Texas Commission on Environmental Quality

Closure Cost Estimate Form for Municipal Solid  
Waste Type I Landfills

This form is for use by applicants or site operators to provide cost estimates for closure of MSW Type I landfills to meet the requirements in 30 Texas Administrative Code (TAC) Chapter 330, Section 330.63(j) and 30 TAC Chapter 330 Subchapter L. The costs to be provided herein are cost estimates for hiring a third party to close the largest waste fill area that could potentially be open in the year to follow and those areas that have not received final cover. If you need assistance in completing this form, please contact the MSW Permits Section in the Waste Permits Division at (512) 239-2335.

Facility Name:

MSW Permit No.:

Site Operator/Permittee Name and Mailing Address:

Total Closure Cost Estimate (20   Dollar Amount):

# Professional Engineer’s Statement, Seal, and Signature

I am a licensed professional engineer in the State of Texas. To the best of my knowledge, this Closure Cost Estimate has been completed in substantial conformance with the facility Closure Plan and, in my professional opinion, is in compliance with Title 30 of the Texas Administrative Code, Chapter 330.

Name:       Title:

Date:

Company Name:       Firm Registration Number:

Professional Engineer’s Seal

Professional Engineer’s Signature

# Annual Review of Permit Conditions, Cost Estimates, Inflation Factor, and Financial Assurance

The permittee/site operator acknowledges that he/she will:

1. Review the facility’s permit conditions on an annual basis and verify that the current active and inactive waste fill areas of the landfill match the areas on which closure cost estimates are based.
2. Request in writing via a permit modification application for an increase in the closure cost estimate and the amount of financial assurance provided if changes to the closure plan or the landfill conditions increase the maximum cost of closure at any time during the remaining active life of the landfill.
3. Request in writing via a permit modification application for a reduction in the cost estimate and the amount of financial assurance provided if the cost estimate exceeds the maximum cost of closure at any time during the remaining active life of the landfill. The permit modification application will include a description of the situation and a detailed justification for the reduction of the closure cost estimate and the amount of financial assurance.
4. Establish financial assurance for closure of the unit in an amount no less than the current closure cost estimate in accordance with 30 TAC Chapter 37, Subchapter R.
5. Adjust the current cost estimate for inflation within 60 days prior to the anniversary date of the first establishment of the financial assurance mechanism.
6. Provide annual inflation adjustments to the closure costs and financial assurance during the active life of the facility, until the facility is officially placed under the post closure care period and all requirements of the final closure plan have been approved in writing by the TCEQ executive director. The adjustment will be made using an inflation factor derived from the most recent annual Implicit Price Deflator for Gross National Product published by the United States Department of Commerce in its Survey of Current Business, as specified in paragraphs (1) and (2) of 30 TAC §37.131. The inflation factor is the result of dividing the latest published annual Deflator by the Deflator for the previous year.
7. Provide continuous financial assurance coverage for closure until the facility is officially placed under the post-closure care period.

# Description of the Closure Cost Estimates Worksheet

The following descriptions of the items on the closure cost estimates worksheet provide guidance for identifying the minimum work or cost elements and estimating the unit or lump sum cost of each item as applicable. Enter additional detail for each item in the field following the item as necessary and as site-specific condition warrants. The cost items are grouped under closure costs for engineering, construction, and storage and processing units. Include attachments to detail any additional work and associated costs necessary to close the site that is not already included as a line item on the worksheet. Reference the attachments and list the work or cost items in the fields under “Additional Engineering Cost Items Not Listed on the Worksheet,” “Additional Construction Cost Items Not Listed on the Worksheet,” or “Additional Storage and Processing Units Items Not Listed on the Worksheet” as applicable. Provide the total cost of the additional work or cost items in each cost category on the worksheet line that precedes the cost subtotal for each cost group.

1. Engineering Costs

The engineering tasks have been subdivided into seven items and are described below. Other related costs may be added as site-specific issues warrant.

* 1. Topographic Survey

A topographic survey will be required to verify the existing elevation and slopes of the landfill to ensure conformance with the final cover system, drainage system, and final grading designs.

Enter additional topographic survey work or cost element details as site-specific conditions warrant:

* 1. Boundary Survey

The metes and bounds description is required for filing of the affidavit of closure and deed recording of any area of the site which has received waste. Other activities to be included here are publication of the public notice of closing activities.

Enter additional boundary survey work or cost element details as site-specific conditions warrant:

* 1. Site Evaluation

The evaluation includes a site inspection to identify waste disposal areas, analyze drainage and erosion protection needs, and to determine other site operational features that are not in compliance with the permit. The site evaluation also includes verifying the need for new or relocation of existing groundwater monitoring wells and landfill gas monitoring probes, analysis of groundwater samples, and review of site operating record. The third party consultant who performed the site evaluation will prepare and submit an engineering report to the executive director to document the status of the site. The report will identify all areas of work and the associated implementation costs necessary to safely close the landfill operations with recommendations on how to fulfill these needs.

Enter additional site evaluation work or cost element details as site-specific conditions warrant:

* 1. Development of Plans

The final closure, plan the final cover system design and specifications, grading and drainage plans, specification for revegetation, design of any other improvements to bring the site into compliance with the permit, the closure schedule, and coordination with the TCEQ and provision of closure notice to the public.

Enter additional development of plans work or cost element details as site-specific conditions warrant:

* 1. Contract Administration (bidding and award)

The third-party consultant will advertise the project, receive the bids, evaluate the bids, award the closure construction contract and administer the contract during construction.

Enter additional contract administration work or cost element details as site-specific conditions warrant:

* 1. Closure Inspection and Testing

The professional of record will observe closure construction, perform cover thickness and permeability verification, and prepare an evaluation report upon completion of closure.

Enter additional closure inspection or testing work or cost element details as site-specific conditions warrant:

* 1. TPDES and other Permits

The third-party consultant will prepare plans, specifications, and other documents necessary for compliance with applicable federal and state laws and requirements, including the Clean Water Act, for the proper closure of the site.

Enter additional TPES or other permits work or cost element details as site-specific conditions warrant:

* 1. Additional Engineering Cost Items Not Listed on the Worksheet

List the Attachment(s) detailing any additional engineering cost items necessary to close the site that is not already included as a line item on the worksheet:       Also, reference these Attachments in the “Units” column on this line of the worksheet. Provide the total cost of all additional engineering cost items in the “Cost” column.

* 1. Engineering Costs Subtotal

Enter the sum of engineering costs in Items 1.1 through 1.8.

1. Construction Costs

Closure construction costs include those for construction of the final cover system, site grading, and drainage improvements. Other costs may be added as site-specific issues warrant.

* 1. Mobilization
     1. Mobilization of Personnel and Equipment

The cost of mobilizing personnel and construction heavy equipment must be included as part of the construction costs.

Enter additional work or cost element details for mobilization of personnel and equipment as site-specific conditions warrant:

* 1. Final Cover System

The owner or operator must install a final cover system that is designed to minimize infiltration and erosion. The final cover system is subdivided into the sideslope cover and cap cover with their associated components to facilitate cost calculations. If an alternative final cover is proposed, the closure cost estimate will still be based on a design that utilizes the conventional composite cover system.

Enter additional final cover system work or cost element details as site-specific conditions warrant:

* + 1. Side Slope Cover

Enter information for Items 2.2.1a through 2.2.1h.

* + 1. Top Slope Cover

Enter information for Items 2.2.2a through 2.2.2h.

* + 1. Cells for Class 1 Nonhazardous Industrial Waste
  1. Site Grading

Site grading includes the final grading of the site, including the landfill cap and sideslopes.

Enter additional site grading work or cost element details as site-specific conditions warrant:

* 1. Site Fencing and Security

Site fencing and security must be included for the area which has received waste and have no existing approved fencing.

Enter additional site fencing and security work or cost element details as site-specific conditions warrant:

* 1. Landfill Gas Monitoring and Control Systems

Enter information for Items 2.5.1 through 2.5.6.

Final installation of the landfill gas monitoring and control systems must include the installation costs of pipes and appurtenances. In the event of a forced closure, the systems may not have been completed, thus, the estimated costs to complete the landfill gas monitoring and control system must be provided.

Enter additional landfill gas monitoring and control systems work or cost element details as site-specific conditions warrant:

* 1. Groundwater Monitoring System
     1. Monitor Well Installation

Upon closure of the site, it may be necessary to relocate the compliance boundary. This requires the installation of new monitor wells.

Enter additional groundwater monitoring system work or cost element details as site-specific conditions warrant:

* + 1. Piezometer and Monitor Well Plugging and Abandonment

Piezometer or monitor well abandonment is the cost of abandoning (plugging) piezometers or monitor wells that are no longer needed. Determine the number of piezometers or monitor wells to be abandoned and include the total cost.

Enter additional plugging and abandonment work or cost element details as site-specific conditions warrant:

* 1. Leachate Management
     1. Completion of Existing Leachate Collection System

In the event of a forced closure, there may be circumstances where the leachate collection system has not been completed. In this event, the leachate collection system must be closed with a permanent outfalls and permanent cleanouts installed.

Enter additional leachate management work or cost element details as site-specific conditions warrant:

* 1. Stormwater Management
     1. Stormwater Drainage Management System

To reduce the potential long-term impacts of the landfill on surface water quality, drainage features must be incorporated into the final cover design to direct runoff, minimize erosion, control sediments, and avoid ponding of stormwater. The drainage system construction costs must be included.

Enter additional stormwater drainage management work or cost element details as site-specific conditions warrant:

* 1. Additional Construction Cost Items Not Listed on Worksheet

List the Attachments detailing any additional construction cost items necessary to close the site that is not already included as a line item on the worksheet:       Also, reference these Attachments in the “Units” column on this line of the worksheet. Provide the total cost of all additional construction cost items in the “Cost” column.

* 1. Construction Costs Subtotal

Enter the sum of construction costs in Items 2.1 through 2.9.

1. Storage and Processing Unit Closure Costs

For landfills that incorporate storage and/or processing operations that are not separately authorized, all waste and processed and unprocessed materials associated with storage and/or processing units must be removed during the closure process.

* 1. Waste Disposal

The cost of disposal of waste at an authorized facility. Enter additional waste disposal work or cost element information as necessary.

* 1. Material Removal and Disinfection

The cost of removal, including transportation, of any remaining processed and unprocessed materials to an authorized off-site location. Enter additional material removal and disinfection work or cost element information as necessary.

* 1. Demolition and Disposal

The cost of dismantling and/or disinfection of storage and/or processing units and disposal, as applicable. Enter additional demolition and disposal work or cost element information as necessary.

* 1. Additional Storage and Processing Unit Closure Cost Items Not Listed in Worksheet

List the Attachments detailing any additional storage and processing unit closure cost items necessary to close the site that is not already included as a line item on the worksheet.       Also, reference these Attachments in the “Units” column on this line of the worksheet. Provide the total cost of all additional storage and processing unit closure cost items in the “Cost” column.

* 1. Storage and Processing Unit Closure Costs Subtotal

1. Sum of Cost Subtotals

Enter the sum of engineering, construction, and storage and processing unit closure cost subtotals from lines 1.9.1, 2.10.1, and 3.5.1.

1. Contingency

Add an amount equal to at least 10 percent of the sum of cost subtotals to cover unanticipated events during implementation of closure activities.

1. Contract Performance Bond

Add an amount equal to at least 2 percent of the sum of cost subtotals for purchase of a surety bond to guarantee satisfactory completion of the closure activities.

1. Third Party Administration and Project Management Costs

Add an amount equal to at least 2.5 percent of the sum of cost subtotals to cover the cost for a third party hired by TCEQ to administer the closure activities.

1. Total Closure Cost

Enter the sum of the amounts on lines 4.1, 5.1, 6.1, and 7.1.

# Closure Cost Estimates Worksheet

## Landfill Data

Total Permitted Waste Disposal Area:       acres

Largest Area Requiring Final Cover in the year to follow:       acres

Total Filled Area with Constructed Final Cover:       acres

Total Area Certified Closed:       acres

Number of Monitor Wells to be Installed for Closure:

Number of Gas Probes to be Installed for Closure:

Total Acreage Needing LFG Collection and Control System:       acres

The unit or lump sum cost for each item is based on the work items and cost elements described in Section III of this Closure Cost Estimate document:

Yes  No  Partially

(if “No” or “Partially” is checked, please include attachments describing the additional work items and detailing the unit, quantities, and costs for the additional items)

## Facility Drawings and Financial Assurance Documentation

* Facility drawings
* Attach facility drawings showing the closure areas to which the closure cost estimates apply.
* Financial assurance documentation
* For an existing facility, attach a copy of the documentation required to demonstrate financial assurance as specified in 30 TAC Chapter 37, Subchapter R.
* For a new facility, a copy of the required documentation shall be submitted 60 days prior to the initial receipt of waste.

## Attachments

* Additional Engineering, Construction, and Storage and Processing Units Cost Items Details

## Closure Cost Estimates Worksheet

If any item listed in this worksheet is not applicable to the subject facility, enter “NA” (Not Applicable) in the affected field.

Table 1. Closure Cost Estimates Worksheet.

| Item No. | Item Description | Units[[1]](#endnote-2) | Quantity | Unit Cost | Cost | Source of Unit Cost Estimate[[2]](#endnote-3) |
| --- | --- | --- | --- | --- | --- | --- |
| 1. Engineering Costs | | | | | | |
| 1.1 | Topographic Survey | specify |  |  |  |  |
| 1.2 | Boundary Survey | specify |  |  |  |  |
| 1.3 | Site Evaluation | Acres |  |  |  |  |
| 1.4 | Development of Plans | Lump Sum | NA | NA |  |  |
| 1.5 | Contract Administration (bidding and award) | Lump Sum | NA | NA |  |  |
| 1.6 | Closure Inspection and Testing | specify |  |  |  |  |
| 1.7 | TPDES and other Permits | Lump Sum | NA | NA |  |  |
| 1.8 | Additional Engineering Cost Items (describe in attachments) | identify attach-ments | NA | NA |  | NA |
| 1.9 Engineering Costs Subtotal | | | | | | |
| 1.9.1 | Engineering Costs Subtotal | NA | NA | NA |  | NA |
| 2. Construction Costs | | | | | | |
| 2.1 Mobilization | | | | | | |
| 2.1.1 | Mobilization of Personnel and Equipment | Lump Sum | NA | NA |  |  |
| 2.2 Final Cover System | | | | | | |
| 2.2.1 Side Slope Cover | | | | | | |
| 2.2.1a | Infiltration Layer – Compacted Clay | Cubic Yards |  |  |  |  |
| 2.2.1b | Infiltration Layer – Geosynthetic Clay Liner | Square Feet |  |  |  |  |
| 2.2.1c | Flexible Membrane Cover – HDPE | Square Feet |  |  |  |  |
| 2.2.1d | Flexible Membrane Cover – LLDPE | Square Feet |  |  |  |  |
| 2.2.1e | Drainage Layer – Aggregate | Cubic Yards |  |  |  |  |
| 2.2.1f | Drainage Layer – Drainage Geocomposite Material | Square Feet |  |  |  |  |
| 2.2.1g | Erosion Layer | Cubic Yards |  |  |  |  |
| 2.2.1h | Vegetation | Acres |  |  |  |  |
| 2.2.2 Top Slope Cover | | | | | | |
| 2.2.2a | Infiltration Layer – Compacted Clay | Cubic Yards |  |  |  |  |
| 2.2.2b | Infiltration Layer – Geosynthetic Clay Liner | Square Feet |  |  |  |  |
| 2.2.2c | Flexible Membrane Cover – HDPE | Square Feet |  |  |  |  |
| 2.2.2d | Flexible Membrane Cover – LLDPE | Square Feet |  |  |  |  |
| 2.2.2e | Drainage Layer – Aggregate | Cubic Yards |  |  |  |  |
| 2.2.2f | Drainage Layer – Drainage Geocomposite Material | Square Feet |  |  |  |  |
| 2.2.2g | Erosion Layer | Cubic Yards |  |  |  |  |
| 2.2.2h | Vegetation | Acres |  |  |  |  |
| 2.2.3 Cells for Class 1 Nonhazardous Industrial Waste | | | | | | |
| 2.2.3a | Dike Construction | specify |  |  |  |  |
| 2.3 Site Grading | | | | | | |
| 2.3.1 | Site Grading | Acres |  |  |  |  |
| 2.4 Site Fencing and Security | | | | | | |
| 2.4.1 | Site Fencing and Security | specify |  |  |  |  |
| 2.5 Landfill Gas Monitoring and Control System | | | | | | |
| 2.5.1 | Gas Control Wells | specify |  |  |  |  |
| 2.5.2 | Gas Header Piping | specify |  |  |  |  |
| 2.5.3 | Gas Lateral Piping | specify |  |  |  |  |
| 2.5.4 | Flare Station | Lump Sum |  |  |  |  |
| 2.5.5 | Condensate Sumps | specify |  |  |  |  |
| 2.5.6 | Completion of LFG Monitoring System | specify |  |  |  |  |
| 2.6 Groundwater Monitoring System | | | | | | |
| 2.6.1 | Groundwater Monitoring Well Installation | Each |  |  |  |  |
| 2.6.2 | Piezometer and Monitor Well Plugging and Abandonment | Each |  |  |  |  |
| 2.7 Leachate Management | | | | | | |
| 2.7.1 | Completion of Leachate Management System | specify |  |  |  |  |
| 2.8 Stormwater Management | | | | | | |
| 2.8.1 | Stormwater Drainage Management System | specify |  |  |  |  |
| 2.9 Other Cost Items | | | | | | |
| 2.9.1 | Additional Construction Cost Items (describe in attachments) | identify attach-ments | NA | NA |  | NA |
| 2.10 Construction Costs Subtotal | | | | | | |
| 2.10.1 | Construction Costs Subtotal | NA | NA | NA |  | NA |
| 3. Storage and Processing Unit Closure Costs | | | | | | |
| 3.1 | Waste Disposal | Tons  Cubic Yards |  |  |  |  |
| 3.2 | Material Removal and Disinfection | specify |  |  |  |  |
| 3.3 | Demolition and Disposal Units | specify |  |  |  |  |
| 3.4 | Additional Storage and Processing Unit Closure Cost Items (describe in attachments) | identify attach-ments | NA | NA |  | NA |
| 3.5 Storage and Processing Unit Closure Costs Subtotal | | | | | | |
| 3.5.1 | Storage and Processing Unit Closure Costs Subtotal | NA | NA | NA |  | NA |
| 4. Sum of Engineering, Construction, and Storage and Processing Unit Closure Costs | | | | | | |
| 4.1 | Sum of Engineering, Construction, and Storage and Processing Unit Closure Cost Subtotals | NA | NA | NA |  | NA |
| 5. Contingency | | | | | | |
| 5.1 | Contingency (10% of Sum of Engineering, Construction, and Storage and Processing Unit Closure Cost Subtotals) | NA | NA | NA |  | NA |
| 6. Contract Performance Bond | | | | | | |
| 6.1 | Contract Performance Bond (2% of Sum of Engineering, Construction, and Storage and Processing Unit Closure Cost Subtotals) | NA | NA | NA |  | NA |
| 7. Third Party Administration and Project Management Costs | | | | | | |
| 7.1 | Third Party Administration and Project Management Costs (2.5% of Sum of Engineering, Construction, and Storage and Processing Unit Closure Cost Subtotals) | NA | NA | NA |  | NA |
| 8. Total Closure Costs | | | | | | |
| 8.1 | Total Closure Costs (sum of amounts in Sections 4, 5, 6, and 7) | NA | NA | NA |  | NA |

1. For items marked “specify,” the responsible professional engineer will enter appropriate unit of measurement [↑](#endnote-ref-2)
2. Sources of Unit Costs for Cost Estimates table may include:   
   (1) Published Cost Estimator Manuals (e.g., RS Means);   
   (2) Third Party Quotes (e.g., Environmental Field Services Contractors);   
   (3) Verifiable Data based on Actual Operations; or  
   (4) Other sources of cost acceptable to the executive director of the TCEQ. [↑](#endnote-ref-3)