



Permit No.	Scan Date	DIN
CCB0072	October 20, 2015	25157

3195 Pine Hall Road
Belews Creek, NC 27009

RECEIVED
October 19, 2015
Solid Waste Section
Asheville Regional Office

336-215-4576

October 19, 2015

North Carolina Department of Environmental Quality
Division of Waste Management
Solid Waste Section
2090 U.S. Highway 70
Swannanoa, North Carolina 28778

Attn: Mr. Larry Frost

Re: Marshall Steam Station Industrial Landfill Structural Fill
Structural Fill Permit No. CCB0072
Marshall Steam Station
Terrell, North Carolina 28682

Dear Mr.Frost,

On June 3, 2015 during a routine inspection, facility staff at Marshall Steam Station noticed a potential area of nonconformity located in the southwestern portion of the Industrial Landfill (Phases 3 & 4) Structural Fill (ILF SF) near the toe. The ILF SF Closure Plan (CCB0072) was submitted to the Solid Waste Division on November 7, 2013.

On June 10 and July 16, Duke Energy submitted investigation and repair plans for the area of slope non-conformity, respectively, that were subsequently approved by the Division June 11 and July 22.

Attached you will find the Construction Quality Assurance Repair Report for the slope non-conformity. This repair was overseen by and report prepared by AECOM under the direction of Duke Energy.

Duke Energy is committed to environmental stewardship and cooperation with the Division regarding the operation, maintenance, safety, and integrity of all of its facilities. We look forward to continuing to work with you regarding environmental concerns.

If there are any questions regarding this request, please contact me at (336) 215-4576.

Respectfully submitted,

Kimberlee Hutchinson, PE
Environmental Services

cc (via e-mail): Ed Mussler, NCDEQ
Shawn McKee, NCDEQ
Elizabeth Werner, NCDEQ
Kyle Baucom, Duke Energy
Tim Russell, Duke Energy
Tyler Dubose, Duke Energy
Ed Sullivan, Duke Energy

Memorandum

To Kyle Baucom, P.E., Duke Energy
Tim Russell, P.E., Duke Energy
Jackson Rollins, P.E., Duke Energy Project: 60431225

CC Gabe Lang - AECOM

Subject Marshall Station Industrial Landfill/Structural Fill
FINAL Report of Repair of Nonconforming Areas– Issue MAR-128

From John Bove, P.E.

Date October 6, 2015

This Technical Memorandum addresses the repairs to the slope non-conformity at the southwest corner of the future Industrial Landfill at Marshall Station – Issue MAR-128. At the request of Duke Energy, AECOM investigated the area with hand augers and test pits in June 2015 and submitted a report with recommendations to Duke Energy dated July 16, 2015. Recommendation included:

- Remove soft saturated ash and dispose in a properly permitted facility,
- Place compacted soil to restore Industrial Landfill slopes and to maintain required soil cover thickness,
- Remove the temporary basin located just above the crest of the slope to eliminate standing water and a potential source of infiltration into the ash,
- Remove the existing down pipe and construct a rip-rap lined swale to manage surface water runoff,
- Monitor the performance of the impacted area prior to and after repairs are completed.

Survey data obtained to monitor the surface of the slope after the June 2015 investigation indicated that no measurable slope movements were detected during June and July 2015. These data, as well as visual inspections by AECOM and Duke Energy staff, indicate that the slope area appears to be stable. Repairs were recommended to allow for routine maintenance and access to the area.

1.0 Background

In early June 2015, Duke Energy staff encountered a small area of exposed ash and soft cover soil near the toe of slope of the structural fill near the future Cell 3/4 Industrial Landfill area. The project location is shown on the attached **Figure 1**.

On June 11, 2015 AECOM Geotechnical Engineers advanced eighteen hand auger borings at locations on the crest, surface, and toe of slope in the area of interest. On June 12, 2015 test pit excavations were performed at seven locations to visually examine the condition of the cover soil and ash. AECOM found areas where soil cover was less than the prescribed 18-inch minimum thickness. In addition, portions of the investigation area were underlain by soft ash and pumping under the weight of the mini-excavator was observed. The areas requiring excavation of the ash or placement of additional fill were identified in the AECOM July 16, 2015 AECOM report.

2.0 Repair Construction

Duke Energy contracted with Earnhardt Grading (Earnhardt) to complete the repairs necessary to stabilize the slope area, place the required soil cover and complete the recommended modifications to the surface water management system. AECOM was contracted to monitor the repairs, to identify the limits of the soft ash areas requiring removal and to prepare this summary report. A Photo Log compiled by the AECOM representative for the Repairs is provided in Attachment 1. Daily Activity and Observation Reports for each day that AECOM was on site are provided in Attachment 2.

After completion of the Readiness Review, Earnhardt mobilized to the site on August 17, 2015 and installed silt fence adjacent to the toe of slope from west of the down pipe to the treeline. A full time Site Safety Officer was provided by Earnhardt. Using the tracks and bucket of an excavator, Earnhardt probed for loose/saturated ash areas starting at the base of the slope west of the down pipe. These areas were excavated until the remaining ash appeared to be firm. Ash and cover soil that was co-mingled with ash was loaded into off-road dump trucks and hauled to the FGD Landfill on the Marshall Station.

The lateral and vertical extents of the soft/saturated ash were established based upon visual observation by the AECOM representative and the Earnhardt Superintendent. The soft/wet areas were limited in size and generally agree with the areas identified by AECOM during the June 2015 investigation (see Daily Activity and Observation Reports, Attachment 2).

Approximately 26 loads of wet or soft ash were removed and hauled to the FGD Landfill on August 17 and 18, 2015. The approximate limits of the excavation on the slope due to the presence of soft or wet ash are provided in the Daily Activity and Observation Reports, Attachment 2, and duplicated on Figure 2. Once it was confirmed visually that the soft/ash was removed, Earnhardt graded the area in preparation for placement of cover soil. As can be seen on Figures 3 and 4, ash was excavated in the area west of the down pipe from the toe of slope to near the crest.

Once the exposed subgrade in the excavation area was graded and prepared, Earnhardt hauled silty fine sand soil to the work area and spread the soil in nominal 8 to 10-inch thick lifts. Each lift was spread using a dozer (see Figure 5) and compacted using a CAT 563 penetrating foot compactor. Earnhardt contracted with ESP Associates to perform in-place density measurements. Compaction was performed until testing indicated that the lift conformed to project criteria (minimum 95% maximum Standard dry density, ASTM D-698

using drive tubes). The ESP Associates report outlining the testing completed and verifying compliance with project criteria is provided in Attachment 3.

As the slope repairs were completed, Earnhardt moved to the crest of the slope on August 19, 2015 to begin removing the divider dike in the temporary stormwater basin. The excavator was used to track over the work area to look for indications of soft or pumping ground surface. Aggregate and soil were removed in these areas to expose the ash subgrade. The ash located at the crest of the slope and beneath the basin was generally dry and firm. There was no visual indication that significant infiltration from the basin into the ash had occurred.

Additional ash was removed and disposed to allow for adequate soil cover (minimum 18-inches) to be placed. Cover soil was hauled to the work area, placed, spread and compacted by Earnhardt. ESP Associates tested for in-place density. The crest elevation of the slope was lowered to both provide adequate soil cover depth and to provide more favorable grades for the new swale.

The former basin area was graded to meet adjacent grades to prevent ponding of surface water runoff. A nominally 10-ft wide swale was graded to connect the existing swale draining the western perimeter of the structural fill. The swale was constructed on the southern slope to replace the down drain and was extended downstream to the existing rip rap lined swale leading to the Ash Basin. The adjacent Industrial Landfill areas were graded to drain to the swale. A photo of the swale at the crest of the slope showing the re-grading of the crest of the slope is shown on Figure 6.

Beginning on August 21, 2015, Earnhardt compacted and fine graded the base of the swale, placed a separator geotextile (Mirafi 180N) and nominal 18-inches of Class I rip rap over the surface of the swale. Rip rap removed from the work area prior to ash removal was re-used for the swale and additional rip rap was imported as required.

The drainage swale was completed on August 25, 2015. The AECOM representative excavated a series of hand auger probes in the completed slope area on August 26, 2015 to verify the depth of cover soil in place. At each location tested by AECOM, the depth of cover soil was greater than 18-inches and conformed to project criteria.

Earnhardt completed stabilization and seeding between September 1 and 3, 2015. Duke Energy contracted with WSP to perform an as-built survey of the completed work on September 3, 2015. The WSP as-built survey is provided in Attachment 4.

Duke Energy provided photographs of the completed and seeded work area. Representative photos are provided for reference on Figures 7 through 9.

3.0 Conclusions

Based upon our observations and test data provided by Earnhardt and Duke Energy, the MAR-128 slope repair has been completed in accordance with the recommendations provided in the July 16, 2015 AECOM Report. Soft ash, where encountered, was removed and replaced with controlled compacted fill. Soil cover over the ash in the work area exceeds

the minimum required thickness. The temporary basin and down pipe were removed and replaced with a rip rap armored swale. The work area was seeded upon completion.

Routine monitoring of the area is recommended. Duke Energy should anticipate the need to repair localized erosion areas and re-seed as needed until the vegetation is well established. Until the slope area is stabilized, it is recommended that the existing silt fence remain in place.

Attachments:

Attachment 1 – AECOM Photo Log

Attachment 2 – AECOM Daily Activity and Observation Reports

Attachment 3 – Construction Materials Testing Services Report, September 3, 2015, prepared by ESP Associates

Attachment 4 – “Topographic Survey Marshall –Ind Landfill Cells 3&4” (As-built survey) prepared by WSP

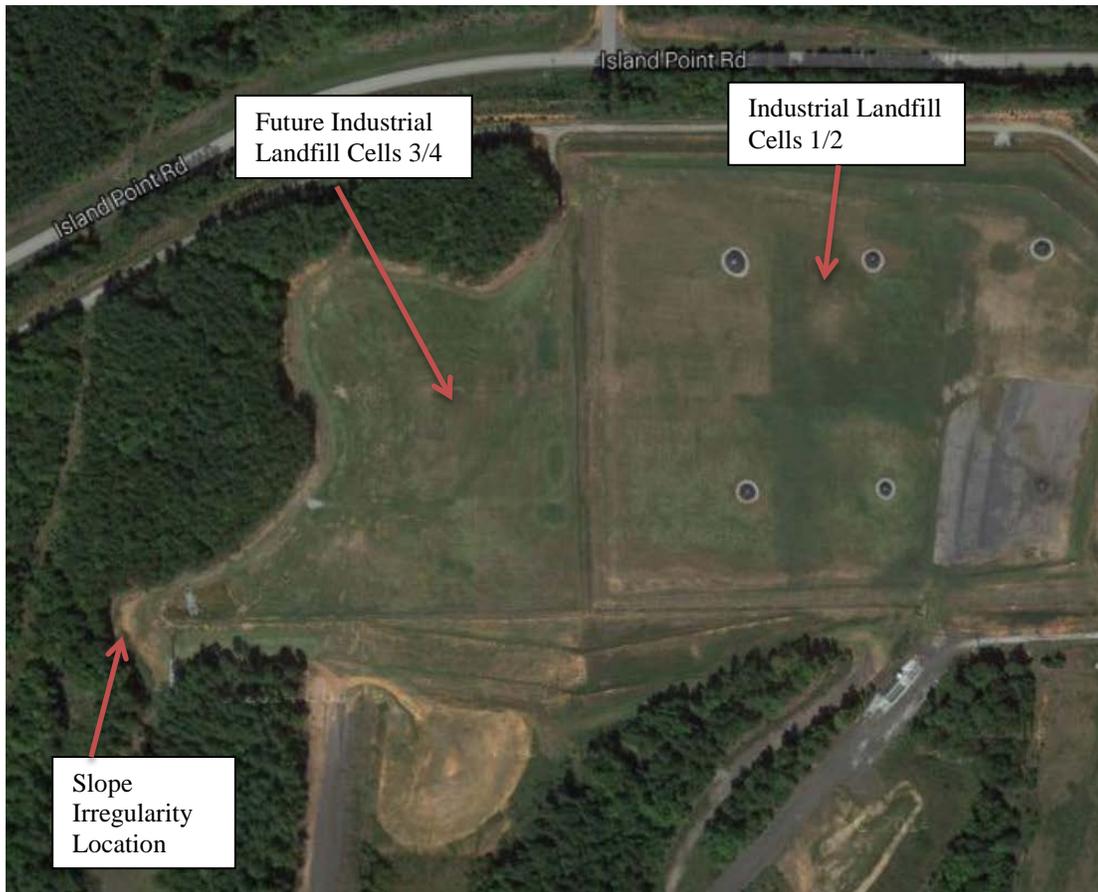
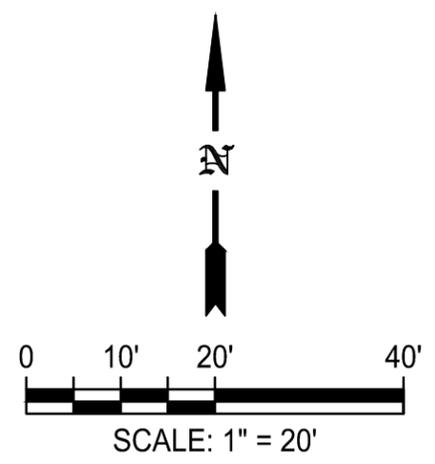


Figure 1 – Location Plan



NOTE:
 1. CONTOURS SHOWN HERE ARE PER FINAL COVER SURVEY BY WSP DATED OCTOBER 16, 2013.

- LEGEND
- ⊕ HAND AUGERS ('A' POINT)
 - TEST PIT ('TP' POINT)
 - 3 ⊕ MONITORING HUB SET
 - FIRM ASH
 - SOFT ASH
 - ASH NOT ENCOUNTERED
 - ▨ SOFT/ WET ASH EXCAVATED

△ TBM #1071:
 841.22' - NAIL

AECOM				
MARSHALL STEAM STATION				
DUKE ENERGY				
MARSHALL INDUSTRIAL LANDFILL				
APPROXIMATE LIMITS OF EXCAVATION				
DRAWN BY: SS	CHECKED BY: JAB	PROJECT No: 60441887	DATE: 10/5/2015	FIGURE No: 2



Figure 3 (left) – Removal and loading of ash west of down drain near toe of slope. Figure 4 (right) - Northern limits of slope excavation, including all of wet ash encountered. Note thickness of cover soil near crest of slope is less than project minimum.



Figure 5 – Placement and spreading of soil cover on south slope of repair area.



Figure 6 – View of finished swale at top of slope looking generally south. Existing pipe to the Ash Basin is visible in the background.



Figure 7 – View of completed rip rap lined swale and seeded areas looking north (Photo provided by Duke Energy)



Figure 8 – View of completed rip rap lined swale and seeded areas looking north (Photo provided by Duke Energy)



Figure 9 – View of completed rip rap lined swale and seeded areas looking west (Photo provided by Duke Energy)



ATTACHMENT 1
AECOM Photo Log

Client Name:
Duke Energy – Marshall Station

Site Location:
Catawba Co., North Carolina

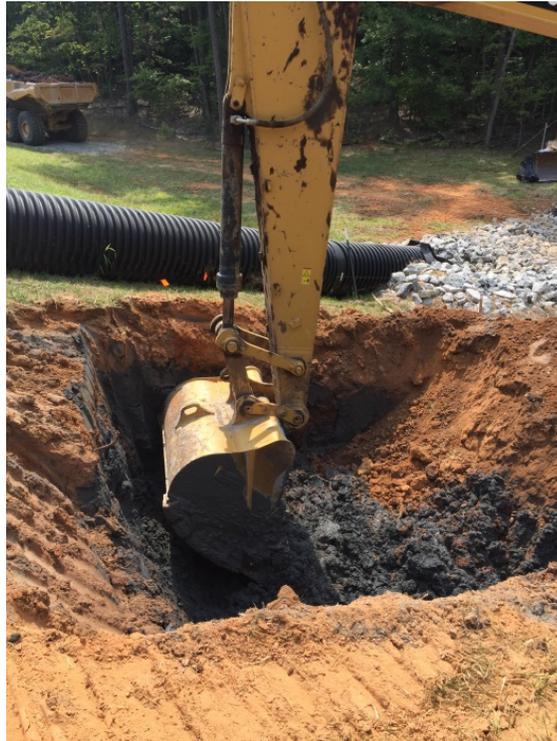
Project No.
60431225
8/17/2015 to
8/25/2015

Description:

Photo 1 – Beginning excavation to locate soft ash for removal. West of down pipe near toe of Industrial Landfill slope. 8/17/15



Photo 2 – Continue excavating to locate grade for ash removal. 8/17/15



Client Name:
Duke Energy – Marshall Station

Site Location:
Catawba Co., North Carolina

Project No.
60431225
8/17/2015 to
8/25/2015

Description:

Photo 3 – Soft ash encountered and removed west of down pipe.
8/17/2015



Photo 4 – Excavating moving to the west to establish western extents of soft ash. 8/17/15



Client Name:
Duke Energy – Marshall Station

Site Location:
Catawba Co., North Carolina

Project No.
60431225
8/17/2015 to
8/25/2015

Description:

Photo 5 – Extent of excavation west of down pipe prior to preparation for placement of compacted fill. Looking west. 8/18/15



Photo 6 – Extent of excavation west of down pipe prior to preparation for placement of compacted fill looking north. 8/18/15



Client Name:
Duke Energy – Marshall Station

Site Location:
Catawba Co., North Carolina

Project No.
60431225
8/17/2015 to
8/25/2015

Description:

Photo 7 – Excavation west of down pipe ready for placement of compacted fill. 8/18/15



Photo 8 – Eastern end of excavation west of down pipe ready for placement of compacted fill. 8/18/15



Client Name:
Duke Energy – Marshall Station

Site Location:
Catawba Co., North Carolina

Project No.
60431225
8/17/2015 to
8/25/2015

Description:

Photo 9 – Placement of initial lift of backfill in area west of down pipe. 8/18/15



Photo 10 – Compaction of initial lift of backfill in area west of down pipe. 8/18/15.



Client Name:
Duke Energy – Marshall Station

Site Location:
Catawba Co., North Carolina

Project No.
60431225
8/17/2015 to
8/25/2015

Description:

Photo 11 – Placement and compaction of backfill soil approximately 50% completed. 8/18/15



Photo 12 – Compacting additional lift. 8/18/15



Client Name:
Duke Energy – Marshall Station

Site Location:
Catawba Co., North Carolina

Project No.
60431225
8/17/2015 to
8/25/2015

Description:

Photo 13 – Beginning to remove sediment basin berm at top of slope. 8/19/15



Photo 14 – Compaction testing final lift on main excavation. 8/19/15



Client Name:
Duke Energy – Marshall Station

Site Location:
Catawba Co., North Carolina

Project No.
60431225
8/17/2015 to
8/25/2015

Description:

Photo 15 – Removing wet/soft ash from beneath drain pipe and to east of down pipe. Looking east.
8/19/15



Photo 16 – Final excavation beneath and to the east of down pipe. 8/19/15.



Client Name:
Duke Energy – Marshall Station

Site Location:
Catawba Co., North Carolina

Project No.
60431225
8/17/2015 to
8/25/2015

Description:

Photo 17 – Placement and compaction of backfill soil east of down pipe location. 8/19/15



Photo 18 – Finish grading of compacted backfill located east of basin down pipe location. Section of pipe remains to provide temporary drainage. 8/19/15



Client Name:
Duke Energy – Marshall Station

Site Location:
Catawba Co., North Carolina

Project No.
60431225
8/17/2015 to
8/25/2015

Description:

Photo 19 – Geotextile placed on slope temporary for erosion protection overnight. 8/19/15-8/20/15



Photo 20 – Excavating crest of slope for removal of remainder of down pipe and grading for rip rap swale. 8/21/15



Client Name:
Duke Energy – Marshall Station

Site Location:
Catawba Co., North Carolina

Project No.
60431225
8/17/2015 to
8/25/2015

Description:

Photo 21 – Crest of slope after removal of top section of down pipe. 8/21/15

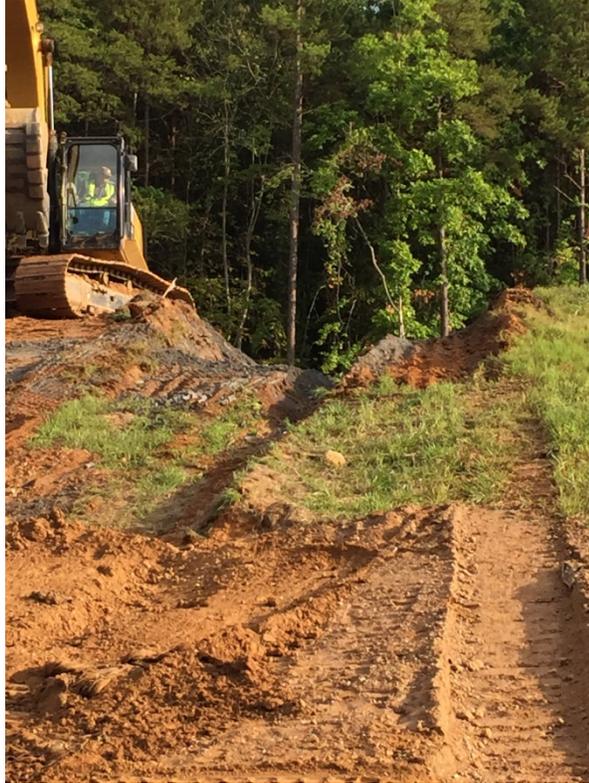


Photo 22 – Excavating drainage swale on top of slope looking southwest. Slopes approximately 1-ft of fall every 10'. 8/21/15



Client Name:
Duke Energy – Marshall Station

Site Location:
Catawba Co., North Carolina

Project No.
60431225
8/17/2015 to
8/25/2015

Description:

Photo 23 – Placing geotextile and initial section of rip rap at far eastern end of new drainage swale. 8/21/15



Photo 24 – New rip rap lined drainage swale looking southwest. 8/21/15



Client Name:
Duke Energy – Marshall Station

Site Location:
Catawba Co., North Carolina

Project No.
60431225
8/17/2015 to
8/25/2015

Description:

Photo 25 – Additional 1-foot of compacted soil cover placed on western slope looking northeast. 8/21/15



Photo 26 – Excavating crest of slope for new drainage swale. 8/22/15



Client Name:
Duke Energy – Marshall Station

Site Location:
Catawba Co., North Carolina

Project No.
60431225
8/17/2015 to
8/25/2015

Description:

Photo 27 – Excavating main ditch line for swale through crest of slope. 8/22/15



Photo 28 – Placement of soil cover over swale in former basin area to provide minimum required cover. 8/22/15



Client Name:
Duke Energy – Marshall Station

Site Location:
Catawba Co., North Carolina

Project No.
60431225
8/17/2015 to
8/25/2015

Description:

Photo 29 – Geotextile placement in swale near crest of the slope.
8/24/15



Photo 30 – Excavating of swale on main slope. 8/21/15



Client Name:
Duke Energy – Marshall Station

Site Location:
Catawba Co., North Carolina

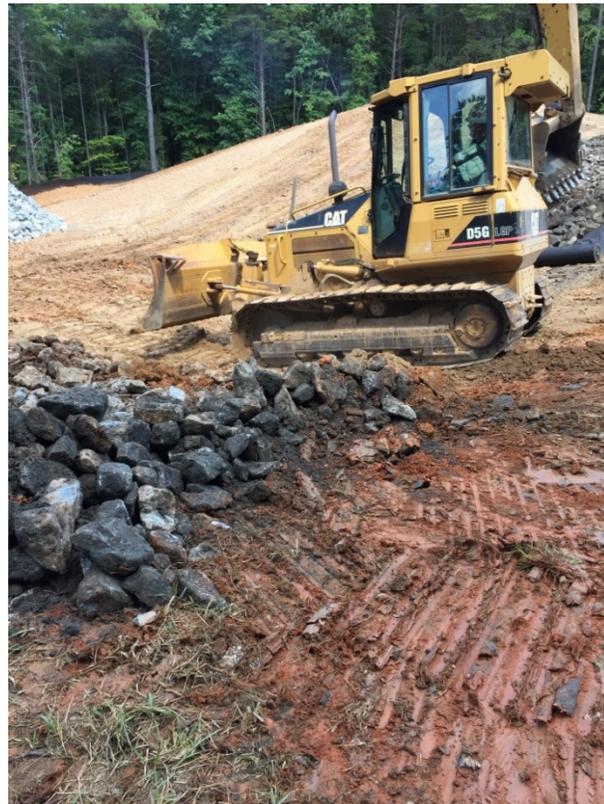
Project No.
60431225
8/17/2015 to
8/25/2015

Description:

Photo 31 – Placing geotextile beneath swale on main slope.
8/24/15



Photo 32 – Compacting swale subgrade at toe of slope to address ground movement. 8/24/15



Client Name:
Duke Energy – Marshall Station

Site Location:
Catawba Co., North Carolina

Project No.
60431225
8/17/2015 to
8/25/2015

Description:

Photo 33 – Placing rip rap in new swale at crest of slope and grading eastern side slope. 8/24/15



Photo 34 – Checking final slope and cover for swale northeast of crest. 8/24/15



Client Name:
Duke Energy – Marshall Station

Site Location:
Catawba Co., North Carolina

Project No.
60431225
8/17/2015 to
8/25/2015

Description:

Photo 35– Placing rip rap for swale on main slope. 8/24/15



Photo 36 – Final grading on east side of new swale. 8/25/15



Client Name:
Duke Energy – Marshall Station

Site Location:
Catawba Co., North Carolina

Project No.
60431225
8/17/2015 to
8/25/2015

Description:

Photo 37 – Geotextile placed on transition of swale from toe of slope to tie into existing rip rap lined swale. 8/25/15



Photo 38 – Finishing rip rap and transitioning of new swale (foreground) to existing swale (background). Looking generally south. 8/25/15



Client Name:
Duke Energy – Marshall Station

Site Location:
Catawba Co., North Carolina

Project No.
60431225
8/17/2015 to
8/25/2015

Photo 39 – Finish grading of slope on western side of new swale prior to seeding. 8/25/15



Photo 40 – Completed swale looking southwest prior to seeding. 8/25/15





ATTACHMENT 2

AECOM Daily Activity and Observation Reports



DAILY ACTIVITY AND OBSERVATION REPORT

Facility Name: Duke Marshall Steam Station		Project: MAR-128		Project Phase: Soft/Wet Ash Removal	
Job No. :			Consecutive Report No.: 1		
Summary of Construction/Operation Activities (Include Additional Sheets as Necessary):					
Began digging out slope at 11:00					
2:30 Met with Earnhardt Grading and Jackson Rollins with Duke Energy to discuss plan. Agreed to plan for digging to investigate ash/ground conditions					
Finished digging at 4:00 pm in order to secure area.					
Tarped excavated face of ash to prevent runoff and secured hole.					
Removed 16 loads of material.					
5 man crew, Cat 336 excavator, 2- 30 ton Cat Haul trucks, water truck					
Summary of Daily Observations (Include any Problems and Resolutions):					
Wet ash found in approximate area of auger A-1,A-2, and A-15. See attached sketch.					
Storm Water Management / Erosion & Sediment Controls Observations (Include Sketches and Additional :					
Summary of Incidents / Accidents / Health & Safety Issues:					
Earnhardt provided full time SSO.					
Directives Given / Approvals Provided:		Mat'l. Description		Today's Qty:	Cumulative Qty:
				ft	ft
				ft	ft
Surveyor's Activities:		Visitors:		Construction Materials/Items Installed:	
Weather:		AM:	PM:	Contractor Started Work: 11:00	Field Representative Started Work: 11:00
Temperature:		AM: ___ deg.	PM: ___ deg.	Contractor Stopped Work: 5:00	Field Representative Stopped Work: 5:00
Field Representative: James Potter			Field Representative's Signature:		Date: 8/17/2015
Reviewed by: J. Bove			Reviewer's Signature:		Date: 8/26/2015

** Attach sketches of observed features on a location map. Also attach other pertinent information on separate sheets, as necessary.*



DAILY ACTIVITY AND OBSERVATION REPORT

Facility Name: Duke Marshall Steam Station		Project: MAR-128	Project Phase: Soft/Wet Ash Removal	
Job No. :				Consecutive Report No.: 2
Summary of Construction/Operation Activities (Include Additional Sheets as Necessary):				
Start digging at 7:30 am				
Completed digging of soft ash on left side of slope at 10:40				
10 Loads of ash removed				
Started lifting of slope at 11:15				
Compaction testing on every lift by ESP.				
20 Loads of fill hauled in				
5 man crew, Cat 336 excavator, 2- 30 ton Cat Haul trucks, Cat D5 Dozer, Cat 563 compactor, water truck				
Lift compaction: 97,96,95,95,95,95				
Summary of Daily Observations (Include any Problems and Resolutions):				
Removed soft/wet ash around approximate area of A-15				
Storm Water Management / Erosion & Sediment Controls Observations (Include Sketches and Additional :				
Summary of Incidents / Accidents / Health & Safety Issues:				
Earnhardt provided full time SSO.				
Directives Given / Approvals Provided:		Mat'l. Description	Today's Qty:	Cumulative Qty:
			ft	ft
			ft	ft
Surveyor's Activities:		Visitors:	Construction Materials/Items Installed:	
Weather:	AM:	PM:	Contractor Started Work: 7:00 am	Field Representative Started Work: 7:30 am
Temperature:	AM: ___ deg.	PM: ___ deg.	Contractor Stopped Work: 4:30 pm	Field Representative Stopped Work: 4:30 pm
Field Representative: James Potter		Field Representative's Signature:		Date: 8/18/15
Reviewed by: John Bove		Reviewer's Signature:		Date: 8/18/15

** Attach sketches of observed features on a location map. Also attach other pertinent information on separate sheets, as necessary.*



APPROX. "WET" ASH LOCATIONS

TBM #1071:
 △ 841.22' - NAIL

AECOM	
MARSHALL STEAM STATION DUKE ENERGY	
MARSHALL INDUSTRIAL LANDFILL ASH CONSISTENCY	
DRAWN BY: SS	CHECKED BY: JAB
PROJECT No:	DATE: 7/6/2015
FIGURE No: 6	



DAILY ACTIVITY AND OBSERVATION REPORT

Facility Name: Duke Marshall Steam Station		Project: MAR-128	Project Phase: Soft/Wet Ash Removal	
Job No. :				Consecutive Report No.: 3
Summary of Construction/Operation Activities (Include Additional Sheets as Necessary):				
Start hauling dirt at 7:30 am				
Compaction testing on every lift by ESP.				
13 Loads of fill hauled in				
Lift compaction: 97,97,95%				
Began working un upper basin area 2:30				
6 Loads of ash removed				
Removed small area of soft soil and ash from right side of drain on lower slope.				
Tested upper slope on right of drain with excavator, no ground movement detected.				
5 man crew, Cat 336 excavator, 2- 30 ton Cat Haul trucks, Cat D5 Dozer, Cat 563 compactor, water truck				
Summary of Daily Observations (Include any Problems and Resolutions):				
Storm Water Management / Erosion & Sediment Controls Observations (Include Sketches and Additional :				
Summary of Incidents / Accidents / Health & Safety Issues:				
Earnhardt provided full time SSO				
Directives Given / Approvals Provided:		Mat'l. Description	Today's Qty:	Cumulative Qty:
			ft	ft
			ft	ft
Surveyor's Activities:		Visitors:	Construction Materials/Items Installed:	
Weather:	AM:	PM:	Contractor Started Work: 7:10	Field Representative Started Work: 7:10
Temperature:	AM: ___ deg.	PM: ___ deg.	Contractor Stopped Work: 3:30	Field Representative Stopped Work: 3:30
Field Representative: J. Potter		Field Representative's Signature:		Date: 8/19/2015
Reviewed by: J. Bove		Reviewer's Signature:		Date: 8/19/2015

** Attach sketches of observed features on a location map. Also attach other pertinent information on separate sheets, as necessary.*



DAILY ACTIVITY AND OBSERVATION REPORT

Facility Name: Duke Marshall Steam Station		Project: MAR-128	Project Phase: Soft/Wet Ash Removal	
Job No. :				Consecutive Report No.: 5
Summary of Construction/Operation Activities (Include Additional Sheets as Necessary):				
Started work at 7 am.				
Compaction testing on every lift by ESP.				
east lift 97%				
Worked on upper drainage ditch				
Removed 10 loads of soil and ash creating ditch.				
Added approximately 1 foot of soil to entire slope and tracked in with D5				
Slope ditch 1 degree per 10'				
TenCate Mirafi 180N/15/300 fabric for ditch with Class 1 rip rap				
5 man crew, Cat 336 excavator, 2- 30 ton Cat Haul trucks, Cat D5 Dozer, Cat 563 compactor, water truck				
Summary of Daily Observations (Include any Problems and Resolutions):				
Storm Water Management / Erosion & Sediment Controls Observations (Include Sketches and Additional :				
Summary of Incidents / Accidents / Health & Safety Issues:				
Earnhardt provided full time SSO.				
Directives Given / Approvals Provided:		Mat'l. Description	Today's Qty:	Cumulative Qty:
			ft	ft
			ft	ft
Surveyor's Activities:		Visitors:	Construction Materials/Items Installed:	
Weather:	AM:	PM:	Contractor Started Work: 7:00	Field Representative Started Work: 7:00
Temperature:	AM: ___ deg.	PM: ___ deg.	Contractor Stopped Work: 4:30	Field Representative Stopped Work: 4:30
Field Representative: J. Potter		Field Representative's Signature:		Date: 8/21/2015
Reviewed by: J. Bove		Reviewer's Signature:		Date: 8/26/2015

** Attach sketches of observed features on a location map. Also attach other pertinent information on separate sheets, as necessary.*



DAILY ACTIVITY AND OBSERVATION REPORT

Facility Name: Duke Marshall Steam Station		Project: MAR-128		Project Phase: Soft/Wet Ash Removal	
Job No. :			Consecutive Report No.: 6		
Summary of Construction/Operation Activities (Include Additional Sheets as Necessary):					
Started work at 7 am.					
Compaction testing on every lift by ESP.					
Each lift 97%					
Worked on upper drainage ditch					
Removed 10 loads of dirt and ash excavated to create ditch.					
Added approximately 1 foot of cover soil to entire slope and tracked in with D5					
Slope ditch 1-ft in 10-ft					
TenCate Mirafi 180N/15/300 fabric for ditch with Class 1 rip rap, main ditch compacted using D5 Dozer					
5 man crew, Cat 336 excavator, 2- 30 ton Cat Haul trucks, Cat D5 Dozer, Cat 563 compactor, water truck					
Summary of Daily Observations (Include any Problems and Resolutions):					
Storm Water Management / Erosion & Sediment Controls Observations (Include Sketches and Additional :					
Summary of Incidents / Accidents / Health & Safety Issues:					
Earnhardt provided full time SSO.					
Directives Given / Approvals Provided:		Mat'l. Description		Today's Qty:	Cumulative Qty:
				ft	ft
				ft	ft
Surveyor's Activities:		Visitors:		Construction Materials/Items Installed:	
Weather:		AM:	PM:	Contractor Started Work: 7:00	Field Representative Started Work: 8:00
Temperature:		AM: ___ deg.	PM: ___ deg.	Contractor Stopped Work: 4:30	Field Representative Stopped Work: 12:00
Field Representative: J. Potter			Field Representative's Signature:		Date: 8/22/2015
Reviewed by: J. Bove			Reviewer's Signature:		Date: 8/26/2015

** Attach sketches of observed features on a location map. Also attach other pertinent information on separate sheets, as necessary.*



DAILY ACTIVITY AND OBSERVATION REPORT

Facility Name: Duke Marshall Steam Station		Project: MAR-128	Project Phase: Soft/Wet Ash Removal	
Job No. :				Consecutive Report No.: 7
Summary of Construction/Operation Activities (Include Additional Sheets as Necessary):				
Started work at 7:30 am.				
Worked on drainage ditch on main slope face.				
Placed Class 1 rip rap. Reutilized existing rip rap as base with fresh rip rap to top of ditch.				
Slope ditch 1 degree per 10'				
Base of ditch 10-ft wide compacted utilizing D5 Dozer				
5 man crew, Cat 336 excavator, 2- 30 ton Cat Haul trucks, Cat D5 Dozer, Cat 563 compactor, water truck				
TenCate Mirafi 180N/15/300 fabric for ditch				
Summary of Daily Observations (Include any Problems and Resolutions):				
Storm Water Management / Erosion & Sediment Controls Observations (Include Sketches and Additional :				
Summary of Incidents / Accidents / Health & Safety Issues:				
Earnhardt provided full time SSO.				
Directives Given / Approvals Provided:		Mat'l. Description	Today's Qty:	Cumulative Qty:
			ft	ft
			ft	ft
Surveyor's Activities:		Visitors:	Construction Materials/Items Installed:	
Weather:	AM:	PM:	Contractor Started Work: 7:30	Field Representative Started Work: 7:30
Temperature:	AM: ___ deg.	PM: ___ deg.	Contractor Stopped Work: 4:30	Field Representative Stopped Work: 4:30
Field Representative: J. Potter		Field Representative's Signature:		Date: 8/24/2015
Reviewed by: J. Bove		Reviewer's Signature:		Date: 8/26/2015

** Attach sketches of observed features on a location map. Also attach other pertinent information on separate sheets, as necessary.*



DAILY ACTIVITY AND OBSERVATION REPORT

Facility Name: Duke Marshall Steam Station		Project: MAR-128		Project Phase: Soft/Wet Ash Removal	
Job No. :			Consecutive Report No.: 8		
Summary of Construction/Operation Activities (Include Additional Sheets as Necessary):					
Started work at 7:30 am.					
Worked on lower ditch and to fix slight ground movement at transition of toe to road elevation					
Placed Class 1 rip rap. Reutilized existing rip rap as base with fresh rip rap to top of ditch.					
Placed 4 loads of dirt to supper slope area.					
Main ditch 10-ft wide compacted utilizing D5 Dozer					
5 man crew, Cat 336 excavator, 2- 30 ton Cat Haul trucks, Cat D5 Dozer, Cat 563 compactor, water truck					
TenCate Mirafi 180N/15/300 fabric for ditch					
Work complete, only seeding remains to be done on 9/3/15					
Total materials removed from site 1452 Tons					
Summary of Daily Observations (Include any Problems and Resolutions):					
Storm Water Management / Erosion & Sediment Controls Observations (Include Sketches and Additional :					
Summary of Incidents / Accidents / Health & Safety Issues:					
Earnhardt provided full time SSO.					
Directives Given / Approvals Provided:		Mat'l. Description		Today's Qty:	Cumulative Qty:
				ft	ft
				ft	ft
Surveyor's Activities:		Visitors:		Construction Materials/Items Installed:	
Weather:	AM:	PM:	Contractor Started Work: 7:30	Field Representative Started Work: 7:30	
Temperature:	AM: ___ deg.	PM: ___ deg.	Contractor Stopped Work: 1:00	Field Representative Stopped Work: 1:00	
Field Representative: J. Potter			Field Representative's Signature:		Date: 8/25/2015
Reviewed by: J. Bove			Reviewer's Signature:		Date: 8/26/2015

** Attach sketches of observed features on a location map. Also attach other pertinent information on separate sheets, as necessary.*



DAILY ACTIVITY AND OBSERVATION REPORT

Facility Name: Duke Marshall Steam Station		Project: MAR-128		Project Phase: Soft/Wet Ash Removal	
Job No. :			Consecutive Report No.: 1		
Summary of Construction/Operation Activities (Include Additional Sheets as Necessary):					
Performed hand augers to verify minimum cover.					
35.605 N 80.935 W, >20 inches cover, no ash encountered at bottom of probe.					
35.6019 N 80.976 W, >19 inches cover, soil with trace of ash encountered at bottom of probe.					
35.621 N 80.976 W, >20 inches cover, no ash encountered at bottom of probe.					
35.621 N 80.975 W, >20 inches cover, no ash encountered at bottom of probe.					
35.621 N 80.973 W, >20 inches cover, no ash encountered at bottom of probe.					
35.604 N 80.952 W, >20 inches cover, no ash encountered at bottom of probe.					
Summary of Daily Observations (Include any Problems and Resolutions):					
Storm Water Management / Erosion & Sediment Controls Observations (Include Sketches and Additional :					
Summary of Incidents / Accidents / Health & Safety Issues:					
Earnhardt provided full time SSO.					
Directives Given / Approvals Provided:		Mat'l. Description		Today's Qty:	Cumulative Qty:
				ft	ft
				ft	ft
Surveyor's Activities:		Visitors:		Construction Materials/Items Installed:	
Weather:	AM:	PM:	Contractor Started Work:	Field Representative Started Work: 1:30	
Temperature:	AM: ___ deg.	PM: ___ deg.	Contractor Stopped Work:	Field Representative Stopped Work: 3:30	
Field Representative: J. Potter			Field Representative's Signature:	Date: 8/26/2015	
Reviewed by: J. Bove			Reviewer's Signature:	Date: 8/26/2015	

** Attach sketches of observed features on a location map. Also attach other pertinent information on separate sheets, as necessary.*



ATTACHMENT 3

**Construction Materials Testing Services Report, September 3, 2015,
prepared by ESP Associates**



September 3, 2015

Mr. Jamie Lineberger
Earnhardt Grading, Inc.
7525 Old Plank Road
Stanley, North Carolina 28164

Reference: **CONSTRUCTION MATERIALS TESTING SERVICES**
Marshall Steam Station
MAR-128 Landfill Cell No. 4 Repair
Terrell, Catawba County, North Carolina
ESP Project No. E4-DT33.300 (Report No. 1)

Dear Mr. Lineberger:

As requested, ESP Associates, P.A. (ESP), is providing construction materials testing services on a part-time basis for the referenced project. This letter summarizes our field density testing for the period beginning August 18 through August 21, 2015. Our materials testing services were coordinated with representatives of Earnhardt Grading. During all operations, horizontal and vertical control was provided in the field by others. A representative of AECOM was present on-site directing the extent and depth of the excavation during the repair process. Our services were limited to performing field density tests during the placement of fill.

FIELD DENSITY TESTING

During this reporting period, an engineering technician from our office visited the site and performed ten (10) field density tests (Test Nos. 1 through 10). The field density tests were performed on the fill materials placed on portions of the MAR-128 Landfill Cell No. 4 area. The tests performed indicate densities equaling or exceeding 95 percent of the soil's maximum dry density based on a Standard Proctor moisture-density relationship. The field density tests are

representative only of the location, depth and date tested. The results of the field density tests along with the laboratory Standard Proctor moisture-density relationship performed on the fill materials are enclosed for your review.

DRAINAGE

Soil strength and settlement potential is highly dependent upon the moisture condition of the supportive soil. Soil characteristics can change dramatically when moisture conditions change. As such, the site and surrounding grades should be maintained to properly control water (surface and subsurface). Grades surrounding structures should be adequately sloped away from the structure to promote positive drainage and prevent water from ponding near or against the structure. Swales and/or storm drainage structures should be maintained to collect and remove all surface water run-off. Any subsurface water that may rise near structural grades should be controlled by adequately constructed subsurface drainage mechanisms.

GENERAL

Inclement weather, construction activity and/or traffic and utility installations can affect the integrity of the subgrade soils. Therefore, we recommend a representative of the geotechnical engineer re-evaluate the subgrade soils immediately prior to the placement of additional soil fill and/or stone placement during the construction process. This re-evaluation can consist of proofrolling the area using a loaded tandem axle dump truck or similar heavy piece of equipment, visual observations, or probing with a small diameter probe rod. Any areas that pump, rut or show instability should be undercut to the firm soils and backfilled with suitable materials.

ESP appreciates the opportunity to assist you during this phase of the project. If you should have any questions concerning this report, or if we may be of further assistance, please contact us.

Sincerely,

ESP Associates, P.A.


Andrew M. Burton, PE
NC Licensure No. 28134





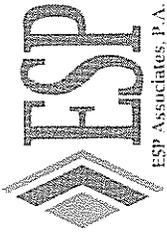
Caleb S. Saruse, PE
Project Engineer

AMB/CSS/mb

Copies submitted (2)

Attachments: Daily Field Reports (3 sheets)
Drive Cylinder Density Test Report (Test Nos. 1 through 10)
Moisture-Density Relationship (S-1)





TECHNICIAN DAILY FIELD REPORT

Project Name: *MILLSHALL / MAR-128 CURB/CALL 428741* Project No.: *DT33.300*
 Weather: *CLEAR* Date: *8-18-15*
 Start Time: *7:00 AM* Total Time: *9.5* Technician Name: *MICHAEL ORESTE*
 Arrive @ Site: *8:15 AM* Mileage: *59MI* Contractor/Foreman: *EMMONSHEART/CHHELLE*
 Leave Site: *3:30 PM* Other Equip. Used: *N/A*
 Finish Time: *4:30 PM*

Services Provided (Check all that apply)

Proofrolling Subgrade prior to fill placement, at final grade, other (comment)

Undercutting Location/comment

Soil Density Testing General location (Roadway/Building Pad/Utilities, etc)

Drive Tube *MAR-128 REPAIR* Quantity *x 5*

Nuclear Gauge stone base asphalt

Sandcone

Volumeter

Pick-up

Other

Subsurface Eval. Preliminary/exploratory footings comment -

Concrete Testing Footings slab wall curb pavement pick-up other comment -

sets: _____ # cylinders per set: _____ mix strength / ID: _____

Rebar Footings slab wall pavement other comment -

Masonry Comment -

Asphalt Comment -

Other Testing Services (List and Explain)-

Site Construction Activities / Discussions/ Non-compliance test results, Name of Contractor's/Owner's rep. Informed -

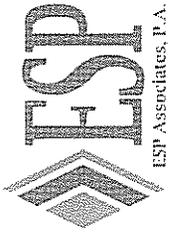
ESP ON SITE AS SCHEDULED. TECHNICIAN ON SITE TO PERFORM FTS AT THE MAR-128 REPAIR SITE. A REPRESENTATIVE WITH AEGION ENGINEERING WAS ON SITE, DIRECTING EACH PART REGARDING ON THE SIZE OF AREA TO BE UNDERCUT. AREA MAR-128 WAS UNDERCUT, AND AEGION APPROVED THE PLACEMENT OF FILL TO BRING ESP TO ORIGINAL FIVE (5) FTS ON THE NEW SCOPE, AS IT WAS BEING CONSTRUCTED. ALL TESTS MET 95% COMPACTATION AND AEGION PERM ENTERED INTO MEETING. CONTRACTOR WAS STOPPED BY DUE AT APPROX 3:30 PM. THE PAVE ROAD WAS CREATING DUST, AND WALK WILL NOT BE ABLE TO CONTINUE UNTIL 8/19, WHEN DUST CONTROL MEASURES COULD BE COMMENTED BY CONTRACTOR. A FLOOR SAMPLE WAS TAKEN, AND RETURNED TO THE PORTLAND CEMENT SAMPLE WAS CHECKED IN AS 8-11-15067

Attachments: *0* Contractor Signature: *ATB*

ESP's P.M. Notified: *A. BURTON* ESP Rep. Signature: *[Signature]*

ESP Admin. Coding	DOT.R.T.	DOT.C.T.	CWI	S.S.I. (soil)	F.S.I.
<i>9.5H</i>	_____	_____	_____	_____	_____
S.E.T.	DOT.S.P.T.	DOT.T.S.T.	M.S.I.	R.C.S.I	S.S.B.S.I (bolt)
M.T.	DOT.N.D.	_____	_____	P.C.S.I	S.W.S.I. (weld)

The presence of ESP in the field shall not be construed as an acceptance or approval of site activities. ESP is in the field to perform specific services and has certain responsibilities which are limited to those specifically authorized in our agreement with our Client. In no event shall ESP be responsible for the safety, means or methods of other parties in the field. Data contained within this report is considered preliminary and shall not be relied upon until reviewed by an ESP project manager.



TECHNICIAN DAILY FIELD REPORT

Project Name: <i>HARSHALL / MAR - 128 SANDFILL CELL 4 REPAIR</i>	Project No.: <i>DT 33, 3010</i>
Weather: <i>Clear</i>	Date: <i>8/19/15</i>
Start Time: <i>6:00 AM</i>	Technician Name: <i>MICHAEL ORESTE</i>
Arrive @ Site: <i>7:00 AM</i>	Contractor/Foreman: <i>EDUARDI / CHARLE</i>
Leave Site: <i>10:00 AM</i>	Other Equip. Used: <i>N/A</i>
Finish Time: <i>11:00 AM</i>	

Services Provided (Check all that apply)

<input type="checkbox"/> Proofrolling	Subgrade <input type="checkbox"/> prior to fill placement, <input type="checkbox"/> at final grade, <input type="checkbox"/> other (comment)
<input type="checkbox"/> Undercutting	Location/comment

Soil Density Testing	General location (Roadway/Building Pad/Utilities, etc)	Quantity
<input type="checkbox"/> Drive Tube <input type="checkbox"/>	<i>MAR - 128 REPAIR SITE</i>	<i>X 3</i>
<input type="checkbox"/> Nuclear Gauge <input type="checkbox"/> - stone base <input type="checkbox"/> asphalt <input type="checkbox"/>		
<input type="checkbox"/> Sandcone <input type="checkbox"/>		
<input type="checkbox"/> Volumeter <input type="checkbox"/>		
<input type="checkbox"/> Pick-up <input type="checkbox"/>		
<input type="checkbox"/> Other <input type="checkbox"/>		

Subsurface Eval.	Preliminary/exploratory <input type="checkbox"/> footings <input type="checkbox"/> comment -
Concrete Testing	<input type="checkbox"/> Footings <input type="checkbox"/> slab <input type="checkbox"/> wall <input type="checkbox"/> curb <input type="checkbox"/> pavement <input type="checkbox"/> pick-up <input type="checkbox"/> other comment -
	# sets: _____ # cylinders per set: _____ mix strength / ID: _____

Rebar	<input type="checkbox"/> Footings <input type="checkbox"/> slab <input type="checkbox"/> wall <input type="checkbox"/> pavement <input type="checkbox"/> other comment -
Masonry	Comment -
Asphalt	Comment -

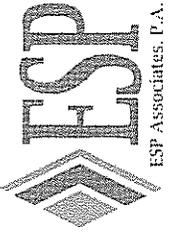
Other Testing Services (List and Explain)-

Site Construction Activities / Discussions / Non-compliance test results, Name of Contractor's/Owner's rep. Informed -

ESP ON SITE AS REQUESTED. TECHNICIAN PERFORMED THREE (3) FIT'S ON THE NEW SLOPE AT THE MAR-128 REPAIR SITE. ALL TESTS MET 95% COMPACTED, AND HAVE BEEN ENTERED INTO MATERIAL. THE SLOPE WAS COMPLETED. EDUARDI WILL CONTACT ESP WHEN A TECHNICIAN IS NEEDED ON SITE, FOR THE NEXT REPAIR AREA.

Attachments:	<i>A. Burton</i>	Contractor Signature:	<i>[Signature]</i>
ESP's P.M. Notified:	<i>A. Burton</i>	ESP Rep. Signature	<i>[Signature]</i>
ESP Admin. Coding			
E.T. <i>SH</i>	D.O.T.C.T. _____	CWI _____	F.S.I. _____
S.E.T. _____	D.O.T.S.P.T. _____	M.S.I. _____	S.S.B.S.I. (bolt) _____
M.T. _____	D.O.T.N.D. _____	P.C.S.I. _____	S.W.S.I. (weld) _____

The presence of ESP in the field shall not be construed as an acceptance or approval of site activities. ESP is in the field to perform specific services and has certain responsibilities which are limited to those specifically authorized in our agreement with our Client. In no event shall ESP be responsible for the safety, means or methods of other parties in the field. Data contained within this report is considered preliminary and shall not be relied upon until reviewed by an ESP project manager.



TECHNICIAN DAILY FIELD REPORT

Project Name: *Marshall MAR-128 CUL 4200* Project No.: *DT33, 300*
 Weather: *Clear* Date: *8-21-15*
 Start Time: *9:00* Technician Name: *MICHAEL ORESTE*
 Arrive @ Site: *10:00* Mileage: *102* Contractor/Foreman: *EARL HART - CHITREVE*
 Leave Site: *12:00* Other Equip. Used: *NA*
 Finish Time: *1:00*

Services Provided (Check all that apply)

Subgrade prior to fill placement, at final grade other (comment)

Undercutting Location/comment

Soil Density Testing

Drive Tube General location (Roadway/Building Pad/Utilities, etc) _____ Quantity *X1*

Nuclear Gauge - stone base asphalt *MAR-128 SCOPE REPAIR (DITCH WARE)*

Sandcone

Volumeter

Pick-up

Other

Subsurface Eval. Preliminary/exploratory footings comment -

Concrete Testing Footings slab wall curb pavement pick-up other comment -

sets: _____ # cylinders per set: _____ mix strength / ID: _____

Rebar Footings slab wall pavement other comment -

Masonry Comment - _____

Asphalt Comment - _____

Other Testing Services (List and Explain)- _____

Site Construction Activities / Discussions / Non-compliance test results, Name of Contractor's/Owner's rep. Informed -

ESP ON SITE AS SCHEDULED. TECHNICIAN TERRIFIED DUE FOT IN THE BOTTOM OF THE DITCH WARE. TEST MEETS 95% COMPACTION, AND HAS BEEN ENTERED INTO METAFIELD THIS WAS THE FINAL TEST NEEDED FOR THE MAR-128 PROJECT.

Attachments: *0*

ESP's P.M. Notified: *A. Brown*

ESP Admin, Coding

E.T.	D.O.T.R.T.	D.O.T.C.T.	CWI	S.S.I. (soil)	F.S.I.
S.E.T.	D.O.T.S.P.T.	D.O.T.S.T.	M.S.I.	R.C.S.I.	S.S.B.S.I. (bolt)
M.T.	D.O.T.N.D.			P.C.S.I.	S.W.S.I. (weld)

Contractor Signature: _____ *ATB*

ESP Rep. Signature: _____

The presence of ESP in the field shall not be construed as an acceptance or approval of site activities. ESP is in the field to perform specific services and has certain responsibilities which are limited to those specifically authorized in our agreement with our Client. In no event shall ESP be responsible for the safety, means or methods of other parties in the field. Data contained within this report is considered preliminary and shall not be relied upon until reviewed by an ESP project manager.



ESP Associates, P.A.
 3475 Lakemont Boulevard
 Fort Mill, SC 29708
 Phone: 803-802-2440 | Fax: 803-802-2515

Drive Cylinder Density Test Report

Report Date: 9/3/2015
 Test Method: ASTM D2937

Client:
 Earnhardt Grading, Inc.
 7525 Old Plank Road
 Stanley, NC 28164

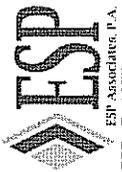
Project:
 DT33.300.000
 Marshall MAR-128 Landfill Cell 4 Repair
 Terrell, NC

Test Results

Test #	Retest Of	Test Date	Proctor ID	Method	Soil Class.	Optimum Moisture (%)	Maximum Dry Density (pcf)	In Place Moisture (%)	In Place Density (pcf)	In Place Dry Density (pcf)	Percent Compaction	Min Comp. (%)	Remark
1		8/18/15	OP-1	A	Sand	14.0	112.5	13.1	126.1	111.5	99	95	
2		8/18/15	OP-1	A	Sand	14.0	112.5	14.0	125.8	110.4	98	95	
3		8/18/15	OP-1	A	Sand	14.0	112.5	14.2	124.3	108.9	97	95	
4		8/18/15	OP-1	A	Sand	14.0	112.5	13.1	123.4	109.1	97	95	
5		8/18/15	OP-1	A	Sand	14.0	112.5	13.2	123.1	108.8	97	95	
6		8/19/15	OP-2	A	Sand	17.7	108.5	15.6	122.1	105.6	97	95	
7		8/19/15	OP-2	A	Sand	17.7	108.5	16.4	123.6	106.2	98	95	
8		8/19/15	OP-2	A	Sand	17.7	108.5	15.9	120.0	103.5	95	95	

Test Information

Test #	Test Location	Elevation	Reference	Drive Cylinder ID	Weight of Cylinder (lb)	Top Diameter (in)	Bottom Diameter (in)	Cylinder Height (in)	Volume of Cylinder (cf)	Field Technician
1	Embankment: MAR-128 Repair		approximately 1 foot below proposed subgrade	23-00090	1.350	3.835	3.835	4.985	0.0333	ORESTE, Mike
2	Embankment: MAR-128 Repair		approximate subgrade	23-00090	1.350	3.835	3.835	4.985	0.0333	ORESTE, Mike
3	Embankment: MAR-128 Repair		approximately 1 foot above existing grade	23-00090	1.350	3.835	3.835	4.985	0.0333	ORESTE, Mike
4	Embankment: MAR-128 Repair		approximately 2 feet above existing grade	23-00090	1.350	3.835	3.835	4.985	0.0333	ORESTE, Mike
5	Embankment: MAR-128 Repair		approximately 3 feet above existing grade	23-00090	1.350	3.835	3.835	4.985	0.0333	ORESTE, Mike
6	Embankment: MAR-128 Repair		approximately 4 feet above existing grade	23-00080	1.340	3.845	3.835	4.930	0.0330	ORESTE, Mike
7	Embankment: MAR-128 Repair		approximately 5 feet above existing grade	23-00080	1.340	3.845	3.835	4.930	0.0330	ORESTE, Mike
8	Embankment: MAR-128 Repair		approximately 6 feet above existing grade	23-00080	1.340	3.845	3.835	4.930	0.0330	ORESTE, Mike



ESP - Fort Mill
 3475 Lakemont Boulevard
 Fort Mill, SC 29708
 Phone: 803-802-2440 | Fax: 803-802-2515

Drive Cylinder Density Test Report

Report Date: 9/3/2015
 Test Method: ASTM D2937

Client:
 Earnhardt Grading, Inc.
 7525 Old Plank Road
 Stanley, NC 28164

Project:
 DT33.300.000
 Marshall MAR-128 Landfill Cell 4 Repair
 Terrell, NC

Remarks	Comments	Test #	Related Test #	Test Type



ESP Associates, P.A.
 3475 Lakemont Boulevard
 Fort Mill, SC 29708
 Phone: 803-802-2440 | Fax: 803-802-2515

Drive Cylinder Density Test Report

Report Date: 9/3/2015
 Test Method: ASTM D2937

Client:
 Earnhardt Grading, Inc.
 7525 Old Plank Road
 Stanley, NC 28164

Project:
 DT33.300.000
 Marshall MAR-128 Landfill Cell 4 Repair
 Terrell, NC

Test Results

Test #	Retest Of	Test Date	Proctor ID	Method	Soil Class.	Optimum Moisture (%)	Maximum Dry Density (pcf)	In Place Moisture (%)	In Place Wet Density (pcf)	In Place Dry Density (pcf)	Percent Compaction	Min Comp. (%)	Remark
9		8/19/15	OP-2	A	Sand	17.7	108.5	15.9	120.0	103.5	95	95	
10		8/21/15	OP-3	A	Sand	16.1	111.9	15.4	127.0	110.1	98	95	

Test Information

Test #	Test Location	Elevation	Reference	Drive Cylinder ID	Weight of Cylinder (lb)	Top Diameter (in)	Bottom Diameter (in)	Cylinder Height (in)	Volume of Cylinder (cf)	Field Technician
9	Embankment: MAR-128 Repair		approximately 6 feet above existing grade	23-00080	1.340	3.845	3.835	4.930	0.0330	ORESTE, Mike
10	Embankment: MAR-128 slope repair, bottom of drainage ditch		approximate subgrade	23-00096	1.330	3.835	3.835	4.985	0.0333	ORESTE, Mike

Remarks	Comments		Related Tests	
	Test #	Related Test #	Test #	Related Test #

Job No. DT33.300
 Project Marshall MAR-128 Landfill Cell 4 Repair
Terrell, North Carolina

Sample I.D. S-1
 Material Source On Site

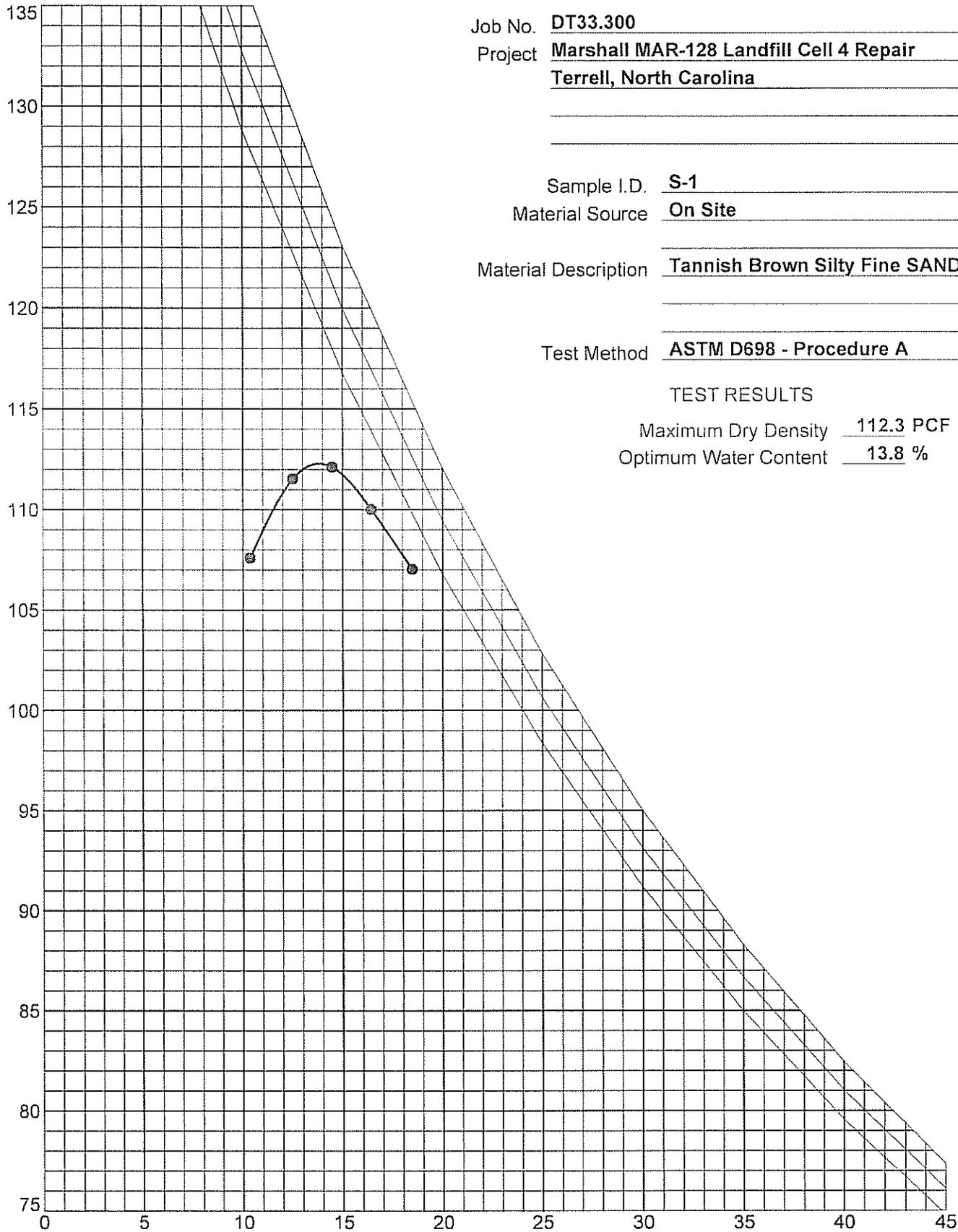
Material Description Tannish Brown Silty Fine SAND

Test Method ASTM D698 - Procedure A

TEST RESULTS

Maximum Dry Density 112.3 PCF
 Optimum Water Content 13.8 %

DRY DENSITY, pcf



WATER CONTENT, % Zero Air Voids Curves For G = 2.6 - 2.8

MOISTURE-DENSITY RELATIONSHIP

Project: Marshall MAR-128 Landfill Cell 4 Repair
 Location: Terrell, North Carolina
 Number: DT33.300



3475 Lakemont Blvd
 Fort Mill, SC 29708
 Telephone: 803.802.2440
 Fax: 803.802.2550

ESP COMPACTION - SINGLE DT33.300.GPJ BP21.302.GPJ 9/3/15



ATTACHMENT 4

“Topographic Survey Marshall –Ind Landfill Cells 3&4” (As-built survey) prepared by WSP

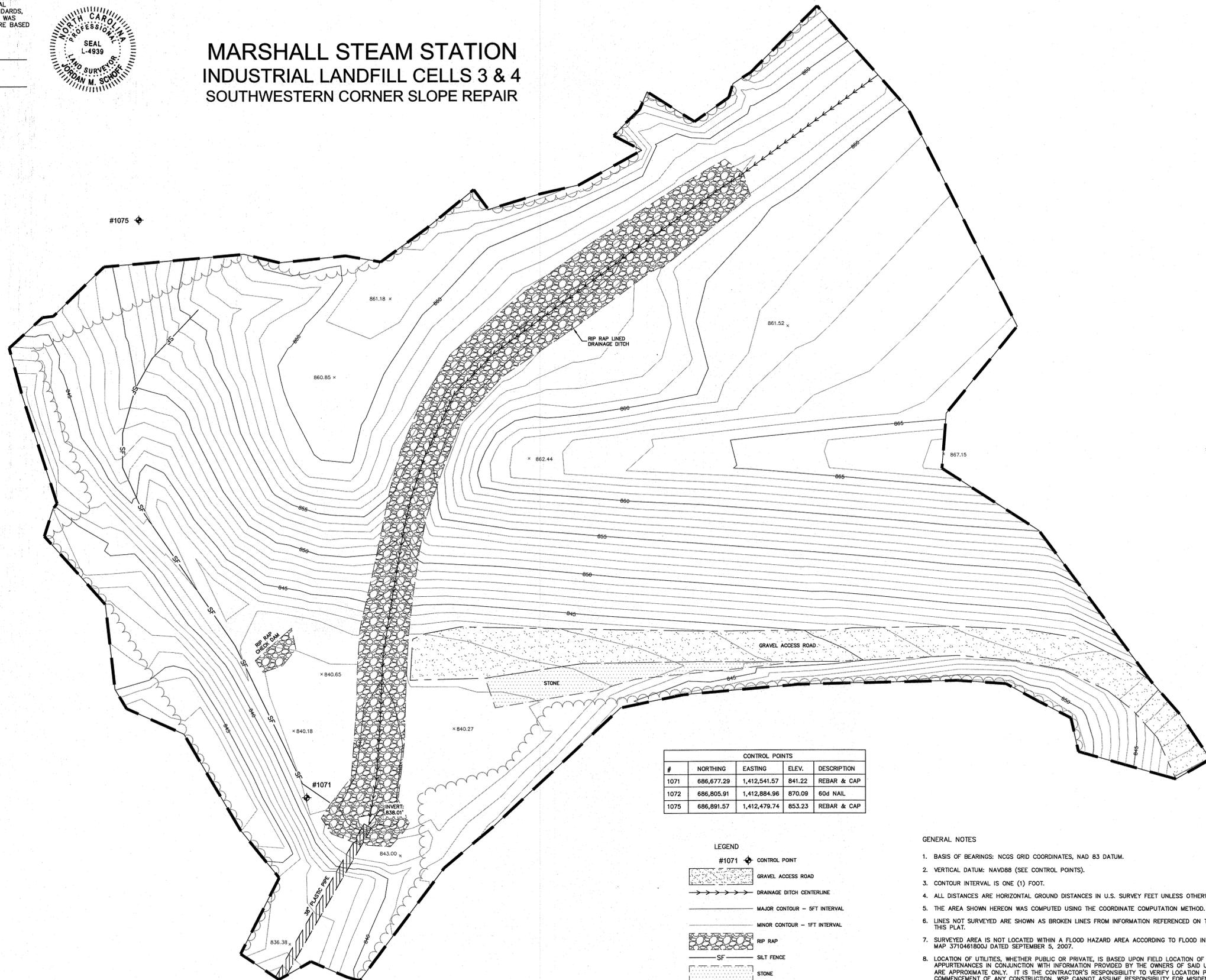
SURVEYOR CERTIFICATION

I, JORDAN M. SCHOFF, CERTIFY THAT THIS PROJECT WAS COMPLETED UNDER MY DIRECT AND RESPONSIBLE CHARGE FROM AN ACTUAL GROUND SURVEY MADE UNDER MY SUPERVISION; THAT THE HORIZONTAL AND VERTICAL ACCURACIES MEET OR EXCEED THE NATIONAL MAP ACCURACY STANDARDS, THAT THE DATA WAS OBTAINED ON AUGUST 31, 2015; THE SURVEY WAS COMPLETED ON SEPTEMBER 3, 2015; AND THAT ALL ELEVATIONS ARE BASED ON NAVD88.

JORDAN M. SCHOFF
 JORDAN M. SCHOFF, P.L.S. # 4939
 DATE 9/3/15



MARSHALL STEAM STATION INDUSTRIAL LANDFILL CELLS 3 & 4 SOUTHWESTERN CORNER SLOPE REPAIR

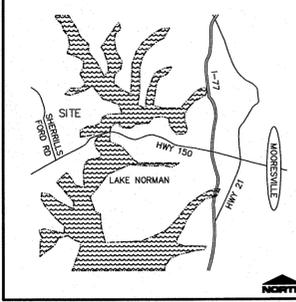


CONTROL POINTS			
#	NORTHING	EASTING	ELEV. DESCRIPTION
1071	686,677.29	1,412,541.57	841.22 REBAR & CAP
1072	686,805.91	1,412,884.96	870.09 60d NAIL
1075	686,891.57	1,412,479.74	853.23 REBAR & CAP

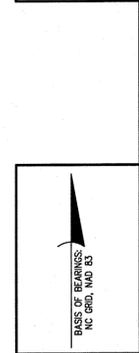
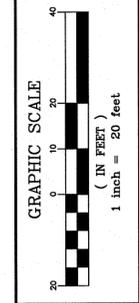
LEGEND	
	#1071 CONTROL POINT
	GRAVEL ACCESS ROAD
	DRAINAGE DITCH CENTERLINE
	MAJOR CONTOUR - 5FT INTERVAL
	MINOR CONTOUR - 1FT INTERVAL
	RIP RAP
	SILT FENCE
	STONE
	× 840.02 SPOT ELEVATION
	SURVEY LIMITS
	TREELINE

GENERAL NOTES

1. BASIS OF BEARINGS: NCGS GRID COORDINATES, NAD 83 DATUM.
2. VERTICAL DATUM: NAVD88 (SEE CONTROL POINTS).
3. CONTOUR INTERVAL IS ONE (1) FOOT.
4. ALL DISTANCES ARE HORIZONTAL GROUND DISTANCES IN U.S. SURVEY FEET UNLESS OTHERWISE NOTED.
5. THE AREA SHOWN HEREON WAS COMPUTED USING THE COORDINATE COMPUTATION METHOD.
6. LINES NOT SURVEYED ARE SHOWN AS BROKEN LINES FROM INFORMATION REFERENCED ON THE FACE OF THIS PLAT.
7. SURVEYED AREA IS NOT LOCATED WITHIN A FLOOD HAZARD AREA ACCORDING TO FLOOD INSURANCE RATE MAP 3710461800J DATED SEPTEMBER 5, 2007.
8. LOCATION OF UTILITIES, WHETHER PUBLIC OR PRIVATE, IS BASED UPON FIELD LOCATION OF VISIBLE APPURTENANCES IN CONJUNCTION WITH INFORMATION PROVIDED BY THE OWNERS OF SAID UTILITIES AND ARE APPROXIMATE ONLY. IT IS THE CONTRACTOR'S RESPONSIBILITY TO VERIFY LOCATION PRIOR TO COMMENCEMENT OF ANY CONSTRUCTION. WSP CANNOT ASSUME RESPONSIBILITY FOR MISIDENTIFICATION OR OMISSION OF UNDERGROUND UTILITIES. DUE TO OSHA REQUIREMENTS PERTAINING TO CONFINED SPACE ENTRY, PIPE SIZES, INVERT ELEVATIONS, ETC., WILL ONLY BE PROVIDED IF FIELD PERSONNEL ARE ABLE TO OBTAIN WITHOUT BREAKING THE PLANE OF THE TOP OF THE STRUCTURE.
9. PROPERTY SUBJECT TO ALL EASEMENTS AND RESTRICTIONS OF RECORD.



WSP
 15401 Western Parkway Suite 100 • Cary, NC 27515 • 919.678.0008
 N.C. B.E.S. Firm License Number F-9891



TOPOGRAPHIC SURVEY
 MARSHALL-IND LANDFILL CELLS 3 & 4
 TERRELL, CATAWBA COUNTY, N.C.
 CURRENT OWNER: DUKE ENERGY
 PREPARED FOR: CCP ENGINEERING

REVISIONS	
1)	Drawn
2)	JMS
3)	Checked
4)	DKB
	Surveyed
	DGR
	Book No.
	1004
DWG File Name	
IND SLOPE FINAL TOPO	
Job Number	
188321B	
Date	
SEPTEMBER 3, 2015	
Scale	
1" = 20'	
Sheet No.	
1 of 1	