

ATTACHMENT V
POST CLOSURE PLAN

Prepared for

SHOOSMITH BROS., INC.
11800 Lewis Road
Chester, Virginia 23831

PART B PERMIT APPLICATION
POST-CLOSURE CARE PLAN

2012 LANDFILL RECONFIGURATION
SHOOSMITH LANDFILL

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- Attachment II: MSE Berm Inspection and Maintenance Plan
- Attachment III: MSE Berm Inspection Checklist
- Attachment IV: MSE Berm Contingency Plan

1. INTRODUCTION

1.1 Terms of Reference

This Post-Closure Care Plan (Plan) is part of the Part B Permit Application for the reconfiguration of the Shoosmith Sanitary Landfill (Landfill) located in Chester, Virginia. This document was prepared in accordance with the requirements of the Virginia Administrative Code (VAC) 9 VAC 20-81-170, which requires that a Part B permit application include a post-closure care plan providing the information requested in VDEQ Submission Instruction No. 6 (SI6). This Plan combines the Landfill's currently approved Post-Closure Care Plan and the proposed landfill reconfiguration Post-Closure Care Plan.

1.2 Landfill Reconfiguration Overview

The proposed landfill reconfiguration involves: (i) constructing a mechanically-stabilized earth (MSE) berm around a portion of the existing landfill for the purpose of raising the grades in that area; and (ii) lowering of the final grades in Cells 19 through 21 such that the waste airspace decrease in cells 19 through 21 equals the increased airspace resulting from the construction of the MSE berms.

The Post-Closure Care Plan for the Landfill is affected by the reconfiguration in the following manner:

- The MSE berm structure is a new structure to be included in post-closure care; and,
- Post-closure care cost estimates for inspection and maintenance of the MSE berm are included.

The following items are not affected by the reconfiguration:

- Post-closure care of the landfill systems apart from the MSE berm.

1.3 Organization of this Plan

This Post-Closure Care Plan has been prepared in accordance with the requirements of SI6 for Solid Waste Permit Applications. For reference purposes, the specific section number of the VDEQ Submission Instruction is provided in parenthesis next to the title of each section and subsection of this Post-Closure Care Plan. For example, (SI6-I.A) stands for "Submission Instruction No. 6 – Section I, Paragraph A".

2. POST-CLOSURE CARE PLAN (SI6-I.G)

The following sections address the post-closure care of the landfill, including the quarry operations and reconfiguration.

2.1 Post-Closure Contact (SI6-I.G.1)

During the post-closure care period, the Operator may be reached by mail or telephone at the following address:

Shoosmith Bros., Inc.
11800 Lewis Road
Chester, Virginia 23831
Contact: Mr. Bruce Coble
(804) 748-3311

2.2 Security (SI6-I.G.2)

Access to the site will be controlled by use of barriers and/or gates at all roads to the property. Throughout the active life of the facility, barriers and gates will be maintained to control access to and from the property and active disposal cells.

All barriers and gates will be clearly marked with signs stating the name of the facility, that solid waste was disposed of on this site-and that the site is no longer in use for disposal purposes.

No solid waste will be left exposed after completion of the landfill closure. Therefore, there this facility should not pose a health hazard to the public or domestic livestock.

2.3 Inspection Plan (SI6-I.G.3)

An inspection program will be conducted throughout the post-closure care period for the site. These inspections will occur monthly unless problem areas are detected. If problems arise, the inspections will be made more frequently and the interval will depend upon the severity of the problem. The inspection check list included in Appendix I of this document

The potential effect to the public and environment will be a factor in determining the inspection interval. Areas to be included in the monthly inspection would be as follows:

- Leachate collection, removal and storage system
- Access and security control
- Posting and signs
- Erosion/sediment damage
- Final cover settlement, subsidence and displacement
- Vegetative cover
- Integrity of surface water drainage ways and impoundments
- Groundwater monitoring system

- Integrity of site benchmarks
- Landfill gas extraction wells and landfill gas monitoring probes

Inspection logs will be completed after each inspection. Copies of the inspections will be kept by the Shoosmith Sanitary Landfill and available to the Virginia Department of Environmental Quality for their review.

Inspection of the reconfiguration will follow the same schedule as the rest of the landfill. Included in Attachment II is a maintenance and inspection plan for the MSE berm. The procedure will include inspection and maintenance of the following items:

- condition of the facing;
- condition of the batter;
- evidence of seepage/erosion through the MSE berm;
- evidence of differential settlement along the MSE berm;
- condition of the top of the MSE berm;
- condition of the base of the MSE berm;
- stormwater structure integrity, and;
- prior repair to the berm.

A field inspection checklist is provided in Attachment III as an attachment to the Maintenance and Contingency Plan, and logs will be kept on file at the offices of the post-closure contact. As a minimum, inspection logs will contain the following information:

- the name of the person(s) performing the inspection;
- the date, time, and prevailing weather conditions;
- a description of the inspection methods used (visual or mechanical);
- the results of the inspection; and
- recommendations for repair/reconstruction or replacement of damaged facilities.

2.4 Maintenance Plan (SI6-I.G.4)

Post-closure activities include a comprehensive inspection, maintenance monitoring and repair schedule. Post closure maintenance will consist of the activities summarized on the inspection check list included in Appendix I of this document. Inspection logs will be completed after each inspection. Copies of the inspections will be kept by the Shoosmith Sanitary Landfill and will be available to the Virginia Department of Environmental Quality for their review.

For the MSE berm, the maintenance plan provided in Attachment II shall be followed. Upon identifying a maintenance need or deficiency, appropriate measures will be promptly taken. The inspector will determine, based on previous experience and the nature of the equipment and application, the need for the type and extent of corrective maintenance action. In addition, a contingency plan is included in Attachment IV to address options for repairing potential issues that may occur with the MSE berm.

2.4.1 Security Control Devices

Security control devices include gates and posted signs at all roads to the property: The gate and signs will be inspected monthly and any damages recorded. Any damage which would interfere with the function of the devices will be immediately corrected.

2.4.2 Erosion Control Damage

The landfill will be inspected monthly and after every major storm event for signs of erosion damage. Areas to be inspected will include rock lined channels, ditches, culverts, the sedimentation basin, discharge/outlets, and slopes. Any gullies will be filled with compacted soil and reseeded as necessary. Ditches, traps, and culverts filled with sediments will be cleaned as needed. The sediment basin will be cleaned as required.

2.4.3 Correction of Settlement, Subsidence, and Settlement

The landfill cover will be inspected monthly. It is not expected that the landfill will experience significant settlement. However, if any areas appear to have settled and standing water is observed, these areas will be regraded to promote positive drainage and will be reseeded.

2.4.4 Run-on and Run-off Controls

These structures, including diversion ditches, and the sediment basin, shall be inspected monthly as discussed in Section 2.4.2 above.

2.4.5 Leachate Collection System

The leachate collection system will be inspected monthly. Leachate management will continue throughout the post-closure care period of the site. Inspections will be made monthly to insure the safe operation of the facility and to maintain the collection system throughout the life of the site and post-closure care period. The integrity of the leachate pump stations will be carefully monitored. Repairs to the system will be completed as necessary to maintain the leachate management system.

Site inspections will be performed to detect any problems from leachate seeps. Any surface seeps will be carefully investigated before excavating and repairing the final cover in the area

of the seeps. Visual inspections shall be conducted in the near vicinity of the seeps to determine if additional control or remedial actions are necessary.

2.4.6 Landfill Gas Monitoring System

Landfill gas migration monitoring will continue throughout the post-closure care period. Boundary probes and the active landfill control system will be inspected on a monthly basis. Any signs of damage or contamination will be recorded. Any observed damages will be repaired immediately; monitoring equipment in accordance with manufacturers' instructions.

2.4.7 Groundwater Monitoring Wells

Groundwater monitoring wells and observation wells will be inspected monthly. Any signs of damage or contamination will be recorded. Minor damages shall be repaired immediately. If major damage or contamination is suspected, a professional geologist will be retained to evaluate the condition of the well. If the well must be replaced, the old well will be abandoned in accordance with the Groundwater Monitoring Plan prepared for the facility. New well construction shall be in accordance with the Groundwater Monitoring Plan.

2.4.8 Vegetative Cover

Post-closure maintenance will include mowing of the grass cover as necessary. This will be done to improve the stand of grass being developed on the landfill cap. During the normal post-closure period, the site will be mowed as needed to maintain the grass cover. It is expected that the frequency of mowing will diminish to once per year as the cover becomes better established. In addition to mowing operations, post-closure activities will include a program of annual seeding. In the fall of the year, the vegetative cover will be evaluated. A plan for reseeding will be developed based on the needs of the site during that year. The necessary seeding will be applied.

2.5 Monitoring Plan (SI6-I.G.5)

2.5.1 Groundwater Monitoring

Groundwater monitoring will continue at the facility throughout the duration of the post closure care period in accordance with the VSWMR. All existing groundwater monitoring wells will be maintained.

2.5.2 Leachate Collection and Disposal

Leachate management will continue throughout the post-closure care period of the site. Inspections will be made monthly to insure the safe operation of the facility and to maintain the collection, recirculation and storage systems throughout the life of the site and post-closure care period. Site inspections will be performed to detect any problems from leachate

seeps. Any surface seeps will be carefully investigated before excavating and repairing the final cover in the area of the seeps. Visual inspections shall be conducted in the near vicinity of the seeps to determine if additional control or remedial actions are necessary. The integrity of the leachate pump stations will be carefully monitored.

2.5.3 Landfill Gas Collection and Venting

The active landfill gas collection system will prevent migration from the property and control emissions. It will be designed to account for the maximum expected recovery rate of landfill gas from the landfill. The landfill gas will be conveyed to open flares designed to destroy 98% of the NMOC collected. Landfill gas migration monitoring will continue throughout the post-closure care period. The landfill gas collection equipment and monitoring probes will be kept in working order during this period in accordance with the Landfill Gas Management Plan.

2.5.4 Leak Detection Between Liner

This facility does not include a leak detection zone in the liner as part of the design.

2.6 Post-Closure Uses (SI6-I.G.6)

The landfill will be maintained as grass-covered open space during the post-closure period. When the post-closure care period begins, Shoosmith will be responsible for maintenance and monitoring activities during the post-closure care period. Activities will be restricted as presented in Attachment I and II.

2.7 Employee Training (SI6-I.G.7)

Personnel responsible for performing site inspections and maintaining the site will be competent individuals trained in the skills necessary to perform their job. Personnel will continue to receive training as new programs become available.

Groundwater and surface water monitoring will be performed by a qualified firm and laboratory analyses will be performed by a certified water testing laboratory. If major problems arise, competent engineering and construction firms will be engaged to assess the situation and recommend ways to alleviate the problems.

Training related to the MSE berm will be covered with new employees or in periodic training sessions. Training topics will include safety procedures to be employed when working at the top of the berm, prohibited activities as defined in Attachment IV, best work practices when maintaining the berm or related structures, or typical inspection items. Additionally, personnel performing bimonthly inspections of the berm will be trained to identify typical signs indicating the need for maintenance of the MSE berm.

3. POST-CLOSURE CARE COST ESTIMATES (SI6-II.B)

A post-closure care cost estimate is required by the Financial Assurance Regulations of Solid Waste Facilities, 9 VAC 20-70-111. In calculating the post-closure care cost the need for occasional maintenance and inspections of the landfill and the reconfiguration was considered. The estimated cost for post-closure care for a 30-year post closure period is \$9,805,954, the cost estimate forms for both closure and post-closure are provided in the Closure Report.

4. FINANCIAL ASSURANCE (SI6-III)

The estimate of closure and post-closure costs for the Landfill are included in the Closure Report. The maximum open area during the life of the facility was calculated to be 47.2 acres as shown in the cost estimate. The estimated cost of closure is based on a maximum potentially exposed area equal to 47.2 acres, including a combination of both Cap #1 and Cap #2. The estimated cost of closure and post-closure activities is presented in the cost estimate, attached to the Closure Report. The total estimated cost for closure and post-closure care is \$14,321,205. The facility's current financial assurance mechanism through Cell 27 will be upgraded to include financial assurance for the closure and post-closure costs of the facility as the individual waste disposal units are constructed and filled in conjunction with continued landfill development.

ATTACHMENT I
LANDFILL INSPECTION CHECKLIST

**Shoosmith Sanitary Landfill
Post-Closure Care Inspection Form**

SYSTEM	COMPONENTS	FREQUENCY	TYPE OF INSPECTION
Groundwater Monitoring System	Monitoring Wells	Monthly/Quarterly	Visual/Mechanical
	Bench Marks	Monthly/Annual	Visual/Instrument
Leachate Collection System	Pump Stations	Monthly	Visual
	Leachate Storage Tanks	Monthly	Visual
	Leachate Cleanouts	Monthly	Visual
Landfill Gas Monitoring System	Boundary Probes	Monthly	Visual
	LFG Extraction Wells	Monthly	Visual
	Header Piping	Monthly	Visual
	Blowers/Flare Station	Monthly	Visual
	Monitoring Equipment	Quarterly	Calibrate
Final Cover System	Integrity of Cap	Monthly	Visual
	Settlement/Subsidence	Monthly	Visual
Erosion and Sedimentation Control Facilities	Rock Lined Channels	Monthly	Visual
	Ditches	Monthly	Visual
	Culverts	Monthly	Visual
	Sedimentation Basins	Monthly	Visual
	Overflow Spillways	Monthly	Visual
	Discharge/Outlets	Monthly	Visual
	Terraces/Slopes	Monthly	Visual
Security Control	Gate (Access)	Monthly	Visual
	Posted Signs	Monthly	Visual

ATTACHMENT II

MSE BERM INSPECTION AND MAINTENANCE PLAN

MSE BERM INSPECTION AND MAINTENANCE

Introduction

The purpose of the mechanically stabilized earth (MSE) berm is to provide vertical expansion of the landfill without lateral expansion of the limits of waste. The MSE berm is typically 60 feet in height. Inspection and maintenance of the MSE berm and associated systems is critical for long-term stability. The following sections provide a brief description of the components of the berm and associated inspection and maintenance.

Features of MSE Berm

The MSE berm is constructed of three basic components: geogrid reinforcement, backfill material, and facing. A brief description of each component is provided below.

Geosynthetic Reinforcement

The geogrid reinforcement of the MSE berm consists of structural geogrid designed to provide stability to the backfill material used to construct the berm. The geogrid reinforcement extends horizontally from the facing into the reinforced section of the berm as shown on the design drawings. The MSE berm will be reinforced using geogrid spaced at 1.5 ft vertically, and the geogrid length ranges between 35 ft and 70 ft. Three strengths of geogrids were used in the design. Two types of reinforcement layouts were designed to accommodate different subsurface conditions, and these layouts are provided in the design drawings.

Backfill Material

The fill for the MSE berm is comprised of coal-combustion products (CCP). A 60-mil HDPE or 40-mil LLDPE geomembrane will be used to fully encapsulate the fill. A granular drainage layer at the bottom will provide drainage of the backfill material. Drainage within the fill will be provided by a toe drain consisting of a 6-inch diameter perforated pipe installed normal to the MSE berm cross section.

Facing

The facing of the MSE berm consists of wrap geogrid, topsoil, erosion control mat, seeding and welded wire baskets and provides protection of the MSE berm by supporting the growth of vegetation. The wrap grid is designed to provide connection between the facing and the structural geogrid and to hold the topsoil on the wall face. The welded wire baskets provide temporary support during construction and the establishment of vegetation. The erosion control mat also provides temporary support of the seed and topsoil while vegetation is established.

Other Components

Other components of the MSE berm include the foundation, utilities, guardrail, perimeter road, and drainage and erosion control system. Components directly related to the berm such as the foundation, guardrail, and utilities within the berm are to be inspected and maintained as part of the berm inspection and maintenance. A discussion of these components is provided in the design report, and inspection and maintenance of these items is provided in the Landfill's Operations Manual. Inspection and maintenance of these other components of the MSE berm is critical in detecting potential negative impacts to the MSE berm.

Inspection and Maintenance

All components of the MSE berm should be inspected and maintained throughout the life of the landfill. The MSE berm should be inspected bimonthly by onsite personnel and annually by a qualified professional engineer using the attached inspection checklist. As part of the annual inspection, a survey shall be taken to record vertical and horizontal location of the top and bottom of the berm at the locations indicated in the Environmental Monitoring Plan, Drawing 43 of the Landfill Reconfiguration Drawing Set. The inspection and report provided by the professional engineer shall take into account the new and historical survey data, and the report and survey shall be completed and submitted to DEQ prior to December 31 of the inspection year. Maintenance of the MSE berm shall be conducted based upon the results of the inspections. All required maintenance and repairs shall be performed in a timely manner to minimize the impacts of the issues noted during the inspection, and the maintenance or repair work shall be recorded in repair logs that will be made available to the professional engineer for the annual inspection. Significant repairs made to the berm shall be observed and documented by a qualified professional engineer.

ATTACHMENT III
MSE BERM INSPECTION CHECKLIST

MSE BERM / REINFORCED SLOPE - FIELD INSPECTION CHECKLIST

SITE NAME & PROJECT _____

DATE OF ANNUAL SURVEY _____

NAME OF REVIEWER: _____

DATE OF SITE VISIT: _____

VISUAL REVIEW ITEMS: For each “Yes” item below, attach typical photo and description. Inspection should be conducted with design and asbuilt drawings and the previous inspection checklist

No.	Visual Review Item	Yes	No	N/A	Station/Magnitude	Observed Features
1.	Condition of Facing					
1a	– Deformed baskets/facing				•	<ul style="list-style-type: none"> • type of facing: • bulging: • varying thickness: • variation along wall height:
1b	– Exposed geosynthetics/reinforcement				•	<ul style="list-style-type: none"> • indications of erosion impacting anchorage: • indications of degradation:
1c	– Damaged or missing block facing/baskets				•	<ul style="list-style-type: none"> • excessive corrosion of steel baskets: • damaged/displaced panels:
1d	– Woody vegetation (over 1-inch diameter)				•	<ul style="list-style-type: none"> • accessibility: • condition of soil/basket: • location along height of wall:
1e	– Dead or stressed vegetation				•	<ul style="list-style-type: none"> • overall condition of vegetation: • location along wall height:
1f	– Signs of vandalism				•	<ul style="list-style-type: none"> • damaged panels: • knife cuts: • impact damage:
1g	– Erosion of soil from baskets				•	<ul style="list-style-type: none"> • location at top or wall face
1h	– Soft soil at face of wall				•	<ul style="list-style-type: none"> • penetration of probe into soil • evidence of freeze/thaw • erosion/seepage

MSE BERM / REINFORCED SLOPE - FIELD INSPECTION CHECKLIST (continued)

No.	Visual Review Item	Yes	No	N/A	Station/Magnitude	Observed Features
2.	Condition of Batter (Design Batter = 1:5 H:V)					
2a	– Constant offset of facing/baskets				•	<ul style="list-style-type: none"> • location of local bulging: • overall loss of batter:
2b	– Evidence of overturning				•	<ul style="list-style-type: none"> • global rotation about toe of wall: • local rotation at specific height(s) along wall:
2c	– Evidence of sliding along reinforcement layers				•	<ul style="list-style-type: none"> • location of displaced baskets: • local wet zones:
3.	Evidence of Seepage/Erosion through MSE Berm					
3a	– Seeps on facing				•	<ul style="list-style-type: none"> • location(s) along height of wall • multiple locations at given station • condition of road/ditch above seepage
3b	– Washed-out fill material on facing or at toe				•	<ul style="list-style-type: none"> • location along height of wall: • erosion or seepage: • extent of washout: • condition of road/ditch above washout:
3c	– Discoloration due to old seeps				•	<ul style="list-style-type: none"> • current condition: • local vegetation differences: • location along wall height:
3d	– Spots of vegetation/algae on facing				•	<ul style="list-style-type: none"> • location along height of wall: • condition of soil behind algae (soft, wet, etc.):
4.	Evidence of Differential Settlement along MSE Berm					
4a	– Hummocky profile on top of berm				•	<ul style="list-style-type: none"> • settlement at top of wall or in road:
4b	– Localized settlement				•	<ul style="list-style-type: none"> • evidence of erosion from wall face: • evidence of ponding water:
4c	– Settlement of facing/baskets				•	<ul style="list-style-type: none"> • settlement profile along baskets: • location along wall height: • local conditions at base of wall:
5.	MSE Berm Top					
5a	– Longitudinal cracks				•	<ul style="list-style-type: none"> • local conditions at wall face: • local topography regarding water flow:

MSE BERM / REINFORCED SLOPE - FIELD INSPECTION CHECKLIST (continued)

No.	Visual Review Item	Yes	No	N/A	Station/Magnitude	Observed Features
5b	– Transversal cracks:				•	<ul style="list-style-type: none"> • local conditions at wall face: • local topography regarding water flow:
5c	– Signs of subsidence behind wall and/or facing				•	<ul style="list-style-type: none"> • local conditions at wall face: • local topography regarding water flow:
5d	– Evidence of erosion across road towards face of wall				•	<ul style="list-style-type: none"> • indication of ongoing problems: • local conditions and grade of ditch:
6.	Foundation at Base of MSE Berm					
6a	– Undermining due to erosion at toe;				•	<ul style="list-style-type: none"> • depth: • local undermining of baskets: • local erosion:
6b	– Appearance of wet or soft foundation soils				•	<ul style="list-style-type: none"> • evidence of flooding or internal seepage: • extent of local conditions:
6c	– Evidence of cracks/bulge/subsidence				•	<ul style="list-style-type: none"> • local soil conditions:
6d	– Indications of local rock layers				•	<ul style="list-style-type: none"> • local seepage: • steep grades:
6e	– Embedment of lower basket: depth of embedment				•	<ul style="list-style-type: none"> • local conditions:
7.	Storm Water Structures					
7a	– Grading of perimeter drainage channel				•	<ul style="list-style-type: none"> • evidence of flat grades: • standing water: • extent:
7b	– Final cover geocomposite drains into channel				•	<ul style="list-style-type: none"> • confirmed in field: • wet zone above ditch at outlet:
7c	– Channel liner system				•	<ul style="list-style-type: none"> • geomembrane lined or unlined: • confirmed in field:
7d	– Sediment or debris build-up in channel				•	<ul style="list-style-type: none"> • cross-section detail: • rip-rap protection: • excessive sediment or vegetation:
7e	– Evidence of previous overtopping of channel				•	<ul style="list-style-type: none"> • visually apparent: • historic repairs:

MSE BERM / REINFORCED SLOPE - FIELD INSPECTION CHECKLIST (continued)

No.	Visual Review Item	Yes	No	N/A	Station/Magnitude	Observed Features
7f	– Damage to storm water pipes or drop inlets				•	<ul style="list-style-type: none"> • protection at outlets of down-chute pipes and/or channels: • evidence of erosion or wash-out: • debris blocking storm water pipes or drop inlets:
7g	– Condition of final cover				•	<ul style="list-style-type: none"> • erosion rills: • condition of vegetation:
7h	– Signs of erosion along drainage channel				•	<ul style="list-style-type: none"> • indications of historic problems or repairs:
8.	Prior Repairs to MSE Berm					
8a	– Evidence of repairs				•	<ul style="list-style-type: none"> • Visually apparent: • date(s)
8b	– Documentation					<ul style="list-style-type: none"> • reports available? • included in inspection report:
8c	– Performance					<ul style="list-style-type: none"> • Description of post-repair performance: • monitoring dates: • results
9.	Other Features					
9a	– Road conditions on top of wall				•	<ul style="list-style-type: none"> • indication of historic repairs: • excessive thickness: • erosion : • excessive moisture:
9b	– Evidence of impacts to other infrastructure				•	<ul style="list-style-type: none"> • forcemain pipes: • other pipes: • other elements:
9c	– Condition of power poles and guardrails adjacent to wall				•	

ATTACHMENT IV
MSE BERM CONTINGENCY PLAN

MSE BERM MAINTENANCE AND CONTINGENCY PLAN

Introduction

This section of the contingency plan provides a list of potential problems with the condition of the MSE berm and repairs that may be used to restore the berm to design conditions. The list of contingency items is separated into typical maintenance items and significant repair items. Recommended financial assurance for the maintenance items is provided as part of the post-closure plan.

Maintenance Items

The table below provides a list of contingency items that are maintenance related. These items tend to be easily repaired and maintained. Access to conduct the necessary repair work would be provided with the existing access roads located at the top and base of the MSE berm. The following repair options are provided as examples of possible repair procedures and are not meant to be exhaustive.

Maintenance Item	Repair Options
Sparse vegetation	Hydroseed and fertilize
Erosion of topsoil	Replace topsoil and seed. Identify cause of erosion and address.
Ponding of water against toe of berm	Place fill material at toe of slope to promote drainage away from toe.
Exposure of wrap geogrid	Replace topsoil as necessary and establish vegetation.
Ponding in the access road on top of the berm	Regrade road to promote drainage towards interior ditch.
Water flowing over face of berm	Regrade top of berm as necessary and clear ditches.
Dead vegetation	If vegetation does not grow out in the spring, remove dead vegetation and reseed
Large woody vegetation	Large shrubs or small trees shall be cut off at the base. Roots shall be left in place
Damage to wrap geogrid	Small or cosmetic damage to wrap grid may not require repair. More significant damage may require splicing new wrap grid to existing wrap grid. A qualified engineer shall be consulted for a repair procedure when damage is discovered.
Damage to welded wire fabric	Welded wire fabric is a temporary structure and may not need repair. A qualified engineer shall be consulted if damage is discovered.

Other Contingency Items

More extensive damage to the berm may lead to eventual failure of the berm; however, failure of the berm is highly unlikely, and it is generally a slow process that does not affect the waste containment system and produces indicators that can be observed as part of regular inspections. The inspection checklist attached to the Inspection and Maintenance procedures requires inspection for indicators of potential failure. These indicators include cracking in the access road, seepage in the berm face, pumping of the soils at the toe of the berm, bulging or movement along the face, or damage to utilities within the berm.

Should these indicators be observed, filling activities adjacent to the area of concern should be relocated and the indicators more closely investigated. Further investigation may include survey of static structures in and around the berm and comparison to as-built survey results. If the investigation determines that the berm is stable, filling activities may resume in the area. Should the investigation indicate potential instability, a plan for repairs or corrective action shall be conducted. An investigation of the indicators and any associated repair or corrective action plans shall be conducted by a qualified engineer.

In the unlikely event of a catastrophic failure resulting from unanticipated events such as acts of God, personnel shall be evacuated from the failure area because of the potential for instability in the adjacent areas. The failure area should not be approached until conditions stabilize. After conditions stabilize and the area is determined to be stable, investigation of the failure may commence. An investigation and a corrective action plan shall be prepared by a qualified engineer. Potential repair options for a catastrophic failure include, but are not limited to, reconstruction of the wall, soil nailing, or buttressing.

Restricted Activities

To minimize the risk of damage to the berm a number of activities are restricted in the vicinity of the berm as follows:

- Excavation at the toe of the berm shall be no deeper than 10 feet. Deeper excavations shall be analyzed by a qualified geotechnical engineer.
- Excavation within five feet of the toe of the berm is restricted.
- When cleaning out adjacent ponds, the owner shall only excavate to designed grades without further engineering analysis.
- Soil stockpiles or other significant loads shall not be placed on top of the berm.
- Climbing on the face of the wall is restricted.