Shrewsbury River Basin, Sea Bright, New Jersey Coastal Storm Risk Management Feasibility Study

Draft Integrated Feasibility Report & Environmental Assessment

Appendix B: Cost Engineering

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Introduction

This appendix presents the detailed cost estimate for the Shrewsbury River, Sea Bright, New Jersey Basin Costal Storm Risk Management Feasibility Study. The project was designed to manage and reduce the risk of flooding of structures in Sea Bright, New Jersey. The study area is generally low elevation and subject to coastal storm-induced flooding from the Shrewsbury River. After the review of several alternatives, as described in the Main Report, the most effective, cost effective solution was determined to be a nonstructural plan that consists of elevating thirty-seven homes and nonresidential structures in downtown Sea Bright. A detailed descripting of the plan is found in the main report and Appendix A (Engineering Appendix).

The material costs were based on a combination of MII database, RSMeans, and quotes, and were compared to historical pricing to ensure reasonableness. Equipment rates were obtained from 2014 Region I price level of the equipment manual, and Davis Bacon Wage Rates for Monmouth County, New Jersey were utilized for labor costs.

The fully funded project cost is $12,109,000 and is cost shared: 65 percent federally funded, 35 percent non-Federal. These costs include the initial first cost $11,140,687 for construction, including lands and damages, design, supervision and associated administration costs (Table B-1). In addition, the escalation to midpoint of construction is included (Table B-2). This midpoint was determined assuming a start date of March 2019 and using the construction schedule shown in Table B-3.

In addition to the start date, the construction schedule was created with other assumptions in mind. It was assumed that five homes would be worked on at once by one contractor with multiple crews working six days a week. A single home will take approximately eight weeks to accomplish with one group of about three to five overlapping with the next group by one month. Assuming work will not be done during the months of December, January, and February because of weather and the potential for existing disconnected plumbing to freeze; the overall duration will be 18 months with a completion date in Nov 2020.

The contingencies were developed using an Abbreviated Risk Analysis program (ARA). The summary of the results of this risk analysis can be viewed in Table B-4.

Table B-1: First Cost

Shrewsbury River Basin Coastal Storm Risk Management Feasibility First Cost
Sea Bright, NJ
OCT 2015 Price Level

Feat. Acct.	Description	Qty	UoM	Contract Cost	Contingency %	Cont $$	Total Cost
	11 FLOODWALLS	1	LS	$ 845,484	44%	$ 368,933	$ 1,214,416
	19 BUILDINGS, GROUNDS, AND UTILITIES	1	LS	$ 5,293,374	44%	$ 2,309,800	$ 7,603,174
	CONSTRUCTION ESTIMATE TOTALS:	1	LS	$ 6,138,858	44%	$ 2,678,732	$ 8,817,590
	01 LANDS AND DAMAGES	1	LS	$ 440,900	20%	$ 88,180	$ 529,080
	30 PLANNING, ENGINEERING, AND DESIGN	1	LS	$ 920,000	29%	$ 264,408	$ 1,184,408
	31 CONSTRUCTION MANAGEMENT	1	LS	$ 490,000	24%	$ 119,609	$ 609,609
	TOTAL FIRST COST			$ 7,989,758		$ 3,150,929	$ 11,140,687

Table B-2: Total Project Cost Summary

PROJECT: Shrewsbury River Basin
PROJECT NO:
LOCATION: Sea Bright, NJ

DISTRICT: New York District **PREPARED: 7/6/2016**
POC: CHIEF, COST ENGINEERING, Mukesh Kumar

This Estimate reflects the scope and schedule in report; Shrewsbury River Basin Draft Feasibility Study 2016

Civil Works Work Breakdown Structure		ESTIMATED COST				PROJECT FIRST COST (Constant Dollar Basis)						TOTAL PROJECT COST (FULLY FUNDED)			
						Program Year (Budget EC): 2016 Effective Price Level Date: 1 OCT 15									
WBS NUMBER A	Civil Works Feature & Sub-Feature Description B	COST ($K) C	CNTG ($K) D	CNTG (%) E	TOTAL ($K) F	ESC (%) G	COST ($K) H	CNTG ($K) I	TOTAL ($K) J	Spent Thru: 10/1/2015 ($K)	TOTAL FIRST COST ($K) K	INFLATED (%) L	COST ($K) M	CNTG ($K) N	FULL ($K) O
19	BUILDINGS, GROUNDS & UTILITIES	$5,293	$2,310	43.6%	$7,603	0.0%	$5,293	$2,310	$7,603	$0	$7,603	8.4%	$5,735	$2,503	$8,238
11	LEVEES & FLOODWALLS Ringwalls	$845	$369	43.6%	$1,214	0.0%	$845	$369	$1,214	$0	$1,214	8.4%	$916	$400	$1,316
	CONSTRUCTION ESTIMATE TOTALS:	$6,139	$2,679	43.6%	$8,818	0.0%	$6,139	$2,679	$8,818	$0	$8,818	8.4%	$6,652	$2,902	$9,554
01	LANDS AND DAMAGES	$441	$88	20.0%	$529	0.0%	$441	$88	$529	$0	$529	6.2%	$468	$94	$562
30	PLANNING, ENGINEERING & DESIGN	$920	$264	28.7%	$1,184	0.0%	$920	$264	$1,184	$0	$1,184	12.4%	$1,034	$297	$1,332
31	CONSTRUCTION MANAGEMENT	$490	$120	24.4%	$610	0.0%	$490	$120	$610	$0	$610	8.5%	$531	$130	$661
	PROJECT COST TOTALS:	$7,990	$3,151	39.4%	$11,141		$7,990	$3,151	**$11,141**	$0	**$11,141**	8.7%	$8,686	$3,423	$12,109

CHIEF, COST ENGINEERING, Mukesh Kumar

PROJECT MANAGER, Jason Shea

CHIEF, REAL ESTATE

CHIEF, PLANNING

CHIEF, ENGINEERING

CHIEF, OPERATIONS

CHIEF, CONSTRUCTION

CHIEF, CONTRACTING

CHIEF, PM-PB, Anthony Ciorra

CHIEF, DPM

ESTIMATED FEDERAL COST: **65%** **$7,871**
ESTIMATED NON-FEDERAL COST: **35%** **$4,238**

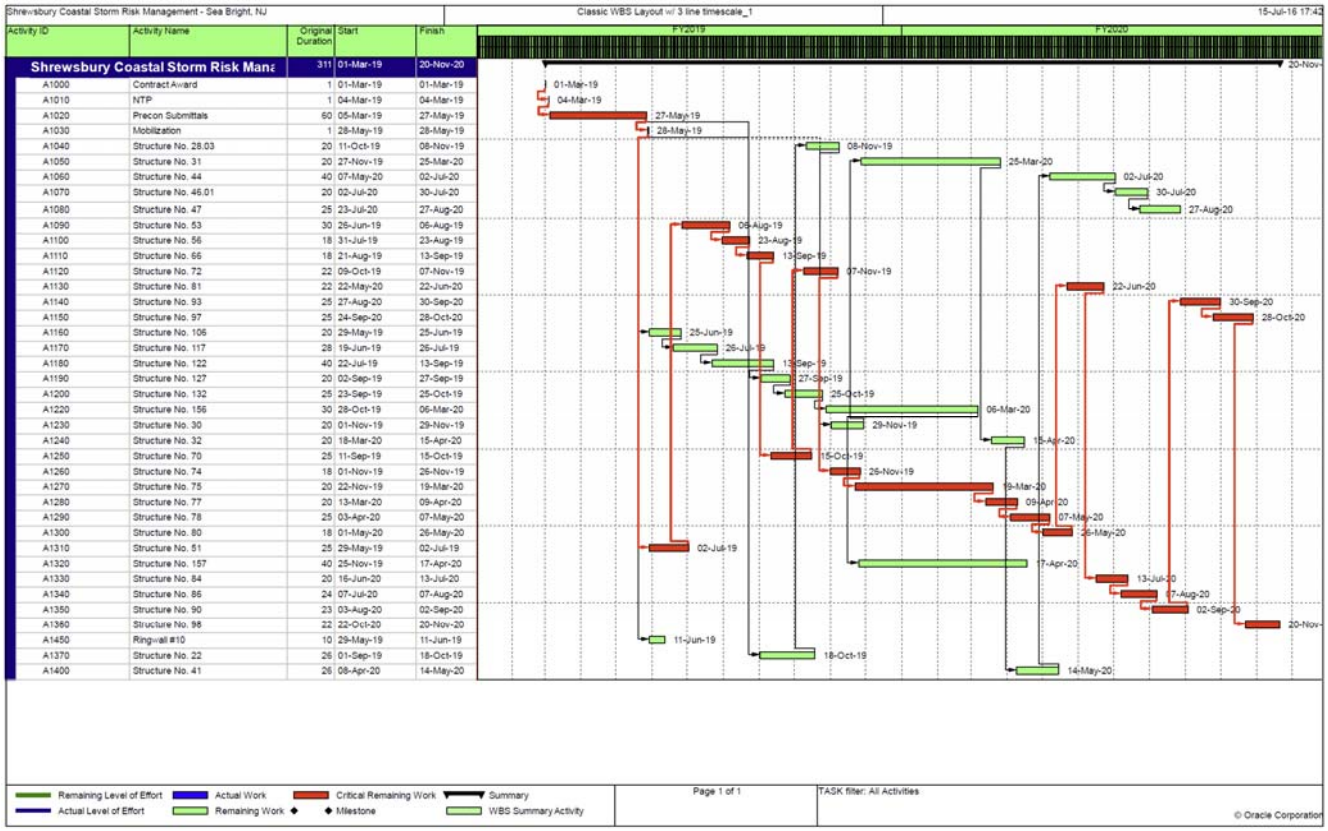
ESTIMATED TOTAL PROJECT COST: **$12,109**

PROJECT: Shrewsbury River Basin
LOCATION: Sea Bright, NJ
This Estimate reflects the scope and schedule in report; Shrewsbury River Basin Draft Feasibility Study 2016

DISTRICT: New York District PREPARED: 7/6/2016
POC: CHIEF, COST ENGINEERING, Mukesh Kumar

Civil Works Work Breakdown Structure		ESTIMATED COST				PROJECT FIRST COST (Constant Dollar Basis)				TOTAL PROJECT COST (FULLY FUNDED)					
		Estimate Prepared: 6-Jul-16 Effective Price Level: 1-Oct-15				Program Year (Budget EC): 2016 Effective Price Level Date: 1 OCT 15									
				RISK BASED											
WBS NUMBER A	Civil Works Feature & Sub-Feature Description B	COST ($K) C	CNTG ($K) D	CNTG (%) E	TOTAL ($K) F	ESC (%) G	COST ($K) H	CNTG ($K) I	TOTAL ($K) J	Mid-Point Date P	INFLATED (%) L	COST ($K) M	CNTG ($K) N	FULL ($K) O	
	CONTRACT 1														
19	BUILDINGS, GROUNDS & UTILITIES Residential Raise Slab	$1,655	$722	43.6%	$2,377	0.0%	$1,655	$722	$2,377	2020Q2	8.4%	$1,793	$783	$2,576	
19	BUILDINGS, GROUNDS & UTILITIES Residential Raise Crawlspace	$3,193	$1,393	43.6%	$4,587	0.0%	$3,193	$1,393	$4,587	2020Q2	8.4%	$3,460	$1,510	$4,970	
19	BUILDINGS, GROUNDS & UTILITIES Remaining Construction Items	$445	$194	43.6%	$639	0.0%	$445	$194	$639	2020Q2	8.4%	$482	$210	$693	
11	LEVEES & FLOODWALLS Non-Residential Ringwalls	$836	$365	43.6%	$1,201	0.0%	$836	$365	$1,201	2020Q2	8.4%	$906	$395	$1,301	
11	LEVEES & FLOODWALLS Deployment/Redeployment of Ringwalls	$10	$4	43.6%	$14	0.0%	$10	$4	$14	2020Q2	8.4%	$10	$5	$15	
	CONSTRUCTION ESTIMATE TOTALS:	$6,139	$2,679	43.6%	**$8,818**		$6,139	$2,679	$8,818			$6,652	$2,902	$9,554	
01	LANDS AND DAMAGES	$441	$88	20.0%	$529	0.0%	$441	$88	$529	2019Q2	6.2%	$468	$94	$562	
30	PLANNING, ENGINEERING & DESIGN														
1.0%	Project Management	$61	$18	28.7%	$79	0.0%	$61	$18	$79	2019Q1	12.1%	$68	$20	$88	
1.0%	Planning & Environmental Compliance	$61	$18	28.7%	$79	0.0%	$61	$18	$79	2019Q1	12.1%	$68	$20	$88	
10.0%	Engineering & Design	$614	$176	28.7%	$790	0.0%	$614	$176	$790	2019Q1	12.1%	$688	$198	$886	
1.0%	Reviews, ATRs, IEPRs, VE	$61	$18	28.7%	$79	0.0%	$61	$18	$79	2019Q1	12.1%	$68	$20	$88	
0.5%	Life Cycle Updates (cost, schedule, risks)	$31	$9	28.7%	$40	0.0%	$31	$9	$40	2019Q1	12.1%	$35	$10	$45	
0.5%	Contracting & Reprographics	$31	$9	28.7%	$40	0.0%	$31	$9	$40	2019Q1	12.1%	$35	$10	$45	
1.0%	Engineering During Construction	$61	$18	28.7%	$79	0.0%	$61	$18	$79	2020Q2	17.7%	$72	$21	$92	
0.0%	Planning During Construction	$0	$0	28.7%	$0	0.0%	$0	$0	$0	0	0.0%	$0	$0	$0	
0.0%	Project Operations	$0	$0	28.7%	$0	0.0%	$0	$0	$0	0	0.0%	$0	$0	$0	
31	CONSTRUCTION MANAGEMENT														
6.0%	Construction Management	$368	$90	24.4%	$458	0.0%	$368	$90	$458	2020Q2	8.5%	$399	$97	$497	
1.0%	Project Operation:	$61	$15	24.4%	$76	0.0%	$61	$15	$76	2020Q2	8.5%	$66	$16	$82	
1.0%	Project Management	$61	$15	24.4%	$76	0.0%	$61	$15	$76	2020Q2	8.5%	$66	$16	$82	
	CONTRACT COST TOTALS:	$7,990	$3,151	39%	$11,141		$7,990	$3,151	$11,141			$8,686	$3,423	$12,109	

Table B-3: Construction



Schedule Assumptions:
-No winter work possible
-Multiple subcontractors will be available to raise 2 or more homes simultaneously
-Masonry, brick and commercial structures will take longer to construct/protect
Site constraints slow productivity

Abbreviated Risk Analysis

Project (less than $40M): **Shrewsbury River Basin, Sea Bright, NJ, Alternative NS2** — **Alternative: TSP - NS2**

Project Development Stage/Alternative: **Feasibility (Recommended Plan)**

Risk Category: **Moderate Risk: Typical Project Construction Type** — **Meeting Date: 10/4/2015**

Total Estimated Construction Contract Cost = $ 6,138,858

	CWWBS	Feature of Work	Contract Cost		% Contingency	$ Contingency	Total
	01 LANDS AND DAMAGES	Real Estate	$ 440,900		20.00%	$ 88,180	$ 529,080
1	19 BUILDINGS, GROUNDS, AND UTILITIES	Residential Structures (Raise Slab on Grade)	$ 1,655,116		35.63%	$ 589,714	$ 2,244,830
2	19 BUILDINGS, GROUNDS, AND UTILITIES	Residential Structures (Raise Crawlspace)	$ 3,193,181		39.93%	$ 1,274,900	$ 4,468,082
3	11 02 FLOODWALLS	Non-Residential (Ringwalls)	$ 845,484		84.82%	$ 717,137	$ 1,562,621
4			$ -		0.00%	$ -	$ -
5			$ -		0.00%	$ -	$ -
6			$ -		0.00%	$ -	$ -
7			$ -		0.00%	$ -	$ -
8			$ -		0.00%	$ -	$ -
9			$ -		0.00%	$ -	$ -
10			$ -		0.00%	$ -	$ -
11			$ -		0.00%	$ -	$ -
12	All Other	Remaining Construction Items	$ 445,077	7.8%	21.79%	$ 96,980	$ 542,058
13	30 PLANNING, ENGINEERING, AND DESIGN	Planning, Engineering, & Design	$ 920,829		28.74%	$ 264,673	$ 1,185,502
14	31 CONSTRUCTION MANAGEMENT	Construction Management	$ 491,109		24.41%	$ 119,857	$ 610,966
XX	FIXED DOLLAR RISK ADD (EQUALLY DISPERSED TO ALL, MUST INCLUDE JUSTIFICATION SEE BELOW)					$ -	

Totals				
Real Estate	$ 440,900	20.00%	$ 88,180	$ 529,080.00
Total Construction Estimate	$ 6,138,858	43.64%	$ 2,678,732	$ 8,817,590
Total Planning, Engineering & Design	$ 920,829	28.74%	$ 264,673	$ 1,185,502
Total Construction Management	$ 491,109	24.41%	$ 119,857	$ 610,966
Total	$ 7,991,695	39%	$ 3,151,442	$ 11,143,138
		Base	50%	80%
Range Estimate ($000's)		$7,992k	$9,883k	$11,143k

* 50% based on base is at 5% CL

Fixed Dollar Risk Add: (Allows for additional risk to be added to the risk analsyis. Must include justification. Does not allocate to Real Estate.	

Shrewsbury River Basin, Sea Bright, NJ, Alternative NS2 TS

Feasibility (Recommended Plan)

Abbreviated Risk Analysis

Meeting Date: 4-Oct-15

Risk Register

Risk Element	Feature of Work	Concerns	PDT Discussions & Conclusions (Include logic & justification for choice of Likelihood & Impact)	Impact	Likelihood	Risk Level
Project Scope Growth				**Maximum Project Growth**		**75%**
PS-1	Residential Structures (Raise Slab on Grade)	• Design confidence? • Investigations sufficient to support design assumptions? • Potential for scope growth, added features and quantities?	Assume corps will do plans & specifications and S&A in house. Design has yet to be done. Investigations are ongoing, but potential for scope growth is low since the main scope is to lift/jack the structure at load bearing members and install piling.	Marginal	Possible	1
PS-2	Residential Structures (Raise Crawlspace)	• Design confidence? • Investigations sufficient to support design assumptions? • Potential for scope growth, added features and quantities?	Assume corps will do plans & specifications and S&A in house. Design has yet to be done. Investigations are ongoing, but potential for scope growth is low since the main scope is to lift/jack the structure at load bearing members and install piling.	Marginal	Possible	1
PS-3	Non-Residential (Ringwalls)	• Design confidence? • Investigations sufficient to support design assumptions? • Potential for scope growth, added features and quantities?	Ringwall design preliminary, type of ringwall likely to change and will affect cost. Due to site constraints, ringwall design may have to be custom and include additional features. Ringwalls may be not the most practical solution to flood proof these buildings, which would change the project scope. Ringwalls of higher height (7-8 ft) have life safety concerns. Walls will need to withstand hydrostatic and wave loads and could require significant foundation - current scope for foundation is unknown.	Moderate	Likely	3
PS-4	0			Negligible	Unlikely	0
PS-12	Remaining Construction Items			Marginal	Possible	1
PS-13	Planning, Engineering, & Design	• Design confidence? • Investigations sufficient to support design assumptions? • Potential for scope growth, added features and quantities?	Increased scope will require additional PED. Additional investigation may be required due to 3-3-3 process.	Moderate	Possible	2
PS-14	Construction Management	• Design confidence? • Investigations sufficient to support design assumptions? • Potential for scope growth, added features and quantities?	Increased scope will require additional S&A - but it is calculated based on percentage of contract cost	Marginal	Possible	1
Acquisition Strategy				**Maximum Project Growth**		**30%**
AS-1	Residential Structures (Raise Slab on Grade)	• Contracting plan firmly established? • Limited bid competition anticipated? • 8a or small business likely?	The contracting plan is not firmly established. In the past it may have been a risk that there were not enough contractors to do the work, but with the recent history, there are more small contractors doing this work. Plenty of 8A and small business that good bid prices can be received.	Marginal	Likely	2
AS-2	Residential Structures (Raise Crawlspace)	• Contracting plan firmly established? • Limited bid competition anticipated? • 8a or small business likely?	The contracting plan is not firmly established. In the past it may have been a risk that there were not enough contractors to do the work, but recently there has been an increase in the number of small contractors doing this work. There are plenty of 8A and small business, so competitive bid prices can be received.	Marginal	Likely	2
AS-3	Non-Residential (Ringwalls)	• Contracting plan firmly established? • Limited bid competition anticipated? • 8a or small business likely?	Contracting plan not firmly established. 8a possible.	Marginal	Likely	2
AS-4	0			Negligible	Unlikely	0
AS-12	Remaining Construction Items			Marginal	Possible	1
AS-13	Planning, Engineering, & Design	• Contracting plan firmly established?	Splitting up into multiple contracts would increase PED costs. Likely to be two contracts - one for residential and one for non-residential.	Moderate	Likely	3
AS-14	Construction Management	• Contracting plan firmly established?	Assume Federal government-managed in the implementation of non-structural measures. Contracting plan is still undetermined.	Moderate	Possible	2
Construction Elements				**Maximum Project Growth**		**25%**
CE-1	Residential Structures (Raise Slab on Grade)	• High risk or complex construction elements, site access, in-water? • Special equipment or subcontractors needed? • Unique construction methods? • Potential for construction modification and claims?	Site-access is a concern with the houses are close together making equipment mobility and staging very difficult. The assumption is made that with the amount of house raises taking place, the equipment and contractors are readily available. The construction is unique but has become more standardized over the last few years. Modification may be made based on foundation condition. More difficult to raise a slab on grade. Claims with settlement and cracking after the house has been raised.	Marginal	Likely	2

CE-2	Residential Structures (Raise Crawlspace)	• High risk or complex construction elements, site access, in water? • Special equipment or subcontractors needed? • Unique construction methods? • Potential for construction modification and claims?	Site-access is a concern with the houses are close together making equipment mobility and staging very difficult. The assumption is made that with the amount of house-raises taking place, the equipment and contractors are readily available. The construction is unique but has become more standardized over the last few years. Modification may be made based on foundation condition. Claims with settlement and cracking after the house has been raised.	Marginal	Likely	2
CE-3	Non-Residential (Ringwalls)	• High risk or complex construction elements, site access, in water? • Special equipment or subcontractors needed? • Unique construction methods? • Potential for construction modification and claims?	Site-access is a significant concern. Businesses are directly at the sidewalk and require access for customers. Installation of ringwall may require non-standard construction techniques.	Moderate	Likely	3
CE-4	0			Negligible	Unlikely	0
CE-12	Remaining Construction Items			Negligible	Unlikely	0
CE-13	Planning, Engineering, & Design			Marginal	Possible	1
CE-14	Construction Management	• Potential for construction modification and claims?	Possible modifications and claims to be managed.	Moderate	Likely	3
Quantities for Current Scope				**Maximum Project Growth**		**20%**
Q-1	Residential Structures (Raise Slab on Grade)	• Level of confidence based on design and assumptions • Appropriate methods applied to calculate quantities? • Sufficient investiagtions to develop quantities?	Unlikely for the quantities to change significantly. Quantities for each house based on known square footage, and the number of houses to be elevated is based on existing elevations, and survey of houses.	Marginal	Possible	1
Q-2	Residential Structures (Raise Crawlspace)	• Level of confidence based on design and assumptions • Appropriate methods applied to calculate quantities? • Sufficient investiagtions to develop quantities?	Unlikely for the quantities to change significantly. Quantities for each house based on known square footage, and the number of houses to be elevated is based on existing elevations and survey of houses.	Marginal	Possible	1
Q-3	Non-Residential (Ringwalls)	• Level of confidence based on design and assumptions • Appropriate methods applied to calculate quantities? • Sufficient investiagtions to develop quantities?	Length of total ringwall and height of ringwall still preliminary. Quantities for the ringwall components based off of assumed design which may change. Only quantity of perimeter (i.e. length of ringwall) provided - but quantities to build the ringwalls are unknown, because the scope is unknown (cost estimate assumes removable structural steel wall)	Moderate	Likely	3
Q-4	0	• Level of confidence based on design and assumptions • Appropriate methods applied to calculate quantities? • Sufficient investiagtions to develop quantities?	Only two non residential structures anticipated to be raised	Marginal	Possible	1
Q-12	Remaining Construction Items	• Level of confidence based on design and assumptions • Appropriate methods applied to calculate quantities? • Sufficient investiagtions to develop quantities?	Additional flood proofing required for raises and ringwalls not based off of any quantities provided. Flood gates or walk overs would be required. AC units for residential units would need to be raised. Utilities would need to be raised as well.	Moderate	Likely	3
Q-13	Planning, Engineering, & Design		Quantities will not have much effect	Negligible	Possible	0
Q-14	Construction Management		Quantities will not have much effect	Negligible	Possible	0
Specialty Fabrication or Equipment				**Maximum Project Growth**		**75%**
FE-1	Residential Structures (Raise Slab on Grade)	• Unusual parts, material or equipment manufactured or installed? Confidence in Contractor's ability to install	Jacking equipment will be used. Elevating homes is fairly standard construction in the area. Helical piles will need to be used where access is limited or piling is not possible/allowed.	Moderate	Possible	2
FE-2	Residential Structures (Raise Crawlspace)	• Unusual parts, material or equipment manufactured or installed? Confidence in Contractor's ability to install	Jacking equipment will be used. Elevating homes is fairly standard construction in the area. Helical piles will need to be used where access is limited or piling is not possible/allowed.	Moderate	Possible	2
FE-3	Non-Residential (Ringwalls)	• Unusual parts, material or equipment manufactured or installed? Confidence in Contractor's ability to install	Construction would be very difficult given the site constraints and proximity to Ocean Ave. Specialty fabrication of the wall is likely - especially for removeable flood walls.	Moderate	Likely	3
FE-4	0			Negligible	Unlikely	0
FE-12	Remaining Construction Items		Standard construction	Negligible	Possible	0
FE-13	Planning, Engineering, & Design	N/A	N/A	Negligible	Possible	0
FE-14	Construction Management	N/A	N/A	Negligible	Possible	0
Cost Estimate Assumptions				**Maximum Project Growth**		**35%**
CT-1	Residential Structures (Raise Slab on Grade)	• Reliability and number of key quotes? • Site accessibility? • Oversue of cost book? • Lack of confidence on critical items?	Preliminary cost estimate was created based on non-structural baseline estimate which takes into consideration only square footage, height of raise, and type of foundation. The baseline estimate was created primarily with cost book items, and may not adequately address site accessibility/congestion and sequencing based on space and labor/equipment resources. However the calculated costs are in line with historical prices. Additional difficulties and costs for masonry structures considered in the cost estimate.	Marginal	Likely	2
CT-2	Residential Structures (Raise Crawlspace)	• Reliability and number of key quotes? • Site accessibility? • Oversue of cost book? • Lack of confidence on critical items?	Preliminary cost estimate was created based on non-structural baseline estimate which takes into consideration only square footage, height of raise, and type of foundation. The baseline estimate was created primarily with cost book items, and may not adequately address site accessibility/congestion and sequencing based on space and labor/equipment resources. However the calculated costs are in line with historical prices. Additional difficulties and costs for masonry structures considered in the cost estimate.	Moderate	Likely	3
CT-3	Non-Residential (Ringwalls)	• Reliability and number of key quotes? • Site accessibility? • Oversue of cost book? • Lack of confidence on critical items?	Minimal scope provided - ringwall design and construction methods assumed based on estimator research. Quote for flood panel obtained from aqua fence	Significant	Likely	4

CT-4	0			Negligible	Unlikely	0
CT-12	Remaining Construction Items			Marginal	Possible	1
CT-13	Planning, Engineering, & Design	• Lack of confidence on critical items?	Values based on percentage of total construction cost	Marginal	Likely	2
CT-14	Construction Management	• Lack of confidence on critical items?	Values based on percentage of total construction cost	Marginal	Likely	2
External Project Risks				**Maximum Project Growth**		**40%**
EX-1	Residential Structures (Raise Slab on Grade)	• Potential for severe adverse weather? • Unanticipated inflations in fuel, key materials? • Political influences, lack of support, obstacles?	Local sponsor and resident input will be significant. Bidding environment. Material cost will fluctuate. Availability of Contractors specializing in elevating houses.	Moderate	Likely	3
EX-2	Residential Structures (Raise Crawlspace)	• Potential for severe adverse weather? • Unanticipated inflations in fuel, key materials? • Political influences, lack of support, obstacles?	Local sponsor and resident input will be significant. Bidding environment. Material cost will fluctuate. Availability of Contractors specializing in elevating houses.	Moderate	Likely	3
EX-3	Non-Residential (Ringwalls)	• Potential for severe adverse weather? • Unanticipated inflations in fuel, key materials? • Political influences, lack of support, obstacles?	Local sponsor and resident input will be significant. Bidding environment. Material cost will fluctuate. Ringwalls over 6 ft may not be allowed by regulation. Potential for life safety concerns with higher ringwalls.	Significant	Likely	4
EX-4	0			Negligible	Unlikely	0
EX-12	Remaining Construction Items	• Potential for severe adverse weather? • Unanticipated inflations in fuel, key materials? • Political influences, lack of support, obstacles?	Input from local sponsor and residents	Marginal	Likely	2
EX-13	Planning, Engineering, & Design	• Potential for severe adverse weather? • Unanticipated inflations in fuel, key materials? • Political influences, lack of support, obstacles?	Input from local sponsor and residents would increase design costs	Marginal	Likely	2
EX-14	Construction Management	• Potential for severe adverse weather? • Unanticipated inflations in fuel, key materials? • Political influences, lack of support, obstacles?		Marginal	Possible	1