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# Elim Subsistence Harbor Feasibility Study

## Appendix E: Cost Engineering

### Elim, Alaska



**April 2020**



**U.S. Army Corps  
of Engineers**  
Alaska District

# Elim Subsistence Harbor Feasibility Study

## Cost Engineering

### Appendix Overview

This Cost Engineering Appendix will be consolidated into the decision document Feasibility Report for Elim, Alaska. The purpose of the feasibility study is to evaluate alternatives for a potential construction contract. The Appendix discusses the cost assumptions, methodology, materials, labor, and equipment, utilized in the contract construction cost estimates.

### Project Type, Features and Alternatives

Six alternatives were evaluated for the purposes of this report. Four are located at Elim Beach and two at the Airport Point near Elim Airport. All the alternatives included breakwater construction and unique local sponsor facilities to include a boat launch, floating docks, mooring points and upland improvements.

### Cost Estimate Basis Summary

This estimate is based on quantities and design sketches provided by USACE CEPOA-EC-CW (Kloster) design engineer and included in this report in CE App. Item 1. The following assumptions were made during the creation of this estimate:

- **Breakwater construction:** Due to the remote location of the potential construction site all material is required to be brought in by barge. Rubble mound breakwater and fill material is assumed to be sourced from Nome quarry located nearly 100 miles from the town of Elim. Once barged to Elim it will be placed using a barge mounted crane and excavator.
- **Dredging:** Dredge will be completed via mechanical method, crane on a floating barge using clamshell, placing in a split scow barge, disposing in open water within 2 miles of the project site. A large portion of the dredge material is assumed to require ripping before dredging may be completed.
- **LSF:** Fill material and rock for roads and upland structure is assumed to all require quarry sourcing.
- **Schedule:** The construction is assumed to require three seasons to construct with the larger harbors having the potentiality of a 4<sup>th</sup> season.

Rock Pricing is based on quotes from Cape Nome Quarry dated March 03, 2015. Attempts have been made to update the pricing but have not been successful to this point:

- A-Rock: \$206/Ton
- B-Rock: \$83/Ton
- C- Rock: \$62/Ton

As this is a class 4 estimate the following assumptions were made:

- Included 30% contingency
- PED and SIOH are allowances
- The estimate index (date of development) is October 2019 so there is no escalation

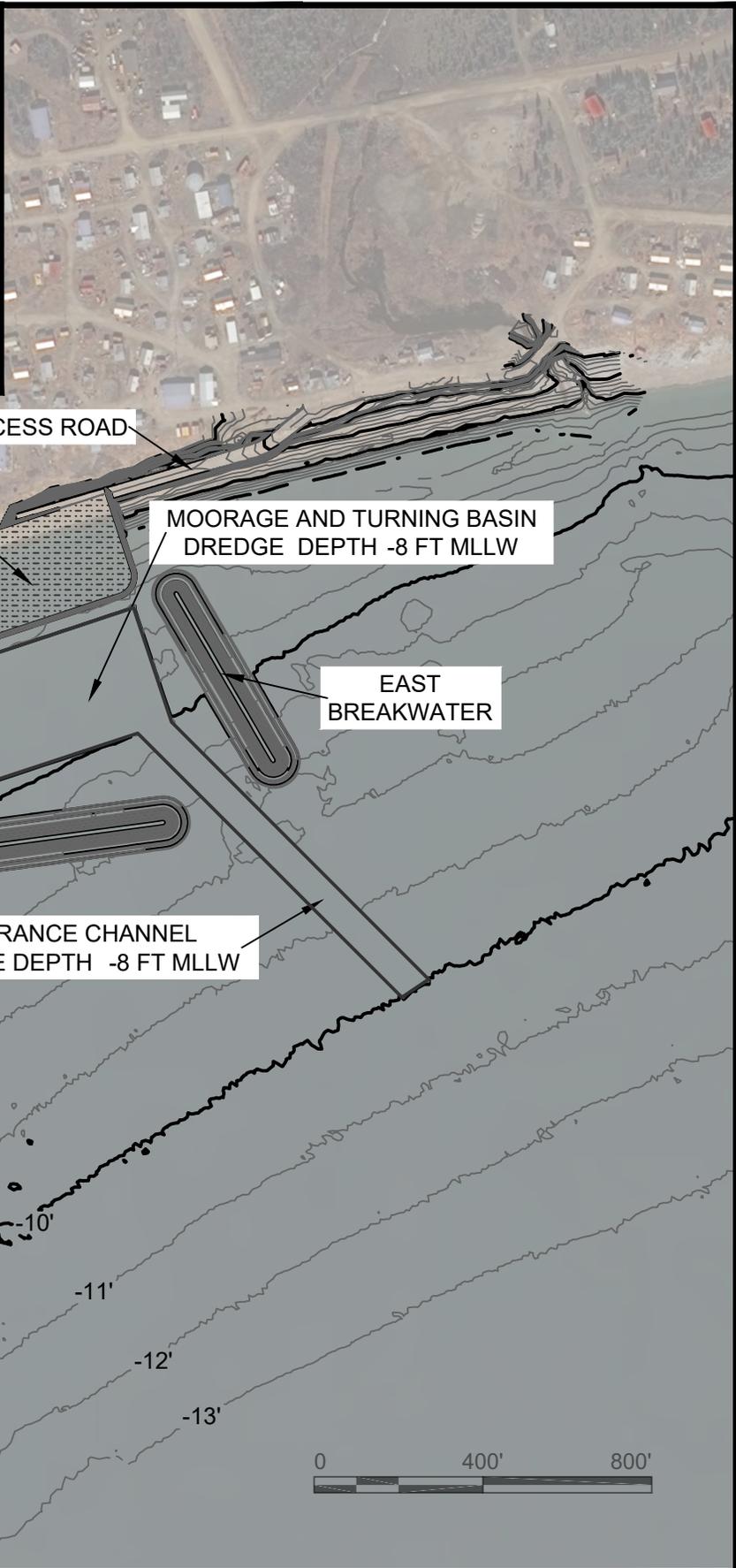
Project risks include difficulty dredging in shallow water, difficulty dealing with rocky/consolidated material, weather, encountering marine mammals, and sourcing rock for the breakwater.

The 6 alternatives evaluated were estimated to range in costs from \$68.6 mil - \$148.4 mil.

ELIM ROMs - Nov 2019	
Alternate	Total
2	\$ 68,670,000
3	\$ 94,540,000
4	\$ 96,490,000
5	\$ 100,780,000
6	\$ 98,830,000
7	\$ 148,360,000

A detailed Breakdown of this cost estimate is included in CE App. Item 2 of this report.

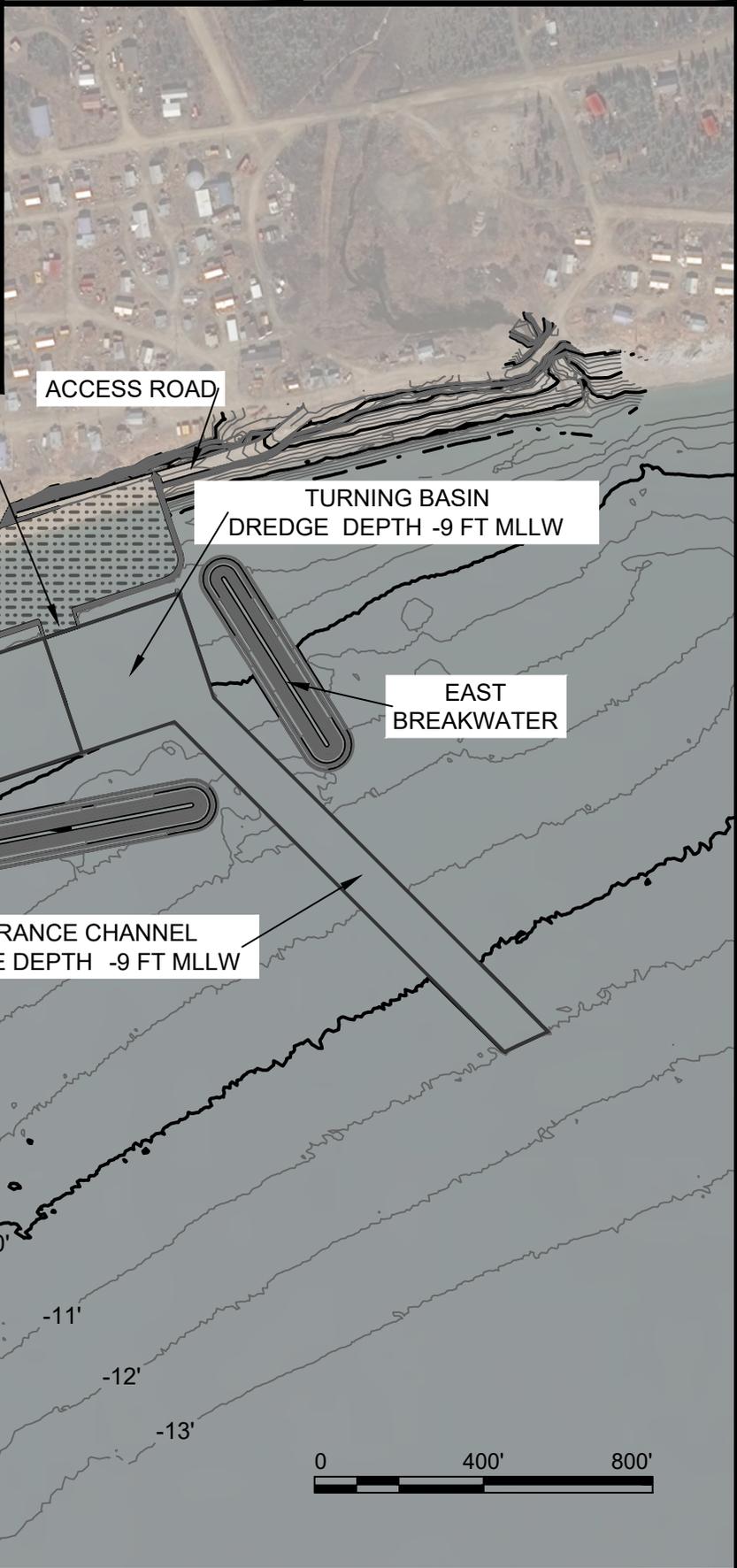
## **Item 1 – Feasibility Study Sketches**



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ELIM NAVIGATION IMPROVEMENTS  
FEASIBILITY STUDY

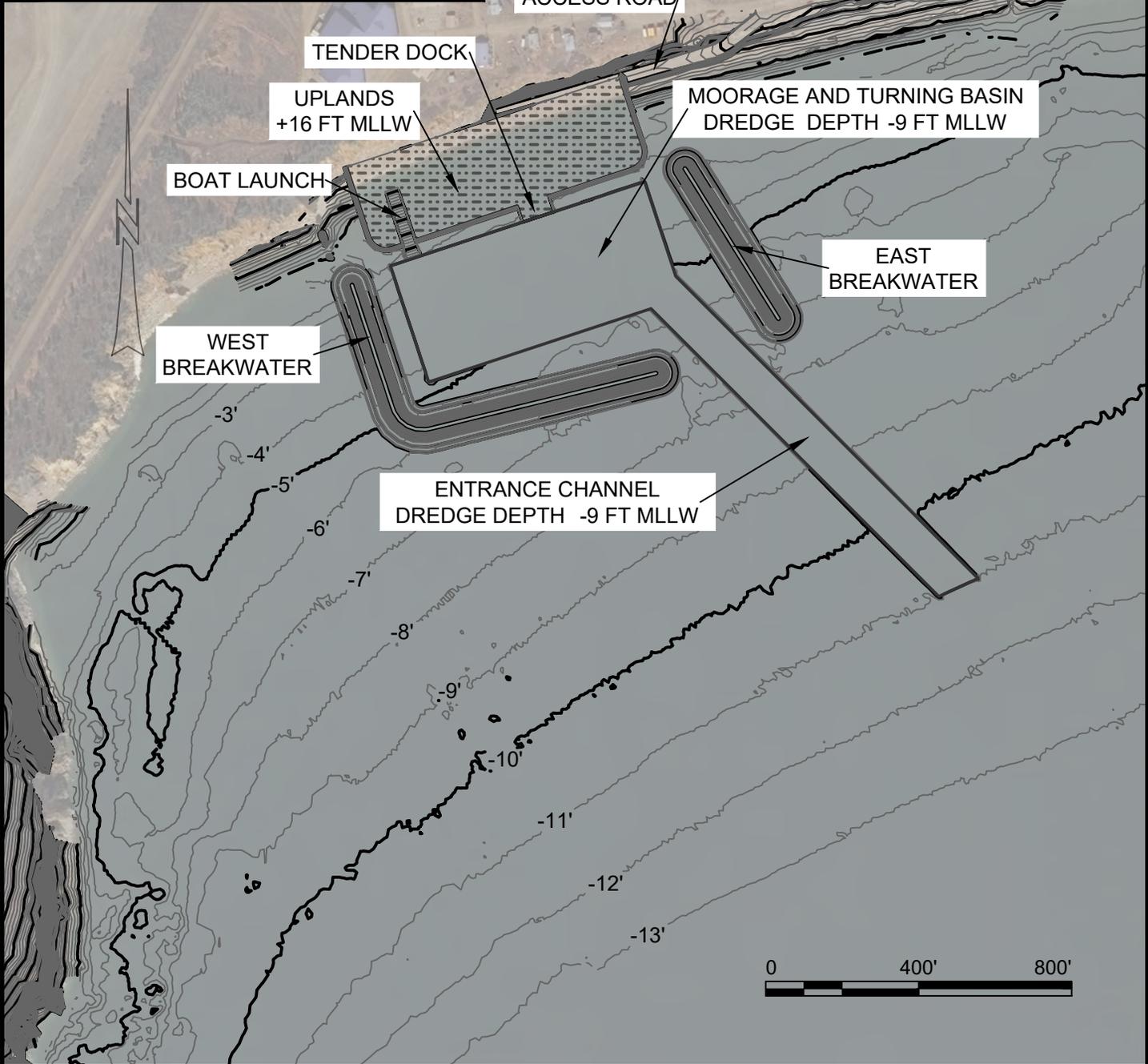
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ELIM NAVIGATION IMPROVEMENTS  
FEASIBILITY STUDY

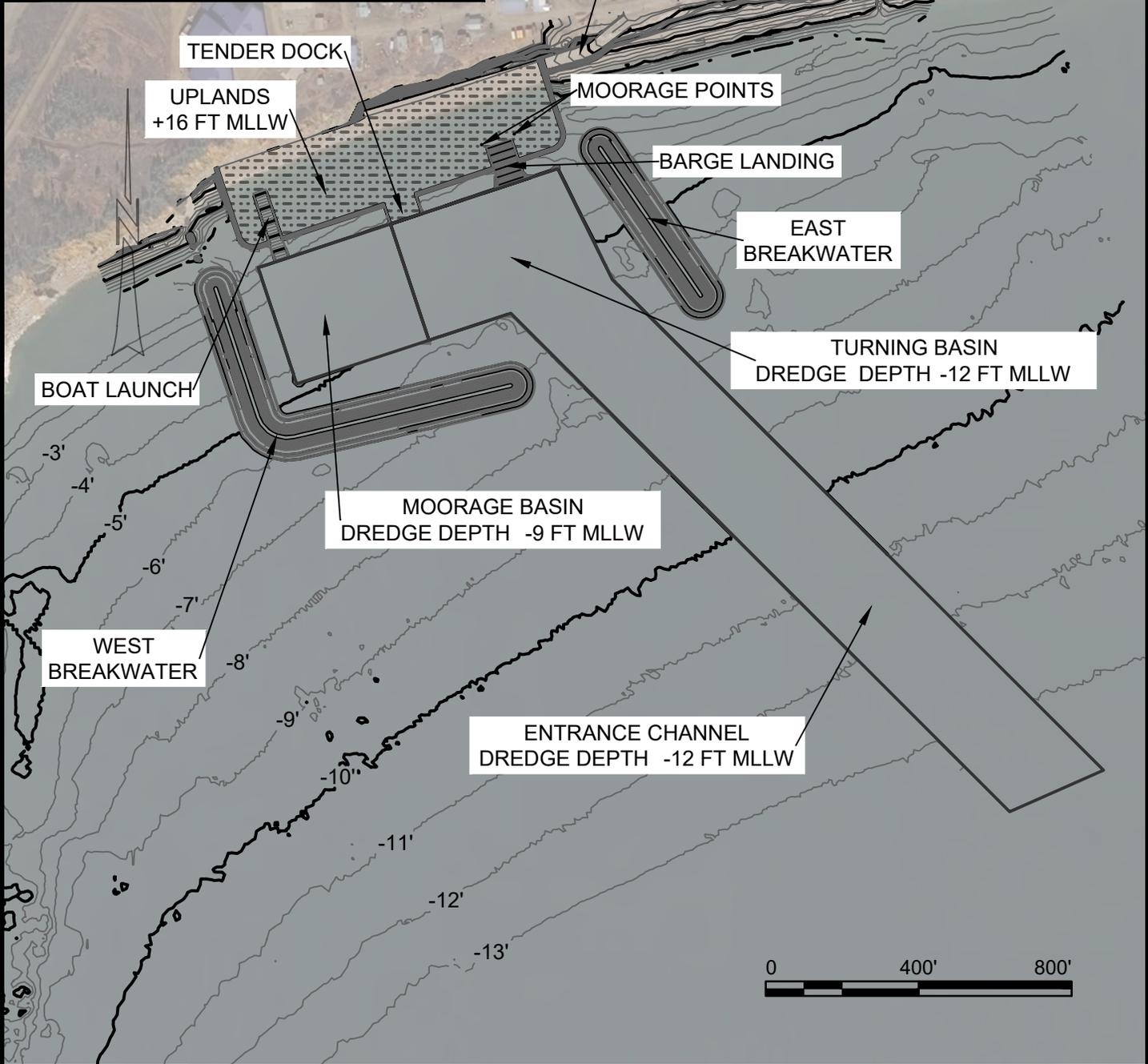
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ELIM NAVIGATION IMPROVEMENTS  
FEASIBILITY STUDY

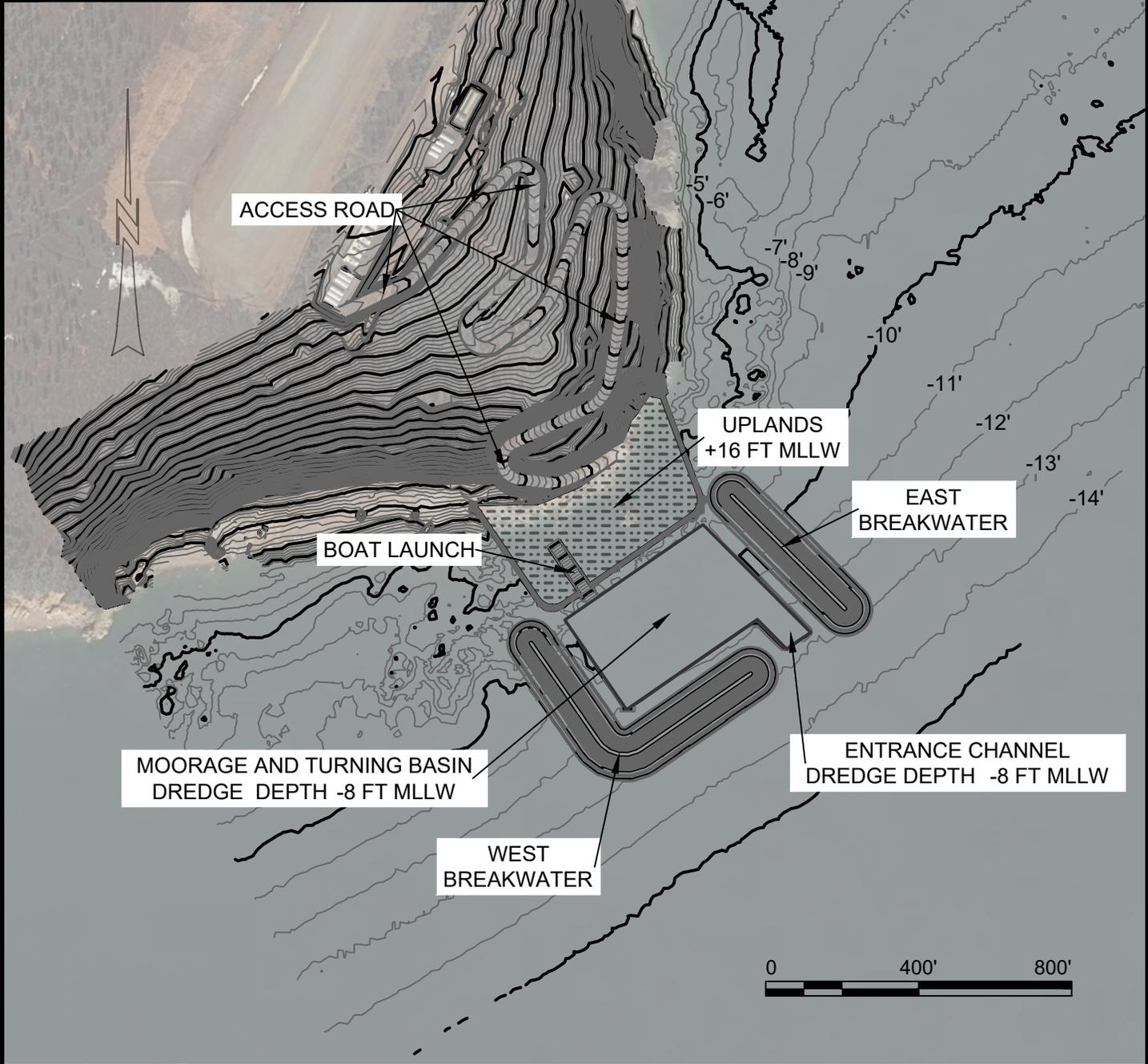
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ELIM NAVIGATION IMPROVEMENTS  
FEASIBILITY STUDY

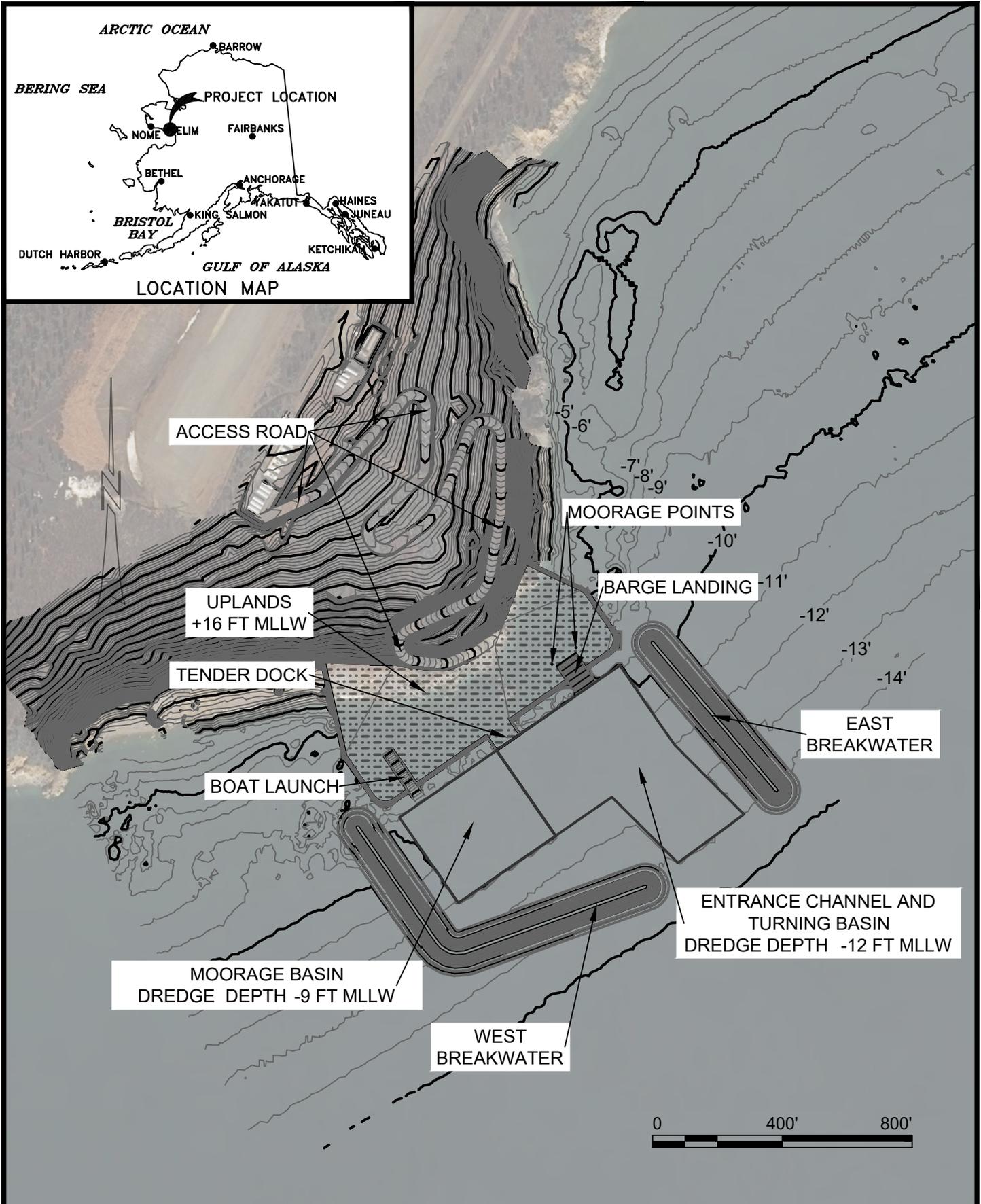
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ELIM NAVIGATION IMPROVEMENTS  
FEASIBILITY STUDY

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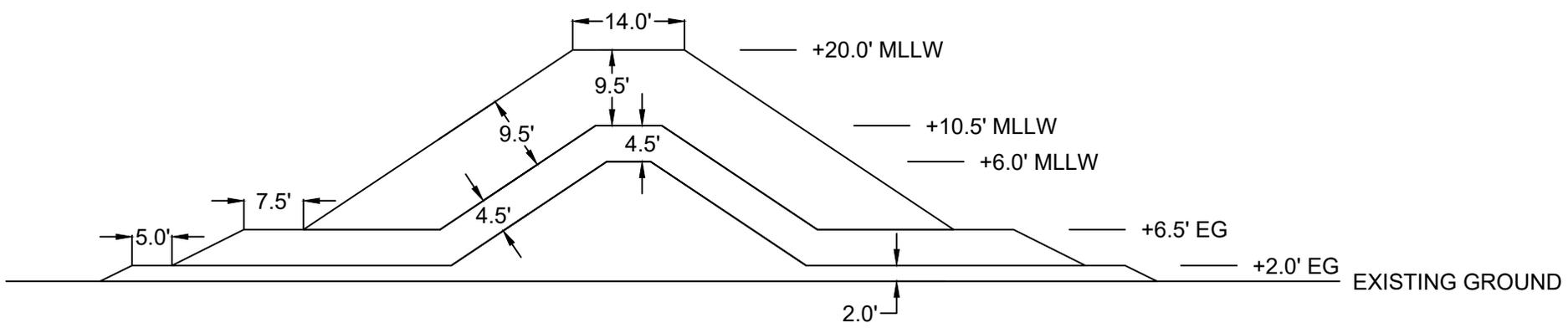


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ELIM NAVIGATION IMPROVEMENTS  
 FEASIBILITY STUDY

ALT  
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OCEAN SIDE | HARBOR SIDE



**Item 2 – Detailed Costs: Alternatives 2-7**

**Elim Harbor Construction Cost Estimate**  
Alternative 2

WBS No.	Feature Account / Item Description	UOM	Quantity	Unit Cost	Total Cost	Notes	
<b>Cost Share Breakwater</b>							
	Mod Demobe - Total Project - Assume 3 Seasons	EA	3	\$ 2,000,000	\$6,000,000	Allowance	
	West Wall	LF					
	"A" - Rock	CY	20210	\$ 572.00	\$11,560,120	from Mii	
	"B" - Rock	CY	18143	\$ 243.00	\$4,408,749	from Mii	
	"C" - Rock	CY	17165	\$ 254.00	\$4,359,905	from Mii	
	East Wall						
	"A" - Rock	CY	10045	\$ 572.00	\$5,745,740	from Mii	
	"B" - Rock	CY	9539	\$ 243.00	\$2,317,916	from Mii	
	"C" - Rock	CY	8383	\$ 254.00	\$2,129,155	from Mii	
	<b>Dredging</b>						
	Dredge and Dispose-Basin, Ent Chan, Surveys	CY	38022	\$ 19.00	\$722,418	from Mii	
	"Ripping" Dredge and Dispose-Basin, Ent Chan	CY	8738	\$ 38.00	\$332,044	Rip = \$19/cyd to rip and \$19/cyd to clam (from Mii)	
	Survey (Assume \$1/sf)	SF	528336	\$ 1.32	\$697,403		
	<b>Sub-Total (Cost Share)</b>				<b>\$38,273,451</b>		
O&M Recurring Years	Maintenance Dredging						
25 years	Mobe	LS	1	\$ 700,000.00	\$700,000	Based on historical Nome Maint. Dredge Contract	
	Dredge	CY	18000	\$ 10.00	\$180,000		
	Survey	SF	528336	\$ 0.50	\$264,168		
25 years	Maintenance Armor Replacement						
	Mobe	LS	1	\$ 2,000,000.00	\$2,000,000		
	Armor Rock Replacement	CY	756	\$ 572.00	\$432,432		
	<b>Sub-Total (Maint Dredge)</b>				<b>\$3,600,000</b>		
<b>LSF Upland</b>							
	Fill	CY	24494	\$ 169.00	\$4,139,486	Material all Assume to be barged in due to unknown nature of local fill material -- Sheetpile Costs from Nome	
	RipRap	CY	96	\$ 249.00	\$23,904		
	Aggregate Surface	CY	2599	\$ 145.00	\$376,855		
	Subbase	CY	5198	\$ 266.00	\$1,382,668		
	Sheetpile	LF	-				
	<b>Access road</b>						
	E1	CY	430	\$ 150.00	\$64,500		
	C1	CY	900	\$ 379.00	\$341,100		
	Fill	CY	3,300	\$ 169.00	\$557,700		
	Cut	CY	0	\$ 5.59	\$0		
	Riprap	CY	1,500	\$ 249.00	\$373,500		
	Excavation	CY	120	\$ 161.00	\$19,320		
	Bedding Layer	CY	25	\$ 150.00	\$3,750		
	24" CMP Culverts (L = 50 ft)	LF	150	\$ 66.00	\$9,900		
	<b>Sub-Total (LSF)</b>				<b>\$7,600,000</b>	\$1,369,770	
	<b>Facilities</b>						
	Moorage Points	EA	0	\$ 35,844.00	\$0	Used Fender Pile From Nome	
	Floating Dock	EA	2	\$ 28,067.00	\$56,134	210 ft x 5 ft	
	Gangway	EA	2	\$ 25,831.00	\$51,662	50 ft x 4 ft	
	Boat Launch	EA	1	\$ 125,000.00	\$125,000	Cast In Place Concrete-perryville?	
	<b>Sub-Total (LSF)</b>				<b>\$7,600,000</b>		
	<b>GNF + LSF (rounded)</b>				<b>\$45,900,000</b>		
	<b>Estimate Contingency 30%</b>				<b>\$13,770,000</b>	Based on ARA	
	<b>PED</b>				<b>\$4,000,000</b>		
	<b>SIOH</b>				<b>\$5,000,000</b>		
	<b>Total Project Cost</b>				<b>\$68,670,000</b>		
	<b>Total O&amp;M Costs - No Markup</b>				<b>\$3,600,000</b>		

Prepared by: CEPOA-EC-D-CE  
Matt Collins  
Jon Capua

Reviewed by: Karl Harvey

Quantity Input: Rebecca Kloster

**Elim Harbor Construction Cost Estimate**  
Alternative 3

WBS No.	Feature Account / Item Description	UOM	Quantity	Unit Cost	Total Cost	Notes	
<b>Breakwater</b>							
<i>Cost Share</i>	Mod Demobe - Total Project - Assume 3 Seasons	EA	3	\$ 2,000,000	\$6,000,000	Allowance	
	West Wall	LF					
	"A" - Rock	CY	21939	\$ 572.00	\$12,549,108	from Mii	
	"B" - Rock	CY	20094	\$ 243.00	\$4,882,842	from Mii	
	"C" - Rock	CY	18101	\$ 254.00	\$4,597,565	from Mii	
	East Wall						
	"A" - Rock	CY	10161	\$ 572.00	\$5,812,092	from Mii	
	"B" - Rock	CY	9788	\$ 243.00	\$2,378,363	from Mii	
	"C" - Rock	CY	8391	\$ 254.00	\$2,131,200	from Mii	
	<b>Dredging</b>						
	Dredge and Dispose-Basin, Ent Chan, Surveys	CY	47750	\$ 19.00	\$907,250	from Mii	
	"Ripping" Dredge and Dispose-Basin, Ent Chan	CY	15139	\$ 38.00	\$575,282	Rip = \$19/cyd to rip and \$19/cyd to clam (from Mii)	
	Survey (Assume \$1/sf)	SF	457315	\$ 1.32	\$603,656		
			<b>Sub-Total (Cost Share)</b>		<b>\$40,500,000</b>		
O&M Recurring Years	Maintenance Dredging						
25 years	Mobe	LS	1	\$ 700,000.00	\$700,000	Based on historical Nome Maint. Dredge Contract	
	Dredge	CY	23000	\$ 10.00	\$230,000		
	Survey	SF	457315	\$ 0.50	\$228,657		
25 years	Maintenance Armor Replacement						
	Mobe	LS	1	\$ 2,000,000.00	\$2,000,000		
	Armor Rock Replacement	CY	803	\$ 572.00	\$459,316		
			<b>Sub-Total (Maint Dredge)</b>		<b>\$3,700,000</b>		
<b>Upland</b>							
<i>LSF</i>	Fill	CY	99748	\$ 169.00	\$16,857,437	Material all Assume to be barged in due to unknown nature of local fill material -- Sheetpile Costs from Nome	
	RipRap	CY	2731	\$ 249.00	\$679,936		
	Aggregate Surface	CY	3117	\$ 145.00	\$451,984		
	Subbase	CY	6234	\$ 266.00	\$1,658,313		
	Sheetpile	LF	207	\$ 19,364.00	\$4,008,348		
	<b>Access road</b>						
	E1	CY	430	\$ 150.00	\$64,500		
	C1	CY	900	\$ 379.00	\$341,100		
	Fill	CY	3300	\$ 169.00	\$557,700		
	Cut	CY	0	\$ 5.59	\$0		
	Riprap	CY	1,500	\$ 249.00	\$373,500		
	Excavation	CY	120	\$ 161.00	\$19,320		
	Bedding Layer	CY	25	\$ 150.00	\$3,750		
	24" CMP Culverts (L = 50 ft)	LF	150	\$ 66.00	\$9,900		
	<b>Facilities</b>						
	Moorage Points	EA	0	\$ 35,844.00	\$0	Used Fender Pile From Nome	
	Floating Dock	EA	2	\$ 28,067.00	\$56,134	210 ft x 5 ft	
	Gangway	EA	2	\$ 25,831.00	\$51,662	50 ft x 4 ft	
	Boat Launch	EA	1	\$ 125,000.00	\$125,000	Cast In Place Concrete	
			<b>Sub-Total (LSF)</b>		<b>\$25,300,000</b>		
			GNF + LSF (rounded)		\$65,800,000		
			Estimate Contingency 30%		\$19,740,000	Based on ARA	
			PED (Allowance)		\$4,000,000		
			SIOH (Allowance)		\$5,000,000		
			<b>Total Project Cost</b>		<b>\$94,540,000</b>		
			<b>Total O&amp;M Costs - No Markup</b>		<b>\$3,700,000</b>		

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Matt Collins  
Jon Capua

Reviewed by: Karl Harvey

Quantity Input: Rebecca Kloster

**Elim Harbor Construction Cost Estimate**  
Alternative 4

WBS No.	Feature Account / Item Description	UOM	Quantity	Unit Cost	Total Cost	Notes	
<b>Cost Share Breakwater</b>							
	Mod Demobe - Total Project - Assume 3 Seasons	EA	3	\$ 2,000,000	\$6,000,000	Allowance	
	West Wall	LF					
	"A" - Rock	CY	22622	\$ 572.00	\$12,939,715		
	"B" - Rock	CY	20074	\$ 243.00	\$4,878,069	from Mii	
	"C" - Rock	CY	19333	\$ 254.00	\$4,910,651	from Mii	
	East Wall						
	"A" - Rock	CY	10157	\$ 572.00	\$5,809,678		
	"B" - Rock	CY	9588	\$ 243.00	\$2,329,937	from Mii	
	"C" - Rock	CY	8609	\$ 254.00	\$2,186,750	from Mii	
	<b>Dredging</b>						
	Dredge and Dispose-Basin, Ent Chan, Surveys	CY	52896	\$ 19.00	\$1,005,020	from Mii	
	"Ripping" Dredge and Dispose-Basin, Ent Chan	CY	19166	\$ 38.00	\$728,325	Rip = \$19/cyd to rip and \$19/cyd to clam (from Mii)	
	Survey (Assume \$1/sf)	SF	783877	\$ 1.32	\$1,034,718		
	<b>Sub-Total (Cost Share)</b>				<b>\$41,900,000</b>		
O&M Recurring Years	Maintenance Dredging						
27 years	Mobe	LS	1	\$ 700,000.00	\$700,000	Based on historical Nome Maint. Dredge Contract	
	Dredge	CY	25000	\$ 10.00	\$250,000		
	Survey	SF	783877	\$ 0.50	\$391,939		
25 years	Maintenance Armor Replacement						
	Mobe	LS	1	\$ 2,000,000.00	\$2,000,000		
	Armor Rock Replacement	CY	819	\$ 572.00	\$468,468		
	<b>Sub-Total (Maint. Dredge)</b>				<b>\$3,900,000</b>		
<b>LSF Upland</b>							
	Fill	CY	100258	\$ 169.00	\$16,943,564	Material all Assume to be barged in due to unknown nature of local fill material -- Sheetpile Costs from Nome	
	RipRap	CY	2745	\$ 249.00	\$683,477		
	Aggregate Surface	CY	3133	\$ 145.00	\$454,293		
	Subbase	CY	6266	\$ 266.00	\$1,666,786		
	Sheetpile	LF	207	\$ 19,364.00	\$4,008,348		
	<b>Access road</b>						
	E1	CY	430	\$ 150.00	\$64,500		
	C1	CY	900	\$ 379.00	\$341,100		
	Fill	CY	3,300	\$ 169.00	\$557,700		
	Cut	CY	0.00	\$ 5.59	\$0		
	Riprap	CY	1,500	\$ 249.00	\$373,500		
	Excavation	CY	120	\$ 161.00	\$19,320		
	Bedding Layer	CY	25	\$ 150.00	\$3,750		
	24" CMP Culverts (L = 50 ft)	LF	150	\$ 66.00	\$9,900		
	<b>Facilities</b>						
	Moorage Points	EA	0	\$ 35,844.00	\$0	Used Fender Pile From Nome	
	Floating Dock	EA	2	\$ 28,067.00	\$56,134	210 ft x 5 ft	
	Gangway	EA	2	\$ 25,831.00	\$51,662	50 ft x 4 ft	
	Boat Launch	EA	1	\$ 125,000.00	\$125,000	Cast In Place Concrete	
	<b>Sub-Total (LSF)</b>				<b>\$25,400,000</b>		
	GNF + O&M + LSF (rounded)				\$67,300,000		
	Estimate Contingency 30%				\$20,190,000	Based on ARA	
	PED (Allowance)				\$4,000,000		
	SIOH (Allowance)				\$5,000,000		
	<b>Total Project Cost</b>				<b>\$96,490,000</b>		
	<b>Total O&amp;M Costs - No Markup</b>				<b>\$3,900,000</b>		

Prepared by: CEPOA-EC-D-CE  
Matt Collins  
Jon Capua

Reviewed by: Karl Harvey

Quantity Input: Rebecca Kloster

**Elim Harbor Construction Cost Estimate**  
Alternative 5

WBS No.	Feature Account / Item Description	UOM	Quantity	Unit Cost	Total Cost	Notes	
<b>Cost Share Breakwater</b>							
	Mod Demobe - Total Project - Assume 3 Seasons	EA	3	\$ 2,000,000	\$6,000,000	Allowance	
	West Wall	LF					
	"A" - Rock	CY	22259	\$ 572.00	\$12,732,188		
	"B" - Rock	CY	19836	\$ 243.00	\$4,820,175	from Mii	
	"C" - Rock	CY	19011	\$ 254.00	\$4,828,812	from Mii	
	East Wall						
	"A" - Rock	CY	10279	\$ 572.00	\$5,879,691		
	"B" - Rock	CY	9634	\$ 243.64	\$2,347,152	from Mii	
	"C" - Rock	CY	8673	\$ 254.00	\$2,202,919	from Mii	
	<b>Dredging</b>						
	Dredge and Dispose-Basin, Ent Chan, Surveys	CY	92405	\$ 19.00	\$1,755,704	from Mii	
	"Ripping" Dredge and Dispose-Basin, Ent Chan	CY	62429	\$ 38.00	\$2,372,290	Rip = \$19/cyd to rip and \$19/cyd to clam (from Mii)	
	Blasting	SF	1758	\$ 14.40	\$25,308		
	Survey	SF	932352	\$ 1.32	\$1,230,705		
			<b>Sub-Total (Cost Share)</b>		<b>\$44,200,000</b>		
O&M Recurring Years	Maintenance Dredging						
30 years	Mobe	LS	1	\$ 700,000.00	\$700,000	Based on historical Nome Maint. Dredge Contract	
	Dredge	CY	51000	\$ 10.00	\$510,000		
	Survey	SF	932352	\$ 0.50	\$466,176		
25 years	Maintenance Armor Replacement						
	Mobe	LS	1	\$ 2,000,000.00	\$2,000,000		
	Armor Rock Replacement	CY	813	\$ 572.00	\$465,036		
			<b>Sub-Total (Maint.)</b>		<b>\$4,200,000</b>		
<b>LSF Upland</b>							
	Fill	CY	104315	\$ 169.00	\$17,629,179	Material all Assume to be barged in due to unknown nature of local fill material -- Sheetpile Costs from Nome	
	RipRap	CY	3232	\$ 249.00	\$804,768		
	Aggregate Surface	CY	3260	\$ 145.00	\$472,676		
	Subbase	CY	6520	\$ 266.00	\$1,734,231		
	Sheetpile	LF	207	\$ 19,364.00	\$4,008,348		
	<b>Access road</b>						
	E1	CY	430	\$ 150.00	\$64,500		
	C1	CY	900	\$ 379.00	\$341,100		
	Fill	CY	3300	\$ 169.00	\$557,700		
	Cut	CY	0	\$ 5.59	\$0		
	Riprap	CY	1500	\$ 249.00	\$373,500		
	Excavation	CY	120	\$ 161.00	\$19,320		
	Bedding Layer	CY	25	\$ 150.00	\$3,750		
	24" CMP Culverts (L = 50 ft)	LF	150	\$ 66.00	\$9,900		
	<b>Facilities</b>						
	Moorage Points	EA	2	\$ 35,844.00	\$71,688	Fender Pile From Nome	
	Floating Dock	EA	2	\$ 28,067.00	\$56,134	210 ft x 5 ft	
	Gangway	EA	2	\$ 25,831.00	\$51,662	50 ft x 4 ft	
	Fuel Header	LF	300	\$ 200.00	\$60,000	ALLOWANCE - 150' extension only	
	Boat Launch	EA	1	\$ 125,000.00	\$125,000	Cast In Place Concrete	
			<b>Sub-Total (LSF)</b>		<b>\$26,400,000</b>		
			GNF + LSF (rounded)		\$70,600,000		
			Estimate Contingency 30%		\$21,180,000 Based on ARA		
			PED (Allowance)		\$4,000,000		
			SIOH (Allowance)		\$5,000,000		
			<b>Total Project Cost</b>		<b>\$100,780,000</b>		
			<b>Total O&amp;M Costs - No Markup</b>		<b>\$4,200,000</b>		

Prepared by: CEPOA-EC-D-CE  
Matt Collins  
Jon Capua

Reviewed by: Karl Harvey

Quantity Input: Rebecca Kloster

**Elim Harbor Construction Cost Estimate**

Alternative 6

WBS No.	Feature Account / Item Description	UOM	Quantity	Unit Cost	Total Cost	Notes
<b>Cost Share Breakwater</b>						
	Mod Demobe - Total Project - Assume 3 Seasons	EA	3	\$ 2,000,000	\$6,000,000	Allowance
	West Wall	LF				
	"A" - Rock	CY	24128	\$ 572.00	\$13,801,256	from Mii
	"B" - Rock	CY	18722	\$ 243.00	\$4,549,490	from Mii
	"C" - Rock	CY	24394	\$ 254.00	\$6,196,162	from Mii
	East Wall					
	"A" - Rock	CY	12950	\$ 572.00	\$7,407,406	from Mii
	"B" - Rock	CY	10623	\$ 243.00	\$2,581,372	from Mii
	"C" - Rock	CY	12726	\$ 254.00	\$3,232,498	from Mii
	<b>Dredging</b>					
	Entrance Channel and Manuver Basin Area	SF	158364			
	Drill and Blast 50% of Area	SF	79182	\$ 14.41	\$1,141,014	from Mii
	Dredge and Dispose-Basin, Ent Chan	CY	0	\$ 18.69	\$0	
	Survey (Assuming \$1/SF)	SF	158364	\$ 1.32	\$209,041	
				<b>Sub-Total (Cost Share)</b>	<b>\$45,200,000</b>	
	<b>O&amp;M Recurring</b>					
30 years	Maintenance Armor Replacement					
	Mobe	LS	1	\$ 2,000,000.00	\$2,000,000	
	Armor Rock Replacement	CY	927	\$ 572.00	\$530,244	
				<b>Sub-Total (Maint.)</b>	<b>\$2,600,000</b>	
<b>LSF Upland</b>						
	Fill	CY	85297	\$ 169.00	\$14,415,224	
	RipRap	CY	1788	\$ 249.00	\$445,323	
	Aggregate Surface	CY	2666	\$ 145.00	\$386,503	
	Subbase	CY	1788	\$ 266.00	\$475,726	
	Sheetpile	LF	0	\$ 19,364.00	\$0	Cost From Nome
	<b>Access road</b>					
	E1	CY	1761	\$ 150.00	\$264,171	
	C1	CY	3877	\$ 379.00	\$1,469,542	
	Fill	CY	10054	\$ 169.00	\$1,699,111	Use Material From Cut
	Cut - Drill and Blast	CY	60000	\$ 65.00	\$3,900,000	
	Riprap	CY	2000	\$ 249.00	\$498,000	
	Excavation	CY	370	\$ 5.59	\$2,068	
	Bedding Layer	CY	75	\$ 150.00	\$11,250	
	24" CMP Culverts (L = 50 ft)	LF	500	\$ 66.00	\$33,000	
	<b>Facilities</b>					
	Moorage Points	EA	0	\$ 35,844.00	\$0	Used Fender Pile From Nome
	Floating Dock	EA	2	\$ 28,067.00	\$56,134	210 ft x 5 ft
	Gangway	EA	2	\$ 25,831.00	\$51,662	50 ft x 4 ft
	Boat Launch	EA	1	\$ 125,000.00	\$125,000	
				<b>Sub-Total (LSF)</b>	<b>\$23,900,000</b>	
				GNF + LSF (rounded)	\$69,100,000	
				Estimate Contingency 30%	\$20,730,000	Based on ARA
				PED (Allowance)	\$4,000,000	
				SIOH (Allowance)	\$5,000,000	
				<b>Total Project Cost</b>	<b>\$98,830,000</b>	
				<b>Total O&amp;M Costs - No Markup</b>	<b>\$2,600,000</b>	

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 Matt Collins  
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Reviewed by: Karl Harvey

Quantity Input: Rebecca Kloster

**Elim Harbor Construction Cost Estimate**  
Alternative 7

WBS No.	Feature Account / Item Description	UOM	Quantity	Unit Cost	Total Cost	Notes
<b>Cost Share</b>						
<b>Breakwater</b>						
	Mod Demobe - Total Project - Assume 3 Seasons	EA	3	\$ 2,000,000	\$6,000,000	Allowance
	West Wall	LF				
	"A" - Rock	CY	37153	\$ 572.00	\$21,251,482	from Mii
	"B" - Rock	CY	27986	\$ 243.00	\$6,800,586	from Mii
	"C" - Rock	CY	35790	\$ 254.00	\$9,090,675	from Mii
	East Wall					
	"A" - Rock	CY	18816	\$ 572.00	\$10,762,912	from Mii
	"B" - Rock	CY	14505	\$ 243.00	\$3,524,781	from Mii
	"C" - Rock	CY	19422	\$ 254.00	\$4,933,099	from Mii
<b>Dredging</b>						
	Entrance Channel and Manuver Basin Area	SF	411000			
	Drill and Blast 50% of Area	SF	205500	\$ 14.38	\$2,955,090	from Mii
	Survey (Assuming \$1/SF)	SF	411000	\$ 1.32	\$542,520	
				<b>Sub-Total (Cost Share)</b>	<b>\$65,900,000</b>	
O&M Recurring Years	Maintenance Dredging					
30 years	Mobe	LS	1	\$ 700,000.00	\$700,000	Based on historical Nome Maint. Dredge Contract
	Dredge	CY	10000	\$ 10.00	\$100,000	
	Survey	SF	411000	\$ 0.50	\$205,500	
25 years	Maintenance Armor Replacement					
	Mobe	LS	1	\$ 2,000,000.00	\$2,000,000	
	Armor Rock Replacement	CY	1399	\$ 572.00	\$800,228	
				<b>Sub-Total (Maint.)</b>	<b>\$3,900,000</b>	
<b>Upland</b>						
	Fill	CY	159833	\$ 169.00	\$27,011,858	
	RipRap	CY	3232	\$ 249.00	\$804,768	
	Aggregate Surface	CY	0	\$ 145.00	\$0	
	Subbase	CY	0	\$ 266.00	\$0	
	Sheetpile	LF	207	\$ 19,364.00	\$4,008,348	Cost From Nome
<b>Access road</b>						
	E1	CY	1761	\$ 150.00	\$264,171	
	C1	CY	3877	\$ 379.00	\$1,469,542	
	Fill	CY	10054	\$ 169.00	\$1,699,111	Use Material From Cut
	Cut - Drill and Blast	CY	60000	\$ 65.00	\$3,900,000	
	Riprap	CY	2000	\$ 249.00	\$498,000	
	Excavation	CY	370	\$ 5.59	\$2,068	
	Bedding Layer	CY	75	\$ 150.00	\$11,250	
	24" CMP Culverts (L = 50 ft)	LF	500	\$ 66.00	\$33,000	
<b>Facilities</b>						
	Moorage Points	EA	2	\$ 35,844.00	\$71,688	Used Fender Pile From Nome
	Floating Dock	EA	2	\$ 28,067.00	\$56,134	210 ft x 5 ft
	Gangway	EA	2	\$ 25,831.00	\$51,662	50 ft x 4 ft
	Fuel	LF	6200	\$ 200.00	\$1,240,000	start at tank farm end at shoreline (3100lf x2 lines @\$200 / lf)
	Boat Launch	EA	1	\$ 125,000.00	\$125,000	
				<b>Sub-Total (LSF)</b>	<b>\$41,300,000</b>	
				GNF + LSF (rounded)	\$107,200,000	
				Estimate Contingency 30%	\$32,160,000	Based on ARA
				PED (Allowance)	\$4,000,000	
				SIOH (Allowance)	\$5,000,000	
				<b>Total Project Cost</b>	<b>\$148,360,000</b>	
				<b>Total O&amp;M Costs - No Markup</b>	<b>\$3,900,000</b>	

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