

APPENDIX L
COSTING OF REMOVAL ACTION ALTERNATIVES

<i>TETRA TECH NUS, INC.</i>		<i>COST ESTIMATE ASSUMPTIONS</i>	
CLIENT: EPA	FILE NO.: N4111-3.5	BY: SAV	PAGE: 1 of 7
SUBJECT: Assumptions and basis of costs for Alternative 1		REVIEWED BY: DMB/GB	DATE: July 2002

Mohawk Tannery EE/CA Alternative 1 – Excavation and Off-Site Disposal

ASSUMPTIONS:

1. Alternative 1 cost items include:
 - Personnel and equipment mobilization
 - Site preparation
 - Excavation and stockpiling of overlying soil at a designated, onsite soil staging area
 - Excavation and stockpiling of sludge/waste at a separate, onsite staging area
 - Loading, transportation, and disposal of sludge/waste at an off-site landfill facility
 - Initial backfill of excavation with overlying soil
 - Backfill and compaction to original grade with imported, clean, common fill
 - Site restoration
 - Post-removal site control

2. Unit costs were derived from values published in:

¹ *Means Environmental Remediation Cost Data*, 6th Annual Edition, R.S. Means Company, Inc., 2000;

² *Means Heavy Construction Cost Data*, 12th Annual Edition, R.S. Means Company, Inc., 1998; and

³ *Means Environmental Remediation Cost Data—Assemblies*, 4th Annual Edition, R.S. Means Company, Inc., 1998.

Means reference codes (i.e. [18 01 0102]) are provided in the comments/references column on the capital costs spreadsheets.

3. Hourly labor costs for construction activities were derived from *The Davis-Bacon Wage Determinations* for Hillsborough County, New Hampshire; published by the U.S. Department of Labor (<http://www.access.gpo.gov/davisbacon/>)

4. The *Engineering News-Record* Construction Cost Index (CCI) was used to adjust construction costs from 1998/2000 levels to present day levels as follows:
 - $CCI_{1998} = 5920$; $CCI_{2000} = 6221$; $CCI_{\text{March, 2002}} = 6502$
 - Unit costs from 1998 were adjusted by $[(6502 - 5920) / 5920] * 100\% = 9.8\%$ to reflect present day costs
 - Unit costs from 2000 were adjusted by $[(6502 - 6221) / 6221] * 100\% = 4.5\%$ to reflect present day costs

5. Abbreviations: LF = linear feet; SF = square feet; SY = square yard; CF = cubic feet; CY = cubic yard; AC = acre; WK = week; MO = month; LS = lump sum; KGAL = 1,000 gallons; PDI = pre-design investigation; TCLP = toxicity characteristic leaching procedure; VOCs = volatile organic compounds; SVOCs = semi-volatile organic compounds

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6. Discount rate for net present worth analysis at 7% per OSWER Directive No. 9355.3-20, June 25, 1993.

ESTIMATED TIME TO COMPLETE ALTERNATIVE 1 (see Figure 5-1):

Once authorized to proceed:

Engineering & Design Specifications (including PDI):	16 weeks
Subcontracting/Procurement:	8 weeks
Mobilization:	1 week
Site Preparation:	3 weeks
Excavation and Disposal: (overlying soil 4 weeks; waste/sludge 30 weeks)	34 weeks
Site restoration:	3 weeks
Demobilization:	1 week

Total site time (from mob to demob): 42 weeks @ 4 wk/mo = approximately 11 months

Total project duration: ~17 months

Note: Duration assumes 5 day work week and 8 hour day. Total project duration does not include potential delays attributed to reduced excavation rates from excessive sludge/waste moisture content.

CAPITAL COST ITEMS:

Mob/Demob and Monthly Costs include delivery/pickup and monthly costs for equipment and supplies necessary to implement the removal action.

- 1) Equipment Mobilization/Demobilization Costs (\$23,150) include one-time costs for the delivery and pickup of the following items. The costs for mob/demob were obtained from TtNUS historical costs and vendor quotes.
 - Office trailer - \$500
 - Storage trailer - \$250
 - Construction equipment – \$5,000
 - Level C respirator cartridges w/ breakthrough indicator for H₂S – \$7,200
 - Sampling equipment/supplies - \$5,000

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- Frac tanks (2) – \$500 each
 - Water storage tanks (2) – \$250 each
 - Odor control units (2) - \$1,000 each
 - Site utilities (installation) - \$1,500
 - Sanitary facilities - \$100
 - Dumpster - \$100
- 2) Monthly costs for equipment/supplies: Monthly costs are provided on the capital costs spreadsheet (items 2-9) for equipment, supplies, facilities, and services necessary to implement the removal action. The duration of costs is assumed to equal the total site time from mob thru demob. Monthly costs were obtained from TtNUS historical costs and vendor quotes.

Decontamination Facilities include:

- 1) Truck Decontamination Pad – assumed 20' x 40' in size with 6" gravel base, 40 mil high density polyethylene (HDPE) liner, and 4" crushed stone, graded to divert decontamination fluids into water collection sump, with wood-framed splash guards equipped with plastic sheeting installed on either side of the pad.
- 2) Decontamination Services – assume:
 - Purchase of two 3,000 PSI pressure washers
 - Operation of pressure washer (including water, soap, electricity, and labor) for duration of T&D, but at a rate of 25% of total T&D hours (T&C duration assumed equal to duration of sludge/waste excavation): 30 wks x 5 days/wk x 8 hrs/day x 25% = 300 hours)
- 3) Personnel Decontamination Pad – assumed 10' x 10' in size with 6" gravel base, 40 mil HDPE liner, and 4" crushed stone.
- 4) Clean and Collected Water Storage Tanks – 2,450 gallons each (2 @ 11 months = 24 months), price quoted by Rain for Rent.

Site Preparation

- 1) Site Access Road Construction. The site access road would originate at the Broad Street entrance to the Fimbel Door Company property, proceed around the Fimbel building, and follow the existing dirt road that runs to the west of the Fimbel Landfill and onto the Mohawk Tannery Site between the gravel pit and Area 5. The proposed route is currently paved between Broad Street and the back of the Fimbel Building. The unpaved portion of the route would be improved with one foot of graded and compacted gravel and crushed stone. Cost estimates for road construction assume:
 - Clearing light brush: 1,500 FT x 30 FT corridor = 45,000 SF = approximately 1 acre
 - Delivery of gravel: 1,500 FT length, 20 FT width, 1 FT thick road = 30,000 CF \cong 1,100 CY
 - Spreading and compaction of gravel road – 30,000 SF \cong 3,300 SY
- 2) Building/Foundation Demolition. Building foundations and concrete structures existing in the vicinity of Area 6 would be demolished to provide room for the construction of a sludge/waste stockpile area. The wood-framed clarifier building adjacent to Area 1 would also be demolished to provide greater access to Area 1 for earth-moving equipment. For costing purposes, it is assumed that the structures do not contain asbestos or lead-based paint. Cost estimation for these items use the following assumptions:
 - Excavation and demolition of 6-8 foundations: assume 10,000 SF at 2 FT thick \cong 750 CY
 - Transportation and Disposal of foundation debris: assume 750 CY \cong 1,200 TON
 - Removal and disposal of clarifier tank (assuming water suitable for discharge to sewer)
 - Demolition of wood-framed building: 30 FT x 90 FT x 10 FT = 27,000 CF

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- Disposal of wood debris: 1,000 CY estimated
- 3) Clear Medium Brush. Clearing of medium brush would be necessary throughout the site to facilitate access to disposal areas and traffic patterns during excavation and hauling. Cost estimation for this item assumes 10 acres of clearing.
- 4) Installation of Erosion and Sedimentation Controls. Erosion and sedimentation controls would be installed along the Nashua River to prevent impacts to the river due to runoff from the site. The cost estimation for this item assumes:
 - Silt fence along Nashua River - 2,500 feet assumed
 - 20 tons hay bales assumed
- 5) Haul Road Construction. Existing onsite roads would be improved to facilitate onsite traffic during excavation activities. Cost estimates assume that roads would be repaired/bulldozed, expanded, and graded so that they are easily passable for heavy trucks. Road dimensions assumed to be 15 feet in width and 1 foot in thickness of gravel/crushed stone:
 - Approximately 4,000 LF x 15 FT x 1 FT = 60,000 CF – volume of stone needed
 - Deliver and dump 60,000 CF \cong 2,222 CY gravel/crushed stone
 - Spread, Grade, and Compact 60,000 SF \cong 6,667 SY
- 6) Prepare Stockpile/Staging Areas. Stockpile/staging areas would be constructed in Area 5 and in Area 6 to stockpile overlying soil and sludge/waste, respectively. Construction of each of the stockpile areas would be similar, consisting of six inches of sand/gravel, overlain by a 40-mil polyethylene liner and one foot of sand/gravel. The overlying soil stockpile would be approximately 80' x 80' in size and the sludge/waste stockpile would be approximately 100' x 100' in size. Each would be graded to promote the collection of liquids (from dewatering or precipitation) in a sump. Cost estimation for this item assumed:
 - 16,400 SF (1,850 SY) graded to prepare stockpile areas (both areas)
 - 16,400 SF 40-mil polyethylene liner
 - 16,400 SF * 1.5 FT sand/gravel (base and cover material included) = 24,600 CF = 910 CY sand/gravel
 - perimeter erosion and sedimentation controls (silt fence and hay bales at perimeter of stockpile area)
- 7) Dust Suppression would be performed during site preparation through the use of spray from a water truck.

Dewatering would be required prior to excavation in Area 1 and during excavation in Areas 1, 2, and possibly 3. For cost estimation purposes, it is assumed that the dewatering system would be operated and maintained for 20 weeks. 160 foot diameter, one foot depth of water assumed for rough estimation of surface water volume in Area 1. It is assumed, pending results of the PDI, that standing water in the lagoon and water from excavations would be pumped into the Nashua sewer system via the onsite sewer line. A fractionation tank would be set up on site as temporary storage for dewatering fluids as they become more turbid during the dewatering process. A second water storage tank would be set up on site into which water would be pumped after the settling process has been completed. Water samples would be collected from this tank to verify that it is acceptable for discharge to the sewer. For the purposes of costing, it is assumed that water will be ultimately discharged to the sewer without pretreatment.

- 1) Pump rental (3 pumps/1 standby) for 20 weeks = 60 weeks total rental
- 2) Discharge Hose – 3" PVC hose (2 at 500 feet each = 1000 LF)
- 3) Fractionation Tanks – two 20,000 gallon tanks for 11 months each @ \$900/month
- 4) Analytical requirements for discharge to sewer estimated at 10 samples each for BOD, COD, cyanide, suspended solids, VOCs, SVOCs, metals, and pH

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- 5) Disposal Fees – assumes 250,000 gallons total: 150,000 gallons surface water and 1,000 gallons groundwater per day of excavation (1,000 gallons/day x 100 days = 100,000 gallons)

Sludge/Waste/Soil Excavation assumes excavation and stockpiling of overlying soil, excavation and stockpiling of sludge/waste. Excavation rate of overlying soil assumed to be 60 CY/hour; excavation rate of sludge/waste assumed to be 50 CY/hour.

- 1) Excavate and Load Overlying Soil. For costing purposes, assumed excavation of overlying soil with crawler-mounted, hydraulic excavator, 2.0 CY bucket @ 60 CY/hour. (Estimated volume in place = 9,500 cy)
- 2) Excavate and Load Sludge/Waste. For costing purposes, assumed reduced production rate for excavation of sludge/waste (50 CY/HR) due to increased moisture content and excavation below the water table. Unit costs increased by 150% to account for dewatering and odor control considerations during excavation. (Estimated volume in place = 60,000 cy)
- 3) Transport Sludge/Waste to Stockpile. Two 12 CY dump trucks assumed at 1,360 hours for excavation.
- 4) Dust suppression assumed to occur twice daily over excavation area, haul roads, and/or stockpile. Approximately 1 acre (43,560 SF) per pass assumed. Two per day for 30 weeks = 300 acres.
- 5) Odor Control during excavation assumed to involve:
 - Rental of 535-gallon water tank, mixing tank, and diesel-powered generator system in which odor control solution would be mixed and delivered to nozzle lines surrounding the excavation area – 8 months @ 2,910/month
 - Pump rental with which to fill water tank 30 weeks @ 300/week
 - For costing purposes, water:product dilution ratio of 100:1 assumed, which results in usage cost of approximately \$86.16/hour. Actual usage rate will be determined as part of the PDI. Assume \$86.16/hour for 1,200 hours of sludge/waste excavation
 - Assumed \$3,500 for technician to travel to site, supervise start up of system, and train operating personnel
 - Subcontractor costs such as taxes and freight are not included in this line item, but incorporated into the cost estimate as an “indirect cost adjustment factor” at the bottom of the sheet
 - Cost estimation based on information from and discussions with vendor
- 6) Air Monitoring includes the collection of air samples at two locations daily (during excavation) near perimeter of site to monitor impacts to ambient air on neighboring properties. Air samples analyzed for sulfides and dioxin. 2 samples/day*30 weeks*5 day/week = 300 samples. Cost_{sulfide} ≅ \$300/sample, cost_{dioxin} ≅ \$700/sample.

Sludge/Waste Stockpiling and Handling

- 1) Odor/Moisture Control. Assume odor/moisture control measures in stockpile area will require lime up to 10% of weight of sludge/waste or 9,000 tons (Sludge/waste density assumed to be 1.5 ton/cy; 60,000cy sludge/waste in place = 90,000 tons)
- 2) Sludge Dewatering/Moisture Control. Assume odor/moisture control at 1 laborer (and rental of front-end loader (\$75/hour) to mix lime into sludge/waste. Assumed duration of stockpile = duration of sludge/waste excavation: 30 wks x 5 days/wk x 8 hrs/day = 1200 hrs.
- 3) Stockpile Maintenance includes rental of dozer for life of stockpile, assumes use of same laborer/equipment operator costed for dewatering/moisture control above. (1 operator, 2 pieces of equipment)

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Confirmatory Sampling/Analysis would be performed to determine the vertical and lateral extent of excavation during removal activities, and to characterize stockpiled sludge/waste in compliance with the acceptance requirements provided by the disposal facility. Confirmatory soil samples would be collected only when all visually contaminated sludge has been removed from the current excavation area. Confirmatory samples would be collected for dioxins, SVOCs, and metals; and would be shipped to an off-site laboratory for analysis with a 24-hour turn around time. (sample shipping and analytical costs obtained from TtNUS historical costs)

- 1) Shipping Cost. Assume 5 coolers, shipped for overnight delivery, per week for 30 weeks of sludge/waste excavation.
- 2) Analytical Cost. Assume one confirmatory sample for every 500 SF of open excavation. Confirmatory samples would be collected for dioxins (\$780/sample), SVOCs (\$225/sample), and metals (\$125/sample).
- 3) Stockpile Characterization Samples. Assume one stockpile characterization sample per 500 tons of sludge/waste delivered to the disposal facility. Samples analyzed for TCLP VOCs (\$250/sample), TCLP SVOCs (\$225/sample), TCLP metals (\$140/sample), ignitability (\$35/sample), corrosivity (\$10/sample), reactivity (\$80/sample), and paint filter (\$10/sample).

Offsite Disposal of Sludge/Waste

- 1) Load Dump Trucks assumes use of crawler-mounted, hydraulic excavator with 2.0 CY bucket at 75 CY/HR; volume increased by 10% from excavated volume (60,000 cy to 66,000 cy) to account for bulking and addition of lime. Loading rates and T&D duration assume that availability of trucks (approx. 20/day) is sufficient to keep up with excavation production rate.
- 2) Transportation and Disposal
 - Alternative 1A – Assumes sludge/waste suitable for disposal in RCRA Subtitle D landfill, \$80/ton based on quote from RCRA D landfill facility in New Hampshire.
 - Alternative 1B – Assumes sludge from Area 1 requires disposal in RCRA Subtitle C landfill, \$181/ton based on quote from RCRA C landfill facility in NY; sludge/waste from other disposal areas suitable for disposal at RCRA D facility in NH (\$80/ton).
 - Alternative 1C – Assumes sludge from Area 1 would be subject to U.S. land disposal ban and would require disposal at Canadian landfill, \$225/ton based on discussion with vendors and past experience with disposal of dioxin-containing waste; sludge/waste from other disposal areas suitable for disposal at RCRA D facility (\$80/ton).

Site Restoration

- 1) Backfill and Compaction. Excavations will be backfilled initially with overlying soil hauled from the overlying soil stockpile area, and backfilled to final grade with unclassified fill delivered and dumped onsite. For costing purposes, it was assumed that excavations would be backfilled to original grade. Backfill will be spread and compacted in 6-inch lifts. Assume 69,000 CY of fill would be required from an off-site source to backfill excavation to original grade (bulking factor to account for compaction during backfill = 1.15).
- 2) Place Topsoil assumes 4-inch layer of topsoil over the area of excavation. Approximately 136,500 SF x 0.33 FT = 45,455 CF or 1,685 CY.
- 3) Revegetate assumes 136,500 SF (3.13 acres) by hydroseeding. Assumes that timing of site work is seasonally appropriate to allow site restoration to occur immediately following site work. Additional costs are not included for temporary erosion control measures or additional mobilization costs.

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Site Staffing includes site personnel required to coordinate and direct removal actions for the duration of the NTCRA.

- 1) Site Supervisor/Field Operations Leader responsible for field oversight of excavation subcontractor, coordination of field activities, documentation of field decisions, preparation of daily construction reports, communication between field crew/subcontractor and home office.
- 2) Site Engineer responsible for coordinating verification sampling and stockpile sampling efforts, interpretation of laboratory analytical results, and maintenance of soil sample database and daily excavation limits.
- 3) Sampler/Site Safety Officer responsible for collecting excavation cleanup verification samples, stockpile samples, and preparation of chain-of-custody paperwork/sample log sheets. Would also serve as site safety officer during excavation, coordinate pre-construction health and safety meeting and daily morning health and safety meetings.
- 4) Sampler/Technician responsible for operation of odor control system, daily setup and break-down of air sampling stations, preparation of chain-of-custody paperwork for air samples, daily packing and shipping of air samples, assist first sampler with soil sample collection/location survey.
- 5) Travel costs assume \$123 per person, per day for lodging, meals, and incidental expenses.

Note: Travel costs are included only for the general contractor staff. It is assumed that local subcontractors would be hired, requiring no travel reimbursement.

OPERATIONS AND MAINTENANCE COSTS:

Post Removal Site Control (PRSC) would include the inspection and maintenance of new vegetation and erosion controls on a quarterly basis for the first 2 years after the completion of the removal action. Assume inspection and maintenance costs as follows:

- Vegetation - \$500/quarter for 8 quarters (Year 1 = \$2,000, Year 2 = \$2,000)
- Erosion controls - \$500/quarter for 8 quarters (Year 1 = \$2,000, Year 2 = \$2,000)

**TABLE L-1PW
PRESENT WORTH ANALYSIS - ALTERNATIVES 1A, 1B, AND 1C
ENGINEERING EVALUATION/COST ANALYSIS
MOHAWK TANNERY SITE
NASHUA, NEW HAMPSHIRE**

Alternative 1A - Disposal of 100% of Sludge/Waste at U.S. RCRA D Landfill

PRESENT WORTH ANALYSIS				
YEAR	PRESENT WORTH FACTOR ¹	CAPITAL COSTS (\$)	O & M COSTS (\$)	PRESENT WORTH (\$)
0	1.000	14,939,248		14,939,248
1	0.935		4,000	3,738
2	0.873		4,000	3,494

TOTAL PRESENT WORTH \$14,946,480

Alternative 1B - Area 1 Sludge to U.S. RCRA C Landfill

PRESENT WORTH ANALYSIS				
YEAR	PRESENT WORTH FACTOR ¹	CAPITAL COSTS (\$)	O & M COSTS (\$)	PRESENT WORTH (\$)
0	1.000	20,427,699		20,427,699
1	0.935		4,000	3,738
2	0.873		4,000	3,494

TOTAL PRESENT WORTH \$20,434,931

Alternative 1C - Area 1 Sludge to Canadian Landfill

PRESENT WORTH ANALYSIS				
YEAR	PRESENT WORTH FACTOR ¹	CAPITAL COSTS (\$)	O & M COSTS (\$)	PRESENT WORTH (\$)
0	1.000	22,818,707		22,818,707
1	0.935		4,000	3,738
2	0.873		4,000	3,494

TOTAL PRESENT WORTH \$22,825,939

¹ Discount rate of 7% per OSWER Directive

TABLE L-1A
CAPITAL COSTS FOR ALTERNATIVE 1A - EXCAVATION AND OFF-SITE DISPOSAL
ENGINEERING EVALUATION/COST ANALYSIS
MOHAWK TANNERY SITE
NASHUA, NEW HAMPSHIRE

Item	Qty	Unit	Unit Cost (\$)				Total Cost (\$)				Total Direct Cost (\$)	Comments/References
			Sub.	Mat.	Labor	Equip.	Sub.	Mat.	Labor	Equip.		
MOB/DEMOB AND MONTHLY COSTS												
1) Equipment Mobilization/Demobilization	1	LS	23,150.00	0.00	0.00	0.00	23,150	0	0	0	23,150	see assumptions
2) Office Trailer (1 ea)	11	MO	0.00	0.00	0.00	385.00	0	0	0	4,235	4,235	historical costs
3) Storage Trailer (1 ea)	11	MO	0.00	0.00	0.00	75.00	0	0	0	825	825	historical costs
4) Portable Communication Equipment	11	MO	0.00	0.00	0.00	300.00	0	0	0	3,300	3,300	historical costs
5) Site Utilities	11	MO	200.00	0.00	0.00	0.00	2,200	0	0	0	2,200	historical costs
6) Sanitary Facilities	11	MO	105.00	0.00	0.00	0.00	1,155	0	0	0	1,155	historical costs
7) Security	11	MO	6,000.00	0.00	0.00	0.00	66,000	0	0	0	66,000	historical costs
8) Sampling Equipment	11	MO	0.00	0.00	0.00	2,000.00	0	0	0	22,000	22,000	historical costs
9) Dumpster Rental/Service	11	MO	230.00	0.00	0.00	0.00	2,530	0	0	0	2,530	historical costs
DECONTAMINATION FACILITIES AND SERVICES												
1) Truck Decontamination Pad												
1a) Gravel Base, Delivered and Dumped	15	CY	0.00	12.00	1.54	1.75	0	180	23	26	229	[18 01 0102]
1b) 40 mil Polyethylene Liner	800	SF	0.00	0.34	0.03	0.00	0	272	24	0	296	[33 08 0563]
1c) Stone Drainage Layer	10	CY	0.00	12.00	2.50	1.21	0	120	25	12	157	[17 03 0419]
1d) Splash Guard	800	SF	0.00	1.25	1.00	0.00	0	1,000	800	0	1,800	
2) Decontamination Services												
2a) Pressure Washer	2	EA	0.00	0.00	0.00	2,876.89	0	0	0	5,754	5,754	[33 17 0816]
2b) Operate Pressure Washer	300	HR	0.00	7.84	29.58	0.00	0	2,352	8,874	0	11,226	[33 17 0823]
3) Personnel Decontamination Pad												
3a) Gravel Base, Delivered and Dumped	2	CY	0.00	12.00	1.54	1.75	0	24	3	4	31	[18 01 0102]
3b) 40 mil Polyethylene Liner	100	SF	0.00	0.34	0.03	0.00	0	34	3	0	37	[33 08 0563]
3c) Stone Drainage Layer	2	CY	0.00	12.00	2.50	1.21	0	24	5	2	31	[17 03 0419]
4) Clean and Spent Water Storage Tanks	22	MO	0.00	450.00	0.00	0.00	0	9,900	0	0	9,900	see assumptions
SITE PREPARATION												
1) Site Access Road Construction												
1a) Clearing	1	AC	0.00	0.00	36.27	28.43	0	0	36	28	65	[17 01 0101]
1b) Gravel, Delivered and Dumped	1100	CY	0.00	12.00	1.59	1.69	0	13,200	1,749	1,859	16,808	[18 01 0102]
1c) Spread, Grade, and Compact	3300	SY	0.00	0.00	0.26	0.49	0	0	858	1,617	2,475	[022 308 0400]
2) Building/Foundation Demolition												
2a) Foundation Removal	750	CY	0.00	0.00	0.86	1.11	0	0	645	833	1,478	[16 01 0104]
2b) Foundation Debris Transportation and Disposal	1200	TON	70.00	0.00	0.00	0.00	84,000	0	0	0	84,000	[17 02 0402]
2c) Clarifier Tank Evacuation/Removal	1	EA	930.00	0.00	483.12	389.79	930	0	483	390	1,803	[020 880]
2d) Wood-Frame Building Demolition	27000	CF	0.00	0.00	0.05	0.08	0	0	1,350	2,160	3,510	[17 02 0108]
2e) Building Debris Transportation & Disposal	1000	CY	0.00	0.00	4.85	7.23	0	0	4,850	7,230	12,080	[17 02 0409]
3) Clear Medium Brush	10	AC	0.00	0.00	67.55	88.32	0	0	676	883	1,559	[17 01 0102]

TABLE L-1A (cont.)
CAPITAL COSTS FOR ALTERNATIVE 1A - EXCAVATION AND OFF-SITE DISPOSAL
ENGINEERING EVALUATION/COST ANALYSIS
MOHAWK TANNERY SITE
NASHUA, NEW HAMPSHIRE
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Item	Qty	Unit	Unit Cost (\$)				Total Cost (\$)				Total Direct Cost (\$)	Comments/References
			Sub.	Mat.	Labor	Equip.	Sub.	Mat.	Labor	Equip.		
SITE PREPARATION (cont.)												
4) Erosion Controls												
4a) Silt Fences	2500	LF	0.00	0.63	1.26	0.00	0	1,575	3,150	0	4,725	[18 05 0206]
4b) Hay Bales	20	TON	0.00	54.90	183.37	61.49	0	1,098	3,667	1,230	5,995	[022 704 1200]
5) Haul Road Construction												
5a) Gravel, Delivered and Dumped	2200	CY	0.00	12.00	1.59	1.69	0	26,400	3,498	3,718	33,616	[18 01 0102]
5b) Spread, Grade, and Compact	6667	SY	0.00	0.00	0.26	0.49	0	0	1,733	3,267	5,000	[022 308 0400]
6) Prepare Stockpile/Staging Areas												
6a) Rough Grade	1850	SY	0.00	0.00	0.85	2.50	0	0	1,573	4,625	6,198	[17 03 0101]
6b) Sand/Gravel, Delivered and Dumped	910	CY	0.00	12.00	1.59	1.69	0	10,920	1,447	1,538	13,905	[18 01 0102]
6b) 40-mil Polyethylene Liner	16400	SF	0.00	0.34	0.03	0.00	0	5,576	492	0	6,068	[33 08 0563]
6d) Erosion and Sedimentation Controls	750	LF	0.00	1.70	4.80	1.10	0	1,275	3,600	825	5,700	
7) Dust suppression (watering) per acre-pass	48400	SY	0.00	0.00	0.00	0.01	0	0	0	484	484	[33 08 0585]
DEWATERING (Areas 1 and 2)												
1) Pumps (rental, 3 units)	60	WK	0.00	243.00	0.00	0.00	0	14,580	0	0	14,580	[17 03 1003]
2) Discharge Hose (3")	1000	LF	0.00	0.00	0.00	4.00	0	0	0	4,000	4,000	
3) Fractionation Tanks (2 @ 11 months each)	22	MO	0.00	0.00	0.00	900.00	0	0	0	19,800	19,800	see assumptions
4) Analytical Samples	10	EA	500.00	0.00	0.00	0.00	5,000	0	0	0	5,000	see assumptions
5) Disposal Fees	250	KGAL	2.00	0.00	0.00	0.00	500	0	0	0	500	see assumptions
SLUDGE/WASTE/SOIL EXCAVATION												
1) Excavate and Load Overlying Soil	9500	CY	0.00	0.00	0.73	1.78	0	0	6,935	16,910	23,845	[17 03 0277]
2) Excavate and Load Sludge/Waste	60000	CY	0.00	0.00	1.10	2.67	0	0	66,000	160,200	226,200	see assumptions
3) Transport to Stockpile Areas	2720	HR	0.00	0.00	12.70	33.43	0	0	34,544	90,930	125,474	[17 03 0285]
4) Dust Suppression	300	AC	0.00	2.56	20.87	26.43	0	768	6,261	7,929	14,958	see assumptions
5) Odor Control	1	LS	140000.00	0.00	0.00	0.00	140,000	0	0	0	140,000	see assumptions
6) Air Monitoring	300	EA	1000.00	0.00	0.00	0.00	300,000	0	0	0	300,000	see assumptions
SLUDGE/WASTE STOCKPILING AND HANDLING												
1) Odor/Moisture Control (lime)	9000	TON	0.00	7.84	0.00	0.00	0	70,560	0	0	70,560	[33 15 0407]
2) Sludge Dewatering/Moisture Control	1200	HR	0.00	0.00	14.36	75.00	0	0	17,232	90,000	107,232	see assumptions
3) Stockpile Maintenance	1200	HR	0.00	0.00	0.00	75.00	0	0	0	90,000	90,000	see assumptions
CONFIRMATORY SAMPLING/ANALYSES												
1) Shipping Cost	150	EA	65.00	0.00	0.00	0.00	9,750	0	0	0	9,750	see assumptions
2) Analytical Cost (dioxin, SVOCs, metals)	250	EA	1130.00	0.00	0.00	0.00	282,500	0	0	0	282,500	see assumptions
3) Stockpile Characterization Samples	200	EA	750.00	0.00	0.00	0.00	150,000	0	0	0	150,000	see assumptions
OFFSITE DISPOSAL OF SLUDGE/WASTE												
1) Load Dump Trucks	66000	CY	0.00	0.00	0.73	1.78	0	0	48,180	117,480	165,660	[17 03 0277]
2) Transportation and Disposal Costs	99000	TON	80.00	0.00	0.00	0.00	7,920,000	0	0	0	7,920,000	see assumptions

TABLE L-1A (cont.)
CAPITAL COSTS FOR ALTERNATIVE 1A - EXCAVATION AND OFF-SITE DISPOSAL
ENGINEERING EVALUATION/COST ANALYSIS
MOHAWK TANNERY SITE
NASHUA, NEW HAMPSHIRE
PAGE 3 OF 3

Item	Qty	Unit	Unit Cost (\$)				Total Cost (\$)				Total Direct Cost (\$)	Comments/References
			Sub.	Mat.	Labor	Equip.	Sub.	Mat.	Labor	Equip.		
SITE RESTORATION												
1) Backfill and Compaction												
1a) with Overlying Soil	9500	CY	0.00	0.31	1.66	4.75	0	2,945	15,770	45,125	63,840	[17 03 0422]
1b) with Clean Fill From Off-Site Location	69000	CY	0.00	5.29	0.90	2.07	0	365,010	62,100	142,830	569,940	[17 03 0423]
2) Place topsoil (4")	1685	CY	0.00	18.13	3.64	3.79	0	30,549	6,133	6,386	43,069	[18 05 0301]
3) Revegetate	3	AC	0.00	340.36	66.98	92.07	0	1,021	201	276	1,498	[18 05 0401]
SITE STAFFING												
1) Site Supervisor/Field Operations Leader	11	MO	0.00	0.00	3200.00	0.00	0	0	35,200	0	35,200	
2) Site Engineer	11	MO	0.00	0.00	3200.00	0.00	0	0	35,200	0	35,200	
4) Sampler/Site Safety Officer	11	MO	0.00	0.00	2400.00	0.00	0	0	26,400	0	26,400	
5) Sampler/Technician	11	MO	0.00	0.00	2400.00	0.00	0	0	26,400	0	26,400	
6) Travel Expenses	210	DAY	0.00	0.00	492.00	0.00	0	0	103,320	0	103,320	see assumptions

SUBTOTAL DIRECT COST

8,987,715	559,383	529,441	858,710	10,935,249
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Subtotal Direct Cost

Direct Cost Adjustment Factors:

Health and Safety on Labor and Equipment @ 5%

Subtotal

Indirect Cost Adjustment Factors:

Tax on materials @ 7%

G&A @ 10% of Equipment, Material, and Labor

SubContract @ 4% of Sub. Cost

Labor Overhead @ 60%

Subtotal Direct and Indirect

Other Costs:

Profit @ 10% of Subtotal Direct and Indirect

Engineering @ 6% of Construction Cost and 2% of Transportation and Disposal Cost

Home Office Mgmt. And Support @ 3% Direct and Indirect

Total Project Cost

Contingency @ 10% of Total Project Cost

TOTAL COST

Total Cost (\$)				Total Cost (\$)	Comments
Sub.	Mat.	Labor	Equip.		
8,987,715	559,383	529,441	858,710	10,935,249	
0	0	26,472	42,936	69,408	
8,987,715	559,383	555,913	901,646	11,004,657	
0	39,157	0	0	39,157	
0	55,938	55,591	90,165	201,694	
359,509	0	0	0	359,509	
0	0	73,920	0	73,920	
9,347,224	654,478	685,424	991,811	11,678,936	
				1,167,894	
				383,936	
				350,368	
				13,581,134	
				1,358,113	

14,939,248

TABLE L-1B
CAPITAL COSTS FOR ALTERNATIVE 1B - EXCAVATION AND OFF-SITE DISPOSAL (AREA 1 SLUDGE TRANSPORTED TO RCRA C DISPOSAL FACILITY)
ENGINEERING EVALUATION/COST ANALYSIS
MOHAWK TANNERY SITE
NASHUA, NEW HAMPSHIRE

Item	Qty	Unit	Unit Cost (\$)				Total Cost (\$)				Total Direct Cost (\$)	Comments/References
			Sub.	Mat.	Labor	Equip.	Sub.	Mat.	Labor	Equip.		
MOB/DEMOB AND MONTHLY COSTS												
1) Equipment Mobilization/Demobilization	1	LS	23,150.00	0.00	0.00	0.00	23,150	0	0	0	23,150	see assumptions
2) Office Trailer (1 ea)	11	MO	0.00	0.00	0.00	385.00	0	0	4,235	4,235	historical costs	
3) Storage Trailer (1 ea)	11	MO	0.00	0.00	0.00	75.00	0	0	825	825	historical costs	
4) Portable Communication Equipment	11	MO	0.00	0.00	0.00	300.00	0	0	3,300	3,300	historical costs	
5) Site Utilities	11	MO	200.00	0.00	0.00	0.00	2,200	0	0	2,200	historical costs	
6) Sanitary Facilities	11	MO	105.00	0.00	0.00	0.00	1,155	0	0	1,155	historical costs	
7) Security	11	MO	6,000.00	0.00	0.00	0.00	66,000	0	0	66,000	historical costs	
8) Sampling Equipment	11	MO	0.00	0.00	0.00	2,000.00	0	0	22,000	22,000	historical costs	
9) Dumpster Rental/Service	11	MO	230.00	0.00	0.00	0.00	2,530	0	0	2,530	historical costs	
DECONTAMINATION FACILITIES AND SERVICES												
1) Truck Decontamination Pad												
1a) Gravel Base, Delivered and Dumped	15	CY	0.00	12.00	1.54	1.75	0	180	23	26	229	[18 01 0102]
1b) 40 mil Polyethylene Liner	800	SF	0.00	0.34	0.03	0.00	0	272	24	0	296	[33 08 0563]
1c) Stone Drainage Layer	10	CY	0.00	12.00	2.50	1.21	0	120	25	12	157	[17 03 0419]
1d) Splash Guard	800	SF	0.00	1.25	1.00	0.00	0	1,000	800	0	1,800	
2) Decontamination Services												
2a) Pressure Washer	2	EA	0.00	0.00	0.00	2,876.89	0	0	0	5,754	5,754	[33 17 0816]
2b) Operate Pressure Washer	300	HR	0.00	7.84	29.58	0.00	0	2,352	8,874	0	11,226	[33 17 0823]
3) Personnel Decontamination Pad												
3a) Gravel Base, Delivered and Dumped	2	CY	0.00	12.00	1.54	1.75	0	24	3	4	31	[18 01 0102]
3b) 40 mil Polyethylene Liner	100	SF	0.00	0.34	0.03	0.00	0	34	3	0	37	[33 08 0563]
3c) Stone Drainage Layer	2	CY	0.00	12.00	2.50	1.21	0	24	5	2	31	[17 03 0419]
4) Clean and Spent Water Storage Tanks	22	MO	0.00	450.00	0.00	0.00	0	9,900	0	0	9,900	see assumptions
SITE PREPARATION												
1) Site Access Road Construction												
1a) Clearing	1	AC	0.00	0.00	36.27	28.43	0	0	36	28	65	[17 01 0101]
1b) Gravel, Delivered and Dumped	1100	CY	0.00	12.00	1.59	1.69	0	13,200	1,749	1,859	16,808	[18 01 0102]
1c) Spread, Grade, and Compact	3300	SY	0.00	0.00	0.26	0.49	0	0	858	1,617	2,475	[022 308 0400]
2) Building/Foundation Demolition												
2a) Foundation Removal	750	CY	0.00	0.00	0.86	1.11	0	0	645	833	1,478	[16 01 0104]
2b) Foundation Debris Transportation and Disposal	1200	TON	70.00	0.00	0.00	0.00	84,000	0	0	0	84,000	[17 02 0402]
2c) Clarifier Tank Evacuation/Removal	1	EA	930.00	0.00	483.12	389.79	930	0	483	390	1,803	[020 880]
2d) Wood-Frame Building Demolition	27000	CF	0.00	0.00	0.05	0.08	0	0	1,350	2,160	3,510	[17 02 0108]
2e) Building Debris Transportation & Disposal	1000	CY	0.00	0.00	4.85	7.23	0	0	4,850	7,230	12,080	[17 02 0409]
3) Clear Medium Brush	10	AC	0.00	0.00	67.55	88.32	0	0	676	883	1,559	[17 01 0102]

TABLE L-1B (cont.)

CAPITAL COSTS FOR ALTERNATIVE 1B - EXCAVATION AND OFF-SITE DISPOSAL (AREA 1 SLUDGE TRANSPORTED TO RCRA C DISPOSAL FACILITY)
ENGINEERING EVALUATION/COST ANALYSIS
MOHAWK TANNERY SITE
NASHUA, NEW HAMPSHIRE
PAGE 2 OF 3

Item	Qty	Unit	Unit Cost (\$)				Total Cost (\$)				Total Direct Cost (\$)	Comments/References
			Sub.	Mat.	Labor	Equip.	Sub.	Mat.	Labor	Equip.		
SITE PREPARATION (cont.)												
4) Erosion Controls												
4a) Silt Fences	2500	LF	0.00	0.63	1.26	0.00	0	1,575	3,150	0	4,725	[18 05 0206]
4b) Hay Bales	20	TON	0.00	54.90	183.37	61.49	0	1,098	3,667	1,230	5,995	[022 704 1200]
5) Haul Road Construction												
5a) Gravel, Delivered and Dumped	2200	CY	0.00	12.00	1.59	1.69	0	26,400	3,498	3,718	33,616	[18 01 0102]
5b) Spread, Grade, and Compact	6667	SY	0.00	0.00	0.26	0.49	0	0	1,733	3,267	5,000	[022 308 0400]
6) Prepare Stockpile/Staging Areas												
6a) Rough Grade	1850	SY	0.00	0.00	0.85	2.50	0	0	1,573	4,625	6,198	[17 03 0101]
6b) Sand/Gravel, Delivered and Dumped	910	CY	0.00	12.00	1.59	1.69	0	10,920	1,447	1,538	13,905	[18 01 0102]
6b) 40-mil Polyethylene Liner	16400	SF	0.00	0.34	0.03	0.00	0	5,576	492	0	6,068	[33 08 0563]
6d) Erosion and Sedimentation Controls	750	LF	0.00	1.70	4.80	1.10	0	1,275	3,600	825	5,700	
7) Dust suppression (watering) per acre-pass	48400	SY	0.00	0.00	0.00	0.01	0	0	0	484	484	[33 08 0585]
DEWATERING (Areas 1 and 2)												
1) Pumps (rental, 3 units)	60	WK	0.00	243.00	0.00	0.00	0	14,580	0	0	14,580	[17 03 1003]
2) Discharge Hose (3")	1000	LF	0.00	0.00	0.00	4.00	0	0	0	4,000	4,000	
3) Fractionation Tanks (2 @ 11 months each)	22	MO	0.00	0.00	0.00	900.00	0	0	0	19,800	19,800	see assumptions
4) Analytical Samples	10	EA	500.00	0.00	0.00	0.00	5,000	0	0	0	5,000	see assumptions
5) Disposal Fees	250	KGAL	2.00	0.00	0.00	0.00	500	0	0	0	500	see assumptions
SLUDGE/WASTE/SOIL EXCAVATION												
1) Excavate and Load Overlying Soil	9500	CY	0.00	0.00	0.73	1.78	0	0	6,935	16,910	23,845	[17 03 0277]
2) Excavate and Load Sludge/Waste	60000	CY	0.00	0.00	1.10	2.67	0	0	66,000	160,200	226,200	see assumptions
3) Transport to Stockpile Areas	2720	HR	0.00	0.00	12.70	33.43	0	0	34,544	90,930	125,474	[17 03 0285]
4) Dust Suppression	300	AC	0.00	2.56	20.87	26.43	0	768	6,261	7,929	14,958	see assumptions
5) Odor Control	1	LS	140000.00	0.00	0.00	0.00	140,000	0	0	0	140,000	see assumptions
6) Air Monitoring	300	EA	1000.00	0.00	0.00	0.00	300,000	0	0	0	300,000	see assumptions
SLUDGE/WASTE STOCKPILING AND HANDLING												
1) Odor/Moisture Control (lime)	9000	TON	0.00	7.84	0.00	0.00	0	70,560	0	0	70,560	[33 15 0407]
2) Sludge Dewatering/Moisture Control	1200	HR	0.00	0.00	14.36	75.00	0	0	17,232	90,000	107,232	see assumptions
3) Stockpile Maintenance	1200	HR	0.00	0.00	0.00	75.00	0	0	0	90,000	90,000	see assumptions
CONFIRMATORY SAMPLING/ANALYSES												
1) Shipping Cost	150	EA	65.00	0.00	0.00	0.00	9,750	0	0	0	9,750	see assumptions
2) Analytical Cost (dioxin, SVOCs, metals)	250	EA	1130.00	0.00	0.00	0.00	282,500	0	0	0	282,500	see assumptions
3) Stockpile Characterization Samples	200	EA	750.00	0.00	0.00	0.00	150,000	0	0	0	150,000	see assumptions
OFFSITE DISPOSAL OF SLUDGE/WASTE												
1) Load Dump Trucks	66000	CY	0.00	0.00	0.73	1.78	0	0	48,180	117,480	165,660	[17 03 0277]
2) Transportation and Disposal Costs (Subtitle D)	57750	TON	80.00	0.00	0.00	0.00	4,620,000	0	0	0	4,620,000	see assumptions
2) Transportation and Disposal Costs (Subtitle C)	41250	TON	181.00	0.00	0.00	0.00	7,466,250	0	0	0	7,466,250	see assumptions

TABLE L-1B (cont.)

CAPITAL COSTS FOR ALTERNATIVE 1B - EXCAVATION AND OFF-SITE DISPOSAL (AREA 1 SLUDGE TRANSPORTED TO RCRA C DISPOSAL FACILITY)

ENGINEERING EVALUATION/COST ANALYSIS

MOHAWK TANNERY SITE

NASHUA, NEW HAMPSHIRE

PAGE 3 OF 3

Item	Qty	Unit	Unit Cost (\$)				Total Cost (\$)				Total Direct Cost (\$)	Comments/References
			Sub.	Mat.	Labor	Equip.	Sub.	Mat.	Labor	Equip.		
SITE RESTORATION												
1) Backfill and Compaction												
1a) with Overlying Soil	9500	CY	0.00	0.31	1.66	4.75	0	2,945	15,770	45,125	63,840	[17 03 0422]
1b) with Clean Fill From Off-Site Location	69000	CY	0.00	5.29	0.90	2.07	0	365,010	62,100	142,830	569,940	[17 03 0423]
2) Place topsoil (4")	1685	CY	0.00	18.13	3.64	3.79	0	30,549	6,133	6,386	43,069	[18 05 0301]
3) Revegetate	3	AC	0.00	340.36	66.98	92.07	0	1,021	201	276	1,498	[18 05 0401]
SITE STAFFING												
1) Site Supervisor/Field Operations Leader	11	MO	0.00	0.00	3200.00	0.00	0	0	35,200	0	35,200	
2) Site Engineer	11	MO	0.00	0.00	3200.00	0.00	0	0	35,200	0	35,200	
4) Sampler/Site Safety Officer	11	MO	0.00	0.00	2400.00	0.00	0	0	26,400	0	26,400	
5) Sampler	11	MO	0.00	0.00	2400.00	0.00	0	0	26,400	0	26,400	
6) Travel Expenses	210	DAY	0.00	0.00	492.00	0.00	0	0	103,320	0	103,320	see assumptions

SUBTOTAL DIRECT COST

13,153,965	559,383	529,441	858,710	15,101,499
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Subtotal Direct Cost

Direct Cost Adjustment Factors:

Health and Safety on Labor and Equipment @ 5%

Subtotal

Indirect Cost Adjustment Factors:

Tax on materials @ 7%

G&A @ 10% of Equipment, Material, and Labor

SubContract @ 4% of Sub. Cost

Labor Overhead @ 60%

Subtotal Direct and Indirect

Other Costs:

Profit @ 10% of Subtotal Direct and Indirect

Engineering @ 6% of Construction Cost and 2% of Transportation and Disposal Cost

Home Office Mgmt. And Support @ 3% Direct and Indirect

Total Project Cost

Contingency @ 10% of Total Project Cost

TOTAL COST

Total Cost (\$)				Total Cost (\$)	Comments
Sub.	Mat.	Labor	Equip.		
13,153,965	559,383	529,441	858,710	15,101,499	
0	0	26,472	42,936	69,408	
13,153,965	559,383	555,913	901,646	15,170,907	
0	39,157	0	0	39,157	
0	55,938	55,591	90,165	201,694	
526,159	0	0	0	526,159	
0	0	73,920	0	73,920	
13,680,124	654,478	685,424	991,811	16,011,836	
				1,601,184	
				477,260	
				480,355	
				18,570,635	
				1,857,064	

20,427,699

TABLE L-1C
CAPITAL COSTS FOR ALTERNATIVE 1C - EXCAVATION AND OFF-SITE DISPOSAL (AREA 1 SLUDGE TRANSPORTED TO CANADIAN LANDFILL)
ENGINEERING EVALUATION/COST ANALYSIS
MOHAWK TANNERY SITE
NASHUA, NEW HAMPSHIRE

Item	Qty	Unit	Unit Cost (\$)				Total Cost (\$)				Total Direct Cost (\$)	Comments/References
			Sub.	Mat.	Labor	Equip.	Sub.	Mat.	Labor	Equip.		
MOB/DEMOB AND MONTHLY COSTS												
1) Equipment Mobilization/Demobilization	1	LS	23,150.00	0.00	0.00	0.00	23,150	0	0	0	23,150	see assumptions
2) Office Trailer (1 ea)	11	MO	0.00	0.00	0.00	385.00	0	0	4,235	4,235	historical costs	
3) Storage Trailer (1 ea)	11	MO	0.00	0.00	0.00	75.00	0	0	825	825	historical costs	
4) Portable Communication Equipment	11	MO	0.00	0.00	0.00	300.00	0	0	3,300	3,300	historical costs	
5) Site Utilities	11	MO	200.00	0.00	0.00	0.00	2,200	0	0	2,200	historical costs	
6) Sanitary Facilities	11	MO	105.00	0.00	0.00	0.00	1,155	0	0	1,155	historical costs	
7) Security	11	MO	6,000.00	0.00	0.00	0.00	66,000	0	0	66,000	historical costs	
8) Sampling Equipment	11	MO	0.00	0.00	0.00	2,000.00	0	0	22,000	22,000	historical costs	
9) Dumpster Rental/Service	11	MO	230.00	0.00	0.00	0.00	2,530	0	0	2,530	historical costs	
DECONTAMINATION FACILITIES AND SERVICES												
1) Truck Decontamination Pad												
1a) Gravel Base, Delivered and Dumped	15	CY	0.00	12.00	1.54	1.75	0	180	23	26	229	[18 01 0102]
1b) 40 mil Polyethylene Liner	800	SF	0.00	0.34	0.03	0.00	0	272	24	0	296	[33 08 0563]
1c) Stone Drainage Layer	10	CY	0.00	12.00	2.50	1.21	0	120	25	12	157	[17 03 0419]
1d) Splash Guard	800	SF	0.00	1.25	1.00	0.00	0	1,000	800	0	1,800	
2) Decontamination Services												
2a) Pressure Washer	2	EA	0.00	0.00	0.00	2,876.89	0	0	0	5,754	5,754	[33 17 0816]
2b) Operate Pressure Washer	300	HR	0.00	7.84	29.58	0.00	0	2,352	8,874	0	11,226	[33 17 0823]
3) Personnel Decontamination Pad												
3a) Gravel Base, Delivered and Dumped	2	CY	0.00	12.00	1.54	1.75	0	24	3	4	31	[18 01 0102]
3b) 40 mil Polyethylene Liner	100	SF	0.00	0.34	0.03	0.00	0	34	3	0	37	[33 08 0563]
3c) Stone Drainage Layer	2	CY	0.00	12.00	2.50	1.21	0	24	5	2	31	[17 03 0419]
4) Clean and Spent Water Storage Tanks	22	MO	0.00	450.00	0.00	0.00	0	9,900	0	0	9,900	see assumptions
SITE PREPARATION												
1) Site Access Road Construction												
1a) Clearing	1	AC	0.00	0.00	36.27	28.43	0	0	36	28	65	[17 01 0101]
1b) Gravel, Delivered and Dumped	1100	CY	0.00	12.00	1.59	1.69	0	13,200	1,749	1,859	16,808	[18 01 0102]
1c) Spread, Grade, and Compact	3300	SY	0.00	0.00	0.26	0.49	0	0	858	1,617	2,475	[022 308 0400]
2) Building/Foundation Demolition												
2a) Foundation Removal	750	CY	0.00	0.00	0.86	1.11	0	0	645	833	1,478	[16 01 0104]
2b) Foundation Debris Transportation and Disposal	1200	TON	70.00	0.00	0.00	0.00	84,000	0	0	0	84,000	[17 02 0402]
2c) Clarifier Tank Evacuation/Removal	1	EA	930.00	0.00	483.12	389.79	930	0	483	390	1,803	[020 880]
2d) Wood-Frame Building Demolition	27000	CF	0.00	0.00	0.05	0.08	0	0	1,350	2,160	3,510	[17 02 0108]
2e) Building Debris Transportation & Disposal	1000	CY	0.00	0.00	4.85	7.23	0	0	4,850	7,230	12,080	[17 02 0409]
3) Clear Medium Brush	10	AC	0.00	0.00	67.55	88.32	0	0	676	883	1,559	[17 01 0102]

TABLE L-1C (cont.)

CAPITAL COSTS FOR ALTERNATIVE 1C - EXCAVATION AND OFF-SITE DISPOSAL (AREA 1 SLUDGE TRANSPORTED TO CANADIAN LANDFILL)

ENGINEERING EVALUATION/COST ANALYSIS

MOHAWK TANNERY SITE

NASHUA, NEW HAMPSHIRE

Item	Qty	Unit	Unit Cost (\$)				Total Cost (\$)				Total Direct Cost (\$)	Comments/References
			Sub.	Mat.	Labor	Equip.	Sub.	Mat.	Labor	Equip.		
SITE PREPARATION (cont.)												
4) Erosion Controls												
4a) Silt Fences	2500	LF	0.00	0.63	1.26	0.00	0	1,575	3,150	0	4,725	[18 05 0206]
4b) Hay Bales	20	TON	0.00	54.90	183.37	61.49	0	1,098	3,667	1,230	5,995	[022 704 1200]
5) Haul Road Construction												
5a) Gravel, Delivered and Dumped	2200	CY	0.00	12.00	1.59	1.69	0	26,400	3,498	3,718	33,616	[18 01 0102]
5b) Spread, Grade, and Compact	6667	SY	0.00	0.00	0.26	0.49	0	0	1,733	3,267	5,000	[022 308 0400]
6) Prepare Stockpile/Staging Areas												
6a) Rough Grade	1850	SY	0.00	0.00	0.85	2.50	0	0	1,573	4,625	6,198	[17 03 0101]
6b) Sand/Gravel, Delivered and Dumped	910	CY	0.00	12.00	1.59	1.69	0	10,920	1,447	1,538	13,905	[18 01 0102]
6b) 40-mil Polyethylene Liner	16400	SF	0.00	0.34	0.03	0.00	0	5,576	492	0	6,068	[33 08 0563]
6d) Erosion and Sedimentation Controls	750	LF	0.00	1.70	4.80	1.10	0	1,275	3,600	825	5,700	
7) Dust suppression (watering) per acre-pass	48400	SY	0.00	0.00	0.00	0.01	0	0	0	484	484	[33 08 0585]
DEWATERING (Areas 1 and 2)												
1) Pumps (rental, 3 units)	60	WK	0.00	243.00	0.00	0.00	0	14,580	0	0	14,580	[17 03 1003]
2) Discharge Hose (3")	1000	LF	0.00	0.00	0.00	4.00	0	0	0	4,000	4,000	
3) Fractionation Tanks (2 @ 11 months each)	22	MO	0.00	0.00	0.00	900.00	0	0	0	19,800	19,800	see assumptions
4) Analytical Samples	10	EA	500.00	0.00	0.00	0.00	5,000	0	0	0	5,000	see assumptions
5) Disposal Fees	250	KGAL	2.00	0.00	0.00	0.00	500	0	0	0	500	see assumptions
SLUDGE/WASTE/SOIL EXCAVATION												
1) Excavate and Load Overlying Soil	9500	CY	0.00	0.00	0.73	1.78	0	0	6,935	16,910	23,845	[17 03 0277]
2) Excavate and Load Sludge/Waste	60000	CY	0.00	0.00	1.10	2.67	0	0	66,000	160,200	226,200	see assumptions
3) Transport to Stockpile Areas	2720	HR	0.00	0.00	12.70	33.43	0	0	34,544	90,930	125,474	[17 03 0285]
4) Dust Suppression	300	AC	0.00	2.56	20.87	26.43	0	768	6,261	7,929	14,958	see assumptions
5) Odor Control	1	LS	140000.00	0.00	0.00	0.00	140,000	0	0	0	140,000	see assumptions
6) Air Monitoring	300	EA	1000.00	0.00	0.00	0.00	300,000	0	0	0	300,000	see assumptions
SLUDGE/WASTE STOCKPILING AND HANDLING												
1) Odor/Moisture Control (lime)	9000	TON	0.00	7.84	0.00	0.00	0	70,560	0	0	70,560	[33 15 0407]
2) Sludge Dewatering/Moisture Control	1200	HR	0.00	0.00	14.36	75.00	0	0	17,232	90,000	107,232	see assumptions
3) Stockpile Maintenance	1200	HR	0.00	0.00	0.00	75.00	0	0	0	90,000	90,000	see assumptions
CONFIRMATORY SAMPLING/ANALYSES												
1) Shipping Cost	150	EA	65.00	0.00	0.00	0.00	9,750	0	0	0	9,750	see assumptions
2) Analytical Cost (dioxin, SVOCs, metals)	250	EA	1130.00	0.00	0.00	0.00	282,500	0	0	0	282,500	see assumptions
3) Stockpile Characterization Samples	200	EA	750.00	0.00	0.00	0.00	150,000	0	0	0	150,000	see assumptions
OFFSITE DISPOSAL OF SLUDGE/WASTE												
1) Load Dump Trucks	66000	CY	0.00	0.00	0.73	1.78	0	0	48,180	117,480	165,660	[17 03 0277]
2) Transportation and Disposal Costs (US Subtitle D)	57750	TON	80.00	0.00	0.00	0.00	4,620,000	0	0	0	4,620,000	see assumptions
2) Transportation and Disposal Costs (Canada)	41250	TON	225.00	0.00	0.00	0.00	9,281,250	0	0	0	9,281,250	see assumptions

TABLE L-1C (cont.)

CAPITAL COSTS FOR ALTERNATIVE 1C - EXCAVATION AND OFF-SITE DISPOSAL (AREA 1 SLUDGE TRANSPORTED TO CANADIAN LANDFILL)

ENGINEERING EVALUATION/COST ANALYSIS

MOHAWK TANNERY SITE

NASHUA, NEW HAMPSHIRE

PAGE 3 OF 3

Item	Qty	Unit	Unit Cost (\$)				Total Cost (\$)				Total Direct Cost (\$)	Comments/References
			Sub.	Mat.	Labor	Equip.	Sub.	Mat.	Labor	Equip.		
SITE RESTORATION												
1) Backfill and Compaction												
1a) with Overlying Soil	9500	CY	0.00	0.31	1.66	4.75	0	2,945	15,770	45,125	63,840	[17 03 0422]
1b) with Clean Fill From Off-Site Location	69000	CY	0.00	5.29	0.90	2.07	0	365,010	62,100	142,830	569,940	[17 03 0423]
2) Place topsoil (4")	1685	CY	0.00	18.13	3.64	3.79	0	30,549	6,133	6,386	43,069	[18 05 0301]
3) Revegetate	3	AC	0.00	340.36	66.98	92.07	0	1,021	201	276	1,498	[18 05 0401]
SITE STAFFING												
1) Site Supervisor/Field Operations Leader	11	MO	0.00	0.00	3200.00	0.00	0	0	35,200	0	35,200	
2) Site Engineer	11	MO	0.00	0.00	3200.00	0.00	0	0	35,200	0	35,200	
4) Sampler/Site Safety Officer	11	MO	0.00	0.00	2400.00	0.00	0	0	26,400	0	26,400	
5) Sampler/Technician	11	MO	0.00	0.00	2400.00	0.00	0	0	26,400	0	26,400	
6) Travel Expenses	210	DAY	0.00	0.00	492.00	0.00	0	0	103,320	0	103,320	see assumptions

SUBTOTAL DIRECT COST

14,968,965	559,383	529,441	858,710	16,916,499
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Subtotal Direct Cost

Direct Cost Adjustment Factors:

Health and Safety on Labor and Equipment @ 5%

Subtotal

Indirect Cost Adjustment Factors:

Tax on materials @ 7%

G&A @ 10% of Equipment, Material, and Labor

SubContract @ 4% of Sub. Cost

Labor Overhead @ 60%

Subtotal Direct and Indirect

Other Costs:

Profit @ 10% of Subtotal Direct and Indirect

Engineering @ 6% of Construction Cost and 2% of Transportation and Disposal Cost

Home Office Mgmt. And Support @ 3% Direct and Indirect

Total Project Cost

Contingency @ 10% of Total Project Cost

TOTAL COST

Total Cost (\$)				Total Cost (\$)	Comments
Sub.	Mat.	Labor	Equip.		
14,968,965	559,383	529,441	858,710	16,916,499	
0	0	26,472	42,936	69,408	
14,968,965	559,383	555,913	901,646	16,985,907	
0	39,157	0	0	39,157	
0	55,938	55,591	90,165	201,694	
598,759	0	0	0	598,759	
0	0	73,920	0	73,920	
15,567,724	654,478	685,424	991,811	17,899,436	
				1,789,944	
				517,916	
				536,983	
				20,744,279	
				2,074,428	

22,818,707

<i>TETRA TECH NUS, INC.</i>		<i>COST ESTIMATE ASSUMPTIONS</i>	
CLIENT: EPA	FILE NO.: N4111-3.5	BY: SAV	PAGE: 1 of 5
SUBJECT: Assumptions and basis of costs for Alternative 2		REVIEWED BY: DMB/GB	DATE: July 2002

**Mohawk Tannery EE/CA
Alternative 2 – Excavation and Consolidation Into On-Site Landfill**

ASSUMPTIONS:

1. Alternative 2 includes:
 - Personnel and equipment mobilization
 - Site preparation
 - Construction of landfill liner system (to be completed prior to excavation)
 - Excavation and stockpiling of overlying soil at a designated, onsite soil staging area
 - Excavation of sludge/waste and consolidation into on-site landfill
 - Initial backfill of excavation with overlying soil
 - Backfill and compaction to original grade with imported, clean, common fill
 - Construction of landfill cover and closure of landfill
 - Site restoration including wetlands re-creation
 - PRSC including operation and maintenance of landfill
2. Unit costs were derived from same sources as identified for Alternative 1.
3. Hourly labor costs for construction activities were derived from the same source as identified for Alternative 1.
4. The *Engineering News-Record* Construction Cost Index (CCI) was used to adjust construction costs by the same method used for Alternative 1.
5. Abbreviations: LF = linear feet; SF = square feet; SY = square yard; CF = cubic feet; CY = cubic yard; AC = acre; WK = week; MO = month; LS = lump sum; KGAL = 1,000 gallons; PDI = pre-design investigation; TCLP = toxicity characteristic leaching procedure; VOCs = volatile organic compounds; SVOCs = semi-volatile organic compounds
6. Discount rate for net present worth analysis at 7% per OSWER Directive No. 9355.3-20, June 25, 1993 (same as Alternative 1).

ESTIMATED TIME TO COMPLETE ALTERNATIVE 2 (see Figure 5-1):

Once authorized to proceed

Engineering & Design Specifications (including PDI):	25 weeks
Coordination with NHDES re: on-site landfill approvals	8 weeks
Subcontracting/Procurement:	8 weeks
Mobilization:	2 week
Site Preparation (including landfill liner construction):	16 weeks

<i>TETRA TECH NUS, INC.</i>		<i>COST ESTIMATE ASSUMPTIONS</i>	
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Excavation and Consolidation into Landfill: 34 weeks
(overlying soil 4 weeks; waste/sludge 30 weeks)

Site Restoration (including landfill closure): 10 weeks

Demobilization: 2 week

Total site time (from mob to demob): 64 weeks @ 4 wk/mo = approximately 16 months

Total project duration: ~26 months

Note: Duration assumes 5 day work week and 8 hour day. Total project duration does not include potential delays attributed to reduced excavation rates from excessive sludge/waste moisture content.

CAPITAL COST ITEMS:

Mob/Demob and Monthly Costs for Alternative 2 would be as detailed for Alternative 1.

Decontamination Facilities for Alternative 2 would be as detailed for Alternative 1, except that pressure washer operation would be assumed at 10% of excavation time instead of 25% to account for fewer off-site truck trips.

Site Preparation activities for Alternative 2 would be as detailed for Alternative 1.

Construction of the Landfill Liner System would be part of the Site Preparation requirements for Alternative 2. The landfill footprint size was estimated using the following assumptions:

- 60,000 CY sludge/waste would be placed into landfill
- 10% volume addition would result due to addition of bulking agent for moisture/odor control, ∴ 66,000 CY (1,782,000 CF) landfill capacity used for costing purposes.
- Assuming 30 to 40 foot thickness of sludge/waste, approximately 50,000 SF required for landfill footprint – conceptual design of landfill assumes circle with 250 FT diameter.

The system would be double-lined, and the following components were used as the basis for construction cost estimates (see Figure 4-3 for a graphic depiction of the conceptual design of the landfill liner system):

- 1) Clearing and Grading of landfill area: 50,000 SF \cong 5,555 SY
- 2) Placement of 24" Clay Layer: 50,000 SF * 2 FT = 100,000 CF \cong 3,700 CY
- 3) Lower Geomembrane Layer – 60 mil thickness over the entire landfill area
- 4) A Secondary Leachate Collection System would be installed above the Lower Geomembrane and would function as the Leak Detection System—designed to intercept any leachate that passes through the Primary Leachate Collection System. The system would be 12" in thickness, consisting of coarse-grained sand and gravel material to facilitate leachate drainage to the perimeter of the landfill. The perimeter of the landfill would be outfitted with

<i>TETRA TECH NUS, INC.</i>		<i>COST ESTIMATE ASSUMPTIONS</i>	
CLIENT: EPA	FILE NO.: N4111-3.5	BY: SAV	PAGE: 3 of 5
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perforated pipe to collect leachate and funnel it to a drainage sump, from which it would be pumped, pretreated (if necessary), and discharged to the sewer system.

- 5) Structural Fill Layer would consist of 12" of structural material over the landfill area
- 6) Middle Clay Layer would be 6" of clay – 25,000 CF \cong 950 CY
- 7) Primary Leachate Collection System would be constructed as described above, except with a 24" thickness

Sludge/Waste Excavation, Dewatering, and Confirmatory Sampling/Analysis assumptions and basis of cost would be the same as detailed for Alternative 1.

Sludge/Waste Handling would occur within the sludge/waste stockpiling area as described for Alternative 1; and would involve odor control and dewatering. Landfill maintenance would also be necessary for the duration of site work as sludge/waste is transported from the stockpiling area to the on-site landfill.

- 1) Odor Control. Assume odor/moisture control measures within landfill will require lime up to 10% of weight of sludge/waste or 9,000 tons. (Sludge/waste density assumed to be 1.5 ton/cy; 60,000cy sludge/waste in place = 90,000 tons)
- 2) Sludge Dewatering/Moisture Control. Assume labor for odor/moisture control at 2 laborers for 1200 hrs (8 HR/day x 30 weeks x 5 days/wk) (anticipated duration of excavation/sludge placement); assume rental of bulldozer and front-end loader to manipulate/mix lime into sludge/waste
- 3) Landfill Maintenance includes labor required to secure landfill at end of day and maintain the integrity of erosion and sedimentation controls – 2 man hours/day assumed during course of sludge/waste placement (2 hrs/day x 30 wks x 5 days/wk = 300 hrs)

Landfill Closure would be implemented subsequent to the completion of excavation and placement of all contaminated sludge/waste. The following components were used as the basis for construction cost estimates (see Figure 4-3 for a graphic depiction of the conceptual design of the landfill cover system):

- 1) Gas Venting Layer would consist of 12" of sand/gravel with gas vent piping system consisting of network of perforated pipe (5,000 LF), five vertical pipes for off-gas release (250 LF), and five gas treatment units
- 2) Upper Clay Layer – 18" clay layer (1.5 FT)* 50,000 SF = 75,000 CF \cong 2,800 CY delivered and spread
- 3) Upper Filter Layer – 60 mil non-woven geotextile, 50,000 SF \cong 5,555 SY
- 4) Soil Cover – 24" unclassified fill (2 FT)* 50,000 SF = 100,000 CF \cong 3,700 CY delivered and spread
- 5) Topsoil Cover – 6" topsoil (0.5 FT)* 50,000 SF = 25,000 CF \cong 950 CY furnished and placed
- 6) Vegetative Cover – assume 1.5 acres seeded, mulched, and watered
- 7) Perimeter Fencing – assume 800 LF of 7 foot high chain-link fence, one 12' wide swinging gate, and 3 strands galvanized barbed wire
- 8) Installation of Monitoring Wells includes the drilling and construction of six groundwater monitoring wells (three upgradient from the landfill and three downgradient from the landfill). Assumed 5 days drilling required.

Site Restoration and Site Staffing assumptions would be the same as detailed for Alternative 1.

<i>TETRA TECHNUS, INC.</i>		<i>COST ESTIMATE ASSUMPTIONS</i>	
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OPERATIONS AND MAINTENANCE COSTS:

Post Removal Site Control would involve post-closure care requirements as detailed in 40 CFR 258. For costing purposes, assume that post-closure care would be performed for the required 30-year period. It is assumed that post-closure care activities would be performed on a monthly basis for 2 years, a quarterly basis for years 3-5, and on a semi-annual basis thereafter. Cost items included in the estimate of operations and maintenance costs for Alternative 2 include:

- Inspect and maintain the integrity and effectiveness of the final cover
 - Fertilize/reseed landfill cover (assume 1/3 of landfill area per year) @ \$500/YR
 - Erosion inspection and repair @ \$1,000/YR
 - Mowing, 1.15 acres, 3 times/year = 3.45 acres * \$80/acre = \$275/YR
- Operate and maintain the leachate collection and stormwater collection systems
 - Assume 40 inches annual precipitation (<http://lwf.ncdc.noaa.gov>) over 50,000 SF landfill area – 50,000 SF * 3.33 FT = 167,000 CF = 1.25 million GAL/YR
 - Discharge to sewer at 1.25 million GAL/YR * \$2/KGAL = \$2,500/YR
 - Analysis of 2 samples/event @ \$200/sample = \$400/event
- Monitor groundwater in the vicinity of the landfill
 - Sampling and analysis of 6 monitoring wells assumed @ \$500/well = \$3,000/event
 - Rental of sample equipment @ \$1,000/event
- Monitor air emissions from the landfill @ \$1,000/event
- Labor required for field investigations – 2 people @ 40 HR = 80 HR * \$75/HR = \$6,000/event
- Yearly reporting – 120 HR @ \$85/HR = \$10,200/YR

PRSC would also include those measures described in the basis of cost for Alternative 1 – specifically, quarterly inspection of new vegetation and erosion controls for the first two years.

<i>TETRA TECHNUS, INC.</i>		<i>COST ESTIMATE ASSUMPTIONS</i>	
CLIENT: EPA	FILE NO.: N4111-3.5	BY: SAV	PAGE: 5 of 5
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**Alternative 2C – Excavation and Consolidation into On-Site Landfill;
Off-Site Landfill Disposal of Area 1 Sludge**

Alternative 2C includes the excavation, stockpiling, transportation, and disposal of sludge from Area 1 at a Canadian landfill. Sludge/waste from Areas 2, 3, 4, 6, and 7 would be consolidated into an on-site landfill, as described above. Capital cost estimates for Alternative 2C are the same as those described above, with the following exceptions (see Table K-2C):

- Required landfill capacity would be reduced by approximately 25,000 CY since Area 1 sludge would be disposed of at an off-site location. Anticipated capital costs were reduced accordingly.
- Transportation and Disposal Costs for Area 1 sludge to Canadian landfill are based on unit costs published in R.S. Means and discussion with vendors.
 - 25,000 CY + 10% volume addition = 27,500 CY = 41,250 tons
 - 27,500 CY @ 20 CY/trip = 1375 trips * 1,000-mile/trip assumed = 1,375,000 miles total transport from site to landfill.
 - On-site landfill O&M costs assumed to be the same for Alternative 2C as for Alternatives 2A and 2B.

**TABLE L-2PW
PRESENT WORTH ANALYSIS - ALTERNATIVE 2
ENGINEERING EVALUATION/COST ANALYSIS
MOHAWK TANNERY SITE
NASHUA, NEW HAMPSHIRE**

Alternatives 2A and 2B - Consolidation into On-Site Landfill

PRESENT WORTH ANALYSIS				
YEAR	PRESENT WORTH FACTOR ¹	CAPITAL COSTS (\$)	O & M COSTS (\$)	PRESENT WORTH (\$)
0	1.000	5,571,917		5,571,917
1	0.935		155,275	145,117
2	0.873		155,275	135,623
3	0.816		60,075	49,039
4	0.763		60,075	45,831
5	0.713		60,075	42,833
6	0.666		37,275	24,838
7	0.623		37,275	23,213
8	0.582		37,275	21,694
9	0.544		37,275	20,275
10	0.508		37,275	18,949
11	0.475		37,275	17,709
12	0.444		37,275	16,551
13	0.415		37,275	15,468
14	0.388		37,275	14,456
15	0.362		37,275	13,510
16	0.339		37,275	12,626
17	0.317		37,275	11,800
18	0.296		37,275	11,028
19	0.277		37,275	10,307
20	0.258		37,275	9,633
21	0.242		37,275	9,002
22	0.226		37,275	8,413
23	0.211		37,275	7,863
24	0.197		37,275	7,349
25	0.184		37,275	6,868
26	0.172		37,275	6,419
27	0.161		37,275	5,999
28	0.150		37,275	5,606
29	0.141		37,275	5,239
30	0.131		37,275	4,897

TOTAL PRESENT WORTH

\$6,300,072

**TABLE L-2PW (cont.)
PRESENT WORTH ANALYSIS - ALTERNATIVE 2C
ENGINEERING EVALUATION/COST ANALYSIS
MOHAWK TANNERY SITE
NASHUA, NEW HAMPSHIRE
PAGE 2 OF 2**

**Alternative 2C - Consolidation into On-Site Landfill;
Off-Site Disposal of Area 1 Sludge**

PRESENT WORTH ANALYSIS				
YEAR	PRESENT WORTH FACTOR ¹	CAPITAL COSTS (\$)	O & M COSTS (\$)	PRESENT WORTH (\$)
0	1.000	18,428,170		18,428,170
1	0.935		155,275	145,117
2	0.873		155,275	135,623
3	0.816		60,075	49,039
4	0.763		60,075	45,831
5	0.713		60,075	42,833
6	0.666		37,275	24,838
7	0.623		37,275	23,213
8	0.582		37,275	21,694
9	0.544		37,275	20,275
10	0.508		37,275	18,949
11	0.475		37,275	17,709
12	0.444		37,275	16,551
13	0.415		37,275	15,468
14	0.388		37,275	14,456
15	0.362		37,275	13,510
16	0.339		37,275	12,626
17	0.317		37,275	11,800
18	0.296		37,275	11,028
19	0.277		37,275	10,307
20	0.258		37,275	9,633
21	0.242		37,275	9,002
22	0.226		37,275	8,413
23	0.211		37,275	7,863
24	0.197		37,275	7,349
25	0.184		37,275	6,868
26	0.172		37,275	6,419
27	0.161		37,275	5,999
28	0.150		37,275	5,606
29	0.141		37,275	5,239
30	0.131		37,275	4,897

TOTAL PRESENT WORTH

\$19,156,325

TABLE L-2A,B
CAPITAL COSTS FOR ALTERNATIVES 2A and 2B - EXCAVATION AND CONSOLIDATION INTO ON-SITE LANDFILL
ENGINEERING EVALUATION/COST ANALYSIS
MOHAWK TANNERY SITE
NASHUA, NEW HAMPSHIRE

Item	Qty	Unit	Unit Cost (\$)				Total Cost (\$)				Total Direct Cost (\$)	Comments/References
			Sub.	Mat.	Labor	Equip.	Sub.	Mat.	Labor	Equip.		
MOB/DEMOB AND MONTHLY COSTS												
1) Equipment Mobilization/Demobilization	1	LS	23,150	0	0	0	23,150	0	0	0	23,150	see assumptions
2) Office Trailer (1 ea)	16	MO	0	0	0	385	0	0	6,160	6,160	historical costs	
3) Storage Trailer (1 ea)	16	MO	0.00	0.00	0.00	75.00	0	0	1,200	1,200	historical costs	
4) Portable Communication Equipment	16	MO	0.00	0.00	0.00	300.00	0	0	4,800	4,800	historical costs	
5) Site Utilities	16	MO	200.00	0.00	0.00	0.00	3,200	0	0	3,200	historical costs	
6) Sanitary Facilities	16	MO	105.00	0.00	0.00	0.00	1,680	0	0	1,680	historical costs	
7) Security	16	MO	6,000.00	0.00	0.00	0.00	96,000	0	0	96,000	historical costs	
8) Sampling Equipment	16	MO	0.00	0.00	0.00	2,000.00	0	0	32,000	32,000	historical costs	
9) Dumpster Rental/Service	16	MO	230.00	0.00	0.00	0.00	3,680	0	0	3,680	historical costs	
DECONTAMINATION FACILITIES AND SERVICES												
1) Truck Decontamination Pad												
1a) Gravel Base, Delivered and Dumped	15	CY	0.00	12.00	1.54	1.75	0	180	23	26	229	[18 01 0102]
1b) 40 mil Polyethylene Liner	800	SF	0.00	0.34	0.03	0.00	0	272	24	0	296	[33 08 0563]
1c) Stone Drainage Layer	10	CY	0.00	12.00	2.50	1.21	0	120	25	12	157	[17 03 0419]
1d) Splash Guard	800	SF	0.00	1.25	1.00	0.00	0	1,000	800	0	1,800	
2) Decontamination Services												
2a) Pressure Washer	2	EA	0.00	0.00	0.00	2,876.89	0	0	0	5,754	5,754	[33 17 0816]
2b) Operate Pressure Washer	120	HR	0.00	7.84	29.58	0.00	0	941	3,550	0	4,490	[33 17 0823]
3) Personnel Decontamination Pad												
3a) Gravel Base, Delivered and Dumped	2	CY	0.00	12.00	1.54	1.75	0	24	3	4	31	[18 01 0102]
3b) 40 mil Polyethylene Liner	100	SF	0.00	0.34	0.03	0.00	0	34	3	0	37	[33 08 0563]
3c) Stone Drainage Layer	2	CY	0.00	12.00	2.50	1.21	0	24	5	2	31	[17 03 0419]
4) Clean and Spent Water Storage Tanks	22	MO	0.00	450.00	0.00	0.00	0	9,900	0	0	9,900	see assumptions
SITE PREPARATION												
1) Site Access Road Construction							0	0	0	0	0	
1a) Clearing	1	AC	0.00	0.00	36.27	28.43	0	0	36	28	65	[17 01 0101]
1b) Gravel, Delivered and Dumped	1100	CY	0.00	12.00	1.59	1.69	0	13,200	1,749	1,859	16,808	[18 01 0102]
1c) Spread, Grade, and Compact	3300	SY	0.00	0.00	0.26	0.49	0	0	858	1,617	2,475	[022 308 0400]
2) Building/Foundation Demolition												
2a) Foundation Removal	750	CY	0.00	0.00	0.86	1.11	0	0	645	833	1,478	[16 01 0104]
2b) Foundation Debris Transportation and Disposal	1200	TON	70.00	0.00	0.00	0.00	84,000	0	0	0	84,000	[17 02 0402]
2c) Clarifier Tank Evacuation/Removal	1	EA	930.00	0.00	483.12	389.79	930	0	483	390	1,803	[020 880]
2d) Wood-Frame Building Demolition	27000	CF	0.00	0.00	0.05	0.08	0	0	1,350	2,160	3,510	[17 02 0108]
2e) Building Debris Transportation & Disposal	1000	CY	0.00	0.00	4.85	7.23	0	0	4,850	7,230	12,080	[17 02 0409]
3) Clear Medium Brush	10	AC	0.00	0.00	67.55	88.32	0	0	676	883	1,559	[17 01 0102]
4) Erosion Controls												
4a) Silt Fences	2500	LF	0.00	0.63	1.26	0.00	0	1,575	3,150	0	4,725	[18 05 0206]
4b) Hay Bales	20	TON	0.00	54.90	183.37	61.49	0	1,098	3,667	1,230	5,995	[022 704 1200]
5) Haul Road Construction												
5a) Gravel, Delivered and Dumped	2200	CY	0.00	12.00	1.59	1.69	0	26,400	3,498	3,718	33,616	[18 01 0102]
5b) Spread, Grade, and Compact	6667	SY	0.00	0.00	0.26	0.49	0	0	1,733	3,267	5,000	[022 308 0400]
6) Prepare Stockpile/Staging Areas												
6a) Rough Grade	1850	SY	0.00	0.00	0.85	2.50	0	0	1,573	4,625	6,198	[17 03 0101]
6b) Sand/Gravel, Delivered and Dumped	910	CY	0.00	12.00	1.59	1.69	0	10,920	1,447	1,538	13,905	[18 01 0102]
6b) 40-mil Polyethylene Liner	16400	SF	0.00	0.34	0.03	0.00	0	5,576	492	0	6,068	[33 08 0563]
6d) Erosion and Sedimentation Controls	750	LF	0.00	1.70	4.80	1.10	0	1,275	3,600	825	5,700	
7) Dust suppression (watering) per acre-pass	48400	SY	0.00	0.00	0.00	0.01	0	0	0	484	484	[33 08 0585]

TABLE L-2A,B (cont.)

**CAPITAL COSTS FOR ALTERNATIVE 2A and 2B - EXCAVATION AND CONSOLIDATION INTO ON-SITE LANDFILL
ENGINEERING EVALUATION/COST ANALYSIS
MOHAWK TANNERY SITE
NASHUA, NEW HAMPSHIRE
PAGE 2 OF 3**

Item	Qty	Unit	Unit Cost (\$)				Total Cost (\$)				Total Direct Cost (\$)	Comments/References
			Sub.	Mat.	Labor	Equip.	Sub.	Mat.	Labor	Equip.		
CONSTRUCT LANDFILL LINER SYSTEM												
1) Clear and Grade Landfill Area	5555	SY	0.00	0.00	0.85	2.50	0	0	4,722	13,888	18,609	[17 03 0101]
2) Place Lower Clay Layer (24")	3700	CY	0.00	6.26	2.68	4.86	0	23,162	9,916	17,982	51,060	[17 03 0428]
3) Lower Geomembrane (60 mil)	50000	SF	0.00	2.00	0.00	0.00	0	100,000	0	0	100,000	[33 08 0572]
4) Secondary Leachate Collection System												
4a) Sand/Gravel	1850	CY	0.00	5.72	2.56	1.91	0	10,582	4,736	3,534	18,852	[17 03 0430]
4b) Perforated PVC Pipe (6" diameter)	800	LF	0.00	2.13	3.85	0.78	0	1,704	3,080	624	5,408	[027 109 2110]
4c) Geotextile Filter	5555	SY	0.00	1.65	0.15	0.00	0	9,166	833	0	9,999	[022 400 1510]
5) Structural Fill	1850	CY	0.00	5.72	2.56	1.91	0	10,582	4,736	3,534	18,852	[17 03 0430]
6) Middle Clay Layer	950	CY	0.00	6.26	2.68	4.86	0	5,947	2,546	4,617	13,110	[17 03 0428]
CONSTRUCT LANDFILL LINER SYSTEM (cont)												
7) Primary Leachate Collection System												
7a) Sand/Gravel	3700	CY	0.00	5.72	2.56	1.91	0	21,164	9,472	7,067	37,703	[17 03 0430]
7b) Perforated PVC Pipe (6" diameter)	800	LF	0.00	2.13	3.85	0.78	0	1,704	3,080	624	5,408	[027 109 2110]
7c) Geotextile Filter	5555	SY	0.00	1.65	0.15	0.00	0	9,166	833	0	9,999	[022 400 1510]
DEWATERING (Areas 1 and 2)												
1) Pumps (rental, 3 units)	60	WK	0.00	243.00	0.00	0.00	0	14,580	0	0	14,580	[17 03 1003]
2) Discharge Hose (3")	1000	LF	0.00	0.00	0.00	4.00	0	0	0	4,000	4,000	
3) Fractionation Tanks (2 @ 11 months each)	22	MO	0.00	0.00	0.00	900.00	0	0	0	19,800	19,800	see assumptions
4) Analytical Samples	10	EA	500.00	0.00	0.00	0.00	5,000	0	0	0	5,000	see assumptions
5) Disposal Fees	250	KGAL	2.00	0.00	0.00	0.00	500	0	0	0	500	see assumptions
SLUDGE/WASTE/SOIL EXCAVATION												
1) Excavate and Load Overlying Soil	9500	CY	0.00	0.00	0.73	1.78	0	0	6,935	16,910	23,845	[17 03 0277]
2) Excavate and Load Sludge/Waste	60000	CY	0.00	0.00	1.10	2.67	0	0	66,000	160,200	226,200	see assumptions
3) Transport to On-Site Landfill	2720	HR	0.00	0.00	12.70	33.43	0	0	34,544	90,930	125,474	[17 03 0285]
4) Dust Suppression	340	AC	0.00	2.56	20.87	26.43	0	870	7,096	8,986	16,952	see assumptions
5) Odor Control	1	LS	140000.00	0.00	0.00	0.00	140,000	0	0	0	140,000	see assumptions
6) Air Monitoring	300	EA	1000.00	0.00	0.00	0.00	300,000	0	0	0	300,000	see assumptions
SLUDGE/WASTE HANDLING												
1) Odor/Moisture Control (lime)	9000	TON	0.00	7.84	0.00	0.00	0	70,560	0	0	70,560	[33 15 0407]
2) Sludge Dewatering/Moisture Control	1200	HR	0.00	0.00	14.36	75.00	0	0	17,232	90,000	107,232	see assumptions
3) Sludge/Waste Handling During Landfill Construction	1200	HR	0.00	0.00	14.00	75.00	0	0	16,800	90,000	106,800	see assumptions
4) Landfill Maintenance	300	HR	0.00	0.00	10.09	0.00	0	0	3,027	0	3,027	see assumptions
CONFIRMATORY SAMPLING/ANALYSES												
1) Shipping Cost	150	EA	65.00	0.00	0.00	0.00	9,750	0	0	0	9,750	see assumptions
2) Analytical Cost (dioxin, SVOCs, metals)	250	EA	1130.00	0.00	0.00	0.00	282,500	0	0	0	282,500	see assumptions
3) Landfill Characterization Samples	50	EA	750.00	0.00	0.00	0.00	37,500	0	0	0	37,500	see assumptions
LANDFILL CLOSURE												
1) Gas Venting Layer												
1a) Sand/Gravel Layer	1850	CY	0.00	5.72	2.56	1.91	0	10,582	4,736	3,534	18,852	[17 03 0430]
1b) Slotted Pipe Network	5000	LF	0.00	2.25	7.50	1.20	0	11,250	37,500	6,000	54,750	[33 26 0803]
1c) Gas Vent Piping System	250	LF	0.00	6.10	9.00	2.40	0	1,525	2,250	600	4,375	[33 07 0201]
1d) Off-Gas Treatment Unit	5	EA	0.00	44,000.00	0.00	0.00	0	220,000	0	0	220,000	[33 13 9101]
2) Upper Clay Layer	2800	CY	0.00	6.26	2.68	4.86	0	17,528	7,504	13,608	38,640	[17 03 0428]
3) Upper Filter Layer	5555	SY	0.00	2.00	0.00	0.00	0	11,110	0	0	11,110	[33 08 0572]
4) Soil Cover	3700	CY	0.00	5.29	0.90	2.07	0	19,573	3,330	7,659	30,562	[17 03 0423]
5) Topsoil Cover	950	CY	0.00	18.13	3.64	3.79	0	17,224	3,458	3,601	24,282	[18 05 0301]
6) Vegetative Cover	1.15	AC	0.00	14,654.04	60.94	55.03	0	16,852	70	63	16,986	[18 05 0402]
7) Perimeter Fencing												
7a) 7' Galvanized Chain Link Fence	800	LF	0.00	27.35	1.37	0.00	0	21,880	1,096	0	22,976	[18 04 0108]

TABLE L-2A,B (cont.)

**CAPITAL COSTS FOR ALTERNATIVE 2A and 2B - EXCAVATION AND CONSOLIDATION INTO ON-SITE LANDFILL
ENGINEERING EVALUATION/COST ANALYSIS
MOHAWK TANNERY SITE
NASHUA, NEW HAMPSHIRE
PAGE 3 OF 3**

Item	Qty	Unit	Unit Cost (\$)				Total Cost (\$)				Total Direct Cost (\$)	Comments/References
			Sub.	Mat.	Labor	Equip.	Sub.	Mat.	Labor	Equip.		
7b) 12' Wide Swing Gate	1	EA	0.00	362.48	69.48	85.13	0	362	69	85	517	[18 04 0118]
7c) Three-Strand Barbed Wire	800	LF	0.00	0.23	0.57	0.36	0	184	456	288	928	[18 04 0111]
8) Installation of Monitoring Wells												
8a) Mobilize Drill Rig and Crew	1	LS	0.00	0.00	629.09	1,272.81	0	0	629	1,273	1,902	[33 01 0101]
8b) Vehicle/Equipment Rental	5	DAY	0.00	500.00	0.00	0.00	0	2,500	0	0	2,500	
8c) Drilling	150	LF	0.00	20.00	0.00	0.00	0	3,000	0	0	3,000	
8d) Well Construction	150	LF	0.00	15.00	0.00	0.00	0	2,250	0	0	2,250	
8e) Drilling Crew Labor	80	HR	0.00	0.00	13.00	0.00	0	0	1,040	0	1,040	
SITE RESTORATION												
1) Backfill and Compaction												
1a) with Overlying Soil	9500	CY	0.00	0.31	1.66	4.75	0	2,945	15,770	45,125	63,840	[17 03 0422]
1b) with Clean Fill From Off-Site Location	69000	CY	0.00	5.29	0.90	2.07	0	365,010	62,100	142,830	569,940	[17 03 0423]
2) Place topsoil (4")	1685	CY	0.00	18.13	3.64	3.79	0	45,325	9,100	9,475	63,900	[18 05 0301]
3) Revegetate	3	AC	0.00	340.36	66.98	92.07	0	1,021	201	276	1,498	[18 05 0401]
SITE STAFFING												
1) Site Supervisor/Field Operations Leader	16	MO	0.00	0.00	3200.00	0.00	0	0	38,400	0	38,400	
2) Site Engineer	16	MO	0.00	0.00	3200.00	0.00	0	0	38,400	0	38,400	
4) Sampler/Site Safety Officer	16	MO	0.00	0.00	2400.00	0.00	0	0	28,800	0	28,800	
5) Sampler/Technician	16	MO	0.00	0.00	2400.00	0.00	0	0	28,800	0	28,800	
6) Travel Expenses	320	DAY	0.00	0.00	492.00	0.00	0	0	104,550	0	104,550	see assumptions

SUBTOTAL DIRECT COST

987,890	1,121,847	618,088	847,755	3,575,579
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Subtotal Direct Cost

Direct Cost Adjustment Factors:

Health and Safety on Labor and Equipment @ 5%

Subtotal

Indirect Cost Adjustment Factors:

Tax on materials @ 7%

G&A @ 10% of Equipment, Material, and Labor

SubContract @ 5% of Sub. Cost

Field Construction Labor Overhead @ 60%

Subtotal Direct and Indirect

Other Costs:

Profit @ 10% of Subtotal Direct and Indirect

Engineering @ 6% of Subtotal Direct and Indirect

Home Office Mgmt. And Support @ 5% Direct and Indirect

Total Field Cost

Contingency @ 10% of Total Field Cost

TOTAL COST

Total Cost (\$)				Total Cost (\$)	Comments
Sub.	Mat.	Labor	Equip.		
987,890	1,121,847	618,088	847,755	3,575,579	
0	0	30,904	42,388	73,292	
987,890	1,121,847	648,992	890,143	3,648,872	
0	78,529	0	0	78,529	
0	112,185	64,899	89,014	266,098	
49,395	0	0	0	49,395	
0	0	143,370	0	143,370	
1,037,285	1,312,561	857,261	979,157	4,186,264	
				418,626	
				251,176	
				209,313	
				5,065,379	
				506,538	

5,571,917

TABLE L-2C
CAPITAL COSTS FOR ALTERNATIVE 2C - EXCAVATION AND CONSOLIDATION INTO ON-SITE LANDFILL (AREA 1 SLUDGE TO OFF-SITE LANDFILL)
ENGINEERING EVALUATION/COST ANALYSIS
MOHAWK TANNERY SITE
NASHUA, NEW HAMPSHIRE

Item	Qty	Unit	Unit Cost (\$)				Total Cost (\$)				Total Direct Cost (\$)	Comments/References
			Sub.	Mat.	Labor	Equip.	Sub.	Mat.	Labor	Equip.		
MOB/DEMOB AND MONTHLY COSTS												
1) Equipment Mobilization/Demobilization	1	LS	23,150	0	0	0	23,150	0	0	0	23,150	see assumptions
2) Office Trailer (1 ea)	16	MO	0	0	0	385	0	0	6,160	6,160	historical costs	
3) Storage Trailer (1 ea)	16	MO	0.00	0.00	0.00	75.00	0	0	1,200	1,200	historical costs	
4) Portable Communication Equipment	16	MO	0.00	0.00	0.00	300.00	0	0	4,800	4,800	historical costs	
5) Site Utilities	16	MO	200.00	0.00	0.00	0.00	3,200	0	0	3,200	historical costs	
6) Sanitary Facilities	16	MO	105.00	0.00	0.00	0.00	1,680	0	0	1,680	historical costs	
7) Security	16	MO	6,000.00	0.00	0.00	0.00	96,000	0	0	96,000	historical costs	
8) Sampling Equipment	16	MO	0.00	0.00	0.00	2,000.00	0	0	32,000	32,000	historical costs	
9) Dumpster Rental/Service	16	MO	230.00	0.00	0.00	0.00	3,680	0	0	3,680	historical costs	
DECONTAMINATION FACILITIES AND SERVICES												
1) Truck Decontamination Pad												
1a) Gravel Base, Delivered and Dumped	15	CY	0.00	12.00	1.54	1.75	0	180	23	26	229	[18 01 0102]
1b) 40 mil Polyethylene Liner	800	SF	0.00	0.34	0.03	0.00	0	272	24	0	296	[33 08 0563]
1c) Stone Drainage Layer	10	CY	0.00	12.00	2.50	1.21	0	120	25	12	157	[17 03 0419]
1d) Splash Guard	800	SF	0.00	1.25	1.00	0.00	0	1,000	800	0	1,800	
2) Decontamination Services												
2a) Pressure Washer	2	EA	0.00	0.00	0.00	2,876.89	0	0	0	5,754	5,754	[33 17 0816]
2b) Operate Pressure Washer	300	HR	0.00	7.84	29.58	0.00	0	6,899	26,030	0	32,930	[33 17 0823]
3) Personnel Decontamination Pad												
3a) Gravel Base, Delivered and Dumped	2	CY	0.00	12.00	1.54	1.75	0	24	3	4	31	[18 01 0102]
3b) 40 mil Polyethylene Liner	100	SF	0.00	0.34	0.03	0.00	0	34	3	0	37	[33 08 0563]
3c) Stone Drainage Layer	2	CY	0.00	12.00	2.50	1.21	0	24	5	2	31	[17 03 0419]
4) Clean and Spent Water Storage Tanks	22	MO	0.00	450.00	0.00	0.00	0	10,800	0	0	10,800	see assumptions
SITE PREPARATION												
1) Site Access Road Construction												
1a) Clearing	1	AC	0.00	0.00	36.27	28.43	0	0	36	28	65	[17 01 0101]
1b) Gravel, Delivered and Dumped	1100	CY	0.00	12.00	1.59	1.69	0	13,200	1,749	1,859	16,808	[18 01 0102]
1c) Spread, Grade, and Compact	3300	SY	0.00	0.00	0.26	0.49	0	0	858	1,617	2,475	[022 308 0400]
2) Building/Foundation Demolition												
2a) Foundation Removal	750	CY	0.00	0.00	0.86	1.11	0	0	645	833	1,478	[16 01 0104]
2b) Foundation Debris Transportation and Disposal	1200	TON	70.00	0.00	0.00	0.00	84,000	0	0	0	84,000	[17 02 0402]
2c) Clarifier Tank Evacuation/Removal	1	EA	930.00	0.00	483.12	389.79	930	0	483	390	1,803	[020 880]
2d) Wood-Frame Building Demolition	27000	CF	0.00	0.00	0.05	0.08	0	0	1,350	2,160	3,510	[17 02 0108]
2e) Building Debris Transportation & Disposal	1000	CY	0.00	0.00	4.85	7.23	0	0	4,850	7,230	12,080	[17 02 0409]
3) Clear Medium Brush	10	AC	0.00	0.00	67.55	88.32	0	0	676	883	1,559	[17 01 0102]
4) Erosion Controls												
4a) Silt Fences	2500	LF	0.00	0.63	1.26	0.00	0	1,575	3,150	0	4,725	[18 05 0206]
4b) Hay Bales	20	TON	0.00	54.90	183.37	61.49	0	1,098	3,667	1,230	5,995	[022 704 1200]
5) Haul Road Construction												
5a) Gravel, Delivered and Dumped	2200	CY	0.00	12.00	1.59	1.69	0	26,400	3,498	3,718	33,616	[18 01 0102]
5b) Spread, Grade, and Compact	6667	SY	0.00	0.00	0.26	0.49	0	0	1,733	3,267	5,000	[022 308 0400]
6) Prepare Stockpile/Staging Areas												
6a) Rough Grade	1850	SY	0.00	0.00	0.85	2.50	0	0	1,573	4,625	6,198	[17 03 0101]
6b) Sand/Gravel, Delivered and Dumped	910	CY	0.00	12.00	1.59	1.69	0	10,920	1,447	1,538	13,905	[18 01 0102]
6b) 40-mil Polyethylene Liner	16400	SF	0.00	0.34	0.03	0.00	0	5,576	492	0	6,068	[33 08 0563]
6d) Erosion and Sedimentation Controls	750	LF	0.00	1.70	4.80	1.10	0	1,275	3,600	825	5,700	
7) Dust suppression (watering) per acre-pass	48400	SY	0.00	0.00	0.00	0.01	0	0	0	484	484	[33 08 0585]

TABLE L-2C (cont.)

**CAPITAL COSTS FOR ALTERNATIVE 2C - EXCAVATION AND CONSOLIDATION INTO ON-SITE LANDFILL (AREA 1 SLUDGE TO OFF-SITE LANDFILL)
 ENGINEERING EVALUATION/COST ANALYSIS
 MOHAWK TANNERY SITE
 NASHUA, NEW HAMPSHIRE
 PAGE 2 OF 3**

Item	Qty	Unit	Unit Cost (\$)				Total Cost (\$)				Total Direct Cost (\$)	Comments/References
			Sub.	Mat.	Labor	Equip.	Sub.	Mat.	Labor	Equip.		
CONSTRUCT LANDFILL LINER SYSTEM												
1) Clear and Grade Landfill Area	3850	SY	0.00	0.00	0.85	2.50	0	0	3,273	9,625	12,898	[17 03 0101]
2) Place Lower Clay Layer (24")	2600	CY	0.00	6.26	2.68	4.86	0	16,276	6,968	12,636	35,880	[17 03 0428]
3) Lower Geomembrane (60 mil)	35000	SF	0.00	2.00	0.00	0.00	0	70,000	0	0	70,000	[33 08 0572]
4) Secondary Leachate Collection System												
4a) Sand/Gravel	1300	CY	0.00	5.72	2.56	1.91	0	7,436	3,328	2,483	13,247	[17 03 0430]
4b) Perforated PVC Pipe (6" diameter)	800	LF	0.00	2.13	3.85	0.78	0	1,704	3,080	624	5,408	[027 109 2110]
4c) Geotextile Filter	3850	SY	0.00	1.65	0.15	0.00	0	6,353	578	0	6,930	[022 400 1510]
5) Structural Fill	1300	CY	0.00	5.72	2.56	1.91	0	7,436	3,328	2,483	13,247	[17 03 0430]
6) Middle Clay Layer	650	CY	0.00	6.26	2.68	4.86	0	4,069	1,742	3,159	8,970	[17 03 0428]
7) Primary Leachate Collection System												
7a) Sand/Gravel	2600	CY	0.00	5.72	2.56	1.91	0	14,872	6,656	4,966	26,494	[17 03 0430]
7b) Perforated PVC Pipe (6" diameter)	800	LF	0.00	2.13	3.85	0.78	0	1,704	3,080	624	5,408	[027 109 2110]
7c) Geotextile Filter	3850	SY	0.00	1.65	0.15	0.00	0	6,353	578	0	6,930	[022 400 1510]
DEWATERING (Areas 1 and 2)												
1) Pumps (rental, 3 units)	60	WK	0.00	243.00	0.00	0.00	0	14,580	0	0	14,580	[17 03 1003]
2) Discharge Hose (3")	1000	LF	0.00	0.00	0.00	4.00	0	0	0	4,000	4,000	
3) Fractionation Tanks (2 @ 11 months each)	22	MO	0.00	0.00	0.00	900.00	0	0	0	19,800	19,800	see assumptions
4) Analytical Samples	10	EA	500.00	0.00	0.00	0.00	5,000	0	0	0	5,000	see assumptions
5) Disposal Fees	250	KGAL	2.00	0.00	0.00	0.00	500	0	0	0	500	see assumptions
SLUDGE/WASTE/SOIL EXCAVATION												
1) Excavate and Load Overlying Soil	9500	CY	0.00	0.00	0.73	1.78	0	0	6,935	16,910	23,845	[17 03 0277]
2) Excavate and Load Sludge/Waste	60000	CY	0.00	0.00	1.10	2.67	0	0	66,000	160,200	226,200	see assumptions
3) Transport to On-Site Landfill/Stockpile Area	2720	HR	0.00	0.00	12.70	33.43	0	0	34,544	90,930	125,474	[17 03 0285]
4) Dust Suppression	340	AC	0.00	2.56	20.87	26.43	0	870	7,096	8,986	16,952	see assumptions
5) Odor Control	1	LS	140000.00	0.00	0.00	0.00	140,000	0	0	0	140,000	see assumptions
6) Air Monitoring	300	EA	1000.00	0.00	0.00	0.00	300,000	0	0	0	300,000	see assumptions
SLUDGE/WASTE HANDLING												
1) Odor/Moisture Control (lime)	9000	TON	0.00	7.84	0.00	0.00	0	70,560	0	0	70,560	[33 15 0407]
2) Sludge Dewatering/Moisture Control	1200	HR	0.00	0.00	14.36	75.00	0	0	17,232	90,000	107,232	see assumptions
3) Sludge/Waste Handling During Landfill Construction	1200	HR	0.00	0.00	14.00	75.00	0	0	16,800	90,000	106,800	see assumptions
4) Landfill Maintenance	300	HR	0.00	0.00	10.09	0.00	0	0	3,027	0	3,027	see assumptions
CONFIRMATORY SAMPLING/ANALYSES												
1) Shipping Cost	150	EA	65.00	0.00	0.00	0.00	9,750	0	0	0	9,750	see assumptions
2) Analytical Cost (dioxin, SVOCs, metals)	250	EA	1130.00	0.00	0.00	0.00	282,500	0	0	0	282,500	see assumptions
3) Waste/On-Site Landfill Characterization Samples	150	EA	750.00	0.00	0.00	0.00	112,500	0	0	0	112,500	see assumptions
TRANSPORTATION AND DISPOSAL												
1) Transport Area 1 Sludge to Canadian Landfill	1375000	MI	2.26	0.00	0.00	0.00	3,107,500	0	0	0	3,107,500	
2) Disposal Fees	41250	TON	150.00	0.00	0.00	0.00	6,187,500	0	0	0	6,187,500	
LANDFILL CLOSURE												
1) Gas Venting Layer												
1a) Sand/Gravel Layer	1300	CY	0.00	5.72	2.56	1.91	0	7,436	3,328	2,483	13,247	[17 03 0430]
1b) Slotted Pipe Network	5000	LF	0.00	2.25	7.50	1.20	0	11,250	37,500	6,000	54,750	[33 26 0803]
1c) Gas Vent Piping System	250	LF	0.00	6.10	9.00	2.40	0	1,525	2,250	600	4,375	[33 07 0201]
1d) Off-Gas Treatment Unit	5	EA	0.00	44,000.00	0.00	0.00	0	220,000	0	0	220,000	[33 13 9101]
2) Upper Clay Layer												
2) Upper Clay Layer	2000	CY	0.00	6.26	2.68	4.86	0	12,520	5,360	9,720	27,600	[17 03 0428]
3) Upper Filter Layer												
3) Upper Filter Layer	3850	SY	0.00	2.00	0.00	0.00	0	7,700	0	0	7,700	[33 08 0572]
4) Soil Cover												
4) Soil Cover	2600	CY	0.00	5.29	0.90	2.07	0	13,754	2,340	5,382	21,476	[17 03 0423]
5) Topsoil Cover												
5) Topsoil Cover	650	CY	0.00	18.13	3.64	3.79	0	11,785	2,366	2,464	16,614	[18 05 0301]

TABLE L-2C (cont.)

CAPITAL COSTS FOR ALTERNATIVE 2C - EXCAVATION AND CONSOLIDATION INTO ON-SITE LANDFILL (AREA 1 SLUDGE TO OFF-SITE LANDFILL)
ENGINEERING EVALUATION/COST ANALYSIS
MOHAWK TANNERY SITE
NASHUA, NEW HAMPSHIRE
PAGE 3 OF 3

Item	Qty	Unit	Unit Cost (\$)				Total Cost (\$)				Total Direct Cost (\$)	Comments/References
			Sub.	Mat.	Labor	Equip.	Sub.	Mat.	Labor	Equip.		
LANDFILL CLOSURE (cont)												
6) Vegetative Cover	0.80	AC	0.00	14,654.04	60.94	55.03	0	11,723	49	44	11,816	[18 05 0402]
7) Perimeter Fencing												
7a) 7' Galvanized Chain Link Fence	675	LF	0.00	27.35	1.37	0.00	0	18,461	925	0	19,386	[18 04 0108]
7b) 12' Wide Swing Gate	1	EA	0.00	362.48	69.48	85.13	0	362	69	85	517	[18 04 0118]
7c) Three-Strand Barbed Wire	675	LF	0.00	0.23	0.57	0.36	0	155	385	243	783	[18 04 0111]
8) Installation of Monitoring Wells												
8a) Mobilize Drill Rig and Crew	1	LS	0.00	0.00	629.09	1,272.81	0	0	629	1,273	1,902	[33 01 0101]
8b) Vehicle/Equipment Rental	5	DAY	0.00	500.00	0.00	0.00	0	2,500	0	0	2,500	
8c) Drilling	150	LF	0.00	20.00	0.00	0.00	0	3,000	0	0	3,000	
8d) Well Construction	150	LF	0.00	15.00	0.00	0.00	0	2,250	0	0	2,250	
8e) Drilling Crew Labor	80	HR	0.00	0.00	13.00	0.00	0	0	1,040	0	1,040	
SITE RESTORATION												
1) Backfill and Compaction												
1a) with Overlying Soil	9500	CY	0.00	0.31	1.66	4.75	0	2,945	15,770	45,125	63,840	[17 03 0422]
1b) with Clean Fill From Off-Site Location	69000	CY	0.00	5.29	0.90	2.07	0	365,010	62,100	142,830	569,940	[17 03 0423]
2) Place topsoil (4")	1685	CY	0.00	18.13	3.64	3.79	0	45,325	9,100	9,475	63,900	[18 05 0301]
3) Revegetate	3	AC	0.00	340.36	66.98	92.07	0	1,021	201	276	1,498	[18 05 0401]
SITE STAFFING												
1) Site Supervisor/Field Operations Leader	16	MO	0.00	0.00	3200.00	0.00	0	0	38,400	0	38,400	
2) Site Engineer	16	MO	0.00	0.00	3200.00	0.00	0	0	38,400	0	38,400	
4) Sampler/Site Safety Officer	16	MO	0.00	0.00	2400.00	0.00	0	0	28,800	0	28,800	
5) Sampler/Technician	16	MO	0.00	0.00	2400.00	0.00	0	0	28,800	0	28,800	
6) Travel Expenses	320	DAY	0.00	0.00	492.00	0.00	0	0	104,550	0	104,550	see assumptions

SUBTOTAL DIRECT COST

10,357,890	1,040,332	623,325	824,070	12,845,619
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Subtotal Direct Cost

Direct Cost Adjustment Factors:

Health and Safety on Labor and Equipment @ 5%

Subtotal

Indirect Cost Adjustment Factors:

Tax on materials @ 7%

G&A @ 10% of Equipment, Material, and Labor

SubContract @ 5% of Sub. Cost

Field Construction Labor Overhead @ 60%

Subtotal Direct and Indirect

Other Costs:

Profit @ 10% of Subtotal Direct and Indirect

Engineering @ 6% of Subtotal Direct and Indirect

Home Office Mgmt. And Support @ 5% Direct and Indirect

Total Field Cost

Contingency @ 10% of Total Field Cost

TOTAL COST

Total Cost (\$)				Total Cost (\$)	Comments
Sub.	Mat.	Labor	Equip.		
10,357,890	1,040,332	623,325	824,070	12,845,619	
0	0	31,166	41,204	72,370	
10,357,890	1,040,332	654,491	865,274	12,917,989	
0	72,823	0	0	72,823	
0	104,033	65,449	86,527	256,010	
517,895	0	0	0	517,895	
0	0	80,640	0	80,640	
10,875,785	1,217,189	800,581	951,801	13,845,357	
				1,384,536	
				830,721	
				692,268	
				16,752,882	
				1,675,288	

18,428,170

<i>TETRA TECHNUS, INC.</i>		<i>COST ESTIMATE ASSUMPTIONS</i>	
CLIENT: EPA	FILE NO.: N4111-3.5	BY: SAV	PAGE: 1 of 2
SUBJECT: Assumptions and basis of costs for Alternative 3		REVIEWED BY: DMB/GB	DATE: July 2002

**Mohawk Tannery EE/CA
Alternatives 3-US and 3-CAN – Excavation, Off-Site Treatment and Disposal**

ASSUMPTIONS:

1. Alternative 3 site activities are the same as detailed for Alternative 1.
2. Unit costs were derived from same sources as identified for Alternative 1.
3. Hourly labor costs for construction activities were derived from the same source as identified for Alternative 1.
4. The *Engineering News-Record* Construction Cost Index (CCI) was used to adjust construction costs by the same method used for Alternative 1.
5. Abbreviations: LF = linear feet; SF = square feet; SY = square yard; CF = cubic feet; CY = cubic yard; AC = acre; WK = week; MO = month; LS = lump sum; KGAL = 1,000 gallons PDI = pre-design investigation; TCLP = toxicity characteristic leaching procedure; VOCs = volatile organic compounds; SVOCs = semi-volatile organic compounds
6. Discount rate for net present worth analysis at 7% per OSWER Directive No. 9355.3-20, June 25, 1993 (same as Alternative 1).
7. Estimated time to complete Alternative 3 would be the same as for Alternative 1 (see Figure 5-1).
8. PRSC cost schedule for Alternative 3 as presented for Alternative 1.

CAPITAL COST ITEMS:

Project Documents would be the same as described for Alternative 1.

Pre-Design Investigation, Mobilization, and Decontamination Facilities assumptions and basis of cost would be as detailed for Alternative 1.

Site Preparation activities for Alternative 3 would be as detailed for Alternative 1.

Sludge/Waste Excavation, Dewatering, and Confirmatory Sampling/Analysis assumptions and basis of cost would be the same as detailed for Alternative 1.

Transportation and Off-Site Treatment/Disposal for Alternative 3 provide the only difference in cost from Alternative 1. A transportation, treatment, and disposal cost of \$0.25/LB or \$500/TON was used for costing purposes for incineration within the United States. This estimate is based on discussions with a vendor, and research of incineration projects implemented at other EPA sites. A transportation, treatment, and disposal cost of \$350/TON was used for incineration at a Canadian treatment facility based on discussions and previous experience with vendors permitted to incinerate dioxin-containing waste.

<i>TETRA TECHNUS, INC.</i>		<i>COST ESTIMATE ASSUMPTIONS</i>	
CLIENT: EPA	FILE NO.: N4111-3.5	BY: SAV	PAGE: 2 of 2
SUBJECT: Assumptions and basis of costs for Alternative 3		REVIEWED BY: DMB/GB	DATE: July 2002

Site Restoration and **Site Staffing** assumptions would be the same as detailed for Alternative 1.

Post Removal Site Control assumptions would be the same as described for Alternative 1.

**TABLE L-3PW
PRESENT WORTH ANALYSIS - ALTERNATIVES 3-US AND 3-CAN
ENGINEERING EVALUATION/COST ANALYSIS
MOHAWK TANNERY SITE
NASHUA, NEW HAMPSHIRE**

Alternative 3 - Off-Site Treatment and Disposal at an American Incinerator

PRESENT WORTH ANALYSIS				
YEAR	PRESENT WORTH FACTOR ¹	CAPITAL COSTS (\$)	O & M COSTS (\$)	PRESENT WORTH (\$)
0	1.000	69,715,077		69,715,077
1	0.935		4,000	3,738
2	0.873		4,000	3,494
TOTAL PRESENT WORTH				<u><u>\$69,722,309</u></u>

Alternative 3A - Off-Site Treatment and Disposal at a Canadian Incinerator

PRESENT WORTH ANALYSIS				
YEAR	PRESENT WORTH FACTOR ¹	CAPITAL COSTS (\$)	O & M COSTS (\$)	PRESENT WORTH (\$)
0	1.000	50,152,281		50,152,281
1	0.935		4,000	3,738
2	0.873		4,000	3,494
TOTAL PRESENT WORTH				<u><u>\$50,159,513</u></u>

¹ Discount rate of 7% per OSWER Directive

TABLE L-3US
CAPITAL COSTS FOR ALTERNATIVE 3-US - EXCAVATION, OFF-SITE TREATMENT AND DISPOSAL
ENGINEERING EVALUATION/COST ANALYSIS
MOHAWK TANNERY SITE
NASHUA, NEW HAMPSHIRE

Item	Qty	Unit	Unit Cost (\$)				Total Cost (\$)				Total Direct Cost (\$)	Comments/References
			Sub.	Mat.	Labor	Equip.	Sub.	Mat.	Labor	Equip.		
MOB/DEMOB AND MONTHLY COSTS												
1) Equipment Mobilization/Demobilization	1	LS	23,150.00	0.00	0.00	0.00	23,150	0	0	0	23,150	see assumptions
2) Office Trailer (1 ea)	11	MO	0.00	0.00	0.00	385.00	0	0	0	4,235	4,235	historical costs
3) Storage Trailer (1 ea)	11	MO	0.00	0.00	0.00	75.00	0	0	0	825	825	historical costs
4) Portable Communication Equipment	11	MO	0.00	0.00	0.00	300.00	0	0	0	3,300	3,300	historical costs
5) Site Utilities	11	MO	200.00	0.00	0.00	0.00	2,200	0	0	0	2,200	historical costs
6) Sanitary Facilities	11	MO	105.00	0.00	0.00	0.00	1,155	0	0	0	1,155	historical costs
7) Security	11	MO	6,000.00	0.00	0.00	0.00	66,000	0	0	0	66,000	historical costs
8) Sampling Equipment	11	MO	0.00	0.00	0.00	2,000.00	0	0	0	22,000	22,000	historical costs
9) Dumpster Rental/Service	11	MO	230.00	0.00	0.00	0.00	2,530	0	0	0	2,530	historical costs
DECONTAMINATION FACILITIES AND SERVICES												
1) Truck Decontamination Pad												
1a) Gravel Base, Delivered and Dumped	15	CY	0.00	12.00	1.54	1.75	0	180	23	26	229	[18 01 0102]
1b) 40 mil Polyethylene Liner	800	SF	0.00	0.34	0.03	0.00	0	272	24	0	296	[33 08 0563]
1c) Stone Drainage Layer	10	CY	0.00	12.00	2.50	1.21	0	120	25	12	157	[17 03 0419]
1d) Splash Guard	800	SF	0.00	1.25	1.00	0.00	0	1,000	800	0	1,800	
2) Decontamination Services												
2a) Pressure Washer	2	EA	0.00	0.00	0.00	2,876.89	0	0	0	5,754	5,754	[33 17 0816]
2b) Operate Pressure Washer	300	HR	0.00	7.84	29.58	0.00	0	2,352	8,874	0	11,226	[33 17 0823]
3) Personnel Decontamination Pad												
3a) Gravel Base, Delivered and Dumped	2	CY	0.00	12.00	1.54	1.75	0	24	3	4	31	[18 01 0102]
3b) 40 mil Polyethylene Liner	100	SF	0.00	0.34	0.03	0.00	0	34	3	0	37	[33 08 0563]
3c) Stone Drainage Layer	2	CY	0.00	12.00	2.50	1.21	0	24	5	2	31	[17 03 0419]
4) Clean and Spent Water Storage Tanks	22	MO	0.00	450.00	0.00	0.00	0	9,900	0	0	9,900	see assumptions
SITE PREPARATION												
1) Site Access Road Construction												
1a) Clearing	1	AC	0.00	0.00	36.27	28.43	0	0	36	28	65	[17 01 0101]
1b) Gravel, Delivered and Dumped	1100	CY	0.00	12.00	1.59	1.69	0	13,200	1,749	1,859	16,808	[18 01 0102]
1c) Spread, Grade, and Compact	3300	SY	0.00	0.00	0.26	0.49	0	0	858	1,617	2,475	[022 308 0400]
2) Building/Foundation Demolition												
2a) Foundation Removal	750	CY	0.00	0.00	0.86	1.11	0	0	645	833	1,478	[16 01 0104]
2b) Foundation Debris Transportation and Disposal	1200	TON	70.00	0.00	0.00	0.00	84,000	0	0	0	84,000	[17 02 0402]
2c) Clarifier Tank Evacuation/Removal	1	EA	930.00	0.00	483.12	389.79	930	0	483	390	1,803	[020 880]
2d) Wood-Frame Building Demolition	27000	CF	0.00	0.00	0.05	0.08	0	0	1,350	2,160	3,510	[17 02 0108]
2e) Building Debris Transportation & Disposal	1000	CY	0.00	0.00	4.85	7.23	0	0	4,850	7,230	12,080	[17 02 0409]
3) Clear Medium Brush	10	AC	0.00	0.00	67.55	88.32	0	0	676	883	1,559	[17 01 0102]

TABLE L-3US (cont.)
CAPITAL COSTS FOR ALTERNATIVE 3-US - EXCAVATION, OFF-SITE TREATMENT AND DISPOSAL
ENGINEERING EVALUATION/COST ANALYSIS
MOHAWK TANNERY SITE
NASHUA, NEW HAMPSHIRE
PAGE 2 OF 3

Item	Qty	Unit	Unit Cost (\$)				Total Cost (\$)				Total Direct Cost (\$)	Comments/References
			Sub.	Mat.	Labor	Equip.	Sub.	Mat.	Labor	Equip.		
SITE PREPARATION (cont.)												
4) Erosion Controls												
4a) Silt Fences	2500	LF	0.00	0.63	1.26	0.00	0	1,575	3,150	0	4,725	[18 05 0206]
4b) Hay Bales	20	TON	0.00	54.90	183.37	61.49	0	1,098	3,667	1,230	5,995	[022 704 1200]
5) Haul Road Construction												
5a) Gravel, Delivered and Dumped	2200	CY	0.00	12.00	1.59	1.69	0	26,400	3,498	3,718	33,616	[18 01 0102]
5b) Spread, Grade, and Compact	6667	SY	0.00	0.00	0.26	0.49	0	0	1,733	3,267	5,000	[022 308 0400]
6) Prepare Stockpile/Staging Areas												
6a) Rough Grade	1850	SY	0.00	0.00	0.85	2.50	0	0	1,573	4,625	6,198	[17 03 0101]
6b) Sand/Gravel, Delivered and Dumped	910	CY	0.00	12.00	1.59	1.69	0	10,920	1,447	1,538	13,905	[18 01 0102]
6b) 40-mil Polyethylene Liner	16400	SF	0.00	0.34	0.03	0.00	0	5,576	492	0	6,068	[33 08 0563]
6d) Erosion and Sedimentation Controls	750	LF	0.00	1.70	4.80	1.10	0	1,275	3,600	825	5,700	
7) Dust suppression (watering) per acre-pass	48400	SY	0.00	0.00	0.00	0.01	0	0	0	484	484	[33 08 0585]
DEWATERING (Areas 1 and 2)												
1) Pumps (rental, 3 units)	60	WK	0.00	243.00	0.00	0.00	0	14,580	0	0	14,580	[17 03 1003]
2) Discharge Hose (3")	1000	LF	0.00	0.00	0.00	4.00	0	0	0	4,000	4,000	
3) Fractionation Tanks (2 @ 11 months each)	22	MO	0.00	0.00	0.00	900.00	0	0	0	19,800	19,800	see assumptions
4) Analytical Samples	10	EA	500.00	0.00	0.00	0.00	5,000	0	0	0	5,000	see assumptions
5) Disposal Fees	250	KGAL	2.00	0.00	0.00	0.00	500	0	0	0	500	see assumptions
SLUDGE/WASTE/SOIL EXCAVATION												
1) Excavate and Load Overlying Soil	9500	CY	0.00	0.00	0.73	1.78	0	0	6,935	16,910	23,845	[17 03 0277]
2) Excavate and Load Sludge/Waste	60000	CY	0.00	0.00	1.10	2.67	0	0	66,000	160,200	226,200	see assumptions
3) Transport to Stockpile Areas	2720	HR	0.00	0.00	12.70	33.43	0	0	34,544	90,930	125,474	[17 03 0285]
4) Dust Suppression	300	AC	0.00	2.56	20.87	26.43	0	768	6,261	7,929	14,958	see assumptions
5) Odor Control	1	LS	140000.00	0.00	0.00	0.00	140,000	0	0	0	140,000	see assumptions
6) Air Monitoring	300	EA	1000.00	0.00	0.00	0.00	300,000	0	0	0	300,000	see assumptions
SLUDGE/WASTE STOCKPILING AND HANDLING												
1) Odor/Moisture Control (lime)	9000	TON	0.00	7.84	0.00	0.00	0	70,560	0	0	70,560	[33 15 0407]
2) Sludge Dewatering/Moisture Control	1200	HR	0.00	0.00	14.36	75.00	0	0	17,232	90,000	107,232	see assumptions
3) Stockpile Maintenance	1200	HR	0.00	0.00	0.00	75.00	0	0	0	90,000	90,000	see assumptions
CONFIRMATORY SAMPLING/ANALYSES												
1) Shipping Cost	150	EA	65.00	0.00	0.00	0.00	9,750	0	0	0	9,750	see assumptions
2) Analytical Cost (dioxin, SVOCs, metals)	250	EA	1130.00	0.00	0.00	0.00	282,500	0	0	0	282,500	see assumptions
3) Stockpile Characterization Samples	200	EA	750.00	0.00	0.00	0.00	150,000	0	0	0	150,000	see assumptions
OFFSITE DISPOSAL OF SLUDGE/WASTE												
1) Load Dump Trucks	66000	CY	0.00	0.00	0.73	1.78	0	0	48,180	117,480	165,660	[17 03 0277]
2) Transportation and Treatment/Disposal Costs	99000	TON	500.00	0.00	0.00	0.00	49,500,000	0	0	0	49,500,000	see assumptions

TABLE L-3US (cont.)
CAPITAL COSTS FOR ALTERNATIVE 3-US - EXCAVATION, OFF-SITE TREATMENT AND DISPOSAL
ENGINEERING EVALUATION/COST ANALYSIS
MOHAWK TANNERY SITE
NASHUA, NEW HAMPSHIRE
PAGE 3 OF 3

Item	Qty	Unit	Unit Cost (\$)				Total Cost (\$)				Total Direct Cost (\$)	Comments/References
			Sub.	Mat.	Labor	Equip.	Sub.	Mat.	Labor	Equip.		
SITE RESTORATION												
1) Backfill and Compaction												
1a) with Overlying Soil	9500	CY	0.00	0.31	1.66	4.75	0	2,945	15,770	45,125	63,840	[17 03 0422]
1b) with Clean Fill From Off-Site Location	69000	CY	0.00	5.29	0.90	2.07	0	365,010	62,100	142,830	569,940	[17 03 0423]
2) Place topsoil (4")	1685	CY	0.00	18.13	3.64	3.79	0	30,549	6,133	6,386	43,069	[18 05 0301]
3) Revegetate	3	AC	0.00	340.36	66.98	92.07	0	1,021	201	276	1,498	[18 05 0401]
SITE STAFFING												
1) Site Supervisor/Field Operations Leader	11	MO	0.00	0.00	3,200.00	0.00	0	0	35,200	0	35,200	
2) Site Engineer	11	MO	0.00	0.00	3,200.00	0.00	0	0	35,200	0	35,200	
4) Sampler/Site Safety Officer	11	MO	0.00	0.00	2,400.00	0.00	0	0	26,400	0	26,400	
5) Sampler/Technician	11	MO	0.00	0.00	2,400.00	0.00	0	0	26,400	0	26,400	
6) Travel Expenses	210	DAY	0.00	0.00	492.00	0.00	0	0	103,320	0	103,320	see assumptions

SUBTOTAL DIRECT COST

50,567,715	559,383	529,441	858,710	52,515,249
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Subtotal Direct Cost

Direct Cost Adjustment Factors:

Health and Safety on Labor and Equipment @ 5%

Subtotal

Indirect Cost Adjustment Factors:

Tax on materials @ 7%

G&A @ 10% of Equipment, Material, and Labor

SubContract @ 4% of Sub. Cost

Labor Overhead @ 60%

Subtotal Direct and Indirect

Other Costs:

Profit @ 10% of Subtotal Direct and Indirect

Engineering @ 6% of Construction Cost and 2% of Transportation, Treatment/Disposal Cost

Home Office Mgmt. And Support @ 3% Direct and Indirect

Total Project Cost

Contingency @ 10% of Total Project Cost

TOTAL COST

Total Cost (\$)				Total Cost (\$)	Comments
Sub.	Mat.	Labor	Equip.		
50,567,715	559,383	529,441	858,710	52,515,249	
0	0	26,472	42,936	69,408	
50,567,715	559,383	555,913	901,646	52,584,657	
0	39,157	0	0	39,157	
0	55,938	55,591	90,165	201,694	
2,022,709	0	0	0	2,022,709	
0	0	73,920	0	73,920	
52,590,424	654,478	685,424	991,811	54,922,136	
				5,492,214	
				1,315,328	
				1,647,664	
				63,377,342	
				6,337,734	

69,715,077

TABLE L-3CAN
CAPITAL COSTS FOR ALTERNATIVE 3-CAN - EXCAVATION, OFF-SITE TREATMENT AND DISPOSAL (CANADIAN FACILITY)
ENGINEERING EVALUATION/COST ANALYSIS
MOHAWK TANNERY SITE
NASHUA, NEW HAMPSHIRE

Item	Qty	Unit	Unit Cost (\$)				Total Cost (\$)				Total Direct Cost (\$)	Comments/References
			Sub.	Mat.	Labor	Equip.	Sub.	Mat.	Labor	Equip.		
MOB/DEMOB AND MONTHLY COSTS												
1) Equipment Mobilization/Demobilization	1	LS	23,150.00	0.00	0.00	0.00	23,150	0	0	0	23,150	see assumptions
2) Office Trailer (1 ea)	11	MO	0.00	0.00	0.00	385.00	0	0	0	4,235	4,235	historical costs
3) Storage Trailer (1 ea)	11	MO	0.00	0.00	0.00	75.00	0	0	0	825	825	historical costs
4) Portable Communication Equipment	11	MO	0.00	0.00	0.00	300.00	0	0	0	3,300	3,300	historical costs
5) Site Utilities	11	MO	200.00	0.00	0.00	0.00	2,200	0	0	0	2,200	historical costs
6) Sanitary Facilities	11	MO	105.00	0.00	0.00	0.00	1,155	0	0	0	1,155	historical costs
7) Security	11	MO	6,000.00	0.00	0.00	0.00	66,000	0	0	0	66,000	historical costs
8) Sampling Equipment	11	MO	0.00	0.00	0.00	2,000.00	0	0	0	22,000	22,000	historical costs
9) Dumpster Rental/Service	11	MO	230.00	0.00	0.00	0.00	2,530	0	0	0	2,530	historical costs
DECONTAMINATION FACILITIES AND SERVICES												
1) Truck Decontamination Pad												
1a) Gravel Base, Delivered and Dumped	15	CY	0.00	12.00	1.54	1.75	0	180	23	26	229	[18 01 0102]
1b) 40 mil Polyethylene Liner	800	SF	0.00	0.34	0.03	0.00	0	272	24	0	296	[33 08 0563]
1c) Stone Drainage Layer	10	CY	0.00	12.00	2.50	1.21	0	120	25	12	157	[17 03 0419]
1d) Splash Guard	800	SF	0.00	1.25	1.00	0.00	0	1,000	800	0	1,800	
2) Decontamination Services												
2a) Pressure Washer	2	EA	0.00	0.00	0.00	2,876.89	0	0	0	5,754	5,754	[33 17 0816]
2b) Operate Pressure Washer	300	HR	0.00	7.84	29.58	0.00	0	2,352	8,874	0	11,226	[33 17 0823]
3) Personnel Decontamination Pad												
3a) Gravel Base, Delivered and Dumped	2	CY	0.00	12.00	1.54	1.75	0	24	3	4	31	[18 01 0102]
3b) 40 mil Polyethylene Liner	100	SF	0.00	0.34	0.03	0.00	0	34	3	0	37	[33 08 0563]
3c) Stone Drainage Layer	2	CY	0.00	12.00	2.50	1.21	0	24	5	2	31	[17 03 0419]
4) Clean and Spent Water Storage Tanks	22	MO	0.00	450.00	0.00	0.00	0	9,900	0	0	9,900	see assumptions
SITE PREPARATION												
1) Site Access Road Construction												
1a) Clearing	1	AC	0.00	0.00	36.27	28.43	0	0	36	28	65	[17 01 0101]
1b) Gravel, Delivered and Dumped	1100	CY	0.00	12.00	1.59	1.69	0	13,200	1,749	1,859	16,808	[18 01 0102]
1c) Spread, Grade, and Compact	3300	SY	0.00	0.00	0.26	0.49	0	0	858	1,617	2,475	[022 308 0400]
2) Building/Foundation Demolition												
2a) Foundation Removal	750	CY	0.00	0.00	0.86	1.11	0	0	645	833	1,478	[16 01 0104]
2b) Foundation Debris Transportation and Disposal	1200	TON	70.00	0.00	0.00	0.00	84,000	0	0	0	84,000	[17 02 0402]
2c) Clarifier Tank Evacuation/Removal	1	EA	930.00	0.00	483.12	389.79	930	0	483	390	1,803	[020 880]
2d) Wood-Frame Building Demolition	27000	CF	0.00	0.00	0.05	0.08	0	0	1,350	2,160	3,510	[17 02 0108]
2e) Building Debris Transportation & Disposal	1000	CY	0.00	0.00	4.85	7.23	0	0	4,850	7,230	12,080	[17 02 0409]
3) Clear Medium Brush	10	AC	0.00	0.00	67.55	88.32	0	0	676	883	1,559	[17 01 0102]

TABLE L-3CAN (cont.)
CAPITAL COSTS FOR ALTERNATIVE 3-CAN - EXCAVATION, OFF-SITE TREATMENT AND DISPOSAL (CANADIAN FACILITY)
ENGINEERING EVALUATION/COST ANALYSIS
MOHAWK TANNERY SITE
NASHUA, NEW HAMPSHIRE
PAGE 2 OF 3

Item	Qty	Unit	Unit Cost (\$)				Total Cost (\$)				Total Direct Cost (\$)	Comments/References
			Sub.	Mat.	Labor	Equip.	Sub.	Mat.	Labor	Equip.		
SITE PREPARATION (cont.)												
4) Erosion Controls												
4a) Silt Fences	2500	LF	0.00	0.63	1.26	0.00	0	1,575	3,150	0	4,725	[18 05 0206]
4b) Hay Bales	20	TON	0.00	54.90	183.37	61.49	0	1,098	3,667	1,230	5,995	[022 704 1200]
5) Haul Road Construction												
5a) Gravel, Delivered and Dumped	2200	CY	0.00	12.00	1.59	1.69	0	26,400	3,498	3,718	33,616	[18 01 0102]
5b) Spread, Grade, and Compact	6667	SY	0.00	0.00	0.26	0.49	0	0	1,733	3,267	5,000	[022 308 0400]
6) Prepare Stockpile/Staging Areas												
6a) Rough Grade	1850	SY	0.00	0.00	0.85	2.50	0	0	1,573	4,625	6,198	[17 03 0101]
6b) Sand/Gravel, Delivered and Dumped	910	CY	0.00	12.00	1.59	1.69	0	10,920	1,447	1,538	13,905	[18 01 0102]
6b) 40-mil Polyethylene Liner	16400	SF	0.00	0.34	0.03	0.00	0	5,576	492	0	6,068	[33 08 0563]
6d) Erosion and Sedimentation Controls	750	LF	0.00	1.70	4.80	1.10	0	1,275	3,600	825	5,700	
7) Dust suppression (watering) per acre-pass	48400	SY	0.00	0.00	0.00	0.01	0	0	0	484	484	[33 08 0585]
DEWATERING (Areas 1 and 2)												
1) Pumps (rental, 3 units)	60	WK	0.00	243.00	0.00	0.00	0	14,580	0	0	14,580	[17 03 1003]
2) Discharge Hose (3")	1000	LF	0.00	0.00	0.00	4.00	0	0	0	4,000	4,000	
3) Fractionation Tanks (2 @ 11 months each)	22	MO	0.00	0.00	0.00	900.00	0	0	0	19,800	19,800	see assumptions
4) Analytical Samples	10	EA	500.00	0.00	0.00	0.00	5,000	0	0	0	5,000	see assumptions
5) Disposal Fees	250	KGAL	2.00	0.00	0.00	0.00	500	0	0	0	500	see assumptions
SLUDGE/WASTE/SOIL EXCAVATION												
1) Excavate and Load Overlying Soil	9500	CY	0.00	0.00	0.73	1.78	0	0	6,935	16,910	23,845	[17 03 0277]
2) Excavate and Load Sludge/Waste	60000	CY	0.00	0.00	1.10	2.67	0	0	66,000	160,200	226,200	see assumptions
3) Transport to Stockpile Areas	2720	HR	0.00	0.00	12.70	33.43	0	0	34,544	90,930	125,474	[17 03 0285]
4) Dust Suppression	300	AC	0.00	2.56	20.87	26.43	0	768	6,261	7,929	14,958	see assumptions
5) Odor Control	1	LS	140000.00	0.00	0.00	0.00	140,000	0	0	0	140,000	see assumptions
6) Air Monitoring	300	EA	1000.00	0.00	0.00	0.00	300,000	0	0	0	300,000	see assumptions
SLUDGE/WASTE STOCKPILING AND HANDLING												
1) Odor/Moisture Control (lime)	9000	TON	0.00	7.84	0.00	0.00	0	70,560	0	0	70,560	[33 15 0407]
2) Sludge Dewatering/Moisture Control	1200	HR	0.00	0.00	14.36	75.00	0	0	17,232	90,000	107,232	see assumptions
3) Stockpile Maintenance	1200	HR	0.00	0.00	0.00	75.00	0	0	0	90,000	90,000	see assumptions
CONFIRMATORY SAMPLING/ANALYSES												
1) Shipping Cost	150	EA	65.00	0.00	0.00	0.00	9,750	0	0	0	9,750	see assumptions
2) Analytical Cost (dioxin, SVOCs, metals)	250	EA	1130.00	0.00	0.00	0.00	282,500	0	0	0	282,500	see assumptions
3) Stockpile Characterization Samples	200	EA	750.00	0.00	0.00	0.00	150,000	0	0	0	150,000	see assumptions
OFFSITE DISPOSAL OF SLUDGE/WASTE												
1) Load Dump Trucks	66000	CY	0.00	0.00	0.73	1.78	0	0	48,180	117,480	165,660	[17 03 0277]
2) Transportation and Treatment/Disposal Costs	99000	TON	350.00	0.00	0.00	0.00	34,650,000	0	0	0	34,650,000	see assumptions

TABLE L-3CAN (cont.)
CAPITAL COSTS FOR ALTERNATIVE 3-CAN - EXCAVATION, OFF-SITE TREATMENT AND DISPOSAL (CANADIAN FACILITY)
ENGINEERING EVALUATION/COST ANALYSIS
MOHAWK TANNERY SITE
NASHUA, NEW HAMPSHIRE
PAGE 3 OF 3

Item	Qty	Unit	Unit Cost (\$)				Total Cost (\$)				Total Direct Cost (\$)	Comments/References
			Sub.	Mat.	Labor	Equip.	Sub.	Mat.	Labor	Equip.		
SITE RESTORATION												
1) Backfill and Compaction												
1a) with Overlying Soil	9500	CY	0.00	0.31	1.66	4.75	0	2,945	15,770	45,125	63,840	[17 03 0422]
1b) with Clean Fill From Off-Site Location	69000	CY	0.00	5.29	0.90	2.07	0	365,010	62,100	142,830	569,940	[17 03 0423]
2) Place topsoil (4")	1685	CY	0.00	18.13	3.64	3.79	0	30,549	6,133	6,386	43,069	[18 05 0301]
3) Revegetate	3	AC	0.00	340.36	66.98	92.07	0	1,021	201	276	1,498	[18 05 0401]
SITE STAFFING												
1) Site Supervisor/Field Operations Leader	11	MO	0.00	0.00	3,200.00	0.00	0	0	35,200	0	35,200	
2) Site Engineer	11	MO	0.00	0.00	3,200.00	0.00	0	0	35,200	0	35,200	
4) Sampler/Site Safety Officer	11	MO	0.00	0.00	2,400.00	0.00	0	0	26,400	0	26,400	
5) Sampler/Technician	11	MO	0.00	0.00	2,400.00	0.00	0	0	26,400	0	26,400	
6) Travel Expenses	210	DAY	0.00	0.00	492.00	0.00	0	0	103,320	0	103,320	see assumptions

SUBTOTAL DIRECT COST

35,717,715	559,383	529,441	858,710	37,665,249
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Subtotal Direct Cost

Direct Cost Adjustment Factors:

Health and Safety on Labor and Equipment @ 5%

Subtotal

Indirect Cost Adjustment Factors:

Tax on materials @ 7%

G&A @ 10% of Equipment, Material, and Labor

SubContract @ 4% of Sub. Cost

Labor Overhead @ 60%

Subtotal Direct and Indirect

Other Costs:

Profit @ 10% of Subtotal Direct and Indirect

Engineering @ 6% of Construction Cost and 2% of Transportation, Treatment/Disposal Cost

Home Office Mgmt. And Support @ 3% Direct and Indirect

Total Project Cost

Contingency @ 10% of Total Project Cost

TOTAL COST

Total Cost (\$)				Total Cost (\$)	Comments
Sub.	Mat.	Labor	Equip.		
35,717,715	559,383	529,441	858,710	37,665,249	
0	0	26,472	42,936	69,408	
35,717,715	559,383	555,913	901,646	37,734,657	
0	39,157	0	0	39,157	
0	55,938	55,591	90,165	201,694	
1,428,709	0	0	0	1,428,709	
0	0	73,920	0	73,920	
37,146,424	654,478	685,424	991,811	39,478,136	
				3,947,814	
				982,688	
				1,184,344	
				45,592,982	
				4,559,298	

50,152,281

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