APPENDIX B: COST TABLES

APPENDIX B
BASIS OF COST ESTIMATE

This appendix provides details of the estimated implementation costs for the remedial alternatives subject to detailed screening in Section 6 of the Feasibility Study Report. Costs include both capital costs for implementation as well as long-term operation and maintenance (O&M) costs, including engineering, administration, and contingencies. Following is a brief overview of the general cost estimating approach and assumptions common to many of the alternatives.

Intended Accuracy of Estimates

Per the USEPA Remedial Investigation/Feasibility Study (RI/FS) guidance, the accuracy of FS cost estimates is intended to be in the range of -30 to +50 percent.

Basis of Costs/Unit Rates

Costs are based on published unit rates, such as R.S. Means, technology review documents, recent actual cost data and supplier quotes for other projects of a similar nature, and professional judgement. Where appropriate and unless otherwise indicated, estimated rates and costs include contractor labor, equipment, materials, expenses, and third- party services (such as waste transportation and disposal), commensurate with the intended accuracy of the estimate. Material costs include procurement, delivery, placement, and compaction, as appropriate. Waste disposal costs include approvals, loading, hauling, and disposal fees.

Construction Cost Index

The most recent Engineering News Record Construction Cost Index is 11392 (as of January 2020). As appropriate, the cost index may be used to update older cost information (for example, the cost index has increased approximately 14 percent since January 2015).

Present Worth

The present worth was calculated for the estimated capital and O&M costs based on the anticipated construction and operations schedule for project implementation (refer to Table 6-3 of the FS). It was assumed that pre-construction activities will occur in 2021, and implementation of the alternative will occur in 2022. The O&M period was assumed to be 30 years. Per USEPA guidance, a 7 percent discount factor was used to determine the present worth.

Capital Costs

Capital costs for each alternative are broken down by direct implementation costs and indirect costs.

Direct Implementation Costs

Direct costs for implementing each alternative are remediation contractor costs broken down by significant components of each remedy. Quantities are based on the volumes and areas described in Section 5 where appropriate. As noted above, unit rates are estimated and include contractor labor, equipment, materials, expenses, and third-party services.

Indirect Costs

Indirect costs are broken into several categories, and represent ancillary costs necessary for, but not directly associated with, implementation of each remedy. While these costs are generally estimated as a fixed percentage of the estimated direct costs, adjustments may be made to more accurately reflect anticipated costs. For example, no construction management costs would be incurred if a remedy consists of the filing of deed notices and other institutional controls.

- ***Investigations:*** Lump sum costs have been included for several investigations based on the relative complexity of the remedy and requirements for the design. Depending on the alternative, investigations may include predesign investigations, soil delineation, treatability studies, and/or geotechnical investigations.

- ***Remedial/Geotechnical Design:*** Preparation of design documents needed for contractor procurement and implementation of the remedy. Generally estimated as 10 percent of direct costs. Based on the relative complexity of the remedy Alternative SW-2 was assumed as a lump sum of $5,000 and Alternative SG-2 was adjusted to 5% of the direct costs.
- ***Mobilization/Miscellaneous Site Preparation:*** Includes mobilization and demobilization of contractor resources to/from the Site, along with miscellaneous costs such as work trailer setup, establishment of electric service, restroom facilities, etc. Generally estimated as 5 percent of direct costs. Alternative SG-2 does not include construction, therefore, it does not require mobilization or site preparation.
- ***Site Administration:*** Costs borne by the responsible party for internal administration of the Site and management of design and remediation contractors. Generally estimated as 5 percent of direct costs. Alternative SG-2 does not include construction; therefore, site administration costs were adjusted to 1 percent of direct costs.
- ***Permitting/Legal Costs:*** Costs associated with applying for and obtaining any local permits necessary for the work, as well as any legal/filing fees commonly associated with institutional controls. Generally estimated as 2 percent of direct costs.
- ***Construction Management/Oversight:*** Costs associated with the management and oversight of the remedial action contractor during implementation of the remedy, including labor, expenses, and third-party services, such as laboratory analysis or surveying, not otherwise included in the direct costs. Generally estimated as 10 percent of direct costs. Alternative SG-2 does not include construction, therefore, it does not require construction management or oversight.

Material Quantities

Common quantity assumptions were based the following:

Conversion from in-place cubic yards to tons for disposal = 1.65 tons/cubic yard
Percentage of excavated soil/fill assumed to require handling as hazardous = 100%

Assumed quantities for the alternatives are summarized as follows:

Waste Alternatives

Item	Quantity	Unit
Footprint of NAPL Impacted Soil	6,850	SF
Depth of Excavation	13	FT
Number of 8'x30' USTs	6	-
Estimated Soil Removal Volume	3,500	CY

Soil/Fill Alternatives

Item	Quantity				Unit
	SF-2	SF-3	SF-4	SF-5	
Footprint of Additional NAPL Impacted Soil	1,200				SF
Depth of Additional NAPL Impacted Soil	7				FT
Volume of NAPL Impacted Soil	310				CY
Asphalt Cap Footprint	-	27,200			SY
New Bulkhead Walls	-	800			FT
Footprint of Targeted Excavation	-	-	22,856	-	SF
Depth of Targeted Excavation	-	-	6	-	FT
Volume of Targeted Excavation	-	-	5,100	-	CY
Untreated Area - Lot 67/69	-	-	-	9,200	SF
S/S Treatment Footprint	-	-	-	137,100	SF
S/S Treatment Volume	-	-	-	30,500	CY

Groundwater Alternatives

Item	Quantity				Unit
	GW-2	GW-3	GW-4	GW-5	
Sheet Pile Containment	70,000	-	-	70,000	SF
Fill Between Old and New Wall	975	-	-	975	CY
Length of Conveyance Trenching/Fill	2,500	-	2,500	-	FT
Width of Conveyance Trenching/Fill, multiple pipes in trench	10	-	10	-	FT
Piping, conduit, wiring, instrumentation, all lines homerun to treatment plant	30,000	-	30,000	-	FT
Footprint of Treatment Building	7,500	-	7,500	-	SF
Length of Discharge Line	500	-	500	-	FT
Initial Injection – inorganic (reagent)	-	1.954 M	-	196,643	LB
Initial Injection – organic (reagent)	-	1.622 M	-	65,548	LB
Days in field	-	300	-	53	Day
Second Round	-	67% initial costs	-	67% initial costs	LS
Third Round	-	33% initial costs	-	33% initial costs	LS

Sewer Alternatives

Item	Quantity	Unit
Length of 4-inch Sewer Pipe	125	FT
Volume of Liquid Waste in Sewer Pipe	90	GAL
Volume of Liquid Waste in 4x4 Manhole	720	GAL
Total Liquid Waste (Manhole + Sewer Pipe) – flush 3 times	2,500	GAL
Number of Drums for Solid Waste	2	-

Soil Gas Alternatives

Item	Quantity		Unit
	SG-2	SG-3	
Amount of Chemical Treatment for Organics		570,322	LB

Operation and Maintenance Costs

O&M costs are those costs required to continue implementation of the remedy after the capital construction period has been completed. Typical components include site inspections, routine monitoring, and continued O&M of remediation systems. Additionally, costs are included for National Contingency Plan (NCP)-required five-year reviews where contaminants remain in place following remediation. Costs for five-year reviews include document review, site inspections, and coordination with agency personnel. For the purposes of this FS, these costs have been distributed between the soil and groundwater alternatives at an estimated annual cost of $5000. Costs for O&M items are presented on an annual cost basis.

Costs for groundwater monitoring assumed annual sampling of up to 25 monitoring wells for volatile organic compounds, semi-volatile organic compounds, and metals, and include costs for labor, equipment, analysis, reporting, and purge water disposal. Classification exception area (CEA) monitoring assumes collection of additional parameters once per year.

Contingency

A contingency of 25 percent is added to both capital and O&M costs to account for unforeseen costs which may be incurred during implementation and O&M of the remedy, such as increases in media quantities required to be addressed beyond that assumed for the FS.

Summary of Present Value Analysis for Cost Estimate

Net Present Value Factor	7%																			
Discount Rate	7%																			
Inflation Rate	0%																			
YEAR	CONTEXT	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
Waste - Alternative 2, Removal and Off-Site Disposal																			
TOTAL PRESENT VALUE	$ 1,580,700		$ 1,798,211																
Capital Costs	$ 1,580,700	$ -	$ 163,474	$ 1,634,738	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Pre-construction Activities	$ 152,800	$ -	$ 163,474	$ -	$ -	$ -													
Mobilization and Demobilization	$ 59,500	$ -	$ -	$ 68,114	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Direct Implentation Costs	$ 1,189,900	$ -	$ -	$ 1,362,281	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Other Indirect Costs	$ 178,500	$ -	$ -	$ 204,342	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
O&M Costs	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Soil/Fill - Alternative 2, Institutional Controls and LNAPL Removal																			
TOTAL PRESENT VALUE	$ 356,100																		
Capital Costs	$ 268,000	$ -	$ 50,302	$ 253,020	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Pre-construction Activities	$ 47,000	$ -	$ 50,302	$ -	$ -	$ -													
Mobilization and Demobilization	$ 9,200	$ -	$ -	$ 10,543	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Direct Implentation Costs	$ 184,200	$ -	$ -	$ 210,850	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Other Indirect Costs	$ 27,600	$ -	$ -	$ 31,628	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
O&M Costs	$ 88,100	$ -	$ -	$ -	$ 8,125	$ 8,125	$ 8,125	$ 8,125	$ 8,125	$ 8,125	$ 8,125	$ 8,125	$ 8,125	$ 8,125	$ 8,125	$ 8,125	$ 8,125	$ 8,125	$ 8,125
Soil/Fill - Alternative 3 Institutional Controls, Engineering Controls (Cap, Sheet Pile) and LNAPL Removal																			
TOTAL PRESENT VALUE	$ 10,450,900																		
Capital Costs	$ 9,638,000	$ -	$ 1,346,855	$ 9,793,550	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Pre-construction Activities	$ 1,258,700	$ -	$ 1,346,855	$ -	$ -	$ -													
Mobilization and Demobilization	$ 349,100	$ -	$ -	$ 399,731	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Direct Implentation Costs	$ 6,982,800	$ -	$ -	$ 7,994,625	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Other Indirect Costs	$ 1,047,400	$ -	$ -	$ 1,199,194	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Diamond Alkali OU2 Contingency	$ 174,700	$ -	$ -	$ 200,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
O&M Costs	$ 812,900	$ -	$ -	$ -	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000
Soil/Fill - Alternative 4, Institutional Controls, Engineering Controls (Cap, Sheet Pile), Focused Removal, and LNAPL Removal																			
TOTAL PRESENT VALUE	$ 12,633,300																		
Capital Costs	$ 11,820,400	$ -	$ 1,572,560	$ 12,050,600	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Pre-construction Activities	$ 1,469,700	$ -	$ 1,572,560	$ -	$ -	$ -													
Mobilization and Demobilization	$ 431,300	$ -	$ -	$ 493,775	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Direct Implentation Costs	$ 8,625,600	$ -	$ -	$ 9,875,500	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Other Indirect Costs	$ 1,293,800	$ -	$ -	$ 1,481,325	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Diamond Alkali OU2 Contingency	$ 174,700	$ -	$ -	$ 200,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
O&M Costs	$ 812,900	$ -	$ -	$ -	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000
Soil/Fill - Alternative 5, Institutional Controls, Engineering Controls (Sheet Pile), In-Situ Remediation, and LNAPL Removal																			
TOTAL PRESENT VALUE	$ 13,971,400																		
Capital Costs	$ 13,226,300	$ -	$ 1,717,955	$ 13,504,550	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Pre-construction Activities	$ 1,605,600	$ -	$ 1,717,955	$ -	$ -	$ -													
Mobilization and Demobilization	$ 484,200	$ -	$ -	$ 554,356	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Direct Implentation Costs	$ 9,683,900	$ -	$ -	$ 11,087,125	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Other Indirect Costs	$ 1,452,600	$ -	$ -	$ 1,663,069	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Diamond Alkali OU2 Contingency	$ 174,700	$ -	$ -	$ 200,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
O&M Costs	$ 745,100	$ -	$ -	$ -	$ 68,750	$ 68,750	$ 68,750	$ 68,750	$ 68,750	$ 68,750	$ 68,750	$ 68,750	$ 68,750	$ 68,750	$ 68,750	$ 68,750	$ 68,750	$ 68,750	$ 68,750
Soil Gas - Alternative 2, Institutional Controls, Monitoring/Engineering Controls, and Site-Wide Engineering Controls																			
TOTAL PRESENT VALUE	$ 449,800																		
Capital Costs	$ 108,400	$ -	$ 8,006	$ 115,519	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Pre-construction Activities	$ 7,500	$ -	$ 8,006	$ -	$ -	$ -													
Mobilization and Demobilization	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Direct Implentation Costs	$ 99,900	$ -	$ -	$ 114,375	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Other Indirect Costs	$ 1,000	$ -	$ -	$ 1,144	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
O&M Costs	$ 341,400	$ -	$ -	$ -	$ 31,500	$ 31,500	$ 31,500	$ 31,500	$ 31,500	$ 31,500	$ 31,500	$ 31,500	$ 31,500	$ 31,500	$ 31,500	$ 31,500	$ 31,500	$ 31,500	$ 31,500

Summary of Present Value Analysis for Cost Estimate

Net Present Value Factor																	
Discount Rate																	
Inflation Rate																	
YEAR	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055
Waste - Alternative 2, Removal and Off-Site Disposal																	
TOTAL PRESENT VALUE																	
Capital Costs	$ -	$ -															
Pre-construction Activities																	
Mobilization and Demobilization	$ -																
Direct Implentation Costs	$ -																
Other Indirect Costs																	
O&M Costs	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -		
Soil/Fill - Alternative 2, Institutional Controls and LNAPL Removal																	
TOTAL PRESENT VALUE																	
Capital Costs	$ -	$ -															
Pre-construction Activities																	
Mobilization and Demobilization	$ -																
Direct Implentation Costs	$ -																
Other Indirect Costs																	
O&M Costs	$ 8,125	$ 8,125	$ 8,125	$ 8,125	$ 8,125	$ 8,125	$ 8,125	$ 8,125	$ 8,125	$ 8,125	$ 8,125	$ 8,125	$ 8,125	$ 8,125	$ 8,125		
Soil/Fill - Alternative 3 Institutional Controls, Engineering Controls (Cap, Sheet Pile) and LNAPL Removal																	
TOTAL PRESENT VALUE																	
Capital Costs	$ -	$ -															
Pre-construction Activities																	
Mobilization and Demobilization	$ -																
Direct Implentation Costs	$ -																
Other Indirect Costs																	
Diamond Alkali OU2 Contingency																	
O&M Costs	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000		
Soil/Fill - Alternative 4, Institutional Controls, Engineering Controls (Cap, Sheet Pile), Focused Removal, and LNAPL Removal																	
TOTAL PRESENT VALUE																	
Capital Costs	$ -	$ -															
Pre-construction Activities																	
Mobilization and Demobilization	$ -																
Direct Implentation Costs	$ -																
Other Indirect Costs																	
Diamond Alkali OU2 Contingency																	
O&M Costs	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000		
Soil/Fill - Alternative 5, Institutional Controls, Engineering Controls (Sheet Pile), In-Situ Remediation, and LNAPL Removal																	
TOTAL PRESENT VALUE																	
Capital Costs	$ -	$ -															
Pre-construction Activities																	
Mobilization and Demobilization	$ -																
Direct Implentation Costs	$ -																
Other Indirect Costs																	
Diamond Alkali OU2 Contingency																	
O&M Costs	$ 68,750	$ 68,750	$ 68,750	$ 68,750	$ 68,750	$ 68,750	$ 68,750	$ 68,750	$ 68,750	$ 68,750	$ 68,750	$ 68,750	$ 68,750	$ 68,750	$ 68,750		
Soil Gas - Alternative 2, Institutional Controls, Monitoring/Engineering Controls, and Site-Wide Engineering Controls																	
TOTAL PRESENT VALUE																	
Capital Costs	$ -	$ -															
Pre-construction Activities																	
Mobilization and Demobilization	$ -																
Direct Implentation Costs	$ -																
Other Indirect Costs																	
O&M Costs	$ 31,500	$ 31,500	$ 31,500	$ 31,500	$ 31,500	$ 31,500	$ 31,500	$ 31,500	$ 31,500	$ 31,500	$ 31,500	$ 31,500	$ 31,500	$ 31,500	$ 31,500		

Summary of Present Value Analysis for Cost Estimate

YEAR	COST PV	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
Soil Gas - Alternative 3, Institutional Controls, Site-Wide Engineering Controls, and In-Situ Remediation																			
TOTAL PRESENT VALUE	**$ 4,050,800**																		
Capital Costs	**$ 4,050,800**	**$ -**	**$ 653,904**	**$ 3,938,064**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
Pre-construction Activities	$ 611,100	$ -	$ 653,904	$ -	$ -	$ -													
Mobilization and Demobilization	$ 147,000	$ -	$ -	$ 168,293	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Direct Implentation Costs	$ 2,939,900	$ -	$ -	$ 3,365,867	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Other Indirect Costs	$ 352,800	$ -	$ -	$ 403,904	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
O&M Costs	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
Sewer Water - Alternative 2, Removal and Off-Site Disposal																			
TOTAL PRESENT VALUE	**$ 24,900**																		
Capital Costs	**$ 24,900**	**$ -**	**$ 6,606**	**$ 21,375**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
Pre-construction Activities	$ 6,200	$ -	$ 6,606	$ -	$ -	$ -													
Mobilization and Demobilization	$ 800	$ -	$ -	$ 891	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Direct Implentation Costs	$ 15,600	$ -	$ -	$ 17,813	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Other Indirect Costs	$ 2,300	$ -	$ -	$ 2,672	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
O&M Costs	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
Groundwater - Alternative 2, Institutional Controls, Containment at River, and Pump and Treat																			
TOTAL PRESENT VALUE	**$ 34,258,600**																		
Capital Costs	**$ 23,608,500**	**$ -**	**$ 1,261,844**	**$ 1,261,844**	**$ 1,261,844**	**$ 26,805,313**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
Pre-construction Activities	$ 3,311,500	$ -	$ 1,261,844	$ 1,261,844	$ 1,261,844	$ -													
Mobilization and Demobilization	$ 845,700	$ -	$ -	$ -	$ -	$ 1,108,555	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Direct Implentation Costs	$ 16,914,200	$ -	$ -	$ -	$ -	$ 22,171,094	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Other Indirect Costs	$ 2,537,100	$ -	$ -	$ -	$ -	$ 3,325,664	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Diamond Alkali OU2 Contingency	$ 152,600	$ -	$ -	$ -	$ -	$ 200,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
O&M Costs	**$ 10,650,100**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ 1,125,000**	**$ 1,125,000**	**$ 1,125,000**	**$ 1,125,000**	**$ 1,125,000**	**$ 1,125,000**	**$ 1,125,000**	**$ 1,125,000**	**$ 1,125,000**	**$ 1,125,000**	**$ 1,125,000**	**$ 1,125,000**	**$ 1,125,000**
Groundwater - Alternative 3, Institutional Controls and In-Situ Remediation																			
TOTAL PRESENT VALUE	**$ 20,844,800**																		
Capital Costs	**$ 19,602,300**	**$ -**	**$ 1,051,811**	**$ 1,051,811**	**$ 1,051,811**	**$ 14,894,343**	**$ -**	**$ -**	**$ -**	**$ 6,939,996**	**$ -**	**$ -**	**$ -**	**$ -**	**$ 3,469,998**	**$ -**	**$ -**	**$ -**	**$ -**
Pre-construction Activities	$ 2,760,300	$ -	$ 1,051,811	$ 1,051,811	$ 1,051,811	$ -													
Mobilization and Demobilization	$ 804,400	$ -	$ -	$ -	$ -	$ 1,054,347	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Direct Implentation Costs	$ 13,624,500	$ -	$ -	$ -	$ -	$ 10,676,953	$ -	$ -	$ -	$ 6,939,996	$ -	$ -	$ -	$ -	$ 3,469,998	$ -	$ -	$ -	$ -
Other Indirect Costs	$ 2,413,100	$ -	$ -	$ -	$ -	$ 3,163,042	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
O&M Costs	**$ 1,242,500**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ 131,250**	**$ 131,250**	**$ 131,250**	**$ 131,250**	**$ 131,250**	**$ 131,250**	**$ 131,250**	**$ 131,250**	**$ 131,250**	**$ 131,250**	**$ 131,250**	**$ 131,250**	**$ 131,250**
Groundwater - Alternative 4, Institutional Controls, Targeted Pump and Treat, and Targeted Periodic In-Situ Remediation																			
TOTAL PRESENT VALUE	**$ 24,234,400**																		
Capital Costs	**$ 10,034,200**	**$ -**	**$ 729,750**	**$ 729,750**	**$ 729,750**	**$ 10,642,500**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
Pre-construction Activities	$ 1,915,100	$ -	$ 729,750	$ 729,750	$ 729,750	$ -													
Mobilization and Demobilization	$ 338,300	$ -	$ -	$ -	$ -	$ 443,438	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Direct Implentation Costs	$ 6,765,900	$ -	$ -	$ -	$ -	$ 8,868,750	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Other Indirect Costs	$ 1,014,900	$ -	$ -	$ -	$ -	$ 1,330,313	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
O&M Costs	**$ 14,200,200**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ 1,500,000**	**$ 1,500,000**	**$ 1,500,000**	**$ 1,500,000**	**$ 1,500,000**	**$ 1,500,000**	**$ 1,500,000**	**$ 1,500,000**	**$ 1,500,000**	**$ 1,500,000**	**$ 1,500,000**	**$ 1,500,000**	**$ 1,500,000**
Groundwater - Alternative 5, Institutional Controls, Site Containment at River Edge and In-Situ Remediation																			
TOTAL PRESENT VALUE	**$ 17,193,900**																		
Capital Costs	**$ 15,951,400**	**$ -**	**$ 820,057**	**$ 820,057**	**$ 820,057**	**$ 17,501,095**	**$ -**	**$ -**	**$ -**	**$ 567,076**	**$ -**	**$ -**	**$ -**	**$ -**	**$ 283,539**	**$ -**	**$ -**	**$ -**	**$ -**
Pre-construction Activities	$ 2,152,100	$ -	$ 820,057	$ 820,057	$ 820,057	$ -													
Mobilization and Demobilization	$ 583,400	$ -	$ -	$ -	$ -	$ 784,655	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Direct Implentation Costs	$ 11,465,800	$ -	$ -	$ -	$ -	$ 14,442,476	$ -	$ -	$ -	$ 567,076	$ -	$ -	$ -	$ -	$ 283,539	$ -	$ -	$ -	$ -
Other Indirect Costs	$ 1,750,100	$ -	$ -	$ -	$ -	$ 2,293,964	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
O&M Costs	**$ 1,242,500**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ 131,250**	**$ 131,250**	**$ 131,250**	**$ 131,250**	**$ 131,250**	**$ 131,250**	**$ 131,250**	**$ 131,250**	**$ 131,250**	**$ 131,250**	**$ 131,250**	**$ 131,250**	**$ 131,250**

Summary of Present Value Analysis for Cost Estimate

YEAR	2018	2019	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054
Soil Gas - Alternative 3, Institutional Controls, Site-Wide Engineering Controls, and In-Situ Remediation																	
TOTAL PRESENT VALUE																	
Capital Costs	$ -	$ -															
Pre-construction Activities																	
Mobilization and Demobilization	$ -																
Direct Implentation Costs	$ -																
Other Indirect Costs																	
O&M Costs	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -		
Sewer Water - Alternative 2, Removal and Off-Site Disposal																	
TOTAL PRESENT VALUE																	
Capital Costs	$ -	$ -															
Pre-construction Activities																	
Mobilization and Demobilization	$ -																
Direct Implentation Costs	$ -																
Other Indirect Costs																	
O&M Costs	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -		
Groundwater - Alternative 2, Institutional Controls, Containment at River, and Pump and Treat																	
TOTAL PRESENT VALUE																	
Capital Costs	$ -	$ -															
Pre-construction Activities																	
Mobilization and Demobilization	$ -																
Direct Implentation Costs	$ -																
Other Indirect Costs																	
Diamond Alkali OU2 Contingency	$ -																
O&M Costs	$ 1,125,000	$ 1,125,000	$ 1,125,000	$1,125,000	$1,125,000	$1,125,000	$1,125,000	$1,125,000	$1,125,000	$1,125,000	$1,125,000	$1,125,000	$1,125,000	$1,125,000	$1,125,000	$1,125,000	$1,125,000
Groundwater - Alternative 3, Institutional Controls and In-Situ Remediation																	
TOTAL PRESENT VALUE																	
Capital Costs	$ -	$ -															
Pre-construction Activities																	
Mobilization and Demobilization	$ -	$ -	$ -														
Direct Implentation Costs	$ -	$ -	$ -														
Other Indirect Costs	$ -	$ -															
O&M Costs	$ 131,250	$ 131,250	$ 131,250	$ 131,250	$ 131,250	$ 131,250	$ 131,250	$ 131,250	$ 131,250	$ 131,250	$ 131,250	$ 131,250	$ 131,250	$ 131,250	$ 131,250	$ 131,250	$ 131,250
Groundwater - Alternative 4, Institutional Controls, Targeted Pump and Treat, and Targeted Periodic In-Situ Remediation																	
TOTAL PRESENT VALUE																	
Capital Costs	$ -	$ -															
Pre-construction Activities																	
Mobilization and Demobilization	$ -	$ -	$ -														
Direct Implentation Costs	$ -	$ -	$ -														
Other Indirect Costs	$ -	$ -															
O&M Costs	$ 1,500,000	$ 1,500,000	$ 1,500,000	$1,500,000	$1,500,000	$1,500,000	$1,500,000	$1,500,000	$1,500,000	$1,500,000	$1,500,000	$1,500,000	$1,500,000	$1,500,000	$1,500,000	$1,500,000	$1,500,000
Groundwater - Alternative 5, Institutional Controls, Site Containment at River Edge and In-Situ Remediation																	
TOTAL PRESENT VALUE																	
Capital Costs	$ -	$ -															
Pre-construction Activities																	
Mobilization and Demobilization	$ -	$ -	$ -														
Direct Implentation Costs	$ -	$ -	$ -														
Other Indirect Costs	$ -	$ -															
O&M Costs	$ 131,250	$ 131,250	$ 131,250	$ 131,250	$ 131,250	$ 131,250	$ 131,250	$ 131,250	$ 131,250	$ 131,250	$ 131,250	$ 131,250	$ 131,250	$ 131,250	$ 131,250	$ 131,250	$ 131,250

SUMMARY TABLE

Component	Total Capital Costs	Total Annual O&M Costs	Total Net Present Worth
Waste			
Alternative 1 - No Action	$ -	$ -	$ -
Alternative 2 - Removal and Off-Site Disposal	$ 1,798,211	$ -	$ 1,580,700
Soil/Fill			
Alternative 1 - No Action	$ -	$ -	$ -
Alternative 2 - Institutional Controls and NAPL Removal	$ 303,322	$ 8,125	$ 356,100
Alternative 3 - Institutional Controls, Engineering Controls, and NAPL Removal	$ 11,140,405	$ 75,000	$ 10,450,900
Alternative 4 - Institutional Controls, Engineering Controls, Focused Removal with Off-Site Disposal of Lead, and NAPL Removal	$ 13,623,160	$ 75,000	$ 12,633,300
Alternative 5 - Institutional Controls, In-Situ Remediation, Engineering Controls, and NAPL Removal	$ 15,222,505	$ 68,750	$ 13,971,400
Groundwater			
Alternative 1 - No Action	$ -	$ -	$ -
Alternative 2 - Institutional Controls, Site Containment at River Edge, and Pump and Treat	$ 30,590,844	$ 1,125,000	$ 34,258,600
Alternative 3 - Institutional Controls and In-Situ Remediation	$ 28,459,770	$ 131,250	$ 20,844,800
Alternative 4 - Institutional Controls, Pump and Treat, and Targeted Periodic In-Situ Remediation	$ 12,831,750	$ 1,500,000	$ 24,234,400
Alternative 5 - Institutional Controls, Site Containment at River Edge and In-Situ Remediation	$ 20,811,881	$ 131,250	$ 17,193,900
Sewer Water			
Alternative 1 - No Action	$ -	$ -	$ -
Alternative 2 - Removal and Off-Site Disposal	$ 27,981	$ -	$ 24,900
Soil Gas			
Alternative 1 - No Action	$ -	$ -	$ -
Alternative 2 - Institutional Controls, Air Monitoring or Engineering Controls (existing occupied buildings) and Site-Wide Engineering Controls (future buildings)	$ 123,525	$ 31,500	$ 449,800
Alternative 3 - Institutional Controls, Site-Wide Engineering Controls (future buildings), and Air Monitoring or Engineering Controls and In-Situ Remediation of Soil/Fill (existing occupied buildings)	$ 4,591,968	$ -	$ 4,050,800

TABLE B-W1 - PRELIMINARY COST ESTIMATE
WASTE - ALTERNATIVE 1
NO ACTION

Component	Estimated Quantity	Unit	Estimated Unit Cost	Estimated Capital Cost	Estimated Annual O&M Cost
Capital Costs					
Direct Implementation Costs				$ -	
			Subtotal - Direct Costs	$ -	
Indirect Costs					
Remedial Design	(10% of Direct Costs)			$ -	
Mobilization/Misc. Site Prep	(5% of Direct Costs)			$ -	
Site Administration	(5% of Direct Costs)			$ -	
Permitting/Legal Costs	(2% of Direct Costs)			$ -	
Construction Management/Oversight	(10% of Direct Costs)			$ -	
			Subtotal - Indirect Costs	$ -	
			Contingency - 25% of Direct and Indirect Costs	$ -	
			Total Capital Costs	**$ -**	
Operation and Maintenance Costs					
					$ -
			Subtotal - O&M Costs		$ -
			Contingency Reserve - 25% of O&M Costs		$ -
			Total Annual O&M Costs		$ -
			Net Present Worth of Annual O&M Costs	**$ -**	
Total Net Present Worth of Alternative				**$ -**	

Note: At time estimate was prepared, ENRCCI = 11392 (January 2020)

TABLE B-W2 - PRELIMINARY COST ESTIMATE
WASTE - ALTERNATIVE 2
REMOVAL AND OFF-SITE DISPOSAL

Component	Estimated Quantity	Unit	Estimated Unit Cost	Estimated Capital Cost	Estimated Annual O&M Cost
Capital Costs					
Direct Implementation Costs					
Consolidation/Containerization of Wastes	1	LS	$ 25,000	$ 25,000	
UST Removal/Disposal	6	Ea	$ 15,000	$ 90,000	
Impacted Soil Removal at USTs	3,500	CY	$ 22	$ 77,000	
Clean Backfill (provide/place/compact)	5,600	Ton	$ 60	$ 336,000	
6" Gravel Surface at NAPL Footprint	800	SY	$ 18	$ 14,400	
Waste Disposal, UST Soil (T&D)	5,800	Ton	$ 75	$ 435,000	
Waste Disposal, Non-haz liquids (T&D)	34,700	Gal	$ 0.25	$ 8,675	
Waste Disposal, LNAPLs (T&D)	4,500	Gal	$ 1	$ 4,500	
Waste Disposal, Non-haz solids/tanks (T&D)	30	Ton	$ 75	$ 2,250	
Soil Treatment for Disposal	880	Ton	$ 25	$ 22,000	
Water Management/Disposal	1	LS	$ 55,000	$ 55,000	
UST Closure Sampling/Reporting	1	LS	$ 20,000	$ 20,000	
			Subtotal - Direct Costs	$ 1,089,825	
Indirect Costs					
Remedial/Geotechnical Design	(10% of Direct Costs)			$ 108,983	
Mobilization/Misc. Site Prep	(5% of Direct Costs)			$ 54,491	
Site Administration	(5% of Direct Costs)			$ 54,491	
Permitting/Legal Costs	(2% of Direct Costs)			$ 21,797	
Construction Management/Oversight	(10% of Direct Costs)			$ 108,983	
			Subtotal - Indirect Costs	$ 348,744	
			Contingency - 25% of Direct and Indirect Costs	$ 359,642	
			Total Capital Costs	**$ 1,798,211**	
Operation and Maintenance Costs					$ -
			Subtotal - O&M Costs		$ -
			Contingency Reserve - 25% of O&M Costs		$ -
			Total Annual O&M Costs		**$ -**
			Net Present Worth of Annual O&M Costs	**$ -**	
Total Net Present Worth of Alternative				**$ 1,580,700**	

Note: At time estimate was prepared, ENRCCI = 11392 (January 2020)

TABLE B-SF1 - PRELIMINARY COST ESTIMATE
SOIL/FILL - ALTERNATIVE 1
NO ACTION

Component	Estimated Quantity	Unit	Estimated Unit Cost	Estimated Capital Cost	Estimated Annual O&M Cost
Capital Costs					
Direct Implementation Costs					
			Subtotal - Direct Costs	$ -	
Indirect Costs					
Remedial Design	(10% of Direct Costs)			$ -	
Mobilization/Misc. Site Prep	(5% of Direct Costs)			$ -	
Site Administration	(5% of Direct Costs)			$ -	
Permitting/Legal Costs	(2% of Direct Costs)			$ -	
Construction Management/Oversight	(10% of Direct Costs)			$ -	
			Subtotal - Indirect Costs	$ -	
			Contingency - 25% of Direct and Indirect Costs	$ -	
			Total Capital Costs	**$ -**	
Operation and Maintenance Costs					
Site Inspections/Maintenance					$ -
Five-Year Reviews					$ -
			Subtotal - O&M Costs		$ -
			Contingency Reserve - 25% of O&M Costs		$ -
			Total Annual O&M Costs		**$ -**
			Net Present Worth of Annual O&M Costs	**$ -**	
Total Net Present Worth of Alternative				**$ -**	

Note: At time estimate was prepared, ENRCCI = 11392 (January 2020)

TABLE B-SF2 - PRELIMINARY COST ESTIMATE
SOIL/FILL - ALTERNATIVE 2
INSTITUTIONAL CONTROLS AND NAPL REMOVAL

Component	Estimated Quantity	Unit	Estimated Unit Cost	Estimated Capital Cost	Estimated Annual O&M Cost
Capital Costs					
Direct Implementation Costs					
Deed Restrictions (legal/filing)	15	Lots	$ 4,000	$ 60,000	
Fencing Enhancements	1,000	LF	$ 20	$ 20,000	
NAPL Removal					
Excavate/Load Soil/Fill	310	CY	$ 15	$ 4,650	
Waste Disposal, Petroleum-impacted (T&D)	510	Ton	$ 75	$ 38,250	
Soil Treatment	510	Ton	$ 25	$ 12,750	
Clean Backfill (provide/place/compact)	510	Ton	$ 60	$ 30,600	
6" Gravel Surface at NAPL Footprint	135	SY	$ 18	$ 2,430	
			Subtotal - Direct Costs	$ 168,680	
Indirect Costs					
Predesign Investigation	Lump Sum			$ 20,000	
Remedial Design	(10% of Direct Costs)			$ 16,868	
Mobilization/Misc. Site Prep	(5% of Direct Costs)			$ 8,434	
Site Administration	(5% of Direct Costs)			$ 8,434	
Permitting/Legal Costs	(2% of Direct Costs)			$ 3,374	
Construction Management/Oversight	(10% of Direct Costs)			$ 16,868	
			Subtotal - Indirect Costs	$ 73,978	
			Contingency - 25% of Direct and Indirect Costs	$ 60,664	
			Total Capital Costs	**$ 303,322**	
Operation and Maintenance Costs					
Site Inspections/Maintenance	1	Annual	$ 1,500		$ 1,500
Five-Year Reviews	1	Annualized	$ 5,000		$ 5,000
			Subtotal - O&M Costs		$ 6,500
			Contingency Reserve - 25% of O&M Costs		$ 1,625
			Total Annual O&M Costs		**$ 8,125**
			Net Present Worth of Annual O&M Costs	**$ 88,100**	
Total Net Present Worth of Alternative				**$ 356,100**	

Note: At time estimate was prepared, ENRCCI = 11392 (January 2020)

TABLE B-SF3 - PRELIMINARY COST ESTIMATE
SOIL/FILL - ALTERNATIVE 3
INSTITUTIONAL CONTROLS, ENGINEERING CONTROLS, AND NAPL REMOVAL

Component	Estimated Quantity	Unit	Estimated Unit Cost	Estimated Capital Cost	Estimated Annual O&M Cost
Capital Costs					
Direct Implementation Costs					
Deed Restrictions (legal/filing)	15	Lots	$ 4,000	$ 60,000	
Fencing Enhancements	1,000	LF	$ 20	$ 20,000	
Site Preparation					
Clear Vegetation	0.5	Ac	$ 1,500	$ 750	
Asphalt and Debris Removal	1	LS	$ 25,000	$ 25,000	
Asphalt and Debris Disposal (T&D)	7500	Ton	$ 75	$ 562,500	
Asphalt Cap					
Regrade as needed to level surface	2000	CY	$ 20	$ 40,000	
Base gravel - 6"	27,200	SY	$ 18	$ 489,600	
Bituminous concrete - 6"	27,200	SY	$ 48	$ 1,305,600	
Seal coating	27,200	SY	$ 1.25	$ 34,000	
NAPL Removal					
Excavate/Load Soil/Fill	310	CY	$ 15	$ 4,650	
Waste Disposal, Petroleum-impacted (T&D)	510	Ton	$ 75	$ 38,250	
Soil Treatment	510	Ton	$ 25	$ 12,750	
Clean Backfill (provide/place/compact)	510	Ton	$ 60	$ 30,600	
Vertical Barrier					
Temporary Silt Screens in river	1	LS	$ 25,000	$ 25,000	
Old Wall Excavation (non soil/fill debris)	240	CY	$ 50	$ 12,000	
Decontamination and Disposal of Old Wall (non-soil/fill debris, T&D)	400	Ton	$ 250	$ 100,000	
Sheet Pile Installation (800' x 30')	24,000	SF	$ 150	$ 3,600,000	
Seal inactive wall pipes	1	LS	$ 35,000	$ 35,000	
			Subtotal - Direct Costs	$ 6,395,700	
Indirect Costs					
Geotechnical Investigation		Lump Sum		$ 60,000	
Predesign Investigation/Soil Delineation		Lump Sum		$ 250,000	
Remedial/Geotechnical Design		(10% of Direct Costs)		$ 639,570	
Mobilization/Misc. Site Prep		(5% of Direct Costs)		$ 319,785	
Site Administration		(5% of Direct Costs)		$ 319,785	
Permitting/Legal Costs		(2% of Direct Costs)		$ 127,914	
Construction Management/Oversight		(10% of Direct Costs)		$ 639,570	
			Subtotal - Indirect Costs	$ 2,356,624	
			Diamond Alkali OU2 Contingency	$ 200,000	
			Contingency - 25% of Direct and Indirect Costs	$ 2,188,081	
			Total Capital Costs	**$ 11,140,405**	
Operation and Maintenance Costs					
Site Inspections/Maintenance	4	Qtr	$ 5,000		$ 20,000
Renew Top Coat every 10 yrs (annualized cost)	1	annualized	$ 35,000		$ 35,000
Five-Year Reviews	1	annualized	$ 5,000		$ 5,000
			Subtotal - O&M Costs		$ 60,000
			Contingency Reserve - 25% of O&M Costs		$ 15,000
			Total Annual O&M Costs		**$ 75,000**
			Net Present Worth of Annual O&M Costs	**$ 812,900**	
Total Net Present Worth of Alternative				**$ 10,450,900**	

Note: At time estimate was prepared, ENRCCI = 11392 (January 2020)

TABLE B-SF4 - PRELIMINARY COST ESTIMATE
SOIL/FILL - ALTERNATIVE 4
INSTITUTIONAL CONTROLS, ENGINEERING CONTROLS, FOCUSED REMOVAL WITH
OFF-SITE DISPOSAL OF LEAD, AND NAPL REMOVAL

	Estimated Quantity	Unit	Estimated Unit Cost	Estimated Capital Cost	Estimated Annual O&M Cost
Capital Costs					
Direct Implementation Costs					
Deed Restrictions (legal/filing)	15	Lots	$ 4,000	$ 60,000	
Fencing Enhancements	1,000	LF	$ 20	$ 20,000	
Site Preparation					
Clear Vegetation	0.5	Ac	$ 1,500	$ 750	
Asphalt and Debris Removal	1	LS	$ 25,000	$ 25,000	
Asphalt and Debris Disposal (T&D)	7500	Ton	$ 75	$ 562,500	
Asphalt Cap					
Regrade as needed to level surface	2000	CY	$ 20	$ 40,000	
Base gravel - 6"	27,200	SY	$ 18	$ 489,600	
Bituminous concrete - 6"	24,800	SY	$ 48	$ 1,190,400	
Seal coating	24,800	SY	$ 1.25	$ 31,000	
NAPL Removal					
Excavate/Load Soil/Fill	310	CY	$ 15	$ 4,650	
Waste Disposal, Petroleum-impacted (T&D)	510	Ton	$ 75	$ 38,250	
Soil Treatment	510	Ton	$ 25	$ 12,750	
Clean Backfill (provide/place/compact)	510	Ton	$ 60	$ 30,600	
Vertical Barrier					
Temporary Silt Screens in river	1	LS	$ 25,000	$ 25,000	
Old Wall Excavation (non soil/fill debris)	240	CY	$ 50	$ 12,000	
Decontamination and Disposal of Old Wall (non-soil/fill debris, T&D)	400	Ton	$ 250	$ 100,000	
Sheet Pile Installation (800' x 30')	24,000	SF	$ 150	$ 3,600,000	
Seal inactive wall pipes	1	LS	$ 35,000	$ 35,000	
Limited Excavation/Disposal					
Foundation Protection During Excavation	1	LS	$ 200,000	$ 200,000	
Excavate/load soils	5,100	CY	$ 15	$ 76,500	
Disposal of soils (non-haz, T&D)	8,415	Ton	$ 75	$ 631,125	
Soil Treatment for Disposal	8,415	Ton	$ 25	$ 210,375	
Clean Backfill (provide/place/compact)	8,415	Ton	$ 60	$ 504,900	
			Subtotal - Direct Costs	$ 7,900,400	
Indirect Costs					
Geotechnical Investigation		Lump Sum		$ 60,000	
Predesign Investigation/Soil Delineation		Lump Sum		$ 250,000	
Remedial Design		(10% of Direct Costs)		$ 790,040	
Mobilization/Misc. Site Prep		(5% of Direct Costs)		$ 395,020	
Site Administration		(5% of Direct Costs)		$ 395,020	
Permitting/Legal Costs		(2% of Direct Costs)		$ 158,008	
Oversight/Post-Ex Sampling		(10% of Direct Costs)		$ 790,040	
			Subtotal - Indirect Costs	$ 2,838,128	
			Diamond Alkali OU2 Contingency	$ 200,000	
			Contingency - 25% of Direct and Indirect Costs	$ 2,684,632	
			Total Capital Costs	**$ 13,623,160**	
Operation and Maintenance Costs					
Site Inspections/Maintenance	4	Qtr	$ 5,000		$ 20,000
Renew Top Coat every 10 yrs (annualized cost)	1	annualized	$ 35,000		$ 35,000
Five-Year Reviews	1	annualized	$ 5,000		$ 5,000
			Subtotal - O&M Costs		$ 60,000
			Contingency Reserve - 25% of O&M Costs		$ 15,000
			Total Annual O&M Costs		**$ 75,000**
			Net Present Worth of Annual O&M Costs	**$ 812,900**	
Total Net Present Worth of Alternative				**$ 12,633,300**	

Note: At time estimate was prepared, ENRCCI = 11392 (January 2020)

TABLE B-SF5 - PRELIMINARY COST ESTIMATE
SOIL/FILL - ALTERNATIVE 5
INSTITUTIONAL CONTROLS, IN-SITU REMEDIATION, ENGINEERING CONTROLS, AND NAPL REMOVAL

Component	Estimated Quantity	Unit	Estimated Unit Cost	Estimated Capital Cost	Estimated Annual O&M Cost
Capital Costs					
Direct Implementation Costs					
Deed Restrictions (legal/filing)	15	Lots	$ 4,000	$ 60,000	
Fencing Enhancements	1,000	LF	$ 20	$ 20,000	
Site Preparation					
Clear Vegetation	0.5	Ac	$ 1,500	$ 750	
Asphalt and Debris Removal	1	LS	$ 25,000	$ 25,000	
Asphalt and Debris Disposal (T&D)	7500	Ton	$ 75	$ 562,500	
NAPL Removal					
Excavate/Load Soil/Fill	310	CY	$ 15	$ 4,650	
Waste Disposal, Petroleum-impacted (T&D)	510	Ton	$ 75	$ 38,250	
Soil Treatment	510	Ton	$ 25	$ 12,750	
Clean Backfill (provide/place/compact)	510	Ton	$ 60	$ 30,600	
Vertical Barrier					
Temporary Silt Screens in river	1	LS	$ 25,000	$ 25,000	
Old Wall Excavation (non soil/fill debris)	240	CY	$ 50	$ 12,000	
Decontamination and Disposal of Old Wall (non-soil/fill debris, T&D)	400	Ton	$ 250	$ 100,000	
Sheet Pile Installation (800' x 30')	24,000	SF	$ 150	$ 3,600,000	
Seal inactive wall pipes	1	LS	$ 35,000	$ 35,000	
In-Situ Treatment					
Excavate top 18"	5100	CY	$ 15	$ 76,500	
Dispose top 18" (T&D)	8,420	Ton	$ 75	$ 631,500	
Regrade as needed to level surface	500	CY	$ 20	$ 10,000	
Insitu Solidification and Stabilization	30,500	CY	$ 60	$ 1,830,000	
Base gravel - 6"	27,200	SY	$ 18	$ 489,600	
Bituminous concrete - 6"	27,200	SY	$ 48	$ 1,305,600	
			Subtotal - Direct Costs	$ 8,869,700	
Indirect Costs					
Geotechnical Investigation		Lump Sum		$ 60,000	
Predesign Investigation/Soil Delineation		Lump Sum		$ 250,000	
Remedial Design, incl. treatability testing		(10% of Direct Costs)		$ 886,970	
Mobilization/Misc. Site Prep		(5% of Direct Costs)		$ 443,485	
Site Administration		(5% of Direct Costs)		$ 443,485	
Permitting/Legal Costs		(2% of Direct Costs)		$ 177,394	
Constr. Mgmt/Oversight/Post-Ex Sampling		(10% of Direct Costs)		$ 886,970	
			Subtotal - Indirect Costs	$ 3,148,304	
			Diamond Alkali OU2 Contingency	$ 200,000	
			Contingency - 25% of Direct and Indirect Costs	$ 3,004,501	
			Total Capital Costs	**$ 15,222,505**	
Operation and Maintenance Costs					
Site Inspections/Maintenance	4	Qtr	$ 3,750		$ 15,000
Renew Top Coat every 10 yrs	1	annualized	$ 35,000		$ 35,000
Five-Year Reviews	1	annualized	$ 5,000		$ 5,000
			Subtotal - O&M Costs		$ 55,000
			Contingency Reserve - 25% of O&M Costs		$ 13,750
			Total Annual O&M Costs		**$ 68,750**
			Net Present Worth of Annual O&M Costs	**$ 745,100**	
Total Net Present Worth of Alternative				**$ 13,971,400**	

Note: At time estimate was prepared, ENRCCI = 11392 (January 2020)

TABLE B-GW1 - PRELIMINARY COST ESTIMATE
GROUNDWATER - ALTERNATIVE 1
NO ACTION

Component	Estimated Quantity	Unit	Estimated Unit Cost	Estimated Capital Cost	Estimated Annual O&M Cost
Capital Costs					
Direct Implementation Costs				$ -	
			Subtotal - Direct Costs	$ -	
Indirect Costs					
Remedial Design	(10% of Direct Costs)			$ -	
Mobilization/Misc. Site Prep	(5% of Direct Costs)			$ -	
Site Administration	(5% of Direct Costs)			$ -	
Permitting/Legal Costs	(2% of Direct Costs)			$ -	
Construction Management/Oversight	(10% of Direct Costs)			$ -	
			Subtotal - Indirect Costs	$ -	
			Contingency - 25% of Direct and Indirect Costs	$ -	
			Total Capital Costs	$ -	
Operation and Maintenance Costs					
Site Inspections/Maintenance					$ -
Five-year Reviews (annualized cost)					$ -
			Subtotal - O&M Costs		$ -
			Contingency Reserve - 25% of O&M Costs		$ -
			Total Annual O&M Costs		$ -
			Net Present Worth of Annual O&M Costs	**$ -**	
Total Net Present Worth of Alternative				**$ -**	

Note: At time estimate was prepared, ENRCCI = 11392 (January 2020)

TABLE B-GW2 - PRELIMINARY COST ESTIMATE
GROUNDWATER - ALTERNATIVE 2
INSTITUTIONAL CONTROLS, CONTAINMENT AT RIVER AT RIVER EDGE, AND PUMP AND TREAT

Component	Estimated Quantity	Unit	Estimated Unit Cost	Estimated Capital Cost	Estimated Annual O&M Cost
Capital Costs					
Direct Implementation Costs					
CEA/WRA Submissions	1	LS	$ 75,000	$ 75,000	
Year 1 Groundwater Monitoring	4	LS	$ 45,000	$ 180,000	
Sheet Pile Containment Installation	70,000	SF	$ 150	$ 10,500,000	
Fill Between Old and New Wall	975	CY	$ 125	$ 121,875	
Extraction Well, pump, riser, well head, pump	20	EA	$ 2,500	$ 50,000	
Conveyance Trenching/Fill	2,500	LF	$ 40	$ 100,000	
Piping, conduit, wiring, instrumentation	30,000	LF	$ 37	$ 1,110,000	
Treatment Building, Pad, Utilities	7,500	SF	$ 250	$ 1,875,000	
Utilities (sewer, water, electrical)	1	LS	$ 100,000	$ 100,000	
Discharge line	500	LF	$ 150	$ 75,000	
200 gpm Treatment System (includes equipment, installation, labor)					
Process Water Tanks	1	LS	$ 150,000	$ 150,000	
Oxidation System	1	LS	$ 500,000	$ 500,000	
Filtration Units	1	LS	$ 400,000	$ 400,000	
Metals Precipitaion System	1	LS	$ 275,000	$ 275,000	
Sludge Processing	1	LS	$ 150,000	$ 150,000	
Carbon Adsorption Units	1	LS	$ 250,000	$ 250,000	
Pumps and Piping	1	LS	$ 150,000	$ 150,000	
Electrical, Instrumentation, Controls	1	LS	$ 1,500,000	$ 1,500,000	
Chemical Feed System	1	LS	$ 175,000	$ 175,000	
			Subtotal - Direct Costs	$ 17,736,875	
Indirect Costs					
Predesign Investigation		Lump Sum		$ 750,000	
Geotechnical Investigation		Lump Sum		$ 150,000	
Remedial Design		(10% of Direct Costs)		$ 1,773,688	
Mobilization/Misc. Site Prep		(5% of Direct Costs)		$ 886,844	
Site Administration		(5% of Direct Costs)		$ 886,844	
Permitting/Legal Costs		(2% of Direct Costs)		$ 354,738	
Construction Management/Oversight		(10% of Direct Costs)		$ 1,773,688	
			Subtotal - Indirect Costs	$ 6,575,800	
			Diamond Alkali OU2 Contingency	$ 200,000	
			Contingency - 25% of Direct and Indirect Costs	$ 6,078,169	
			Total Capital Costs	**$ 30,590,844**	
Operation and Maintenance Costs					
Routine Groundwater Monitoring	2	event	$ 45,000		$ 90,000
Biennial Sampling Per CEA (annualized costs)	1	event	$ 10,000		$ 10,000
Treatment System					
Utilities	1	LS	$ 150,000		$ 150,000
Chemicals (oxidant, pH adjustment, etc.)	1	LS	$ 50,000		$ 50,000
Carbon Changeout	1	LS	$ 50,000		$ 50,000
Sludge/Waste Management	1	LS	$ 50,000		$ 50,000
Routine O&M (staffed 40 hrs per wk)	1	LS	$ 320,000		$ 320,000
Non Routine Maintenance	1	LS	$ 25,000		$ 25,000
Performance Sampling	1	LS	$ 150,000		$ 150,000
Five-Year Reviews	1	annualized	$ 5,000		$ 5,000
			Subtotal - O&M Costs		$ 900,000
			Contingency Reserve - 25% of O&M Costs		$ 225,000
			Total Annual O&M Costs		**$ 1,125,000**
			Net Present Worth of Annual O&M Costs	**$ 10,650,100**	
Total Net Present Worth of Alternative				**$ 34,258,600**	

Note: At time estimate was prepared, ENRCCI = 11392 (January 2020)

TABLE B-GW3 - PRELIMINARY COST ESTIMATE
GROUNDWATER - ALTERNATIVE 3
INSTITUTIONAL CONTROLS AND IN-SITU REMEDIATION

Component	Estimated Quantity	Unit	Estimated Unit Cost	Estimated Capital Cost	Estimated Annual O&M Cost
Capital Costs					
Direct Implementation Costs					
CEA/WRA Submissions	1	LS	$ 75,000	$ 75,000	
1st Year Groundwater Monitoring	4	Event	$ 45,000	$ 180,000	
Initial Chemical Treatment (organics)	1,622,250	LB	$ 1.75	$ 2,838,938	
Initial Chemical Treatment (inorganics)	1,954,500	LB	$ 2.25	$ 4,397,625	
Inject labor/equipment	300	Day	$ 3,500	$ 1,050,000	
Round 2 Injections (67% , chemicals and labor)	1	LS	$ 5,551,997	$ 5,551,997	
Round 3 Injections (33% , chemicals and labor)	1	LS	$ 2,775,998	$ 2,775,998	
			Subtotal - Direct Costs	$16,869,558	
Indirect Costs					
Predesign Investigation	Lump Sum			$ 500,000	
Remedial Design	(10% of Direct Costs)			$ 1,686,956	
Mobilization/Misc. Site Prep	(5% of Direct Costs)			$ 843,478	
Site Administration	(5% of Direct Costs)			$ 843,478	
Permitting/Legal Costs	(2% of Direct Costs)			$ 337,391	
Construction Management/Oversight	(10% of Direct Costs)			$ 1,686,956	
			Subtotal - Indirect Costs	$ 5,898,259	
			Contingency - 25% of Direct and Indirect Costs	$ 5,691,954	
			Total Capital Costs	**$ 28,459,770**	
Operation and Maintenance Costs					
Routine Groundwater Monitoring	2	Event	$ 45,000		$ 90,000
Biennial Sampling per CEA (annualized cost)	1	Event	$ 10,000		$ 10,000
Five-year Reviews (annualized cost)	1	(annualized)	$ 5,000		$ 5,000
			Subtotal - O&M Costs		$ 105,000
			Contingency Reserve - 25% of O&M Costs		$ 26,250
			Total Annual O&M Costs		**$ 131,250**
			Net Present Worth of Annual O&M Costs	**$ 1,242,500**	
Total Net Present Worth of Alternative				**$ 20,844,800**	

Note: At time estimate was prepared, ENRCCI = 11392 (January 2020)

TABLE B-GW4 - PRELIMINARY COST ESTIMATE
GROUNDWATER - ALTERNATIVE 4
INSTITUTIONAL CONTROLS, PUMP AND TREAT, AND TARGETED PERIODIC IN-SITU REMEDIATION

Component	Estimated Quantity	Unit	Estimated Unit Cost	Estimated Capital Cost	Estimated Annual O&M Cost
Capital Costs					
Direct Implementation Costs					
CEA/WRA Submissions	1	LS	$ 75,000	$ 75,000	
Year 1 Groundwater Monitoring	4	LS	$ 45,000	$ 180,000	
Extraction Well, pump, riser, well head, pump	20	EA	$ 1,500	$ 30,000	
Conveyance Trenching/Fill	2,500	CY	$ 40	$ 100,000	
Piping, conduit, wiring, instrumentation	30,000	LF	$ 37	$ 1,110,000	
Treatment Building, Pad, Utilities	7,500	SF	$ 250	$ 1,875,000	
Utilities (sewer, water, electrical)	1	LS	$ 100,000	$ 100,000	
Discharge line	500	LF	$ 150	$ 75,000	
200 gpm Treatment System, includes equipment, installation, labor					
Process Water Tanks	1	LS	$ 150,000	$ 150,000	
Oxidation System	1	LS	$ 500,000	$ 500,000	
Filtration Units	1	LS	$ 400,000	$ 400,000	
Metals Precipitaion System	1	LS	$ 275,000	$ 275,000	
Sludge Processing	1	LS	$ 150,000	$ 150,000	
Carbon Adsorption Units	1	LS	$ 250,000	$ 250,000	
Pumps and Piping	1	LS	$ 150,000	$ 150,000	
Electrical, Instrumentation, Controls	1	LS	$ 1,500,000	$ 1,500,000	
Chemical Feed System	1	LS	$ 175,000	$ 175,000	
			Subtotal - Direct Costs	$7,095,000	
Indirect Costs					
Predesign Investigation		Lump Sum		$ 750,000	
Geotechnical Investigation		Lump Sum		$ 150,000	
Remedial Design		(10% of Direct Costs)		$ 709,500	
Mobilization/Misc. Site Prep		(5% of Direct Costs)		$ 354,750	
Site Administration		(5% of Direct Costs)		$ 354,750	
Permitting/Legal Costs		(2% of Direct Costs)		$ 141,900	
Construction Management/Oversight		(10% of Direct Costs)		$ 709,500	
			Subtotal - Indirect Costs	$ 3,170,400	
			Contingency - 25% of Direct and Indirect Costs	$ 2,566,350	
			Total Capital Costs	**$ 12,831,750**	
Operation and Maintenance Costs					
Routine Groundwater Monitoring	2	event	$ 45,000		$ 90,000
Biennial Sampling Per CEA (annualized costs)	1	event	$ 10,000		$ 10,000
Treatment System					
Utilities	1	LS	$ 150,000		$ 150,000
Chemicals (oxidant, pH adjustment, etc.)	1	LS	$ 50,000		$ 50,000
Carbon Changeout	1	LS	$ 50,000		$ 50,000
Sludge/Waste Management	1	LS	$ 50,000		$ 50,000
Routine O&M (staffed 40 hrs per wk)	1	LS	$ 320,000		$ 320,000
Non Routine Maintenance	1	LS	$ 25,000		$ 25,000
Performance Sampling	1	LS	$ 150,000		$ 150,000
In-Situ Targetted Treatment for Selected Contaminants	1	LS	$ 300,000		$ 300,000
Five-year Reviews	1	annualized	$ 5,000		$ 5,000
			Subtotal - O&M Costs		$ 1,200,000
			Contingency Reserve - 25% of O&M Costs		$ 300,000
			Total Annual O&M Costs		**$ 1,500,000**
			Net Present Worth of Annual O&M Costs	**$ 14,200,200**	
Total Net Present Worth of Alternative				**$ 24,234,400**	

Note: At time estimate was prepared, ENRCCI = 11392 (January 2020)

TABLE B-GW5 - PRELIMINARY COST ESTIMATE
GROUNDWATER - ALTERNATIVE 5
INSTITUTIONAL CONTROLS, SITE CONTAINMENT AT RIVER EDGE AND FOCUSED IN-SITU REMEDIATION

Component	Estimated Quantity	Unit	Estimated Unit Cost	Estimated Capital Cost	Estimated Annual O&M Cost
Capital Costs					
Direct Implementation Costs					
CEA/WRA Submissions	1	LS	$ 75,000	$ 75,000	
1st Year Groundwater Monitoring	4	Event	$ 45,000	$ 180,000	
Sheet Pile Containment Installation	70,000	SF	$ 150	$ 10,500,000	
Fill Between Old and New Wall	975	CY	$ 125	$ 121,875	
Initial Chemical Treatment (organics)	196,643	LB	$ 1.75	$ 344,124	
Initial Chemical Treatment (inorganics)	65,548	LB	$ 2.25	$ 147,482	
Inject labor/equipment	53	Day	$ 3,500	$ 185,500	
Round 2 Injections (67% , chemicals and labor)	1	LS	$ 453,661	$ 453,661	
Round 3 Injections (33% , chemicals and labor)	1	LS	$ 226,831	$ 226,831	
			Subtotal - Direct Costs	$12,234,473	
Indirect Costs					
Predesign Investigation		Lump Sum		$ 350,000	
Geotechnical Investigation		Lump Sum		$ 150,000	
Remedial Design		(10% of Direct Costs)		$ 1,223,447	
Mobilization/Misc. Site Prep		(5% of Direct Costs)		$ 611,724	
Site Administration		(5% of Direct Costs)		$ 611,724	
Permitting/Legal Costs		(2% of Direct Costs)		$ 244,689	
Construction Management/Oversight		(10% of Direct Costs)		$ 1,223,447	
			Subtotal - Indirect Costs	$ 4,415,031	
			Contingency - 25% of Direct and Indirect Costs	$ 4,162,376	
			Total Capital Costs	**$ 20,811,881**	
Operation and Maintenance Costs					
Routine Groundwater Monitoring	2	Event	$ 45,000		$ 90,000
Biennial Sampling per CEA (annualized cost)	1	Event	$ 10,000		$ 10,000
Five-year Reviews (annualized cost)	1	(annualized)	$ 5,000		$ 5,000
			Subtotal - O&M Costs		$ 105,000
			Contingency Reserve - 25% of O&M Costs		$ 26,250
			Total Annual O&M Costs		**$ 131,250**
			Net Present Worth of Annual O&M Costs	**$ 1,242,500**	
Total Net Present Worth of Alternative				**$ 17,193,900**	

Note: At time estimate was prepared, ENRCCI = 11392 (January 2020)

TABLE B-SW1 - PRELIMINARY COST ESTIMATE
SEWER WATER - ALTERNATIVE 1
NO ACTION

Component	Estimated Quantity	Unit	Estimated Unit Cost	Estimated Capital Cost	Estimated Annual O&M Cost
Capital Costs					
Direct Implementation Costs					
			Subtotal - Direct Costs	$ -	
Indirect Costs					
Remedial Design	(10% of Direct Costs)			$ -	
Mobilization/Misc. Site Prep	(5% of Direct Costs)			$ -	
Site Administration	(5% of Direct Costs)			$ -	
Permitting/Legal Costs	(2% of Direct Costs)			$ -	
Construction Management/Oversight	(10% of Direct Costs)			$ -	
			Subtotal - Indirect Costs	$ -	
			Contingency - 25% of Direct and Indirect Costs	$ -	
			Total Capital Costs	**$ -**	
Operation and Maintenance Costs					$ -
			Subtotal - O&M Costs		$ -
			Contingency Reserve - 25% of O&M Costs		$ -
			Total Annual O&M Costs		**$ -**
			Net Present Worth of Annual O&M Costs	**$ -**	
Total Net Present Worth of Alternative				**$ -**	

Note: At time estimate was prepared, ENRCCI = 11392 (January 2020)

TABLE B-SW2 - PRELIMINARY COST ESTIMATE
SEWER WATER - ALTERNATIVE 2
REMOVAL AND OFF-SITE DISPOSAL

Component	Estimated Quantity	Unit	Estimated Unit Cost	Estimated Capital Cost	Estimated Annual O&M Cost
Capital Costs					
Direct Implementation Costs					
Removal of Liquids/Solids	1	LS	$ 5,000	$ 5,000	
Pressure Wash Manhole	1	LS	$ 3,000	$ 3,000	
Waste Disposal (liquids, non-haz, T&D)	2,500	Gallons	$ 0.30	$ 750	
Waste Disposal (solids, non-haz, T&D)	2	Drums	$ 250	$ 500	
Disconnect and Grout Pipe and Manhole	1	LS	$ 5,000	$ 5,000	
			Subtotal - Direct Costs	$ 14,250	
Indirect Costs					
Remedial Design	Lump Sum			$ 5,000	
Mobilization/Misc. Site Prep	(5% of Direct Costs)			$ 713	
Site Administration	(5% of Direct Costs)			$ 713	
Permitting/Legal Costs	(2% of Direct Costs)			$ 285	
Construction Management/Overisght	(10% of Direct Costs)			$ 1,425	
			Subtotal - Indirect Costs	$ 8,135	
			Contingency - 25% of Direct and Indirect Costs	$ 5,596	
			Total Capital Costs	**$ 27,981**	
Operation and Maintenance Costs					
					$ -
			Subtotal - O&M Costs		$ -
			Contingency Reserve - 25% of O&M Costs		$ -
			Total Annual O&M Costs		**$ -**
			Net Present Worth of Annual O&M Costs	**$ -**	
Total Net Present Worth of Alternative				**$ 24,900**	

Note: At time estimate was prepared, ENRCCI = 11392 (January 2020)

TABLE B-SG1 - PRELIMINARY COST ESTIMATE
SOIL GAS - ALTERNATIVE 1
NO ACTION

Component	Estimated Quantity	Unit	Estimated Unit Cost	Estimated Capital Cost	Estimated Annual O&M Cost
Capital Costs					
Direct Implementation Costs					
			Subtotal - Direct Costs	$ -	
Indirect Costs					
Remedial Design	(10% of Direct Costs)			$ -	
Mobilization/Misc. Site Prep	(5% of Direct Costs)			$ -	
Site Administration	(5% of Direct Costs)			$ -	
Permitting/Legal Costs	(2% of Direct Costs)			$ -	
Construction Management/Oversight	(10% of Direct Costs)			$ -	
			Subtotal - Indirect Costs	$ -	
			Contingency - 25% of Direct and Indirect Costs	$ -	
			Total Capital Costs	**$ -**	
Operation and Maintenance Costs					$ -
			Contingency Reserve - 25% of O&M Costs		$ -
			Total Annual O&M Costs		**$ -**
			Net Present Worth of Annual O&M Costs	**$ -**	

Note: At time estimate was prepared, ENRCCI = 11392 (January 2020)

TABLE B-SG2 - PRELIMINARY COST ESTIMATE
SOIL GAS - ALTERNATIVE 2
INSTITUTIONAL CONTROLS, AIR MONITORING/ENGINEERING CONTROLS, AND SITE-WIDE ENGINEERING CONTROLS

Component	Estimated Quantity	Unit	Estimated Unit Cost	Estimated Capital Cost	Estimated Annual O&M Cost
Capital Costs					
Direct Implementation Costs					
Deed Restrictions/CEAs	15	Lots	$ 4,000	$ 60,000	
Initial Round of Indoor Air Monitoring (3/bldg)	21	Sample	$ 1,500	$ 31,500	
Subtotal - Direct Costs				$ 91,500	
Indirect Costs					
Remedial Design	(5% of Direct Costs)			$ 4,575	
Site Administration	(1% of Direct Costs)			$ 915	
Permitting/Legal Costs	(1% of Direct Costs)			$ 1,830	
Subtotal - Indirect Costs				$ 7,320	
Contingency - 25% of Direct and Indirect Costs				$ 24,705	
Total Capital Costs				**$ 123,525**	
Operation and Maintenance Costs					
Indoor Air Monitoring	21	Sample	$ 1,500		$ 31,500
Subtotal - O&M Costs					$ 31,500
Contingency - 25% of O&M Costs					**$ 31,500**
Net Present Worth of Annual O&M Costs				**$ 341,400**	
Total Net Present Worth of Alternative				**$ 449,800**	

Note: At time estimate was prepared, ENRCCI = 11392 (January 2020)

TABLE B-SG3 - PRELIMINARY COST ESTIMATE
SOIL GAS - ALTERNATIVE 3
INSTITUTIONAL CONTROLS, SITE-WIDE ENGINEERING CONTROLS, AND IN-SITU REMEDIATION

Component	Estimated Quantity	Unit	Estimated Unit Cost	Estimated Capital Cost	Estimated Annual O&M Cost
Capital Costs					
Direct Implementation Costs					
Deed Restrictions/CEAs	15	Lots	$ 4,000	$ 60,000	
In-Situ Treatment					
Initial Chemical Treatment (organics)	570,322	LB	$ 1.75	$ 998,064	
Inject labor/equipment	90	Day	$ 3,500	$ 315,000	
Round 2 Injections (67% , chemicals and labor)	1	LS	$ 879,753	$ 879,753	
Round 3 Injections (33% , chemicals and labor)	1	LS	$ 439,876	$ 439,876	
			Subtotal - Direct Costs	$ 2,692,693	
Indirect Costs					
Delineation/Treatability Study	Lump Sum			$ 200,000	
Remedial Design	(10% of Direct Costs)			$ 269,269	
Mobilization/Misc. Site Prep	(5% of Direct Costs)			$ 134,635	
Site Administration	(2% of Direct Costs)			$ 53,854	
Permitting/Legal Costs	(2% of Direct Costs)			$ 53,854	
Construction Management/Oversight	(10% of Direct Costs)			$ 269,269	
			Subtotal - Indirect Costs	$ 980,881	
			Contingency - 25% of Direct and Indirect Costs	$ 918,394	
			Total Capital Costs	**$ 4,591,968**	
Operation and Maintenance Costs					$ -
			Subtotal - O&M Costs		$ -
			Contingency Reserve - 25% of O&M Costs		$ -
			Total Annual O&M Costs		**$ -**
			Net Present Worth of Annual O&M Costs	**$ -**	
Total Net Present Worth of Alternative				**$ 4,050,800**	

Note: At time estimate was prepared, ENRCCI = 11392 (January 2020)