

**North Shore of Long Island
Bayville, NY
Coastal Storm Risk Management
Feasibility Study**

Appendix D - Cost Engineering

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Cost Introduction

This feasibility study has determined that periodic coastal storms, such as tropical storms, hurricanes, and nor'easters, pose a severe threat to life and property in the Village of Bayville, New York. There is an opportunity to manage coastal storm risks in Bayville. In response to these problems and opportunities, plan formulation activities considered a range of structural and nonstructural measures. Through an iterative plan formulation process, potential coastal storm risk management measures were identified, evaluated, and compared. Four final alternatives, 1 through 4, were compared to determine the Tentatively Selected Plan (TSP) for Bayville.

Alternative 4, the TSP, provides for 3,850 linear feet of I-wall type concrete floodwall combined with 2,940 linear feet of buried floodwall on the Long Island Sound (north) side of Bayville. For initial analysis the top elevation of the structure has been established at elevation +14 feet (ft) North Atlantic Vertical Datum (NAVD88). The TSP also provides for 2,800 linear feet of I-wall type concrete floodwall adjoining the Mill Neck Creek neighborhood and a 5,300 linear foot set-back floodwall will be built down the center lane of West Harbor Drive to the established design height on the Oyster Bay (south) side of Bayville. Traffic cross-overs (raised road) will be constructed at two intersections to reduce traffic impacts to local residents. For initial analysis the top elevation of the structure has been established at elevation +13 ft NAVD88. Three pump stations, with a combined capacity of 159 cfs, will be required to pump storm water through the line of protection and into the Bay. All three pump stations will be co-located with an emergency natural gas powered auxiliary power generator. New drainage lines will be constructed to efficiently deliver storm water to the pump stations. The project will require temporary and permanent easements as well as wetlands restoration as part of the environmental impacts mitigation. The exact dimensions and level of performance of the project will be determined as part of the optimization process to follow the release of this draft Feasibility Report.

The cost information presented in this appendix is considered preliminary in nature and is based on current historical data of similar scope. The contingencies for the final array of alternatives were developed through an Abbreviated Risk Analysis (ARA). A more detailed MII cost estimate and a Cost and Schedule Risk Analysis (CSRA) for the TSP will be developed after plan optimization.

The project will be cost-shared 65% Federal and 35% non-Federal.

This cost appendix contains the following:

- Total Project Cost Summary for the TSP
- Construction Schedule for the TSP
- Preliminary costs for the final array of alternatives
- ARA results and risk register sheets for the final array of alternatives

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Alternative 4 - Tentatively Selected Plan (TSP)

- **Total Project Cost Summary (TPCS)**
 - **Schedule**
- **Abbreviated Risk Analysis (ARA)**
 - **Cost Estimate**

**** TOTAL PROJECT COST SUMMARY ****

PROJECT: North Shore of Long Island, Bayville NY, Coastal Storm Risk Management Feasibility Study -
PROJECT NO: P2 403338
LOCATION: Bayville, NY

DISTRICT: New England District
POC: CHIEF, COST ENGINEERING, Patricia Bolton
PREPARED: 11/19/2015

ALTERNATIVE 4 - Tentatively Selected Plan (TSP)

This Estimate reflects the scope and schedule in report; Project X Major Rehabilitation Report MONTH YEAR

Civil Works Work Breakdown Structure		ESTIMATED COST				PROJECT FIRST COST (Constant Dollar Basis)					TOTAL PROJECT COST (FULLY FUNDED)					
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	Program Year (Budget EC): Effective Price Level Date: 2017 1 OCT 16		TOTAL FIRST COST (\$K) K	INFLATED (%) L	COST (\$K) M	CNTG (\$K) N	FULL (\$K) O
										Spent Thru: 10/1/2013 (\$K)						
11	LEVEES & FLOODWALLS	\$1,043	\$403	38.6%	\$1,446	1.8%	\$1,062	\$410	\$1,472	\$0	\$1,472	5.4%	\$1,119	\$432	\$1,552	
11	LEVEES & FLOODWALLS	\$4,248	\$1,964	46.2%	\$6,212	1.8%	\$4,323	\$1,998	\$6,321	\$0	\$6,321	5.4%	\$4,558	\$2,107	\$6,665	
11	LEVEES & FLOODWALLS	\$5,796	\$2,136	36.9%	\$7,932	1.8%	\$5,899	\$2,174	\$8,072	\$0	\$8,072	5.4%	\$6,219	\$2,292	\$8,510	
11	LEVEES & FLOODWALLS	\$11,185	\$4,914	43.9%	\$16,098	1.8%	\$11,383	\$5,000	\$16,383	\$0	\$16,383	5.4%	\$12,001	\$5,272	\$17,272	
11	LEVEES & FLOODWALLS	\$4,313	\$1,422	33.0%	\$5,736	1.8%	\$4,390	\$1,447	\$5,837	\$0	\$5,837	5.4%	\$4,628	\$1,526	\$6,154	
02	RELOCATIONS	\$1,831	\$417	22.8%	\$2,248	1.8%	\$1,863	\$425	\$2,288	\$0	\$2,288	5.4%	\$1,964	\$448	\$2,412	
13	PUMPING PLANT	\$7,721	\$2,221	28.8%	\$9,942	1.8%	\$7,857	\$2,261	\$10,118	\$0	\$10,118	5.4%	\$8,284	\$2,383	\$10,667	
18	CULTURAL RESOURCE PRESERVATION	\$1,000	\$70	7.0%	\$1,070	1.8%	\$1,018	\$71	\$1,089	\$0	\$1,089	5.4%	\$1,073	\$75	\$1,148	
CONSTRUCTION ESTIMATE TOTALS:		\$37,138	\$13,547		\$50,685	1.8%	\$37,794	\$13,786	\$51,580	\$0	\$51,580	5.4%	\$39,846	\$14,535	\$54,381	
01	LANDS AND DAMAGES	\$6,100	\$1,220	20.0%	\$7,320	1.8%	\$6,208	\$1,242	\$7,449	\$0	\$7,449	1.9%	\$6,323	\$1,265	\$7,588	
30	PLANNING, ENGINEERING & DESIGN	\$2,000	\$1,075	53.7%	\$3,075	3.6%	\$2,072	\$1,114	\$3,186	\$0	\$3,186	5.3%	\$2,183	\$1,173	\$3,356	
31	CONSTRUCTION MANAGEMENT	\$1,655	\$559	33.8%	\$2,214	1.8%	\$1,685	\$569	\$2,254	\$0	\$2,254	5.5%	\$1,777	\$600	\$2,377	
PROJECT COST TOTALS:		\$46,893	\$16,400	35.0%	\$63,293		\$47,759	\$16,710	\$64,469	\$0	\$64,469	5.0%	\$50,130	\$17,572	\$67,702	

CHIEF, COST ENGINEERING, Patricia Bolton

PROJECT MANAGER, Ron Pinzone

CHIEF, REAL ESTATE, xxx

CHIEF, PLANNING, John Kennelly

CHIEF, ENGINEERING, Scott Acone

CHIEF, OPERATIONS, Frank Fedele

CHIEF, CONSTRUCTION, Sean Dolan

CHIEF, CONTRACTING, Sheila Winston-Vincuilla

CHIEF, PM-PB, xxxxx

CHIEF, DPM, William Scully

ESTIMATED FEDERAL COST: 65% \$44,006
ESTIMATED NON-FEDERAL COST: 35% \$23,696
ESTIMATED TOTAL PROJECT COST: \$67,702

**** TOTAL PROJECT COST SUMMARY ****

**** CONTRACT COST SUMMARY ****

PROJECT: North Shore of Long Island, Bayville NY, Coastal Storm Risk Management Feasibility Study -
 LOCATION: Bayville, NY
 This Estimate reflects the scope and schedule in report: Project X Major Rehabilitation Report MONTH YEAR

DISTRICT: New England District
 POC: CHIEF, COST ENGINEERING, Patricia Bolton
 PREPARED: 11/19/2015
ALTERNATIVE 4 - Tentatively Selected Plan (TSP)

Civil Works Work Breakdown Structure		ESTIMATED COST				PROJECT FIRST COST (Constant Dollar Basis)				TOTAL PROJECT COST (FULLY FUNDED)				
		Estimate Prepared: 13-Nov-15		Effective Price Level: 1-Oct-15		Program Year (Budget EC): 2017		Effective Price Level Date: 1 OCT 16						
		RISK BASED												
WBS NUMBER	Civil Works Feature & Sub-Feature Description	COST (\$K)	CNTG (\$K)	CNTG (%)	TOTAL (\$K)	ESC (%)	COST (\$K)	CNTG (\$K)	TOTAL (\$K)	Mid-Point Date	INFLATED (%)	COST (\$K)	CNTG (\$K)	FULL (\$K)
A	B	C	D	E	F	G	H	I	J	P	L	M	N	O
PHASE 1 or CONTRACT 1														
11	LEVEES & FLOODWALLS	\$1,043	\$403	38.6%	\$1,446	1.8%	\$1,062	\$410	\$1,472	2019Q4	5.4%	\$1,119	\$432	\$1,552
11	LEVEES & FLOODWALLS	\$4,248	\$1,964	46.2%	\$6,212	1.8%	\$4,323	\$1,998	\$6,321	2019Q4	5.4%	\$4,558	\$2,107	\$6,665
11	LEVEES & FLOODWALLS	\$5,796	\$2,136	36.9%	\$7,932	1.8%	\$5,899	\$2,174	\$8,072	2019Q4	5.4%	\$6,219	\$2,292	\$8,510
11	LEVEES & FLOODWALLS	\$11,185	\$4,914	43.9%	\$16,098	1.8%	\$11,383	\$5,000	\$16,383	2019Q4	5.4%	\$12,001	\$5,272	\$17,272
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02	RELOCATIONS	\$1,831	\$417	22.8%	\$2,248	1.8%	\$1,863	\$425	\$2,288	2019Q4	5.4%	\$1,964	\$448	\$2,412
13	PUMPING PLANT	\$7,721	\$2,221	28.8%	\$9,942	1.8%	\$7,857	\$2,261	\$10,118	2019Q4	5.4%	\$8,284	\$2,383	\$10,667
18	CULTURAL RESOURCE PRESERVATION	\$1,000	\$70	7.0%	\$1,070	1.8%	\$1,018	\$71	\$1,089	2019Q4	5.4%	\$1,073	\$75	\$1,148
CONSTRUCTION ESTIMATE TOTALS:		\$37,138	\$13,547	36.5%	\$50,685		\$37,794	\$13,786	\$51,580			\$39,846	\$14,535	\$54,381
01	LANDS AND DAMAGES	\$6,100	\$1,220	20.0%	\$7,320	1.8%	\$6,208	\$1,242	\$7,449	2018Q1	1.9%	\$6,323	\$1,265	\$7,588
30	PLANNING, ENGINEERING & DESIGN													
0.5%	Project Management	\$182	\$98	53.7%	\$280	3.6%	\$189	\$101	\$290	2018Q1	4.0%	\$196	\$105	\$301
0.2%	Planning & Environmental Compliance	\$73	\$39	53.7%	\$112	3.6%	\$76	\$41	\$116	2018Q1	4.0%	\$79	\$42	\$121
2.9%	Engineering & Design	\$1,091	\$586	53.7%	\$1,677	3.6%	\$1,130	\$607	\$1,738	2018Q1	4.0%	\$1,176	\$632	\$1,807
0.2%	Reviews, ATRs, IEPRs, VE	\$73	\$39	53.7%	\$112	3.6%	\$76	\$41	\$116	2018Q1	4.0%	\$79	\$42	\$121
0.2%	Life Cycle Updates (cost, schedule, risks)	\$73	\$39	53.7%	\$112	3.6%	\$76	\$41	\$116	2018Q1	4.0%	\$79	\$42	\$121
0.2%	Contracting & Reprographics	\$73	\$39	53.7%	\$112	3.6%	\$76	\$41	\$116	2018Q1	4.0%	\$79	\$42	\$121
0.6%	Engineering During Construction	\$218	\$117	53.7%	\$335	3.6%	\$226	\$121	\$347	2019Q4	11.4%	\$252	\$135	\$387
0.4%	Planning During Construction	\$145	\$78	53.7%	\$223	3.6%	\$150	\$81	\$231	2019Q4	11.4%	\$167	\$90	\$257
0.2%	Project Operations	\$72	\$39	53.7%	\$111	3.6%	\$75	\$40	\$115	2018Q1	4.0%	\$78	\$42	\$119
31	CONSTRUCTION MANAGEMENT													
3.1%	Construction Management	\$1,141	\$385	33.8%	\$1,526	1.8%	\$1,162	\$392	\$1,554	2019Q4	5.5%	\$1,225	\$414	\$1,639
0.6%	Project Operation:	\$228	\$77	33.8%	\$305	1.8%	\$232	\$78	\$310	2019Q4	5.5%	\$245	\$83	\$328
0.8%	Project Management	\$286	\$97	33.8%	\$383	1.8%	\$291	\$98	\$389	2019Q4	5.5%	\$307	\$104	\$411
CONTRACT COST TOTALS:		\$46,893	\$16,400		\$63,293		\$47,759	\$16,710	\$64,469			\$50,130	\$17,572	\$67,702

Abbreviated Risk Analysis

Project (less than \$40M): **Bayville, NY Coastal Storm Risk Management Feasibility Study**
 Project Development Stage/Alternative: **Feasibility (Alternatives)**
 Risk Category: **Moderate Risk: Typical Project Construction Type**

Alternative: Alternative 4 - TSP

Meeting Date: 11/12/2015

Total Estimated Construction Contract Cost = \$ **37,137,972**

	CWWBS	Feature of Work	Contract Cost	% Contingency	\$ Contingency	Total
	01 LANDS AND DAMAGES	Real Estate	\$ -	0.00%	\$ -	\$ -
1	11 02 FLOODWALLS	General Requirements	\$ 1,043,266	38.61%	\$ 402,776	\$ 1,446,042
2	11 02 FLOODWALLS	Floodwall @ Mill Creek	\$ 4,248,209	46.22%	\$ 1,963,382	\$ 6,211,591
3	11 02 FLOODWALLS	Floodwall in Roadway @ W. Harbor Drive	\$ 5,796,122	36.85%	\$ 2,135,770	\$ 7,931,892
4	11 02 FLOODWALLS	Floodwall @ Long Island Sound	\$ 11,184,891	43.93%	\$ 4,914,030	\$ 16,098,921
5	11 LEVEES AND FLOODWALLS	Buried Floodwall @ Long Island Sound	\$ 4,313,487	32.97%	\$ 1,422,141	\$ 5,735,628
6	02 01 ROADS, Construction Activities	Road Raisings	\$ 1,830,919	22.80%	\$ 417,471	\$ 2,248,390
7	19 BUILDINGS, GROUNDS, AND UTILITIES	Interior Drainage	\$ 7,721,078	28.77%	\$ 2,221,599	\$ 9,942,676.94
8			\$ -	0.00%	\$ -	\$ -
9			\$ -	0.00%	\$ -	\$ -
10			\$ -	0.00%	\$ -	\$ -
11			\$ -	0.00%	\$ -	\$ -
12	All Other	Remaining Construction Items (Wetland Mitigation)	\$ 1,000,000	2.8%	\$ 70,000	\$ 1,070,000
13	30 PLANNING, ENGINEERING, AND DESIGN	Planning, Engineering, & Design	\$ 2,000,000	53.74%	\$ 1,074,780	\$ 3,074,780
14	31 CONSTRUCTION MANAGEMENT	Construction Management	\$ 1,655,000	33.76%	\$ 558,735	\$ 2,213,735
XX	FIXED DOLLAR RISK ADD (EQUALLY DISPERSED TO ALL, MUST INCLUDE JUSTIFICATION SEE BELOW)				\$ -	\$ -

Totals					
	Real Estate	\$ -	0.00%	\$ -	\$ -
	Total Construction Estimate	\$ 37,137,972	36.48%	\$ 13,547,170	\$ 50,685,142
	Total Planning, Engineering & Design	\$ 2,000,000	53.74%	\$ 1,074,780	\$ 3,074,780
	Total Construction Management	\$ 1,655,000	33.76%	\$ 558,735	\$ 2,213,735
	Total	\$ 40,792,972	37%	\$ 15,180,685	\$ 55,973,657
				Base	50%
	Range Estimate (\$000's)			\$40,793k	\$49,902k
					80%
					\$55,974k

* 50% based on base is at 5% CL

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

Bayville, NY Coastal Storm Risk Management Feasibility Study

Feasibility (Alternatives)
Abbreviated Risk Analysis

Meeting Date: 12-Nov-15

	Risk Level				
Very Likely	2	3	4	5	5
Likely	1	2	3	4	5
Possible	0	1	2	3	4
Unlikely	0	0	1	2	3
	Negligible	Marginal	Moderate	Significant	Critical

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	General Requirements	Concern expressed regarding project scope increase to other areas in Bayville.	It is likely PDT will have to include nonstructural mitigation to properties in Bayville near the western edge of the current project site(s) as a result of public input.	Marginal	Likely	2
PS-2	Floodwall @ Mill Creek	Concerns expressed over current height of protection and coastal study on which the protection is designed against. Additional concern regarding current I-wall design vs T-wall design.	Current scope already designed to protect against 50-year storm. Current design and associated costs are result in positive BCR but additional costs associated with larger protection will likely result in a negative BCR, resulting in NO protection for Bayville. Final protection heights will be determined during optimization which may rise slightly but will have marginal impact. The existing I-wall design is right on the threshold of requiring T-wall design. The existing design is conservative but optimization may push heights above I-wall design limits. It is possible the design will require T-walls which could have a significant impact on all floodwall design and construction.	Significant	Possible	3
PS-3	Floodwall in Roadway @ W. Harbor Drive	Concerns expressed over current height of protection and coastal study on which the protection is designed against. Additional concern regarding current I-wall design vs T-wall design.	Current scope already designed to protect against 50-year storm with pre-Sandy Comprehensive values. Current design and associated costs are result in positive BCR but additional costs associated with larger protection will likely result in a negative BCR, resulting in NO protection for Bayville. Final protection heights will be determined during optimization which may rise slightly but will have marginal impact. The existing I-wall design is right on the threshold of requiring T-wall design. The existing design is conservative but optimization may push heights above I-wall design limits. It is possible the design will require T-walls which could have a significant impact on all floodwall design and construction.	Significant	Possible	3
PS-4	Floodwall @ Long Island Sound	Concerns expressed over current height of protection and coastal study on which the protection is designed against. Additional concern regarding current I-wall design vs T-wall design.	Current scope already designed to protect against 50-year storm with pre-Sandy Comprehensive values. Current design and associated costs are result in positive BCR but additional costs associated with larger protection will likely result in a negative BCR, resulting in NO protection for Bayville. Final protection heights will be determined during optimization which may rise slightly but will have marginal impact. The existing I-wall design is right on the threshold of requiring T-wall design. The existing design is conservative but optimization may push heights above I-wall design limits. It is unlikely the design will require T-walls but could have a significant impact on all floodwall design and construction.	Significant	Possible	3
PS-5	Buried Floodwall @ Long Island Sound	Concerns expressed over current height of protection and coastal study on which the protection is designed against.	Current scope already designed to protect against 50-year storm with pre-Sandy Comprehensive values. Current design and associated costs are result in positive BCR but additional costs associated with larger protection will likely result in a negative BCR, resulting in NO protection for Bayville. Final protection heights will be determined during optimization which may rise slightly but will have marginal impact.	Marginal	Possible	1
PS-6	Road Raisings	No concerns.	N/A	Negligible	Unlikely	0
PS-7	Interior Drainage	Concern over existing drainage design.	Gravity outfall for drainage may change during optimization.	Negligible	Unlikely	0

PS-12	Remaining Construction Items (Wetland Mitigation)	No concerns regarding risk for wetland restoration.	NY District PDT has costed similar wetland restoration work at approximately \$300k-\$400k per acre of restoration. Bayville project has approximately 1/3 acre that requires restoration. Assumed cost of \$1 mil is more than sufficient to complete this feature of work. Little to no risk assumed.	Negligible	Unlikely	0	
PS-13	Planning, Engineering, & Design	Concern expressed regarding project scope increase to other areas in Bayville.	It is likely PDT will have to include nonstructural mitigation to properties in Bayville near the western edge of the current project site(s) as a result of public input. The change in I-wall to T-wall design will have a significant impact on P.E.D. if that change is required.	Significant	Likely	4	
PS-14	Construction Management	Concern expressed regarding project scope increase to other areas in Bayville.	It is likely PDT will have to include nonstructural mitigation to properties in Bayville near the western edge of the current project site(s) as a result of public input.	Marginal	Likely	2	
Acquisition Strategy						Maximum Project Growth	30%
AS-1	General Requirements	Concern expressed over contractor type, subs required, bid competition, and adequate bid schedule	Due to the large scale of the project, acquisition is not expected to be small business or 8a. It is assumed NY/Long Island has sufficient contractors with the ability to perform work successfully. Project could have multiple contracts (outer protection and interior drainage seperated for example) which may result in coordination issues.	Moderate	Possible	2	
AS-2	Floodwall @ Mill Creek	Concern expressed over contractor type, subs required, bid competition, and adequate bid schedule	Due to the large scale of the project, acquisition is not expected to be small business or 8a. It is assumed NY/Long Island has sufficient contractors with the ability to perform work successfully. Project could have multiple contracts (outer protection and interior drainage seperated for example) which may result in coordination issues.	Marginal	Possible	1	
AS-3	Floodwall in Roadway @ W. Harbor Drive	Concern expressed over contractor type, subs required, bid competition, and adequate bid schedule	Due to the large scale of the project, acquisition is not expected to be small business or 8a. It is assumed NY/Long Island has sufficient contractors with the ability to perform work successfully. Project could have multiple contracts (outer protection and interior drainage seperated for example) which may result in coordination issues.	Marginal	Possible	1	
AS-4	Floodwall @ Long Island Sound	Concern expressed over contractor type, subs required, bid competition, and adequate bid schedule	Due to the large scale of the project, acquisition is not expected to be small business or 8a. It is assumed NY/Long Island has sufficient contractors with the ability to perform work successfully. Project could have multiple contracts (outer protection and interior drainage seperated for example) which may result in coordination issues.	Marginal	Possible	1	
AS-5	Buried Floodwall @ Long Island Sound	Concern expressed over contractor type, subs required, bid competition, and adequate bid schedule	Due to the large scale of the project, acquisition is not expected to be small business or 8a. It is assumed NY/Long Island has sufficient contractors with the ability to perform work successfully. Project could have multiple contracts (outer protection and interior drainage seperated for example) which may result in coordination issues.	Marginal	Possible	1	
AS-6	Road Raisings	Concern expressed over contractor type, subs required, bid competition, and adequate bid schedule	Due to the large scale of the project, acquisition is not expected to be small business or 8a. It is assumed NY/Long Island has sufficient contractors with the ability to perform work successfully. Project could have multiple contracts (outer protection and interior drainage seperated for example) which may result in coordination issues.	Marginal	Possible	1	
AS-7	Interior Drainage	Concern expressed over contractor type, subs required, bid competition, and adequate bid schedule	Due to the large scale of the project, acquisition is not expected to be small business or 8a. It is assumed NY/Long Island has sufficient contractors with the ability to perform work successfully. Project could have multiple contracts (outer protection and interior drainage seperated for example) which may result in coordination issues.	Marginal	Possible	1	

AS-12	Remaining Construction Items (Wetland Mitigation)	No concerns regarding risk for wetland restoration.	NY District PDT has costed similar wetland restoration work at approximately \$300k-\$400k per acre of restoration. Bayville project has approximately 1/3 acre that requires restoration. Assumed cost of \$1 mil is more than sufficient to complete this feature of work. Little to no risk assumed.	Negligible	Unlikely	0	
AS-13	Planning, Engineering, & Design	No concerns.	N/A	Negligible	Unlikely	0	
AS-14	Construction Management	Concern expressed over contractor type, subs required, bid competition, and adequate bid schedule	Due to the large scale of the project, acquisition is not expected to be small business or 8a. It is assumed NY/Long Island has sufficient contractors with the ability to perform work successfully. Project could have multiple contracts (outer protection and interior drainage seperated for example) which may result in coordination issues.	Moderate	Possible	2	
Construction Elements						Maximum Project Growth	25%
CE-1	General Requirements	Concern expressed over site access, laydown areas, space to work, standoff distance to residences. Additional concerns regarding restricted work periods and the need for water diversion on the beach and at Mill Creek.	Site access from laydown areas may pose a risk as the contractor(s) proceed with work. It will require coordination and planning to avoid stockpiling material outside laydown areas, which are limited in size and location. Additional risk involved with dwellings being so close to proposed construction areas. Load restrictions/bridge access may cause delays/issues with delivery of materials. It is yet to be determined if any restricted work periods will be enforced by the Village or other entities adjacent to the beach and/or Mill Creek. It was determined that water diversion will be necessary for work along the beach and adjacent to Mill Creek. Any issue or combination of these issues is likely (especially the water diversion issue) and will have a moderate impact.	Moderate	Likely	3	
CE-2	Floodwall @ Mill Creek	Concern expressed over site access, laydown areas, space to work, standoff distance to residences. Additional concerns regarding restricted work periods and the need for water diversion on the beach and at Mill Creek.	Site access from laydown areas may pose a risk as the contractor(s) proceed with work. It will require coordination and planning to avoid stockpiling material outside laydown areas, which are limited in size and location. Additional risk involved with dwellings being so close to proposed construction areas. Load restrictions/bridge access may cause delays/issues with delivery of materials. It is yet to be determined if any restricted work periods will be enforced by the Village or other entities adjacent to the beach and/or Mill Creek. It was determined that water diversion will be necessary for work along the beach and adjacent to Mill Creek. Any issue or combination of these issues is likely (especially the water diversion issue) and will have a moderate impact.	Moderate	Likely	3	
CE-3	Floodwall in Roadway @ W. Harbor Drive	Concern expressed over site access, laydown areas, space to work, standoff distance to residences.	Site access from laydown areas may pose a risk as the contractor(s) proceed with work. It will require coordination and planning to avoid stockpiling material outside laydown areas, which are limited in size and location. Additional risk involved with dwellings being so close to proposed construction areas. Load restrictions/bridge access may cause delays/issues with delivery of materials. Any issue or combination of these issues is possible and could have a marginal impact.	Marginal	Possible	1	
CE-4	Floodwall @ Long Island Sound	Concern expressed over site access, laydown areas, space to work, standoff distance to residences. Additional concerns regarding restricted work periods and the need for water diversion on the beach and at Mill Creek.	Site access from laydown areas may pose a risk as the contractor(s) proceed with work. It will require coordination and planning to avoid stockpiling material outside laydown areas, which are limited in size and location. Additional risk involved with dwellings being so close to proposed construction areas. Load restrictions/bridge access may cause delays/issues with delivery of materials. It is yet to be determined if any restricted work periods will be enforced by the Village or other entities adjacent to the beach and/or Mill Creek. It was determined that water diversion will be necessary for work along the beach and adjacent to Mill Creek. Any issue or combination of these issues is likely (especially the water diversion issue) and will have a moderate impact.	Moderate	Likely	3	

CE-5	Buried Floodwall @ Long Island Sound	Concern expressed over site access, laydown areas, space to work, standoff distance to residences. Additional concerns regarding restricted work periods and the need for water diversion on the beach and at Mill Creek.	Site access from laydown areas may pose a risk as the contractor(s) proceed with work. It will require coordination and planning to avoid stockpiling material outside laydown areas, which are limited in size and location. Additional risk involved with dwellings being so close to proposed construction areas. Load restrictions/bridge access may cause delays/issues with delivery of materials. It is yet to be determined if any restricted work periods will be enforced by the Village or other entities adjacent to the beach and/or Mill Creek. It was determined that water diversion will be necessary for work along the beach and adjacent to Mill Creek. Any issue or combination of these issues is likely (especially the water diversion issue) and will have a moderate impact.	Moderate	Likely	3	
CE-6	Road Raisings	Concern expressed over site access, laydown areas, space to work, standoff distance to residences.	Site access from laydown areas may pose a risk as the contractor(s) proceed with work. It will require coordination and planning to avoid stockpiling material outside laydown areas, which are limited in size and location. Additional risk involved with dwellings being so close to proposed construction areas. Load restrictions/bridge access may cause delays/issues with delivery of materials. Any issue or combination of these issues is possible and could have a marginal impact.	Marginal	Possible	1	
CE-7	Interior Drainage	Concern expressed over site access, laydown areas, space to work, standoff distance to residences.	Site access from laydown areas may pose a risk as the contractor(s) proceed with work. It will require coordination and planning to avoid stockpiling material outside laydown areas, which are limited in size and location. Additional risk involved with dwellings being so close to proposed construction areas. Load restrictions/bridge access may cause delays/issues with delivery of materials. Dewatering and high tides could cause prolonged construction times. Any issue or combination of these issues is possible and could have a marginal impact.	Marginal	Possible	1	
CE-12	Remaining Construction Items (Wetland Mitigation)	No concerns regarding risk for wetland restoration.	NY District PDT has costed similar wetland restoration work at approximately \$300k-\$400k per acre of restoration. Bayville project has approximately 1/3 acre that requires restoration. Assumed cost of \$1 mil is more than sufficient to complete this feature of work. Little to no risk assumed.	Negligible	Unlikely	0	
CE-13	Planning, Engineering, & Design	No concerns.	N/A	Negligible	Unlikely	0	
CE-14	Construction Management	Concern expressed over site access, laydown areas, space to work, standoff distance to residences. Additional concerns regarding restricted work periods and the need for water diversion on the beach and at Mill Creek.	Site access from laydown areas may pose a risk as the contractor(s) proceed with work. It will require coordination and planning to avoid stockpiling material outside laydown areas, which are limited in size and location. Additional risk involved with dwellings being so close to proposed construction areas. Load restrictions/bridge access may cause delays/issues with delivery of materials. It is yet to be determined if any restricted work periods will be enforced by the Village or other entities adjacent to the beach and/or Mill Creek. It was determined that water diversion will be necessary for work along the beach and adjacent to Mill Creek. Any issue or combination of these issues is likely (especially the water diversion issue) and will have a moderate impact.	Moderate	Likely	3	
Quantities for Current Scope						Maximum Project Growth	20%
Q-1	General Requirements	No concerns.	N/A	Negligible	Unlikely	0	
Q-2	Floodwall @ Mill Creek	Concern expressed over the sheeting depth required and additional quantity of materials necessary where existing features are proposed to be demo'ed.	Sheeting depth may change based on seepage analysis, which has not been completed to date. Additional sheeting required is possible but will have marginal impact (material costs only as crew/equipment is already present).	Marginal	Possible	1	

Q-3	Floodwall in Roadway @ W. Harbor Drive	Concern expressed over the sheeting depth required and additional quantity of materials necessary where existing features are proposed to be demo'ed.	Sheeting depth may change based on seepage analysis, which has not been completed to date. Additional sheeting required is possible but will have marginal impact (material costs only as crew/equipment is already present).	Marginal	Possible	1	
Q-4	Floodwall @ Long Island Sound	Concern expressed over the sheeting depth required and additional quantity of materials necessary where existing features are proposed to be demo'ed.	Sheeting depth may change based on seepage analysis, which has not been completed to date. Additional sheeting required is possible but will have marginal impact (material costs only as crew/equipment is already present).	Marginal	Possible	1	
Q-5	Buried Floodwall @ Long Island Sound	Concern expressed over the sheeting depth required and additional quantity of materials necessary where existing features are proposed to be demo'ed.	Sheeting depth may change based on seepage analysis, which has not been completed to date. Additional sheeting required is possible but will have marginal impact (material costs only as crew/equipment is already present).	Marginal	Possible	1	
Q-6	Road Raisings	Concern expressed over number of utility crossings and condition of existing drainage present where road raisings are proposed.	The number of crossings were assumed and are likely to change (up or down) and will have a minimal impact since the necessary crews and equipment are assumed to be present already. Currently assumed that existing drainage at road raisings is okay for risers but may require replacement.	Moderate	Possible	2	
Q-7	Interior Drainage	Sizing, location, and/or types of drainage, to include pump stations, may change later.	The current design calls for HDPE pipes and minimum ground cover. Pump station design is based on previous projects and the assumption that the drainage areas are similar with this project. Additional design requirements may call for changes to some/all drainage features. Proposed pipelines are in sandy soils and close to existing utility lines. Alignments may need to be adjusted in the field. Excavation will require shoring. These changes are likely and will have a moderate impact to this feature of work.	Moderate	Likely	3	
Q-12	Remaining Construction Items (Wetland Mitigation)	No concerns regarding risk for wetland restoration.	NY District PDT has costed similar wetland restoration work at approximately \$300k-\$400k per acre of restoration. Bayville project has approximately 1/3 acre that requires restoration. Assumed cost of \$1 mil is more than sufficient to complete this feature of work. Little to no risk assumed.	Negligible	Unlikely	0	
Q-13	Planning, Engineering, & Design	Concern expressed over the sheeting depth required and additional quantity of materials necessary where existing features are proposed to be demo'ed.	Sheeting depth may change based on seepage analysis, which has not been completed to date. Additional sheeting required is possible but will have marginal impact (material costs only as crew/equipment is already present).	Marginal	Possible	1	
Q-14	Construction Management	Concern expressed over the sheeting depth required and additional quantity of materials necessary where existing features are proposed to be demo'ed.	Sheeting depth may change based on seepage analysis, which has not been completed to date. Additional sheeting required is possible but will have marginal impact (material costs only as crew/equipment is already present).	Marginal	Possible	1	
Specialty Fabrication or Equipment						Maximum Project Growth	75%
FE-1	General Requirements	Concern expressed over ability to provide batch plant on site and nearest quarry, batch plant, steel manufacturer.	The distance to these sites may drive costs due to the abnormally long haul routes due to the somewhat remote location and bridge loading limits of the site on Long Island. While it's possible this will be an issue, delivery costs are assumed in the estimate so impact will likely be marginal.	Marginal	Possible	1	
FE-2	Floodwall @ Mill Creek	Concern expressed over ability to provide batch plant on site and nearest quarry, batch plant, steel manufacturer.	The distance to these sites may drive costs due to the abnormally long haul routes due to the somewhat remote location of the site on Long Island. While it's possible this will be an issue, delivery costs are assumed in the estimate so impact will likely be marginal.	Marginal	Possible	1	
FE-3	Floodwall in Roadway @ W. Harbor Drive	Concern expressed over ability to provide batch plant on site and nearest quarry, batch plant, steel manufacturer.	The distance to these sites may drive costs due to the abnormally long haul routes due to the somewhat remote location of the site on Long Island. While it's possible this will be an issue, delivery costs are assumed in the estimate so impact will likely be marginal.	Marginal	Possible	1	
FE-4	Floodwall @ Long Island Sound	Concern expressed over ability to provide batch plant on site and nearest quarry, batch plant, steel manufacturer.	The distance to these sites may drive costs due to the abnormally long haul routes due to the somewhat remote location of the site on Long Island. While it's possible this will be an issue, delivery costs are assumed in the estimate so impact will likely be marginal.	Marginal	Possible	1	

FE-5	Buried Floodwall @ Long Island Sound	Concern expressed over ability to provide batch plant on site and nearest quarry, batch plant, steel manufacturer.	The distance to these sites may drive costs due to the abnormally long haul routes due to the somewhat remote location of the site on Long Island. While it's possible this will be an issue, delivery costs are assumed in the estimate so impact will likely be marginal.	Marginal	Possible	1	
FE-6	Road Raisings	Concern expressed over ability to provide batch plant on site and nearest quarry, batch plant, steel manufacturer.	The distance to these sites may drive costs due to the abnormally long haul routes due to the somewhat remote location of the site on Long Island. While it's possible this will be an issue, delivery costs are assumed in the estimate so impact will likely be marginal.	Marginal	Possible	1	
FE-7	Interior Drainage	Concern expressed over pump station variable speed pumps being proprietary or sole sourced and the ability of equipment in pump stations to handle the salt water conditions expected.	Similar projects done recently in New England in brackish water with similar equipment proposed. These costs are carried in Bayville estimates. Tide fluctuations may be greater than in Salisbury. Additional costs for dewatering and trench shoring will be incurred and, favorably, these costs are assumed in the current working estimate. The tide fluctuation will possibly have a moderate impact on construction of the interior drainage.	Moderate	Possible	2	
FE-12	Remaining Construction Items (Wetland Mitigation)	No concerns regarding risk for wetland restoration.	NY District PDT has costed similar wetland restoration work at approximately \$300k-\$400k per acre of restoration. Bayville project has approximately 1/3 acre that requires restoration. Assumed cost of \$1 mil is more than sufficient to complete this feature of work. Little to no risk assumed.	Negligible	Unlikely	0	
FE-13	Planning, Engineering, & Design	No concerns.	N/A	Negligible	Unlikely	0	
FE-14	Construction Management	No concerns.	N/A	Negligible	Unlikely	0	
Cost Estimate Assumptions						Maximum Project Growth	35%
CT-1	General Requirements	Estimate assumes only one mob/demob with two years of construction.	It is possible that the contractor(s) won't be able to work through the winter depending on the work to be performed, weather, and restrictions of local entities on sequencing and laydown areas. This would have a significant impact if two/multiple mob/demobs were required.	Significant	Possible	3	
CT-2	Floodwall @ Mill Creek	Estimate assumes items from cost book or items from similar projects. Estimate assumes one large prime earthwork contractor.	Production rates from similar projects may be not be 100% applicable due to staging/congestion/available work area specific to Bayville. In reality, the prime will likely be supplemented by smaller earthwork subs to assist with the large amount of work to be performed. It is possible lower production rates, differing construction methodology, and an additional level of markups for some features of work would have a significant impact on cost estimate assumptions.	Significant	Possible	3	
CT-3	Floodwall in Roadway @ W. Harbor Drive	Estimate assumes items from cost book or items from similar projects. Estimate assumes one large prime earthwork contractor.	Production rates from similar projects may be not be 100% applicable due to staging/congestion/available work area specific to Bayville. In reality, the prime will likely be supplemented by smaller earthwork subs to assist with the large amount of work to be performed. It is possible lower production rates, differing construction methodology, and an additional level of markups for some features of work would have a significant impact on cost estimate assumptions.	Significant	Possible	3	
CT-4	Floodwall @ Long Island Sound	Estimate assumes items from cost book or items from similar projects. Estimate assumes one large prime earthwork contractor.	Production rates from similar projects may be not be 100% applicable due to staging/congestion/available work area specific to Bayville. In reality, the prime will likely be supplemented by smaller earthwork subs to assist with the large amount of work to be performed. It is possible lower production rates, differing construction methodology, and an additional level of markups for some features of work would have a significant impact on cost estimate assumptions.	Significant	Possible	3	

CT-5	Buried Floodwall @ Long Island Sound	Estimate assumes items from cost book or items from similar projects. Estimate assumes one large prime earthwork contractor.	Production rates from similar projects may be not be 100% applicable due to staging/congestion/available work area specific to Bayville. In reality, the prime will likely be supplemented by smaller earthwork subs to assist with the large amount of work to be performed. It is possible lower production rates, differing construction methodology, and an additional level of markups for some features of work would have a significant impact on cost estimate assumptions.	Significant	Possible	3	
CT-6	Road Raisings	Estimate assumes items from cost book or items from similar projects. Estimate assumes one large prime earthwork contractor.	Production rates from similar projects may be not be 100% applicable due to staging/congestion/available work area specific to Bayville. In reality, the prime will likely be supplemented by smaller earthwork subs to assist with the large amount of work to be performed. It is possible lower production rates, differing construction methodology, and an additional level of markups for some features of work would have a moderate impact on cost estimate assumptions.	Moderate	Possible	2	
CT-7	Interior Drainage	Estimate assumes items from cost book or items from similar projects. Estimate assumes one large prime earthwork contractor.	Production rates from similar projects may be not be 100% applicable due to staging/congestion/available work area specific to Bayville. In reality, the prime will likely be supplemented by smaller earthwork subs to assist with the large amount of work to be performed. It is possible lower production rates, differing construction methodology, and an additional level of markups for some features of work would have a moderate impact on cost estimate assumptions.	Moderate	Possible	2	
CT-12	Remaining Construction Items (Wetland Mitigation)	No concerns regarding risk for wetland restoration.	NY District PDT has costed similar wetland restoration work at approximately \$300k-\$400k per acre of restoration. Bayville project has approximately 1/3 acre that requires restoration. Assumed cost of \$1 mil is more than sufficient to complete this feature of work. Little to no risk assumed.	Negligible	Unlikely	0	
CT-13	Planning, Engineering, & Design	Initial P.E.D. costs assumed from Planner.	P.E.D. costs not assumed to be a percentage of construction costs. It is possible this value will change and the impact could be moderate if the cost was developed incorrectly.	Moderate	Possible	2	
CT-14	Construction Management	Initial Construction Management costs assumed from Planner.	Construction Management costs not assumed to be a percentage of construction costs. It is possible this value will change and the impact could be moderate if the cost was developed incorrectly.	Moderate	Possible	2	
External Project Risks						Maximum Project Growth	40%
EX-1	General Requirements	Concerns expressed over Oyster Bay National Wildlife Refuge directly abuts Mill Creek and shellfish harvesting in Mill Creek, real estate and permitting issues, funding (both fed and nonfed), and local opposition to project. Weather/Acts of God, sea level rise, construction controls to keep locals out of project limits, and unexpected fuel/material inflation.	Wildlife Refuge and shellfish harvesting could impact construction timelines at work adjacent to Mill Creek; these impacts can and will be flushed out in later project stages. Real estate and permitting issues will be resolved prior to solicitation and will not affect construction cost or schedule. Sea level rise should not be significant enough to affect protection heights or construction even with construction midpoint scheduled for 2020. No abnormal inflation is expected, CWCCIS inflation calculated in TPCS should be adequate to cover any fuel/material cost increases. Weather, funding delays, and local opposition to the project has the potential to impact construction costs for all portions of the project.	Moderate	Possible	2	
EX-2	Floodwall @ Mill Creek	Concerns expressed over Oyster Bay National Wildlife Refuge directly abuts Mill Creek and shellfish harvesting in Mill Creek, real estate and permitting issues, funding (both fed and nonfed), and local opposition to project. Weather/Acts of God, sea level rise, construction controls to keep locals out of project limits, and unexpected fuel/material inflation.	Wildlife Refuge and shellfish harvesting could impact construction timelines at work adjacent to Mill Creek; these impacts can and will be flushed out in later project stages. Real estate and permitting issues will be resolved prior to solicitation and will not affect construction cost or schedule. Sea level rise should not be significant enough to affect protection heights or construction even with construction midpoint scheduled for 2020. No abnormal inflation is expected, CWCCIS inflation calculated in TPCS should be adequate to cover any fuel/material cost increases. Weather, funding delays, and local opposition to the project has the potential to impact construction costs for all portions of the project.	Moderate	Possible	2	

EX-3	Floodwall in Roadway @ W. Harbor Drive	Concerns expressed over real estate and permitting issues, funding (both fed and nonfed), and local opposition to project. Weather/Acts of God, sea level rise, construction controls to keep locals out of project limits, and unexpected fuel/material inflation.	Real estate and permitting issues will be resolved prior to solicitation and will not affect construction cost or schedule. Sea level rise should not be significant enough to affect protection heights or construction even with construction midpoint scheduled for 2020. No abnormal inflation is expected, CWCCIS inflation calculated in TPCS should be adequate to cover any fuel/material cost increases. Weather, funding delays, and local opposition to the project has the potential to impact construction costs for all portions of the project.	Marginal	Unlikely	0
EX-4	Floodwall @ Long Island Sound	Concerns expressed over real estate and permitting issues, funding (both fed and nonfed), and local opposition to project. Weather/Acts of God, sea level rise, construction controls to keep locals out of project limits, and unexpected fuel/material inflation.	Real estate and permitting issues will be resolved prior to solicitation and will not affect construction cost or schedule. Sea level rise should not be significant enough to affect protection heights or construction even with construction midpoint scheduled for 2020. No abnormal inflation is expected, CWCCIS inflation calculated in TPCS should be adequate to cover any fuel/material cost increases. Weather, funding delays, and local opposition to the project has the potential to impact construction costs for all portions of the project.	Marginal	Possible	1
EX-5	Buried Floodwall @ Long Island Sound	Concerns expressed over real estate and permitting issues, funding (both fed and nonfed), and local opposition to project. Weather/Acts of God, sea level rise, construction controls to keep locals out of project limits, and unexpected fuel/material inflation.	Real estate and permitting issues will be resolved prior to solicitation and will not affect construction cost or schedule. Sea level rise should not be significant enough to affect protection heights or construction even with construction midpoint scheduled for 2020. No abnormal inflation is expected, CWCCIS inflation calculated in TPCS should be adequate to cover any fuel/material cost increases. Weather, funding delays, and local opposition to the project has the potential to impact construction costs for all portions of the project.	Marginal	Possible	1
EX-6	Road Raisings	Concerns expressed over real estate and permitting issues, funding (both fed and nonfed), and local opposition to project. Weather/Acts of God, sea level rise, construction controls to keep locals out of project limits, and unexpected fuel/material inflation.	Real estate and permitting issues will be resolved prior to solicitation and will not affect construction cost or schedule. Sea level rise should not be significant enough to affect protection heights or construction even with construction midpoint scheduled for 2020. No abnormal inflation is expected, CWCCIS inflation calculated in TPCS should be adequate to cover any fuel/material cost increases. Weather, funding delays, and local opposition to the project has the potential to impact construction costs for all portions of the project.	Marginal	Possible	1
EX-7	Interior Drainage	Concerns expressed over real estate and permitting issues, funding (both fed and nonfed), and local opposition to project. Weather/Acts of God, sea level rise, construction controls to keep locals out of project limits, and unexpected fuel/material inflation.	Real estate and permitting issues will be resolved prior to solicitation and will not affect construction cost or schedule. Sea level rise should not be significant enough to affect protection heights or construction even with construction midpoint scheduled for 2020. No abnormal inflation is expected, CWCCIS inflation calculated in TPCS should be adequate to cover any fuel/material cost increases. Weather, funding delays, and local opposition to the project has the potential to impact construction costs for all portions of the project.	Marginal	Possible	1
EX-12	Remaining Construction Items (Wetland Mitigation)	No concerns regarding risk for wetland restoration.	NY District PDT has costed similar wetland restoration work at approximately \$300k-\$400k per acre of restoration. Bayville project has approximately 1/3 acre that requires restoration. Assumed cost of \$1 mil is more than sufficient to complete this feature of work. Little to no risk assumed.	Negligible	Unlikely	0
EX-13	Planning, Engineering, & Design	Concern expressed over study type and the design requirements associated with those types.	A similar New England District project required significant redesign based on an interpretation of the study type. It is possible this issue will present itself with this study.	Significant	Possible	3
EX-14	Construction Management	Concerns expressed over Oyster Bay National Wildlife Refuge directly abuts Mill Creek and shellfish harvesting in Mill Creek, real estate and permitting issues, funding (both fed and nonfed), and local opposition to project. Weather/Acts of God, sea level rise, construction controls to keep locals out of project limits, and unexpected fuel/material inflation.	Wildlife Refuge and shellfish harvesting could impact construction timelines at work adjacent to Mill Creek; these impacts can and will be flushed out in later project stages. Real estate and permitting issues will be resolved prior to solicitation and will not affect construction cost or schedule. Sea level rise should not be significant enough to affect protection heights or construction even with construction midpoint scheduled for 2020. No abnormal inflation is expected, CWCCIS inflation calculated in TPCS should be adequate to cover any fuel/material cost increases. Weather, funding delays, and local opposition to the project has the potential to impact construction costs for all portions of the project.	Moderate	Possible	2

BayvilleNY_CSDR_Alternatives Analysis_Alternative 4
ALTERNATIVE 4 - Tentatively Selected Plan (TSP)

Scope:

Long Island Sound side of Bayville: 3,850 linear feet of I-wall type concrete floodwall combined with 2,940 linear feet of buried floodwall. For initial analysis the top elevation of the structure has been established at elevation +14 feet (ft) North Atlantic Vertical Datum (NAVD88) (2% flood with wave setup). Oyster Bay (south) side of Bayville: 2,800 linear feet of I-wall type concrete floodwall adjoining the Mill Neck Creek neighborhood. Additionally, a 5,300 linear foot set-back floodwall will be built down the center lane of West Harbor Drive to the established design height. Traffic cross-overs (raised road) will be constructed at two intersections to reduce traffic impacts to local residents. For initial analysis the top elevation of the structure has been established at elevation +13 ft NAVD88 (2% flood without wave setup which is not a significant design factor for the Bay side).

Drainage features: With the floodwalls in place, pump stations will be required to pump storm water through the line of protection and into the Bay. Pump stations were designed with consideration of the USACE policy concerning minimum facility. Three pump stations with a combined capacity of 159 cfs have been sized to handle to large the volume of storm water expected within the study area. All three pump stations will be co-located with an emergency natural gas powered auxiliary power generator. New drainage lines will be constructed to efficiently deliver storm water to the pump stations and to prevent making the interior drainage problem worse than it currently is once the perimeter protection is constructed.

Sizing and interior drainage will be refined during optimization following the ADM Milestone.

Acquisition Strategy:

IFB [No additional markups/contractors provided for 8a or SBA acquisition.]

Contractor Markups:

Prime: 6% JOOH, 6% HOOH, 9.47% Profit (PWG), Class B Bond Table
Subs: 5% JOOH, 5%HOOH, 9.47% Profit (PWG)

Other Markups:

90% global productivity applied to estimate to account for working in wet and confined conditions and 4% sales tax.

Assumptions:

Majority of drainage costs obtained from Salisbury, MA Blackwater River project. Floodwall costs obtained from Pawcatuck Coastal Study. Estimate assumes one or more prime contractors are heavy earthwork and can and will self-perform a vast majority of the earthwork (to include excavation, backfill, sheetpiling, dune work, etc.). Contingency and escalation calculated in ARA and TPCS.

Estimated by Jeffrey Gaeta
Designed by NAE
Prepared by Jeffrey Gaeta

Preparation Date 11/20/2015
Effective Date of Pricing 11/20/2015
Estimated Construction Time 720 Days

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<u>Description</u>	<u>Quantity</u>	<u>UOM</u>	<u>LaborCost</u>	<u>MatlCost</u>	<u>EQCost</u>	<u>SubBidCost</u>	<u>BareCost</u>	<u>ContractCost</u>	<u>ProjectCost</u>
Project Cost Summary Report			5,240,151	14,120,882	2,222,980	5,484,827	27,068,839	37,137,972	37,137,972
BayvilleNY_FRM_Feasibility_Alternative 4	1.00	EA	5,240,151	14,120,882	2,222,980	5,484,827	27,068,839	37,137,972	37,137,972
General Requirements	1.00	EA	21,867	16,546	98,400	687,760	824,573	1,043,266	1,043,266
Mill Creek Floodwall - 2,260 LF	2,260.00	LF	582,851	1,988,169	250,681	275,720	3,097,422	4,248,209	4,248,209
West Harbor Drive Floodwall in Roadway - 5,860 LF	5,860.00	LF	822,363	2,578,296	264,779	457,080	4,122,518	5,796,122	5,796,122
Long Island Sound Floodwall - 4,500 LF	4,500.00	LF	1,514,295	5,146,120	631,820	849,700	8,141,935	11,184,891	11,184,891
Long Island Sound Reinforced Dune - 3,000 LF	3,000.00	LF	739,076	2,040,575	318,203	45,000	3,142,854	4,313,487	4,313,487
Road Raisings	1.00	EA	231,105	475,096	87,262	550,000	1,343,462	1,830,919	1,830,919
Interior Drainage	1.00	EA	1,328,594	1,876,080	571,835	1,812,028	5,588,537	7,721,078	7,721,078
Wetland Mitigation	1.00	EA	0	0	0	807,539	807,539	1,000,000	1,000,000

Alternative 1

- **Abbreviated Risk Analysis (ARA)**
 - **Cost Estimate**

Abbreviated Risk Analysis

Project (less than \$40M): **Bayville, NY Coastal Storm Risk Management Feasibility Study**
 Project Development Stage/Alternative: **Feasibility (Alternatives)**
 Risk Category: **Moderate Risk: Typical Project Construction Type**

Alternative: Alternative 1

Meeting Date: 11/12/2015

Total Estimated Construction Contract Cost = \$ **41,653,895**

	CWWBS	Feature of Work	Contract Cost	% Contingency	\$ Contingency	Total
	01 LANDS AND DAMAGES	Real Estate	\$ -	0.00%	\$ -	\$ -
1	11 02 FLOODWALLS	General Requirements	\$ 1,043,217	38.61%	\$ 402,757	\$ 1,445,974
2	11 02 FLOODWALLS	Floodwall @ Mill Creek	\$ 4,248,012	46.22%	\$ 1,963,291	\$ 6,211,303
3	11 02 FLOODWALLS	Floodwall @ W. Harbor Drive	\$ 10,932,584	36.85%	\$ 4,028,467	\$ 14,961,051
4	11 02 FLOODWALLS	Floodwall @ Long Island Sound	\$ 11,184,373	43.93%	\$ 4,913,803	\$ 16,098,176
5	11 LEVEES AND FLOODWALLS	Buried Floodwall @ Long Island Sound	\$ 4,313,288	32.97%	\$ 1,422,075	\$ 5,735,363
6	02 01 ROADS, Construction Activities	Road Raisings	\$ 1,211,700	22.80%	\$ 276,282	\$ 1,487,982
7	19 BUILDINGS, GROUNDS, AND UTILITIES	Interior Drainage	\$ 7,720,721	28.77%	\$ 2,221,496	\$ 9,942,217.22
8			\$ -	0.00%	\$ -	\$ -
9			\$ -	0.00%	\$ -	\$ -
10			\$ -	0.00%	\$ -	\$ -
11			\$ -	0.00%	\$ -	\$ -
12	All Other	Remaining Construction Items (Wetland Mitigation)	\$ 1,000,000	2.5%	\$ 70,000	\$ 1,070,000
13	30 PLANNING, ENGINEERING, AND DESIGN	Planning, Engineering, & Design	\$ 2,000,000	53.74%	\$ 1,074,780	\$ 3,074,780
14	31 CONSTRUCTION MANAGEMENT	Construction Management	\$ 1,655,000	33.76%	\$ 558,735	\$ 2,213,735
XX	FIXED DOLLAR RISK ADD (EQUALLY DISPERSED TO ALL, MUST INCLUDE JUSTIFICATION SEE BELOW)				\$ -	\$ -

Totals						
	Real Estate	\$ -	0.00%	\$ -	\$ -	\$ -
	Total Construction Estimate	\$ 41,653,895	36.73%	\$ 15,298,172	\$ 56,952,067	\$ 56,952,067
	Total Planning, Engineering & Design	\$ 2,000,000	53.74%	\$ 1,074,780	\$ 3,074,780	\$ 3,074,780
	Total Construction Management	\$ 1,655,000	33.76%	\$ 558,735	\$ 2,213,735	\$ 2,213,735
	Total	\$ 45,308,895	37%	\$ 16,931,687	\$ 62,240,582	\$ 62,240,582

Range Estimate (\$000's)	Base	50%	80%
	\$45,309k	\$55,468k	\$62,241k

* 50% based on base is at 5% CL

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

Bayville, NY Coastal Storm Risk Management Feasibility Study

Feasibility (Alternatives)

Abbreviated Risk Analysis

Meeting Date: 12-Nov-15

Risk Level					
Very Likely	2	3	4	5	5
Likely	1	2	3	4	5
Possible	0	1	2	3	4
Unlikely	0	0	1	2	3
	Negligible	Marginal	Moderate	Significant	Critical

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	General Requirements	Concern expressed regarding project scope increase to other areas in Bayville.	It is likely PDT will have to include nonstructural mitigation to properties in Bayville near the western edge of the current project site(s) as a result of public input.	Marginal	Likely	2
PS-2	Floodwall @ Mill Creek	Concerns expressed over current height of protection and coastal study on which the protection is designed against. Additional concern regarding current I-wall design vs T-wall design.	Current scope already designed to protect against 50-year storm with pre-Sandy Comprehensive values. Current design and associated costs are result in positive BCR but additional costs associated with larger protection will likely result in a negative BCR, resulting in NO protection for Bayville. Final protection heights will be determined during optimization which may rise slightly but will have marginal impact. The existing I-wall design is right on the threshold of requiring T-wall design. The existing design is conservative but optimization may push heights above I-wall design limits. It is possible the design will require T-walls which could have a significant impact on all floodwall design and construction.	Significant	Possible	3
PS-3	Floodwall @ W. Harbor Drive	Concerns expressed over current height of protection and coastal study on which the protection is designed against. Additional concern regarding current I-wall design vs T-wall design.	Current scope already designed to protect against 50-year storm with pre-Sandy Comprehensive values. Current design and associated costs are result in positive BCR but additional costs associated with larger protection will likely result in a negative BCR, resulting in NO protection for Bayville. Final protection heights will be determined during optimization which may rise slightly but will have marginal impact. The existing I-wall design is right on the threshold of requiring T-wall design. The existing design is conservative but optimization may push heights above I-wall design limits. It is possible the design will require T-walls which could have a significant impact on all floodwall design and construction.	Significant	Possible	3
PS-4	Floodwall @ Long Island Sound	Concerns expressed over current height of protection and coastal study on which the protection is designed against. Additional concern regarding current I-wall design vs T-wall design.	Current scope already designed to protect against 50-year storm with pre-Sandy Comprehensive values. Current design and associated costs are result in positive BCR but additional costs associated with larger protection will likely result in a negative BCR, resulting in NO protection for Bayville. Final protection heights will be determined during optimization which may rise slightly but will have marginal impact. The existing I-wall design is right on the threshold of requiring T-wall design. The existing design is conservative but optimization may push heights above I-wall design limits. It is unlikely the design will require T-walls but could have a significant impact on all floodwall design and construction.	Significant	Possible	3
PS-5	Buried Floodwall @ Long Island Sound	Concerns expressed over current height of protection and coastal study on which the protection is designed against.	Current scope already designed to protect against 50-year storm with pre-Sandy Comprehensive values. Current design and associated costs are result in positive BCR but additional costs associated with larger protection will likely result in a negative BCR, resulting in NO protection for Bayville. Final protection heights will be determined during optimization which may rise slightly but will have marginal impact.	Marginal	Possible	1
PS-6	Road Raisings	No concerns.	N/A	Negligible	Unlikely	0
PS-7	Interior Drainage	Concern over existing drainage design.	Gravity outfall for drainage may change during optimization.	Negligible	Unlikely	0

PS-12	Remaining Construction Items (Wetland Mitigation)	No concerns regarding risk for wetland restoration.	NY District PDT has costed similar wetland restoration work at approximately \$300k-\$400k per acre of restoration. Bayville project has approximately 1/3 acre that requires restoration. Assumed cost of \$1 mil is more than sufficient to complete this feature of work. Little to no risk assumed.	Negligible	Unlikely	0
PS-13	Planning, Engineering, & Design	Concern expressed regarding project scope increase to other areas in Bayville.	It is likely PDT will have to include nonstructural mitigation to properties in Bayville near the western edge of the current project site(s) as a result of public input. The change in I-wall to T-wall design will have a significant impact on P.E.D. if that change is required.	Significant	Likely	4
PS-14	Construction Management	Concern expressed regarding project scope increase to other areas in Bayville.	It is likely PDT will have to include nonstructural mitigation to properties in Bayville near the western edge of the current project site(s) as a result of public input.	Marginal	Likely	2
Acquisition Strategy					Maximum Project Growth	30%
AS-1	General Requirements	Concern expressed over contractor type, subs required, bid competition, and adequate bid schedule	Due to the large scale of the project, acquisition is not expected to be small business or 8a. It is assumed NY/Long Island has sufficient contractors with the ability to perform work successfully. Project could have multiple contracts (outer protection and interior drainage seperated for example) which may result in coordination issues.	Moderate	Possible	2
AS-2	Floodwall @ Mill Creek	Concern expressed over contractor type, subs required, bid competition, and adequate bid schedule	Due to the large scale of the project, acquisition is not expected to be small business or 8a. It is assumed NY/Long Island has sufficient contractors with the ability to perform work successfully. Project could have multiple contracts (outer protection and interior drainage seperated for example) which may result in coordination issues.	Marginal	Possible	1
AS-3	Floodwall @ W. Harbor Drive	Concern expressed over contractor type, subs required, bid competition, and adequate bid schedule	Due to the large scale of the project, acquisition is not expected to be small business or 8a. It is assumed NY/Long Island has sufficient contractors with the ability to perform work successfully. Project could have multiple contracts (outer protection and interior drainage seperated for example) which may result in coordination issues.	Marginal	Possible	1
AS-4	Floodwall @ Long Island Sound	Concern expressed over contractor type, subs required, bid competition, and adequate bid schedule	Due to the large scale of the project, acquisition is not expected to be small business or 8a. It is assumed NY/Long Island has sufficient contractors with the ability to perform work successfully. Project could have multiple contracts (outer protection and interior drainage seperated for example) which may result in coordination issues.	Marginal	Possible	1
AS-5	Buried Floodwall @ Long Island Sound	Concern expressed over contractor type, subs required, bid competition, and adequate bid schedule	Due to the large scale of the project, acquisition is not expected to be small business or 8a. It is assumed NY/Long Island has sufficient contractors with the ability to perform work successfully. Project could have multiple contracts (outer protection and interior drainage seperated for example) which may result in coordination issues.	Marginal	Possible	1
AS-6	Road Raisings	Concern expressed over contractor type, subs required, bid competition, and adequate bid schedule	Due to the large scale of the project, acquisition is not expected to be small business or 8a. It is assumed NY/Long Island has sufficient contractors with the ability to perform work successfully. Project could have multiple contracts (outer protection and interior drainage seperated for example) which may result in coordination issues.	Marginal	Possible	1
AS-7	Interior Drainage	Concern expressed over contractor type, subs required, bid competition, and adequate bid schedule	Due to the large scale of the project, acquisition is not expected to be small business or 8a. It is assumed NY/Long Island has sufficient contractors with the ability to perform work successfully. Project could have multiple contracts (outer protection and interior drainage seperated for example) which may result in coordination issues.	Marginal	Possible	1
AS-12	Remaining Construction Items (Wetland Mitigation)	No concerns regarding risk for wetland restoration.	NY District PDT has costed similar wetland restoration work at approximately \$300k-\$400k per acre of restoration. Bayville project has approximately 1/3 acre that requires restoration. Assumed cost of \$1 mil is more than sufficient to complete this feature of work. Little to no risk assumed.	Negligible	Unlikely	0

AS-13	Planning, Engineering, & Design	No concerns.	N/A	Negligible	Unlikely	0
AS-14	Construction Management	Concern expressed over contractor type, subs required, bid competition, and adequate bid schedule	Due to the large scale of the project, acquisition is not expected to be small business or 8a. It is assumed NY/Long Island has sufficient contractors with the ability to perform work successfully. Project could have multiple contracts (outer protection and interior drainage separated for example) which may result in coordination issues.	Moderate	Possible	2
Construction Elements				Maximum Project Growth		25%
CE-1	General Requirements	Concern expressed over site access, laydown areas, space to work, standoff distance to residences. Additional concerns regarding restricted work periods and the need for water diversion on the beach and at Mill Creek.	Site access from laydown areas may pose a risk as the contractor(s) proceed with work. It will require coordination and planning to avoid stockpiling material outside laydown areas, which are limited in size and location. Additional risk involved with dwellings being so close to proposed construction areas. Load restrictions/bridge access may cause delays/issues with delivery of materials. It is yet to be determined if any restricted work periods will be enforced by the Village or other entities adjacent to the beach and/or Mill Creek. It was determined that water diversion will be necessary for work along the beach and adjacent to Mill Creek. Any issue or combination of these issues is likely (especially the water diversion issue) and will have a moderate impact.	Moderate	Likely	3
CE-2	Floodwall @ Mill Creek	Concern expressed over site access, laydown areas, space to work, standoff distance to residences. Additional concerns regarding restricted work periods and the need for water diversion on the beach and at Mill Creek.	Site access from laydown areas may pose a risk as the contractor(s) proceed with work. It will require coordination and planning to avoid stockpiling material outside laydown areas, which are limited in size and location. Additional risk involved with dwellings being so close to proposed construction areas. Load restrictions/bridge access may cause delays/issues with delivery of materials. It is yet to be determined if any restricted work periods will be enforced by the Village or other entities adjacent to the beach and/or Mill Creek. It was determined that water diversion will be necessary for work along the beach and adjacent to Mill Creek. Any issue or combination of these issues is likely (especially the water diversion issue) and will have a moderate impact.	Moderate	Likely	3
CE-3	Floodwall @ W. Harbor Drive	Concern expressed over site access, laydown areas, space to work, standoff distance to residences.	Site access from laydown areas may pose a risk as the contractor(s) proceed with work. It will require coordination and planning to avoid stockpiling material outside laydown areas, which are limited in size and location. Additional risk involved with dwellings being so close to proposed construction areas. Load restrictions/bridge access may cause delays/issues with delivery of materials. Any issue or combination of these issues is possible and could have a marginal impact.	Marginal	Possible	1
CE-4	Floodwall @ Long Island Sound	Concern expressed over site access, laydown areas, space to work, standoff distance to residences. Additional concerns regarding restricted work periods and the need for water diversion on the beach and at Mill Creek.	Site access from laydown areas may pose a risk as the contractor(s) proceed with work. It will require coordination and planning to avoid stockpiling material outside laydown areas, which are limited in size and location. Additional risk involved with dwellings being so close to proposed construction areas. Load restrictions/bridge access may cause delays/issues with delivery of materials. It is yet to be determined if any restricted work periods will be enforced by the Village or other entities adjacent to the beach and/or Mill Creek. It was determined that water diversion will be necessary for work along the beach and adjacent to Mill Creek. Any issue or combination of these issues is likely (especially the water diversion issue) and will have a moderate impact.	Moderate	Likely	3

CE-5	Buried Floodwall @ Long Island Sound	Concern expressed over site access, laydown areas, space to work, standoff distance to residences. Additional concerns regarding restricted work periods and the need for water diversion on the beach and at Mill Creek.	Site access from laydown areas may pose a risk as the contractor(s) proceed with work. It will require coordination and planning to avoid stockpiling material outside laydown areas, which are limited in size and location. Additional risk involved with dwellings being so close to proposed construction areas. Load restrictions/bridge access may cause delays/issues with delivery of materials. It is yet to be determined if any restricted work periods will be enforced by the Village or other entities adjacent to the beach and/or Mill Creek. It was determined that water diversion will be necessary for work along the beach and adjacent to Mill Creek. Any issue or combination of these issues is likely (especially the water diversion issue) and will have a moderate impact.	Moderate	Likely	3	
CE-6	Road Raisings	Concern expressed over site access, laydown areas, space to work, standoff distance to residences.	Site access from laydown areas may pose a risk as the contractor(s) proceed with work. It will require coordination and planning to avoid stockpiling material outside laydown areas, which are limited in size and location. Additional risk involved with dwellings being so close to proposed construction areas. Load restrictions/bridge access may cause delays/issues with delivery of materials. Any issue or combination of these issues is possible and could have a marginal impact.	Marginal	Possible	1	
CE-7	Interior Drainage	Concern expressed over site access, laydown areas, space to work, standoff distance to residences.	Site access from laydown areas may pose a risk as the contractor(s) proceed with work. It will require coordination and planning to avoid stockpiling material outside laydown areas, which are limited in size and location. Additional risk involved with dwellings being so close to proposed construction areas. Load restrictions/bridge access may cause delays/issues with delivery of materials. Dewatering and high tides could cause prolonged construction times. Any issue or combination of these issues is possible and could have a marginal impact.	Marginal	Possible	1	
CE-12	Remaining Construction Items (Wetland Mitigation)	No concerns regarding risk for wetland restoration.	NY District PDT has costed similar wetland restoration work at approximately \$300k-\$400k per acre of restoration. Bayville project has approximately 1/3 acre that requires restoration. Assumed cost of \$1 mil is more than sufficient to complete this feature of work. Little to no risk assumed.	Negligible	Unlikely	0	
CE-13	Planning, Engineering, & Design	No concerns.	N/A	Negligible	Unlikely	0	
CE-14	Construction Management	Concern expressed over site access, laydown areas, space to work, standoff distance to residences. Additional concerns regarding restricted work periods and the need for water diversion on the beach and at Mill Creek.	Site access from laydown areas may pose a risk as the contractor(s) proceed with work. It will require coordination and planning to avoid stockpiling material outside laydown areas, which are limited in size and location. Additional risk involved with dwellings being so close to proposed construction areas. Load restrictions/bridge access may cause delays/issues with delivery of materials. It is yet to be determined if any restricted work periods will be enforced by the Village or other entities adjacent to the beach and/or Mill Creek. It was determined that water diversion will be necessary for work along the beach and adjacent to Mill Creek. Any issue or combination of these issues is likely (especially the water diversion issue) and will have a moderate impact.	Moderate	Likely	3	
Quantities for Current Scope					Maximum Project Growth		20%
Q-1	General Requirements	No concerns.	N/A	Negligible	Unlikely	0	
Q-2	Floodwall @ Mill Creek	Concern expressed over the sheeting depth required and additional quantity of materials necessary where existing features are proposed to be demo'ed.	Sheeting depth may change based on seepage analysis, which has not been completed to date. Additional sheeting required is possible but will have marginal impact (material costs only as crew/equipment is already present).	Marginal	Possible	1	
Q-3	Floodwall @ W. Harbor Drive	Concern expressed over the sheeting depth required and additional quantity of materials necessary where existing features are proposed to be demo'ed.	Sheeting depth may change based on seepage analysis, which has not been completed to date. Additional sheeting required is possible but will have marginal impact (material costs only as crew/equipment is already present).	Marginal	Possible	1	

Q-4	Floodwall @ Long Island Sound	Concern expressed over the sheeting depth required and additional quantity of materials necessary where existing features are proposed to be demo'ed.	Sheeting depth may change based on seepage analysis, which has not been completed to date. Additional sheeting required is possible but will have marginal impact (material costs only as crew/equipment is already present).	Marginal	Possible	1
Q-5	Buried Floodwall @ Long Island Sound	Concern expressed over the sheeting depth required and additional quantity of materials necessary where existing features are proposed to be demo'ed.	Sheeting depth may change based on seepage analysis, which has not been completed to date. Additional sheeting required is possible but will have marginal impact (material costs only as crew/equipment is already present).	Marginal	Possible	1
Q-6	Road Raisings	Concern expressed over number of utility crossings and condition of existing drainage present where road raisings are proposed.	The number of crossings were assumed and are likely to change (up or down) and will have a minimal impact since the necessary crews and equipment are assumed to be present already. Currently assumed that existing drainage at road raisings is okay for risers but may require replacement.	Moderate	Possible	2
Q-7	Interior Drainage	Sizing, location, and/or types of drainage, to include pump stations, may change later.	The current design calls for HDPE pipes and minimum ground cover. Pump station design is based on previous projects and the assumption that the drainage areas are similar with this project. Additional design requirements may call for changes to some/all drainage features. Proposed pipelines are in sandy soils and close to existing utility lines. Alignments may need to be adjusted in the field. Excavation will require shoring. These changes are likely and will have a moderate impact to this feature of work.	Moderate	Likely	3
Q-12	Remaining Construction Items (Wetland Mitigation)	No concerns regarding risk for wetland restoration.	NY District PDT has costed similar wetland restoration work at approximately \$300k-\$400k per acre of restoration. Bayville project has approximately 1/3 acre that requires restoration. Assumed cost of \$1 mil is more than sufficient to complete this feature of work. Little to no risk assumed.	Negligible	Unlikely	0
Q-13	Planning, Engineering, & Design	Concern expressed over the sheeting depth required and additional quantity of materials necessary where existing features are proposed to be demo'ed.	Sheeting depth may change based on seepage analysis, which has not been completed to date. Additional sheeting required is possible but will have marginal impact (material costs only as crew/equipment is already present).	Marginal	Possible	1
Q-14	Construction Management	Concern expressed over the sheeting depth required and additional quantity of materials necessary where existing features are proposed to be demo'ed.	Sheeting depth may change based on seepage analysis, which has not been completed to date. Additional sheeting required is possible but will have marginal impact (material costs only as crew/equipment is already present).	Marginal	Possible	1
Specialty Fabrication or Equipment					Maximum Project Growth	75%
FE-1	General Requirements	Concern expressed over ability to provide batch plant on site and nearest quarry, batch plant, steel manufacturer.	The distance to these sites may drive costs due to the abnormally long haul routes due to the somewhat remote location and bridge loading limits of the site on Long Island. While it's possible this will be an issue, delivery costs are assumed in the estimate so impact will likely be marginal.	Marginal	Possible	1
FE-2	Floodwall @ Mill Creek	Concern expressed over ability to provide batch plant on site and nearest quarry, batch plant, steel manufacturer.	The distance to these sites may drive costs due to the abnormally long haul routes due to the somewhat remote location and bridge loading limits of the site on Long Island. While it's possible this will be an issue, delivery costs are assumed in the estimate so impact will likely be marginal.	Marginal	Possible	1
FE-3	Floodwall @ W. Harbor Drive	Concern expressed over ability to provide batch plant on site and nearest quarry, batch plant, steel manufacturer.	The distance to these sites may drive costs due to the abnormally long haul routes due to the somewhat remote location and bridge loading limits of the site on Long Island. While it's possible this will be an issue, delivery costs are assumed in the estimate so impact will likely be marginal.	Marginal	Possible	1
FE-4	Floodwall @ Long Island Sound	Concern expressed over ability to provide batch plant on site and nearest quarry, batch plant, steel manufacturer.	The distance to these sites may drive costs due to the abnormally long haul routes due to the somewhat remote location and bridge loading limits of the site on Long Island. While it's possible this will be an issue, delivery costs are assumed in the estimate so impact will likely be marginal.	Marginal	Possible	1
FE-5	Buried Floodwall @ Long Island Sound	Concern expressed over ability to provide batch plant on site and nearest quarry, batch plant, steel manufacturer.	The distance to these sites may drive costs due to the abnormally long haul routes due to the somewhat remote location and bridge loading limits of the site on Long Island. While it's possible this will be an issue, delivery costs are assumed in the estimate so impact will likely be marginal.	Marginal	Possible	1

FE-6	Road Raisings	Concern expressed over ability to provide batch plant on site and nearest quarry, batch plant, steel manufacturer.	The distance to these sites may drive costs due to the abnormally long haul routes due to the somewhat remote location and bridge loading limits of the site on Long Island. While it's possible this will be an issue, delivery costs are assumed in the estimate so impact will likely be marginal.	Marginal	Possible	1
FE-7	Interior Drainage	Concern expressed over pump station variable speed pumps being proprietary or sole sourced and the ability of equipment in pump stations to handle the salt water conditions expected.	Similar projects done recently in New England in brackish water with similar equipment proposed. These costs are carried in Bayville estimates. Tide fluctuations may be greater than in Salisbury. Additional costs for dewatering and trench shoring will be incurred and, favorably, these costs are assumed in the current working estimate. The tide fluctuation will possibly have a moderate impact on construction of the interior drainage.	Moderate	Possible	2
FE-12	Remaining Construction Items (Wetland Mitigation)	No concerns regarding risk for wetland restoration.	NY District PDT has costed similar wetland restoration work at approximately \$300k-\$400k per acre of restoration. Bayville project has approximately 1/3 acre that requires restoration. Assumed cost of \$1 mil is more than sufficient to complete this feature of work. Little to no risk assumed.	Negligible	Unlikely	0
FE-13	Planning, Engineering, & Design	No concerns.	N/A	Negligible	Unlikely	0
FE-14	Construction Management	No concerns.	N/A	Negligible	Unlikely	0
Cost Estimate Assumptions				Maximum Project Growth		35%
CT-1	General Requirements	Estimate assumes only one mob/demob with two years of construction.	It is possible that the contractor(s) won't be able to work through the winter depending on the work to be performed, weather, and restrictions of local entities on sequencing and laydown areas. This would have a significant impact if two/multiple mob/demobs were required.	Significant	Possible	3
CT-2	Floodwall @ Mill Creek	Estimate assumes items from cost book or items from similar projects. Estimate assumes one large prime earthwork contractor.	Production rates from similar projects may be not be 100% applicable due to staging/congestion/available work area specific to Bayville. In reality, the prime will likely be supplemented by smaller earthwork subs to assist with the large amount of work to be performed. It is possible lower production rates, differing construction methodology, and an additional level of markups for some features of work would have a significant impact on cost estimate assumptions.	Significant	Possible	3
CT-3	Floodwall @ W. Harbor Drive	Estimate assumes items from cost book or items from similar projects. Estimate assumes one large prime earthwork contractor.	Production rates from similar projects may be not be 100% applicable due to staging/congestion/available work area specific to Bayville. In reality, the prime will likely be supplemented by smaller earthwork subs to assist with the large amount of work to be performed. It is possible lower production rates, differing construction methodology, and an additional level of markups for some features of work would have a significant impact on cost estimate assumptions.	Significant	Possible	3
CT-4	Floodwall @ Long Island Sound	Estimate assumes items from cost book or items from similar projects. Estimate assumes one large prime earthwork contractor.	Production rates from similar projects may be not be 100% applicable due to staging/congestion/available work area specific to Bayville. In reality, the prime will likely be supplemented by smaller earthwork subs to assist with the large amount of work to be performed. It is possible lower production rates, differing construction methodology, and an additional level of markups for some features of work would have a significant impact on cost estimate assumptions.	Significant	Possible	3
CT-5	Buried Floodwall @ Long Island Sound	Estimate assumes items from cost book or items from similar projects. Estimate assumes one large prime earthwork contractor.	Production rates from similar projects may be not be 100% applicable due to staging/congestion/available work area specific to Bayville. In reality, the prime will likely be supplemented by smaller earthwork subs to assist with the large amount of work to be performed. It is possible lower production rates, differing construction methodology, and an additional level of markups for some features of work would have a significant impact on cost estimate assumptions.	Significant	Possible	3

CT-6	Road Raisings	Estimate assumes items from cost book or items from similar projects. Estimate assumes one large prime earthwork contractor.	Production rates from similar projects may be not be 100% applicable due to staging/congestion/available work area specific to Bayville. In reality, the prime will likely be supplemented by smaller earthwork subs to assist with the large amount of work to be performed. It is possible lower production rates, differing construction methodology, and an additional level of markups for some features of work would have a moderate impact on cost estimate assumptions.	Moderate	Possible	2	
CT-7	Interior Drainage	Estimate assumes items from cost book or items from similar projects. Estimate assumes one large prime earthwork contractor.	Production rates from similar projects may be not be 100% applicable due to staging/congestion/available work area specific to Bayville. In reality, the prime will likely be supplemented by smaller earthwork subs to assist with the large amount of work to be performed. It is possible lower production rates, differing construction methodology, and an additional level of markups for some features of work would have a moderate impact on cost estimate assumptions.	Moderate	Possible	2	
CT-12	Remaining Construction Items (Wetland Mitigation)	No concerns regarding risk for wetland restoration.	NY District PDT has costed similar wetland restoration work at approximately \$300k-\$400k per acre of restoration. Bayville project has approximately 1/3 acre that requires restoration. Assumed cost of \$1 mil is more than sufficient to complete this feature of work. Little to no risk assumed.	Negligible	Unlikely	0	
CT-13	Planning, Engineering, & Design	Initial P.E.D. costs assumed from Planner.	P.E.D. costs not assumed to be a percentage of construction costs. It is possible this value will change and the impact could be moderate if the cost was developed incorrectly.	Moderate	Possible	2	
CT-14	Construction Management	Initial Construction Management costs assumed from Planner.	Construction Management costs not assumed to be a percentage of construction costs. It is possible this value will change and the impact could be moderate if the cost was developed incorrectly.	Moderate	Possible	2	
External Project Risks						Maximum Project Growth	40%
EX-1	General Requirements	Concerns expressed over Oyster Bay National Wildlife Refuge directly abuts Mill Creek and shellfish harvesting in Mill Creek, real estate and permitting issues, funding (both fed and nonfed), and local opposition to project. Weather/Acts of God, sea level rise, construction controls to keep locals out of project limits, and unexpected fuel/material inflation.	Wildlife Refuge and shellfish harvesting could impact construction timelines at work adjacent to Mill Creek; these impacts can and will be flushed out in later project stages. Real estate and permitting issues will be resolved prior to solicitation and will not affect construction cost or schedule. Sea level rise should not be significant enough to affect protection heights or construction even with construction midpoint scheduled for 2020. No abnormal inflation is expected, CWCCIS inflation calculated in TPCS should be adequate to cover any fuel/material cost increases. Weather, funding delays, and local opposition to the project has the potential to impact construction costs for all portions of the project.	Moderate	Possible	2	
EX-2	Floodwall @ Mill Creek	Concerns expressed over Oyster Bay National Wildlife Refuge directly abuts Mill Creek and shellfish harvesting in Mill Creek, real estate and permitting issues, funding (both fed and nonfed), and local opposition to project. Weather/Acts of God, sea level rise, construction controls to keep locals out of project limits, and unexpected fuel/material inflation.	Wildlife Refuge and shellfish harvesting could impact construction timelines at work adjacent to Mill Creek; these impacts can and will be flushed out in later project stages. Real estate and permitting issues will be resolved prior to solicitation and will not affect construction cost or schedule. Sea level rise should not be significant enough to affect protection heights or construction even with construction midpoint scheduled for 2020. No abnormal inflation is expected, CWCCIS inflation calculated in TPCS should be adequate to cover any fuel/material cost increases. Weather, funding delays, and local opposition to the project has the potential to impact construction costs for all portions of the project.	Moderate	Possible	2	
EX-3	Floodwall @ W. Harbor Drive	Concerns expressed over real estate and permitting issues, funding (both fed and nonfed), and local opposition to project. Weather/Acts of God, sea level rise, construction controls to keep locals out of project limits, and unexpected fuel/material inflation.	Real estate and permitting issues will be resolved prior to solicitation and will not affect construction cost or schedule. Sea level rise should not be significant enough to affect protection heights or construction even with construction midpoint scheduled for 2020. No abnormal inflation is expected, CWCCIS inflation calculated in TPCS should be adequate to cover any fuel/material cost increases. Weather, funding delays, and local opposition to the project has the potential to impact construction costs for all portions of the project.	Marginal	Unlikely	0	

EX-4	Floodwall @ Long Island Sound	Concerns expressed over real estate and permitting issues, funding (both fed and nonfed), and local opposition to project. Weather/Acts of God, sea level rise, construction controls to keep locals out of project limits, and unexpected fuel/material inflation.	Real estate and permitting issues will be resolved prior to solicitation and will not affect construction cost or schedule. Sea level rise should not be significant enough to affect protection heights or construction even with construction midpoint scheduled for 2020. No abnormal inflation is expected. CWCCIS inflation calculated in TPCS should be adequate to cover any fuel/material cost increases. Weather, funding delays, and local opposition to the project has the potential to impact construction costs for all portions of the project.	Marginal	Possible	1
EX-5	Buried Floodwall @ Long Island Sound	Concerns expressed over real estate and permitting issues, funding (both fed and nonfed), and local opposition to project. Weather/Acts of God, sea level rise, construction controls to keep locals out of project limits, and unexpected fuel/material inflation.	Real estate and permitting issues will be resolved prior to solicitation and will not affect construction cost or schedule. Sea level rise should not be significant enough to affect protection heights or construction even with construction midpoint scheduled for 2020. No abnormal inflation is expected. CWCCIS inflation calculated in TPCS should be adequate to cover any fuel/material cost increases. Weather, funding delays, and local opposition to the project has the potential to impact construction costs for all portions of the project.	Marginal	Possible	1
EX-6	Road Raisings	Concerns expressed over real estate and permitting issues, funding (both fed and nonfed), and local opposition to project. Weather/Acts of God, sea level rise, construction controls to keep locals out of project limits, and unexpected fuel/material inflation.	Real estate and permitting issues will be resolved prior to solicitation and will not affect construction cost or schedule. Sea level rise should not be significant enough to affect protection heights or construction even with construction midpoint scheduled for 2020. No abnormal inflation is expected. CWCCIS inflation calculated in TPCS should be adequate to cover any fuel/material cost increases. Weather, funding delays, and local opposition to the project has the potential to impact construction costs for all portions of the project.	Marginal	Possible	1
EX-7	Interior Drainage	Concerns expressed over real estate and permitting issues, funding (both fed and nonfed), and local opposition to project. Weather/Acts of God, sea level rise, construction controls to keep locals out of project limits, and unexpected fuel/material inflation.	Real estate and permitting issues will be resolved prior to solicitation and will not affect construction cost or schedule. Sea level rise should not be significant enough to affect protection heights or construction even with construction midpoint scheduled for 2020. No abnormal inflation is expected. CWCCIS inflation calculated in TPCS should be adequate to cover any fuel/material cost increases. Weather, funding delays, and local opposition to the project has the potential to impact construction costs for all portions of the project.	Marginal	Possible	1
EX-12	Remaining Construction Items (Wetland Mitigation)	No concerns regarding risk for wetland restoration.	NY District PDT has costed similar wetland restoration work at approximately \$300k-\$400k per acre of restoration. Bayville project has approximately 1/3 acre that requires restoration. Assumed cost of \$1 mil is more than sufficient to complete this feature of work. Little to no risk assumed.	Negligible	Unlikely	0
EX-13	Planning, Engineering, & Design	Concern expressed over study type and the design requirements associated with those types.	A similar New England District project required significant redesign based on an interpretation of the study type. It is possible this issue will present itself with this study.	Significant	Possible	3
EX-14	Construction Management	Concerns expressed over Oyster Bay National Wildlife Refuge directly abuts Mill Creek and shellfish harvesting in Mill Creek, real estate and permitting issues, funding (both fed and nonfed), and local opposition to project. Weather/Acts of God, sea level rise, construction controls to keep locals out of project limits, and unexpected fuel/material inflation.	Wildlife Refuge and shellfish harvesting could impact construction timelines at work adjacent to Mill Creek; these impacts can and will be flushed out in later project stages. Real estate and permitting issues will be resolved prior to solicitation and will not affect construction cost or schedule. Sea level rise should not be significant enough to affect protection heights or construction even with construction midpoint scheduled for 2020. No abnormal inflation is expected. CWCCIS inflation calculated in TPCS should be adequate to cover any fuel/material cost increases. Weather, funding delays, and local opposition to the project has the potential to impact construction costs for all portions of the project.	Moderate	Possible	2

BayvilleNY_CSDR_Alternatives Analysis_Alternative 1
ALTERNATIVE 1

Scope:

Long Island Sound side of Bayville: 3,850 linear feet of I-wall type concrete floodwall combined with 2,940 linear feet of buried floodwall. For initial analysis the top elevation of the structure has been established at elevation +14 feet (ft) North Atlantic Vertical Datum (NAVD88) (2% flood with wave setup). Oyster Bay (south) side of Bayville: 8,100 linear feet of I-wall type concrete floodwall. For initial analysis the top elevation of the structure has been established at elevation +13 ft NAVD88 (2% flood without wave setup which is not a significant design factor for the Bay side).

Drainage features: With the floodwalls in place, pump stations will be required to pump storm water through the line of protection and into the Bay. Pump stations were designed with consideration of the USACE policy concerning minimum facility. Three pump stations with a combined capacity of 159 cfs have been sized to handle to large the volume of storm water expected within the study area. All three pump stations will be co-located with an emergency natural gas powered auxiliary power generator. New drainage lines will be constructed to efficiently deliver storm water to the pump stations and to prevent making the interior drainage problem worse than it currently is once the perimeter protection is constructed.

Sizing and interior drainage will be refined during optimization following the ADM Milestone.

Acquisition Strategy:

IFB [No additional markups/contractors provided for 8a or SBA acquisition.]

Contractor Markups:

Prime: 6% JOOH, 6% HOOH, 9.47% Profit (PWG), Class B Bond Table
Subs: 5% JOOH, 5%HOOH, 9.47% Profit (PWG)

Other Markups:

90% global productivity applied to estimate to account for working in wet and confined conditions and 4% sales tax.

Assumptions:

Majority of drainage costs obtained from Salisbury, MA Blackwater River project. Floodwall costs obtained from Pawcatuck Coastal Study. Estimate assumes one or more prime contractors are heavy earthwork and can and will self-perform a vast majority of the earthwork (to include excavation, backfill, sheetpiling, dune work, etc.). Contingency and escalation calculated in ARA and TPCS.

Estimated by Jeffrey Gaeta
Designed by NAE
Prepared by Jeffrey Gaeta

Preparation Date 11/20/2015
Effective Date of Pricing 11/20/2015
Estimated Construction Time 720 Days

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<u>Description</u>	<u>Quantity</u>	<u>UOM</u>	<u>LaborCost</u>	<u>MatlCost</u>	<u>EQCost</u>	<u>SubBidCost</u>	<u>BareCost</u>	<u>ContractCost</u>	<u>ProjectCost</u>
Project Cost Summary Report			6,014,792	16,794,421	2,554,983	4,984,864	30,349,060	41,653,896	41,653,896
BayvilleNY_FRM_Feasibility_Alternative 1	1.00	EA	6,014,792	16,794,421	2,554,983	4,984,864	30,349,060	41,653,896	41,653,896
General Requirements	1.00	EA	21,867	16,546	98,400	687,760	824,573	1,043,217	1,043,217
Mill Creek Floodwall - 2,260 LF	2,260.00	LF	582,851	1,988,169	250,681	275,720	3,097,422	4,248,012	4,248,012
West Harbor Drive Floodwall - 5,860 LF	5,860.00	LF	1,597,004	5,251,835	596,782	457,080	7,902,701	10,932,584	10,932,584
Long Island Sound Floodwall - 4,500 LF	4,500.00	LF	1,514,295	5,146,120	631,820	849,700	8,141,935	11,184,373	11,184,373
Long Island Sound Reinforced Dune - 3,000 LF	3,000.00	LF	739,076	2,040,575	318,203	45,000	3,142,854	4,313,288	4,313,288
Road Raisings	1.00	EA	231,105	475,096	87,262	50,000	843,462	1,211,700	1,211,700
Interior Drainage	1.00	EA	1,328,594	1,876,080	571,835	1,812,028	5,588,537	7,720,721	7,720,721
Wetland Mitigation	1.00	EA	0	0	0	807,576	807,576	1,000,000	1,000,000

Alternative 2

- **Abbreviated Risk Analysis (ARA)**
 - **Cost Estimate**

Abbreviated Risk Analysis

Project (less than \$40M): **Bayville, NY Coastal Storm Risk Management Feasibility Study**
 Project Development Stage/Alternative: **Feasibility (Alternatives)**
 Risk Category: **Moderate Risk: Typical Project Construction Type**

Alternative: Alternative 2

Meeting Date: 11/12/2015

Total Estimated Construction Contract Cost = \$ **40,302,316**

	CWWBS	Feature of Work	Contract Cost	% Contingency	\$ Contingency	Total
	01 LANDS AND DAMAGES	Real Estate	\$ -	0.00%	\$ -	\$ -
1	11 02 FLOODWALLS	General Requirements	\$ 1,043,213	38.61%	\$ 402,756	\$ 1,445,969
2	11 02 FLOODWALLS	Levee @ Mill Creek	\$ 6,398,050	35.25%	\$ 2,255,428	\$ 8,653,478
3	11 02 FLOODWALLS	Road Raising @ W. Harbor Drive	\$ 7,431,070	27.38%	\$ 2,034,423	\$ 9,465,493
4	11 02 FLOODWALLS	Floodwall @ Long Island Sound	\$ 11,184,328	43.93%	\$ 4,913,783	\$ 16,098,111
5	11 LEVEES AND FLOODWALLS	Buried Floodwall @ Long Island Sound	\$ 4,313,270	32.97%	\$ 1,422,069	\$ 5,735,339
6	02 01 ROADS, Construction Activities	Road Raisings	\$ 1,211,695	22.80%	\$ 276,280	\$ 1,487,975
7	19 BUILDINGS, GROUNDS, AND UTILITIES	Interior Drainage	\$ 7,720,690	28.77%	\$ 2,221,487	\$ 9,942,177.30
8			\$ -	0.00%	\$ -	\$ -
9			\$ -	0.00%	\$ -	\$ -
10			\$ -	0.00%	\$ -	\$ -
11			\$ -	0.00%	\$ -	\$ -
12	All Other	Remaining Construction Items (Wetland Mitigation)	\$ 1,000,000	2.5%	\$ 70,000	\$ 1,070,000
13	30 PLANNING, ENGINEERING, AND DESIGN	Planning, Engineering, & Design	\$ 2,000,000	53.74%	\$ 1,074,780	\$ 3,074,780
14	31 CONSTRUCTION MANAGEMENT	Construction Management	\$ 1,655,000	33.76%	\$ 558,735	\$ 2,213,735
XX	FIXED DOLLAR RISK ADD (EQUALLY DISPERSED TO ALL, MUST INCLUDE JUSTIFICATION SEE BELOW)				\$ -	\$ -

Totals						
	Real Estate	\$ -	0.00%	\$ -	\$ -	\$ -
	Total Construction Estimate	\$ 40,302,316	33.74%	\$ 13,596,227	\$ 53,898,543	\$ 53,898,543
	Total Planning, Engineering & Design	\$ 2,000,000	53.74%	\$ 1,074,780	\$ 3,074,780	\$ 3,074,780
	Total Construction Management	\$ 1,655,000	33.76%	\$ 558,735	\$ 2,213,735	\$ 2,213,735
	Total	\$ 43,957,316	35%	\$ 15,229,742	\$ 59,187,058	\$ 59,187,058
				Base	50%	80%
	Range Estimate (\$000's)			\$43,957k	\$53,095k	\$59,187k

* 50% based on base is at 5% CL

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

Bayville, NY Coastal Storm Risk Management Feasibility Study

Feasibility (Alternatives)
Abbreviated Risk Analysis

Meeting Date: 12-Nov-15

		Risk Level				
Very Likely		2	3	4	5	5
Likely		1	2	3	4	5
Possible		0	1	2	3	4
Unlikely		0	0	1	2	3
		Negligible	Marginal	Moderate	Significant	Critical

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						75%
				Maximum Project Growth		
PS-1	General Requirements	Concern expressed regarding project scope increase to other areas in Bayville.	It is likely PDT will have to include nonstructural mitigation to properties in Bayville near the western edge of the current project site(s) as a result of public input.	Marginal	Likely	2
PS-2	Levee @ Mill Creek	Concerns expressed over current height of protection and coastal study on which the protection is designed against.	Current scope already designed to protect against 50-year storm with pre-Sandy Comprehensive values. Current design and associated costs are result in positive BCR but additional costs associated with larger protection will likely result in a negative BCR, resulting in NO protection for Bayville. Final protection heights will be determined during optimization which may rise slightly but will have marginal impact.	Marginal	Possible	1
PS-3	Road Raising @ W. Harbor Drive	Concerns expressed over current height of protection and coastal study on which the protection is designed against.	Current scope already designed to protect against 50-year storm with pre-Sandy Comprehensive values. Current design and associated costs are result in positive BCR but additional costs associated with larger protection will likely result in a negative BCR, resulting in NO protection for Bayville. Final protection heights will be determined during optimization which may rise slightly but will have marginal impact.	Marginal	Possible	1
PS-4	Floodwall @ Long Island Sound	Concerns expressed over current height of protection and coastal study on which the protection is designed against. Additional concern regarding current I-wall design vs T-wall design.	Current scope already designed to protect against 50-year storm with pre-Sandy Comprehensive values. Current design and associated costs are result in positive BCR but additional costs associated with larger protection will likely result in a negative BCR, resulting in NO protection for Bayville. Final protection heights will be determined during optimization which may rise slightly but will have marginal impact. The existing I-wall design is right on the threshold of requiring T-wall design. The existing design is conservative but optimization may push heights above I-wall design limites. It is possible the design will require T-walls which could have a significant impact on all floodwall design and construction.	Significant	Possible	3
PS-5	Buried Floodwall @ Long Island Sound	Concerns expressed over current height of protection and coastal study on which the protection is designed against.	Current scope already designed to protect against 50-year storm with pre-Sandy Comprehensive values. Current design and associated costs are result in positive BCR but additional costs associated with larger protection will likely result in a negative BCR, resulting in NO protection for Bayville. Final protection heights will be determined during optimization which may rise slightly but will have marginal impact.	Marginal	Possible	1
PS-6	Road Raisings	No concerns.	N/A	Negligible	Unlikely	0
PS-7	Interior Drainage	Concern over existing drainage design.	Gravity outfall for drainage may change during optimization.	Negligible	Unlikely	0
PS-12	Remaining Construction Items (Wetland Mitigation)	No concerns regarding risk for wetland restoration.	NY District PDT has costed similar wetland restoration work at approximately \$300k-\$400k per acre of restoration. Bayville project has approximately 1/3 acre that requires restoration. Assumed cost of \$1 mil is more than sufficient to complete this feature of work. Little to no risk assumed.	Negligible	Unlikely	0

PS-13	Planning, Engineering, & Design	Concern expressed regarding project scope increase to other areas in Bayville.	It is likely PDT will have to include nonstructural mitigation to properties in Bayville near the western edge of the current project site(s) as a result of public input. The change in I-wall to T-wall design will have a significant impact on P.E.D. if that change is required.	Significant	Likely	4
PS-14	Construction Management	Concern expressed regarding project scope increase to other areas in Bayville.	It is likely PDT will have to include nonstructural mitigation to properties in Bayville near the western edge of the current project site(s) as a result of public input.	Marginal	Likely	2
Acquisition Strategy				Maximum Project Growth		30%
AS-1	General Requirements	Concern expressed over contractor type, subs required, bid competition, and adequate bid schedule	Due to the large scale of the project, acquisition is not expected to be small business or 8a. It is assumed NY/Long Island has sufficient contractors with the ability to perform work successfully. Project could have multiple contracts (outer protection and interior drainage seperated for example) which may result in coordination issues.	Moderate	Possible	2
AS-2	Levee @ Mill Creek	Concern expressed over contractor type, subs required, bid competition, and adequate bid schedule	Due to the large scale of the project, acquisition is not expected to be small business or 8a. It is assumed NY/Long Island has sufficient contractors with the ability to perform work successfully. Project could have multiple contracts (outer protection and interior drainage seperated for example) which may result in coordination issues.	Marginal	Possible	1
AS-3	Road Raising @ W. Harbor Drive	Concern expressed over contractor type, subs required, bid competition, and adequate bid schedule	Due to the large scale of the project, acquisition is not expected to be small business or 8a. It is assumed NY/Long Island has sufficient contractors with the ability to perform work successfully. Project could have multiple contracts (outer protection and interior drainage seperated for example) which may result in coordination issues.	Marginal	Possible	1
AS-4	Floodwall @ Long Island Sound	Concern expressed over contractor type, subs required, bid competition, and adequate bid schedule	Due to the large scale of the project, acquisition is not expected to be small business or 8a. It is assumed NY/Long Island has sufficient contractors with the ability to perform work successfully. Project could have multiple contracts (outer protection and interior drainage seperated for example) which may result in coordination issues.	Marginal	Possible	1
AS-5	Buried Floodwall @ Long Island Sound	Concern expressed over contractor type, subs required, bid competition, and adequate bid schedule	Due to the large scale of the project, acquisition is not expected to be small business or 8a. It is assumed NY/Long Island has sufficient contractors with the ability to perform work successfully. Project could have multiple contracts (outer protection and interior drainage seperated for example) which may result in coordination issues.	Marginal	Possible	1
AS-6	Road Raisings	Concern expressed over contractor type, subs required, bid competition, and adequate bid schedule	Due to the large scale of the project, acquisition is not expected to be small business or 8a. It is assumed NY/Long Island has sufficient contractors with the ability to perform work successfully. Project could have multiple contracts (outer protection and interior drainage seperated for example) which may result in coordination issues.	Marginal	Possible	1
AS-7	Interior Drainage	Concern expressed over contractor type, subs required, bid competition, and adequate bid schedule	Due to the large scale of the project, acquisition is not expected to be small business or 8a. It is assumed NY/Long Island has sufficient contractors with the ability to perform work successfully. Project could have multiple contracts (outer protection and interior drainage seperated for example) which may result in coordination issues.	Marginal	Possible	1
AS-12	Remaining Construction Items (Wetland Mitigation)	No concerns regarding risk for wetland restoration.	NY District PDT has costed similar wetland restoration work at approximately \$300k-\$400k per acre of restoration. Bayville project has approximately 1/3 acre that requires restoration. Assumed cost of \$1 mil is more than sufficient to complete this feature of work. Little to no risk assumed.	Negligible	Unlikely	0
AS-13	Planning, Engineering, & Design	No concerns.	N/A	Negligible	Unlikely	0

AS-14	Construction Management	Concern expressed over contractor type, subs required, bid competition, and adequate bid schedule	Due to the large scale of the project, acquisition is not expected to be small business or 8a. It is assumed NY/Long Island has sufficient contractors with the ability to perform work successfully. Project could have multiple contracts (outer protection and interior drainage seperated for example) which may result in coordination issues.	Moderate	Possible	2
Construction Elements				Maximum Project Growth		25%
CE-1	General Requirements	Concern expressed over site access, laydown areas, space to work, standoff distance to residences. Additional concerns regarding restricted work periods and the need for water diversion on the beach and at Mill Creek.	Site access from laydown areas may pose a risk as the contractor(s) proceed with work. It will require coordination and planning to avoid stockpiling material outside laydown areas, which are limited in size and location. Additional risk involved with dwellings being so close to proposed construction areas. Load restrictions/bridge access may cause delays/issues with delivery of materials. It is yet to be determined if any restricted work periods will be enforced by the Village or other entities adjacent to the beach and/or Mill Creek. It was determined that water diversion will be necessary for work along the beach and adjacent to Mill Creek. Any issue or combination of these issues is likely (especially the water diversion issue) and will have a moderate impact.	Moderate	Likely	3
CE-2	Levee @ Mill Creek	Concern expressed over site access, laydown areas, space to work, standoff distance to residences. Additional concerns regarding restricted work periods and the need for water diversion on the beach and at Mill Creek.	Site access from laydown areas may pose a risk as the contractor(s) proceed with work. It will require coordination and planning to avoid stockpiling material outside laydown areas, which are limited in size and location. Additional risk involved with dwellings being so close to proposed construction areas. Load restrictions/bridge access may cause delays/issues with delivery of materials. It is yet to be determined if any restricted work periods will be enforced by the Village or other entities adjacent to the beach and/or Mill Creek. It was determined that water diversion will be necessary for work along the beach and adjacent to Mill Creek. Any issue or combination of these issues is likely (especially the water diversion issue) and will have a moderate impact.	Moderate	Likely	3
CE-3	Road Raising @ W. Harbor Drive	Concern expressed over site access, laydown areas, space to work, standoff distance to residences.	Site access from laydown areas may pose a risk as the contractor(s) proceed with work. It will require coordination and planning to avoid stockpiling material outside laydown areas, which are limited in size and location. Additional risk involved with dwellings being so close to proposed construction areas. Load restrictions/bridge access may cause delays/issues with delivery of materials. Any issue or combination of these issues is possible and could have a marginal impact.	Marginal	Possible	1
CE-4	Floodwall @ Long Island Sound	Concern expressed over site access, laydown areas, space to work, standoff distance to residences. Additional concerns regarding restricted work periods and the need for water diversion on the beach and at Mill Creek.	Site access from laydown areas may pose a risk as the contractor(s) proceed with work. It will require coordination and planning to avoid stockpiling material outside laydown areas, which are limited in size and location. Additional risk involved with dwellings being so close to proposed construction areas. Load restrictions/bridge access may cause delays/issues with delivery of materials. It is yet to be determined if any restricted work periods will be enforced by the Village or other entities adjacent to the beach and/or Mill Creek. It was determined that water diversion will be necessary for work along the beach and adjacent to Mill Creek. Any issue or combination of these issues is likely (especially the water diversion issue) and will have a moderate impact.	Moderate	Likely	3

CE-5	Buried Floodwall @ Long Island Sound	Concern expressed over site access, laydown areas, space to work, standoff distance to residences. Additional concerns regarding restricted work periods and the need for water diversion on the beach and at Mill Creek.	Site access from laydown areas may pose a risk as the contractor(s) proceed with work. It will require coordination and planning to avoid stockpiling material outside laydown areas, which are limited in size and location. Additional risk involved with dwellings being so close to proposed construction areas. Load restrictions/bridge access may cause delays/issues with delivery of materials. It is yet to be determined if any restricted work periods will be enforced by the Village or other entities adjacent to the beach and/or Mill Creek. It was determined that water diversion will be necessary for work along the beach and adjacent to Mill Creek. Any issue or combination of these issues is likely (especially the water diversion issue) and will have a moderate impact.	Moderate	Likely	3	
CE-6	Road Raisings	Concern expressed over site access, laydown areas, space to work, standoff distance to residences.	Site access from laydown areas may pose a risk as the contractor(s) proceed with work. It will require coordination and planning to avoid stockpiling material outside laydown areas, which are limited in size and location. Additional risk involved with dwellings being so close to proposed construction areas. Load restrictions/bridge access may cause delays/issues with delivery of materials. Any issue or combination of these issues is possible and could have a marginal impact.	Marginal	Possible	1	
CE-7	Interior Drainage	Concern expressed over site access, laydown areas, space to work, standoff distance to residences.	Site access from laydown areas may pose a risk as the contractor(s) proceed with work. It will require coordination and planning to avoid stockpiling material outside laydown areas, which are limited in size and location. Additional risk involved with dwellings being so close to proposed construction areas. Load restrictions/bridge access may cause delays/issues with delivery of materials. Dewatering and high tides could cause prolonged construction times. Any issue or combination of these issues is possible and could have a marginal impact.	Marginal	Possible	1	
CE-12	Remaining Construction Items (Wetland Mitigation)	No concerns regarding risk for wetland restoration.	NY District PDT has costed similar wetland restoration work at approximately \$300k-\$400k per acre of restoration. Bayville project has approximately 1/3 acre that requires restoration. Assumed cost of \$1 mil is more than sufficient to complete this feature of work. Little to no risk assumed.	Negligible	Unlikely	0	
CE-13	Planning, Engineering, & Design	No concerns.	N/A	Negligible	Unlikely	0	
CE-14	Construction Management	Concern expressed over site access, laydown areas, space to work, standoff distance to residences. Additional concerns regarding restricted work periods and the need for water diversion on the beach and at Mill Creek.	Site access from laydown areas may pose a risk as the contractor(s) proceed with work. It will require coordination and planning to avoid stockpiling material outside laydown areas, which are limited in size and location. Additional risk involved with dwellings being so close to proposed construction areas. Load restrictions/bridge access may cause delays/issues with delivery of materials. It is yet to be determined if any restricted work periods will be enforced by the Village or other entities adjacent to the beach and/or Mill Creek. It was determined that water diversion will be necessary for work along the beach and adjacent to Mill Creek. Any issue or combination of these issues is likely (especially the water diversion issue) and will have a moderate impact.	Moderate	Likely	3	
Quantities for Current Scope						Maximum Project Growth	20%
Q-1	General Requirements	No concerns.	N/A	Negligible	Unlikely	0	
Q-2	Levee @ Mill Creek	Concern expressed over the sheeting depth required and additional quantity of materials necessary where existing features are proposed to be demo'ed.	Sheeting depth may change based on seepage analysis, which has not been completed to date. Additional sheeting required is possible but will have marginal impact (material costs only as crew/equipment is already present).	Marginal	Possible	1	

Q-3	Road Raising @ W. Harbor Drive	Concern expressed over the lack of stone protection on the slopes of the raised road sections and additional quantity of materials necessary where existing features are proposed to be demo'ed.	A requirement to add stone to the slopes of the raised road sections is likely but will have marginal impact (material costs only as crew/equipment is already present).	Marginal	Likely	2	
Q-4	Floodwall @ Long Island Sound	Concern expressed over the sheeting depth required and additional quantity of materials necessary where existing features are proposed to be demo'ed.	Sheeting depth may change based on seepage analysis, which has not been completed to date. Additional sheeting required is possible but will have marginal impact (material costs only as crew/equipment is already present).	Marginal	Possible	1	
Q-5	Buried Floodwall @ Long Island Sound	Concern expressed over the sheeting depth required and additional quantity of materials necessary where existing features are proposed to be demo'ed.	Sheeting depth may change based on seepage analysis, which has not been completed to date. Additional sheeting required is possible but will have marginal impact (material costs only as crew/equipment is already present).	Marginal	Possible	1	
Q-6	Road Raisings	Concern expressed over number of utility crossings and condition of existing drainage present where road raisings are proposed.	The number of crossings were assumed and are likely to change (up or down) and will have a minimal impact since the necessary crews and equipment are assumed to be present already. Currently assumed that existing drainage at road raisings is okay for risers but may require replacement.	Moderate	Possible	2	
Q-7	Interior Drainage	Sizing, location, and/or types of drainage, to include pump stations, may change later.	The current design calls for HDPE pipes and minimum ground cover. Pump station design is based on previous projects and the assumption that the drainage areas are similar with this project. Additional design requirements may call for changes to some/all drainage features. Proposed pipelines are in sandy soils and close to existing utility lines. Alignments may need to be adjusted in the field. Excavation will require shoring. These changes are likely and will have a moderate impact to this feature of work.	Moderate	Likely	3	
Q-12	Remaining Construction Items (Wetland Mitigation)	No concerns regarding risk for wetland restoration.	NY District PDT has costed similar wetland restoration work at approximately \$300k-\$400k per acre of restoration. Bayville project has approximately 1/3 acre that requires restoration. Assumed cost of \$1 mil is more than sufficient to complete this feature of work. Little to no risk assumed.	Negligible	Unlikely	0	
Q-13	Planning, Engineering, & Design	Concern expressed over the sheeting depth required and additional quantity of materials necessary where existing features are proposed to be demo'ed.	Sheeting depth may change based on seepage analysis, which has not been completed to date. Additional sheeting required is possible but will have marginal impact (material costs only as crew/equipment is already present).	Marginal	Possible	1	
Q-14	Construction Management	Concern expressed over the sheeting depth required and additional quantity of materials necessary where existing features are proposed to be demo'ed.	Sheeting depth may change based on seepage analysis, which has not been completed to date. Additional sheeting required is possible but will have marginal impact (material costs only as crew/equipment is already present).	Marginal	Possible	1	
Specialty Fabrication or Equipment						Maximum Project Growth	75%
FE-1	General Requirements	Concern expressed over ability to provide batch plant on site and nearest quarry, batch plant, steel manufacturer.	The distance to these sites may drive costs due to the abnormally long haul routes due to the somewhat remote location and bridge loading limits of the site on Long Island. While it's possible this will be an issue, delivery costs are assumed in the estimate so impact will likely be marginal.	Marginal	Possible	1	
FE-2	Levee @ Mill Creek	Concern expressed over ability to provide batch plant on site and nearest quarry, batch plant, steel manufacturer.	The distance to these sites may drive costs due to the abnormally long haul routes due to the somewhat remote location of the site on Long Island. While it's possible this will be an issue, delivery costs are assumed in the estimate so impact will likely be marginal.	Marginal	Possible	1	
FE-3	Road Raising @ W. Harbor Drive	Concern expressed over ability to provide batch plant on site and nearest quarry, batch plant, steel manufacturer.	The distance to these sites may drive costs due to the abnormally long haul routes due to the somewhat remote location of the site on Long Island. While it's possible this will be an issue, delivery costs are assumed in the estimate so impact will likely be marginal.	Marginal	Possible	1	
FE-4	Floodwall @ Long Island Sound	Concern expressed over ability to provide batch plant on site and nearest quarry, batch plant, steel manufacturer.	The distance to these sites may drive costs due to the abnormally long haul routes due to the somewhat remote location of the site on Long Island. While it's possible this will be an issue, delivery costs are assumed in the estimate so impact will likely be marginal.	Marginal	Possible	1	

FE-5	Buried Floodwall @ Long Island Sound	Concern expressed over ability to provide batch plant on site and nearest quarry, batch plant, steel manufacturer.	The distance to these sites may drive costs due to the abnormally long haul routes due to the somewhat remote location of the site on Long Island. While it's possible this will be an issue, delivery costs are assumed in the estimate so impact will likely be marginal.	Marginal	Possible	1
FE-6	Road Raisings	Concern expressed over ability to provide batch plant on site and nearest quarry, batch plant, steel manufacturer.	The distance to these sites may drive costs due to the abnormally long haul routes due to the somewhat remote location of the site on Long Island. While it's possible this will be an issue, delivery costs are assumed in the estimate so impact will likely be marginal.	Marginal	Possible	1
FE-7	Interior Drainage	Concern expressed over pump station variable speed pumps being proprietary or sole sourced and the ability of equipment in pump stations to handle the salt water conditions expected.	Similar projects done recently in New England in brackish water with similar equipment proposed. These costs are carried in Bayville estimates. Tide fluctuations may be greater than in Salisbury. Additional costs for dewatering and trench shoring will be incurred and, favorably, these costs are assumed in the current working estimate. The tide fluctuation will possibly have a moderate impact on construction of the interior drainage.	Moderate	Possible	2
FE-12	Remaining Construction Items (Wetland Mitigation)	No concerns regarding risk for wetland restoration.	NY District PDT has costed similar wetland restoration work at approximately \$300k-\$400k per acre of restoration. Bayville project has approximately 1/3 acre that requires restoration. Assumed cost of \$1 mil is more than sufficient to complete this feature of work. Little to no risk assumed.	Negligible	Unlikely	0
FE-13	Planning, Engineering, & Design	No concerns.	N/A	Negligible	Unlikely	0
FE-14	Construction Management	No concerns.	N/A	Negligible	Unlikely	0
Cost Estimate Assumptions					Maximum Project Growth	35%
CT-1	General Requirements	Estimate assumes only one mob/demob with two years of construction.	It is possible that the contractor(s) won't be able to work through the winter depending on the work to be performed, weather, and restrictions of local entities on sequencing and laydown areas. This would have a significant impact if two/multiple mob/demobs were required.	Significant	Possible	3
CT-2	Levee @ Mill Creek	Estimate assumes items from cost book or items from similar projects. Estimate assumes one large prime earthwork contractor.	Production rates from similar projects may be not be 100% applicable due to staging/congestion/available work area specific to Bayville. In reality, the prime will likely be supplemented by smaller earthwork subs to assist with the large amount of work to be performed. It is possible lower production rates, differing construction methodology, and an additional level of markups for some features of work would have a significant impact on cost estimate assumptions.	Significant	Possible	3
CT-3	Road Raising @ W. Harbor Drive	Estimate assumes items from cost book or items from similar projects. Estimate assumes one large prime earthwork contractor.	Production rates from similar projects may be not be 100% applicable due to staging/congestion/available work area specific to Bayville. In reality, the prime will likely be supplemented by smaller earthwork subs to assist with the large amount of work to be performed. It is possible lower production rates, differing construction methodology, and an additional level of markups for some features of work would have a significant impact on cost estimate assumptions.	Significant	Possible	3
CT-4	Floodwall @ Long Island Sound	Estimate assumes items from cost book or items from similar projects. Estimate assumes one large prime earthwork contractor.	Production rates from similar projects may be not be 100% applicable due to staging/congestion/available work area specific to Bayville. In reality, the prime will likely be supplemented by smaller earthwork subs to assist with the large amount of work to be performed. It is possible lower production rates, differing construction methodology, and an additional level of markups for some features of work would have a significant impact on cost estimate assumptions.	Significant	Possible	3

CT-5	Buried Floodwall @ Long Island Sound	Estimate assumes items from cost book or items from similar projects. Estimate assumes one large prime earthwork contractor.	Production rates from similar projects may be not be 100% applicable due to staging/congestion/available work area specific to Bayville. In reality, the prime will likely be supplemented by smaller earthwork subs to assist with the large amount of work to be performed. It is possible lower production rates, differing construction methodology, and an additional level of markups for some features of work would have a significant impact on cost estimate assumptions.	Significant	Possible	3	
CT-6	Road Raisings	Estimate assumes items from cost book or items from similar projects. Estimate assumes one large prime earthwork contractor.	Production rates from similar projects may be not be 100% applicable due to staging/congestion/available work area specific to Bayville. In reality, the prime will likely be supplemented by smaller earthwork subs to assist with the large amount of work to be performed. It is possible lower production rates, differing construction methodology, and an additional level of markups for some features of work would have a moderate impact on cost estimate assumptions.	Moderate	Possible	2	
CT-7	Interior Drainage	Estimate assumes items from cost book or items from similar projects. Estimate assumes one large prime earthwork contractor.	Production rates from similar projects may be not be 100% applicable due to staging/congestion/available work area specific to Bayville. In reality, the prime will likely be supplemented by smaller earthwork subs to assist with the large amount of work to be performed. It is possible lower production rates, differing construction methodology, and an additional level of markups for some features of work would have a moderate impact on cost estimate assumptions.	Moderate	Possible	2	
CT-12	Remaining Construction Items (Wetland Mitigation)	No concerns regarding risk for wetland restoration.	NY District PDT has costed similar wetland restoration work at approximately \$300k-\$400k per acre of restoration. Bayville project has approximately 1/3 acre that requires restoration. Assumed cost of \$1 mil is more than sufficient to complete this feature of work. Little to no risk assumed.	Negligible	Unlikely	0	
CT-13	Planning, Engineering, & Design	Initial P.E.D. costs assumed from Planner.	P.E.D. costs not assumed to be a percentage of construction costs. It is possible this value will change and the impact could be moderate if the cost was developed incorrectly.	Moderate	Possible	2	
CT-14	Construction Management	Initial Construction Management costs assumed from Planner.	Construction Management costs not assumed to be a percentage of construction costs. It is possible this value will change and the impact could be moderate if the cost was developed incorrectly.	Moderate	Possible	2	
External Project Risks						Maximum Project Growth	40%
EX-1	General Requirements	Concerns expressed over Oyster Bay National Wildlife Refuge directly abuts Mill Creek and shellfish harvesting in Mill Creek, real estate and permitting issues, funding (both fed and nonfed), and local opposition to project. Weather/Acts of God, sea level rise, construction controls to keep locals out of project limits, and unexpected fuel/material inflation.	Wildlife Refuge and shellfish harvesting could impact construction timelines at work adjacent to Mill Creek; these impacts can and will be flushed out in later project stages. Real estate and permitting issues will be resolved prior to solicitation and will not affect construction cost or schedule. Sea level rise should not be significant enough to affect protection heights or construction even with construction midpoint scheduled for 2020. No abnormal inflation is expected, CWCCIS inflation calculated in TPCS should be adequate to cover any fuel/material cost increases. Weather, funding delays, and local opposition to the project has the potential to impact construction costs for all portions of the project.	Moderate	Possible	2	
EX-2	Levee @ Mill Creek	Concerns expressed over Oyster Bay National Wildlife Refuge directly abuts Mill Creek and shellfish harvesting in Mill Creek, real estate and permitting issues, funding (both fed and nonfed), and local opposition to project. Weather/Acts of God, sea level rise, construction controls to keep locals out of project limits, and unexpected fuel/material inflation.	Wildlife Refuge and shellfish harvesting could impact construction timelines at work adjacent to Mill Creek; these impacts can and will be flushed out in later project stages. Real estate and permitting issues will be resolved prior to solicitation and will not affect construction cost or schedule. Sea level rise should not be significant enough to affect protection heights or construction even with construction midpoint scheduled for 2020. No abnormal inflation is expected, CWCCIS inflation calculated in TPCS should be adequate to cover any fuel/material cost increases. Weather, funding delays, and local opposition to the project has the potential to impact construction costs for all portions of the project.	Moderate	Possible	2	

EX-3	Road Raising @ W. Harbor Drive	Concerns expressed over real estate and permitting issues, funding (both fed and nonfed), and local opposition to project. Weather/Acts of God, sea level rise, construction controls to keep locals out of project limits, and unexpected fuel/material inflation.	Real estate and permitting issues will be resolved prior to solicitation and will not affect construction cost or schedule. Sea level rise should not be significant enough to affect protection heights or construction even with construction midpoint scheduled for 2020. No abnormal inflation is expected, CWCCIS inflation calculated in TPCS should be adequate to cover any fuel/material cost increases. Weather, funding delays, and local opposition to the project has the potential to impact construction costs for all portions of the project.	Marginal	Unlikely	0
EX-4	Floodwall @ Long Island Sound	Concerns expressed over real estate and permitting issues, funding (both fed and nonfed), and local opposition to project. Weather/Acts of God, sea level rise, construction controls to keep locals out of project limits, and unexpected fuel/material inflation.	Real estate and permitting issues will be resolved prior to solicitation and will not affect construction cost or schedule. Sea level rise should not be significant enough to affect protection heights or construction even with construction midpoint scheduled for 2020. No abnormal inflation is expected, CWCCIS inflation calculated in TPCS should be adequate to cover any fuel/material cost increases. Weather, funding delays, and local opposition to the project has the potential to impact construction costs for all portions of the project.	Marginal	Possible	1
EX-5	Buried Floodwall @ Long Island Sound	Concerns expressed over real estate and permitting issues, funding (both fed and nonfed), and local opposition to project. Weather/Acts of God, sea level rise, construction controls to keep locals out of project limits, and unexpected fuel/material inflation.	Real estate and permitting issues will be resolved prior to solicitation and will not affect construction cost or schedule. Sea level rise should not be significant enough to affect protection heights or construction even with construction midpoint scheduled for 2020. No abnormal inflation is expected, CWCCIS inflation calculated in TPCS should be adequate to cover any fuel/material cost increases. Weather, funding delays, and local opposition to the project has the potential to impact construction costs for all portions of the project.	Marginal	Possible	1
EX-6	Road Raisings	Concerns expressed over real estate and permitting issues, funding (both fed and nonfed), and local opposition to project. Weather/Acts of God, sea level rise, construction controls to keep locals out of project limits, and unexpected fuel/material inflation.	Real estate and permitting issues will be resolved prior to solicitation and will not affect construction cost or schedule. Sea level rise should not be significant enough to affect protection heights or construction even with construction midpoint scheduled for 2020. No abnormal inflation is expected, CWCCIS inflation calculated in TPCS should be adequate to cover any fuel/material cost increases. Weather, funding delays, and local opposition to the project has the potential to impact construction costs for all portions of the project.	Marginal	Possible	1
EX-7	Interior Drainage	Concerns expressed over real estate and permitting issues, funding (both fed and nonfed), and local opposition to project. Weather/Acts of God, sea level rise, construction controls to keep locals out of project limits, and unexpected fuel/material inflation.	Real estate and permitting issues will be resolved prior to solicitation and will not affect construction cost or schedule. Sea level rise should not be significant enough to affect protection heights or construction even with construction midpoint scheduled for 2020. No abnormal inflation is expected, CWCCIS inflation calculated in TPCS should be adequate to cover any fuel/material cost increases. Weather, funding delays, and local opposition to the project has the potential to impact construction costs for all portions of the project.	Marginal	Possible	1
EX-12	Remaining Construction Items (Wetland Mitigation)	No concerns regarding risk for wetland restoration.	NY District PDT has costed similar wetland restoration work at approximately \$300k-\$400k per acre of restoration. Bayville project has approximately 1/3 acre that requires restoration. Assumed cost of \$1 mil is more than sufficient to complete this feature of work. Little to no risk assumed.	Negligible	Unlikely	0
EX-13	Planning, Engineering, & Design	Concern expressed over study type and the design requirements associated with those types.	A similar New England District project required significant redesign based on an interpretation of the study type. It is possible this issue will present itself with this study.	Significant	Possible	3
EX-14	Construction Management	Concerns expressed over Oyster Bay National Wildlife Refuge directly abuts Mill Creek and shellfish harvesting in Mill Creek, real estate and permitting issues, funding (both fed and nonfed), and local opposition to project. Weather/Acts of God, sea level rise, construction controls to keep locals out of project limits, and unexpected fuel/material inflation.	Wildlife Refuge and shellfish harvesting could impact construction timelines at work adjacent to Mill Creek; these impacts can and will be flushed out in later project stages. Real estate and permitting issues will be resolved prior to solicitation and will not affect construction cost or schedule. Sea level rise should not be significant enough to affect protection heights or construction even with construction midpoint scheduled for 2020. No abnormal inflation is expected, CWCCIS inflation calculated in TPCS should be adequate to cover any fuel/material cost increases. Weather, funding delays, and local opposition to the project has the potential to impact construction costs for all portions of the project.	Moderate	Possible	2

BayvilleNY_CSDR_Alternatives Analysis_Alternative 2
ALTERNATIVE 2

Scope:

Long Island Sound side of Bayville: 3,850 linear feet of I-wall type concrete floodwall combined with 2,940 linear feet of buried floodwall. For initial analysis the top elevation of the structure has been established at elevation +14 feet (ft) North Atlantic Vertical Datum (NAVD88) (2% flood with wave setup). Oyster Bay (south) side of Bayville: 2,800 linear feet of earthen levee adjoining the Mill Neck Creek neighborhood. 5,300 linear feet of West Harbor Drive is elevated to the design height with all adjoining private driveways and intersections tied in. For initial analysis the top elevation of structures has been established at elevation +13 ft NAVD88 (2% flood without wave setup which is not a significant design factor for the Bay side.)

Drainage features: With the floodwalls and levees in place, pump stations will be required to pump storm water through the line of protection and into the Bay. Pump stations were designed with consideration of the USACE policy concerning minimum facility. Three pump stations with a combined capacity of 159 cfs have been sized to handle to large the volume of storm water expected within the study area. All three pump stations will be co-located with an emergency natural gas powered auxiliary power generator. New drainage lines will be constructed to efficiently deliver storm water to the pump stations and to prevent making the interior drainage problem worse than it currently is once the perimeter protection is constructed.

Sizing and interior drainage will be refined during optimization following the ADM Milestone.

Acquisition Strategy:

IFB [No additional markups/contractors provided for 8a or SBA acquisition.]

Contractor Markups:

Prime: 6% JOOH, 6% HOOH, 9.47% Profit (PWG), Class B Bond Table

Subs: 5% JOOH, 5%HOOH, 9.47% Profit (PWG)

Other Markups:

90% global productivity applied to estimate to account for working in wet and confined conditions and 4% sales tax.

Assumptions:

Majority of drainage costs obtained from Salisbury, MA Blackwater River project. Floodwall costs obtained from Pawcatuck Coastal Study. Estimate assumes one or more prime contractors are heavy earthwork and can and will self-perform a vast majority of the earthwork (to include excavation, backfill, sheetpiling, dune work, etc.). Contingency and escalation calculated in ARA and TPCS.

Estimated by Jeffrey Gaeta

Designed by NAE

Prepared by Jeffrey Gaeta

Preparation Date 11/20/2015

Effective Date of Pricing 11/20/2015

Estimated Construction Time 720 Days

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<u>Description</u>	<u>Quantity</u>	<u>UOM</u>	<u>LaborCost</u>	<u>MatlCost</u>	<u>EQCost</u>	<u>SubBidCost</u>	<u>BareCost</u>	<u>ContractCost</u>	<u>ProjectCost</u>
Project Cost Summary Report			6,391,033	15,178,865	3,084,892	4,290,617	28,945,407	40,302,317	40,302,317
BayvilleNY_FRM_Feasibility_Alternative 2	1.00	EA	6,391,033	15,178,865	3,084,892	4,290,617	28,945,407	40,302,317	40,302,317
General Requirements	1.00	EA	21,867	16,546	98,400	687,760	824,573	1,043,213	1,043,213
Mill Creek Levee - 2,260 LF	2,260.00	LF	1,229,659	2,660,152	732,647	0	4,622,458	6,398,050	6,398,050
West Harbor Drive Road Raising - 5,860 LF	5,860.00	LF	1,326,437	2,964,296	644,725	38,550	4,974,009	7,431,070	7,431,070
Long Island Sound Floodwall - 4,500 LF	4,500.00	LF	1,514,295	5,146,120	631,820	849,700	8,141,935	11,184,328	11,184,328
Long Island Sound Reinforced Dune - 3,000 LF	3,000.00	LF	739,076	2,040,575	318,203	45,000	3,142,854	4,313,270	4,313,270
Road Raisings	1.00	EA	231,105	475,096	87,262	50,000	843,462	1,211,695	1,211,695
Interior Drainage	1.00	EA	1,328,594	1,876,080	571,835	1,812,028	5,588,537	7,720,690	7,720,690
Wetland Mitigation	1.00	EA	0	0	0	807,579	807,579	1,000,000	1,000,000

Alternative 3

- **Abbreviated Risk Analysis (ARA)**
 - **Cost Estimate**

Abbreviated Risk Analysis

Project (less than \$40M): **Bayville, NY Coastal Storm Risk Management Feasibility Study**
 Project Development Stage/Alternative: **Feasibility (Alternatives)**
 Risk Category: **Moderate Risk: Typical Project Construction Type**

Alternative: Alternative 3

Meeting Date: 11/12/2015

Total Estimated Construction Contract Cost = \$ **38,153,707**

	CWWBS	Feature of Work	Contract Cost	% Contingency	\$ Contingency	Total
	01 LANDS AND DAMAGES	Real Estate	\$ -	0.00%	\$ -	\$ -
1	11 02 FLOODWALLS	General Requirements	\$ 1,043,254	38.61%	\$ 402,772	\$ 1,446,026
2	11 02 FLOODWALLS	Floodwall @ Mill Creek	\$ 4,248,160	46.22%	\$ 1,963,360	\$ 6,211,520
3	11 02 FLOODWALLS	Road Raising @ W. Harbor Drive	\$ 7,431,359	27.38%	\$ 2,034,502	\$ 9,465,861
4	11 02 FLOODWALLS	Floodwall @ Long Island Sound	\$ 11,184,764	43.93%	\$ 4,913,974	\$ 16,098,738
5	11 LEVEES AND FLOODWALLS	Buried Floodwall @ Long Island Sound	\$ 4,313,438	32.97%	\$ 1,422,125	\$ 5,735,563
6	02 01 ROADS, Construction Activities	Road Raisings	\$ 1,211,741	22.80%	\$ 276,291	\$ 1,488,032
7	19 BUILDINGS, GROUNDS, AND UTILITIES	Interior Drainage	\$ 7,720,991	28.77%	\$ 2,221,574	\$ 9,942,564.91
8			\$ -	0.00%	\$ -	\$ -
9			\$ -	0.00%	\$ -	\$ -
10			\$ -	0.00%	\$ -	\$ -
11			\$ -	0.00%	\$ -	\$ -
12	All Other	Remaining Construction Items (Wetland Mitigation)	\$ 1,000,000	2.7%	\$ 70,000	\$ 1,070,000
13	30 PLANNING, ENGINEERING, AND DESIGN	Planning, Engineering, & Design	\$ 2,000,000	53.74%	\$ 1,074,780	\$ 3,074,780
14	31 CONSTRUCTION MANAGEMENT	Construction Management	\$ 1,655,000	33.76%	\$ 558,735	\$ 2,213,735
XX	FIXED DOLLAR RISK ADD (EQUALLY DISPERSED TO ALL, MUST INCLUDE JUSTIFICATION SEE BELOW)				\$ -	\$ -

Totals						
	Real Estate	\$ -	0.00%	\$ -	\$ -	\$ -
	Total Construction Estimate	\$ 38,153,707	34.87%	\$ 13,304,597	\$ 51,458,304	\$ 51,458,304
	Total Planning, Engineering & Design	\$ 2,000,000	53.74%	\$ 1,074,780	\$ 3,074,780	\$ 3,074,780
	Total Construction Management	\$ 1,655,000	33.76%	\$ 558,735	\$ 2,213,735	\$ 2,213,735
	Total	\$ 41,808,707	36%	\$ 14,938,112	\$ 56,746,819	\$ 56,746,819

Range Estimate (\$000's)	Base	50%	80%
	\$41,809k	\$50,772k	\$56,747k

* 50% based on base is at 5% CL

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

Bayville, NY Coastal Storm Risk Management Feasibility Study

Feasibility (Alternatives)

Abbreviated Risk Analysis

Meeting Date: 12-Nov-15

Risk Level					
Very Likely	2	3	4	5	5
Likely	1	2	3	4	5
Possible	0	1	2	3	4
Unlikely	0	0	1	2	3
	Negligible	Marginal	Moderate	Significant	Critical

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	General Requirements	Concern expressed regarding project scope increase to other areas in Bayville.	It is likely PDT will have to include nonstructural mitigation to properties in Bayville near the western edge of the current project site(s) as a result of public input.	Marginal	Likely	2
PS-2	Floodwall @ Mill Creek	Concerns expressed over current height of protection and coastal study on which the protection is designed against. Additional concern regarding current I-wall design vs T-wall design.	Current scope already designed to protect against 50-year storm with pre-Sandy Comprehensive values. Current design and associated costs are result in positive BCR but additional costs associated with larger protection will likely result in a negative BCR, resulting in NO protection for Bayville. Final protection heights will be determined during optimization which may rise slightly but will have marginal impact. The existing I-wall design is right on the threshold of requiring T-wall design. The existing design is conservative but optimization may push heights above I-wall design limits. It is possible the design will require T-walls which could have a significant impact on all floodwall design and construction.	Significant	Possible	3
PS-3	Road Raising @ W. Harbor Drive	Concerns expressed over current height of protection and coastal study on which the protection is designed against.	Current scope already designed to protect against 50-year storm with pre-Sandy Comprehensive values. Current design and associated costs are result in positive BCR but additional costs associated with larger protection will likely result in a negative BCR, resulting in NO protection for Bayville. Final protection heights will be determined during optimization which may rise slightly but will have marginal impact.	Marginal	Possible	1
PS-4	Floodwall @ Long Island Sound	Concerns expressed over current height of protection and coastal study on which the protection is designed against. Additional concern regarding current I-wall design vs T-wall design.	Current scope already designed to protect against 50-year storm with pre-Sandy Comprehensive values. Current design and associated costs are result in positive BCR but additional costs associated with larger protection will likely result in a negative BCR, resulting in NO protection for Bayville. Final protection heights will be determined during optimization which may rise slightly but will have marginal impact. The existing I-wall design is right on the threshold of requiring T-wall design. The existing design is conservative but optimization may push heights above I-wall design limits. It is unlikely the design will require T-walls but could have a significant impact on all floodwall design and construction.	Significant	Possible	3
PS-5	Buried Floodwall @ Long Island Sound	Concerns expressed over current height of protection and coastal study on which the protection is designed against.	Current scope already designed to protect against 50-year storm with pre-Sandy Comprehensive values. Current design and associated costs are result in positive BCR but additional costs associated with larger protection will likely result in a negative BCR, resulting in NO protection for Bayville. Final protection heights will be determined during optimization which may rise slightly but will have marginal impact.	Marginal	Possible	1
PS-6	Road Raisings	No concerns.	N/A	Negligible	Unlikely	0
PS-7	Interior Drainage	Concern over existing drainage design.	Gravity outfall for drainage may change during optimization.	Negligible	Unlikely	0
PS-12	Remaining Construction Items (Wetland Mitigation)	No concerns regarding risk for wetland restoration.	NY District PDT has costed similar wetland restoration work at approximately \$300k-\$400k per acre of restoration. Bayville project has approximately 1/3 acre that requires restoration. Assumed cost of \$1 mil is more than sufficient to complete this feature of work. Little to no risk assumed.	Negligible	Unlikely	0

PS-13	Planning, Engineering, & Design	Concern expressed regarding project scope increase to other areas in Bayville.	It is likely PDT will have to include nonstructural mitigation to properties in Bayville near the western edge of the current project site(s) as a result of public input. The change in I-wall to T-wall design will have a significant impact on P.E.D. if that change is required.	Significant	Likely	4
PS-14	Construction Management	Concern expressed regarding project scope increase to other areas in Bayville.	It is likely PDT will have to include nonstructural mitigation to properties in Bayville near the western edge of the current project site(s) as a result of public input.	Marginal	Likely	2
Acquisition Strategy				Maximum Project Growth		30%
AS-1	General Requirements	Concern expressed over contractor type, subs required, bid competition, and adequate bid schedule	Due to the large scale of the project, acquisition is not expected to be small business or 8a. It is assumed NY/Long Island has sufficient contractors with the ability to perform work successfully. Project could have multiple contracts (outer protection and interior drainage separated for example) which may result in coordination issues.	Moderate	Possible	2
AS-2	Floodwall @ Mill Creek	Concern expressed over contractor type, subs required, bid competition, and adequate bid schedule	Due to the large scale of the project, acquisition is not expected to be small business or 8a. It is assumed NY/Long Island has sufficient contractors with the ability to perform work successfully. Project could have multiple contracts (outer protection and interior drainage separated for example) which may result in coordination issues.	Marginal	Possible	1
AS-3	Road Raising @ W. Harbor Drive	Concern expressed over contractor type, subs required, bid competition, and adequate bid schedule	Due to the large scale of the project, acquisition is not expected to be small business or 8a. It is assumed NY/Long Island has sufficient contractors with the ability to perform work successfully. Project could have multiple contracts (outer protection and interior drainage separated for example) which may result in coordination issues.	Marginal	Possible	1
AS-4	Floodwall @ Long Island Sound	Concern expressed over contractor type, subs required, bid competition, and adequate bid schedule	Due to the large scale of the project, acquisition is not expected to be small business or 8a. It is assumed NY/Long Island has sufficient contractors with the ability to perform work successfully. Project could have multiple contracts (outer protection and interior drainage separated for example) which may result in coordination issues.	Marginal	Possible	1
AS-5	Buried Floodwall @ Long Island Sound	Concern expressed over contractor type, subs required, bid competition, and adequate bid schedule	Due to the large scale of the project, acquisition is not expected to be small business or 8a. It is assumed NY/Long Island has sufficient contractors with the ability to perform work successfully. Project could have multiple contracts (outer protection and interior drainage separated for example) which may result in coordination issues.	Marginal	Possible	1
AS-6	Road Raisings	Concern expressed over contractor type, subs required, bid competition, and adequate bid schedule	Due to the large scale of the project, acquisition is not expected to be small business or 8a. It is assumed NY/Long Island has sufficient contractors with the ability to perform work successfully. Project could have multiple contracts (outer protection and interior drainage separated for example) which may result in coordination issues.	Marginal	Possible	1
AS-7	Interior Drainage	Concern expressed over contractor type, subs required, bid competition, and adequate bid schedule	Due to the large scale of the project, acquisition is not expected to be small business or 8a. It is assumed NY/Long Island has sufficient contractors with the ability to perform work successfully. Project could have multiple contracts (outer protection and interior drainage separated for example) which may result in coordination issues.	Marginal	Possible	1
AS-12	Remaining Construction Items (Wetland Mitigation)	No concerns regarding risk for wetland restoration.	NY District PDT has costed similar wetland restoration work at approximately \$300k-\$400k per acre of restoration. Bayville project has approximately 1/3 acre that requires restoration. Assumed cost of \$1 mil is more than sufficient to complete this feature of work. Little to no risk assumed.	Negligible	Unlikely	0
AS-13	Planning, Engineering, & Design	No concerns.	N/A	Negligible	Unlikely	0

AS-14	Construction Management	Concern expressed over contractor type, subs required, bid competition, and adequate bid schedule	Due to the large scale of the project, acquisition is not expected to be small business or 8a. It is assumed NY/Long Island has sufficient contractors with the ability to perform work successfully. Project could have multiple contracts (outer protection and interior drainage separated for example) which may result in coordination issues.	Moderate	Possible	2
Construction Elements				Maximum Project Growth		25%
CE-1	General Requirements	Concern expressed over site access, laydown areas, space to work, standoff distance to residences. Additional concerns regarding restricted work periods and the need for water diversion on the beach and at Mill Creek.	Site access from laydown areas may pose a risk as the contractor(s) proceed with work. It will require coordination and planning to avoid stockpiling material outside laydown areas, which are limited in size and location. Additional risk involved with dwellings being so close to proposed construction areas. Load restrictions/bridge access may cause delays/issues with delivery of materials. It is yet to be determined if any restricted work periods will be enforced by the Village or other entities adjacent to the beach and/or Mill Creek. It was determined that water diversion will be necessary for work along the beach and adjacent to Mill Creek. Any issue or combination of these issues is likely (especially the water diversion issue) and will have a moderate impact.	Moderate	Likely	3
CE-2	Floodwall @ Mill Creek	Concern expressed over site access, laydown areas, space to work, standoff distance to residences. Additional concerns regarding restricted work periods and the need for water diversion on the beach and at Mill Creek.	Site access from laydown areas may pose a risk as the contractor(s) proceed with work. It will require coordination and planning to avoid stockpiling material outside laydown areas, which are limited in size and location. Additional risk involved with dwellings being so close to proposed construction areas. Load restrictions/bridge access may cause delays/issues with delivery of materials. It is yet to be determined if any restricted work periods will be enforced by the Village or other entities adjacent to the beach and/or Mill Creek. It was determined that water diversion will be necessary for work along the beach and adjacent to Mill Creek. Any issue or combination of these issues is likely (especially the water diversion issue) and will have a moderate impact.	Moderate	Likely	3
CE-3	Road Raising @ W. Harbor Drive	Concern expressed over site access, laydown areas, space to work, standoff distance to residences.	Site access from laydown areas may pose a risk as the contractor(s) proceed with work. It will require coordination and planning to avoid stockpiling material outside laydown areas, which are limited in size and location. Additional risk involved with dwellings being so close to proposed construction areas. Load restrictions/bridge access may cause delays/issues with delivery of materials. Any issue or combination of these issues is possible and could have a marginal impact.	Marginal	Possible	1
CE-4	Floodwall @ Long Island Sound	Concern expressed over site access, laydown areas, space to work, standoff distance to residences. Additional concerns regarding restricted work periods and the need for water diversion on the beach and at Mill Creek.	Site access from laydown areas may pose a risk as the contractor(s) proceed with work. It will require coordination and planning to avoid stockpiling material outside laydown areas, which are limited in size and location. Additional risk involved with dwellings being so close to proposed construction areas. Load restrictions/bridge access may cause delays/issues with delivery of materials. It is yet to be determined if any restricted work periods will be enforced by the Village or other entities adjacent to the beach and/or Mill Creek. It was determined that water diversion will be necessary for work along the beach and adjacent to Mill Creek. Any issue or combination of these issues is likely (especially the water diversion issue) and will have a moderate impact.	Moderate	Likely	3

CE-5	Buried Floodwall @ Long Island Sound	Concern expressed over site access, laydown areas, space to work, standoff distance to residences. Additional concerns regarding restricted work periods and the need for water diversion on the beach and at Mill Creek.	Site access from laydown areas may pose a risk as the contractor(s) proceed with work. It will require coordination and planning to avoid stockpiling material outside laydown areas, which are limited in size and location. Additional risk involved with dwellings being so close to proposed construction areas. Load restrictions/bridge access may cause delays/issues with delivery of materials. It is yet to be determined if any restricted work periods will be enforced by the Village or other entities adjacent to the beach and/or Mill Creek. It was determined that water diversion will be necessary for work along the beach and adjacent to Mill Creek. Any issue or combination of these issues is likely (especially the water diversion issue) and will have a moderate impact.	Moderate	Likely	3	
CE-6	Road Raisings	Concern expressed over site access, laydown areas, space to work, standoff distance to residences.	Site access from laydown areas may pose a risk as the contractor(s) proceed with work. It will require coordination and planning to avoid stockpiling material outside laydown areas, which are limited in size and location. Additional risk involved with dwellings being so close to proposed construction areas. Load restrictions/bridge access may cause delays/issues with delivery of materials. Any issue or combination of these issues is possible and could have a marginal impact.	Marginal	Possible	1	
CE-7	Interior Drainage	Concern expressed over site access, laydown areas, space to work, standoff distance to residences.	Site access from laydown areas may pose a risk as the contractor(s) proceed with work. It will require coordination and planning to avoid stockpiling material outside laydown areas, which are limited in size and location. Additional risk involved with dwellings being so close to proposed construction areas. Load restrictions/bridge access may cause delays/issues with delivery of materials. Dewatering and high tides could cause prolonged construction times. Any issue or combination of these issues is possible and could have a marginal impact.	Marginal	Possible	1	
CE-12	Remaining Construction Items (Wetland Mitigation)	No concerns regarding risk for wetland restoration.	NY District PDT has costed similar wetland restoration work at approximately \$300k-\$400k per acre of restoration. Bayville project has approximately 1/3 acre that requires restoration. Assumed cost of \$1 mil is more than sufficient to complete this feature of work. Little to no risk assumed.	Negligible	Unlikely	0	
CE-13	Planning, Engineering, & Design	No concerns.	N/A	Negligible	Unlikely	0	
CE-14	Construction Management	Concern expressed over site access, laydown areas, space to work, standoff distance to residences. Additional concerns regarding restricted work periods and the need for water diversion on the beach and at Mill Creek.	Site access from laydown areas may pose a risk as the contractor(s) proceed with work. It will require coordination and planning to avoid stockpiling material outside laydown areas, which are limited in size and location. Additional risk involved with dwellings being so close to proposed construction areas. Load restrictions/bridge access may cause delays/issues with delivery of materials. It is yet to be determined if any restricted work periods will be enforced by the Village or other entities adjacent to the beach and/or Mill Creek. It was determined that water diversion will be necessary for work along the beach and adjacent to Mill Creek. Any issue or combination of these issues is likely (especially the water diversion issue) and will have a moderate impact.	Moderate	Likely	3	
Quantities for Current Scope						Maximum Project Growth	20%
Q-1	General Requirements	No concerns.	N/A	Negligible	Unlikely	0	
Q-2	Floodwall @ Mill Creek	Concern expressed over the sheeting depth required and additional quantity of materials necessary where existing features are proposed to be demo'ed.	Sheeting depth may change based on seepage analysis, which has not been completed to date. Additional sheeting required is possible but will have marginal impact (material costs only as crew/equipment is already present).	Marginal	Possible	1	
Q-3	Road Raising @ W. Harbor Drive	Concern expressed over the lack of stone protection on the slopes of the raised road sections and additional quantity of materials necessary where existing features are proposed to be demo'ed.	A requirement to add stone to the slopes of the raised road sections is likely but will have marginal impact (material costs only as crew/equipment is already present).	Marginal	Likely	2	

Q-4	Floodwall @ Long Island Sound	Concern expressed over the sheeting depth required and additional quantity of materials necessary where existing features are proposed to be demo'ed.	Sheeting depth may change based on seepage analysis, which has not been completed to date. Additional sheeting required is possible but will have marginal impact (material costs only as crew/equipment is already present).	Marginal	Possible	1
Q-5	Buried Floodwall @ Long Island Sound	Concern expressed over the sheeting depth required and additional quantity of materials necessary where existing features are proposed to be demo'ed.	Sheeting depth may change based on seepage analysis, which has not been completed to date. Additional sheeting required is possible but will have marginal impact (material costs only as crew/equipment is already present).	Marginal	Possible	1
Q-6	Road Raisings	Concern expressed over number of utility crossings and condition of existing drainage present where road raisings are proposed.	The number of crossings were assumed and are likely to change (up or down) and will have a minimal impact since the necessary crews and equipment are assumed to be present already. Currently assumed that existing drainage at road raisings is okay for risers but may require replacement.	Moderate	Possible	2
Q-7	Interior Drainage	Sizing, location, and/or types of drainage, to include pump stations, may change later.	The current design calls for HDPE pipes and minimum ground cover. Pump station design is based on previous projects and the assumption that the drainage areas are similar with this project. Additional design requirements may call for changes to some/all drainage features. Proposed pipelines are in sandy soils and close to existing utility lines. Alignments may need to be adjusted in the field. Excavation will require shoring. These changes are likely and will have a moderate impact to this feature of work.	Moderate	Likely	3
Q-12	Remaining Construction Items (Wetland Mitigation)	No concerns regarding risk for wetland restoration.	NY District PDT has costed similar wetland restoration work at approximately \$300k-\$400k per acre of restoration. Bayville project has approximately 1/3 acre that requires restoration. Assumed cost of \$1 mil is more than sufficient to complete this feature of work. Little to no risk assumed.	Negligible	Unlikely	0
Q-13	Planning, Engineering, & Design	Concern expressed over the sheeting depth required and additional quantity of materials necessary where existing features are proposed to be demo'ed.	Sheeting depth may change based on seepage analysis, which has not been completed to date. Additional sheeting required is possible but will have marginal impact (material costs only as crew/equipment is already present).	Marginal	Possible	1
Q-14	Construction Management	Concern expressed over the sheeting depth required and additional quantity of materials necessary where existing features are proposed to be demo'ed.	Sheeting depth may change based on seepage analysis, which has not been completed to date. Additional sheeting required is possible but will have marginal impact (material costs only as crew/equipment is already present).	Marginal	Possible	1
Specialty Fabrication or Equipment				Maximum Project Growth		75%
FE-1	General Requirements	Concern expressed over ability to provide batch plant on site and nearest quarry, batch plant, steel manufacturer.	The distance to these sites may drive costs due to the abnormally long haul routes due to the somewhat remote location and bridge loading limits of the site on Long Island. While it's possible this will be an issue, delivery costs are assumed in the estimate so impact will likely be marginal.	Marginal	Possible	1
FE-2	Floodwall @ Mill Creek	Concern expressed over ability to provide batch plant on site and nearest quarry, batch plant, steel manufacturer.	The distance to these sites may drive costs due to the abnormally long haul routes due to the somewhat remote location of the site on Long Island. While it's possible this will be an issue, delivery costs are assumed in the estimate so impact will likely be marginal.	Marginal	Possible	1
FE-3	Road Raising @ W. Harbor Drive	Concern expressed over ability to provide batch plant on site and nearest quarry, batch plant, steel manufacturer.	The distance to these sites may drive costs due to the abnormally long haul routes due to the somewhat remote location of the site on Long Island. While it's possible this will be an issue, delivery costs are assumed in the estimate so impact will likely be marginal.	Marginal	Possible	1
FE-4	Floodwall @ Long Island Sound	Concern expressed over ability to provide batch plant on site and nearest quarry, batch plant, steel manufacturer.	The distance to these sites may drive costs due to the abnormally long haul routes due to the somewhat remote location of the site on Long Island. While it's possible this will be an issue, delivery costs are assumed in the estimate so impact will likely be marginal.	Marginal	Possible	1
FE-5	Buried Floodwall @ Long Island Sound	Concern expressed over ability to provide batch plant on site and nearest quarry, batch plant, steel manufacturer.	The distance to these sites may drive costs due to the abnormally long haul routes due to the somewhat remote location of the site on Long Island. While it's possible this will be an issue, delivery costs are assumed in the estimate so impact will likely be marginal.	Marginal	Possible	1

FE-6	Road Raisings	Concern expressed over ability to provide batch plant on site and nearest quarry, batch plant, steel manufacturer.	The distance to these sites may drive costs due to the abnormally long haul routes due to the somewhat remote location of the site on Long Island. While it's possible this will be an issue, delivery costs are assumed in the estimate so impact will likely be marginal.	Marginal	Possible	1
FE-7	Interior Drainage	Concern expressed over pump station variable speed pumps being proprietary or sole sourced and the ability of equipment in pump stations to handle the salt water conditions expected.	Similar projects done recently in New England in brackish water with similar equipment proposed. These costs are carried in Bayville estimates. Tide fluctuations may be greater than in Salisbury. Additional costs for dewatering and trench shoring will be incurred and, favorably, these costs are assumed in the current working estimate. The tide fluctuation will possibly have a moderate impact on construction of the interior drainage.	Moderate	Possible	2
FE-12	Remaining Construction Items (Wetland Mitigation)	No concerns regarding risk for wetland restoration.	NY District PDT has costed similar wetland restoration work at approximately \$300k-\$400k per acre of restoration. Bayville project has approximately 1/3 acre that requires restoration. Assumed cost of \$1 mil is more than sufficient to complete this feature of work. Little to no risk assumed.	Negligible	Unlikely	0
FE-13	Planning, Engineering, & Design	No concerns.	N/A	Negligible	Unlikely	0
FE-14	Construction Management	No concerns.	N/A	Negligible	Unlikely	0
Cost Estimate Assumptions					Maximum Project Growth	35%
CT-1	General Requirements	Estimate assumes only one mob/demob with two years of construction.	It is possible that the contractor(s) won't be able to work through the winter depending on the work to be performed, weather, and restrictions of local entities on sequencing and laydown areas. This would have a significant impact if two/multiple mob/demobs were required.	Significant	Possible	3
CT-2	Floodwall @ Mill Creek	Estimate assumes items from cost book or items from similar projects. Estimate assumes one large prime earthwork contractor.	Production rates from similar projects may be not be 100% applicable due to staging/congestion/available work area specific to Bayville. In reality, the prime will likely be supplemented by smaller earthwork subs to assist with the large amount of work to be performed. It is possible lower production rates, differing construction methodology, and an additional level of markups for some features of work would have a significant impact on cost estimate assumptions.	Significant	Possible	3
CT-3	Road Raising @ W. Harbor Drive	Estimate assumes items from cost book or items from similar projects. Estimate assumes one large prime earthwork contractor.	Production rates from similar projects may be not be 100% applicable due to staging/congestion/available work area specific to Bayville. In reality, the prime will likely be supplemented by smaller earthwork subs to assist with the large amount of work to be performed. It is possible lower production rates, differing construction methodology, and an additional level of markups for some features of work would have a significant impact on cost estimate assumptions.	Significant	Possible	3
CT-4	Floodwall @ Long Island Sound	Estimate assumes items from cost book or items from similar projects. Estimate assumes one large prime earthwork contractor.	Production rates from similar projects may be not be 100% applicable due to staging/congestion/available work area specific to Bayville. In reality, the prime will likely be supplemented by smaller earthwork subs to assist with the large amount of work to be performed. It is possible lower production rates, differing construction methodology, and an additional level of markups for some features of work would have a significant impact on cost estimate assumptions.	Significant	Possible	3
CT-5	Buried Floodwall @ Long Island Sound	Estimate assumes items from cost book or items from similar projects. Estimate assumes one large prime earthwork contractor.	Production rates from similar projects may be not be 100% applicable due to staging/congestion/available work area specific to Bayville. In reality, the prime will likely be supplemented by smaller earthwork subs to assist with the large amount of work to be performed. It is possible lower production rates, differing construction methodology, and an additional level of markups for some features of work would have a significant impact on cost estimate assumptions.	Significant	Possible	3

CT-6	Road Raisings	Estimate assumes items from cost book or items from similar projects. Estimate assumes one large prime earthwork contractor.	Production rates from similar projects may be not be 100% applicable due to staging/congestion/available work area specific to Bayville. In reality, the prime will likely be supplemented by smaller earthwork subs to assist with the large amount of work to be performed. It is possible lower production rates, differing construction methodology, and an additional level of markups for some features of work would have a moderate impact on cost estimate assumptions.	Moderate	Possible	2	
CT-7	Interior Drainage	Estimate assumes items from cost book or items from similar projects. Estimate assumes one large prime earthwork contractor.	Production rates from similar projects may be not be 100% applicable due to staging/congestion/available work area specific to Bayville. In reality, the prime will likely be supplemented by smaller earthwork subs to assist with the large amount of work to be performed. It is possible lower production rates, differing construction methodology, and an additional level of markups for some features of work would have a moderate impact on cost estimate assumptions.	Moderate	Possible	2	
CT-12	Remaining Construction Items (Wetland Mitigation)	No concerns regarding risk for wetland restoration.	NY District PDT has costed similar wetland restoration work at approximately \$300k-\$400k per acre of restoration. Bayville project has approximately 1/3 acre that requires restoration. Assumed cost of \$1 mil is more than sufficient to complete this feature of work. Little to no risk assumed.	Negligible	Unlikely	0	
CT-13	Planning, Engineering, & Design	Initial P.E.D. costs assumed from Planner.	P.E.D. costs not assumed to be a percentage of construction costs. It is possible this value will change and the impact could be moderate if the cost was developed incorrectly.	Moderate	Possible	2	
CT-14	Construction Management	Initial Construction Management costs assumed from Planner.	Construction Management costs not assumed to be a percentage of construction costs. It is possible this value will change and the impact could be moderate if the cost was developed incorrectly.	Moderate	Possible	2	
External Project Risks						Maximum Project Growth	40%
EX-1	General Requirements	Concerns expressed over Oyster Bay National Wildlife Refuge directly abuts Mill Creek and shellfish harvesting in Mill Creek, real estate and permitting issues, funding (both fed and nonfed), and local opposition to project. Weather/Acts of God, sea level rise, construction controls to keep locals out of project limits, and unexpected fuel/material inflation.	Wildlife Refuge and shellfish harvesting could impact construction timelines at work adjacent to Mill Creek; these impacts can and will be flushed out in later project stages. Real estate and permitting issues will be resolved prior to solicitation and will not affect construction cost or schedule. Sea level rise should not be significant enough to affect protection heights or construction even with construction midpoint scheduled for 2020. No abnormal inflation is expected, CWCCIS inflation calculated in TPCS should be adequate to cover any fuel/material cost increases. Weather, funding delays, and local opposition to the project has the potential to impact construction costs for all portions of the project.	Moderate	Possible	2	
EX-2	Floodwall @ Mill Creek	Concerns expressed over Oyster Bay National Wildlife Refuge directly abuts Mill Creek and shellfish harvesting in Mill Creek, real estate and permitting issues, funding (both fed and nonfed), and local opposition to project. Weather/Acts of God, sea level rise, construction controls to keep locals out of project limits, and unexpected fuel/material inflation.	Wildlife Refuge and shellfish harvesting could impact construction timelines at work adjacent to Mill Creek; these impacts can and will be flushed out in later project stages. Real estate and permitting issues will be resolved prior to solicitation and will not affect construction cost or schedule. Sea level rise should not be significant enough to affect protection heights or construction even with construction midpoint scheduled for 2020. No abnormal inflation is expected, CWCCIS inflation calculated in TPCS should be adequate to cover any fuel/material cost increases. Weather, funding delays, and local opposition to the project has the potential to impact construction costs for all portions of the project.	Moderate	Possible	2	
EX-3	Road Raising @ W. Harbor Drive	Concerns expressed over real estate and permitting issues, funding (both fed and nonfed), and local opposition to project. Weather/Acts of God, sea level rise, construction controls to keep locals out of project limits, and unexpected fuel/material inflation.	Real estate and permitting issues will be resolved prior to solicitation and will not affect construction cost or schedule. Sea level rise should not be significant enough to affect protection heights or construction even with construction midpoint scheduled for 2020. No abnormal inflation is expected, CWCCIS inflation calculated in TPCS should be adequate to cover any fuel/material cost increases. Weather, funding delays, and local opposition to the project has the potential to impact construction costs for all portions of the project.	Marginal	Unlikely	0	

EX-4	Floodwall @ Long Island Sound	Concerns expressed over real estate and permitting issues, funding (both fed and nonfed), and local opposition to project. Weather/Acts of God, sea level rise, construction controls to keep locals out of project limits, and unexpected fuel/material inflation.	Real estate and permitting issues will be resolved prior to solicitation and will not affect construction cost or schedule. Sea level rise should not be significant enough to affect protection heights or construction even with construction midpoint scheduled for 2020. No abnormal inflation is expected, CWCCIS inflation calculated in TPCS should be adequate to cover any fuel/material cost increases. Weather, funding delays, and local opposition to the project has the potential to impact construction costs for all portions of the project.	Marginal	Possible	1
EX-5	Buried Floodwall @ Long Island Sound	Concerns expressed over real estate and permitting issues, funding (both fed and nonfed), and local opposition to project. Weather/Acts of God, sea level rise, construction controls to keep locals out of project limits, and unexpected fuel/material inflation.	Real estate and permitting issues will be resolved prior to solicitation and will not affect construction cost or schedule. Sea level rise should not be significant enough to affect protection heights or construction even with construction midpoint scheduled for 2020. No abnormal inflation is expected, CWCCIS inflation calculated in TPCS should be adequate to cover any fuel/material cost increases. Weather, funding delays, and local opposition to the project has the potential to impact construction costs for all portions of the project.	Marginal	Possible	1
EX-6	Road Raisings	Concerns expressed over real estate and permitting issues, funding (both fed and nonfed), and local opposition to project. Weather/Acts of God, sea level rise, construction controls to keep locals out of project limits, and unexpected fuel/material inflation.	Real estate and permitting issues will be resolved prior to solicitation and will not affect construction cost or schedule. Sea level rise should not be significant enough to affect protection heights or construction even with construction midpoint scheduled for 2020. No abnormal inflation is expected, CWCCIS inflation calculated in TPCS should be adequate to cover any fuel/material cost increases. Weather, funding delays, and local opposition to the project has the potential to impact construction costs for all portions of the project.	Marginal	Possible	1
EX-7	Interior Drainage	Concerns expressed over real estate and permitting issues, funding (both fed and nonfed), and local opposition to project. Weather/Acts of God, sea level rise, construction controls to keep locals out of project limits, and unexpected fuel/material inflation.	Real estate and permitting issues will be resolved prior to solicitation and will not affect construction cost or schedule. Sea level rise should not be significant enough to affect protection heights or construction even with construction midpoint scheduled for 2020. No abnormal inflation is expected, CWCCIS inflation calculated in TPCS should be adequate to cover any fuel/material cost increases. Weather, funding delays, and local opposition to the project has the potential to impact construction costs for all portions of the project.	Marginal	Possible	1
EX-12	Remaining Construction Items (Wetland Mitigation)	No concerns regarding risk for wetland restoration.	NY District PDT has costed similar wetland restoration work at approximately \$300k-\$400k per acre of restoration. Bayville project has approximately 1/3 acre that requires restoration. Assumed cost of \$1 mil is more than sufficient to complete this feature of work. Little to no risk assumed.	Negligible	Unlikely	0
EX-13	Planning, Engineering, & Design	Concern expressed over study type and the design requirements associated with those types.	A similar New England District project required significant redesign based on an interpretation of the study type. It is possible this issue will present itself with this study.	Significant	Possible	3
EX-14	Construction Management	Concerns expressed over Oyster Bay National Wildlife Refuge directly abuts Mill Creek and shellfish harvesting in Mill Creek, real estate and permitting issues, funding (both fed and nonfed), and local opposition to project. Weather/Acts of God, sea level rise, construction controls to keep locals out of project limits, and unexpected fuel/material inflation.	Wildlife Refuge and shellfish harvesting could impact construction timelines at work adjacent to Mill Creek; these impacts can and will be flushed out in later project stages. Real estate and permitting issues will be resolved prior to solicitation and will not affect construction cost or schedule. Sea level rise should not be significant enough to affect protection heights or construction even with construction midpoint scheduled for 2020. No abnormal inflation is expected, CWCCIS inflation calculated in TPCS should be adequate to cover any fuel/material cost increases. Weather, funding delays, and local opposition to the project has the potential to impact construction costs for all portions of the project.	Moderate	Possible	2

BayvilleNY_CSDR_Alternatives Analysis_Alternative 3
ALTERNATIVE 3

Scope:

Long Island Sound side of Bayville: 3,850 linear feet of I-wall type concrete floodwall combined with 2,940 linear feet of buried floodwall. For initial analysis the top elevation of the structure has been established at elevation +14 feet (ft) North Atlantic Vertical Datum (NAVD88) (2% flood with wave setup). Oyster Bay (south) side of Bayville: 2,800 linear feet of I-wall type concrete floodwall adjoining the Mill Neck Creek neighborhood. Additionally, 5,300 linear feet of West Harbor Drive is elevated to the design height with all adjoining private driveways and intersections tied in. For initial analysis the top elevation of the structure has been established at elevation +13 ft NAVD88 (2% flood without wave setup which is not a significant design factor for the Bay side).

Drainage features: With the floodwalls and road raising in place, pump stations will be required to pump storm water through the line of protection and into the Bay. Pump stations were designed with consideration of the USACE policy concerning minimum facility. Three pump stations with a combined capacity of 159 cfs have been sized to handle to large the volume of storm water expected within the study area. All three pump stations will be co-located with an emergency natural gas powered auxiliary power generator. New drainage lines will be constructed to efficiently deliver storm water to the pump stations and to prevent making the interior drainage problem worse than it currently is once the perimeter protection is constructed.

Sizing and interior drainage will be refined during optimization following the ADM Milestone.

Acquisition Strategy:

IFB [No additional markups/contractors provided for 8a or SBA acquisition.]

Contractor Markups:

Prime: 6% JOOH, 6% HOOH, 9.47% Profit (PWG), Class B Bond Table
Subs: 5% JOOH, 5%HOOH, 9.47% Profit (PWG)

Other Markups:

90% global productivity applied to estimate to account for working in wet and confined conditions and 4% sales tax.

Assumptions:

Majority of drainage costs obtained from Salisbury, MA Blackwater River project. Floodwall costs obtained from Pawcatuck Coastal Study. Estimate assumes one or more prime contractors are heavy earthwork and can and will self-perform a vast majority of the earthwork (to include excavation, backfill, sheetpiling, dune work, etc.). Contingency and escalation calculated in ARA and TPCS.

Estimated by Jeffrey Gaeta
Designed by NAE
Prepared by Jeffrey Gaeta

Preparation Date 11/20/2015
Effective Date of Pricing 11/20/2015
Estimated Construction Time 720 Days

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<u>Description</u>	<u>Quantity</u>	<u>UOM</u>	<u>LaborCost</u>	<u>MatlCost</u>	<u>EQCost</u>	<u>SubBidCost</u>	<u>BareCost</u>	<u>ContractCost</u>	<u>ProjectCost</u>
Project Cost Summary Report			5,744,225	14,506,882	2,602,926	4,566,306	27,420,340	38,153,707	38,153,707
BayvilleNY_FRM_Feasibility_Alternative 3	1.00	EA	5,744,225	14,506,882	2,602,926	4,566,306	27,420,340	38,153,707	38,153,707
General Requirements	1.00	EA	21,867	16,546	98,400	687,760	824,573	1,043,254	1,043,254
Mill Creek Floodwall - 2,260 LF	2,260.00	LF	582,851	1,988,169	250,681	275,720	3,097,422	4,248,160	4,248,160
West Harbor Drive Road Raising - 5,860 LF :: NEED TO REWORK CONTENTS 3 AUG 2015	5,860.00	LF	1,326,437	2,964,296	644,725	38,550	4,974,009	7,431,359	7,431,359
Long Island Sound Floodwall - 4,500 LF	4,500.00	LF	1,514,295	5,146,120	631,820	849,700	8,141,935	11,184,764	11,184,764
Long Island Sound Reinforced Dune - 3,000 LF	3,000.00	LF	739,076	2,040,575	318,203	45,000	3,142,854	4,313,438	4,313,438
Road Raisings	1.00	EA	231,105	475,096	87,262	50,000	843,462	1,211,741	1,211,741
Interior Drainage	1.00	EA	1,328,594	1,876,080	571,835	1,812,028	5,588,537	7,720,991	7,720,991
Wetland Mitigation	1.00	EA	0	0	0	807,548	807,548	1,000,000	1,000,000