

Appendix B

Remedial Alternative Cost Estimates

Table B-1. Estimated cost for Alternative 1, Waste Removal, Off-Site Disposal (Special Waste Classification), Dispersion/Dilution, and Compliance Monitoring—Heglar Kronquist Landfill, Mead, Washington

| Description | Units | Estimated Quantity | Unit Price | Total | Notes |
|---|-------|--------------------|------------|--------------|--|
| Cover Removal, Waste Excavation, and Backfilling | | | | | |
| Mob/demob | LS | 1 | \$5,000 | \$5,000 | Estimate. |
| Excavate | CY | 81,930 | \$3.59 | \$293,863 | Remedial Action Cost Engineering and Requirements system (RACER), Version 10.4.0, 2011. Remove cover and set aside for reuse. Excavate waste, assuming 20% over-excavation in dross pit area. |
| Backfill (purchase, delivery, and place) | | | | | |
| Unclassified - imported | CY | 78,876 | \$10.59 | \$835,293 | RACER (2011). |
| Reuse | CY | 15,344 | \$5.11 | \$78,373 | Assumes removed cover material will be reused to backfill pit, including gravel. |
| Seeding/vegetation | acre | 2.9 | \$4,137 | \$11,998 | Estimate from local landscaping subcontractor. |
| Laboratory analyses | each | 84 | \$271 | \$22,787 | RACER (2011). Assumes one sample for every 27 truck loads. Analytical costs will vary based on landfill requirements. |
| Management and oversight | hours | 4,382 | \$105 | \$460,110 | Assumes waste removed during 6 months from April 1 through September 30, 6 days per week, 156 days. Assumes 34 CY per truck and approximately 15 trucks per day. Oversight by two personnel with preparation, follow-up, and management. |
| Field and travel expenses | days | 156 | \$397 | \$61,974 | Field and travel expenses assuming 156 days. |
| Offsite Disposal | | | | | |
| Bulk waste loading | CY | 68,230 | \$2.80 | \$191,288 | RACER (2011). Based on in-place volumes (dross and over-excavation soils). |
| Tipping fee (special waste classification) | TON | 79,647 | \$129 | \$10,274,463 | Estimate from local landfill assuming deactivation and solidification. Includes dross and over-excavation soils. Assumes soil density of 110 lb/CF. |
| Transport (240 miles one way; 34 CY truck) | TON | 79,647 | \$42.18 | \$3,359,510 | Estimate from local transporter, including truck liners. Assume 1.09 TON/CY for dross and 1.49 TON/CY for moist soil. |
| Equipment, expenses, supplies, and minor decontamination | days | 156 | \$450 | \$70,200 | Estimated equipment, supplies, and decontamination. |
| Engineering and Documentation | | | | | |
| Cleanup Action Plan (CAP) review | LS | 2 | \$10,000 | \$20,000 | Estimate; draft and final. |
| Plans, specifications, and permitting | LS | 1 | \$40,000 | \$40,000 | Estimate assuming grading permit, final topographic survey and related. |
| Work plan | LS | 1 | \$65,000 | \$65,000 | Estimate. |
| 5-year review, Ecology | LS | 1 | \$20,000 | \$20,000 | Estimate. |
| Closure report | LS | 1 | \$85,000 | \$85,000 | Estimate assuming site closure report with removal confirmation/documentation, including a final topographic survey. |
| Compliance Monitoring - Groundwater and Surface Water (5 years) | | | | | |
| Year 1 Groundwater and Surface Water Monitoring/Reporting (4 quarterly events) | | | | | |
| Labor | LS | 1 | \$23,800 | \$23,800 | Estimate assuming 4 events, 9 sampling locations, and 3 QA/QC samples. |
| Analytical laboratory | LS | 4 | \$864 | \$3,457 | Estimate assuming 4 events, 9 sampling locations, 3 QA/QC samples, and analysis of chloride, nitrate, sodium. |
| Field and travel expenses | LS | 4 | \$2,231 | \$8,925 | Estimate assuming 4 events. |
| Waste disposal | LS | 1 | \$950 | \$950 | Estimate assuming discharge to City sewer, 2 drums per event, and 1 waste removal event following completion of monitoring. |
| Validation and reporting | LS | 1 | \$7,536 | \$7,536 | Estimate assuming 1 annual memorandum. |
| Year 2 Groundwater and Surface Water Monitoring/Reporting (4 quarterly events) | | | | | |
| Labor | LS | 1 | \$23,800 | \$23,800 | Estimate assuming 4 events, 9 sampling locations, and 3 QA/QC samples. |
| Analytical laboratory | LS | 4 | \$864 | \$3,457 | Estimate assuming 4 events, 9 sampling locations, 3 QA/QC samples, and analysis of chloride, nitrate, sodium. |
| Field and travel expenses | LS | 4 | \$2,205 | \$8,820 | Estimate assuming 4 events. |
| Waste disposal | LS | 1 | \$950 | \$950 | Estimate assuming discharge to City sewer, 2 drums per event and 1 waste removal event following completion of monitoring. |
| Validation and reporting | LS | 1 | \$6,336 | \$6,336 | Estimate assuming 1 annual memorandum report. |

Table B-1. Estimated cost for Alternative 1, Waste Removal, Off-Site Disposal (Special Waste Classification), Dispersion/Dilution, and Compliance Monitoring—Heglar Kronquist Landfill, Mead, Washington

| Description | Units | Estimated Quantity | Unit Price | Total | Notes |
|---|-------|--------------------|------------|---------------------|---|
| Year 3 Groundwater and Surface Water Monitoring/Reporting (2 semi-annual events) | | | | | |
| Labor | LS | 1 | \$11,900 | \$11,900 | Estimate assuming 2 events, 9 sampling locations, and 3 QA/QC samples. |
| Analytical laboratory | LS | 2 | \$864 | \$1,729 | Estimate assuming 2 events, 9 sampling locations, 3 QA/QC samples, and analysis of chloride, nitrate, sodium. |
| Field and travel expenses | LS | 2 | \$2,205 | \$4,410 | Estimate assuming 2 events. |
| Waste disposal | LS | 1 | \$550 | \$550 | Estimate assuming discharge to City sewer, 2 drums per event and 1 waste removal event following completion of monitoring. |
| Validation and reporting | LS | 1 | \$4,168 | \$4,168 | Estimate assuming 1 annual memorandum. |
| Year 4 Groundwater and Surface Water Monitoring/Reporting (2 semi-annual events) | | | | | |
| Labor | LS | 1 | \$11,900 | \$11,900 | Estimate assuming 2 events, 9 sampling locations, and 3 QA/QC samples. |
| Analytical laboratory | LS | 2 | \$864 | \$1,729 | Estimate assuming 2 events, 9 sampling locations, 9 QA/QC samples, and analysis of chloride, nitrate, sodium. |
| Field and travel expenses | LS | 2 | \$2,205 | \$4,410 | Estimate assuming 2 events. |
| Waste disposal | LS | 1 | \$550 | \$550 | Estimate assuming discharge to City sewer, 2 drums per event and 1 waste removal event following completion of monitoring. |
| Validation and reporting | LS | 1 | \$4,168 | \$4,168 | Estimate assuming 1 annual memorandum. |
| Year 5 Groundwater and Surface Water Monitoring/Reporting (1 annual event) | | | | | |
| Labor | LS | 1 | \$5,950 | \$5,950 | Estimate assuming 1 event, 9 sampling locations, and 3 QA/QC samples. |
| Analytical laboratory | LS | 1 | \$864 | \$864 | Estimate assuming 1 event, 9 sampling locations, 3 QA/QC samples, and analysis of chloride, nitrate, sodium. |
| Field and travel expenses | LS | 1 | \$2,205 | \$2,205 | Estimate assuming 1 event. |
| Waste disposal | LS | 1 | \$450 | \$450 | Estimate assuming discharge to City sewer, 2 drums per event and 1 waste removal event following completion of monitoring. |
| Validation and reporting | LS | 1 | \$4,584 | \$4,584 | Estimate assuming 1 annual memorandum. |
| Well Decommissioning (9 wells) | | | | | |
| 3 historic wells | LS | 3 | \$5,250 | \$15,750 | Estimate based on decommissioning historic private well in October 2010. Assumes decommissioning of Wells 3bcd-1, 3bcd-2, 3bcc prior to cap restoration work. |
| 6 RI wells | LS | 6 | \$983 | \$5,900 | Estimate from local drilling contractor to decommission Wells MW-1 through MW-6 following post-closure monitoring. |
| Field oversight and management | LS | 1 | \$6,270 | \$6,270 | Estimate assuming 3 days of field activities. |
| Field oversight expenses | LS | 3 | \$350 | \$1,050 | Estimate assuming 3 days of field activities. |
| SUBTOTAL | | | | \$16,071,427 | |
| Contingency (25% of costs) | | LS | 1 | \$4,017,857 | \$4,017,857 |
| TOTAL | | | | \$20,089,284 | |

Notes: Local sales tax at 2011 rate of 8.1% added to cost estimates, including RACER estimates, as appropriate.

Costs will vary depending on final engineering design, and fuel and material costs. Assumes existing gravel layer can be reused to backfill excavation (no disposal).

Costs shown in 2011 dollars. Costs in future contractor bids may vary.

Estimates for liner material based on \$75 per barrel crude (http://www.tsocorp.com/stellent/groups/corpcomm/documents/tsocorp_documents/001326.pdf), and fuel prices on \$102.50 per barrel (<http://www.tradingnrg.com/will-opec-raise-oil-quota-current-crude-oil-prices-fall-june-1-2011/>).

CF - cubic foot

CY - cubic yard

LS - lump sum

Table B-2. Estimated cost for Alternative 2, Cap Enhancement, Institutional Controls, Dispersion/Dilution, and Compliance Monitoring—Heglar Kronquist Landfill, Mead, Washington

| Description | Units | Estimated Quantity | Unit Price | Total | Notes |
|---|-------|--------------------|------------|-----------|--|
| Cap Enhancement (preparation, liner, cap cover) | | | | | |
| Mob/demob | LS | 1 | \$5,000 | \$5,000 | Estimate. |
| Site preparation (bulldozing) | SY | 12,347 | \$0.72 | \$8,829 | Remedial Action Cost Engineering and Requirements system (RACER), Version 10.4.0, 2011. |
| Site preparation (single pass grading) | SY | 12,347 | \$0.40 | \$4,905 | RACER (2011). |
| Materials (imported) | | | | | |
| Non-expansive fill ($k = 10^{-4} - 10^{-5}$ cm/s) | | | | | |
| Purchase and delivery | CY | 3,607 | \$35.19 | \$126,918 | Estimate from local earthwork subcontractor. |
| Placement ^a | CY | 3,544 | \$5.11 | \$18,102 | Estimate from local earthwork subcontractor. |
| Gravel (3/4" angular) | | | | | |
| Purchase and delivery | CY | 2,109 | \$17 | \$35,907 | Estimate from local earthwork subcontractor. |
| Placement ^b | CY | 2,024 | \$9 | \$17,230 | Estimate from local earthwork subcontractor. |
| Top Soil | | | | | |
| Purchase and delivery | CY | 6,095 | \$23 | \$138,363 | Estimate from local earthwork subcontractor. |
| Placement | CY | 6,095 | \$5.11 | \$31,132 | Estimate from local earthwork subcontractor. |
| Gravel (3" minus) | | | | | |
| Purchase and delivery | CY | 284 | \$17 | \$4,835 | Estimate from local earthwork subcontractor. |
| Placement (toe buttress) | CY | 284 | \$12 | \$3,546 | Estimate from local earthwork subcontractor. |
| Seeding/Vegetation and Watering | | | | | |
| | acre | 2.64 | \$4,608 | \$12,166 | Estimate from local landscaping subcontractor. |
| Geosynthetics (purchase, transport, and install) | | | | | |
| 200 mil geonet | LS | 1 | \$49,500 | \$49,500 | Estimate from local liner subcontractor (based on 123,177 SF). |
| 16 oz non-woven geotextile | LS | 1 | \$39,384 | \$39,384 | Estimate from local liner subcontractor (based on 123,177 SF). |
| Geocomposite drainage material | LS | 1 | \$82,104 | \$82,104 | Estimate from local liner subcontractor (based on 123,177 SF). |
| 60 mil HDPE geomembrane | LS | 1 | \$75,833 | \$75,833 | Estimate from local liner subcontractor (based on 123,177 SF). |
| Construction of anchor trench | feet | 1,296 | \$7 | \$8,826 | Estimate from local earthwork subcontractor. |
| Tree removal | LS | 10 | \$568 | \$5,675 | Estimate. |
| Fence replacement, vent repair, drain pipe, cleanup | LS | 1 | \$62,428 | \$62,428 | Estimate from local fencing subcontractor. General estimate for vent repair, drain pipe and cleanup. |
| Preparation, oversight, and follow-up | LS | 1 | \$86,000 | \$86,000 | Estimate for project preparation (health and safety plan, site walks, contracting, project set-up), 15 days of field work (2 personnel), PE supervision during key aspects of cover work, follow-up, and management during field activities. |
| Field and travel expenses | LS | 15 | \$494 | \$7,406 | Travel and field expenses assuming 15 days. |
| Engineering and Documentation | | | | | |
| Management and meetings | LS | 1 | \$50,000 | \$50,000 | Estimate. |
| Cleanup Action Plan (CAP) review | LS | 2 | \$10,000 | \$20,000 | Estimate; draft and final. |
| Plans, specifications, permitting, and access agreement | LS | 1 | \$69,500 | \$69,500 | Estimate assuming plans and specs for construction, grading permit, and access agreement for property east of landfill. Assumes geotechnical report not necessary. |
| Design report/work plan | LS | 1 | \$65,000 | \$65,000 | Estimate. |
| Remedy implementation report | LS | 1 | \$95,000 | \$95,000 | Estimate assuming report with cap restoration documentation, including a final topographic survey. |
| 20-Year Maintenance | | | | | |
| O&M plan | LS | 1 | \$30,000 | \$30,000 | O&M plan for inspections and minor maintenance. |
| Annual site inspection and mowing | year | 20 | \$1,000 | \$20,000 | Estimate assuming minor maintenance costs. |
| 5-year reviews, Ecology | LS | 4 | \$20,000 | \$80,000 | Estimate. |
| Deed Restriction (covenant) | | | | | |
| | LS | 1 | \$10,000 | \$10,000 | Estimate to review, facilitate document preparation and filing. |
| Compliance Monitoring - Air, Groundwater and Surface Water (5 years) | | | | | |
| Year 1 Groundwater and Surface Water Monitoring/Reporting (4 quarterly events) | | | | | |
| Labor | LS | 1 | \$23,800 | \$23,800 | Estimate assuming 4 events, 9 sampling locations, and 3 QA/QC samples. |
| Analytical laboratory | LS | 4 | \$864 | \$3,457 | Estimate assuming 4 events, 9 sampling locations, 3 QA/QC samples, and analysis of chloride, nitrate, sodium. |
| Field and travel expenses | LS | 4 | \$2,231 | \$8,925 | Estimate assuming 4 events. |
| Waste disposal | LS | 1 | \$950 | \$950 | Estimate assuming discharge to City sewer, 2 drums per event, and 1 waste removal event following completion of monitoring. |
| Validation and reporting | LS | 1 | \$7,536 | \$7,536 | Estimate assuming 1 annual memorandum. |
| Year 2 Groundwater and Surface Water Monitoring/Reporting (4 quarterly events) | | | | | |
| Labor | LS | 1 | \$23,800 | \$23,800 | Estimate assuming 4 events, 9 sampling locations, and 3 QA/QC samples. |
| Analytical laboratory | LS | 4 | \$864 | \$3,457 | Estimate assuming 4 events, 9 sampling locations, 3 QA/QC samples, and analysis of chloride, nitrate, sodium. |
| Field and travel expenses | LS | 4 | \$2,205 | \$8,820 | Estimate assuming 4 events. |
| Waste disposal | LS | 1 | \$950 | \$950 | Estimate assuming discharge to City sewer, 2 drums per event and 1 waste removal event following completion of monitoring. |
| Validation and reporting | LS | 1 | \$6,336 | \$6,336 | Estimate assuming 1 annual memorandum report. |

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| Description | Units | Estimated Quantity | Unit Price | Total | Notes |
|---|-------|--------------------|------------|--------------------|---|
| Year 2 Air Monitoring/Reporting (1 event) | | | | | |
| Labor | LS | 1 | \$7,441 | \$7,441 | Estimate assuming 1 event, 3 sampling locations, ammonia only. |
| Analytical laboratory | LS | 1 | \$1,262 | \$1,262 | Estimate assuming 1 event, 3 sampling locations, ammonia only. |
| Field and travel expenses | LS | 1 | \$4,020 | \$4,020 | Estimate assuming 1 event, 3 sampling locations, ammonia only. |
| Validation and reporting | LS | 1 | \$6,854 | \$6,854 | Estimate assuming 1 event, 3 sampling locations, ammonia only. |
| Year 3 Groundwater and Surface Water Monitoring/Reporting (2 semi-annual events) | | | | | |
| Labor | LS | 1 | \$11,900 | \$11,900 | Estimate assuming 2 events, 9 sampling locations, and 3 QA/QC samples. |
| Analytical laboratory | LS | 2 | \$864 | \$1,729 | Estimate assuming 2 events, 9 sampling locations, 3 QA/QC samples, and analysis of chloride, nitrate, sodium. |
| Field and travel expenses | LS | 2 | \$2,205 | \$4,410 | Estimate assuming 2 events. |
| Waste disposal | LS | 1 | \$550 | \$550 | Estimate assuming discharge to City sewer, 2 drums per event and 1 waste removal event following completion of monitoring. |
| Validation and reporting | LS | 1 | \$4,168 | \$4,168 | Estimate assuming 1 annual memorandum. |
| Year 4 Groundwater and Surface Water Monitoring/Reporting (2 semi-annual events) | | | | | |
| Labor | LS | 1 | \$11,900 | \$11,900 | Estimate assuming 2 events, 9 sampling locations, and 3 QA/QC samples. |
| Analytical laboratory | LS | 2 | \$864 | \$1,729 | Estimate assuming 2 events, 9 sampling locations, 9 QA/QC samples, and analysis of chloride, nitrate, sodium. |
| Field and travel expenses | LS | 2 | \$2,205 | \$4,410 | Estimate assuming 2 events. |
| Waste disposal | LS | 1 | \$550 | \$550 | Estimate assuming discharge to City sewer, 2 drums per event and 1 waste removal event following completion of monitoring. |
| Validation and reporting | LS | 1 | \$4,168 | \$4,168 | Estimate assuming 1 annual memorandum. |
| Year 5 Groundwater and Surface Water Monitoring/Reporting (1 annual event) | | | | | |
| Labor | LS | 1 | \$5,950 | \$5,950 | Estimate assuming 1 event, 9 sampling locations, and 3 QA/QC samples. |
| Analytical laboratory | LS | 1 | \$864 | \$864 | Estimate assuming 1 event, 9 sampling locations, 3 QA/QC samples, and analysis of chloride, nitrate, sodium. |
| Field and travel expenses | LS | 1 | \$2,205 | \$2,205 | Estimate assuming 1 event. |
| Waste disposal | LS | 1 | \$450 | \$450 | Estimate assuming discharge to City sewer, 2 drums per event and 1 waste removal event following completion of monitoring. |
| Validation and reporting | LS | 1 | \$4,584 | \$4,584 | Estimate assuming 1 annual memorandum. |
| Well Decommissioning (9 wells) | | | | | |
| 3 historic wells | LS | 3 | \$5,250 | \$15,750 | Estimate based on decommissioning historic private well in October 2010. Assumes decommissioning of Wells 3bcd-1, 3bcd-2, 3bcc prior to cap restoration work. |
| 6 RI wells | LS | 6 | \$983 | \$5,900 | Estimate from local drilling contractor to decommission Wells MW-1 through MW-6 following post-closure monitoring. |
| Field oversight and management | LS | 1 | \$6,270 | \$6,270 | Estimate assuming 3 days of field activities. |
| Field oversight expenses | LS | 3 | \$350 | \$1,050 | Estimate assuming 3 days of field activities. |
| Closure Report | LS | 1 | \$50,000 | \$50,000 | Estimate assuming site visit and closure report following monitoring. |
| SUBTOTAL | | | | \$1,509,734 | |
| Contingency (25% of costs) | LS | 1 | \$377,433 | \$377,433 | |
| TOTAL | | | | \$1,887,167 | |

Notes: Local sales tax at 2011 rate of 8.1% added to cost estimates, including RACER estimates, as appropriate.
Costs will vary depending on final engineering design, and fuel and material costs. Costs shown in 2011 dollars. Costs in future contractor bids may vary.
Estimates for liner material based on \$75 per barrel crude (http://www.tsocorp.com/stellent/groups/corpcomm/documents/tsocorp_documents/001326.pdf), and fuel prices on \$102.50 per barrel (<http://www.tradingnrg.com/will-opec-raise-oil-quota-current-crude-oil-prices-fall-june-1-2011/>).

cm/s - centimeters per second
CY - cubic yard
HDPE - high-density polyethylene
k - permeability
LS - lump sum
O&M - operations and maintenance
oz - ounce
QA/QC - quality control/quality assurance
RI - Remedial Investigation
SF - square feet
SY - square yard

^a Excludes 63 CY allocated to anchor trench.

^b Excludes 85 CY allocated to anchor trench and fill around vent pipes.

Appendix C

1994 Landfill Cover Evaluation Photographs

1994 Landfill Cover Evaluation Photographs

Heglar Kronquist Landfill
Mead, Washington



Photograph 1.



Photograph 2.

1994 Landfill Cover Evaluation Photographs

Heglar Kronquist Landfill
Mead, Washington



Photograph 3.

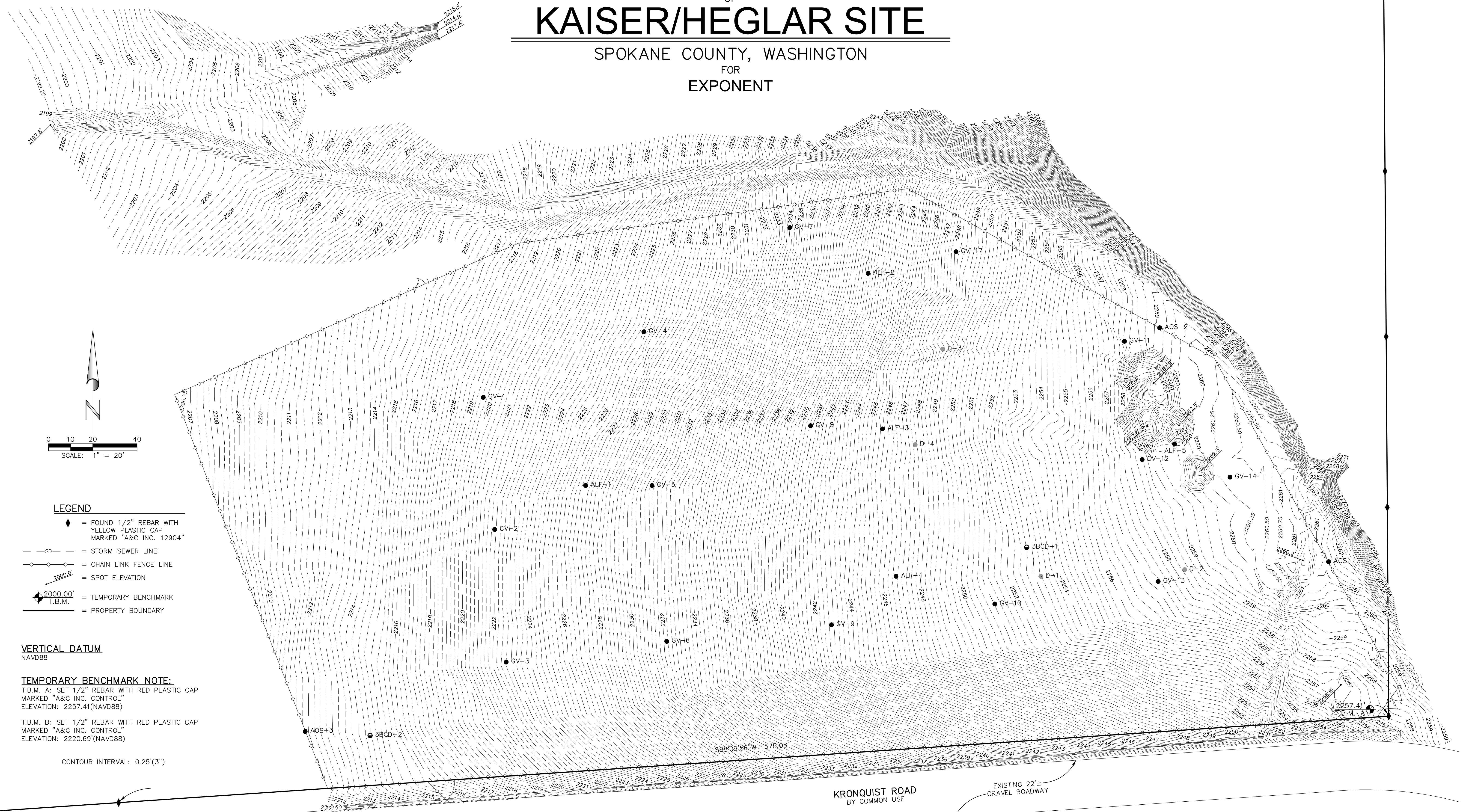


Photograph 4.

Appendix D

Topographic Survey of Landfill Cover, May 2011

TOPOGRAPHIC SURVEY
OF
KAISER/HEGLAR SITE
SPOKANE COUNTY, WASHINGTON
FOR
EXPONENT



LEGEND

- = FOUND 1/2" REBAR WITH YELLOW PLASTIC CAP MARKED "A&C INC. 12904"
- = STORM SEWER LINE
- = CHAIN LINK FENCE LINE
- = SPOT ELEVATION
- = TEMPORARY BENCHMARK
- = PROPERTY BOUNDARY

VERTICAL DATUM

NAVD88

TEMPORARY BENCHMARK NOTE:

T.B.M. A: SET 1/2" REBAR WITH RED PLASTIC CAP MARKED "A&C INC. CONTROL" ELEVATION: 2257.41(NAVD88)

T.B.M. B: SET 1/2" REBAR WITH RED PLASTIC CAP MARKED "A&C INC. CONTROL" ELEVATION: 2220.69(NAVD88)

CONTOUR INTERVAL: 0.25'(3")

888°09'56"W 575.06'

KRONQUIST ROAD
BY COMMON USE

EXISTING 22'±
GRAVEL ROADWAY

2220.69'
T.B.M. B

