

# Attachment 4 - Closure and Post-Closure Plan

## SECTION 3 – CLOSURE PLAN

### 3.1 CLOSURE STRATEGY/SCHEDULE

This section describes the final cover construction, site capacity, schedule of closure implementation, estimated costs for closure, and final inspection procedures for the closure Stages at the BCL.

The Executive Secretary will be notified in writing at least 60 days prior to the anticipated last receipt of waste in accordance with R315-302-3(4)(a). Implementation of the final closure Phase will begin within 30 days after last receipt of waste. Final closure of the entire Landfill will be completed within 180 days of implementation of closure activities, unless an extension has been granted by the Executive Secretary.

Closure will occur incrementally in several stages. As a substantial portion of each landfill Phase has been filled to design capacity, that area will be closed. It is anticipated that each of the landfill Phases will be closed in several distinct closures stages. The following table summarizes by landfill Phases the approximate Landfill Phase capacity and projected dates of service:

<b>Landfill Phase</b>	<b>Phase Capacity (cubic yards)</b>	<b>Projected Date of Completion</b>
Phase 1	190,194	2012
Phase 2	110,642	2020
Phase 3	276,924	2039
<b>MSW TOTALS</b>	<b>577,760</b>	

To estimate the landfill life and project the timing of constructed projects; engineering assumptions about the extent of each Phase were made to be able to calculate volumes. The length of time that each Phase will be in service will depend upon the day to day operation of the landfill and will vary from the specific dates of closure presented above. It may be necessary, due to site access requirements, to partially fill future Phases to allow for final waste placement within a particular Phase.

The closure of the BCL will be completed in accordance with this plan. Closure activities will be performed in such a manner as to accomplish the following goals:

- minimize the need for further maintenance;
- minimize or eliminate threats to human health and the environment from post-closure escape of solid waste constituents, leachate, landfill gases, contaminated run-off or waste decomposition products to the ground, ground water, surface water, or the atmosphere; and,
- adequately prepare the facility for the post-closure period.

All closure stages will be in accordance with a State of Utah DEQ approved QA/QC Plan.

### **3.2 FINAL COVER DESIGN AND INSTALLATION**

#### **3.2.1 Final Cover – General**

The final cover at the BCL will be completed in multiple stages. Final cover construction will be completed as the landfill approaches the final cover elevation presented in Appendix I.

All equipment which will not be used on-site during the post-closure period will be removed. Structures at the site which remain after the final receipt of waste, and which will not be an integral part of post-closure site maintenance, will be dismantled and removed from the site. Any soil contamination remaining after the final receipt of waste will be removed, treated, or disposed of according to applicable regulations. Following the final receipt of waste, any remaining stockpiles of recyclable or other stored materials will be removed from the site.

Rough contouring will be performed throughout the life of the site during daily operations. Following the general site cleanup described above, final contouring will be performed using native soils to establish a suitable foundation layer for final cover construction. The site will be surveyed to establish base elevations for closure cap construction. After final grading of the foundation layer (6 – 12 inches in depth), the installation of the final cover will begin.

A QA/QC and closure documentation program will be submitted to the UDWMRC for review and approval prior to any construction activities. Final cover testing will be performed as part of a construction Quality Assurance / Quality Control (QA/QC) Plan.

#### **3.2.2 C&D Landfill Cover**

The former C&D landfill area has been closed in 2010. Appendix L – C&D Landfill Cover contains the details of the State approved QA/QC Plan and documentation of the final cover construction.

### **3.2.3 Final Cover – Design**

The original cover design has been replaced with an alternate final cover. Appendix M – Alternate Final Cover describes the methodology utilized to determine that the alternate cover design is as protective to the environment as the original permitted cover. The final cover is 24” of select soil placed over a base of 6”-12” site soils. The final cover will be graded to prevent ponding and minimize infiltration of run-off waters.

The top slopes will be graded at a minimum of three percent into a perimeter drainage channel. Storm flows will be routed over the sideslopes and into the perimeter drainage channel. All sideslopes are graded to a maximum slope of three to one, horizontal to vertical (3:1), and are configured to minimize drainage lengths while promoting surface run-off to perimeter drainage channels. Each phase of closure construction will be certified by a professional engineer registered in the State of Utah.

Drainage channels were sized to accommodate the flow from a 25-year, 24-hour storm event. A detailed discussion of site hydrology and hydraulics is included in the drainage report presented in Appendix K. A drainage channel will be constructed around the interior perimeter of the closed area, inside the perimeter access road. Four culverts will be installed in strategic locations to direct run-off from the closed surface of the landfill under site access roads and away from the site as illustrated in Drawing 5 (Appendix A). All culverts and sideslope downdrains are sized as 18-inch corrugated metal pipe. Exterior perimeter drainage channels will not be required because of the location of the landfill atop the Last Chance Bench. Off-site run-on is not anticipated.

### **3.2.4 Final Cover Closure – MSW Closure Area 1 and Area 2**

The first MSW areas of the BCL are currently being closed utilizing the alternate final cover design. Appendix N – MSW Closure 1 includes the State approved QA/QC Plan for the final cover of the MSW areas. A drawing showing all areas of the BCL scheduled to receive final cover by the end of 2018 is included in Appendix N as well.

## **3.3 SEED, FERTILIZER AND MULCH**

The top 6-inches of the final cover will be utilized for vegetation. The vegetative layer of the cap will be seeded with a mixture of grasses suitable for fast growth in the region, then fertilized and mulched.

Early establishment of vegetation on the landfill's final slope surface will impede soil

erosion and promote evapotranspiration. BCL staff will periodically evaluate vegetative growth, vigor, and color so that the integrity of the final cover system is maintained. If stress signs on vegetation caused by landfill gas and leachate seeps are noted, the problem will be corrected. Corrective procedures will be conducted based on current design recommendations and will be built consistent with construction specifications. BCL staff or a licensed landscape contractor will make repairs, as necessary.

### **3.4 LANDSCAPING**

The landfill facility, including all surrounding grounds, will be maintained in conjunction with any scheduled maintenance activities (i.e., road improvements, etc.). The landscape of the Landfill will be designed to be both functional and low maintenance. Due to the location of the Landfill; the required landscaping will be minimal in nature and be comprised of drought tolerant native grasses.

### **3.5 FINAL COVER CONTOURS**

The Landfill's final grades will be inspected and maintained to ensure its integrity and conformity with the conceptual final cover plans.

Any areas where water has collected (ponded) will be regraded. Erosion damage resulting from extremely heavy rainfall will be repaired. BCL staff will inspect the final grading no less than quarterly.

### **3.6 QUALITY ASSURANCE/QUALITY CONTROL (QA/QC)**

For construction of all final landfill cover, drawings, specifications and QA/QC procedures will be developed by a Utah licensed Professional Engineer and submitted to the State of Utah DWMRC for review and approval prior to construction of each closure Phase.

### **3.7 CLOSURE COST ESTIMATES**

The current cost estimates for the closure of the BCL operation is provided in Appendix O – Closure/Post Closure Costs.

### **3.8 CERTIFICATION OF CLOSURE AND RECORD KEEPING**

A Utah licensed Professional Engineer will be retained to observe the closure of each of the final cover Phases. The registered engineer will be employed by BCL, or will be a BCL-hired consultant and will certify the Landfill was closed according to the closure plan. Any amendment or deviation to the closure plan will be approved by the Executive Secretary and any associated permit modifications will be made. Final closure work and documentation will be observed and reviewed by UDWMRC personnel as necessary.

As part of the certification process, the engineer shall also provide closure as-built drawings to the Executive Secretary within 90 days following completion of closure activities.

Additionally, the final plats and the amount and location of waste will be recorded on the site title. The owner will file the notarized plat with the County Recorder within 60 days following certification of closure.

## **SECTION 4 – POST-CLOSURE CARE PLAN**

### **4.1 MONITORING PROGRAM**

Post closure activities will begin when final cover closure is approved by the Executive Secretary. The following presents the post-closure plan for the BCL facility. The following subsections offer a description of the monitoring programs applicable to the BCL facility.

#### **4.1.1 Groundwater**

No groundwater monitoring is required or performed at the BCL.

#### **4.1.2 Surface Water**

Although no surface water sampling activities are scheduled for the landfill, BCL staff will inspect the drainage system no less than quarterly. Temporary repairs to any observed damage will be made until permanent repairs can be scheduled. BCL or a licensed general contractor will replace drainage facilities, if necessary. BCL has a Storm Water Pollution Prevention Plan (SWPPP) on file on site; a copy of the SWPPP is presented in Appendix D.

#### **4.1.3 Leachate Collection and Treatment**

A leachate collection system was neither required nor installed during utilization of the unlined BCL; therefore, no monitoring is required.

#### **4.1.4 Landfill Gas**

Landfill gas monitoring wells have not been installed at the BCL site. Landfill gas is monitored at operator level around the site perimeter to monitor explosive landfill gas emissions. The perimeter of the disposal area, as well as all structures at the site, will be monitored quarterly to ensure compliance with State regulations regarding explosive landfill gas.

During post-closure; BCL landfill personnel or a contracted company will be responsible for the gas observations at the facility perimeter and facility structures. Monitoring will occur no less often than quarterly and will be conducted more often if the need arises. In the event that a sample exceeds the regulatory level, BCL (or contracted) personnel will notify the UDWRC immediately and undertake appropriate corrective actions.

As outlined in R315-303 BCL will take all the necessary steps to protect human health and will immediately notify UDEQ of explosive gas levels detected above allowable levels and actions to be taken. Also, within 7 days of incident, BCL will place in the operating record documentation of the explosive gas levels detected and a description of the interim steps taken to protect human health. Within 60 days of detection, BCL personnel will implement a remediation plan for the explosive gas releases, place a copy of the plan in the operating record, and notify UDEQ that the plan has been implemented. The remediation plan will describe the nature and extent of the problem and the proposed remedy.

## **4.2 MAINTENANCE PROGRAM**

The following subsections offer a description of the routine maintenance to be performed in association with any ground water monitoring, storm water, leachate collection, gas collection or final cover systems.

### **4.2.1 Monitoring Systems**

#### **4.2.1.1 Ground water**

No ground water monitoring is required or performed at the BCL; therefore, no maintenance is required.

#### **4.2.1.2 Surface Water**

Drainage control problems can result in accelerated erosion of a particular area within the landfill. Differential settlement of drainage control structures can limit their usefulness and may result in a failure to properly direct storm water off-site.

Implementation of a post-closure maintenance program will maintain the integrity of the final drainage system throughout the post-closure maintenance period. The final surface water drainage system will be evaluated and inspected, no less than quarterly, for ponded water and blockage of, or damage to, drainage structures and swales. Where erosion problems are noted or drainage control structures need repair, proper maintenance procedures will be implemented as soon as site conditions permit so that further damage is prevented.

BCL staff will inspect the drainage system no less than quarterly. Temporary repairs will be made until permanent repairs can be scheduled. BCL or a licensed general contractor will replace drainage facilities.

#### ***4.2.1.3 Leachate Collection and Treatment***

No systems are installed; therefore, no maintenance is required.

#### ***4.2.1.4 Landfill Gas***

No systems are installed; therefore, no maintenance is required

#### ***4.2.1.5 Final Grading***

The landfill cover final grade will be inspected no less than quarterly and maintained to preserve its integrity. Evaluation and inspection of the cover final grades will include evaluations of vegetation and overall system performance. At the completion of closure activities, the surface of the cover will be surveyed to provide a reference point for monitoring settlement.

Areas where water has collected (ponded) will be regraded. Erosion damage resulting from extremely heavy rainfall will be repaired.

### **4.2.2 Cover and Run-On/Run-Off Systems**

The final cover system will incorporate features to manage storm water, minimize erosion, and provide for efficient removal of storm water. The constructed cover will convey collected water via earthen dikes, swales, drainage channels, and culverts away from the Landfill.

Placement of all permanent drainage facilities will be completed during, or immediately following, installation of the final soil cover.

### **4.3 SCHEDULE OF POST-CLOSURE ACTIVITIES**

Post-closure activities, consisting of monitoring and maintaining the final cover and permanent drainage facilities, will be implemented periodically as areas of the Landfill are filled to final grade.



**4.4 POST CLOSURE COST ESTIMATES**

Updated cost estimates for post-closure care for the BCL facilities are presented in Appendix P – Closure/Post Closure Costs.

**4.5 CHANGES TO RECORD OF TITLE, LAND USE, AND ZONING**

BCL will notify the County Recorder's Office at any such time when there is a change to the Record of Title, land use plan, or zoning restrictions. In addition, BCL will notify the Recorder at that time when the post-closure care period has expired.

**4.6 POST CLOSURE FACILITY CONTACTS**

For all post-closure care information; all contact will be through the Beaver County Commission or a designee. Contact with Beaver County officials will be at the following number:

Beaver County Administrator ..... (435) 438 - 6466

**4.7 POST CLOSURE LAND USE**

Beaver County will select an end use that will be limited to those that do not threaten the integrity of the existing control systems. All activities will be approved by the appropriate cities/agencies prior to implementation. Typical end uses range from recycling operations (which complement existing operations) to recreational activities. Since the closure of the first Landfill site may be over 20 years away, it is not currently possible to develop those land use plans to be consistent with surrounding land uses and the needs of the area that may be relevant at that future time.