

Table 1
Estimated Post-Closure Monitoring/Maintenance Costs
North Country Environmental Services, Inc.
Mar-23

Task		Annual Cost Years 1-5	Annual Cost Years 6-10	Annual Cost Years 11-20	Annual Cost Years 21-30
I-a	Water Quality Monitoring	\$ 45,000.00	\$ 36,000.00	\$ 26,000.00	\$ 26,000.00
I-b	Repair of Monitoring Wells	\$ 500.00	\$ 500.00	\$ 500.00	\$ 500.00
II-a	Landfill Gas Migration Monitoring	\$ 10,000.00	\$ 10,000.00	\$ 10,000.00	\$ 10,000.00
II-b	Landfill Gas Collection System O&M	\$ 154,110.00	\$ 91,810.00	\$ 44,810.00	\$ 30,810.00
II-c	Replacing 20% of the Active Gas Collection System	\$ 15,900.00	\$ 15,900.00	\$ 15,900.00	\$ 15,900.00
III	Settlement Monitoring	\$ 3,000.00	\$ 3,000.00	\$ 3,000.00	\$ 700.00
IV-a	Leachate/Condensate Disposal	\$ 230,200.00	\$ 159,100.00	\$ 107,300.00	\$ 87,200.00
IV-b	Leachate Monitoring	\$ 4,800.00	\$ 4,800.00	\$ 3,200.00	\$ 3,200.00
IV-c	Leachate Pump Station O&M	\$ 25,300.00	\$ 18,100.00	\$ 15,700.00	\$ 14,100.00
V	Air Quality Monitoring	\$ 125,300.00	\$ 63,000.00	\$ 33,000.00	\$ 18,000.00
VI	Repair & Site Maintenance Costs	\$ 12,800.00	\$ 11,000.00	\$ 7,750.00	\$ 6,000.00
VII	Inspections	\$ 12,500.00	\$ 8,500.00	\$ 8,500.00	\$ 8,500.00
VIII	Other	\$ -	\$ -	\$ -	\$ -
IX	10% Contingency	\$ 64,000.00	\$ 42,200.00	\$ 27,600.00	\$ 22,100.00
TOTAL		\$ 703,410.00	\$ 463,910.00	\$ 303,260.00	\$ 243,010.00

Notes:

A summary of the assumptions made in developing the estimate is attached

Costs presented are in 2023 dollars

Costs are based on our experience and data and information provided by NCES. Actual costs may vary.

Supporting Documentation for 2023 Post-Closure Costs

March 2023

The following assumptions were made in developing the post-closure cost estimate. The estimated initial annual cost is summarized in the NHDES Post-Closure Cost Estimate form and the estimated annual costs for the entire 30-year post-closure period are summarized in Table 1 with the present value for the annual costs presented in Table 2. The costs were developed based on information provided by North Country Environmental Services, previous cost estimates developed for the facility, and our experience.

Item Ia – Water Quality Monitoring

Years 1 – 5

- Annual Costs for sampling and reporting were estimated to be **\$45,000**. These costs will remain unchanged in the first five years of the post-closure monitoring program.

Years 6 - 10

- We have assumed that after the first five years of monitoring, that a reduction from tri-annual to bi-annual sampling will be allowed by NHDES, based on our experience at many unlined landfill closure sites. This will reduce the annual costs by approximately \$9,000 to an annual cost of **\$37,000**.

Years 11 – 30

- We have assumed that after ten years of monitoring that a further reduction in sampling parameters or locations will be allowed by NHDES. This will reduce the annual sampling costs to an estimated **\$27,000**

Item Ib – Repair of Monitoring Wells

Years 1 - 30

- Carry an annual cost of \$500, which provides additional funds for minor repairs.

Item IIa - Landfill Gas Migration Monitoring

- The annual costs of **\$10,000** for the quarterly monitoring of landfill gas migration will be required to be completed throughout the post-closure monitoring period. It is possible that NHDES may permit some reductions to the frequency and locations, after several years of monitoring and data gathering, but this is not relied upon in the estimate.

Years 11 - 20

Assume that starting in year 11, the LFG collection system operates on one blower and one flare. Assume the electricity cost, in 2023 dollars, would be 40 percent of the current total electricity cost, or about **\$28,000 per year for 10 years.**

Years 20 - 30

Assume that the one blower and one flare operate on a part-time basis with a 50 percent duty cycle. Therefore, the annual electricity cost would be about **\$14,000 per year for the last 10 years of the period.**

Item IIc – Replacing 20% of the Active Gas Collection System

This item is to replace 20% of the active landfill gas system per Env-Sw 1403.02(g)(7) within the footprint of the landfill through Stage VI. This cost is presented as an annual value with the full replacement cost spread out over 30 years. **The annual cost for replacement of 20% of the landfill gas system is \$15,900 for years 1 through 30.**

Item III – Settlement Monitoring

Years 1 - 30

- Assume settlement survey costs will average about \$3,000 per year for years 1 through 20. Years 20 through 30 will not require instrument survey and only a visual inspection at an estimated cost of \$700 per year.

Item IV-a – Leachate/Condensate Disposal

Leachate generated at NCES is hauled to an off-site disposal facility. Based on information provided by NCES, the average transportation and disposal cost is \$0.115 per gallon of leachate.

Years 1 - 5

- Assume 2.7 acres of the West Side cap and 1.4 acres of the Eastern Slope cap remains and will have been in place for at least 6 years at the time of closure and that the leachate flow rate will average 55 gallons per acre per day (gpad), which would produce about 226 gallons per day (gpd).
- Assume 47.8 acres of cap are constructed in Year 1 and that leachate is produced in this area at the rate of 110 gpad or 5,258 gpd.
- **Therefore, the annual cost for years 1 through 5 is approximately \$230,200.**

Years 6 - 10

- Assume flow rate of 50 gpad over 4.1 acres, or 205 gpd.
- Assume a flow rate of 75 gpad for the remaining 47.8 acres, or 3,585 gpd.
- **Therefore, the annual cost for years 6 through 10 is approximately \$159,100.**

Years 11 - 20

- Assume a flow rate of 40 gpad over 4.1 acres, or 164 gpd.
- Assume a flow rate of 50 gpad over 47.8 acres, or 2,390 gpd.
- **Therefore, the annual cost for years 11 through 20 is approximately \$107,300.**

Years 21 - 30

- Assume flow rate of 40 gpad over the entire 51.90 acres, or 2,067 gpd.

Therefore, the annual cost for years 21 through 30 is approximately \$87,200.

Item IV-b - Leachate Monitoring

Years 1 - 10

- Assume leachate is collected for analysis for the parameters required by the Solid Waste Rules three times per year from all Stages.
- Based on current costs for analytical testing, the annual laboratory cost is \$2,400.
- Assume labor and expenses total \$800 per round or \$2,400 annually.
- **Therefore, the annual cost for years 1 through 10 is \$4,800.**

Years 11 - 30

- Assume based on diminishing flows and stabilization of the leachate that the frequency of sampling may be cut by one-third so that the cost of monitoring is two-thirds of the initial cost. During years 11-20 following closure, sampling will be conducted twice per year. With stabilization, it is likely that the parameters for which analyses are required could also be reduced resulting in a further reduction in the monitoring cost, which is not reflected here.
- **Therefore, the annual cost for years 11 through 30 is about \$3,200.**

Item IV-c Leachate Pump Station Operation & Maintenance

Years 1 - 30

- Assume routine inspections coincide with gas system maintenance under Item 2 at a cost of **\$3,600** per year.
- Assume replacement parts and repairs for system components cost approximately **\$3,100** per year.
- Assume pipes are cleaned every two years at a cost of \$5,200 (annualized cost of **\$2,600**).
- **Therefore, the annual maintenance cost for years 1 through 30 is about \$9,300.**

Electricity Costs

Years 1 - 5

- Assume the annual electricity cost for years 1 through 5 is about **\$16,000**.

Years 6 -10

- Assume the leachate flow rates drops to about 55 percent of flow at closure on average over the 5 year period due to the cap so that the annual electricity cost for years 6 through 10 is about **\$8,800**.

Years 11 - 20

- Assume the leachate flow rates drop to about 40 percent of the flow at closure on average over the 10 year period so that the annual electricity cost for years 11 through 15 is about **\$6,400**.

Years 21 - 30

- Assume the leachate flow rates drop to about 30 percent of the flow at closure on average over the 10 year period so that the annual electricity cost for years 21 through 30 is about **\$4,800**.