North Shore of Long Island, Asharoken, New York Coastal Storm Risk Management Feasibility Study

Appendix C

Cost Engineering

November 2015

APPENDIX C
COST ESTIMATES

NORTH SHORE OF LONG ISLAND

COASTAL STORM RISK MANAGEMENT – FEASIBILITY STUDY

ASHAROKEN, NY

APPENDIX C - COST ESTIMATES

Table of Contents

List of Tables

List of Figures

List of Attachments

INTRODUCTION

The Village of Asharoken is located in Suffolk County, NY, within the town of Huntington along the North Shore of Long Island facing the Long Island Sound. The Village of Asharoken is a narrow isthmus connecting the Village of Northport on the 'mainland' of Long Island to the hamlet of Eatons Neck. The Coastal Storm Risk Feasibility Study for Asharoken identifies several alternatives to protect residents from flooding and erosion. The project area extends the 2.4 miles of Asharoken Beach that is most susceptible to storm-induced flooding as identified in Figure C1 below.

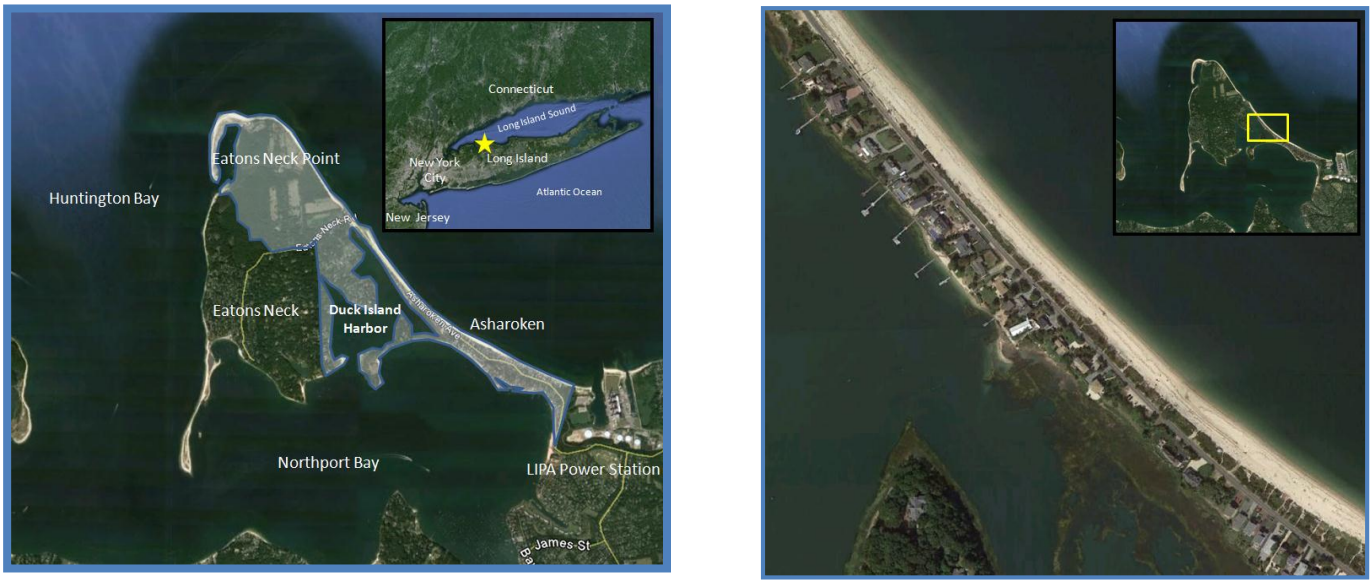


Figure C1 – Study Area Location Map

The Project Delivery Team (PDT) looked at various alternatives during the evaluation/alternatives analysis phase, and identified 5 project alternatives, each consisting of different volumes of initial beachfill and structural features such as seawalls and groins, as well as various beach renourishment schedules over a 50 year period. The project 1st Cost for the alternatives is summarized in the Table C1 below. Of the alternatives identified, alternative 4 was chosen as the Tentatively Selected Plan (TSP) and is the focus of this cost engineering appendix. The project contingencies for these alternatives were developed thru Abbreviated Risk Analysis (ARA) tool provided by the Cost MCX. The project 1st Cost listed under Table C1 below includes the project contingencies.

Table C1 – Alternative Phase First Cost Summary

Asharoken, New York					
	Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4**	**Alternative 5**
		Beachfill and Buried	Beachfill and Buried	Beachfill and	Beachfill and
	Beachfill Only	Seawall-full shoreline	Seawall-half shoreline	Three West Groins	3 West, 8 East Groins
Initial Fill Volume (CY)	600,000	375,000	450,000	**600,000**	600,000
Coastal Structures	n/a	buried seawall	partial buried seawall	**3 rock groins**	11 rock groins
Nourishment (cy/period)	60,000 cy/3 yrs	200,000 cy/10 yrs	200,000 cy/10 yrs	**80,000 cy/5 yrs**	100,000 cy/10 yrs
Total Nourishment in 50yrs	1,000,000 cy	1,000,000 cy	1,000,000 cy	**800,000 cy**	500,000 cy
COSTS					
Initial Construction Cost	$21,552,000	$66,931,000	$45,940,000	**$23,665,000**	$32,426,000

Alternative 4 was chosen as the Tentatively Selected Plan (TSP), providing the most increased storm damage protection at the northwest steel bulkhead seawall; retains the minimum design width at the southeast timber bulkhead section; and has a reduced erosion rate, nourishment frequency, and quantity at the critical erosion reaches. The TSP consists an initial placement of 600,000 cy of dredged beachfill, the construction of three Rock Groins of 120 ft, 100 ft and 80 ft in length, and a renourishment cycle of 80,000 cy of beachfill every 5 years for 50 years The Total First Cost developed for the initial construction project elements is presented in Table C2

Table C2- First Cost

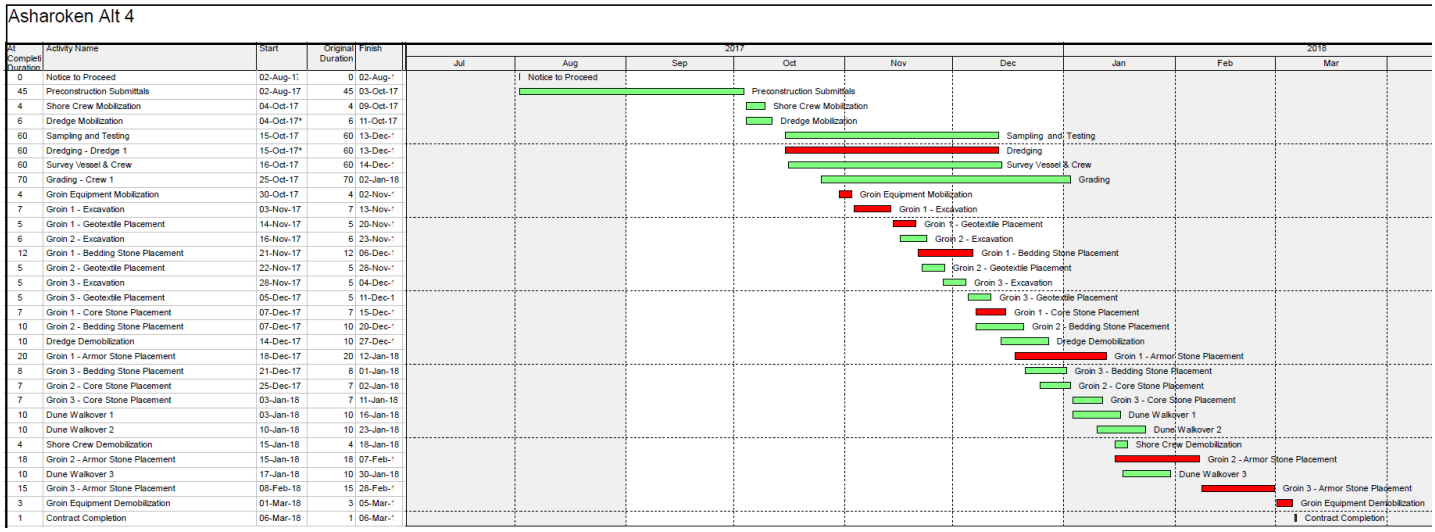
Alternative 4 Total First Cost
Asharoken, Long Island NY
OCT 2014 Price Level

Feat. Acct.	Description	Qty	UoM		Subtotal	Contingency %		Cont $$		Total Cost
10	**Breakwaters and Seawalls**	**1**	**LS**	**$**	**1,265,000**	**33%**	**$**	**417,703**	**$**	**1,682,703**
17	**Beach Replenishment**									
	Hydraulic Beach Fill	1	LS	$	9,831,485.47	21%	$	2,101,972	$	11,933,457
	Timber Pedestrian Dune Walkover	1	LS	$	315,514.53	21%	$	67,457	$	382,972
	CONSTRUCTION ESTIMATE TOTALS:	**1**	**LS**	**$**	**11,412,000**	**23%**	**$**	**2,587,132**	**$**	**13,999,132**
01	**Lands and Damages**	**1**	**LS**	**$**	**5,247,000**	**12%**	**$**	**624,624**	**$**	**5,871,624**
30	**Planning, Engineering & Design**	**1**	**LS**	**$**	**2,570,000**	**8%**	**$**	**198,276**	**$**	**2,768,276**
31	**Construction Management**	**1**	**LS**	**$**	**967,685**	**6%**	**$**	**58,061**	**$**	**1,025,746**
	TOTAL FIRST COST			**$**	**21,461,685**		**$**	**3,885,795**	**$**	**23,664,777**

BASIS OF COST

The construction cost estimate was developed using the Corps of Engineers Dredge Estimating Program (CEDEP) and Micro-Computer Aided Cost Estimating System (MCACES), Second Generation (MII) using the appropriate Work Breakdown Structure (WBS), based on current estimated quantities provided by the Design and Hydraulics & Hydrology engineers. Using the quantities, the cost estimate was developed utilizing cost resources such as RSMeans, historical data on similar construction features, contractor quotes, and MII Cost Libraries. The contingencies for the plans were developed based on the PDT discussion on various features of the project using the Abbreviated Risk Analysis (ARA) template provided by the Cost Mandatory Center of Expertise (MCX), Walla Walla District. These contingencies were applied to the construction cost estimates to develop the Total Project First Cost. The construction duration for the TSP was estimated at 8 months, as show on Figure C2 below. The construction schedule for the plan was developed based on the crew outputs referenced from RSMeans and assuming multiple crews working simultaneously.

Figure C2 – Construction Schedule



CONTINGENCIES

As stated in ER 1110-2-1302, the goal in contingency development is to identify the uncertainty associated with an item of work or task to an acceptable degree of confidence. Consideration must be given to the detail available at each stage of planning, design, or construction for which a cost estimate is being prepared. Contingencies may vary throughout the cost estimate and could constitute significant portion of the overall costs when the lack of investigated data or design details are available. Final contingency development and assignment that describes the potential for cost growth is included in the cost estimate. During development of the cost

estimates, sufficient contingencies developed via PDT discussion during CSRA were applied to develop the Total Project First Cost. The CSRA for the TSP is show in Table C3 in the following page.

Table C3 – Contingencies

Abbreviated Risk Analysis

Project (less than $40M): **Project Example** — **Alternative:** **Alternative #4**
Project Development Stage/Alternative: **Alternative Formulation**
Risk Category: **Moderate Risk: Typical Project Construction Type** — **Meeting Date:** **2/12/2015**

Total Estimated Construction Contract Cost = $ 55,273,250

CWWBS	Feature of Work	Contract Cost		% Contingency	$ Contingency	Total
01 LANDS AND DAMAGES	Real Estate	$ 5,247,000		11.90%	$ 624,416	$ 5,871,416
10 BREAKWATERS AND SEAWALLS	Groins	$ 1,265,079		33.02%	$ 417,785	$ 1,682,864
17 BEACH REPLENISHMENT	Beach Fill	$ 9,831,657		21.38%	$ 2,102,296	$ 11,933,953
17 BEACH REPLENISHMENT	Crossover	$ 315,514		21.93%	$ 69,204	$ 384,718
17 BEACH REPLENISHMENT	Renourishment	$ 43,861,000		12.63%	$ 5,541,362	$ 49,402,362
		$ -		0.00%	$ -	$ -
		$ -		0.00%	$ -	$ -
		$ -		0.00%	$ -	$ -
		$ -		0.00%	$ -	$ -
		$ -		0.00%	$ -	$ -
		$ -		0.00%	$ -	$ -
		$ -		0.00%	$ -	$ -
All Other	Remaining Construction Items	$ -	*0.0%*	0.00%	$ -	$ -
30 PLANNING, ENGINEERING, AND DESIGN	Planning, Engineering, & Design	$ 6,187,000		7.72%	$ 477,328	$ 6,664,328
31 CONSTRUCTION MANAGEMENT	Construction Management	$ 5,184,000		6.00%	$ 310,798	$ 5,494,798
FIXED DOLLAR RISK ADD (EQUALLY DISPERSED TO ALL, MUST INCLUDE JUSTIFICATION SEE BELOW)					$ -	

Totals				
Real Estate	$ 5,247,000	11.90%	$ 624,416	$ 5,871,416.09
Total Construction Estimate	$ 55,273,250	14.71%	$ 8,130,648	$ 63,403,898
Total Planning, Engineering & Design	$ 6,187,000	7.72%	$ 477,328	$ 6,664,328
Total Construction Management	$ 5,184,000	6.00%	$ 310,798	$ 5,494,798
Total	**$ 71,891,250**	**13%**	**$ 9,543,190**	**$ 81,434,440**
		Base	**50%**	**80%**
Range Estimate ($000's)		$71,891k	$77,617k	$81,434k

Meeting Date: 11-Feb-15

PDT Members
Note: PDT involvement is commensurate with project size and involvement.

Project Management:	Ronald Pinzon
Planner:	Gregory B. Aponte
Engieering Manager:	Seth Greenwald
Contracting:	
Real Estate:	Robert Vohden
Relocations:	
Economist:	Johnny Chan
Engineering & Design:	
Technical Lead:	
Geotech:	
H&H	
Civil:	David Yang
Structural:	
Mechanical:	
Electrical:	
Cost Engineering:	Cynthia Zhang
Cost Engineering:	Emily Eng

Project Example Alternative #4
Alternative Formulation
Abbreviated Risk Analysis

Risk Evaluation

WBS	Potential Risk Areas	Project Scope Growth	Acquisition Strategy	Construction Elements	Quantities for Current Scope	Specialty Fabrication or Equipment	Cost Estimate Assumptions	External Project Risks	Cost in Thousands
01 LANDS AND DAMAGES	Real Estate								$5,247,000
10 BREAKWATERS AND SEAWALLS	Groins	1	1	3	1	1	3	3	$1,265
17 BEACH REPLENISHMENT	Beach Fill	0	1	0	1	0	3	3	$9,832
17 BEACH REPLENISHMENT	Crossover	1	1	0	0	0	3	3	$316
17 BEACH REPLENISHMENT	Renourishment	1	0	0	1	0	3	0	$43,861
0	0	0	0	0	0	0	0	0	$0
0	0	0	0	0	0	0	0	0	$0
0	0	0	0	0	0	0	0	0	$0
0	0	0	0	0	0	0	0	0	$0
0	0	0	0	0	0	0	0	0	$0
0	0	0	0	0	0	0	0	0	$0
0	0	0	0	0	0	0	0	0	$0
All Other	Remaining Construction Items	0	0	0	0	0	0	0	$0
30 PLANNING, ENGINEERING, AND DESIGN	Planning, Engineering, & Design	2	0	0	0	0	0	1	$6,187
31 CONSTRUCTION MANAGEMENT	Construction Management	1	0	2	0	0	0	0	$5,184
									$66,644
Risk		$ 1,548	$ 225	$ 275	$ 1,001	$ 30	$ 4,666	$ 1,173	**$8,919**
ixed Dollar Risk Allocation		$ -	$ -	$ -	$ -	$ -	$ -	$ -	**$0**
	Risk	$ 1,548	$ 225	$ 275	$ 1,001	$ 30	$ 4,666	$ 1,173	**$8,919**
								Total	**$75,563**

Use/ View	Risk Element	Feature of Work	Concerns	PDT Discussions & Conclusions (Include logic & justification for choice of Likelihood & Impact)	Impact	Likelihood	Risk Level	13% Line Item Magnitude ($000)
	Project Scope Growth				Maximum Project Growth		75%	
Yes	PS-1	Groins	Potential for scope growth, added features and quantities.	Tentative selected plan, which is subject to change based on local sponsor involvement. If federal sponsor has any input they would likely reduce the scope if	Marginal	Possible	1	$1,265k
Yes	PS-2	Beach Fill	Potential for scope growth, added features and quantities.	Growth of volume and layout of the beachfill is unlikely	Negligible	Unlikely	0	$9,832k
Yes	PS-3	Crossover	Potential for scope growth, added features and quantities. Project accomplish intent. Design confidence.	Potential for scope growth due to unknown requirement for ADA. As of right now, it is assumed that walkovers will be non-ADA compliant based on discussion with designer.	Marginal	Possible	1	$316k
Yes	PS-4	Renourishment	Potential for scope growth, added features and quantities. Investigations suffcient to support design assumptions	Scope of the renourishment is defined and based on historical and modelling results	Negligible	Likely	1	$43,861k
Yes	PS-5	0			Negligible	Unlikely	0	$-
Yes	PS-6	0			Negligible	Unlikely	0	$-
Yes	PS-7	0			Negligible	Unlikely	0	$-
Yes	PS-8	0			Negligible	Unlikely	0	$-
Yes	PS-9	0			Negligible	Unlikely	0	$-
Yes	PS-10	0			Negligible	Unlikely	0	$-
Yes	PS-11	0			Negligible	Unlikely	0	$-
Yes	PS-12	Remaining Construction Items			Negligible	Unlikely	0	$-
Yes	PS-13	Planning, Engineering, & Design	Potential for scope growth, added features and quantities.	Discussion above will not affect PED. However, PED is subject to change because the PMP is not yet developed.	Moderate	Possible	2	$6,187k
Yes	PS-14	Construction Management	Potential for scope growth, added features and quantities. Design confidence.	Disucssions above may affect the need for additonal S&A, but for a very little time period. If construction schedule increases, some additional S&A will be needed.	Marginal	Possible	1	$5,184k

	Acquisition Strategy				Maximum Project Growth		30%	
Yes	AS-1	Groins	Requirement for subcontracting.	It is likely that the Dredging Contractor will bid on the project as a prime and sub out the groins. We don't anticipate impact to the cost as it is a typical strategy. However, changed bid environment can affect price such as availibility of subcontractor.	Negligible	Likely	1	$1,265k
Yes	AS-2	Beach Fill	Requirement for subcontracting	as a prime and sub out the shore work. We don't anticipate impact to the cost as it is a typical strategy. However, changed bid environment can affect price such as availibility of subcontractor.	Negligible	Likely	1	$9,832k
Yes	AS-3	Crossover	Requirement for subcontracting	Likely to be subbed out, but given the small cost of the work, therefore it will not greatly increse the overcost	Negligible	Likely	1	$316k
Yes	AS-4	Renourishment	Limited bid competition anticipated	Competition of delivery of sand is competitive due to the number of sand quarries in the county	Negligible	Unlikely	0	$43,861k
Yes	AS-5	0			Negligible	Unlikely	0	$-
Yes	AS-6	0			Negligible	Unlikely	0	$-
Yes	AS-7	0			Negligible	Unlikely	0	$-
Yes	AS-8	0			Negligible	Unlikely	0	$-
Yes	AS-9	0			Negligible	Unlikely	0	$-
Yes	AS-10	0			Negligible	Unlikely	0	$-
Yes	AS-11	0			Negligible	Unlikely	0	$-
Yes	AS-12	Remaining Construction Items			Negligible	Unlikely	0	$-
Yes	AS-13	Planning, Engineering, & Design	N/A	N/A	Negligible	Unlikely	0	$6,187k
Yes	AS-14	Construction Management	N/A	N/A	Negligible	Unlikely	0	$5,184k

	Construction Elements				Maximum Project Growth		25%	
Yes	CE-1	Groins	Accerlerated schedule or harsh weather schedule. High risk or complex construction elements, site access, in-water?	Environmental windows will limit the time period to construct. However environmental windows are known and will be factor into the construction windows. Unsure of delivery method of stones (barge vs. trucking).	Significant	Possible	3	$1,265k
Yes	CE-2	Beach Fill	Accelerated schedule or harsh weather schedule.	Bad weather days area already factor into our design. Therefore it is not a concern. Environmental windows are known and will be factor into the construction windows.	Negligible	Possible	0	$9,832k
Yes	CE-3	Crossover	N/A	N/A	Negligible	Unlikely	0	$316k
Yes	CE-4	Renourishment	Accelerated schedule or harsh weather schedule.	Bad weather days area already factor into our design. Therefore it is not a concern. Environmental windows are known and will be factor into the construction windows.	Negligible	Possible	0	$43,861k
Yes	CE-5	0			Negligible	Unlikely	0	$-
Yes	CE-6	0			Negligible	Unlikely	0	$-
Yes	CE-7	0			Negligible	Unlikely	0	$-
Yes	CE-8	0			Negligible	Unlikely	0	$-
Yes	CE-9	0			Negligible	Unlikely	0	$-
Yes	CE-10	0			Negligible	Unlikely	0	$-
Yes	CE-11	0			Negligible	Unlikely	0	$-
Yes	CE-12	Remaining Construction Items			Negligible	Unlikely	0	$-
Yes	CE-13	Planning, Engineering, & Design	N/A	N/A	Negligible	Unlikely	0	$6,187k
Yes	CE-14	Construction Management	High risk or complex construction elements, site access, in water.	Mitigation monitoring needs to be done during construction. The extend of monitoring is unknown.	Marginal	Likely	2	$5,184k

	Quantities for Current Scope				Maximum Project Growth		20%	
Yes	Q-1	Groins	Appropriate methods applied to calculate quantities. Level of confidence based on design and assumptions.	Design are confident in the quantities of groins. Quantities may change based on new survey data.	Marginal	Possible	1	$1,265k
Yes	Q-2	Beach Fill	Appropriate methods applied to calculate quantities. Level of confidence based on design and assumptions. Possibility for increased quantities due to loss, waste or subsidence.	Confident in current quantities and method of calculation. Quantities base on older survey. Contingency factors already considered to cover the the storm conditions that can impact the quantities due to loss of beach..	Marginal	Possible	1	$9,832k
Yes	Q-3	Crossover	N/A	N/A	Negligible	Unlikely	0	$316k
Yes	Q-4	Renourishment	Possibility for increased quantities due to loss, waste, or subsidence. Level of confidence based on design and assumptions. Appropriate methods applied to calculated quantities.	We don't anticipate changes in quantities base on historical analysis. Contingency factors already build into the quantity.	Moderate	Unlikely	1	$43,861k
Yes	Q-5	0			Negligible	Unlikely	0	$-
Yes	Q-6	0			Negligible	Unlikely	0	$-
Yes	Q-7	0			Negligible	Unlikely	0	$-
Yes	Q-8	0			Negligible	Unlikely	0	$-
Yes	Q-9	0			Negligible	Unlikely	0	$-
Yes	Q-10	0			Negligible	Unlikely	0	$-
Yes	Q-11	0			Negligible	Unlikely	0	$-
Yes	Q-12	Remaining Construction Items			Negligible	Unlikely	0	$-
Yes	Q-13	Planning, Engineering, & Design	N/A	N/A	Negligible	Unlikely	0	$6,187k
Yes	Q-14	Construction Management	N/A	N/A	Negligible	Unlikely	0	$5,184k

	Specialty Fabrication or Equipment				Maximum Project Growth		75%	
Yes	FE-1	Groins	Specialty equipment	Crane/barge may be required for groin placement	Marginal	Possible	1	$1,265k
Yes	FE-2	Beach Fill	N/A	N/A	Negligible	Unlikely	0	$9,832k
Yes	FE-3	Crossover	N/A	N/A	Negligible	Unlikely	0	$316k
Yes	FE-4	Renourishment	N/A	N/A	Negligible	Unlikely	0	$43,861k
Yes	FE-5	0			Negligible	Unlikely	0	$-
Yes	FE-6	0			Negligible	Unlikely	0	$-
Yes	FE-7	0			Negligible	Unlikely	0	$-
Yes	FE-8	0			Negligible	Unlikely	0	$-
Yes	FE-9	0			Negligible	Unlikely	0	$-
Yes	FE-10	0			Negligible	Unlikely	0	$-
Yes	FE-11	0			Negligible	Unlikely	0	$-
Yes	FE-12	Remaining Construction Items			Negligible	Unlikely	0	$-
Yes	FE-13	Planning, Engineering, & Design	N/A	N/A	Negligible	Unlikely	0	$6,187k
Yes	FE-14	Construction Management	N/A	N/A	Negligible	Unlikely	0	$5,184k

	Cost Estimate Assumptions				Maximum Project Growth		35%	
Yes	CT-1	Groins	Reliability and number of key quotes. Assumptions regarding crew, productivity, overtime.	Stone prices subject to change. Currently large material cost. Productivity of armor stone placement can vary.	Significant	Possible	3	$1,265k
Yes	CT-2	Beach Fill	Assumptions regarding crew, productivity, overtime.	Since the majority of the cost is the $/CY of dreged material, changes to productivity will have an affect on the overall contract cost.	Significant	Possible	3	$9,832k
Yes	CT-3	Crossover	Overuse of Cost Book, lump sum. Allowance. Lack confidence on critical cost items	Line items in cost book were used for walkover construction. These line items such as lumber may ajust more frequently and can affect the overall cost.	Moderate	Likely	3	$316k
Yes	CT-4	Renourishment	Reliability and number of key quotes. Lack confidence on critical cost items.	The work is very much material price and trucking cost dependent therefore subject to change due to location of the sand quarry suppliers the contractor choose.	Significant	Possible	3	$43,861k
Yes	CT-5	0			Negligible	Unlikely	0	$-
Yes	CT-6	0			Negligible	Unlikely	0	$-
Yes	CT-7	0			Negligible	Unlikely	0	$-
Yes	CT-8	0			Negligible	Unlikely	0	$-
Yes	CT-9	0			Negligible	Unlikely	0	$-
Yes	CT-10	0			Negligible	Unlikely	0	$-
Yes	CT-11	0			Negligible	Unlikely	0	$-
Yes	CT-12	Remaining Construction Items			Negligible	Unlikely	0	$-
Yes	CT-13	Planning, Engineering, & Design	N/A	N/A	Negligible	Unlikely	0	$6,187k
Yes	CT-14	Construction Management	N/A	N/A	Negligible	Unlikely	0	$5,184k

	External Project Risks				Maximum Project Growth		40%	
Yes	EX-1	Groins	Political influences, lack of support, obstacles. Unacnticipated inflations in fuel, key materials. Potential for market volatility impacting competition, pricing.	Political, lack of support and real estate (public access) and real estate cost. Large material cost in stone for groins, could change price if material price change.	Significant	Possible	3	$1,265k
Yes	EX-2	Beach Fill	Political influences, lack of support, obstacles. Unacnticipated inflations in fuel, key materials. Potential for market volatility impacting competition, pricing.	Political, lack of support and real estate (public access) and real estate cost. Fuel price used for the dredge can increase unit price of beach fill.	Significant	Possible	3	$9,832k
Yes	EX-3	Crossover	Political influences, lack of support, obstacles. Unacnticipated inflations in fuel, key materials. Potential for market volatility impacting competition, pricing.	Political, lack of support and real estate (public access) and real estate cost.	Significant	Possible	3	$316k
Yes	EX-4	Renourishment	N/A	N/A	Negligible	Unlikely	0	$43,861k
Yes	EX-5	0			Negligible	Unlikely	0	$-
Yes	EX-6	0			Negligible	Unlikely	0	$-
Yes	EX-7	0			Negligible	Unlikely	0	$-
Yes	EX-8	0			Negligible	Unlikely	0	$-
Yes	EX-9	0			Negligible	Unlikely	0	$-
Yes	EX-10	0			Negligible	Unlikely	0	$-
Yes	EX-11	0			Negligible	Unlikely	0	$-
Yes	EX-12	Remaining Construction Items			Negligible	Unlikely	0	$-
Yes	EX-13	Planning, Engineering, & Design	Political influences, lack of support, obstacles.	Non federal sponsor requesting accelerated schedule might the cost of PED.	Marginal	Possible	1	$6,187k
Yes	EX-14	Construction Management	Political influences, lack of support, obstacles.	Changes in mitigation requirement may change over time. In case if there is any increase work, it would therefore increase the duration of the contract and the S&A.	Negligible	Possible	0	$5,184k

LANDS AND DAMAGES

In order to construct the proposed plan of improvement, local interests would be required to provide certain lands and easements. The total lands and damages costs provided by the real estate PDT member are identified in the table below, and are included in the total project cost.

Table C4 – Real Estate Costs

	TOTAL PROJECT REAL ESTATE COSTS	Non-Federal	Federal	Project Cost
	ASHAROKEN			
	Cost Summary:			
	Incidental Costs (01A)	$3,022,200		$3,022,200
	Real Estate Acquisition Costs (01B)	$2,224,989	$0	$2,224,989
	Subtotal:	$5,247,189	$0	$5,247,189
	20% Contingency, Less Land Payments (01B1)	$624,440	$0	$624,440
01	**LANDS AND DAMAGES**	$5,871,628	$0	**$5,871,628**
	Project Mangement Costs (30)		$501,100	$501,100
	Subtotal:		$501,100	$501,100
	20% Contingency		$100,220	$100,200
30	**PROJECT MANAGEMENT**		$601,320	**$601,320**

PLANNING, ENGINEERING AND DESIGN

The costs were developed for all activities associated with the planning, engineering and design effort. The cost for this account includes the preparation of Design Documentation Reports and plans and specifications for the TSP and engineering support during construction through project completion. It includes all the in-house labor based upon work-hour requirements, material and facility costs, travel and overhead. The percentage breakout in the Total Project Cost Summary (TPCS) was developed based on input from respective offices in accordance with the CWBS as well as historical prices.

CONSTRUCTION MANAGEMENT

The costs were developed for all construction management activities from pre-award requirements through final contract closeout. These costs include the in-house labor based upon work-hour requirements, materials, facility costs, support contracts, travel and overhead. Costs were developed based on the input from the construction division in accordance with the CWBS and include but are not limited to anticipated items such as the salaries of the resident engineer and staff, survey men, inspectors, draftsmen, clerical, and custodial personnel; operation, maintenance and fixed charges for transportation and for other field equipment; field supplies; construction management, general construction supervision; project office administration, distributive cost of area office and general overhead charged to the project. The work items and activities would include, but not be limited to: the salaries of all supervisory, engineering, office and safety field personnel; all on site expenses.

INTEREST DURING CONSTRUCTION

Interest during construction (IDC) is the cost of construction money invested before the beginning of the period of economic analysis and before the accumulation of benefits by the project. IDC costs have been added to the project cost to determine investment costs. Average annual costs were determined based on investment costs which include IDC. The pre-base year costs were estimated using the Federal interest rate of 3.375 percent (FY15).

RENOURISHMENT COSTS

The Renourishment costs for Alternative 4 are based on a renourishment cycle of 80,000 cubic yards of beach fill placed every 5 years for 50 years.

MAJOR REHABILTATION COSTS

The Major Rehabilitation costs were estimated to represent the cost for possible emergency placement of beach fill, resulting from 200 year, 100 year, 50 year and 20 year storms, over the 50 year life of the project, and are weighted by the probability of such a storm occurring between renourishment cycles.

OPERATION AND MAINTENANCE

The Operation and Maintenance (O&M) costs were estimated to represent the anticipated annual costs necessary to maintain the project throughout the project life. The majority of the maintenance cost is due to groin maintenance, which is calculated as 0.5% of the total cost of the groin construction, based on historical maintenance costs for groins and seawalls. Additionally, minor maintenance costs are attributed to annual dune maintenance.

COASTAL AND ENVIRONMENTAL MONITORING

Coastal and environmental monitoring costs have been provided by the costal and environmental section PDT members, and represent the annualized cost for the monitoring of flora and fauna, and surveying of borrow source and beach fill during construction. The majority of these costs occur during years 1 through 5 of the 50 year project life.

ESTIMATED ANNUAL COSTS

Annual costs are based on an economic project life of 50 year and an interest rate of 3.375%. The annual charges include the annualized investment costs along with annual operation and maintenance costs. A detailed breakdown of annual costs for the TSP is presented in Table C5 below.

Table C5 – Annualize Cost

Project First Cost	$	23,665,000
Interest During Construction	$	230,698
Total Investment Cost:	$	23,895,698
Annual Costs		
Annualized Initial Construction Cost (a)	$	806,000
Annualized Scheduled Renourishment (b)	$	883,000
Annualized Major Rehab Cost (c)	$	130,000
Annual Dune & Groin Maintenance Cost (d)	$	26,000
Annual Coastal Monitoring Cost	$	9,000
Annual Environmental Monitoring Cost	$	41,000
Total Annual Cost*	**$**	**1,895,000**

*OCT 2014 Price Level

Section I

(a) I = 3.38% and n = 50 yrs

(b) From Renourishment table, 80,000 cy every 5 yrs, for 50 yrs

(c) From Annualized Major Rehabilitation Cost Table

(d) Based 0.5% of initial new groin, groin extension and groin rehabilitation costs from First Cost table on TPCS.

When compared to the five project alternatives, alternative 4 provides the least annual cost, as shown in table C6 below.

Table C6 – Annual Cost Comparison

	Alternative 1 Beachfill Only	**Alternative 2** Beachfill and Buried Seawall-full shoreline	**Alternative 3** Beachfill and Buried Seawall-half shoreline	**Alternative 4** **Beachfill and Three West Groins**	**Alternative 5** Beachfill and 3 West, 8 East Groins
Initial Fill Volume (CY)	600,000	375,000	450,000	**600,000**	600,000
Coastal Structures	n/a	buried seawall	partial buried seawall	**3 rock groins**	11 rock groins
Nourisment (cy/period)	60,000 cy/3 yrs	200,000 cy/10 yrs	200,000 cy/10 yrs	**80,000 cy/5 yrs**	100,000 cy/10 yrs
Total Nourishment in 50yrs	1,000,000 cy	1,000,000 cy	1,000,000 cy	**800,000 cy**	500,000 cy
COSTS					
Initial Construction Cost	$21,552,000	$66,931,000	$45,940,000	**$23,665,000**	$32,426,000
Annualized Initial Constr.	$734,000	$2,310,000	$1,579,000	**$806,000**	$1,114,000
Annual Nourishment Cost	$1,143,000	$997,000	$997,000	**$883,000**	$504,000
Annualized Monitoring Costs	$50,000	$50,000	$50,000	**$50,000**	$93,000
Annualized Maintenance and Rehab	$147,000	$353,000	$259,000	**$156,000**	$196,000
Total Annual Cost	$2,074,000	$3,710,000	$2,885,000	**$1,895,000**	$1,907,000

COST SUMMARY

The Total Fully Funded Project cost for the TSP (Alternative 4) is $24,721,000 for initial nourishment and $124,607,000 for renourishment over a 50 year time period. The costs are to be 65% federally funded and 35% non-federally funded for initial construction and 50% federally funded and 50% non-federally funded for renourishment. Figure C2 below provides the Total Project Cost Summary for alternative 4, which includes contingencies and escalation. The project first cost is escalates each WBS cost to the project program year, and the fully funded total project cost is escalated through the 50 year project life to total project completion.

Figure C3 – Total Project Cost Summary

PROJECT: Asharoken - Alternative 4 | DISTRICT: NAN New York | PREPARED: 9/26/2015
PROJECT N: - | POC: CHIEF, COST ENGINEERING, Mukesh Kumar
LOCATION: Asharoken, Long Island

This Estimate reflects the scope and schedule in report; -

Civil Works Work Breakdown Structure		ESTIMATED COST				PROJECT FIRST COST (Constant Dollar Basis)				TOTAL PROJECT COST (FULLY FUNDED)				
						Program Year (Budget EC):			2017					
						Effective Price Level Date:			1 OCT16					
WBS NUMBER	Civil Works Feature & Sub-Feature Description	COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	Spent Thru: 26-Sep-15 ($K)		COST ($K)	CNTG ($K)	FULL ($K)
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
10	BREAKWATER & SEAWALLS	$1,265	$418	33%	$1,683	2.2%	$1,293	$427	$1,719	$0		$1,323	$437	$1,760
17	BEACH REPLENISHMENT	$10,147	$2,169	21%	$12,316	2.2%	$10,368	$2,217	$12,585	$0		$10,561	$2,258	$12,819
	CONSTRUCTION ESTIMATE TOTALS:	$11,412	$2,587		$13,999	2.2%	$11,661	$2,644	$14,304	$0		$11,884	$2,695	$14,579
01	LANDS AND DAMAGES	$5,247	$625	12%	$5,872	2.2%	$5,361	$638	$6,000	$0		$5,410	$644	$6,054
30	PLANNING, ENGINEERING & DESIGN	$2,570	$198	8%	$2,768	4.9%	$2,695	$208	$2,903	$0		$2,747	$212	$2,959
31	CONSTRUCTION MANAGEMENT	$968	$58	6%	$1,026	4.9%	$1,015	$61	$1,076	$0		$1,065	$64	$1,128
	PROJECT COST TOTALS:	$20,197	$3,468		$23,665		$20,733	$3,551	**$24,283**	$0		$21,106	$3,615	$24,721
17	BEACH REPLENISHMENT renourishments	$43,861	$5,540	13%	$49,400	2.2%	$44,817	$5,660	$50,477	$0		$80,996	$10,230	$91,226
	RENOURISHMENT ESTIMATE TOTALS:	$43,861	$5,540		$49,400	2.2%	$44,817	$5,660	$50,477	$0		$80,996	$10,230	$91,226
30	PLANNING, ENGINEERING & DESIGN renourishments	$3,617	$279	8%	$3,896	4.9%	$3,794	$293	$4,086	$0		$10,881	$839	$11,721
31	CONSTRUCTION MANAGEMENT renourishments	$4,216	$253	6%	$4,469	4.9%	$4,422	$265	$4,687	$0		$20,434	$1,226	$21,660
	PROJECT COST TOTALS:	$51,694	$6,072		$57,765		$53,032	$6,218	**$59,251**	$0		$112,311	$12,295	$124,607

Mandatory by Regulation	CHIEF, COST ENGINEERING, Mukesh Kumar			
		ESTIMATED FEDERAL COST:	65%	**$16,069**
Mandatory by Regulation	PROJECT MANAGER, Ron Pinzon	ESTIMATED NON-FEDERAL COST:	35%	**$8,652**
Mandatory by Regulation	CHIEF, REAL ESTATE, Noreen Dresser	**ESTIMATED TOTAL PROJECT COST:**		**$24,721**
	CHIEF, PLANNING,Frank Santomauro	ESTIMATED FEDERAL COST:	50%	**$62,303**
		ESTIMATED NON-FEDERAL COST:	50%	**$62,303**
	CHIEF, ENGINEERING, Arthur Connolly			
		ESTIMATED RENOURISHMENT TOTAL PROJECT COST:		**$124,607**
	CHIEF, OPERATIONS, Tom Creamer			
	CHIEF, CONSTRUCTION, Gerald Byrne			
	CHIEF, CONTRACTING,Frank Cashman			
	CHIEF, PM-PB, Anthony Ciorra			
	CHIEF, DPM, Joseph Seebode			

****** CONTRACT COST SUMMARY ******

PROJECT: Asharoken - Alternative 4
LOCATION: Asharoken, Long Island
This Estimate reflects the scope and schedule in report; -

DISTRICT: NAN New York PREPARED: 9/26/2015
POC: CHIEF, COST ENGINEERING, Mukesh Kumar

Civil Works Work Breakdown Structure		ESTIMATED COST				PROJECT FIRST COST (Constant Dollar Basis)				TOTAL PROJECT COST (FULLY FUNDED)				
		Estimate Prepared: 9/26/2015 Effective Price Level: 26-Sep-2015				Program Year (Budget EC): 2017 Effective Price Level Date: 1 Oct16								
		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
	Contract #1													
10	BREAKWATER & SEAWALLS	$1,265	$418	33%	$1,683	2.2%	$1,293	$427	$1,719	2018Q2	2.3%	$1,323	$437	$1,760
17	BEACH REPLENISHMENT	$10,147	$2,169	21%	$12,316	2.2%	$10,368	$2,217	$12,585	2018Q1	1.9%	$10,561	$2,258	$12,819
	CONSTRUCTION ESTIMATE TOTALS:	$11,412	$2,587	23%	**$13,999**		$11,661	$2,644	$14,304			$11,884	$2,695	$14,579
01	LANDS AND DAMAGES	$5,247	$625	12%	$5,872	2.2%	$5,361	$638	$6,000	2017Q3	0.9%	$5,410	$644	$6,054
30	PLANNING, ENGINEERING & DESIGN													
2.5%	Project Management	$285	$22	8%	$307	4.9%	$299	$23	$322	2017Q3	1.9%	$305	$24	$328
1.0%	Planning & Environmental Compliance	$114	$9	8%	$123	4.9%	$120	$9	$129	2017Q3	1.9%	$122	$9	$131
8.8%	Engineering & Design	$999	$77	8%	$1,076	4.9%	$1,048	$81	$1,129	2017Q3	1.9%	$1,068	$82	$1,150
1.0%	Reviews, ATRs, IEPRs, VE	$114	$9	8%	$123	4.9%	$120	$9	$129	2017Q3	1.9%	$122	$9	$131
0.3%	risks)	$29	$2	8%	$31	4.9%	$30	$2	$33	2017Q3	1.9%	$31	$2	$33
0.3%	Contracting & Reprographics	$29	$2	8%	$31	4.9%	$30	$2	$33	2017Q3	1.9%	$31	$2	$33
1.5%	Engineering During Construction	$171	$13	8%	$184	4.9%	$179	$14	$193	2017Q3	1.9%	$183	$14	$197
2.0%	Planning During Construction	$228	$18	8%	$246	4.9%	$239	$18	$258	2017Q3	1.9%	$244	$19	$263
	Real Estate Management	$601	$46	8%	$647	4.9%	$630	$49	$679	2017Q3	1.9%	$642	$50	$692
31	CONSTRUCTION MANAGEMENT													
8.5%	Construction Management	$968	$58	6%	$1,026	4.9%	$1,015	$61	$1,076	2018Q2	4.9%	$1,065	$64	$1,128
0.0%	Project Operation:	$0	$0	6%	$0	0.0%	$0	$0	$0	0-Jan-1900	0.0%	$0	$0	$0
0.0%	Project Management	$0	$0	6%	$0	0.0%	$0	$0	$0	0-Jan-1900	0.0%	$0	$0	$0
	CONTRACT COST TOTALS:	$20,197	$3,468		**$23,665**		$20,733	$3,551	$24,283			$21,106	$3,615	**$24,721**

****** CONTRACT COST SUMMARY ******

PROJECT: Asharoken - Alternative 4
LOCATION: Asharoken, Long Island
This Estimate reflects the scope and schedule in report; -

DISTRICT: NAN New York PREPARED: 9/26/2015
POC: CHIEF, COST ENGINEERING, Mukesh Kumar

Civil Works Work Breakdown Structure			ESTIMATED COST				PROJECT FIRST COST (Constant Dollar Basis)				TOTAL PROJECT COST (FULLY FUNDED)				
PERIODIC RENOURISHMENT (every 3 yrs)			Estimate Prepared: 9/26/2015 Effective Price Level: 26-Sep-2015				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
17	BEACH REPLENISHMENT	Year 5	$5,426	$685	13%	$6,111	2.2%	$5,544	$700	$6,244	2023Q1	12.4%	$6,232	$787	$7,020
17	BEACH REPLENISHMENT	Year 10	$4,351	$549	13%	$4,900	2.2%	$4,445	$561	$5,007	2028Q1	24.1%	$5,518	$697	$6,215
17	BEACH REPLENISHMENT	Year 15	$4,261	$538	13%	$4,799	2.2%	$4,353	$550	$4,903	2033Q1	37.0%	$5,966	$754	$6,720
17	BEACH REPLENISHMENT	Year 20	$4,261	$538	13%	$4,799	2.2%	$4,353	$550	$4,903	2038Q1	51.3%	$6,587	$832	$7,419
17	BEACH REPLENISHMENT	Year 25	$4,261	$538	13%	$4,799	2.2%	$4,353	$550	$4,903	2043Q1	67.1%	$7,273	$919	$8,191
17	BEACH REPLENISHMENT	Year 30	$4,261	$538	13%	$4,799	2.2%	$4,353	$550	$4,903	2048Q1	84.4%	$8,029	$1,014	$9,044
17	BEACH REPLENISHMENT	Year 35	$4,261	$538	13%	$4,799	2.2%	$4,353	$550	$4,903	2053Q1	103.6%	$8,865	$1,120	$9,985
17	BEACH REPLENISHMENT	Year 40	$4,261	$538	13%	$4,799	2.2%	$4,353	$550	$4,903	2058Q1	124.8%	$9,788	$1,236	$11,024
17	BEACH REPLENISHMENT	Year 45	$4,261	$538	13%	$4,799	2.2%	$4,353	$550	$4,903	2063Q1	148.2%	$10,807	$1,365	$12,171
17	BEACH REPLENISHMENT	Year 50	$4,261	$538	13%	$4,799	2.2%	$4,353	$550	$4,903	2068Q1	174.1%	$11,931	$1,507	$13,438
	CONSTRUCTION ESTIMATE TOTALS:		$43,861	$5,540	13%	**$49,400**		$44,817	$5,660	$50,477			$80,996	$10,230	$91,226
30	PLANNING, ENGINEERING & DESIGN	Year 5	$362	$28	8%	$390	4.9%	$379	$29	$409	2022Q3	23.8%	$470	$36	$506
30	PLANNING, ENGINEERING & DESIGN	Year 10	$362	$28	8%	$390	4.9%	$379	$29	$409	2027Q3	52.2%	$578	$45	$622
30	PLANNING, ENGINEERING & DESIGN	Year 15	$362	$28	8%	$390	4.9%	$379	$29	$409	2022Q3	23.8%	$470	$36	$506
30	PLANNING, ENGINEERING & DESIGN	Year 20	$362	$28	8%	$390	4.9%	$379	$29	$409	2027Q3	52.2%	$578	$45	$622
30	PLANNING, ENGINEERING & DESIGN	Year 25	$362	$28	8%	$390	4.9%	$379	$29	$409	2032Q3	90.9%	$724	$56	$780
30	PLANNING, ENGINEERING & DESIGN	Year 30	$362	$28	8%	$390	4.9%	$379	$29	$409	2037Q3	143.9%	$925	$71	$997
30	PLANNING, ENGINEERING & DESIGN	Year 35	$362	$28	8%	$390	4.9%	$379	$29	$409	2042Q3	212.4%	$1,185	$91	$1,277
30	PLANNING, ENGINEERING & DESIGN	Year 40	$362	$28	8%	$390	4.9%	$379	$29	$409	2047Q3	300.1%	$1,518	$117	$1,635
30	PLANNING, ENGINEERING & DESIGN	Year 45	$362	$28	8%	$390	4.9%	$379	$29	$409	2052Q3	412.5%	$1,944	$150	$2,094
30	PLANNING, ENGINEERING & DESIGN	Year 50	$362	$28	8%	$390	4.9%	$379	$29	$409	2057Q3	556.4%	$2,490	$192	$2,682
	PLANNING, ENGINEERING & DESIGN TOTALS:		$3,617	$279	8%	**$3,896**		$3,794	$293	$4,086			$10,881	$839	$11,721
31	CONSTRUCTION MANAGEMENT	Year 5	$422	$25	6%	$447	4.9%	$442	$27	$469	2023Q1	26.3%	$558	$34	$592
31	CONSTRUCTION MANAGEMENT	Year 10	$422	$25	6%	$447	4.9%	$442	$27	$469	2028Q1	55.6%	$688	$41	$729
31	CONSTRUCTION MANAGEMENT	Year 15	$422	$25	6%	$447	4.9%	$442	$27	$469	2033Q1	95.5%	$864	$52	$916
31	CONSTRUCTION MANAGEMENT	Year 20	$422	$25	6%	$447	4.9%	$442	$27	$469	2038Q1	150.0%	$1,105	$66	$1,172
31	CONSTRUCTION MANAGEMENT	Year 25	$422	$25	6%	$447	4.9%	$442	$27	$469	2043Q1	220.2%	$1,416	$85	$1,501
31	CONSTRUCTION MANAGEMENT	Year 30	$422	$25	6%	$447	4.9%	$442	$27	$469	2048Q1	310.1%	$1,813	$109	$1,922
31	CONSTRUCTION MANAGEMENT	Year 35	$422	$25	6%	$447	4.9%	$442	$27	$469	2053Q1	425.3%	$2,323	$139	$2,462
31	CONSTRUCTION MANAGEMENT	Year 40	$422	$25	6%	$447	4.9%	$442	$27	$469	2058Q1	572.8%	$2,975	$178	$3,153
31	CONSTRUCTION MANAGEMENT	Year 45	$422	$25	6%	$447	4.9%	$442	$27	$469	2063Q1	761.8%	$3,810	$229	$4,039
31	CONSTRUCTION MANAGEMENT	Year 50	$422	$25	6%	$447	4.9%	$442	$27	$469	2068Q1	1003.8%	$4,880	$293	$5,173
	CONSTRUCTION MANAGEMENT TOTALS:		$4,216	$253	6%	**$4,469**		$4,422	$265	$4,687			$20,434	$1,226	$21,660
	CONTRACT COST TOTALS:		$51,694	$6,072		**$57,765**		$53,032	$6,218	$59,251			$112,311	$12,295	**$124,607**

MII Reports

Print Date Mon 28 September 2015
Eff. Date 9/26/2015

U.S. Army Corps of Engineers
Project : Asharoken, Long Island Beachfill and Groin Construction - Alternative 4

Time 14:28:34

Description	Quantity	UOM	ProjectCost
Asharoken MII Report			71,902,251.28
Asharoken, Long Island Beachfill and Groin Construction	1.0000	LS	20,197,251.28
01 - Lands and Damages	1.0000	LS	5,247,000.00
10 - Breakwaters and Seawalls	1.0000	LS	1,265,079.01
17 - Beach Replenishment	1.0000	LS	10,147,172.27
30 - Planning, Engineering & Design	1.0000	LS	2,570,000.00
31 - Construction Management	1.0000	LS	968,000.00
Beach Renourishment - yr 5	1.0000	LS	6,210,000.00
17- Beach Renourishment Costs - Trucking	1.0000	LS	5,426,000.00
30 - Planning, Engineering & Design	1.0000	LS	362,000.00
31 - Construction Management	1.0000	LS	422,000.00
Beach Renourishment - yr 10	1.0000	LS	5,135,000.00
17- Beach Renourishment Costs - Trucking	1.0000	LS	4,351,000.00
30 - Planning, Engineering & Design	1.0000	LS	362,000.00
31 - Construction Management	1.0000	LS	422,000.00
Beach Renourishment - yr 15	1.0000	LS	5,045,000.00
17- Beach Renourishment Costs - Trucking	1.0000	LS	4,261,000.00
30 - Planning, Engineering & Design	1.0000	LS	362,000.00
31 - Construction Management	1.0000	LS	422,000.00
Beach Renourishment - yr 20	1.0000	LS	5,045,000.00
17- Beach Renourishment Costs - Trucking	1.0000	LS	4,261,000.00
30 - Planning, Engineering & Design	1.0000	LS	362,000.00
31 - Construction Management	1.0000	LS	422,000.00
Beach Renourishment - yr 25	1.0000	LS	5,045,000.00
17- Beach Renourishment Costs - Trucking	1.0000	LS	4,261,000.00
30 - Planning, Engineering & Design	1.0000	LS	362,000.00
31 - Construction Management	1.0000	LS	422,000.00
Beach Renourishment - yr 30	1.0000	LS	5,045,000.00
17- Beach Renourishment Costs - Trucking	1.0000	LS	4,261,000.00
30 - Planning, Engineering & Design	1.0000	LS	362,000.00
31 - Construction Management	1.0000	LS	422,000.00
Beach Renourishment - yr 35	1.0000	LS	5,045,000.00
17- Beach Renourishment Costs - Trucking	1.0000	LS	4,261,000.00
30 - Planning, Engineering & Design	1.0000	LS	362,000.00
31 - Construction Management	1.0000	LS	422,000.00
Beach Renourishment - yr 40	1.0000	LS	5,045,000.00
17- Beach Renourishment Costs - Trucking	1.0000	LS	4,261,000.00
30 - Planning, Engineering & Design	1.0000	LS	362,000.00
31 - Construction Management	1.0000	LS	422,000.00
Beach Renourishment - yr 45	1.0000	LS	5,045,000.00
17- Beach Renourishment Costs - Trucking	1.0000	LS	4,261,000.00
30 - Planning, Engineering & Design	1.0000	LS	362,000.00
31 - Construction Management	1.0000	LS	422,000.00
Beach Renourishment - yr 50	1.0000	LS	5,045,000.00
17- Beach Renourishment Costs - Trucking	1.0000	LS	4,261,000.00
30 - Planning, Engineering & Design	1.0000	LS	362,000.00
31 - Construction Management	1.0000	LS	422,000.00

District Quality Control (DQC)