BRIDGETON LANDFILL, LLC

NORTH QUARRY CAP ENHANCEMENT WORK PLAN AND SCEHDULE

13570 ST. CHARLES ROCK ROAD BRIDGETON, MISSOURI 63044

Missouri Solid Waste Permit Number MO-118912 Project No.: 0120-131-10-52

PREPARED BY:



Bridgeton Landfill LLC

October 9, 2015

Mr. Chris Nagel
Missouri Department of Natural Resources
Solid Waste Management Program
1738 East Elm Street
Jefferson City, Missouri 65101

Re:

North Quarry Cap Enhancement Work Plan and Schedule

Bridgeton Sanitary Landfill

Permit No. 0118912, St. Louis County

Dear Mr. Nagel

Bridgeton Landfill, LLC (Bridgeton Landfill) provides the attached North Quarry Cap Enhancement Work Plan and Schedule pursuant to your letter of September 24, 2015, excerpted below:

"Action Required to Comply: Submission of the work plan including abandonment of North Quarry RCPs and schedule to SWMP no later than October 9, 2015, is required:

We understand a component of the work planning process is the evaluation of North Quarry RCP structures in order to determine appropriate abandonment procedures. Such activities are a part of the North Quarry Cap Enhancement work plan and sufficient time needs to be allotted for completion of this task in the required schedule. However, the overarching requirement is not for an evaluation of the RCP structures, but rather submission of a work plan and schedule for completion of a North Quarry Cap Enhancement Project to reduce the potential for:

- Oxygen intrusion due to erosion or desiccation of the existing soil and vegetative cap;
- Air emissions and odors should the subsurface smoldering fire move into the North Quarry; and
- A new independent smoldering fire in the North Quarry."

Due to normal settlement of the landfill as well as disturbance as a result of ongoing investigation of the adjacent disposal areas, improvements to the final cover system are being conducted. The attached work plan outlines various improvements to the North Quarry cap to enhance storm water management and re-establish vegetation. In addition, the improvements will also reduce the possibility of air intrusion, odors, and lessen soil erosion. A schedule for completion is also outlined in the work plan.

Findings and discussion from the "RCP Historical Records Review – North Quarry Report," which was submitted electronically to the SWMP on October 1, 2015, are also summarized in the attached work plan.

Bridgeton Landfill LLC

To the extent that the Department disputes the conclusions or suggested Work Plan contained in the attached submittal, Bridgeton Landfill invokes the dispute resolution provisions of Paragraph 47 of the First Agreed Order of Preliminary Injunction, and will raise the matter before the Special Master.

Please feel free to call me if you have any questions or comments.

Sincerely,

Brian J. Power

Environmental Manager Bridgeton Landfill, LLC

Attachments:

- North Quarry Cap Enhancement Work Plan and Schedule



October 9, 2015

Mr. Brian Power Environmental Manager Bridgeton Landfill, LLC 13570 St. Charles Rock Road Bridgeton, MO 63044

Re: Submission of North Quarry Cap Enhancement Work Plan and Schedule

Bridgeton Landfill

Project No.: 0120-131-10-52

Dear Mr. Power:

Weaver Consultants Group (WCG) has been tasked with completing the requirement to produce a work plan and schedule for completion of the North Quarry Cap Enhancement Project. The project consists of improving storm water management infrastructure and addition of soil in areas on the North Quarry cap, evaluating enhancements to the North Quarry cap and reviewing historical permit documents and site information in regards to environmental controls that were constructed with reinforced concrete piping (RCP) within the north quarry portion of the Bridgeton Landfill. The purpose of this exercise is to reduce the possibility of oxygen being introduced to the waste mass through the cap.

Summary of Improvements

The area referenced as the North Quarry received final cover in 2006 consisting of two feet of compacted clay with a permeability of 1×10^{-5} cm/sec overlain with one foot of vegetative soil. Due to typical and normal settlement of the landfill as well as disturbance as a result of ongoing investigation of the adjacent disposal areas, improvements to the final cover system are being conducted. The following enhancements will be made to the North Quarry cover system to improve storm water management and re-establish vegetation. Additionally, these actions will reduce the possibility of air intrusion, odors and lessen soil erosion.

- Regrade terraces. The terrace network on the side slopes of the landfill where no EVOH cap is installed will be regraded, as needed, to enhance drainage at a minimum of two percent slope. Additional soil may also be added to the existing terraces to maintain a minimum depth as outlined in Drawing 6 of Attachment 1. The locations and proposed storm water flow for the terraces can be found in Drawing 4 of Attachment 1.
- Install FML. Flexible Membrane Liner (FML) will be installed in the area between the EVOH liner and existing perimeter road to promote sheet flow into a perimeter storm water channel. The area where FML will be installed will be cleared of vegetation and

graded to create a channel and promote flow toward the existing culverts which drain into the storm water retention basin. The FML will extend to the northeast around the solid waste boundary to maximize the amount of storm water collected. The FML will extend to the south near the southernmost culvert draining into the storm water retention basin. The area to receive FML can be found in Drawing 4 of Attachment 1.

- Install and re-stablish letdowns. Two new storm water letdowns will be constructed and one will be re-established as shown on Drawing 4 of Attachment 1. The existing rip-rap letdown located west of the storm water retention basin will be re-constructed with FML. The letdown will drain into the newly constructed FML area to allow for ease of drainage into the storm water retention basin. A new rip-rap lined letdown will be installed along the north side of the main access road to direct storm water toward Outfall #7 northeast of the office. A new FML lined letdown will be constructed along the northern edge of the existing EVOH lined letdown will be re-constructed along the northern edge of the existing EVOH lined perimeter channel to minimize soil erosion adjacent to the existing EVOH lined area. The location of the letdowns can be found in Drawing 4 of Attachment 1. The details on the design of the letdowns can be found in Drawing 6 of Attachment 1.
- Install culverts. A new 18" reinforced concrete pipe (RCP) culvert will be installed at the bottom of the newly installed rip-rap lined letdown along the north side of the access road. A new 24" HDPE culvert will be installed northeast of the flare compound. The new culvert will convey the storm water into an existing storm water channel around the flare yard and into the large storm water retention basin. The locations of the proposed culverts can be found in Drawing 4 of Attachment 1. The details on the design of the culverts can be found in Drawing 6 of Attachment 1.
- Clean existing culverts. Existing culverts, including the three culverts that drain into the
 small storm water retention basin to the north of the flare yard, will be cleared of
 debris to prevent blockage and ponding of storm water. The existing culvert near the
 location of the proposed 24" culvert will also be cleaned. The locations of the culverts
 identified to be cleaned can be found in Drawing 4 of Attachment 1.
- Road removal. The gravel access roads on top of the North Quarry are currently being removed. The material is being stockpiled for future road construction at the site. The areas where the road removal is occurring will be filled with clean soil and graded to match existing grade. The road removal will help return the landfill to post-closure conditions. The roads to be removed can be found in Drawing 3 of Attachment 1.
- Re-grading of landfill surface. Various portions of the landfill surface will be re-graded to promote storm water management at the landfill. Most notably, additional soil will be placed over the Solid Waste Permit# 118906 disposal area as well as the north

quarry crown area. The areas to be re-graded can be found in Drawing 4 of Attachment 1.

- The northeast area will receive approximately two feet of addition cover material and re-graded to promote drainage. The existing road and culvert will be removed and re-constructed when grading is complete.
- The landfill crown will also be re-graded to promote storm water drainage and then to re-establish vegetation. Six inches of soil will be added on the crown giving the surface a thicker cover, minimizing oxygen intrusion and odors.
- Place FML boots on extraction wells. FML boots will be installed on all active extraction
 wells in the North Quarry that are not currently under the EVOH liner. The FML boot
 will prevent air intrusion with an impermeable membrane that clamps onto the well
 casing and extends beyond the well bore. The boot will be placed below existing
 surface, covered with additional soil and graded to drain away from the gas extraction
 well. The wells to receive an FML boot can be found in Drawing 4 of Attachment 1.
- BMPs. Best Management Practices (BMPs) found in the site's Storm Water Pollution Prevention Plan (SWPPP) will be followed during the construction activities in the North Quarry Cap Enhancement Project.
- Seed and vegetate all disturbed areas. A significant amount of work will be done to enhance the North Quarry cap. A large area of the cap will be disturbed during these improvements. All disturbed areas will be receiving seeding to help establish vegetation and minimize soil erosion. Approximate areas to receive additional soil and re-establish vegetation are shown in Drawing 5 of Attachment 1.

RCP Abandonment

The "RCP Historical Records Review – North Quarry Report" found in Attachment 2 was submitted electronically to the MDNR on October 1, 2015. The attached report identifies two sources of RCPs in the North Quarry: Trench Rock Wells (TRWs) utilized for gas collection and Leachate Collection Wells (LCWs). RCPs were utilized as protective barriers for these points and extended as waste was placed in the vicinity of the structure. In summary, it is recommended not to pursue additional abandonment of these structures at this time.

As discussed in detail in the attached report the TRWs do not extend to the quarry floor and as such are not an anchored structure to the base of the landfill and likely settle with the waste mass. The leachate collection wells, excluding the northernmost LCW Old Collection Well A, are significantly below the ground surface and therefore, not feasible to pursue abandonment. These structures do not present a risk of oxygen intrusion given their location below ground

surface. The report indicates LCW Old Collection Well A may be near the surface and significantly away from the reaction area. Historically, gas extraction wells in the vicinity of Old Collection Well A have not demonstrated a risk of oxygen intrusion, coupled with the additional soil, no further action is proposed for this location as outlined further in the attached report.

RCPs located in the North Quarry were surveyed, staked, and visibly inspected for differential settlement and odors on September 22, 2015 by Weaver Consultant Group. No settlement or odors were observed in any of the RCP locations. The RCP locations have shown no visible influence on the surface of the landfill or elevated oxygen levels in nearby extraction wells. It is recommended to not pursue further abandonment of the RCPs given the possible depth to the structures and lack of impact the locations have had on oxygen intrusion and settlement. The LCW RCP locations will continue to be visibly inspected for differential settlement and odors while all locations will be monitored for elevated levels of oxygen in adjacent wells to determine if further evaluation is needed. The historical RCP investigation and visual survey of the RCP locations has determined that a work plan for additional abandonment of the RCPs is not needed at this time.

Schedule for Completion

Project work shall be completed in accordance with the following schedule:

- October 5, 2015 Begin to extend laterals and install wells heads to all gas extraction
 wells located to the south of the "sentry line" of the TMPs in the North Quarry as agreed
 during recent discussions with the MDNR.
- October 12, 2015 Storm water improvements and cap enhancement project begins.
- October 30, 2015 Complete the installation of laterals and wells heads to all gas extraction wells located to the south of the "sentry line" of the TMPs in the North Quarry.
- December 1, 2015 Project shall be complete with site cleanup and demobilization.

Inspections and Maintenance

Inspection and maintenance of the cover will be performed in accordance with the procedures in the latest version of Volume 1 of the Operation, Maintenance, and Monitoring (OM&M) Plan. Although Bridgeton Landfill is still awaiting approval of that plan, the procedures contained within it constitute best management practices for the Bridgeton Landfill. Table 1 – Inspections and Maintenance, has been excerpted from the current OM&M Plan and included as Attachment 3 (note portions of table for "clay final cover").

Sincerely,

Weaver Consultants Group, LLC

Michele Clark

Senior Project Director

Attachments:

Attachment 1 – Storm Water Infrastructure Improvement Drawings (D1-D6)

- D1 Cover Page
- D2 Existing Conditions
- D3 Roads to be Removed
- D4 Proposed Storm Water Infrastructure Improvements
- D5 Disturbed Areas to be Seeded and Vegetated
- D6 Construction Details

Attachment 2 – "RCP Historical Records Review – North Quarry Report" dated October 1, 2015.

Attachment 3 – Inspection and Maintenance

Attachment 1

Storm Water Infrastructure Improvements Drawings

BRIDGETON LANDFILL, LLC

BRIDGETON, MISSOURI 2015 NORTH QUARRY CAP ENHANCEMENTS

PREPARED BY



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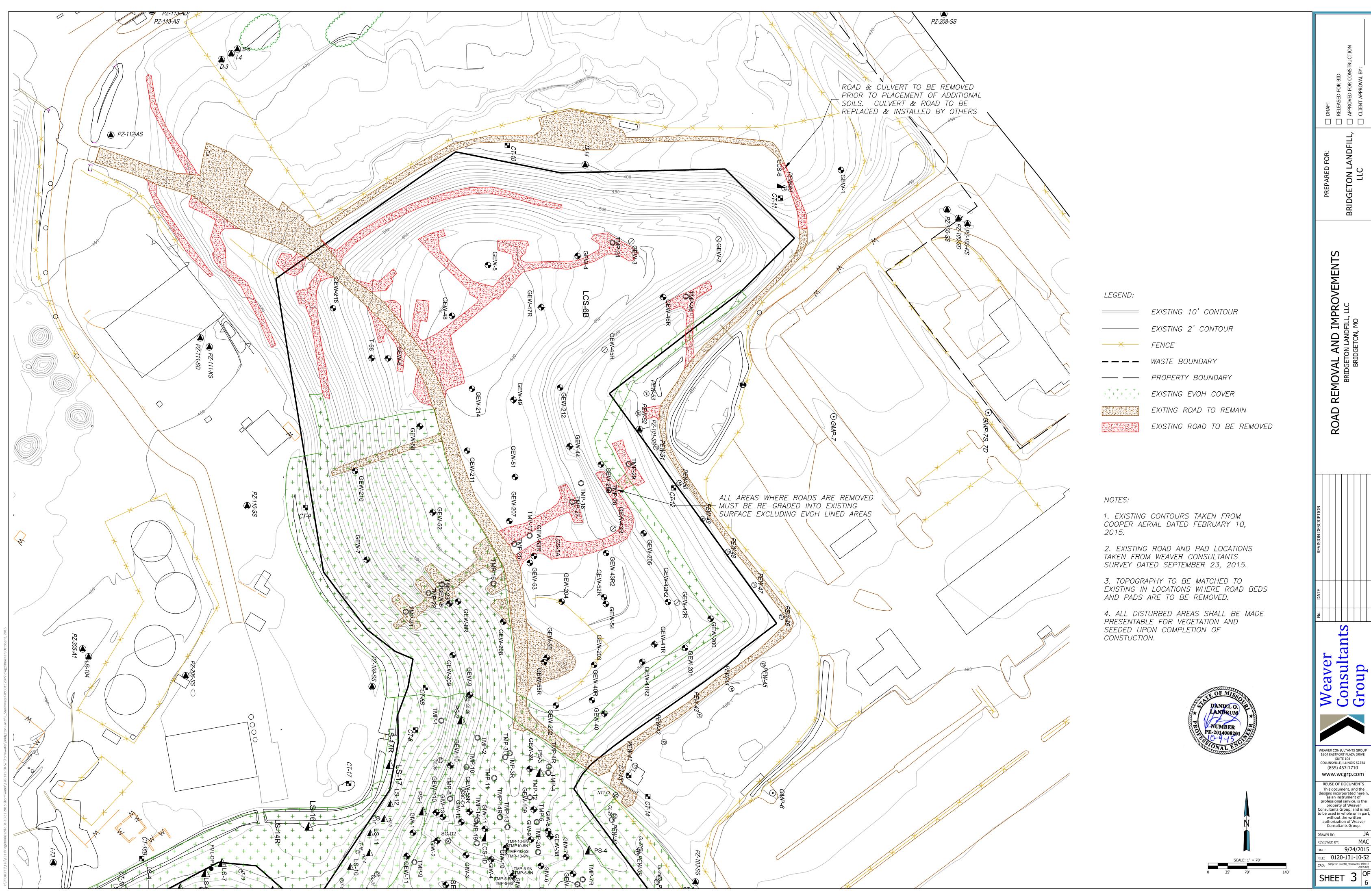
OCTOBER 2015

INDEX OF SHEETS

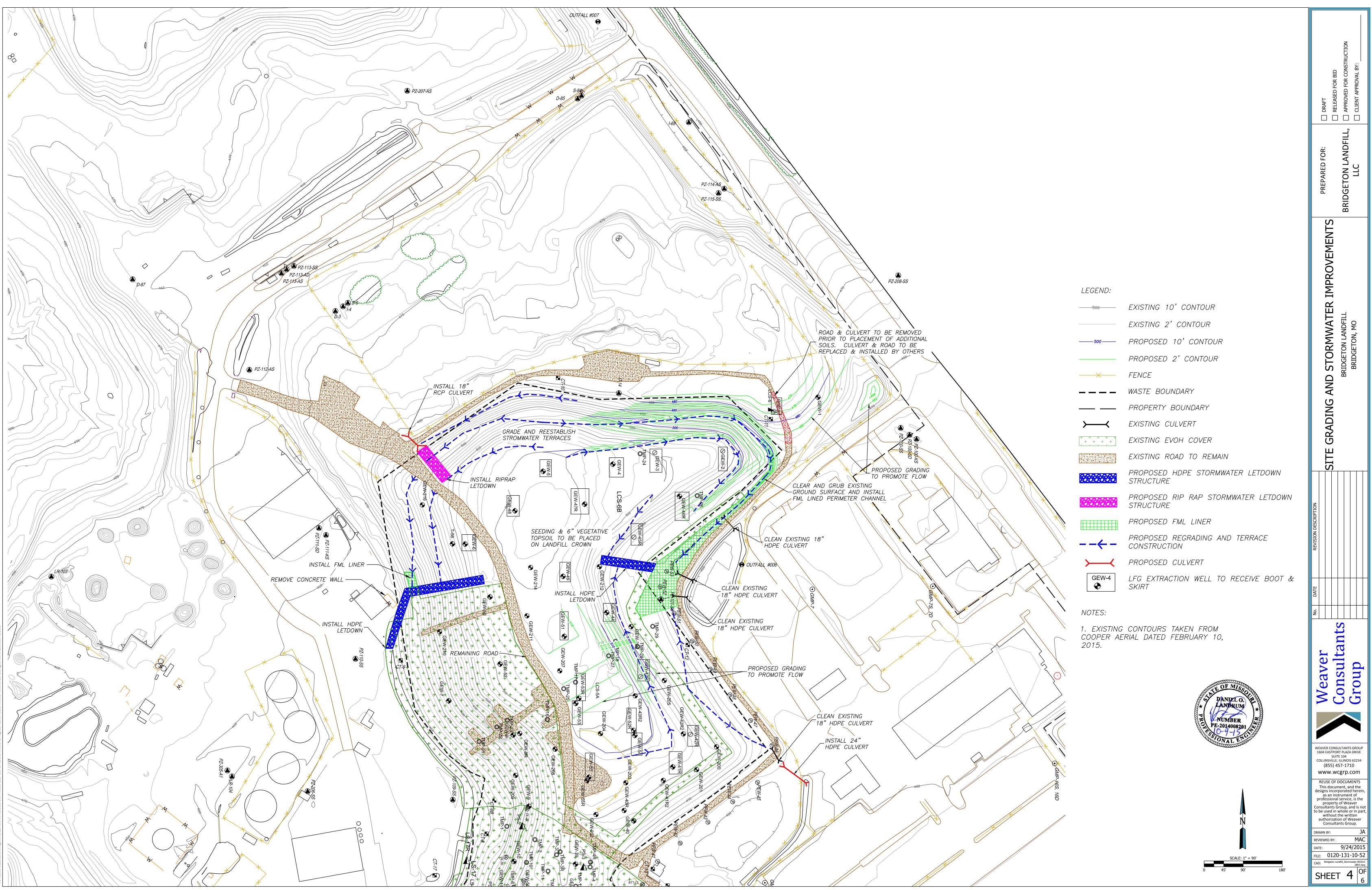
DRAWING No.	DESCRIPTION
1 OF 6	COVER PAGE
2 OF 6	2015 EXISTING CONDITIONS
3 OF 6	ROAD REMOVAL AND IMPROVEMENTS
4 OF 6	SITE GRADING AND STORM WATER IMPROVEMENTS
5 OF 6	DISTURBED AREAS
6 OF 6	DETAILS







9/24/2015



WEAVER CONSULTANTS GROUP 1604 EASTPORT PLAZA DRIVE SUITE 104 COLLINSVILLE, ILLINOIS 62234 (855) 457-1710 www.wcgrp.com

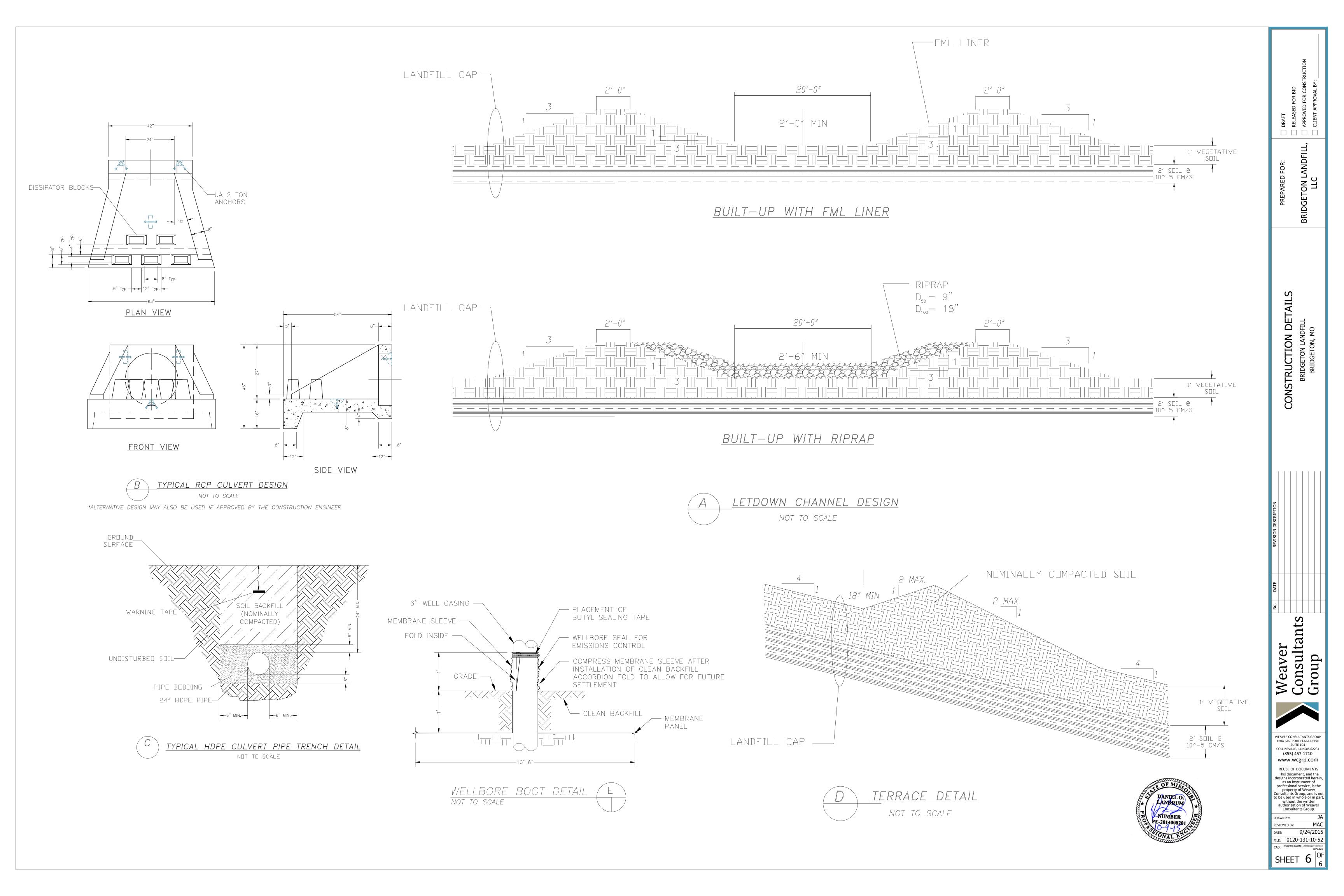
REUSE OF DOCUMENTS

to be used in whole or in part 9/24/2015

FILE: 0120-131-10-52



DISTURBED AREAS
BRIDGETON LANDFILL, LLC
BRIDGETON, MO



Attachment 2 "RCP Historical Records Review – North Quarry Report" dated October 1, 2015



Attachment 3

Inspection and Maintenance

Table 1 – Inspections and Maintenance

	Item or Conditions to Be Inspected	Potential Adverse Impact	Criteria for Acceptance	Corrective Procedures	Target Corrective Timeline*
CLAY FINAL COVER	Non-uniform waste settlement in clay final cover	Ponding	No damage or significant ponding	Fill the area of significant ponding to promote sheet flow, add topsoil and reseed.	1 week
	Crevasses in clay final cover	Infiltration	No cracks wider than 3" and deeper than one foot	Fill opening with soil compacted to meet final cover specifications, restore topsoil and vegetation. Replace damaged piping if necessary.	1 week
	Liquids (leachate) breaking out of clay final cover	Surface water impact	No liquids or staining verified as attributable to leachate observed	Collect and remove liquid as soon as possible. Block liquid from entering stormwater collection channels if necessary. Once liquid is under control, excavate saturated area, install french drain if deemed necessary, and backfill with new clay and topsoil to restore original configuration	Same Day
FML FINAL COVER	Crevasses or voids in the soil directly under the FML	Safety hazard	No significant cracks, stretched (trampolined) FML, separation, etc. observed	Determine the nature and extent of the crack upon discovery, and evaluate safety, extent, and if repair is required. Cordon area with warning tape if unsafe for foot traffic. Follow procedures in Appendix D for repair.	3 months
	Rips, tears, or punctures of the FML cap	Odor	No rips, tears, punctures, or stress observed	Extrusion weld FML repair patch (or bead for small holes) as soon as practical upon discovery. Remove, adjust or protect temporary FML cap from objects causing stress point concentrations.	Same day if causing odor. One month if no odor.
	Degradation of FML Material	Odor/Fragility	No brittleness or delamination	Extrusion weld FML repair patch (or bead for small holes) as soon as practical upon discovery. Remove, adjust or protect temporary FML cap from objects causing stress point concentrations.	Same day if causing odor. One month if no odor.
	FML boots connected to LFG wells or other penetrations	Odor	No stress or damage observed	Repair the FML boot, patch, weld, or seal	Same day if causing odor. One month if no odor.
	Liquids (leachate) below the FML cap	Liquid accumulation at toe, leachate release.	No bulging observed	Clean and jet the toe drain or subcap drain to which the collected liquid was designed to drain. Evaluate subcap drainage piping, and install additional subcap drainage piping or repair existing as necessary. Repair FML.	Same day if release imminent. One month if no release imminent.
	LFG below the FML cap	Odor	No gas build-up (pillowing) observed	Increase vacuum to subcap LFG collectors in the area of the pillowed FML. Install surface vacuum point (bubblesucker) if necessary.	Same day

^{*} These timelines are target goals only, which may be impacted by weather conditions, contractor availability (if needed), and safety conditions.

Table 1 – Inspections and Maintenance (continued)

	Item or Conditions to Be Inspected	Potential Adverse Impact	Criteria for Acceptance	Corrective Procedures	Target Corrective Timeline*
GAS	Wellhead	Odor	No gas leakage or oxygen infiltration	Repair in accordance with procedures in Volume 2	Same day
	Piping	Reduced gas collection odor	No "bellies" or breaks	Repair in accordance with procedures in Volume 2	Same day
IANAGEMENT	Earthen Ditch Vegetation	Erosion	Grass health, good coverage, less than 6" long	Overseed and mulch	3 months
	Earthen Ditch Riprap	Erosion	Pieces in place, no exposed subsoil	Move or add riprap	3 months
	Ditch Clogging	Flooding	Sediment build up or other obstruction	Remove obstruction to original ditch line	Same day if significant obstruction; 3 months if mild obstruction.
	Culvert Structural Integrity	Flooding	Near circular or original shape throughout length	Remove and replace if deformation affecting capacity or collapse is imminent.	1 month if significant deformation; 3 months if mild deformation.
	Culvert Clogging	Flooding	Top of corrugations visible and/or less than 3" sediment	High-volume water flush until clean	Same day if significant obstruction; 3 months if mild obstruction.
ER A	Clay Cap Slope Erosion	Erosion	No erosion rills greater than 6" deep	Fill rill, reseed, and much	3 months
SURFACE WATER MANAGEMENT	Clay Cap Vegetation	Erosion	Grass healthy, good coverage, less than 18" long. No shrubs or seedlings	Overseed and mulch as appropriate, remove shrubs or seedlings, irrigate as necessary.	3 months
	Detention Pond Liner	Infiltration	No rips or seam separation	Extrusion weld FML repair patch (or bead for small holes) as soon as practical upon discovery. Document repairs in accordance with FML QA/QC Plan.	1 month
	Detention Pond Valve	Release of impacted water	Valves are not clogged and exercise freely	Jet obstructions from valve closing, lubricate workings, exercise valve.	Same day
	Detention Pond Sediment	Capacity reduction	Less than one foot accumulation	Remove with backhoe or water jet and vac	3 months
	Detention Pond Outlet	Flooding	Smooth transition from outlet pipe to ditch invert, erosion protection in place	Restore and regraded, add new rip rap as necessary.	Same day if significant obstruction; 3 months if mild obstruction.

^{*} These timelines are target goals only, which may be impacted by weather conditions, contractor availability (if needed), and safety conditions.