CLOSURE PLAN
(40CFR Part 257.102(b))

LOCKWOOD ASH DISPOSAL SITE

Prepared on behalf of:

Lockwood Hills LLC
590 Plant Road, PO Box 187
Dresden, New York 14441

Prepared by:

DAIGLER ENGINEERING, P.C.
CIVIL & GEO-ENVIRONMENTAL ENGINEERING
2620 Grand Island Blvd.
Grand Island, New York 14072-2131

August 2019

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(40CFR PART 257.102(b))
Lockwood Hills LLC
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1 INTRODUCTION

Lockwood Hills LLC (Lockwood Hills) manages the Lockwood Ash Disposal Site (Lockwood or the Landfill), an ash monofill located in the Town of Torrey, Yates County, New York on Swarthout Road. Lockwood Hills maintains a 6 NYCRR Part 360 Solid Waste Management Facility permit (Permit No. 8-5736-00005/00003) for this facility issued by the New York State Department of Environmental Conservation (NYSDEC).

2 COMPLIANCE REQUIREMENT

Under the CCR Rule, existing Coal Combustion Residuals (CCR) landfills must prepare a closure plan. The plan must describe the steps necessary to close the CCR landfill at any point during its active life, consistent with recognized and generally accepted good engineering practices, to meet the applicable requirements of 40CFR Part 257.102(b)(1)(i) through (vi).

The following information is required:

- A narrative description of how the CCR landfill will be closed;
- A description of the final cover system, designed in accordance with 257.102(d), including installation procedures and performance objectives;
- An estimate of the maximum amount of CCR ever onsite over the active life of the CCR landfill (current and projected final total volume);
- An estimate of the largest area of the CCR landfill ever requiring final cover at any time during its active life; and
- A schedule for completing all closure activities, including:
    - Anticipated year closure will be completed;
    - List of major milestones such as permit approvals from other agencies; and
    - Installation of final cover system.

The plan will require revision if there is a change in conditions that would substantially affect the written plan in effect. Revised plans are not in effect until they are certified by a qualified professional engineer and placed in the operating record, and the revision must occur at least 60 days prior to any change in operation. In the event of an unanticipated event requiring a change in the plan, the revision must be completed no later than 60 days after the triggering event. If closure has commenced and the plan requires revision, the revision must occur no later than 30 days after the triggering event.

3 EVALUATION

3.1 LANDFILL CLOSURE DESCRIPTION

Lockwood will be closed with the CCR and non-CCR waste remaining in place. Closure of the Landfill will occur sequentially in areas of the Landfill that reach final waste grades. By Part 257.102(e)(1) and (2), closure activities must be initiated either within 30 days of the last known (emphasis added) receipt of CCR or non CCR waste, or within two years of the last receipt of CCR or non-CCR waste. Sequential closure of the Landfill is planned in order to minimize the construction effort when final closure occurs in the future. The Landfill closure process will follow the more stringent requirements of the New York State Department of Environmental Conservation (NYSDEC) Part 363 regulations.

In addition to the physical construction requirements to place a final cover system, closure will also entail investigative and administrative action items. These items, required by the NYSDEC, include a Closure Site Investigation including a surface leachate and a vector presence investigation. The surface leachate investigation identifies any instances of leachate seeps or uncontrolled leachate emanating from the facility, including chemical characterization of any observed surface leachate. The vector investigation identifies the presence of nuisance vectors that could damage the final cover system components and implements a remedial program prior to the cessation of waste acceptance at the facility. The NYSDEC will also require a revised closure, post closure, custodial care cost estimate. Approval of the Closure Site Investigation and the revised cost estimates by the NYSDEC is required prior to each sequential closure construction commencement.

Prior to each closure construction project, Lockwood Hills will have prepared detailed construction documents, including a Construction Quality Assurance/Construction Quality Control Plan, for contractor and material selection purposes. NYSDEC approval of the construction documents will be required before contractor and materials selection can commence. Materials selected for final cover construction will have to undergo testing to ensure minimum design factors of safety can be achieved. Integral to all these actions, Lockwood Hills will schedule such that the actual construction can occur during a typical June – October construction season appropriate for Central New York State.

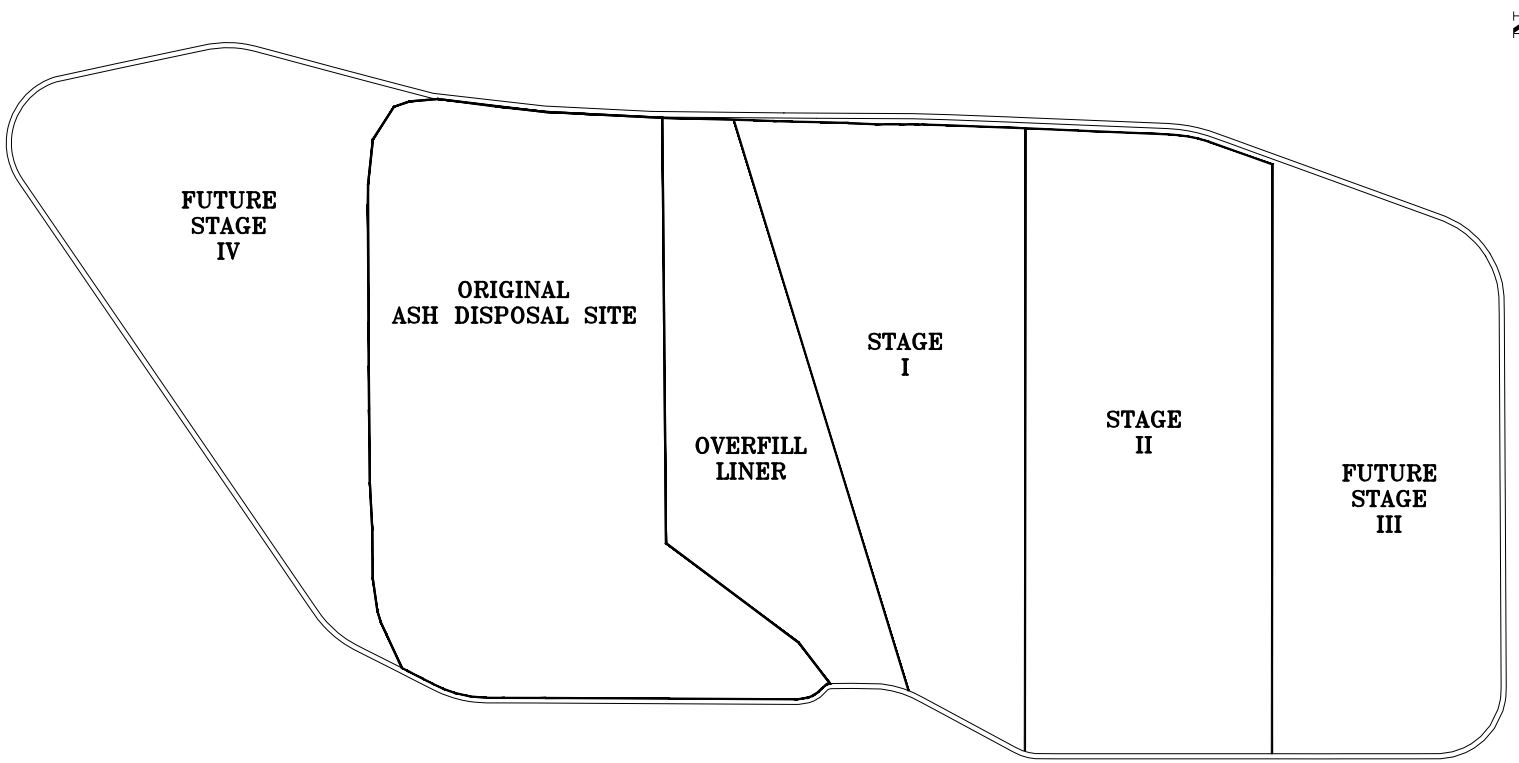
Closure of the Landfill would also occur if all land disposal activities at the site permanently cease before the remaining capacity of the Landfill is exhausted. The CCR Rule requires a notification of the intent to finally close the Landfill within 30 days after waste acceptance permanently ceases {257.102(e)(1)(i)} and completion of final closure six months after the initiation of final closure activities {257.102(f)(1)(i)}. A time extension pursuant to Part 257.102(f)(2)(ii)(C), can be obtained if necessary.

3.2 FINAL COVER SYSTEM DESIGN

The goal of the final cover design required by the CCR Rule is to minimize infiltration of precipitation into the waste mass, and to minimize erosion thereby preventing exposure of the underlying waste to the environment. The minimum requirements to achieve these goals are prescribed by Part 257.102(d)(3)(i)(A) through (D).

The final cover system must have a permeability less than or equal to the bottom liner system, if present, or the natural subsoils if no liner is present, or $1x10^{-5}$ centimeters per sec (cm/sec), whichever is least. There are different basal liner systems present at the Landfill. The Original Ash Disposal Site (OADS) liner consists of a two-foot thick soil liner of unspecified permeability covered by a two-foot thick bottom ash layer acting as a drainage layer. An overfill liner above the southern half of the OADS consists of a single 50-mil polyvinyl chloride (PVC) geomembrane liner sandwiched between layers of geotextile cushion and overlain by a one-foot thick bottom ash drainage layer. The Stage I and II cells have a double liner system consisting of a lower two-foot thick compacted soil liner, compacted to densities and moisture contents corresponding to laboratory remolded permeability test results of less than 1×10^{-7} cm/sec, a four-inch thick sand layer for primary liner leak detection, an upper 50-mil PVC membrane liner between two geotextile cushion layers and topped with a two-foot thick bottom ash drainage layer. See Figure 3-1for a layout of the current and future Landfill liner areas.

Q:\Lockwood Hills LLC\31-0019-03 2019 General Services\CCR Rule Compliance\CCR Rule Submission\Closure Post Closure\ACAD\LOCKWOOD LANDFILL AREAS.dwg 8/14/2019 11:07 AM



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LOCKWOOD HILLS LLC		LOCKWOOD LANDFILL AREAS		FIGURE 3-1
SCALE: 1"=300'	REVISION # 0	CCR RULE COMPLIANCE CLOSURE PLAN		
August 2019	TOWN OF TORREY	YATES COUNTY	NEW YORK	

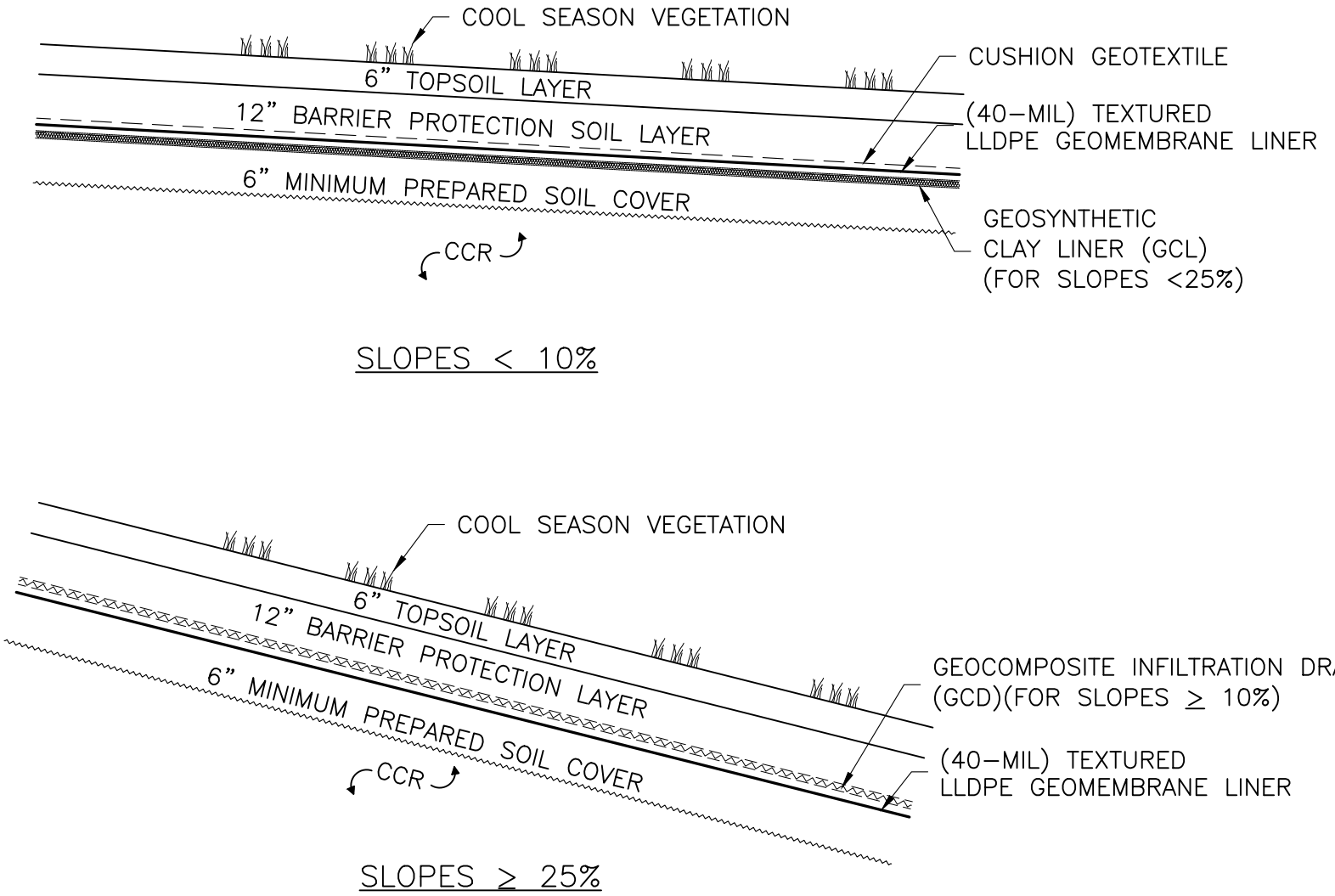
The "final cover system" required by 257.102(d)(3)(i)(B) and (C) consists of an erosion layer of at least 6 inches in thickness and an infiltration layer at least 18 inches thick below it. The infiltration layer purpose is to minimize infiltration of liquids. The final cover system must also be designed to accommodate settling and subsidence. The final cover design that is proposed for the Landfill is an alternate design, as allowed by Part 257.102(d)(3)(ii), that meets the requirements of the NYSDEC and addresses the minimum requirements of the CCR Rule. The design incorporates EPA's suggestion regarding use of a composite cover system (on surfaces where the slope is less than 25 percent) and follows the more stringent NYSDEC final cover standard, which includes designing for erosion control. The final cover system performance requirement for the CCR Rule, to minimize infiltration of precipitation and to protect the waste mass from exposure due to erosion, is achieved with this design.

3.2.1 Alternate Final Cover System Components and Performance Objectives

The final cover system required by New York State includes several more components making it more robust than the CCR Rule requirement. Referring to Figure 3-2, the alternate final cover system design for Lockwood, to address the more stringent New York requirement, includes in descending order:

- Topsoil layer at least six inches thick, vegetated with cool season grasses;
- Barrier protection layer 12 inches thick;
- Geocomposite drainage layer (GCD) on slopes greater than ten percent;
- Geotextile on slopes less than ten percent;
- Composite barrier layer consisting of both a geosynthetic clay liner (GCL) overlain by a textured linear low density polyethylene (LLDPE) geomembrane with a minimum 40 mils thickness, on slopes less than 25 percent;
- A single 40-mil LLDPE geomembrane on slopes greater than or equal to 25 percent; and
- Six inches of interim cover soils.

Q:\Lockwood Hills LLC\31-0019-03 2019 General Services\CCR Rule Compliance\CCR Rule Submission\Closure Post Closure\ACAD\Figure 3-2 Final Cover System.dwg 8/14/2019 11:05 AM



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LOCKWOOD HILLS LLC		FINAL COVER SYSTEM		FIGURE 3-2
SCALE: NOT TO SCALE	REVISION # 0	CCR RULE COMPLIANCE CLOSURE PLAN		
August 2019	TOWN OF TORREY	YATES COUNTY	NEW YORK	

Infiltration is minimized by the composite liner on the Landfill slopes less than 25 percent and the single geomembrane on slopes steeper than or equal to 25 percent. The infiltration minimization performance objective is further enhanced with the GCD which will reduce liquid head build-up on the geomembrane liner. The two systems together complement each other with the GCD reducing the driving force of any liquid above a defect in the geomembrane and the GCL acting as a plug for any minor defect in the geomembrane.

Maintaining final cover system durability is afforded by both the six-inch thick interim cover subbase layer as well as the 18-inch thick layers of barrier protection soil and the topsoil layer. The interim cover soil subbase protects the overlying geosynthetic materials from damage. The thickness of the barrier protection and topsoil layers protects the cover from root penetration.

3.2.2 Final Cover Stormwater Management

To allow for efficient drainage and to account for unexpected subsidence or settlement, the final cover system is sloped at a minimum of 4 percent. In addition, the final cover system will include several thousand linear feet of stormwater diversion sideslope swales that drain into a network of gabion-lined downchutes. Geocomposite infiltration outlet drains will also be installed to allow infiltration water collected by the geocomposite drainage layer to discharge into the sideslope swales at regular intervals. Sizing and spacing of the sideslope swales are not uniform and therefore not readily describable, but their design meets the performance requirements for a 100-year, 24-hour storm event as provided by the New York State Stormwater Management Manual, 2015 edition. The use of erosion resistant channel linings and the establishment of a vegetated topsoil layer also provides protection against erosion.

The stormwater design elements of this cover system protect the integrity of the final cover system and further addresses both the erosion minimization and infiltration reduction performance objectives of the CCR Rule.

3.2.3 Final Cover System Stability Elements

New York State regulation requires both the interim and final configuration of the landfill waste slopes to have a minimum factor of safety (FOS) of 1.5 against sliding failure under static conditions, when those slopes meet final grade during operation and upon final closure of a landfill

cell. A minimum FOS of 1.5 must also be met for the final cover system considering seepage patterns that will develop assuming the saturated hydraulic conductivity of the barrier protection and topsoil layers during the wettest months of the year. Finally, New York requires an evaluation of the overall global stability of the waste mass and foundation soils, local and deep stability along critical interfaces of the final cover system and local and global stability of appurtenant components to the final cover system such as landfill access roads.

Access roads onto the Landfill are designed to be built with ash and are incised into the waste mass. The resulting interior and exterior slopes adjacent to the roads are sloped at 2(H):1(V) until those slopes are blended into the 3(H):1(V) final sideslope above and below the access road. Upon closure of a section of the Landfill where an access road currently exists, the road materials will be stripped away, and final cover components placed over the ash subbase. Specifications for the installation of the final cover elements where the access road will be reconstructed will include testing of materials such as the subbase ash material and any geosynthetics to provide a minimum 1.5 FOS. Sideslope diversion swales and downchutes will be checked for the minimum FOS as well. Final cover system components will undergo shear testing upon selection to ensure the minimum FOS of 1.5 can be met under simulated construction and post-construction conditions. Interfaces to be tested at various loads include the GCL-interim cover soils interface, the geomembrane – GCL interface, the geocomposite-geomembrane interface and the barrier protection soils-geocomposite interface. All interfaces must meet or surpass the minimum shear strength requirement for the requisite FOS.

The geocomposite drainage layer will also be tested for long term flow capacity under a test load simulating post closure conditions and at gradients approximating the minimum slope (four percent), the maximum slope (33 percent) and an intermediate slope between the two limits. The test will measure the flow rate in the geocomposite sandwiched between the soils used for the overlying barrier protection layer and the underlying geomembrane. Long term sufficient transmissivity is a key element in ensuring the cover soils above the geosynthetics remain in place and not slough off and damage the final cover system due to excess porewater pressures and seepage forces above the interface between the cover soils and the geosynthetic materials.

3.3 FINAL COVER INSTALLATION DESCRIPTION

Proper installation of the components of the final cover system described in Paragraph 3.2.1 help ensure the aforementioned performance objectives can be achieved. A Construction Quality Assurance/ Construction Quality Control (CQA/CQC) Plan will govern how each cover system component listed below is constructed, inspected, tested and professional engineer certified. The CQA/CQC Plan will be prepared and submitted to the NYSDEC for review and approval prior to initiation of closure construction.

The order of construction for closure at the Landfill is as follows:

- Subgrade Preparation;
- GCL Placement (on slopes less than 25 percent);
- Geomembrane Placement;
- Geocomposite Drainage Layer Placement (on slopes greater than or equal to 10 percent);
- Cushion Geotextile Placement (on areas where the geocomposite drainage layer is not required per final design specifications;
- Barrier Protection Layer Placement; and
- Topsoil Layer with Cool Season Vegetation.

3.4 ESTIMATED CURRENT AND PROJECTED FUTURE TOTAL VOLUME OF CCR

The estimated current volume of CCR and non-CRR waste, taken from the 2018 Annual Report to the NYSDEC is 1,566,000 cubic yards. This total figure reflects disposal activity at the Landfill from 1979 to the end of 2018. The remaining capacity for the constructed portion of the permitted Landfill is 422,000 cubic yards and 2,450,000 cubic yards for the potential future, currently unconstructed, Stage III and IV portions of the Landfill.

3.5 ESTIMATED CURRENT AND MAXIMUM AREA REQUIRING FINAL COVER

According to the 2018 NYSDEC Annual Report, 19.3 acres of the 29.8-acre constructed Landfill currently has interim cover. Accounting for slope correction which increases the planimetric area to be covered, the surface area where final cover has yet to be installed is currently 20.2 acres. If the Landfill were to close immediately, this acreage represents the best available estimate of the current, maximum area requiring final cover for the Landfill.

Landfill closure will be completed in phases as shown on Figures 3-3, 3-4, and 3-5. Potential maximum surface area requiring closure at any time during phased closure is 38.8 acres and will decrease to 11.7 acres at the end of the last Phase. Whether each future phase is necessary will depend on if future Stages III and IV of the Landfill are constructed.

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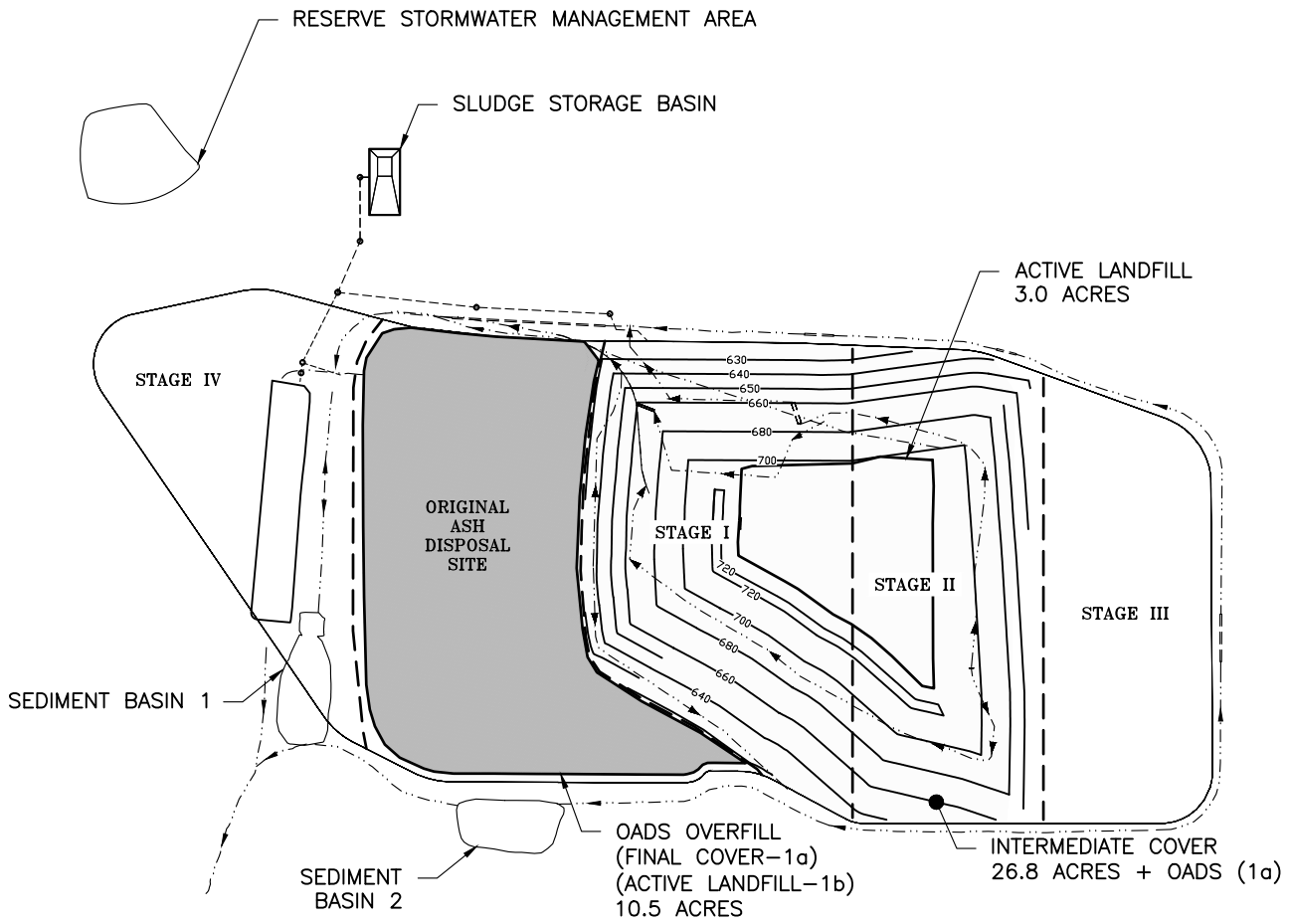
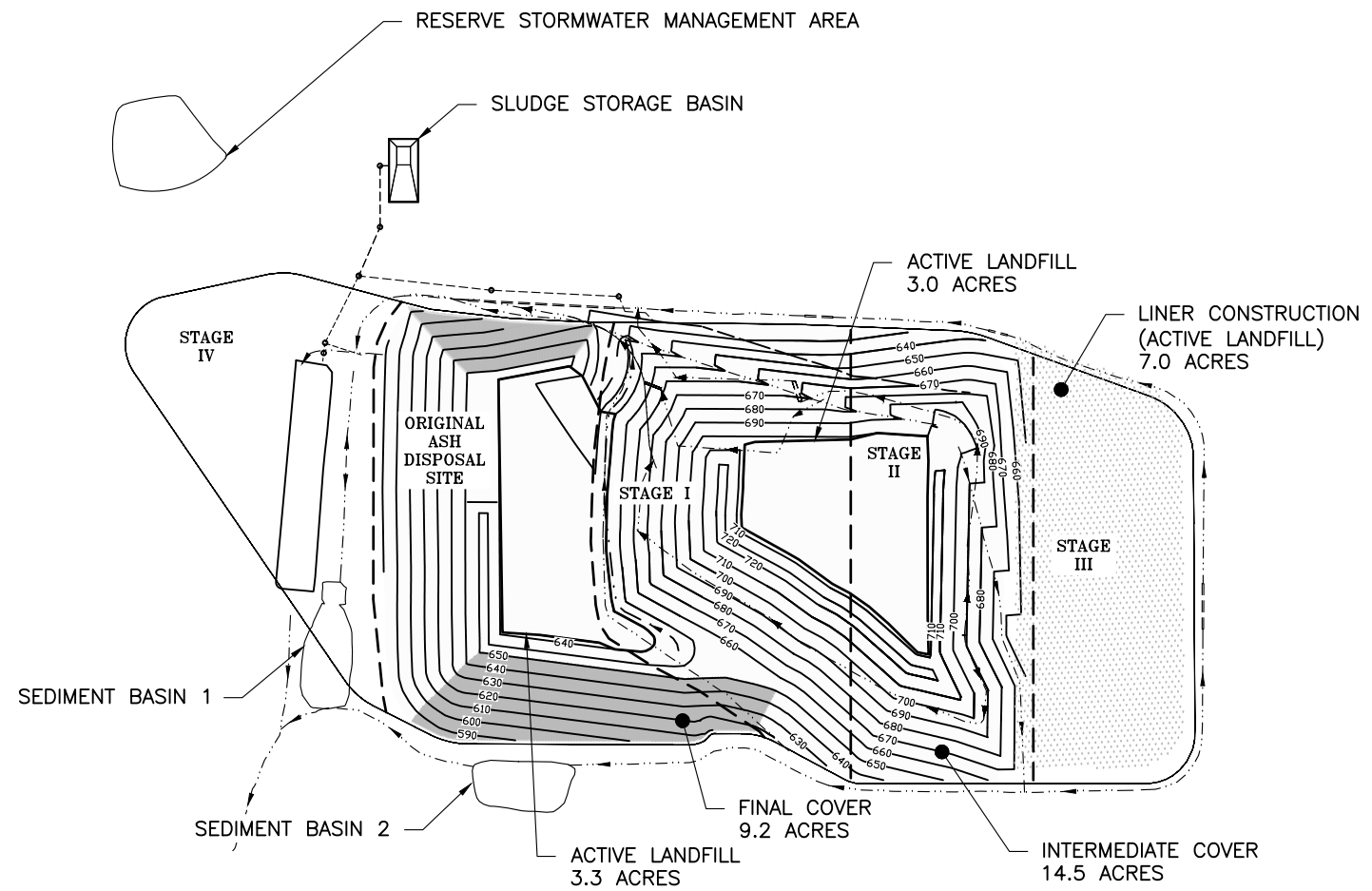


PHASE 1 FILLING AND DRAINAGE PLAN



PHASE 2 FILLING AND DRAINAGE PLAN

PHASE 1a (CURRENT LANDFILL, AS OPERATING)

ACTIVE LANDFILL	= 3.0 ACRES
INTERMEDIATE COVER	= 16.3 ACRES
FINAL COVER	= 10.5 ACRES
TOTAL	= 29.8 ACRES

PHASE 1b (ACTIVE LANDFILL OF OADS OVERFILL)

ACTIVE LANDFILL	= 13.5 ACRES
INTERMEDIATE COVER	= 16.3 ACRES
TOTAL	= 29.8 ACRES

FINAL COVER

LINER CONSTRUCTION

LEACHATE TRANSFER PIPE AND MANHOLE

STORMWATER CHANNEL

PHASE 2

ACTIVE LANDFILL	= 13.3 ACRES
INTERMEDIATE COVER	= 14.5 ACRES
FINAL COVER	= 9.2 ACRES
TOTAL	= 37.0 ACRES

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NYSPE NO. 061689

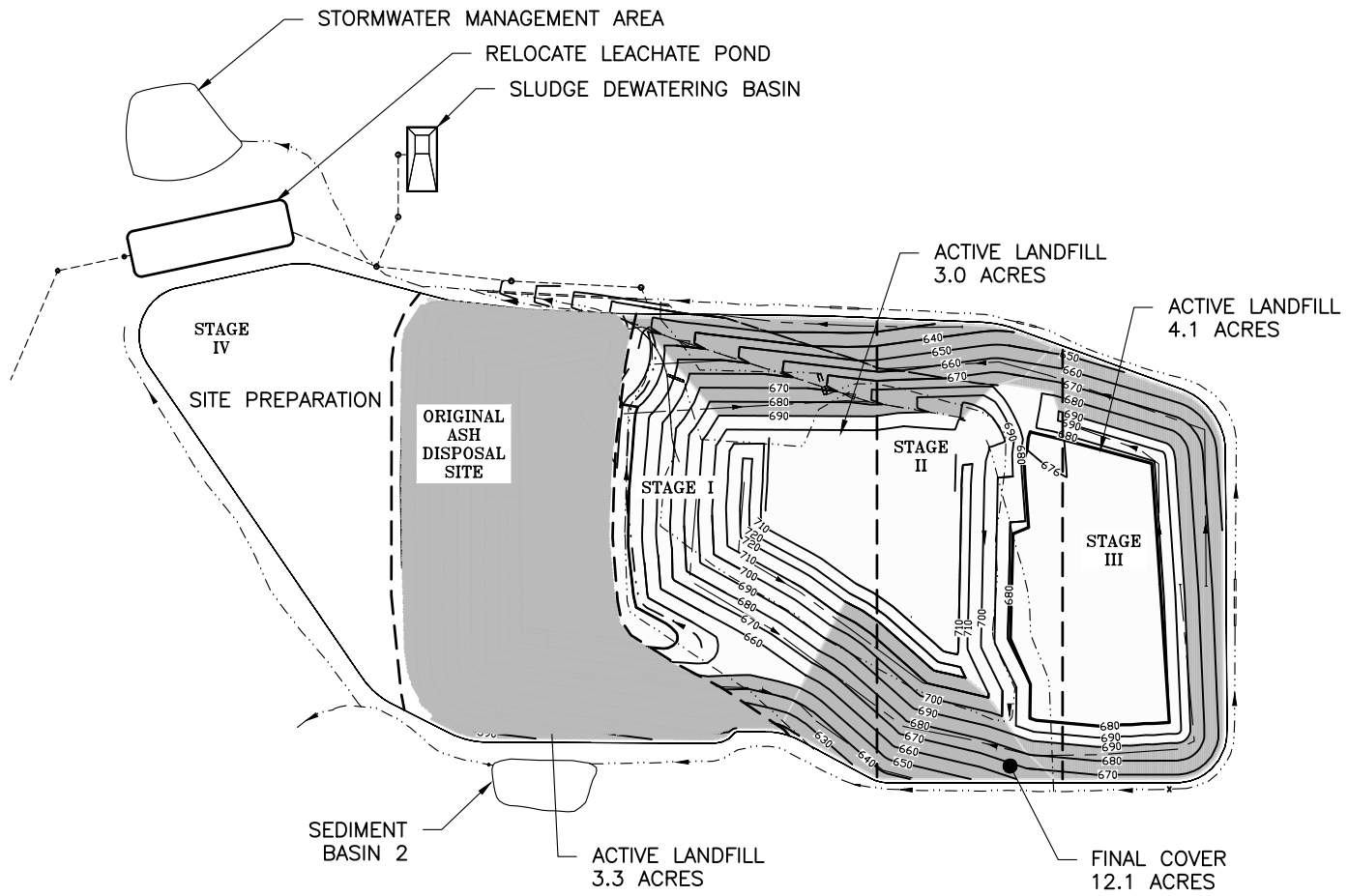
DATE: August 2019

SCALE: 1"=400'

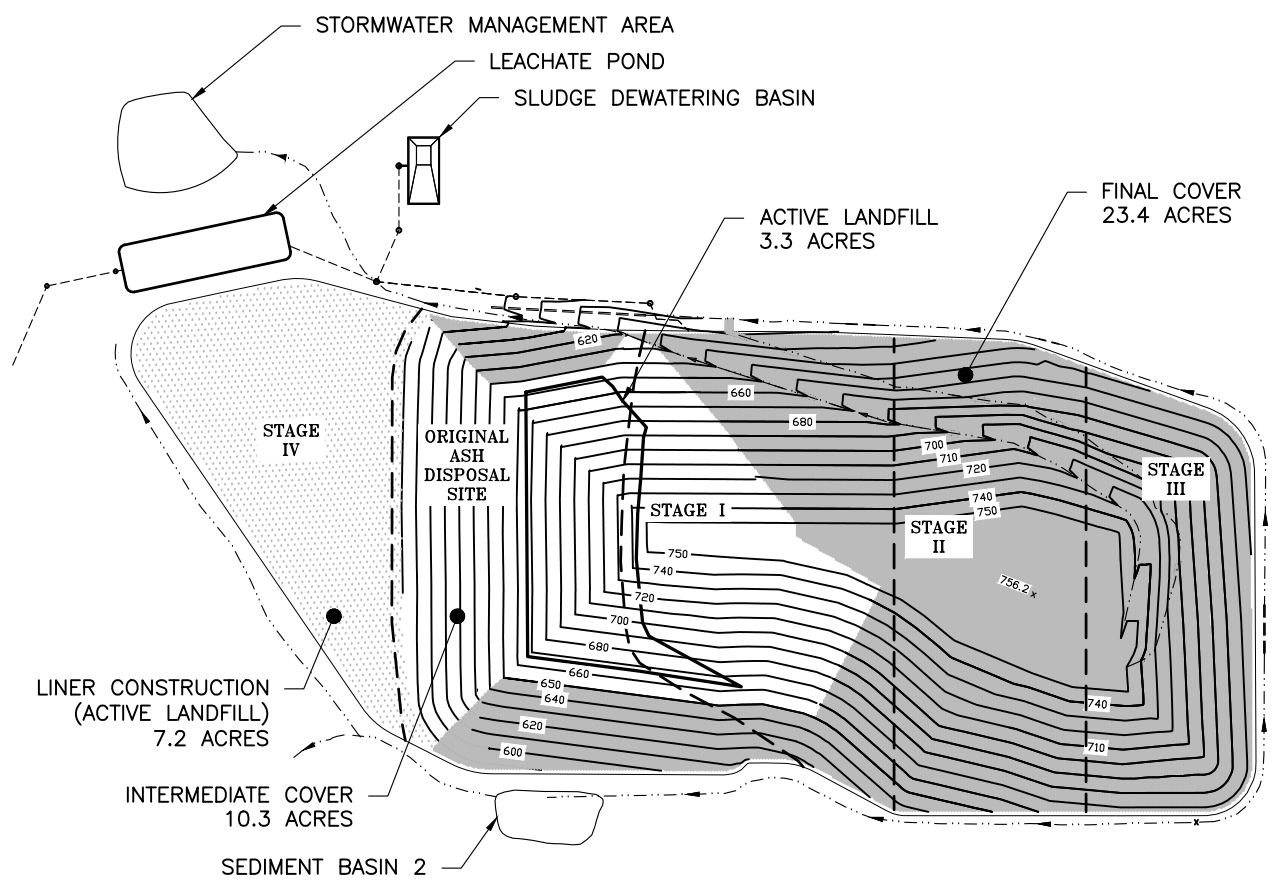
400' 0' 400' 800'

PREPARED FOR: LOCKWOOD HILLS LLC			PHASE 1 THROUGH 2 FILL PROGRESSION & CLOSURE PLAN CCR RULE COMPLIANCE CLOSURE PLAN
DES. BY:	DRW. BY:	CHK. BY:	
DWG: Phasing Plan 1–2.dwg			TOWN OF TORREY / YATES COUNTY / NEW YORK

FIGURE 3-3



PHASE 3 FILLING AND DRAINAGE PLAN



PHASE 4 FILLING AND DRAINAGE PLAN

PHASE 3
ACTIVE LANDFILL = 10.4 ACRES
INTERMEDIATE COVER = 14.5 ACRES
FINAL COVER = 12.1 ACRES
TOTAL = 37.0 ACRES

FINAL COVER
LINER CONSTRUCTION
LEACHATE TRANSFER PIPE AND MANHOLE
STORMWATER CHANNEL

PHASE 4
ACTIVE LANDFILL = 10.5 ACRES
INTERMEDIATE COVER = 10.3 ACRES
FINAL COVER = 23.4 ACRES
TOTAL = 44.2 ACRES

400′ 0′ 400′ 800′

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PREPARED FOR: LOCKWOOD HILLS LLC	PHASE 3 THROUGH 4 FILL PROGRESSION & CLOSURE PLAN CCR RULE COMPLIANCE CLOSURE PLAN	FIGURE 3-4
DES. BY: / DRW. BY: / CHK. BY:		
DWG: Phasing Plan 3-4.dwg	TOWN OF TORREY / YATES COUNTY / NEW YORK	

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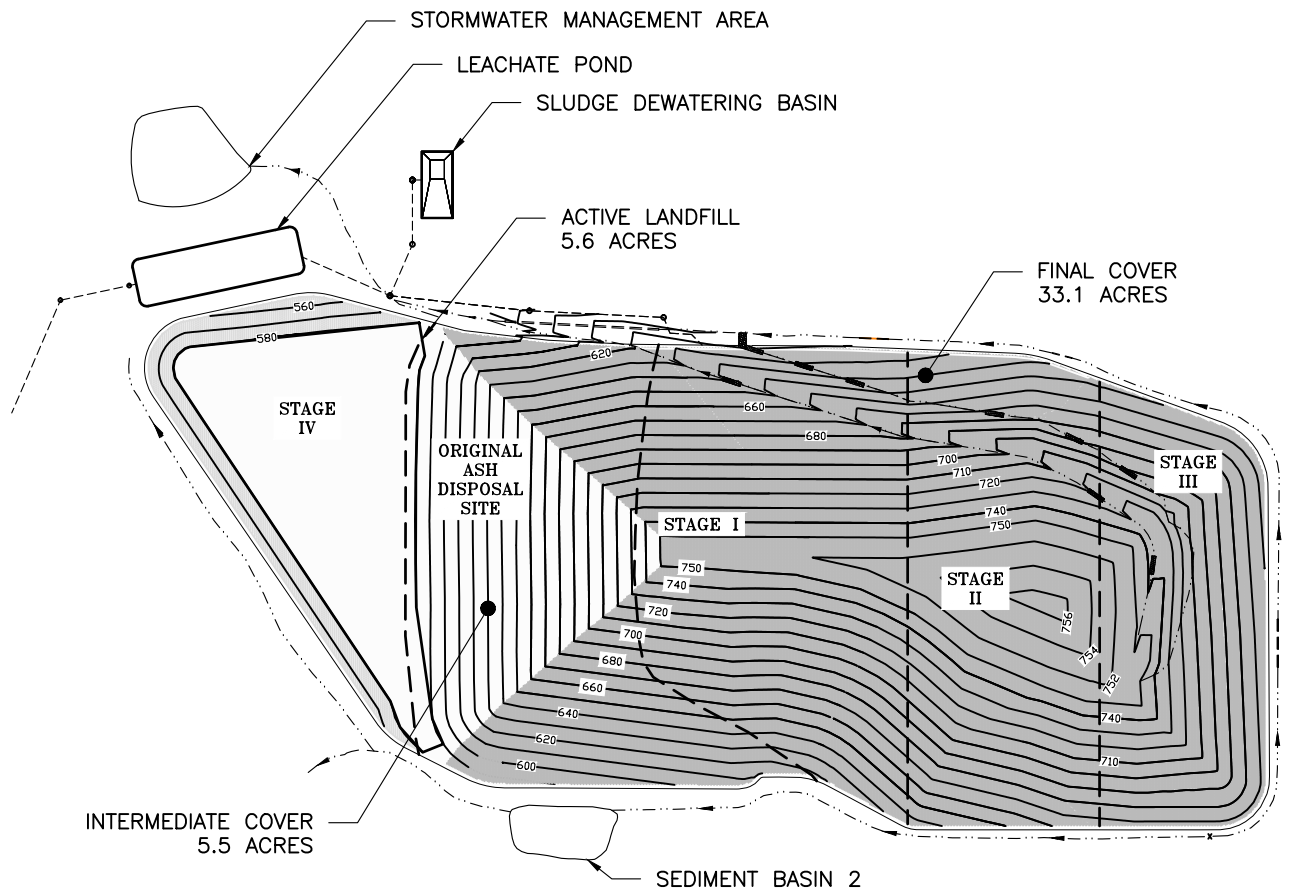
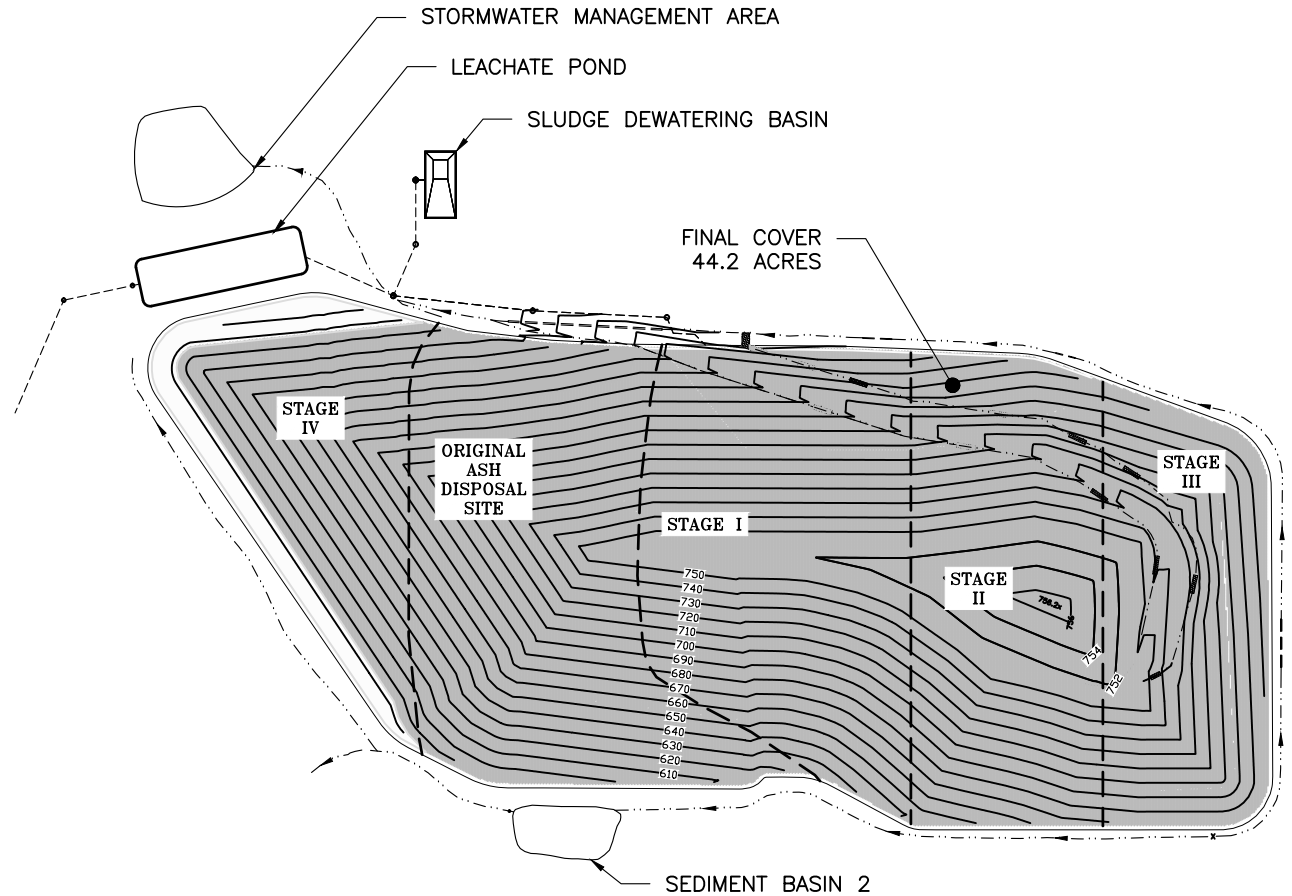


PHASE 5 FILLING AND DRAINAGE PLAN



PHASE 6 FINAL GRADING PLAN

FINAL COVER

LEACHATE TRANSFER PIPE AND MANHOLE

STORMWATER CHANNEL

PHASE 5

ACTIVE LANDFILL	= 5.6	ACRES
INTERMEDIATE COVER	= 5.5	ACRES
FINAL COVER	= 33.1	ACRES
TOTAL	= 44.2	ACRES

PHASE 6

ACTIVE LANDFILL	= 0.0	ACRES
INTERMEDIATE COVER	= 0.0	ACRES
FINAL COVER	= 44.2	ACRES
TOTAL	= 44.2	ACRES

400′ 0′ 400′ 800′

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DATE: August 2019

SCALE: 1"=400'

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DES. BY:	DRW. BY:	CHK. BY:	
DWG: Phasing Plan 5-6.dwg	TOWN OF TORREY	YATES COUNTY	NEW YORK

FIGURE 3-5

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3.6 SCHEDULE

Commencement of final closure activity is defined as cessation of waste disposal and completion of permit applications or other prerequisites with the NYSDEC {Part 257.102(e)(3)}. In order to meet the CCR Rule requirement that final closure activity be completed within six months of commencing final closure activities {Part 257.102(f)(1)(i)}, significant pre- final closure efforts and planning are required. The schedule lays out a path the facility would follow as the Landfill approaches the end of its site life.

A hypothetical schedule is presented in Table 3-1.

TABLE 3-1: CCR RULE CLOSURE SCHEDULE

Task	Duration
Preparation of Required Reports and Final Design	Six Months
NYSDEC Review and Approval Process	Four Months
Construction Contractor Bidding and Selection	1.5 Months
CLOSURE NOTIFICATION	One Day
Final Cover Construction	Five Months
Closure Construction Certification	One Month
CONSTRUCTION COMPLETION NOTIFICATION	One Day
Record Amended Deed	30 Days
NOTIFICATION OF AMENDED DEED	One Day

In the event final closure cannot be completed within the six-month time, the Rule allows for two one-year extensions. Extension requests, if necessary, will include a narrative discussion supporting the request, such as weather delays, shortened construction season or delays caused by coordination with other agencies.

4 CERTIFICATION

"I hereby certify that I have reviewed the closure plan for the Lockwood Ash Landfill, owned and operated by Lockwood Hills LLC, and the requirements in federal regulation 40CFR Part 257 Subpart D - Standards for the Disposal of Coal Combustion Residuals (CCR) in Landfills and Surface Impoundments published April 17, 2015 and amended on March 15, 2018. The proposed closure plan has been designed and constructed to meet the requirements specified for CCR units in 40CFR 257.102(b)- Criteria for Conducting The Closure Or Retrofit of CCR Units – Written Closure Plan. Any future revisions or updates to this plan will be certified and added to the facility's operating record."

I am a duly licensed professional engineer in the State of New York.

James A Daigler, P.E.

NYSPE LIC # 061689

5 REFERENCES

2018 Annual Report, Lockwood Ash Disposal Site, Facility No. 62N01, prepared by Daigler Engineering, P.C., March 2019.

Stormwater Separation Plan, Lockwood Ash Disposal Site, prepared by Daigler Engineering, P.C., rev June 2016.

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