Amended
CCR Landfill Closure Plan

Limestone Electric Generating Station
Jewett, Texas

February 2020
Rev. September 2024

Prepared For

NRG Texas Power LLC

CERTIFICATION

Amended CCR Landfill Closure Plan

Limestone Electric Generating Station

I, the undersigned Texas Professional Engineer, hereby certify that I am familiar with the technical requirements of Title 40 Code of Federal Regulations Part 257 Subpart D (§257). I certify that it is my professional opinion that this document meets the requirements for a written closure plan prepared pursuant to 40 CFR 257.102. I also certify that this document was prepared by me and that I am a registered professional engineer under the laws of the State of Texas.

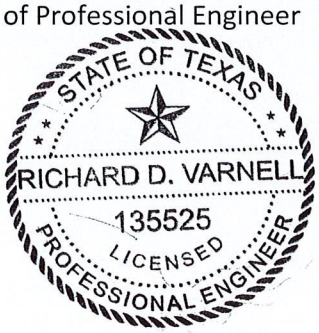
For the purpose of this document, "certify" and "certification" shall be interpreted and construed to be a "statement of professional opinion". The certification is understood and intended to be an expression of my professional opinion as a Texas Licensed Professional Engineer, based upon knowledge, information, and belief. The statement(s) of professional opinion are not and shall not be interpreted or construed to be a guarantee or a warranty of the analysis herein.

Richard D. Varnell
Printed Name of Professional Engineer

135525
Texas License Number
Firm No. 3775, TRC Environmental, Inc.

Richard Varnell
Signature of Professional Engineer

9/20/2024
Date



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A - Texas Genco, Civil Specification, LEGS Class II Solid Waste Disposal System

B – Landfill Cover Design Drawings

C - Run-On and Run-Off Control System Plan for the CCR Landfill

D – Current and Final Condition Drawings

1. INTRODUCTION & PURPOSE

Federal CCR Rule Reference: 40 CFR 257.102(b)

Pursuant to 40 CFR 257.102(b), this document serves as the written closure plan for the existing coal combustion residual (CCR) landfill, Unit 004 Landfill, at NRG Texas Power LLC's (NRG) Limestone Electric Generating Station. NRG intends to close the landfill in compliance with the requirements of 40 CFR 257.102(d), by leaving the CCR in place and installing a final cover system.

2. CLOSURE PLAN NARRATIVE DESCRIPTION

Federal CCR Rule Reference: 40 CFR 257.102(b)(1)(i) and 257.102(d)(1)

As disposal areas within the landfill reach capacity, the stored CCR will be graded to designed contours, and a protective final cover system will be incrementally installed to minimize infiltration and prevent storm water contact with the CCR. Materials for the final cover system are placed and compacted so as to limit erosion, settling, subsidence, and future maintenance, and to maintain positive drainage. As portions of the final cover system are installed, soil properties, compaction, permeability, and thickness testing are performed to confirm compliance with the Amended Closure Plan and federal and state regulations in effect at the time. Eventually, the entire landfill will be encapsulated with a final cover system as described in Section 3 of this Amended Closure Plan.

At the time this Amended Closure Plan was prepared, NRG had installed the final cover system over areas that had reached their design capacities in the western portion of the landfill. Soil properties, compaction, and thickness testing of the cover material were performed during installation. Most of the western portion of the landfill ceased accepting CCR and the final cover system had been installed prior to the effective date of the CCR Rule on October 19, 2015.

3. FINAL COVER SYSTEM DESCRIPTION

Federal CCR Rule Reference: 40 CFR 257.102(b)(1)(iii) and 257.102(d)(1)

Pursuant to the closure performance standards provided in 40 CFR 257.102(d)(1), the final cover system for Unit 004 Landfill will:

1. Ensure the design of the final cover system accommodates settling and subsidence to protect the integrity of the final cover system.
2. Minimize the post-closure infiltration of liquid into the CCR.
3. Minimize the risk of release of CCR or contaminated run-off to the ground or surface waters, or to the atmosphere.
4. Preclude the probability of future impoundment of water, sediment, or slurry.
5. Provide major slope stability to prevent sloughing of the final cover system during the post-closure care period.
6. Minimize future maintenance.

7. Allow closure activities to be completed as quickly as practical consistent with recognized and good engineering practices.

Specifications, drawings, and related documents for the final cover system are provided in Attachments A through D.

3.1 ESTABLISH GRADE AND SUPPORT FOR FINAL COVER SYSTEM

Federal CCR Rule Reference: 257.102(d)(1)(ii), 257.102(d)(1)(iii) & 257.102(d)(3)(i)(D)

Per the CCR Rule, the upper surface of the stored CCR, or possibly general fill if sufficient quantities of CCR are not available, will be graded to form a mounded profile. The top of the mound will be graded from a high point or ridge with 3 to 5 percent slope outward. At the crest of the side slopes, a perimeter drainage swale will be constructed to intercept storm water and minimize flow from the upper area to the side slopes. These drainage swales will be directed to armored or paved drainage ditches that will channelize flow down the side slope and into a second ditch system that encircles the base of the landfill. The slopes have also been designed to accommodate settling and subsidence while maintaining this positive drainage strategy.

3.2 INFILTRATION LAYER

Federal CCR Rule Reference: 257.102(d)(1)(i), 257.102(d)(3)(i)(A), & 257.102(d)(3)(i)(B)

Per 257.102(d)(i)(A) and (B) of the CCR Rule, an infiltration layer consisting of compacted low permeability clay material, will be placed on top of the graded CCR or general fill to minimize infiltration of liquids into the closed CCR unit. This layer will be tied into the existing cover in the same manner as provided in the specification for preparing the landfill material in Section 5.3 of the specification. Per the CCR Rule, the infiltration layer will consist of a minimum thickness of 18 inches of compacted clay material. The clay infiltration layer will have a permeability no greater than 1×10^{-7} centimeters per second (cm/sec) to match the permeability of the in-place bottom liner system.

3.3 EROSION LAYER

Federal CCR Rule Reference: 257.102(d)(3)(i)(C)

Per 257.102(d)(i)(C) of the CCR Rule, an erosion layer, consisting of topsoil capable of sustaining native plant growth, will be provided above the infiltration layer to minimize erosion of the final cover system. Per the CCR Rule, the erosion layer will consist of a minimum of 6 inches of topsoil. The entire surface of the final cover system for the closed landfill will be seeded with native vegetation, and regular maintenance of the seeding will take place until a vegetative cover is established and self-sustaining. The storm water run-off management strategy described in Section 3.1 further minimizes erosion of the final cover system.

4. ESTIMATED MAXIMUM INVENTORY OF CCR

Federal CCR Rule Reference: 40 CFR 257.102(b)(1)(iv)

As of December 2023, approximately 30.96 million cubic yards of CCR had been disposed within the landfill. It is estimated that the landfill may store approximately 50 million cubic yards of CCR prior to the landfill reaching design capacity.

5. ESTIMATED COVER SURFACE AREA

Federal CCR Rule Reference: 40 CFR 257.102(b)(1)(v)

The final cover system is estimated to encapsulate an area of approximately 425 acres. Approximately 195 acres of the final cover system was installed as of December 2019. NRG will continue to incrementally cover areas of the landfill as these areas reach capacity. It is estimated that the largest surface area that may require cover at any point in time in the remaining life of the landfill is approximately 100 acres.

6. CLOSURE SCHEDULE

Federal CCR Rule Reference: 40 CFR 257.102(b)(1)(vi)

Table 1 identifies major milestones necessary to close the landfill with an estimated duration and an estimated year of completion for each milestone. NRG estimates that all closure activities for the CCR landfill will be complete by the year 2050.

Table 1: Planning Level Schedule for Closure of Existing CCR Landfill

Task Description	Estimated Duration	Estimated Completion Year
Place Amended Closure Plan into the Facility's Operating Record (FOR).	1 Day	2024
Send Notification of the Availability of Amended Closure Plan to the Texas Commission of Environmental Quality (TCEQ) and Post the Amended Closure Plan to NRG's CCR Website.	1 Month	2024
Deposit CCR into the Landfill Until Disposal Capacity is Reached.	Ongoing	2050
Final Grading of CCR Material to Designed Slopes and Contours.	Ongoing	2050
Place Final Cover System as Areas Reach Capacity.	Ongoing	2050
Place Notification of Intent to Close into FOR.	1 Month	2050
Certification of Completion of Closure by a Qualified Texas Professional Engineer.	1 Month	2050
Place Notification of Landfill Closure Completion into FOR.	1 Month	2050

Table 1: Planning Level Schedule for Closure of Existing CCR Landfill		
Task Description	**Estimated Duration**	**Estimated Completion Year**
Send Notification of Completion of Closure to the TCEQ & Post Notification of Completion of Closure to NRG's CCR Website.	1 Month	2050
Record a Notation of CCR Landfill Closure on the Deed of the Property.	1 Month	2050
Place Notification of the Deed Notation into Station's Operating Record.	1 Month	2050
Send Notification of the Deed Notation to the TCEQ & Post Notification Recording a Notation on the Deed to NRG's CCR Website.	1 Month	2050

7. AMENDMENTS TO CLOSURE PLAN

Federal CCR Rule Reference: 40 CFR 257.102(b)(3)

NRG will amend this plan prior to a change in the operation of the CCR landfill that would substantially affect the written closure plan in effect or after an unanticipated event necessitates a revision to the written closure plan. If this written closure plan is revised, NRG will retain a qualified professional engineer licensed in the State of Texas to provide written certification that amendments to this plan meet the requirements of 40 CFR 257.102(b).

8. COMPLETION OF CLOSURE ACTIVITIES

Federal CCR Rule Reference: 40 CFR 257.102(f)(3)

Upon completion of closure, NRG will obtain a certification from a qualified professional engineer licensed in the State of Texas verifying that the Unit 004 landfill has been closed in accordance with the closure plan in effect at the time of closure.

Attachment A
Specifications and CQA Plan

TEXAS GENCO

Engineering Services Department
Civil Division

CIVIL SPECIFICATION

LEGS CLASS II
SOLID WASTE DISPOSAL SYSTEM

FOR NON MAJOR PROJECT USE

NO.	DATE	SECTIONS AFFECTED	BY	CHECKED	APPROVED
0	06/19/90	App for Construction	T. Brunette	W. Hackney	J. Malinak
1	01/29/91	General Revision	T. Brunette	W. Hackney	J. Malinak
2	11/21/91	General Revision	T. Brunette	W. Hackney	J. Malinak
3	02/01/95	General Revision	C. Shipley	W. Hackney	J. Malinak
4	08/08/96	General Revision	R. L. Brown	R. L. Brown	J. Malinak

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Texas Genco Specification
Solid Waste Disposal System

1.0 GENERAL

1.1 DESCRIPTION OF WORK

The applicable solid waste disposal system includes areas for Class II Waste Disposal (Areas 1 and 2) including two runoff ponds, a dewatered sludge solids waste disposal area with a runoff pond, a stabilization facility, an emergency pond and an equipment maintenance area. The system is shown on Ebasco drawing M-001601S03 Plot Plan.

This Specification covers the site preparation, construction, containment and reclamation of the Class II Solid Waste Disposal Area 1 and 2. This work includes, but is not restricted to, the following items:

A. Construction of Class II Solid Waste Disposal Areas.

B. Construction of containment system of solids waste disposal areas including liners, dikes and covers.

C. Drainage of Class II Solid Waste Disposal Areas 1 and 2, including ditches, dikes and pipelines.

E. Haul roads for Class II Solid Waste Disposal Areas 1 and 2.

1.2 QUALITY STANDARDS

The Contractor shall control the quality of items and services to meet the requirements of this Specification, and the listed codes, specifications and standards applicable to the extent referenced within the text of this Specification.

1.3 APPLICABLE CODES, SPECIFICATIONS AND STANDARDS

1.3.1 General

Materials and services furnished in accordance with this Specification shall comply with the codes, specifications and standards listed below. Later editions may be used by mutual consent in writing between Contractor and Texas Genco. Any conflict between this Specification and the referenced codes, specifications and standards shall be immediately brought to Texas Genco's attention for written resolution.

ASTM - American Society for Testing and Materials

D-422-72	Standard Method for Particle - Size Analysis of Soils
D-423-72	Standard Test Method for Liquid Limit Soils
D-424-71	Standard Test Method for Plastic Limit and Plasticity Index of Soils
D-698-78	Standard Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate mixtures using 5.5-lb (2.49-kg) Rammer and 12-in. (305-mm) Drop
D1140-71	Standard Test Method for the Amount of Material in Soils Finer than the No. 200 (75-mm) Sieve
D1556-82	Standard Test Method for the Density of Soil in Place by the Sand-Cone Method
D1557-78	Standard Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures using 10-lb (4.54-kg) Rammer and 18-in. (457-mm) Drop
D2167-84	Standard Test Method for Density of Soil in Place by the Rubber - Balloon Method
D2216-80	Standard Test Method of Laboratory Determination of Moisture Content of Soil
D2435-80	Standard Method of Test for One-Dimensional Consolidation Properties of Soils
D2850-87	Standard Method of Test for Unconsolidated, Undrained Strength of Cohesive Soils in Triaxial Compression
D2922-81	Standard Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
D2937-83	Standard Test Method for Density of Soil in Place by the Drive-Cylinder Method

D3017-88 Standard Test Method for Moisture Content of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)

Particle Size Analysis - Texas Procedure - April, 1980

OSHA - Occupational Safety and Health Administration

Regulations 29 CFR Part 1926 - Occupational Safety and Health Regulations for Construction

Texas Highway Department Standard Specifications for Construction of Highways, Streets and Bridges

In addition to the general requirements of this Specification, additional specific requirements pertaining to clearing, grubbing, and excavating in Ebasco Specifications "Clearing and Grubbing" (HOU-3037-101400) and "Excavation, Backfill, Filling and Grading" (HOU-3037-102401) shall also apply.

1.4 REFERENCE DRAWINGS

Ebasco Drawings

M - 104604S01	thru	S11	AQCS	FDN
M - 113600S04	thru	S06	SWDA	Grading
M - 113605S01	&	S02	SWDA	Sanitary System
M - 113610S03	thru	S06	SWDA	Drainage
M - 113620S01	thru	S08	SWDA	Road and RR
M - 113621S01	&	S02	SWDA	Runoff Ponds
M - 001600				
M - 001601S02	&	S03		
M - 113621S03	thru	S05		

Texas Genco LMS Drawings

L0 - C - 2001	Solid Waste Disposal Area - Plot Plan
L0 - C - 2002	Solid Waste Disposal Area - Sections And Details

2.0 CONSTRUCTION SEQUENCING OF WASTE DISPOSAL AREAS

2.1 GENERAL

During the initial construction phase, the stabilization facility, emergency pond, and equipment maintenance area shall be completed. The preparation of the initial cells to be used in both the Class II Solid Waste Disposal Area (Areas 1 and 2), and the dewatered sludge solids waste disposal area shall also be completed, including associated runoff ponds, haul roads, and drainage systems.

2.2 CLASS II SOLID WASTE DISPOSAL AREAS

The development of the solid waste disposal cells in the various areas shall continue on a sequential basis. As a particular cell is being filled, the clearing, grubbing, placement of the liner, and drainage system for the adjoining cell shall commence. During the filling of a cell, all surface runoff from the cell shall be directed by dikes to a ditch which will discharge to the area's runoff pond. After a cell has been completed, including final soil cover and seeding, the drainage system shall be as detailed on the design drawings and runoff will be directed towards the permanent perimeter drainage system.

The filling of a particular cell in the solid waste disposal area shall proceed as follows:

- Clearing and grubbing as per Project Specification "Clearing and Grubbing (HOU-3037-101400) such that the subgrade shall be free of roots, stumps, branches, organics or other deleterious materials which could puncture, damage or otherwise inhibit the liner from functioning properly.

- Placement of the liner and/or dike as specified in Section 4.0.

- Dumping, spreading and compaction of flue gas desulfurization solids stabilized with fly ash and mixed with bottom ash (bottom ash disposal only as designated by the owner).

The material shall be spread and compacted in a manner that facilitates and supports the construction of subsequent lifts of disposed waste material, closure material (clay and topsoil) and construction equipment.

Plant benchmarks shall be utilized to establish final landfill grade elevations. The landfill final grade elevations will be check yearly by Texas Genco.

No field testing program shall be required to ensure that the density requirements are being met. However, Texas Genco may implement a testing program, if deemed necessary, so as to ensure the design life of the area.

At the time of final filling, and prior to placing topsoil cover and seeding, the cell surface shall be sloped at a grade between 3 and 5 percent and as specified on the approved for construction drawings to control erosion and facilitate routing of runoff water to the perimeter ditch.

All cells shall not have permanent side slopes steeper than one (1) vertical to three (3) horizontal. The permanent exterior slopes of the waste disposal areas shall be constructed with side slopes no steeper than 4 horizontal to 1 vertical as shown on the drawings.

- Placement and compaction of the top cover and exterior slope cover. The top cover and exterior slope cover shall be constructed as described in Section 5.0.

- Placement, loose compaction and seeding of final top soil cover. Topsoil placement and seeding of the final exterior surfaces shall be performed as described in Section 7.0.

3.0 CLAY EXCAVATION

3.1 Clay for Area 1 cell liners and cover will be obtained from either Area 1, Area 2, or Offsite. Prior to obtaining clay from Area 2 or offsite it will be the responsibility of the Contractor to excavate and effectively utilize the clay located within the confines of Area 1 and on Texas Genco property surrounding Area 1. The Contractor shall have working excavation drawings for Texas Genco - Engineering review. Prior to clay excavation, test pits shall be excavated by the Contractor on a 150 foot grid pattern, or as designated by Texas Genco. Testing of the clays will be conducted by Texas Genco - Inspection Services; however, the Contractor will be responsible for mapping the clay seams based on the soil test results.

3.2 In areas where clay is excavated, the topsoil shall be stockpiled. When excavation in a defined area is complete, the area shall be left in such a state that a future clay

liner can be installed, if required. The stockpiled topsoil shall be placed over the area and the area shall be seeded in accordance with section 7.0 of this specification. Erosion control of the excavated areas will be the responsibility of the Contractor.

4.0 CLAY LINER

4.1 SCOPE OF WORK

4.1.1 The Contractor shall furnish all labor, material, supervision, and equipment to complete the clay liner for the cells in the Class II Solid Waste Disposal Area (Areas 1 and 2), including hauling, discing, compacting, drying and/or watering, removal of rainfall and removal of all previously placed material unsuitable due to weather conditions, final grading and sealing and all necessary items as detailed or required to complete the compacted liner in accordance with the drawings.

4.1.2 The Contractor shall certify and show by weighing under witness by TEXAS GENCO that the compaction equipment is fully ballasted. The compaction equipment manufacturer's specifications shall be furnished with the certification.

4.2 MATERIALS

Clay that meets all of the following requirements shall be classified as clay fill for use in construction of the compacted clay liner.

4.2.1 Clay fill shall meet the requirements of CL or CH clay as classified in accordance with the Unified Soil Classification System (ASTM D 2487-83) except that 30 percent or more by dry weight of the material shall pass a No. 200 Standard Sieve. Clay fill shall have a liquid limit greater than 30 and plasticity index greater than 15.

4.2.2 Clay fill materials shall be reasonably free of gypsum, ferrous, and/or calcareous concretions and nodules or other deleterious substances.

4.2.3 Continuous and repeated visual inspection of the materials being used will be performed by the Contractor and TEXAS GENCO to ensure proper soils are being used. In addition, TEXAS GENCO will make frequent inspections of the liner placement operations and materials and will consult with the site personnel on suitable liner materials and locations of such.

4.3 CONSTRUCTION

The area where the liner is to be placed shall be prepared by discing or scarifying to loosen the surface to a depth of nine (9) inches. The entire depth shall then be moisture conditioned to bring the material within the range of ±4 percent of optimum. The subgrade shall then be compacted to at least 95 percent of the maximum dry density determined from the Standard Proctor Test. Immediately after scarifying and compaction, the first layer of material shall be placed and compacted as follows:

4.3.1 Clay fill lift thickness, after compaction, shall be between 6 and 7 inches. Thinner lifts are permissible to achieve design grades.

4.3.2 Prior to compaction, each lift of clay fill material shall be thoroughly mixed by discing to provide a uniform soil particle size for compactive efforts. The maximum clod size shall be limited to 4 inches maximum.

Unnecessary equipment or truck trafficking of the surface shall not be permitted during the period between mixing and placement of the following lift unless approved by Texas Genco.

4.3.3 After mixing, representative samples will be taken by Texas Genco and tested for moisture content prior to any compactive efforts. If the moisture content is within the range specified in Section 4.3.6.1 below, compaction may begin. If the moisture content is outside of this range, the clay fill will be wetted or dried and reworked accordingly. The clay fill should be sprinkled or sprayed with water (most probably from a water truck) and dozed, wind-rowed, and/or disc-plowed to uniformly increase the moisture content of the clay if the material is below Optimum Moisture Content (OMC). The clay fill should be dozed, wind-rowed, and/or disc-plowed to help air dry the clay if the moisture content is too high.

4.3.4 Each lift will be thoroughly compacted and will have moisture and density controls salified through field testing before a subsequent lift is placed.

4.3.5 Compaction of lifts shall be as follows:

4.3.5.1 Compaction of lifts shall be performed with an appropriately heavy, properly ballasted, penetrating-foot compactor (such as a CAT 815 or equivalent) subject to Texas Genco approval. A minimum of four passes will be required on each lift regardless of whether the lift meets density specifications. A pass is defined as one

trip of the compacting equipment over the lift and back to the starting point by a single drum roller or one trip across the lift surface from one side to the other if the compacting equipment has front and back compacting rollers.

4.3.5.2 The daily work area shall extend a distance so as to maintain moist soil conditions (facilitate bonding) and continuous operations. Desiccation and crusting of the lift surface shall be avoided.

4.3.5.3 If desiccation and crusting of the lift surface occurs before placement of next lift, this area shall be scarified to a sufficient depth to mix with moist materials, or sprinkled with water and then scarified. In any case, the clay shall be scarified to a depth of 2" between lifts.

4.3.5.4 Transition from full depth liner to beginning of adjacent new section shall be accomplished by sloping (cutting back) end of full depth section for tying in new lift.

4.3.5.5 The disposal area bottom shall be constructed initially. The transition between the bottom and side slopes shall be accomplished by compacting parallel or perpendicular to the slope.

4.3.5.6 Dozer equipment shall not be used for primary compaction efforts.

4.3.6 During compaction, the placement soil moisture content and dry density shall be maintained within the limits specified below:

4.3.6.1 Compaction moisture content shall be between one and five percent wet of OMC.

4.3.7 The clay fill shall be compacted to a minimum dry density determined from the Standard Proctor Test (ASTM D-698). Densities less than 95 percent of the maximum dry density determined from the Standard Proctor Test shall be recompacted and/or removed and reworked to meet density objectives.

4.3.8 During construction, drying of finished lifts or sections of compacted clay liner shall be prevented by sprinkling with water, as needed.

4.3.9 At the end of each construction day's activities, completed lifts or sections of compacted clay liner shall be sealed by rolling with a rubber tired or smooth drum rollers and sprinkled with water as needed.

4.3.10 The compacted clay liner shall have at least the minimum thickness shown on the drawings. Thickness on the side slopes shall be measured perpendicular to the slope face.

4.3.11 The as-built thickness of the compacted clay liner shall be determined by survey methods (nondestructive) as described below. An individual lift may be sampled upon completion (but prior to subsequent lift placement) with an approved sampler or investigative tool, but the resulting penetration shall be properly backfilled with hand tamped clay fill or a mixture of concrete sand conforming to ASTM C-33 and dry bentonite uniformly mixed in equal parts by dry weight. Samples of the in-place compacted clay liner shall be tested and evaluated prior to acceptance.

4.3.12 After completion of a segment of compacted clay liner, the top of the clay shall be surveyed to ensure that the specified thickness of primary compacted clay liner has been achieved. The compacted clay liner shall have a maximum permeability of 1 x 10^{-7} cm/sec.

5.0 CLAY TOP COVER AND EXTERIOR SLOPE COVER

5.1 SCOPE OF WORK

5.1.1 The Contractor shall furnish all labor, material, supervision, and equipment to complete the clay top cover and exterior slope cover construction for the Class II Solid Waste Disposal Areas (Area 1 and 2), including hauling, disking, compacting, drying, removal of rainfall and removal of all previously placed material unsuitable due to weather conditions, final grading and sealing and all necessary items as detailed or required to complete the compacted top cover and exterior slope cover construction in accordance with the drawings.

5.1.2 The Contractor shall certify and show by weighing under witness by Texas Genco that the compaction equipment is fully ballasted. The compaction equipment manufacturer's specifications shall be furnished with the certification.

5.2 MATERIALS

Clay that meets all of the following requirements shall be classified as select clay fill for use in construction of the compacted clay cover.

5.2.1 Clay fill shall meet the requirements of CL or CH clay as classified in accordance with the Unified Soil Classification System (ASTM D 2487-83) except that 30

percent or more by dry weight of the material shall pass a No. 200 Standard Sieve. Clay fill shall have a liquid limit greater than 30 and plasticity index greater than 15.

5.2.2 Clay fill materials shall be reasonably free of gypsum, ferrous, and/or calcareous concretions and nodules or other deleterious substances.

5.2.3 Continuous and repeated visual inspection of the materials being used will be performed by the Contractor and Texas Genco to ensure proper soils are being used. In addition, Texas Genco will make frequent inspections of the top cover and exterior slope cover placement operations and materials and will consult with the site personnel on suitable liner materials and locations of such.

5.3 CONSTRUCTION

Prior to the construction of the top cover and exterior slope cover on landfilled materials, the area where the cover is to be placed shall be prepared by disking or scarifying to a depth of nine (9) inches. This entire depth shall then be moisture conditioned by repetitions of plowing and watering. Prior to placement of clay, the combustion by-product slickened surface shall be roughed-up by use of a dozer to ensure good bonding between the combustion by-product and the first layer of the clay liner. The first layer of the cover material shall be placed and compacted as follows:

5.3.1 Clay fill lift thickness, after compaction, shall be between 6 and 7 inches. Thinner lifts are permissible to achieve design grades.

5.3.2 Prior to compaction, each lift of clay fill material shall be thoroughly mixed by disking to provide a uniform soil particle size for compactive efforts. The maximum clod size shall be limited to 4 inches maximum.

Unnecessary equipment or truck trafficking of the surface shall not be permitted during the period between mixing and placement of the following lift unless approved by Texas Genco.

5.3.3 After mixing, representative samples will be taken by Texas Genco and tested for moisture content prior to any compactive efforts. If the moisture content is within the range specified in Section 5.3.6.1 below, compaction may begin. If the moisture content is outside of this range, the clay fill will be wetted or dried and reworked accordingly. The clay fill should be sprinkled or sprayed with water (most probably from a water truck) and dozed, wind-rowed, and/or disc-plowed to

uniformly increase the moisture content of the clay if the material is below Optimum Moisture Content (OMC). The clay fill should be dozed, wind-rowed, and/or disc-plowed to help air dry the clay if the moisture content is too high.

5.3.4 Each lift will be thoroughly compacted and satisfy moisture and density controls through field testing before a subsequent lift is placed.

5.3.5 Compaction of lifts shall be as follows:

5.3.5.1 Compaction of lifts shall be performed with an appropriately heavy, properly ballasted, penetrating-foot compactor (such as a CAT 815 or equivalent) subject to Texas Genco approval. A minimum of four passes will be required on each lift regardless of whether the lift meets density specifications. A pass is defined as one trip of the compacting equipment over the lift and back to the starting point by a single drum roller or one trip across the lift surface from one side to the other if the compacting equipment has front and back compacting rollers.

5.3.5.2 The daily work area shall extend a distance so as to maintain moist soil conditions (facilitate bonding) and continuous operations. Desiccation and crusting of the lift surface shall be avoided. In any case, the clay shall be scarified to a depth of 2" between lifts.

5.3.5.3 If desiccation and crusting of the lift surface occurs before placement of next lift, this area shall be scarified to a sufficient depth to mix with moist materials, or sprinkled with water and then scarified.

5.3.5.4 Transition from full depth cover to beginning of adjacent new section shall be accomplished by sloping (cutting back) end of full depth section for tying in new lift.

5.3.5.5 Compaction shall be accomplished by rolling parallel or perpendicular to the slope.

5.3.5.6 Dozer equipment shall not be used for primary compaction efforts.

5.3.6 During compaction, the placement soil moisture content and dry density shall be maintained within the limits specified below:

5.3.6.1 Compaction moisture content shall be between one and five percent wet of OMC.

5.3.7 The clay fill shall be compacted to a minimum dry density determined from the Standard Proctor Test (ASTM D-698). Densities less than 95 percent of the

maximum dry density determined from the Standard Proctor Test shall be recompacted and/or removed and reworked to meet density objectives.

5.3.8 During construction, drying of finished lifts or sections of compacted clay cover shall be prevented by sprinkling with water, as needed.

5.3.9 At the end of each construction day's activities, completed lifts or sections of compacted clay cover shall be sealed by rolling with a rubber tired or smooth drum rollers and sprinkled with water as needed.

5.3.10 The compacted clay cover shall be to the minimum thickness as shown on the drawings. Thickness of the clay cover on the side slopes shall be measured perpendicular to the slope face.

5.3.11 The as-built thickness of the compacted clay cover shall be determined by survey methods (nondestructive) as described below. An individual lift may be sampled upon completion (but prior to subsequent lift placement) with an approved sampler or investigative tool, but the resulting penetration shall be properly backfilled with hand tamped select clay fill or a mixture of concrete sand conforming to ASTM C-33 and dry bentonite uniformly mixed in equal parts by dry weight. Samples of the in-place compacted clay cover shall be tested and evaluated prior to acceptance.

5.3.12 After completion of a segment of compacted clay top cover and/or exterior slope cover, the top of the clay shall be surveyed to ensure that the specified thickness of primary compacted clay cover has been achieved. The compacted clay cover shall have a maximum permeability of 1×10^{-7} cm/sec.

Field and laboratory tests shall be made at frequent intervals to determine that moisture content and dry density requirements are being satisfied. Locations shall be designated by Texas Genco.

6.0 TOPSOIL AND SEEDING

6.1 Topsoil shall be placed on the exterior surfaces and spread in accordance with the depth specified on the approved for construction drawings as measured after light rolling. Any trash, wood, brush, stumps, or other objectionable materials encountered shall be removed.

6.2 All exterior surfaces shall be seeded with Bermuda and natural grass seed and fertilized. Texas Genco will accept responsibility of a closed cell after a 6" stand of continuous Bermuda and natural grass has been established.

7.0 LIMESTONE ROCK FOR ENERGY DISSIPATION

7.1 The limestone rock used to dissipate the hydraulic energy at the base of the concrete - lined downslope channel shall be strong, durable, broken stone, free of cracks, soft seams, and similar structural defects. The aggregate shall be roughly angular, reasonably free of thin, flat, or elongated pieces. Neither the breadth nor the thickness of any stone shall be less than one-third of its length. The riprap materials shall weigh between 50 and 150 pounds each and at least 60 percent of the stones shall weigh more than 100 pounds each.

7.2 Placement of the material in the energy dissipation shall be made in a manner which prevents segregation, maintains an open matrix of stone, prevents further breaking of the blocks, and prevents damage to the concrete structure which forms the dissipater.

8.0 CONCRETE AND REINFORCING STEEL

8.1 All concrete materials and installation shall be in accordance with Class C Concrete as referenced in the attached Civil Standard Specification C-002 entitled "Concrete."

8.2 Reinforcing steel materials and installation shall be in accordance with the attached Civil Standard Specification C-003 entitled "Reinforcing Steel."

9.0 DRAINAGE

9.1 GENERAL

Work shall include but not necessarily be limited to the construction and maintenance of temporary and permanent drainage, and sediment control for the solid waste disposal area. Such work will involve the construction of ditches, dikes, traps, slope drains, preparing slopes, compacting top soil, seeding and fertilizing as to comply with this Specification and drawings or as directed by the Engineer.

The design storm for temporary construction drainage is the 25 year, 24 hour event.

9.2 CLASS II SOLID WASTE DISPOSAL AREAS

A permanent drainage system consisting of peripheral ditches and dikes shall be constructed in the Class II solid waste disposal areas. The peripheral ditches shall serve to convey all runoff, from the finished reclaimed cells and all other cells which are neither being developed nor filled, to the area's natural runoff system. The ditches, dikes, stilling basins, catch basins and drop structures shall be as shown on the design drawings.

The area's natural runoff system, Lynn Creek, shall be rerouted to the dimensions and elevations shown on the design drawings.

The runoff from the cell which is at any point being filled shall be directed to dikes within the disposal area, which shall be in turn conveyed to a pipe or ditch running along the area haul road and discharging to the area's runoff pond. The size and type of pipe or ditch shall be as shown on the design drawings. The maximum open area being drained to the area's runoff pond shall not exceed 63 acres, unless approved by Texas Genco Engineering.

As an area is filled and covered the drainage system shall be re-routed so as to discharge into the peripheral ditch system. Maintenance shall be provided as needed for both the permanent and temporary ditch systems.

As construction of the cell rows proceeds towards the area's runoff pond, the temporary drainage system shall sequentially be routed towards the ditch.

The top of the seeded reclaimed cells shall be sloped at a three percent grade to permit the surface runoff to be collected at the top of the exterior slopes by channels which drain into five (5) downslope concrete lined channels which conduct the runoff to the permanent peripheral channels.

10.0 **HAUL ROADS**

The main haul road through the bottom ash waste disposal area 1 shall be an unsurfaced type, two lane, all weather, 42 feet right-of-way width designed for 85 ton truck capacity. The preliminary construction of these roads shall use bottom ash and be adequate to allow satisfactory passage for vehicles hauling materials to the cell being filled.

The spurs leading from the main haul road to the various disposal cells within the area shall be constructed as needed. As a particular cell is being filled the road spur within the cell will be constantly raised and continuous maintenance of this road shall be provided by the on-site spreading equipment to ensure the satisfactory passage of the hauling trucks. A turn-around area shall be provided at the end of the spur. Once a cell is filled the haul road shall be covered and seeded as specified in Section 7.0.

Periodic maintenance of these roads shall be performed so as to permit normal vehicular use at all times and shall include dust control.

11.0 TESTING

11.1 All earthwork and soils testing shall be conducted by Texas Genco.

11.2 The following minimum testing frequency shall be utilized:

Material	Test and Frequency
Clay fill from clay borrow area.	Standard Proctor Compaction Test (ASTM D698) for each soil type and each 10,000 cu. yds. excavated.
Clay fill installed as clay liner, top clay cover, or clay exterior slope cover.	One in-place density & moisture content test per 125,000 sq. ft. of compacted lift. At least one test shall be performed for each lift of material placed.

11.3 All test locations shall be referenced by approximate plant coordinate and elevation.

11.4 The latest Codes and Standards will be applicable.

12.0 GROUNDWATER MONITORING SYSTEM

A series of groundwater monitoring wells have been installed in the vicinity of the dewatered sludge waste disposal cells and run-off ponds so as to comply with Texas Natural Resource Conservation Commission (TNRCC). New wells shall be installed as new areas are developed.

A program has been implemented to obtain and analyze samples from the installed groundwater monitoring system. All monitoring wells have been sampled and the samples analyzed to establish groundwater quality and to determine contamination on a periodic basis.

The parameters to be established during the analysis shall meet the requirements of the TNRCC.

13.0 DRAWINGS

The Contractor shall be responsible for having complete full size working cell development and cell closure drawings available for Texas Genco - Engineering review. Quarterly submittal of these drawings will be required. As a minimum, these drawings should include definition of the cell limits, details of the temporary drainage system, and details for sequencing of cell closure.

COVER SYSTEM CONSTRUCTION QUALITY ASSURANCE PLAN

Solid Waste Disposal Area
Limestone Electric Generating Station,
Jewett, Texas
April 2024

Project Number: 535131

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Table of Contents

1.0 INTRODUCTION

This document presents the Construction Quality Assurance (CQA) Plan for specific components of the landfill cover system that will be constructed on open sections of the Solid Waste Disposal Area (SWDA) landfill at the Limestone Electric Generating Station (Station) located near Jewett, Texas. The majority of the Station is located in Limestone County, while the SWDA, which is also known as coal combustion residual (CCR) Unit 004, is located in Freestone County.

CCR is disposed by the Station in the SWDA Landfill. Upon completion of the cover system installation, TRC will provide a certification documenting the cover system meets the requirements of the approved Closure Plan and applicable rules governing CCR Landfills in Texas.

1.1 Background

NRG is closing open sections of the SWDA Landfill where active waste disposal has not occurred for years. As depicted on Sheet 4 of the construction plans, the open area being considered for closure is located along the northeast face of the landfill. Roughly 40 acres in extent, this overall area was broken into four separate zones equivalent in size to make closure estimating easier. The zones are:

- Zone 1 – 10.71 Acres of Landfill Closure + 4.92 Acres of Additional Stormwater Ditch Construction.
- Zone 2 – 10.79 Acres of Landfill Closure + 3.65 Acres of Additional Stormwater Ditch Construction.
- Zone 3 – 10.15 Acres of Landfill Closure + 5.80 Acres of Additional Stormwater Ditch Construction.
- Zone 4 – 8.27 Acres of Landfill Closure + 1.65 Acres of Additional Stormwater Ditch Construction.

The proposed final cover system will be constructed by EcoMaterial Technologies, Inc. (EcoMaterial) under separate contract to NRG. The cover system will consist of compacted clay with a minimum thickness of 18 inches (1.5 feet, installed in three, 8-inch lifts compacted to 6 inches) covered with a minimum of 6 inches (0.5 feet) of vegetated topsoil.

In addition to the cover system, a new stormwater ditch system will be constructed of 18 inches (1.5 feet) of compacted clay that will be installed in the same manner as the cover system. A loose lift of 9 inches (0.75 feet) of topsoil will also be installed on the ditch system, however it will be compacted to an approximate total thickness of 6-inches (0.5 feet) then smooth rolled to facilitate stormwater flow. As an alternative to the cover soil (which will erode over time), the facility could elect to install Fabriform pavement in the stormwater ditch system which would be similar to the other non-contact stormwater ditches at the Facility. CQA testing will not be performed on the non-contact stormwater ditches.

1.2 Purpose and Scope

The purpose of this CQA Plan is to provide procedures to confirm that the disposal area liner is constructed and documented consistent with the Construction Drawings and Specifications.

The scope of this document includes:

- General CQA requirements concerning roles, responsibilities, and qualifications of parties involved;
- The preconstruction meeting; and
- General inspection and documentation procedures. Specific CQA requirements for each cover system component address construction procedures and observation, field and laboratory testing frequency and methods, and acceptance criteria.

2.0 ROLES AND RESPONSIBLITIES

Roles and responsibilities for the CQA that will be performed to document the cover system are summarized below.

2.1 Construction Quality Assurance Officer

The CQA officer shall supervise and be responsible for all inspections, testing, and related construction documentation as described in this CQA Plan. The CQA officer will be responsible for preparation of the construction documentation report to certify substantial compliance with the engineering design and shall act as the Certifying Engineer following construction completion. The CQA officer shall be a Texas Registered Professional Engineer.

The CQA officer may designate a representative to perform weekly site visits and reporting duties on their behalf. Likewise, the CQA officer may designate a qualified testing technician with experience in the assigned aspect of construction to perform daily inspection, testing, and sampling duties in his behalf. Although these duties may be delegated, the CQA officer will retain the responsibility for these activities.

The CQA officer or the CQA officer's designated representative shall visit the construction site on a weekly basis or at a minimum during active periods of construction to personally observe and document the construction and review documentation procedures. Also, at a minimum, the CQA officer shall personally observe, on at least one occasion, each of the major elements of construction. The CQA officer shall be readily available for consultation, as needed. The CQA officer will make recommendations to the owner or the owner's representative based on observation and performance of individuals in the field. Those recommendations may be based on changed conditions, variation from the approved plans and specifications, change orders, out of compliance test results, re-work, and similar issues or conditions.

The CQA officer or the CQA officer's representative shall monitor daily progress at the construction site. Either the CQA officer or the CQA officer's designated representative will prepare a weekly summary report that discusses the work and testing completed during the week, test results, sample locations, change orders, clarification requests, and the planned work schedule for the next week.

2.2 Testing Technician

The testing technician will carry out daily inspection, testing, and sampling duties under the direct supervision of the CQA officer or his or her representative. The testing technician will observe and document construction and installation procedures. The testing technician will prepare daily summary and inspection reports via an electronic reporting software called Compass. The daily inspection summary will be provided to the CQA officer through the Compass interface and through file sharing. The testing technician will immediately notify the CQA officer of problems or deviations from the CQA Plan or design plans and specifications. Reporting, documentation, and resolution of problems and deficiencies shall be carried out as described in Subsection 4.3. The testing technician will not have authority to approve design or specification changes without the consent of the CQA officer.

2.3 Soils Testing Laboratory

The Soils Testing Laboratory retained will be experienced in disposal area construction soils testing in accordance with the American Society of Testing and Materials (ASTM) Standards and other applicable standards. The selected laboratory will be required to be responsive to the project needs by providing test results within reasonable time frames, as defined by contract terms or regulatory compliance requirements. This shall include providing verbal communication on the status of ongoing tests and immediate communication of test results as needed to facilitate ongoing construction. Such information may include hydraulic conductivity test data, proctor values, and borrow source characterization data. Final laboratory reports will be certified by the soils testing laboratory and submitted to the CQA officer.

2.4 Construction Contractor

A construction firm retained by the owner or the owner's representative to furnish earthwork and piping construction will perform the construction contractor's role. The construction contractor will be experienced in solid waste disposal area construction and knowledgeable about clay liner and cover system construction techniques. The construction contractor will provide the CQA officer with timely updates on daily and weekly progress, will participate in weekly meetings, and will contribute to the weekly update reports. Work stoppages due to weather, equipment failure, or similar should be reported by the construction contractor the day it occurs. Unexpected conditions should be reported by the construction contractor within 24 to 48 hours.

3.0 PRECONSTRUCTION MEETING

Prior to construction commencing at the disposal facility, a preconstruction meeting shall be held at the facility. This meeting will include the parties involved in the construction, including the CQA officer, the CQA officers designates, representatives of the testing laboratory, construction contractor, and owner. The objectives of this meeting include construction planning and coordination of tasks; communication plans and procedures; management of change procedures; responsibilities and authority during construction, identification of potential problems that might cause difficulties and delays in construction; and proper interpretation of design intent by contractors.

Specific topics to be addressed at this meeting include the following:

- Review general safety requirements of the owner and specific safety issues associated with the construction activities.
- Review critical design details of the project, including the plans and specifications.
- Review measures for surface water runoff and runon diversion control.
- Review the responsibilities of each party.
- Review lines of authority and communication.
- Review methods for documenting and reporting and for distributing documents and reports.
- Review requirements of the Soils Testing Laboratory regarding sample sizes, methods of collection, and shipment. Also, review turnaround times for sample data and implications on construction schedule pending receipt of acceptance data.
- Review the number and locations of the testing requirements for soils and geosynthetic components.
- Review procedures for test results and subsequent action required for failed tests.
- Review a proposed weekly work schedule.
- Conduct a site walk of the clay borrow pit to evaluate clay proposed for cover system (refer to subsection 5.2.2 for more information on the clay borrow pit).

4.0 GENERAL CONSTRUCTION INSPECTION AND DOCUMENTATION

This section describes general documentation procedures to be implemented including use of forms, identification and resolution of problems or deficiencies, and photographic documentation.

4.1 Daily Summaries and Weekly Reports

Brief work and testing summaries shall be prepared by the construction contractor and the testing technician and provided to the CQA officer on a daily basis (or as dictated by construction activity at the site) for each day of activity. Summary reports shall contain the following information, as appproriate:

1. Date, project name, location, and names of key contributors, including the testing technician, construction contractor's foreman, CQA officer, and/or the CQA officer's representative.

2. Time work starts and ends each construction work day. Also, the duration and reason for work stoppages (i.e., weather delay, equipment shortage, labor shortage, unanticipated conditions encountered, etc.).

3. Data on weather conditions including temperature, humidity, wind speed and direction, cloud cover, and precipitation.

4. Construction contractor's work force, equipment in use, and materials delivered to or removed from job site.

5. Chronological description of work in progress including locations and type of work performed.

6. Summary of meetings held and attendees.

7. A description of materials used, and references or results of testing and documentation.

8. Discussion of problems/deficiencies identified and corrective actions taken as described in Subsection 4.3 (Problem/Deficiency Identification and Corrective Action).

9. Identification/list of laboratory samples collected, marked, and delivered to laboratories, or clear reference to the document containing such information if samples were obtained.

10. An accurate record of calibrations, recalibrations, or standardizations performed on field testing equipment, including actions taken as a result of recalibrations.

11. Copies of field data sheets or other daily output from Compass.

4.2 Paper and Electronic Forms, Checklists, and Data Sheets

Additional paper and/or electronic forms may be developed during the project to provide specific needs such as geomembrane inspections or simply to improve efficiency of data collection. New forms shall be approved by the CQA officer prior to their use, shall be distributed to the project team, and shall be incorporated in this CQA Plan upon approval.

4.3 Problem/Deficiency Identification and Corrective Action

Problem or deficiency identification and corrective action will be documented in the daily reports provided to the CQA officer and the Weekly Reports prepared by the CQA officer for the owner. These problems or deficiencies include when a construction material or activity is observed or tested that does not meet the requirements set forth in this Plan and in the construction specifications. The Weekly Report should clearly reference daily reports, photographs, laboratory or field testing information, or forms that contain data or observations leading to the determination of a problem or deficiency. Problem/deficiency identification and corrective action documentation may include the following information:

1. A description of the problem or deficiency, including reference to supplemental data or observations responsible for determining the problem or deficiency.

2. Location of the problem or deficiency, including how and when the problem or deficiency was discovered. In addition, an estimate of how long the problem or deficiency has existed.

3. An opinion as to the probable cause of the problem or deficiency.

4. A recommended corrective action for resolving the problem or deficiency. If the corrective action has already been implemented, then the observations and documentation to show that the problem or deficiency has been resolved. If the problem or deficiency has not been resolved by the end of the day upon which it was discovered, then the report will clearly state that it is an unresolved problem or deficiency. Subsequent Daily Reports shall indicate the status of problems or deficiencies until resolved.

Deficiencies should be communicated, as soon as possible, to allow corrective action to be implemented without significant rework and/or disruption of work. If the problem or deficiency has not been resolved, the CQA officer and the preparer will discuss the necessary corrective actions. The CQA officer will work with the owner and construction contractor to implement actions as necessary to resolve the problem or deficiency. A summary and specific description of such problems or deficiencies and corrective actions implemented shall be provided in the Construction Documentation Report.

The CQA officer, working with the owner and construction contractor, will determine if the problem or deficiency is an indication of a situation that might require changes to the plans and specifications and/or the CQA Plan. Revisions to the plans or specifications or the CQA Plan must be approved by the CQA officer and the site owner prior to being implemented.

4.4 Photographic Documentation

Photographs will be taken to document observations, problems, deficiencies, corrective actions, and work in progress. Global positioning system (GPS) coordinates will be collected for each

photograph taken. Photographs will be in digital format and will be filed in chronological order in a permanent file by the CQA officer. Photographs will be taken of:

1. Each test location;
2. Each sample location;
3. Each shelby tube prior to shipment; and
4. Of the extent and character of the work accomplished while the testing technician, CQA officer, and/or CQA officer's representative is on-site.

The following information should be documented in the Compass software and daily summary for each photograph:

1. Date and time;
2. Location where photograph was taken, including information regarding the orientation of the photograph itself for proper viewing (i.e., looking south);
3. Description of the subject matter;
4. Unique identifying number for reference in other reports (if applicable); and
5. Name of photographer.

4.5 Surveying

Required surveying will be performed by the construction contractor under the supervision of the CQA officer, or his designated representative. Surveys will be based on survey control monuments that have been established for the facility. Surveys will be performed on a nominal 50 x 50 foot grid, with additional focus on key locations such as breaks in slope, top or toe of slopes, and the limit of cover system construction. Elevations and coordinates will be based on a plant specific system. However, elevations will be readily convertible to MSL datum, and coordinates will be readily convertible to the Central Zone of the Texas State Plane Coordinate System (NAD 83) in US survey feet.

The location of field tests and samples will be recorded through the collection of GPS coordinates. In the event that GPS coordinates prove insufficient, the CQA officer, or his designated representative, is responsible to provide or request survey control.

5.0 COVER SYSTEM CONSTRUCTION QUALITY ASSURANCE

As previously mentioned, the cover system will consist of compacted clay with a minimum thickness of 18 inches (1.5 feet) (installed in three, 8-inch lifts compacted to 6 inches) covered

with a minimum of 6 inches (0.5 feet) of vegetated topsoil. Per TCEQ guidance[1], and in accordance with 30 TAC §352.1221/40 CFR §257.102(d)(3), the final cover system must meet the following requirements:

- The permeability of the final cover must be less than or equal to the permeability of the bottom liner. Because the permeability of the SWDA's liner is $1x10^{-7}$ centimeters per second (cm/sec), $1x10^{-7}$ cm/sec is the maximum allowable hydraulic conductivity of the cover system.
- The cover system must have an infiltration layer of a minimum of 18 inches of earthen material.
- The final cover system must have a minimum of 6 inches of erosion layer of earthen material that is capable of sustaining native plan growth.
- The final cover system must be designed to accommodate settling and subsidence.

5.1 Waste Subgrade

The construction contractor will fill or remove CCR waste in the construction area to match the design elevations of the waste subgrade provided in the construction plans. The construction contractor will be responsible for means and methods to implement the work.

5.1.1 Procedures and Observation

The testing technician, CQA officer, and/or CQA officer's representative will observe the subgrade construction activities and will document relevant observations to support certification of the following requirements:

1. The construction contractor will confirm the uniformity of the prepared subgrade. CCR waste material excavation, placement, and grading will be monitored for removal of unsuitable material. The construction contractor will segregate and/or remove unsuitable subgrade materials, which include:

    a. Boulders, cobbles, and angular rocks greater than 2 inches in diameter;

    b. Voids, mounds, or other areas that do not meet the planned waste elevations provided in the construction plans for the project;

1 *Coal Combustion Residuals (CCR) Landfill, Draft Technical Guideline No. 30,* TCEQ, dated May 2020; and *Nonhazardous Industrial Solid Waste Landfills, Draft Technical Guideline No. 3*, TCEQ, dated May 3, 2976, revised November 30, 2015.

c. Unstable or saturated material;

d. Organic material; and

e. Other materials or conditions that prevent the installation of a compacted clay cover system.

2. The construction contractor will not move CCR waste to an area outside of the landfill. All waste cut or excavated during the project will be placed back within the defined limits of construction so that it will ultimately be located beneath the installed cover system, or moved to an active portion of the landfill.

3. The waste subgrade will be compacted to the extent that it is non-yielding, then scarified (if warranted) prior to the placement of the first clay lift.

5.1.2 Survey

As the waste subgrade for each zone or subset within a zone reaches the design elevation, the construction contractor will survey those areas and provide that information to the CQA officer. In no event shall cover system construction proceed prior to confirmation that the waste elevations meet the design requirements as shown in the construction documents or otherwise agreed to with the Owner and CQA officer.

5.2 Compacted Clay Component of Cover System

Per TCEQ guidance, cover material should consist of a well-graded, fine-grained, clay-rich soil having low cracking potential and good workability and compaction characteristics. The TCEQ recommends a soil containing at least 20% of material passing a No. 200 sieve, having a plasticity index between 10% and 35%, having less than 10% gravel, and that includes no rocks larger than two inches in diameter. Based on general engineering practices, the TCEQ recommends that the compacted soil should have a hydraulic conductivity of $1x10^{-7}$ cm/sec or less. The cover should be constructed and maintained to avoid ponding and erosion. The clay acceptance criteria provided in Subsection 5.2.2 documents that the clay that will be used in cover soil construction will meet or exceed these criteria.

5.2.1 Procedures and Observation

Field tests and soil sample types will be recorded in the daily construction summaries and weekly reports (refer to Subsection 4.1) including locations (by coordinates or survey point reference number) and elevation or lift number of field tests and laboratory sample points. The construction contractor will be responsible for means and methods to implement the work. The testing technician, CQA officer, and/or the CQA officer's designated representative will observe compacted clay fill construction activities and will document relevant observations to support certification of the following requirements:

- The CQA officer will confirm the subbase is acceptable and ready for clay fill placement prior to placement of clay fill over the subbase. Procedures for determining subbase acceptance are discussed in Subsection 5.1.
- All parties (the construction contractor, testing technician, CQA officer, and/or the CQA officer's representative) will confirm the uniformity of the excavated soil to be used as clay fill. Soil placement will be monitored for segregation and removal of unsuitable material and for changes in soil type, color, texture, and moisture content.
- The Construction Contractor will segregate and/or remove unsuitable materials such as granular soil, silty or sandy clay not meeting acceptance criteria, boulders, cobbles, organic material, and other deleterious material.
- The clay will be installed in uncompacted lifts of no more than 8 inches in thickness and compacted with a sheeps-foot roller or similar to no more than 6 inches in thickness.
- The testing technician, CQA officer, and/or the CQA officer's representative will observe clay placement and perform field testing with contractor assistance. The testing technician will measure field densities and moisture contents, using methods described in Subsection 5.2.2 (Sampling Requirements and Acceptance Criteria), to document that the compacted clay fill is in substantial conformance with the placement specifications and that soil placement has been conducted in a manner to achieve a uniform, homogeneous clay mass.
- Voids created by nuclear density gauge (NDG) probes or as the result of Shelby tube samples will be backfilled with granular bentonite, hydrated, and tamped to achieve a compacted and complete repair of the compacted clay.
- Areas of unacceptable permeability, density, or moisture content, as defined by Subsection 5.2.2 (Sampling Requirements and Acceptance Criteria), will be documented by the testing technician, CQA officer, and/or the CQA officer's designated representative. Corrective action will consist of moisture-conditioning of the soil, additional compactive effort, and/or replacement of the material as necessary. Methods for moisture-conditioning soil are described below. Following corrective actions, such areas will be retested. Additional lifts will not be placed in areas with failed test results until corrective action has been completed and retesting has confirmed acceptable compaction has been achieved.
- If necessary, surfaces of liner or cover to receive successive lifts of clay will be moisture-conditioned either by scarification and addition of water where desiccated, or by discing and air drying where saturated to promote effective bonding of lifts. Following scarification, water will be applied with a spray bar applicator or equivalent method to achieve uniform distribution.
- Clay placement will be performed in a manner to achieve continuous and complete keying together of clay cover construction areas. Stepped joints will be utilized to connect lateral segments of clay cover construction, and to connect the current compacted clay cover with previously installed cover.

- No frozen soil will be used for clay fill cover construction. Frozen soil in the compaction work area will be removed or allowed to melt prior to compaction.
- Stones and other penetrating objects 2 inches or larger and stones with sharp edges or points protruding from the surface of the final lift of compacted clay fill will be removed. Organic material will be removed by the contractor as well. Voids made by the removal of stones will be filled with clay soil or bentonite.
- Preconstruction planning will be undertaken to sequence construction activities to minimize the length of time any completed clay surface will be exposed prior to receiving protective cover. Protective cover will be provided by the installation of cover soil.

5.2.2 Sampling Requirements and Acceptance Criteria

Field and laboratory sampling frequencies are based on the area or volume of material placed, as specified in the project specifications. This section describes the required analyses, methods, sample frequencies, and acceptance limits. The testing technician will perform field tests and will collect soil samples for laboratory analysis with the approval of the CQA officer. The testing technician and the soil testing laboratory will perform laboratory analyses with the approval of the CQA officer.

PRECONSTRUCTION SAMPLING

Based on prior knowledge, the clay borrow source produces a lean clay that meets TCEQ guidelines for compacted clay liner material. Prior hydraulic conductivity laboratory analyses of remolded samples from the clay borrow source indicated a range of $1.6x10^{-8}$ to $4.3x10^{-8}$ cm/sec.

Representative (grab) samples will be obtained from the clay borrow source (if not used in construction of a prior phase) and analyzed for standard proctor, Atterberg limits, and grain size prior to construction. This will confirm soil characteristics and provide an initial maximum dry density and optimum moisture content for field moisture/density testing. Multiple samples will be collected to ensure that sufficient data is obtained of the clay material to allow for the maximum dry density and optimum moisture content values used for compaction testing to be adjusted as needed during the cover construction. In the event that changes in physical appearance or soil characteristics are observed, additional sample(s) will be obtained and analyzed.

The following laboratory analyses will be performed on all representative samples obtained:

PARAMETER	TEST METHOD
Moisture-density relationship using Standard Proctor compaction	ASTM D698
Atterberg limits	ASTM D4318
Grain-size analysis	ASTM D422

The following acceptance criteria will apply to the compacted clay soil.

- A minimum 30% by weight that passes the 200 sieve.
- A saturated hydraulic conductivity of $1x10^{-7}$ cm/s or less, when compacted to required moisture contents and densities based on the standard Proctor method.
- A liquid limit of 30% or greater.
- A plasticity index of 15% or greater.

FIELD TESTING

The following field testing methods will be used by the testing technician during construction:

PARAMETER	METHOD
Moisture content	ASTM D6938
Soil density	ASTM D2922

Field density and moisture content tests will be performed at a minimum rate of 1 test per 8,000 square feet (per 6-inch lift) of installed clay (roughly a 90-foot by 90-foot area). Testing will not be performed in the ditch system. Nuclear density gauge test locations, results, and the tested lift will be compiled in a daily summary. The CQA officer will compile the daily summaries and submit them to NRG electronically in a weekly report. The daily and weekly reports will also be maintained in the QA/QC record.

Acceptance criteria for field density will require soil compaction to a minimum of 95 percent of the Standard Proctor (ASTM D698) maximum dry density. Moisture content requirements will be at least wet of optimum. The acceptable range will be based on Proctor moisture-density relationships and compaction versus permeability relationships.

LABORATORY TESTING

Routine laboratory testing of the clay cover soil will be performed on samples of in-place clay soil. Sampling locations will be determined by the CQA officer or testing technician. Samples for

determining in-place properties will be collected by pushing Shelby tubes. Geotechnical samples of in-place clay will be collected at a frequency of 1 sample per 100,000 square feet per 6-inch lift installed. Two Shelby tubes will be pushed per sample location (within 2 feet of each other) by the construction contractor (with a bulldozer blade or similar). The testing technician will wrap both Shelby tubes, photograph them, and label them "A" and "B". The testing technician will submit the A sample for hydraulic conductivity, Atterberg limits, and sieve analyses. The B sample will be held pending results of the A sample. If analysis of the A sample yields questionable results, the B sample will be submitted for analyses. The samples will be analyzed for the following:

PARAMETER	TEST METHOD
Hydraulic conductivity	ASTM D5084
Atterberg limits	ASTM D4318
Grain-size analysis	ASTM D422

All hydraulic conductivity analyses will be performed on undisturbed extruded material – samples shall not be remolded by the laboratory.

If the A and B geotechnical samples both indicate that the clay area does not meet the permeability standards established in the Closure Plan and/or the CQA Plan, the CQA officer will direct the construction contractor to remove the portion of the cover system where the geotechnical samples were obtained so it can be recompacted. If the Atterberg limits and sieve analysis indicate that the clay is outside of specifications, the clay from this area will be amended with bentonite clay or mixed with/replaced with fresh material.

5.2.3 Survey

As the compacted clay reaches its design thickness the construction contractor will survey those areas and provide that information to the CQA officer. Completed areas should be surveyed as quickly as possible, so that cover soil can be installed on the clay to prevent its desiccation.

5.3 Cover Soil

Per federal and state CCR Rules, an erosion layer consisting of at least 6 inches of topsoil capable of sustaining native plant growth, will be provided above the compacted clay layer to minimize erosion of the final cover system. The topsoil must be seeded with native vegetation and/or a climate appropriate grass, and regular maintenance of the seeding will take place until a vegetative cover is established and self-sustaining.

5.3.1 Procedures and Observation

The testing technician, CQA officer, and/or CQA officer's representative will observe the cover soil installation and will document relevant observations to support certification of the following requirements:

1. A minimum thickness of 0.5 feet as determined by survey.
2. Seeding and watering or hydromulching the cover soil with a native or climate appropriate grass seed or seed mix that will be preapproved by the CQA officer.
3. Obtaining a vegetative cover with a density of at least 70% of the native background vegetative cover for the area and time of year..

5.3.2 Survey

As the topsoil reaches the design elevation, the construction contractor will survey those areas and provide that information to the CQA officer.

Attachment B
Landfill Cover Design Drawings

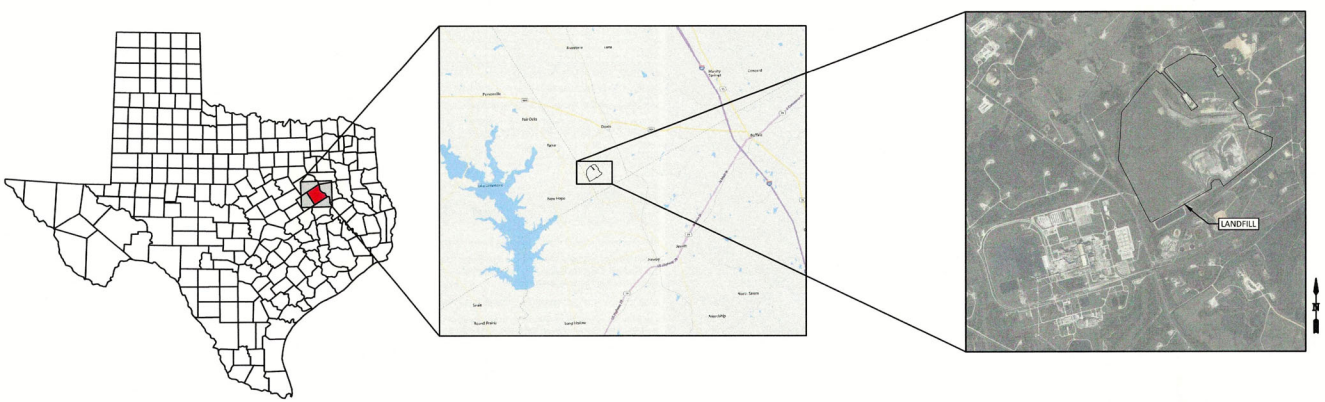
NRG ENERGY - LIMESTONE ELECTRIC GENERATING STATION

LANDFILL COVER SYSTEM DESIGN

PREPARED FOR: NRG ENERGY
LIMESTONE ELECTRIC GENERATING STATION
JEWETT, TEXAS

PREPARED BY: TRC ENVIRONMENTAL CORPORATION
AUSTIN, TEXAS

DATE: MARCH 2024



TEXAS | FREESTONE COUNTY | SITE LOCATOR

SHEET INDEX

SHEET NUMBER	SHEET TITLE
1	TITLE SHEET
2	GENERAL CIVIL NOTES
3	EXISTING CONDITIONS AERIAL
4	OVERALL COVER SYSTEM, ZONES, AND EROSION CONTROL
5	ASH GRADING PLAN - ZONE 1
6	ASH GRADING PLAN - ZONE 2
7	ASH GRADING PLAN - ZONE 3
8	ASH GRADING PLAN - ZONE 4
9	CLAY GRADING - ZONE 1
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11	CLAY GRADING - ZONE 3
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13	COVER SYSTEM GRADING PLAN - ZONE 1
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16	COVER SYSTEM GRADING PLAN - ZONE 4
17	MISCELLANEOUS DETAILS
18	EROSION CONTROL DETAILS

STATE OF TEXAS
RICHARD D. VARNELL
135525
LICENSED
PROFESSIONAL ENGINEER
Richard Varnell
3/26/2024
#3775

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Suite 250
Austin, TX 78752
Phone: 512.239.6080

A. GENERAL NOTES

1. SITE LOCATION: NRG LIMESTONE PLANT, JEWETT, TEXAS.
2. THE TOPOGRAPHIC BASE MAP HAS BEEN CREATED FROM GROUND SURVEY PERFORMED IN 2022 BY ECOMATERIAL TECHNOLOGIES, INC.
3. HORIZONTAL DATUM FOR THIS DRAWING IS LOCAL AND NOT ANCHORED. THE PROJECT FALLS WITHIN THE CENTRAL ZONE OF THE TEXAS STATE PLANE COORDINATE SYSTEM (NAD 83) IN US SURVEY FEET.
4. VERTICAL DATUM FOR THIS DRAWING SET IS NORTH AMERICAN VERTICAL DATUM 1988 (NAVD 88). CONTOUR INTERVAL IS 1 FOOT.
5. THE ORIGINAL PLANS FOR THIS PROJECT WERE PREPARED ON FULL SIZE ARCH D SHEETS (24-INCHES BY 36-INCHES). THE SPECIFIC SCALE FOR THE INDIVIDUAL UNITS WOULD BE TRUE ONLY ON THE ORIGINAL TRACING. REPRODUCED COPIES, REDUCTIONS, OR OTHER METHODS OF PRINTING MAY CHANGE OR ALTER THE SCALE. THE ENGINEER IS NOT RESPONSIBLE FOR SCALE DIMENSIONS UTILIZED BY OTHERS ON THESE PLANS.
6. PROTECT ALL GROUNDWATER MONITORING WELLS DURING CONSTRUCTION.
7. THE CONTRACTOR SHALL LOCATE, PROTECT, AND MAINTAIN BENCHMARKS, MONUMENTS, AND CONTROL POINTS. RE-ESTABLISH DISTURBED OR DESTROYED ITEMS BY LICENSED LAND SURVEYOR IN THE STATE OF TEXAS AT NO ADDITIONAL COST TO OWNER.

B. STORMWATER NOTES

1. THROUGHOUT THE CONSTRUCTION, AND AT THE COMPLETION OF CONSTRUCTION, THE CONTRACTOR SHALL ASSURE THAT DRAINAGE OF STORMWATER RUNOFF IS NOT BLOCKED.
2. DURING CONSTRUCTION, THE STORM WATER RUNOFF FROM ALL DISTURBED AREAS SHALL BE FILTERED BY SILT FENCES, HAY BALES, AND/OR ROCK BERMS. THESE TEMPORARY EROSION AND SEDIMENTATION CONTROLS ARE TO REMAIN IN PLACE UNTIL THE DISTURBED AREAS ARE REVEGETATED AND THE AREAS HAVE BECOME PERMANENTLY STABILIZED. ALL TEMPORARY EROSION AND SEDIMENTATION CONTROLS TO BE INSPECTED PERIODICALLY FOR DAMAGE CAUSED BY CONSTRUCTION ACTIVITIES AND FOLLOWING EVERY RAINFALL. DAMAGED OR OBSTRUCTED CONTROLS TO BE REPAIRED/REPLACED AS NECESSARY TO MAINTAIN THEIR PROPER OPERATION. REFER TO EROSION & SEDIMENT CONTROL PLAN.
3. CONTRACTOR SHALL ENSURE EXISTING DRAINAGE PATTERNS ARE MAINTAINED AS SHOWN.

C. SITE GRADING NOTES

1. EXCAVATED MATERIAL (NON-HAZARDOUS OR NON-CONTAMINATED) MAY BE TEMPORARILY STOCKPILED IN DESIGNATED AREAS AS DIRECTED BY THE OWNER. REINFORCED FILTER FABRIC FENCE TO BE INSTALLED AROUND STOCKPILE ON DOWNSTREAM SIDE AND BOTH SIDES ADJACENT TO THE DOWNSTREAM SIDE. STOCKPILES ARE NOT TO TRAP OR POND WATER. TOPSOIL TO BE STOCKPILED SEPARATELY. ALL EXCESS EXCAVATED MATERIAL THAT IS NOT USED TO BACKFILL THE EXISTING STRUCTURES IS TO BE REMOVED FROM THE SITE AND DISPOSED OF IN PROPER ACCORDANCE W/ ALL REGULATORY AUTHORITIES. CONTRACTOR SHALL NOTIFY THE OWNER'S REPRESENTATIVE AND STATE AUTHORITIES OF LOCATION OF DISPOSAL BEFORE MATERIAL IS REMOVED.
2. THE ASH GRADING PLANS FOR EACH ZONE REPRESENTS SUBGRADE ELEVATIONS.
3. THE GRADE ELEVATIONS SHOWN ARE INTENDED TO PROVIDE DRAINAGE AWAY FROM STRUCTURES. MINOR FIELD CHANGES MAY BE NECESSARY TO PROVIDE ADEQUATE DRAINAGE. GRADE UNIFORMLY BETWEEN ELEVATIONS SHOWN TO PROVIDE POSITIVE DRAINAGE.
4. ADJUST MANHOLE COVERS, VALVE BOXES, ELECTRICAL MANHOLES, ETC. TO MATCH PROPOSED FINISHED GRADE.

D. EROSION/SEDIMENTATION NOTES

1. THE CONTRACTOR SHALL INSTALL AND MAINTAIN EROSION/SEDIMENTATION CONTROLS AND NATURAL AREA PROTECTIVE FENCING PRIOR TO ANY SITE PREPARATION WORK (CLEARING, GRUBBING, GRADING, OR EXCAVATION). CONTRACTOR TO REMOVE EROSION/SEDIMENTATION CONTROLS AT THE COMPLETION OF PROJECT AND GRASS RESTORATION.
2. SECONDARY CONTAINMENT IS REQUIRED FOR ALL FUEL STORAGE. INTENTIONAL RELEASE OF VEHICLE OR EQUIPMENT FLUIDS ONTO THE GROUND IS NOT ALLOWED. CONTAMINATED SOIL RESULTING FROM ACCIDENTAL SPILL TO BE REMOVED AND DISPOSED OF PROPERLY.
3. VEGETATED FINISHED CUT AND FILL SLOPES SHOULD NOT BE STEEPER THAN 3H:1V, UNLESS AN EROSION CONTROL BLANKET OR TURF REINFORCEMENT MAT IS USED.
4. DO NOT PLACE CUTS OR FILLS CLOSE TO PROPERTY, ENDANGERING ADJOINING PROPERTY WITHOUT ADEQUATELY PROTECTING SUCH PROPERTIES AGAINST EROSION, SEDIMENTATION, SLIPPAGE, SETTLEMENT, SUBSIDENCE, OR OTHER DAMAGES.
5. PROVIDE SUBSURFACE DRAINAGE IN AREAS HAVING A HIGH-WATER TABLE TO INTERCEPT SEEPAGE THAT AFFECTS SLOPE STABILITY, BEARING STRENGTH, AND UNDESIRABLE WETNESS.
6. DO NOT PLACE FILL MATERIAL WHERE IT CAN SLIDE OR WASH ONTO ANOTHER PROPERTY.
7. DO NOT PLACE FILL ADJACENT TO CHANNEL BANKS WHERE IT CAN CREATE BANK FAILURE, REDUCE THE CAPACITY OF THE STREAM, OR RESULT IN DOWNSTREAM SEDIMENT DEPOSITION.
8. PROVIDE ADEQUATE CHANNELS AND FLOODWAYS TO SAFELY CONVEY INCREASED RUNOFF FROM THE DEVELOPED AREA TO AN ADEQUATE OUTLET WITHOUT CAUSING SIGNIFICANT CHANNEL DEGRADATION OR INCREASED OFF-SITE FLOODING.
9. GRADE THE SITE TO DIRECT FLOWS TO APPROPRIATE CONTROLS.

E. SITE SPECIFIC NOTES

1. THE CONTRACTOR WILL PROVIDE ALL CONSTRUCTION STAKING SERVICES FOR THE PROJECT. THE COST OF THESE SERVICES WILL BE REFLECTED IN THE UNIT PRICE AMOUNT BID IN THE PROPOSAL.
2. CONTRACTOR SHALL ADJUST ALL EXISTING UTILITIES AS REQUIRED FOR THE INSTALLATION OF THE PROPOSED IMPROVEMENTS INCLUDING RELOCATING THE UTILITIES IF NECESSARY.
3. THE CONTRACTOR SHALL IMMEDIATELY REMOVE ALL SURFACE OR SEEPAGE WATER FROM SEWERS, DRAINS, DITCHES, AND OTHER SOURCES WHICH MAY ACCUMULATE DURING THE EXCAVATION AND CONSTRUCTION WORK BY PROVIDING THE NECESSARY UNDERDRAINS OR OTHERWISE AND BY DOING THE NECESSARY PUMPING, BAILING OR DRAINING. THE CONTRACTOR SHALL HAVE AVAILABLE AT ALL TIMES SUFFICIENT EQUIPMENT IN PROPER WORKING ORDER FOR DOING THE WORK HEREIN REQUIRED. ALL WATER REMOVED FROM EXCAVATIONS SHALL BE DISPOSED OF IN AN APPROVED MANNER SO AS TO NOT CREATE UNSANITARY CONDITIONS NOR TO INTERFERE UNDULY WITH THE USE OF STREETS, PRIVATE DRIVEWAYS, OR ENTRANCES. PUMPING, BAILING, DRAINING, UNDERDRAINS, DITCHES, ETC., SHALL BE CONSIDERED AS INCIDENTAL WORK AND WILL NOT BE PAID FOR AS SEPARATE ITEMS, BUT THEIR COST SHALL BE INCLUDED IN THE CONTRACT PRICES BID IN THE PROPOSAL FOR THE VARIOUS BID ITEMS.
4. THE CONTRACTOR WILL OWN THE PROJECT UNTIL ACCEPTANCE BY THE OWNER. HE SHALL ARRANGE AND PURCHASE, AS REQUIRED, INSURANCE FOR FLOOD OR ANY OTHER DAMAGES TO HIS WORK DURING CONSTRUCTION.
5. POWER POLES TO BE BRACED AT CONTRACTOR'S EXPENSE. THE CONTRACTOR SHALL NOTIFY/COORDINATE WITH THE APPROPRIATE UTILITY COMPANY.
6. THE CONTRACTOR SHALL PROVIDE GENERATORS TO SUPPLY POWER FOR ANY ACTIVITIES RELATED TO CONSTRUCTION. GENERATORS AND TEMPORARY PUMPS TO BE LOCATED IN CONTRACTOR-PROVIDED TEMPORARY SECONDARY CONTAINMENT.

F. GENERAL CONSTRUCTION NOTES

1. NO OPEN BURNING OR USE OF EXPLOSIVES IS PERMITTED ON THIS PROJECT.
2. THESE PLANS DO NOT EXTEND TO OR INCLUDE DESIGNS OR SYSTEMS PERTAINING TO THE SAFETY OF THE CONSTRUCTION CONTRACTOR OR ITS EMPLOYEES, AGENTS OR REPRESENTATIVES IN THE PERFORMANCE OF THE WORK. THE SEAL OF THE REGISTERED PROFESSIONAL ENGINEER(S) HEREON DOES NOT EXTEND TO ANY SUCH SAFETY SYSTEMS THAT MAY NOW OR HEREAFTER BE INCORPORATED IN THE WORK.
3. CONTRACTOR IS RESPONSIBLE FOR PROTECTION OF PERSONS AND PROPERTY, INCLUDING SAFE WORKING CONDITIONS THROUGHOUT WORK PROGRESS. PROVIDE SAFEGAURDS, INCLUDING WARNING SIGNS, BARRICADES, TEMPORARY FENCES, WARNING LIGHTS, AND OTHER SIMILAR ITEMS THAT ARE REQUIRED FOR PROTECTION OF ALL PERSONNEL DURING DEMOLITION AND REMOVAL OPERATIONS. ERECT FENCES, BARRICADES, GAURDRAILS, LIGHTS AND OTHER SIMILAR ITEMS AROUND EXPOSED EXCAVATIONS. MAINTAIN SAFEGAURDS UNTIL EXCAVATIONS HAVE BEEN COMPLETELY FILLED.
4. A PRE-CONSTRUCTION CONFERENCE IS TO BE HELD PRIOR TO BEGINNING CONSTRUCTION. THIS CONFERENCE SHALL TAKE PLACE AT A LOCATION SELECTED BY OWNER & ENGINEER. CONTRACTOR TO ARRANGE A MEETING DATE WITH THE OWNER AT LEAST SEVEN DAYS PRIOR TO THE MEETING TIME.
5. LOCATION OF EXISTING UTILITIES SHOWN ON PLANS WAS COMPILED FROM INFORMATION PROVIDED. NO WARRANTY IS IMPLIED AS TO THE ACTUAL LOCATION OF EXISTING UTILITIES. CONTRACTOR TO FIELD VERIFY LOCATIONS OF EXISTING UTILITIES PRIOR TO COMMENCEMENT OF CONSTRUCTION. THE CONTRACTOR IS RESPONSIBLE FOR LOCATING UNDERGROUND FEATURES.
6. WHEN UNLOCATED OR INCORRECTLY LOCATED UNDERGROUND PIPING OR A BREAK IN A LINE OR OTHER UTILITIES AND SERVICES ARE ENCOUNTERED DURING SITE WORK OPERATIONS, THE CONTRACTOR SHALL NOTIFY THE OWNER, ENGINEER, AND APPLICABLE UTILITY COMPANY IMMEDIATELY TO OBTAIN PROCEDURE DIRECTIONS. THE CONTRACTOR SHALL COOPERATE WITH THE OWNER, ENGINEER, AND APPLICABLE UTILITY COMPANY IN MAINTAINING ACTIVE SERVICES IN OPERATION.
7. THE CONTRACTOR SHALL MAINTAIN ACCESS TO PUBLIC AND PRIVATE FACILITIES DURING CONSTRUCTION. CONSTRUCTION ACTIVITIES TO BE COORDINATED WITH THE OWNER.
8. THE CONTRACTOR SHALL COORDINATE INTERRUPTIONS OF ALL UTILITIES AND SERVICES WITH OWNER, ENGINEER, AND APPLICABLE UTILITY COMPANY OR COMPANIES. ALL WORK SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF THE APPLICABLE UTILITY COMPANY OR AGENCY INVOLVED.
9. EXISTING PAVING, BUILDINGS, AND OTHER ITEMS SHOWN ON PLANS NOT SPECIFICALLY RELATED TO THE WORK OF THE CONTRACTOR IS FOR INFORMATION ONLY.
10. EXISTING SURFACE AND SUBSURFACE STRUCTURES (GAS MAINS, WATER MAINS, STORM SEWERS, TELEPHONE CABLES, ETC.) ARE SHOWN ON THE PLANS IF THEIR LOCATION HAS BEEN DETERMINED, BUT IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO AVOID DAMAGING THESE EXISTING STRUCTURES WHETHER OR NOT THEY ARE SHOWN ON THE PLANS. THE OWNER AND ENGINEER ASSUME NO RESPONSIBILITY FOR FAILURE TO SHOW ANY OR ALL OF THESE STRUCTURES ON THE PLANS OR TO SHOW THEM IN THEIR EXACT LOCATION. IF ANY STRUCTURE IS DAMAGED BY THE CONTRACTOR, IT SHALL BE HIS RESPONSIBILITY TO REPAIR THE DAMAGE AT HIS OWN EXPENSE AND RESTORE THE STRUCTURE TO ITS ORIGINAL CONDITION.
11. CONTRACTOR SHALL LOCATE AND DETERMINE (VERIFY IF DEPTH IS SHOWN IN PLANS) ELEVATION OF ALL EXISTING UNDERGROUND UTILITIES A MINIMUM OF 500 FEET AHEAD OF TRENCHING. IF A UTILITY IF FOUND TO BE IN CONFLICT WITH PROPOSED GRADES, THE ENGINEER SHALL BE CONTACTED AND GRADES ADJUSTED TO AVOID CONFLICT.
12. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO VERIFY LOCATIONS, ELEVATIONS AND DIMENSIONS OF ADJACENT AND/OR CONFLICTING UTILITIES IN ADVANCE OF CONSTRUCTION IN ORDER THAT ADJUSTMENTS CAN BE MADE TO PROVIDE ADEQUATE CLEARANCES, IF REQUIRED. THE CONTRACTOR SHALL PRESERVE AND PROTECT PUBLIC UTILITIES AT ALL TIMES DURING CONSTRUCTION. ANY DAMAGE TO UTILITIES RESULTING FROM THE CONTRACTOR'S OPERATIONS SHALL BE RESTORED AT HIS EXPENSE. THE ENGINEER SHALL BE NOTIFIED WHEN PROPOSED FACILITY GRADES CONFLICT WITH EXISTING UTILITY GRADES.

G. SUBGRADE PREPARATION

1. SUBMIT DATA FOR PROPOSED FILL TO ENGINEER FOR REVIEW AND APPROVAL. AT A MINIMUM INCLUDE THE SOURCE OF MATERIALS,GRADATION, AND PROCTOR LABORATORY TEST RESULTS FOR DENSITY AND MOISTURE. CONTROLLED STRUCTURAL FILL SHALL CONSIST OF A LOW PLASTICITY SOIL/ROCK MATERIAL.
2. SURFICIAL TOPSOIL, ASH, SOFT/WET SOILS, VEGETATION, ORGANIC MATTER, AND DEBRIS SHOULD BE REMOVED FROM AREAS WHERE WORK IS BEING PERFORMED BY THE CONTRACTOR. SATURATED, DISTURBED, AND UNSTABLE SUBGRADE SHOULD ALSO BE REMOVED IMMEDIATELY PRIOR TO FILL PLACEMENT.
3. SUBGRADE PREPARATION AND PROOF-ROLLING SHOULD BE PERFORMED UNDER THE OBSERVATION OF THE ENGINEER'S REPRESENTATIVE TO DOCUMENT ACCEPTABLE SUBGRADE CONDITIONS. PROOF ROLL THE SUBGRADE OF BERMS AND STRUCTURES TO CONFIRM THAT IT IS STABLE SUBGRADE PRIOR TO FILL PLACEMENT. THE PROOF-ROLL CAN BE PERFORMED USING A LOADED HAUL TRUCK OR SMOOTH DRUM COMPACTOR.
4. FINE-GRAINED SOILS ARE SUSCEPTIBLE TO WEAKENING AND DISTURBANCE FROM REPEATED CONSTRUCTION TRAFFIC AND INCREASED WATER CONTENTS. THE SUSCEPTIBILITY WILL DEPEND LARGELY ON CLIMATIC CONDITIONS (I.E., THE AMOUNT OF PRECIPITATION) DURING CONSTRUCTION.
5. HIGHLY PLASTIC SOILS MAY SWELL AND HEAVE IF EXPOSED TO EXCESS MOISTURE. CONSTRUCTION EXCAVATIONS AND GRADING SHOULD BE PERFORMED TO SHEET FLOW STORMWATER AWAY FROM EXPOSED SUBGRADE OR PUMP WATER FROM LOW AREAS. DO NOT ALLOW WATER TO POND IN EXPOSED AREAS.
6. THE SUBGRADE SHOULD BE INSPECTED TO REMOVE GRAVEL SIZE PARTICLES GREATER THAN 3 INCHES IN DIAMETER PRIOR TO PLACING THE LINER.

H. SOIL PLACEMENT AND COMPACTION

1. SOIL AND FILL SHOULD BE MOISTENED TO NEAR-OPTIMUM MOISTURE CONTENT, AND PLACED IN LOOSE LIFTS NOT EXCEEDING 8 INCHES IN THICKNESS. THE SOIL/FILL SHOULD BE COMPACTED USING SUITABLE EQUIPMENT FOR THE SOIL TYPE TO THE REQUIRED DENSITY. THE GENERAL FILL SHOULD BE COMPACTED TO AT LEAST 95 PERCENT OF ITS MAXIMUM DRY UNIT WEIGHT (STANDARD PROCTOR DENSITY ASTM D698) AT A MOISTURE CONTENT RANGING BETWEEN PLUS OR MINUS 2% OF THE OPTIMUM MOISTURE CONTENT. THE COMPACTED CLAY COMPONENT OF THE COVER SYSTEM SHALL BE COMPACTED TO AT LEAST 95 PERCENT OF ITS MAXIMUM DRY UNIT WEIGHT (STANDARD PROCTOR DENSITY) AT A MOISTURE CONTENT AT LEAST 2% WET OF OPTIMUM.
2. REFER TO THE CONSTRUCTION QUALITY ASSURANCE PLAN FOR QUALITY CONTROL REQUIREMENTS FOR CLAY PLACEMENT.

CONSTRUCTION SEQUENCE

1. OBTAIN APPLICABLE PERMITS.
2. HOLD PRE-CONSTRUCTION CONFERENCE AT LEAST 1 WEEK PRIOR TO STARTING CONSTRUCTION.
3. CALL 811 TO HAVE ALL UNDERGROUND UTILITIES LOCATED PRIOR TO STARTING ANY CONSTRUCTION OPERATIONS.
4. LOCATE AND PROTECT ANY SENSITIVE AREAS SHOWN ON PLANS, IE WETLANDS, EXISTING STRUCTURES, GAS LINES, WATER LINES, OVERHEAD UTILITIES, ETC.
5. INSTALL SILT FENCING AROUND THE LIMITS OF CONSTRUCTION AS SHOWN ON THE PLANS.
6. CONSTRUCT THE COVER SYSTEM AS SHOWN ON THE PLANS.
7. INSTALL NON-CONTACT STORMWATER DITCH AS SHOWN ON COVER SYSTEM FINAL GRADING PLAN.
8. UPON COMPLETION OF CONSTRUCTION AND STABILIZATION, VERIFY ALL PERMANENT SEEDING HAS ACHIEVED THE PROPER COVERAGE AREA AND DENSITY REQUIRED BY TCEQ.
9. STRUCTURAL NOTES FOR CONCRETE OUTFALL STRUCTURES WILL BE PROVIDED IN FUTURE.

I. CONCRETE WORK NOTES

1. CONCRETE BATCH DESIGN(S) SHALL BE PROPORTIONED AND PRODUCED IN ACCORDANCE WITH ACI 350 AND ACI 301 REFERENCE CONCRETE SPECIFICATIONS FOR SLUMP REQUIREMENTS, QUALITY CONTROL, TEST REQUIREMENTS, ETC.
2. USE OF DIFFERENT CLASSES OF CONCRETE SHALL BE AS SHOWN BELOW: -F'c = 4000 PSI MINIMUM - ALL CONCRETE FOR GRADE SUPPORTED SLABS, SLABS OVER METAL DECK, RETAINING WALLS, CHANNEL LININGS, FOOTINGS, AND ALL STRUCTURAL CONCRETE NOT SPECIFICALLY COVERED.
3. THE FINISH CONCRETE SURFACES SHALL BE TRUE TO THE SPECIFIED ELEVATIONS AND DIMENSIONS WITHIN THE TOLERANCES AND OTHER RECOMMENDATIONS SPECIFIED IN THE PROJECT'S SPECIFICATIONS.
4. UNLESS NOTED OTHERWISE ON THE DRAWINGS, EXTERIOR CONCRETE SLABS SHALL RECEIVE A BULL FLOAT AND LIGHT BROOM FINISH. THE CONCRETE WALLS SHALL BE RUBBED FINISH.
5. CONTRACTOR SHALL PROVIDED NECESSARY CONSTRUCTION JOINTS IN MONOLITHIC CONCRETE FRAMING SO THAT NOT MORE THAN 400 CUBIC YARDS ARE POURED IN ONE POUR.
6. LOCATION OF CONSTRUCTION JOINTS SHALL HAVE PRIOR REVIEW BY THE STRUCTURAL ENGINEER AND SHALL BE GENERALLY LOCATED AT OR NEAR ONE THIRD OF SPANS OF MEMBERS. ALL CONTINUOUS REINFORCEMENT SHALL BE CARRIED THROUGH THE JOINTS. REFERENCE DETAILS FOR CONTINUOUS KEY BETWEEN ADJACENT POURS AND ADDITIONAL REINFORCEMENT AT THE CONSTRUCTION JOINTS.
7. REINFORCING BARS SHALL CONFORM TO THE FOLLOWINGS ASTM SPECIFICATIONS:
   -ALL BAR REINFORCING - A-615, GRADE 60
   -WELDED WIRE FABRIC - A-185
8. ABSOLUTELY NO WELDING OR REINFORCING BARS OR TORCHING TO BEND REINFORCING BARS SHALL BE ALLOWED WITHOUT THE SPECIFIC APPROVAL OF THE STRUCTURAL ENGINEER.
9. CLEAR CONCRETE COVER SHALL BE AS BELOW, UNO:
   -CONCRETE CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH: 3"
   -ALL OTHER CONCRETE: 2"
10. BAR SUPPORT ACCESSORIES SHALL BE PROVIDED IN ACCORDANCE WITH THE LATEST ACI MANUAL OF STANDARD PRACTICE FOR DETAILING REINFORCED CONCRETE STRUCTURES, SPACED NOT MORE THAT 4 FEET ON CENTER. WHEN THE CONCRETE SURFACE WILL BE EXPOSED TO VIEW AND/OR WEATHER, THE PORTIONS OF ALL BAR SUPPORTS WITHIN 1/2" OF THE CONCRETE SURFACE SHALL BE NONCORROSIVE OR PROTECTED AGAINST CORROSION. ANY CONCRETE WITH A SANDBLAST FINISH SHALL HAVE STAINLESS BAR SUPPORTS. NO ROCKS, CMU, CLAY TILE, OR BRICK SHALL BE USED TO SUPPORT REINFORCING.
11. REINFORCING SUPPLIER SHALL PROVIDE COMPLETE PLACEMENT AND FABRICATING DRAWINGS FOR ALL REINFORCING INCLUDING THE LOCATION AND SIZE OF ALL ACCESSORIES AND SUPPORTS.
12. ALL ITEMS EMBEDDED IN CONCRETE SHALL BE TIED AND SECURED PRIOR TO PLACEMENT OF CONCRETE.
13. ALL CONCRETE WORKS SHALL HAVE THEIR PERIMETERS HARDFORMED. USE OF EXCAVATION EDGES AS FORMS IS NOT ACCEPTABLE.
14. ALL COLD JOINTS SHALL HAVE A ROUGH SURFACE, KEYWAY AND WATERSTOP. AN APPROVED BONDING AGENT SHALL BE APPLIED AT THE ROUGH SURFACE ENTIRELY.

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PROFESSIONAL ENGINEER
8/12/2024
For Civil Notes

STATE OF TEXAS
REZA ALAVI
130728
LICENSED
PROFESSIONAL ENGINEER
8/12/2024
For Structural Details

PROJECT: NRG ENERGY - LANDFILL COVER SYSTEM DESIGN
LIMESTONE ELECTRIC GENERATING STATION
JEWETT, TEXAS

TITLE: GENERAL CIVIL NOTES

DRAWN BY:	RMACIAS	PROJ. NO.:	58563Z.0000
CHECKED BY:	RVARNELL		
APPROVED BY:	RVARNELL		SHEET 2 OF 18
DATE:	MARCH 2024		

TRC
505 East Huntland Drive
Suite 250
Austin, TX 78752
Phone: 512.239.6080

FILE NO: GENERAL CIVIL NOTES.dwg

24x36 -- USER: RMacias -- ATTACHED XREFS: -- ATTACHED IMAGES: 811
DRAWING NAME: S:\NRG - Privileged and Confidential\Limestone\Landfill Cad files\Project files GENERAL CIVIL NOTES.dwg -- PLOT DATE: August 12, 2024 - 11:35AM -- LAYOUT: 24x36

Texas 2017 ECD

N

400 200 0 400 800

SCALE : 1" = 400'

STATE OF TEXAS
RICHARD D. VARNELL
135525
LICENSED
PROFESSIONAL ENGINEER

3/26/2024 #3775

PROJECT: NRG ENERGY - LANDFILL COVER SYSTEM DESIGN
LIMESTONE ELECTRIC GENERATING STATION
JEWETT, TEXAS

TITLE: EXISTING CONDITIONS AERIAL

DRAWN BY:	BHARRIS	PROJ NO.:	585632.0000
CHECKED BY:	RVARNELL		
APPROVED BY:	RVARNELL		SHEET 3 OF 18
DATE:	MARCH 2024		

TRC

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Austin, TX 78752
Phone: 512.239.6080

FILE NO.: EXISTING CONDITIONS LANDFILL AERIAL.dwg

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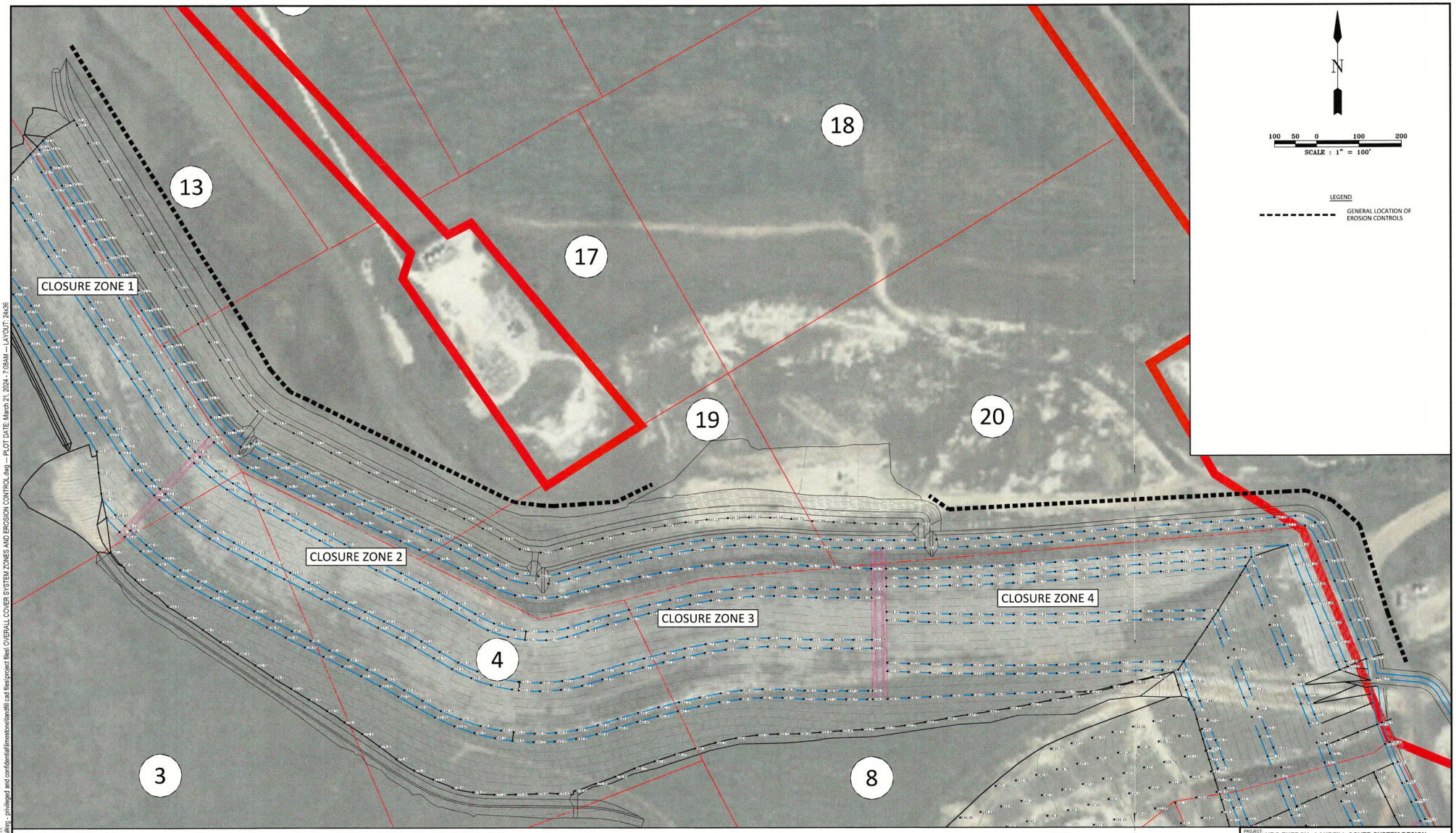
24x36 -- USER: bharris -- ATTACHED XREF'S: -- ATTACHED IMAGES: 811;
DRAWING NAME: \\austin-fp3\environmental\Projects\nrg - privileged and confidential\limestone\landfill cad files\project files\ EXISTING CONDITIONS LANDFILL AERIAL.dwg -- PLOT DATE: March 21, 2024 - 7:02AM -- LAYOUT: 24x36
Version: 2017.10.21



NOTE:

ELEVATIONS SHOWN REPRESENT TOP OF COVER SYSTEM.

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STATE OF TEXAS
RICHARD D. VARNELL
135525
LICENSED PROFESSIONAL ENGINEER

#37-75
3/26/2024

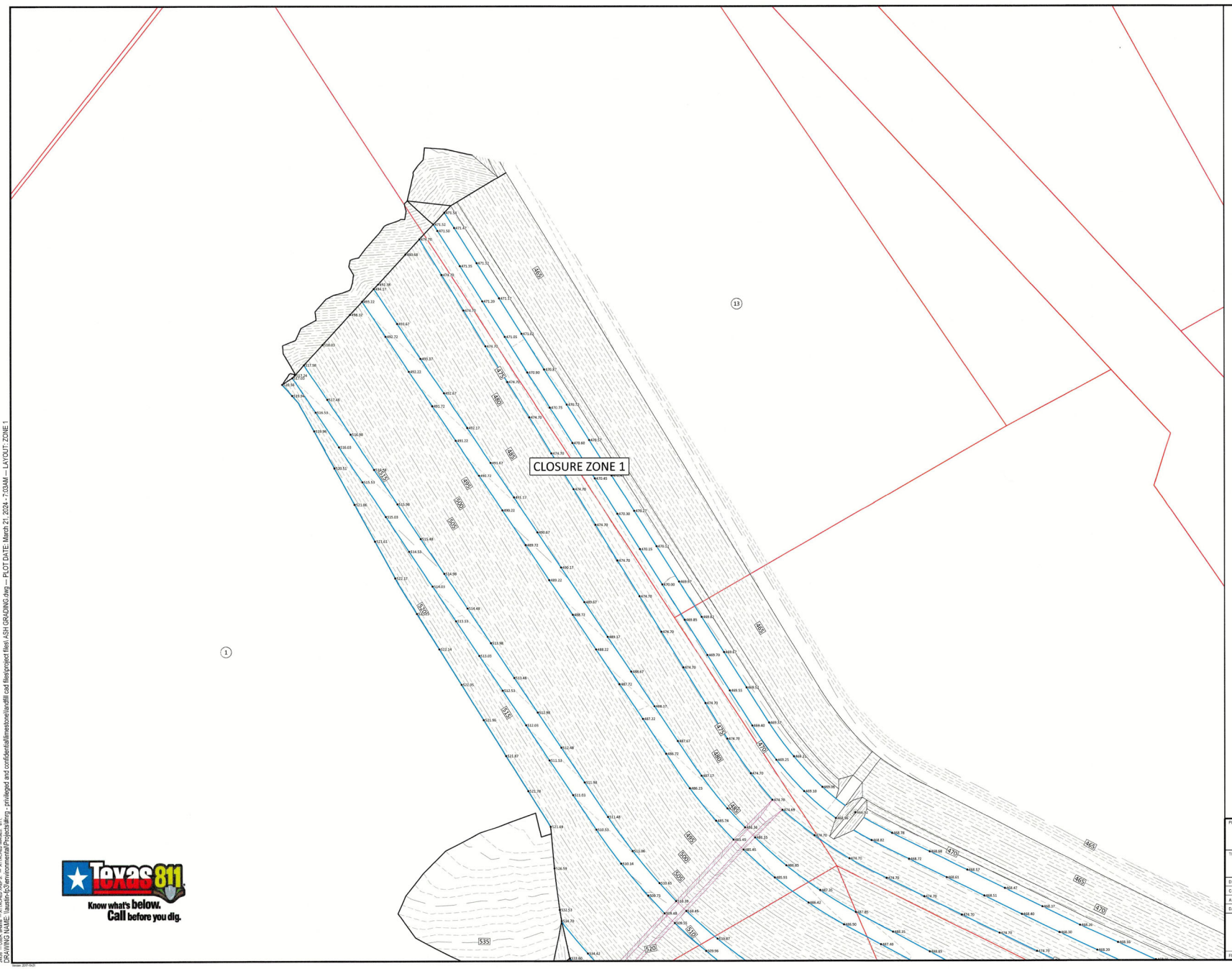
PROJECT: NRG ENERGY - LANDFILL COVER SYSTEM DESIGN
LIMESTONE ELECTRIC GENERATING STATION
JEWETT, TEXAS

TITLE: OVERALL COVER SYSTEM, ZONES, AND EROSION CONTROL

DRAWN BY:	BHARRIS	PROJ. NO.:	585632.0000
CHECKED BY:	RVARNELL		
APPROVED BY:	RVARNELL		SHEET 4 OF 18
DATE:	MARCH 2024		

TRC
505 East Huntland Drive
Suite 250
Austin, TX 78752
Phone: 512.239.8080

FILE NO.: OVERALL COVER SYSTEM ZONES AND EROSION CONTROL.dwg



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PROJECT: NRG ENERGY - LANDFILL COVER SYSTEM DESIGN
LIMESTONE ELECTRIC GENERATING STATION
JEWETT, TEXAS

TITLE: ASH GRADING PLAN - ZONE 1

DRAWN BY:	BHARRIS	PROJ. NO.:	585632.0000
CHECKED BY:	RVARNELL		
APPROVED BY:	RVARNELL		SHEET 5 OF 18
DATE:	MARCH 2024		

TRC
505 East Huntland Drive
Suite 250
Austin, TX 78752
Phone: 512.239.6080

FILE NO: ASH GRADING.dwg

24x36 -- USER: Bharris -- ATTACHED XREFS: -- ATTACHED IMAGES: 811;
DRAWING NAME: \\austin-fp2\environmental\Projects\dwg - privileged and confidential\limestone\landfill cad files\project files\ ASH GRADING.dwg -- PLOT DATE: March 21, 2024 - 7:03AM -- LAYOUT: ZONE 1
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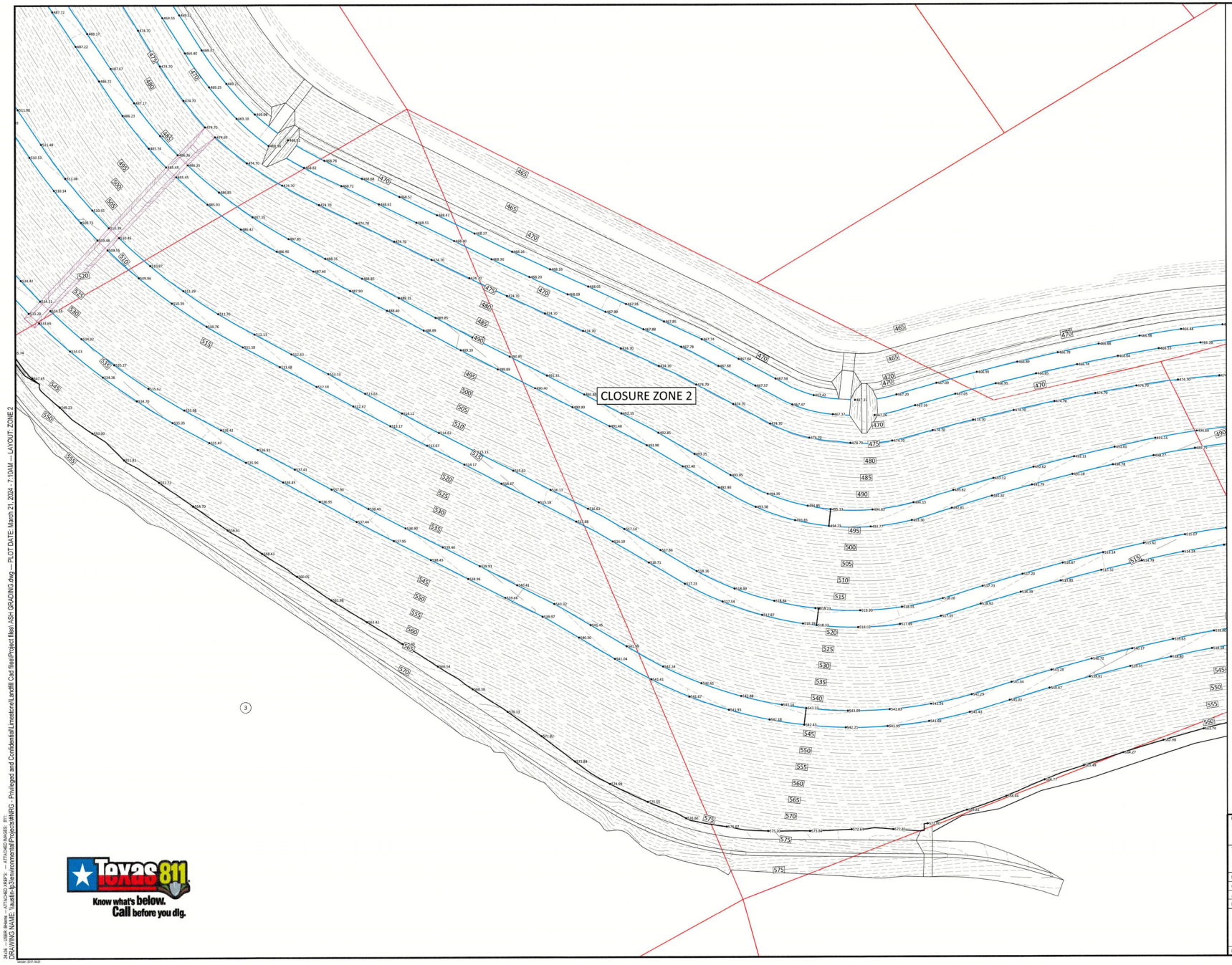

N

50 25 0 50 100

SCALE : 1" = 50'

Texas 811
Know what's below.
Call before you dig.

STATE OF TEXAS
RICHARD D. VARNELL
135525
LICENSED
PROFESSIONAL ENGINEER

#3775
3/26/2024

PROJECT: NRG ENERGY - LANDFILL COVER SYSTEM DESIGN
LIMESTONE ELECTRIC GENERATING STATION
JEWETT, TEXAS

TITLE: ASH GRADING PLAN - ZONE 2

DRAWN BY:	BHARRIS	PROJ NO.:	585632.0000
CHECKED BY:	RVARNELL		
APPROVED BY:	RVARNELL		SHEET 6 OF 18
DATE:	MARCH 2024		

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FILE NO: ASH GRADING.dwg

24x36 -- IBEE Blanks -- ATTACHED REFS: -- ATTACHED IMAGES: #11
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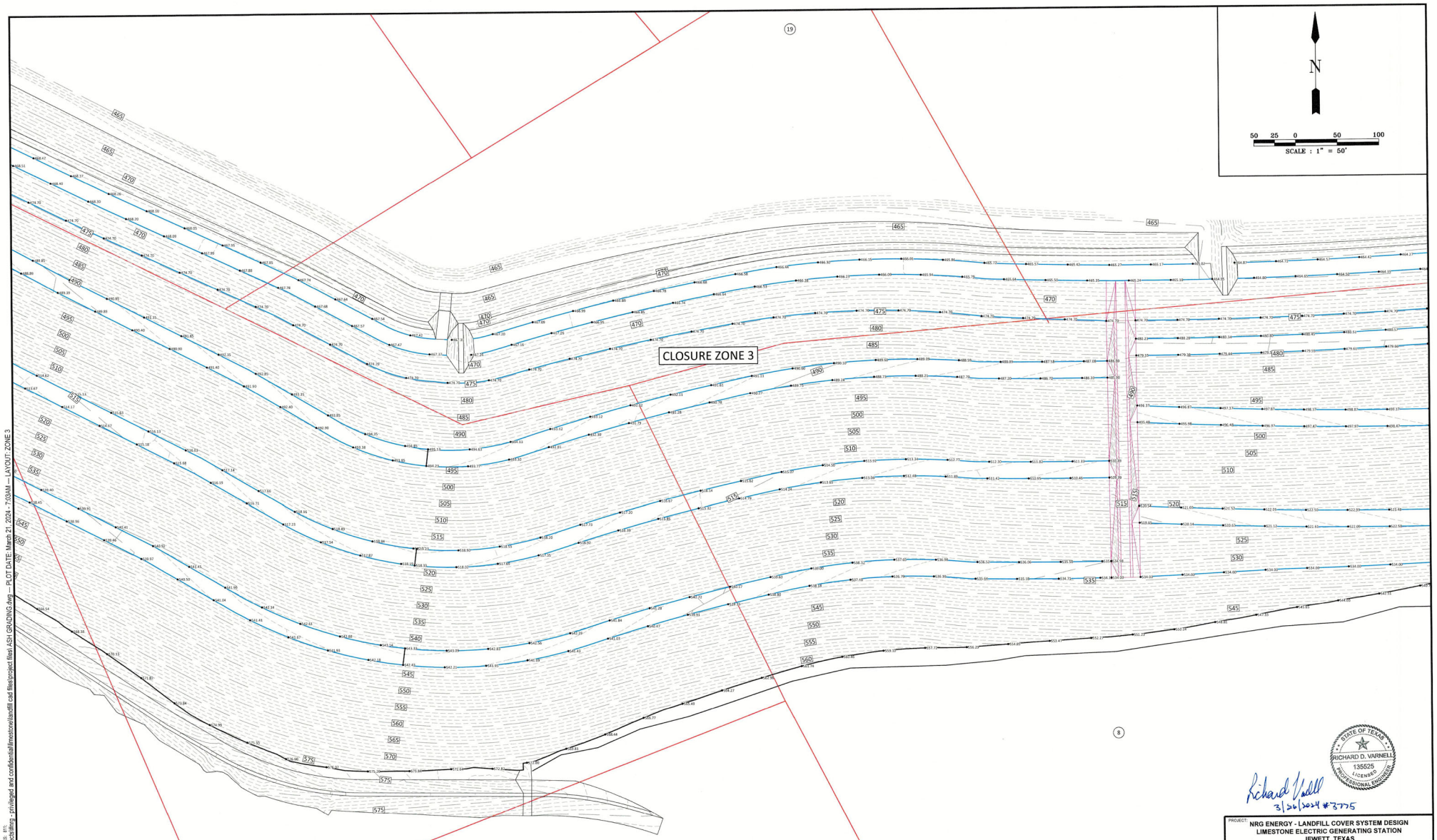

Texas 811
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Call before you dig.

STATE OF TEXAS
RICHARD D. VARNELL
135625
LICENSED
PROFESSIONAL ENGINEER

Richard Varnell
3/26/2024 #3775

PROJECT:	NRG ENERGY - LANDFILL COVER SYSTEM DESIGN LIMESTONE ELECTRIC GENERATING STATION JEWETT, TEXAS
TITLE:	ASH GRADING PLAN - ZONE 3
DRAWN BY:	BHARRIS
CHECKED BY:	RVARNELL
APPROVED BY:	RVARNELL
DATE:	MARCH 2024
PROJ. NO.:	585632.0000
	SHEET 7 OF 18

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Suite 250
Austin, TX 78752
Phone: 512.239.6080

FILE NO.: ASH GRADING.dwg

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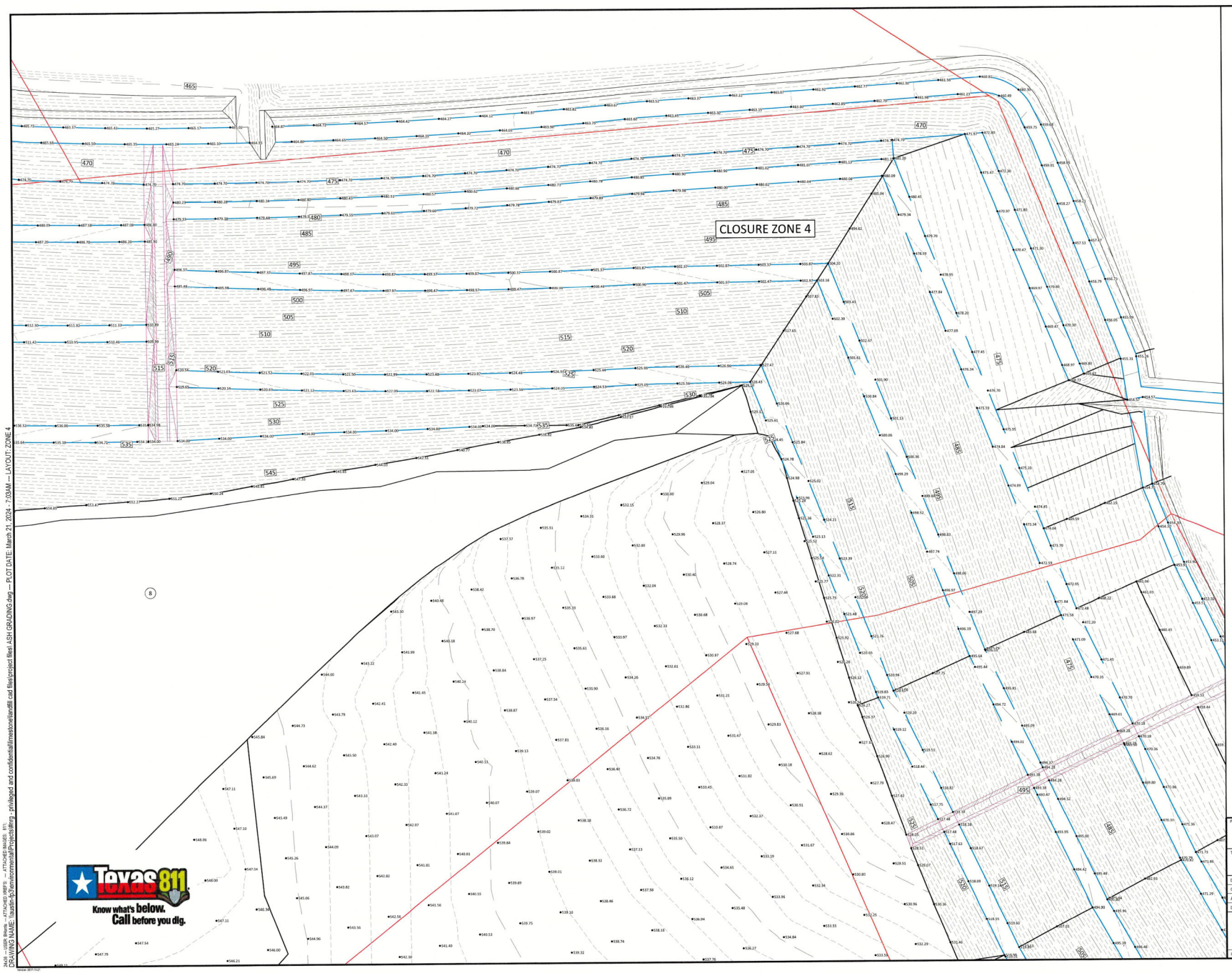
Xrefs: 2017 BLU



N

50 25 0 50 100

SCALE : 1" = 50'

Texas 811
Know what's below.
Call before you dig.

Richard Varnell
3/26/2024
#3795

STATE OF TEXAS
RICHARD D. VARNELL
135525
LICENSED
PROFESSIONAL ENGINEER

PROJECT: NRG ENERGY - LANDFILL COVER SYSTEM DESIGN
LIMESTONE ELECTRIC GENERATING STATION
JEWETT, TEXAS

TITLE: ASH GRADING PLAN - ZONE 4

DRAWN BY:	BHARRIS	PROJ. NO.:	585632.0000
CHECKED BY:	RVARNELL		
APPROVED BY:	RVARNELL		SHEET 8 OF 18
DATE:	MARCH 2024		

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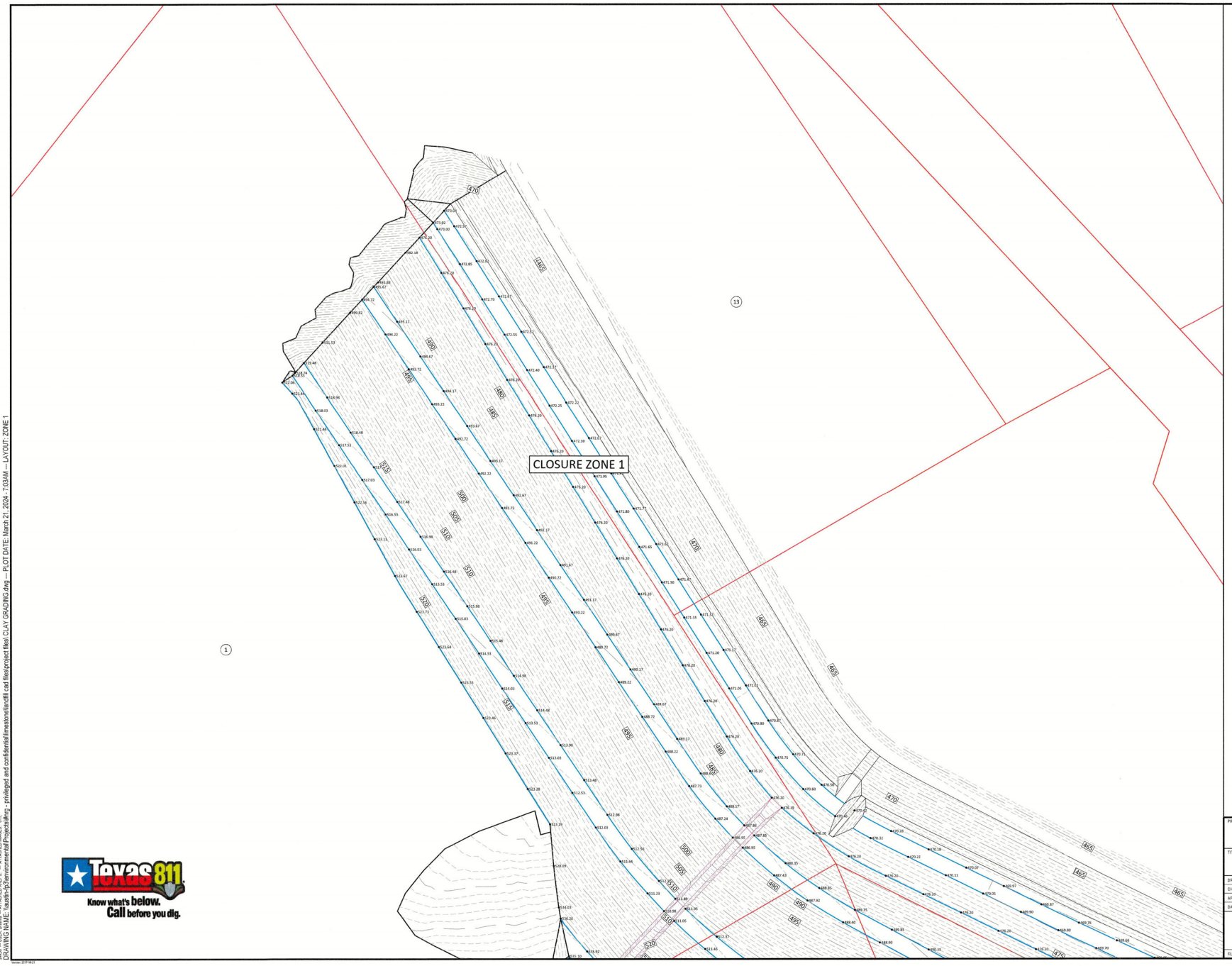
FILE NO.: ASH GRADING.dwg

2408 -- USER: bharris -- ATTACHED XREFS: -- ATTACHED IMAGES: 811
DRAWING NAME: I:\austin-25\environ\pdf\projects\nrg - privileged and confidential\limestone\landfill cad files\project files\ ASH GRADING.dwg -- PLOT DATE: March 21, 2024 - 7:03AM -- LAYOUT: ZONE 4



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STATE OF TEXAS
RICHARD D. VARNELL
135525
LICENSED
PROFESSIONAL ENGINEER

3/26/2024 #37765

PROJECT: NRG ENERGY - LANDFILL COVER SYSTEM DESIGN
LIMESTONE ELECTRIC GENERATING STATION
JEWETT, TEXAS

TITLE: CLAY GRADING - ZONE 1

DRAWN BY:	BHARRIS
CHECKED BY:	RVARNELL
APPROVED BY:	RVARNELL
DATE:	MARCH 2024
PROJ. NO.:	585632.0000

SHEET 9 OF 18

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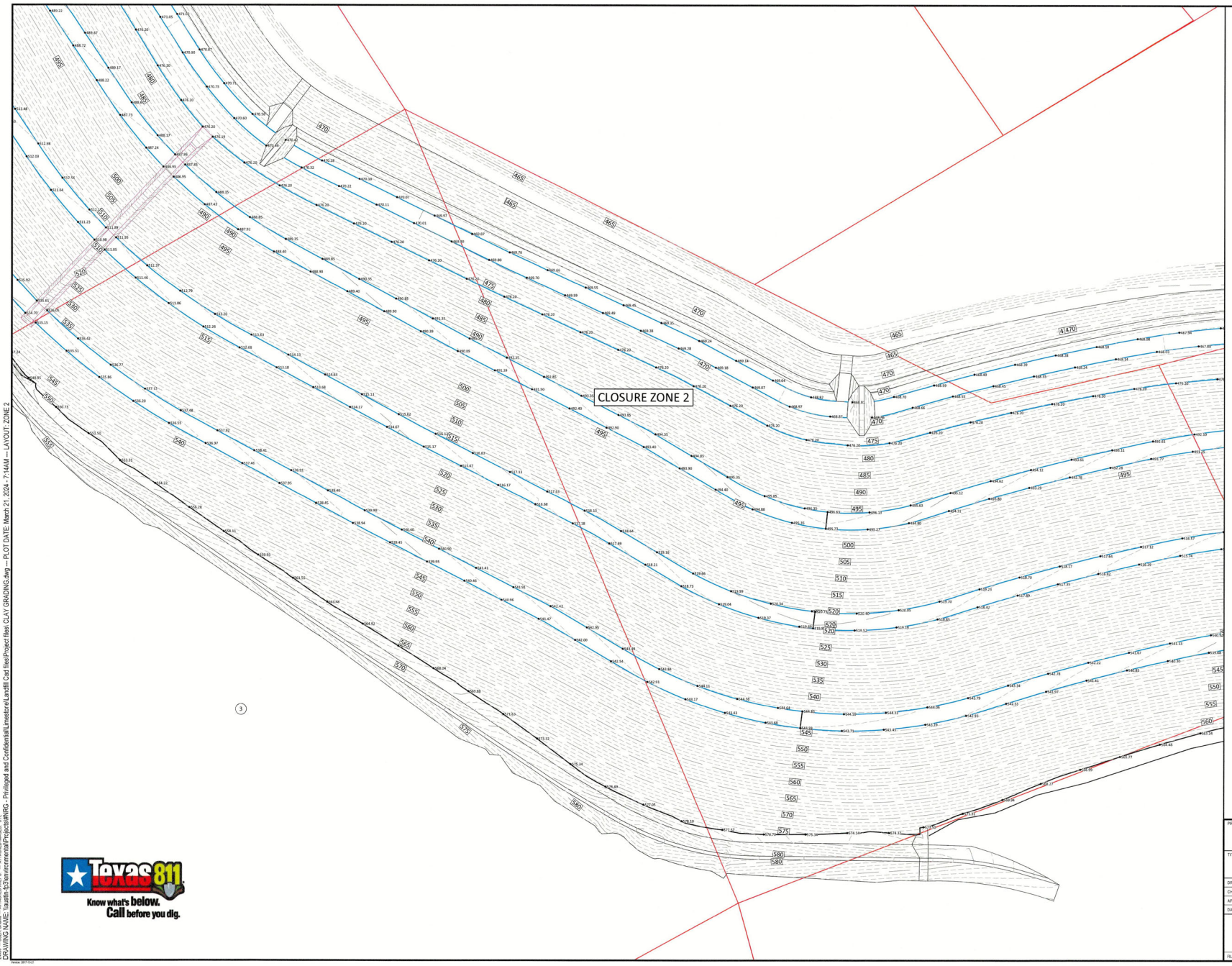
FILE NO.: CLAY GRADING.dwg



N

50 25 0 50 100

SCALE : 1" = 50'

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STATE OF TEXAS
RICHARD D. VARNELL
135525
LICENSED
PROFESSIONAL ENGINEER

Richard Varnell
3/26/2024
#3775

PROJECT: NRG ENERGY - LANDFILL COVER SYSTEM DESIGN
LIMESTONE ELECTRIC GENERATING STATION
JEWETT, TEXAS

TITLE: CLAY GRADING - ZONE 2

DRAWN BY:	BHARRIS	PROJ NO.:	585632.0000
CHECKED BY:	RVARNELL		
APPROVED BY:	RVARNELL		SHEET 10 OF 18
DATE:	MARCH 2024		

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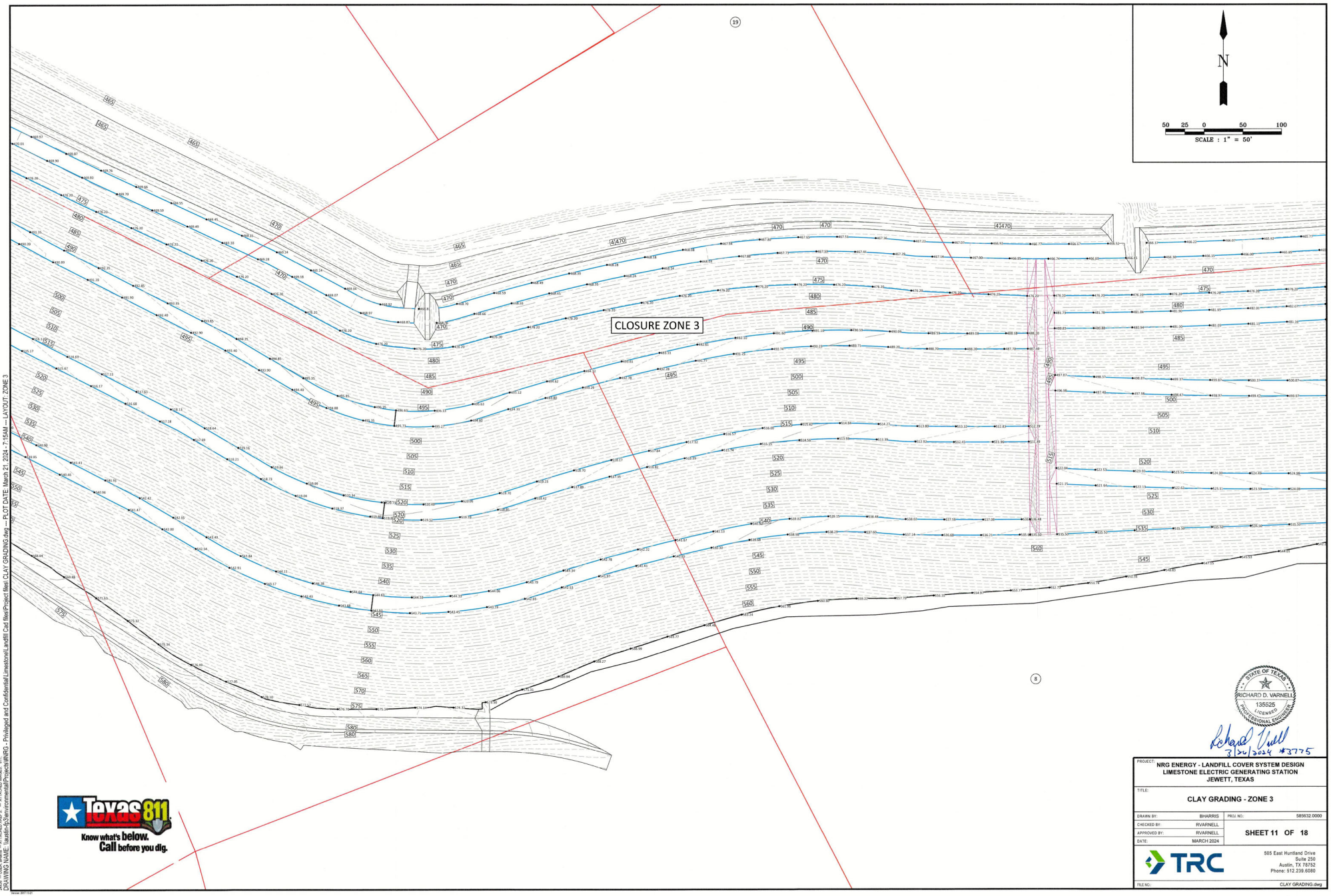
FILE NO.: CLAY GRADING.dwg

DATA - USER NAME = ... - ATTACHED XREFS = ... - ATTACHED IMAGES = 811
DRAWING NAME = I:\austin\Environmental Projects\NRG - Privileged and Confidential\LLimestone\Landfill Cad files\Project files\ CLAY GRADING.dwg — PLOT DATE: March 21, 2024 - 7:14AM — LAYOUT: ZONE 2



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STATE OF TEXAS
RICHARD D. VARNELL
135525
LICENSED
PROFESSIONAL ENGINEER

Richard Varnell 3/26/2024 #3775

PROJECT: NRG ENERGY - LANDFILL COVER SYSTEM DESIGN
LIMESTONE ELECTRIC GENERATING STATION
JEWETT, TEXAS

TITLE: CLAY GRADING - ZONE 3

DRAWN BY:	BHARRIS	PROJ. NO.:	585632.0000
CHECKED BY:	RVARNELL		
APPROVED BY:	RVARNELL		SHEET 11 OF 18
DATE:	MARCH 2024		

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FILE NO.: CLAY GRADING.dwg

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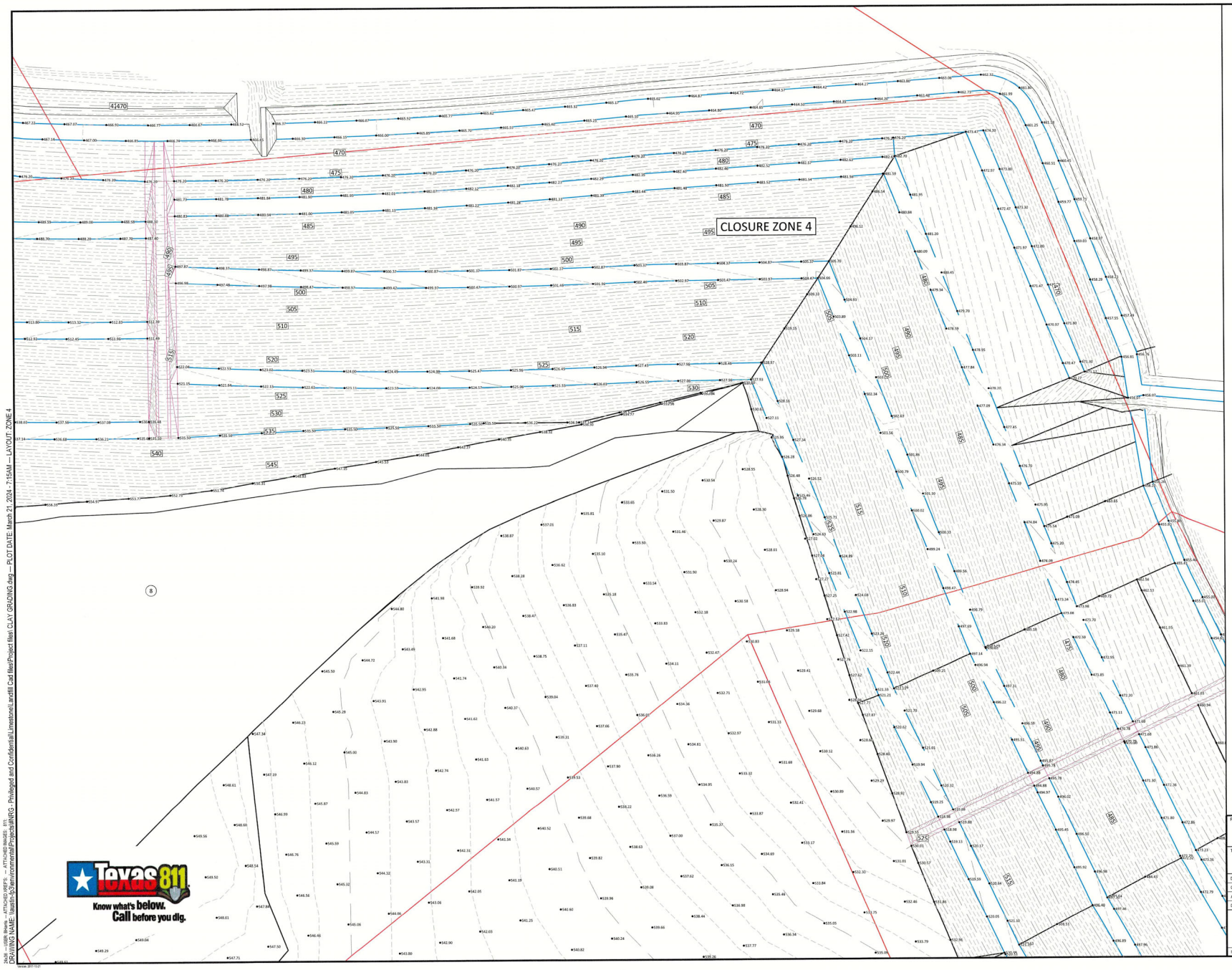
DRAWING NAME: \\austin-fp3\environmental\Projects\NRG - Privileged and Confidential\Limestone\Landfill Cad files\Project files\CLAY GRADING.dwg -- PLOT DATE: March 21, 2024 - 7:16AM -- LAYOUT: ZONE 3



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STATE OF TEXAS
RICHARD D. VARNELL
135525
LICENSED
PROFESSIONAL ENGINEER

Richard Varnell 3/26/2024 #3775

PROJECT: NRG ENERGY - LANDFILL COVER SYSTEM DESIGN
LIMESTONE ELECTRIC GENERATING STATION
JEWETT, TEXAS

TITLE: CLAY GRADING - ZONE 4

DRAWN BY:	BHARRIS	PROJ. NO:	585632.0000
CHECKED BY:	RVARNELL		
APPROVED BY:	RVARNELL		SHEET 12 OF 18
DATE:	MARCH 2024		

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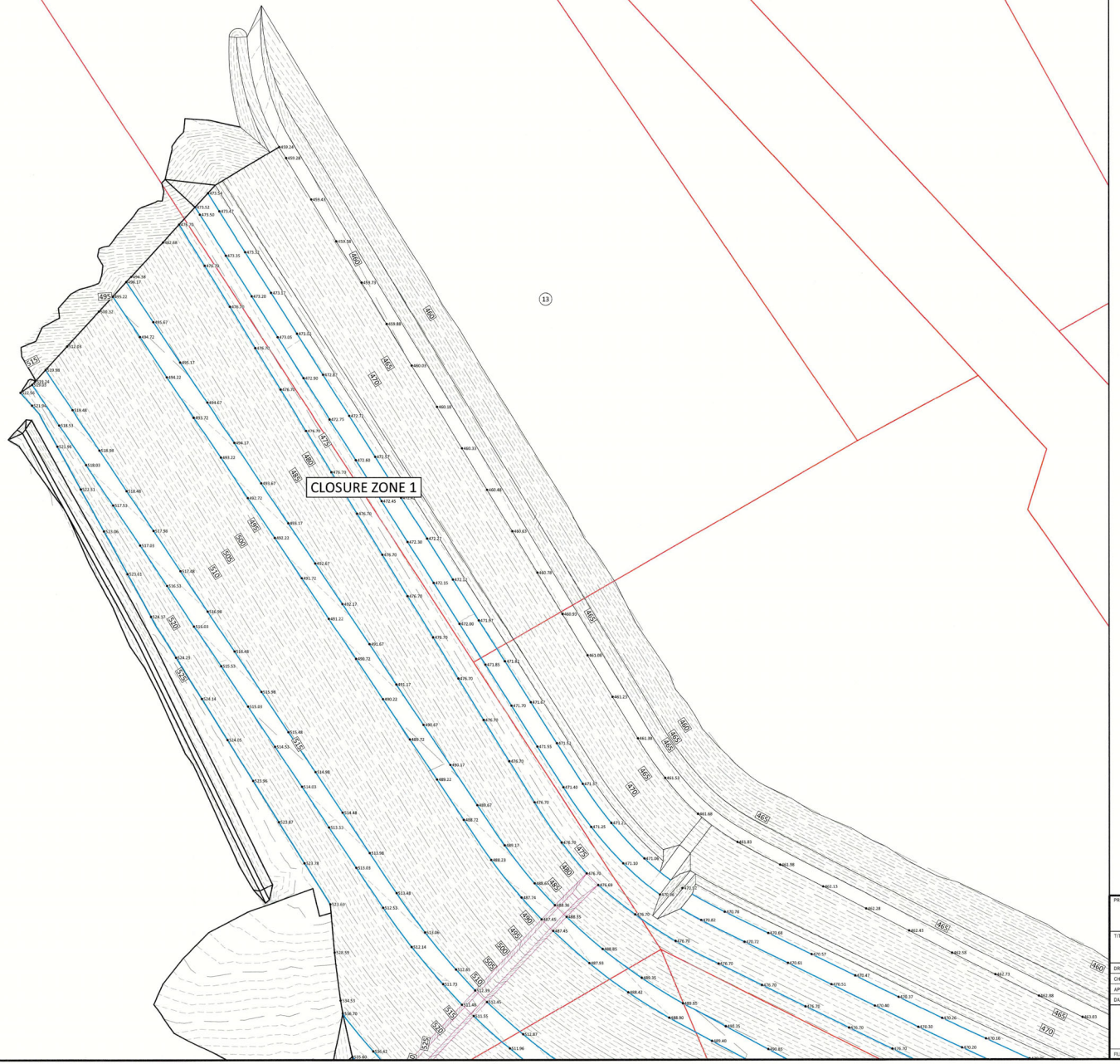
FILE NO: CLAY GRADING.dwg



N

50 25 0 50 100

SCALE : 1" = 50'

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Call before you dig.

STATE OF TEXAS
RICHARD D. VARNELL
135525
LICENSED
PROFESSIONAL ENGINEER

Richard Varnell
#135525
3/22/2024

PROJECT:
NRG ENERGY - LANDFILL COVER SYSTEM DESIGN
LIMESTONE ELECTRIC GENERATING STATION
JEWETT, TEXAS

TITLE:
COVER SYSTEM GRADING PLAN - ZONE 1

DRAWN BY:	BHARRIS	PROJ NO:	585632.0009
CHECKED BY:	RVARNELL		
APPROVED BY:	RVARNELL	SHEET 13 OF 18	
DATE:	MARCH 2024		

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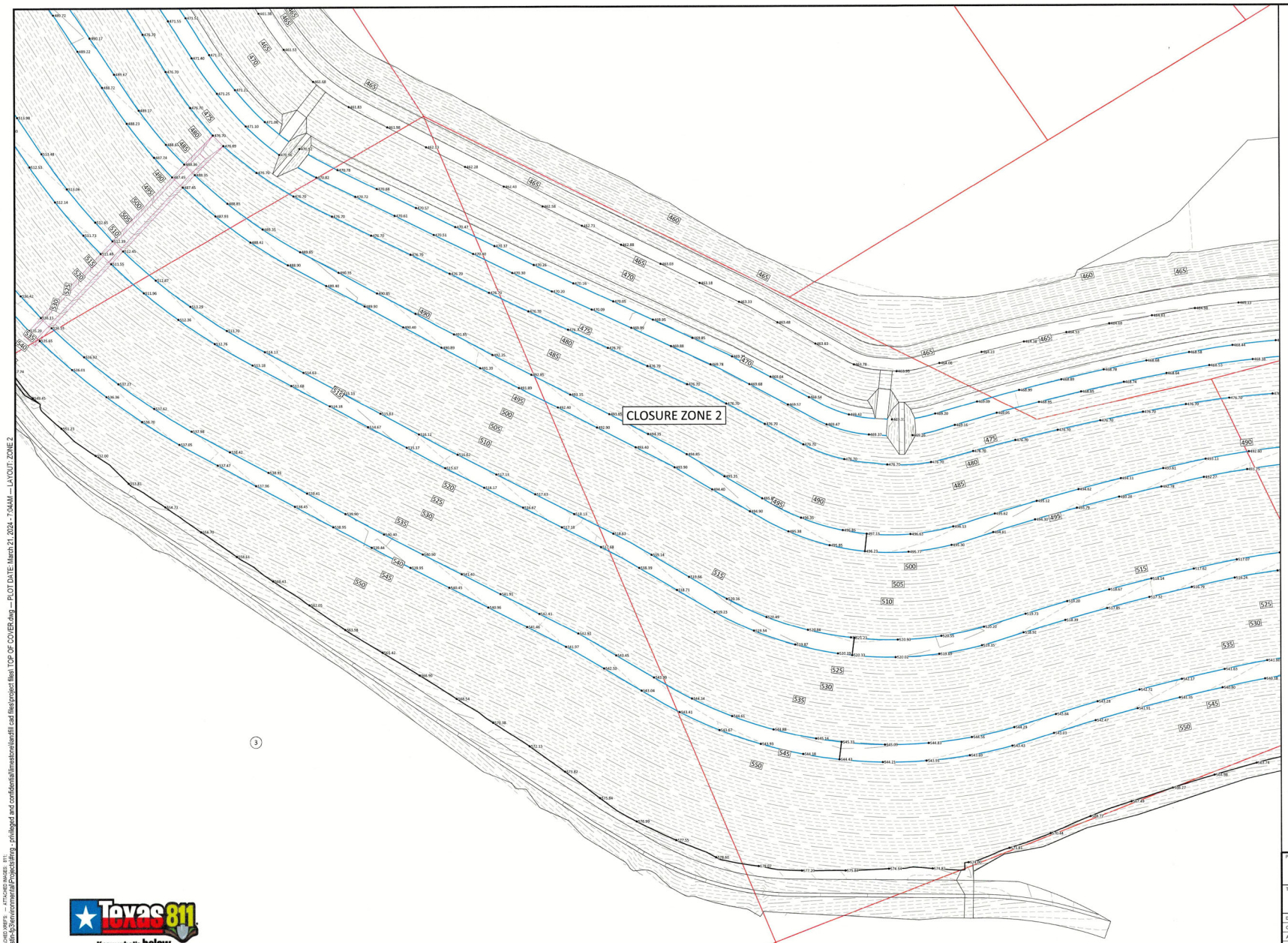
FILE NO: TOP OF COVER.dwg

DATE: 03/21/2024 - 7:04AM
DRAWING NAME: \\austin-fp3\environmental\Projects\#reg - privileged and confidential\limestone\landfill cad files\project files\ TOP OF COVER.dwg -- PLOT DATE: March 21 2024 - 7:04AM -- LAYOUT: ZONE 1



N

50 25 0 50 100

SCALE : 1" = 50'

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RICHARD D. VARNELL
135525
LICENSED
PROFESSIONAL ENGINEER
3/20/2024

PROJECT:
NRG ENERGY - LANDFILL COVER SYSTEM DESIGN
LIMESTONE ELECTRIC GENERATING STATION
JEWETT, TEXAS

TITLE:
COVER SYSTEM GRADING PLAN - ZONE 2

DRAWN BY:	BHARRIS	PROJ. NO.:	585632.0000
CHECKED BY:	RVARNELL		
APPROVED BY:	RVARNELL		SHEET 14 OF 18
DATE:	MARCH 2024		

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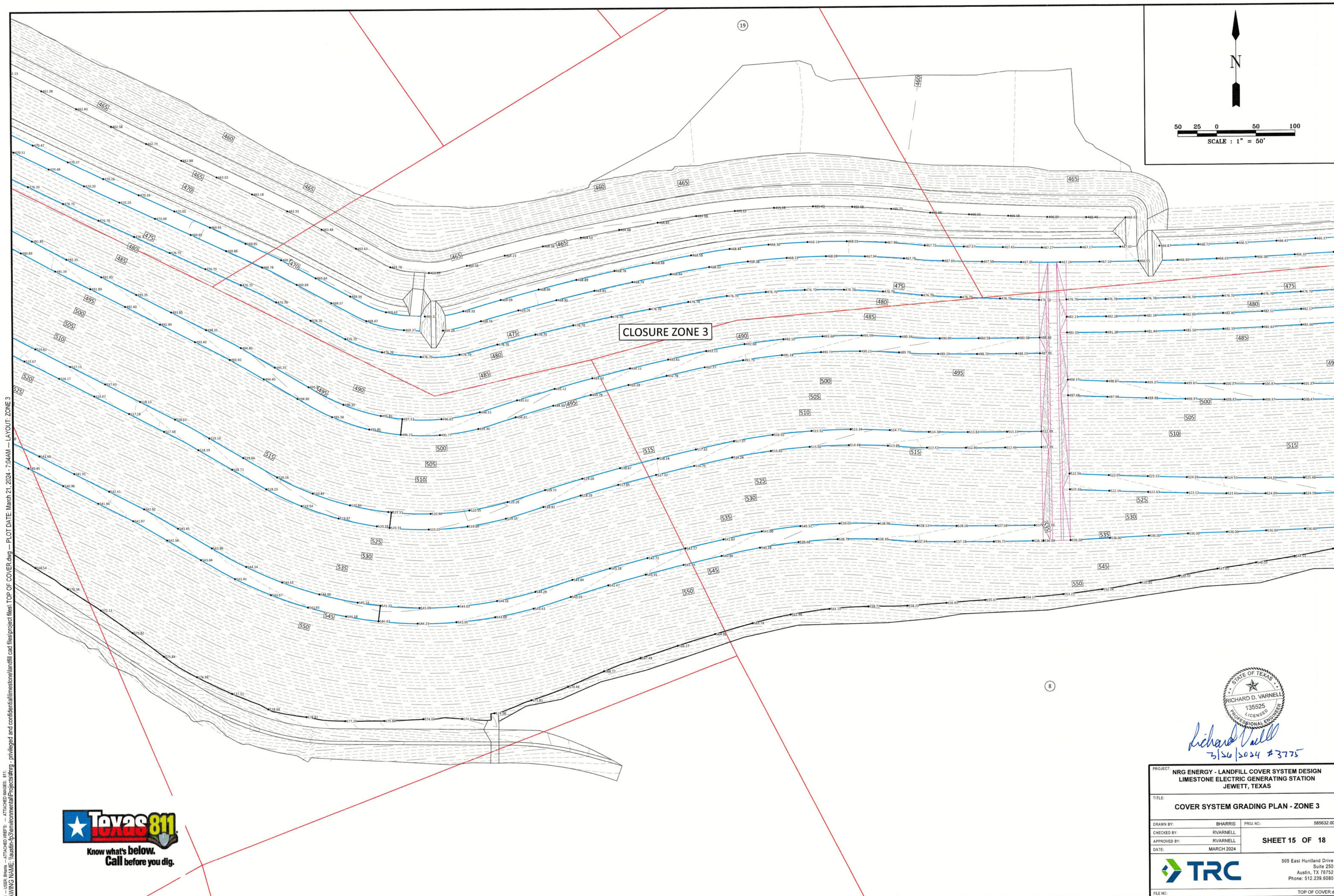

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STATE OF TEXAS
RICHARD D. VARNELL
135525
LICENSED
PROFESSIONAL ENGINEER

3/26/2024 #3775

PROJECT: NRG ENERGY - LANDFILL COVER SYSTEM DESIGN
LIMESTONE ELECTRIC GENERATING STATION
JEWETT, TEXAS

TITLE: COVER SYSTEM GRADING PLAN - ZONE 3

DRAWN BY:	BHARRIS	PROJ NO.:	585632.0000
CHECKED BY:	RVARNELL	SHEET 15 OF 18	
APPROVED BY:	RVARNELL		
DATE:	MARCH 2024		

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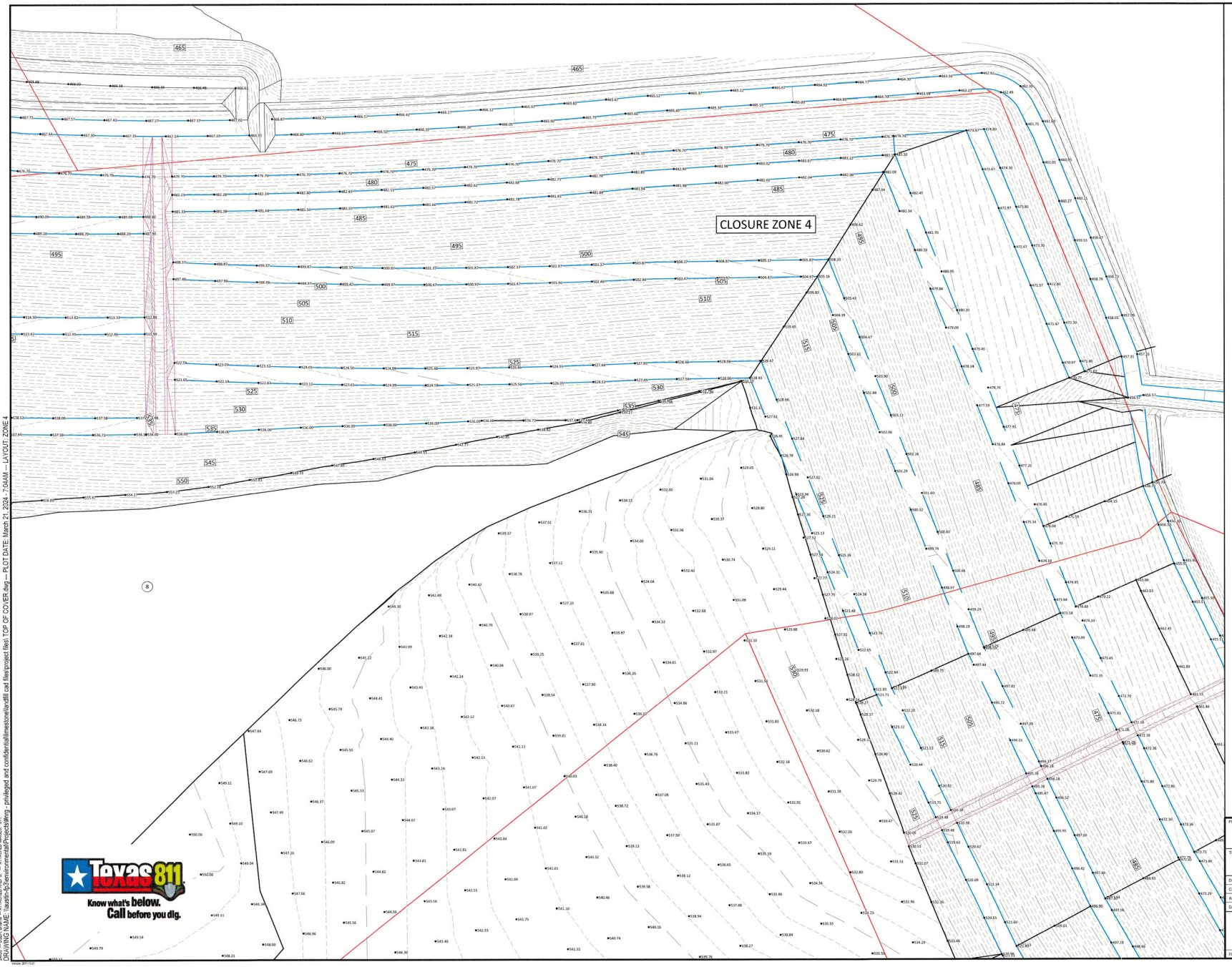
FILE NO: TOP OF COVER.dwg

DRAWING NAME: \\austin-fp3\environmental\Projects\NRG - privileged and confidential\limestone\landfill cad files\project files\ TOP OF COVER.dwg — PLOT DATE: March 21, 2024 - 7:04AM — LAYOUT: ZONE 3



N

50 25 0 50 100

SCALE : 1" = 50'

Texas 811
Know what's below.
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STATE OF TEXAS
RICHARD D. VARNELL
135525
LICENSED
PROFESSIONAL ENGINEER

3/26/2024 #3775

PROJECT: NRG ENERGY - LANDFILL COVER SYSTEM DESIGN
LIMESTONE ELECTRIC GENERATING STATION
JEWETT, TEXAS

TITLE: COVER SYSTEM GRADING PLAN - ZONE 4

DRAWN BY:	BHARRIS	PROJ NO:	585632.0000
CHECKED BY:	RVARNELL		
APPROVED BY:	RVARNELL		SHEET 16 OF 18
DATE:	MARCH 2024		

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FILE NO: TOP OF COVER.dwg

24x36 -- USER: bharris -- ATTACHED_XREFS: -- ATTACHED IMAGES: #11
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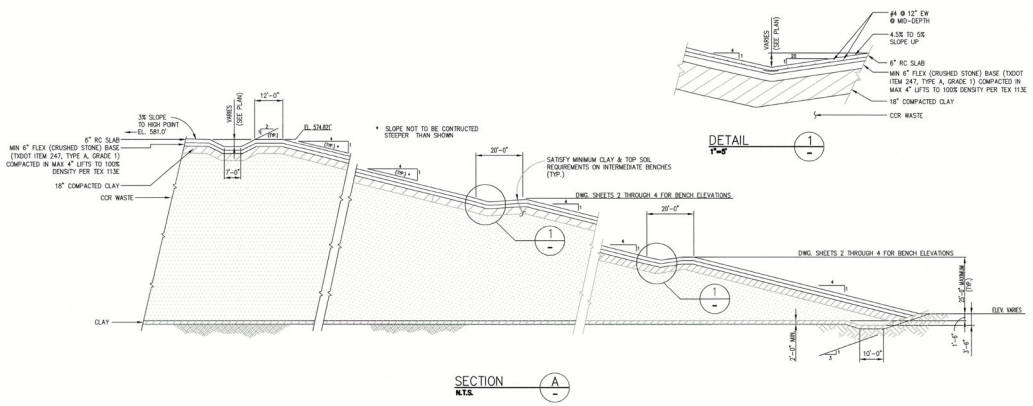
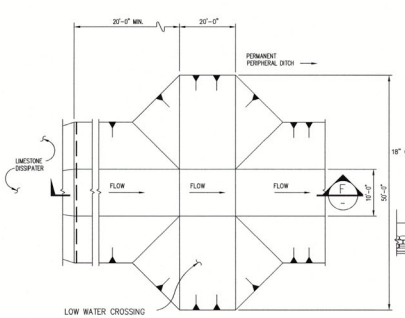
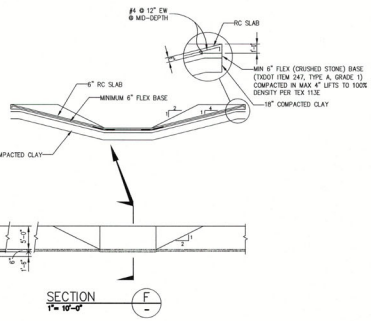


SECTION A
N.T.S.

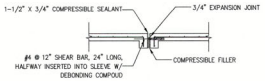
DETAIL 1
1"=5'



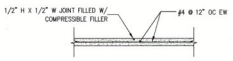
OPTIONAL – PLAN OF OUTFALL CHANNEL @ LOW WATER CROSSING
SCALE: 1"=10'



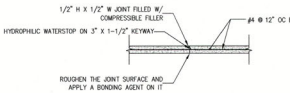
SECTION F
1"= 10'-0"



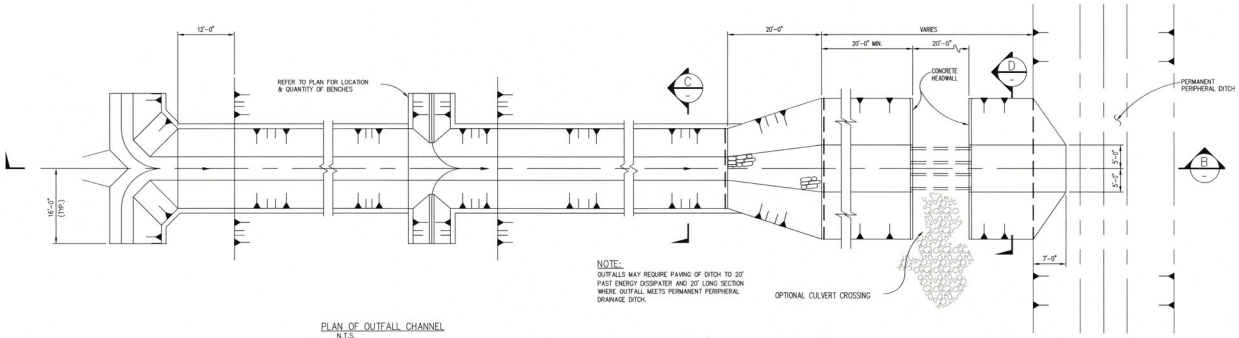
TYP. EXPANSION JOINT DETAIL
SCALE: NTS



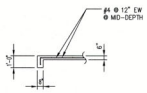
TYP. CONTRACTION JOINT DETAIL
SCALE: NTS



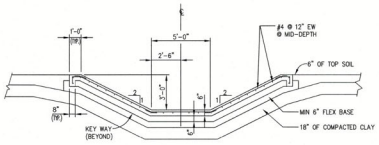
TYP. CONSTRUCTION JOINT DETAIL
SCALE: NTS



PLAN OF OUTFALL CHANNEL
N.T.S.

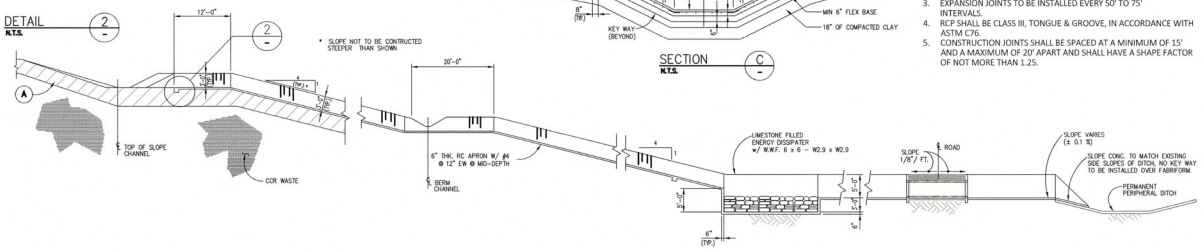


DETAIL 2
N.T.S.



SECTION C
N.T.S.

NOTE:
1. INSTALL KEY-WAYS @ START OF DOWNSLOPE CHANNEL EL. 520 AND EACH BENCH THEREAFTER.
2. INSTALL KEY-WAYS @ THREE SIDES @ 20' LONG SECTION WHERE OUTFALL MEETS PERMANENT PERIPHERAL DITCH.
3. EXPANSION JOINTS TO BE INSTALLED EVERY 50' TO 75' INTERVALS.
4. RCP SHALL BE CLASS III, TONGUE & GROOVE, IN ACCORDANCE WITH ASTM C76.
5. CONSTRUCTION JOINTS SHALL BE SPACED AT A MINIMUM OF 15' AND A MAXIMUM OF 20' APART AND SHALL HAVE A SHAPE FACTOR OF NOT MORE THAN 1.25.



SECTION B
N.T.S.

Know what's below. Call before you dig.

STATE OF TEXAS
RICHARD D. VARNELL
135525
LICENSED PROFESSIONAL ENGINEER
8/22/2024
For Civil Details

STATE OF TEXAS
REZA ALAVI
130726
LICENSED PROFESSIONAL ENGINEER
8/22/2024
For Structural Details

PROJECT: NRG ENERGY - LANDFILL COVER SYSTEM DESIGN
LIMESTONE ELECTRIC GENERATING STATION
JEWETT, TEXAS

TITLE: MISCELLANEOUS DETAILS

DRAWN BY:	RMACIAS	PROJ NO.:	585632.0000
CHECKED BY:	RVARNELL		
APPROVED BY:	RVARNELL		SHEET 17 OF 18
DATE:	MARCH 2024		

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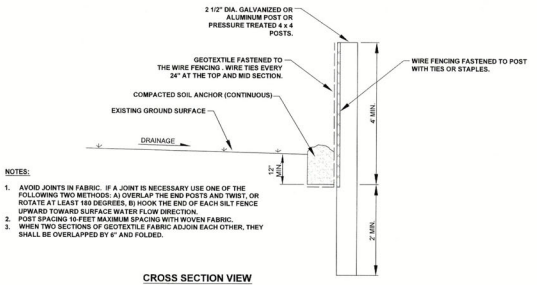
505 East Huntland Drive
Suite 250
Austin, TX 78752
Phone: 512.239.6080

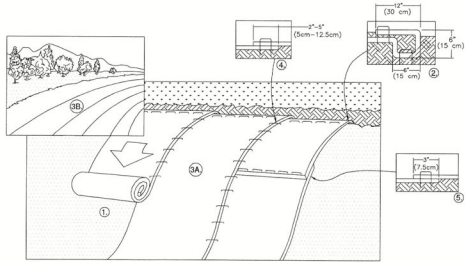
FILE NO.: MISC DETAILS.dwg



NOTES:

1. AVOID JOINTS IN FABRIC. IF A JOINT IS NECESSARY USE ONE OF THE FOLLOWING TWO METHODS: A) OVERLAP THE END POSTS AND TWIST, OR ROTATE AT LEAST 180 DEGREES, B) HOOK THE END OF EACH SILT FENCE UPWARD TOWARD SURFACE WATER FLOW DIRECTION.
2. POST SPACING 10-FEET MAXIMUM SPACING WITH WOVEN FABRIC.
3. WHEN TWO SECTIONS OF GEOTEXTILE FABRIC ADJOIN EACH OTHER, THEY SHALL BE OVERLAPPED BY 6" AND FOLDED.

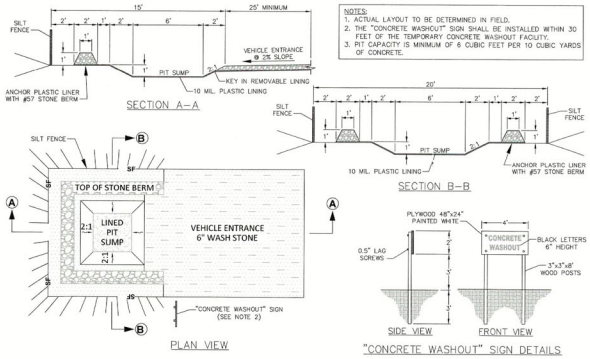
1/15 SILT FENCE (TYPICAL)
(NOT TO SCALE)



1. PREPARE SOIL BEFORE INSTALLING ROLLED EROSION CONTROL PRODUCTS (RECP's), INCLUDING ANY NECESSARY APPLICATION OF LIME, FERTILIZER, AND SEED.
2. BEGIN AT THE TOP OF THE SLOPE BY ANCHORING THE ECM IN A 6" (15 CM) DEEP X 6" (15 CM) WIDE TRENCH WITH APPROXIMATELY 12" (30cm) OF RECP's EXTENDED BEYOND THE UP-SLOPE PORTION OF THE TRENCH. ANCHOR THE RECP's WITH A ROW OF STAPLES/STAKES APPROXIMATELY 12" (30 CM) APART IN THE BOTTOM OF THE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING. APPLY SEED TO COMPACTED SOIL AND FOLD REMAINING 12" (30 CM) PORTION OF RECP's BACK OVER SEED AND COMPACTED SOIL. SECURE RECP's OVER COMPACTED SOIL WITH A ROW OF STAPLES/STAKES SPACED APPROXIMATELY 12" (30 CM) APART ACROSS THE WIDTH OF THE RECP's.
3. ROLL THE RECP's (A.) DOWN THE SLOPE. RECP's WILL UNROLL WITH APPROPRIATE SIDE AGAINST THE SOIL SURFACE. ALL RECP's MUST BE SECURELY FASTENED TO SOIL SURFACE BY PLACING STAPLES/STAKES IN APPROXIMATE LOCATIONS AS SHOWN IN THE STAPLE PATTERN GUIDE.
4. THE EDGES OF PARALLEL RECP's MUST BE STAPLED WITH APPROXIMATELY 2" - 5" (5 CM - 12.5 CM) OVERLAP DEPENDING ON RECP's TYPE.
5. CONSECUTIVE RECP's SPLICED DOWN THE SLOPE MUST BE PLACED END OVER END (SHINGLE STYLE) WITH AN APPROXIMATE 3" (7.5 CM) OVERLAP. STAPLE THROUGH OVERLAPPED AREA, APPROXIMATELY 12" (30 CM) APART ACROSS ENTIRE RECP's WIDTH.

NOTE:
*IN LOOSE SOIL CONDITIONS, THE USE OF STAPLE OR STAKE LENGTHS GREATER THAN 6" (15 CM) MAY BE NECESSARY TO PROPERLY SECURE THE ECM.

2/15 EROSION CONTROL MATTING INSTALLATION (TYPICAL)
(NOT TO SCALE)

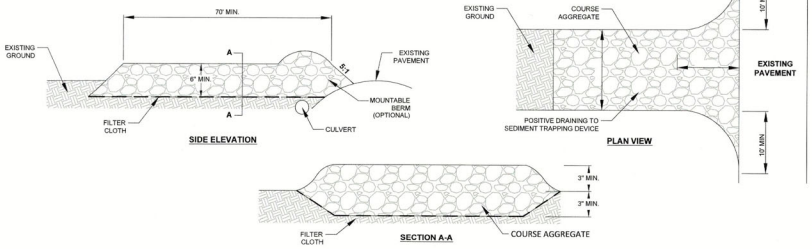


NOTES:
1. ACTUAL LAYOUT TO BE DETERMINED IN FIELD.
2. THE "CONCRETE WASHOUT" SIGN SHALL BE INSTALLED WITHIN 30 FEET OF THE TEMPORARY CONCRETE WASHOUT FACILITY.
3. PIT CAPACITY IS MINIMUM OF 6 CUBIC FEET PER 10 CUBIC YARDS OF CONCRETE.

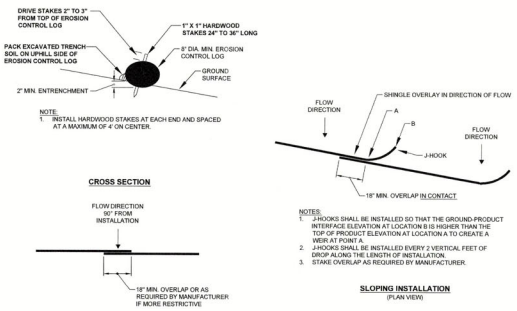
3/15 CONCRETE WASHOUT
(NOT TO SCALE)

NOTES:

1. INFORMATION SHOWN SHOULD BE CONSIDERED APPROXIMATE AND SHALL BE FIELD VERIFIED PRIOR TO CONSTRUCTION.
2. STRUCTURES SHOWN ARE APPROXIMATE AND SHALL BE FIELD VERIFIED PRIOR TO CONSTRUCTION.
3. SURVEY DATA PROVIDED BY THE CLIENT WAS PERFORMED BY ECOMATERIAL TECHNOLOGIES IN 2022.
4. EXISTING UTILITIES (ABOVE AND BELOW GROUND) SHALL BE LOCATED PRIOR TO CONSTRUCTION.
5. REFER TO PLAN SHEET 2 OF THIS PLAN SET FOR GENERAL NOTES.
6. ITEMS TO BE ABANDONED/REMOVED SHALL BE DONE IN ACCORDANCE WITH THE OVERALL PROJECT SCHEDULE.
7. ABANDONED HYDRAULIC STRUCTURES THAT ARE LEFT IN PLACE SHALL BE FILLED WITH NON-SHRINK GROUT OR CONCRETE. STRUCTURES AND PIPES TO BE ABANDONED MAY BE REMOVED AS NEEDED TO FACILITATE NEW CONSTRUCTION.
8. THE OWNER ASSUMES NO RESPONSIBILITY FOR THE ACTUAL CONDITION OF THE STRUCTURES TO BE DEMOLISHED OR MODIFIED.



4/15 STABILIZED CONSTRUCTION ENTRANCE
(NOT TO SCALE)



5/15 EROSION CONTROL LOG INSTALLATION
(NOT TO SCALE)

Texas 811
Know what's below. Call before you dig.

STATE OF TEXAS
RICHARD D. VARNELL
135525
LICENSED
PROFESSIONAL ENGINEER

Richard Varnell
#135525 3/26/2024

PROJECT:
NRG ENERGY - LANDFILL COVER SYSTEM DESIGN
LIMESTONE ELECTRIC GENERATING STATION
JEWETT, TEXAS

TITLE:
EROSION CONTROL DETAILS

DRAWN BY:	BHARRIS	PROJ. NO.:	585632.0000
CHECKED BY:	RVARNELL		
APPROVED BY:	RVARNELL		SHEET 18 OF 18
DATE:	MARCH 2024		

TRC
505 East Huntland Drive
Suite 250
Austin, TX 78752
Phone: 512.239.6080

FILE NO.: EROSION CONTROL DETAILS.dwg

Attachment C
Run-On and Run-Off Control System Plan for the CCR Landfill

NRG Texas Power LLC
Limestone Generating Station, Units 1 & 2

Run-On and Run-Off Control System Plan for the CCR Landfill

Prepared by

Sargent & Lundy LLC

Revised by

TRC

14701 St. Mary's Lane, Suite 500
Houston, TX 77079

Rev. 1
Issue Date: October 14, 2016
Revision Date: September 17, 2021

1 INTRODUCTION AND PURPOSE

Pursuant to 40 CFR 257.81(c), this document provides the revised written run-on and run-off control system plan for NRG Texas Power LLC's (NRG) Limestone Generating Station. Based on the applicability criteria of 40 CFR 257.81(a), the following CCR landfill and drainage feature are addressed herein:

- Unit 004 Landfill, and
- Unit 002 Storm Water Pond.

Unit 004 Landfill functions as a single unit, but it is subdivided into multiple areas. Run-off from the Unit 004 Landfill is directed to Unit 002 Storm Water Pond via a conveyance ditch within the landfill.

2 RESULTS & CONCLUSIONS

The run-on and run-off control systems were analyzed for the CCR landfill unit to assess how the landfill control systems managed the storm water run-off during the design storm event. Run-on does not reach the landfill because of the diked edges around the perimeter. The areas of the landfill with topsoil cover direct the non-contact storm water to downcomers, which convey the run-off to the perimeter ditch system.

Storm water run-off from the landfill is controlled and managed with the use of a ditch system located within the limits of the landfill, conveying landfill run-off to the Unit 002 Storm Water Pond. The ditch system includes three separate culvert installations, two (C2 and C3) located beneath haul roads leading to the landfill, and one (C1) located beneath the north dike of the Unit 002 Storm Water Pond. Although an additional 36-inch diameter pipe was added into culvert C2, each of the culverts remains undersized for conveying the peak design runoff. Various options may be considered by NRG to meet the drainage criteria, including, but not limited to, reducing the open landfill area that is conveyed by the ditch and culvert drainage system to the Unit 002 Storm Water Pond, increasing the diameter of the culverts or the number of culverts at each location to increase hydraulic capacity, or increasing the ditch capacity through raising the ditch dike height and/or increasing the ditch width.

Unit 002 Storm Water Pond has sufficient capacity to collect and manage the storm water run-off from the Unit 004 Landfill during the design storm event without overtopping since the estimated maximum water level from the design storm event remains lower than the top of dike elevation. The storm water run-off control results, including available storage volume in the landfill ditch, are presented below.

CCR Unit 004 Landfill Run-Off Collection	Total Drainage Area (ac)	Design Storm Event[1]	Total Volume Storm Water Run-off (ac-ft)	Unit 004 Landfill Ditch Storage Capacity (ac-ft)	Unit 002 Storm Water Pond Storage Capacity	Estimated Initial Water Level in Unit 002 Storm Water Pond (ft/ac-ft)	Estimated Maximum Water Level (ft)	Top of Surface Impoundment Dike Elevation (ft)
Unit 002 Storm Water Pond	111.25	25-year, 24-hour	54.33	1.77	99.17	425.65/ ~45.9	433.00	434.00

1- U.S. Department of Commerce. Technical Paper No. 40; Rainfall Frequency Atlas of the United States for Durations from 30 Minutes to 24 Hours and Return Periods from 1 to 100 Years. Washington, D.C.: U.S. Department of Commerce Weather Bureau. May 1961 (8.5") (NOAA PFDS storm event 7.6")

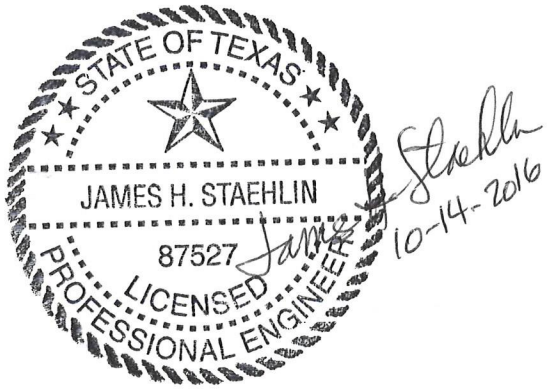
3 CERTIFICATIONS

This initial run-on and run-off control system plan meets the requirements of 40 CFR §257.81.

I certify that this Document was prepared by me or under my supervision and that I am a registered professional engineer under the laws of the State of Texas.

This document is released for use under the authority of James H. Staehlin, Texas PE # 87527 on October 14, 2016. Sargent & Lundy LLC Texas Registered Engineering Firm # F-2202.

Certified by: JAMES H. STAEHLIN Date: 10-14-2016



3 CERTIFICATIONS

This revised run-on and run-off control system plan meets the requirements of 40 CFR §257.81.

I certify that this Document was reviewed and revised by me and that I am a registered professional engineer under the laws of the State of Texas.

Name: Bruce M. Daniel

Registration No.: 48121

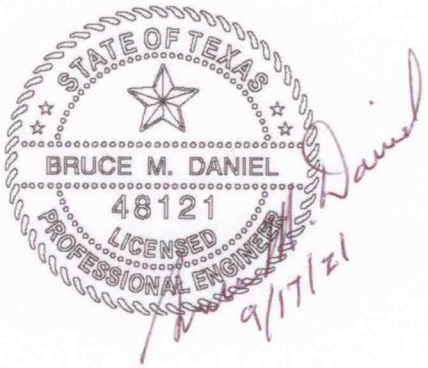
State: TX

Firm Registration: 3775, TRC Environmental

Signature: Bruce M. Daniel

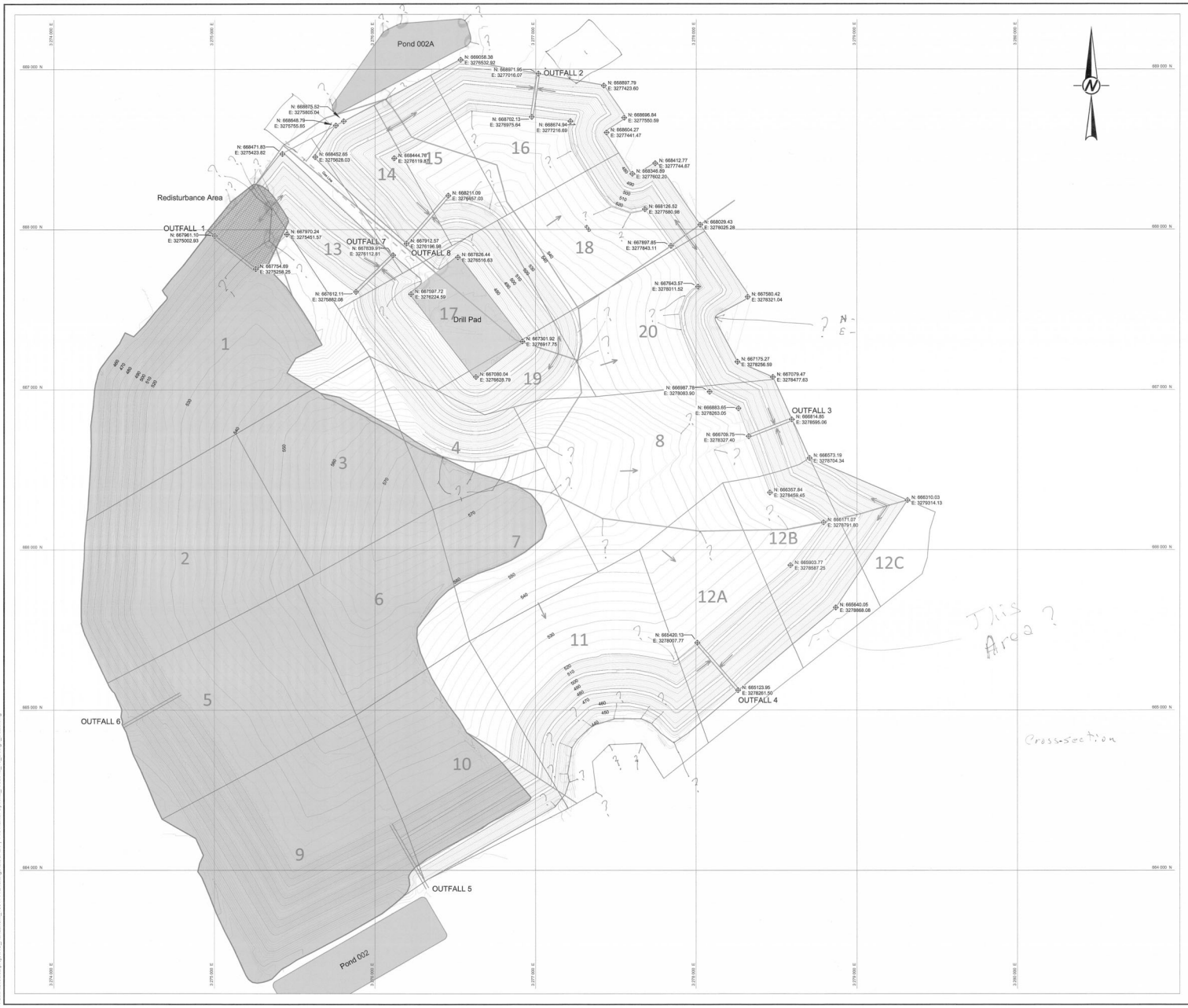
Date: 9/17/21

(seal)



Attachment D
Current and Final Condition Drawings


N 10,000
N 8,000
N 6,000
N 4,000
E 12,000
E 10,000
E 8,000
E 6,000
E 4,000
DRAWING SOURCE NOTE:
BASED ON DRAWING FROM
ECOMATERIAL TECHNOLOGIES
NRG TEXAS POWER, LLC
LIMESTONE ELECTRIC GENERATING STATION
JEWETT, TEXAS
PRELIMINARY TOP OF COVER ELEVATIONS OF OPEN SECTIONS OF LANDFILL
SHEET 2
TRC



LEGEND

- LANDFILL TOE
- CAPPED AREA
- LANDFILL SECTION
- POND
- DRILL PAD AREA
- REDISTURBANCE AREA
- OUTFALL STRUCTURE
- WATERSHED BOUNDARY
- DRAINAGE FLOW DIRECTION
- PIPELINE
- MAJOR CONTOUR (10 FT. INTERVAL)
- MINOR CONTOUR (2 FT. INTERVAL)

0 300 600
1" = 300' FEET

DRAFT

CLIENT
NRG ENERGY

PROJECT
ASH LANDFILL REVIEW AND DESIGN

TITLE
OPTION 2 DESIGN

CONSULTANT
Golder Associates

YYYY-MM-DD	2016-02-26
DESIGNED	ZW
PREPARED	JF
REVIEWED	RRY
APPROVED	RRY

PROJECT NO. 1531714 REV. 0 FIGURE 2

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI D

Path: \\golvuu2\prj\NRG_Ash\Landfill_1531714\Drafting\AutoCAD\ | File Name: Option2_Area12_13_Design_Data.dwg