



December 21, 2018

Mr. Jeff Pittman, PE
Cooperative Energy
P.O. Box 15849
Hattiesburg, MS 39402

Re: Annual CCR Landfill Inspection Report for 2018 Revision 1
R.D. Morrow, Sr. Power Generating Station
Purvis, Lamar County, Mississippi

Dear Mr. Pittman:

Cooperative Energy (formerly South Mississippi Electric Power Association) retained Environmental Management Services, Inc. (EMS) to conduct the annual inspection for the coal combustion residuals (CCR) landfill at the R.D. Morrow, Sr. Generating Station in Purvis, Mississippi. The purpose of this report is to comply with the air criteria in the federal Coal Combustion Residual Rule (CCR Rule) 40 CFR 257.84(b)(1) and (b)(2) requiring an annual inspection of the CCR landfill at the subject property.

1.0 Introduction

EMS performed the CCR landfill inspection on December 7, 2018 and a land elevation survey was performed on September 11, 2018. The review of available existing information, inspection summary, and conclusions regarding changes in landfill geometry, CCR volume, and the structure, operation, stability, and safety of the landfill are summarized herein.

The CCR Rule requirements for the annual landfill inspection include:

- A review of available information regarding the status and condition of the CCR unit [257.84 (b)(1)(i)]
- A visual inspection of the CCR unit to identify signs of distress or malfunction [257.84(B)(1)(ii)]
- An inspection report that includes the following:
 - Changes in geometry since the last inspection [257.84 (b)(2)(i)]
 - Approximate volume of CCR in unit at time of inspection [257.84 (b)(2)(ii)]
 - Appearance of actual or potential structural weakness of the CCR unit, in addition to any existing conditions that are disrupting or have the potential to disrupt the operation and safety of the CCR unit [257.84 (b)(2)(iii)]
 - Any other changes which may have affected the stability or operation of the CCR unit since the last inspection [257.84 (b)(2)(iv)]

Cooperative Energy must notify the Mississippi Department of Environmental Quality (MDEQ) Director within 30 days of placing the CCR Landfill Annual Inspection Report in the operating record and posting to the CCR web site (40 CFR 257.106 and 257.107).

The landfill site is located in the N1/2 of the NE1/4 of Sec.21, T3N, R14W, in Lamar County, Mississippi, as shown on the Site Location Map presented as **Figure 1**. The site is located at latitude 31° 12' 40" and longitude -89° 23' 53". The approximately 72 acre permitted landfill site is located within the 1,200 acre R.D. Morrow, Sr. Generating Station property. The permitted landfill area is shown on the Existing Site Plan presented as **Figure 2**. The 72 acre permitted landfill area includes approximately 46 acres of existing landfill permit and a proposed 26 acre expansion area located to the west of the existing landfill. None of the expansion area has been constructed at this time.

The CCR landfill consists of various cells and partially capped areas as shown in the Figure 2 site plan. An aerial photograph showing the landfill area is shown in **Figure 3**. The entire existing operating footprint of the landfill is regulated as an "existing CCR landfill" in accordance with the definitions in the CCR Rule. The proposed expansion will be classified as a new or lateral expansion of the CCR landfill. However, the landfill also operates under a solid waste permit issued by the Mississippi Department of Environmental Quality.

2.0 Review of Available Information

EMS has worked for Cooperative Energy providing services for over 10 years related to the design, construction, operation, and monitoring of the CCR landfill, and therefore, have a great degree of familiarity with the landfill and relevant records. EMS has also performed professional land surveys of the landfill to calculate filled and available volumes on an approximately annual basis for the past several years. In preparing this year's volume estimate EMS had direct access to prior volume survey records. Other information was available for review as needed for this annual inspection and report.

3.0 Inspection Summary

The EMS personnel, Jeremy Van Slyke, performed the annual landfill inspection on December 7, 2018. The inspection findings are summarized in the following sections.

A landfill sector index map showing the various portions of the active landfill with alphanumeric sector labels is attached as **Figure 4**. At the time of the inspection, CCR materials had recently been placed in Sector F as shown on the index map. In preparation to repower the plant, remaining unburned coal from the coal pile is being placed into Sector F, as approved by the MDEQ.

3.1 Vegetation

Healthy grassy vegetation is present on all sectors of the landfill except the active working face area, Sector F, the top surface of the western cell designated as Sector A, and scattered locations where invasive grasses (including Cogon grass) have been eradicated. The grassy areas are mowed with a bush hog several times per year. No trees or woody vegetation are present on the landfill surfaces or capped areas.

The earthen drainage ditches along the south side of the landfill are generally clear of vegetation and those ditches drained uniformly eastward to the serpentine ditch treatment system.

The eastern edge of Sector A2 which had seepage during the 2017 inspection contained very little seepage during the 2018 inspection, and conditions are better than 2017. A small seep was identified at the

western toe of Sector A4. Active seeps with associated erosion were identified on the northern boundary of Sector A1. This condition and planned corrective measures are described further in Section 8.0 below.

3.2 Erosion

Erosion was noted in December 2018 within seepage areas along the northern boundary of Sector A1. Early stage rill erosion that was beginning to form during the 2016 annual inspection could not be located during the 2017 and 2018 inspections. Increased grass growth and routine maintenance and mowing appears to have mitigated the prior erosion rills. Therefore, no corrective measures are required for this area. The seeps and erosion on the northern boundary of Sector A1 are addressed in Section 8.0 below.

3.3 Storm Water Management

Storm water management around the landfill consists primarily of a system of earthen perimeter ditches that route non-contact storm water into the serpentine treatment system. Seepage of leachate from the northern boundary of Sector A1 and a limited amount of non-contact storm water runoff from closed areas including the northern half of Sector A1 and all of Sector A4 drain westward, then south into Black Creek. The storm water ditch on the north side of Sector A1 contains cattails and has somewhat reduced drainage efficiency toward its west end due to rip-rap velocity breaks in that area. Storm water runoff south of the landfill cells flowing toward the east is robust due to ditch maintenance.

3.4 Leachate Collection System

In the fourth quarter of 2017 Cooperative Energy applied to the MDEQ for permission to install permanent automated sump pumps and associated connecting piping along the southern border of the landfill leading to the serpentine ditch treatment system. MDEQ granted permission by letter reply. Cooperative Energy completed the pump installation project during 2018. The system is now operating.

3.5 Record Keeping

Cooperative Energy performs weekly inspections of the landfill as required by the CCR regulations. In addition to visual inspection of the landfill flow measurements from the automated sump pumps are collected and entered into an electronic database to track the leachate collection systems effectiveness.

4.0 Changes in Geometry

Given that most of the landfill is covered by lush grassy vegetation, it is readily apparent from visual inspection where CCR has been placed recently. The inspection indicated that CCR had recently been filled only in Sector F.

The EMS licensed professional land surveyor performs elevation surveys of the landfill on an approximately annual basis. EMS performed the 2018 survey on September 11, 2018. EMS then used the survey data to create a digital elevation terrain model. Inspection of the model surface confirmed that CCR placement had been limited to Sector F.

5.0 CCR Volume

As described in the previous section, an AutoCAD® surface model was prepared based on an elevation survey of the landfill. The model surface was compared to the prior year model surface using the AutoCAD® Civil 3D package to calculate the change in volume from 2017 to 2018. The map representing the results of this effort is included as **Figure 5 – 2018 Airspace Calculations** showing airspace volume calculations.

The CCR volume in the Landfill as of September 11, 2018, is estimated to be approximately 2,153,000 cubic yards (CY). Approximately 9,500 CY of material was added to the landfill since the last survey conducted October 3, 2017. Based on the design volume and the latest topographic survey, approximately 1,061,000 CY of permitted airspace remains available in the developed portion of the landfill.

6.0 Structural Weakness and Disrupting Conditions

Based on a review of available information and the December 7, 2018 observations, EMS found no significant indications of structural weakness of the landfill. Seepage and erosion along Sector A1 northern boundary was identified, but this area has gravel-filled toe drains that were installed over 10 years ago to relieve hydrostatic pressure in that area. In addition saturated conditions, seepage, and bare soil were observed along a portion of the boundary between Sectors A2 and F. A small saturated area was identified on the western edge of Sector A4.

7.0 Changes Affecting Stability or Operations

Based on the inspections, survey, and review of records performed in association with this annual inspection, to our knowledge, there have been no changes in condition or operation that have affected stability or operation of the CCR landfill.

The plant is preparing for a repower project that will eliminate the use of coal as a fuel and will therefore stop the production of CCR materials for disposal in the CCR Landfill.

8.0 Recommendations

The CCR Rule requires deficiencies or releases to be remedied as soon as feasible in accordance with 257.84(b)(5) which states:

“If a deficiency or release is identified during an inspection, the owner or operator must remedy the deficiency or release as soon as feasible and prepare documentation detailing the corrective measures taken.”

While seepage conditions have been identified in and around Sector A, these conditions are not expected to disrupt the operation and safety of the CCR landfill given that they have been in steady state conditions for many years. We recommend that Cooperative Energy continue to perform weekly inspections of the landfill to monitor for any conditions that would indicate a change or worsening of the seepage conditions.

As described in Section 7.0, it is anticipated that as part of the repower project Cooperative Energy will initiate closure of the CCR Landfill. We recommend that improvements be constructed during the closure process that will mitigate the seepage conditions.

9.0 Closing

The inspection of the CCR landfill at the R. D. Morrow, Sr. Generating Station was conducted to satisfy the requirements of the federal CCR rule. Based on the field observations and a review of available information, EMS concludes that the design, construction, operation, and maintenance of the landfill with implementation of corrective measures for the identified deficiency will be consistent with recognized and generally accepted good engineering standards.

Please contact us at your convenience with any questions you may have. I can be reached at (601) 544-3674.

Sincerely,
Environmental Management Services, Inc.

Christopher T. Johnson, P.E., P.S.
Engineering Manager/Vice President
Mississippi Professional Engineer No. #15761



Date: 12/19/2018 REV. 1/18/2019

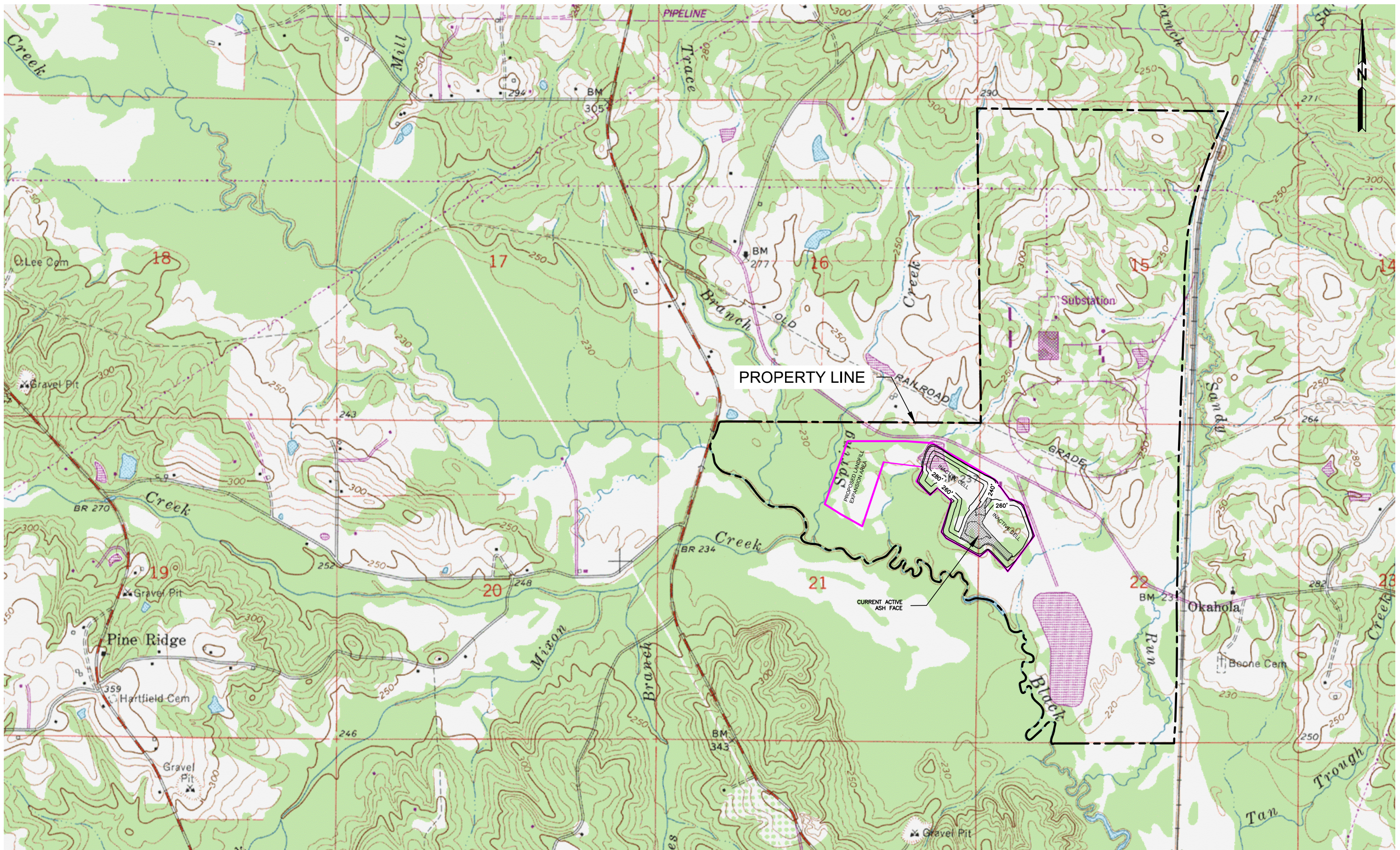
Attached Figures:

- Site Location Map
- Landfill Sector Index Map
- Site Plan
- Site Aerial Photo
- 2018 Airspace Calculations (at final capacity)

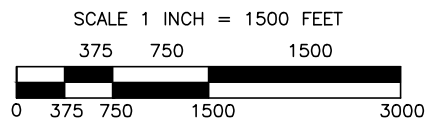
c: Ken Ruckstuhl, EMS

FIGURES





REFERENCE: 7.5 MIN. SERIES TOPOGRAPHIC MAP
PURVIS, MISSISSIPPI 1982



PREPARED FOR

SITE LOCATION
R.D. MORROW, SR. GENERATING PLANT
PURVIS, MISSISSIPPI

SHEET TITLE

DATE

12/20/2016

SCALE

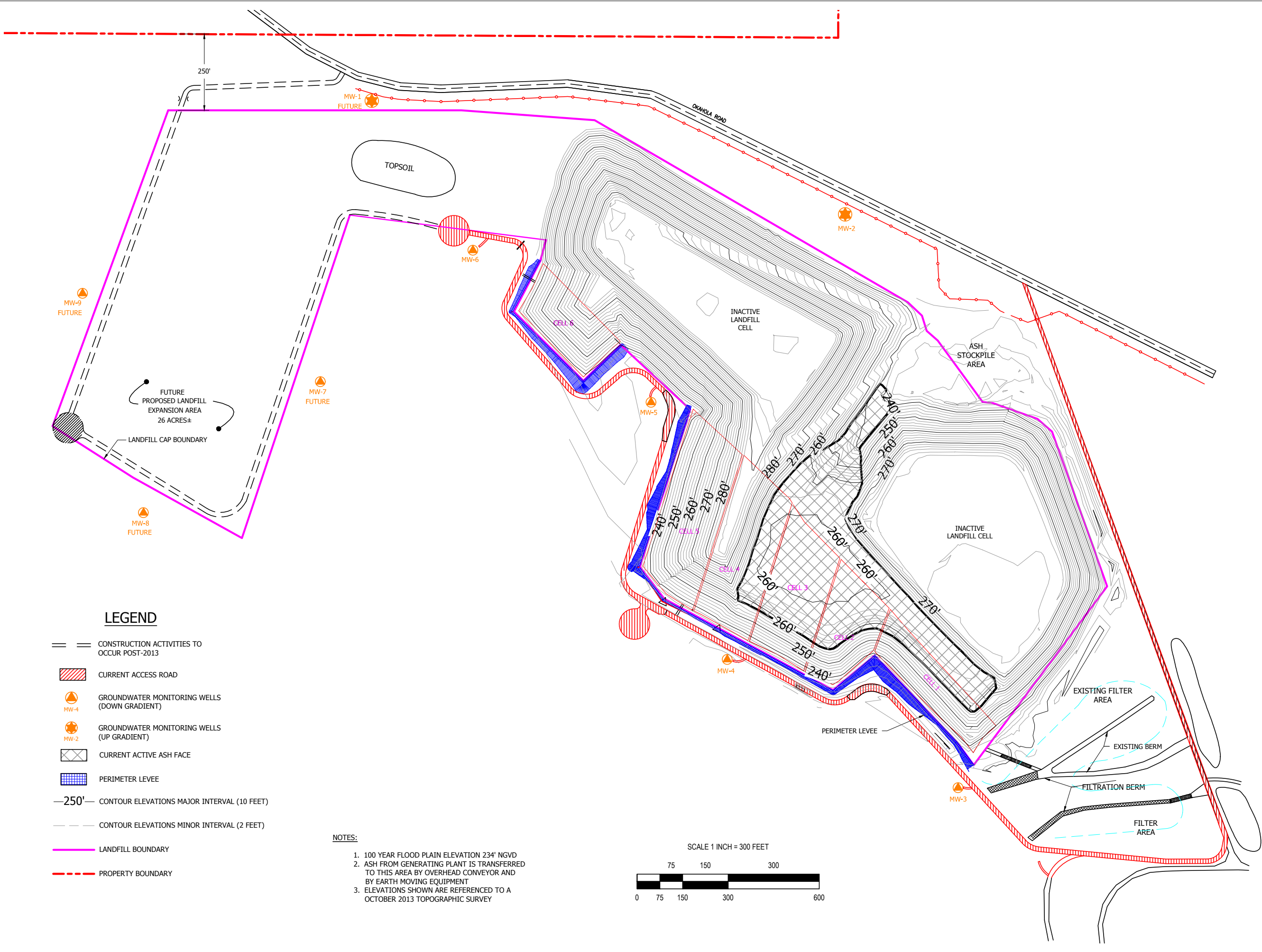
AS SHOWN

SHEET NO.

1

PROJECT NO.

SOU2-16-002

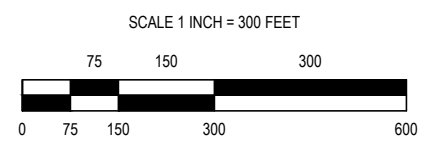


LEGEND

- == CONSTRUCTION ACTIVITIES TO OCCUR POST-2013
- ▨ CURRENT ACCESS ROAD
- ⊕ MW-4 GROUNDWATER MONITORING WELLS (DOWN GRADIENT)
- ⊕ MW-2 GROUNDWATER MONITORING WELLS (UP GRADIENT)
- ▨ CURRENT ACTIVE ASH FACE
- ▨ PERIMETER LEVEE
- 250'— CONTOUR ELEVATIONS MAJOR INTERVAL (10 FEET)
- CONTOUR ELEVATIONS MINOR INTERVAL (2 FEET)
- LANDFILL BOUNDARY
- - - PROPERTY BOUNDARY

NOTES:

1. 100 YEAR FLOOD PLAIN ELEVATION 234' NGVD
2. ASH FROM GENERATING PLANT IS TRANSFERRED TO THIS AREA BY OVERHEAD CONVEYOR AND BY EARTH MOVING EQUIPMENT
3. ELEVATIONS SHOWN ARE REFERENCED TO A OCTOBER 2013 TOPOGRAPHIC SURVEY



PREPARED FOR

SITE PLAN
R.D. MORROW, SR., GENERATING PLANT
PURVIS, MISSISSIPPI

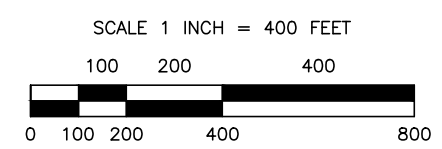
SHEET TITLE	
DATE	12/26/2017
SCALE	AS SHOWN
SHEET NO.	2
PROJECT NO.	SOU2-16-002



REFERENCE: AERIAL IMAGE
2012 GOOGLE EARTH
PURVIS, MISSISSIPPI

LEGEND

- LANDFILL BOUNDARY
- ◇— CHAIN LINK FENCE

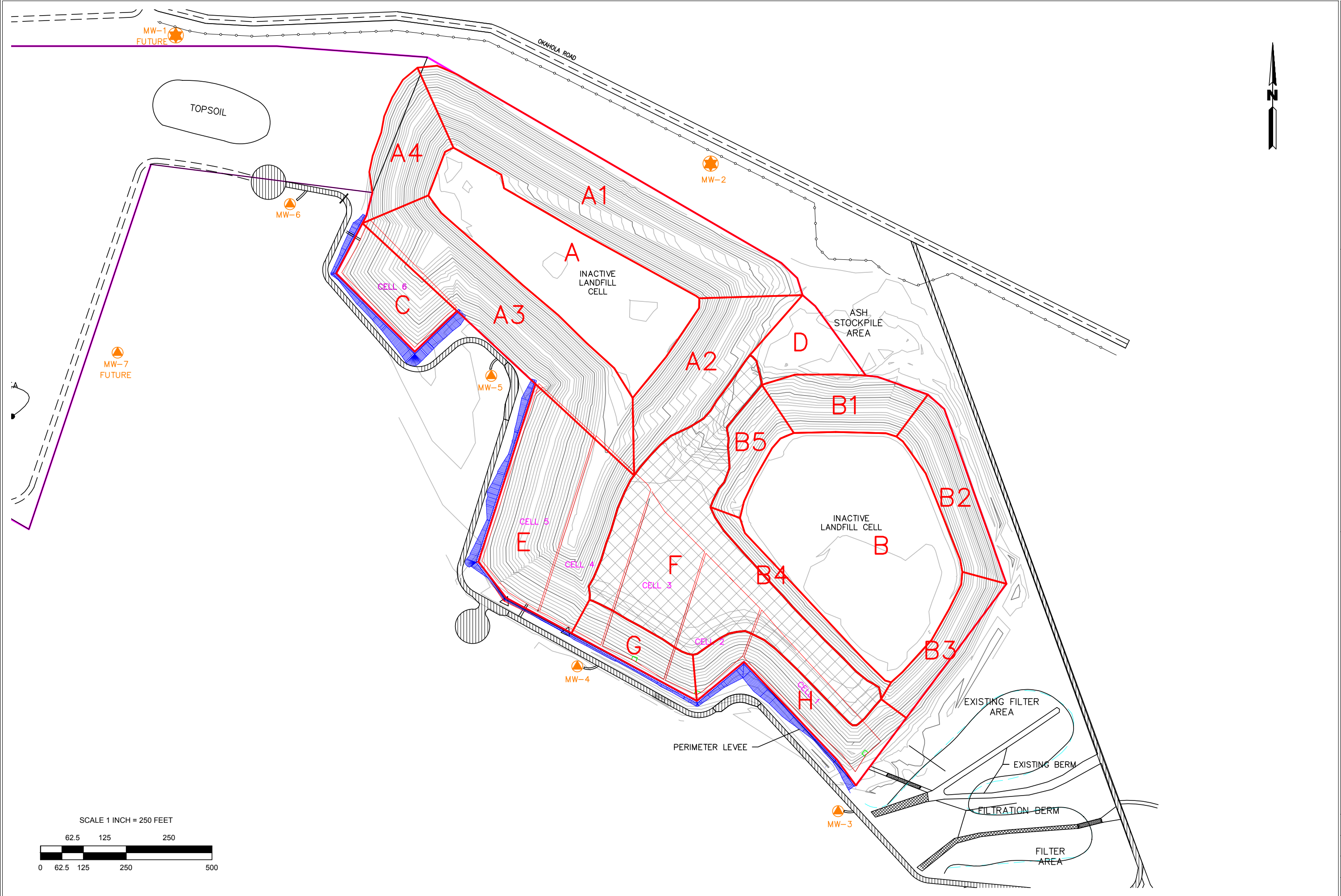


SHEET TITLE	AERIAL PHOTOGRAPH
DATE	12/20/2016
SCALE	AS SHOWN
SHEET NO.	3
PROJECT NO.	SOU2-16-002

R.D. MORROW, SR., GENERATING PLANT
PURVIS, MISSISSIPPI

PREPARED FOR





MW-1
FUTURE

TOPSOIL

OKAHOLA ROAD

MW-6

MW-2

MW-7
FUTURE

MW-5

MW-4

MW-3

A4

A1

A

INACTIVE
LANDFILL
CELL

CELL 6
C

A3

D

ASH
STOCKPILE
AREA

A2

B1

B5

INACTIVE
LANDFILL
CELL

B2

CELL 5
E

B

CELL 4

F

B4

CELL 3

G

CELL 2

B4

B3

PERIMETER LEVEE

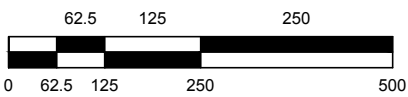
EXISTING FILTER
AREA

EXISTING BERM

FILTRATION BERM

FILTER
AREA

SCALE 1 INCH = 250 FEET



PREPARED FOR

LANDFILL SECTOR INDEX MAP
R.D. MORROW, SR., GENERATING PLANT
PURVIS, MISSISSIPPI

SHEET TITLE

DATE 12/20/2016

SCALE AS SHOWN

SHEET NO. 4

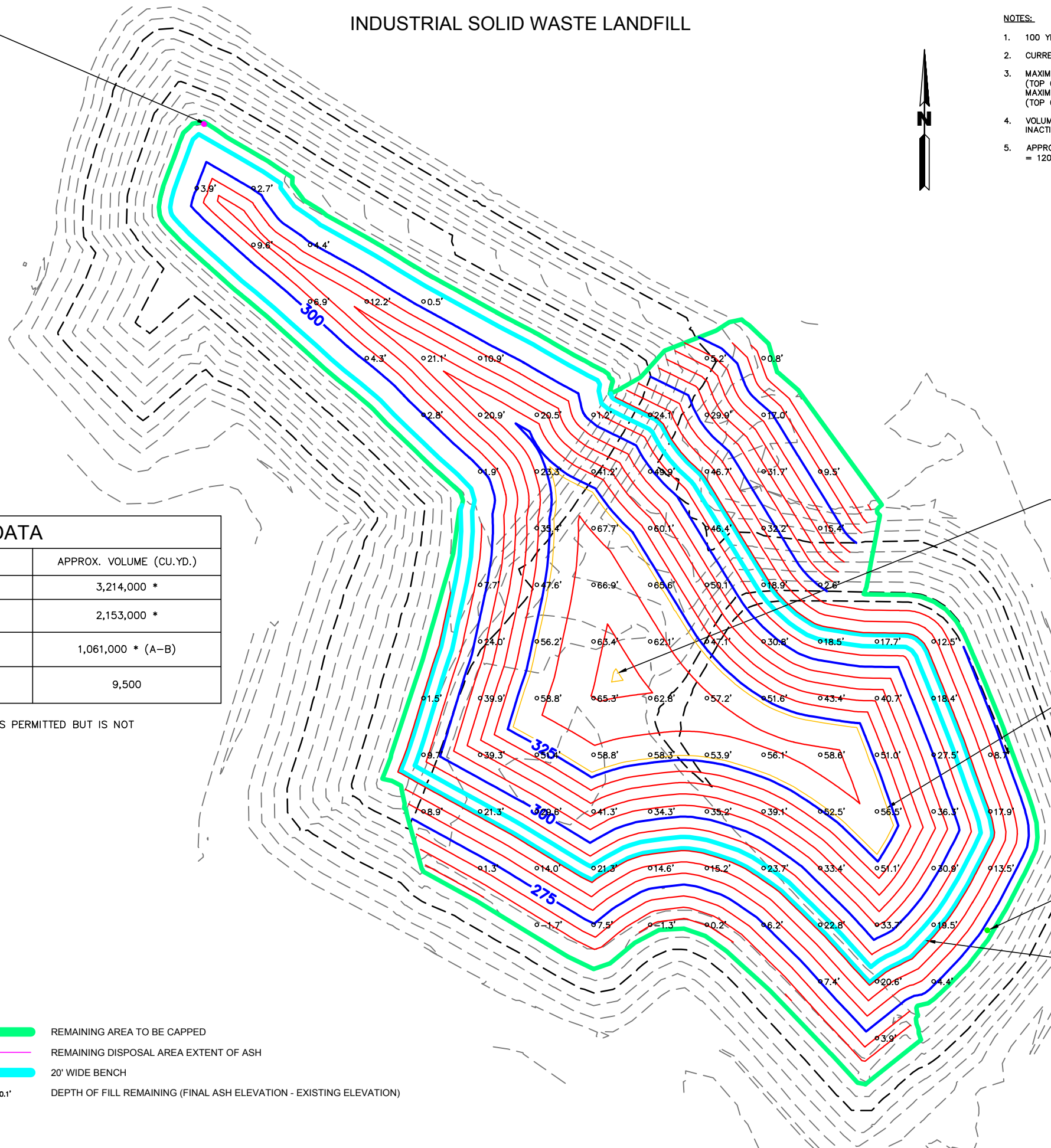
PROJECT NO. SOU2-16-002

INDUSTRIAL SOLID WASTE LANDFILL

WESTERN ELEVATION POLE
FLANGE ELEVATION = 296.03'
FINAL ELEVATION = 330.00'
APPROXIMATE LENGTH = 33.0'
POLE NOT INSTALLED

NOTES:

- 100 YEAR FLOOD PLAIN ELEVATION 234' NGVD
- CURRENT SURVEY DATA WAS OBTAINED SEPTEMBER 11, 2018
- MAXIMUM HEIGHT OF THE LANDFILL (TOP OF CLAY CAP COVER ELEVATION) = 340.0'
MAXIMUM HEIGHT OF THE LANDFILL WASTE (TOP OF WASTE ELEVATION) = 337.0'
- VOLUME OF WASTE IN THE INACTIVE CELL = 603,688 CU.YD.
- APPROXIMATE VOLUME OF COVER NEEDED TO CAP REMAINING LANDFILL = 120,000 CU.Y.D (INCLUDES 2.0' CLAY CAP AND 1.0' TOPSOIL COVER)



MAXIMUM FLY ASH EXTENTS
ELEVATION = 337.0'

4:1 TOP OF ASH EXTENTS
ELEVATION = 327'

EASTERN ELEVATION POLE
FLANGE ELEVATION = 275.10'
FINAL ELEVATION = 330.00'
APPROXIMATE LENGTH = 54.9'
POLE NOT INSTALLED

20' WIDE FLY ASH BENCH
ELEVATION = 291.0'

2018 AIRSPACE DATA

DESCRIPTION	APPROX. VOLUME (CU.YD.)
A) GROSS AIRSPACE PERMITTED FOR CONSTRUCTED CELLS	3,214,000 *
B) VOLUME OF WASTE IN ENTIRE LANDFILL	2,153,000 *
C) AIRSPACE AVAILABLE FOR DISPOSAL AS OF SEPT, 11 2018	1,061,000 * (A-B)
D) WASTE PLACED FROM 10/3/2017 TO 9/11/2018	9,500

* DOES NOT INCLUDE WESTERN SECTION (±26 ACRES THAT IS PERMITTED BUT IS NOT PLANNED FOR DEVELOPMENT AT THIS TIME)

LEGEND

- EXISTING GRADE ELEVATION CONTOURS**
- 250' --- MAJOR INTERVAL (25-FT)
 - 245' --- MINOR INTERVAL (5-FT)
- FINISHED GRADE ELEVATION CONTOURS (TOP OF ASH)**
- 275' --- MAJOR INTERVAL (25-FT)
 - 270' --- MINOR INTERVAL (5-FT)
- 0.1' --- REMAINING AREA TO BE CAPPED
 - 0.1' --- REMAINING DISPOSAL AREA EXTENT OF ASH
 - 0.1' --- 20' WIDE BENCH
 - 0.1' --- DEPTH OF FILL REMAINING (FINAL ASH ELEVATION - EXISTING ELEVATION)

