

CLOSURE/POST CLOSURE PLAN

**DELINEATION AND VERIFICATION FOR
FRANK ROAD CLASS III-IV DEMOLITION
LANDFILL
SHELBY COUNTY, TENNESSEE**

**HBA Project Number
97-09167**

Prepared For:

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COST ESTIMATE

COST ESTIMATE

**WORKSHEET A:
CLOSURE ACTIVITIES (Based on 3rd party cost)**

NOTES: 1)This worksheet is to be submitted as part of the C/PC Plan.
2)Provide cost for all activities which apply.
3)Additional cost information may be attached as needed.

1. Establishing final cover: (82.8 Acres)

A. Top soil:

| | | |
|----|--|-------------------|
| 1. | Quantity needed (yd ³) (1613 cy/acre x 82.8) | \$ <u>133,557</u> |
| 2. | Excavation unit cost (\$/yd ³) | \$ <u>1.00</u> |
| 3. | Excavation cost (1. x 2.) | \$ <u>133,557</u> |
| 4. | Placement and spreading unit cost (\$/yd ³) | \$ <u>1.00</u> |
| 5. | Placement cost (1. x 4.) | \$ <u>133,557</u> |

*TOTAL: Top soil (3. + 5.) \$ 267,114

B. Landfill cap

| | | |
|----|---|-------------------|
| 1. | On-site Clay (1210 cy/acre x 82.8) | |
| a. | Quantity needed (yd ³) | \$ <u>100,188</u> |
| b. | Excavation unit cost (\$/yd ³) | \$ <u>1.00</u> |
| c. | Excavation cost (a. x b.) | \$ <u>100,188</u> |
| d. | Placement/spreading unit cost (\$/yd ³) | \$ <u>1.00</u> |
| e. | Placement cost (a. x d.) | \$ <u>100,188</u> |
| f. | Compaction unit cost (\$/yd ³) | \$ <u>0.25</u> |
| g. | Compaction cost (a. x f.) | \$ <u>25,047</u> |

*TOTAL: On-site clay (c. + e. + g.) \$ 225,423

| | | |
|----|---|------------|
| 2. | Off-site clay | <u>N/A</u> |
| a. | Quantity needed (yd ³) | <u>"</u> |
| b. | Purchase unit cost | <u>"</u> |
| c. | Purchase cost (a. x b.) | <u>"</u> |
| d. | Delivery unit cost (\$/yd ³) | <u>"</u> |
| e. | Delivery cost (a. x d.) | <u>"</u> |
| f. | Placement/spreading unit cost (\$/yd ³) | <u>"</u> |
| g. | Placement cost (a. x f.) | <u>"</u> |
| h. | Compaction unit cost (\$/yd ³) | <u>"</u> |
| i. | Compaction cost (a. x h.) | <u>"</u> |

*TOTAL: Off-site clay (c. + e. + g. + i.) N/A

| | | |
|----|------------------------------------|------------|
| 3. | Quality control/testing of clay | |
| a. | Number of sample to be tested | <u>N/A</u> |
| b. | Clay testing unit cost (\$/sample) | <u>"</u> |
| c. | Testing cost (a. x b.) | <u>"</u> |

*TOTAL: Clay testing (C) N/A

C. Synthetic membrane

| | | |
|----|---|------------|
| 1. | Quantity needed (yd. ²) | <u>N/A</u> |
| 2. | Purchase unit cost (\$/yd ²) | <u>"</u> |
| 3. | Purchase cost (1. x 2.) | <u>"</u> |
| 4. | Installation unit cost (\$/ yd ²) | <u>"</u> |
| 5. | Installation cost (1. x 4.) | <u>"</u> |

| | |
|---|--------------------------|
| *TOTAL: Synthetic membrane (3. x 5.) | <u><u>N/A</u></u> |
| D. Geotextile filter fabric | |
| 1. Quantity needed (yd ²) | <u>N/A</u> |
| 2. Purchase unit cost (\$/yd ²) | <u>"</u> |
| 3. Purchase cost (1. x 2.) | <u>"</u> |
| 4. Installation unit cost (\$/ yd ²) | <u>"</u> |
| 5. Installation cost (1. x 4.) | <u>"</u> |
| *TOTAL: Geotextile filter fabric (3. x 5.) | <u><u>N/A</u></u> |
| TOTAL for Establishing final cover (*): (A + B + C + D) | <u><u>\$ 492,537</u></u> |
| 2. Establishing vegetation cover: | |
| A. Labor (\$/acre) | <u>\$ 600.00</u> |
| B. Seeding (\$/acre) | <u>Included in A</u> |
| C. Fertilization (\$/acre) | <u>"</u> |
| D. Mulching (\$/acre) | <u>"</u> |
| E. Number of acres (\$/acre) | <u>82.8</u> |
| TOTAL for Establishing vegetation cover: E. x (A. + B. + C. + D.) | <u><u>\$ 49,680</u></u> |
| 3. Establishing or completing a system to minimize and control erosion/sedimentation: | |
| A. Sediment pond (Included in operating cost) | |
| 1. Excavation/construction (\$) | <u>N/A</u> |
| 2. Materials (e.g. pipe, riprap) (\$) | <u>"</u> |
| *TOTAL (1. + 2.) | <u><u>\$ N/A</u></u> |
| B. Diversion ditch | |
| 1. Construction (\$) | <u>N/A</u> |
| 2. Materials (\$) | <u>"</u> |
| *TOTAL: (1. + 2.) | <u><u>\$ N/A</u></u> |
| C. Temporary structures (e.g. silt fence, swales) | |
| 1. Construction (\$) | <u>N/A</u> |
| 2. Materials (\$) | <u>"</u> |
| *TOTAL: (1. + 2.) | <u><u>\$ N/A</u></u> |
| TOTAL for establishing or completing a system to minimize and control erosion and Sedimentation (*):(A.+ B.+ C.) | <u><u>\$ N/A</u></u> |
| 4. Establishing or completing leachate collection removal, and treatment system: (Included in operating cost) | |
| A. Installation | |
| 1. Number of feet | <u>N/A</u> |
| 2. Unit cost (\$/ft) | <u>"</u> |
| 3. Storage tanks (\$) | <u>"</u> |
| 4. Pumps (\$) | <u>"</u> |
| TOTAL for Establishing or completing leachate system: (1. + 2. + 3. + 4.) | <u><u>\$ N/A</u></u> |

5. Establishing or completing a system to collect or vent gases:

| | | |
|----|-------------------------|------------|
| A. | Installation | |
| 1. | Materials (e.g. piping) | <u>N/A</u> |
| 2. | Equipment (e.g. pumps) | <u>N/A</u> |
| 3. | Labor (e.g. drilling) | <u>N/A</u> |

TOTAL for establishing or completing a system to collect or vent gases:

(1. + 2. + 3.) \$ N/A

6. Establishing or completing groundwater/surface water monitoring system:

Wells will be installed prior to any filling - operating cost

| | | |
|----|---|------------------|
| A. | Installation | |
| 1. | Number of wells | <u>7</u> |
| 2. | Drilling Cost (1. x 2.)Installation Cost/Well | <u>Completed</u> |
| 3. | Materials (e.g. casing) (1. x 3.) | <u>"</u> |
| 4. | Equipment (e.g. pumps) | <u>"</u> |
| 5. | Labor | <u>"</u> |

TOTAL for establishing or completing groundwater monitoring system:

(2. + 3. + 4. + 5.) N/A

TOTAL CLOSURE COSTS:

(sum of TOTALS for Sections 1. thru 6. \$ 542,217 (2008)

Adjust to closure in 2010, use 5%
inflation per year

TOTAL CLOSURE COSTS: \$ 596,438 (2010)

COST ESTIMATE

WORKSHEET B:

POST CLOSURE ACTIVITIES
(based on 3rd party cost)

FIRST YEAR ONLY

- NOTES: 1) This worksheet is to be submitted as part of the C/CP Plan.
2) The facility will be maintained and monitored for 30 years after final closure for Class I and II landfills and 2 years after final closure of Class III and IV landfills.
3) Fill in blanks for all activities which apply.
4) All costs are to be calculated on an ANNUAL BASIS.

1. Surveying inspections to confirm final grade and drainage are maintained:

| | |
|--------------------------------|----------------------|
| A. Transportation (82.8 acres) | <u>100/acre</u> |
| B. Labor | <u>Included in A</u> |

TOTAL for Surveying inspections: (A. + B) \$ 8,280

2. Maintain healthy vegetation:

| | |
|--------------------------------------|----------------------|
| A. Transportation (\$80/acre x 82.8) | <u>6,624</u> |
| B. Labor | <u>Included in A</u> |
| C. Seeding | <u>"</u> |
| D. Fertilization | <u>"</u> |
| E. Mulching | <u>"</u> |
| F. Rodent Control | <u>"</u> |
| G. Mowing | <u>"</u> |

TOTAL for Maintaining healthy vegetation:
(A. + B. + C. + D. + E. + F. + G.) \$ 6,624

3. Maintain the drainage facilities, sediment ponds and other erosion/sedimentation control measures:

| | |
|--|----------------------|
| A. Transportation(\$90/acre x 82.8) | <u>\$ 7,452</u> |
| B. Labor | <u>Included in A</u> |
| C. Cleaning out of systems | <u>"</u> |
| D. Repair of gullies or rills less than 18.5/yd ³ | |
| 1. Soil acquisition (Adequate Borrow areas on-site) | <u>"</u> |
| a. Quantity (yd ³) | <u>N/A</u> |
| b. Purchase unit cost (\$/yd ³) | <u>N/A</u> |
| c. Purchase cost (a. x b.) | <u>N/A</u> |
| d. Delivery unit cost (\$/yd ³) | <u>N/A</u> |
| e. Delivery cost (a. x d.) | <u>N/A</u> |
| Total 1: (c. + e.) | <u>N/A</u> |
| 2. Placement /spreading/compaction | <u>Included in A</u> |
| 3. Revegetation | <u>"</u> |
| Total D: (1. + 2. + 3.) | <u>"</u> |

TOTAL for Maintaining drainage: (A. + B. + C. + D.) \$ 7,452

4. Maintain and monitor the leachate collection, removal and treatment system:

A. Treatment of leachate

1. On-Site

| | |
|--|---------------|
| a. Quantity (yd ³) | \$ <u>N/A</u> |
| b. Treatment unit cost (\$/yd ³) | <u>N/A</u> |
| c. Treatment costs (a. x b.) | <u>N/A</u> |
| d. Sewer discharge unit cost | <u>N/A</u> |
| e. Discharge cost (a. x d.) | <u>N/A</u> |
| Total 1: On-site (c. + e.) | <u>N/A</u> |

2. Off-Site

| | |
|----------------------------------|------------|
| a. Quantity (yd ³) | <u>N/A</u> |
| b. Hauling unit cost (\$/yd) | <u>N/A</u> |
| c. Hauling cost (a. x b.) | <u>N/A</u> |
| d. Treatment unit cost (a. x d.) | <u>N/A</u> |
| e. Treatment cost (a. x d.) | <u>N/A</u> |
| Total 2: (c. + e.) | <u>N/A</u> |

B. Maintenance of leachate collection system:

| | |
|----------------------------------|---------------|
| 1. Transportation | \$ <u>N/A</u> |
| 2. Labor | <u>N/A</u> |
| 3. Repairs/Materials (eg. below) | |
| a. Pumps | <u>"</u> |
| b. Cleaning out system | <u>"</u> |
| c. Leak detection | <u>"</u> |
| d. Other | <u>"</u> |
| Total 3: (a. + b. + c. + d.) | <u>"</u> |

*TOTAL: (1. + 2. + 3.) N/A

TOTAL for monitoring and maintaining leachate system (*): (A. + B.)

\$ N/A

5. Maintain and monitor the gas collection or venting system:

| | |
|---|---------------|
| A. Transportation (Monitor Gas on Site \$200 x 4) | \$ <u>N/A</u> |
| B. Labor | <u>N/A</u> |
| C. Repairs/Materials (eg. below) | |
| 1. Cleaning | <u>N/A</u> |
| 2. Caps | <u>N/A</u> |
| 3. Other | <u>N/A</u> |
| Total: (1. + 2. + 3.) | <u>N/A</u> |

TOTAL for Maintaining and monitoring gas control system: (A. + B. + C.)

\$ N/A

6. Maintain and monitor the groundwater and/or surface water monitoring system:

A. Monitoring of groundwater systems:

| | |
|---|----------------------|
| 1. Number of wells/springs | <u>7</u> |
| 2. Number of samples/well | <u>2</u> |
| 3. Unit cost of analysis | <u>\$ 120</u> |
| 4. Cost of sampling + analysis (1. x 2. x 3.) | <u>1680</u> |
| 5. Labor cost per well | <u>Included in 3</u> |
| 6. Labor costs (1. x 5.) | <u>Included in 3</u> |
| TOTAL A: (4. + 6.) | <u>\$ 1680</u> |

B. Inspection and maintenance of system:

| | |
|-----------------------------------|----------------------|
| 1. Transportation | <u>\$ 100</u> |
| 2. Labor | <u>Included in 1</u> |
| 3. Repairs/Materials | |
| a. Caps | <u>"</u> |
| b. Tubing | <u>"</u> |
| c. Pumps | <u>"</u> |
| d. Well replacement | <u>"</u> |
| e. Other | <u>"</u> |
| Total 3: (a. + b. + c. + d. + e.) | <u>Included in 1</u> |
| *TOTAL B: (1. + 2. + 3.) | <u>\$ 100</u> |

TOTAL for Maintaining and monitoring groundwater systems (*): (A. + B.)

\$ 1780

TOTAL POST CLOSURE COSTS:

Annual Basis:

(Sum of Sections 1. thru 6.)

\$ 24,136

Adjust to closure in 2010

\$ 26,550

Inflation Rate Utilized:

5%

20 year Basis:

(Annual cost) (Inflation rate) (20 years)

\$

NOTE: If desired because of anticipated cost or inflation fluctuations, we recommend submitting a separate sheet with the year-by-year annual costs (30 year breakdown) for maintaining and monitoring facility.

WORKSHEET C

82.8 Acre P/C at 5% Inflation
Based on 3rd party cost
2 Year P/C

YEAR 1

| | |
|---|-----------------|
| 1. TOTAL FOR SURVEYING INSPECTIONS | \$ <u>6,700</u> |
| 2. TOTAL FOR MAINTAINING HEALTHY VEGETATION | <u>5,360</u> |
| 3. TOTAL FOR MAINTAINING DRAINAGE | <u>6,030</u> |
| 4. TOTAL FOR MONITORING AND MAINTAINING LEACHATE COLLECTION SYSTEM | <u>N/A</u> |
| 5. TOTAL FOR MAINTAINING AND MONITORING GAS CONTROL SYSTEM | <u>N/A</u> |
| 6. TOTAL FOR MAINTAINING AND MONITORING GROUND WATER SYSTEMS | <u>1,780</u> |

TOTAL POST CLOSURE COSTS

Annual Basis

Sum of Sections 1. through 6.

\$ 19,870

YEAR 2

| | |
|---|---------------|
| 1. TOTAL FOR SURVEYING INSPECTIONS | \$ <u>N/A</u> |
| 2. TOTAL FOR MAINTAINING HEALTHY VEGETATION | <u>5,360</u> |
| 3. TOTAL FOR MAINTAINING DRAINAGE | <u>6,030</u> |
| 4. TOTAL FOR MONITORING AND MAINTAINING LEACHATE COLLECTION SYSTEM | <u>N/A</u> |
| 5. TOTAL FOR MAINTAINING AND MONITORING GAS CONTROL SYSTEM | <u>N/A</u> |
| 6. TOTAL FOR MAINTAINING AND MONITORING GROUND WATER SYSTEMS | <u>1,780</u> |

TOTAL POST CLOSURE COSTS

Annual Basis

Sum of Sections 1. through 6.

\$ 13,170

TOTAL

\$ 33,040

TOTAL ADJUSTED TO 2010

(2 Years @ 5%)

\$ 36,344