

Attachment E

Financial Assurance Documentation

Post Closure Maintenance Cost Estimate for Cedar Hills Regional Landfill

Background

WAC 173-351 requires owners and operators of Municipal Solid Waste Landfills (MSWLF) have a detailed written estimate, in current dollars, of the cost of hiring a third party to conduct post-closure care for the MSWLF unit or all MSWLF units in compliance with the post-closure plan developed under WAC 173-351-500(2). The post closure period is defined to last thirty years or as long as necessary for the landfill to become functionally stable. For this cost estimate, thirty years maintenance is assumed, per the WAC requirement for Post Closure Maintenance (PCM).

PCM estimates have been prepared for Cedar Hills Regional Landfill (CHRLF) previously. These estimates are prepared based on historical levels of effort required for tasks that will continue through the post closure period and levels of effort required for similar tasks conducted at closed landfills maintained by the King County Solid Waste Division (SWD). The last major revision was completed in 2012; annual reviews include reviewing the proposed activities and adjusting activities that have changed based on changes to operation and maintenance practices utilized by SWD.

Purpose

This document provides the basis for the PCM estimate. This includes the underlying assumptions and the documented changes from previous years. The estimate is to be reviewed annually and updated as necessary.

2014 Update

The cost items were reviewed for completeness for 2014. No additional items were identified. The cost estimates remained the same and the total annual PCM cost was inflated to 2014 dollars.

2015-2017 Updates

The cost items were reviewed for completeness annually by SWD Facility Engineering and Science Unit. No additional items were identified. The line-item detail cost estimates in Table 1 remained the same and the total annual PCM cost was inflated to current year dollars using the Seattle area CPI-U index computed by the King County Office of Economic Forecasting and Analysis (OEFA).

2018 Update.

The cost items were reviewed and adjusted to reflect the addition of Area 8. Area 8 increases the volume of the landfill by 12% and the footprint by 14%. The following PCM elements were increased by 14% to reflect the addition of Area 8: Cover maintenance, leachate system maintenance, stormwater system maintenance, landfill gas system maintenance, electrical utility charges, and wastewater utility charges.

2019-2021 Updates

The cost items were reviewed for completeness annually by SWD Facility Engineering and Science Section. No additional items were identified. The line-item detail cost estimates in Table 1 remained the same and the total annual PCM cost was inflated to current year dollars. No additional capacity is assumed beyond the currently permitted landfill capacity in this financial assurance analysis for PCM.

Major PCM Elements

The cost estimate includes maintenance costs for the environmental control systems at the site. The main systems are the landfill gas collection system, the leachate collection system, the North Flare Station, the leachate aeration lagoons, the cover system and the groundwater monitoring network. All tasks from previous PCM estimates were reviewed to determine that all tasks are still necessary and that all necessary tasks are included. The itemized tasks were reviewed with SWD operations leads and/or supervisors.

All tasks were reviewed to determine whether current estimates of levels of effort to complete the task are still current and to determine level of effort for any new tasks.

The estimate is based on tasks being performed by SWD staff or contractors in the same manner as currently performed. To compensate for the potential that all tasks may be performed by contractors, a project management cost was added to the overall estimate. The underlying assumption is that the cost of performing the work remains constant whether performed by SWD forces or contractors, but SWD would incur increased costs for managing contracts with the contractors.

The cost items in the PCM estimate include:

- Cover Maintenance & General Site Maintenance
 - Vegetation control
 - Geomembrane repair
 - Road maintenance
 - Fence Repair
 - Litter Control
 - Grading
 - Well Boot repair
- Leachate System Maintenance
 - Aerator repair and maintenance
 - Pump repair and maintenance
 - Leachate extraction well replacement
 - Periodic line cleaning
 - Air compressor repair and maintenance
- Stormwater System Maintenance
 - Stormwater conveyance system cleaning and maintenance
 - Catch basin cleaning and maintenance
 - Pond cleaning and maintenance
- Landfill Gas System Maintenance
 - Blower repair and maintenance

- Flare repair and maintenance
- Stack emissions testing
- Routine testing and maintenance
- Environmental Monitoring
 - Groundwater and leachate samples
 - Laboratory analysis
 - Sample collection
 - Data analysis
 - Reporting
 - Data Management
- Electrical Utilities
- Permits
 - Operating Permit for Closed Landfill
 - Air Operating Permit
- Wastewater Utility Fees
- Project Management and Reporting
 - Sample collection
 - Data management
 - Reporting
 - Project Management
- Investigation and Remediation
- Project management costs for third party contractor
- Contingency

Key Assumptions for Cost Estimates

Several key assumptions were made regarding the cost estimates. These assumptions are outlined below.

- ❖ The post closure period will be thirty years in length, beginning when the closure is approved by Public Health – Seattle and King County (PHSKC).
- ❖ At the time of closure, BEW or equivalent facility will be operating to utilize the landfill gas generated at the site. The facility will have scheduled downtime for maintenance, requiring use of the flares. The source testing requirement for this minimized use of the flares will be to test all flares once every five years.
- ❖ The closure project at the final closure will leave all systems in full working condition, with no anticipated major repairs.
- ❖ Support facilities and equipment currently located at CHRLF will either be relocated or will be supported through another funding source.
- ❖ Leachate recirculation within the landfill is not included in the estimate. It is expected that if leachate recirculation is implemented, this will represent a cost savings for PCM.
- ❖ Operating and maintenance costs are included in the hourly rates for equipment.
- ❖ Overhead costs for employees include all costs associated with providing resources for employees to perform their tasks, including supervision.
- ❖ Equipment required to perform tasks is included in task budgets, including pickups for supervisors and leads. Equipment costs are based on federal approved rates, as available and California State approved rates otherwise.

- ❖ As is true with SWD’s existing closed landfills, the Industrial General Stormwater Permit (IGSWP) will no longer be in effect after closure; no surface/storm water sampling will be required.
- ❖ The estimate is based on tasks being performed by SWD staff or contractors in the same manner as currently performed. To compensate for the potential that all tasks may be performed by contractors, a project management cost was added to the overall estimate. The underlying assumption is that the cost of performing the work remains constant whether performed by SWD forces or contractors, but SWD would incur increased costs for managing contracts with the contractors.
- ❖ The contingency in this estimate includes known unknowns such as responses to changes in groundwater quality or need to address landfill gas in native soil. This contingency assumes there will be one major investigation and remediation project during the thirty-year closure period. This activity is projected from years 5 through 10. Additional contingency is included to address the management of the risk that the landfill gas and leachate systems may have a failure requiring extensive repair or replacement and is assumed at 25% of the maintenance cost of the leachate and landfill gas systems.
- ❖ Major cost items with more uncertainty include a 5-10% estimating contingency. These items are maintenance activities currently performed and therefore have reliable cost projections to perform the work, but the frequency required is less certain. Higher contingency is applied to systems that have had more variable maintenance costs.
- ❖ Unknown unknowns are not included in the contingency and are assumed to be covered by management reserves. Examples of potential unknown unknowns include remediation due to Queen City Farms, changes to regulations and natural disasters.

Assumptions specific to the tasks are included in the detail tables that provide the supporting documentation for the estimate.

Summary of Costs

The summary of costs is provided in the table below.

**Table 1: Cedar Hills Regional Landfill Post Closure Maintenance Cost Estimate
(Updated in 2018 based on Area 8)**

Task Group	Annual Amount	Basis
Cover Maintenance	\$605,000	Based on 2012 estimated hours for PCM; updated wage and benefit rates and includes a 5% contingency, and was increased by 14%
Leachate System Maintenance	\$234,000	Based on 2012 estimated hours for PCM; updated wage and benefit rates; reduced aerator repair and replacement to reflect historical; adjusted for reduced leachate production in PCM and includes 10% contingency and was increased by 14%.
Stormwater System Maintenance	\$500,000	Based on 2012 estimated hours for PCM; updated wage and benefit rates and includes a 5% contingency and was increased by 14%.

Landfill Gas System Maintenance	\$300,000	Based on 2012 estimated hours for PCM; updated wage and benefit rates; assumes BEW or alternative utilizing all LFG; flares operating intermittently requiring source testing every 5 yrs. This estimate includes a 10% contingency.
Environmental Monitoring	\$166,000	2012 analytical lab, weather station maintenance inflated
Electrical Utilities	\$328,000	Based on 2012 costs increased by 14% and inflated.
Permits	\$6,000	Based on 2012 permit costs inflated
Project Management and Reporting ¹	\$754,000	Includes project management, field staff for monitoring; database mgmt. contract mgmt.; field equipment
Project management costs for third party contractor	\$238,000	Assumes contractor can complete labor at same cost as KCSWD; KC assumes 9% cost to manage - contingency is inherent to labor tasks
Wastewater utility	\$328,000	Assume reduced to average of 100 MG per year over the 30 years and increased by 14% from prior estimate
Base Estimate	\$3,459,000	
Contingency	\$308,000	Contingency based on 25% of leachate & LFG system maintenance plus one \$5M project occurring between years 5 and 10
2018 Total	\$3,767,000	2018 dollars
2019 Total	\$3,984,000	2019 dollars (CPI-U assumed at 5.76%)
2020 Total	\$4,042,000	2020 dollars (CPI-U assumed at 1.45%)
2021 Total	\$4,134,562	2021 dollars (CPI-U assumed at 2.29%)

Exclusions

This estimate does not include costs of unknown risks. The risks addressed are identifiable and have some probability of occurring based on experiences at other closed sites. The estimate does not address the potential for the PCM period to extend beyond the minimum thirty years prescribed in the WAC 173-351.

Attachments

Landfill Reserve Fund Model

