INTEGRITY FEDERAL SERVICES

NCA MASTER SPECIFICATIONS
VOLUME 3

(Appendices)

BILOXI NATIONAL CEMETERY

GRAVESITE EXPANSION AND FCA DEFICIENCIES

VA PROJECT NUMBER: 832CM3036

Biloxi National Cemetery Gravesite Expansion & FCA Deficiencies

Biloxi, MS

Project Specifications – Volume 3
Project Number: 832CM3036

Prepared for:
US Department of Veterans Affairs
National Cemetery Administration
425 I Street, NW
Washington DC, 20001

Prepared by

INTEGRITY FEDERAL SERVICES

ECS Southeast, LLC

Geotechnical Engineering Report

Biloxi National Cemetery Expansion

400 Veterans Ave.
Biloxi, Harrison County, Mississippi

ECS Project No. 65:1896

August 28, 2025

August 28, 2025

Mr. Benjamin Svedlow
Integrity Federal Services
148 South Queen Street
Suite 201
Martinsburg, WV 25401

ECS Project No. 65:1896

Reference: Geotechnical Engineering Report
Biloxi National Cemetery Expansion
400 Veterans Ave.
Biloxi, Harrison County, Mississippi

Mr. Svedlow,

ECS Southeast, LLC (ECS) has completed the subsurface exploration, laboratory testing, and geotechnical engineering analyses for the Biloxi National Cemetery Expansion project in Biloxi, MS. Our services were performed in accordance with our agreed to scope of work. This report presents our geotechnical analysis of the project along with the results of the field exploration and laboratory testing conducted, and our design and construction recommendations.

It has been our pleasure to be of service to Integrity Federal Services during the design phase of this project. We would appreciate the opportunity to remain involved during the continuation of the design phase, and we would like to provide our services during construction phase operations as well to evaluate subsurface conditions assumed for this report. Should you have any questions concerning the information contained in this report, or if we can be of further assistance to you, please feel free to contact us.

Respectfully submitted,

ECS Southeast, LLC

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APPENDICES

EXECUTIVE SUMMARY

The following summarizes the main findings of the exploration, particularly those that may have a cost impact on the planned development. Further, our principal foundation recommendations are summarized. Information gleaned from the Executive Summary should not be utilized in lieu of reading the entire geotechnical report.

PROJECT UNDERSTANDING:

- Structure Information: Approximate 680 square foot building addition, new crypts
- Considerations: High groundwater table, proximity to existing structures

SUBSURFACE CONDITIONS:

- Surface Material: Topsoil, approximately 6 inches
- Probable Fill: Refer to Section 5.2.2
- Potential Undercuts: Approximately 6 inches to remove topsoil
- Natural Material: Brown and Gray Silty Sand (SM), Brown and Gray Poorly Graded Sand with Silt (SP-SM), Gray and Tan Poorly Graded Sand (SP)
- Swell Potential (PVR): Low
- Groundwater: Groundwater was encountered at depths ranging from approximately 6 to 8 feet below existing grades across the site during drilling operations

DESIGN & CONSTRUCTION RECOMMENDATIONS:

- Shallow foundations
    - Max. Net Allow. Bearing Pressure
        - 2,100 psf for spread footings
    - Min. Exterior Footing Depth = 24 inches
    - Min. Interior Footing Depth = Per structural design
- Slab-on-Grade: Modulus of Subgrade Reaction of 100 pci
- Seismic Design: IBC Site Class “D”

ECS should be retained to review all project documents to confirm conformance with our recommendations, and to perform CMT testing for earthwork and foundation construction activities to document that our recommendations are strictly followed. This also allows us to quickly provide recommendations for remedial activities, where necessary.

INTRODUCTION

The purpose of this study was to provide geotechnical information for the expansion project at the Biloxi National Cemetery in Biloxi, MS. The project will include a single-story, slab-on-grade building addition, new crypts, and site grading. We anticipate the plan area of the building addition to encompass approximately 680 square feet. The recommendations developed for this report are based on project information supplied in a May 20, 2025, email from Ben Svedlow of Integrity Federal Services.

Our services were provided in accordance with Proposal No. 65:3063-GP REV.01, dated May 22, 2025, as authorized by Mark Dyck of Integrity Federal Services on June 26, 2025, which included our terms and conditions of service.

This report contains the procedures and results of our subsurface exploration and laboratory testing programs, review of existing site conditions, engineering analyses, and recommendations for the design and construction of the project.

The report includes the following items:

- Observations from our site reconnaissance including current site conditions and surface topographic conditions.
- Description of the field exploration and laboratory tests performed.
- Final logs of soil test borings and records of the field exploration and laboratory tests in accordance with the standard practice of geotechnical engineers. This includes a location diagram.
- Recommendations for allowable bearing pressure for conventional shallow foundation systems and estimates of total and differential foundation settlement. This will include specific project information and design loads assumed by ECS.
- Recommendations for floor slab construction, including recommendations for subgrade modulus and subgrade improvements.
- Evaluation of the on-site soil characteristics encountered in the soil boring. Specifically, we will discuss the suitability of the on-site materials for reuse as engineered fill to support ground slabs.
- A discussion of groundwater and its potential impact on structures and project construction.
- Recommendations regarding seismic site classification for this project site, in accordance with IBC 2021 and ASCE 7-16.
- Recommendations regarding site preparation and construction observations and testing.

2.0 PROJECT INFORMATION

2.1 PROJECT LOCATION/CURRENT SITE USE/PAST SITE USE

The project is located at 400 Veterans Ave. in Biloxi, Harrison County, Mississippi. The site is an existing national cemetery with maintained grass and asphalt surfaced pavements. Historical imagery obtained from Google Earth© appears to show the site has remained in the same general condition since 2004. The topography of the site varies slightly with surface elevations ranging from approximately +20 feet to +27 feet MSL. The elevations and topographic variations were obtained from Google-Earth©. The location is depicted in Figure 2.1.1 shown below:

Figure 2.1.1: General Site Location Outlined in Red

2.2 PROPOSED CONSTRUCTION

The following information explains our understanding of the planned development including proposed buildings and related infrastructure. If ECS's understanding of the project is not correct, especially if the structural loads or elevations are different, please contact ECS so that we may review these changes and revise our recommendations, as appropriate.

SUBJECT	DESIGN INFORMATION / ASSUMPTIONS
Building Footprint	Approximately 680 Square Feet
Number of Stories	Single-Story
Usage	Unknown
Anticipated Framing	Metal
Anticipated Column Loads	25 kips Maximum
Anticipated Wall Loads	2 Kips Per Linear Foot (klf) Maximum
Anticipated Finish Floor Elevation	EL. 24 ft MSL (Less than 2 feet above present site grades)

3.0 FIELD EXPLORATION AND LABORATORY TESTING

3.1 FIELD EXPLORATION PROGRAM

The field exploration was planned with the objective of characterizing the project site in general geotechnical and geological terms and to evaluate subsequent field and laboratory data to assist in the determination of geotechnical recommendations.

3.1.1 Test Borings

Our scope of work included drilling a total of eighteen (18) soil test borings. One (1) test boring located in the footprint of the proposed building addition was advanced to a depth of approximately 25 feet below the existing site grades. Ten (10) test borings were drilled in the crypt's footprint to a depth of approximately 10 feet below the existing site grades. Also, seven (7) test borings were drilled in the areas of proposed site grading. Our borings were located with a handheld GPS unit, and their approximate locations are shown on the Boring Location Diagram in Appendix A. The approximate ground surface elevations noted in this report were estimated from Google-Earth©.

Representative soil samples were obtained by means of Standard Penetration Test (SPT) procedures in accordance with ASTM Specifications D-1586 in granular soils. SPT sampling is performed by driving a split-barrel sampler into the soil in 1.5-foot intervals with a 140-lb hammer and measures the resistance of the soil to penetration of the 2-inch diameter sampler.

Field logs of the soils encountered in the borings were maintained by ECS's field engineer. After recovery, each geotechnical soil sample was removed for the sampler and visually classified. Representative portions of each soil sample were then wrapped in plastic and transported to our laboratory for further visual examination and laboratory testing. After completion of the drilling operations, the boreholes were backfilled with cuttings to the existing ground surface.

3.2 SUBSURFACE CHARACTERIZATION

The following text provides generalized characterizations of the soil strata encountered during our subsurface exploration. For subsurface information specific information, please refer to the Boring Logs in Appendix B:

GENERALIZED SUBSURFACE CONDITIONS

Approximate Depth (ft)	Stratum No.	Soil Description
0 – 0.5	-	**TOPSOIL, APPROXIMTELY 6 INCHES**
0.5 – 4.5	I	**POORLY GRADED SAND WITH SILT (SP-SM),** Brown, Very Loose to Loose
4.5 – 23.5	II	**POORLY GRADED SAND (SP),** Gray**,** Medium Dense to Very Dense
23.5 – 25.0	III	**SILTY SAND (SM),** Gray, Very Loose

Notes:
(1) Soil descriptions show generalized strata to 25'. Strata in the borings vary with depth, please see attached Boring Logs in Appendix B.

Please refer to the attached boring logs and laboratory data summary for this field exploration for a more detailed description of the subsurface conditions encountered in the borings as the stratification descriptions above are generalized for presentation purposes.

3.3 GROUNDWATER OBSERVATIONS

Groundwater levels, if observed, were made in the borings during drilling operations. In auger drilling operations, water is not introduced into the borehole and the groundwater position can often be evaluated by observing water flowing into and out of the excavation. Furthermore, visual observation of soil samples retrieved can often be used in evaluating the groundwater conditions.

*Groundwater was encountered at depths ranging from approximately **6 to 8 feet** below existing grade across the site during drilling operations.*

The highest groundwater observations are normally encountered in the late winter or early spring or following seasonal heavy rainfall events. Fluctuations in the location of the long-term water table may occur due to changes in precipitation, evaporation, surface water runoff and other factors not immediately apparent at the time of his investigation. Therefore, the groundwater conditions at this site are expected to be significantly influenced by surface water runoff and seasonal rainfall.

3.4 LABORATORY TESTING

The laboratory testing consisted of selected tests performed on samples obtained during our field exploration operations. Classification and index property tests were performed on representative soil samples. The soil samples were tested for Moisture Content (ASTM D2216), Atterberg Limits (ASTM D4318), and Percent Passing No. 200 Sieve (ASTM D1140).

Each sample was visually classified based on texture and plasticity in accordance with ASTM D2488 Standard Practice for Description and Identification of Soils (Visual-Manual Procedures) and including USCS classification symbols. After classification, the samples were grouped in the major zones noted on the boring logs in Appendix B. The group symbols for each soil type are indicated in parentheses along with the soil descriptions. The stratification lines between strata on the logs are approximate; in situ, the transitions may be gradual.

The soil samples will be retained in our laboratory for a period of 60 days, after which, they will be discarded unless other instructions are received as to their disposition.

4.0 DESIGN RECOMMENDATIONS

The following recommendations have been developed based on Sections 2 and 3. If there are any changes to the project characteristics or if different subsurface conditions are encountered during construction, ECS should be consulted so that the recommendations of this report can be reviewed.

4.1 GEOTECHNICAL CONSIDERATIONS

Based on the subsurface conditions encountered in the borings, anticipated fill heights, the anticipated loading conditions and the lowest level bearing elevation, the site appears suited for the proposed development provided the recommendations herein are strictly adhered to. The following sections detail our recommendations for the proposed development regarding foundation and below grade work.

For this project, we anticipate that the building addition can be supported with shallow foundations on conventional continuous or spread footings. The Shallow Foundations Section (4.2) provides recommendations for the support of the proposed building bearing on medium dense native sands or properly compacted engineered fill material.

4.1.1 Presence of Expansive Soils

Based on the laboratory test results, some of the near surface soils encountered within the building pad and pavement areas consist of sands which can generally have a low swelling potential. Soils with swelling potential located above the water table and within depths that are subject to changes in moisture are expected to experience volume change and were considered in our potential vertical rise (PVR) estimation. **The potential vertical rise (PVR) is estimated to be less than 1 inch using an applied load of 1.0 psi.**

Generally, one (1) inch of PVR is acceptable as the maximum allowable value used for design and construction. However, the structural engineer must confirm if these PVR values are within acceptable

limits for the specific project. These PVR estimations assume that the soils are allowed to increase/decrease in moisture content from a relatively dry condition to a relatively wet condition over a depth of approximately 10 feet from the existing ground surface at the time of field exploration.

4.1.2 Perimeter Conditions

The existing soils are moisture sensitive and will become inadequate when above their optimum moisture content as evaluated by ASTM D698. Positive drainage away from the structure should be provided during construction and maintained throughout the life of the proposed project. Water should not be allowed to infiltrate into the excavations during construction. Foundation soils should not be allowed to become wet. Grades must be sloped to provide effective drainage away from the building during and after construction. Adjacent concrete sidewalks and pavements should be sloped to provide drainage away from the building, and joints should be sealed; close attention should be paid to those directly abutting the building.

Roof runoff and surface drainage should be collected and discharged away from the structure to prevent wetting of the foundation soils. Roof gutters should be installed and connected to downspouts and pipes directing roof runoff into stormwater collection systems or discharged onto positively sloped pavements.

4.2 SHALLOW FOUNDATIONS

For structures with maximum column loads of 25 kips or less and provided subgrades and engineered fills are prepared as recommended in this report, the proposed structure can be supported by shallow foundations. For column loads greater than 25 kips, ECS should be consulted to provide additional recommendations. We recommend that the foundation design use the following parameters:

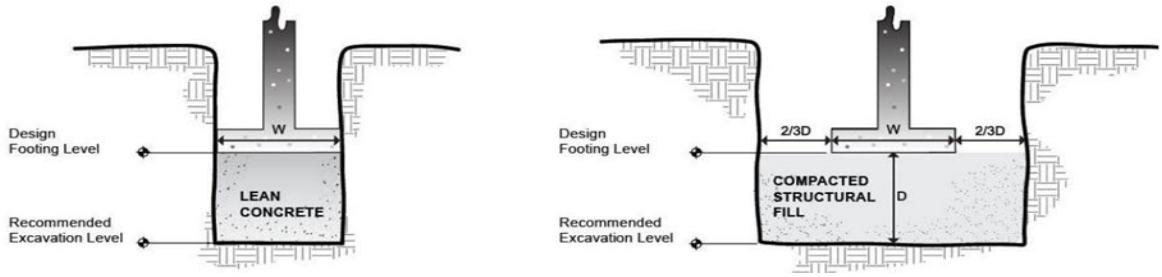
Design Parameter	Column Footing	Wall Footing
Net Allowable Bearing Pressure (1)	2,100 psf	
Acceptable Bearing Soil Material	Compacted Engineered Fill or Medium Dense Native Sands	
Minimum Width	24 inches	18 inches
Minimum Footing Embedment Depth (below slab or finished grade) (2)	24 inches	24 inches
Estimated Total Settlement (3)	Less than 1- inch	Less than 1- inch
Estimated Differential Settlement (4)	Less than $^1/_2$ inches between columns	Less than $^1/_2$ inches

Notes:

(1) Net allowable bearing pressure is the applied pressure in excess of the surrounding overburden soils above the base of the foundation.
(2) For bearing considerations and expansive soil concerns.
(3) The estimated total settlement is for up to a 3.5 ft x 3.5 ft square footing at a maximum imposed bearing pressure of 2,100 psf. If final column loads are greater than 25 kips, ECS must be contacted to approve foundation recommendations and update settlement calculations, if needed.
(4) Based on maximum column/wall loads and variability in borings. Differential settlement can be re-evaluated once the foundation plans are more complete.

Potential Undercuts: **Very loose silty soils were encountered in the upper 2 feet in the building addition footprint and should be remediated as described in Section 5.2.1.** If soft or loose soils are observed during footing observations, the footings should be extended to adequate bearing soils. Undercut areas should be backfilled with compacted engineered fill or lean concrete (f'c ≥ 1,000 psi at 28 days) to the

original design bottom of footing elevation; the original footing should be constructed on top of the hardened lean concrete or engineered fill. If engineered fill is used to backfill the undercut footing, the over-excavated footings should be widened accordingly on all sides for each one (1) foot of over excavation as detailed in Figure 4.2.1 below. If lean concrete is used for backfill, the over-excavation does not require widening.



Lean Concrete Backfill **Engineered Fill Backfill**

Figure 4.2.1: Backfill Detail

The net allowable soil bearing pressure refers to that pressure which may be transmitted to the foundation bearing soils in excess of the final minimum surrounding overburden pressure. The final footing elevation should be evaluated by ECS's geotechnical engineering personnel to evaluate that the bearing soils are capable of supporting the recommended net allowable bearing pressure and adequate for foundation construction. These evaluations should include visual observations using a T-probe or static cone penetrometer, or with the use of a Dynamic Cone Penetrometer (DCP), if necessary. Evaluations should be performed within each column footing excavation (minimum of 2 tests per column footing) and at intervals not greater than 25 feet in continuous footings. The DCP testing should extend at least 2 feet below the final foundation subgrade. A minimum DCP value of 10 blows should be used for the evaluation of the foundations.

The settlement of a structure is a function of the compressibility of the bearing materials, bearing pressure, actual structural loads, fill depths, and the bearing elevation of footings with respect to the final ground surface elevation. Estimates of settlement for foundations bearing on engineered or non-engineered fills are strongly dependent on the quality of fill placed. Factors that may affect the quality of fill include maximum loose lift thickness of the fills placed and the amount of compactive effort placed on each lift. If the recommendations outlined in this report are followed, we expect total settlements for the proposed construction to be in the range of 1 inch or less, while the differential settlement will be approximately half of the anticipated total settlement. This evaluation is based on our engineering experience and the anticipated loadings for this type of structure and is intended to aid the structural engineer with the design.

Exposure to the environment may weaken the soils at the foundation bearing level if the foundation excavations remain exposed during periods of inclement weather. Therefore, foundation concrete should be placed the same day that final excavation is achieved, and the design bearing pressure verified. If the bearing soils are softened by surface water absorption or exposure to the environment, the softened soils must be removed from the foundation excavation bottom immediately prior to placement of concrete. If the foundation excavation must remain open overnight, or if rainfall is apparent while the bearing soils

are exposed, we recommend that a 1 to 3-inch thick "mud mat" of "lean" concrete be placed over the exposed bearing soils before the placement of reinforcing steel.

4.2.1 Considerations for Existing Foundations of Adjacent Structures

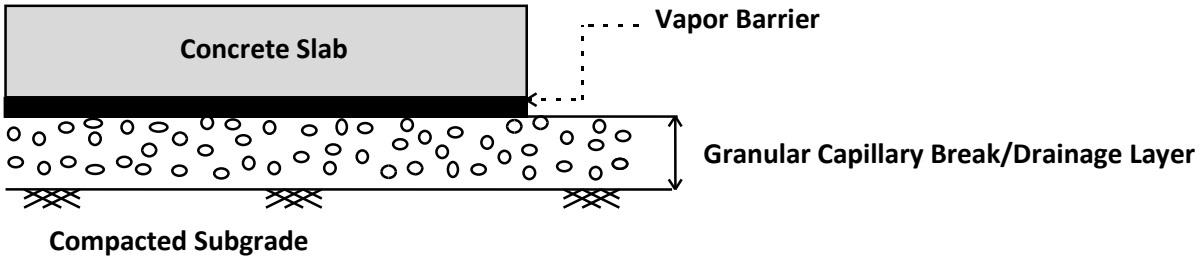
At a minimum, new foundations should be placed at least 5 footing widths from any existing foundations. Overlapping stresses between the new and existing foundations may cause unanticipated settlement and potentially damage both structures. Once foundation plans are finalized, ECS should be contacted to review the plans and make additional recommendations as necessary.

Due to the presence of existing structures, caution should be exercised when performing undercut operations adjacent to the existing foundations. Prior to performing undercutting, ECS should be contacted to review the planned undercut and make recommendations to limit the potential for undermining adjacent existing foundations.

New buildings that will be structurally attached to existing buildings should be designed to allow for differential movement between the two buildings of up to one (1) inch.

4.3 SLABS ON GRADE

Provided subgrades and engineered fills are prepared as discussed herein, the proposed floor slabs can be constructed as Ground Supported Slabs (or Slab-On-Grade) on lean natural soils, newly placed fill soils or lime treated soils. Based on the assumed finished floor elevation, it appears that the slabs will bear on native sand material or newly placed engineered fill. The following graphic depicts our soil-supported slab recommendations:



1. Drainage Layer Thickness: 4 inches
2. Drainage Layer Material: GRAVEL (GP, GW), SAND (SP, SW)

Soft or yielding soils may be encountered in some areas. Those soils should be removed and replaced with compacted engineered fill in accordance with the recommendations included in this report.

Subgrade Modulus: Provided the engineered fill and 4-inch granular drainage layer are constructed in accordance with our recommendations, the slab may be designed assuming a modulus of subgrade reaction, **k_1 of 100 pci (lbs./cu. inch).** The modulus of subgrade reaction value is based on a 1 ft by 1 ft plate load test basis.

Vapor Barrier: Before the placement of concrete, a vapor barrier may be placed on top of the granular drainage layer to provide additional protection against moisture penetration through the floor slab. When

a vapor barrier is used, special attention should be given to surface curing of the slab to reduce the potential for uneven drying, curling and/or cracking of the slab. Depending on proposed flooring material types, the structural engineer and/or the architect may choose to eliminate the vapor barrier.

Slab Isolation: Soil-supported slabs should be isolated from the foundations and foundation-supported elements of the structure so that differential movement between the foundations and slab will not induce excessive shear and bending stresses in the floor slab. Where the structural configuration prevents the use of a free-floating slab such as in a drop-down footing/monolithic slab configuration, the slab should be designed with adequate reinforcement and load transfer devices to reduce risk of overstressing of the slab.

4.4 SEISMIC DESIGN CONSIDERATIONS

Seismic Site Classification: The International Building Code (IBC) 2021 requires site classification for seismic design based on the upper 100 feet of a soil profile. The methods are utilized in classifying sites, namely the shear wave velocity (v_s) method; the Undrained Shear Strength (s_u) method; and the Standard Penetration Resistance (N-value) method. The Standard Penetration Resistance (N-value) method was used in classifying this site.

SEISMIC SITE CLASSIFICATION			
Site Class	**Soil Profile Name**	**Shear Wave Velocity, Vs, (ft./s)**	**Standard Penetration Resistance (N-value)**
A	Hard Rock	Vs > 5,000 fps	N/A
B	Rock	2,500 < Vs ≤ 5,000 fps	N/A
C	Very dense soil and soft rock	1,200 < Vs ≤ 2,500 fps	N > 50
D	**Stiff Soil Profile**	**600 ≤ Vs ≤ 1,200 fps**	**15 ≤ N ≤ 50**
E	Soft Soil Profile	Vs < 600 fps	N < 15

Based upon our interpretation of the subsurface conditions, the expected **Seismic Site Classification is "D"** as shown in the preceding Table.

The Site Class definition should not be confused with the Seismic Design Category designation which the Structural Engineer typically assesses. If a higher site classification is beneficial to the project, we can provide additional testing methods that may yield more favorable results.

5.0 SITE CONSTRUCTION RECOMMENDATIONS

5.1 SUBGRADE PREPARATION

The existing soils are moisture sensitive and will become inadequate when above their optimum moisture content as evaluated by ASTM D698. Effective site drainage should be implemented at the beginning of and maintained throughout construction activities. Care should be taken to keep construction traffic to a minimum during and immediately after times of inclement weather.

ECS should be on-site full-time during earthwork and foundation construction activities to document that our recommendations are strictly followed and to provide recommendations for remedial activities, if necessary.

5.1.1 Stripping and Grubbing

The subgrade preparation should consist of undercutting up to 6 inches of topsoil, debris, and utilities and soft or yielding materials from the 10-foot expanded building limits, and 5 feet beyond the toe of engineered fills.

Note: Following stripping and grubbing the entire construction area should be proofrolled as outlined in Section 5.1.2 of this report. Soils observed to rut or deflect greater than an inch in depth should be undercut and replaced or otherwise mitigated.

Deeper topsoil or organic laden soils may be present in wet, low-lying, and poorly drained areas. In wooded areas, the root balls may extend as deep as about 2 feet and will require additional localized stripping depth to completely remove the organics. ECS should be retained to evaluate that topsoil and poor surficial materials have been removed prior to the placement of engineered fill or construction of structures.

5.1.2 Proofrolling

Following clearing activities and prior to fill placement or other construction on subgrades, the subgrades should be evaluated by an ECS field technician. The exposed subgrade should be thoroughly proofrolled with a half loaded tandem-axle dump truck or similar construction equipment weighing a minimum of 15 tons. Proofrolling should be traversed in two perpendicular directions with overlapping passes of the vehicle under the observation of an ECS technician. This procedure is intended to assist in identifying localized yielding materials.

Where proofrolling identifies areas of yielding or “pumping” subgrade those areas should be repaired prior to the placement of subsequent engineered fill or other construction materials. Observations of yielding or “pumping” should be addressed with ECS to establish the appropriate remediation as outlined in Section 5.2.1.

5.2 EARTHWORK OPERATIONS

5.2.1 Subgrade Stabilization

Methods of stabilization include densification, undercutting, moisture conditioning, or chemical stabilization. Test pits may be excavated to explore the shallow subsurface materials to help in determining the cause of the observed inadequate materials, and to assist in the evaluation of appropriate remedial actions to stabilize the subgrade. Anticipated methods of subgrade stabilization of the near surface soils are provided below:

Moisture Conditioning: If it is established that high moisture content is the cause of the inadequate subgrade, the geotechnical engineer may require the earthwork contractor process the upper 12 to 18 inches of in-situ subgrade by windrowing with a dozer or plowing with a set of heavy-duty disk harrows until soil moisture is observed to be within 2 percent of its optimum moisture content as evaluated by ASTM D698 to improve subgrade conditions before consideration other mitigation approaches. The drying effort should begin after the exposed subgrade is free of standing water and the windrowing/disking should be continuous during a period of dry weather. ECS should be onsite to periodically perform soil moisture testing. The processed areas should be sealed with compaction equipment and a flat drum roller or dozer blade at the end of the day in case of overnight rain. If weather conditions do not allow appropriate time to dry the native subgrade, the geotechnical engineer may recommend chemical treatment with cement in order to provide an adequate working surface for fill placement.

Subgrade Densification: After completing the clearing and stripping operations and installing temporary groundwater control measures (if required), the exposed surface should be compacted with a **heavy vibratory roller having a minimum static, at-drum weight on the order of 10 to 12 tons**. Because of the relatively dry condition of the surficial fine sands, these soils may need to be wetted to increase their moisture content nearer to their optimum value that will best facilitate compaction. Typically, the material should exhibit moisture contents within ±2 percentage points of the modified Proctor optimum moisture content (ASTM D 1557) during the compaction operations. Considering the dry nature of the surficial fine sandy soils, dozer equipment should be anticipated to assist the rollers in traversing the site during the compaction operations. With the soils properly moisture conditioned, our experience indicates that at least eight overlapping passes in each direction of the vibratory roller should achieve the desired densification of the surficial very loose fine sands to depths of 3 to 4 feet or more.

Compaction should continue until densities of at least 95 percent of the modified Proctor maximum dry density (ASTM D 1557) have been achieved within the upper one foot of the compacted natural soils at the site. Dynamic cone penetrometer (DCP) soundings, performed by hand, should also be performed subsequent to the surface soil heavy compaction operations to confirm densification of the very loose soils within the upper 2 feet of the existing grade.

Should the bearing level soils experience pumping and soil strength loss during the compaction operations, compaction work should be immediately terminated, and (1) the disturbed soils should be removed and backfilled with compacted engineered fill, or (2) the excess moisture content within the disturbed soils should be allowed to dissipate before recompacting.

Care should be exercised to avoid damaging any nearby structures while the compaction operation is underway. Prior to commencing compaction, occupants of adjacent structures should be notified, and the existing conditions of the structures should be documented with photographs and survey (if deemed necessary). Compaction should cease if deemed detrimental to adjacent structures, and ECS should be contacted immediately. We recommend the vibratory roller remain a minimum of 50 feet from existing structures. Within this zone, use of a track-mounted bulldozer, or a vibratory roller operating in the static mode, is recommended.

Undercut and Replace: If other means of soil stabilization are not practical, the undercutting or removal of the inadequate subsurface material may be required. The undercutting of such material will be conducted, inspected, and tested in accordance with Section 5.1.

Lime Stabilization: We do not anticipate lime treatment of the onsite sandy soils; however, lime stabilization may be used to modify onsite clay soils to achieve an adequate working surface and achieve PIs less than 20 for reuse as engineered fill. The amount of lime necessary to achieve lime stabilization will vary depending on the clay mineral, plasticity and type of lime used for stabilization. For estimating purposes 4 to 6% percent of lime by volume should be used; however, a laboratory lime series should be performed at the time of construction to establish the optimum lime content. Surficial samples should be collected from across the site and testing should be conducted on the composite sample. Lime treatment should conform to MDOT Division 300 (Bases) – Section 200. An ECS Field Engineer or Senior Technician should be present during lime treatment activities to observe lime quantities and document that treated areas are in conformance with the project requirements. Please note that caution should be used when powdered lime in used in closely populated areas. To control dust, a lime slurry or pelletized lime may be used where dust must be controlled. In addition, pelletized lime will generally require 2 to 3 times the effort to properly pulverize and mix into the clay soils than a powder or slurry.

5.2.2 Probable Fill

Fill or deleterious material/debris was not encountered in the soil borings but may be encountered between or beyond our borings due to past development of existing structures nearby. If encountered, ECS recommends removing the existing fill and debris in its entirety and replacing it with well compacted engineered fill meeting the parameters outlined in Section 5.2.3.

5.2.3 Engineered Fill

Prior to placement of engineered fill, representative bulk samples (approximately 50 pounds) of on-site and/or off-site borrow should be submitted to ECS for laboratory testing, which will typically include Atterberg limits, natural moisture content, grain-size distribution, and moisture-density relationships (i.e., Proctors) for compaction. Import materials should be tested prior to being hauled to the site to evaluate if they meet project specifications. Alternatively, Proctor data from other accredited laboratories can be submitted if the test results are within the last 90 days.

Satisfactory Engineered Fill Materials: Materials satisfactory for use as Engineered Fill should consist of inorganic soils with the following engineering properties and compaction requirements.

ENGINEERED FILL INDEX PROPERTIES		
Soil Type	**USCS Classification**	**Property**
Imported Fill	CL, SC, SM, SP, SP-SM, SP-SC	LL < 40, PI < 20, Fines Content < 25%
Aggregate Base	GP	MDOT Division 703 (Aggregates) crushed limestone or similarly graded recycled aggregates
On-Site Soils	SM/SP-SM	The native soils in the upper 4 feet appear to meet the requirements for reuse as engineered fill.

ENGINEERED FILL COMPACTION REQUIREMENTS	
Subject	**Requirement**
Compaction Standard	Standard Proctor, ASTM D698
Required Compaction	95% of Maximum Dry Density
Moisture Content	Optimum to +3 % Points of the Soil's Optimum Value
Loose Thickness	8 Inches Prior to Compaction

Fill Placement: Excessively wet fill soils or aggregates should be scarified, aerated, and moisture conditioned prior to compaction.

On-Site Borrow Suitability: Natural deposits of soils that meet the definition above may be used as engineered fill on the site.

5.3 FOUNDATION AND SLAB OBSERVATIONS

Protection of Foundation Excavations: Exposure to the environment may weaken the soils at the footing bearing level if the foundation excavations remain open; therefore, foundation concrete should be placed the same day that excavations are made. Bearing soils that are weakened by surface water intrusion or exposure must be removed from the foundation excavation bottom immediately prior to placement of concrete. If the excavation must remain open overnight, or if rainfall becomes imminent while the bearing soils are exposed, a 1 to 3-inch thick "mud mat" of "lean" concrete should be placed on the bearing soils before the placement of reinforcing steel.

Footing Subgrade Observations: The soils at the foundation bearing elevation are anticipated to be adequate for support of the proposed structure if foundations bear in medium dense sands or properly compacted engineered fill material. ECS should observe the foundation subgrade prior to placing foundation concrete, to confirm the bearing soils are as recommended.

Slab Subgrade Verification: Prior to placement of a drainage layer, the subgrade should be prepared in accordance with the recommendations found in Section 5.1.

5.4 UTILITY INSTALLATIONS

Utility Subgrades: The soils encountered in our exploration are expected to be generally adequate for support of utility pipes. The pipe subgrades should be observed and probed for stability by ECS. Loose or inadequate materials encountered should be removed and replaced with adequate compacted Engineered Fill, or pipe stone bedding material.

Utility Backfilling: The granular bedding material (often AASHTO #57 stone) should be at least 4 inches thick, but not less than that specified by the civil engineer's project drawings and specifications. We recommend that the bedding materials be placed up to the springline of the pipe. Fill placed for support of the utilities, as well as backfill over the utilities, should conform to Section 5.2.

Excavation Safety: Excavations and slopes should be constructed and maintained in accordance with OSHA excavation safety standards. The contractor is solely responsible for designing, constructing, and maintaining adequate excavations and slopes. The contractor's responsible person, as defined in 29 CFR

Part 1926, should evaluate the soil exposed in the excavations as part of the contractor's safety procedures. In no case should slope height, slope inclination, or excavation depth, including utility trench excavation depth, exceed those specified in local, state, and federal safety regulations. ECS is providing this information solely as a service to our client. ECS is not assuming responsibility for construction site safety or the contractor's activities; such responsibility is not being implied and should not be inferred.

6.0 CLOSING

ECS has prepared this report to guide the geotechnical-related design and construction aspects of the project. We performed these services in accordance with the standard of care expected of professionals in the industry performing similar services on projects of like size and complexity at this time in the region. No other representation expressed or implied, and no warranty or guarantee is included or intended in this report.

The description of the proposed project is based on information provided to ECS by Integrity Federal Services. If any of this information is inaccurate or changes, either because of our interpretation of the documents provided or site or design changes that may occur later, ECS should be contacted so we can review our recommendations and provide additional or alternate recommendations that reflect the proposed construction.

We recommend that ECS review the project plans and specifications so we can confirm that those plans/specifications are in accordance with the recommendations of this geotechnical report.

Field observations, and quality assurance testing during earthwork and foundation installation are an extension of, and integral to, the geotechnical design. We recommend that ECS be retained to apply our expertise throughout the geotechnical phases of construction, and to provide consultation and recommendation should issues arise. ECS is not responsible for the conclusions, opinions, or recommendations of others based on the data in this report.

Appendix A - Drawings and Reports

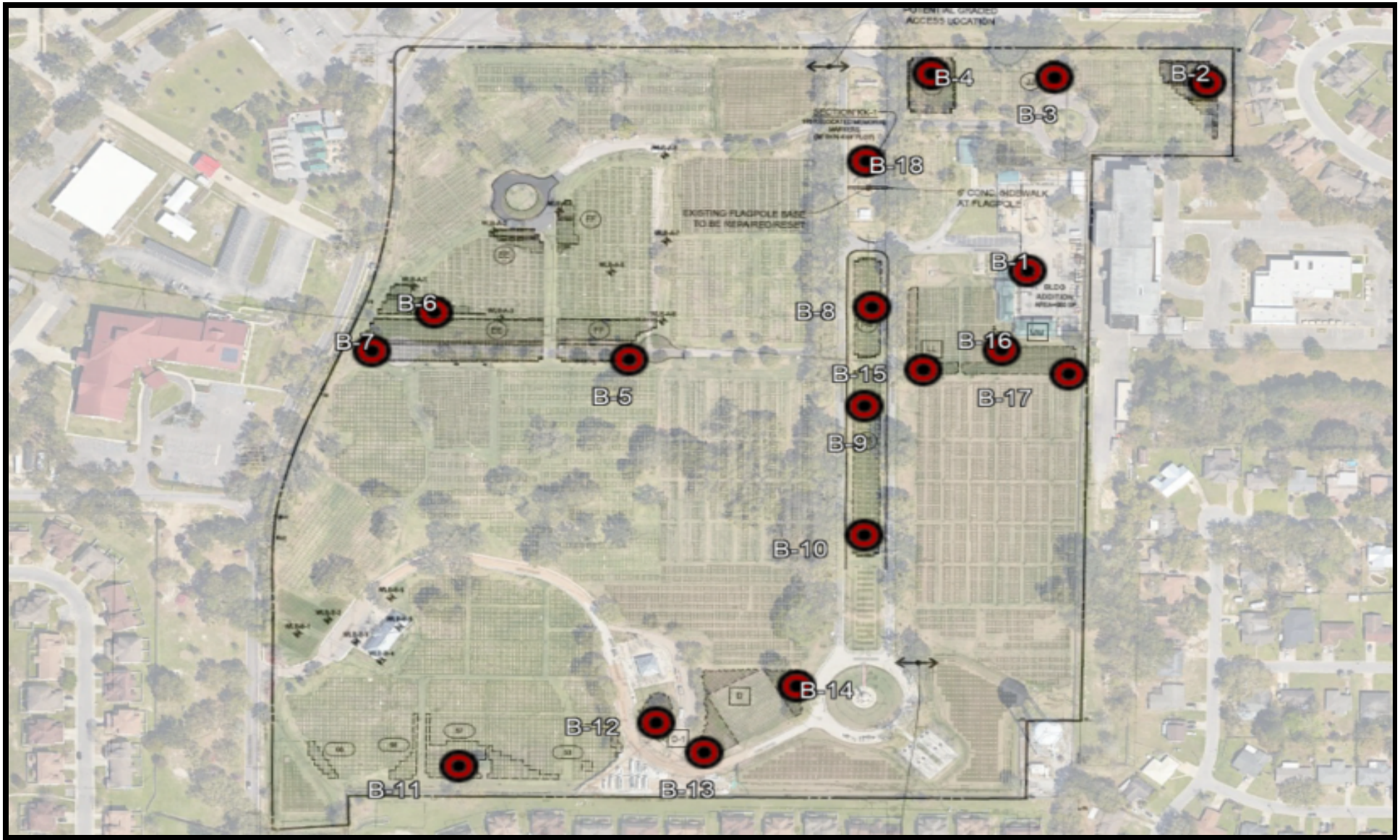
Site Location Diagram
Boring Location Diagram(s)

SITE LOCATION DIAGRAM

Biloxi National Cemetery Expansion

400 Veterans Ave., Biloxi, Mississippi
Integrity Federal Services

ENGINEER	JCC3
SCALE	1" = 600'
PROJECT NO.	65:1896
SHEET	
DATE	8/25/2025



BORING LOCATION DIAGRAM

Biloxi National Cemetery Expansion

400 Veterans Ave., Biloxi, Mississippi
Integrity Federal Services

ENGINEER	JCC3
SCALE	1" = 300'
PROJECT NO.	65:1896
SHEET	
DATE	8/25/2025

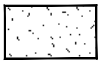
Appendix B – Field Operations

Reference Notes
Boring Logs

REFERENCE NOTES FOR BORING LOGS

MATERIAL[1,2]


ASPHALT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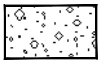
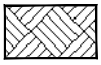
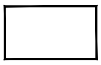
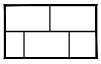

GRAVEL

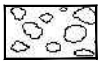

TOPSOIL

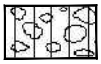

VOID


BRICK

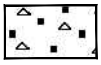

AGGREGATE BASE COURSE

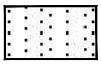

GW **WELL-GRADED GRAVEL**
gravel-sand mixtures, little or no fines

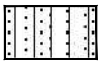

GP **POORLY-GRADED GRAVEL**
gravel-sand mixtures, little or no fines


GM **SILTY GRAVEL**
gravel-sand-silt mixtures

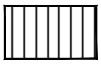

GC **CLAYEY GRAVEL**
gravel-sand-clay mixtures

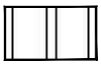

SW **WELL-GRADED SAND**
gravelly sand, little or no fines

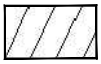

SP **POORLY-GRADED SAND**
gravelly sand, little or no fines


SM **SILTY SAND**
sand-silt mixtures

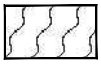

SC **CLAYEY SAND**
sand-clay mixtures

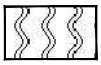

ML **SILT**
non-plastic to medium plasticity

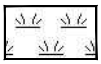

MH **ELASTIC SILT**
high plasticity


CL **LEAN CLAY**
low to medium plasticity


CH **FAT CLAY**
high plasticity


OL **ORGANIC SILT or CLAY**
non-plastic to low plasticity


OH **ORGANIC SILT or CLAY**
high plasticity


PT **PEAT**
highly organic soils

DRILLING SAMPLING SYMBOLS & ABBREVIATIONS

SS	Split Spoon Sampler	PM	Pressuremeter Test
ST	Shelby Tube Sampler	RD	Rock Bit Drilling
WS	Wash Sample	RC	Rock Core, NX, BX, AX
BS	Bulk Sample of Cuttings	REC	Rock Sample Recovery %
PA	Power Auger (no sample)	RQD	Rock Quality Designation %
HSA	Hollow Stem Auger		

PARTICLE SIZE IDENTIFICATION

DESIGNATION		PARTICLE SIZES
Boulders		12 inches (300 mm) or larger
Cobbles		3 inches to 12 inches (75 mm to 300 mm)
Gravel:	Coarse	¾ inch to 3 inches (19 mm to 75 mm)
	Fine	4.75 mm to 19 mm (No. 4 sieve to ¾ inch)
Sand:	Coarse	2.00 mm to 4.75 mm (No. 10 to No. 4 sieve)
	Medium	0.425 mm to 2.00 mm (No. 40 to No. 10 sieve)
	Fine	0.074 mm to 0.425 mm (No. 200 to No. 40 sieve)
Silt & Clay ("Fines")		<0.074 mm (smaller than a No. 200 sieve)

COHESIVE SILTS & CLAYS

UNCONFINED COMPRESSIVE STRENGTH, Q_P[4]	SPT[5] (BPF)	CONSISTENCY[7] (COHESIVE)
<0.25	<2	Very Soft
0.25 - <0.50	3 - 4	Soft
0.50 - <1.00	5 - 8	Firm
1.00 - <2.00	9 - 15	Stiff
2.00 - <4.00	16 - 30	Very Stiff
4.00 - 8.00	31 - 50	Hard
>8.00	>50	Very Hard

GRAVELS, SANDS & NON-COHESIVE SILTS

SPT[5]	DENSITY
<5	Very Loose
5 - 10	Loose
11 - 30	Medium Dense
31 - 50	Dense
>50	Very Dense

RELATIVE AMOUNT[7]	COARSE GRAINED (%)[8]	FINE GRAINED (%)[8]
Trace	≤5	≤5
With	10 - 20	10 - 25
Adjective *(ex: "Silty")*	25 - 45	30 - 45

WATER LEVELS[6]

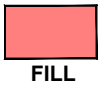

WL (First Encountered)


WL (Completion)


WL (Seasonal High Water)


WL (Stabilized)

FILL AND ROCK


FILL


POSSIBLE FILL


PROBABLE FILL


ROCK

[1]Classifications and symbols per ASTM D 2488-17 (Visual-Manual Procedure) unless noted otherwise.

[2]To be consistent with general practice, "POORLY GRADED" has been removed from GP, GP-GM, GP-GC, SP, SP-SM, SP-SC soil types on the boring logs.

[3]Non-ASTM designations are included in soil descriptions and symbols along with ASTM symbol [Ex: (SM-FILL)].

[4]Typically estimated via pocket penetrometer or Torvane shear test and expressed in tons per square foot (tsf).

[5]Standard Penetration Test (SPT) refers to the number of hammer blows (blow count) of a 140 lb. hammer falling 30 inches on a 2 inch OD split spoon sampler required to drive the sampler 12 inches (ASTM D 1586). "N-value" is another term for "blow count" and is expressed in blows per foot (bpf). SPT correlations per 7.4.2 Method B and need to be corrected if using an auto hammer.

[6]The water levels are those levels actually measured in the borehole at the times indicated by the symbol. The measurements are relatively reliable when augering, without adding fluids, in granular soils. In clay and cohesive silts, the determination of water levels may require several days for the water level to stabilize. In such cases, additional methods of measurement are generally employed.

[7]Minor deviation from ASTM D 2488-17 Note 14.

[8]Percentages are estimated to the nearest 5% per ASTM D 2488-17.

CLIENT: **Integrity Federal Services**	PROJECT NO.: **65:1896**	BORING NO.: **B-01**	SHEET: **1 OF 1**
PROJECT NAME: **Biloxi National Cemetery Expansion**	DRILLER/CONTRACTOR: **ECS**		
SITE LOCATION: **400 Veterans Ave., Biloxi, Mississippi, 39531**			LOSS OF CIRCULATION: 100%
LATITUDE: **30.411584**	LONGITUDE: **-88.942746**	STRUCTURE: **Building Addition**	SURFACE ELEVATION: **23**	BOTTOM OF CASING

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DISTANCE	SAMPLE RECOVERY (IN)	DESCRIPTION OF MATERIAL	STRATIGRAPHY	ELEVATION (FT)	WATER LEVELS	BLOWS/6" (TCP/MC/SPT N-VALUE)	Rec % / RQD % / SPT / TCP / ModCal	LIQUID LIMIT	PLASTICITY INDEX	MOISTUE CONTENT (%)	QP (TSF)	FINES CONTENT
					Topsoil [Thickness=6"].										
	1	SS	18	18	(SP-SM) POORLY GRADED SAND WITH SILT-brown, very loose to loose.				3-2-2 N = 4				3.9		
	2	SS	18	18			20		3-3-3 N = 6				11.5		9.9
5	3	SS	18	18	(SP) POORLY GRADED SAND-gray, medium dense.			▽	2-4-7 N = 11				20.8		
	4	SS	18	18			15		2-7-10 N = 17				25.0		0.8
	5	SS	18	18	(SP) POORLY GRADED SAND-gray, very dense.				1-15-36 N = 51				32.5		
10							10								
	6	SS	18	18	(SP) POORLY GRADED SAND-gray, medium dense.				2-8-12 N = 20				21.4		1.4
15							5								
	7	SS	18	18					8-12-16 N = 28				22.0		
20							0								
	8	SS	18	18	(SM) SILTY SAND-gray, very loose.				2-1-3 N = 4				25.2		48.9
					END OF BORING AT 25 Ft										

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

▽ WL (First Encountered):	6 FT	BORING STARTED:	07/15/2025	CAVE IN DEPTH:	Not Observed
▼ WL (Completion):		BORING COMPLETED:	07/15/2025	HAMMER TYPE:	Automatic
▽▼ WL (Seasonal High Water):		EQUIPMENT:	LOGGED BY:	DRILLING METHOD:	
▽ WL (Stabilized):		ATV	AD	Hollow Stem Auger (0'-10'), Wet Rotary (10'-25')	

GEOTECHNICAL BOREHOLE LOG

CLIENT: **Integrity Federal Services**	PROJECT NO.: **65:1896**	BORING NO.: **B-02**	SHEET: **1 OF 1**
PROJECT NAME: **Biloxi National Cemetery Expansion**	DRILLER/CONTRACTOR: **ECS**		
SITE LOCATION: **400 Veterans Ave., Biloxi, Mississippi, 39531**			LOSS OF CIRCULATION
LATITUDE: **30.412704**	LONGITUDE: **-88.941715**	STRUCTURE: **Crypt**	SURFACE ELEVATION: **24**	BOTTOM OF CASING

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DISTANCE	SAMPLE RECOVERY (IN)	DESCRIPTION OF MATERIAL	STRATIGRAPHY	ELEVATION (FT)	WATER LEVELS	BLOWS/6" (TCP/MC/SPT N - VALUE)	LIQUID LIMIT	PLASTICITY INDEX	MOISTUE CONTENT (%)	QP (TSF)	FINES CONTENT
					Topsoil [Thickness=6"].									
	1	SS	18	18	(SP-SM) POORLY GRADED SAND WITH SILT-brown, very loose to loose.				1-2-2 N = 4					
	2	SS	18	18			20		1-1-2 N = 3			3.2		7.3
5	3	SS	18	18					1-3-2 N = 5					
	4	SS	18	18	(SP) POORLY GRADED SAND-tan, very loose to loose.				1-2-2 N = 4					
	5	SS	18	18			15		1-2-5 N = 7					
					END OF BORING AT 10 Ft									

Rec % ■ RQD % ■ (0 20 40 60 80 100)
SPT ⊗ TCP ▼ ModCal ⊠ (0 10 20 30 40 50)

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

WL (First Encountered):	**BORING STARTED:** 07/15/2025		**CAVE IN DEPTH:** Not Observed
WL (Completion):	**BORING COMPLETED:** 07/15/2025		**HAMMER TYPE:** Automatic
WL (Seasonal High Water):	**EQUIPMENT:**	**LOGGED BY:**	**DRILLING METHOD:**
WL (Stabilized):	ATV	AD	Hollow Stem Auger (0'-10')

GEOTECHNICAL BOREHOLE LOG

CLIENT: **Integrity Federal Services**	PROJECT NO.: **65:1896**	BORING NO.: **B-03**	SHEET: **1 OF 1**
PROJECT NAME: **Biloxi National Cemetery Expansion**	DRILLER/CONTRACTOR: **ECS**		
SITE LOCATION: **400 Veterans Ave., Biloxi, Mississippi, 39531**			LOSS OF CIRCULATION
LATITUDE: **30.412721**	LONGITUDE: **-88.942609**	STRUCTURE: **Crypt**	SURFACE ELEVATION: **27**	BOTTOM OF CASING

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DISTANCE	SAMPLE RECOVERY (IN)	DESCRIPTION OF MATERIAL	STRATIGRAPHY	ELEVATION (FT)	WATER LEVELS	BLOWS/6" (TCP/MC/SPT N - VALUE)	LIQUID LIMIT	PLASTICITY INDEX	MOISTUE CONTENT (%)	QP (TSF)	FINES CONTENT
					Topsoil [Thickness=6"].									
	1	SS	18	18	(SP-SM) POORLY GRADED SAND WITH SILT-brown, very loose to loose.		25		2-6-2 N = 8					
	2	SS	18	18					4-4-4 N = 8					
5	3	SS	18	18					2-2-2 N = 4			6.2		
	4	SS	18	18			20		1-1-2 N = 3					
	5	SS	18	18					2-4-3 N = 7					
					END OF BORING AT 10 Ft									

Rec % ■ RQD % ■ (0 20 40 60 80 100)
SPT ⊗ TCP ▼ ModCal ⊠ (0 10 20 30 40 50)

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

WL (First Encountered):	**BORING STARTED:** 07/15/2025		**CAVE IN DEPTH:** Not Observed
WL (Completion):	**BORING COMPLETED:** 07/15/2025		**HAMMER TYPE:** Automatic
WL (Seasonal High Water):	**EQUIPMENT:**	**LOGGED BY:**	**DRILLING METHOD:**
WL (Stabilized):	ATV	AD	Hollow Stem Auger (0'-10')

GEOTECHNICAL BOREHOLE LOG

CLIENT: **Integrity Federal Services**	PROJECT NO.: **65:1896**	BORING NO.: **B-04**	SHEET: **1 OF 1**
PROJECT NAME: **Biloxi National Cemetery Expansion**	DRILLER/CONTRACTOR: **ECS**		
SITE LOCATION: **400 Veterans Ave., Biloxi, Mississippi, 39531**			LOSS OF CIRCULATION
LATITUDE: **30.412735**	LONGITUDE: **-88.943329**	STRUCTURE: **Crypt**	SURFACE ELEVATION: **25**	BOTTOM OF CASING

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DISTANCE	SAMPLE RECOVERY (IN)	DESCRIPTION OF MATERIAL	STRATIGRAPHY	ELEVATION (FT)	WATER LEVELS	BLOWS/6" (TCP/MC/SPT N - VALUE)	LIQUID LIMIT	PLASTICITY INDEX	MOISTUE CONTENT (%)	QP (TSF)	FINES CONTENT
					Topsoil [Thickness=6"].									
	1	SS	18	18	(SP-SM) POORLY GRADED SAND WITH SILT-brown, very loose to loose.				1-3-3 N = 6					
	2	SS	18	18					1-2-2 N = 4					
5	3	SS	18	18			20	▽	2-3-4 N = 7					
	4	SS	18	18	(SP) POORLY GRADED SAND-gray, loose to medium dense.				2-4-6 N = 10			19.7		2.5
	5	SS	18	18					2-6-10 N = 16					
					END OF BORING AT 10 Ft		15							

Rec % ■ RQD % ■ (0 20 40 60 80 100)
SPT ⊗ TCP ▼ ModCal ⊠ (0 10 20 30 40 50)

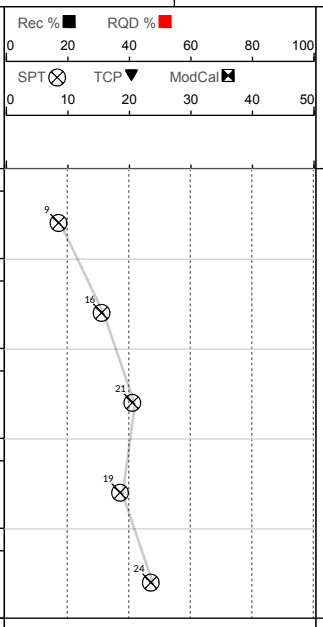
THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

▽ **WL (First Encountered):**	**6 FT**	**BORING STARTED:**	**07/15/2025**	**CAVE IN DEPTH:**	**Not Observed**
▼ **WL (Completion):**		**BORING COMPLETED:**	**07/15/2025**	**HAMMER TYPE:**	**Automatic**
▽ **WL (Seasonal High Water):**		**EQUIPMENT:**	**LOGGED BY:**	**DRILLING METHOD:**	
▽ **WL (Stabilized):**		**ATV**	**AD**	**Hollow Stem Auger (0'-10')**	

GEOTECHNICAL BOREHOLE LOG

CLIENT: **Integrity Federal Services**	PROJECT NO.: **65:1896**	BORING NO.: **B-05**	SHEET: **1 OF 1**
PROJECT NAME: **Biloxi National Cemetery Expansion**	DRILLER/CONTRACTOR: **ECS**		
SITE LOCATION: **400 Veterans Ave., Biloxi, Mississippi, 39531**			LOSS OF CIRCULATION
LATITUDE: **30.411006**	LONGITUDE: **-88.945067**	STRUCTURE: **Crypt**	SURFACE ELEVATION: **20**	BOTTOM OF CASING

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DISTANCE	SAMPLE RECOVERY (IN)	DESCRIPTION OF MATERIAL	STRATIGRAPHY	ELEVATION (FT)	WATER LEVELS	BLOWS/6" (TCP/MC/SPT N - VALUE)	LIQUID LIMIT	PLASTICITY INDEX	MOISTUE CONTENT (%)	QP (TSF)	FINES CONTENT
					Topsoil [Thickness=6"].									
	1	SS	18	18	(SM) SILTY SAND-brown, loose.				2-5-4 N = 9			4.9		22.9
	2	SS	18	18	(SM) SILTY SAND-brown and gray, medium dense.				2-6-10 N = 16					
5	3	SS	18	18			15	▽	3-9-12 N = 21					
	4	SS	18	18					4-8-11 N = 19					
	5	SS	18	18					2-9-15 N = 24					
							10							
					END OF BORING AT 10 Ft									



THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

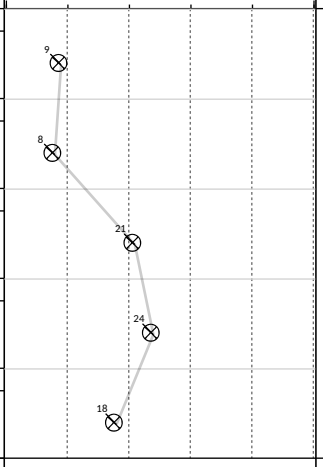
▽ WL (First Encountered):	6 FT	BORING STARTED:	07/15/2025	CAVE IN DEPTH:	Not Observed
▼ WL (Completion):		BORING COMPLETED:	07/15/2025	HAMMER TYPE:	Automatic
▽ WL (Seasonal High Water):		EQUIPMENT:	LOGGED BY:	DRILLING METHOD:	
▽ WL (Stabilized):		ATV	AD	Hollow Stem Auger (0'-10')	

GEOTECHNICAL BOREHOLE LOG

CLIENT: **Integrity Federal Services**	PROJECT NO.: **65:1896**	BORING NO.: **B-06**	SHEET: **1 OF 1**
PROJECT NAME: **Biloxi National Cemetery Expansion**	DRILLER/CONTRACTOR: **ECS**		
SITE LOCATION: **400 Veterans Ave., Biloxi, Mississippi, 39531**			LOSS OF CIRCULATION
LATITUDE: **30.411273**	LONGITUDE: **-88.946215**	STRUCTURE: **Crypt**	SURFACE ELEVATION: **20**	BOTTOM OF CASING

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DISTANCE	SAMPLE RECOVERY (IN)	DESCRIPTION OF MATERIAL	STRATIGRAPHY	ELEVATION (FT)	WATER LEVELS	BLOWS/6" (TCP/MC/SPT N - VALUE)	LIQUID LIMIT	PLASTICITY INDEX	MOISTUE CONTENT (%)	QP (TSF)	FINES CONTENT
					Topsoil [Thickness=6"].									
	1	SS	18	18	(SP-SM) POORLY GRADED SAND WITH SILT-brown, loose.				2-5-4 N = 9					
	2	SS	18	18					3-4-4 N = 8					
5	3	SS	18	18	(SP) POORLY GRADED SAND-gray and brown, medium dense.		15	▽	3-9-12 N = 21					
	4	SS	18	18					4-10-14 N = 24					
	5	SS	18	18					1-7-11 N = 18					
					END OF BORING AT 10 Ft		10							

Rec % ■ RQD % ■ (0 20 40 60 80 100)
SPT ⊗ TCP ▼ ModCal ⊠ (0 10 20 30 40 50)



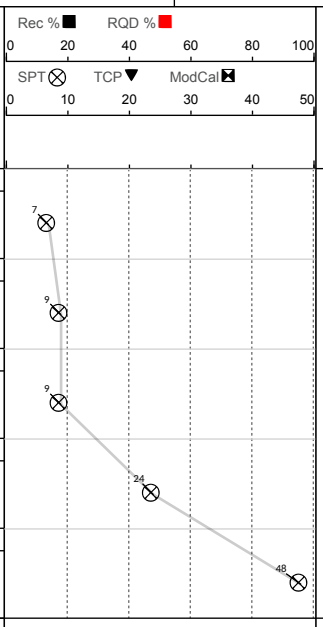
THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

▽ **WL (First Encountered):**	**6 FT**	**BORING STARTED:**	**07/15/2025**	**CAVE IN DEPTH:**	**Not Observed**
▼ **WL (Completion):**		**BORING COMPLETED:**	**07/15/2025**	**HAMMER TYPE:**	**Automatic**
▽ **WL (Seasonal High Water):**		**EQUIPMENT:**	**LOGGED BY:**	**DRILLING METHOD:**	
▽ **WL (Stabilized):**		**ATV**	**AD**	**Hollow Stem Auger (0'-10')**	

GEOTECHNICAL BOREHOLE LOG

CLIENT: **Integrity Federal Services**	PROJECT NO.: **65:1896**	BORING NO.: **B-07**	SHEET: **1 OF 1**
PROJECT NAME: **Biloxi National Cemetery Expansion**	DRILLER/CONTRACTOR: **ECS**		
SITE LOCATION: **400 Veterans Ave., Biloxi, Mississippi, 39531**			LOSS OF CIRCULATION
LATITUDE: **30.411037**	LONGITUDE: **-88.946574**	STRUCTURE: **Crypt**	SURFACE ELEVATION: **20**	BOTTOM OF CASING

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DISTANCE	SAMPLE RECOVERY (IN)	DESCRIPTION OF MATERIAL	STRATIGRAPHY	ELEVATION (FT)	WATER LEVELS	BLOWS/6" (TCP/MC/SPT N - VALUE)	LIQUID LIMIT	PLASTICITY INDEX	MOISTUE CONTENT (%)	QP (TSF)	FINES CONTENT
					Topsoil [Thickness=6"].									
	1	SS	18	18	(SM) SILTY SAND-brown, loose.				1-2-5 N = 7					
	2	SS	18	18					2-4-5 N = 9					
5	3	SS	18	18	(SM) SILTY SAND-gray, loose.		15		1-2-7 N = 9			19.6		35.0
	4	SS	18	18	(SP) POORLY GRADED SAND-gray and brown, medium dense to dense.			▽	4-12-12 N = 24					
	5	SS	18	18					6-18-30 N = 48					
					END OF BORING AT 10 Ft		10							



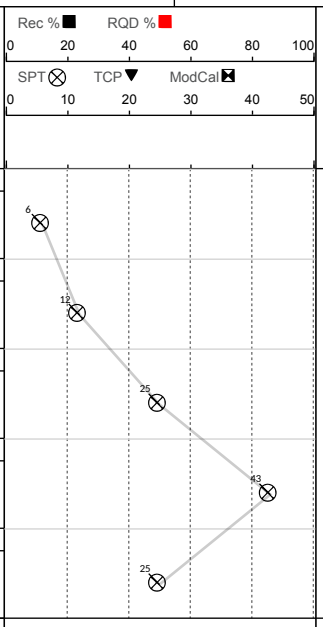
THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

▽ WL (First Encountered):	8 FT	BORING STARTED:	07/15/2025	CAVE IN DEPTH:	Not Observed
▼ WL (Completion):		BORING COMPLETED:	07/15/2025	HAMMER TYPE:	Automatic
▽ WL (Seasonal High Water):		EQUIPMENT:	LOGGED BY:	DRILLING METHOD:	
▽ WL (Stabilized):		ATV	AD	Hollow Stem Auger (0'-10')	

GEOTECHNICAL BOREHOLE LOG

CLIENT: **Integrity Federal Services**	PROJECT NO.: **65:1896**	BORING NO.: **B-08**	SHEET: **1 OF 1**
PROJECT NAME: **Biloxi National Cemetery Expansion**	DRILLER/CONTRACTOR: **ECS**		
SITE LOCATION: **400 Veterans Ave., Biloxi, Mississippi, 39531**			LOSS OF CIRCULATION
LATITUDE: **30.411336**	LONGITUDE: **-88.943651**	STRUCTURE: **Crypt**	SURFACE ELEVATION: **22**	BOTTOM OF CASING

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DISTANCE	SAMPLE RECOVERY (IN)	DESCRIPTION OF MATERIAL	STRATIGRAPHY	ELEVATION (FT)	WATER LEVELS	BLOWS/6" (TCP/MC/SPT N - VALUE)	LIQUID LIMIT	PLASTICITY INDEX	MOISTUE CONTENT (%)	QP (TSF)	FINES CONTENT
					Topsoil [Thickness=6"].									
	1	SS	18	18	(SM) SILTY SAND-trace gravel, brown, loose.		20		1-4-2 N = 6					
	2	SS	18	18	(SP) POORLY GRADED SAND-gray, medium dense to dense.				1-5-7 N = 12			15.1		
5	3	SS	18	18				▽	4-12-13 N = 25					
	4	SS	18	18			15		4-18-25 N = 43					
	5	SS	18	18					4-12-13 N = 25					
					END OF BORING AT 10 Ft									



THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

▽ WL (First Encountered):	6 FT	BORING STARTED:	07/15/2025	CAVE IN DEPTH:	Not Observed
▼ WL (Completion):		BORING COMPLETED:	07/15/2025	HAMMER TYPE:	Automatic
▽ WL (Seasonal High Water):		EQUIPMENT:	LOGGED BY:	DRILLING METHOD:	
▽ WL (Stabilized):		ATV	AD	Hollow Stem Auger (0'-10')	

GEOTECHNICAL BOREHOLE LOG

CLIENT: **Integrity Federal Services**	PROJECT NO.: **65:1896**	BORING NO.: **B-09**	SHEET: **1 OF 1**
PROJECT NAME: **Biloxi National Cemetery Expansion**	DRILLER/CONTRACTOR: **ECS**		
SITE LOCATION: **400 Veterans Ave., Biloxi, Mississippi, 39531**			LOSS OF CIRCULATION
LATITUDE: **30.410745**	LONGITUDE: **-88.943686**	STRUCTURE: **Crypt**	SURFACE ELEVATION: **23**	BOTTOM OF CASING

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DISTANCE	SAMPLE RECOVERY (IN)	DESCRIPTION OF MATERIAL	STRATIGRAPHY	ELEVATION (FT)	WATER LEVELS	BLOWS/6" (TCP/MC/SPT N - VALUE)	LIQUID LIMIT	PLASTICITY INDEX	MOISTUE CONTENT (%)	QP (TSF)	FINES CONTENT
					Topsoil [Thickness=6"].									
	1	SS	18	18	(SM) SILTY SAND-brown, very loose.				1-2-1 N = 3					
	2	SS	18	18	(SP) POORLY GRADED SAND-gray, very loose.		20		1-1-1 N = 2					
5	3	SS	18	18	(SP) POORLY GRADED SAND-gray, loose to medium dense.				1-6-10 N = 16					
	4	SS	18	18			15		2-3-5 N = 8					
	5	SS	18	18					2-7-9 N = 16			23.5		1.9
					END OF BORING AT 10 Ft									

Rec % ■ RQD % ■ (0 20 40 60 80 100)
SPT ⊗ TCP ▼ ModCal ⊠ (0 10 20 30 40 50)

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

WL (First Encountered):	**BORING STARTED:** 07/15/2025		**CAVE IN DEPTH:** Not Observed
WL (Completion):	**BORING COMPLETED:** 07/15/2025		**HAMMER TYPE:** Automatic
WL (Seasonal High Water):	**EQUIPMENT:**	**LOGGED BY:**	**DRILLING METHOD:**
WL (Stabilized):	ATV	AD	Hollow Stem Auger (0'-10')

GEOTECHNICAL BOREHOLE LOG

CLIENT: **Integrity Federal Services**	PROJECT NO.: **65:1896**	BORING NO.: **B-10**	SHEET: **1 OF 1**
PROJECT NAME: **Biloxi National Cemetery Expansion**	DRILLER/CONTRACTOR: **ECS**		
SITE LOCATION: **400 Veterans Ave., Biloxi, Mississippi, 39531**			LOSS OF CIRCULATION
LATITUDE: **30.409974**	LONGITUDE: **-88.943673**	STRUCTURE: **Crypt**	SURFACE ELEVATION: **24**	BOTTOM OF CASING

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DISTANCE	SAMPLE RECOVERY (IN)	DESCRIPTION OF MATERIAL	STRATIGRAPHY	ELEVATION (FT)	WATER LEVELS	BLOWS/6" (TCP/MC/SPT N - VALUE)	LIQUID LIMIT	PLASTICITY INDEX	MOISTUE CONTENT (%)	QP (TSF)	FINES CONTENT
					Topsoil [Thickness=6"].									
	1	SS	18	18	(SM) SILTY SAND-brown, loose.				1-3-2 N = 5					
	2	SS	18	18	(SM) SILTY SAND-tan and gray, loose.		20		2-2-4 N = 6					
5	3	SS	18	18	(SP) POORLY GRADED SAND-gray, medium dense.			▽	2-8-6 N = 14			21.2		
	4	SS	18	18					3-10-9 N = 19					
	5	SS	18	18			15		2-6-10 N = 16					
					END OF BORING AT 10 Ft									

Rec % ■ RQD % ■ (0 20 40 60 80 100)
SPT ⊗ TCP ▼ ModCal ⊠ (0 10 20 30 40 50)

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

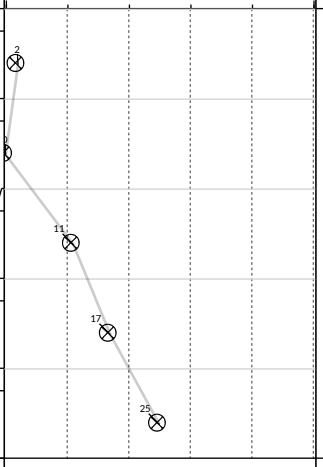
▽ **WL (First Encountered):**	**6 FT**	**BORING STARTED:**	**07/15/2025**	**CAVE IN DEPTH:**	**Not Observed**
▼ **WL (Completion):**		**BORING COMPLETED:**	**07/15/2025**	**HAMMER TYPE:**	**Automatic**
▽ **WL (Seasonal High Water):**		**EQUIPMENT:**	**LOGGED BY:**	**DRILLING METHOD:**	
▽ **WL (Stabilized):**		**ATV**	**AD**	**Hollow Stem Auger (0'-10')**	

GEOTECHNICAL BOREHOLE LOG

CLIENT: **Integrity Federal Services**	PROJECT NO.: **65:1896**	BORING NO.: **B-11**	SHEET: **1 OF 1**
PROJECT NAME: **Biloxi National Cemetery Expansion**	DRILLER/CONTRACTOR: **ECS**		
SITE LOCATION: **400 Veterans Ave., Biloxi, Mississippi, 39531**			LOSS OF CIRCULATION
LATITUDE: **30.408564**	LONGITUDE: **-88.94602**	STRUCTURE: **Crypt**	SURFACE ELEVATION: **21**	BOTTOM OF CASING

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DISTANCE	SAMPLE RECOVERY (IN)	DESCRIPTION OF MATERIAL	STRATIGRAPHY	ELEVATION (FT)	WATER LEVELS	BLOWS/6" (TCP/MC/SPT N - VALUE)	LIQUID LIMIT	PLASTICITY INDEX	MOISTUE CONTENT (%)	QP (TSF)	FINES CONTENT
					Topsoil [Thickness=6"].									
	1	SS	18	18	(SP-SM) POORLY GRADED SAND WITH SILT-brown and tan, very loose.		20		WoH-1 -1 N = 2					
	2	SS	18	18					WoH- WoH- WoH N = 0			14.2		8.8
5	3	SS	18	18	(SP) POORLY GRADED SAND-tan and gray, medium dense.		15		3-5-6 N = 11					
	4	SS	18	18				▽	2-7- 10 N = 17					
	5	SS	18	18					4-12- 13 N = 25					
					END OF BORING AT 10 Ft									

Rec % ■ RQD % ■ (0 20 40 60 80 100)
SPT ⊗ TCP ▼ ModCal ⊠ (0 10 20 30 40 50)



THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

▽ WL (First Encountered):	8 FT	BORING STARTED:	07/15/2025	CAVE IN DEPTH:	Not Observed
▼ WL (Completion):		BORING COMPLETED:	07/15/2025	HAMMER TYPE:	Automatic
▽ WL (Seasonal High Water):		EQUIPMENT:	LOGGED BY:	DRILLING METHOD:	
▽ WL (Stabilized):		ATV	AD	Hollow Stem Auger (0'-10')	

GEOTECHNICAL BOREHOLE LOG

CLIENT:	PROJECT NO.:	BORING NO.:	SHEET:
Integrity Federal Services	**65:1896**	**B-12**	**1 OF 1**
PROJECT NAME: **Biloxi National Cemetery Expansion**	DRILLER/CONTRACTOR: **ECS**		
SITE LOCATION: **400 Veterans Ave., Biloxi, Mississippi, 39531**			LOSS OF CIRCULATION
LATITUDE: **30.408838**	LONGITUDE: **-88.94487**	STRUCTURE: **Site Grading**	SURFACE ELEVATION: **21**	BOTTOM OF CASING

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DISTANCE	SAMPLE RECOVERY (IN)	DESCRIPTION OF MATERIAL	STRATIGRAPHY	ELEVATION (FT)	WATER LEVELS	BLOWS/6" (TCP/MC/SPT N - VALUE)	LIQUID LIMIT	PLASTICITY INDEX	MOISTUE CONTENT (%)	QP (TSF)	FINES CONTENT
					Topsoil [Thickness=6"].									
	1	SS	18	18	(SP-SM) POORLY GRADED SAND WITH SILT-brown, very loose.		20		2-1-1 N = 2					
	2	SS	18	18	(SP) POORLY GRADED SAND-gray, medium dense.				1-5-7 N = 12			20.3		4.6
5	3	SS	18	18					5-15-14 N = 29					
					END OF BORING AT 6 Ft		15	▽						

Rec % ■ RQD % ■ (0 20 40 60 80 100)
SPT ⊗ TCP ▼ ModCal ⊠ (0 10 20 30 40 50)

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

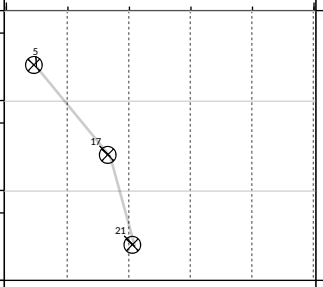
▽ **WL (First Encountered):**	**6 FT**	**BORING STARTED:**	**07/15/2025**	**CAVE IN DEPTH:**	**Not Observed**
▼ **WL (Completion):**		**BORING COMPLETED:**	**07/15/2025**	**HAMMER TYPE:**	**Automatic**
▽ **WL (Seasonal High Water):**		**EQUIPMENT:**	**LOGGED BY:**	**DRILLING METHOD:**	
▽ **WL (Stabilized):**		**ATV**	**AD**	**Hollow Stem Auger (0'-6')**	

GEOTECHNICAL BOREHOLE LOG

CLIENT:	PROJECT NO.:	BORING NO.:	SHEET:
Integrity Federal Services	**65:1896**	**B-13**	**1 OF 1**
PROJECT NAME: **Biloxi National Cemetery Expansion**	DRILLER/CONTRACTOR: **ECS**		
SITE LOCATION: **400 Veterans Ave., Biloxi, Mississippi, 39531**			LOSS OF CIRCULATION
LATITUDE: **30.408664**	LONGITUDE: **-88.944587**	STRUCTURE: **Site Grading**	SURFACE ELEVATION: **21**	BOTTOM OF CASING

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DISTANCE	SAMPLE RECOVERY (IN)	DESCRIPTION OF MATERIAL	STRATIGRAPHY	ELEVATION (FT)	WATER LEVELS	BLOWS/6" (TCP/MC/SPT N - VALUE)	LIQUID LIMIT	PLASTICITY INDEX	MOISTUE CONTENT (%)	QP (TSF)	FINES CONTENT
					Topsoil [Thickness=6"].									
	1	SS	18	18	(SP-SM) POORLY GRADED SAND WITH SILT-brown, loose.		20		1-4-1 N = 5			8.1		
	2	SS	18	18	(SP) POORLY GRADED SAND-gray, medium dense.				2-6-11 N = 17					
5	3	SS	18	18					3-11-10 N = 21					
					END OF BORING AT 6 Ft		15							

Rec % ■ RQD % ■ (0 20 40 60 80 100)
SPT ⊗ TCP ▼ ModCal ⊠ (0 10 20 30 40 50)



THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

▽ **WL (First Encountered):**	**BORING STARTED:** 07/15/2025		**CAVE IN DEPTH:** Not Observed
▼ **WL (Completion):**	**BORING COMPLETED:** 07/15/2025		**HAMMER TYPE:** Automatic
▽ **WL (Seasonal High Water):**	**EQUIPMENT:**	**LOGGED BY:**	**DRILLING METHOD:**
▽ **WL (Stabilized):**	ATV	AD	Hollow Stem Auger (0'-6')

GEOTECHNICAL BOREHOLE LOG

CLIENT: **Integrity Federal Services**	PROJECT NO.: **65:1896**	BORING NO.: **B-14**	SHEET: **1 OF 1**
PROJECT NAME: **Biloxi National Cemetery Expansion**	DRILLER/CONTRACTOR: **ECS**		
SITE LOCATION: **400 Veterans Ave., Biloxi, Mississippi, 39531**			LOSS OF CIRCULATION
LATITUDE: **30.409068**	LONGITUDE: **-88.944052**	STRUCTURE: **Site Grading**	SURFACE ELEVATION: **23**	BOTTOM OF CASING

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DISTANCE	SAMPLE RECOVERY (IN)	DESCRIPTION OF MATERIAL	STRATIGRAPHY	ELEVATION (FT)	WATER LEVELS	BLOWS/6" (TCP/MC/SPT N - VALUE)	Rec % / RQD % / SPT / TCP / ModCal	LIQUID LIMIT	PLASTICITY INDEX	MOISTUE CONTENT (%)	QP (TSF)	FINES CONTENT
					Topsoil [Thickness=6"].										
	1	SS	18	18	(SM) SILTY SAND-brown, loose.				3-5-5 N = 10				4.9		17.0
	2	SS	18	18			20		2-2-3 N = 5						
5	3	SS	18	18	(SP) POORLY GRADED SAND-gray, loose.				1-2-5 N = 7						
					END OF BORING AT 6 Ft										

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

WL (First Encountered):	**BORING STARTED:** 07/15/2025		**CAVE IN DEPTH:** Not Observed
WL (Completion):	**BORING COMPLETED:** 07/15/2025		**HAMMER TYPE:** Automatic
WL (Seasonal High Water):	**EQUIPMENT:**	**LOGGED BY:**	**DRILLING METHOD:**
WL (Stabilized):	ATV	AD	Hollow Stem Auger (0'-6')

GEOTECHNICAL BOREHOLE LOG

CLIENT: **Integrity Federal Services**	PROJECT NO.: **65:1896**	BORING NO.: **B-15**	SHEET: **1 OF 1**
PROJECT NAME: **Biloxi National Cemetery Expansion**	DRILLER/CONTRACTOR: **ECS**		
SITE LOCATION: **400 Veterans Ave., Biloxi, Mississippi, 39531**			LOSS OF CIRCULATION
LATITUDE: **30.410967**	LONGITUDE: **-88.943345**	STRUCTURE: **Site Grading**	SURFACE ELEVATION: **21**	BOTTOM OF CASING

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DISTANCE	SAMPLE RECOVERY (IN)	DESCRIPTION OF MATERIAL	STRATIGRAPHY	ELEVATION (FT)	WATER LEVELS	BLOWS/6" (TCP/MC/SPT N - VALUE)	Rec % / RQD % / SPT / TCP / ModCal	LIQUID LIMIT	PLASTICITY INDEX	MOISTUE CONTENT (%)	QP (TSF)	FINES CONTENT
					Topsoil [Thickness=6"].										
	1	SS	18	18	(SM) SILTY SAND-brown, very loose.		20		1-2-1 N = 3						
	2	SS	18	18	(SP) POORLY GRADED SAND-gray, medium dense.				1-5-7 N = 12						
5	3	SS	18	18					2-9-14 N = 23						
					END OF BORING AT 6 Ft		15								

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

WL (First Encountered):	**BORING STARTED:** 07/15/2025		**CAVE IN DEPTH:** Not Observed
WL (Completion):	**BORING COMPLETED:** 07/15/2025		**HAMMER TYPE:** Automatic
WL (Seasonal High Water):	**EQUIPMENT:**	**LOGGED BY:**	**DRILLING METHOD:**
WL (Stabilized):	ATV	AD	Hollow Stem Auger (0'-6')

GEOTECHNICAL BOREHOLE LOG

CLIENT: **Integrity Federal Services**	PROJECT NO.: **65:1896**	BORING NO.: **B-16**	SHEET: **1 OF 1**
PROJECT NAME: **Biloxi National Cemetery Expansion**	DRILLER/CONTRACTOR: **ECS**		
SITE LOCATION: **400 Veterans Ave., Biloxi, Mississippi, 39531**			LOSS OF CIRCULATION
LATITUDE: **30.411092**	LONGITUDE: **-88.942888**	STRUCTURE: **Site Grading**	SURFACE ELEVATION: **20**	BOTTOM OF CASING

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DISTANCE	SAMPLE RECOVERY (IN)	DESCRIPTION OF MATERIAL	STRATIGRAPHY	ELEVATION (FT)	WATER LEVELS	BLOWS/6" (TCP/MC/SPT N - VALUE)	Rec % / RQD % / SPT / TCP / ModCal	LIQUID LIMIT	PLASTICITY INDEX	MOISTUE CONTENT (%)	QP (TSF)	FINES CONTENT
					Topsoil [Thickness=6"].										
	1	SS	18	18	(SM) SILTY SAND-brown, loose.				3-6-3 N = 9						
	2	SS	18	18	(SM) SILTY SAND-brown, very loose.				WoH-WoH-WoH N = 0						
5	3	SS	18	18	(SP-SM) POORLY GRADED SAND WITH SILT-gray, medium dense.		15		2-7-11 N = 18				18.0		8.2
					END OF BORING AT 6 Ft										

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

WL (First Encountered):	**BORING STARTED:** 07/15/2025		**CAVE IN DEPTH:** Not Observed
WL (Completion):	**BORING COMPLETED:** 07/15/2025		**HAMMER TYPE:** Automatic
WL (Seasonal High Water):	**EQUIPMENT:**	**LOGGED BY:**	**DRILLING METHOD:**
WL (Stabilized):	ATV	AD	Hollow Stem Auger (0'-6')

GEOTECHNICAL BOREHOLE LOG

CLIENT:	PROJECT NO.:	BORING NO.:	SHEET:
Integrity Federal Services	**65:1896**	**B-17**	**1 OF 1**
PROJECT NAME: **Biloxi National Cemetery Expansion**	DRILLER/CONTRACTOR: **ECS**		
SITE LOCATION: **400 Veterans Ave., Biloxi, Mississippi, 39531**			LOSS OF CIRCULATION
LATITUDE: **30.410952**	LONGITUDE: **-88.942493**	STRUCTURE: **Site Grading**	SURFACE ELEVATION: **21**	BOTTOM OF CASING

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DISTANCE	SAMPLE RECOVERY (IN)	DESCRIPTION OF MATERIAL	STRATIGRAPHY	ELEVATION (FT)	WATER LEVELS	BLOWS/6" (TCP/MC/SPT N - VALUE)	LIQUID LIMIT	PLASTICITY INDEX	MOISTUE CONTENT (%)	QP (TSF)	FINES CONTENT
					Topsoil [Thickness=6"].									
	1	SS	18	18	(SM) SILTY SAND-brown, loose.		20		2-5-3 N = 8					
	2	SS	18	18	(SP) POORLY GRADED SAND-gray, loose to medium dense.				2-4-6 N = 10					
5	3	SS	18	18					3-10-14 N = 24			21.9		
					END OF BORING AT 6 Ft		15							

Rec % ■ RQD % ■ (0 20 40 60 80 100)
SPT ⊗ TCP ▼ ModCal ⊠ (0 10 20 30 40 50)

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

▽ **WL (First Encountered):**	**6 FT**	**BORING STARTED:**	**07/15/2025**	**CAVE IN DEPTH:**	**Not Observed**
▼ **WL (Completion):**		**BORING COMPLETED:**	**07/15/2025**	**HAMMER TYPE:**	**Automatic**
▽ **WL (Seasonal High Water):**		**EQUIPMENT:**	**LOGGED BY:**	**DRILLING METHOD:**	
▽ **WL (Stabilized):**		**ATV**	**AD**	**Hollow Stem Auger (0'-6')**	

GEOTECHNICAL BOREHOLE LOG

CLIENT: **Integrity Federal Services**	PROJECT NO.: **65:1896**	BORING NO.: **B-18**	SHEET: **1 OF 1**
PROJECT NAME: **Biloxi National Cemetery Expansion**	DRILLER/CONTRACTOR: **ECS**		
SITE LOCATION: **400 Veterans Ave., Biloxi, Mississippi, 39531**			LOSS OF CIRCULATION
LATITUDE: **30.412208**	LONGITUDE: **-88.943701**	STRUCTURE: **Site Grading**	SURFACE ELEVATION: **25**	BOTTOM OF CASING

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DISTANCE	SAMPLE RECOVERY (IN)	DESCRIPTION OF MATERIAL	STRATIGRAPHY	ELEVATION (FT)	WATER LEVELS	BLOWS/6" (TCP/MC/SPT N-VALUE)	LIQUID LIMIT	PLASTICITY INDEX	MOISTUE CONTENT (%)	QP (TSF)	FINES CONTENT
					Topsoil [Thickness=6"].									
	1	SS	18	18	(SP-SM) POORLY GRADED SAND WITH SILT-brown, very loose.				1-2-2 N = 4					
	2	SS	18	18					1-1-2 N = 3			5.9		13.6
5	3	SS	18	18	(SP) POORLY GRADED SAND-tan, loose.		20		2-3-5 N = 8					
					END OF BORING AT 6 Ft									

Rec % ■ RQD % ■ (0 20 40 60 80 100)
SPT ⊗ TCP ▼ ModCal ⊠ (0 10 20 30 40 50)

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

WL (First Encountered):	**BORING STARTED:** 07/15/2025		**CAVE IN DEPTH:** Not Observed
WL (Completion):	**BORING COMPLETED:** 07/15/2025		**HAMMER TYPE:** Automatic
WL (Seasonal High Water):	**EQUIPMENT:**	**LOGGED BY:**	**DRILLING METHOD:**
WL (Stabilized):	ATV	AD	Hollow Stem Auger (0'-6')

GEOTECHNICAL BOREHOLE LOG

Appendix C – Laboratory Testing

Laboratory Testing Summary

Laboratory Testing Summary

Sample Location	Sample Number	Depth (ft)	^MC (%)	Soil Type	Atterberg Limits			**Percent Passing No. 200 Sieve	Moisture - Density		CBR (%)		#Organic Content (%)
					LL	PL	PI		<Maximum Density (pcf)	<Optimum Moisture (%)	0.1 in.	0.2 in.	
B-01	1	0.5-2.0	3.9										
B-01	2	2.5-4.0	11.5		NP	NP	NP	9.9					
B-01	3	4.5-6.0	20.8										
B-01	4	6.5-8.0	25.0		NP	NP	NP	0.8					
B-01	5	8.5-10.0	32.5										
B-01	6	13.5-15.0	21.4					1.4					
B-01	7	18.5-20.0	22.0										
B-01	8	23.5-25.0	25.2					48.9					
B-02	2	2.5-4.0	3.2					7.3					
B-03	3	4.5-6.0	6.2										

Notes: See test reports for test method, ^ASTM D2216-19, *ASTM D2488, **ASTM D1140-17, #ASTM D2974-20e1 < See test report for D4718 corrected values

Definitions: MC: Moisture Content, Soil Type: USCS (Unified Soil Classification System), LL: Liquid Limit, PL: Plastic Limit, PI: Plasticity Index, CBR: California Bearing Ratio, OC: Organic Content

Project: Biloxi National Cemetery Expansion
Client: Integrity Federal Services

Project No.: 65:1896
Date Reported: 8/21/2025

Office / Lab	Address	Office Number / Fax
ECS Southeast LLC - Long Beach	528 Klondyke Road Suite F Long Beach MS 39560	(225)264-3231

Tested by	Checked by	Approved by	Date Received
Ivaldez	NBurke	NBurke	7/14/2025

Laboratory Testing Summary

Sample Location	Sample Number	Depth (ft)	^MC (%)	Soil Type	Atterberg Limits			**Percent Passing No. 200 Sieve	Moisture - Density		CBR (%)		#Organic Content (%)
					LL	PL	PI		<Maximum Density (pcf)	<Optimum Moisture (%)	0.1 in.	0.2 in.	
B-04	4	6.5-8.0	19.7					2.5					
B-05	1	0.5-2.0	4.9					22.9					
B-07	3	4.5-6.0	19.6		NP	NP	NP	35.0					
B-08	2	2.5-4.0	15.1										
B-09	5	8.5-10.0	23.5					1.9					
B-10	3	4.5-6.0	21.2										
B-11	2	2.5-4.0	14.2		NP	NP	NP	8.8					
B-12	2	2.5-4.0	20.3		NP	NP	NP	4.6					
B-13	1	0.5-2.0	8.1										
B-14	1	0.5-2.0	4.9					17.0					

Notes: See test reports for test method, ^ASTM D2216-19, *ASTM D2488, **ASTM D1140-17, #ASTM D2974-20e1 < See test report for D4718 corrected values

Definitions: MC: Moisture Content, Soil Type: USCS (Unified Soil Classification System), LL: Liquid Limit, PL: Plastic Limit, PI: Plasticity Index, CBR: California Bearing Ratio, OC: Organic Content

Project: Biloxi National Cemetery Expansion
Client: Integrity Federal Services

Project No.: 65:1896
Date Reported: 8/21/2025

Office / Lab	Address	Office Number / Fax
ECS Southeast LLC - Long Beach	528 Klondyke Road Suite F Long Beach MS 39560	(225)264-3231

Tested by	Checked by	Approved by	Date Received
JSmith	NBurke	NBurke	7/14/2025

Laboratory Testing Summary

Sample Location	Sample Number	Depth (ft)	^MC (%)	Soil Type	Atterberg Limits			**Percent Passing No. 200 Sieve	Moisture - Density		CBR (%)		#Organic Content (%)
					LL	PL	PI		<Maximum Density (pcf)	<Optimum Moisture (%)	0.1 in.	0.2 in.	
B-16	3	4.5-6.0	18.0		NP	NP	NP	8.2					
B-17	3	4.5-6.0	21.9										
B-18	2	2.5-4.0	5.9					13.6					

Notes: See test reports for test method, ^ASTM D2216-19, *ASTM D2488, **ASTM D1140-17, #ASTM D2974-20e1 < See test report for D4718 corrected values

Definitions: MC: Moisture Content, Soil Type: USCS (Unified Soil Classification System), LL: Liquid Limit, PL: Plastic Limit, PI: Plasticity Index, CBR: California Bearing Ratio, OC: Organic Content

Project: Biloxi National Cemetery Expansion
Client: Integrity Federal Services

Project No.: 65:1896
Date Reported: 8/21/2025

Office / Lab	Address	Office Number / Fax
ECS Southeast LLC - Long Beach	528 Klondyke Road Suite F Long Beach MS 39560	(225)264-3231

Tested by	Checked by	Approved by	Date Received
JSmith	NBurke	NBurke	7/14/2025

Important Information about This

Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

The Geoprofessional Business Association (GBA) has prepared this advisory to help you – assumedly a client representative – interpret and apply this geotechnical-engineering report as effectively as possible. In that way, clients can benefit from a lowered exposure to the subsurface problems that, for decades, have been a principal cause of construction delays, cost overruns, claims, and disputes. If you have questions or want more information about any of the issues discussed below, contact your GBA-member geotechnical engineer. Active involvement in the Geoprofessional Business Association exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project.

Geotechnical-Engineering Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical-engineering study conducted for a given civil engineer will not likely meet the needs of a civil-works constructor or even a different civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client. *Those who rely on a geotechnical-engineering report prepared for a different client can be seriously misled*. No one except authorized client representatives should rely on this geotechnical-engineering report without first conferring with the geotechnical engineer who prepared it. *And no one – not even you – should apply this report for any purpose or project except the one originally contemplated.*

Read this Report in Full

Costly problems have occurred because those relying on a geotechnical-engineering report did not read it *in its entirety*. Do not rely on an executive summary. Do not read selected elements only. *Read this report in full.*

You Need to Inform Your Geotechnical Engineer about Change

Your geotechnical engineer considered unique, project-specific factors when designing the study behind this report and developing the confirmation-dependent recommendations the report conveys. A few typical factors include:

- the client's goals, objectives, budget, schedule, and risk-management preferences;
- the general nature of the structure involved, its size, configuration, and performance criteria;
- the structure's location and orientation on the site; and
- other planned or existing site improvements, such as retaining walls, access roads, parking lots, and underground utilities.

Typical changes that could erode the reliability of this report include those that affect:

- the site's size or shape;
- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light-industrial plant to a refrigerated warehouse;
- the elevation, configuration, location, orientation, or weight of the proposed structure;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes – even minor ones – and request an assessment of their impact. *The geotechnical engineer who prepared this report cannot accept responsibility or liability for problems that arise because the geotechnical engineer was not informed about developments the engineer otherwise would have considered.*

This Report May Not Be Reliable

Do not rely on this report if your geotechnical engineer prepared it:

- for a different client;
- for a different project;
- for a different site (that may or may not include all or a portion of the original site); or
- before important events occurred at the site or adjacent to it; e.g., man-made events like construction or environmental remediation, or natural events like floods, droughts, earthquakes, or groundwater fluctuations.

Note, too, that it could be unwise to rely on a geotechnical-engineering report whose reliability may have been affected by the passage of time, because of factors like changed subsurface conditions; new or modified codes, standards, or regulations; or new techniques or tools. *If your geotechnical engineer has not indicated an "apply-by" date on the report, ask what it should be*, and, in general, *if you are the least bit uncertain* about the continued reliability of this report, contact your geotechnical engineer before applying it. A minor amount of additional testing or analysis – if any is required at all – could prevent major problems.

Most of the "Findings" Related in This Report Are Professional Opinions

Before construction begins, geotechnical engineers explore a site's subsurface through various sampling and testing procedures. *Geotechnical engineers can observe actual subsurface conditions only at those specific locations where sampling and testing were performed.* The data derived from that sampling and testing were reviewed by your geotechnical engineer, who then applied professional judgment to form opinions about subsurface conditions throughout the site. Actual sitewide-subsurface conditions may differ – maybe significantly – from those indicated in this report. Confront that risk by retaining your geotechnical engineer to serve on the design team from project start to project finish, so the individual can provide informed guidance quickly, whenever needed.

This Report's Recommendations Are Confirmation-Dependent

The recommendations included in this report – including any options or alternatives – are confirmation-dependent. In other words, *they are not final*, because the geotechnical engineer who developed them relied heavily on judgment and opinion to do so. Your geotechnical engineer can finalize the recommendations *only after observing actual subsurface conditions* revealed during construction. If through observation your geotechnical engineer confirms that the conditions assumed to exist actually do exist, the recommendations can be relied upon, assuming no other changes have occurred. *The geotechnical engineer who prepared this report cannot assume responsibility or liability for confirmation-dependent recommendations if you fail to retain that engineer to perform construction observation.*

This Report Could Be Misinterpreted

Other design professionals' misinterpretation of geotechnical-engineering reports has resulted in costly problems. Confront that risk by having your geotechnical engineer serve as a full-time member of the design team, to:

- confer with other design-team members,
- help develop specifications,
- review pertinent elements of other design professionals' plans and specifications, and
- be on hand quickly whenever geotechnical-engineering guidance is needed.

You should also confront the risk of constructors misinterpreting this report. Do so by retaining your geotechnical engineer to participate in prebid and preconstruction conferences and to perform construction observation.

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can shift unanticipated-subsurface-conditions liability to constructors by limiting the information they provide for bid preparation. To help prevent the costly, contentious problems this practice has caused, include the complete geotechnical-engineering report, along with any attachments or appendices, with your contract documents, *but be certain to note conspicuously that you've included the material for informational purposes only*. To avoid misunderstanding, you may also want to note that "informational purposes" means constructors have no right to rely on the interpretations, opinions, conclusions, or recommendations in the report, but they may rely on the factual data relative to the specific times, locations, and depths/elevations referenced. Be certain that constructors know they may learn about specific project requirements, including options selected from the report, *only* from the design drawings and specifications. Remind constructors that they may perform their own studies if they want to, and *be sure to allow enough time* to permit them to do so. Only then might you be in a position to give constructors the information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions. Conducting prebid and preconstruction conferences can also be valuable in this respect.

Read Responsibility Provisions Closely

Some client representatives, design professionals, and constructors do not realize that geotechnical engineering is far less exact than other engineering disciplines. That lack of understanding has nurtured unrealistic expectations that have resulted in disappointments, delays, cost overruns, claims, and disputes. To confront that risk, geotechnical engineers commonly include explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely*. Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The personnel, equipment, and techniques used to perform an environmental study – e.g., a "phase-one" or "phase-two" environmental site assessment – differ significantly from those used to perform a geotechnical-engineering study. For that reason, a geotechnical-engineering report does not usually relate any environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated subsurface environmental problems have led to project failures.* If you have not yet obtained your own environmental information, ask your geotechnical consultant for risk-management guidance. As a general rule, *do not rely on an environmental report prepared for a different client, site, or project, or that is more than six months old.*

Obtain Professional Assistance to Deal with Moisture Infiltration and Mold

While your geotechnical engineer may have addressed groundwater, water infiltration, or similar issues in this report, none of the engineer's services were designed, conducted, or intended to prevent uncontrolled migration of moisture – including water vapor – from the soil through building slabs and walls and into the building interior, where it can cause mold growth and material-performance deficiencies. Accordingly, ***proper implementation of the geotechnical engineer's recommendations will not of itself be sufficient to prevent moisture infiltration.*** Confront the risk of moisture infiltration by including building-envelope or mold specialists on the design team. ***Geotechnical engineers are not building-envelope or mold specialists.***

GEOPROFESSIONAL BUSINESS ASSOCIATION

Telephone: 301/565-2733
e-mail: info@geoprofessional.org www.geoprofessional.org

REFERENCE BEARINGS:
The bearings shown hereon are based on the "Mississippi State Plane Coordinate System - East Zone - NAD 83" using GPS GCGC-RTN System accessed on August 11, 2025. (*) Represents the Basis of Bearings. Distances shown are U.S. Survey feet.

REFERENCE ELEVATIONS:
The elevations shown hereon are based on the "North American Vertical Datum of 1988 - NAVD 88" (Geoid 12b) using GPS GCGC-RTN System accessed on August 11, 2025.

LEGEND

ELEVATION OF TOP OF STRUCTURE	TOP = 18.00
ELEVATION OF BOTTOM OF STRUCTURE	INV. = 15.00
EXISTING SPOT ELEVATION	× 10.63
EXISTING DRAINAGE MANHOLE	Ⓓ
EXISTING SUBSURFACE DRAINAGE	=======
EXISTING REINFORCED CONCRETE PIPE	18" RCP
EXISTING CORRUGATED METAL PIPE	24" CMP
EXISTING POLYVINYL CHLORIDE PIPE	12" PVC
EXISTING HIGH DENSITY POLYETHYLENE PIPE	12" HDPE

SCALE: 1" = 50'
SCALE IN FEET

50 25 0 50 100 150

CERTIFICATION:
This is to certify to INTEGRITY FEDERAL SERVICES that this survey was done by me or under my direct supervision and control, that the survey was done on the ground and was done in accordance with the most recent Minimum Standards of Practice for Land Surveyors as set forth by the State of Mississippi, Board of Licensure for Professional Engineers and Surveyors and that the accuracy specification and positional tolerances are in accordance with Class "C" surveys indicated in the above standards. I also certify there are no visible encroachments across any property lines except as shown.

Michael P. Blanchard, PS, Reg. No. 2834

This survey plat is not valid without the raised or colored seal and signature of the Registered Land Surveyor.

NOTES:
1.) No attempt has been made by T. Baker Smith, LLC to verify title, actual legal ownership, deed restrictions, servitudes, easements, alleys, right-of-ways or other burdens on the property, other than that furnished by the client or his representative. There is no representation that all applicable servitudes and restrictions are shown hereon. The surveyor has made no title search or public record search in compiling the data for this survey.

2.) The words "Certify," "Certifies" or "Certification" as used herein is understood to be an expression of professional opinion by the surveyor, based upon his best knowledge, information, and belief, as such, it does not constitute a guarantee nor a warranty, expressed or implied.

FIELD BOOK: 28, PG 20

FIELD WORK COMPLETED ON: AUGUST 11, 2025

NO	DATE:	REV. DESCRIPTION:	BY:	CHK:	APP:
		REVISIONS			

T. BAKER SMITH
412 South Van Avenue
Houma, LA 70363
(985)868-1050 - tbsmith.com
MS Survey COA #: 117

JOB NO:	2025.1093.140
DRAWN BY:	JET
APPROVED BY:	WMV
DATE:	08/12/2025
SHEET NO:	1 OF 1

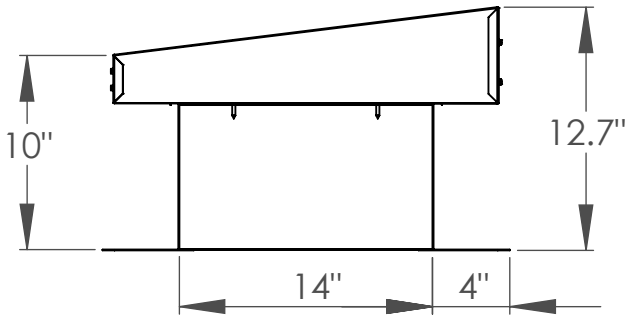
AS-BUILT SURVEY OF DRAINAGE STRUCTURES

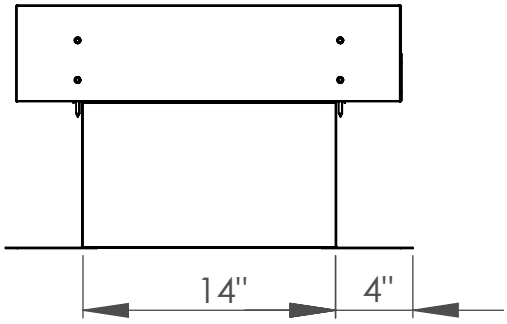
INTEGRITY FEDERAL SERVICES
VA CEMETERY
CITY OF BILOXI, SECOND JUDICIAL DISTICT
OF HARRISON COUNTY, MISSISSIPPI

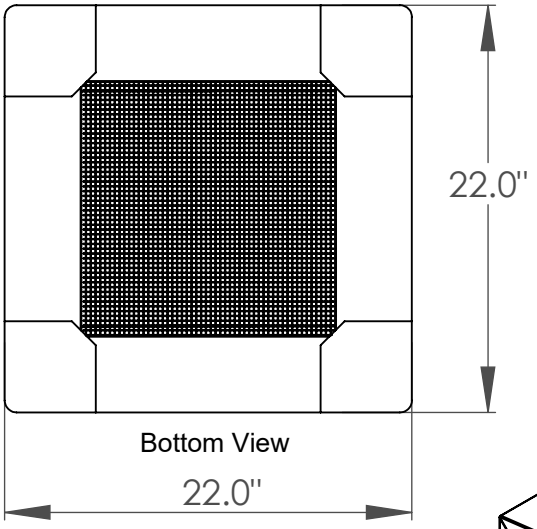
8/19/2025 - P:\Y-2025\2025.1093\SURVEY\CORE SURVEY\DRAWINGS\1140\2025.1093.140.DWG

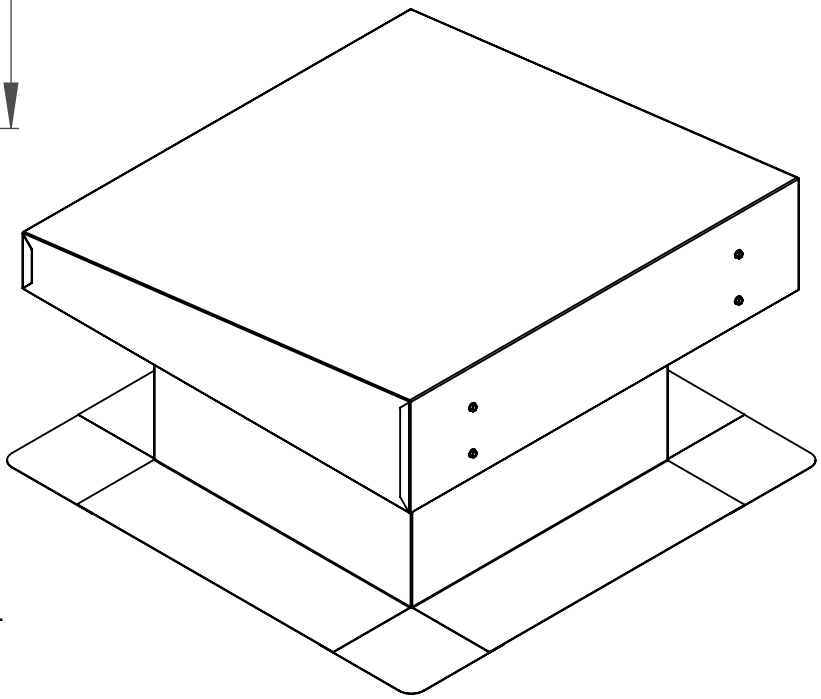
BUR Flat Top
14" x 14"

Part #	Size	Color
600-2142	14" x 14"	Galvanized









Features

- 1 full square foot of air flow (144 sq. in.).
- 8" water height.
- Full 4" flange.
- Low profile flat lid, sloped fpr water run off.
- Welded seams for high heat applications.
- Internal reinforcements provide great strength.
- 26 Gauge galvanized metal.
- Listed to CSA CAN 3 - A93 Standard.

Innovative Ideas Since 1978

DATE: 08/23/17
DRAWN BY: ZV
COMMENTS:
DO NOT SCALE DRAWING

Part title & J#

BUR Flat Top 14" x 14"

SIZE
A

19370 - 60th Ave., Surrey, BC V3S 3M2
Ph: 604-530-0712
Fax: 604-530-8482
www.menzies-metal.com

BUR (BUILT UP ROOF) FLAT TOP VENT
SHORT SPEC

Specification: Menzies Square BUR Flat Top Vent for flat roof application. Install as per manufacturer's written instructions (located on website). Manufactured by Menzies Metal Products (www.menzies-metal.com, 1-800-665-8840).

- 26 gauge galvanized steel
- Hotweld construction.
- Internal reinforcements
- 8" water height.
- 4" flange.
- Integral screening 1/4" hardware cloth.

19370 60th Avenue, Surrey, BC V3S 3M2
800-665-8840 sales@menzies-metal.com
www.menzies-metal.com

12042013

Material Safety Data Sheet

Section 1- PRODUCT IDENTIFICATION

Material	**ZINC COATED SHEET STEEL**		**WHMIS Class** D2A, D2B
Synonyms	Galvanized, Galvanneal, Galvalume, Galvalume Plus, Zincrometal		
Manufacturer			
Telephone No.	(604) 946 - 3890	**Material Use**	Manufacture of steel articles

Section 2 – HAZARDOUS INGREDIENTS

Hazardous Ingredients	Weight %	CAS No.	LD50	Exposure Limit (mg/m^3)
Steel:				
Iron (Fe)	~ 95	7439-89-6	30 g/kg (rat-oral)	5 (Fume)
Manganese (Mn)	≤ 1.65	7439-96-5	9 g/kg (rat-oral)	0.2
Chromium (Cr)	≤ 1.1	7440-47-3	U	0.5
Nickel (Ni)	≤ 0.12	7440-02-0	U	1.5

(Hazardous Ingredients – lists components which meet the reporting requirements of the Hazardous Products Act.)

Coating:

1.	Galvanized				
	Zinc (Zn)	99	7440-66-6	U	5 (Fume)
	(Z-coating. Coating weights range from 15 to 500 g/m^2 or up to 20% total steel weight)				
2.	Galvanneal				
	Zinc (Zn)	88	7440-66-6	U	5 (Fume)
	Iron (Fe)	11	7439-89-6	U	5 (Fume)
	(Annealed Z-coating. Coating weights range from 20 to 100 g/m^2 or up to 10% total steel weight)				
3.	Galvalume, Galvalume Plus				
	Aluminum (Al)	55	7429-90-5	U	10
	Zinc (Zn)	43	7440-66-6	U	5 (Fume)
	(AZ-coating. Coating weights range from 50 to 150 g/m^2 or up to 15% total steel)				

Surface Treatments:

(Constitutes less than 0.5% of total steel weight)

1. Passivation - Chromic acid solution leaving a chromium residual of 11 to 40mg/m^2 per side.
2. Slushing Oil - (Ferrocote 61 MAL HCL-1G, Ferrocote 61-AUS, PL-7105-A)
   Hydrotreated naphthenic oils or petroleum based lubricating oils containing sulphonates and anti-oxidants.
3. Vanishing Oil - (Rustilo DW 924) Mineral oil and isoparaffin petroleum distillate.
   Oil Coating weights range from1.1 to 5.4 g/m^2 per side.
4. Pre Temper - (Qwerl 266-LV) White petroleum mineral oil.
   Galvalume Plus – (Oakite PC4610) Acrylic coating of polystyrene-acrylate copolymers.

Note:

These products do not contain and are not manufactured with any Class I or Class II ozone depleting substances.
These products meet the Coalition of North Eastern governors' (CONEG) requirements for combined heavy metal content of less than 100 ppm.

Legend: ***U = Unknown*** ***NA = Not Applicable***

Material Safety Data Sheet

Material: ZINC COATED SHEET STEEL

Section 3 – PHYSICAL DATA

Silver Grey Metallic Solid
Boiling Pt. (°C) - N.A.
Melting Pt. (°C) - 1530
Specific Gravity - 7.5 to 8

Section 4 – FIRE AND EXPLOSION DATA

Non – Flammable. Will not support combustion

Section 5 – REACTIVITY DATA

Stable: Contact with strong mineral acids will release flammable hydrogen gas

Section 6 – TOXICOLOGICAL PROPERTIES

ROUTE OF ENTRY

None in its natural state. Operations such as welding, burning, grinding or machining may pose acute or chronic inhalation health effects. Skin or eye contact with coating oils may cause irritation with prolonged or repeated contact.

EFFECTS OF ACUTE EXPOSURE

None to sheet steel. Welding, burning, grinding or machining can generate metal particulate or elemental oxide fumes. Inhalation overexposure to manganese fume has been reported to cause "metal fume fever" characterized by fever and chills (i.e., flu-like symptoms). Such an overexposure is unlikely due to the small amount of manganese available. Fumes or mists of surface treatment oils may irritate the eyes and upper respiratory tract, and cause headache, dizziness and / or nausea if exposure is excessive.

EFFECTS OF CHRONIC EXPOSURE

None to sheet steel. Chronic inhalation overexposure to metal fume (i.e., iron oxide fume) may cause a benign pneumoconiosis (i.e., siderosis) with few or no symptoms. Repeated or prolonged contact to coating oils may cause skin irritation and dermatitis.

IRRITANCY		SYNERGISTIC MATERIALS
None	**Carcinogenicity-** Chromium and Nickel (See Additional Information) **Reproductive, Teratogenicity, Mutagenicity – no known effects**	U

Section 7 – PREVENTATIVE MEASURES

Dependent upon the process being performed on the sheet steel material.
Each operation must be addressed for suitable personal protective equipment required.
General ventilation is normally adequate. Welding requires local exhaust ventilation or fume filter respirator, gloves and eyeware. Avoid prolonged or repeated skin contact, launder oil-contaminated clothing. Use oil impervious gloves if required to prevent contact. Avoid eye contact with oil contaminated hands.

Section 8 – FIRST AID MEASURES

Eyes - Flush with water
Skin - Wash contact areas with soap and water
Inhalation - For overexposure to metal fume, remove person to fresh air. Seek medical attention.

ADDITIONAL INFORMATION

IARC lists certain hexavalent chromium compounds under its Group 1 - "Confirmed Human Carcinogen". IARC lists certain nickel compounds under its Group 2A - "Suspected Human Carcinogen". Welding fume may also contain contaminants from fluxes and / or other welding consumables. Oil coatings should be removed prior to welding or grinding to minimize smoke generation.

Section 9 – PREPARATION DATE

PREPARED BY	PHONE	DATE PREPARED
Cascadia Metals	(604) 946 - 3890	July 1, 2013

Legend: ***U = Unknown*** ***NA = Not Applicable***

STEEL ACIER

REFER TO MATERIAL SAFETY DATA SHEET

CONSULTER LA FICHE SIGNALETIQUE

Overexposure to dusts or fumes generated during welding or burning steels, particularly those containing chromium or nickel, may cause respiratory disease.

High exposure to fumes during welding or burning of zinc coated products can cause reversible short-term flu-like symptoms.

Prolonged skin contact with coated steel may cause skin irritation in sensitive individuals.

LIMIT inhalation of dusts or fumes generated during processing.

LIMIT skin contact.

Overexposure to metal fumes: Move to fresh air. Seek medical attention if necessary
Skin contact: Wash with soap and water.

Read the relevant Material Safety Data Sheet for more information

La surexposition aux poussieres ou aux fumees generees lors du soudage, surtout des aciers contentant du chrome ou du nickel, pourrait provoquer des maladies respiratoires.

Une exposition intensive aux fumees lors du soudage des produits revetus de zinc pourrait provoquer a court terme des symptomes reversibles de grippe.
Le contact avec la peau et les aciers revetus pourrait provoquer une irritation de la peau chez certains individus.

LIMITER L'inhalation des poussieres ou des fumees generees pendant la transformation.

LIMITER Le contact avec la peau
Si l'individu est surexpose aux fumees venant des metaux, emmenez la personne pour qu'elle puisse avoir de l'air frais. Demandez des soins medicaux si necessaire.
S'il y a contact avec la peau, lavez la peau a l'eau et au savon.

Veuillez consulter la fiche signaletique pertinente pour plus de renseignements.

Cascadia Metals
7630 Berg Road
Delta, British Columbia V4G 1G4
(604) 946 - 3890
(800) 738 - 9677

BL520DD

Blast Resistant Stationary Louver

Extruded Aluminum

RUSKIN
AUTHORITY IN AIR CONTROL

APPLICATION

The BL520DD is a 5" deep mechanically fastened, extruded aluminum double drainable stationary horizontal louver designed to protect air intake and exhaust openings in exterior walls. This louver offers exceptional protection against wind-driven rain under the most severe conditions. This louver is designed with a drainable gutter system channeling water from the blades to downspouts in the jambs, where water is exhausted out of the front of the louver.

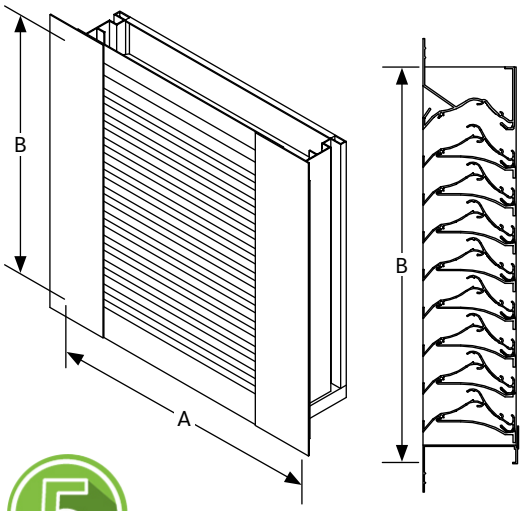
STANDARD CONSTRUCTION

Frame	5" (127) deep, 6063T6 extruded aluminum with .081" (2.1) nominal wall thickness.
Blades	6063T6 extruded aluminum .063" (1.6) nominal wall thickness.
Screen	5/8" x .040" (16 x 1) expanded flattened aluminum bird screen in removable frame. Screen adds approximately 1/2" (13) to louver depth.
Finish	Mill.
Minimum Size	12"w x 12"h (305 x 305).
Approximate Shipping Weight	7 lbs. per sq. ft. (34.2 kg/m^2)
Maximum Factory Assembly Size	Single sections shall not exceed 60"w x 120"h (1524 x 3048). Louvers larger than the maximum single section size will require field assembly of smaller sections. **Field Assembly:** Unlimited width x 120"h (3048). Multiple section louvers will be shipped in single sections and must be joined together in the field by the installer. Section joint splice hardware is provided. **Sections may not be stacked in height.** Openings taller than the maximum louver height will need to be divided into multiple openings with suitable structural members. Structural members are not designed or provided by Ruskin.
Installation	The BL520DD must be installed per the appropriate Installation Detail. Reference the appropriate separate Installation Instruction Sheet.
Supports	Louvers may be provided with rear mounted blade supports that increase overall louver depth depending on louver size, ssembly configuration, windload or blastload.

Consult Ruskin for additional information.

FEATURES

- Withstands up to 16.6 psi peak pressure and repeatedly at 11.5 psi peak pressure and an impulse of 95 psi-ms
- Closely spaced horizontal blades minimize the penetration of wind-driven rain, reducing damage and additional operating expenses
- Tested in the AMCA 500-L Wind-Driven Rain Penetration Test
- 39% Free Area
- Excellent pressure drop performance
- Aluminum construction for low maintenance and high resistance to corrosion



5 YEAR LIMITED WARRANTY

ISO9001 CERTIFIED

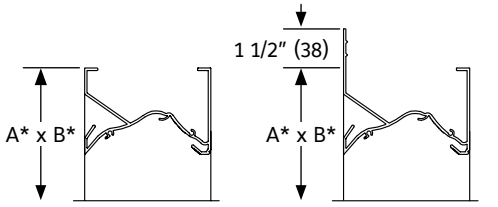
TYPICAL BLAST REQUIREMENTS	
Pressure	**Impulse**
4 psi	28 psi-ms
6 psi	42 psi-ms
8 psi	59 psi-ms
10 psi	90 psi-ms

VARIATIONS

- Front or rear security bars
- A variety of bird and insect screens
- Selection of finishes: prime coat, 50% PVDF (modified fluoropolymer), epoxy, Pearledize 50 & 70, 70% PVDF, clear and color anodize. (Some variation in anodize color consistency is possible)

Consult Ruskin for other special requirements.

FRAME CONSTRUCTION



STANDARD INTEGRAL FLANGE

NOTES:
- Dimensions in inches, parenthesis ( ) indicate millimeters.
- Units furnished 1/4" (6) smaller than given opening dimensions.

FREE AREA GUIDE

Free Area Guide shows free area in ft² and m² for various sizes of BL520DD.

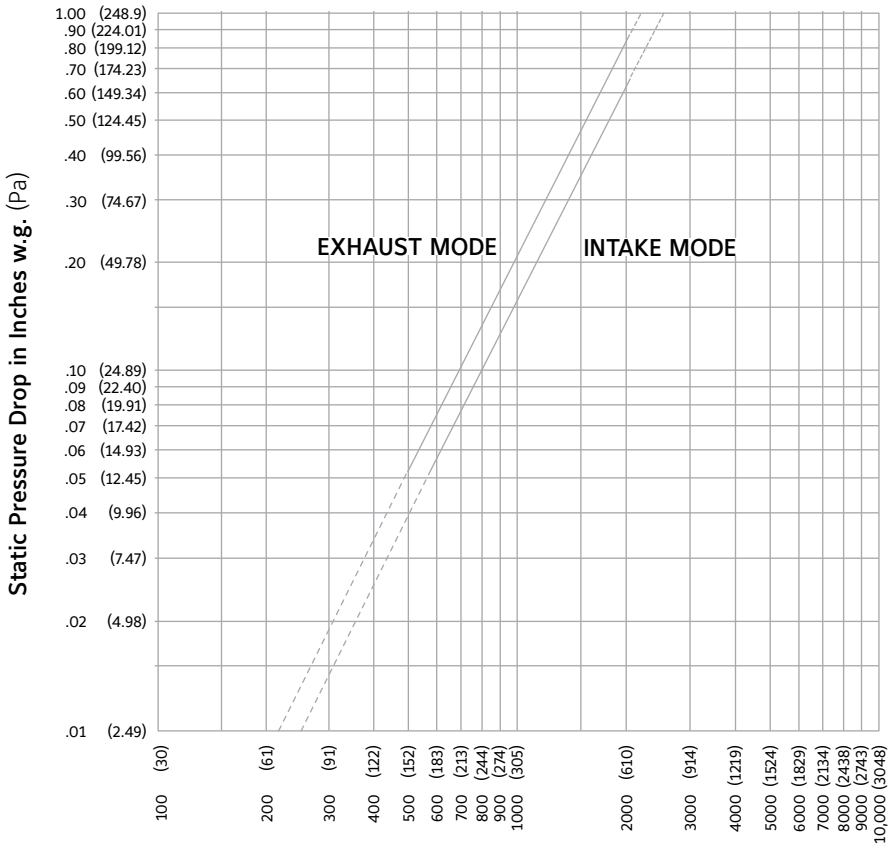
Width – Inches and Meters

Height – Inches and Meters

	12 0.30	**18** 0.45	**24** 0.60	**30** 0.75	**36** 0.90	**42** 1.05	**48** 1.20
18 0.45	**0.49** 0.05	**0.79** 0.07	**1.09** 0.10	**1.40** 0.13	**1.70** 0.16	**2.00** 0.19	**2.31** 0.21
24 0.60	**0.70** 0.06	**1.13** 0.10	**1.56** 0.15	**2.00** 0.19	**2.43** 0.23	**2.86** 0.27	**3.30** 0.31
30 0.75	**0.90** 0.10	**1.47** 0.16	**2.03** 0.22	**2.60** 0.27	**3.16** 0.33	**3.72** 0.39	**4.29** 0.45
36 0.90	**1.11** 0.10	**1.81** 0.17	**2.50** 0.23	**3.20** 0.30	**3.89** 0.36	**4.58** 0.43	**5.28** 0.49
42 1.05	**1.32** 0.12	**2.15** 0.20	**2.97** 0.28	**3.79** 0.35	**4.62** 0.43	**5.44** 0.51	**6.27** 0.58
48 1.20	**1.60** 0.15	**2.60** 0.24	**3.60** 0.33	**4.59** 0.43	**5.59** 0.52	**6.59** 0.61	**7.59** 0.71
54 1.35	**1.81** 0.17	**2.94** 0.27	**4.07** 0.38	**5.19** 0.48	**6.32** 0.59	**7.45** 0.69	**8.58** 0.80
60 1.50	**2.02** 0.19	**3.28** 0.30	**4.54** 0.42	**5.79** 0.54	**7.05** 0.66	**8.31** 0.77	**9.57** 0.89
66 1.65	**2.23** 0.21	**3.62** 0.34	**5.00** 0.47	**6.39** 0.59	**7.78** 0.72	**9.17** 0.85	**10.56** 1.98
72 1.80	**2.44** 0.23	**3.96** 0.37	**5.47** 0.51	**6.99** 0.65	**8.51** 0.79	**10.03** 0.93	**11.55** 1.07
78 1.95	**2.72** 0.25	**4.41** 0.41	**6.10** 0.57	**7.79** 0.72	**9.49** 0.88	**11.18** 1.04	**12.87** 1.20
84 2.10	**2.92** 0.27	**4.75** 0.44	**6.57** 0.61	**8.39** 0.78	**10.22** 0.95	**12.04** 1.12	**13.86** 1.29
90 2.25	**3.13** 0.29	**5.09** 0.47	**7.04** 0.65	**8.99** 0.84	**10.95** 1.02	**12.90** 1.20	**14.85** 1.38
96 2.40	**3.34** 0.31	**5.43** 0.50	**7.51** 0.70	**9.59** 0.89	**11.68** 1.09	**13.76** 1.28	**15.84** 1.47

PRESSURE DROP

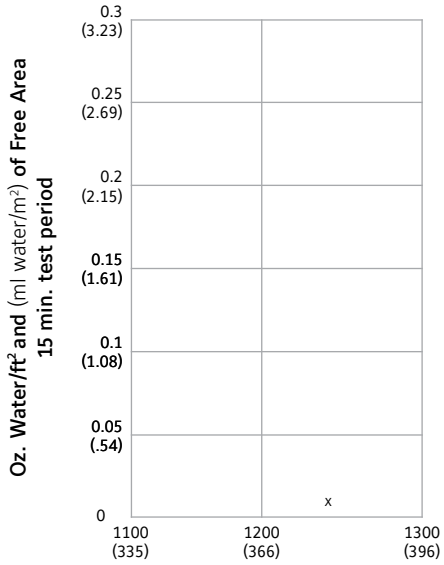
Pressure Drop Testing Performed 48″ x 48″ (1219 x 1219) unit.



Rating do not include the effect of a bird screen.

WATER PENETRATION GRAPH

Test size 48″ wide X 48″ high (1219 X 1219)
Beginning point of water penetration at .01 oz./sq. ft. is above 1250 fpm (381 m/min).



WIND-DRIVEN RAIN PERFORMANCE

Test size is 1m x 1m (39" x 39") core area, 1.04m x 1.12m (41" x 44") nominal. Free Area of test louver is 5.45 ft² (.51m²).

29 mph (47 kph) wind & 3" (76) per hour rain conditions				
Core Velocity[1] fpm (m/s)	Airflow cfm (m³/min)	Free Area Velocity[2] fpm (m/sec.)	Effectiveness Ratio	Class[3]
0 (0)	0 (0)	0 (0)	99.9%	A
98 (.5)	1060 (30)	226 (1.1)	99.9%	A
197 (1.0)	2119 (60)	389 (2.0)	99.9%	A
287 (1.5)	3179 (90)	583 (3.0)	99.9%	A
381 (1.9)	4239 (120)	778 (4.0)	99.9%	A
476 (2.4)	5299 (150)	972 (4.9)	99.9%	A
586 (3.0)	6358 (180)	1167 (5.9)	99.8%	A
673 (3.4)	7418 (210)	1361 (6.9)	99.7%	A
763 (3.9)	8478 (240)	1556 (7.9)	98.9%	B
882 (4.5)	9537 (270)	1750 (8.9)	97.3%	B
987 (5.0)	10597 (300)	1944 (9.9)	95.3%	B

50 mph (80 kph) wind & 8" (203) per hour rain conditions				
Core Velocity[1] fpm (m/s)	Airflow cfm (m³/min)	Free Area Velocity[2] fpm (m/sec.)	Effectiveness Ratio	Class[3]
0 (0)	0 (0)	0 (0)	99.4%	A
106 (.5)	1060 (30)	226 (1.1)	99.3%	A
184 (.9)	2119 (60)	389 (2.0)	99.2%	A
282 (1.4)	3179 (90)	583 (3.0)	99.0%	A
408 (1.9)	4239 (120)	778 (4.0)	99.0%	A
495 (2.5)	5299 (150)	972 (4.9)	98.9%	B
567 (2.9)	6358 (180)	1167 (5.9)	98.9%	B
680 (3.5)	7418 (210)	1361 (6.9)	98.3%	B
791 (4.0)	8478 (240)	1556 (7.9)	97.2%	B
882 (4.5)	9537 (270)	1750 (8.9)	95.1%	B
982 (5.0)	10597 (300)	1944 (9.9)	23.9%	D

NOTES:

1. Core area is the open area of the louver face (face area less lover frames). Core Velocity is the airflow velocity through the Core Area of the louver (1m x 1m).
2. Free Area of test size is calculated per AMCA standard 500-L.
3. Wind Driven Rain Penetration Classes:

Class	Effectiveness
A	1 to .99
B	0.989 to 0.95
C	0.949 to 0.80
D	Below 0.8

4. Intake Discharge Loss Class 2
   Discharge Loss Coefficient is calculated by dividing a louvers' actual airflow rate vs. a theoretical airflow for the opening. It provides an indication of the louvers' airflow characteristics.

Discharge Loss Classes:

Class	Discharge Loss Coefficient
1	0.4 and above
2	0.3 to 0.399
3	0.2 to 0.299
4	0.199 and below

(The higher the coefficient, the less resistance to airflow.)

5. The AMCA Wind Driven Rain Test is performed in a laboratory environment and incorporates controlled wind, water and system airflow effects. In actual field installations, storms may create conditions not considered by the AMCA test. Penthouse and similar applications where wind can pass through multiple louvers in an enclosure is another condition that is not simulated by AMCA tests. These applications can create elevated water penetration rates through any louver. Because of these uncontrolled situations, it is recommended that provisions to manage water penetration through louvers be included in the building design.

SUGGESTED SPECIFICATION

Furnish and install louvers as hereinafter specified where shown on plans or as described in schedules. Louvers shall be stationary drainable type with drain gutters in each blade and downspouts in jambs and mullions. Louvers shall have a minimum of 47% free area based on a 48" wide x 48" high (1219 x 1219) size. Stationary drainable blades shall be contained within a 5" (127) frame. Louver components (heads, jambs, sills, blades, & mullions) shall be factory assembled by the louver manufacturer. Louver sizes too large for shipping shall be built up by the contractor from factory assembled louver sections to provide overall sizes required. Louver design shall limit span between visible mullions to 10 feet (3) and shall incorporate structural supports required to withstand a windload of 30 lbs. per sq. ft. (1.44KPa) (equivalent of a 110 mph wind [177 KPH] wind–specifier may substitute any loading required).

Louvers shall be Ruskin model BL520DD extruded 6063T6 aluminum construction as follows:

Frame: 5" (127) deep, .094" (2.4) wall thickness.

Blades: .080" (2.0) nominal wall thickness.

Screen: 5/8" x .040" (16 x 1) expanded, flattened aluminum bird screen in removable frame. Screen adds approximately 1/2" (13) to louver depth.

Finish: Select finish specification from Ruskin/Valspar Finishes Brochure.

LINKS TO IMPORTANT DOCUMENTS

Document Title
Paint Finishes and Color Guide
Limited Warranty Document

RUSKIN®
AUTHORITY IN AIR CONTROL

3900 Doctor Greaves Road
Grandview, MO 64030
Website: www.ruskin.com
Phone: (816) 761-7476

INTERIOR FINISHES PRESENTATION
Final Construction Documents
Biloxi NC Gravesite Expansion FCA Deficiencies

Project Number 832CM3036 (VA) / 339531001 (Alesia)

VA | U.S. Department of Veterans Affairs

JANUARY 23 2026

ALESIA ARCHITECTURE

Interior Paint Finishes:

ALESIA ARCHITECTURE

FINISHES BASIS OF DESIGN- All finishes selected are to match the existing Biloxi campus finishes.

Sherwin Williams – Promar 200 Zero VOC, SW 7014 Eider White

P1 Standard Wall pain / **SC1** (Special Coating) Wall Paint

Sherwin Williams – Promar 200 Zero VOC, SW 9139 Debonair

P4.

Sherwin Williams SW 7675 Sealskin

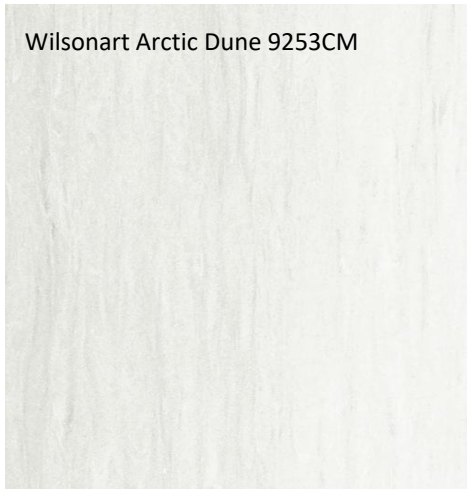
HMD1. Door paint. **HMF1**. Door frame.

FINISHES BASIS OF DESIGN- All finishes selected are to match the existing Biloxi campus finishes.

Laminate:

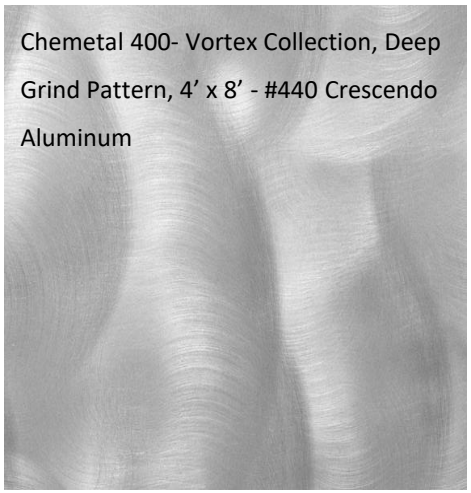
PLAM1. Vertical Surface

Solid Surface:



SS1. Countertops

Hardware:



MTL-1.

ALESIA ARCHITECTURE

FINISHES BASIS OF DESIGN- All finishes selected are to match the existing Biloxi campus finishes.

Wall Base:

Roppe - Pinnacle Rubber Base Standard 5/8” Toe - 193 Black Brown. Size – 4”.

RB1. Wall Base.

Stair Treads:

Tarkett – Angle Fit Rubber Stair Tread with Integrated Rise, 48 Grey WG, Hammered Texture

RF2. Stair treads.

Trim:

Roppe - #67 Adapter and transition or equal, 40CR2P193. Sized to fit application

TR3. Trim, rubber**.**

ALESIA ARCHITECTURE

FINISHES BASIS OF DESIGN- All finishes selected are to match the existing Biloxi campus finishes.

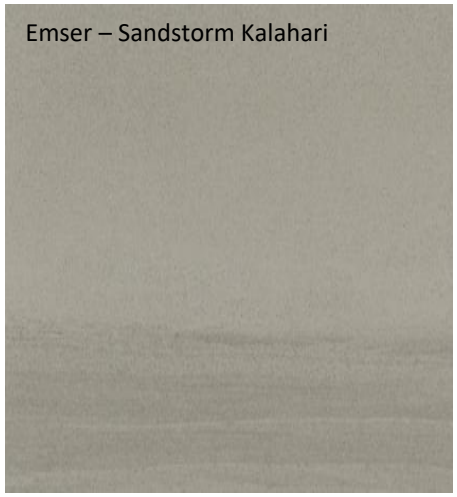
Doors:

ST-1

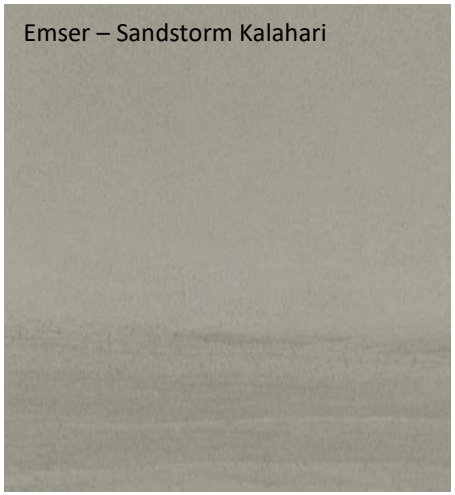
ALESIA ARCHITECTURE

FINISHES BASIS OF DESIGN- All finishes selected are to match the existing Biloxi campus finishes.

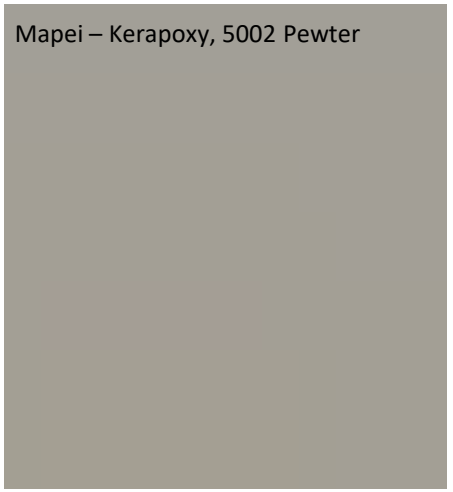
Ceramic/Porcelain Tiling:



PT1. Mosaic (12X24)



PT2. Wall used in shower Mosaic (12X24)



GT1. Grout

ALESIA ARCHITECTURE

FINISHES BASIS OF DESIGN- All finishes selected are to match the existing Biloxi campus finishes.

Flooring:

- Floor pattern to be installed as graphically indicated on finish plan. Refer to finish plans for finish patterns and locations.

LVT1. Luxury Vinyl Tile.