

LEONARDO, RARITAN BAY AND SANDY HOOK BAY, NEW JERSEY  
(LEONARDO)

APPENDIX D  
COST ESTIMATES

LEONARDO, RARITAN BAY AND SANDY HOOK BAY, NEW JERSEY  
(LEONARDO)

MARCH 2015 COST ESTIMATES

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## Introduction

This Appendix presents the detailed cost estimate for the Leonardo, New Jersey Coastal Storm Risk Management Feasibility Study. The project was designed to manage and reduce the risk of flooding of the homes in Leonardo, New Jersey. The shoreline areas are of low elevation and subject to storm induced flooding and in some locations, erosion and/or wave damage. After review of several options, the most cost effective solution was determined to be nonstructural. Based on the main floor elevations of homes in the area and a 0.7 ft of sea level rise, twenty-five structures were found to be in need of an elevation raise, before more detailed optimization occurs for the final feasibility study.

The material costs were based on a combination of MII database, RSMeans, quotes, and some historical information from the Greenbrook, NJ, Flood Damage Reduction Project (12-9-09). Equipment rates were obtained from 2014 Region I price level of the equipment manual, and Davis Bacon Wage Rates for Monmouth County, NJ were utilized for labor costs.

The fully funded project cost is \$5,703,000 and is cost shared: 65% federally funded, 35% non-Federal. These costs include the initial first cost (\$5,463,000) for construction, including lands and damages, design, supervision and associated administration costs (Table 1). In addition, the escalation to midpoint of construction is included (Table 2). This midpoint was determined assuming a start date of October 2016 and using the construction schedule shown in Table 3.

In addition to the start date, the construction schedule was created with other assumptions in mind. It was assumed that five homes would be worked on at once by one contractor with multiple crews working six days a week. A single home will take approximately eight weeks to accomplish with one group of five overlapping with the next group by one month. Assuming work will not be done the months of December, January, and February because of weather and the potential for existing disconnected plumbing to freeze; the overall duration will be ten months with a completion date in July 2017.

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

**Table 1: First Cost Table**

**Leonardo, Raritan Bay and Sandy Hook Bay, New Jersey (Leonardo)**  
October 2014 Price Level

**Tentative Selected Plan Cost Estimate Summary**

<b>Feat. Acct.</b>	<b>Description</b>	<b>Qty</b>	<b>UoM</b>	<b>Subtotal</b>	<b>Cont. %</b>	<b>Cont \$S</b>	<b>Total Cost</b>
01	LANDS AND DAMAGES	1	LS	\$ 544,740	20.00%	\$ 108,948	\$ 653,688
	<b>TotalLANDS AND DAMAGES</b>			<b>\$ 544,740</b>		<b>\$ 108,948</b>	<b>\$ 653,688</b>
19	BUILDINGS, GROUNDS & UTILITIES	1	LS	\$ 2,576,090	41.73%	\$ 1,075,002	\$ 3,651,093
	<b>TotalBUILDINGS, GROUNDS &amp; UTILITIES</b>			<b>\$ 2,576,090</b>		<b>\$ 1,075,002</b>	<b>\$ 3,651,093</b>
30	PLANNING, ENGINEERING & DESIGN	1	LS	\$ 648,713	15.67%	\$ 101,653	\$ 750,367
31	CONSTRUCTION MANAGEMENT	1	LS	\$ 337,127	20.96%	\$ 70,662	\$ 407,788
	<b>TOTAL FIRST COST</b>			<b>\$ 4,106,671</b>		<b>\$ 1,356,266</b>	<b>\$ 5,462,936</b>

## Table 2: Total Project Cost Summary (TPCS)

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

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PROJECT: Leonardo, Raritan Bay and Sandy Hook Bay, New Jersey (Leonardo)  
PROJECT NO: P2 403362  
LOCATION: Leonardo, NJ

DISTRICT: NAN New York District  
PREPARED: 1/8/2015  
POC: CHIEF, COST ENGINEERING, Mukesh

This Estimate reflects the scope and schedule in report; Leonardo TSP

Civil Works Work Breakdown Structure		ESTIMATED COST				PROJECT FIRST COST (Constant Dollar Basis)				TOTAL PROJECT COST (FULLY FUNDED)					
WBS NUMBER	Civil Works Feature & Sub-Feature Description	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: 2015 1 OCT 14		ESC (%) M	COST (\$K) N	CNTG (\$K) O	FULL (\$K) O
										Spent Thru: 10/1/2013 (\$K)	FIRST COST (\$K)				
19	BUILDINGS, GROUNDS & UTILITIES	\$2,537	\$1,059	42%	\$3,595	1.6%	\$2,576	\$1,075	\$3,651	\$0	\$3,651	4.4%	\$2,689	\$1,122	\$3,812
<b>CONSTRUCTION ESTIMATE TOTALS:</b>		\$2,537	\$1,059		\$3,595	1.6%	\$2,576	\$1,075	\$3,651	\$0	\$3,651	4.4%	\$2,689	\$1,122	\$3,812
01	LANDS AND DAMAGES	\$536	\$107	20%	\$644	1.6%	\$545	\$109	\$654	\$0	\$654	1.9%	\$555	\$111	\$666
30	PLANNING, ENGINEERING & DESIGN	\$635	\$100	16%	\$735	2.2%	\$649	\$102	\$750	\$0	\$750	4.4%	\$678	\$106	\$784
31	CONSTRUCTION MANAGEMENT	\$330	\$69	21%	\$399	2.2%	\$337	\$71	\$408	\$0	\$408	8.5%	\$366	\$77	\$442
<b>PROJECT COST TOTALS:</b>		\$4,038	\$1,334	33%	\$5,373		\$4,107	\$1,356	\$5,463	\$0	\$5,463	4.4%	\$4,287	\$1,416	\$5,703

- Mandatory by Regulation** CHIEF, COST ENGINEERING, Mukesh Kumar
- Mandatory by Regulation** PROJECT MANAGER, Jenifer Thalhauser
- Mandatory by Regulation** CHIEF, REAL ESTATE, Noreen Dresser
- CHIEF, PLANNING, Frank Santomauro
- CHIEF, ENGINEERING, Arthur Connolly
- CHIEF, OPERATIONS, Thomas Creamer
- CHIEF, CONSTRUCTION, Timothy Yarger
- CHIEF, CONTRACTING, Francis Cashman
- CHIEF, PM-PB, xxxxx
- CHIEF, DPM, Joseph Seebode

ESTIMATED FEDERAL COST: 65% \$3,707  
ESTIMATED NON-FEDERAL COST: 35% \$1,996  
**ESTIMATED TOTAL PROJECT COST: \$5,703**

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

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

PROJECT: Leonardo, Raritan Bay and Sandy Hook Bay, New Jersey (Leonardo)  
LOCATION: Leonardo, NJ  
This Estimate reflects the scope and schedule in report; Leonardo TSP

DISTRICT: NAN New York District  
PREPARED: 1/8/2015  
POC: CHIEF, COST ENGINEERING, Mukesh Kumar

Civil Works Work Breakdown Structure		ESTIMATED COST				PROJECT FIRST COST (Constant Dollar Basis)				TOTAL PROJECT COST (FULLY FUNDED)						
WBS NUMBER	Civil Works Feature & Sub-Feature Description	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: 2015 1 OCT 14		Mid-Point Date P	ESC (%) L	COST (\$K) M	CNTG (\$K) N	FULL (\$K) O
										Estimate Prepared: Effective Price Level: 5/20/2014 10/1/2013	RISK BASED					
19	PHASE 1 or CONTRACT 1 BUILDINGS, GROUNDS & UTILITIES	\$2,537	\$1,059	42%	\$3,595	1.6%	\$2,576	\$1,075	\$3,651	\$0	\$3,651	2017Q2	4.4%	\$2,689	\$1,122	\$3,812
<b>CONSTRUCTION ESTIMATE TOTALS:</b>		\$2,537	\$1,059	42%	\$3,595		\$2,576	\$1,075	\$3,651		\$3,651			\$2,689	\$1,122	\$3,812
01	LANDS AND DAMAGES	\$536	\$107	20%	\$644	1.6%	\$545	\$109	\$654		\$654	2016Q1	1.9%	\$555	\$111	\$666
30	PLANNING, ENGINEERING & DESIGN															
2.5%	Project Management	\$63	\$10	16%	\$73	2.2%	\$64	\$10	\$74		\$74	2016Q1	3.4%	\$67	\$10	\$77
2.0%	Planning & Environmental Compliance	\$51	\$8	16%	\$59	2.2%	\$52	\$8	\$60		\$60	2016Q1	3.4%	\$54	\$8	\$62
10.0%	Engineering & Design	\$254	\$40	16%	\$294	2.2%	\$259	\$41	\$300		\$300	2016Q1	3.4%	\$268	\$42	\$310
3.0%	Reviews, ATRs, IEPRs, VE	\$76	\$12	16%	\$88	2.2%	\$78	\$12	\$90		\$90	2016Q1	3.4%	\$80	\$13	\$93
0.5%	Life Cycle Updates (cost, schedule, risks)	\$13	\$2	16%	\$15	2.2%	\$13	\$2	\$15		\$15	2016Q1	3.4%	\$14	\$2	\$16
2.0%	Contracting & Repographics	\$51	\$8	16%	\$59	2.2%	\$52	\$8	\$60		\$60	2016Q1	3.4%	\$54	\$8	\$62
3.0%	Engineering During Construction	\$76	\$12	16%	\$88	2.2%	\$78	\$12	\$90		\$90	2017Q2	8.5%	\$84	\$13	\$97
2.0%	Planning During Construction	\$51	\$8	16%	\$59	2.2%	\$52	\$8	\$60		\$60	2017Q2	8.5%	\$57	\$9	\$65
0.0%	Project Operations	\$0	\$0	16%	\$0	0.0%	\$0	\$0	\$0		\$0	0	0.0%	\$0	\$0	\$0
31	CONSTRUCTION MANAGEMENT															
10.0%	Construction Management	\$254	\$53	21%	\$307	2.2%	\$259	\$54	\$314		\$314	2017Q2	8.5%	\$281	\$59	\$340
0.0%	Project Operation:	\$0	\$0	21%	\$0	0.0%	\$0	\$0	\$0		\$0	0	0.0%	\$0	\$0	\$0
3.0%	Project Management	\$76	\$16	21%	\$92	2.2%	\$78	\$16	\$94		\$94	2017Q2	8.5%	\$84	\$18	\$102
<b>CONTRACT COST TOTALS:</b>		\$4,038	\$1,334		\$5,373		\$4,107	\$1,356	\$5,463		\$5,463			\$4,287	\$1,416	\$5,703

**Table 3: Construction Schedule**

Task Name	Duration	Start	Finish	2016				2017			
				1st Half		2nd Half		1st Half		2nd Half	
				Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4
<b>Leonardo, NJ Non Structural Constructive</b>	<b>258 days</b>	<b>Mon 10/3/16</b>	<b>Mon 7/31/17</b>								
<b>Structure ID No. 4</b>	<b>48 days</b>	<b>Mon 10/3/16</b>	<b>Mon 11/28/16</b>								
Preconstruction Activities	4 days	Mon 10/3/16	Fri 10/7/16								
Disconnect Utilities	2 days	Fri 10/7/16	Mon 10/10/16								
Mobilization	2 days	Mon 10/10/16	Wed 10/12/16								
Demo	5 days	Wed 10/12/16	Tue 10/18/16								
Elevation and New Foundation	15 days	Tue 10/18/16	Fri 11/4/16								
Reconnect Utilities	2 days	Fri 11/4/16	Mon 11/7/16								
Interior Work	5 days	Mon 11/7/16	Sat 11/12/16								
Exterior Work	10 days	Sat 11/12/16	Thu 11/24/16								
Demobilization	3 days	Thu 11/24/16	Mon 11/28/16								
<b>Structure ID No. 13</b>	<b>48 days</b>	<b>Mon 10/3/16</b>	<b>Mon 11/28/16</b>								
<b>Structure ID No. 14</b>	<b>48 days</b>	<b>Mon 10/3/16</b>	<b>Mon 11/28/16</b>								
<b>Structure ID No. 22</b>	<b>48 days</b>	<b>Mon 10/3/16</b>	<b>Mon 11/28/16</b>								
<b>Structure ID No. 23</b>	<b>48 days</b>	<b>Mon 10/3/16</b>	<b>Mon 11/28/16</b>								
<b>Structure ID No. 27</b>	<b>48 days</b>	<b>Mon 3/6/17</b>	<b>Mon 5/1/17</b>								
<b>Structure ID No. 38</b>	<b>48 days</b>	<b>Mon 3/6/17</b>	<b>Mon 5/1/17</b>								
<b>Structure ID No. 93</b>	<b>48 days</b>	<b>Mon 3/6/17</b>	<b>Mon 5/1/17</b>								
<b>Structure ID No. 149.1</b>	<b>48 days</b>	<b>Mon 3/6/17</b>	<b>Mon 5/1/17</b>								
<b>Structure ID No. 161</b>	<b>48 days</b>	<b>Mon 3/6/17</b>	<b>Mon 5/1/17</b>								
<b>Structure ID No. 179</b>	<b>48 days</b>	<b>Mon 4/3/17</b>	<b>Mon 5/29/17</b>								
<b>Structure ID No. 182</b>	<b>48 days</b>	<b>Mon 4/3/17</b>	<b>Mon 5/29/17</b>								
<b>Structure ID No. 185</b>	<b>48 days</b>	<b>Mon 4/3/17</b>	<b>Mon 5/29/17</b>								
<b>Structure ID No. 188</b>	<b>48 days</b>	<b>Mon 4/3/17</b>	<b>Mon 5/29/17</b>								
<b>Structure ID No. 189</b>	<b>48 days</b>	<b>Mon 4/3/17</b>	<b>Mon 5/29/17</b>								
<b>Structure ID No. 190</b>	<b>48 days</b>	<b>Mon 5/1/17</b>	<b>Mon 6/26/17</b>								
<b>Structure ID No. 191</b>	<b>48 days</b>	<b>Mon 5/1/17</b>	<b>Mon 6/26/17</b>								
<b>Structure ID No. 192</b>	<b>48 days</b>	<b>Mon 5/1/17</b>	<b>Mon 6/26/17</b>								
<b>Structure ID No. 196</b>	<b>48 days</b>	<b>Mon 5/1/17</b>	<b>Mon 6/26/17</b>								
<b>Structure ID No. 268</b>	<b>48 days</b>	<b>Mon 5/1/17</b>	<b>Mon 6/26/17</b>								
<b>Structure ID No. 313</b>	<b>48 days</b>	<b>Mon 6/5/17</b>	<b>Mon 7/31/17</b>								
<b>Structure ID No. 319</b>	<b>48 days</b>	<b>Mon 6/5/17</b>	<b>Mon 7/31/17</b>								
<b>Structure ID No. 337</b>	<b>48 days</b>	<b>Mon 6/5/17</b>	<b>Mon 7/31/17</b>								
<b>Structure ID No. 343</b>	<b>48 days</b>	<b>Mon 6/5/17</b>	<b>Mon 7/31/17</b>								
<b>Structure ID No. 345</b>	<b>48 days</b>	<b>Mon 6/5/17</b>	<b>Mon 7/31/17</b>								

**Table 4: Abbreviated Risk Analysis (ARA)**

**Abbreviated Risk Analysis**

Project (less than \$40M): **Leonardo, Raritan Bay & Sandy Hook Bay, New Jersey**  
 Project Development Stage: **Feasibility (Alternatives)**  
 Risk Category: **Low Risk: Simple Project-No Life Safety**

Total Construction Contract Cost = \$ **2,536,658**

CWWBS	Feature of Work	Contract Cost	% Contingency	\$ Contingency	Total
01 LANDS AND DAMAGES	Real Estate	\$ 536,400	20.00%	\$ 107,280	\$ 643,680.00
1 19 BUILDINGS, GROUNDS, AND UTILITIES	Residential Structures (Slab on Grade)	\$ 641,486	43.31%	\$ 277,853	\$ 919,338.75
2 19 BUILDINGS, GROUNDS, AND UTILITIES	Residential Structures (Subgrade Basemen	\$ 798,725	41.19%	\$ 329,000	\$ 1,127,724.93
3 19 BUILDINGS, GROUNDS, AND UTILITIES	Residential Structures (Raised - Crawlspace	\$ 993,967	41.19%	\$ 409,421	\$ 1,403,388.09
4 19 BUILDINGS, GROUNDS, AND UTILITIES	Non-Residential (Wood Construction)	\$ 102,479	41.19%	\$ 42,212	\$ 144,690.89
13 30 PLANNING, ENGINEERING, AND DESIGN	Planning, Engineering, & Design	\$ 635,000	15.67%	\$ 99,500	\$ 734,500.40
14 31 CONSTRUCTION MANAGEMENT	Construction Management	\$ 330,000	20.96%	\$ 69,184	\$ 399,183.73
<b>Totals</b>					
	Real Estate	\$ 536,400	20.00%	\$ 107,280	\$ 643,680.00
	Total Construction Estimate	\$ 2,536,658	41.73%	\$ 1,058,485	\$ 3,595,143
	Total Planning, Engineering & Design	\$ 635,000	15.67%	\$ 99,500	\$ 734,500
	Total Construction Management	\$ 330,000	20.96%	\$ 69,184	\$ 399,184
	<b>Total</b>	<b>\$ 4,038,058</b>		<b>\$ 1,334,449</b>	<b>\$ 5,372,507</b>

**Leonardo, Raritan Bay & Sandy Hook Bay, New Jersey (Leonardo)**  
 Feasibility (Alternatives)  
 Abbreviated Risk Analysis

Meeting Date: 9-Jul-14

	Risk Level				
Very Likely	2	3	4	5	6
Likely	1	2	3	4	5
Possible	0	1	2	3	4
Unlikely	0	0	1	2	3
	Negligible	Marginal	Significant	Critical	Crisis

Risk Element	Feature of Work	Concerns Pull Down Tab (ENABLE MACROS THRU TRUST CENTER) (Choose ALL that apply)	Concerns	PDT Discussions & Conclusions (Include logic & justification for choice of Likelihood & Impact)	Likelihood	Impact	Risk Level
<b>Project Scope Growth</b>							
						<b>Max Potential Cost Growth</b>	<b>40%</b>
PS-1	Residential Structures (Slab on Grade)	• Potential for scope growth, added features and quantities?	• Design confidence? • Investigations sufficient to support design assumptions? • Potential for scope growth, added features and quantities?	Design has yet to be done. Assume USACE will do plans & specifications in house and homeowner may hire contractor to do work on their own. Investigations are ongoing, and potential for scope growth is low.	Possible	Significant	2
PS-2	Residential Structures (Subgrade Basement)	• Potential for scope growth, added features and quantities?	• Design confidence? • Investigations sufficient to support design assumptions? • Potential for scope growth, added features and quantities?	Design has yet to be done. Assume USACE will do plans & specifications in house and homeowner may hire contractor to do work on their own. Investigations are ongoing, and potential for scope growth is low. Same.	Possible	Significant	2
PS-3	Residential Structures (Raised - Crawlspace)	• Potential for scope growth, added features and quantities?	• Design confidence? • Investigations sufficient to support design assumptions? • Potential for scope growth, added features and quantities?	Design has yet to be done. Assume USACE will do plans & specifications in house and homeowner may hire contractor to do work on their own. Investigations are ongoing, and potential for scope growth is low.	Possible	Significant	2
PS-4	Non-Residential (Wood Construction)	• Potential for scope growth, added features and quantities?	• Design confidence? • Investigations sufficient to support design assumptions? • Potential for scope growth, added features and quantities?	Design has yet to be done. Assume USACE will do plans & specifications in house and homeowner may hire contractor to do work on their own. Investigations are ongoing, and potential for scope growth is low.	Possible	Significant	2
PS-13	Planning, Engineering, & Design	• Investigations sufficient to support design assumptions?	• Design confidence? • Investigations sufficient to support design assumptions?	Design is not complete and investigations are still ongoing.	Possible	Marginal	1
PS-14	Construction Management	• Potential for scope growth, added features and quantities?		N/A	Unlikely	Negligible	0

Acquisition Strategy						Max Potential Cost Growth		30%
AS-1	Residential Structures (Slab on Grade)	• BA or small business likely?	<ul style="list-style-type: none"> <li>Contracting plan firmly established?</li> <li>Limited bid competition anticipated?</li> <li>BA or small business likely?</li> </ul>	The contracting plan is not firmly established. Undetermined if USACE or homeowners will hire contractor. In the past it may have been a risk that there were not enough contractors to do the work, but recently there has been an increase in the number of small contractors doing this work. There are plenty of BA and small business, so competitive bid prices can be received.	Likely	Significant	3	
AS-2	Residential Structures (Subgrade Basement)	• Contracting plan firmly established?	<ul style="list-style-type: none"> <li>Contracting plan firmly established?</li> <li>Limited bid competition anticipated?</li> <li>BA or small business likely?</li> </ul>	The contracting plan is not firmly established. Undetermined if USACE or homeowners will hire contractor. In the past it may have been a risk that there were not enough contractors to do the work, but recently there has been an increase in the number of small contractors doing this work. There are plenty of BA and small business, so competitive bid prices can be received.	Likely	Significant	3	
AS-3	Residential Structures (Raised - Crawlspace)	• Contracting plan firmly established?	<ul style="list-style-type: none"> <li>Contracting plan firmly established?</li> <li>Limited bid competition anticipated?</li> <li>BA or small business likely?</li> </ul>	The contracting plan is not firmly established. Undetermined if USACE or homeowners will hire contractor. In the past it may have been a risk that there were not enough contractors to do the work, but recently there has been an increase in the number of small contractors doing this work. There are plenty of BA and small business, so competitive bid prices can be received.	Likely	Significant	3	
AS-4	Non-Residential (Wood Construction)	• Contracting plan firmly established?	<ul style="list-style-type: none"> <li>Contracting plan firmly established?</li> <li>Limited bid competition anticipated?</li> <li>BA or small business likely?</li> </ul>	The contracting plan is not firmly established. Undetermined if USACE or homeowners will hire contractor. In the past it may have been a risk that there were not enough contractors to do the work, but recently there has been an increase in the number of small contractors doing this work. There are plenty of BA and small business, so competitive bid prices can be received.	Likely	Significant	3	
AS-13	Planning, Engineering, & Design	• Contracting plan firmly established?		N/A	Unlikely	Negligible	0	
AS-14	Construction Management	• Contracting plan firmly established?	• Contracting plan firmly established?	Assume either Federal government-managed or homeowner and Federal-government managed in the implementation of non-structural measures. Homeowner would manage the project with Corps inspection at the end or provide the option of Corps to provide QA/QC. Contracting plan is still undetermined.	Likely	Significant	3	
Construction Elements						Max Potential Cost Growth		16%
CE-1	Residential Structures (Slab on Grade)	• Potential for construction modification and claims?	<ul style="list-style-type: none"> <li>High risk or complex construction elements, site access, in-water?</li> <li>Special equipment or subcontractors needed?</li> <li>Unique construction methods?</li> <li>Potential for construction modification and claims?</li> </ul>	Site-access is a concern since the houses are close together making equipment mobility and staging very difficult. The assumption is made that with the amount of house-raises taking place recently, the equipment and contractors are readily available. Unique construction, but it has become more standardized over the last few years. Out of all the different types of construction, slab on grade has some extra risk as the concrete monolith has less flexibility than a wood floor and can crack. Modification may be made based on the condition of the foundation. There is a possibility of claims because settlement/cracking after the house has been raised.	Very LIKELY	Marginal	3	
CE-2	Residential Structures (Subgrade Basement)	• Accelerated schedule or harsh weather schedule?	<ul style="list-style-type: none"> <li>High risk or complex construction elements, site access, in-water?</li> <li>Special equipment or subcontractors needed?</li> <li>Unique construction methods?</li> <li>Potential for construction modification and claims?</li> </ul>	Site-access is a concern since the houses are close together making equipment mobility and staging very difficult. The assumption is made that with the amount of house-raises taking place recently, the equipment and contractors are readily available. Unique construction, but it has become more standardized over the last few years. Modification may be made based on the condition of the foundation. There is a possibility of claims because settlement/cracking after the house has been raised.	Likely	Marginal	2	
CE-3	Residential Structures (Raised - Crawlspace)	• Accelerated schedule or harsh weather schedule?	<ul style="list-style-type: none"> <li>High risk or complex construction elements, site access, in-water?</li> <li>Special equipment or subcontractors needed?</li> <li>Unique construction methods?</li> <li>Potential for construction modification and claims?</li> </ul>	Site-access is a concern since the houses are close together making equipment mobility and staging very difficult. The assumption is made that with the amount of house-raises taking place recently, the equipment and contractors are readily available. Unique construction, but it has become more standardized over the last few years. Modification may be made based on the condition of the foundation. There is a possibility of claims because settlement/cracking after the house has been raised.	Likely	Marginal	2	
CE-4	Non-Residential (Wood Construction)	• Accelerated schedule or harsh weather schedule?	<ul style="list-style-type: none"> <li>High risk or complex construction elements, site access, in-water?</li> <li>Special equipment or subcontractors needed?</li> <li>Unique construction methods?</li> <li>Potential for construction modification and claims?</li> </ul>	Site-access is a concern since the houses are close together making equipment mobility and staging very difficult. The assumption is made that with the amount of house-raises taking place recently, the equipment and contractors are readily available. Unique construction, but it has become more standardized over the last few years. Modification may be made based on the condition of the foundation. There is a possibility of claims because settlement/cracking after the house has been raised.	Likely	Marginal	2	
CE-13	Planning, Engineering, & Design	• Special equipment or subcontractors needed?	• Special equipment or subcontractors needed?	Although this work is becoming more common place in the area, the USACE district does not have much experience with designing and managing these types of projects.	Likely	Marginal	2	
CE-14	Construction Management	• Special equipment or subcontractors needed?	• Special equipment or subcontractors needed?	Possible modifications and claims to be managed. Modification may be made based on the condition of the foundation. There is a possibility of claims because settlement/cracking after the house has been raised. Although this work is becoming more common place in the area, the USACE district does not have much experience with designing and managing these types of projects.	Likely	Marginal	2	
Quantities for Current Scope						Max Potential Cost Growth		20%
Q-1	Residential Structures (Slab on Grade)	• Appropriate methods applied to calculate quantities?	• Appropriate methods applied to calculate quantities?	This is not a concern. With non-structural we do not believe the quantities will increase. It is possible that the quantities will decrease if some homeowners do not want to participate.	Unlikely	Negligible	0	
Q-2	Residential Structures (Subgrade Basement)	• Appropriate methods applied to calculate quantities?	• Appropriate methods applied to calculate quantities?	This is not a concern. With non-structural we do not believe the quantities will increase. It is possible that the quantities will decrease if some homeowners do not want to participate.	Unlikely	Negligible	0	
Q-3	Residential Structures (Raised - Crawlspace)	• Appropriate methods applied to calculate quantities?	• Appropriate methods applied to calculate quantities?	This is not a concern. With non-structural we do not believe the quantities will increase. It is possible that the quantities will decrease if some homeowners do not want to participate.	Unlikely	Negligible	0	
Q-4	Non-Residential (Wood Construction)	• Appropriate methods applied to calculate quantities?	• Appropriate methods applied to calculate quantities?	This is not a concern. With non-structural we do not believe the quantities will increase. It is possible that the quantities will decrease if some homeowners do not want to participate.	Unlikely	Negligible	0	
Q-13	Planning, Engineering, & Design	• Level of confidence based on design and assumptions?		No concern	Unlikely	Negligible	0	
Q-14	Construction Management	• Level of confidence based on design and assumptions?		No concern	Unlikely	Negligible	0	

Specialty Fabrication or Equipment					Max Potential Cost Growth		50%
FE-1	Residential Structures (Slab on Grade)	• Unusual parts, material or equipment manufactured or installed?	• Unusual parts, material or equipment manufactured or installed?	The assumption is made that with the amount of house-raises taking place recently, the equipment and contractors are readily available.	Unlikely	Negligible	0
FE-2	Residential Structures (Subgrade Basement)	• Unusual parts, material or equipment manufactured or installed?	• Unusual parts, material or equipment manufactured or installed?	The assumption is made that with the amount of house-raises taking place recently, the equipment and contractors are readily available.	Unlikely	Negligible	0
FE-3	Residential Structures (Raised - Crawlspace)	• Unusual parts, material or equipment manufactured or installed?	• Unusual parts, material or equipment manufactured or installed?	The assumption is made that with the amount of house-raises taking place recently, the equipment and contractors are readily available.	Unlikely	Negligible	0
FE-4	Non-Residential (Wood Construction)	• Unusual parts, material or equipment manufactured or installed?	• Unusual parts, material or equipment manufactured or installed?	The assumption is made that with the amount of house-raises taking place recently, the equipment and contractors are readily available.	Unlikely	Negligible	0
FE-13	Planning, Engineering, & Design	• Unusual parts, material or equipment manufactured or installed?		No concern	Unlikely	Negligible	0
FE-14	Construction Management	• Unusual parts, material or equipment manufactured or installed?		No concern	Unlikely	Negligible	0

Cost Estimate Assumptions					Max Potential Cost Growth		25%
CT-1	Residential Structures (Slab on Grade)	• Site accessibility, transport delays, congestion?	• Reliability and number of key quotes? • Overuse of Cost Book, lump sum, allowances? • Site accessibility, transport delays, congestion?	Preliminary cost estimate was created based on non-structural baseline estimate which takes into consideration only square footage, height of raise, and type of foundation. The baseline estimate was created primarily with cost book items, and site accessibility/congestion was not considered.	Very LIKELY	Significant	4
CT-2	Residential Structures (Subgrade Basement)	• Reliability and number of key quotes?	• Reliability and number of key quotes? • Overuse of Cost Book, lump sum, allowances? • Site accessibility, transport delays, congestion?	Preliminary cost estimate was created based on non-structural baseline estimate which takes into consideration only square footage, height of raise, and type of foundation. The baseline estimate was created primarily with cost book items, and site accessibility/congestion was not considered.	Very LIKELY	Significant	4
CT-3	Residential Structures (Raised - Crawlspace)	• Reliability and number of key quotes?	• Reliability and number of key quotes? • Overuse of Cost Book, lump sum, allowances? • Site accessibility, transport delays, congestion?	Preliminary cost estimate was created based on non-structural baseline estimate which takes into consideration only square footage, height of raise, and type of foundation. The baseline estimate was created primarily with cost book items, and site accessibility/congestion was not considered.	Very LIKELY	Significant	4
CT-4	Non-Residential (Wood Construction)	• Reliability and number of key quotes?	• Reliability and number of key quotes? • Overuse of Cost Book, lump sum, allowances? • Site accessibility, transport delays, congestion?	Preliminary cost estimate was created based on non-structural baseline estimate which takes into consideration only square footage, height of raise, and type of foundation. The baseline estimate was created primarily with cost book items, and site accessibility/congestion was not considered.	Very LIKELY	Significant	4
CT-13	Planning, Engineering, & Design	• Overuse of Cost Book, lump sum, allowances?	• Overuse of Cost Book, lump sum, allowances?	Additional effort in the final design phase is needed to reduce the uncertainties in the cost methods noted above.	Likely	Marginal	2
CT-14	Construction Management	• Reliability and number of key quotes?			Unlikely	Negligible	0

External Project Risks					Max Potential Cost Growth		20%
EX-1	Residential Structures (Slab on Grade)	• Unanticipated inflations in fuel, key materials?	• Potential for severe adverse weather? • Unanticipated inflations in fuel, key materials?	Main road access to numerous home sites floods during full moon high tides. Copper pipe, rebar, concrete, etc. material cost will fluctuate.	Likely	Significant	3
EX-2	Residential Structures (Subgrade Basement)	• Potential for severe adverse weather?	• Potential for severe adverse weather? • Unanticipated inflations in fuel, key materials?	Main road access to numerous home sites floods during full moon high tides. Copper pipe, rebar, concrete, etc. material cost will fluctuate.	Likely	Significant	3
EX-3	Residential Structures (Raised - Crawlspace)	• Potential for severe adverse weather?	• Potential for severe adverse weather? • Unanticipated inflations in fuel, key materials?	Main road access to numerous home sites floods during full moon high tides. Copper pipe, rebar, concrete, etc. material cost will fluctuate.	Likely	Significant	3
EX-4	Non-Residential (Wood Construction)	• Potential for severe adverse weather?	• Potential for severe adverse weather? • Unanticipated inflations in fuel, key materials?	Main road access to numerous home sites floods during full moon high tides. Copper pipe, rebar, concrete, etc. material cost will fluctuate.	Likely	Significant	3
EX-13	Planning, Engineering, & Design	• Potential for severe adverse weather?		No concern.	Unlikely	Negligible	0
EX-14	Construction Management	• Potential for severe adverse weather?	• Potential for severe adverse weather?	Flooding may reduce access to the construction site and cause delays to the project.	Likely	Marginal	2