence Interval – though typically this would be expected to be a 50- or 100-year event, major flooding events have recurred with much more regular frequency. An interval of 20 years was selected.
        - Wastewater Service Impact – the DPW recorded a service impact of one week (7 days)
        - Additional Damages:

- The equipment replacement and supplies cost for the Salvation Army was estimated to have been at least $25,000.
- Replacement Rent and Transportation Costs were calculated for the 34 individuals who were displaced for nearly four months post-flood, as follows:
    - 34 individuals divided by 2.53 individuals per household (average household size in High Point) = approximately 14 rooms needed
    - 14 rooms multiplied by 90 days = 1,260 room-days
    - 1,260 room days multiplied by $50 dollars per room = $63,000
- Additional volunteer work was needed for repairs, estimated at 10 volunteers for 5 days

- Minor Flooding Event
    - Recurrence Interval – the High Point DPW stated that this is currently at least an annual recurring event. Thus we used an interval of one year.
    - Wastewater Service Impact – the DPW recorded a service impact of 2 days for minor events
    - Additional Damages:
        - The equipment replacement and supplies cost for minor flooding was estimated to be at least $1,000.
        - Additional volunteer work was needed for repairs, estimated at 3 volunteers for 3 days

- Historical Damages Post-Mitigation
    - It was assumed that no major flooding events would recur within the project life, and that minor flooding event frequency would decrease from annually to every 10 years.
- Standard Benefits – Ecosystem Services – the total project area was conservatively estimated to be 2 acres, even though the sewershed is much larger. The percentages of land use were also conservatively estimated at 80% Urban Green Space and 20% Riparian for sewer locations closer to the stream.

2. Streambank Restoration

- Property Structure Type – Other
- Hazard Type – Riverine Flood – this is the most pressing issue, and thus was used as the parameter for all analyses

- Mitigation Action Type – Floodplain and Stream Restoration
- Project Useful Life – 30 years for a natural infrastructure system, conservatively less than the typical 50 years that is the standard in the FEMA BCA guidance for utility infrastructure
- Annual Maintenance Costs – provided by the High Point Department of Public Works, estimated to be an average of $2,000/year, and to include regular waste collection and episodic replacement of vegetation and eroded sections.
- Year Property was Built – Same parameters as used for sewer lines.
- Historical Damages Before Mitigation – two sets of damages are included in this section, same as the parameters for the sewer lines.
- Historical Damages Post-Mitigation
    - It was assumed that no major flooding events would recur within the project life, and that minor flooding event frequency would decrease from annually to every 10 years.
- Standard Benefits – Ecosystem Services – the total project area was calculated from conceptual design plans, at 3.23 acres. The drainage shed for the streambank is much larger. The percentage of land use will be 100% Riparian.

3. GSI Basin Construction

- Property Structure Type – Green Infrastructure
- Hazard Type – Riverine Flood – this is the most pressing issue, and thus was used as the parameter for all analyses
- Mitigation Action Type – Bioretention.
- Project Useful Life – 50 years, as is the standard in the FEMA BCA guidance for utility infrastructure
- Standard Benefits – Green Infrastructure – the total project area was calculated from the conceptual design plans, and totals 2.28 acres of basin bottoms. The proposed drainage shed is much larger – at a proposed 10:1 loading ration, the basins would be able to collect at least 22 acre-inches of stormwater runoff.

Analysis Results

The benefit-cost ratio for the project is listed in the table below, along the BCRs for each individual component. Costs provided in the determination of the BCR include maintenance costs over the project useful life of the mitigation project. The total project BCR is **2.97** which demonstrates that the mitigation project is a cost-effective solution. The BCA Report is provided in Appendix A and the BCA Excel Spreadsheet is attached to the project application.

Mitigation Element	Benefits	Costs	BCR (B/C)
1. Sewer Repairs (Drainage Improvement)	$ 7,250,784	$ 2,619,595	2.77
2. Streambank Restoration (Floodplain and Stream Restoration)	$ 9,294,161	$ 3,284,493	2.83
3. GSI Basin Construction (Bioretention)	$ 3,110,194	$ 710,301	4.38
TOTAL	**$ 19,655,139**	**$ 6,614,389**	**2.97**

Benefits to Disadvantaged Populations

The project area is located within US Census Tract 143 and connects to four other US Census Tracts - all of which meet the definition of an Area of Persistent Poverty, as defined by the federal 2021 Consolidated Appropriations Act. This 1.8 square mile census tract has a population of approximately 3,200 and is one of 12 Federal Low-Income Opportunity Zones in Guilford County.

The project area is also located entirely within Disadvantaged Areas as defined by the North Department of Environmental Quality (NCDEQ) Potentially Underserved Census Block groups.

Accordingly, the project will have particular benefits for these residents in the lower-income, inner-city Southwest High Point and downstream neighborhoods. This project would represent significant investments into neglected communities and help the state and the federal government meet the goals of increasing equity in low-income communities.

Resources

Finally, this planning and engineering analysis used the following resources and guidance in the processes listed above:

- FEMA BCA Reference Guide (June 2009)
- NC Stormwater Design Manual (2017, 2020)
- NCDEQ Stormwater Control Measure Credit Document (2017)
- Guilford County Watershed Protection/Stormwater Management Section guidance
- City of High Point Department of Public Services, Stormwater Division guidance
- EPA Green Infrastructure guidance
- FEMA Building Community Resilience with Nature-Based Solutions: A Guide for Local Communities (2021)
- ASCE Manual on Engineering Practice 87 – Design of Urban Stormwater Controls (2012)
- Southwest High Point Green Infrastructure Plan (2019)
- Richland Creek Action Plan (2021)
- Richland Creek Watershed Action Plan Story (2021)
- 2021 Richland Creek Companion Guide

ATTACHMENT A – BCA REPORT

FEMA Benefit-Cost Calculator

V.6.0 (Build 20230103.1822 | Release Notes)

Benefit-Cost Analysis

Project Name: Richland Creek Green Infrastructure, High Point, Guilford County, NC [Copied on 1/5/2023 @ 23:7:30]

				Using 7% Discount Rate			Using 3% Discount Rate (For FY22 BRIC and FMA only)		
Map Marker ▲	Mitigation Title	Property Type	Hazard	Benefits (B)	Costs (C)	BCR (B/C)	Benefits (B)	Costs (C)	BCR (B/C)
1	Bioretention @ 27260, High Point, North Carolina		Riverine Flood	$ 3,889,124	$ 2,381,015	1.63	$ 7,250,784	$ 2,619,595	2.77
2	Drainage Improvement @ 27260, High Point, North Carolina		DFA - Riverine Flood	$ 4,985,136	$ 3,260,634	1.53	$ 9,294,161	$ 3,284,493	2.83
3	Floodplain and Stream Restoration @ 27260, High Point, North Carolina		DFA - Riverine Flood	$ 1,969,064	$ 695,918	2.83	$ 3,110,194	$ 710,301	4.38
TOTAL (SELECTED)				**$ 10,843,324**	**$ 6,337,567**	**1.71**	**$ 19,655,139**	**$ 6,614,389**	**2.97**
TOTAL				**$ 10,843,324**	**$ 6,337,567**	**1.71**	**$ 19,655,139**	**$ 6,614,389**	**2.97**

Property Configuration

Property Title:	Bioretention @ 27260, High Point, North Carolina
Property Location:	27260, Guilford, North Carolina
Property Coordinates:	35.949841400000025, -80.00180999999998
Hazard Type:	Riverine Flood
Mitigation Action Type:	Bioretention
Property Type:	Green Infrastructure
Analysis Method Type:	Modeled Damages

Cost Estimation

Bioretention @ 27260, High Point, North Carolina

Project Useful Life (years):	50
Project Cost:	$2,105,000
Number of Maintenance Years:	50 Use Default:Yes
Annual Maintenance Cost:	$20,000

Standard Benefits - Green Infrastructure

Bioretention @ 27260, High Point, North Carolina

Total Project Area (acres):	2.28
Expected Annual Green Infrastructure Benefits:	$281,805

Benefits-Costs Summary

Bioretention @ 27260, High Point, North Carolina

Total Standard Mitigation Benefits:	$3,889,124
Total Social Benefits:	$0
Total Mitigation Project Benefits:	$3,889,124
Total Mitigation Project Cost:	$2,381,015
Benefit Cost Ratio - Standard:	1.63
Benefit Cost Ratio - Standard + Social:	1.63

Property Configuration

Property Title:	Drainage Improvement @ 27260, High Point, North Carolina
Property Location:	27260, Guilford, North Carolina
Property Coordinates:	35.949841400000025, -80.00180999999998
Hazard Type:	Riverine Flood
Mitigation Action Type:	Drainage Improvement
Property Type:	Utilities
Analysis Method Type:	Historical Damages

Cost Estimation

Drainage Improvement @ 27260, High Point, North Carolina

Project Useful Life (years):	50
Project Cost:	$3,233,033
Number of Maintenance Years:	50 Use Default:Yes
Annual Maintenance Cost:	$2,000

Damage Analysis Parameters - Damage Frequency Assessment

Drainage Improvement @ 27260, High Point, North Carolina

Year of Analysis was Conducted:	2023
Year Property was Built:	1924
Analysis Duration:	10 Use Default: *No*

Utilities Properties

Drainage Improvement @ 27260, High Point, North Carolina

Type of Service:	Wastewater
Number of Customers Served:	1,256
Value of Unit of Service ($/person/day):	$60 Use Default:Yes
Total Value of Service Per Day ($/day):	$75,360

Historical Damages Before Mitigation

Drainage Improvement @ 27260, High Point, North Carolina

		WASTEWATER	OPTIONAL DAMAGES			VOLUNTEER COSTS		TOTAL		
Damage Year	Recurrence Interval (years)	Impact (days)	Salvation Army Equipment and Supplies Replacement Cost ($)	Replacement Rent and Transportation Costs	Category 3 ($)	Number of Volunteers	Number of Days	Damages ($)	Current Dollars?	Inflated Damages ($)
2019	20	7	25,000	63,000	0	10	5	622,195	No	635,402
2000	1	2	1,000	0	0	3	3	153,159	No	154,276

Annualized Damages Before Mitigation

Drainage Improvement @ 27260, High Point, North Carolina

Annualized Recurrence Interval (years)	Damages and Losses ($)	Annualized Damages and Losses ($)
1	154,276	297,439
20	635,402	31,770
	Sum Damages and Losses ($)	Sum Annualized Damages and Losses ($)
	789,678	329,209

Expected Damages After Mitigation

Drainage Improvement @ 27260, High Point, North Carolina

	WASTEWATER	OPTIONAL DAMAGES			VOLUNTEER COSTS		TOTAL
Recurrence Interval (years)	Impact (days)	Salvation Army Equipment and Supplies Replacement Cost ($)	Replacement Rent and Transportation Costs	Category 3 ($)	Number of Volunteers	Number of Days	Damages ($)
10	1	1,000	0	0	2	3	77,319

Annualized Damages After Mitigation

Drainage Improvement @ 27260, High Point, North Carolina

Annualized Recurrence Interval (years)	Damages and Losses ($)	Annualized Damages and Losses ($)
10	77,319	7,732
	Sum Damages and Losses ($)	Sum Annualized Damages and Losses ($)
	77,319	7,732

Standard Benefits - Ecosystem Services

Drainage Improvement @ 27260, High Point, North Carolina

Total Project Area (acres):	2
Percentage of Urban Green Open Space:	80.00%
Percentage of Rural Green Open Space:	0.00%
Percentage of Riparian:	20.00%
Percentage of Coastal Wetlands:	0.00%
Percentage of Inland Wetlands:	0.00%
Percentage of Forests:	0.00%
Percentage of Coral Reefs:	0.00%
Percentage of Shellfish Reefs:	0.00%
Percentage of Beaches and Dunes:	0.00%
Expected Annual Ecosystem Services Benefits:	$39,745

Benefits-Costs Summary

Drainage Improvement @ 27260, High Point, North Carolina

Total Standard Mitigation Benefits:	$4,985,136
Total Social Benefits:	$0
Total Mitigation Project Benefits:	$4,985,136
Total Mitigation Project Cost:	$3,260,634
Benefit Cost Ratio - Standard:	1.53
Benefit Cost Ratio - Standard + Social:	1.53

Property Configuration

Property Title:	Floodplain and Stream Restoration @ 27260, High Point, North Carolina
Property Location:	27260, Guilford, North Carolina
Property Coordinates:	35.949841400000025, -80.00180999999998
Hazard Type:	Riverine Flood
Mitigation Action Type:	Floodplain and Stream Restoration
Property Type:	Other
Analysis Method Type:	Historical Damages

Cost Estimation

Floodplain and Stream Restoration @ 27260, High Point, North Carolina

Project Useful Life (years):	30
Project Cost:	$671,100
Number of Maintenance Years:	30 Use Default:Yes
Annual Maintenance Cost:	$2,000

Damage Analysis Parameters - Damage Frequency Assessment

Floodplain and Stream Restoration @ 27260, High Point, North Carolina

Year of Analysis was Conducted:	2023
Year Property was Built:	1924
Analysis Duration:	100 Use Default:Yes

Historical Damages Before Mitigation

Floodplain and Stream Restoration @ 27260, High Point, North Carolina

		OTHER	OPTIONAL DAMAGES			VOLUNTEER COSTS		TOTAL		
Damage Year	Recurrence Interval (years)	Damages ($)	Replacement Rent and Transportation Costs ($)	Category 2 ($)	Category 3 ($)	Number of Volunteers	Number of Days	Damages ($)	Current Dollars?	Inflated Damages ($)
2019	20	25,000	63,000	0	0	10	5	94,675	No	107,882
2000	1	4,800	0	0	0	3	3	6,239	No	11,604

Annualized Damages Before Mitigation

Floodplain and Stream Restoration @ 27260, High Point, North Carolina

Annualized Recurrence Interval (years)	Damages and Losses ($)	Annualized Damages and Losses ($)
1	11,604	33,613
20	107,882	5,394
	Sum Damages and Losses ($)	Sum Annualized Damages and Losses ($)
	119,486	39,007

Expected Damages After Mitigation

Floodplain and Stream Restoration @ 27260, High Point, North Carolina

	OTHER	OPTIONAL DAMAGES			VOLUNTEER COSTS		TOTAL
Recurrence Interval (years)	Damages ($)	Replacement Rent and Transportation Costs ($)	Category 2 ($)	Category 3 ($)	Number of Volunteers	Number of Days	Damages ($)
10	4,800	0	0	0	0	0	4,800

Annualized Damages After Mitigation

Floodplain and Stream Restoration @ 27260, High Point, North Carolina

Annualized Recurrence Interval (years)	Damages and Losses ($)	Annualized Damages and Losses ($)
10	4,800	480
	Sum Damages and Losses ($)	Sum Annualized Damages and Losses ($)
	4,800	480

Standard Benefits - Ecosystem Services

Floodplain and Stream Restoration @ 27260, High Point, North Carolina

Total Project Area (acres):	3.23
Percentage of Urban Green Open Space:	0.00%
Percentage of Rural Green Open Space:	0.00%
Percentage of Riparian:	100.00%
Percentage of Coastal Wetlands:	0.00%
Percentage of Inland Wetlands:	0.00%
Percentage of Forests:	0.00%
Percentage of Coral Reefs:	0.00%
Percentage of Shellfish Reefs:	0.00%
Percentage of Beaches and Dunes:	0.00%
Expected Annual Ecosystem Services Benefits:	$120,153

Benefits-Costs Summary

Floodplain and Stream Restoration @ 27260, High Point, North Carolina

Total Standard Mitigation Benefits:	$1,969,064
Total Social Benefits:	$0
Total Mitigation Project Benefits:	$1,969,064
Total Mitigation Project Cost:	$695,918
Benefit Cost Ratio - Standard:	2.83
Benefit Cost Ratio - Standard + Social:	2.83