

# **Cost Estimate High Production Rate**

**General Information**  
**LOWER DUWAMISH WATERWAY**  
**SEDIMENT CLEANUP - FS ESTIMATE**  
**SEATTLE, WASHINGTON**

**03/30/09**

Fish Window	October 1 to February 13	
Work Days Per Year	120 days	Includes Allowance for Downtime
Work Schedule	12 hours/day	
Discount Rate	3 Percent	
Sales Tax	8.8 Percent	
Contingency	30 Percent	

**Table I-1 DREDGE PRODUCTION ESTIMATE  
LOWER DUWAMISH WATERWAY  
SEDIMENT CLEANUP - FS ESTIMATE  
SEATTLE, WASHINGTON**

**Dredge Production Estimate - Open Access - Derrick Barge**

Prescribed Volume	500000 cy
Cycle Time	3 min
Bucket Capacity	6 cy
Effective Bucket Capacity (70%)	4.2 cy
Operating Day	24 hrs
Efficiency	70%
Daily Production	1411 cy/day
No. days	354 days

Deep, open access areas  
Debris removal  
Offloading  
  
Bulk Removal  
More overdredge (1.0 ft plus)  
Less accurate/less control of bucket placement  
Increased potential for water quality impacts/residuals

**Dredge Production Estimate - Open Access Deep - Precision Excavator**

Prescribed Volume	500000 cy
Cycle Time	2.5 min
Bucket Capacity	5 cy
Effective Bucket Capacity (70%)	3.5 cy
Operating Day	24 hrs
Efficiency	70%
Daily Production	1411 cy/day
No. days	354 days

Midrange depth (-35 to -40 ft depth)  
Limited debris removal  
Bulk removal/precision final pass removal  
Minimal overdredge (0.5 ft to 1.0 ft overdredge)  
More accurate/more control of bucket placement  
Potential for decreased water quality impacts/residuals

**Dredge Production Estimate - Open Access Shallow - Precision Excavator**

Prescribed Volume	500000 cy
Cycle Time	2.5 min
Bucket Capacity	3 cy
Effective Bucket Capacity (70%)	2.1 cy
Operating Day	24 hrs
Efficiency	65%
Daily Production	786 cy/day
No. days	636 days

Shallow depth range (-30 ft to -35 ft and shallow)  
Limited underdock application  
Bulk removal/precision final pass removal  
Minimal overdredge (0.5 ft to 1.0 ft overdredge)  
More accurate/more control of bucket placement  
Potential for decreased water quality impacts/residuals

**Dredge Production Estimate - Underdock - Diver- Assist Hydraulic**

Prescribed Volume	25000 cy
Operating Day	24 hrs
Efficiency	65%
Daily Production	240 cy/day
No. days	104 days

Final cleanup around structures (piles, docks and other areas that cannot be accessed by conventional dredge equipment)

**Dredge Production Estimate - Debris Sweep - Derrick Barge**

Prescribed Area	100 acres
Cycle Time	10 min
Bucket Capacity	12 cy
Effective Bucket Capacity (70%)	8.4 cy
Operating Day	24 hrs
Efficiency	70%
Debris Picks Per Day	101
Assume Daily Production	0.37 acre/day
Labor and Equipment Costs	\$12,000 per day
Side Scan Survey and Debris Transport/Disposal	\$8,000 per day
Total Cost	\$20,000 per day
Total Cost	\$54,054 per acre
No. days	270 days

Assume 400 ft x 40 ft lane per day

Assume 150 tons of debris per day at \$25/ton for transport and disposal at CDL

**Table I-2 CAPPING PRODUCTION ESTIMATE  
LOWER DUWAMISH WATERWAY  
SEDIMENT CLEANUP - FS ESTIMATE  
SEATTLE, WASHINGTON**

<b>Capping Production Estimate - Open Access - Derrick Barge</b>	
Prescribed Volume	100000 cy
Cycle Time	2.5 min
Bucket Capacity	8 cy
Effective Bucket Capacity (85%)	6.8 cy
Operating Day	24 hrs
Efficiency	75%
Daily Production	2938 cy/day
No. days	34 days

<b>ENR Production Estimate - Open Access - Derrick Barge</b>	
Prescribed Volume	100000 cy
Cycle Time	2.5 min
Bucket Capacity	8 cy
Effective Bucket Capacity (85%)	6.8 cy
Operating Day	24 hrs
Efficiency	70%
Daily Production	2742 cy/day
No. days	36 days

<b>Capping Production Estimate - Open Access Deep - Precision Excavator</b>	
Prescribed Volume	100000 cy
Cycle Time	2 min
Bucket Capacity	5 cy
Effective Bucket Capacity (85%)	4.25 cy
Operating Day	24 hrs
Efficiency	75%
Daily Production	2295 cy/day
No. days	44 days

<b>ENR Production Estimate - Open Access Deep - Precision Excavator</b>	
Prescribed Volume	100000 cy
Cycle Time	2 min
Bucket Capacity	5 cy
Effective Bucket Capacity (85%)	4.25 cy
Operating Day	24 hrs
Efficiency	70%
Daily Production	2142 cy/day
No. days	47 days

<b>Capping Production Estimate - Open Access Shallow - Precision Excavator</b>	
Prescribed Volume	500000 cy
Cycle Time	2 min
Bucket Capacity	3 cy
Effective Bucket Capacity (85%)	2.55 cy
Operating Day	24 hrs
Efficiency	65%
Daily Production	1193 cy/day
No. days	419 days

<b>ENR Production Estimate - Open Access Shallow - Precision Excavator</b>	
Prescribed Volume	500000 cy
Cycle Time	2 min
Bucket Capacity	3 cy
Effective Bucket Capacity (85%)	2.55 cy
Operating Day	24 hrs
Efficiency	60%
Daily Production	1102 cy/day
No. days	454 days

<b>Capping Production Estimate - Underdock - Hydraulic, conveyor</b>	
Prescribed Volume	25000 cy
Operating Day	24 hrs
Efficiency	
Daily Production	350 cy/day
No. days	days

<b>ENR Production Estimate - Underdock - Hydraulic, conveyor</b>	
Prescribed Volume	25000 cy
Operating Day	24 hrs
Efficiency	
Daily Production	300 cy/day
No. days	days

<b>Capping Production Estimate - Underdock - Shotcrete</b>	
Prescribed Volume	25000 cy
Operating Day	12 hrs
Efficiency	
Daily Production	cy/day
No. days	days

<b>Capping Production Estimate - Open Access - Derrick Barge for Armor Placement</b>	
Prescribed Volume	100000 cy
Cycle Time	7 min
Bucket Capacity	8 cy
Effective Bucket Capacity (85%)	6.8 cy
Operating Day	24 hrs
Efficiency	75%
Daily Production	1049 cy/day
No. days	95 days

**Table I-3 CAPPING MATERIAL UNIT COST  
LOWER DUWAMISH WATERWAY  
SEDIMENT CLEANUP - FS ESTIMATE  
SEATTLE, WASHINGTON**

Capping Material

Assumed SG

1.62

**Example Tow / Barge Surcharge Calc (i.e. for Steillacoom or CEWE)**

Quoted			
<b>Glacier NW / Lonestar Quarry</b>			
Contact			
Spec (i.e. Sand, Fish Mix, Pea Gravel, Armor)	<b>4 to 8 inch Crushed Spall Rock</b>		
Basis	\$15.75	Ton	
Delivered	\$ 2.30	Ton	\$ 3.73 / cy
		Ton	\$ - / cy
Total	<u>\$18.05</u>	Ton	<u>\$ 29.24 / cy</u>

Est Tow Charge	
	30 nautical miles RT
	5 knots avg
	6 hrs sail
	400 tons/hr loading
	1500 tons capacity
	3.75 hrs loading
	9.75 total hrs
\$	300.00 per hr, tug
\$	50.00 per hr., barge
\$	350.00 per hr., total
\$	3,412.50 trip cost
\$	2.30 add'l per ton

Quoted			
<b>Glacier NW / Lonestar Quarry</b>			
Contact			
			<a href="mailto:WA-AggSales@GlacierNW.com">WA-AggSales@GlacierNW.com</a>
Spec (i.e. Sand, Fish Mix, Pea Gravel, Armor)	<b>Sand (8/30 Sieved)</b>		
Basis	\$13.00	Ton	
Delivered	\$ 2.30	Ton	\$ 3.73 / cy
			\$ - / cy
Total	<u>\$15.30</u>	Ton	<u>\$ 24.79 / cy</u>

Quoted			
<b>Glacier NW / Lonestar Quarry</b>			
Contact			
Spec (i.e. Sand, Fish Mix, Pea Gravel, Armor)	<b>Pea Gravel</b>		
Basis	\$15.00	Ton	
FOB		Ton	\$ -
Delivered to Site	\$ 2.30	Ton	\$ 3.73 / cy
Total	<u>\$17.30</u>	Ton	<u>\$ 28.03 / cy</u>

Quoted			
<b>Glacier NW / Lonestar Quarry</b>			
Contact			
Spec (i.e. Sand, Fish Mix, Pea Gravel, Armor)	<b>Fish Mix</b>		
Basis	\$25.00	Ton	
Delivered	\$ 2.30	Ton	\$ 3.73 / cy
			\$ - / cy
Total	<u>\$27.30</u>	Ton	<u>\$ 44.23 / cy</u>

**Table I-4 TRANS-LOADING UNIT COST  
LOWER DUWAMISH WATERWAY  
SEDIMENT CLEANUP - FS ESTIMATE  
SEATTLE, WASHINGTON**

Cost Estimating Parameters & Methodology:	
Trans-loading Area Setup	\$1,000,000 LS
Water Management	\$10,000 per day
Transport sediment to offload facility	\$22,320 per day
Offload Sediments to Offload Area	\$3 per ton
Transport Storage Containers to Railcar	\$7.9 per ton
Load into Trucks	\$3.6 per ton
Cost includes daily rate for two 1,600 cy capacity disposal barges and 1,800 hp tug.	

include 2 mat barges and 1800 hp tug

**Sediment Offload Calculations**

Crane Rental	\$2,000 per day
Operating Cost	\$300 per hour
Average Production Rate	1,400 cy per day (24-hr)

**Truck Transport Calculations**

RT Miles	8 miles
Tons/Trip	30 tons
Time per trip	45 min
Total Trucks	67 per day
Trucks Operating	4
Material Transport	2000 tons per day
Trucking Cost	\$165 per hour
Trucking Cost	\$15,840 per day
Trucking Cost	\$7.9 per ton
Hours per day	24 hour

**Loading onto Trucks**

FEL (2)	\$1,200 per day
Operating Cost	\$250 per hour
Operating Cost	\$6,000 per day
Total Daily Cost	\$7,200 per day
Total Daily Cost	\$3.6 per ton

Available trans-loading and rail transportation capacity for dredged material is the limiting factor at 1,000 tons per day (per Joe Casselini at Allied Waste Services)

**Table I-5 SURVEY COSTS  
LOWER DUWAMISH WATERWAY  
SEDIMENT CLEANUP - FS ESTIMATE  
SEATTLE, WASHINGTON**

**Payment / Progress Surveys**

**Single Beam / Multibeam Survey Inclusive of acquisition, processing, and data delivery**

Quote 1	\$ 4,780 / Day
Quote 2	\$ 5,075 / Day
Avg.	\$ 4,928 / Day \$5,000 / Day

**Table I-6 MOBILIZATION, DEMOBILIZATION, SITE RESTORATION AND CONTRACTOR PROJECT  
 LOWER DUWAMISH WATERWAY  
 SEDIMENT CLEANUP - FS ESTIMATE  
 SEATTLE, WASHINGTON**

**Mobilization**

Mobilize Equipment and Facilities (Derrick Crane)	\$750,000 LS
Land Lease for Operations and Staging	\$250,000 per year
Site Office & Operating Expense	\$43,200 per month
Contractor Work Plan Submittals	\$100,000 per year
Barge Protection	\$80,000 LS

**Project Management**

Labor and Supervision	\$225,600 per month
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**Standby Time**

Standby for Site Access	5% total project days
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**Table I-17 Analytical Sample Group and Costs for Post-Remediation and Operations/Maintenance Monitoring - Surface Sediment Only-Alternative 2**

**Post-Remediation Compliance with RALs - Sediment Only**

Cost Parameter	Dredge	Cap	ENR
Subtotal unit analytical cost per sample	\$ 2,200	\$ 2,200	\$ 2,200
No. of samples per acre	4	4	4
Remediation area (acre)	32	3	0
Daily labor, equipment and materials cost	\$ 8,500	\$ 8,500	\$ 8,500
No. of sampling days	30	15	20
Subtotal analytical cost	\$ 281,600	\$ 29,308	\$ -
Subtotal labor, equipment and materials cost	\$ 255,000	\$ 127,500	\$ 170,000
Data management, analysis and reporting	\$ 120,000	\$ 31,000	\$ -
Total monitoring cost	\$ 656,600	\$ 187,808	\$ 170,000

**Operations and Maintenance - Sediment and Bathymetry**

Cost Parameter	Dredge	Cap	ENR	MNR
Subtotal unit analytical cost per sample	\$ 2,200	\$ 2,200	\$ 2,200	\$ 2,200
No. of samples per acre	2	2	4	4
Remediation area (acre)	32	3	0	96
Daily labor, equipment and materials cost	\$ 8,500	\$ 8,500	\$ 8,500	\$ 8,500
Bathymetry	\$ 21,399	\$ 5,506	\$ -	\$ 41,334
No. of sampling days(@ 5 stations/day)	13	1	-	77
Monitoring frequency	A	A	B	B
Subtotal annual analytical cost	\$ 140,800	\$ 14,654	\$ -	\$ 843,666
Subtotal annual labor, equipment and materials cost	\$ 130,199	\$ 16,829	\$ -	\$ 693,257
Annual data management, analysis and reporting	\$ 120,000	\$ 31,000	\$ -	\$ 232,000
Subtotal annual monitoring costs	\$ 390,999	\$ 62,483	\$ -	\$ 1,768,923

Notes:

- Table presents an assumed suite of analytical parameters that are applied as a sample group. Includes 15% for QC.
- Bathymetry costs calculated by scaling estimated site-wide cost of \$100,000 (supported by vendor quote) using a power scaling function and power of 0.6: e.g., cost(area A) = Cost(site-wide) \* (Area A/418 acres)<sup>0.6</sup>
- Assumed monitoring frequencies for remedial actions: A - 2, 3 and 5 yr  
B - 2, 3, 5, 7 and 10 yr

**Repair Costs for Cap and ENR - 5% of total area**

	Cap	ENR
Area	0.17	0.00
Cost/Ac	\$300,000	\$100,000
<b>Total Cost</b>	<b>\$49,957</b>	<b>\$0</b>

Notes:

- Monitoring frequency Year 5 and 10  
5% Assume 5% of total area requires repair
- These repair costs are carried over to Table I-7 for PV analysis as part of OM&M cost development

**Additional Dredge Volume Due to MNR and Verification Monitoring Reverting to Active Remediation**

Verification Monitoring	28 acres
MNR	96 acres
5% of Verification Monitoring Area	1.4 acres
10% of MNR	9.59 acres
<b>Total</b>	<b>10.99 acres</b>

Notes:

- Assume that 5% of verification monitoring area and 10% of MNR area reverts back to active remediation (dredging)
- The total acreage is carried over to Table I-28 and added to the dredge volumes for Alternative 2

**Table I-8 Analytical Sample Group and Costs for Post-Remediation and Operations/Maintenance Monitoring - Surface Sediment Only-Alternative 3a**

**Post-Remediation Compliance with RALs - Sediment Only**

Cost Parameter	Dredge	Cap	ENR
Subtotal unit analytical cost per sample	\$ 2,200	\$ 2,200	\$ 2,200
No. of samples per acre	4	4	4
Remediation area (acre)	28	8	36
Daily labor, equipment and materials cost	\$ 8,500	\$ 8,500	\$ 8,500
No. of sampling days	30	15	20
Subtotal analytical cost	\$ 246,400	\$ 69,256	\$ 314,908
Subtotal labor, equipment and materials cost	\$ 255,000	\$ 127,500	\$ 170,000
Data management, analysis and reporting	\$ 111,000	\$ 52,000	\$ 128,000
Total monitoring cost	\$ 612,400	\$ 248,756	\$ 612,908

**Operations and Maintenance - Sediment and Bathymetry**

Cost Parameter	Dredge	Cap	ENR	MNR
Subtotal unit analytical cost per acre	\$ 2,200	\$ 2,200	\$ 2,200	\$ 2,200
No. of samples per acre	2	2	4	4
Remediation area (acre)	28	8	36	54
Daily labor, equipment and materials cost	\$ 8,500	\$ 8,500	\$ 8,500	\$ 8,500
Bathymetry	\$ 19,751	\$ 9,223	\$ 22,883	\$ 29,359
No. of sampling days(@ 5 stations/day)	11	3	29	43
Monitoring frequency	A	A	B	B
Subtotal annual analytical cost	\$ 123,200	\$ 34,628	\$ 314,908	\$ 477,041
Subtotal annual labor, equipment and materials cost	\$ 114,951	\$ 35,981	\$ 266,221	\$ 397,981
Annual data management, analysis and reporting	\$ 111,000	\$ 52,000	\$ 128,000	\$ 165,000
Subtotal annual monitoring costs	\$ 349,151	\$ 122,609	\$ 709,129	\$ 1,040,022

Notes:

- Table presents an assumed suite of analytical parameters that are applied as a sample group. Includes 15% for QC.
- Bathymetry costs calculated by scaling estimated site-wide cost of \$100,000 (supported by vendor quote) using a power scaling function and power of 0.6: e.g., cost(area A) = Cost(site-wide) \* (Area A/418 acres)^0.6
- Assumed monitoring frequencies for remedial actions: A - 2, 3 and 5 yr  
B - 2, 3, 5, 7 and 10 yr

**Repair Costs - 5% of total area**

	Cap	ENR
Area	0.39	1.79
Cost/Ac	\$300,000	\$100,000
<b>Total Cost</b>	<b>\$118,050</b>	<b>\$178,925</b>

Notes:

- Monitoring frequency Year 5 and 10  
5% Assume 5% of total area requires repair
- These repair costs are carried over to Table I-8 for PV analysis as part of OM&M cost development

**Additional Dredge Volume Due to MNR and Verification Monitoring Reverting to Active Remediation**

Verification Monitoring	28 acres
MNR	54 acres
5% of Verification Monitoring Area	1.4 acres
10% of MNR	5.42 acres
<b>Total</b>	<b>6.82 acres</b>

Notes:

- Assume that 5% of verification monitoring area and 10% of MNR area reverts back to active remediation (dredging)
- The total acreage is carried over to Table I-28 and added to the dredge volumes for Alternative 3a

**Table I-9 Analytical Sample Group and Costs for Post-Remediation and Operations/Maintenance Monitoring - Surface Sediment Only-Alternative 3b**

**Post-Remediation Compliance with RALs - Sediment Only**

Cost Parameter	Dredge	Cap	ENR
Subtotal unit analytical cost per sample	\$ 2,200	\$ 2,200	\$ 2,200
No. of samples per acre	4	4	4
Remediation area (acre)	31	10	41.10456143
Daily labor, equipment and materials cost	\$ 8,500	\$ 8,500	\$ 8,500
No. of sampling days	30	15	20
Subtotal analytical cost	\$ 272,800	\$ 87,120	\$ 361,720
Subtotal labor, equipment and materials cost	\$ 255,000	\$ 127,500	\$ 170,000
Data management, analysis and reporting	\$ 118,000	\$ 59,000	\$ 139,000
Total monitoring cost	\$ 645,800	\$ 273,620	\$ 670,720

**Operations and Maintenance - Sediment and Bathymetry**

Cost Parameter	Dredge	Cap	ENR	MNR
Subtotal unit analytical cost per acre	\$ 2,200	\$ 2,200	\$ 2,200	\$ 2,200
No. of samples per acre	2	2	4	4
Remediation area (acre)	31	10	41	43
Daily labor, equipment and materials cost	\$ 8,500	\$ 8,500	\$ 8,500	\$ 8,500
Bathymetry	\$ 20,995	\$ 10,585	\$ 24,867	\$ 25,432
No. of sampling days(@ 5 stations/day)	12	4	33	34
Monitoring frequency	A	A	B	B
Subtotal annual analytical cost	\$ 136,400	\$ 43,560	\$ 361,720	\$ 375,522
Subtotal annual labor, equipment and materials cost	\$ 126,395	\$ 44,245	\$ 304,378	\$ 315,608
Annual data management, analysis and reporting	\$ 118,000	\$ 59,000	\$ 139,000	\$ 143,000
Subtotal annual monitoring costs	\$ 380,795	\$ 146,805	\$ 805,098	\$ 834,130

Notes:

- Table presents an assumed suite of analytical parameters that are applied as a sample group. Includes 15% for QC.
- Bathymetry costs calculated by scaling estimated site-wide cost of \$100,000 (supported by vendor quote) using a power scaling function and power of 0.6: e.g., cost(area A) = Cost(site-wide) \* (Area A/418 acres)<sup>0.6</sup>
- Assumed monitoring frequencies for remedial actions: A - 2, 3 and 5 yr  
B - 2, 3, 5, 7 and 10 yr

**Repair Costs - 5% of total area**

	Cap	ENR
Area	0.50	2.055228071
Cost/Ac	\$300,000	\$100,000
<b>Total Cost</b>	<b>\$148,500</b>	<b>\$205,523</b>

Notes:

- Monitoring frequency Year 5 and 10  
5% Assume 5% of total area requires repair
- These repair costs are carried over to Table I-9 for PV analysis as part of OM&M cost development

**Additional Dredge Volume Due to MNR and Verification Monitoring Reverting to Active Remediation**

Verification Monitoring	28 acres
MNR	43 acres
5% of Verification Monitoring Area	1.4 acres
10% of MNR	4.27 acres
<b>Total</b>	<b>5.67 acres</b>

Notes:

- Assume that 5% of verification monitoring area and 10% of MNR area reverts back to active remediation (dredging)
- The total acreage is carried over to Table I-28 and added to the dredge volumes for Alternative 3b

**Table I-10 Analytical Sample Group and Costs for Post-Remediation and Operations/Maintenance Monitoring - Surface Sediment Only-Alternative 3c**

**Post-Remediation Compliance with RALs - Sediment Only**

Cost Parameter	Dredge	Cap	ENR
Subtotal unit analytical cost per sample	\$ 2,200	\$ 2,200	\$ 2,200
No. of samples per acre	4	4	4
Remediation area (acre)	46	14	46
Daily labor, equipment and materials cost	\$ 8,500	\$ 8,500	\$ 8,500
No. of sampling days	30	15	20
Subtotal analytical cost	\$ 404,800	\$ 122,327	\$ 406,717
Subtotal labor, equipment and materials cost	\$ 255,000	\$ 127,500	\$ 170,000
Data management, analysis and reporting	\$ 149,000	\$ 73,000	\$ 150,000
Total monitoring cost	\$ 808,800	\$ 322,827	\$ 726,717

**Operations and Maintenance - Sediment and Bathymetry**

Cost Parameter	Dredge	Cap	ENR	MNR
Subtotal unit analytical cost per acre	\$ 2,200	\$ 2,200	\$ 2,200	\$ 2,200
No. of samples per acre	2	2	4	4
Remediation area (acre)	46	14	46	26
Daily labor, equipment and materials cost	\$ 8,500	\$ 8,500	\$ 8,500	\$ 8,500
Bathymetry	\$ 26,604	\$ 12,975	\$ 26,680	\$ 19,040
No. of sampling days (@ 5 stations/day)	18	6	37	21
Monitoring frequency	A	A	B	B
Subtotal annual analytical cost	\$ 202,400	\$ 61,163	\$ 406,717	\$ 231,797
Subtotal annual labor, equipment and materials cost	\$ 183,004	\$ 60,238	\$ 340,961	\$ 198,156
Annual data management, analysis and reporting	\$ 149,000	\$ 73,000	\$ 150,000	\$ 107,000
Subtotal annual monitoring costs	\$ 534,404	\$ 194,401	\$ 897,679	\$ 536,953

Notes:

- Table presents an assumed suite of analytical parameters that are applied as a sample group. Includes 15% for QC.
- Bathymetry costs calculated by scaling estimated site-wide cost of \$100,000 (supported by vendor quote) using a power scaling function and power of 0.6: e.g., cost(area A) = Cost(site-wide) \* (Area A/418 acres)<sup>0.6</sup>
- Assumed monitoring frequencies for remedial actions: A - 2, 3 and 5 yr  
B - 2, 3, 5, 7 and 10 yr

**Repair Costs - 5% of total area**

	Cap	ENR
Area	0.70	2.31
Cost/Ac	\$300,000	\$100,000
<b>Total Cost</b>	<b>\$208,512</b>	<b>\$231,089</b>

Notes:

- Monitoring frequency Year 5 and 10  
5% Assume 5% of total area requires repair
- These repair costs are carried over to Table I-10 for PV analysis as part of OM&M cost development

**Additional Dredge Volume Due to MNR and Verification Monitoring Reverting to Active Remediation**

Verification Monitoring	28 acres
MNR	26 acres
5% of Verification Monitoring A	1.4 acres
10% of MNR	2.63 acres
<b>Total</b>	<b>4.03 acres</b>

Notes:

- Assume that 5% of verification monitoring area and 10% of MNR area reverts back to active remediation (dredging)
- The total acreage is carried over to Table I-28 and added to the dredge volumes for Alternative 3c

**Table I-11 Analytical Sample Group and Costs for Post-Remediation and Operations/Maintenance Monitoring - Surface Sediment Only-Alternative 3d**

**Post-Remediation Compliance with RALs - Sediment Only**

Cost Parameter	Dredge	Cap	ENR
Subtotal unit analytical cost per sample	\$ 2,200	\$ 2,200	\$ 2,200
No. of samples per acre	4	4	4
Remediation area (acre)	64	31	45
Daily labor, equipment and materials cost	\$ 8,500	\$ 8,500	\$ 8,500
No. of sampling days	30	15	20
Subtotal analytical cost	\$ 563,200	\$ 273,856	\$ 396,000
Subtotal labor, equipment and materials cost	\$ 255,000	\$ 127,500	\$ 170,000
Data management, analysis and reporting	\$ 182,000	\$ 118,000	\$ 147,000
Total monitoring cost	\$ 1,000,200	\$ 519,356	\$ 713,000

**Operations and Maintenance - Sediment and Bathymetry**

Cost Parameter	Dredge	Cap	ENR	MNR
Subtotal unit analytical cost per acre	\$ 2,200	\$ 2,200	\$ 2,200	\$ 2,200
No. of samples per acre	2	2	4	4
Remediation area (acre)	64	31	45	0
Daily labor, equipment and materials cost	\$ 8,500	\$ 8,500	\$ 8,500	\$ 8,500
Bathymetry	\$ 32,434	\$ 21,044	\$ 26,256	\$ -
No. of sampling days(@ 5 stations/day)	26	12	36	-
Monitoring frequency	A	A	B	B
Subtotal annual analytical cost	\$ 281,600	\$ 136,928	\$ 396,000	\$ -
Subtotal annual labor, equipment and materials cost	\$ 250,034	\$ 126,852	\$ 332,256	\$ -
Annual data management, analysis and reporting	\$ 182,000	\$ 118,000	\$ 147,000	\$ -
Subtotal annual monitoring costs	\$ 713,634	\$ 381,780	\$ 875,256	\$ -

Notes:

- Table presents an assumed suite of analytical parameters that are applied as a sample group. Includes 15% for QC.
- Bathymetry costs calculated by scaling estimated site-wide cost of \$100,000 (supported by vendor quote) using a power scaling function and power of 0.6: e.g., cost(area A) = Cost(site-wide) \* (Area A/418 acres)<sup>0.6</sup>
- Assumed monitoring frequencies for remedial actions: A - 2, 3 and 5 yr  
B - 2, 3, 5, 7 and 10 yr

**Repair Costs - 5% of total area**

	Cap	ENR
Area	1.56	2.25
Cost/Ac	\$300,000	\$100,000
<b>Total Cost</b>	<b>\$466,800</b>	<b>\$225,000</b>

Notes:

- Monitoring frequency Year 5 and 10  
5% Assume 5% of total area requires repair
- These repair costs are carried over to Table I-11 for PV analysis as part of OM&M cost development

**Additional Dredge Volume Due to MNR and Verification Monitoring Reverting to Active Remediation**

Verification Monitoring	28 acres
MNR	0 acres
5% of Verification Monitoring Area	1.4 acres
10% of MNR	0.00 acres
<b>Total</b>	<b>1.40 acres</b>

Notes:

- Assume that 5% of verification monitoring area and 10% of MNR area reverts back to active remediation (dredging)
- The total acreage is carried over to Table I-28 and added to the dredge volumes for Alternative 3c

**Table I-12 Analytical Sample Group and Costs for Post-Remediation and Operations/Maintenance Monitoring - Surface Sediment Only-Alternative 4a**

**Post-Remediation Compliance with RALs - Sediment Only**

Cost Parameter	Dredge	Cap	ENR
Subtotal unit analytical cost per sample	\$ 2,200	\$ 2,200	\$ 2,200
No. of samples per acre	4	4	4
Remediation area (acre)	70.52415437	7	0
Daily labor, equipment and materials cost	\$ 8,500	\$ 8,500	\$ 8,500
No. of sampling days	30	15	20
Subtotal analytical cost	\$ 620,613	\$ 58,200	\$ -
Subtotal labor, equipment and materials cost	\$ 255,000	\$ 127,500	\$ 170,000
Data management, analysis and reporting	\$ 193,000	\$ 47,000	\$ -
Total monitoring cost	\$ 1,068,613	\$ 232,700	\$ 170,000

**Operations and Maintenance - Sediment and Bathymetry**

Cost Parameter	Dredge	Cap	ENR	MNR
Subtotal unit analytical cost per acre	\$ 2,200	\$ 2,200	\$ 2,200	\$ 2,200
No. of samples per acre	2	2	4	4
Remediation area (acre)	70.52415437	7	0	54
Daily labor, equipment and materials cost	\$ 8,500	\$ 8,500	\$ 8,500	\$ 8,500
Bathymetry	\$ 34,379	\$ 8,309	\$ -	\$ 29,359
No. of sampling days(@ 5 stations/day)	28	3	-	43
Monitoring frequency	A	A	B	B
Subtotal annual analytical cost	\$ 310,306	\$ 29,100	\$ -	\$ 477,041
Subtotal annual labor, equipment and materials cost	\$ 274,161	\$ 30,796	\$ -	\$ 397,981
Annual data management, analysis and reporting	\$ 193,000	\$ 47,000	\$ -	\$ 165,000
Subtotal annual monitoring costs	\$ 777,468	\$ 106,896	\$ -	\$ 1,040,022

Notes:

- Table presents an assumed suite of analytical parameters that are applied as a sample group. Includes 15% for QC.
- Bathymetry costs calculated by scaling estimated site-wide cost of \$100,000 (supported by vendor quote) using a power scaling function and power of 0.6: e.g., cost(area A) = Cost(site-wide) \* (Area A/418 acres)^0.6
- Assumed monitoring frequencies for remedial actions A - 2, 3 and 5 yr  
 B - 2, 3, 5, 7 and 10 yr

**Repair Costs - 5% of total area**

	Cap	ENR
Area	0.33	0.00
Cost/Ac	\$300,000	\$100,000
<b>Total Cost</b>	<b>\$99,205</b>	<b>\$0</b>

Notes:

- Monitoring frequency Year 5 and 10  
 5% Assume 5% of total area requires repair
- These repair costs are carried over to Table I-12 for PV analysis as part of OM&M cost development

**Additional Dredge Volume Due to MNR and Verification Monitoring Reverting to Active Remediation**

Verification Monitoring	28 acres
MNR	54 acres
5% of Verification Monitoring Area	1.4 acres
10% of MNR	5.42 acres
<b>Total</b>	<b>6.82 acres</b>

Notes:

- Assume that 5% of verification monitoring area and 10% of MNR area reverts back to active remediation (dredging)
- The total acreage is carried over to Table I-28 and added to the dredge volumes for Alternative 4a

**Table I-13 Analytical Sample Group and Costs for Post-Remediation and Operations/Maintenance Monitoring - Surface Sediment Only-Alternative 4b**

**Post-Remediation Compliance with RALs - Sediment Only**

Cost Parameter	Dredge	Cap	ENR
Subtotal unit analytical cost per sample	\$ 2,200	\$ 2,200	\$ 2,200
No. of samples per acre	4	4	4
Remediation area (acre)	90.99653353	7	0
Daily labor, equipment and materials cost	\$ 8,500	\$ 8,500	\$ 8,500
No. of sampling days	30	15	20
Subtotal analytical cost	\$ 800,769	\$ 58,200	\$ -
Subtotal labor, equipment and materials cost	\$ 255,000	\$ 127,500	\$ 170,000
Data management, analysis and reporting	\$ 225,000	\$ 47,000	\$ -
Total monitoring cost	\$ 1,280,769	\$ 232,700	\$ 170,000

**Operations and Maintenance - Sediment and Bathymetry**

Cost Parameter	Dredge	Cap	ENR	MNR
Subtotal unit analytical cost per acre	\$ 2,200	\$ 2,200	\$ 2,200	\$ 2,200
No. of samples per acre	2	2	4	4
Remediation area (acre)	90.99653353	7	0	43
Daily labor, equipment and materials cost	\$ 8,500	\$ 8,500	\$ 8,500	\$ 8,500
Bathymetry	\$ 40,060	\$ 8,309	\$ -	\$ 25,432
No. of sampling days(@ 5 stations/day)	36	3	-	34
Monitoring frequency	A	A	B	B
Subtotal annual analytical cost	\$ 400,385	\$ 29,100	\$ -	\$ 375,522
Subtotal annual labor, equipment and materials cost	\$ 349,448	\$ 30,796	\$ -	\$ 315,608
Annual data management, analysis and reporting	\$ 225,000	\$ 47,000	\$ -	\$ 143,000
Subtotal annual monitoring costs	\$ 974,833	\$ 106,896	\$ -	\$ 834,130

Notes:

1. Table presents an assumed suite of analytical parameters that are applied as a sample group. Includes 15% for QC.
2. Bathymetry costs calculated by scaling estimated site-wide cost of \$100,000 (supported by vendor quote) using a power scaling function and power of 0.6: e.g., cost(area A) = Cost(site-wide) \* (Area A/418 acres)<sup>0.6</sup>
3. Assumed monitoring frequencies for remedial action: A - 2, 3 and 5 yr  
 B - 2, 3, 5, 7 and 10 yr

**Repair Costs - 5% of total area**

	Cap	ENR
Area	0.33	0.00
Cost/Ac	\$300,000	\$100,000
<b>Total Cost</b>	<b>\$99,205</b>	<b>\$0</b>

Notes:

1. Monitoring frequency Year 5 and 10  
 5% Assume 5% of total area requires repair
2. These repair costs are carried over to Table I-13 for PV analysis as part of OM&M cost development

**Additional Dredge Volume Due to MNR and Verification Monitoring Reverting to Active Remediation**

Verification Monitoring	28 acres
MNR	43 acres
5% of Verification Monitoring Area	1.4 acres
10% of MNR	4.27 acres
<b>Total</b>	<b>5.67 acres</b>

Notes:

1. Assume that 5% of verification monitoring area and 10% of MNR area reverts back to active remediation (dredging)
2. The total acreage is carried over to Table I-28 and added to the dredge volumes for Alternative 4b

**Table I-14 Analytical Sample Group and Costs for Post-Remediation and Operations/Maintenance Monitoring - Surface Sediment Only-Alternative 4c**

**Post-Remediation Compliance with RALs - Sediment Only**

Cost Parameter	Dredge	Cap	ENR
Subtotal unit analytical cost per sample	\$ 2,200	\$ 2,200	\$ 2,200
No. of samples per acre	4	4	4
Remediation area (acre)	107	7	0
Daily labor, equipment and materials cost	\$ 8,500	\$ 8,500	\$ 8,500
No. of sampling days	30	15	20
Subtotal analytical cost	\$ 941,600	\$ 64,384	\$ -
Subtotal labor, equipment and materials cost	\$ 255,000	\$ 127,500	\$ 170,000
Data management, analysis and reporting	\$ 248,000	\$ 50,000	\$ -
Total monitoring cost	\$ 1,444,600	\$ 241,884	\$ 170,000

**Operations and Maintenance - Sediment and Bathymetry**

Cost Parameter	Dredge	Cap	ENR	MNR
Subtotal unit analytical cost per acre	\$ 2,200	\$ 2,200	\$ 2,200	\$ 2,200
No. of samples per acre	2	2	4	4
Remediation area (acre)	107	7	0	26
Daily labor, equipment and materials cost	\$ 8,500	\$ 8,500	\$ 8,500	\$ 8,500
Bathymetry	\$ 44,149	\$ 8,828	\$ -	\$ 19,040
No. of sampling days(@ 5 stations/day)	43	3	-	21
Monitoring frequency	A	A	B	B
Subtotal annual analytical cost	\$ 470,800	\$ 32,192	\$ -	\$ 231,797
Subtotal annual labor, equipment and materials cost	\$ 407,949	\$ 33,704	\$ -	\$ 198,156
Annual data management, analysis and reporting	\$ 248,000	\$ 50,000	\$ -	\$ 107,000
Subtotal annual monitoring costs	\$ 1,126,749	\$ 115,896	\$ -	\$ 536,953

Notes:

- Table presents an assumed suite of analytical parameters that are applied as a sample group. Includes 15% for QC.
- Bathymetry costs calculated by scaling estimated site-wide cost of \$100,000 (supported by vendor quote) using a power scaling function and power of 0.6: e.g., cost(area A) = Cost(site-wide) \* (Area A/418 acres)<sup>0.6</sup>
- Assumed monitoring frequencies for remedial action A - 2, 3 and 5 yr  
 B - 2, 3, 5, 7 and 10 yr

**Repair Costs - 5% of total area**

	Cap	ENR
Area	0.37	0.00
Cost/Ac	\$300,000	\$100,000
<b>Total Cost</b>	<b>\$109,746</b>	<b>\$0</b>

Notes:

- Monitoring frequency Year 5 and 10  
 5% Assume 5% of total area requires repair
- These repair costs are carried over to Table I-14 for PV analysis as part of OM&M cost development

**Additional Dredge Volume Due to MNR and Verification Monitoring Reverting to Active Remediation**

Verification Monitoring	28 acres
MNR	26 acres
5% of Verification Monitoring Area	1.4 acres
10% of MNR	2.63 acres
<b>Total</b>	<b>4.03 acres</b>

Notes:

- Assume that 5% of verification monitoring area and 10% of MNR area reverts back to active remediation (dredging)
- The total acreage is carried over to Table I-28 and added to the dredge volumes for Alternative 4c



**Table I-15 Analytical Sample Group and Costs for Post-Remediation and Operations/Maintenance Monitoring - Surface Sediment Only-Alternative 4d**

**Post-Remediation Compliance with RALs - Sediment Only**

Cost Parameter	Dredge	Cap	ENR
Subtotal unit analytical cost per sample	\$ 2,200	\$ 2,200	\$ 2,200
No. of samples per acre	4	4	4
Remediation area (acre)	131	9	0
Daily labor, equipment and materials cost	\$ 8,500	\$ 8,500	\$ 8,500
No. of sampling days	30	15	20
Subtotal analytical cost	\$ 1,152,800	\$ 78,194	\$ -
Subtotal labor, equipment and materials cost	\$ 255,000	\$ 127,500	\$ 170,000
Data management, analysis and reporting	\$ 280,000	\$ 56,000	\$ -
Total monitoring cost	\$ 1,687,800	\$ 261,694	\$ 170,000

**Operations and Maintenance - Sediment and Bathymetry**

Cost Parameter	Dredge	Cap	ENR	MNR
Subtotal unit analytical cost per acre	\$ 2,200	\$ 2,200	\$ 2,200	\$ 2,200
No. of samples per acre	2	2	4	4
Remediation area (acre)	131	9	0	0
Daily labor, equipment and materials cost	\$ 8,500	\$ 8,500	\$ 8,500	\$ 8,500
Bathymetry	\$ 49,849	\$ 9,920	\$ -	\$ -
No. of sampling days(@ 5 stations/day)	52	4	-	-
Monitoring frequency	A	A	B	B
Subtotal annual analytical cost	\$ 576,400	\$ 39,097	\$ -	\$ -
Subtotal annual labor, equipment and materials cost	\$ 495,249	\$ 40,131	\$ -	\$ -
Annual data management, analysis and reporting	\$ 280,000	\$ 56,000	\$ -	\$ -
Subtotal annual monitoring costs	\$ 1,351,649	\$ 135,229	\$ -	\$ -

Notes:

1. Table presents an assumed suite of analytical parameters that are applied as a sample group. Includes 15% for QC.
2. Bathymetry costs calculated by scaling estimated site-wide cost of \$100,000 (supported by vendor quote) using a power scaling function and power of 0.6: e.g., cost(area A) = Cost(site-wide) \* (Area A/418 acres)^0.6
3. Assumed monitoring frequencies for remedial actions A - 2, 3 and 5 yr  
 B - 2, 3, 5, 7 and 10 yr

**Repair Costs - 5% of total area**

	Cap	ENR
Area	0.44	0
Cost/Ac	\$300,000	\$100,000
<b>Total Cost</b>	<b>\$133,286</b>	<b>\$0</b>

Notes:

1. Monitoring frequency Year 5 and 10  
 5% Assume 5% of total area requires repair
2. These repair costs are carried over to Table I-15 and Table I-16 for PV analysis as part of OM&M cost development

**Additional Dredge Volume Due to MNR and Verification Monitoring Reverting to Active Remediation**

Verification Monitoring	28 acres
MNR	0 acres
5% of Verification Monitoring Area	1.4 acres
10% of MNR	0.00 acres
<b>Total</b>	<b>1.40 acres</b>

Notes:

1. Assume that 5% of verification monitoring area and 10% of MNR area reverts back to active remediation (dredging)
2. The total acreage is carried over to Table I-28 and added to the dredge volumes for Alternative 4d

**Table I-16 Analytical Sample Group and Costs for Post-Remediation and Operations/Maintenance Monitoring - Surface Sediment Only-Alternative 5**

**Post-Remediation Compliance with RALs - Sediment Only**

Cost Parameter	Dredge	Cap	ENR
Subtotal unit analytical cost per sample	\$ 2,200	\$ 2,200	\$ 2,200
No. of samples per acre	4	4	4
Remediation area (acre)	290	9	0
Daily labor, equipment and materials cost	\$ 8,500	\$ 8,500	\$ 8,500
No. of sampling days	30	15	20
Subtotal analytical cost	\$ 2,552,000	\$ 82,538	\$ -
Subtotal labor, equipment and materials cost	\$ 255,000	\$ 127,500	\$ 170,000
Data management, analysis and reporting	\$ 450,000	\$ 57,000	\$ -
Total monitoring cost	\$ 3,257,000	\$ 267,038	\$ 170,000

**Operations and Maintenance - Sediment and Bathymetry**

Cost Parameter	Dredge	Cap	ENR	MNR
Subtotal unit analytical cost per acre	\$ 2,200	\$ 2,200	\$ 2,200	\$ 2,200
No. of samples per acre	2	2	4	4
Remediation area (acre)	290	9	0	0
Daily labor, equipment and materials cost	\$ 8,500	\$ 8,500	\$ 8,500	\$ 8,500
Bathymetry	\$ 80,303	\$ 10,247	\$ -	\$ -
No. of sampling days(@ 5 stations/day)	116	4	-	-
Monitoring frequency	A	A	B	B
Subtotal annual analytical cost	\$ 1,276,000	\$ 41,269	\$ -	\$ -
Subtotal annual labor, equipment and materials cost	\$ 1,066,303	\$ 42,136	\$ -	\$ -
Annual data management, analysis and reporting	\$ 450,000	\$ 57,000	\$ -	\$ -
Subtotal annual monitoring costs	\$ 2,792,303	\$ 140,405	\$ -	\$ -

Notes:

- Table presents an assumed suite of analytical parameters that are applied as a sample group. Includes 15% for QC.
- Bathymetry costs calculated by scaling estimated site-wide cost of \$100,000 (supported by vendor quote) using a power scaling function and power of 0.6: e.g., cost(area A) = Cost(site-wide) \* (Area A/418 acres)<sup>0.6</sup>
- Assumed monitoring frequencies for remedial action: A - 2, 3 and 5 yr  
 B - 2, 3, 5, 7 and 10 yr

**Repair Costs - 5% of total area**

	Cap	ENR
Area	0.47	0
Cost/Ac	\$300,000	\$100,000
<b>Total Cost</b>	\$140,689	\$0

Notes:

- Monitoring frequency Year 5 and 10  
 5% Assume 5% of total area requires repair
- These repair costs are carried over to Table I-17 for PV analysis as part of OM&M cost development

**Additional Dredge Volume Due to MNR and Verification Monitoring Reverting to Active Remediation**

Verification Monitoring	0 acres
MNR	0 acres
5% of Verification Monitoring Area	0 acres
10% of MNR	0.00 acres
<b>Total</b>	<b>0.00 acres</b>

Notes:

- Assume that 5% of verification monitoring area and 10% of MNR area reverts back to active remediation (dredging)
- The total acreage is carried over to Table I-28 and added to the dredge volumes for Alternative 5

# Table I-17 Site-Wide Analytical Package for Baseline and Long-Term RAO Monitoring

LOWER DUWAMISH WATERWAY  
 SEDIMENT CLEANUP - FS ESTIMATE  
 SEATTLE, WASHINGTON

<b>Sediment</b>			
	<b>Subtotal Sediment</b>		<b>190,500</b>
<b>Tissue</b>			
	<b>Subtotal Tissue</b>		<b>96,200</b>
<b>Water</b>			
	<b>Subtotal Water</b>		<b>21,960</b>
Annual data management, analysis, and repc	na	na	<b>\$ 250,000</b>
	<b>Subtotal All</b>		<b>\$558,660</b>
	<b>QC (15%)</b>		<b>\$83,799</b>
	<b>Grand Total</b>		<b>\$ 640,000</b>

Notes:

1. Baseline monitoring consists of a complete sample group as set forth in the table. The sampling is performed before remediation activities commence. The purpose of baseline sampling is to establish surface sediment, tissue, and water quality conditions.
2. Costs are assumed to apply at year 0 (baseline; capital expense) and years 5, 10, and 15; (4 rounds total).
3. Present value of payments made according to schedule in Note No. 2 and assuming 3% discount rate

Table I-18 PRESENT VALUE CALCULATION - Alt 2  
 LOWER DUWAMISH WATERWAY  
 SEDIMENT CLEANUP - FS ESTIMATE  
 SEATTLE, WASHINGTON

PRESENT VALUE CALCULATION  
 i= 3%

Year, n	Annual Operations and Maintenance Costs (Dredging)	O&M Cap	O&M ENR	O&M MNR	Annual Long-Term Monitoring Costs	Sum of Year "n" Costs	Present Value Factor, i	Present Value of All Year "n" Costs	Present Value of All Year "n" O&M Dredge Costs	PV Cap	PV ENR	PV MNR	Present Value of All Year "n" LTM Costs	Cumulative Present Value of All Costs, Year 1 through n
0					\$640,000	\$640,000	1	\$640,000	\$0	\$0	\$0	\$0	\$640,000	\$640,000
1	\$0	\$0	\$0	\$0	\$0	\$0	0.970873786	\$0	\$0	\$0	\$0	\$0	\$0	\$640,000
2	\$390,999	\$62,483	\$0	\$1,768,923	\$0	\$390,999	0.942599909	\$368,554	\$368,554	\$58,897	\$0	\$1,667,380	\$0	\$1,008,554
3	\$390,999	\$62,483	\$0	\$1,768,923	\$0	\$390,999	0.915141659	\$357,819	\$357,819	\$57,181	\$0	\$1,618,815	\$0	\$1,366,373
4	\$0	\$0	\$0	\$0	\$0	\$0	0.889497048	\$0	\$0	\$0	\$0	\$0	\$0	\$1,366,373
5	\$390,999	\$112,441	\$0	\$1,768,923	\$640,000	\$1,030,999	0.866407948	\$889,348	\$337,279	\$96,993	\$0	\$1,525,889	\$552,070	\$2,255,721
6	\$0	\$0	\$0	\$0	\$0	\$0	0.837484257	\$0	\$0	\$0	\$0	\$0	\$0	\$2,255,721
7	\$0	\$0	\$0	\$1,768,923	\$0	\$0	0.813095111	\$0	\$0	\$0	\$0	\$1,438,296	\$0	\$2,255,721
8	\$0	\$0	\$0	\$0	\$0	\$0	0.789409234	\$0	\$0	\$0	\$0	\$0	\$0	\$2,255,721
9	\$0	\$0	\$0	\$0	\$0	\$0	0.766416732	\$0	\$0	\$0	\$0	\$0	\$0	\$2,255,721
10	\$0	\$0	\$0	\$1,768,923	\$640,000	\$640,000	0.744093915	\$476,220	\$0	\$0	\$0	\$1,316,245	\$476,220	\$2,731,941
11					\$0	\$0	0.722421277	\$0	\$0	\$0	\$0	\$0	\$0	\$2,731,941
12					\$0	\$0	0.70137988	\$0	\$0	\$0	\$0	\$0	\$0	\$2,731,941
13					\$0	\$0	0.68095134	\$0	\$0	\$0	\$0	\$0	\$0	\$2,731,941
14					\$0	\$0	0.661117806	\$0	\$0	\$0	\$0	\$0	\$0	\$2,731,941
15					\$640,000	\$640,000	0.641861947	\$410,792	\$0	\$0	\$0	\$0	\$410,792	\$3,142,733
16					\$0	\$0	0.623166939	\$0	\$0	\$0	\$0	\$0	\$0	\$3,142,733
17					\$0	\$0	0.605016446	\$0	\$0	\$0	\$0	\$0	\$0	\$3,142,733
18					\$0	\$0	0.587394608	\$0	\$0	\$0	\$0	\$0	\$0	\$3,142,733
19					\$0	\$0	0.570286027	\$0	\$0	\$0	\$0	\$0	\$0	\$3,142,733
20					\$0	\$0	0.553675754	\$0	\$0	\$0	\$0	\$0	\$0	\$3,142,733
21					\$0	\$0	0.537549276	\$0	\$0	\$0	\$0	\$0	\$0	\$3,142,733
22					\$0	\$0	0.521892501	\$0	\$0	\$0	\$0	\$0	\$0	\$3,142,733
23					\$0	\$0	0.506691748	\$0	\$0	\$0	\$0	\$0	\$0	\$3,142,733
24					\$0	\$0	0.491933736	\$0	\$0	\$0	\$0	\$0	\$0	\$3,142,733
25					\$0	\$0	0.477605569	\$0	\$0	\$0	\$0	\$0	\$0	\$3,142,733
26					\$0	\$0	0.463684727	\$0	\$0	\$0	\$0	\$0	\$0	\$3,142,733
27					\$0	\$0	0.450189056	\$0	\$0	\$0	\$0	\$0	\$0	\$3,142,733
28					\$0	\$0	0.437076753	\$0	\$0	\$0	\$0	\$0	\$0	\$3,142,733
29					\$0	\$0	0.424346362	\$0	\$0	\$0	\$0	\$0	\$0	\$3,142,733
30					\$0	\$0	0.41198676	\$0	\$0	\$0	\$0	\$0	\$0	\$3,142,733
31					\$0	\$0	0.39987145	\$0	\$0	\$0	\$0	\$0	\$0	\$3,142,733
32					\$0	\$0	0.388337034	\$0	\$0	\$0	\$0	\$0	\$0	\$3,142,733
33					\$0	\$0	0.377026247	\$0	\$0	\$0	\$0	\$0	\$0	\$3,142,733
34					\$0	\$0	0.3660449	\$0	\$0	\$0	\$0	\$0	\$0	\$3,142,733
35					\$0	\$0	0.355383398	\$0	\$0	\$0	\$0	\$0	\$0	\$3,142,733
36					\$0	\$0	0.345032425	\$0	\$0	\$0	\$0	\$0	\$0	\$3,142,733
37					\$0	\$0	0.334982937	\$0	\$0	\$0	\$0	\$0	\$0	\$3,142,733
38					\$0	\$0	0.325226152	\$0	\$0	\$0	\$0	\$0	\$0	\$3,142,733
39					\$0	\$0	0.315753546	\$0	\$0	\$0	\$0	\$0	\$0	\$3,142,733
40					\$0	\$0	0.306556841	\$0	\$0	\$0	\$0	\$0	\$0	\$3,142,733
41					\$0	\$0	0.297628001	\$0	\$0	\$0	\$0	\$0	\$0	\$3,142,733
42					\$0	\$0	0.288959224	\$0	\$0	\$0	\$0	\$0	\$0	\$3,142,733
43					\$0	\$0	0.280542936	\$0	\$0	\$0	\$0	\$0	\$0	\$3,142,733
44					\$0	\$0	0.272371782	\$0	\$0	\$0	\$0	\$0	\$0	\$3,142,733
45					\$0	\$0	0.264438624	\$0	\$0	\$0	\$0	\$0	\$0	\$3,142,733
46					\$0	\$0	0.256736528	\$0	\$0	\$0	\$0	\$0	\$0	\$3,142,733
47					\$0	\$0	0.249258765	\$0	\$0	\$0	\$0	\$0	\$0	\$3,142,733
48					\$0	\$0	0.241998801	\$0	\$0	\$0	\$0	\$0	\$0	\$3,142,733
49					\$0	\$0	0.234950292	\$0	\$0	\$0	\$0	\$0	\$0	\$3,142,733
50					\$0	\$0	0.22810708	\$0	\$0	\$0	\$0	\$0	\$0	\$3,142,733
51					\$0	\$0	0.221463184	\$0	\$0	\$0	\$0	\$0	\$0	\$3,142,733
<b>Totals</b>	<b>\$1,172,996</b>				<b>\$2,560,000</b>	<b>\$3,732,996</b>		<b>\$3,142,733</b>	<b>\$1,060,000</b>	<b>\$210,000</b>	<b>\$0</b>	<b>\$7,570,000</b>	<b>\$2,080,000</b>	

**PRESENT VALUE CALCULATION**

**Table I-19 PRESENT VALUE CALCULATION - Alt 3a**  
**LOWER DUWAMISH WATERWAY**  
**SEDIMENT CLEANUP - FS ESTIMATE**  
**SEATTLE, WASHINGTON**

i= 3%

Year, n	Annual Operations and Maintenance Costs (Dredging)	O&M Cap	O&M ENR	O&M MNR	Annual Long-Term Monitoring Costs	Sum of Year "n" Costs	Present Value Factor, i	Present Value of All Year "n" Costs	Present Value of All Year "n" O&M Dredge Costs	PV Cap	PV ENR	PV MNR	Present Value of All Year "n" LTM Costs	Cumulative Present Value of All Costs, Year 1 through n
0					\$640,000	\$640,000	1	\$640,000	\$0	\$0	\$0	\$0	\$640,000	\$640,000
1	\$0	\$0	\$0	\$0	\$0	\$0	0.970873786	\$0	\$0	\$0	\$0	\$0	\$0	\$640,000
2	\$349,151	\$122,609	\$709,129	\$1,040,022	\$0	\$349,151	0.942595909	\$329,108	\$329,108	\$115,571	\$668,422	\$980,321	\$0	\$969,108
3	\$349,151	\$122,609	\$709,129	\$1,040,022	\$0	\$349,151	0.915141659	\$319,523	\$319,523	\$112,205	\$648,953	\$951,768	\$0	\$1,288,631
4	\$0	\$0	\$0	\$0	\$0	\$0	0.888487048	\$0	\$0	\$0	\$0	\$0	\$0	\$1,288,631
5	\$349,151	\$240,659	\$888,054	\$1,040,022	\$640,000	\$989,151	0.862608784	\$853,250	\$301,181	\$207,595	\$766,043	\$897,132	\$552,070	\$2,141,881
6	\$0	\$0	\$0	\$0	\$0	\$0	0.837484257	\$0	\$0	\$0	\$0	\$0	\$0	\$2,141,881
7	\$0	\$0	\$709,129	\$1,040,022	\$0	\$0	0.813091511	\$0	\$0	\$0	\$576,587	\$845,633	\$0	\$2,141,881
8	\$0	\$0	\$0	\$0	\$0	\$0	0.789409234	\$0	\$0	\$0	\$0	\$0	\$0	\$2,141,881
9	\$0	\$0	\$0	\$0	\$0	\$0	0.766416732	\$0	\$0	\$0	\$0	\$0	\$0	\$2,141,881
10	\$0	\$0	\$888,054	\$1,040,022	\$640,000	\$640,000	0.744093915	\$476,220	\$0	\$0	\$660,795	\$773,874	\$476,220	\$2,618,101
11					\$0	\$0	0.722421277	\$0	\$0	\$0	\$0	\$0	\$0	\$2,618,101
12					\$0	\$0	0.701379888	\$0	\$0	\$0	\$0	\$0	\$0	\$2,618,101
13					\$0	\$0	0.68095134	\$0	\$0	\$0	\$0	\$0	\$0	\$2,618,101
14					\$0	\$0	0.661117806	\$0	\$0	\$0	\$0	\$0	\$0	\$2,618,101
15					\$640,000	\$640,000	0.641861947	\$410,792	\$0	\$0	\$0	\$0	\$410,792	\$3,028,893
16					\$0	\$0	0.623166939	\$0	\$0	\$0	\$0	\$0	\$0	\$3,028,893
17					\$0	\$0	0.605016446	\$0	\$0	\$0	\$0	\$0	\$0	\$3,028,893
18					\$0	\$0	0.587394608	\$0	\$0	\$0	\$0	\$0	\$0	\$3,028,893
19					\$0	\$0	0.570286027	\$0	\$0	\$0	\$0	\$0	\$0	\$3,028,893
20					\$0	\$0	0.553675754	\$0	\$0	\$0	\$0	\$0	\$0	\$3,028,893
21					\$0	\$0	0.537549276	\$0	\$0	\$0	\$0	\$0	\$0	\$3,028,893
22					\$0	\$0	0.521892501	\$0	\$0	\$0	\$0	\$0	\$0	\$3,028,893
23					\$0	\$0	0.506691748	\$0	\$0	\$0	\$0	\$0	\$0	\$3,028,893
24					\$0	\$0	0.491933736	\$0	\$0	\$0	\$0	\$0	\$0	\$3,028,893
25					\$0	\$0	0.477605569	\$0	\$0	\$0	\$0	\$0	\$0	\$3,028,893
26					\$0	\$0	0.463694727	\$0	\$0	\$0	\$0	\$0	\$0	\$3,028,893
27					\$0	\$0	0.450189056	\$0	\$0	\$0	\$0	\$0	\$0	\$3,028,893
28					\$0	\$0	0.437076753	\$0	\$0	\$0	\$0	\$0	\$0	\$3,028,893
29					\$0	\$0	0.424346362	\$0	\$0	\$0	\$0	\$0	\$0	\$3,028,893
30					\$0	\$0	0.41198676	\$0	\$0	\$0	\$0	\$0	\$0	\$3,028,893
31					\$0	\$0	0.399987145	\$0	\$0	\$0	\$0	\$0	\$0	\$3,028,893
32					\$0	\$0	0.388337034	\$0	\$0	\$0	\$0	\$0	\$0	\$3,028,893
33					\$0	\$0	0.377026247	\$0	\$0	\$0	\$0	\$0	\$0	\$3,028,893
34					\$0	\$0	0.3660449	\$0	\$0	\$0	\$0	\$0	\$0	\$3,028,893
35					\$0	\$0	0.355383398	\$0	\$0	\$0	\$0	\$0	\$0	\$3,028,893
36					\$0	\$0	0.345032425	\$0	\$0	\$0	\$0	\$0	\$0	\$3,028,893
37					\$0	\$0	0.334982937	\$0	\$0	\$0	\$0	\$0	\$0	\$3,028,893
38					\$0	\$0	0.325226152	\$0	\$0	\$0	\$0	\$0	\$0	\$3,028,893
39					\$0	\$0	0.315753546	\$0	\$0	\$0	\$0	\$0	\$0	\$3,028,893
40					\$0	\$0	0.306556841	\$0	\$0	\$0	\$0	\$0	\$0	\$3,028,893
41					\$0	\$0	0.297628001	\$0	\$0	\$0	\$0	\$0	\$0	\$3,028,893
42					\$0	\$0	0.288959224	\$0	\$0	\$0	\$0	\$0	\$0	\$3,028,893
43					\$0	\$0	0.280542936	\$0	\$0	\$0	\$0	\$0	\$0	\$3,028,893
44					\$0	\$0	0.272371782	\$0	\$0	\$0	\$0	\$0	\$0	\$3,028,893
45					\$0	\$0	0.264438624	\$0	\$0	\$0	\$0	\$0	\$0	\$3,028,893
46					\$0	\$0	0.256736528	\$0	\$0	\$0	\$0	\$0	\$0	\$3,028,893
47					\$0	\$0	0.249258765	\$0	\$0	\$0	\$0	\$0	\$0	\$3,028,893
48					\$0	\$0	0.241998801	\$0	\$0	\$0	\$0	\$0	\$0	\$3,028,893
49					\$0	\$0	0.234950292	\$0	\$0	\$0	\$0	\$0	\$0	\$3,028,893
50					\$0	\$0	0.22810708	\$0	\$0	\$0	\$0	\$0	\$0	\$3,028,893
51					\$0	\$0	0.221463184	\$0	\$0	\$0	\$0	\$0	\$0	\$3,028,893
<b>Totals</b>	<b>\$1,047,453</b>				<b>\$2,560,000</b>	<b>\$3,607,453</b>		<b>\$3,028,893</b>	<b>\$950,000</b>	<b>\$440,000</b>	<b>\$3,320,000</b>	<b>\$4,450,000</b>	<b>\$2,080,000</b>	

**PRESENT VALUE CALCULATION**

**Table I-20 PRESENT VALUE CALCULATION - Alt 3b  
LOWER DUWAMISH WATERWAY  
SEDIMENT CLEANUP - FS ESTIMATE  
SEATTLE, WASHINGTON**

i= 3%

Year, n	Annual Operations and Maintenance Costs (Dredging)	O&M Cap	O&M ENR	O&M MNR	Annual Long-Term Monitoring Costs	Sum of Year "n" Costs	Present Value Factor, i	Present Value of All Year "n" Costs	Present Value of All Year "n" O&M Dredge Costs	PV Cap	PV ENR	PV MNR	Present Value of All Year "n" LTM Costs	Cumulative Present Value of All Costs, Year 1 through n
0					\$640,000	\$640,000	1	\$640,000	\$0	\$0	\$0	\$0	\$640,000	\$640,000
1	\$0	\$0	\$0	\$0	\$0	\$0	0.970873786	\$0	\$0	\$0	\$0	\$0	\$0	\$640,000
2	\$380,795	\$146,805	\$805,098	\$834,130	\$0	\$380,795	0.942596909	\$358,936	\$358,936	\$138,377	\$758,882	\$786,247	\$0	\$998,936
3	\$380,795	\$146,805	\$805,098	\$834,130	\$0	\$380,795	0.915141659	\$348,481	\$348,481	\$134,347	\$736,779	\$763,347	\$0	\$1,347,417
4	\$0	\$0	\$0	\$0	\$0	\$0	0.888487048	\$0	\$0	\$0	\$0	\$0	\$0	\$1,347,417
5	\$380,795	\$295,305	\$1,010,621	\$834,130	\$640,000	\$1,020,795	0.862608784	\$880,547	\$328,477	\$254,732	\$871,771	\$719,528	\$552,070	\$2,227,963
6	\$0	\$0	\$0	\$0	\$0	\$0	0.837484257	\$0	\$0	\$0	\$0	\$0	\$0	\$2,227,963
7	\$0	\$0	\$805,098	\$834,130	\$0	\$0	0.813091511	\$0	\$0	\$0	\$654,619	\$678,224	\$0	\$2,227,963
8	\$0	\$0	\$0	\$0	\$0	\$0	0.789409234	\$0	\$0	\$0	\$0	\$0	\$0	\$2,227,963
9	\$0	\$0	\$0	\$0	\$0	\$0	0.766416732	\$0	\$0	\$0	\$0	\$0	\$0	\$2,227,963
10	\$0	\$0	\$1,010,621	\$834,130	\$640,000	\$640,000	0.744093915	\$476,220	\$0	\$0	\$751,997	\$620,671	\$476,220	\$2,704,183
11					\$0	\$0	0.722421277	\$0	\$0	\$0	\$0	\$0	\$0	\$2,704,183
12					\$0	\$0	0.70137988	\$0	\$0	\$0	\$0	\$0	\$0	\$2,704,183
13					\$0	\$0	0.68095134	\$0	\$0	\$0	\$0	\$0	\$0	\$2,704,183
14					\$0	\$0	0.66117806	\$0	\$0	\$0	\$0	\$0	\$0	\$2,704,183
15					\$640,000	\$640,000	0.641861947	\$410,792	\$0	\$0	\$0	\$0	\$410,792	\$3,114,975
16					\$0	\$0	0.623166939	\$0	\$0	\$0	\$0	\$0	\$0	\$3,114,975
17					\$0	\$0	0.605018446	\$0	\$0	\$0	\$0	\$0	\$0	\$3,114,975
18					\$0	\$0	0.587394608	\$0	\$0	\$0	\$0	\$0	\$0	\$3,114,975
19					\$0	\$0	0.570286027	\$0	\$0	\$0	\$0	\$0	\$0	\$3,114,975
20					\$0	\$0	0.553675754	\$0	\$0	\$0	\$0	\$0	\$0	\$3,114,975
21					\$0	\$0	0.537549276	\$0	\$0	\$0	\$0	\$0	\$0	\$3,114,975
22					\$0	\$0	0.521892501	\$0	\$0	\$0	\$0	\$0	\$0	\$3,114,975
23					\$0	\$0	0.506691748	\$0	\$0	\$0	\$0	\$0	\$0	\$3,114,975
24					\$0	\$0	0.491933736	\$0	\$0	\$0	\$0	\$0	\$0	\$3,114,975
25					\$0	\$0	0.477605569	\$0	\$0	\$0	\$0	\$0	\$0	\$3,114,975
26					\$0	\$0	0.463694727	\$0	\$0	\$0	\$0	\$0	\$0	\$3,114,975
27					\$0	\$0	0.450189056	\$0	\$0	\$0	\$0	\$0	\$0	\$3,114,975
28					\$0	\$0	0.437076753	\$0	\$0	\$0	\$0	\$0	\$0	\$3,114,975
29					\$0	\$0	0.424346362	\$0	\$0	\$0	\$0	\$0	\$0	\$3,114,975
30					\$0	\$0	0.41198676	\$0	\$0	\$0	\$0	\$0	\$0	\$3,114,975
31					\$0	\$0	0.39987145	\$0	\$0	\$0	\$0	\$0	\$0	\$3,114,975
32					\$0	\$0	0.388337034	\$0	\$0	\$0	\$0	\$0	\$0	\$3,114,975
33					\$0	\$0	0.377026247	\$0	\$0	\$0	\$0	\$0	\$0	\$3,114,975
34					\$0	\$0	0.3660449	\$0	\$0	\$0	\$0	\$0	\$0	\$3,114,975
35					\$0	\$0	0.355383398	\$0	\$0	\$0	\$0	\$0	\$0	\$3,114,975
36					\$0	\$0	0.345032425	\$0	\$0	\$0	\$0	\$0	\$0	\$3,114,975
37					\$0	\$0	0.334982937	\$0	\$0	\$0	\$0	\$0	\$0	\$3,114,975
38					\$0	\$0	0.325226152	\$0	\$0	\$0	\$0	\$0	\$0	\$3,114,975
39					\$0	\$0	0.315753546	\$0	\$0	\$0	\$0	\$0	\$0	\$3,114,975
40					\$0	\$0	0.306556841	\$0	\$0	\$0	\$0	\$0	\$0	\$3,114,975
41					\$0	\$0	0.297628001	\$0	\$0	\$0	\$0	\$0	\$0	\$3,114,975
42					\$0	\$0	0.288959224	\$0	\$0	\$0	\$0	\$0	\$0	\$3,114,975
43					\$0	\$0	0.280542936	\$0	\$0	\$0	\$0	\$0	\$0	\$3,114,975
44					\$0	\$0	0.272371782	\$0	\$0	\$0	\$0	\$0	\$0	\$3,114,975
45					\$0	\$0	0.264438624	\$0	\$0	\$0	\$0	\$0	\$0	\$3,114,975
46					\$0	\$0	0.256736528	\$0	\$0	\$0	\$0	\$0	\$0	\$3,114,975
47					\$0	\$0	0.249258765	\$0	\$0	\$0	\$0	\$0	\$0	\$3,114,975
48					\$0	\$0	0.241998801	\$0	\$0	\$0	\$0	\$0	\$0	\$3,114,975
49					\$0	\$0	0.234950292	\$0	\$0	\$0	\$0	\$0	\$0	\$3,114,975
50					\$0	\$0	0.22810708	\$0	\$0	\$0	\$0	\$0	\$0	\$3,114,975
51					\$0	\$0	0.221463184	\$0	\$0	\$0	\$0	\$0	\$0	\$3,114,975
<b>Totals</b>	<b>\$1,142,384</b>				<b>\$2,560,000</b>	<b>\$3,702,384</b>		<b>\$3,114,975</b>	<b>\$1,040,000</b>	<b>\$530,000</b>	<b>\$3,770,000</b>	<b>\$3,570,000</b>	<b>\$2,080,000</b>	

**PRESENT VALUE CALCULATION**

**Table I-21 PRESENT VALUE CALCULATION - Alt 3c  
LOWER DUWAMISH WATERWAY  
SEDIMENT CLEANUP - FS ESTIMATE  
SEATTLE, WASHINGTON**

i = 3%

Year, n	Annual Operations and Maintenance Costs (Dredging)	O&M Cap	O&M ENR	O&M MNR	Annual Long-Term Monitoring Costs	Sum of Year "n" Costs	Present Value Factor, i	Present Value of All Year "n" Costs	Present Value of All Year "n" O&M Dredge Costs	PV Cap	PV ENR	PV MNR	Present Value of All Year "n" LTM Costs	Cumulative Present Value of All Costs, Year 1 through n
0					\$640,000	\$640,000	1	\$640,000	\$0	\$0	\$0	\$0	\$640,000	\$640,000
1	\$0	\$0	\$0	\$0	\$0	\$0	0.970873786	\$0	\$0	\$0	\$0	\$0	\$0	\$640,000
2	\$534,404	\$194,401	\$897,679	\$536,953	\$0	\$534,404	0.942595909	\$503,727	\$503,727	\$183,242	\$846,148	\$506,130	\$0	\$1,143,727
3	\$534,404	\$194,401	\$897,679	\$536,953	\$0	\$534,404	0.915141659	\$489,055	\$489,055	\$177,905	\$821,503	\$491,388	\$0	\$1,632,783
4	\$0	\$0	\$0	\$0	\$0	\$0	0.888487048	\$0	\$0	\$0	\$0	\$0	\$0	\$1,632,783
5	\$534,404	\$402,913	\$1,128,768	\$536,953	\$640,000	\$1,174,404	0.862608784	\$1,013,051	\$460,982	\$347,556	\$973,685	\$463,180	\$552,070	\$2,645,834
6	\$0	\$0	\$0	\$0	\$0	\$0	0.837484257	\$0	\$0	\$0	\$0	\$0	\$0	\$2,645,834
7	\$0	\$0	\$897,679	\$536,953	\$0	\$0	0.813091511	\$0	\$0	\$0	\$729,895	\$436,592	\$0	\$2,645,834
8	\$0	\$0	\$0	\$0	\$0	\$0	0.789409234	\$0	\$0	\$0	\$0	\$0	\$0	\$2,645,834
9	\$0	\$0	\$0	\$0	\$0	\$0	0.766416732	\$0	\$0	\$0	\$0	\$0	\$0	\$2,645,834
10	\$0	\$0	\$1,128,768	\$536,953	\$640,000	\$640,000	0.744093915	\$476,220	\$0	\$0	\$839,910	\$399,543	\$476,220	\$3,122,054
11					\$0	\$0	0.722421277	\$0	\$0	\$0	\$0	\$0	\$0	\$3,122,054
12					\$0	\$0	0.70137988	\$0	\$0	\$0	\$0	\$0	\$0	\$3,122,054
13					\$0	\$0	0.68095134	\$0	\$0	\$0	\$0	\$0	\$0	\$3,122,054
14					\$0	\$0	0.661117806	\$0	\$0	\$0	\$0	\$0	\$0	\$3,122,054
15					\$640,000	\$640,000	0.641861947	\$410,792	\$0	\$0	\$0	\$0	\$410,792	\$3,532,846
16					\$0	\$0	0.623166939	\$0	\$0	\$0	\$0	\$0	\$0	\$3,532,846
17					\$0	\$0	0.605016446	\$0	\$0	\$0	\$0	\$0	\$0	\$3,532,846
18					\$0	\$0	0.587394608	\$0	\$0	\$0	\$0	\$0	\$0	\$3,532,846
19					\$0	\$0	0.570286027	\$0	\$0	\$0	\$0	\$0	\$0	\$3,532,846
20					\$0	\$0	0.553675754	\$0	\$0	\$0	\$0	\$0	\$0	\$3,532,846
21					\$0	\$0	0.537549276	\$0	\$0	\$0	\$0	\$0	\$0	\$3,532,846
22					\$0	\$0	0.521892501	\$0	\$0	\$0	\$0	\$0	\$0	\$3,532,846
23					\$0	\$0	0.506691748	\$0	\$0	\$0	\$0	\$0	\$0	\$3,532,846
24					\$0	\$0	0.491933736	\$0	\$0	\$0	\$0	\$0	\$0	\$3,532,846
25					\$0	\$0	0.477605569	\$0	\$0	\$0	\$0	\$0	\$0	\$3,532,846
26					\$0	\$0	0.463694727	\$0	\$0	\$0	\$0	\$0	\$0	\$3,532,846
27					\$0	\$0	0.450189056	\$0	\$0	\$0	\$0	\$0	\$0	\$3,532,846
28					\$0	\$0	0.437076753	\$0	\$0	\$0	\$0	\$0	\$0	\$3,532,846
29					\$0	\$0	0.424346362	\$0	\$0	\$0	\$0	\$0	\$0	\$3,532,846
30					\$0	\$0	0.41198676	\$0	\$0	\$0	\$0	\$0	\$0	\$3,532,846
31					\$0	\$0	0.399987145	\$0	\$0	\$0	\$0	\$0	\$0	\$3,532,846
32					\$0	\$0	0.388337034	\$0	\$0	\$0	\$0	\$0	\$0	\$3,532,846
33					\$0	\$0	0.377026247	\$0	\$0	\$0	\$0	\$0	\$0	\$3,532,846
34					\$0	\$0	0.3660449	\$0	\$0	\$0	\$0	\$0	\$0	\$3,532,846
35					\$0	\$0	0.355383398	\$0	\$0	\$0	\$0	\$0	\$0	\$3,532,846
36					\$0	\$0	0.345032425	\$0	\$0	\$0	\$0	\$0	\$0	\$3,532,846
37					\$0	\$0	0.334982937	\$0	\$0	\$0	\$0	\$0	\$0	\$3,532,846
38					\$0	\$0	0.325226152	\$0	\$0	\$0	\$0	\$0	\$0	\$3,532,846
39					\$0	\$0	0.315753546	\$0	\$0	\$0	\$0	\$0	\$0	\$3,532,846
40					\$0	\$0	0.306556841	\$0	\$0	\$0	\$0	\$0	\$0	\$3,532,846
41					\$0	\$0	0.297628001	\$0	\$0	\$0	\$0	\$0	\$0	\$3,532,846
42					\$0	\$0	0.288959224	\$0	\$0	\$0	\$0	\$0	\$0	\$3,532,846
43					\$0	\$0	0.280542936	\$0	\$0	\$0	\$0	\$0	\$0	\$3,532,846
44					\$0	\$0	0.272371782	\$0	\$0	\$0	\$0	\$0	\$0	\$3,532,846
45					\$0	\$0	0.264438624	\$0	\$0	\$0	\$0	\$0	\$0	\$3,532,846
46					\$0	\$0	0.256736528	\$0	\$0	\$0	\$0	\$0	\$0	\$3,532,846
47					\$0	\$0	0.249258765	\$0	\$0	\$0	\$0	\$0	\$0	\$3,532,846
48					\$0	\$0	0.241998801	\$0	\$0	\$0	\$0	\$0	\$0	\$3,532,846
49					\$0	\$0	0.234950292	\$0	\$0	\$0	\$0	\$0	\$0	\$3,532,846
50					\$0	\$0	0.22810708	\$0	\$0	\$0	\$0	\$0	\$0	\$3,532,846
51					\$0	\$0	0.221463184	\$0	\$0	\$0	\$0	\$0	\$0	\$3,532,846
<b>Totals</b>	<b>\$1,603,212</b>				<b>\$2,560,000</b>	<b>\$4,163,212</b>		<b>\$3,532,846</b>	<b>\$1,450,000</b>	<b>\$710,000</b>	<b>\$4,210,000</b>	<b>\$2,300,000</b>	<b>\$2,080,000</b>	

PRESENT VALUE CALCULATION

Table I-22 PRESENT VALUE CALCULATION - Alt 3d  
 LOWER DUWAMISH WATERWAY  
 SEDIMENT CLEANUP - FS ESTIMATE  
 SEATTLE, WASHINGTON

i= 3%

Year, n	Annual Operations and Maintenance Costs (Dredging)	O&M Cap	O&M ENR	O&M MNR	Annual Long-Term Monitoring Costs	Sum of Year "n" Costs	Present Value Factor, i	Present Value of All Year "n" Costs	Present Value of All Year "n" O&M Dredge Costs	PV Cap	PV ENR	PV MNR	Present Value of All Year "n" LTM Costs	Cumulative Present Value of All Costs, Year 1 through n
0					\$640,000	\$640,000	1	\$640,000	\$0	\$0	\$0	\$0	\$640,000	\$640,000
1	\$0	\$0	\$0	\$0	\$0	\$0	0.970873786	\$0	\$0	\$0	\$0	\$0	\$0	\$640,000
2	\$713,634	\$381,780	\$875,256	\$0	\$0	\$713,634	0.942595909	\$672,669	\$672,669	\$359,864	\$825,012	\$0	\$0	\$1,312,669
3	\$713,634	\$381,780	\$875,256	\$0	\$0	\$713,634	0.915141659	\$653,076	\$653,076	\$349,382	\$800,983	\$0	\$0	\$1,965,745
4	\$0	\$0	\$0	\$0	\$0	\$0	0.888487048	\$0	\$0	\$0	\$0	\$0	\$0	\$1,965,745
5	\$713,634	\$848,580	\$1,100,256	\$0	\$640,000	\$1,353,634	0.862908784	\$1,167,657	\$615,587	\$731,992	\$949,090	\$0	\$552,070	\$3,133,402
6	\$0	\$0	\$0	\$0	\$0	\$0	0.837494257	\$0	\$0	\$0	\$0	\$0	\$0	\$3,133,402
7	\$0	\$0	\$875,256	\$0	\$0	\$0	0.813091511	\$0	\$0	\$0	\$711,663	\$0	\$0	\$3,133,402
8	\$0	\$0	\$0	\$0	\$0	\$0	0.789409234	\$0	\$0	\$0	\$0	\$0	\$0	\$3,133,402
9	\$0	\$0	\$0	\$0	\$0	\$0	0.766416732	\$0	\$0	\$0	\$0	\$0	\$0	\$3,133,402
10	\$0	\$0	\$1,100,256	\$0	\$640,000	\$640,000	0.744093915	\$476,220	\$0	\$0	\$818,693	\$0	\$476,220	\$3,609,622
11						\$0	0.722421277	\$0	\$0	\$0	\$0	\$0	\$0	\$3,609,622
12						\$0	0.70137988	\$0	\$0	\$0	\$0	\$0	\$0	\$3,609,622
13						\$0	0.68095134	\$0	\$0	\$0	\$0	\$0	\$0	\$3,609,622
14						\$0	0.661117806	\$0	\$0	\$0	\$0	\$0	\$0	\$3,609,622
15					\$640,000	\$640,000	0.641861947	\$410,792	\$0	\$0	\$0	\$0	\$410,792	\$4,020,413
16					\$0	\$0	0.623166939	\$0	\$0	\$0	\$0	\$0	\$0	\$4,020,413
17					\$0	\$0	0.605016446	\$0	\$0	\$0	\$0	\$0	\$0	\$4,020,413
18					\$0	\$0	0.587394608	\$0	\$0	\$0	\$0	\$0	\$0	\$4,020,413
19					\$0	\$0	0.570286027	\$0	\$0	\$0	\$0	\$0	\$0	\$4,020,413
20					\$0	\$0	0.553675754	\$0	\$0	\$0	\$0	\$0	\$0	\$4,020,413
21					\$0	\$0	0.537549276	\$0	\$0	\$0	\$0	\$0	\$0	\$4,020,413
22					\$0	\$0	0.521892501	\$0	\$0	\$0	\$0	\$0	\$0	\$4,020,413
23					\$0	\$0	0.506691748	\$0	\$0	\$0	\$0	\$0	\$0	\$4,020,413
24					\$0	\$0	0.491933736	\$0	\$0	\$0	\$0	\$0	\$0	\$4,020,413
25					\$0	\$0	0.477605569	\$0	\$0	\$0	\$0	\$0	\$0	\$4,020,413
26					\$0	\$0	0.463694727	\$0	\$0	\$0	\$0	\$0	\$0	\$4,020,413
27					\$0	\$0	0.450189056	\$0	\$0	\$0	\$0	\$0	\$0	\$4,020,413
28					\$0	\$0	0.437076753	\$0	\$0	\$0	\$0	\$0	\$0	\$4,020,413
29					\$0	\$0	0.424346362	\$0	\$0	\$0	\$0	\$0	\$0	\$4,020,413
30					\$0	\$0	0.41198676	\$0	\$0	\$0	\$0	\$0	\$0	\$4,020,413
31					\$0	\$0	0.39987145	\$0	\$0	\$0	\$0	\$0	\$0	\$4,020,413
32					\$0	\$0	0.388337034	\$0	\$0	\$0	\$0	\$0	\$0	\$4,020,413
33					\$0	\$0	0.377026247	\$0	\$0	\$0	\$0	\$0	\$0	\$4,020,413
34					\$0	\$0	0.3660449	\$0	\$0	\$0	\$0	\$0	\$0	\$4,020,413
35					\$0	\$0	0.355383398	\$0	\$0	\$0	\$0	\$0	\$0	\$4,020,413
36					\$0	\$0	0.345032425	\$0	\$0	\$0	\$0	\$0	\$0	\$4,020,413
37					\$0	\$0	0.334982937	\$0	\$0	\$0	\$0	\$0	\$0	\$4,020,413
38					\$0	\$0	0.325226152	\$0	\$0	\$0	\$0	\$0	\$0	\$4,020,413
39					\$0	\$0	0.315753546	\$0	\$0	\$0	\$0	\$0	\$0	\$4,020,413
40					\$0	\$0	0.306556841	\$0	\$0	\$0	\$0	\$0	\$0	\$4,020,413
41					\$0	\$0	0.297628001	\$0	\$0	\$0	\$0	\$0	\$0	\$4,020,413
42					\$0	\$0	0.288959224	\$0	\$0	\$0	\$0	\$0	\$0	\$4,020,413
43					\$0	\$0	0.280542936	\$0	\$0	\$0	\$0	\$0	\$0	\$4,020,413
44					\$0	\$0	0.272371782	\$0	\$0	\$0	\$0	\$0	\$0	\$4,020,413
45					\$0	\$0	0.264438624	\$0	\$0	\$0	\$0	\$0	\$0	\$4,020,413
46					\$0	\$0	0.256736528	\$0	\$0	\$0	\$0	\$0	\$0	\$4,020,413
47					\$0	\$0	0.249258765	\$0	\$0	\$0	\$0	\$0	\$0	\$4,020,413
48					\$0	\$0	0.241998801	\$0	\$0	\$0	\$0	\$0	\$0	\$4,020,413
49					\$0	\$0	0.234950292	\$0	\$0	\$0	\$0	\$0	\$0	\$4,020,413
50					\$0	\$0	0.22810708	\$0	\$0	\$0	\$0	\$0	\$0	\$4,020,413
51					\$0	\$0	0.221463184	\$0	\$0	\$0	\$0	\$0	\$0	\$4,020,413
<b>Totals</b>	<b>\$2,140,902</b>				<b>\$2,560,000</b>	<b>\$4,700,902</b>		<b>\$4,020,413</b>	<b>\$1,940,000</b>	<b>\$1,440,000</b>	<b>\$4,110,000</b>	<b>\$0</b>	<b>\$2,080,000</b>	



**PRESENT VALUE CALCULATION**

**Table I-23 PRESENT VALUE CALCULATION - Alt 4a**  
**LOWER DUWAMISH WATERWAY**  
**SEDIMENT CLEANUP - FS ESTIMATE**  
**SEATTLE, WASHINGTON**

i= 3%

Year, n	Annual Operations and Maintenance Costs (Dredging)	O&M Cap	O&M ENR	O&M MNR	Annual Long-Term Monitoring Costs	Sum of Year "n" Costs	Present Value Factor, i	Present Value of All Year "n" Costs	Present Value of All Year "n" O&M Dredge Costs	PV Cap	PV ENR	PV MNR	Present Value of All Year "n" LTM Costs	Cumulative Present Value of All Costs, Year 1 through n
0					\$640,000	\$640,000	1	\$640,000	\$0	\$0	\$0	\$0	\$640,000	\$640,000
1	\$0	\$0	\$0	\$0	\$0	\$0	0.970873786	\$0	\$0	\$0	\$0	\$0	\$0	\$640,000
2	\$777,468	\$106,896	\$0	\$1,040,022	\$0	\$777,468	0.942595909	\$732,838	\$732,838	\$100,760	\$0	\$0	\$980,321	\$1,372,838
3	\$777,468	\$106,896	\$0	\$1,040,022	\$0	\$777,468	0.915141659	\$711,493	\$711,493	\$97,825	\$0	\$0	\$951,768	\$2,084,331
4	\$0	\$0	\$0	\$0	\$0	\$0	0.888487048	\$0	\$0	\$0	\$0	\$0	\$0	\$2,084,331
5	\$777,468	\$206,101	\$0	\$1,040,022	\$640,000	\$1,417,468	0.862508784	\$1,222,720	\$670,650	\$177,785	\$0	\$0	\$897,132	\$552,070
6	\$0	\$0	\$0	\$0	\$0	\$0	0.837484257	\$0	\$0	\$0	\$0	\$0	\$0	\$3,307,051
7	\$0	\$0	\$0	\$1,040,022	\$0	\$0	0.813091511	\$0	\$0	\$0	\$0	\$0	\$845,633	\$3,307,051
8	\$0	\$0	\$0	\$0	\$0	\$0	0.789409234	\$0	\$0	\$0	\$0	\$0	\$0	\$3,307,051
9	\$0	\$0	\$0	\$0	\$0	\$0	0.766416732	\$0	\$0	\$0	\$0	\$0	\$0	\$3,307,051
10	\$0	\$0	\$0	\$1,040,022	\$640,000	\$640,000	0.744093915	\$476,220	\$0	\$0	\$0	\$773,874	\$476,220	\$3,783,271
11					\$0	\$0	0.722421277	\$0	\$0	\$0	\$0	\$0	\$0	\$3,783,271
12					\$0	\$0	0.70137988	\$0	\$0	\$0	\$0	\$0	\$0	\$3,783,271
13					\$0	\$0	0.68095134	\$0	\$0	\$0	\$0	\$0	\$0	\$3,783,271
14					\$0	\$0	0.661117806	\$0	\$0	\$0	\$0	\$0	\$0	\$3,783,271
15					\$640,000	\$640,000	0.641861947	\$410,792	\$0	\$0	\$0	\$0	\$410,792	\$4,194,063
16					\$0	\$0	0.623166939	\$0	\$0	\$0	\$0	\$0	\$0	\$4,194,063
17					\$0	\$0	0.605016446	\$0	\$0	\$0	\$0	\$0	\$0	\$4,194,063
18					\$0	\$0	0.587394608	\$0	\$0	\$0	\$0	\$0	\$0	\$4,194,063
19					\$0	\$0	0.570286027	\$0	\$0	\$0	\$0	\$0	\$0	\$4,194,063
20					\$0	\$0	0.553675754	\$0	\$0	\$0	\$0	\$0	\$0	\$4,194,063
21					\$0	\$0	0.537549276	\$0	\$0	\$0	\$0	\$0	\$0	\$4,194,063
22					\$0	\$0	0.521892501	\$0	\$0	\$0	\$0	\$0	\$0	\$4,194,063
23					\$0	\$0	0.506691748	\$0	\$0	\$0	\$0	\$0	\$0	\$4,194,063
24					\$0	\$0	0.491933736	\$0	\$0	\$0	\$0	\$0	\$0	\$4,194,063
25					\$0	\$0	0.477605569	\$0	\$0	\$0	\$0	\$0	\$0	\$4,194,063
26					\$0	\$0	0.463694727	\$0	\$0	\$0	\$0	\$0	\$0	\$4,194,063
27					\$0	\$0	0.450189056	\$0	\$0	\$0	\$0	\$0	\$0	\$4,194,063
28					\$0	\$0	0.437076753	\$0	\$0	\$0	\$0	\$0	\$0	\$4,194,063
29					\$0	\$0	0.424346362	\$0	\$0	\$0	\$0	\$0	\$0	\$4,194,063
30					\$0	\$0	0.41198676	\$0	\$0	\$0	\$0	\$0	\$0	\$4,194,063
31					\$0	\$0	0.399987145	\$0	\$0	\$0	\$0	\$0	\$0	\$4,194,063
32					\$0	\$0	0.388337034	\$0	\$0	\$0	\$0	\$0	\$0	\$4,194,063
33					\$0	\$0	0.377026247	\$0	\$0	\$0	\$0	\$0	\$0	\$4,194,063
34					\$0	\$0	0.3660449	\$0	\$0	\$0	\$0	\$0	\$0	\$4,194,063
35					\$0	\$0	0.355383398	\$0	\$0	\$0	\$0	\$0	\$0	\$4,194,063
36					\$0	\$0	0.345032425	\$0	\$0	\$0	\$0	\$0	\$0	\$4,194,063
37					\$0	\$0	0.334982937	\$0	\$0	\$0	\$0	\$0	\$0	\$4,194,063
38					\$0	\$0	0.325226152	\$0	\$0	\$0	\$0	\$0	\$0	\$4,194,063
39					\$0	\$0	0.315753546	\$0	\$0	\$0	\$0	\$0	\$0	\$4,194,063
40					\$0	\$0	0.306556841	\$0	\$0	\$0	\$0	\$0	\$0	\$4,194,063
41					\$0	\$0	0.297628001	\$0	\$0	\$0	\$0	\$0	\$0	\$4,194,063
42					\$0	\$0	0.288959224	\$0	\$0	\$0	\$0	\$0	\$0	\$4,194,063
43					\$0	\$0	0.280542936	\$0	\$0	\$0	\$0	\$0	\$0	\$4,194,063
44					\$0	\$0	0.272371782	\$0	\$0	\$0	\$0	\$0	\$0	\$4,194,063
45					\$0	\$0	0.264438624	\$0	\$0	\$0	\$0	\$0	\$0	\$4,194,063
46					\$0	\$0	0.256736528	\$0	\$0	\$0	\$0	\$0	\$0	\$4,194,063
47					\$0	\$0	0.249258765	\$0	\$0	\$0	\$0	\$0	\$0	\$4,194,063
48					\$0	\$0	0.241998801	\$0	\$0	\$0	\$0	\$0	\$0	\$4,194,063
49					\$0	\$0	0.234950292	\$0	\$0	\$0	\$0	\$0	\$0	\$4,194,063
50					\$0	\$0	0.22810708	\$0	\$0	\$0	\$0	\$0	\$0	\$4,194,063
51					\$0	\$0	0.221463184	\$0	\$0	\$0	\$0	\$0	\$0	\$4,194,063
<b>Totals</b>	<b>\$2,332,403</b>				<b>\$2,560,000</b>	<b>\$4,892,403</b>		<b>\$4,194,063</b>	<b>\$2,110,000</b>	<b>\$380,000</b>	<b>\$0</b>	<b>\$4,450,000</b>	<b>\$2,080,000</b>	

**PRESENT VALUE CALCULATION**

**Table I-24 PRESENT VALUE CALCULATION - Alt 4b**  
**LOWER DUWAMISH WATERWAY**  
**SEDIMENT CLEANUP - FS ESTIMATE**  
**SEATTLE, WASHINGTON**

i= 3%

Year, n	Annual Operations and Maintenance Costs (Dredging)	O&M Cap	O&M ENR	O&M MNR	Annual Long-Term Monitoring Costs	Sum of Year "n" Costs	Present Value Factor, i	Present Value of All Year "n" Costs	Present Value of All Year "n" O&M Dredge Costs	PV Cap	PV ENR	PV MNR	Present Value of All Year "n" LTM Costs	Cumulative Present Value of All Costs, Year 1 through n
0					\$640,000	\$640,000	1	\$640,000	\$0	\$0	\$0	\$0	\$640,000	\$640,000
1	\$0	\$0	\$0	\$0	\$0	\$0	0.970873786	\$0	\$0	\$0	\$0	\$0	\$0	\$640,000
2	\$974,833	\$106,896	\$0	\$834,130	\$0	\$974,833	0.942595909	\$918,873	\$918,873	\$100,760	\$0	\$786,247	\$0	\$1,558,873
3	\$974,833	\$106,896	\$0	\$834,130	\$0	\$974,833	0.915141659	\$892,110	\$892,110	\$97,825	\$0	\$763,347	\$0	\$2,450,984
4	\$0	\$0	\$0	\$0	\$0	\$0	0.888487048	\$0	\$0	\$0	\$0	\$0	\$0	\$2,450,984
5	\$974,833	\$206,101	\$0	\$834,130	\$640,000	\$1,614,833	0.862608784	\$1,392,969	\$840,899	\$177,785	\$0	\$719,528	\$552,070	\$3,843,952
6	\$0	\$0	\$0	\$0	\$0	\$0	0.837484257	\$0	\$0	\$0	\$0	\$0	\$0	\$3,843,952
7	\$0	\$0	\$0	\$834,130	\$0	\$834,130	0.813091511	\$678,224	\$0	\$0	\$0	\$678,224	\$0	\$3,843,952
8	\$0	\$0	\$0	\$0	\$0	\$0	0.788409234	\$0	\$0	\$0	\$0	\$0	\$0	\$3,843,952
9	\$0	\$0	\$0	\$0	\$0	\$0	0.76416732	\$0	\$0	\$0	\$0	\$0	\$0	\$3,843,952
10	\$0	\$0	\$0	\$834,130	\$640,000	\$640,000	0.740093915	\$476,220	\$0	\$0	\$0	\$620,671	\$476,220	\$4,320,173
11					\$0	\$0	0.722421277	\$0	\$0	\$0	\$0	\$0	\$0	\$4,320,173
12					\$0	\$0	0.70137988	\$0	\$0	\$0	\$0	\$0	\$0	\$4,320,173
13					\$0	\$0	0.68095134	\$0	\$0	\$0	\$0	\$0	\$0	\$4,320,173
14					\$0	\$0	0.66117806	\$0	\$0	\$0	\$0	\$0	\$0	\$4,320,173
15					\$640,000	\$640,000	0.641861947	\$410,792	\$0	\$0	\$0	\$0	\$410,792	\$4,730,964
16					\$0	\$0	0.623166939	\$0	\$0	\$0	\$0	\$0	\$0	\$4,730,964
17					\$0	\$0	0.605016446	\$0	\$0	\$0	\$0	\$0	\$0	\$4,730,964
18					\$0	\$0	0.587394608	\$0	\$0	\$0	\$0	\$0	\$0	\$4,730,964
19					\$0	\$0	0.570286027	\$0	\$0	\$0	\$0	\$0	\$0	\$4,730,964
20					\$0	\$0	0.553675754	\$0	\$0	\$0	\$0	\$0	\$0	\$4,730,964
21					\$0	\$0	0.537549276	\$0	\$0	\$0	\$0	\$0	\$0	\$4,730,964
22					\$0	\$0	0.521892501	\$0	\$0	\$0	\$0	\$0	\$0	\$4,730,964
23					\$0	\$0	0.506691748	\$0	\$0	\$0	\$0	\$0	\$0	\$4,730,964
24					\$0	\$0	0.491933736	\$0	\$0	\$0	\$0	\$0	\$0	\$4,730,964
25					\$0	\$0	0.477605669	\$0	\$0	\$0	\$0	\$0	\$0	\$4,730,964
26					\$0	\$0	0.463694727	\$0	\$0	\$0	\$0	\$0	\$0	\$4,730,964
27					\$0	\$0	0.450189056	\$0	\$0	\$0	\$0	\$0	\$0	\$4,730,964
28					\$0	\$0	0.437076753	\$0	\$0	\$0	\$0	\$0	\$0	\$4,730,964
29					\$0	\$0	0.424346362	\$0	\$0	\$0	\$0	\$0	\$0	\$4,730,964
30					\$0	\$0	0.41198676	\$0	\$0	\$0	\$0	\$0	\$0	\$4,730,964
31					\$0	\$0	0.399987145	\$0	\$0	\$0	\$0	\$0	\$0	\$4,730,964
32					\$0	\$0	0.388337034	\$0	\$0	\$0	\$0	\$0	\$0	\$4,730,964
33					\$0	\$0	0.377026247	\$0	\$0	\$0	\$0	\$0	\$0	\$4,730,964
34					\$0	\$0	0.3660449	\$0	\$0	\$0	\$0	\$0	\$0	\$4,730,964
35					\$0	\$0	0.355383398	\$0	\$0	\$0	\$0	\$0	\$0	\$4,730,964
36					\$0	\$0	0.345032425	\$0	\$0	\$0	\$0	\$0	\$0	\$4,730,964
37					\$0	\$0	0.334982937	\$0	\$0	\$0	\$0	\$0	\$0	\$4,730,964
38					\$0	\$0	0.325226152	\$0	\$0	\$0	\$0	\$0	\$0	\$4,730,964
39					\$0	\$0	0.315753546	\$0	\$0	\$0	\$0	\$0	\$0	\$4,730,964
40					\$0	\$0	0.306556841	\$0	\$0	\$0	\$0	\$0	\$0	\$4,730,964
41					\$0	\$0	0.297628001	\$0	\$0	\$0	\$0	\$0	\$0	\$4,730,964
42					\$0	\$0	0.288959224	\$0	\$0	\$0	\$0	\$0	\$0	\$4,730,964
43					\$0	\$0	0.280542936	\$0	\$0	\$0	\$0	\$0	\$0	\$4,730,964
44					\$0	\$0	0.272371782	\$0	\$0	\$0	\$0	\$0	\$0	\$4,730,964
45					\$0	\$0	0.264438624	\$0	\$0	\$0	\$0	\$0	\$0	\$4,730,964
46					\$0	\$0	0.256736528	\$0	\$0	\$0	\$0	\$0	\$0	\$4,730,964
47					\$0	\$0	0.249258765	\$0	\$0	\$0	\$0	\$0	\$0	\$4,730,964
48					\$0	\$0	0.241998801	\$0	\$0	\$0	\$0	\$0	\$0	\$4,730,964
49					\$0	\$0	0.234950292	\$0	\$0	\$0	\$0	\$0	\$0	\$4,730,964
50					\$0	\$0	0.22810708	\$0	\$0	\$0	\$0	\$0	\$0	\$4,730,964
51					\$0	\$0	0.221463184	\$0	\$0	\$0	\$0	\$0	\$0	\$4,730,964
<b>Totals</b>	<b>\$2,924,498</b>				<b>\$2,560,000</b>	<b>\$5,484,498</b>		<b>\$4,730,964</b>	<b>\$2,650,000</b>	<b>\$380,000</b>	<b>\$0</b>	<b>\$3,570,000</b>	<b>\$2,080,000</b>	

Table I-25 PRESENT VALUE CALCULATION - Alt 4c  
 LOWER DUWAMISH WATERWAY  
 SEDIMENT CLEANUP - FS ESTIMATE  
 SEATTLE, WASHINGTON

PRESENT VALUE CALCULATION  
 i= 3%

Year, n	Annual Operations and Maintenance Costs (Dredging)	O&M Cap	O&M ENR	O&M MNR	Annual Long-Term Monitoring Costs	Sum of Year "n" Costs	Present Value Factor, i	Present Value of All Year "n" Costs	Present Value of All Year "n" O&M Dredge Costs	PV Cap	PV ENR	PV MNR	Present Value of All Year "n" LTM Costs	Cumulative Present Value of All Costs, Year 1 through n
0					\$640,000	\$640,000	1	\$640,000	\$0	\$0	\$0	\$0	\$640,000	\$640,000
1	\$0	\$0	\$0	\$0	\$0	\$0	0.970873786	\$0	\$0	\$0	\$0	\$0	\$0	\$640,000
2	\$1,126,749	\$115,896	\$0	\$536,953	\$0	\$1,126,749	0.942595909	\$1,062,069	\$1,062,069	\$109,243	\$0	\$506,130	\$0	\$1,702,069
3	\$1,126,749	\$115,896	\$0	\$536,953	\$0	\$1,126,749	0.915141659	\$1,031,135	\$1,031,135	\$106,061	\$0	\$491,388	\$0	\$2,733,205
4	\$0	\$0	\$0	\$0	\$0	\$0	0.888487048	\$0	\$0	\$0	\$0	\$0	\$0	\$2,733,205
5	\$1,126,749	\$225,642	\$0	\$536,953	\$640,000	\$1,766,749	0.862608784	\$1,524,014	\$971,944	\$194,641	\$0	\$463,180	\$552,070	\$4,257,218
6	\$0	\$0	\$0	\$0	\$0	\$0	0.837484257	\$0	\$0	\$0	\$0	\$0	\$0	\$4,257,218
7	\$0	\$0	\$0	\$536,953	\$0	\$0	0.813091511	\$0	\$0	\$0	\$0	\$436,592	\$0	\$4,257,218
8	\$0	\$0	\$0	\$0	\$0	\$0	0.789409234	\$0	\$0	\$0	\$0	\$0	\$0	\$4,257,218
9	\$0	\$0	\$0	\$0	\$0	\$0	0.766416732	\$0	\$0	\$0	\$0	\$0	\$0	\$4,257,218
10	\$0	\$0	\$0	\$536,953	\$640,000	\$640,000	0.744093915	\$476,220	\$0	\$0	\$0	\$399,543	\$476,220	\$4,733,438
11					\$0	\$0	0.722421277	\$0	\$0	\$0	\$0	\$0	\$0	\$4,733,438
12					\$0	\$0	0.70137988	\$0	\$0	\$0	\$0	\$0	\$0	\$4,733,438
13					\$0	\$0	0.68095134	\$0	\$0	\$0	\$0	\$0	\$0	\$4,733,438
14					\$0	\$0	0.661117806	\$0	\$0	\$0	\$0	\$0	\$0	\$4,733,438
15					\$640,000	\$640,000	0.641861947	\$410,792	\$0	\$0	\$0	\$0	\$410,792	\$5,144,230
16					\$0	\$0	0.623166939	\$0	\$0	\$0	\$0	\$0	\$0	\$5,144,230
17					\$0	\$0	0.605016446	\$0	\$0	\$0	\$0	\$0	\$0	\$5,144,230
18					\$0	\$0	0.587394608	\$0	\$0	\$0	\$0	\$0	\$0	\$5,144,230
19					\$0	\$0	0.570286027	\$0	\$0	\$0	\$0	\$0	\$0	\$5,144,230
20					\$0	\$0	0.553675754	\$0	\$0	\$0	\$0	\$0	\$0	\$5,144,230
21					\$0	\$0	0.537549276	\$0	\$0	\$0	\$0	\$0	\$0	\$5,144,230
22					\$0	\$0	0.521892501	\$0	\$0	\$0	\$0	\$0	\$0	\$5,144,230
23					\$0	\$0	0.506691748	\$0	\$0	\$0	\$0	\$0	\$0	\$5,144,230
24					\$0	\$0	0.491933736	\$0	\$0	\$0	\$0	\$0	\$0	\$5,144,230
25					\$0	\$0	0.477605569	\$0	\$0	\$0	\$0	\$0	\$0	\$5,144,230
26					\$0	\$0	0.463694727	\$0	\$0	\$0	\$0	\$0	\$0	\$5,144,230
27					\$0	\$0	0.450189056	\$0	\$0	\$0	\$0	\$0	\$0	\$5,144,230
28					\$0	\$0	0.437076753	\$0	\$0	\$0	\$0	\$0	\$0	\$5,144,230
29					\$0	\$0	0.424346362	\$0	\$0	\$0	\$0	\$0	\$0	\$5,144,230
30					\$0	\$0	0.41198676	\$0	\$0	\$0	\$0	\$0	\$0	\$5,144,230
31					\$0	\$0	0.399987145	\$0	\$0	\$0	\$0	\$0	\$0	\$5,144,230
32					\$0	\$0	0.388337034	\$0	\$0	\$0	\$0	\$0	\$0	\$5,144,230
33					\$0	\$0	0.377026247	\$0	\$0	\$0	\$0	\$0	\$0	\$5,144,230
34					\$0	\$0	0.3660449	\$0	\$0	\$0	\$0	\$0	\$0	\$5,144,230
35					\$0	\$0	0.355383398	\$0	\$0	\$0	\$0	\$0	\$0	\$5,144,230
36					\$0	\$0	0.345032425	\$0	\$0	\$0	\$0	\$0	\$0	\$5,144,230
37					\$0	\$0	0.334982937	\$0	\$0	\$0	\$0	\$0	\$0	\$5,144,230
38					\$0	\$0	0.325226152	\$0	\$0	\$0	\$0	\$0	\$0	\$5,144,230
39					\$0	\$0	0.315753546	\$0	\$0	\$0	\$0	\$0	\$0	\$5,144,230
40					\$0	\$0	0.306556841	\$0	\$0	\$0	\$0	\$0	\$0	\$5,144,230
41					\$0	\$0	0.297628001	\$0	\$0	\$0	\$0	\$0	\$0	\$5,144,230
42					\$0	\$0	0.288959224	\$0	\$0	\$0	\$0	\$0	\$0	\$5,144,230
43					\$0	\$0	0.280542936	\$0	\$0	\$0	\$0	\$0	\$0	\$5,144,230
44					\$0	\$0	0.272371782	\$0	\$0	\$0	\$0	\$0	\$0	\$5,144,230
45					\$0	\$0	0.264438624	\$0	\$0	\$0	\$0	\$0	\$0	\$5,144,230
46					\$0	\$0	0.256736528	\$0	\$0	\$0	\$0	\$0	\$0	\$5,144,230
47					\$0	\$0	0.249258765	\$0	\$0	\$0	\$0	\$0	\$0	\$5,144,230
48					\$0	\$0	0.241988801	\$0	\$0	\$0	\$0	\$0	\$0	\$5,144,230
49					\$0	\$0	0.234950292	\$0	\$0	\$0	\$0	\$0	\$0	\$5,144,230
50					\$0	\$0	0.22810708	\$0	\$0	\$0	\$0	\$0	\$0	\$5,144,230
51					\$0	\$0	0.221463184	\$0	\$0	\$0	\$0	\$0	\$0	\$5,144,230
Totals	\$3,380,248				\$2,560,000	\$5,940,248		\$5,144,230	\$3,070,000	\$410,000	\$0	\$2,300,000	\$2,080,000	

Table I-26 PRESENT VALUE CALCULATION - Alt 4d  
 LOWER DUWAMISH WATERWAY  
 SEDIMENT CLEANUP - FS ESTIMATE  
 SEATTLE, WASHINGTON

PRESENT VALUE CALCULATION

i= 3%

Year, n	Annual Operations and Maintenance Costs (Dredging)	O&M Cap	O&M ENR	O&M MNR	Annual Long-Term Monitoring Costs	Sum of Year "n" Costs	Present Value Factor, i	Present Value of All Year "n" Costs	Present Value of All Year "n" O&M Dredge Costs	PV Cap	PV ENR	PV MNR	Present Value of All Year "n" LTM Costs	Cumulative Present Value of All Costs, Year 1 through n
0					\$640,000	\$640,000	1	\$640,000	\$0	\$0	\$0	\$0	\$640,000	\$640,000
1	\$0	\$0	\$0	\$0	\$0	\$0	0.970873786	\$0	\$0	\$0	\$0	\$0	\$0	\$640,000
2	\$1,351,649	\$135,229	\$0	\$0	\$0	\$1,351,649	0.942595909	\$1,274,059	\$1,274,059	\$127,466	\$0	\$0	\$0	\$1,914,059
3	\$1,351,649	\$135,229	\$0	\$0	\$0	\$1,351,649	0.915141659	\$1,236,950	\$1,236,950	\$123,753	\$0	\$0	\$0	\$3,151,009
4	\$0	\$0	\$0	\$0	\$0	\$0	0.888487048	\$0	\$0	\$0	\$0	\$0	\$0	\$3,151,009
5	\$1,351,649	\$268,514	\$0	\$0	\$640,000	\$1,991,649	0.862608784	\$1,718,014	\$1,165,944	\$231,623	\$0	\$0	\$552,070	\$4,869,023
6	\$0	\$0	\$0	\$0	\$0	\$0	0.837494257	\$0	\$0	\$0	\$0	\$0	\$0	\$4,869,023
7	\$0	\$0	\$0	\$0	\$0	\$0	0.813091511	\$0	\$0	\$0	\$0	\$0	\$0	\$4,869,023
8	\$0	\$0	\$0	\$0	\$0	\$0	0.789409234	\$0	\$0	\$0	\$0	\$0	\$0	\$4,869,023
9	\$0	\$0	\$0	\$0	\$0	\$0	0.766416732	\$0	\$0	\$0	\$0	\$0	\$0	\$4,869,023
10	\$0	\$0	\$0	\$0	\$640,000	\$640,000	0.744093915	\$476,220	\$0	\$0	\$0	\$0	\$476,220	\$5,345,243
11					\$0	\$0	0.722421277	\$0	\$0	\$0	\$0	\$0	\$0	\$5,345,243
12					\$0	\$0	0.70137988	\$0	\$0	\$0	\$0	\$0	\$0	\$5,345,243
13					\$0	\$0	0.68095134	\$0	\$0	\$0	\$0	\$0	\$0	\$5,345,243
14					\$0	\$0	0.661117806	\$0	\$0	\$0	\$0	\$0	\$0	\$5,345,243
15					\$640,000	\$640,000	0.641861947	\$410,792	\$0	\$0	\$0	\$0	\$410,792	\$5,756,035
16					\$0	\$0	0.623166939	\$0	\$0	\$0	\$0	\$0	\$0	\$5,756,035
17					\$0	\$0	0.605016446	\$0	\$0	\$0	\$0	\$0	\$0	\$5,756,035
18					\$0	\$0	0.587394608	\$0	\$0	\$0	\$0	\$0	\$0	\$5,756,035
19					\$0	\$0	0.570286027	\$0	\$0	\$0	\$0	\$0	\$0	\$5,756,035
20					\$0	\$0	0.553675754	\$0	\$0	\$0	\$0	\$0	\$0	\$5,756,035
21					\$0	\$0	0.537549276	\$0	\$0	\$0	\$0	\$0	\$0	\$5,756,035
22					\$0	\$0	0.521892501	\$0	\$0	\$0	\$0	\$0	\$0	\$5,756,035
23					\$0	\$0	0.506691748	\$0	\$0	\$0	\$0	\$0	\$0	\$5,756,035
24					\$0	\$0	0.491933736	\$0	\$0	\$0	\$0	\$0	\$0	\$5,756,035
25					\$0	\$0	0.477605569	\$0	\$0	\$0	\$0	\$0	\$0	\$5,756,035
26					\$0	\$0	0.463694727	\$0	\$0	\$0	\$0	\$0	\$0	\$5,756,035
27					\$0	\$0	0.450189056	\$0	\$0	\$0	\$0	\$0	\$0	\$5,756,035
28					\$0	\$0	0.437076753	\$0	\$0	\$0	\$0	\$0	\$0	\$5,756,035
29					\$0	\$0	0.424346362	\$0	\$0	\$0	\$0	\$0	\$0	\$5,756,035
30					\$0	\$0	0.41198676	\$0	\$0	\$0	\$0	\$0	\$0	\$5,756,035
31					\$0	\$0	0.399987145	\$0	\$0	\$0	\$0	\$0	\$0	\$5,756,035
32					\$0	\$0	0.388337034	\$0	\$0	\$0	\$0	\$0	\$0	\$5,756,035
33					\$0	\$0	0.377026247	\$0	\$0	\$0	\$0	\$0	\$0	\$5,756,035
34					\$0	\$0	0.3660449	\$0	\$0	\$0	\$0	\$0	\$0	\$5,756,035
35					\$0	\$0	0.355383398	\$0	\$0	\$0	\$0	\$0	\$0	\$5,756,035
36					\$0	\$0	0.345032425	\$0	\$0	\$0	\$0	\$0	\$0	\$5,756,035
37					\$0	\$0	0.334982937	\$0	\$0	\$0	\$0	\$0	\$0	\$5,756,035
38					\$0	\$0	0.325226152	\$0	\$0	\$0	\$0	\$0	\$0	\$5,756,035
39					\$0	\$0	0.315753546	\$0	\$0	\$0	\$0	\$0	\$0	\$5,756,035
40					\$0	\$0	0.306556841	\$0	\$0	\$0	\$0	\$0	\$0	\$5,756,035
41					\$0	\$0	0.297628001	\$0	\$0	\$0	\$0	\$0	\$0	\$5,756,035
42					\$0	\$0	0.288959224	\$0	\$0	\$0	\$0	\$0	\$0	\$5,756,035
43					\$0	\$0	0.280542936	\$0	\$0	\$0	\$0	\$0	\$0	\$5,756,035
44					\$0	\$0	0.272371782	\$0	\$0	\$0	\$0	\$0	\$0	\$5,756,035
45					\$0	\$0	0.264438624	\$0	\$0	\$0	\$0	\$0	\$0	\$5,756,035
46					\$0	\$0	0.256736528	\$0	\$0	\$0	\$0	\$0	\$0	\$5,756,035
47					\$0	\$0	0.249296765	\$0	\$0	\$0	\$0	\$0	\$0	\$5,756,035
48					\$0	\$0	0.241998801	\$0	\$0	\$0	\$0	\$0	\$0	\$5,756,035
49					\$0	\$0	0.234950292	\$0	\$0	\$0	\$0	\$0	\$0	\$5,756,035
50					\$0	\$0	0.22810708	\$0	\$0	\$0	\$0	\$0	\$0	\$5,756,035
51					\$0	\$0	0.221463184	\$0	\$0	\$0	\$0	\$0	\$0	\$5,756,035
<b>Totals</b>	<b>\$4,054,947</b>				<b>\$2,560,000</b>	<b>\$6,614,947</b>		<b>\$5,756,035</b>	<b>\$3,680,000</b>	<b>\$480,000</b>	<b>\$0</b>	<b>\$0</b>	<b>\$2,080,000</b>	

Table I-27 PRESENT VALUE CALCULATION - Alt 5  
 LOWER DUWAMISH WATERWAY  
 SEDIMENT CLEANUP - FS ESTIMATE  
 SEATTLE, WASHINGTON

PRESENT VALUE CALCULATION

i= 3%

Year, n	Annual Operations and Maintenance Costs (Dredging)	O&M Cap	O&M ENR	O&M MNR	Annual Long-Term Monitoring Costs	Sum of Year "n" Costs	Present Value Factor, i	Present Value of All Year "n" Costs	Present Value of All Year "n" O&M Dredge Costs	PV Cap	PV ENR	PV MNR	Present Value of All Year "n" LTM Costs	Cumulative Present Value of All Costs, Year 1 through n
0					\$640,000	\$640,000	1	\$640,000	\$0	\$0	\$0	\$0	\$640,000	\$640,000
1	\$0	\$0	\$0	\$0	\$0	\$0	0.970873786	\$0	\$0	\$0	\$0	\$0	\$0	\$640,000
2	\$2,792,303	\$140,405	\$0	\$0	\$0	\$2,792,303	0.942598909	\$2,632,014	\$2,632,014	\$132,345	\$0	\$0	\$0	\$3,272,014
3	\$2,792,303	\$140,405	\$0	\$0	\$0	\$2,792,303	0.915141659	\$2,555,353	\$2,555,353	\$128,491	\$0	\$0	\$0	\$5,827,367
4	\$0	\$0	\$0	\$0	\$0	\$0	0.888487048	\$0	\$0	\$0	\$0	\$0	\$0	\$5,827,367
5	\$2,792,303	\$281,094	\$0	\$0	\$640,000	\$3,432,303	0.862608784	\$2,960,735	\$2,408,665	\$242,474	\$0	\$0	\$552,070	\$8,788,102
6	\$0	\$0	\$0	\$0	\$0	\$0	0.837484257	\$0	\$0	\$0	\$0	\$0	\$0	\$8,788,102
7	\$0	\$0	\$0	\$0	\$0	\$0	0.813091511	\$0	\$0	\$0	\$0	\$0	\$0	\$8,788,102
8	\$0	\$0	\$0	\$0	\$0	\$0	0.789409234	\$0	\$0	\$0	\$0	\$0	\$0	\$8,788,102
9	\$0	\$0	\$0	\$0	\$0	\$0	0.766416732	\$0	\$0	\$0	\$0	\$0	\$0	\$8,788,102
10	\$0	\$0	\$0	\$0	\$640,000	\$640,000	0.744093915	\$476,220	\$0	\$0	\$0	\$0	\$476,220	\$9,264,322
11					\$0	\$0	0.722421277	\$0	\$0	\$0	\$0	\$0	\$0	\$9,264,322
12					\$0	\$0	0.70137988	\$0	\$0	\$0	\$0	\$0	\$0	\$9,264,322
13					\$0	\$0	0.68095134	\$0	\$0	\$0	\$0	\$0	\$0	\$9,264,322
14					\$0	\$0	0.661117806	\$0	\$0	\$0	\$0	\$0	\$0	\$9,264,322
15					\$640,000	\$640,000	0.641861947	\$410,792	\$0	\$0	\$0	\$0	\$410,792	\$9,675,113
16					\$0	\$0	0.623166939	\$0	\$0	\$0	\$0	\$0	\$0	\$9,675,113
17					\$0	\$0	0.605016446	\$0	\$0	\$0	\$0	\$0	\$0	\$9,675,113
18					\$0	\$0	0.587394608	\$0	\$0	\$0	\$0	\$0	\$0	\$9,675,113
19					\$0	\$0	0.570286027	\$0	\$0	\$0	\$0	\$0	\$0	\$9,675,113
20					\$0	\$0	0.553675754	\$0	\$0	\$0	\$0	\$0	\$0	\$9,675,113
21					\$0	\$0	0.537549276	\$0	\$0	\$0	\$0	\$0	\$0	\$9,675,113
22					\$0	\$0	0.521892501	\$0	\$0	\$0	\$0	\$0	\$0	\$9,675,113
23					\$0	\$0	0.506691748	\$0	\$0	\$0	\$0	\$0	\$0	\$9,675,113
24					\$0	\$0	0.491933736	\$0	\$0	\$0	\$0	\$0	\$0	\$9,675,113
25					\$0	\$0	0.477605569	\$0	\$0	\$0	\$0	\$0	\$0	\$9,675,113
26					\$0	\$0	0.463694727	\$0	\$0	\$0	\$0	\$0	\$0	\$9,675,113
27					\$0	\$0	0.450189056	\$0	\$0	\$0	\$0	\$0	\$0	\$9,675,113
28					\$0	\$0	0.437076753	\$0	\$0	\$0	\$0	\$0	\$0	\$9,675,113
29					\$0	\$0	0.424346362	\$0	\$0	\$0	\$0	\$0	\$0	\$9,675,113
30					\$0	\$0	0.41198676	\$0	\$0	\$0	\$0	\$0	\$0	\$9,675,113
31					\$0	\$0	0.39987145	\$0	\$0	\$0	\$0	\$0	\$0	\$9,675,113
32					\$0	\$0	0.388337034	\$0	\$0	\$0	\$0	\$0	\$0	\$9,675,113
33					\$0	\$0	0.377026247	\$0	\$0	\$0	\$0	\$0	\$0	\$9,675,113
34					\$0	\$0	0.3660449	\$0	\$0	\$0	\$0	\$0	\$0	\$9,675,113
35					\$0	\$0	0.355383398	\$0	\$0	\$0	\$0	\$0	\$0	\$9,675,113
36					\$0	\$0	0.345032425	\$0	\$0	\$0	\$0	\$0	\$0	\$9,675,113
37					\$0	\$0	0.334982937	\$0	\$0	\$0	\$0	\$0	\$0	\$9,675,113
38					\$0	\$0	0.325226152	\$0	\$0	\$0	\$0	\$0	\$0	\$9,675,113
39					\$0	\$0	0.315753546	\$0	\$0	\$0	\$0	\$0	\$0	\$9,675,113
40					\$0	\$0	0.306556841	\$0	\$0	\$0	\$0	\$0	\$0	\$9,675,113
41					\$0	\$0	0.297628001	\$0	\$0	\$0	\$0	\$0	\$0	\$9,675,113
42					\$0	\$0	0.288959224	\$0	\$0	\$0	\$0	\$0	\$0	\$9,675,113
43					\$0	\$0	0.280542936	\$0	\$0	\$0	\$0	\$0	\$0	\$9,675,113
44					\$0	\$0	0.272371782	\$0	\$0	\$0	\$0	\$0	\$0	\$9,675,113
45					\$0	\$0	0.264438624	\$0	\$0	\$0	\$0	\$0	\$0	\$9,675,113
46					\$0	\$0	0.256736528	\$0	\$0	\$0	\$0	\$0	\$0	\$9,675,113
47					\$0	\$0	0.249258765	\$0	\$0	\$0	\$0	\$0	\$0	\$9,675,113
48					\$0	\$0	0.241998801	\$0	\$0	\$0	\$0	\$0	\$0	\$9,675,113
49					\$0	\$0	0.234950292	\$0	\$0	\$0	\$0	\$0	\$0	\$9,675,113
50					\$0	\$0	0.22810708	\$0	\$0	\$0	\$0	\$0	\$0	\$9,675,113
51					\$0	\$0	0.221463184	\$0	\$0	\$0	\$0	\$0	\$0	\$9,675,113
<b>Totals</b>	<b>\$8,376,910</b>				<b>\$2,560,000</b>	<b>\$10,936,910</b>		<b>\$9,675,113</b>	<b>\$7,600,000</b>	<b>\$500,000</b>	<b>\$0</b>	<b>\$0</b>	<b>\$2,080,000</b>	



**Table I-29 BASIS FOR COST ESTIMATES<sup>1</sup>**

LOWER DUWAMISH WATERWAY  
SEDIMENT CLEANUP - FS ESTIMATE  
SEATTLE, WASHINGTON

Cost Estimating Parameters & Methodology		Notes	Source
Discount Rate	3.0%	21	EPA, July 2000
Project Management and Remediation Design	30.0%	35	EPA, July 2000
Construction Management	10.0%	36	EPA, July 2000
Sales Tax	8.8%		
Contingency	35.0%	37	EPA, July 2000
Agency Review and Oversight	1.0%	3	
<b>Mobilization, Demobilization and Site Restoration (Dredging and Capping)</b>			
Mobilize/Demobilize Equipment and Facilities	\$750,000 LS	3, 26	
Land Lease for Operations and Staging	\$250,000 per year	3	
Contractor Work Plan Submittals	\$100,000 per year	3	
Barge Protector	\$80,000 LS	3	
<b>Project Management (Contractor)</b>			
Labor and Supervisor	\$225,600 per month	3, 16	
Construction Office and Operating Expense	\$43,200 per month	3, 4	
<b>Confined Aquatic Disposal</b>			
Impacted Material/Clean Cap Material Placement R	2,938 cy per day (12-hr)	3, 10	
Overburden Removal Rate from CAD Cell/Derrick C	1,411 cy in situ per day (12-hr)	3, 10	
Transport and Disposal of Material at Elliott Bay Op	\$10 cy	3, 40	
<b>Dredging</b>			
Debris Sweep	\$50,000 per acre	2, 3, 9	Local Contractor Quote
Shift Rate (12 hours)	\$16,000 per day	2, 5	Local Contractor Quote
Shift Rate for Bank Areas with Obstructions(12 hour)	\$24,000 per day	2, 5, 41	
Dredge Rate (Derrick Crane - 6 cy bucket)	1,411 cy in situ per day (24-hr)	3, 6, 22	
Dredge Rate (Excavator Deep Access-5 cy bucket)	1,411 cy in situ per day (24-hr)	3, 7	
Dredge Rate (Excavator Shallow Access-3 cy bucket)	786 cy in situ per day (24-hr)	3, 8	
Dredge Rate (Hydraulic)	240 cy in situ per day (24-hr)	4	
Gravity Dewatering (on the barge)	\$2 per cy	2	Local Contractor Quote
Material Barge (3 barges)	\$1,800 per day	2	Local Contractor Quote
Assist Tug (700 to 1200 HP)	\$16,368 per day	2, 13	Local Contractor Quote
<b>Sediment Handling and Disposal Cost</b>			
Railcar transport to and tipping at Subtitle D Landf	\$60 per ton	2, 20, 34	Local Contractor Quote
Transportation cost by barge to transloading facility	\$1,200 per day	2, 14	Local Contractor Quote
Assist Tug (1800 HP)	\$21,120 per day	2, 13	Local Contractor Quote
Transloading Area Setup	\$1,000,000 LS	3	
Water Management	\$10,000 per day	3	
Transloading Costs	\$14 per ton	3, 15	
<b>Capping/ENR</b>			
Debris Sweep	\$35,000 per acre	3, 9	
Shift Rate (12 hours)	\$16,000 per day	2, 5	Local Contractor Quote
Cap Placement Rate (Derrick Crane - 8 cy bucket)	2,293 cy per day (24-hr)	3, 10	
Cap Placement Rate (Excavator Deep Access-5 cy)	2,295 cy per day (24-hr)	3, 11	
Cap Placement Rate (Excavator Deep Access-3 cy)	1,193 cy per day (24-hr)	3, 12	
Cap Placement Rate (Underdock Hydraulic Convey)	350 cy per day (24-hr)	3	
ENR Placement Rate (Derrick Crane - 8 cy bucket)	2,742 cy per day (24-hr)	3, 27	
ENR Placement Rate (Excavator Deep Access-5 cy)	2,142 cy per day (24-hr)	3, 28	
ENR Placement Rate (Excavator Deep Access-3 cy)	1,102 cy per day (24-hr)	3, 29	
ENR Placement Rate (Underdock Hydraulic Convey)	300 cy per day (24-hr)	3	
Cap material procurement and delivery(Sand)	\$25 per cy	2, 23	Local Commercial Source Quote
Cap material procurement and delivery(4 to 8 in cru)	\$29 per cy	2	Local Commercial Source Quote
Cap material procurement and delivery(Pea Gravel)	\$28 per cy	2	Local Commercial Source Quote
Cap material procurement and delivery(Fish M)	\$44 per cy	2	Local Commercial Source Quote
Material Barge for Cap Material (2 barges)	\$1,200 per day	2	Local Contractor Quote
Assist Tug (700 to 1200 HP)	\$16,368 per day	2, 13	Local Contractor Quote
<b>Treatment by Soil Washing, Mechanical Dewatering &amp; Water Trm</b>			
Mob/Demob and Site Layout	\$4,000,000 LS	2, 17	Contractor Quote
Soil Washing, Mech Dewatering & Water Trm	\$120 per cy	2, 18	Contractor Quote
Treated Sand Disposal	\$0 per cy	39	Contractor Quote
<b>Standby Time</b>			
Standby for Site Access	5% total project days	3, 38	
<b>Construction QA/QC</b>			
Implementation Monitoring	\$5,000 per day	3, 19	
Post-remediation Compliance Monitoring (Dredge, C)	\$2,200 per acre	3	
Daily Cost	\$8,500 per day	3	
Data Management Analysis and Reportin	\$15,000 per acre	3	Assume \$15,000 for first acre and scale up using power of 0.
Project Completion Report (incl. As-built drawings)	\$20,000 LS	3	
<b>Operations, Maintenance and Monitoring Cost</b>			
OM&M (Dredging)	\$2,200 per acre	3, 24	Assumed monitoring frequency at 2, 3, and 5 year
OM&M (Capping)	\$2,200 per acre	3, 24	Assumed monitoring frequency at 2, 3, and 5 year
OM&M (ENR)	\$2,200 per acre	3, 25	Assumed monitoring frequency at 2, 3, 5, 7 and 10 year
O&M (MNR)	\$2,200 per acre	3, 25	Assumed monitoring frequency at 2, 3, 5, 7 and 10 year
OM&M Daily Cost	\$8,500 per day	3	Daily labor, equipment and material costs during OM&M implementation
Cap Repair	\$300,000 per acre	3	Assumed for 5% of the cap area implemented at Year 5 and 1
ENR Repair	\$100,000 per acre	3	Assumed for 5% of the ENR area implemented at Year 5 and 1
<b>Long-term Monitoring</b>			
Long-term Monitoring	\$640,000 per year	3	Year 0 (baseline; capital expense) and years 5, 10 and 15(4 rounds total includes annual data management, analysis and reporting)

**Table I-29 BASIS FOR COST ESTIMATES (page 2)**

**Notes**

- 2008 dollars
- Vendor quote
- Professional judgment based on previous project.
- Construction office includes rental office trailers, operating expense, vehicle rental, PPE and pollution insurac
- Assume two 12 hour shift per day
- 6 cy derrick crane with 0.70 Fill Factor, 3 min cycle time, and 0.70 TE
- 5 cy excavator with 0.70 Fill Factor, 2.5 min cycle time, and 0.70 TE
- 3 cy excavator with 0.70 Fill Factor, 2.5 min cycle time, and 0.65 TE
- Assume 400 ft by 40 ft lane for debris sweep per day or 0.37 acres/day. Cost includes side scan survey and debris disposal at CDL. Debris sweep costs for capping area assumed to include debris sweep requirements for capping areas are generally lower compared to dredge area
- 8 cy derrick crane with 0.85 Fill Factor, 2.5 min cycle time, and 0.75 TE
- 5 cy excavator with 0.85 Fill Factor, 2 min cycle time, and 0.75 TE
- 3 cy excavator with 0.85 Fill Factor, 2 min cycle time, and 0.65 TE
- Includes fuel surcharge of 10% for fuel rate above \$
- Cost includes daily rate for two 1,600 cy capacity material barge
- Cost includes material transfer from barge onto offloading area, load dewatered sediment onto truck with containers, truck transport to rail facility. Offloading of sediment from barges at an offloading facility (infrastructure to be built in the future) in the vicinity of site to transloading area. Trucks with 20 ft containers on chassis and fitted with lift
- Labor categories include project manager, chief surveyor/QCM, works manager/superintendent, surveyor, accountant, CIH and travel and housing cost
- Includes capital cost from conception to production, total plant footprint of approximately 4 acres to 7 acres with 40 to 45 tph capacity
- Assume 40% sand, cost includes labor, plant operations, maintenance and filter cake disposal and no credit for beneficial reuse of sediment
- Implementation monitoring includes survey boat and equipment required for routine bathymetric surveys and pH/turbidity checks
- Cost includes liners installed in the 20 ft containers
- Based on current inflation rate of 4.95%, used a lower value of discount rate for this estimate. EPA recommends 7% discount rate
- Available transloading capacity (2,000 tons per day) limits the dredge volume to 1,400 cy per day
- Cost includes delivery to the Site by barge.
- Analytical costs with a sampling frequency of 2 samples per acre
- Analytical costs with a sampling frequency of 4 samples per acre
- Includes project management and labor during mobilization and demobilization phases
- 8 cy derrick crane with 0.85 Fill Factor, 2.5 min cycle time, and 0.70 TE
- 5 cy excavator with 0.85 Fill Factor, 2 min cycle time, and 0.70 TE
- 3 cy excavator with 0.85 Fill Factor, 2 min cycle time, and 0.60 TE
- Sediment dredge volume includes 1ft overdredge allowance, 0.5 ft design allowance and 1ft allowance for deeper contamination
- LS denotes Lump Sum
- CY denotes Cubic Yard
- Excavated sediment volume assumed to be 1.2 times the in-situ sediment volume
- Wet bulk density of dewatered dredge sediment assumed to be 1.5 tons per cubic yard
- Includes 10% toward project management and 20% toward remedial design. Selected percentages are the high end specified in the EPA cost guidance document due to the complex nature of the project. Remedial design includes pre-design sampling and analysis, engineering survey, design plans and specifications, cost estimate and schedule
- The selected percentage (10%) is the mid to high range as specified in the EPA cost guidance document. A higher percentage was selected due to the complex nature of the project
- Total contingency includes 20% toward scope contingency and 15% toward bid contingency. Scope contingency is toward the high end specified in the EPA cost guidance document; bid contingency for a sediments project of this magnitude will likely change considerably between FS and Final Design. Bid contingency of 15% is mid-range of the values specified in the EPA cost guidance document
- Standby time is included to cover items such as tribal fishing, analytical data wait time, water quality exceedances and physical access issues
- Assume 50% of sediment that is processed through the soil washing unit results in treated sand material. Assume that treated sand material can be disposed at a local soil
- Includes barge transport and disposal at the DMMP Elliott Bay open water disposal site
- Higher daily rate applied to 10% of the total duration for each alternative to account for additional costs resulting from over-water structures, slope stability, outfall protection, habitat enhancement etc.

**Table I-30 Alternative 1: No Further Action/Remediation of EAAs**

**LOWER DUWAMISH WATERWAY  
SEDIMENT CLEANUP - FS ESTIMATE  
SEATTLE, WASHINGTON**

TASK	QUANTITY	UNIT	UNIT COST	TOTAL COST
<b>PRE-CONSTRUCTION</b>				
Mobilization, Demobilization and Site Restoration (Dredging and Capping)	0	PER EVENT	\$750,000	\$0
Land Lease for Operations and Staging	0	PER YEAR	\$250,000	\$0
Contractor Work Plan Submittals	0	PER YEAR	\$100,000	\$0
Barge Protection	0	LS	\$80,000	\$0
<b>Subtotal:</b>				<b>\$0</b>
<b>PROJECT MANAGEMENT (CONTRACTOR)</b>				
Labor and Supervision	0	MONTH	\$225,600	\$0
Construction Office and Operating Expense	0	MONTH	\$43,200	\$0
<b>Subtotal:</b>				<b>\$0</b>
<b>DREDGING</b>				
Debris Sweep	0	ACRE	\$50,000	\$0
Shift Rate (12 hours)	0	DAY	\$16,000	\$0
Gravity Dewatering (on the barge)	0	CY	\$2	\$0
Material Barge	0	DAY	\$1,800	\$0
Assist Tug	0	DAY	\$16,368	\$0
<b>Subtotal:</b>				<b>\$0</b>
<b>SEDIMENT HANDLING AND DISPOSAL</b>				
Transportation cost by barge to transloading facility	0	DAY	\$1,200	\$0
Assist Tug	0	DAY	\$21,120	\$0
Transloading Area Setup	0	LS	\$1,000,000	\$0
Water Management	0	DAY	\$10,000	\$0
Transloading Costs	0	TON	\$14	\$0
Railcar Transport to and Tipping at Subtitle D Landfill	0	TON	\$60	\$0
<b>Subtotal:</b>				<b>\$0</b>
<b>SEDIMENT CAPPING</b>				
Debris Sweep	0	ACRE	\$35,000	\$0
Shift Rate (12 hours)	0	DAY	\$16,000	\$0
Cap material procurement and delivery(Sand)	0	CY	\$25	\$0
Cap material procurement and delivery(4 to 8 in crushed spall rock)	0	CY	\$29	\$0
Cap material procurement and delivery(Pea Gravel)	0	CY	\$28	\$0
Cap material procurement and delivery(Fish Mix)	0	CY	\$44	\$0
Material Barge for Cap Material	0	DAY	\$1,200	\$0
Assist Tug	0	DAY	\$16,368	\$0
<b>Subtotal:</b>				<b>\$0</b>
<b>ENHANCED NATURAL RECOVERY</b>				
Debris Sweep	0	ACRE	\$35,000	\$0
Shift Rate (12 hours)	0	DAY	\$16,000	\$0
Cap material procurement and delivery(Sand)	0	CY	\$25	\$0
Cap material procurement and delivery(4 to 8 in crushed spall rock)	0	CY	\$29	\$0
Cap material procurement and delivery(Pea Gravel)	0	CY	\$28	\$0
Cap material procurement and delivery(Fish Mix)	0	CY	\$44	\$0
Material Barge for Cap Material	0	DAY	\$1,200	\$0
Assist Tug	0	DAY	\$16,368	\$0
<b>Subtotal:</b>				<b>\$0</b>
<b>STANDBY TIME</b>				
Standby for Site Access	0	PER DAY	\$16,000	\$0
<b>Subtotal:</b>				<b>\$0</b>
<b>CONSTRUCTION QA/QC</b>				
Implementation Monitoring	0	PER DAY	\$5,000	\$0
<b>Subtotal:</b>				<b>\$0</b>
<b>Post-Remediation Compliance Monitoring</b>				
Compliance Testing (Dredging)	0	PER EVENT	\$0	\$0
Compliance Testing (Capping)	0	PER EVENT	\$0	\$0
Compliance Testing (ENR)	0	PER EVENT	\$0	\$0
Project Completion Report	0	LS	\$20,000	\$0
<b>Subtotal:</b>				<b>\$0</b>
<b>CAPITAL COST</b>				
Construction Contingency				\$0
Sales Tax				\$0
Project Management and Remedial Design				\$0
Construction Management				\$0
Agency Review and Oversight				\$0
<b>TOTAL CAPITAL COST</b>				<b>\$0</b>
<b>OPERATIONS AND MAINTENANCE/MONITORING COSTS</b>				
Operations, Maintenance and Monitoring(Dredging)	0	LS		\$0
Operations, Maintenance and Monitoring(Capping)	0	LS		\$0
Operations, Maintenance and Monitoring(ENR)	0	LS		\$0
Operations, Maintenance and Monitoring(MNR)	0	LS		\$0
Long-term Monitoring	0	LS		\$0
<b>Subtotal:</b>				<b>\$0</b>
<b>TOTAL COST</b>				<b>\$50,000,000<sup>a</sup></b>

Notes:

- All cost values are estimates, and should not be interpreted as final construction or project costs.
  - Operating season based on 120-day fish window requirements.
  - LS denotes Lump Sum
  - CY denotes Cubic Yard
  - Operations Maintenance and Monitoring Costs include rolled-up costs for O&M monitoring, O&M daily cost, cap repair costs and ENR repair costs.
  - 15-year PV applied to Operations Maintenance and Monitoring Costs
- <sup>a</sup> Cost based a sum of individual EAA costs provided by site managers



**Table I-31 Alternative 2: Emphasis on Hotspot Removal  
(Most Effective Risk Reduction)**

LOWER DUWAMISH WATERWAY  
SEDIMENT CLEANUP - FS ESTIMATE  
SEATTLE, WASHINGTON

TASK	QUANTITY	UNIT	UNIT COST	TOTAL COST
<b>PRE-CONSTRUCTION</b>				
Mobilization, Demobilization and Site Restoration (Dredging and Capping)	3	PER EVENT	\$750,000	\$2,137,500
Land Lease for Operations and Staging	3	PER YEAR	\$250,000	\$712,500
Contractor Work Plan Submittals	3	PER YEAR	\$100,000	\$285,000
Barge Protection	1	LS	\$80,000	\$80,000
<b>Subtotal:</b>				<b>\$3,215,000</b>
<b>PROJECT MANAGEMENT (CONTRACTOR)</b>				
Labor and Supervision	14	MONTH	\$225,600	\$3,214,800
Construction Office and Operating Expense	14	MONTH	\$43,200	\$615,600
<b>Subtotal:</b>				<b>\$3,830,400</b>
<b>DREDGING</b>				
Debris Sweep	32	ACRE	\$50,000	\$1,600,000
Shift Rate (12 hours)	342	DAY	\$16,000	\$5,472,000
Shift Rate for Bank Areas with Obstructions (12 hours)	38	DAY	\$24,000	\$912,000
Gravity Dewatering (on the barge)	445,728	CY	\$2	\$891,456
Material Barge	380	DAY	\$1,800	\$684,000
Assist Tug	380	DAY	\$16,368	\$6,219,840
<b>Subtotal:</b>				<b>\$15,779,296</b>
<b>CONFINED AQUATIC DISPOSAL</b>				
Overburden Removal (Shift Rate - 12 hours)	260	DAY	\$16,000	\$4,160,000
Impacted Material Placement (Shift Rate - 12-hours)	85	DAY	\$16,000	\$1,356,209
Cap Material procurement and delivery(Sand)	74,000	CY	\$25	\$1,834,164
Cap Placement (Shift Rate - 12 hours)	25	DAY	\$16,000	\$403,050
Overburden Transport and Disposal at Elliott Bay Open Water Site	371,000	CY	\$10	\$3,710,000
<b>Subtotal:</b>				<b>\$11,463,423</b>
<b>SEDIMENT HANDLING AND DISPOSAL</b>				
Transportation cost by barge to transloading facility	342	DAY	\$1,200	\$410,400
Assist Tug	342	DAY	\$21,120	\$7,223,040
Transloading Area Setup	1	LS	\$1,000,000	\$1,000,000
Water Management	342	DAY	\$10,000	\$3,420,000
Transloading Costs	295,092	TON	\$14	\$4,186,368
Railcar Transport to and Tipping at Subtitle D Landfil	295,092	TON	\$60	\$17,705,503
<b>Subtotal:</b>				<b>\$33,945,311</b>
<b>SEDIMENT CAPPING</b>				
Debris Sweep	3.3	ACRE	\$35,000	\$116,567
Shift Rate (12 hours)	60	DAY	\$16,000	\$960,000
Cap material procurement and delivery(Sand)	57,526	CY	\$25	\$1,425,845
Cap material procurement and delivery(4 to 8 in crushed spall rock)	0	CY	\$29	\$0
Cap material procurement and delivery(Pea Gravel)	0	CY	\$28	\$0
Cap material procurement and delivery(Fish Mix)	0	CY	\$44	\$0
Material Barge for Cap Material	60	DAY	\$1,200	\$72,000
Assist Tug	60	DAY	\$16,368	\$982,080
<b>Subtotal:</b>				<b>\$3,556,492</b>
<b>ENHANCED NATURAL RECOVERY</b>				
Debris Sweep	0	ACRE	\$35,000	\$0
Shift Rate (12 hours)	0	DAY	\$16,000	\$0
Cap material procurement and delivery(Sand)	0	CY	\$25	\$0
Cap material procurement and delivery(4 to 8 in crushed spall rock)	0	CY	\$29	\$0
Cap material procurement and delivery(Pea Gravel)	0	CY	\$28	\$0
Cap material procurement and delivery(Fish Mix)	0	CY	\$44	\$0
Material Barge for Cap Material	0	DAY	\$1,200	\$0
Assist Tug	0	DAY	\$16,368	\$0
<b>Subtotal:</b>				<b>\$0</b>
<b>STANDBY TIME</b>				
Standby for Site Access	19	PER DAY	\$16,000	\$304,000
<b>Subtotal:</b>				<b>\$304,000</b>
<b>CONSTRUCTION QA/QC</b>				
Implementation Monitoring	342	PER DAY	\$5,000	\$1,710,000
<b>Subtotal:</b>				<b>\$1,710,000</b>
<b>Post-Remediation Compliance Monitoring</b>				
Compliance Testing (Dredging)	1	PER EVENT	\$656,600	\$656,600
Compliance Testing (Capping)	1	PER EVENT	\$187,808	\$187,808
Compliance Testing (ENR)	0	PER EVENT	\$170,000	\$0
Project Completion Report	1	LS	\$20,000	\$20,000
<b>Subtotal:</b>				<b>\$864,408</b>
<b>CAPITAL COST</b>				
Construction Contingency				\$26,133,916
Sales Tax				\$6,570,813
Project Management and Remedial Design				\$22,400,499
Construction Management				\$7,466,833
Agency Review and Oversight				\$746,683
<b>TOTAL CAPITAL COST</b>				<b>\$137,987,075</b>
<b>OPERATIONS AND MAINTENANCE/MONITORING COSTS</b>				
Operations and Maintenance(Dredging)	1	LS	\$1,060,000	\$1,060,000
Operations and Maintenance(Capping)	1	LS	\$210,000	\$210,000
Operations and Maintenance(ENR)	0	LS	\$0	\$0
Operations and Maintenance(MNR)	1	LS	\$7,570,000	\$7,570,000
Long-term Monitoring	1	LS	\$2,080,000	\$2,080,000
<b>Subtotal:</b>				<b>\$10,920,000</b>
<b>TOTAL COST</b>				<b>\$148,907,100</b>

Notes:

1. All cost values are estimates, and should not be interpreted as final construction or project costs.
2. Operating season based on 120-day fish window requirements.

**Table I-32 Alternative 3: Emphasis on Containment  
3a: Address CSL exceedances, dioxins/furans and direct contact risks**

LOWER DUWAMISH WATERWAY  
SEDIMENT CLEANUP - FS ESTIMATE  
SEATTLE, WASHINGTON

TASK	QUANTITY	UNIT	UNIT COST	TOTAL COST
<b>PRE-CONSTRUCTION</b>				
Mobilization, Demobilization and Site Restoration (Dredging and Capping)	3	PER EVENT	\$750,000	\$2,081,250
Land Lease for Operations and Staging	3	PER YEAR	\$250,000	\$693,750
Contractor Work Plan Submittals	3	PER YEAR	\$100,000	\$277,500
Barge Protection	1	LS	\$80,000	\$80,000
<b>Subtotal:</b>				<b>\$3,132,500</b>
<b>PROJECT MANAGEMENT (CONTRACTOR)</b>				
Labor and Supervision	14	MONTH	\$225,600	\$3,130,200
Construction Office and Operating Expense	14	MONTH	\$43,200	\$599,400
<b>Subtotal:</b>				<b>\$3,729,600</b>
<b>DREDGING</b>				
Debris Sweep	28	ACRE	\$50,000	\$1,400,000
Shift Rate (12 hours)	333	DAY	\$16,000	\$5,328,000
Shift Rate for Bank Areas with Obstructions (12 hours)	37	DAY	\$24,000	\$888,000
Gravity Dewatering (on the barge)	416,434	CY	\$2	\$832,868
Material Barge	370	DAY	\$1,800	\$666,000
Assist Tug	370	DAY	\$16,368	\$6,056,160
<b>Subtotal:</b>				<b>\$15,171,028</b>
<b>SEDIMENT HANDLING AND DISPOSAL</b>				
Transportation cost by barge to transloading facility	333	DAY	\$1,200	\$399,600
Assist Tug	333	DAY	\$21,120	\$7,032,960
Transloading Area Setup	1	LS	\$1,000,000	\$1,000,000
Water Management	333	DAY	\$10,000	\$3,330,000
Transloading Costs	624,651	TON	\$14.2	\$8,861,716
Railcar Transport to and Tipping at Subtitle D Landfil	624,651	TON	\$60	\$37,479,060
<b>Subtotal:</b>				<b>\$58,103,336</b>
<b>SEDIMENT CAPPING</b>				
Debris Sweep	7.9	ACRE	\$35,000	\$275,450
Shift Rate (12 hours)	100	DAY	\$16,000	\$1,600,000
Cap material procurement and delivery(Sand)	102,172	CY	\$25	\$2,532,445
Cap material procurement and delivery(4 to 8 in crushed spall rock)	0	CY	\$29	\$0
Cap material procurement and delivery(Pea Gravel)	0	CY	\$28	\$0
Cap material procurement and delivery(Fish Mix)	0	CY	\$44	\$0
Material Barge for Cap Material	100	DAY	\$1,200	\$120,000
Assist Tug	100	DAY	\$16,368	\$1,636,800
<b>Subtotal:</b>				<b>\$6,164,695</b>
<b>ENHANCED NATURAL RECOVERY</b>				
Debris Sweep	36	ACRE	\$35,000	\$1,252,475
Shift Rate (12 hours)	16	DAY	\$16,000	\$252,683
Cap material procurement and delivery(Sand)	43,300	CY	\$25	\$1,073,230
Cap material procurement and delivery(4 to 8 in crushed spall rock)	0	CY	\$29	\$0
Cap material procurement and delivery(Pea Gravel)	0	CY	\$28	\$0
Cap material procurement and delivery(Fish Mix)	0	CY	\$44	\$0
Material Barge for Cap Material	16	DAY	\$1,200	\$18,951
Assist Tug	16	DAY	\$16,368	\$258,495
<b>Subtotal:</b>				<b>\$2,855,834</b>
<b>STANDBY TIME</b>				
Standby for Site Access	19	PER DAY	\$16,000	\$296,000
<b>Subtotal:</b>				<b>\$296,000</b>
<b>CONSTRUCTION QA/QC</b>				
Implementation Monitoring	333	PER DAY	\$5,000	\$1,665,000
<b>Subtotal:</b>				<b>\$1,665,000</b>
<b>Post-Remediation Compliance Monitoring</b>				
Compliance Testing (Dredging)	1	PER EVENT	\$612,400	\$612,400
Compliance Testing (Capping)	1	PER EVENT	\$248,756	\$248,756
Compliance Testing (ENR)	1	PER EVENT	\$612,908	\$612,908
Project Completion Report	1	LS	\$20,000	\$20,000
<b>Subtotal:</b>				<b>\$1,494,064</b>
<b>CAPITAL COST</b>				
Construction Contingency				\$32,414,220
Sales Tax				\$8,149,861
Project Management and Remedial Design				\$27,783,617
Construction Management				\$9,261,206
Agency Review and Oversight				\$926,121
<b>TOTAL CAPITAL COST</b>				<b>\$171,147,081</b>
<b>OPERATIONS AND MAINTENANCE/MONITORING COSTS</b>				
Operations and Maintenance(Dredging)	1	LS	\$950,000	\$950,000
Operations and Maintenance(Capping)	1	LS	\$440,000	\$440,000
Operations and Maintenance(ENR)	1	LS	\$3,320,000	\$3,320,000
Operations and Maintenance(MNR)	1	LS	\$4,450,000	\$4,450,000
Long-term Monitoring	1	LS	\$2,080,000	\$2,080,000
<b>Subtotal:</b>				<b>\$11,240,000</b>
<b>TOTAL COST</b>				
				<b>\$182,387,100</b>

Notes:

- All cost values are estimates, and should not be interpreted as final construction or project costs.
- Operating season based on 120-day fish window requirements.
- LS denotes Lump Sum
- CY denotes Cubic Yard
- Operations Maintenance and Monitoring Costs include rolled-up costs for O&M monitoring, O&M daily cost, cap repair costs and ENR repair costs.
- 15-year PV applied to Operations Maintenance and Monitoring Costs

**Table I-33 Alternative 3: Emphasis on Containment  
3b: Achieve SQS 10 years after end of remedy construction**

LOWER DUWAMISH WATERWAY  
SEDIMENT CLEANUP - FS ESTIMATE  
SEATTLE, WASHINGTON

TASK	QUANTITY	UNIT	UNIT COST	TOTAL COST
<b>PRE-CONSTRUCTION</b>				
Mobilization, Demobilization and Site Restoration (Dredging and Capping)	3	PER EVENT	\$750,000	\$2,306,250
Land Lease for Operations and Staging	3	PER YEAR	\$250,000	\$768,750
Contractor Work Plan Submittals	3	PER YEAR	\$100,000	\$307,500
Barge Protection	1	LS	\$80,000	\$80,000
<b>Subtotal:</b>				<b>\$3,462,500</b>
<b>PROJECT MANAGEMENT (CONTRACTOR)</b>				
Labor and Supervision	15	MONTH	\$225,600	\$3,468,600
Construction Office and Operating Expense	15	MONTH	\$43,200	\$664,200
<b>Subtotal:</b>				<b>\$4,132,800</b>
<b>DREDGING</b>				
Debris Sweep	31	ACRE	\$50,000	\$1,550,000
Shift Rate (12 hours)	369	DAY	\$16,000	\$5,904,000
Shift Rate for Bank Areas with Obstructions (12 hours)	41	DAY	\$24,000	\$984,000
Gravity Dewatering (on the barge)	446,557	CY	\$2	\$893,113
Material Barge	410	DAY	\$1,800	\$738,000
Assist Tug	410	DAY	\$16,368	\$6,710,880
<b>Subtotal:</b>				<b>\$16,779,993</b>
<b>SEDIMENT HANDLING AND DISPOSAL</b>				
Transportation cost by barge to transloading facility	369	DAY	\$1,200	\$442,800
Assist Tug	369	DAY	\$21,120	\$7,793,280
Transloading Area Setup	1	LS	\$1,000,000	\$1,000,000
Water Management	369	DAY	\$10,000	\$3,690,000
Transloading Costs	669,835	TON	\$14.2	\$9,502,723
Railcar Transport to and Tipping at Subtitle D Landfil	669,835	TON	\$60	\$40,190,088
<b>Subtotal:</b>				<b>\$62,618,891</b>
<b>SEDIMENT CAPPING</b>				
Debris Sweep	9.9	ACRE	\$35,000	\$346,500
Shift Rate (12 hours)	100	DAY	\$16,000	\$1,600,000
Cap material procurement and delivery(Sand)	120,064	CY	\$25	\$2,975,913
Cap material procurement and delivery(4 to 8 in crushed spall rock)		0 CY	\$29	\$0
Cap material procurement and delivery(Pea Gravel)		0 CY	\$28	\$0
Cap material procurement and delivery(Fish Mix)		0 CY	\$44	\$0
Material Barge for Cap Material	100	DAY	\$1,200	\$120,000
Assist Tug	100	DAY	\$16,368	\$1,636,800
<b>Subtotal:</b>				<b>\$6,679,213</b>
<b>ENHANCED NATURAL RECOVERY</b>				
Debris Sweep	41	ACRE	\$35,000	\$1,438,660
Shift Rate (12 hours)	18	DAY	\$16,000	\$290,246
Cap material procurement and delivery(Sand)	49,737	CY	\$25	\$1,232,769
Cap material procurement and delivery(4 to 8 in crushed spall rock)		0 CY	\$29	\$0
Cap material procurement and delivery(Pea Gravel)		0 CY	\$28	\$0
Cap material procurement and delivery(Fish Mix)		0 CY	\$44	\$0
Material Barge for Cap Material	18	DAY	\$1,200	\$21,768
Assist Tug	18	DAY	\$16,368	\$296,921
<b>Subtotal:</b>				<b>\$3,280,365</b>
<b>STANDBY TIME</b>				
Standby for Site Access	21	PER DAY	\$16,000	\$328,000
<b>Subtotal:</b>				<b>\$328,000</b>
<b>CONSTRUCTION QA/QC</b>				
Implementation Monitoring	369	PER DAY	\$5,000	\$1,845,000
<b>Subtotal:</b>				<b>\$1,845,000</b>
<b>Post-Remediation Compliance Monitoring</b>				
Compliance Testing (Dredging)	1	PER EVENT	\$645,800	\$645,800
Compliance Testing (Capping)	1	PER EVENT	\$273,620	\$273,620
Compliance Testing (ENR)	1	PER EVENT	\$0	\$0
Project Completion Report	1	LS	\$20,000	\$20,000
<b>Subtotal:</b>				<b>\$939,420</b>
<b>CAPITAL COST</b>				<b>\$100,066,182</b>
Construction Contingency				\$35,023,164
Sales Tax				\$8,805,824
Project Management and Remedial Design				\$30,019,854
Construction Management				\$10,006,618
Agency Review and Oversight				\$1,000,662
<b>TOTAL CAPITAL COST</b>				<b>\$184,922,304</b>
<b>OPERATIONS AND MAINTENANCE/MONITORING COSTS</b>				
Operations and Maintenance(Dredging)	1	LS	\$1,040,000	\$1,040,000
Operations and Maintenance(Capping)	1	LS	\$530,000	\$530,000
Operations and Maintenance(ENR)	1	LS	\$3,770,000	\$3,770,000
Operations and Maintenance(MNR)	1	LS	\$3,570,000	\$3,570,000
Long-term Monitoring	1	LS	\$2,080,000	\$2,080,000
<b>Subtotal:</b>				<b>\$10,990,000</b>
<b>TOTAL COST</b>				<b>\$195,912,300</b>

Notes:

1. All cost values are estimates, and should not be interpreted as final construction or project costs.
2. Operating season based on 120-day fish window requirements.
3. LS denotes Lump Sum
4. CY denotes Cubic Yard
5. Operations Maintenance and Monitoring Costs include rolled-up costs for O&M monitoring, O&M daily cost, cap repair costs and ENR repair costs.
6. 15-year PV applied to Operations Maintenance and Monitoring Costs

**Table I-34 Alternative 3: Emphasis on Containment  
3c: Lower Action Levels for Human and Health Risk Drivers**

LOWER DUWAMISH WATERWAY  
SEDIMENT CLEANUP - FS ESTIMATE  
SEATTLE, WASHINGTON

TASK	QUANTITY	UNIT	UNIT COST	TOTAL COST
<b>PRE-CONSTRUCTION</b>				
Mobilization, Demobilization and Site Restoration (Dredging and Capping)	3	PER EVENT	\$750,000	\$2,587,500
Land Lease for Operations and Staging	3	PER YEAR	\$250,000	\$862,500
Contractor Work Plan Submittals	3	PER YEAR	\$100,000	\$345,000
Barge Protection	1	LS	\$80,000	\$80,000
<b>Subtotal:</b>				<b>\$3,875,000</b>
<b>PROJECT MANAGEMENT (CONTRACTOR)</b>				
Labor and Supervisor	17	MONTH	\$225,600	\$3,891,600
Construction Office and Operating Expense	17	MONTH	\$43,200	\$745,200
<b>Subtotal:</b>				<b>\$4,636,800</b>
<b>DREDGING</b>				
Debris Sweep	46	ACRE	\$50,000	\$2,300,000
Shift Rate (12 hours)	414	DAY	\$16,000	\$6,624,000
Shift Rate for Bank Areas with Obstructions (12 hours)	46	DAY	\$24,000	\$1,104,000
Gravity Dewatering (on the barge)	559,196	CY	\$2	\$1,118,392
Material Barge	460	DAY	\$1,800	\$828,000
Assist Tug	460	DAY	\$16,368	\$7,529,280
<b>Subtotal:</b>				<b>\$19,503,672</b>
<b>SEDIMENT HANDLING AND DISPOSAL</b>				
Transportation cost by barge to transloading facility	414	DAY	\$1,200	\$496,800
Assist Tug	414	DAY	\$21,120	\$8,743,680
Transloading Area Setup	1	LS	\$1,000,000	\$1,000,000
Water Management	414	DAY	\$10,000	\$4,140,000
Transloading Costs	838,794	TON	\$14.2	\$11,899,694
Railcar Transport to and Tipping at Subtitle D Landfill	838,794	TON	\$60	\$50,327,654
<b>Subtotal:</b>				<b>\$76,607,828</b>
<b>SEDIMENT CAPPING</b>				
Debris Sweep	13.9	ACRE	\$35,000	\$486,527
Shift Rate (12 hours)	130	DAY	\$16,000	\$2,080,000
Cap material procurement and delivery(Sand)	165,544	CY	\$25	\$4,103,177
Cap material procurement and delivery(4 to 8 in crushed spall rock)	0	CY	\$29	\$0
Cap material procurement and delivery(Pea Gravel)	0	CY	\$28	\$0
Cap material procurement and delivery(Fish Mix)	0	CY	\$44	\$0
Material Barge for Cap Material	130	DAY	\$1,200	\$156,000
Assist Tug	130	DAY	\$16,368	\$2,127,840
<b>Subtotal:</b>				<b>\$8,953,544</b>
<b>ENHANCED NATURAL RECOVERY</b>				
Debris Sweep	46	ACRE	\$35,000	\$1,617,626
Shift Rate (12 hours)	20	DAY	\$16,000	\$326,352
Cap material procurement and delivery(Sand)	55,924	CY	\$25	\$1,386,123
Cap material procurement and delivery(4 to 8 in crushed spall rock)	0	CY	\$29	\$0
Cap material procurement and delivery(Pea Gravel)	0	CY	\$28	\$0
Cap material procurement and delivery(Fish Mix)	0	CY	\$44	\$0
Material Barge for Cap Material	20	DAY	\$1,200	\$24,476
Assist Tug	20	DAY	\$16,368	\$333,858
<b>Subtotal:</b>				<b>\$3,688,436</b>
<b>STANDBY TIME</b>				
Standby for Site Access	23	PER DAY	\$16,000	\$368,000
<b>Subtotal:</b>				<b>\$368,000</b>
<b>CONSTRUCTION QA/QC</b>				
Implementation Monitoring	414	PER DAY	\$5,000	\$2,070,000
<b>Subtotal:</b>				<b>\$2,070,000</b>
<b>Post-Remediation Compliance Monitoring</b>				
Compliance Testing (Dredging)	1	PER EVENT	\$808,800	\$808,800
Compliance Testing (Capping)	1	PER EVENT	\$322,827	\$322,827
Compliance Testing (ENR)	1	PER EVENT	\$726,717	\$726,717
Project Completion Report	1	LS	\$20,000	\$20,000
<b>Subtotal:</b>				<b>\$1,878,344</b>
<b>CAPITAL COST</b>				
Construction Contingency				\$42,553,569
Sales Tax				\$10,699,183
Project Management and Remedial Design				\$36,474,487
Construction Management				\$12,158,162
Agency Review and Oversight				\$1,215,816
<b>TOTAL CAPITAL COST</b>				<b>\$224,682,842</b>
<b>OPERATIONS AND MAINTENANCE/MONITORING COSTS</b>				
Operations and Maintenance(Dredging)	1	LS	\$1,450,000	\$1,450,000
Operations and Maintenance(Capping)	1	LS	\$710,000	\$710,000
Operations and Maintenance(ENR)	1	LS	\$4,210,000	\$4,210,000
Operations and Maintenance(MNR)	1	LS	\$2,300,000	\$2,300,000
Long-term Monitoring	1	LS	\$2,080,000	\$2,080,000
<b>Subtotal:</b>				<b>\$10,750,000</b>
<b>TOTAL COST</b>				<b>\$235,432,800</b>

Notes:

1. All cost values are estimates, and should not be interpreted as final construction or project costs.
2. Operating season based on 120-day fish window requirements.
3. LS denotes Lump Sum
4. CY denotes Cubic Yard
5. Operations Maintenance and Monitoring Costs include rolled-up costs for O&M monitoring, O&M daily cost, cap repair costs and ENR repair costs.
6. 15-year PV applied to Operations Maintenance and Monitoring Costs

**Table I-35 Alternative 3: Emphasis on Containment  
3d: Achieve SQS at the End of Remedy Construction**

LOWER DUWAMISH WATERWAY  
SEDIMENT CLEANUP - FS ESTIMATE  
SEATTLE, WASHINGTON

TASK	QUANTITY	UNIT	UNIT COST	TOTAL COST
<b>PRE-CONSTRUCTION</b>				
Mobilization, Demobilization and Site Restoration (Dredging and Capping)	4	PER EVENT	\$750,000	\$2,981,250
Land Lease for Operations and Staging	4	PER YEAR	\$250,000	\$993,750
Contractor Work Plan Submittals	4	PER YEAR	\$100,000	\$397,500
Barge Protection	1	LS	\$80,000	\$80,000
<b>Subtotal:</b>				<b>\$4,452,500</b>
<b>PROJECT MANAGEMENT (CONTRACTOR)</b>				
Labor and Supervision	20	MONTH	\$225,600	\$4,483,800
Construction Office and Operating Expense	20	MONTH	\$43,200	\$858,600
<b>Subtotal:</b>				<b>\$5,342,400</b>
<b>DREDGING</b>				
Debris Sweep	64	ACRE	\$50,000	\$3,200,000
Shift Rate (12 hours)	477	DAY	\$16,000	\$7,632,000
Shift Rate for Bank Areas with Obstructions (12 hours)	53	DAY	\$24,000	\$1,272,000
Gravity Dewatering (on the barge)	629,291	CY	\$2	\$1,258,581
Material Barge	530	DAY	\$1,800	\$954,000
Assist Tug	530	DAY	\$16,368	\$8,675,040
<b>Subtotal:</b>				<b>\$22,991,621</b>
<b>SEDIMENT HANDLING AND DISPOSAL</b>				
Transportation cost by barge to transloading facility	477	DAY	\$1,200	\$572,400
Assist Tug	477	DAY	\$21,120	\$10,074,240
Transloading Area Setup	1	LS	\$1,000,000	\$1,000,000
Water Management	477	DAY	\$10,000	\$4,770,000
Transloading Costs	943,936	TON	\$14.2	\$13,391,305
Railcar Transport to and Tipping at Subtitle D Landfill	943,936	TON	\$60	\$56,636,160
<b>Subtotal:</b>				<b>\$86,444,105</b>
<b>SEDIMENT CAPPING</b>				
Debris Sweep	23	ACRE	\$35,000	\$809,200
Shift Rate (12 hours)	170	DAY	\$16,000	\$2,720,000
Cap material procurement and delivery(Sand)	243,484	CY	\$25	\$6,035,001
Cap material procurement and delivery(4 to 8 in crushed spall rock)	0	CY	\$29	\$0
Cap material procurement and delivery(Pea Gravel)	0	CY	\$28	\$0
Cap material procurement and delivery(Fish Mix)	0	CY	\$44	\$0
Material Barge for Cap Material	170	DAY	\$1,200	\$204,000
Assist Tug	170	DAY	\$16,368	\$2,782,560
<b>Subtotal:</b>				<b>\$12,550,761</b>
<b>ENHANCED NATURAL RECOVERY</b>				
Debris Sweep	45	ACRE	\$35,000	\$1,575,000
Shift Rate (12 hours)	20	DAY	\$16,000	\$317,752
Cap material procurement and delivery(Sand)	54,450	CY	\$25	\$1,349,598
Cap material procurement and delivery(4 to 8 in crushed spall rock)	0	CY	\$29	\$0
Cap material procurement and delivery(Pea Gravel)	0	CY	\$28	\$0
Cap material procurement and delivery(Fish Mix)	0	CY	\$44	\$0
Material Barge for Cap Material	20	DAY	\$1,200	\$23,831
Assist Tug	20	DAY	\$16,368	\$325,060
<b>Subtotal:</b>				<b>\$3,591,242</b>
<b>STANDBY TIME</b>				
Standby for Site Access	27	PER DAY	\$16,000	\$424,000
<b>Subtotal:</b>				<b>\$424,000</b>
<b>CONSTRUCTION QA/QC</b>				
Implementation Monitoring	477	PER DAY	\$5,000	\$2,385,000
<b>Subtotal:</b>				<b>\$2,385,000</b>
<b>Post-Remediation Compliance Monitoring</b>				
Compliance Testing (Dredging)	1	PER EVENT	\$1,000,200	\$1,000,200
Compliance Testing (Capping)	1	PER EVENT	\$519,356	\$519,356
Compliance Testing (ENR)	1	PER EVENT	\$0	\$0
Project Completion Report	1	LS	\$20,000	\$20,000
<b>Subtotal:</b>				<b>\$1,539,556</b>
<b>CAPITAL COST</b>				<b>\$139,721,185</b>
Construction Contingency				\$48,902,415
Sales Tax				\$12,295,464
Project Management and Remedial Design				\$41,916,356
Construction Management				\$13,972,119
Agency Review and Oversight				\$1,397,212
<b>TOTAL CAPITAL COST</b>				<b>\$258,204,751</b>
<b>OPERATIONS AND MAINTENANCE/MONITORING COSTS</b>				
Operations and Maintenance(Dredging)	1	LS	\$1,940,000	\$1,940,000
Operations and Maintenance(Capping)	1	LS	\$1,440,000	\$1,440,000
Operations and Maintenance(ENR)	1	LS	\$4,110,000	\$4,110,000
Operations and Maintenance(MNR)	0	LS	\$0	\$0
Long-term Monitoring	1	LS	\$2,080,000	\$2,080,000
<b>Subtotal:</b>				<b>\$9,570,000</b>
<b>TOTAL COST</b>				<b>\$267,774,800</b>

Notes:

1. All cost values are estimates, and should not be interpreted as final construction or project costs.
2. Operating season based on 120-day fish window requirements.
3. LS denotes Lump Sum
4. CY denotes Cubic Yard
5. Operations Maintenance and Monitoring Costs include rolled-up costs for O&M monitoring, O&M daily cost, cap repair costs and ENR repair costs.
6. 15-year PV applied to Operations Maintenance and Monitoring Costs

**Table I-36 Alternative 4: Emphasis on Removal**

**4a: Address CSL Exceedances, Dioxin/Furans, and Direct Contact Risks**

LOWER DUWAMISH WATERWAY  
 SEDIMENT CLEANUP - FS ESTIMATE  
 SEATTLE, WASHINGTON

TASK	QUANTITY	UNIT	UNIT COST	TOTAL COST
<b>PRE-CONSTRUCTION</b>				
Mobilization, Demobilization and Site Restoration (Dredging and Capping)	6	PER EVENT	\$750,000	\$4,162,500
Land Lease for Operations and Staging	6	PER YEAR	\$250,000	\$1,387,500
Contractor Work Plan Submittals	6	PER YEAR	\$100,000	\$555,000
Barge Protection	1	LS	\$80,000	\$80,000
<b>Subtotal:</b>				<b>\$6,185,000</b>
<b>PROJECT MANAGEMENT (CONTRACTOR)</b>				
Labor and Supervision	28	MONTH	\$225,600	\$6,260,400
Construction Office and Operating Expense	28	MONTH	\$43,200	\$1,198,800
<b>Subtotal:</b>				<b>\$7,459,200</b>
<b>DREDGING</b>				
Debris Sweep	71	ACRE	\$50,000	\$3,526,208
Shift Rate (12 hours)	666	DAY	\$16,000	\$10,656,000
Shift Rate for Bank Areas with Obstructions (12 hours)	74	DAY	\$24,000	\$1,776,000
Gravity Dewatering (on the barge)	836,091	CY	\$2	\$1,672,183
Material Barge	740	DAY	\$1,800	\$1,332,000
Assist Tug	740	DAY	\$16,368	\$12,112,320
<b>Subtotal:</b>				<b>\$31,074,710</b>
<b>SEDIMENT HANDLING AND DISPOSAL</b>				
Transportation cost by barge to transloading facility	666	DAY	\$1,200	\$799,200
Assist Tug	666	DAY	\$21,120	\$14,065,920
Transloading Area Setup	1	LS	\$1,000,000	\$1,000,000
Water Management	666	DAY	\$10,000	\$6,660,000
Transloading Costs	1,254,137	TON	\$14.2	\$17,792,023
Railcar Transport to and Tipping at Subtitle D Landfil	1,254,137	TON	\$60	\$75,248,218
<b>Subtotal:</b>				<b>\$115,565,361</b>
<b>SEDIMENT CAPPING</b>				
Debris Sweep	6.6	ACRE	\$35,000	\$231,479
Shift Rate (12 hours)	140	DAY	\$16,000	\$2,240,000
Cap material procurement and delivery(Sand)	122,679	CY	\$25	\$3,040,733
Cap material procurement and delivery(4 to 8 in crushed spall rock)	0	CY	\$29	\$0
Cap material procurement and delivery(Pea Gravel)	0	CY	\$28	\$0
Cap material procurement and delivery(Fish Mix)	0	CY	\$44	\$0
Material Barge for Cap Material	140	DAY	\$1,200	\$168,000
Assist Tug	140	DAY	\$16,368	\$2,291,520
<b>Subtotal:</b>				<b>\$7,971,731</b>
<b>ENHANCED NATURAL RECOVERY</b>				
Debris Sweep	0	ACRE	\$35,000	\$0
Shift Rate (12 hours)	0	DAY	\$16,000	\$0
Cap material procurement and delivery(Sand)	0	CY	\$25	\$0
Cap material procurement and delivery(4 to 8 in crushed spall rock)	0	CY	\$29	\$0
Cap material procurement and delivery(Pea Gravel)	0	CY	\$28	\$0
Cap material procurement and delivery(Fish Mix)	0	CY	\$44	\$0
Material Barge for Cap Material	0	DAY	\$1,200	\$0
Assist Tug	0	DAY	\$16,368	\$0
<b>Subtotal:</b>				<b>\$0</b>
<b>STANDBY TIME</b>				
Standby for Site Access	37	PER DAY	\$16,000	\$592,000
<b>Subtotal:</b>				<b>\$592,000</b>
<b>CONSTRUCTION QA/QC</b>				
Implementation Monitoring	666	PER DAY	\$5,000	\$3,330,000
<b>Subtotal:</b>				<b>\$3,330,000</b>
<b>Post-Remediation Compliance Monitoring</b>				
Compliance Testing (Dredging)	1	PER EVENT	\$1,068,613	\$1,068,613
Compliance Testing (Capping)	1	PER EVENT	\$232,700	\$232,700
Compliance Testing (ENR)	0	PER EVENT	\$170,000	\$0
Project Completion Report	1	LS	\$20,000	\$20,000
<b>Subtotal:</b>				<b>\$1,321,313</b>
<b>CAPITAL COST</b>				<b>\$173,499,315</b>
Construction Contingency				\$60,724,760
Sales Tax				\$15,267,940
Project Management and Remedial Design				\$52,049,795
Construction Management				\$17,349,932
Agency Review and Oversight				\$1,734,993
<b>TOTAL CAPITAL COST</b>				<b>\$320,626,734</b>
<b>OPERATIONS AND MAINTENANCE/MONITORING COSTS</b>				
Operations and Maintenance(Dredging)	1	LS	\$2,110,000	\$2,110,000
Operations and Maintenance(Capping)	1	LS	\$380,000	\$380,000
Operations and Maintenance(ENR)	0	LS	\$0	\$0
Operations and Maintenance(MNR)	1	LS	\$4,450,000	\$4,450,000
Long-term Monitoring	1	LS	\$2,080,000	\$2,080,000
<b>Subtotal:</b>				<b>\$9,020,000</b>
<b>TOTAL COST</b>				<b>\$329,646,700</b>

Notes:

1. All cost values are estimates, and should not be interpreted as final construction or project costs.
2. Operating season based on 120-day fish window requirements.
3. LS denotes Lump Sum
4. CY denotes Cubic Yard
5. Operations Maintenance and Monitoring Costs include rolled-up costs for O&M monitoring, O&M daily cost, cap repair costs and ENR repair costs.
6. 15-year PV applied to Operations Maintenance and Monitoring Costs

Table I-37 Alternative 4: Emphasis on Removal

4b: Achieve SQS by Year 10 Following End of Remedy Construction

LOWER DUWAMISH WATERWAY  
 SEDIMENT CLEANUP - FS ESTIMATE  
 SEATTLE, WASHINGTON

TASK	QUANTITY	UNIT	UNIT COST	TOTAL COST
<b>PRE-CONSTRUCTION</b>				
Mobilization, Demobilization and Site Restoration (Dredging and Capping)	6	PER EVENT	\$750,000	\$4,725,000
Land Lease for Operations and Staging	6	PER YEAR	\$250,000	\$1,575,000
Contractor Work Plan Submittals	6	PER YEAR	\$100,000	\$630,000
Barge Protection	1	LS	\$80,000	\$80,000
<b>Subtotal:</b>				<b>\$7,010,000</b>
<b>PROJECT MANAGEMENT (CONTRACTOR)</b>				
Labor and Supervision	32	MONTH	\$225,600	\$7,106,400
Construction Office and Operating Expense	32	MONTH	\$43,200	\$1,360,800
<b>Subtotal:</b>				<b>\$8,467,200</b>
<b>DREDGING</b>				
Debris Sweep	90.99653353	ACRE	\$50,000	\$4,549,827
Shift Rate (12 hours)	756	DAY	\$16,000	\$12,096,000
Shift Rate for Bank Areas with Obstructions (12 hours)	84	DAY	\$24,000	\$2,016,000
Gravity Dewatering (on the barge)	979,491	CY	\$2	\$1,958,982
Material Barge	840	DAY	\$1,800	\$1,512,000
Assist Tug	840	DAY	\$16,368	\$13,749,120
<b>Subtotal:</b>				<b>\$35,881,928</b>
<b>SEDIMENT HANDLING AND DISPOSAL</b>				
Transportation cost by barge to transloading facility	756	DAY	\$1,200	\$907,200
Assist Tug	756	DAY	\$21,120	\$15,966,720
Transloading Area Setup	1	LS	\$1,000,000	\$1,000,000
Water Management	756	DAY	\$10,000	\$7,560,000
Transloading Costs	1,469,236	TON	\$14.2	\$20,843,565
Railcar Transport to and Tipping at Subtitle D Landfill	1,469,236	TON	\$60	\$88,154,177
<b>Subtotal:</b>				<b>\$134,431,662</b>
<b>SEDIMENT CAPPING</b>				
Debris Sweep	6.6	ACRE	\$35,000	\$231,479
Shift Rate (12 hours)	150	DAY	\$16,000	\$2,400,000
Cap material procurement and delivery(Sand)	147,451	CY	\$25	\$3,654,721
Cap material procurement and delivery(4 to 8 in crushed spall rock)	0	CY	\$29	\$0
Cap material procurement and delivery(Pea Gravel)	0	CY	\$28	\$0
Cap material procurement and delivery(Fish Mix)	0	CY	\$44	\$0
Material Barge for Cap Material	150	DAY	\$1,200	\$180,000
Assist Tug	150	DAY	\$16,368	\$2,455,200
<b>Subtotal:</b>				<b>\$8,921,400</b>
<b>ENHANCED NATURAL RECOVERY</b>				
Debris Sweep	0	ACRE	\$35,000	\$0
Shift Rate (12 hours)	0	DAY	\$16,000	\$0
Cap material procurement and delivery(Sand)	0	CY	\$25	\$0
Cap material procurement and delivery(4 to 8 in crushed spall rock)	0	CY	\$29	\$0
Cap material procurement and delivery(Pea Gravel)	0	CY	\$28	\$0
Cap material procurement and delivery(Fish Mix)	0	CY	\$44	\$0
Material Barge for Cap Material	0	DAY	\$1,200	\$0
Assist Tug	0	DAY	\$16,368	\$0
<b>Subtotal:</b>				<b>\$0</b>
<b>STANDBY TIME</b>				
Standby for Site Access	42	PER DAY	\$16,000	\$672,000
<b>Subtotal:</b>				<b>\$672,000</b>
<b>CONSTRUCTION QA/QC</b>				
Implementation Monitoring	756	PER DAY	\$5,000	\$3,780,000
<b>Subtotal:</b>				<b>\$3,780,000</b>
<b>Post-Remediation Compliance Monitoring</b>				
Compliance Testing (Dredging)	1	PER EVENT	\$1,280,769	\$1,280,769
Compliance Testing (Capping)	1	PER EVENT	\$232,700	\$232,700
Compliance Testing (ENR)	0	PER EVENT	\$170,000	\$0
Project Completion Report	1	LS	\$20,000	\$20,000
<b>Subtotal:</b>				<b>\$1,533,470</b>
<b>CAPITAL COST</b>				<b>\$200,697,660</b>
Construction Contingency				\$70,244,181
Sales Tax				\$17,661,394
Project Management and Remedial Design				\$60,209,298
Construction Management				\$20,069,766
Agency Review and Oversight				\$2,006,977
<b>TOTAL CAPITAL COST</b>				<b>\$370,889,276</b>
<b>OPERATIONS AND MAINTENANCE/MONITORING COSTS</b>				
Operations and Maintenance(Dredging)	1	LS	\$2,650,000	\$2,650,000
Operations and Maintenance(Capping)	1	LS	\$380,000	\$380,000
Operations and Maintenance(ENR)	0	LS	\$0	\$0
Operations and Maintenance(MNR)	1	LS	\$3,570,000	\$3,570,000
Long-term Monitoring	1	LS	\$2,080,000	\$2,080,000
<b>Subtotal:</b>				<b>\$8,680,000</b>
<b>TOTAL COST</b>				<b>\$379,569,300</b>

Notes:

- All cost values are estimates, and should not be interpreted as final construction or project costs.
- Operating season based on 120-day fish window requirements.
- LS denotes Lump Sum
- CY denotes Cubic Yard
- Operations Maintenance and Monitoring Costs include rolled-up costs for O&M monitoring, O&M daily cost, cap repair costs and ENR repair costs.
- 15-year PV applied to Operations Maintenance and Monitoring Costs

**Table I-38 Alternative 4: Emphasis on Removal  
4c: Lower Action Levels For Human Health Risk Driver Chemicals**

LOWER DUWAMISH WATERWAY  
SEDIMENT CLEANUP - FS ESTIMATE  
SEATTLE, WASHINGTON

TASK	QUANTITY	UNIT	UNIT COST	TOTAL COST
<b>PRE-CONSTRUCTION</b>				
Mobilization, Demobilization and Site Restoration (Dredging and Capping)	7	PER EVENT	\$750,000	\$5,175,000
Land Lease for Operations and Staging	7	PER YEAR	\$250,000	\$1,725,000
Contractor Work Plan Submittals	7	PER YEAR	\$100,000	\$690,000
Barge Protection	1	LS	\$80,000	\$80,000
<b>Subtotal:</b>				<b>\$7,670,000</b>
<b>PROJECT MANAGEMENT (CONTRACTOR)</b>				
Labor and Supervision	35	MONTH	\$225,600	\$7,783,200
Construction Office and Operating Expense	35	MONTH	\$43,200	\$1,490,400
<b>Subtotal:</b>				<b>\$9,273,600</b>
<b>DREDGING</b>				
Debris Sweep	107	ACRE	\$50,000	\$5,350,000
Shift Rate (12 hours)	828	DAY	\$16,000	\$13,248,000
Shift Rate for Bank Areas with Obstructions (12 hours)	92	DAY	\$24,000	\$2,208,000
Gravity Dewatering (on the barge)	1,118,954	CY	\$2	\$2,237,908
Material Barge	920	DAY	\$1,800	\$1,656,000
Assist Tug	920	DAY	\$16,368	\$15,058,560
<b>Subtotal:</b>				<b>\$39,758,468</b>
<b>SEDIMENT HANDLING AND DISPOSAL</b>				
Transportation cost by barge to transloading facility	828	DAY	\$1,200	\$993,600
Assist Tug	828	DAY	\$21,120	\$17,487,360
Transloading Area Setup	1	LS	\$1,000,000	\$1,000,000
Water Management	828	DAY	\$10,000	\$8,280,000
Transloading Costs	1,678,431	TON	\$14.2	\$23,811,345
Railcar Transport to and Tipping at Subtitle D Landfil	1,678,431	TON	\$60	\$100,705,877
<b>Subtotal:</b>				<b>\$152,278,182</b>
<b>SEDIMENT CAPPING</b>				
Debris Sweep	7.3	ACRE	\$35,000	\$256,073
Shift Rate (12 hours)	170	DAY	\$16,000	\$2,720,000
Cap material procurement and delivery(Sand)	170,757	CY	\$25	\$4,232,383
Cap material procurement and delivery(4 to 8 in crushed spall rock)		0 CY	\$29	\$0
Cap material procurement and delivery(Pea Gravel)		0 CY	\$28	\$0
Cap material procurement and delivery(Fish Mix)		0 CY	\$44	\$0
Material Barge for Cap Material	170	DAY	\$1,200	\$204,000
Assist Tug	170	DAY	\$16,368	\$2,782,560
<b>Subtotal:</b>				<b>\$10,195,017</b>
<b>ENHANCED NATURAL RECOVERY</b>				
Debris Sweep	0	ACRE	\$35,000	\$0
Shift Rate (12 hours)	0	DAY	\$16,000	\$0
Cap material procurement and delivery(Sand)	0	CY	\$25	\$0
Cap material procurement and delivery(4 to 8 in crushed spall rock)	0	CY	\$29	\$0
Cap material procurement and delivery(Pea Gravel)	0	CY	\$28	\$0
Cap material procurement and delivery(Fish Mix)	0	CY	\$44	\$0
Material Barge for Cap Material	0	DAY	\$1,200	\$0
Assist Tug	0	DAY	\$16,368	\$0
<b>Subtotal:</b>				<b>\$0</b>
<b>STANDBY TIME</b>				
Standby for Site Access	46	PER DAY	\$16,000	\$736,000
<b>Subtotal:</b>				<b>\$736,000</b>
<b>CONSTRUCTION QA/QC</b>				
Implementation Monitoring	828	PER DAY	\$5,000	\$4,140,000
<b>Subtotal:</b>				<b>\$4,140,000</b>
<b>Post-Remediation Compliance Monitoring</b>				
Compliance Testing (Dredging)	1	PER EVENT	\$1,444,600	\$1,444,600
Compliance Testing (Capping)	1	PER EVENT	\$241,884	\$241,884
Compliance Testing (ENR)	0	PER EVENT	\$170,000	\$0
Project Completion Report	1	LS	\$20,000	\$20,000
<b>Subtotal:</b>				<b>\$1,706,484</b>
<b>CAPITAL COST</b>				
Construction Contingency				\$79,015,213
Sales Tax				\$19,866,682
Project Management and Remedial Design				\$67,727,325
Construction Management				\$22,575,775
Agency Review and Oversight				\$2,257,578
<b>TOTAL CAPITAL COST</b>				<b>\$417,200,325</b>
<b>OPERATIONS AND MAINTENANCE/MONITORING COSTS</b>				
Operations and Maintenance(Dredging)	1	LS	\$3,070,000	\$3,070,000
Operations and Maintenance(Capping)	1	LS	\$410,000	\$410,000
Operations and Maintenance(ENR)	0	LS	\$0	\$0
Operations and Maintenance(MNR)	1	LS	\$2,300,000	\$2,300,000
Long-term Monitoring	1	LS	\$2,080,000	\$2,080,000
<b>Subtotal:</b>				<b>\$7,860,000</b>
<b>TOTAL COST</b>				<b>\$425,060,300</b>

Notes:

1. All cost values are estimates, and should not be interpreted as final construction or project costs.
2. Operating season based on 120-day fish window requirements.
3. LS denotes Lump Sum
4. CY denotes Cubic Yard
5. Operations Maintenance and Monitoring Costs include rolled-up costs for O&M monitoring, O&M daily cost, cap repair costs and ENR repair costs.
6. 15-year PV applied to Operations Maintenance and Monitoring Costs



**Table I-39 Alternative 4: Emphasis on Removal  
4d: Achieve SQS at the End of Remedy Construction. Treatment of Dredged Material**

LOWER DUWAMISH WATERWAY  
SEDIMENT CLEANUP - FS ESTIMATE  
SEATTLE, WASHINGTON

TASK	QUANTITY	UNIT	UNIT COST	TOTAL COST
<b>PRE-CONSTRUCTION</b>				
Mobilization, Demobilization and Site Restoration (Dredging and Capping)	9	PER EVENT	\$750,000	\$6,468,750
Land Lease for Operations and Staging	9	PER YEAR	\$250,000	\$2,156,250
Contractor Work Plan Submittals	9	PER YEAR	\$100,000	\$862,500
Barge Protection	1	LS	\$80,000	\$80,000
<b>Subtotal:</b>				<b>\$9,567,500</b>
<b>PROJECT MANAGEMENT (CONTRACTOR)</b>				
Labor and Supervision	43	MONTH	\$225,600	\$9,729,000
Construction Office and Operating Expense	43	MONTH	\$43,200	\$1,863,000
<b>Subtotal:</b>				<b>\$11,592,000</b>
<b>DREDGING</b>				
Debris Sweep	131	ACRE	\$50,000	\$6,550,000
Shift Rate (12 hours)	1,035	DAY	\$16,000	\$16,560,000
Shift Rate for Bank Areas with Obstructions (12 hours)	115	DAY	\$24,000	\$2,760,000
Gravity Dewatering (on the barge)	1,383,774	CY	\$2	\$2,767,547
Material Barge	1,150	DAY	\$1,800	\$2,070,000
Assist Tug	1,150	DAY	\$16,368	\$18,823,200
<b>Subtotal:</b>				<b>\$49,530,747</b>
<b>SEDIMENT HANDLING AND DISPOSAL</b>				
Transportation cost by barge to transloading facility	1,035	DAY	\$1,200	\$1,242,000
Assist Tug	1,035	DAY	\$21,120	\$21,859,200
Transloading Area Setup	1	LS	\$1,000,000	\$1,000,000
Water Management	1,035	DAY	\$10,000	\$10,350,000
Transloading Costs	1,037,830	TON	\$14.2	\$14,723,352
Railcar Transport to and Tipping at Subtitle D Landfil	1,037,830	TON	\$60	\$62,269,817
<b>Subtotal:</b>				<b>\$111,444,369</b>
<b>SEDIMENT CAPPING</b>				
Debris Sweep	8.9	ACRE	\$35,000	\$311,000
Shift Rate (12 hours)	200	DAY	\$16,000	\$3,200,000
Cap material procurement and delivery(Sand)	208,837	CY	\$25	\$5,176,223
Cap material procurement and delivery(4 to 8 in crushed spall rock)	0	CY	\$29	\$0
Cap material procurement and delivery(Pea Gravel)	0	CY	\$28	\$0
Cap material procurement and delivery(Fish Mix)	0	CY	\$44	\$0
Material Barge for Cap Material	200	DAY	\$1,200	\$240,000
Assist Tug	200	DAY	\$16,368	\$3,273,600
<b>Subtotal:</b>				<b>\$12,200,823</b>
<b>ENHANCED NATURAL RECOVERY</b>				
Debris Sweep	0	ACRE	\$35,000	\$0
Shift Rate (12 hours)	0	DAY	\$16,000	\$0
Cap material procurement and delivery(Sand)	0	CY	\$25	\$0
Cap material procurement and delivery(4 to 8 in crushed spall rock)	0	CY	\$29	\$0
Cap material procurement and delivery(Pea Gravel)	0	CY	\$28	\$0
Cap material procurement and delivery(Fish Mix)	0	CY	\$44	\$0
Material Barge for Cap Material	0	DAY	\$1,200	\$0
Assist Tug	0	DAY	\$16,368	\$0
<b>Subtotal:</b>				<b>\$0</b>
<b>TREATMENT BY SOIL WASHING</b>				
Mobilization/Demobilization and Site Layou	1	LS	\$4,000,000	\$4,000,000
Soil Washing, Mechanical Dewatering and Water Treatment	691,887	CY	\$120	\$83,026,422
Treated Sand Disposal	345,943	CY	\$0	\$0
<b>Subtotal:</b>				<b>\$87,026,422</b>
<b>STANDBY TIME</b>				
Standby for Site Access	58	PER DAY	\$16,000	\$920,000
<b>Subtotal:</b>				<b>\$920,000</b>
<b>CONSTRUCTION QA/QC</b>				
Implementation Monitoring	1,035	PER DAY	\$5,000	\$5,175,000
<b>Subtotal:</b>				<b>\$5,175,000</b>
<b>Post-Remediation Compliance Monitoring</b>				
Compliance Testing (Dredging)	1	PER EVENT	\$1,687,800	\$1,687,800
Compliance Testing (Capping)	1	PER EVENT	\$261,694	\$261,694
Compliance Testing (ENR)	0	PER EVENT	\$0	\$0
Project Completion Report	1	LS	\$20,000	\$20,000
<b>Subtotal:</b>				<b>\$1,969,494</b>
<b>CAPITAL COST</b>				<b>\$289,426,356</b>
Construction Contingency				\$101,299,224
Sales Tax				\$25,469,519
Project Management and Remedial Design				\$86,827,907
Construction Management				\$28,942,636
Agency Review and Oversight				\$2,894,264
<b>TOTAL CAPITAL COST</b>				<b>\$534,859,905</b>
<b>OPERATIONS AND MAINTENANCE/MONITORING COSTS</b>				
Operations and Maintenance(Dredging)	1	LS	\$3,680,000	\$3,680,000
Operations and Maintenance(Capping)	1	LS	\$480,000	\$480,000
Operations and Maintenance(ENR)	0	LS	\$0	\$0
Operations and Maintenance(MNR)	0	LS	\$0	\$0
Long-term Monitoring	1	LS	\$2,080,000	\$2,080,000
<b>Subtotal:</b>				<b>\$6,240,000</b>
<b>TOTAL COST</b>				<b>\$541,099,900</b>

Notes:

1. All cost values are estimates, and should not be interpreted as final construction or project costs.
2. Operating season based on 120-day fish window requirements.
3. LS denotes Lump Sum
4. CY denotes Cubic Yard
5. Operations Maintenance and Monitoring Costs include rolled-up costs for O&M monitoring, O&M daily cost, cap repair costs and ENR repair costs.
6. 15-year PV applied to Operations Maintenance and Monitoring Costs

**Table I-40 Alternative 5: Emphasis on Removal. Mechanically Dredge SMAs that Exceed RALs (SQS Exceedances and Tot**

LOWER DUWAMISH WATERWAY  
 SEDIMENT CLEANUP - FS ESTIMATE  
 SEATTLE, WASHINGTON

TASK	QUANTITY	UNIT	UNIT COST	TOTAL COST
<b>PRE-CONSTRUCTION</b>				
Mobilization, Demobilization and Site Restoration (Dredging and Capping)	19	PER EVENT	\$750,000	\$14,175,000
Land Lease for Operations and Staging	19	PER YEAR	\$250,000	\$4,725,000
Contractor Work Plan Submittals	19	PER YEAR	\$100,000	\$1,890,000
Barge Protection	1	LS	\$80,000	\$80,000
<b>Subtotal:</b>				<b>\$20,870,000</b>
<b>PROJECT MANAGEMENT (CONTRACTOR)</b>				
Labor and Supervision	95	MONTH	\$225,600	\$21,319,200
Construction Office and Operating Expense	95	MONTH	\$43,200	\$4,082,400
<b>Subtotal:</b>				<b>\$25,401,600</b>
<b>DREDGING</b>				
Debris Sweep	290	ACRE	\$50,000	\$14,500,000
Shift Rate (12 hours)	2,268	DAY	\$16,000	\$36,288,000
Shift Rate for Bank Areas with Obstructions (12 hours)	252	DAY	\$16,000	\$4,032,000
Gravity Dewatering (on the barge)	2,876,836	CY	\$2	\$5,753,672
Material Barge	2,520	DAY	\$1,800	\$4,536,000
Assist Tug	2,520	DAY	\$16,368	\$41,247,360
<b>Subtotal:</b>				<b>\$106,357,032</b>
<b>SEDIMENT HANDLING AND DISPOSAL</b>				
Transportation cost by barge to transloading facility	2,268	DAY	\$1,200	\$2,721,600
Assist Tug	2,268	DAY	\$21,120	\$47,900,160
Transloading Area Setup	1	LS	\$1,000,000	\$1,000,000
Water Management	2,268	DAY	\$10,000	\$22,680,000
Transloading Costs	4,315,254	TON	\$14.2	\$61,219,070
Railcar Transport to and Tipping at Subtitle D Landfill	4,315,254	TON	\$60	\$258,915,240
<b>Subtotal:</b>				<b>\$394,436,070</b>
<b>SEDIMENT CAPPING</b>				
Debris Sweep	9.4	ACRE	\$35,000	\$328,274
Shift Rate (12 hours)	280	DAY	\$16,000	\$4,480,000
Cap material procurement and delivery(Sand)	404,100	CY	\$25	\$10,016,033
Cap material procurement and delivery(4 to 8 in crushed spall rock	0	CY	\$29	\$0
Cap material procurement and delivery(Pea Gravel)	0	CY	\$28	\$0
Cap material procurement and delivery(Fish Mix)	0	CY	\$44	\$0
Material Barge for Cap Material	280	DAY	\$1,200	\$336,000
Assist Tug	280	DAY	\$16,368	\$4,583,040
<b>Subtotal:</b>				<b>\$19,743,348</b>
<b>ENHANCED NATURAL RECOVERY</b>				
Debris Sweep	0	ACRE	\$35,000	\$0
Shift Rate (12 hours)	0	DAY	\$16,000	\$0
Cap material procurement and delivery(Sand)	0	CY	\$25	\$0
Cap material procurement and delivery(4 to 8 in crushed spall rock	0	CY	\$29	\$0
Cap material procurement and delivery(Pea Gravel)	0	CY	\$28	\$0
Cap material procurement and delivery(Fish Mix)	0	CY	\$44	\$0
Material Barge for Cap Material	0	DAY	\$1,200	\$0
Assist Tug	0	DAY	\$16,368	\$0
<b>Subtotal:</b>				<b>\$0</b>
<b>STANDBY TIME</b>				
Standby for Site Access	126	PER DAY	\$16,000	\$2,016,000
<b>Subtotal:</b>				<b>\$2,016,000</b>
<b>CONSTRUCTION QA/QC</b>				
Implementation Monitoring	2,268	PER DAY	\$5,000	\$11,340,000
<b>Subtotal:</b>				<b>\$11,340,000</b>
<b>Post-Remediation Compliance Monitoring</b>				
Compliance Testing (Dredging)	1	PER EVENT	\$3,257,000	\$3,257,000
Compliance Testing (Capping)	1	PER EVENT	\$267,038	\$267,038
Compliance Testing (ENR)	0	PER EVENT	\$0	\$0
Project Completion Report	1	LS	\$20,000	\$20,000
<b>Subtotal:</b>				<b>\$3,544,038</b>
<b>CAPITAL COST</b>				
Construction Contingency				\$204,297,831
Sales Tax				\$51,366,312
Project Management and Remedial Design				\$175,112,426
Construction Management				\$58,370,809
Agency Review and Oversight				\$5,837,081
<b>TOTAL CAPITAL COST</b>				<b>\$1,078,692,545</b>
<b>OPERATIONS AND MAINTENANCE/MONITORING COSTS</b>				
Operations and Maintenance(Dredging)	1	LS	\$7,600,000	\$7,600,000
Operations and Maintenance(Capping)	1	LS	\$500,000	\$500,000
Operations and Maintenance(ENR)	0	LS	\$0	\$0
Operations and Maintenance(MNR)	0	LS	\$0	\$0
Long-term Monitoring	1	LS	\$2,080,000	\$2,080,000
<b>Subtotal:</b>				<b>\$10,180,000</b>
<b>TOTAL COST</b>				<b>\$1,088,872,500</b>

Notes:

1. All cost values are estimates, and should not be interpreted as final construction or project costs.
2. Operating season based on 120-day fish window requirements.
3. LS denotes Lump Sum
4. CY denotes Cubic Yard
5. Operations Maintenance and Monitoring Costs include rolled-up costs for O&M monitoring, O&M daily cost, cap repair costs and ENR repair costs.
6. 15-year PV applied to Operations Maintenance and Monitoring Costs

**Table I-41 Summary of Costs**

LOWER DUWAMISH WATERWAY  
 SEDIMENT CLEANUP - FS ESTIMATE  
 SEATTLE, WASHINGTON

Alternative Number <sup>a</sup>	1	2	3a	3b	3c	3d	4a	4b	4c	4d	5
<b>Capital Cost</b>	\$0	\$137,987,075	\$171,147,081	\$184,922,304	\$224,682,842	\$258,204,751	\$320,626,734	\$370,889,276	\$417,200,325	\$534,859,905	\$1,078,692,545
<b>Indirect Construction Cost</b>	\$0	\$10,920,000	\$11,240,000	\$10,990,000	\$10,750,000	\$9,570,000	\$9,020,000	\$8,680,000	\$7,860,000	\$6,240,000	\$10,180,000
<b>Total Cost</b>	<b>\$50,000,000a</b>	<b>\$148,907,100</b>	<b>\$182,387,100</b>	<b>\$195,912,300</b>	<b>\$235,432,800</b>	<b>\$267,774,800</b>	<b>\$329,646,700</b>	<b>\$379,569,300</b>	<b>\$425,060,300</b>	<b>\$541,099,900</b>	<b>\$1,088,872,500</b>

Notes:

1. Capital cost includes construction contingency, sales tax, engineering, procurement, and construction management.
  2. Indirect construction cost includes operations and maintenance (dredging, capping, ENR, and MNR) and long-term monitoring.
- <sup>a</sup>Total costs for Alternatives 2 through 5 do not include EAA costs.