

Appendix D

Simplified Terrestrial Ecological Evaluation

APPENDIX D

PORT GAMBLE RI/FS

TERRESTRIAL ECOLOGICAL EVALUATION NOTES

Soil concentrations considered protective of terrestrial ecological receptors (plants and animals) were developed using a simplified TEE (WAC 173-340-7492). Site-specific terrestrial ecological evaluation is not required for the Site because it does not meet any of the criteria in WAC 173-340-7491(2).

Consistent with WAC 173-340-7492(1)(d), chemical concentrations listed in Table 749-2 of WAC 173-340-900, which are based on protection of terrestrial ecological receptors, were used in developing preliminary cleanup levels for constituents detected in soil, obtained from Table 749-2 of WAC 173-340-900. The existing and planned future uses of the Site are open space and residential; therefore, the simplified TEE unrestricted site cleanup levels are appropriate and are included in Table 2.

Two of the final excavation sidewall performance samples collected during the 2002 IRM in Area 2 were slightly greater than the simplified TEE cleanup level for lead of 220 mg/kg (270 mg/kg in sample PS-72B, and 230 mg/kg in sample PS-122S). These detected lead concentrations were, however, within the requirements for statistical compliance as allowed by Section 173-340-740(7) of the MTCA regulation.

The dataset of the performance sampling results was analyzed using MTCASat to determine compliance parameters based on the distribution of the data. The calculated true mean of the data is 78 mg/kg. Because the data were neither normally nor lognormally distributed, the Z-statistic was used to calculate the 95 percent upper confidence level (UCL 95). Using this method, the UCL 95 around the true mean is 98 mg/kg. This results in a UCL 95 that is less than the 220 mg/kg TEE cleanup level for lead in soil. This MTCASat report is presented as Appendix D of the *2012 Remedial Investigation/Feasibility Study*.

The performance sampling data set for the limits of the remedial excavation therefore comply with the MTCA Method A Soil Cleanup Level for Unrestricted Land Uses since:

1. No more than 10 percent of sample results exceed the 220 mg/kg cleanup level for lead (i.e., two of 31 final performance samples from the Area 2 excavation, or 6.5 percent)
2. No single sample is more than twice the cleanup level (i.e., maximum concentration is 270 mg/kg)
3. The UCL 95 around the true mean is less than the cleanup level (i.e., the UCL 95 is 98 mg/kg).

Based upon this analysis of the performance sampling dataset, the remaining in-place soil at the 2002 IRM excavation in Area 2 is currently in compliance with the TEE soil standard. Therefore, no further remedial action is required or necessary at this location.

Determine if Site Qualifies for Exclusion. This step of the TEE is conducted to determine if there is a potential for concentrations of chemicals in Site soils to pose a risk to soil biota, plants, or wildlife. The Site may be excluded from the TEE process if there is an incomplete exposure pathway from contaminants in soil to terrestrial ecological receptors (based on current or future Site use); or if there is no habitat for terrestrial ecological receptors in the area(s) of the Site where contaminants are located; or, if concentrations of Site contaminants are at or lower than natural background levels. If Site conditions meet any one of the Primary Exclusions, the TEE process is complete. If Site conditions do not meet any of the four exclusions (as in the case for this Site), the TEE process continues to determine whether a Simplified or Site-specific TEE assessment is warranted.

Determine if a Simplified TEE can be Performed. The type of TEE required is dependant upon four Site-specific conditions. If none of the four conditions exist at the site being evaluated, then a Simplified TEE can be performed; otherwise, a Site-specific TEE is required. The Site qualifies for a Simplified TEE based on the following:

1. The Site is not located on or directly adjacent to an area where management or land use plans will maintain or restore native or semi-native vegetation.
2. The Site is not used by either a) threatened or endangered species; b) wildlife species classified by Ecology as "priority species" or "species of concern" under Title 77 Revised Code of Washington (RCW); or c) plant species classified by Washington State Department of Natural Resources Natural Heritage Program as "endangered," "threatened," or "sensitive."
3. The Site is not located on an area of land containing at least 10 acres of native vegetation within 500 feet of the area of contamination.
4. Ecology has not determined that the Site may present a risk to significant wildlife populations.

Though there are small pockets of undeveloped land within a 500-foot offset from Site boundaries, they do not represent a significant amount of habitat and are not related to the Site by historical operations.

Determine if Simplified TEE can be Ended - Exposure Analysis

The following exposure analysis is based on the following questions and scoring results:

1. Based on the lack of significant native vegetation or suitable wildlife habitat, a simplified TEE is appropriate. The total area of soil contamination at the Site is not less than or equal to 350 square feet. The Site is approximate 25 acres.
2. Land use at the Site and surrounding area does not make substantial wildlife use unlikely based on Ecology Table 749-1. The scoring from Ecology Table 749-1 is presented below:
 - a. The area of the Site is estimated to be approximately 25 acres (12 points).
 - b. The Site will be a residential or open space property (1 point).
 - c. The habitat quality of the Site is rated as Low (3 points).
 - d. The undeveloped land is unlikely attract wildlife (2 points).
 - e. There are some of the indicated chemicals present at concentrations above screening levels (1 point).
 - f. The sum of the points from "b" through "e" is 7, which is less than the score of "a" resulting in continuation of the Simplified TEE. If the sum of "b" through "e" is greater than "a," the TEE process could end.

Pathway and Contaminant Evaluation Given that the Simplified TEE process could not be ended based on the Exposure Analysis, a pathway and contaminant evaluation was performed. Since the planned future land use at the Site is residential or open space, the wildlife exposure pathways for priority chemicals of ecological concern listed in [Table 749-2](http://www.ecy.wa.gov/programs/tcp/policies/terrestrial/table_749-2.htm) (http://www.ecy.wa.gov/programs/tcp/policies/terrestrial/table_749-2.htm) at or above the unrestricted concentrations was considered. While there is a small chance of exposure, it is unlikely that a contaminant pathway for wildlife would be complete due to the lack of suitable habitat. Further, the detected Site concentrations are below those listed for unrestricted land use sites in Ecology's Priority Contaminants of Ecological Concern for Sites that Qualify for the Simplified Terrestrial Ecological Evaluation (Table 749-2), with the exception of dioxins.

Based on the Simplified TEE, soils at the Site are unlikely to pose a substantial threat of significant adverse effects to terrestrial ecological receptors and no further terrestrial ecological evaluation is required for any of the contaminants listed in Table 749-2. A site-specific ecological evaluation was performed to evaluate the risk to ecological receptors from total dioxin/furan TEQ. This evaluation is presented in the March 30, 2016 Port Gamble Mill Site Earthworm Bioaccumulation Data memorandum.

Appendix E

Potential Climate Change Vulnerability

Appendix E Potential Climate Change Vulnerability

- **Seismic stability of shoreline slopes:**
 - The Port Gamble Bay EDR discusses seismic shoreline stability in detail (Appendix C); the steepest and tallest slopes were evaluated and found to have an anticipated deformation range of 3 to 6 inches due to an earthquake, which is less than the cap thickness and not problematic
 - Deformation would be identified and repaired in the event of an earthquake as set forth in the Port Gamble Bay Operations, Maintenance and Monitoring Plan
 - The southern shoreline is not as steep, and not as tall as the shoreline evaluated in the EDR, so conditions are expected to be even more stable
 - Deformation analyses conducted to assess the seismic question indicate expected movement of 0.5 to 1 inches for the south shoreline, which is negligible
- **Stability of shoreline slope under inundated upland conditions:**
 - Inundated upland future conditions could result from sea level rise and/or increased frequency of severe storms
 - Even under inundated conditions on the Mill Site uplands, shoreline slope stability would be maintained well within engineering safety factors targeted in the EDR
- **Sea level rise:**
 - A scenario-based evaluation of potential sea-level rise in the next 100 years (i.e., by 2120) was conducted, using a range of sea-level rise predictions following Ecology and other guidance and building on Washington Sea Grant (2018) projections
 - Sea-level rise estimates range from 2.5 to 4.0 ft; in 100 years, king tides (the highest tides of the year) under the upper end of sea-level rise scenarios considered could extend up to approximately elevation +15.5 ft mean lower low water (MLLW)
 - Note that the current Mill Site uplands are above elevation +15.5 ft MLLW, and are anticipated to increase in the future to accommodate residential and/or commercial redevelopment)

Table E-1
Tide Levels for NOAA Station 9445016

Tide Type	Tide Level (feet MLLW)
Mean Higher High Water (MHHW)	10.2
Mean High Water (MHW)	9.3
Mean Tide Level (MTL)	6.0
Mean Sea Level (MSL)	6.0
Mean Low Water (MLW)	2.8
Mean Lower Low Water (MLLW)	0.0

- Highest astronomical tide around 11.5 feet MLLW (based on tide predictions at the same NOAA Station).

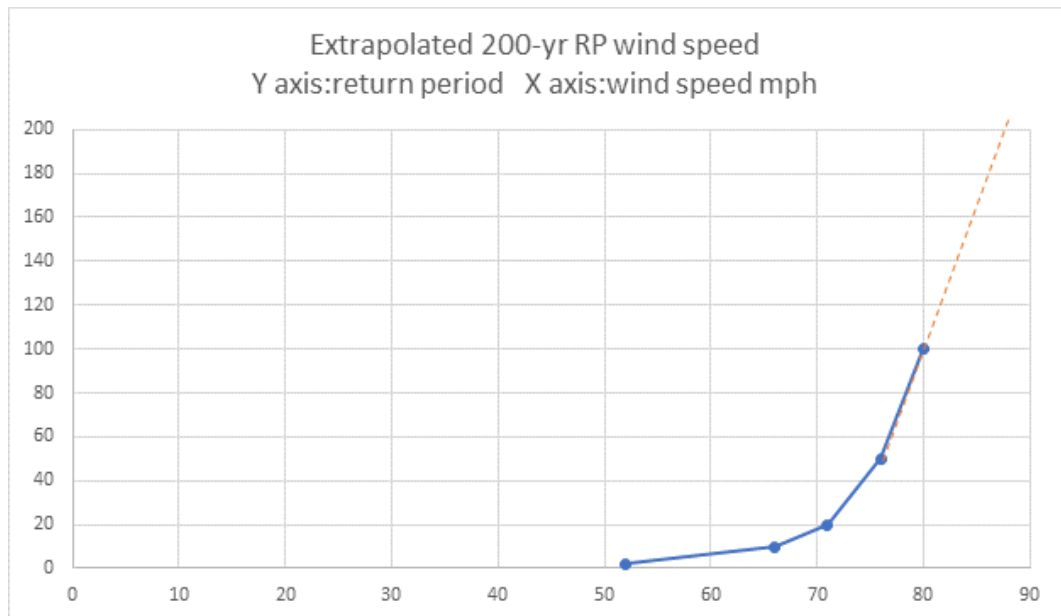
19-year period (Low RCP 4.5):	0	0.5	1	1.5	2	2.5	3	4	5	6	7	8	9	10
2010	92	0	0	0	0	0	0	0	0	0	0	0	0	0
2020	96	1	0	0	0	0	0	0	0	0	0	0	0	0
2030	98	23	0	0	0	0	0	0	0	0	0	0	0	0
2040	98	55	3	0	0	0	0	0	0	0	0	0	0	0
2050	99	75	19	1	0	0	0	0	0	0	0	0	0	0
2060	99	86	42	8	1	0	0	0	0	0	0	0	0	0
2070	99	91	60	22	5	1	0	0	0	0	0	0	0	0

2080	99	93	72	39	13	4	1	0	0	0	0	0	0	0
2090	99	95	79	52	25	9	3	1	0	0	0	0	0	0
2100	99	96	85	64	39	19	8	2	1	0	0	0	0	0
2110	99	96	88	71	49	29	14	3	1	1	0	0	0	0
2120	99	96	89	76	57	38	22	6	2	1	1	0	0	0
2130	99	96	91	80	64	46	30	10	4	2	1	1	0	0
2140	99	96	91	81	68	53	38	16	6	3	2	1	1	0
2150	99	96	92	84	72	59	44	21	9	4	2	1	1	1
19-year period (High RCP 8.5):	0	0.5	1	1.5	2	2.5	3	4	5	6	7	8	9	10
2010	91	0	0	0	0	0	0	0	0	0	0	0	0	0
2020	97	1	0	0	0	0	0	0	0	0	0	0	0	0
2030	98	22	0	0	0	0	0	0	0	0	0	0	0	0
2040	99	57	3	0	0	0	0	0	0	0	0	0	0	0
2050	99	79	24	2	0	0	0	0	0	0	0	0	0	0
2060	99	90	50	11	1	0	0	0	0	0	0	0	0	0
2070	100	95	72	33	8	2	1	0	0	0	0	0	0	0
2080	100	97	84	55	24	8	2	0	0	0	0	0	0	0
2090	100	98	90	71	43	20	8	1	0	0	0	0	0	0
2100	100	98	94	81	61	38	20	4	1	0	0	0	0	0
2110	100	99	95	85	67	45	26	6	2	1	0	0	0	0
2120	100	99	97	90	77	59	40	14	4	2	1	1	0	0
2130	100	99	98	93	83	69	52	23	8	4	2	1	1	0

2140	100	99	98	94	87	76	62	33	14	6	3	2	1	1
2150	100	99	98	95	90	81	70	43	22	10	5	3	2	1

- **Increase storm intensity:**

- In 100 years, higher wind speeds could increase the significant storm wave height from approximately 3.5 to 4.5 feet, assuming the current estimated 200-year wind speed is approximately the 100-yr wind speed by 2120
- Increased wind speeds could potentially require 1.0-foot shoreline armor stone to ensure stability
- The current shoreline cap includes armor stone up to roughly 1.2 feet diameter placed to the top of bank in part to accommodate potential future sea-level rise



- **Tidal pumping:**

- Reible modeling was conducted to evaluate risks from increased tidal pumping; using conservative assumptions (doubling tidal pumping of shallow groundwater)
- Modeled dioxin/furan concentrations in groundwater and surface water would be reduced from baseline conditions, maintaining protectiveness

Appendix F

Feasibility Study Alternative Cost Estimates

Table G-1
Alternative 6 - Cost Estimate

<u>Description</u>	<u>Quantity</u>	<u>Units</u>	<u>Unit Cost</u>	<u>Total Cost</u>
<i>Indirect Costs</i>				
Project Management	1	LS	\$56,018	\$56,018
Remedial Design	1	LS	\$560,180	\$560,180
Construction Management	1	LS	\$280,090	\$280,090
Ecology Oversight	1	LS	\$56,018	\$56,018
Stockpile characterization	26	ea	\$1,000	\$25,838
Confirmatory sampling	130	ea	\$1,000	\$129,910
Long-term Monitoring	0	LS	\$0	\$0
Contingency (20%)				\$221,611
Subtotal Indirect Costs				<u>\$1,108,054</u>
<i>Capital Costs</i>				
Mobilization/Demobilization	1	LS	\$75,000	\$75,000
Temporary Erosion and Sediment Controls	6	acre	\$5,000	\$30,577
Survey	1	LS	\$20,000	\$20,000
Concrete/Asphalt removal (demolition, processing, transportation, and disposal)	11,611	SY	\$20	\$232,220
Concrete/Asphalt perforation	0	SY	\$4	\$0
Soil Excavation and stockpiling	18,597	CY	\$10.50	\$195,263
Bank Excavation and stockpiling	20,161	CY	\$18	\$362,898
Bank Pile removal	300	Ea	\$155	\$46,500
Intertidal Capping	4,508	SY	\$14	\$63,117
Intertidal backfill/capping	9,170	CY	\$10	\$91,700
Purchase, place, compact a 2-foot thick clean cap (includes geotextile marker layer)	0	SY	\$14	\$0
Excavation benching (below 8 feet)	1,000	LF	\$20	\$20,000
Excavation dewatering	1	LS	\$50,000	\$50,000
Purchase, place, compact clean imported backfill	8,907	CY	\$10	\$89,071
Place and compact re-used backfill	9,689	CY	\$4	\$38,758
Purchase and place 6 inches of topsoil	12,991	SY	\$6	\$77,946
Transportation and Disposal (Commercial Landfill)	29,068	CY	\$112	\$3,255,630
Transportation and Disposal (Model Airplane Field)	0	CY	\$25	\$0
Hydro seeding	12,991	SY	\$2	\$19,487
Contingency (20%)				\$933,633
Subtotal Capital Costs				<u>\$5,601,800</u>
TOTAL				<u>\$6,709,854</u>

Table G-1
Alternative 6 - Cost Estimate

Assumptions:

Project Management estimated at 1% of capital costs.

No long-term monitoring costs included for this complete removal alternative.

Remedial Design including pre-design characterization and permitting; estimated at 10% of capital costs.

Construction Management estimated at 5% of capital costs.

Ecology Oversight estimated at 1% of capital costs.

Stockpile characterization testing estimate based on analytical cost for dioxin/furans, one sample per 1,500 cubic yards of excavation.

Confirmatory sampling based on analytical cost for dioxin/furans, one sample approximately every 100 SY within excavation areas.

Mob/demob, temporary erosion and sediment controls, and survey costs based on professional judgement and costs from similar projects (e.g. Model Airplane Field).

Concrete/asphalt removal cost is based on actual costs from in-water cleanup. Assumes slab thickness of 4 inches, actual thickness could vary.

Soil Excavation and stockpiling based on professional judgement and costs from similar projects, including the in-water cleanup project.

Bank Excavation and stockpiling based on professional judgement and costs from similar projects, including the in-water cleanup project.

Removal of buried piling in the bank excavation estimate is based on experience during in-water work (cost and quantities).

Cost for the 2-foot thick clean cap is based on professional judgement and costs from the Model Airplane Field project including material costs from the nearby Zimmer Pit.

Excavation benching cost assumes minimal shoring required (i.e. additional slope excavation to create a bench, 2 CY/linear foot). To be refined during design.

Dewatering assumes labor and equipment rental for baker tank(s), pumps, and filtration system. Details/equipment requirements to be determined during design.

Purchase, place, compact clean imported backfill cost based on costs from the Model Airplane Field project including material costs from the nearby Zimmer Pit.

Place and compact re-used backfill; assumed 25% of stockpiled soil can be re-used as backfill after stockpile characterization (<45 ng/kg dioxin/furan TEQ)

Topsoil and hydroseeding costs based on professional judgement and costs from similar projects including the Model Airplane Field project.

Commercial landfill transportation and disposal costs are based on actual costs from in-water cleanup.

Assumed 75% of stockpiled soil requires commercial landfill disposal after stockpile characterization (>45 ng/kg dioxin/furan TEQ)

Note : *These estimates are developed using current and generally accepted engineering cost estimation methods. Note that these estimates are based on assumptions concerning future events and actual costs may be affected by known and unknown risks including, but not limited to, changes in general economic and business conditions, site conditions that were unknown to Anchor QEA, LLC at the time the estimates were performed, future changes in site conditions, regulatory or enforcement policy changes, and delays in performance. Actual costs may vary from these estimates and such variations may be material. Anchor QEA, LLC is not licensed as accountants or securities attorneys and, therefore, make no representations that these costs form an appropriate basis for complying with financial reporting requirements for such costs.*

Table G-2
Alternative 7A - Cost Estimate

<u>Description</u>	<u>Quantity</u>	<u>Units</u>	<u>Unit Cost</u>	<u>Total Cost</u>
<i>Indirect Costs</i>				
Project Management	1	LS	\$48,315	\$48,315
Remedial Design	1	LS	\$483,151	\$483,151
Construction Management	1	LS	\$241,576	\$241,576
Ecology Oversight	1	LS	\$48,315	\$48,315
Stockpile characterization testing	22	ea	\$1,000	\$21,520
Confirmatory sampling	88	ea	\$1,000	\$88,180
Long-term Monitoring	1	LS	\$97,555	\$97,555
Contingency (20%)				\$205,723
Subtotal Indirect Costs				\$1,234,336
<i>Capital Costs</i>				
Mobilization/Demobilization	1	LS	\$75,000	\$75,000
Temporary Erosion and Sediment Controls	6	acre	\$5,000	\$30,577
Survey	1	LS	\$15,000	\$15,000
Concrete/Asphalt removal (demolition, processing, transportation, and disposal)	11611	SY	\$20	\$232,220
Concrete/Asphalt perforation	0	SY	\$4	\$0
Soil Excavation and stockpiling	12120	CY	\$10.50	\$127,255
Bank Excavation and stockpiling	20161	CY	\$18	\$362,898
Bank Pile removal	300	Ea	\$155	\$46,500
Intertidal Capping	4508	SY	\$14	\$63,117
Intertidal backfill/capping	9170	CY	\$10	\$91,700
Purchase, place, compact a 2-foot thick clean cap (includes geotextile marker layer)	2159	SY	\$14	\$30,226
Excavation benching (below 8 feet)	1000	LF	\$20	\$20,000
Excavation dewatering	1	LS	\$50,000	\$50,000
Purchase, place, compact clean imported backfill	4049	CY	\$10	\$40,494
Place and compact re-used backfill	8070	CY	\$4	\$32,281
Purchase and place 6 inches of topsoil	12991	SY	\$6	\$77,946
Transportation and Disposal (Commercial Landfill)	24210	CY	\$112	\$2,711,562
Transportation and Disposal (Model Airplane Field)	0	CY	\$25	\$0
Hydro seeding	12991	SY	\$2	\$19,487
Contingency (20%)				\$805,252
Subtotal Capital Costs				\$4,831,514
TOTAL				\$6,065,849

Table G-2
Alternative 7A - Cost Estimate

Assumptions:

Project Management estimated at 1% of capital costs.

Remedial design including pre-design characterization, permitting, and baseline groundwater monitoring; estimated at 10% of capital costs.

Construction Management estimated at 5% of capital costs.

Ecology Oversight estimated at 1% of capital costs.

Stockpile characterization testing estimate based on analytical cost for dioxin/furans, one sample per 1,500 cubic yards of excavation.

Confirmatory sampling based on analytical cost for dioxin/furans, one sample approximately every 100 SY within excavation areas.

Long-term monitoring costs are summarized in more detail on Table G-6.

Mob/demob, temporary erosion and sediment controls, and survey costs based on professional judgement and costs from similar projects (e.g. Model Airplane Field).

Concrete/asphalt removal cost is based on actual costs from in-water cleanup. Assumes slab thickness of 4 inches, actual thickness could vary.

Soil Excavation and stockpiling based on professional judgement and costs from similar projects, including the in-water cleanup project.

Bank Excavation and stockpiling based on professional judgement and costs from similar projects, including the in-water cleanup project.

Removal of buried piling in the bank excavation estimate is based on experience during in-water work (cost and quantities).

Cost for the 2-foot thick clean cap is based on professional judgement and costs from the Model Airplane Field project including material costs from the nearby Zimmer Pit.

Excavation benching cost assumes minimal shoring required (i.e. additional slope excavation to create a bench, 2 CY/linear foot). To be refined during design.

Dewatering assumes labor and equipment rental for baker tank(s), pumps, and filtration system. Details/equipment requirements to be determined during design.

Purchase, place, compact clean imported backfill cost based on costs from the Model Airplane Field project including material costs from the nearby Zimmer Pit.

Place and compact re-used backfill; assumed 25% of stockpiled soil can be re-used as backfill after stockpile characterization (<45 ng/kg dioxin/furan TEQ)

Topsoil and hydroseeding costs based on professional judgement and costs from similar projects including the Model Airplane Field project.

Commercial landfill transportation and disposal costs are based on actual costs from in-water cleanup.

Assumed 75% of stockpiled soil requires commercial landfill disposal after stockpile characterization (>45 ng/kg dioxin/furan TEQ)

Note : *These estimates are developed using current and generally accepted engineering cost estimation methods. Note that these estimates are based on assumptions concerning future events and actual costs may be affected by known and unknown risks including, but not limited to, changes in general economic and business conditions, site conditions that were unknown to Anchor QEA, LLC at the time the estimates were performed, future changes in site conditions, regulatory or enforcement policy changes, and delays in performance. Actual costs may vary from these estimates and such variations may be material. Anchor QEA, LLC is not licensed as accountants or securities attorneys and, therefore, make no representations that these costs form an appropriate basis for complying with financial reporting requirements for such costs.*

Table G-2A
Alternative 7B - Cost Estimate

<u>Description</u>	<u>Quantity</u>	<u>Units</u>	<u>Unit Cost</u>	<u>Total Cost</u>
<i>Indirect Costs</i>				
Project Management	1	LS	\$41,033	\$41,033
Remedial Design including pre-design characterization and permitting	1	LS	\$410,327	\$410,327
Construction Management	1	LS	\$205,163	\$205,163
Ecology Oversight	1	LS	\$41,033	\$41,033
Stockpile characterization testing	22	ea	\$1,000	\$21,520
Confirmatory sampling	88	ea	\$1,000	\$88,180
Long-term Monitoring	1	LS	\$97,555	\$97,555
Contingency (20%)				\$180,962
Subtotal Indirect Costs				<u>\$1,085,773</u>
<i>Capital Costs</i>				
Mobilization/Demobilization	1	LS	\$75,000	\$75,000
Temporary Erosion and Sediment Controls	6	acre	\$5,000	\$30,577
Survey	1	LS	\$15,000	\$15,000
Concrete/Asphalt removal (demolition, processing, transportation, and disposal)	11611	SY	\$20	\$232,220
Concrete/Asphalt perforation	0	SY	\$4	\$0
Soil Excavation and stockpiling	12120	CY	\$10.50	\$127,255
Bank Excavation	20161	CY	\$18	\$362,898
Bank Pile removal	300	Ea	\$155	\$46,500
Intertidal Capping	4508	SY	\$14	\$63,117
Intertidal backfill/capping	9170	CY	\$10	\$91,700
Purchase, place, compact a 2-foot thick clean cap (includes geotextile marker layer)	8615	SY	\$14	\$120,611
Excavation benching (below 8 feet)	1000	LF	\$20	\$20,000
Excavation dewatering	1	LS	\$50,000	\$50,000
Purchase, place, compact clean imported backfill	4049	CY	\$10	\$40,494
Place and compact re-used backfill (<45 ng/kg dioxin/furan TEQ)	8070	CY	\$4	\$32,281
Purchase and place 6 inches of topsoil	12991	SY	\$6	\$77,946
Transportation and Disposal (Commercial Landfill >260 ng/kg dioxin/furan TEQ)	17754	CY	\$112	\$1,988,479
Transportation and Disposal (Model Airplane Field)	0	CY	\$25	\$0
On site placement of shoreline material (<260 ng/kg dioxin/furan TEQ)	6456	CY	\$4	\$25,824
Hydro seeding	12991	SY	\$2	\$19,487
Contingency (20%)				\$683,878
Subtotal Capital Costs				<u>\$4,103,266</u>
TOTAL				<u>\$5,189,039</u>

Table G-2A
Alternative 7B - Cost Estimate

Assumptions:

Project Management estimated at 1% of capital costs.

Remedial design including pre-design characterization, permitting, and baseline groundwater monitoring; estimated at 10% of capital costs.

Construction Management estimated at 5% of capital costs.

Ecology Oversight estimated at 1% of capital costs.

Stockpile characterization testing estimate based on analytical cost for dioxin/furans, one sample per 1,500 cubic yards of excavation.

Confirmatory sampling based on analytical cost for dioxin/furans, one sample approximately every 100 SY within excavation areas.

Long-term monitoring costs are summarized in more detail on table E-6.

Mob/demob, temporary erosion and sediment controls, and survey costs based on professional judgement and costs from similar projects (e.g. Model Airplane Field).

Concrete/asphalt removal cost is based on actual costs from in-water cleanup. Assumes slab thickness of 4 inches, actual thickness could vary.

Soil Excavation and stockpiling based on professional judgement and costs from similar projects, including the in-water cleanup project.

Bank Excavation and stockpiling based on professional judgement and costs from similar projects, including the in-water cleanup project.

Removal of buried piling in the bank excavation estimate is based on experience during in-water work (cost and quantities).

Cost for the 2-foot thick clean cap is based on professional judgement and costs from the Model Airplane Field project including material costs from the nearby Zimmer Pit.

Excavation benching cost assumes minimal shoring required (i.e. additional slope excavation to create a bench, 2 CY/linear foot). To be refined during design.

Dewatering assumes labor and equipment rental for baker tank(s), pumps, and filtration system. Details/equipment requirements to be determined during design.

Purchase, place, compact clean imported backfill cost based on costs from the Model Airplane Field project including material costs from the nearby Zimmer Pit.

Place and compact re-used backfill; assumed 25% of stockpiled soil can be re-used as backfill after stockpile characterization (<45 ng/kg dioxin/furan TEQ)

Topsoil and hydroseeding costs based on professional judgement and costs from similar projects including the Model Airplane Field project.

Commercial landfill transportation and disposal costs are based on actual costs from in-water cleanup.

Assumed 55% of stockpiled soil requires commercial landfill disposal after stockpile characterization (>260 ng/kg dioxin/furan TEQ)

Assumed 20% of stockpiled soil is suitable for on site placement and capping after stockpile characterization (<260 ng/kg dioxin/furan TEQ)

Note : *These estimates are developed using current and generally accepted engineering cost estimation methods. Note that these estimates are based on assumptions concerning future events and actual costs may be affected by known and unknown risks including, but not limited to, changes in general economic and business conditions, site conditions that were unknown to Anchor QEA, LLC at the time the estimates were performed, future changes in site conditions, regulatory or enforcement policy changes, and delays in performance. Actual costs may vary from these estimates and such variations may be material. Anchor QEA, LLC is not licensed as accountants or securities attorneys and, therefore, make no representations that these costs form an appropriate basis for complying with financial reporting requirements for such costs.*

Table G-3
Alternative 8 - Cost Estimate

<u>Description</u>	<u>Quantity</u>	<u>Units</u>	<u>Unit Cost</u>	<u>Total Cost</u>
<i>Indirect Costs</i>				
Project Management	1	LS	\$22,003	\$22,003
Remedial Design including pre-design characterization and permitting	1	LS	\$220,034	\$220,034
Construction Management	1	LS	\$110,017	\$110,017
Ecology Oversight	1	LS	\$22,003	\$22,003
Stockpile characterization testing	9	ea	\$1,000	\$8,530
Confirmatory sampling	43	ea	\$1,000	\$43,330
Long-term Monitoring	1	LS	\$97,555	\$97,555
Contingency (25%)				\$130,868
Subtotal Indirect Costs				\$654,342
<i>Capital Costs</i>				
Mobilization/Demobilization	1	LS	\$75,000	\$75,000
Temporary Erosion and Sediment Controls	6	acre	\$5,000	\$30,577
Survey	1	LS	\$10,000	\$10,000
Concrete/Asphalt removal (demolition, processing, transportation, and disposal)	2953	SY	\$20	\$59,060
Concrete/Asphalt perforation	8658	SY	\$4	\$34,632
Soil Excavation and stockpiling	6900	CY	\$10.50	\$72,450
Bank Excavation	5895	CY	\$18	\$106,110
Bank Pile removal	300	Ea	\$155	\$46,500
Intertidal Capping	6286	SY	\$14	\$88,006
Intertidal backfill/capping	0	CY	\$10	\$0
Purchase, place, compact a 2-foot thick clean cap (includes geotextile marker layer)	8658	SY	\$14	\$121,212
Excavation benching (below 8 feet)	1000	LF	\$20	\$20,000
Excavation dewatering	1	LS	\$50,000	\$50,000
Purchase, place, compact clean imported backfill	6900	CY	\$10	\$69,000
Place and compact re-used backfill (<45 ng/kg dioxin/furan TEQ)	2559	CY	\$4	\$10,236
Purchase and place 6 inches of topsoil	12991	SY	\$6	\$77,946
Transportation and Disposal (Commercial Landfill)	7677	CY	\$112	\$859,824
Transportation and Disposal (MAF Landfill)	0	CY	\$25	\$0
On site placement of shoreline material (<260 ng/kg dioxin/furan TEQ)	2559	CY	\$4	\$10,236
Hydro seeding	12991	SY	\$2	\$19,487
Contingency (25%)				\$440,069
Subtotal Capital Costs				\$2,200,344
TOTAL				\$2,854,686

Table G-3
Alternative 8 - Cost Estimate

Assumptions:

Project Management estimated at 1% of capital costs.

Remedial design including pre-design characterization, permitting, and baseline groundwater monitoring; estimated at 10% of capital costs.

Construction Management estimated at 5% of capital costs.

Ecology Oversight estimated at 1% of capital costs.

Stockpile characterization testing estimate based on analytical cost for dioxin/furans, one sample per 1,500 cubic yards of excavation.

Confirmatory sampling based on analytical cost for dioxin/furans, one sample approximately every 100 SY within excavation areas.

Long-term monitoring costs are summarized in more detail on Table G-6.

Mob/demob, temporary erosion and sediment controls, and survey costs based on professional judgement and costs from similar projects (e.g. Model Airplane Field).

Concrete/asphalt removal cost is based on actual costs from in-water cleanup. Assumes slab thickness of 4 inches, actual thickness could vary.

Soil Excavation and stockpiling based on professional judgement and costs from similar projects, including the in-water cleanup project.

Cost for the 2-foot thick clean cap is based on professional judgement and costs from the Model Airplane Field project including material costs from the nearby Zimmer Pit.

Excavation benching cost assumes minimal shoring required (i.e. additional slope excavation to create a bench, 2 CY/linear foot). To be refined during design.

Dewatering assumes labor and equipment rental for baker tank(s), pumps, and filtration system. Details/equipment requirements to be determined during design.

Purchase, place, compact clean imported backfill cost based on costs from the Model Airplane Field project including material costs from the nearby Zimmer Pit.

Place and compact re-used backfill; assumed 20% of stockpiled soil can be re-used as backfill after stockpile characterization (<45 ng/kg dioxin/furan TEQ)

Topsoil and hydroseeding costs based on professional judgement and costs from similar projects including the Model Airplane Field project.

Commercial landfill transportation and disposal costs are based on actual costs from in-water cleanup.

Assumed 60% of stockpiled soil requires commercial landfill disposal after stockpile characterization (>260 ng/kg dioxin/furan TEQ)

Assumed 20% of stockpiled soil is suitable for on site placement and capping after stockpile characterization (<260 ng/kg dioxin/furan TEQ)

Note : *These estimates are developed using current and generally accepted engineering cost estimation methods. Note that these estimates are based on assumptions concerning future events and actual costs may be affected by known and unknown risks including, but not limited to, changes in general economic and business conditions, site conditions that were unknown to Anchor QEA, LLC at the time the estimates were performed, future changes in site conditions, regulatory or enforcement policy changes, and delays in performance. Actual costs may vary from these estimates and such variations may be material. Anchor QEA, LLC is not licensed as accountants or securities attorneys and, therefore, make no representations that these costs form an appropriate basis for complying with financial reporting requirements for such costs.*

Table G-4
Alternative 9 - Cost Estimate

<u>Description</u>	<u>Quantity</u>	<u>Units</u>	<u>Unit Cost</u>	<u>Total Cost</u>
<i>Indirect Costs</i>				
Project Management	1	LS	\$16,755	\$16,755
Remedial Design including pre-design characterization and permitting	1	LS	\$167,555	\$167,555
Construction Management	1	LS	\$83,777	\$83,777
Ecology Oversight	1	LS	\$16,755	\$16,755
Stockpile characterization testing	4	ea	\$1,000	\$3,930
Confirmatory sampling	30	ea	\$1,000	\$29,530
Long-term Monitoring	1	LS	\$97,555	\$97,555
Contingency (25%)				\$103,965
				<hr/>
			Subtotal Indirect Costs	\$519,823
<i>Capital Costs</i>				
Mobilization/Demobilization	1	LS	\$75,000	\$75,000
Temporary Erosion and Sediment Controls	6	acre	\$5,000	\$30,577
Survey	1	LS	\$10,000	\$10,000
Concrete/Asphalt removal (demolition, processing, transportation, and disposal)	2953	SY	\$20	\$59,060
Concrete/Asphalt perforation	8658	SY	\$4	\$34,632
Soil Excavation and stockpiling	0	CY	\$10.50	\$0
Bank Excavation	5895	CY	\$18	\$106,110
Bank Pile removal	300	Ea	\$155	\$46,500
Intertidal Capping	6286	SY	\$14	\$88,006
Intertidal backfill/capping	0	CY	\$10	\$0
Purchase, place, compact a 2-foot thick clean cap (includes geotextile marker layer)	8658	SY	\$14	\$121,212
Excavation benching (below 8 feet)	1000	LF	\$20	\$20,000
Excavation dewatering	1	LS	\$50,000	\$50,000
Purchase, place, compact clean imported backfill	6900	CY	\$10	\$69,000
Place and compact re-used backfill (<45 ng/kg dioxin/furan TEQ)	1179	CY	\$4	\$4,716
Purchase and place 6 inches of topsoil	12991	SY	\$6	\$77,946
Transportation and Disposal (Commercial Landfill)	4716	CY	\$112	\$528,192
Transportation and Disposal (MAF Landfill)	0	CY	\$25	\$0
Hydro seeding	12991	SY	\$2	\$19,487
Contingency (25%)				\$335,109
				<hr/>
			Subtotal Capital Costs	\$1,675,547
				<hr/>
			TOTAL	\$2,195,369

Table G-4
Alternative 9 - Cost Estimate

Construction Management estimated at 5% of capital costs.

Ecology Oversight estimated at 1% of capital costs.

Stockpile characterization testing estimate based on analytical cost for dioxin/furans, one sample per 1,500 cubic yards of excavation.

Confirmatory sampling based on analytical cost for dioxin/furans, one sample approximately every 100 SY within excavation areas.

Long-term monitoring costs are summarized in more detail on Table G-6.

Mob/demob, temporary erosion and sediment controls, and survey costs based on professional judgement and costs from similar projects (e.g. Model Airplane Field).

Concrete/asphalt removal cost is based on actual costs from in-water cleanup. Assumes slab thickness of 4 inches, actual thickness could vary.

Cost for the 2-foot thick clean cap is based on professional judgement and costs from the Model Airplane Field project including material costs from the nearby Zimmer Pit.

Purchase, place, compact clean imported backfill cost based on costs from the Model Airplane Field project including material costs from the nearby Zimmer Pit.

Topsoil and hydroseeding costs based on professional judgement and costs from similar projects including the Model Airplane Field project.

Place and compact re-used backfill; assumed 20% of stockpiled soil can be re-used as backfill after stockpile characterization (<45 ng/kg dioxin/furan TEQ)

Commercial landfill transportation and disposal costs are based on actual costs from in-water cleanup.

Assumed 80% of stockpiled soil requires commercial landfill disposal after stockpile characterization (>45 ng/kg dioxin/furan TEQ)

Note: These estimates are developed using current and generally accepted engineering cost estimation methods. Note that these estimates are based on assumptions concerning future events and actual costs may be affected by known and unknown risks including, but not limited to, changes in general economic and business conditions, site conditions that were unknown to Anchor QEA, LLC at the time the estimates were performed, future changes in site conditions, regulatory or enforcement policy changes, and delays in performance. Actual costs may vary from these estimates and such variations may be material. Anchor QEA, LLC is not licensed as accountants or securities attorneys and, therefore, make no representations that these costs form an appropriate basis for complying with financial reporting requirements for such costs.

**Table G-5
Alternative 10 - Cost Estimate**

<u>Description</u>	<u>Quantity</u>	<u>Units</u>	<u>Unit Cost</u>	<u>Total Cost</u>
<i>Indirect Costs</i>				
Project Management (1% of capital costs)	1	LS	\$0	\$0
Institutional Controls	1	LS	\$100,000	\$100,000
Construction Management (5% of capital costs)	1	LS	\$0	\$0
Ecology Oversight (1% of capital costs)	1	LS	\$0	\$0
Stockpile characterization testing (analytical cost)	0	ea	\$1,000	\$0
Confirmatory sampling (approximately every 100 SY)	0	ea	\$1,000	\$0
Long-term Monitoring	1	LS	\$97,555	\$97,555
Contingency (20%)				\$20,000
Subtotal Indirect Costs				\$217,555
<i>Capital Costs</i>				
Mobilization/Demobilization	0	LS	\$25,000	\$0
Temporary Erosion and Sediment Controls	0	acre	\$5,000	\$0
Survey	0	LS	\$5,000	\$0
Concrete/Asphalt removal (demolition, processing, transportation, and disposal)	0	SY	\$20	\$0
Concrete/Asphalt perforation	0	SY	\$4	\$0
Soil Excavation and stockpiling	0	CY	\$11	\$0
Purchase, place, compact a 2-foot thick clean cap (includes geotextile marker layer)	0	SY	\$14	\$0
Excavation benching (below 8 feet)	0	LF	\$10	\$0
Excavation dewatering	0	LS	\$50,000	\$0
Activated carbon amendmended backfill (purchase activated carbon)	0	CY	\$100	\$0
Blend and place carbon amended backfill (conveyor cost)	0	LS	\$5,000	\$0
Compact carbon amended backfill	0	CY	\$2	\$0
Purchase, place, compact clean imported backfill	0	CY	\$10	\$0
Place and compact re-used backfill (<12 ng/kg dioxin/furan TEQ)	0	CY	\$4	\$0
Purchase and place 6 inches of topsoil	0	SY	\$6	\$0
Transportation and Disposal (Commercial Landfill)	0	CY	\$112	\$0
Hydro seeding	0	SY	\$2	\$0
Contingency (20%)				\$0
Subtotal Capital Costs				\$0
TOTAL				\$217,555

Table G-5
Alternative 10 - Cost Estimate

Assumptions:

Long-term monitoring costs are summarized in more detail on Table G-6.

Note: These estimates are developed using current and generally accepted engineering cost estimation methods. Note that these estimates are based on assumptions concerning future events and actual costs may be affected by known and unknown risks including, but not limited to, changes in general economic and business conditions, site conditions that were unknown to Anchor QEA, LLC at the time the estimates were performed, future changes in site conditions, regulatory or enforcement policy changes, and delays in performance. Actual costs may vary from these estimates and such variations may be material. Anchor QEA, LLC is not licensed as accountants or securities attorneys and, therefore, make no representations that these costs form an appropriate basis for complying with financial reporting requirements for such costs.

**Table G-6
Long-term Monitoring Event Cost Summary**

<u>Description</u>	<u>Quantity</u>	<u>Units</u>	<u>Unit Cost</u>	<u>Total Cost</u>
Project Management (10%)	1	LS	\$1,250	\$1,250
Labor (sample 3 wells and conduct upland cap area inspections)	20	Hour	\$200	\$4,000
Analytical	5	Ea	\$700	\$3,500
Equipment and Expendables	1	LS	\$1,000	\$1,000
Expenses	1	LS	\$1,000	\$1,000
Reporting	15	hr	\$200	\$3,000
Subtotal				\$12,500
Contingency 20%				\$2,500
Total (per monitoring Event)				\$15,000

Assumptions:

Labor includes field preparation and travel time, field events will be combined with in-water long-term monitoring and Model Airplane Field monitoring, as practical.
Monitoring scope assumes three shoreline monitoring wells adjacent to the higher concentration dioxin/furan excavation at the eastern wharf.
Analytical cost assumes groundwater sample analysis for Dioxin (method 1613B) \$650 per sample, plus data validation (\$50)
Net Present Value (NPV) calculation using a discount rate of 3% and assuming monitoring every 5 years, starting 2 years after construction, is included in table T-E6A.
Baseline groundwater monitoring costs have been included in the remedial design for each alternative.

Table G-6A
Long-term Monitoring 100-year Net Present Value

Year	Base Estimate (each event)	Discount Rate:	Net Present Value Cost Estimate
		3%	
0	\$ -	100.00%	\$ -
1	\$ -	97.09%	\$ -
2	\$ 15,000	94.26%	\$ 14,139
3	\$ -	91.51%	\$ -
4	\$ -	88.85%	\$ -
5	\$ -	86.26%	\$ -
6	\$ -	83.75%	\$ -
7	\$ 15,000	81.31%	\$ 12,196
8	\$ -	78.94%	\$ -
9	\$ -	76.64%	\$ -
10	\$ -	74.41%	\$ -
11	\$ -	72.24%	\$ -
12	\$ 15,000	70.14%	\$ 10,521
13	\$ -	68.10%	\$ -
14	\$ -	66.11%	\$ -
15	\$ -	64.19%	\$ -
16	\$ -	62.32%	\$ -
17	\$ 15,000	60.50%	\$ 9,075
18	\$ -	58.74%	\$ -
19	\$ -	57.03%	\$ -
20	\$ -	55.37%	\$ -
21	\$ -	53.75%	\$ -
22	\$ 15,000	52.19%	\$ 7,828
23	\$ -	50.67%	\$ -
24	\$ -	49.19%	\$ -
25	\$ -	47.76%	\$ -
26	\$ -	46.37%	\$ -
27	\$ 15,000	45.02%	\$ 6,753
28	\$ -	43.71%	\$ -
29	\$ -	42.43%	\$ -
30	\$ -	41.20%	\$ -
31	\$ -	40.00%	\$ -
32	\$ 15,000	38.83%	\$ 5,825
33	\$ -	37.70%	\$ -
34	\$ -	36.60%	\$ -
35	\$ -	35.54%	\$ -
36	\$ -	34.50%	\$ -
37	\$ 15,000	33.50%	\$ 5,025
38	\$ -	32.52%	\$ -
39	\$ -	31.58%	\$ -
40	\$ -	30.66%	\$ -
41	\$ -	29.76%	\$ -
42	\$ 15,000	28.90%	\$ 4,334
43	\$ -	28.05%	\$ -
44	\$ -	27.24%	\$ -
45	\$ -	26.44%	\$ -
46	\$ -	25.67%	\$ -
47	\$ 15,000	24.93%	\$ 3,739
48	\$ -	24.20%	\$ -
49	\$ -	23.50%	\$ -
50	\$ -	22.81%	\$ -

Year	Base Estimate (each event)	Discount Rate:	Net Present Value Cost Estimate
		3%	
51	\$ -	22.15%	\$ -
52	\$ 15,000	21.50%	\$ 3,225
53	\$ -	20.88%	\$ -
54	\$ -	20.27%	\$ -
55	\$ -	19.68%	\$ -
56	\$ -	19.10%	\$ -
57	\$ 15,000	18.55%	\$ 2,782
58	\$ -	18.01%	\$ -
59	\$ -	17.48%	\$ -
60	\$ -	16.97%	\$ -
61	\$ -	16.48%	\$ -
62	\$ 15,000	16.00%	\$ 2,400
63	\$ -	15.53%	\$ -
64	\$ -	15.08%	\$ -
65	\$ -	14.64%	\$ -
66	\$ -	14.21%	\$ -
67	\$ 15,000	13.80%	\$ 2,070
68	\$ -	13.40%	\$ -
69	\$ -	13.01%	\$ -
70	\$ -	12.63%	\$ -
71	\$ -	12.26%	\$ -
72	\$ 15,000	11.90%	\$ 1,786
73	\$ -	11.56%	\$ -
74	\$ -	11.22%	\$ -
75	\$ -	10.89%	\$ -
76	\$ -	10.58%	\$ -
77	\$ 15,000	10.27%	\$ 1,540
78	\$ -	9.97%	\$ -
79	\$ -	9.68%	\$ -
80	\$ -	9.40%	\$ -
81	\$ -	9.12%	\$ -
82	\$ 15,000	8.86%	\$ 1,329
83	\$ -	8.60%	\$ -
84	\$ -	8.35%	\$ -
85	\$ -	8.11%	\$ -
86	\$ -	7.87%	\$ -
87	\$ 15,000	7.64%	\$ 1,146
88	\$ -	7.42%	\$ -
89	\$ -	7.20%	\$ -
90	\$ -	6.99%	\$ -
91	\$ -	6.79%	\$ -
92	\$ 15,000	6.59%	\$ 989
93	\$ -	6.40%	\$ -
94	\$ -	6.21%	\$ -
95	\$ -	6.03%	\$ -
96	\$ -	5.86%	\$ -
97	\$ 15,000	5.69%	\$ 853
98	\$ -	5.52%	\$ -
99	\$ -	5.36%	\$ -
100	\$ -	5.20%	\$ -
Total	\$ 300,000		\$ 97,555

**Table G-7
Excavation Volume Summary**

Area ID	Surface Area (SY)	Alternate 6			Alternate 7A			Alternate 7B			Alternate 8			Alternate 9		
		Depth (ft)	Depth (Y)	Vol (CY)	Depth (ft)	Depth (Y)	Vol (CY)	Depth (ft)	Depth (Y)	Vol (CY)	Depth (ft)	Depth (Y)	Vol (CY)	Depth (ft)	Depth (Y)	Vol (CY)
1	3,315	1.5	0.5	1,658	1.5	0.5	1,658	1.5	0.5	1,658	0	0.0	0	0	0.0	0
2A	1,607	2	0.7	1,071	2	0.7	1,071	2	0.7	1,071	0	0.0	0	0	0.0	0
2B	1,380	15	5.0	6,900	15	5.0	6,900	15	5.0	6,900	15	5.0	6,900	0	0.0	0
2C	2,159	11	3.7	7,916	2	0.7	1,439	2	0.7	1,439	0	0.0	0	0	0.0	0
2D*	529	varies		1,630	varies		1,630	varies		1,630	varies		1,630	varies		1,630
3A	0	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
3B	0	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
3C*	1,460	varies		5,922	varies		5,922	varies		5,922	varies		2,432	varies		2,432
4A	1,170	2	0.7	780	2	0.7	780	2	0.7	780	0	0.0	0	0	0.0	0
4B	407	2	0.7	271	2	0.7	271	2	0.7	271	0	0.0	0	0	0.0	0
4C*	964	varies		12,609	varies		12,609	varies		12,609	varies		1,833	varies		1,833
Total	12,991	Total 38,758			Total 32,281			Total 32,281			Total 12,795			Total 5,895		
		Bank Exc 20,161			Bank Exc 20,161			Bank Exc 20,161			Bank Exc 5,895			Bank Exc 5,895		
		Upland Exc 18,597			Upland Exc 12,120			Upland Exc 12,120			Upland Exc 6,900			Upland Exc 0		

* - Volume includes additional intertidal quantity (waterward from the top of bank) calculated in CAD using the assumed excavation depth, current topographic/bathymetric surface, with excavation daylighting on the existing armored intertidal slope/cap.

- ft - feet
- SY - square yards
- Y - yards
- CY - cubic yards

Area 1 is based on 12 ng/kg (north area to remain residential/commercial)

**Table G-8
Capping Area Summary**

Area ID	Surface Area (SY) with hardscape	Alternative 6		Alternative 7A		Alternative 7B		Alternative 8 and 9		Alternative 6		Alternative 7A		Alternative 7B		Alternative 8		Alternative 9	
		Capping and Hardscape Perforation	Hardscape Removal	Capping and Hardscape Perforation	Hardscape Removal	Capping and Hardscape Perforation	Hardscape Removal	Capping and Hardscape Perforation	Hardscape Removal	Cap Area (SY)	Backfill Vol (CY)	Cap Area (SY)	Backfill Vol (CY)	Cap Area (SY)	Backfill Vol (CY)	Cap Area (SY)	Backfill Vol (CY)	Cap Area (SY)	Backfill Vol (CY)
1	3,315	0	3,315	0	3,315	0	3,315	3,315	0	--	--	--	--	--	--	--	--	--	--
2A	1,607	0	1,607	0	1,607	0	1,607	1,607	0	--	--	--	--	--	--	--	--	--	--
2B	1,380	0	0	0	0	0	0	0	0	--	--	--	--	--	--	--	--	--	--
2C	2,159	0	2,159	0	2,159	0	2,159	2,159	0	--	--	--	--	--	--	--	--	--	--
2D	529	0	529	0	529	0	529	0	529	1300	0	1300	0	1300	0	1300	0	1300	0
3A	0	0	0	0	0	0	0	0	0	--	--	--	--	--	--	--	--	--	--
3B	0	0	0	0	0	0	0	0	0	--	--	--	--	--	--	--	--	--	--
3C	1,460	0	1,460	0	1,460	0	1,460	0	1,460	3208	0	3208	0	3208	0	2903	0	2903	0
4A	1,170	0	1,170	0	1,170	0	1,170	1,170	0	--	--	--	--	--	--	--	--	--	--
4B	407	0	407	0	407	0	407	407	0	--	--	--	--	--	--	--	--	--	--
4C	964	0	964	0	964	0	964	0	964	0	9170	0	9170	0	9170	2083	0	2083	0
Total	12,991	0	11,611	0	11,611	0	11,611	8,658	2,953										

Area 1 is based on 12 ng/kg (north area to remain residential/commercial)

Appendix G

Contingent Land Use Feasibility Study

Alternative Cost Estimates

Table F-1
Alternative 1 - Cost Estimate

<u>Description</u>	<u>Quantity</u>	<u>Units</u>	<u>Unit Cost</u>	<u>Total Cost</u>
<i>Indirect Costs</i>				
Project Management	1	LS	\$78,651	\$78,651
Remedial Design	1	LS	\$786,508	\$786,508
Construction Management	1	LS	\$393,254	\$393,254
Ecology Oversight	1	LS	\$78,651	\$78,651
Stockpile characterization	57	ea	\$1,000	\$56,515
Confirmatory sampling	296	ea	\$1,000	\$295,985
Long-term Monitoring	0	LS	\$0	\$0
Contingency (20%)				\$337,913
				<hr/>
			Subtotal Indirect Costs	\$1,689,564
<i>Capital Costs</i>				
Mobilization/Demobilization	1	LS	\$75,000	\$75,000
Temporary Erosion and Sediment Controls	6	acre	\$5,000	\$30,577
Survey	1	LS	\$20,000	\$20,000
Concrete/Asphalt removal (demolition, processing, transportation, and disposal)	28,219	SY	\$20	\$564,374
Concrete/Asphalt perforation	0	SY	\$4	\$0
Soil Excavation and stockpiling	47,818	CY	\$10.50	\$502,088
Bank Excavation and stockpiling	36,954	CY	\$18	\$665,172
Bank Pile removal	300	Ea	\$155	\$46,500
Intertidal Capping	6,111	SY	\$55	\$336,111
Purchase, place, compact a 2-foot thick clean cap (includes geotextile marker layer)	0	SY	\$14	\$0
Excavation benching (below 8 feet)	1,000	LF	\$20	\$20,000
Excavation dewatering	1	LS	\$50,000	\$50,000
Purchase, place, compact clean imported backfill	59,340	CY	\$10	\$593,403
Place and compact re-used backfill	25,432	CY	\$4	\$101,726
Purchase and place 6 inches of topsoil	29,598	SY	\$6	\$177,591
Transportation and Disposal (Commercial Landfill)	21,193	CY	\$112	\$2,373,612
Transportation and Disposal (Model Airplane Field)	38,147	CY	\$25	\$953,684
Hydro seeding	29,598	SY	\$2	\$44,398
Contingency (20%)				\$1,310,847
				<hr/>
			Subtotal Capital Costs	\$7,865,084
				<hr/>
			TOTAL	\$9,554,647

Table F-1
Alternative 1 - Cost Estimate

Assumptions:

Project Management estimated at 1% of capital costs.

No long-term monitoring costs included for this complete removal alternative.

Remedial Design including pre-design characterization and permitting; estimated at 10% of capital costs.

Construction Management estimated at 5% of capital costs.

Ecology Oversight estimated at 1% of capital costs.

Stockpile characterization testing estimate based on analytical cost for dioxin/furans, one sample per 1,500 cubic yards of excavation.

Confirmatory sampling based on analytical cost for dioxin/furans, one sample approximately every 100 SY within excavation areas.

Mob/demob, temporary erosion and sediment controls, and survey costs based on professional judgement and costs from similar projects (e.g. Model Airplane Field).

Concrete/asphalt removal cost is based on actual costs from in-water cleanup. Assumes slab thickness of 4 inches, actual thickness could vary.

Soil Excavation and stockpiling based on professional judgement and costs from similar projects, including the in-water cleanup project.

Bank Excavation and stockpiling based on professional judgement and costs from similar projects, including the in-water cleanup project.

Removal of buried piling in the bank excavation estimate is based on experience during in-water work (cost and quantities).

Intertidal capping based on actual costs from in-water cleanup project.

Cost for the 2-foot thick clean cap is based on professional judgement and costs from the Model Airplane Field project including material costs from the nearby Zimmer Pit.

Excavation benching cost assumes minimal shoring required (i.e. additional slope excavation to create a bench, 2 CY/linear foot). To be refined during design.

Dewatering assumes labor and equipment rental for baker tank(s), pumps, and filtration system. Details/equipment requirements to be determined during design.

Purchase, place, compact clean imported backfill cost based on costs from the Model Airplane Field project including material costs from the nearby Zimmer Pit.

Place and compact re-used backfill; assumed 30% of stockpiled soil can be re-used as backfill after stockpile characterization (<12 ng/kg dioxin/furan TEQ)

Topsoil and hydroseeding costs based on professional judgement and costs from similar projects including the Model Airplane Field project.

Commercial landfill transportation and disposal costs are based on actual costs from in-water cleanup.

Assumed 25% of stockpiled soil requires commercial landfill disposal after stockpile characterization (>45 ng/kg dioxin/furan TEQ)

Assumed 45% of stockpiled soil is suitable for Model Airplane Field LPL disposal after stockpile characterization (<45 ng/kg dioxin/furan TEQ)

Note : *These estimates are developed using current and generally accepted engineering cost estimation methods. Note that these estimates are based on assumptions concerning future events and actual costs may be affected by known and unknown risks including, but not limited to, changes in general economic and business conditions, site conditions that were unknown to Anchor QEA, LLC at the time the estimates were performed, future changes in site conditions, regulatory or enforcement policy changes, and delays in performance. Actual costs may vary from these estimates and such variations may be material. Anchor QEA, LLC is not licensed as accountants or securities attorneys and, therefore, make no representations that these costs form an appropriate basis for complying with financial reporting requirements for such costs.*

Table F-2A
Alternative 2A - Cost Estimate

<u>Description</u>	<u>Quantity</u>	<u>Units</u>	<u>Unit Cost</u>	<u>Total Cost</u>
<i>Indirect Costs</i>				
Project Management	1	LS	\$62,374	\$62,374
Remedial Design	1	LS	\$623,737	\$623,737
Construction Management	1	LS	\$311,868	\$311,868
Ecology Oversight	1	LS	\$62,374	\$62,374
Stockpile characterization testing	39	ea	\$1,000	\$38,783
Confirmatory sampling	160	ea	\$1,000	\$160,322
Long-term Monitoring	1	LS	\$97,555	\$97,555
Contingency (20%)				\$271,402
	Subtotal Indirect Costs			\$1,628,415
<i>Capital Costs</i>				
Mobilization/Demobilization	1	LS	\$75,000	\$75,000
Temporary Erosion and Sediment Controls	6	acre	\$5,000	\$30,577
Survey	1	LS	\$15,000	\$15,000
Concrete/Asphalt removal (demolition, processing, transportation, and disposal)	28219	SY	\$20	\$564,374
Concrete/Asphalt perforation	0	SY	\$4	\$0
Soil Excavation and stockpiling	21220	CY	\$10.50	\$222,808
Bank Excavation and stockpiling	36954	CY	\$18	\$665,172
Bank Pile removal	300	Ea	\$155	\$46,500
Intertidal Capping	6111	SY	\$55	\$336,111
Purchase, place, compact a 2-foot thick clean cap (includes geotextile marker layer)	13566	SY	\$14	\$189,928
Excavation benching (below 8 feet)	1000	LF	\$20	\$20,000
Excavation dewatering	1	LS	\$50,000	\$50,000
Purchase, place, compact clean imported backfill	40722	CY	\$10	\$407,216
Place and compact re-used backfill	17452	CY	\$4	\$69,809
Purchase and place 6 inches of topsoil	29598	SY	\$6	\$177,591
Transportation and Disposal (Commercial Landfill)	14543	CY	\$112	\$1,628,866
Transportation and Disposal (Model Airplane Field)	26178	CY	\$25	\$654,455
Hydro seeding	29598	SY	\$2	\$44,398
Contingency (20%)				\$1,039,561
	Subtotal Capital Costs			\$6,237,366
		TOTAL		\$7,865,781

Table F-2A
Alternative 2A - Cost Estimate

Assumptions:

Project Management estimated at 1% of capital costs.

Remedial design including pre-design characterization, permitting, and baseline groundwater monitoring; estimated at 10% of capital costs.

Construction Management estimated at 5% of capital costs.

Ecology Oversight estimated at 1% of capital costs.

Stockpile characterization testing estimate based on analytical cost for dioxin/furans, one sample per 1,500 cubic yards of excavation.

Confirmatory sampling based on analytical cost for dioxin/furans, one sample approximately every 100 SY within excavation areas.

Long-term monitoring costs are summarized in more detail on table E-6.

Mob/demob, temporary erosion and sediment controls, and survey costs based on professional judgement and costs from similar projects (e.g. Model Airplane Field).

Concrete/asphalt removal cost is based on actual costs from in-water cleanup. Assumes slab thickness of 4 inches, actual thickness could vary.

Soil Excavation and stockpiling based on professional judgement and costs from similar projects, including the in-water cleanup project.

Bank Excavation and stockpiling based on professional judgement and costs from similar projects, including the in-water cleanup project.

Removal of buried piling in the bank excavation estimate is based on experience during in-water work (cost and quantities).

Intertidal capping based on actual costs from in-water cleanup project.

Cost for the 2-foot thick clean cap is based on professional judgement and costs from the Model Airplane Field project including material costs from the nearby Zimmer Pit.

Excavation benching cost assumes minimal shoring required (i.e. additional slope excavation to create a bench, 2 CY/linear foot). To be refined during design.

Dewatering assumes labor and equipment rental for baker tank(s), pumps, and filtration system. Details/equipment requirements to be determined during design.

Purchase, place, compact clean imported backfill cost based on costs from the Model Airplane Field project including material costs from the nearby Zimmer Pit.

Place and compact re-used backfill; assumed 30% of stockpiled soil can be re-used as backfill after stockpile characterization (<12 ng/kg dioxin/furan TEQ)

Topsoil and hydroseeding costs based on professional judgement and costs from similar projects including the Model Airplane Field project.

Commercial landfill transportation and disposal costs are based on actual costs from in-water cleanup.

Assumed 25% of stockpiled soil requires commercial landfill disposal after stockpile characterization (>45 ng/kg dioxin/furan TEQ)

Assumed 45% of stockpiled soil is suitable for Model Airplane Field LPL disposal after stockpile characterization (<45 ng/kg dioxin/furan TEQ)

Note : *These estimates are developed using current and generally accepted engineering cost estimation methods. Note that these estimates are based on assumptions concerning future events and actual costs may be affected by known and unknown risks including, but not limited to, changes in general economic and business conditions, site conditions that were unknown to Anchor QEA, LLC at the time the estimates were performed, future changes in site conditions, regulatory or enforcement policy changes, and delays in performance. Actual costs may vary from these estimates and such variations may be material. Anchor QEA, LLC is not licensed as accountants or securities attorneys and, therefore, make no representations that these costs form an appropriate basis for complying with financial reporting requirements for such costs.*

Table F-2B
Alternative 2B - Cost Estimate

<u>Description</u>	<u>Quantity</u>	<u>Units</u>	<u>Unit Cost</u>	<u>Total Cost</u>
<i>Indirect Costs</i>				
Project Management	1	LS	\$54,866	\$54,866
Remedial Design including pre-design characterization and permitting	1	LS	\$548,664	\$548,664
Construction Management	1	LS	\$274,332	\$274,332
Ecology Oversight	1	LS	\$54,866	\$54,866
Stockpile characterization testing	39	ea	\$1,000	\$38,783
Confirmatory sampling	160	ea	\$1,000	\$160,322
Long-term Monitoring	1	LS	\$97,555	\$97,555
Contingency (20%)				\$245,878
Subtotal Indirect Costs				\$1,475,266
<i>Capital Costs</i>				
Mobilization/Demobilization	1	LS	\$75,000	\$75,000
Temporary Erosion and Sediment Controls	6	acre	\$5,000	\$30,577
Survey	1	LS	\$15,000	\$15,000
Concrete/Asphalt removal (demolition, processing, transportation, and disposal)	28219	SY	\$20	\$564,374
Concrete/Asphalt perforation	0	SY	\$4	\$0
Soil Excavation and stockpiling	21220	CY	\$10.50	\$222,808
Bank Excavation	36954	CY	\$18	\$665,172
Bank Pile removal	300	Ea	\$155	\$46,500
Intertidal Capping	6111	SY	\$55	\$336,111
Purchase, place, compact a 2-foot thick clean cap (includes geotextile marker layer)	50566	SY	\$14	\$707,928
Excavation benching (below 8 feet)	1000	LF	\$20	\$20,000
Excavation dewatering	1	LS	\$50,000	\$50,000
Purchase, place, compact clean imported backfill	40722	CY	\$10	\$407,216
Place and compact re-used backfill (<12 ng/kg dioxin/furan TEQ)	17452	CY	\$4	\$69,809
Purchase and place 6 inches of topsoil	78785	SY	\$6	\$472,710
Transportation and Disposal (Commercial Landfill >260 ng/kg dioxin/furan TEQ)	5817	CY	\$112	\$651,546
Transportation and Disposal (Model Airplane Field)	0	CY	\$25	\$0
On site placement of shoreline material (<260 ng/kg dioxin/furan TEQ)	34904	CY	\$4	\$139,617
Hydro seeding	65219	SY	\$2	\$97,828
Contingency (20%)				\$914,439
Subtotal Capital Costs				\$5,486,636
TOTAL				\$6,961,902

Table F-2B
Alternative 2B - Cost Estimate

Assumptions:

Project Management estimated at 1% of capital costs.

Remedial design including pre-design characterization, permitting, and baseline groundwater monitoring; estimated at 10% of capital costs.

Construction Management estimated at 5% of capital costs.

Ecology Oversight estimated at 1% of capital costs.

Stockpile characterization testing estimate based on analytical cost for dioxin/furans, one sample per 1,500 cubic yards of excavation.

Confirmatory sampling based on analytical cost for dioxin/furans, one sample approximately every 100 SY within excavation areas.

Long-term monitoring costs are summarized in more detail on table E-6.

Mob/demob, temporary erosion and sediment controls, and survey costs based on professional judgement and costs from similar projects (e.g. Model Airplane Field).

Concrete/asphalt removal cost is based on actual costs from in-water cleanup. Assumes slab thickness of 4 inches, actual thickness could vary.

Soil Excavation and stockpiling based on professional judgement and costs from similar projects, including the in-water cleanup project.

Bank Excavation and stockpiling based on professional judgement and costs from similar projects, including the in-water cleanup project.

Removal of buried piling in the bank excavation estimate is based on experience during in-water work (cost and quantities).

Intertidal capping based on actual costs from in-water cleanup project.

Cost for the 2-foot thick clean cap is based on professional judgement and costs from the Model Airplane Field project including material costs from the nearby Zimmer Pit.

Excavation benching cost assumes minimal shoring required (i.e. additional slope excavation to create a bench, 2 CY/linear foot). To be refined during design.

Dewatering assumes labor and equipment rental for baker tank(s), pumps, and filtration system. Details/equipment requirements to be determined during design.

Purchase, place, compact clean imported backfill cost based on costs from the Model Airplane Field project including material costs from the nearby Zimmer Pit.

Place and compact re-used backfill; assumed 30% of stockpiled soil can be re-used as backfill after stockpile characterization (<12 ng/kg dioxin/furan TEQ)

Topsoil and hydroseeding costs based on professional judgement and costs from similar projects including the Model Airplane Field project.

Commercial landfill transportation and disposal costs are based on actual costs from in-water cleanup.

Assumed 10% of stockpiled soil requires commercial landfill disposal after stockpile characterization (>260 ng/kg dioxin/furan TEQ)

Assumed 60% of stockpiled soil is suitable for on site placement and capping after stockpile characterization (<260 ng/kg dioxin/furan TEQ)

Note: *These estimates are developed using current and generally accepted engineering cost estimation methods. Note that these estimates are based on assumptions concerning future events and actual costs may be affected by known and unknown risks including, but not limited to, changes in general economic and business conditions, site conditions that were unknown to Anchor QEA, LLC at the time the estimates were performed, future changes in site conditions, regulatory or enforcement policy changes, and delays in performance. Actual costs may vary from these estimates and such variations may be material. Anchor QEA, LLC is not licensed as accountants or securities attorneys and, therefore, make no representations that these costs form an appropriate basis for complying with financial reporting requirements for such costs.*

Table F-3
Alternative 3 - Cost Estimate

<u>Description</u>	<u>Quantity</u>	<u>Units</u>	<u>Unit Cost</u>	<u>Total Cost</u>
<i>Indirect Costs</i>				
Project Management	1	LS	\$21,369	\$21,369
Remedial Design including pre-design characterization and permitting	1	LS	\$213,691	\$213,691
Construction Management	1	LS	\$106,846	\$106,846
Ecology Oversight	1	LS	\$21,369	\$21,369
Stockpile characterization testing	5	ea	\$1,000	\$4,599
Confirmatory sampling	14	ea	\$1,000	\$13,798
Long-term Monitoring	1	LS	\$97,555	\$97,555
Contingency (25%)				\$119,807
Subtotal Indirect Costs				\$599,034
<i>Capital Costs</i>				
Mobilization/Demobilization	1	LS	\$75,000	\$75,000
Temporary Erosion and Sediment Controls	6	acre	\$5,000	\$30,577
Survey	1	LS	\$10,000	\$10,000
Concrete/Asphalt removal (demolition, processing, transportation, and disposal)	0	SY	\$20	\$0
Concrete/Asphalt perforation	28219	SY	\$4	\$112,875
Soil Excavation and stockpiling	6899	CY	\$10.50	\$72,438
Purchase, place, compact a 2-foot thick clean cap (includes geotextile marker layer)	28216	SY	\$14	\$395,026
Excavation benching (below 8 feet)	1000	LF	\$20	\$20,000
Excavation dewatering	1	LS	\$50,000	\$50,000
Purchase, place, compact clean imported backfill	6899	CY	\$10	\$68,989
Place and compact re-used backfill (<12 ng/kg dioxin/furan TEQ)	0	CY	\$4	\$0
Purchase and place 6 inches of topsoil	29598	SY	\$6	\$177,591
Transportation and Disposal (Commercial Landfill)	5519	CY	\$112	\$618,140
Transportation and Disposal (MAF Landfill)	1380	CY	\$25	\$34,494
Hydro seeding	29598	SY	\$2	\$44,398
Contingency (25%)				\$427,382
Subtotal Capital Costs				\$2,136,911
TOTAL				\$2,735,946

Table F-3
Alternative 3 - Cost Estimate

Assumptions:

Project Management estimated at 1% of capital costs.

Remedial design including pre-design characterization, permitting, and baseline groundwater monitoring; estimated at 10% of capital costs.

Construction Management estimated at 5% of capital costs.

Ecology Oversight estimated at 1% of capital costs.

Stockpile characterization testing estimate based on analytical cost for dioxin/furans, one sample per 1,500 cubic yards of excavation.

Confirmatory sampling based on analytical cost for dioxin/furans, one sample approximately every 100 SY within excavation areas.

Long-term monitoring costs are summarized in more detail on table E-6.

Mob/demob, temporary erosion and sediment controls, and survey costs based on professional judgement and costs from similar projects (e.g. Model Airplane Field).

Concrete/asphalt removal cost is based on actual costs from in-water cleanup. Assumes slab thickness of 4 inches, actual thickness could vary.

Soil Excavation and stockpiling based on professional judgement and costs from similar projects, including the in-water cleanup project.

Cost for the 2-foot thick clean cap is based on professional judgement and costs from the Model Airplane Field project including material costs from the nearby Zimmer Pit.

Excavation benching cost assumes minimal shoring required (i.e. additional slope excavation to create a bench, 2 CY/linear foot). To be refined during design.

Dewatering assumes labor and equipment rental for baker tank(s), pumps, and filtration system. Details/equipment requirements to be determined during design.

Purchase, place, compact clean imported backfill cost based on costs from the Model Airplane Field project including material costs from the nearby Zimmer Pit.

Place and compact re-used backfill; assumed 0% of stockpiled soil can be re-used as backfill after stockpile characterization (<12 ng/kg dioxin/furan TEQ)

Topsoil and hydroseeding costs based on professional judgement and costs from similar projects including the Model Airplane Field project.

Commercial landfill transportation and disposal costs are based on actual costs from in-water cleanup.

Assumed 80% of stockpiled soil requires commercial landfill disposal after stockpile characterization (>45 ng/kg dioxin/furan TEQ)

Assumed 20% of stockpiled soil is suitable for Model Airplane Field LPL disposal after stockpile characterization (<45 ng/kg dioxin/furan TEQ)

Note : *These estimates are developed using current and generally accepted engineering cost estimation methods. Note that these estimates are based on assumptions concerning future events and actual costs may be affected by known and unknown risks including, but not limited to, changes in general economic and business conditions, site conditions that were unknown to Anchor QEA, LLC at the time the estimates were performed, future changes in site conditions, regulatory or enforcement policy changes, and delays in performance. Actual costs may vary from these estimates and such variations may be material. Anchor QEA, LLC is not licensed as accountants or securities attorneys and, therefore, make no representations that these costs form an appropriate basis for complying with financial reporting requirements for such costs.*

Table F-4
Alternative 4 - Cost Estimate

<u>Description</u>	<u>Quantity</u>	<u>Units</u>	<u>Unit Cost</u>	<u>Total Cost</u>
<i>Indirect Costs</i>				
Project Management	1	LS	\$9,546	\$9,546
Remedial Design	1	LS	\$95,460	\$95,460
Construction Management	1	LS	\$47,730	\$47,730
Ecology Oversight	1	LS	\$9,546	\$9,546
Stockpile characterization testing	0	ea	\$1,000	\$0
Confirmator sampling	0	ea	\$1,000	\$0
Long-term Monitoring	1	LS	\$97,555	\$97,555
Contingency (20%)				\$51,968
Subtotal Indirect Costs				\$311,806
<i>Capital Costs</i>				
Mobilization/Demobilization	1	LS	\$25,000	\$25,000
Temporary Erosion and Sediment Controls	6	acre	\$5,000	\$30,577
Survey	1	LS	\$10,000	\$10,000
Concrete/Asphalt removal (demolition, processing, transportation, and disposal)	0	SY	\$20	\$0
Concrete/Asphalt perforation	28219	SY	\$4	\$112,875
Soil Excavation and stockpiling	0	CY	\$10.50	\$0
Purchase, place, compact a 2-foot thick clean cap (includes geotextile marker layer)	28219	SY	\$14	\$395,062
Excavation benching (below 8 feet)	0	LF	\$20	\$0
Excavation dewatering	0	LS	\$50,000	\$0
Purchase, place, compact clean imported backfill	0	CY	\$10	\$0
Place and compact re-used backfill (<12 ng/kg dioxin/furan TEQ)	0	CY	\$4	\$0
Purchase and place 6 inches of topsoil	29598	SY	\$6	\$177,591
Transportation and Disposal (Commercial Landfill)	0	CY	\$112	\$0
Hydro seeding	29598	SY	\$2	\$44,398
Contingency (20%)				\$159,101
Subtotal Capital Costs				\$954,603
TOTAL				\$1,266,409

Table F-4
Alternative 4 - Cost Estimate

Assumptions:

Project Management estimated at 1% of capital costs.

Remedial design including pre-design characterization, permitting, and baseline groundwater monitoring; estimated at 10% of capital costs.

Construction Management estimated at 5% of capital costs.

Ecology Oversight estimated at 1% of capital costs.

Stockpile characterization testing estimate based on analytical cost for dioxin/furans, one sample per 1,500 cubic yards of excavation.

Confirmatory sampling based on analytical cost for dioxin/furans, one sample approximately every 100 SY within excavation areas.

Long-term monitoring costs are summarized in more detail on table E-6.

Mob/demob, temporary erosion and sediment controls, and survey costs based on professional judgement and costs from similar projects (e.g. Model Airplane Field).

Concrete/asphalt removal cost is based on actual costs from in-water cleanup. Assumes slab thickness of 4 inches, actual thickness could vary.

Cost for the 2-foot thick clean cap is based on professional judgement and costs from the Model Airplane Field project including material costs from the nearby Zimmer Pit.

Purchase, place, compact clean imported backfill cost based on costs from the Model Airplane Field project including material costs from the nearby Zimmer Pit.

Topsoil and hydroseeding costs based on professional judgement and costs from similar projects including the Model Airplane Field project.

Note: These estimates are developed using current and generally accepted engineering cost estimation methods. Note that these estimates are based on assumptions concerning future events and actual costs may be affected by known and unknown risks including, but not limited to, changes in general economic and business conditions, site conditions that were unknown to Anchor QEA, LLC at the time the estimates were performed, future changes in site conditions, regulatory or enforcement policy changes, and delays in performance. Actual costs may vary from these estimates and such variations may be material. Anchor QEA, LLC is not licensed as accountants or securities attorneys and, therefore, make no representations that these costs form an appropriate basis for complying with financial reporting requirements for such costs.

**Table F-5
Alternative 5 - Cost Estimate**

<u>Description</u>	<u>Quantity</u>	<u>Units</u>	<u>Unit Cost</u>	<u>Total Cost</u>
<i>Indirect Costs</i>				
Project Management (1% of capital costs)	1	LS	\$0	\$0
Institutional Controls	1	LS	\$100,000	\$100,000
Construction Management (5% of capital costs)	1	LS	\$0	\$0
Ecology Oversight (1% of capital costs)	1	LS	\$0	\$0
Stockpile characterization testing (analytical cost)	0	ea	\$1,000	\$0
Confirmatory sampling (approximately every 100 SY)	0	ea	\$1,000	\$0
Long-term Monitoring	1	LS	\$97,555	\$97,555
Contingency (20%)				\$20,000
	Subtotal Indirect Costs			\$217,555
<i>Capital Costs</i>				
\$217,555	0	LS	\$25,000	\$0
Temporary Erosion and Sediment Controls	0	acre	\$5,000	\$0
Survey	0	LS	\$5,000	\$0
Concrete/Asphalt removal (demolition, processing, transportation, and disposal)	0	SY	\$20	\$0
Concrete/Asphalt perforation	0	SY	\$4	\$0
Soil Excavation and stockpiling	0	CY	\$11	\$0
Purchase, place, compact a 2-foot thick clean cap (includes geotextile marker layer)	0	SY	\$14	\$0
Excavation benching (below 8 feet)	0	LF	\$10	\$0
Excavation dewatering	0	LS	\$50,000	\$0
Activated carbon amended backfill (purchase activated carbon)	0	CY	\$100	\$0
Blend and place carbon amended backfill (conveyor cost)	0	LS	\$5,000	\$0
Compact carbon amended backfill	0	CY	\$2	\$0
Purchase, place, compact clean imported backfill	0	CY	\$10	\$0
Place and compact re-used backfill (<12 ng/kg dioxin/furan TEQ)	0	CY	\$4	\$0
Purchase and place 6 inches of topsoil	0	SY	\$6	\$0
Transportation and Disposal (Commercial Landfill)	0	CY	\$112	\$0
Hydro seeding	0	SY	\$2	\$0
Contingency (20%)				\$0
	Subtotal Capital Costs			\$0
	TOTAL			\$217,555

Table F-5
Alternative 5 - Cost Estimate

Assumptions:

Long-term monitoring costs are summarized in more detail on Table F-6.

Note: These estimates are developed using current and generally accepted engineering cost estimation methods. Note that these estimates are based on assumptions concerning future events and actual costs may be affected by known and unknown risks including, but not limited to, changes in general economic and business conditions, site conditions that were unknown to Anchor QEA, LLC at the time the estimates were performed, future changes in site conditions, regulatory or enforcement policy changes, and delays in performance. Actual costs may vary from these estimates and such variations may be material. Anchor QEA, LLC is not licensed as accountants or securities attorneys and, therefore, make no representations that these costs form an appropriate basis for complying with financial reporting requirements for such costs.

**Table F-6
Long-term Monitoring Event Cost Summary**

<u>Description</u>	<u>Quantity</u>	<u>Units</u>	<u>Unit Cost</u>	<u>Total Cost</u>
Project Management (10%)	1	LS	\$1,250	\$1,250
Labor (sample 3 wells and conduct upland cap area inspections)	20	Hour	\$200	\$4,000
Analytical	5	Ea	\$700	\$3,500
Equipment and Expendables	1	LS	\$1,000	\$1,000
Expenses	1	LS	\$1,000	\$1,000
Reporting	15	hr	\$200	\$3,000
Subtotal				\$12,500
Contingency 20%				\$2,500
Total (per monitoring Event)				\$15,000

Assumptions:

Labor includes field preparation and travel time, field events will be combined with in-water long-term monitoring and Model Airplane Field monitoring, as practical.
Monitoring scope assumes three shoreline monitoring wells adjacent to the higher concentration dioxin/furan excavation at the eastern wharf.
Analytical cost assumes groundwater sample analysis for Dioxin (method 1613B) \$650 per sample, plus data validation (\$50)
Net Present Value (NPV) calculation using a discount rate of 3% and assuming monitoring every 5 years, starting 2 years after construction, is included in table T-E6A.
Baseline groundwater monitoring costs have been included in the remedial design for each alternative.

Table F-6A
Long-term Monitoring 100-year Net Present Value

Year	Base Estimate (each event)	Discount Rate:	Net Present Value Cost Estimate
		3%	
0	\$ -	100.00%	\$ -
1	\$ -	97.09%	\$ -
2	\$ 15,000	94.26%	\$ 14,139
3	\$ -	91.51%	\$ -
4	\$ -	88.85%	\$ -
5	\$ -	86.26%	\$ -
6	\$ -	83.75%	\$ -
7	\$ 15,000	81.31%	\$ 12,196
8	\$ -	78.94%	\$ -
9	\$ -	76.64%	\$ -
10	\$ -	74.41%	\$ -
11	\$ -	72.24%	\$ -
12	\$ 15,000	70.14%	\$ 10,521
13	\$ -	68.10%	\$ -
14	\$ -	66.11%	\$ -
15	\$ -	64.19%	\$ -
16	\$ -	62.32%	\$ -
17	\$ 15,000	60.50%	\$ 9,075
18	\$ -	58.74%	\$ -
19	\$ -	57.03%	\$ -
20	\$ -	55.37%	\$ -
21	\$ -	53.75%	\$ -
22	\$ 15,000	52.19%	\$ 7,828
23	\$ -	50.67%	\$ -
24	\$ -	49.19%	\$ -
25	\$ -	47.76%	\$ -
26	\$ -	46.37%	\$ -
27	\$ 15,000	45.02%	\$ 6,753
28	\$ -	43.71%	\$ -
29	\$ -	42.43%	\$ -
30	\$ -	41.20%	\$ -
31	\$ -	40.00%	\$ -
32	\$ 15,000	38.83%	\$ 5,825
33	\$ -	37.70%	\$ -
34	\$ -	36.60%	\$ -
35	\$ -	35.54%	\$ -
36	\$ -	34.50%	\$ -
37	\$ 15,000	33.50%	\$ 5,025
38	\$ -	32.52%	\$ -
39	\$ -	31.58%	\$ -
40	\$ -	30.66%	\$ -
41	\$ -	29.76%	\$ -
42	\$ 15,000	28.90%	\$ 4,334
43	\$ -	28.05%	\$ -
44	\$ -	27.24%	\$ -
45	\$ -	26.44%	\$ -
46	\$ -	25.67%	\$ -
47	\$ 15,000	24.93%	\$ 3,739
48	\$ -	24.20%	\$ -
49	\$ -	23.50%	\$ -
50	\$ -	22.81%	\$ -

Year	Base Estimate (each event)	Discount Rate:	Net Present Value Cost Estimate
		3%	
51	\$ -	22.15%	\$ -
52	\$ 15,000	21.50%	\$ 3,225
53	\$ -	20.88%	\$ -
54	\$ -	20.27%	\$ -
55	\$ -	19.68%	\$ -
56	\$ -	19.10%	\$ -
57	\$ 15,000	18.55%	\$ 2,782
58	\$ -	18.01%	\$ -
59	\$ -	17.48%	\$ -
60	\$ -	16.97%	\$ -
61	\$ -	16.48%	\$ -
62	\$ 15,000	16.00%	\$ 2,400
63	\$ -	15.53%	\$ -
64	\$ -	15.08%	\$ -
65	\$ -	14.64%	\$ -
66	\$ -	14.21%	\$ -
67	\$ 15,000	13.80%	\$ 2,070
68	\$ -	13.40%	\$ -
69	\$ -	13.01%	\$ -
70	\$ -	12.63%	\$ -
71	\$ -	12.26%	\$ -
72	\$ 15,000	11.90%	\$ 1,786
73	\$ -	11.56%	\$ -
74	\$ -	11.22%	\$ -
75	\$ -	10.89%	\$ -
76	\$ -	10.58%	\$ -
77	\$ 15,000	10.27%	\$ 1,540
78	\$ -	9.97%	\$ -
79	\$ -	9.68%	\$ -
80	\$ -	9.40%	\$ -
81	\$ -	9.12%	\$ -
82	\$ 15,000	8.86%	\$ 1,329
83	\$ -	8.60%	\$ -
84	\$ -	8.35%	\$ -
85	\$ -	8.11%	\$ -
86	\$ -	7.87%	\$ -
87	\$ 15,000	7.64%	\$ 1,146
88	\$ -	7.42%	\$ -
89	\$ -	7.20%	\$ -
90	\$ -	6.99%	\$ -
91	\$ -	6.79%	\$ -
92	\$ 15,000	6.59%	\$ 989
93	\$ -	6.40%	\$ -
94	\$ -	6.21%	\$ -
95	\$ -	6.03%	\$ -
96	\$ -	5.86%	\$ -
97	\$ 15,000	5.69%	\$ 853
98	\$ -	5.52%	\$ -
99	\$ -	5.36%	\$ -
100	\$ -	5.20%	\$ -
Total	\$ 300,000		\$ 97,555

**Table F-7
Excavation Volume Summary**

Area ID	Surface Area (SY)	Alternate 1			Alternate 2A			Alternate 2B			Alternate 3		
		Excavation			Excavation			Excavation			Excavation		
		Depth (ft)	Depth (Y)	Vol (CY)	Depth (ft)	Depth (Y)	Vol (CY)	Depth (ft)	Depth (Y)	Vol (CY)	Depth (ft)	Depth (Y)	Vol (CY)
1	3,315	1.5	0.5	1,657	1.5	0.5	1,657	1.5	0.5	1,657	0	0.0	0
2A	5,043	5	1.7	8,404	2	0.7	3,362	2	0.7	3,362	0	0.0	0
2B	1,380	15	5.0	6,899	15	5.0	6,899	15	5.0	6,899	15	5.0	6,899
2C	4,928	11	3.7	18,068	2	0.7	3,285	2	0.7	3,285	0	0.0	0
2D*	1,560	5	1.7	3,181	5	1.7	3,181	5	1.7	3,181	0	0.0	0
3A	956	2	0.7	638	2	0.7	638	2	0.7	638	0	0.0	0
3B	1,408	4	1.3	1,878	2	0.7	939	2	0.7	939	0	0.0	0
3C*	1,840	4	1.3	3,088	4	1.3	3,088	4	1.3	3,088	0	0.0	0
4A	4,473	2	0.7	2,982	2	0.7	2,982	2	0.7	2,982	0	0.0	0
4B	2,187	10	3.3	7,292	2	0.7	1,458	2	0.7	1,458	0	0.0	0
4C*	2,509	15	5.0	30,685	15	5.0	30,685	15	5.0	30,685	0	0.0	0
Total	29,598	Total 84,772			Total 58,174			Total 58,174			Total 6,899		
		Bank Exc 36,954			Bank Exc 36,954			Bank Exc 36,954			Bank Exc 0		
		Upland Exc 47,818			Upland Exc 21,220			Upland Exc 21,220			Upland Exc 6,899		

* - Volume includes additional intertidal quantity (waterward from the top of bank) calculated in CAD using the assumed excavation depth, current topographic/bathymetric surface, with excavation daylighting on the existing armored intertidal slope/cap.

ft - feet

SY - square yards

Y - yards

CY - cubic yards

**Table F-8
Capping Area Summary**

Area ID	Surface Area (SY) with hardscape	Alternative 1		Alternative 2A		Alternative 2B		Alternative 3 and 4		Alternatives (1, 2A, and 2B) Intertidal Cap Replacement						
	from GIS	Capping and Hardscape Perforation	Hardscape Removal	Capping and Hardscape Perforation	Hardscape Removal	Capping and Hardscape Perforation	Hardscape Removal	Capping and Hardscape Perforation	Hardscape Removal	Vertical Cut (ft)	Length of Shoreline (ft)	Slope	Length of slope (ft)	Area (SF)	Area (SY)	
1	3,315	0	3,315	0	3,315	0	3,315	3,315	0	0	--	--	--	--	--	
2A	5,043	0	5,043	0	5,043	0	5,043	5,043	0	0	--	--	--	--	--	
2B	0	0	0	0	0	0	0	0	0	0	--	--	--	--	--	
2C	4,928	0	4,928	0	4,928	0	4,928	4,928	0	0	--	--	--	--	--	
2D*	1,560	0	1,560	0	1,560	0	1,560	1,560	0	5	300	3h:1v	16	4,800	533	
3A	956	0	956	0	956	0	956	956	0	0	--	--	--	--	--	
3B	1,408	0	1,408	0	1,408	0	1,408	1,408	0	0	--	--	--	--	--	
3C*	1,840	0	1,840	0	1,840	0	1,840	1,840	0	4	400	3h:1v	13	5,200	578	
4A	4,473	0	4,473	0	4,473	0	4,473	4,473	0	0	--	--	--	--	--	
4B	2,187	0	2,187	0	2,187	0	2,187	2,187	0	0	--	--	--	--	--	
4C*	2,509	0	2,509	0	2,509	0	2,509	2,509	0	15	500	6h:1v	90	45,000	5,000	
Total	28,219	0	28,219	0	28,219	0	28,219	28,219	0							6,111

37,000 onsite disposal area (3ft thickness)

50,566